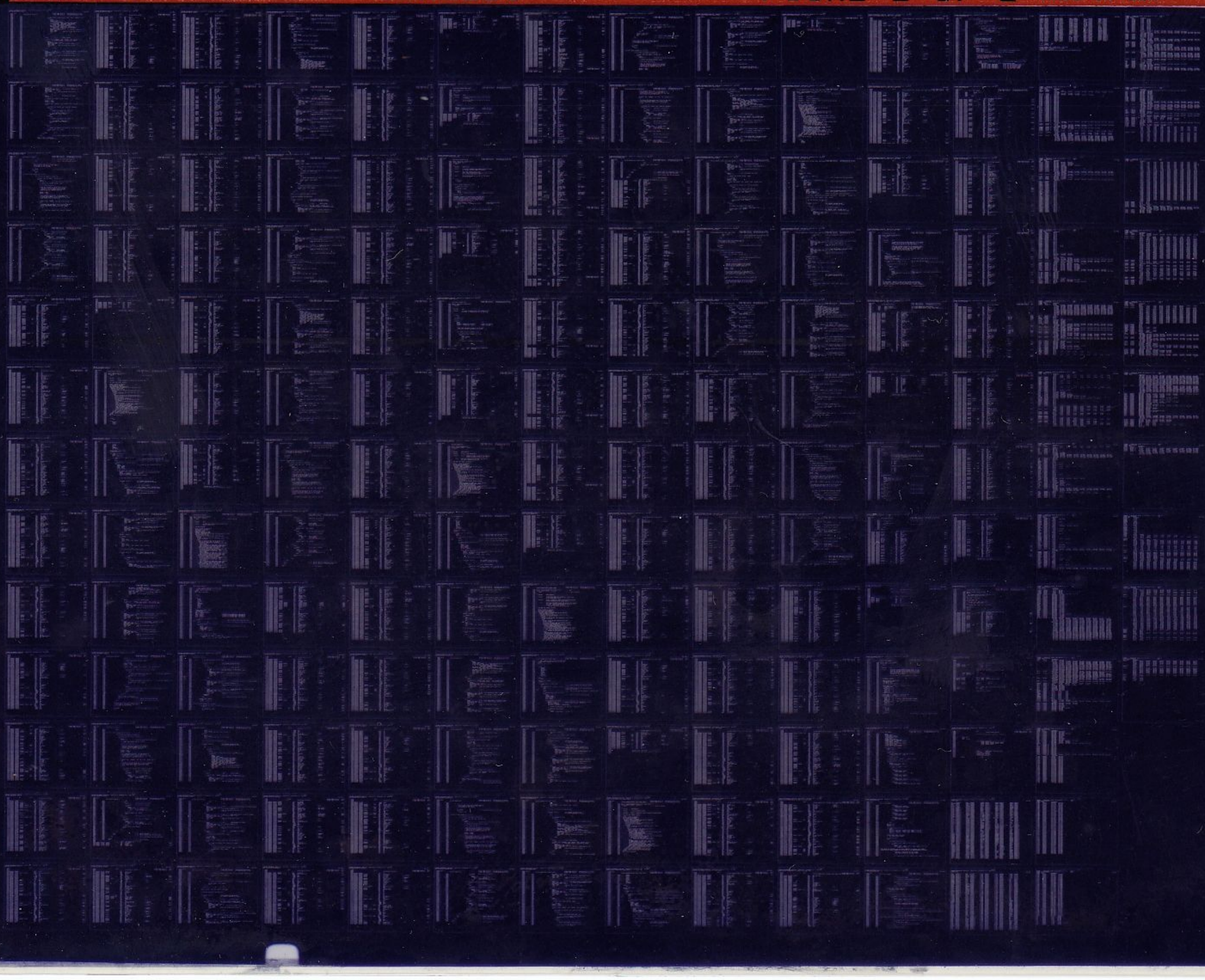
ML11

PERF EXERCISER
CZMLBBO

AH-S430B-MC
FICHE 1 OF 2

ML11 PERF EXERCISER
CZMLBBO

AH-S430B-MC
FICHE 2 OF 2



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IDENTIFICATION

PRODUCT CODE: AC-S428B-MC

PRODUCT NAME: CZMLBB0 ML11 PERFORMANCE EXERCISER

PRODUCT DATE: 19-MAR-82

MAINTAINER: MEMORY DIAGNOSTICS ENGINEERING

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE ML11 PERFORMANCE EXERCISER IS A BLISS PROGRAM WHICH RUNS UNDER THE PDP-11 DIAGNOSTIC SUPERVISOR AND WHICH EXERCISES UP TO 8 ML11 UNITS ON A SINGLE RH CONTROLLER. AN ML11 UNIT IS A FAST, RANDOM ACCESS, BLOCK MODE MOS MEMORY SYSTEM WITH ECC CAPABILITY. IT IS MADE UP OF 3 CONTROL MODULES AND UP TO 16 ARRAY MODULES. IT IS A MASSBUS DEVICE, AND AS SUCH, CONFORMS TO MASSBUS STANDARDS.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

1. PDP-11 WITH 28K WORDS OF MEMORY
2. CONSOLE TERMINAL
3. RH11 OR RH70 CONTROLLER
4. 1 TO 8 ML11A OR ML11B DRIVES
5. XXDP+ LOAD MEDIA

1.3 RELATED DOCUMENTS AND STANDARDS

THE HARDWARE DESIGN IS EXPECTED TO CONFORM TO THE STANDARDS SET FORTH IN THE MASSBUS SPECIFICATION (DEC STANDARD 159).

THE FOLLOWING DOCUMENTATION MAY PROVE USEFUL IN LEARNING MORE ABOUT THE ML11:

1. ML11 ENGINEERING SPECIFICATION
2. RWS04 FIXED-HEAD DISK SUBSYSTEM USER'S MANUAL
3. THE ML11 PERFORMANCE EXERCISER'S PROGRAM LISTING
4. THE ML11 LOGIC TEST'S SPECIFICATIONS AND LISTINGS
5. ML11 PROJECT PLAN
6. XXDP+ USER'S MANUAL (CHQUS)
7. PDP-11 DIAGNOSTIC SUPERVISOR DOCUMENTATION (SUPINT, SUPFUN,

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

ML11 SUBSYSTEM FAULTS WILL BE DETECTED BUT NOT ISOLATED, SINCE OTHER DIAGNOSTICS WILL BE AVAILABLE FOR TROUBLESHOOTING THE EXACT CAUSE OF

FAILURE. A LIST OF AVAILABLE DIAGNOSTIC TOOLS IS INCLUDED IN APPENDIX A OF THE ML11 FUNCTIONAL SPECIFICATION.

1.5 ASSUMPTIONS

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A VERY BRIEF DESCRIPTION OF THOSE PARTS OF THE DIAGNOSTIC RUNTIME SERVICES OF THE PDP-11 DIAGNOSTIC SUPERVISOR WHICH ARE APPLICABLE FOR THIS EXERCISER. CONSULT THE XXDP+ USER'S MANUAL (CHQUS) FOR MORE DETAILS.

2.1 COMMANDS

THE FOLLOWING IS A LIST OF THE 11 COMMANDS AVAILABLE TO THE DRS. ANY COMMAND IS RECOGNIZED BY ITS FIRST 3 CHARACTERS, AND MANY COMMANDS MAY BE MODIFIED BY OPTIONAL SWITCHES WHICH ARE DESCRIBED IN THE NEXT SECTION.

DRS COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO THE XXDP+ MONITOR
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME)
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

2.2 SWITCHES

SWITCHES ARE USED TO MODIFY PROGRAM OPERATION, AND ARE APPENDED TO COMMANDS. THE SWITCHES WHICH HAVE MEANING FOR THIS EXERCISER AND INFORMATION ABOUT THEIR USE ARE GIVEN IN THE FOLLOWING TWO TABLES.

SWITCH	EFFECT
/PASS:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS (SEE SECTION 2.3)
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY

DDDDD PASSES ONLY (DDDDD = 1 TO 64000).

/UNITS:LIST TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE: /UNITS:0:3:5-7 USE UNITS 0,3,5,6,7 (UNIT NUMBERS = 0-7)

EXAMPLE OF SWITCH USAGE:

START/PASS:1000/EOP:100

THE EFFECT OF THIS COMMAND WILL BE:

1. ALL UNITS WILL BE TESTED 1000 TIM
2. THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY.

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	PASS	FLAGS	EOP	UNITS
START	X	X	X	X
RESTART	X	X	X	X
CONTINUE	X	X	X	
PROCEED		X		
DROP				X
ADD				X
PRINT				
DISPLAY				X
FLAGS				
ZFLAGS				
EXIT				

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATION PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS. THEY REMAIN SET OF CLEARED AS SPECIFED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO DRS COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBE*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)

IXE*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
BOE	"BELL" ON ERROR
ISR	INHIBIT STATISTICAL REPORTS
IDU	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE

* ERROR MESSAGES ARE DESCRIBED IN SECTION 4.7

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. MORE THAN ONE FLAG MAY BE SPECIFIED WITH THE /FLAGS SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

/FLAGS:LOE:IER:BOE

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE DIAGNOSTIC RUNTIME SERVICES PROMPTS THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?". YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN PRELOADED USING THE SETUP UTILITY (SEE CHAP. 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y" THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT:

2.4.1 QUESTIONS AND ANSWERS

1. CSR ADDRESS (172000) 0?

   ANSWER: THE CSR ADDRESS OF THE RH CONTROLLER (OCTAL, DEFAULT 172000).

2. INTERRUPT VECTOR (204) 0?

   ANSWER: THE INTERRUPT VECTOR ADDRESS (OCTAL, DEFAULT 204).

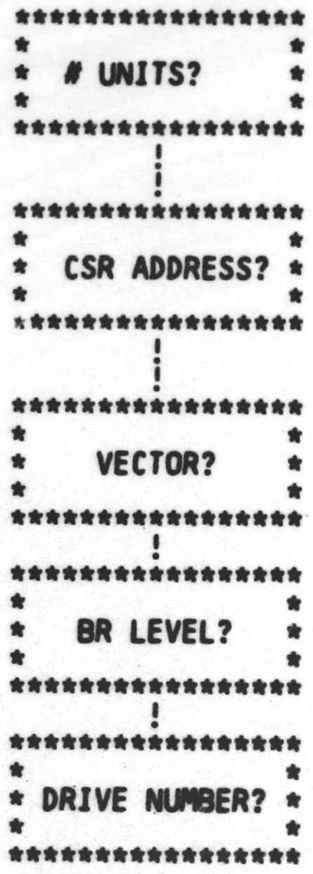
3. BR LEVEL FOR INTERRUPT (5) 0?

   ANSWER: THE BUS REQUEST LEVEL FOR INTERRUPT (OCTAL, DEFAULT 5).

4. DRIVE NUMBER (0) 0?

   ANSWER: THE PHYSICAL DRIVE NUMBER(S) OF THE DRIVE(S) TO BE TESTED (OCTAL, {0-7}, DEFAULT 0).

2.4.2 SUMMARY OF HARDWARE QUESTION SEQUENCE



2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS, OR AFTER A RESTART OR OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?" IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED IN THE NEXT PARAGRAPH(S).

INCLUDED IN THIS SECTION ARE QUESTIONS ABOUT PARAMETERS WHICH AFFECT PROGRAM OPERATION. REQUESTS FOR SOFTWARE OPTIONS SHOULD BE DISCUSSED AND INCORPORATED INTO THIS SPECIFICATION AS SOON AS POSSIBLE, AND CERTAINLY BEFORE SIGNOFF TIME.

IF A ^Z (CONTROL-Z) IS TYPED AS THE ANSWER TO ANY QUESTION, THE PROGRAM WILL START TO EXECUTE.

IF A ^C (CONTROL-C) IS TYPED AT ANY TIME, CONTROL WILL RETURN TO THE DIAGNOSTIC SUPERVISOR.

2.5.1 QUESTIONS AND ANSWERS

1. LIMIT RANGE OF SECTORS TO BE TESTED (N) L?

   ANSWER: TO TEST ONLY A CERTAIN RANGE OF SECTORS INSTEAD OF AN ENTIRE UNIT. ALTHOUGH THIS QUESTION IS NOT OPTIONAL, IT SHOULD BE ANSWERED 'NO' UNLESS THE ANSWER TO THE HARDWARE QUESTION "# UNITS ?" WAS 1.
   (LOGICAL, {Y TO TEST PARTIAL UNIT, N FOR ENTIRE UNIT}, DEFAULT N).

THE QUESTIONS WHICH FOLLOW ARE OPTIONAL, AND DEPEND ON AN AFFIRMATIVE ANSWER TO THE PREVIOUS QUESTION:

2. DO YOU KNOW THE EXACT RANGE OF SECTORS TO BE TESTED (N) L?

   ANSWER: THIS DECIDES WHETHER TO ASK FOR SECTOR NUMBERS OR BOARD NUMBER.

THE NEXT TWO QUESTIONS WILL BE ASKED ONLY IF QUESTION 2 IS ANSWERED YES:

3. FIRST SECTOR TO TEST (0) O?

   ANSWER: THE SECTOR NUMBER WHERE TESTING BEGINS
   (OCTAL, {0-7777 FOR ML11A, 0-37777 FOR ML11B},
   DEFAULT 0).

4. LAST SECTOR TO TEST (LAST) O?

   ANSWER: THE LAST SECTOR NUMBER TO BE TESTED
   (OCTAL, {0-7777 FOR ML11A, 0-37777 FOR ML11B},
   DEFAULT 37777).

THE NEXT QUESTION WILL BE ASKED ONLY IF QUESTION 2 IS ANSWERED NO:

5. WHICH BOARD {1-16} SHOULD BE TESTED (1) D?

   ANSWER: THE NUMBER OF THE ONLY BOARD TO BE TESTED
   (DECIMAL, {1-16}, DEFAULT 1).

6. THE PROGRAM OPTIONS INCLUDE:

   1. ADDRESS CHECK
   2. PATTERN TEST

3. UNIQUE DATA CHECK

4. MARCH TEST

5. RANDOMNESS TESTS

DO YOU WANT TO DROP ANY OF THESE FROM THE EXERCISER (N) L?

ANSWER: THIS DECIDES WHETHER TO ASK FOR OPTION NUMBERS.
(LOGICAL, {Y FOR PARTIAL EXERCISER, N FOR COMPLETE EXERCISER}, DEFAULT N).

THE FOLLOWING SET OF QUESTIONS WILL BE ASKED ONLY IF QUESTION 6 IS ANSWERED YES:

7. DROP OPTION 1 (N) L?

8. DROP OPTION 2 (N) L?

9. DROP OPTION 3 (N) L?

10. DROP OPTION 4 (N) L?

11. DROP OPTION 5 (N) L?

12. ENABLE REFRESH MARGINING (N) L?

ANSWER: NORMAL OPERATION IS WITHOUT REFRESH MARGINING.
(LOGICAL, {Y TO ENABLE, N TO DISABLE}, DEFAULT N).

13. DISABLE ERROR CORRECTION (N) L?

ANSWER: NORMAL OPERATION IS WITH ECC ENABLED.
(LOGICAL, {Y TO DISABLE, N TO ENABLE}, DEFAULT N).

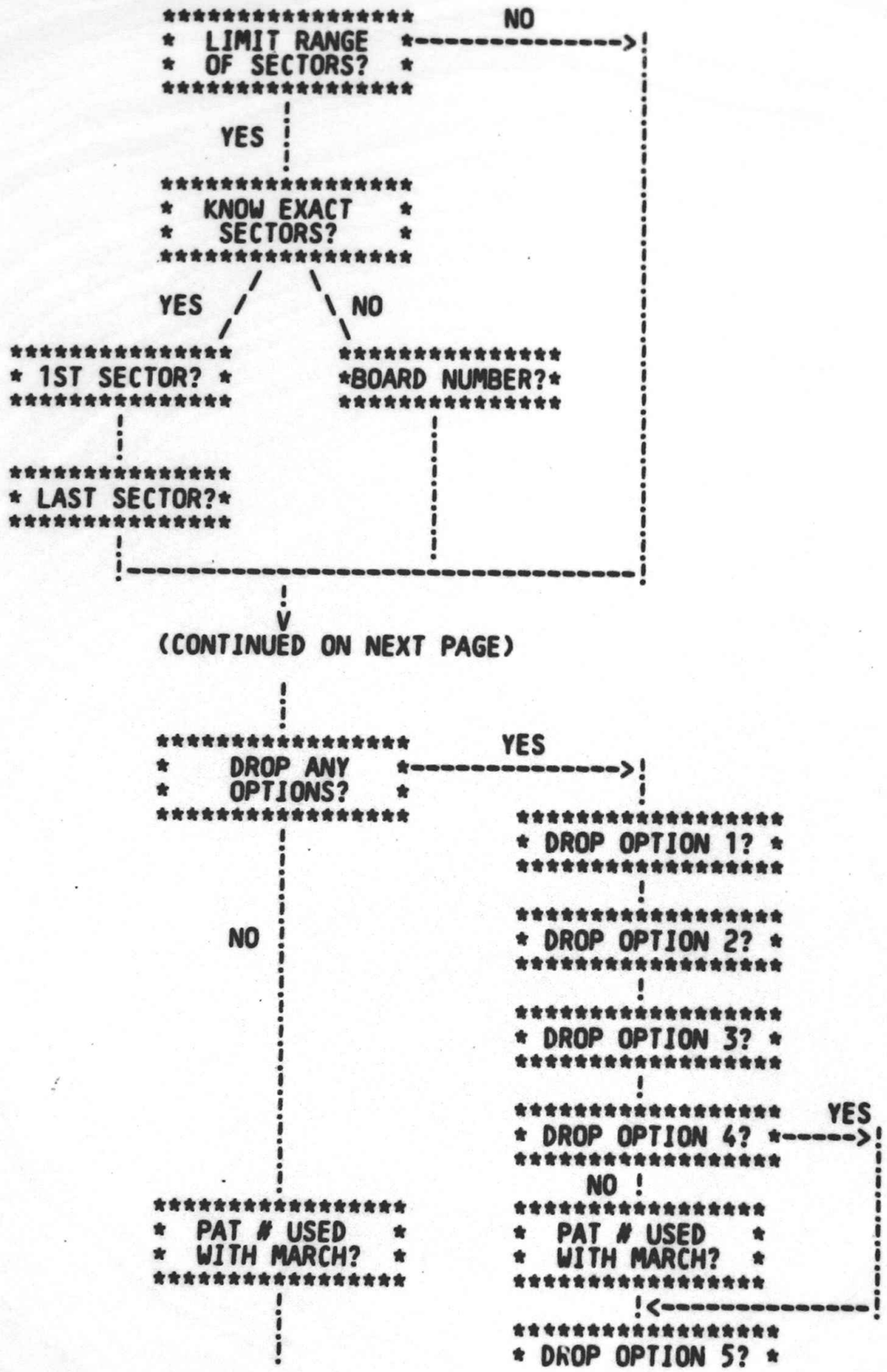
14. ENABLE END OF PASS SUMMARY PRINTOUT (N) L?

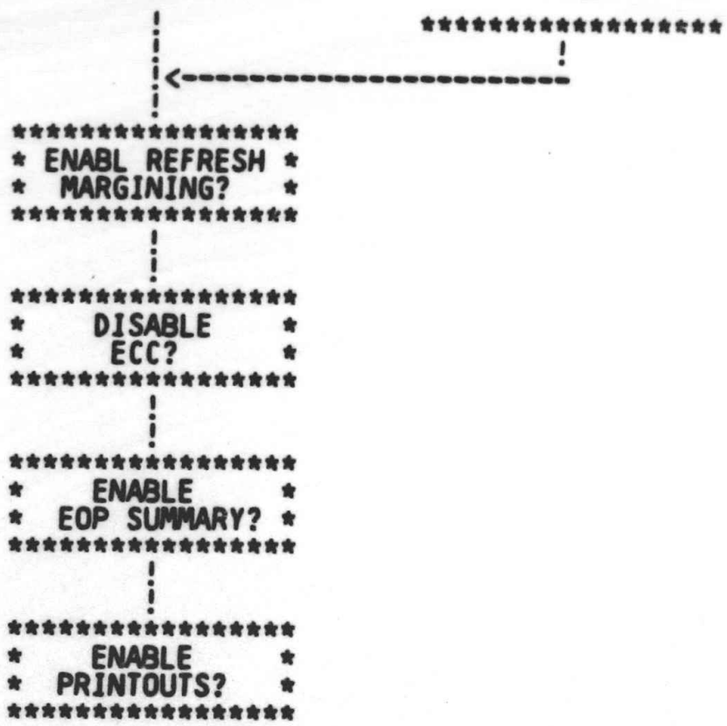
ANSWER: NORMAL OPERATION IS WITHOUT END OF PASS SUMMARY PRINTOUT.
(LOGICAL, {Y TO ENABLE, N TO DISABLE PRINTOUT}, DEFAULT N).

15. ENABLE ERROR PRINTOUTS (N) L?

ANSWER: NORMAL OPERATION IS WITHOUT ERROR PRINTOUTS.
(LOGICAL, {Y TO ENABLE, N TO DISABLE PRINTOUT}, DEFAULT N).

2.5.2 SUMMARY OF SOFTWARE QUESTION SEQUENCE


LIMIT RANGE OF SECTORS?
NO
YES
KNOW EXACT SECTORS?
YES
NO
1ST SECTOR?
LAST SECTOR?
BOARD NUMBER?
(CONTINUED ON NEXT PAGE)
DROP ANY OPTIONS?
YES
NO
DROP OPTION 1?
DROP OPTION 2?
DROP OPTION 3?
DROP OPTION 4?
YES
NO
DROP OPTION 5?
PAT # USED WITH MARCH?
PAT # USED WITH MARCH?



2.6 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE, SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THE DIALOGUE BECOMES TEDIOUS BECAUSE MOST OF THE ANSWERS ARE REPETITIOUS.

SUPPOSE YOU ARE TESTING A HYPOTHETICAL DEVICE, THE XY11 WHICH IS MADE UP OF ONE CONTROL MODULE WITH 8 UNITS (SUB-DEVICES). THESE 8 UNITS, NUMBERED 0 THROUGH 7, HAVE JUST ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS, CALLED THE Q-FACTOR.

THE 3 EXAMPLES WHICH FOLLOW SHOW DIFFERENT WAYS OF ANSWERING THE HARDWARE QUESTIONS TO ACHIEVE IDENTICAL RESULTS. IN EACH EXAMPLE, THERE ARE TO BE 8 XY11'S TESTED WHICH HAVE THE FOLLOWING Q-FACTORS:

UNIT #	Q-FACTOR
0	0
1	1
2	0
3	0
4	0
5	0
6	1
7	1

EXAMPLE 1: ANSWER SEPARATELY FOR EACH UNIT

```
# UNITS (D) ?  8<CR>

UNIT 0
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
Q-FACTOR (O) 0 ?  0<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  1<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 1 ? 0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  5<CR>
Q-FACTOR (O) 0 ? 1<CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6<CR>
Q-FACTOR (O) 1 ? 1<CR>

UNIT 7
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  7<CR>
Q-FACTOR (O) 1 ? <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON-DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE, THE HARDWARE PARAMETERS DO NOT DIFFER SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

EXAMPLE 2: USE THE MULTIPLE SPECIFICATION FEATURE OF THE RUNTIME SERVICES TO MAKE FEWER PASSES THROUGH THE QUESTIONS.

```
# UNITS (D) ?  8<CR>

UNIT 0
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ? 0,1<CR>
Q-FACTOR (O) 0 ?  0,1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2-5<CR>
Q-FACTOR (O) 1 ?  0<CR>

UNIT 6
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  6,7<CR>
Q-FACTOR (O) 0 ?  1,1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. THE FIRST PASS BUILDS 2 ENTRIES, BECAUSE 2 SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE DRS ASSUMES THAT THE CSR ADDRESS IS 160000 FOR BOTH UNITS. IN THE SECOND PASS, 4 ENTRIES WERE BUILT. THE "-" CONSTRUCT TELLS THE DRS TO INCREMENT THE DATA FROM THE FIRST VALUE TO THE SECOND. IN THIS CASE, "2-5" SPECIFIES SUB-DEVICES 2,3,4, AND 5. THE CSR ADDRESS AND Q-FACTOR FOR THE 4 ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST 2 UNITS ARE SPECIFIED IN THE THIRD PASS.

EXAMPLE 3: ACCOMPLISH THE WHOLE PROCESS IN JUST ONE PASS THROUGH THE QUESTIONS.

```
# UNITS  (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ? 0-7<CR>
Q-FACTOR (O) 0 ? 0,1,0,...,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A BLANK FIELD) DIRECT THE DRS TO REPEAT THE LAST REPLY.

2.7 QUICK START-UP PROCEDURE

2.7.1 TO START-UP THIS PROGRAM WHEN RUNNING UNDER XXDP+

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ QUESTIONS
3. TYPE "R NAME", WHERE "NAME" IS THE FILENAME OF THE .BIN OR .BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS
7. ANSWER THE "CHANGE SW" QUESTION WITH "N"

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

2.7.2 TO START-UP THIS PROGRAM WHEN RUNNING UNDER ACT

THE FILE WHICH WILL BE STARTED MUST, AT SOME TIME, HAVE BEEN CREATED WITH THE 'SETUP' UTILITY PROGRAM. ASSUMING THAT THIS HAS BEEN DONE, THE START-UP PROCEDURE IS THE SAME AS THE ONE IN SECTION 2.7.1.

TO CREATE A FILE USING THE SETUP UTILITY:

1. TYPE "R SETUP"
2. THE TARGET ENVIRONMENT IS ACT, SO TYPE "AC"
3. TYPE THE SETUP COMMAND:
   *SETUP OUTFILE.EXT=INFILE.EXT
   WHERE OUTFILE.EXT = THE NEWLY CREATED FILE
   AND INFILE.EXT = THE RELEASED .BIN FILE
4. YOU WILL HAVE AN OPPORTUNITY TO SET UP A PERMANENT DEFAULT TEST CONFIGURATION BY ANSWERING THE HARDWARE AND SOFTWARE QUESTIONS. ONCE THIS IS DONE, YOU WILL NO LONGER BE FORCED TO ANSWER "Y" TO "CHANGE HW ?" EVERY TIME YOU START THE PROGRAM. YOU WILL ALSO BE ASKED THE LSI AND 50HZ QUESTIONS HERE.
5. TYPE "EXIT"

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME TYPE NUMBER ON UNIT NUMBER  TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

WHERE:

- NAME = DIAGNOSTIC NAME
- TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
- NUMBER = ERROR NUMBER
- UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
- TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
- PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

3.2.1 MESSAGES DURING INITIALIZATION

DURING INITIALIZATION, THERE ARE 3 ERROR CONDITIONS WHICH CAN BE DETECTED AND WHICH CAUSE THE DRIVE TO BE DROPPED:

```
CAUSE1  =  '  (NOT POWERED UP)'
CAUSE2  =  '  (NOT AN ML11 UNIT)'
CAUSE3  =  '  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
```

THE 'CAUSE3' MESSAGE IS THEN FOLLOWED BY
EITHER: !'TOP SECTOR OF XXXXXX EXCEEDS SYSTEM LIMIT OF YYYYYY'
OR: !'LOW SECTOR OF XXXXXX EXCEEDS TOP SECTOR OF YYYYYY'

3.2.2 MESSAGES DURING TESTING

AFTER INITIALIZATION, THERE ARE 4 ERROR DIAGNOSES WHICH ARE POSSIBLE:

```
MSG1    =  '--> RUN ML11 LOGIC TEST'
```

THIS MESSAGE APPEARS WHEN AN ML11

SYSTEM ERROR OCCURS. THE USER IS INSTRUCTED TO RUN THE LOGIC TEST TO SEE IF THAT PROGRAM CAN ISOLATE THE REASON FOR THE FAILURE. NOTE THAT THIS MESSAGE IS NOT USED FOR DATA ERRORS.

MSG2 = '--> RUN ML11 PROM MAINTENANCE PROGRAM'

THIS MESSAGE APPEARS WHENEVER ANY OF THE FOLLOWING CONDITIONS IS TRUE:

A) AN ECC HARD ERROR (ECH OR UNC) IS DETECTED

B) AN ARRAY REACHES ITS HARD OR SOFT ERROR THRESHOLD

C) DURING A PERFORMANCE SUMMARY, IF AN ARRAY HAS REACHED OR EXCEEDED ITS HARD OR SOFT ERROR THRESHOLD.

MSG3 = 'SOFT ERROR'

A SOFT ERROR IS A CORRECTABLE DATA ERROR WHICH CAN BE ELIMINATED BY REWRITING AND REREADING.

MSG4 = 'HARD ERROR'

A HARD ERROR IS A CORRECTABLE DATA ERROR WHICH PERSISTS AFTER A REWRITE AND A REREAD.

ANY WRITE COMMAND HAS 3 POSSIBLE ERROR CALLS ASSOCIATED WITH IT:

ERROR POSITION	ERROR TYPE	DIAGNOSTIC MESSAGE	CAUSE OF ERROR/ACTION
1ST	ERRDF	MSG1	ALL 6 RETRIES FAILED FOR AN ML11 SYSTEM ERROR WHICH WAS ORIGINALLY CONSIDERED TO BE NON-FATAL. DROP THE DRIVE.
2ND	ERRDF	MSG1	CONTROLLER FATAL ERROR. DROP THE DRIVE.
3RD	ERRDF	MSG1	DRIVE FATAL ERROR. DROP THE DRIVE.

ANY READ OR WRITE CHECK COMMAND HAS 8 ERROR CALLS ASSOCIATED WITH IT. 5 FOR SYSTEM ERRORS (WHICH RESULT IN DROPPING THE DRIVE) AND 3 FOR HARD AND SOFT DATA ERRORS (WHICH ARE COUNTED ON A PER ARRAY BASIS):

THE SYSTEM ERRORS:

ERROR	ERROR	DIAGNOSTIC

POSITION	TYPE	MESSAGE	CAUSE OF ERROR/ACTION
1ST	ERRDF	MSG1	AFTER A SUCCESSFUL READ COMMAND, THE WRITE AND READ BUFFERS ARE COMPARED. IF THEY DO NOT MATCH PERFECTLY, THEN THE ECC LOGIC FAILED. DROP THE DRIVE.
2ND	ERRDF	MSG1	ALL 6 RETRIES FAILED FOR AN ML11 SYSTEM ERROR WHICH WAS ORIGINALLY CONSIDERED TO BE NON-FATAL. DROP THE DRIVE.
3RD	ERRDF	MSG1	CONTROLLER FATAL ERROR. DROP THE DRIVE.
4TH	ERRDF	MSG1	DRIVE FATAL ERROR. DROP THE DRIVE.
5TH	ERRDF	MSG2	ECC HARD ERROR DETECTED. DROP THE DRIVE.

THE DATA ERRORS:

ERROR POSITION	ERROR TYPE	DIAGNOSTIC MESSAGE	CAUSE OF ERROR/ACTION
6TH	ERRHRD	MSG4	HARD ERROR. DURING ERROR CLASSIFICATION, RETRY FAILED AGAIN (AS IF A DATA ERROR IN THE SAME BIT POSITION). UPDATE THE HARD COUNT FOR THE ASSOCIATED ARRAY AND CHECK THE NEW COUNT AGAINST THE THRESHOLD.
7TH	ERRSOFT	MSG3	SOFT ERROR. DURING ERROR CLASSIFICATION, RETRY FAILED AGAIN (AS IF A DATA ERROR IN A DIFFERENT BIT POSITION). UPDATE THE SOFT COUNT FOR THE ASSOCIATED ARRAY AND CHECK THE NEW COUNT AGAINST THE THRESHOLD.
8TH	ERRSOFT	MSG3	SOFT ERROR. DURING ERROR CLASSIFICATION, RETRY DID NOT PRODUCE ANOTHER DATA ERROR (THE RETRY MAY PASS, OR IT MAY FAIL FOR SOME NEW REASON). UPDATE THE SOFT COUNT FOR THE ASSOCIATED ARRAY AND CHECK THE NEW COUNT AGAINST THE THRESHOLD.

THERE IS A CORRESPONDENCE BETWEEN EVERY NUMBER AND THE PLACE IN THE PROGRAM WHERE THE ERROR WAS DETECTED:

A) THE MOST SIGNIFICANT DIGIT IDENTIFIES THE OPTION NUMBER.

EXCEPTION: THE COMMAND INTEGRITY ROUTINE IS THOUGHT OF AS OPTION 0, AND SO ALL ITS ERROR NUMBERS WILL APPEAR TO ONLY BE 1 OR 2 SIGNIFICANT DIGITS. TAKE THE 0 TO BE A SIGNIFICANT DIGIT (SEE EXAMPLES).

B) THE 2 LEAST SIGNIFICANT DIGITS ARE THE POSITIONAL NUMBERS TO IDENTIFY WHERE THE ERROR CALL IS LOCATED WITHIN THE OPTION.

C) FOR OPTION 5, THE SECOND MOST SIGNIFICANT DIGIT IS USED TO IDENTIFY WHICH RANDOM TEST IS RUNNING.

EXAMPLES:

1) ERROR NUMBER: 6 => COMMAND INTEGRITY ROUTINE (OPTION 0), ERROR 06

2) ERROR NUMBER: 208 => OPTION 2, ERROR 08

3) ERROR NUMBER: 5311 => OPTION 5, RAND3, ERROR 11

BELOW IS A SUMMARY OF THE ACTUAL ERROR CALLS IN EACH TEST OPTION:

```
!
! THE 'INTEGRITY' ROUTINE:
!
                    !WRITE COMMAND:

!ERRDF(1,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 01 ****
!ERRDF(2,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 02 ****
!ERRDF(3,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 03 ****

                    !READ COMMAND:

!ERRDF(4,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 04 ****
!ERRDF(5,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 05 ****
!ERRDF(6,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 06 ****
!ERRDF(7,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 07 ****
!ERRDF(8,MSG2,0);    !**** INTEGRITY ROUTINE ERROR 08 ****
!ERRHRD(9,MSG4,0);   !**** INTEGRITY ROUTINE ERROR 09 ****
!ERRSOFT(10,MSG3,0);!**** INTEGRITY ROUTINE ERROR 10 ****
!ERRSOFT(11,MSG3,1);!**** INTEGRITY ROUTINE ERROR 10 ****

                    !WRITE CHECK COMMAND:

!ERRDF(12,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 12 ****
!ERRDF(13,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 13 ****
!ERRDF(14,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 14 ****
!ERRDF(15,MSG2,0);   !**** INTEGRITY ROUTINE ERROR 15 ****
!ERRHRD(16,MSG4,0);  !**** INTEGRITY ROUTINE ERROR 16 ****
!ERRSOFT(17,MSG3,8);!**** INTEGRITY ROUTINE ERROR 17 ****
!ERRSOFT(18,MSG3,1);!**** INTEGRITY ROUTINE ERROR 18 ****

!
! OPTION 1:
!
                    !WRITE COMMAND:

!ERRDF(101,MSG1,0);   !**** OPTION 1 ERROR 01 ****
!ERRDF(102,MSG1,0);   !**** OPTION 1 ERROR 02 ****
!ERRDF(103,MSG1,0);   !**** OPTION 1 ERROR 03 ****

                    !CHECK OR READ:

!ERRDF(104,MSG1,0);   !**** OPTION 1 ERROR 04 ****
```

```
!ERRDF(105,MSG1,0);    !**** OPTION 1 ERROR 05 ****
!ERRDF(106,MSG1,0);    !**** OPTION 1 ERROR 06 ****
!ERRDF(107,MSG1,0);    !**** OPTION 1 ERROR 07 ****
!ERRDF(108,MSG2,0);    !**** OPTION 1 ERROR 08 ****
!ERRHRD(109,MSG4,0);   !**** OPTION 1 ERROR 09 ****
!ERRSOFT(110,MSG3,0);  !**** OPTION 1 ERROR 10 ****
!ERRSOFT(111,MSG3,0);  !**** OPTION 1 ERROR 11 ****

!
! OPTION 2:
!
                    !WRITE COMMAND

!ERRDF(201,MSG1,0);    !**** OPTION 2 ERROR 01 ****
!ERRDF(202,MSG1,0);    !**** OPTION 2 ERROR 02 ****
!ERRDF(203,MSG1,0);    !**** OPTION 2 ERROR 03 ****

                    !CHECK OR READ:

!ERRDF(204,MSG1,0);    !**** OPTION 2 ERROR 04 ****
!ERRDF(205,MSG1,0);    !**** OPTION 2 ERROR 05 ****
!ERRDF(206,MSG1,0);    !**** OPTION 2 ERROR 06 ****
!ERRDF(207,MSG1,0);    !**** OPTION 2 ERROR 07 ****
!ERRDF(208,MSG2,0);    !**** OPTION 2 ERROR 08 ****
!ERRHRD(209,MSG4,0);   !**** OPTION 2 ERROR 09 ****
!ERRSOFT(210,MSG3,0);  !**** OPTION 2 ERROR 10 ****
!ERRSOFT(211,MSG3,1);  !**** OPTION 2 ERROR 10 ****

                    !LOOP CHECK OR READ:

!ERRDF(212,MSG1,0);    !**** OPTION 2 ERROR 12 ****
!ERRDF(213,MSG1,0);    !**** OPTION 2 ERROR 13 ****
!ERRDF(214,MSG1,0);    !**** OPTION 2 ERROR 14 ****
!ERRDF(215,MSG1,0);    !**** OPTION 2 ERROR 15 ****
!ERRDF(216,MSG2,0);    !**** OPTION 2 ERROR 16 ****
!ERRHRD(217,MSG4,0);   !**** OPTION 2 ERROR 17 ****
!ERRSOFT(218,MSG3,0);  !**** OPTION 2 ERROR 18 ****
!ERRSOFT(219,MSG3,0);  !**** OPTION 2 ERROR 19 ****

!
! OPTION 3:
!

                    !WRITE COMMAND:

!ERRDF(301,MSG1,0);    !**** OPTION 3 ERROR 01 ****
!ERRDF(302,MSG1,0);    !**** OPTION 3 ERROR 02 ****
!ERRDF(303,MSG1,0);    !**** OPTION 3 ERROR 03 ****

                    !CHECK OR READ:

!ERRDF(304,MSG1,0);    !**** OPTION 3 ERROR 04 ****
!ERRDF(305,MSG1,0);    !**** OPTION 3 ERROR 05 ****
!ERRDF(306,MSG1,0);    !**** OPTION 3 ERROR 06 ****
!ERRDF(307,MSG1,0);    !**** OPTION 3 ERROR 07 ****
!ERRDF(308,MSG2,0);    !**** OPTION 3 ERROR 08 ****
!ERRHRD(309,MSG4,0);   !**** OPTION 3 ERROR 09 ****
```

```
                        !ERRSOFT(310,MSG3,0); !**** OPTION 3 ERROR 10 ****
                        !ERRSOFT(311,MSG3,0); !**** OPTION 3 ERROR 11 ****

                        !
                        ! OPTION 4:
                        !

                                !MARCHING UP:

                                        !WRITE DATA:

                        !ERRDF(401,MSG1,0);    !**** OPTION 4 ERROR 01 ****
                        !ERRDF(402,MSG1,0);    !**** OPTION 4 ERROR 02 ****
                        !ERRDF(403,MSG1,0);    !**** OPTION 4 ERROR 03 ****

                                !MARCHING UP:

                                        !CHECK OR READ DATA:

                        !ERRDF(404,MSG1,0);    !**** OPTION 4 ERROR 04 ****
                        !ERRDF(405,MSG1,0);    !**** OPTION 4 ERROR 05 ****
                        !ERRDF(406,MSG1,0);    !**** OPTION 4 ERROR 06 ****
                        !ERRDF(407,MSG1,0);    !**** OPTION 4 ERROR 07 ****
                        !ERRDF(408,MSG2,0);    !**** OPTION 4 ERROR 08 ****
                        !ERRHRD(409,MSG4,0);   !**** OPTION 4 ERROR 09 ****
                        !ERRSOFT(410,MSG3,0);  !**** OPTION 4 ERROR 10 ****
                        !ERRSOFT(411,MSG3,0);  !**** OPTION 4 ERROR 11 ****

                                        !WRITE COMP:

                        !ERRDF(412,MSG1,0);    !**** OPTION 4 ERROR 12 ****
                        !ERRDF(413,MSG1,0);    !**** OPTION 4 ERROR 13 ****
                        !ERRDF(414,MSG1,0);    !**** OPTION 4 ERROR 14 ****

                                !MARCHING DOWN:

                                        !CHECK OR READ COMP:

                        !ERRDF(415,MSG1,0);    !**** OPTION 4 ERROR 15 ****
                        !ERRDF(416,MSG1,0);    !**** OPTION 4 ERROR 16 ****
                        !ERRDF(417,MSG1,0);    !**** OPTION 4 ERROR 17 ****
                        !ERRDF(418,MSG1,0);    !**** OPTION 4 ERROR 18 ****
                        !ERRDF(419,MSG2,0);    !**** OPTION 4 ERROR 19 ****
                        !ERRHRD(420,MSG4,0);   !**** OPTION 4 ERROR 20 ****
                        !ERRSOFT(421,MSG3,0);  !**** OPTION 4 ERROR 21 ****
                        !ERRSOFT(422,MSG3,0);  !**** OPTION 4 ERROR 22 ****

                                        !WRITE DATA:

                        !ERRDF(423,MSG1,0);    !**** OPTION 4 ERROR 23 ****
                        !ERRDF(424,MSG1,0);    !**** OPTION 4 ERROR 24 ****
                        !ERRDF(425,MSG1,0);    !**** OPTION 4 ERROR 25 ****

                                !MARCHING UP:

                                        !CHECK OR READ DATA:
```

```
!ERRDF(426,MSG1,0);    !**** OPTION 4 ERROR 26 ****
!ERRDF(427,MSG1,0);    !**** OPTION 4 ERROR 27 ****
!ERRDF(428,MSG1,0);    !**** OPTION 4 ERROR 28 ****
!ERRDF(429,MSG1,0);    !**** OPTION 4 ERROR 29 ****
!ERRDF(430,MSG2,0);    !**** OPTION 4 ERROR 30 ****
!ERRHRD(431,MSG4,0);   !**** OPTION 4 ERROR 31 ****
!ERRSOFT(432,MSG3,0);  !**** OPTION 4 ERROR 32 ****
!ERRSOFT(433,MSG3,0);  !**** OPTION 4 ERROR 33 ****


!
! OPTION 5:
!

        !'RAND1' ROUTINE:

                !WRITE COMMAND:

!ERRDF(5101,MSG1,0);    !**** OPTION 5, RAND1 ERROR 01 ****
!ERRDF(5102,MSG1,0);    !**** OPTION 5, RAND1 ERROR 02 ****
!ERRDF(5103,MSG1,0);    !**** OPTION 5, RAND1 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(5104,MSG1,0);    !**** OPTION 5, RAND1 ERROR 04 ****
!ERRDF(5105,MSG1,0);    !**** OPTION 5, RAND1 ERROR 05 ****
!ERRDF(5106,MSG1,0);    !**** OPTION 5, RAND1 ERROR 06 ****
!ERRDF(5107,MSG1,0);    !**** OPTION 5, RAND1 ERROR 07 ****
!ERRDF(5108,MSG2,0);    !**** OPTION 5, RAND1 ERROR 08 ****
!ERRHRD(5109,MSG4,0);   !**** OPTION 5, RAND1 ERROR 09 ****
!ERRSOFT(5110,MSG3,0);  !**** OPTION 5, RAND1 ERROR 10 ****
!ERRSOFT(5111,MSG3,0);  !**** OPTION 5, RAND1 ERROR 11 ****

        !'RAND2' ROUTINE:

                !WRITE COMMAND:

!ERRDF(5201,MSG1,0);    !**** OPTION 5, RAND2 ERROR 01 ****
!ERRDF(5202,MSG1,0);    !**** OPTION 5, RAND2 ERROR 02 ****
!ERRDF(5203,MSG1,0);    !**** OPTION 5, RAND2 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(5204,MSG1,0);    !**** OPTION 5, RAND2 ERROR 04 ****
!ERRDF(5205,MSG1,0);    !**** OPTION 5, RAND2 ERROR 05 ****
!ERRDF(5206,MSG1,0);    !**** OPTION 5, RAND2 ERROR 06 ****
!ERRDF(5207,MSG1,0);    !**** OPTION 5, RAND2 ERROR 07 ****
!ERRDF(5208,MSG2,0);    !**** OPTION 5, RAND2 ERROR 08 ****
!ERRHRD(5209,MSG4,0);   !**** OPTION 5, RAND2 ERROR 09 ****
!ERRSOFT(5210,MSG3,0);  !**** OPTION 5, RAND2 ERROR 10 ****
!ERRSOFT(5211,MSG3,0);  !**** OPTION 5, RAND2 ERROR 11 ****

        !'RAND3' ROUTINE:

                !WRITE COMMAND:

!ERRDF(5301,MSG1,0);    !**** OPTION 5, RAND3 ERROR 01 ****
```

```
!ERRDF(5302,MSG1,0);    !**** OPTION 5, RAND3 ERROR 02 ****
!ERRDF(5303,MSG1,0);    !**** OPTION 5, RAND3 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(5304,MSG1,0);    !**** OPTION 5, RAND3 ERROR 04 ****
!ERRDF(5305,MSG1,0);    !**** OPTION 5, RAND3 ERROR 05 ****
!ERRDF(5306,MSG1,0);    !**** OPTION 5, RAND3 ERROR 06 ****
!ERRDF(5307,MSG1,0);    !**** OPTION 5, RAND3 ERROR 07 ****
!ERRDF(5308,MSG2,0);    !**** OPTION 5, RAND3 ERROR 08 ****
!ERRHRD(5309,MSG4,0);   !**** OPTION 5, RAND3 ERROR 09 ****
!ERRSOFT(5310,MSG3,0);  !**** OPTION 5, RAND3 ERROR 10 ****
!ERRSOFT(5311,MSG3,0);  !**** OPTION 5, RAND3 ERROR 11 ****

        !'RAND4' ROUTINE:

                !WRITE COMMAND:

!ERRDF(5401,MSG1,0);    !**** OPTION 5, RAND4 ERROR 01 ****
!ERRDF(5402,MSG1,0);    !**** OPTION 5, RAND4 ERROR 02 ****
!ERRDF(5403,MSG1,0);    !**** OPTION 5, RAND4 ERROR 03 ****

                !CHECK OR READ:

!ERRDF(5404,MSG1,0);    !**** OPTION 5, RAND4 ERROR 04 ****
!ERRDF(5405,MSG1,0);    !**** OPTION 5, RAND4 ERROR 05 ****
!ERRDF(5406,MSG1,0);    !**** OPTION 5, RAND4 ERROR 06 ****
!ERRDF(5407,MSG1,0);    !**** OPTION 5, RAND4 ERROR 07 ****
!ERRDF(5408,MSG2,0);    !**** OPTION 5, RAND4 ERROR 08 ****
!ERRHRD(5409,MSG4,0);   !**** OPTION 5, RAND4 ERROR 09 ****
!ERRSOFT(5410,MSG3,0);  !**** OPTION 5, RAND4 ERROR 10 ****
!ERRSOFT(5411,MSG3,0);  !**** OPTION 5, RAND4 ERROR 11 ****
```

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH A SUMMARY WHICH SHOWS THE DIAGNOSTIC'S PERFORMANCE SINCE IT WAS STARTED. THE SAME PROGRESS REPORT CAN BE OBTAINED BY STOPPING THE PROGRAM'S EXECUTION (VIA A ^C) AND BY ISSUING THE 'PRINT' COMMAND. A TYPICAL REPORT FOR 2 DRIVES IS SHOWN BELOW:

```
PERFORMANCE SUMMARY

NUMBER OF MBYTES TRANSFERRED:
 1028 MBYTES WRITTEN
  250 MBYTES READ
 1145 MBYTES WRITE CHECKED

LOGICAL UNIT: 0    DRIVE: 1    SERIAL #: 1234
  SOFT ERROR COUNT:     9
    ARRAY  3:     9
  HARD ERROR COUNT:    11
    ARRAY  0:     6
    ARRAY 10:     2
    ARRAY 15:     3
  TRANSFER RETRIES:     0
```

```
LOGICAL UNIT: 1    DRIVE: 1    SERIAL #: 9876
DRIVE DROPPED   (CONTROLLER FATAL ERROR)
  SOFT ERROR COUNT:    100
    ARRAY  1:        9
    ARRAY 13:       10  --> RUN ML11 PROM MAINTENANCE PROGRAM
    ARRAY 14:        1
    ARRAY 15:       80  --> RUN ML11 PROM MAINTENANCE PROGRAM
  HARD ERROR COUNT:      2
    ARRAY 14:        1
    ARRAY 15:        1
  TRANSFER RETRIES:      0
```

5.0 DEVICE INFORMATION TABLES

AT THE START OF THE PROGRAM, AN AUTOMATIC CHECK OF THE SYSTEM CONFIGURATION IS MADE AND DEVICE INFORMATION SIMILAR TO THE FOLLOWING IS PRINTED FOR EACH UNIT:

```
    LOGICAL UNIT: 0    DRIVE: 0    SERIAL #: 1234
    ML11-A     SECTORS UNDER TEST: 000000 TO 017777
    TRANSFER RATE: 1 MBYTES/SECOND     CSR ADDRESS: 176400
```

6.0 TEST SUMMARIES

THERE IS JUST ONE HARDWARE TEST IN THE EXERCISER, AND ITS PURPOSE IS TO ACT AS A SCHEDULER TO CALL THE SUBROUTINES WHICH ACTUALLY PERFORM ALL OF THE TEST CODE. THE SUBROUTINES, CALLED OPTIONS, ARE DESCRIBED BELOW:

6.1 OPTION 1 (OPT1)

PURPOSE: TO CHECK ADDRESSES USING DATA = SECTOR NUMBER. TRANSFERS ARE 4K WORDS IN LENGTH, AND ALL SECTORS ARE TESTED.

THE CODE FOR 'OPT1' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COMPLEMENT FLAG FROM 0 TO 1
: BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
: INCR LOGICAL UNIT FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS ONE UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET WRDCNT
: : : : : GENERATE THE PATTERN
```

```
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

6.2 OPTION 2 (OPT2)

PURPOSE: TO CHECK ON DATA RELIABILITY USING THE PATTERNS FROM THE PATTERN TABLE.

THE CODE FOR 'OPT2' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY THE ROUTINE IS RUNNING
CHOOSE A MAXIMUM PATTERN NUMBER
INCR COUNT FROM 1 TO (2*MAX)
: BEGIN 2 (START OF PATTERN SELECTION LOOP)
: GENERATE THE PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET_WRDCNT
: : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: IF NOT THE QUICK VERIFY PASS THEN 'LOOP READ' (DESCRIBED BELOW)
: END 2 (END OF PATTERN SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

```
THE 'LOOP READ' CODE IN BRIEF:

BEGIN 11 (START OF LOOP READING SECTION)
INCR LUN FROM 0 TO LAST
: BEGIN 12 (START OF LOGICAL UNIT SELECTION LOOP)
: TESTLOOP2:
: : BEGIN 13 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : IF UNIT IS ACTIVE
: : THEN
: : : BEGIN 14 (START OF TEST FOR AN ACTIVE UNIT)
: : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : SECTOR = LOWEST
: : : WHILE SECTOR LEQ HIGHEST DO
: : : : BEGIN 15 (START OF SECTOR SELECTION LOOP)
: : : : GET_WRDCNT
: : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
: : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : INCR KOUNT FROM 1 TO TIMES
: : : : : BEGIN 16 (START OF COUNTING LOOP FOR LOOP READING)
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP2)
: : : : : END 16 (END OF COUNTING LOOP FOR LOOP READING)
: : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : UPDATE SECTOR NUMBER BY # SECTORS IN PREVIOUS TRANSFER
: : : : END 15 (END OF SECTOR SELECTION LOOP)
: : : END 14 (END OF TEST FOR AN ACTIVE UNIT)
: : END 13 (END OF TESTLOOP2)
: END 12 (END OF LOGICAL UNIT SELECTION LOOP)
END 11 (END OF LOOP READING SECTION)
```

6.3 OPTION 3 (OPT3)

PURPOSE: TO DO A UNIQUE DATA CHECK ON ALL AVAILABLE UNITS.

THE CODE FOR 'OPT3' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COMPLEMENT FLAG FROM 0 TO 1
: BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
: GENERATE THE PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET_WRDCNT
: : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
```

```
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

6.4 OPTION 4 (OPT4)

PURPOSE: TO LOOK FOR INTEREACTIONS BETWEEN SECTORS
USING A MARCH TEST.

THE CODE FOR 'OPT4' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
WORD COUNT = 256
GENERATE A BUFFER OF DATA
GENERATE A BUFFER OF COMP
INITIALIZE POINTERS TO 4 BUFFERS FOR WRITE/READ DATA/COMP
INCR LUN FROM 0 TO LAST
: BEGIN 2 (START OF LOGICAL UNIT SELECTION LOOP)
: TESTLOOP:
: : BEGIN 3 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : IF UNIT IS ACTIVE
: : THEN
: : : BEGIN 4 (START OF TEST FOR AN ACTIVE UNIT)
: : : INCR SECTOR FROM LOWEST TO HIGHEST
: : : : BEGIN 4A (START OF 1ST SECTOR SELECTION LOOP)
: : : : WRITE 'DATA'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4A (END OF 1ST SECTOR SELECTION LOOP)
: : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
: : : INCR SECTOR FROM LOWEST TO HIGHEST
: : : : BEGIN 4B (START OF 2ND SECTOR SELECTION LOOP)
: : : : DO THE WRITE CHECK OR READ OF 'DATA'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : WRITE 'COMP'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4B (END OF 2ND SECTOR SELECTION LOOP)
: : : CHOOSE WHETHER TO WRITE CHECK OR READ 'COMP'
: : : DECR SECTOR FROM HIGHEST TO LOWEST
: : : : BEGIN 4C (START OF 3RD SECTOR SELECTION LOOP)
: : : : DO THE WRITE CHECK OR READ OF 'COMP'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : WRITE DATA
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4C (END OF 3RD SECTOR SELECTION LOOP)
: : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
: : : INCR SECTOR FROM LOWEST TO HIGHEST
: : : : BEGIN 4D (START OF 4TH SECTOR SELECTION LOOP)
```

```
: : : : DO THE WRITE CHECK OR READ OF 'DATA'
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : END 4D (END OF 4TH SECTOR SELECTION LOOP)
: : : END 4 (END OF TEST FOR AN ACTIVE UNIT)
: : END 3 (END OF TESTLOOP)
: END 2 (END OF LOGICAL UNIT SELECTION LOOP)
RETURN
END 1 (END OF ROUTINE)
```

6.5 OPTION 5 (OPT5)

PURPOSE: TO EXERCISE THE ML11 SYSTEMS UNDER TEST IN A RANDOM MANNER. SO AS TO SIMULATE THE FLEXIBILITY OF TESTING THAT WOULD BE DONE BY AN OPERATING SYSTEM.

THERE ARE 4 RANDOM TESTS WHICH ARE CALLED BY 'OPT5' TO ACCOMPLISH ALL TESTING. IT IS THE RESPONSIBILITY OF THIS ROUTINE TO DECIDE HOW MANY TIMES THOSE 4 RANDOM TESTS WILL BE EXECUTED. REFER TO 'RAND1' TO 'RAND4' BELOW FOR MORE INFORMATION.

6.5.1 RAND1 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA

THE CODE FOR 'RAND1' IN BRIEF:

```
BEGIN 1  (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
: GENERATE THE RANDOM PATTERN
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : SECTOR = LOWEST
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
: : : : : GET_WRDCNT
: : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
: : : : : END 6 (END OF SECTOR SELECTION LOOP)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
```

```
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
RETURN
END 1 (END OF ROUTINE)
```

6.5.2 RAND2 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA AND WORD COUNTS

THE CODE FOR 'RAND2' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
: INCR LUN FROM 0 TO LAST
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : GENERATE THE RANDOM PATTERN
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : SECTOR = LOWEST
: : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
: : : : WHILE SECTOR LEQ HIGHEST DO
: : : : : BEGIN 6 (START OF A PASS THROUGH ALL SECTORS)
: : : : : CHOOSE A RANDOM WORD COUNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : CALCULATE NEXT STARTING SECTOR (BASED ON WORD COUNT)
: : : : : IF NEXT STARTING SECTOR GTR HIGHEST
: : : : : : THEN ADJUST THE WORD COUNT AND NEXT SECTOR SO THEY FIT
: : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : : SECTOR = THE CALCULATED NEXT STARTING SECTOR
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : END 6 (END OF A PASS THROUGH ALL SECTORS)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
RETURN
END 1 (END OF ROUTINE)
```

6.5.3 RAND3 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA, WORD COUNTS AND SECTORS

THE CODE FOR 'RAND3' IN BRIEF:

```
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
: GENERATE THE RANDOM PATTERN
: INCR LUN FROM 0 TO LAST
```

```
: : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
: : INITIALIZE BUFFER POINTERS
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : IF UNIT IS ACTIVE
: : : THEN
: : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
: : : : TIMES = (HIGHEST - LOWEST)/2 + 1
: : : : INCR KOUNT FROM 1 TO TIMES
: : : : : BEGIN 6 (START OF COUNTING LOOP FOR SECTOR SELECTION)
: : : : : CHOOSE A RANDOM WORD COUNT
: : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : : CHOOSE A RANDOM SECTOR
: : : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
: : : : : IF CALCULATED VALUE GTR HIGHEST
: : : : : : THEN ADJUST THE WORD COUNT SO IT FITS
: : : : : : :     WITHIN THE TESTABLE SECTOR LIMITS
: : : : : WRITE
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
: : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : : DO THE WRITE CHECK OR READ
: : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
: : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : : END 6 (END OF COUNTING LOOP FOR SECTOR SELECTION)
: : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
RETURN
END 1 (END OF ROUTINE)
```

6.5.4 RAND4 ROUTINE

PURPOSE: TO TEST USING RANDOM DATA, WORD COUNTS, SECTORS AND UNITS

```
THE CODE FOR 'RAND4' IN BRIEF:
BEGIN 1 (START OF ROUTINE)
SAY ROUTINE IS RUNNING
INCR COUNT FROM 1 TO REPEAT
: BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
: GENERATE THE RANDOM PATTERN
: TIMES = NUMBER OF UNITS * 4
: INCR KOUNT FROM 1 TO TIMES
: : BEGIN 3 (START OF COUNTING LOOP FOR UNIT SELECTION)
: : CHOOSE A RANDOM LOGICAL UNIT WHICH IS ACTIVE
: : INITIALIZE BUFFER POINTERS
: : TESTLOOP:
: : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
: : : INCR KOUNT2 FROM 1 TO 10
: : : : BEGIN 5 (START OF COUNTING LOOP FOR SECTOR SELECTION)
: : : : CHOOSE A RANDOM WORD COUNT
: : : : SET UP BUFFER POINTERS BEFORE TRANSFER
: : : : CHOOSE A RANDOM SECTOR
: : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
: : : : IF CALCULATED VALUE GTR HIGHEST
: : : : : THEN ADJUST THE WORD COUNT SO IT FITS
: : : : : :     WITHIN THE TESTABLE SECTOR LIMITS
: : : : WRITE
```

```
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : CHOOSE WHETHER TO WRITE CHECK OR READ
: : : : DO THE WRITE CHECK OR READ
: : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
: : : : CHANGE BUFFER POINTERS AFTER TRANSFER
: : : : END 5 (END OF COUNTING LOOP FOR SECTOR SELECTION)
: : : END 4 (END OF TESTLOOP)
: : END 3 (END OF COUNTING LOOP FOR UNIT SELECTION)
: END 2 (END OF REPEAT LOOP FOR THIS ROUTINE
RETURN
END 1 (END OF ROUTINE)
```

7.0 MAINTENANCE HISTORY

MODIFIED BY: D.W. NEALE DATE: 18-FEB-82 VERSION: B

ALL FUNCTIONAL CHANGES TO THIS DIAGNOSTIC ARE LABLED WITH A COMMENT LINE OF 'VER CZMLBB' PRECEEDING ANY MODIFIED OR ADDED LINE/BLOCK OF CODE.

FUNCTIONAL CHANGES TO THIS DIAGNOSTIC INCLUDE:

1. MODIFING CODE TO ENSURE QUALITY TESTING OF ML-11B AND ML-11A BLOCK MODE MEMORY SYSTEMS.

2. CORRECT EXERCISER FUNCTIONALITY TO CALL OUT ML11 PROM MAINTENANCE PROGRAM AFTER 10 UNIQUE FAILING SINGLE BIT ERRORS (SBE'S) HAVE BEEN DISCOVERED PER ARRAY MODULE.

   VERSION 'A' PROM MAINTENANCE CALL OUT OCCURES AFTER ANY TEN SBE'S ARE DISCOVERED PER ARRAY MODULE.

3. PER REQUEST OF F/S AND MEMORY ENGINEERING, THE REPORTING OF 'MDPE' ERRORS DURING SBE'S CORRECTION WILL BE IGNORED.

4. ADDING TO THE REPORT SUMMARY CODE SECTION A TABLE OF SBE LOCATIONS AND PRINTING OF THIS TABLE DURING REPORT CODE PRINTING.

```
                                .SBTTL  PROGRAM HEADER AND TABLES

000000                          .ENABL  ABS,AMA
002000                          .       =       2000

002000                          BGNMOD

                                ;++
                                ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                                ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                                ;--

002000                          POINTER ALL


002000                          HEADER  CZMLB,B,0,1800.,1
002000
002000  103                                             LSNAME::
002001  132                                                     .ASCII  /C/
002002  115                                                     .ASCII  /Z/
002003  114                                                     .ASCII  /M/
002004  102                                                     .ASCII  /L/
002005  000                                                     .ASCII  /B/
002006  000                                                     .BYTE   0
002007  000                                                     .BYTE   0
002010                                                          .BYTE   0
002010  102                                             LSREV::
002011                                                          .ASCII  /B/
002011  060                                             LSDEPO::
002012                                                          .ASCII  /0/
002012  000000                                          LSUNIT::
002014                                                          .WORD   TSPTHV
002014  003410                                          LSTIML::
002016                                                          .WORD   1800.
002016  002266                                          LSHPCP::
002020                                                          .WORD   LSHARD
002020  002450                                          LSSPCP::
002022                                                          .WORD   LSSOFT
002022  002210                                          LSHPTP::
002024                                                          .WORD   LSHW
002024  002222                                          LSSPTP::
002026                                                          .WORD   LSSW
002026  105050                                          LSLADP::
002030                                                          .WORD   LSLAST
002030  000000                                          LSSTA::
002032                                                          .WORD   0
002032  000000                                          LSCO::
002034                                                          .WORD   0
002034  000001                                          LSDTYP::
002036                                                          .WORD   1
002036  000000                                          LSAPT::
002040                                                          .WORD   0
002040  002204                                          LSDTP::
002042                                                          .WORD   LSDISPATCH
002042  000000                                          LSPRIO::
002044                                                          .WORD   0
002044  000000                                          LSENVI::
                                                                .WORD   0
```

```
002046
002046  000000                          L$EXP1::
002050                                          .WORD   0
002050    003                           L$MREV::
002051    003                                   .BYTE   C$REVISION
002052                                          .BYTE   C$EDIT
002052  000000                          L$EF::
002054  000000                                  .WORD   0
002056                                          .WORD   0
002056  000000                          L$SPC::
002060                                          .WORD   0
002060  002122                          L$DEVP::
002062                                          .WORD   L$DVTYP
002062  005474                          L$REPP::
002064                                          .WORD   L$RPT
002064  000000                          L$EXP4::
002066                                          .WORD   0
002066  000000                          L$EXP5::
002070                                          .WORD   0
002070  005652                          L$AUT::
002072                                          .WORD   L$AU
002072  005640                          L$DUT::
002074                                          .WORD   L$DU
002074  000000                          L$LUN::
002076                                          .WORD   0
002076  002130                          L$DESP::
002100                                          .WORD   L$DESC
002100  104035                          L$LOAD::
002102                                          EMT     E$LOAD
002102  002172                          L$ETP::
002104                                          .WORD   L$ERRTBL
002104  040722                          L$ICP::
002106                                          .WORD   L$INIT
002106  105034                          L$CCP::
002110                                          .WORD   L$CLEAN
002110  005506                          L$ACP::
002112                                          .WORD   L$AUTO
002112  004126                          L$PRT::
002114                                          .WORD   L$PROT
002114  000000                          L$TEST::
002116                                          .WORD   0
002116  000000                          L$DLY::
002120                                          .WORD   0
002120  000000                          L$HIME::
                                                .WORD   0
66
77
78                                      ;       NAMES OF DEVICES SUPPORTED BY THIS PROGRAM
79                                      ;
80  002122                              ;       DEVTYP <ML11>
    002122
    002122    115   114   061           L$DVTYP::
                                                .ASCIZ  /ML11/
                                                .EVEN
```

```
                                ;
                                ;       TEST DESCRIPTION
                                ;
002130                          DESCRIPT <CZMLBB ML11 PERFORMANCE EXERCISER>
002130                                                                  LSDESC::
002130  103     132     115                                                     .ASCIZ  /CZMLBB ML11 PERFORM
                                                                                .EVEN
                                ;
                                ;       THE GLOBAL ERROR TABLE (INFORMATION
                                ;       USED IN A CALL TO THE MACRO 'ERROR')
                                ;
002172                          ERRTBL
002172                                                                  LSERRTBL::
002172  000000                  ERRTYP::        .WORD   0
002174  000000                  ERRNBR::        .WORD   0
002176  000000                  ERRMSG::        .WORD   0
002200  000000                  ERRBLK::        .WORD   0

                                ;++
                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRES OF EACH TEST.
                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                ;--

002202                                  DISPATCH 1
002202  000001                                                                  .WORD   1
002204                                                                  LSDISPATCH::
002204  102712                                                                  .WORD   T1

                                ;++
                                ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
                                ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
                                ;--

002206                          BGNHW   DFPTBL
002206  000004                                                                 .WORD   L10000-L$HW/2
002210                                                                  L$HW::
002210                                                                  DFPTBL::

002210  176400                  .WORD   176400          ;CSR ADDRESS
002212  000204                  .WORD   204             ;RH VECTOR ADDRESS
002214  000005                  .WORD   5               ;BR LEVEL FOR INTERRUPT
002216  000000                  .WORD   0               ;ML11 DRIVE NUMBER

002220                          ENDHW
002220                                                                  L10000:
```

```
                                ;++
                                ; THE DEFAULT SOFTWARE P-TABLE CONTAINS VARIOUS DATA USED BY THE
                                ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE SET
                                ; UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR AT RUN
                                ; TIME.
                                ;--

002220                                  BGNSW   SFPTBL
002220  000021                                                         .WORD   L10001-L$SW/2
002222                                                          L$SW::
002222                                                          SFPTBL::

002222  000000          LIMIT:: .WORD   0       ;LIMIT RANGE OF SECTORS TO BE TESTED
                                                ;       0 = NO  1 = YES
002224  000000          RANGE:: .WORD   0       ;DOES OPERATOR KNOW EXACT SECTOR NUMBERS?
                                                ;       0 = NO  1 = YES
002226  000000          LSECT:: .WORD   0       ;LOW SECTOR NUMBER
002230  000000          TSECT:: .WORD   0       ;TOP SECTOR NUMBER
002232  000000          ONLY::  .WORD   0       ;ONLY BOARD TO TEST (BOARD #'S ARE 0 TO 15)
002234  000000          DROPNE:: .WORD  0       ;DROP ANY OPTIONS?      0 = NO  1 = YES
002236  000000          DROP1:: .WORD   0       ;DROP OPTION #1?        0 = NO  1 = YES
002240  000000          DROP2:: .WORD   0       ;DROP OPTION #2?        0 = NO  1 = YES
002242  000000          DROP3:: .WORD   0       ;DROP OPTION #3?        0 = NO  1 = YES
002244  000000          DROP4:: .WORD   0       ;DROP OPTION #4?        0 = NO  1 = YES
002246  000001          MARPAT:: .WORD  1       ;PATTERN NUMBER USED FOR MARCH TEST
002250  000000          DROP5:: .WORD   0       ;DROP OPTION #5?        0 = NO  1 = YES
002252  000000          REFRESH::.WORD  0       ;ENABLE MARGINING?      0 = NO (LEAVE DISABLED)
                                                ;                       1 = YES (ENABLE IT)
002254  000000          ECCDIS:: .WORD  0       ;DISABLE ECC?           0 = NO (LEAVE ENABLED)
                                                ;                       1 = YES (DISABLE IT)


                                ;********** IMPORTANT NOTE **********
                                ; THE FOLLOWING 2 SOFTWARE PARAMETERS ;
                                ; HAVE NON-STANDARD DEFAULTS.  ERRORS ;
                                ; AND END OF PASS PERFORMANCE SUMMARY ;
                                ; REPORTS WILL ** N O T ** BE PRINTED ;
                                ; UNLESS  THE  OPERATOR  SPECIFICALLY ;
                                ; REQUESTS THE PRINTOUTS VIA SUITABLE ;
                                ; ANSWERS TO THE SOFTWARE QUESTIONS.  ;
                                ;                                     ;
                                ; THIS OPERATING FEATURE WAS INCLUDED ;
                                ; IN THE ML11 PERFORMANCE EXERCISER'S ;
                                ; FUNCTIONAL SPECIFICATION AT THE RE- ;
                                ; QUEST OF FIELD SERVICE.             ;
                                ;*************************************

002256  000000          EOPSUM:: .WORD  0       ;ENABLE EOP SUMMARIES?  0 = NO PRINTOUT
                                                ;                       1 = YES
002260  000000          ERROUT:: .WORD  0       ;ENABLE ERROR PRINTOUTS? 0 = NO PRINTOUT
                                                ;                        1 = YES
002262  000000          EFN$21:: .WORD  0       ;ENABLE SOFT ERROR TESTING 0 = NO (DEFAULT)
                                                ;                          1 = YES
                                                ;THIS OPTION IS DESIGNED FOR MEMORY ENGINEERING
                                                ;FOR DMT PURPOSES

002264                                  ENDSW
```

```
                002264                                                                  L10001:
  197
  222
  248
  249
  250
  251                                   ;++
  252                                   ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
  253                                   ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
  254                                   ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
  255                                   ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
  256                                   ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
  257                                   ; WITH THE OPERATOR.
  258                                   ;--
  259 002264                                    BGNHRD
      002264  000022                                                                  L$HARD::  .WORD L10002-L$HARD/2
      002266
  260
  270
  271
  272 002266                                    GPRMA   QH1,0,0,0,177777,YES
      002266  000031                                                                           .WORD   T$CODE
      002270  002332                                                                           .WORD   QH1
      002272  000000                                                                           .WORD   T$LOLIM
      002274  177777                                                                           .WORD   T$HILIM
  273 002276                                    GPRMA   QH2,2,0,0,377,YES
      002276  001031                                                                           .WORD   T$CODE
      002300  002351                                                                           .WORD   QH2
      002302  000000                                                                           .WORD   T$LOLIM
      002304  000377                                                                           .WORD   T$HILIM
  274 002306                                    GPRMD   QH3,4,0,7,1,7,YES
      002306  002032                                                                           .WORD   T$CODE
      002310  002374                                                                           .WORD   QH3
      002312  000007                                                                           .WORD   7
      002314  000001                                                                           .WORD   T$LOLIM
      002316  000007                                                                           .WORD   T$HILIM
  275 002320                                    GPRMD   QH4,6,0,7,0,7,YES
      002320  003032                                                                           .WORD   T$CODE
      002322  002425                                                                           .WORD   QH4
      002324  000007                                                                           .WORD   7
      002326  000000                                                                           .WORD   T$LOLIM
      002330  000007                                                                           .WORD   T$HILIM
  276
  277 002332                                    ENDHRD
                                                                                          .EVEN
      002332                                                                  L10002:
  278
  285
  286 002332      103     123     122   QH1:    .ASCIZ  /CSR ADDRESS            ?/
  287 002351      111     116     124   QH2:    .ASCIZ  /INTERRUPT VECTOR       ?/
  288 002374      102     122     040   QH3:    .ASCIZ  /BR LEVEL FOR INTERRUPT ?/
  289 002425      104     122     111   QH4:    .ASCIZ  /DRIVE NUMBER           ?/
  290                                           .EVEN
  291
  292
  293                                   ;++
  294                                   ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
```

```
                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                        ; WITH THE OPERATOR.
                        ;--

002446                          BGNSFT
002446  000106                                                .WORD L10003-L$SOFT/2
002450                                                  L$SOFT::
002450
002450                          GPRML   QS1,0,1,YES
002450  000130                                                .WORD   T$CODE
002452  002664                                                .WORD   QS1
002454  000001                                                .WORD   1
002456                          XFERF   6$
002456  025044                                                .WORD   T$CODE
002460                          GPRML   QS2,2,1,YES
002460  001130                                                .WORD   T$CODE
002462  002732                                                .WORD   QS2
002464  000001                                                .WORD   1
002466                          XFERF   5$
002466  014044                                                .WORD   T$CODE
002470                          GPRMD   QS3,4,0,177777,0,177777,YES
002470  002032                                                .WORD   T$CODE
002472  003007                                                .WORD   QS3
002474  177777                                                .WORD   177777
002476  000000                                                .WORD   T$LOLIM
002500  177777                                                .WORD   T$HILIM
002502                          GPRMD   QS4,6,0,177777,0,177777,YES
002502  003032                                                .WORD   T$CODE
002504  003047                                                .WORD   QS4
002506  177777                                                .WORD   177777
002510  000000                                                .WORD   T$LOLIM
002512  177777                                                .WORD   T$HILIM
002514                          XFER    6$
002514  006004                                                .WORD   T$CODE
002516  004052          5$:     GPRMD   QS5,10,D,37,0,15.,YES
002516                                                        .WORD   T$CODE
002520  003107                                                .WORD   QS5
002522  000037                                                .WORD   37
002524  000000                                                .WORD   T$LOLIM
002526  000017                                                .WORD   T$HILIM
002530          6$:     GPRML   QS6,12,1,YES
002530  005130                                                .WORD   T$CODE
002532  003147                                                .WORD   QS6
002534  000001                                                .WORD   1
002536                          XFERT   7$
002536  007024                                                .WORD   T$CODE
002540                          GPRMD   QS11,24,D,77,1,10.,YES
002540  012052                                                .WORD   T$CODE
002542  003554                                                .WORD   QS11
002544  000077                                                .WORD   77
002546  000001                                                .WORD   T$LOLIM
002550  000012                                                .WORD   T$HILIM
002552                          XFER    13$
```

```
                002552  026004
    325         002554
                002554  006130
                002556  003454
                002560  000001
    326         002562
                002562  007130
                002564  003474
                002566  000001
    327         002570
                002570  010130
                002572  003514
                002574  000001
    328         002576
                002576  011130
                002600  003534
                002602  000001
    329         002604
                002604  006024
    330         002606
                002606  012052
                002610  003554
                002612  000077
                002614  000001
                002616  000012
    331         002620
                002620  013130
                002622  003637
                002624  000001
    332         002626
                002626  014130
                002630  003657
                002632  000001
    333         002634
                002634  015130
                002636  003724
                002640  000001
    334         002642
                002642  016130
                002644  003763
                002646  000001
    335         002650
                002650  017130
                002652  004030
                002654  000001
    336         002656
                002656  020130
                002660  004066
                002662  000001
    337
    338
    339         002664

                002664
```

```
7$:     GPRML   QS7,14,1,YES
        GPRML   QS8,16,1,YES
        GPRML   QS9,20,1,YES
        GPRML   QS10,22,1,YES
        XFERT   12$
        GPRMD   QS11,24,D,77,1,10.,YES
12$:    GPRML   QS12,26,1,YES
13$:    GPRML   QS13,30,1,YES
        GPRML   QS14,32,1,YES
        GPRML   QS15,34,1,YES
        GPRML   QS16,36,1,YES
        GPRML   QS17,40,1,YES

        .EVEN
        ENDSFT
```

```
        .WORD   T$CODE

        .WORD   T$CODE
        .WORD   QS7
        .WORD   1

        .WORD   T$CODE
        .WORD   QS8
        .WORD   1

        .WORD   T$CODE
        .WORD   QS9
        .WORD   1

        .WORD   T$CODE
        .WORD   QS10
        .WORD   1

        .WORD   T$CODE

        .WORD   T$CODE
        .WORD   QS11
        .WORD   77
        .WORD   T$LOLIM
        .WORD   T$HILIM

        .WORD   T$CODE
        .WORD   QS12
        .WORD   1

        .WORD   T$CODE
        .WORD   QS13
        .WORD   1

        .WORD   T$CODE
        .WORD   QS14
        .WORD   1

        .WORD   T$CODE
        .WORD   QS15
        .WORD   1

        .WORD   T$CODE
        .WORD   QS16
        .WORD   1

        .WORD   T$CODE
        .WORD   QS17
        .WORD   1


        .EVEN
L10003:
```

```
002664   114   111   115   QS1:    .ASCIZ   /LIMIT RANGE OF SECTORS TO BE TESTED ?/
002732   104   117   040   QS2:    .ASCIZ   /DO YOU KNOW EXACT RANGE OF SECTORS TO TEST ?/
003007   106   111   122   QS3:    .ASCIZ   /FIRST  SECTOR  TO  BE  TESTED  ?/
003047   114   101   123   QS4:    .ASCIZ   /LAST   SECTOR  TO  BE  TESTED  ?/
003107   127   110   111   QS5:    .ASCIZ   /WHICH  BOARD   {0-15}  TESTED  ?/
003147   124   110   105   QS6:    .ASCII   /THE PROGRAM OPTIONS INCLUDE:/
003203   012   015   040           .ASCII   <12><15>/   1.  ADDRESS CHECK/
003231   012   015   040           .ASCII   <12><15>/   2.  PATTERN TEST/
003256   012   015   040           .ASCII   <12><15>/   3.  UNIQUE DATA CHECK/
003310   012   015   040           .ASCII   <12><15>/   4.  MARCH TEST/
003333   012   015   040           .ASCII   <12><15>/   5.  RANDOMNESS TESTS/
003364   012   015   104           .ASCIZ   <12><15>/DO YOU WANT TO DROP ANY OF THESE FROM THE EXERCISER ?/
003454   104   122   117   QS7:    .ASCIZ   /DROP OPTION 1 ?/
003474   104   122   117   QS8:    .ASCIZ   /DROP OPTION 2 ?/
003514   104   122   117   QS9:    .ASCIZ   /DROP OPTION 3 ?/
003534   104   122   117   QS10:   .ASCIZ   /DROP OPTION 4 ?/
003554   120   101   124   QS11:   .ASCIZ   /PATTERN NUMBER {1-10} TO BE USED WITH MARCH TEST ?/
003637   104   122   117   QS12:   .ASCIZ   /DROP OPTION 5 ?/
003657   105   116   101   QS13:   .ASCIZ   /ENABLE REFRESH MARGINING            ?/
003724   104   111   123   QS14:   .ASCIZ   /DISABLE ERROR CORRECTION            ?/
003763   105   116   101   QS15:   .ASCIZ   /ENABLE END OF PASS SUMMARY PRINTOUT?/
004030   105   116   101   QS16:   .ASCIZ   /ENABLE ERROR PRINTOUTS              ?/
004066   105   116   101   QS17:   .ASCIZ   /ENABLE SOFT ERROR TESTING           ?/
                                   .EVEN

                           ;++
                           ; THE PROTECTION TABLE IS USED BY THE RUNTIME
                           ; SERVICES TO PROTECT THE LOAD MEDIA.
                           ;--

004126                             BGNPROT
004126                                                                           L$PROT::

004126   177777                    -1              ;OFFSET INTO P-TABLE FOR CSR ADDRESS
004130   177777                    -1              ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
004132   177777                    -1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER

004134                             ENDPROT


004134                     $PATCH:: .BLKW  32.     ;THIS LEAVES ROOM FOR THE 22 ML-11 REGISTERS TOO

004234                             ENDMOD
```

```
                                .SBTTL  'RANDOM NUMBER GENERATOR'

                                ;ROUTINE TO GENERATE 16-BIT PSEUDO RANDOM NUMBERS

                                ;INPUTS:                NONE
                                ;IMPLIED INPUTS:        SEED1, SEED2, SEED3 are global values which will
                                ;                       be used by, but not input to the generator.
                                ;OUTPUTS:               'RANDOM'--WORD CONTAINING RANDOM 16-BIT INTEGER VALUE
                                ;IMPLIED OUTPUTS:       NONE
                                ;CALLING SEQUENCE:      JSR PC,RN

005370  010046                RN::    MOV     R0,-(SP)
005372  016700  000062                MOV     SEED2,R0
005376  000241                        CLC
005400  005367  000052                DEC     SEED1
005404  006100                        ROL     R0
005406  006100                        ROL     R0
005410  066700  000042                ADD     SEED1,R0
005414  066700  000042                ADD     SEED3,R0
005420  010067  000034                MOV     R0,SEED2
005424  006100                        ROL     R0
005426  006100                        ROL     R0
005430  066700  000026                ADD     SEED3,R0
005434  006100                        ROL     R0
005436  006100                        ROL     R0
005440  010067  000016                MOV     R0,SEED3
005444  016767  000010  000012        MOV     SEED2,RANDOM            ;SAVE NEW R.N.
005452  012600                        MOV     (SP)+,R0
005454  000207                        RTS     PC


005456  000000                SEED1:: .WORD   0
005460  001233                SEED2:: .WORD   1233
005462  007622                SEED3:: .WORD   7622

005464  000000                RANDOM:: .WORD  0
```

```
;MLX3                                                    25-Mar-1982 22:23:37    TOPS-20 Bliss-16 V2(212)
;                                                        25-Mar-1982 22:21:30    PA:<NEALE>MLX3.BLI.1 (1)

;          0001  MODULE MLX3 =
;          0002  BEGIN
;          0003
;          0004  REQUIRE 'BLSMAC.REQ';
;          1494
;          1495  %SBTTL 'REPORT CODING SECTION'
;          1496
;          1497  EXTERNAL ROUTINE
;          1498     EOP: NOVALUE;
;          1499
;          1500  BGNRPT;
;          1501
;          1502  EOP();
;          1503
;          1504  RETURN;
;          1505
;          1506  ENDRPT;


                                .GLOBL  EOP


                                .SBTTL  LRPT REPORT CODING SECTION

005466  004767  075234  LRPT:   JSR     PC,EOP                          ;                       1502
005472  000207                  RTS     PC                              ;                       1498

                        ; Routine Size:  3 words
                        ; Maximum stack depth per invocation:  0 words


                                .SBTTL  L$RPT REPORT CODING SECTION
005474  004767  177766  L$RPT:: JSR     PC,LRPT                         ;                       1504
                        ;MLX3                                                   25-Mar-1982 22:23:37    TOPS
                        ;                       REPORT CODING SECTION           25-Mar-1982 22:21:30    PA:<
005500  104425                  TRAP    25
005502  000207                  RTS     PC

                        ; Routine Size:  4 words
                        ; Maximum stack depth per invocation:  0 words
```

```
;MLX3
;                    AUTODROP SECTION                    25-Mar-1982 22:23:37   TOPS-20 Bliss-16 V2(212)
;                                                        25-Mar-1982 22:21:30   PA:<NEALE>MLX3.BLI.1 (2)
;
;          1507  %SBTTL 'AUTODROP SECTION'
;          1508
;          1509  !++
;          1510  !  THIS SECTION IS OPTIONALLY EXECUTED IMMEDIATELY AFTER THE INITIALIZATION
;          1511  !  CODE IF THE /ADR FLAG WAS SET.  THE INTENT IS TO EXAMINE THE UNITS UNDER
;          1512  !  TEST TO SEE IF THEY WILL RESPOND.  THOSE THAT DON'T RESPOND ARE DROPPED.
;          1513  !
;          1514  !  THIS FUNCTION IS AN INTEGRAL PART OF THE INITIALIZATION CODE ITSELF, AND
;          1515  !  THEREFORE A SEPARATE AUTODROP SECTION IS REDUNDANT AND NOT PROVIDED.
;          1516  !--
;          1517
;          1518  BGNAUTO;
;          1519
;          1520  RETURN;
;          1521
;          1522  ENDAUTO;
;
;                                .SBTTL  LAUTO AUTODROP SECTION
005504  000207           LAUTO:  RTS     PC                      ;                1506
;
;                                ; Routine Size:  1 word
;                                ; Maximum stack depth per invocation:  0 words
;
;                                .SBTTL  L$AUTO AUTODROP SECTION
005506  004767  177772   L$AUTO::JSR     PC,LAUTO                ;                1520
005512  104461                   TRAP    61
005514  000207                   RTS     PC
;
;                                ; Routine Size:  4 words
;                                ; Maximum stack depth per invocation:  0 words
```

```
130 ;MLX3
131 ;                   DROP UNIT SECTION                    25-Mar-1982 22:23:37    TOPS-20 Bliss-16 V2(212)
132 ;                                                        25-Mar-1982 22:21:30    PA:<NEALE>MLX3.BLI.1 (3)
133 ;          1523  %SBTTL 'DROP UNIT SECTION'
134 ;          1524
135 ;          1525  !++
136 ;          1526  !  THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DRIVE TO NO
137 ;          1527  !  LONGER BE TESTED.  WHEN THIS HAPPENS, THE FOLLOWING ACTIONS WILL BE
138 ;          1528  !  TAKEN:
139 ;          1529  !
140 ;          1530  !  (1) SET THE DRIVE STATUS TO INACTIVE AND SET THE DRIVE'S DROP FLAG.
141 ;          1531  !
142 ;          1532  !  (2) DECREMENT THE NUMBER OF ACTIVE DRIVES, AND IF ZERO ABORT PASS.
143 ;          1533  !--
144 ;          1534
145 ;          1535  BGNDU;
146 ;          1536
147 ;          1537  !+
148 ;          1538  ! DELCARE THE EXTERNAL SUMMARY REPORT CODE
149 ;          1539  ! DATA STORAGE LOCATIONS TO THIS SECTION
150 ;          1540  !-
151 ;          1541
152 ;          1542  EXTERNAL
153 ;          1543     L$LUN,                          !DEFINES NUMBER OF UUT'S ATTACHED
154 ;          1544     DRIVE_STATUS:BITVECTOR[8],      !DRIVE STATUS FLAG REGISTER
155 ;          1545     DROPT_DRIVES:BITVECTOR[8],      !DRIVE DROP STATUS FLAG REGISTER
156 ;          1546     NUM_DRIVES;                     !INDICATES THE NUMBER OF ATTACHED UUT'S TO TEST
157 ;          1547
158 ;          1548
159 ;          1549  LITERAL
160 ;          1550     INACTIVE = 0,                   !CODE TO DESELECT UUT'S
161 ;          1551     ACTIVE = 1;                     !CODE TO SELECT UUT'S
162 ;          1552
163 ;          1553
164 ;          1554  !+
165 ;          1555  ! THIS SECTION IS CALLED FOR THE PURPOSE OF
166 ;          1556  ! DROPPING THIS UUT FROM FURTHER TESTING.
167 ;          1557  !
168 ;          1558  ! THEREFORE CLEAR THIS UUT'S DRIVE ACTIVE FLAG BIT
169 ;          1559  ! AND SET THIS UUT'S DRIVE DROPPED FLAG.
170 ;          1560  !-
171 ;          1561
172 ;          1562  DRIVE_STATUS[.L$LUN] = INACTIVE;        !CLEAR THE DRIVE ACTIVE FLAG
173 ;          1563  DROPT_DRIVES[.L$LUN] = ACTIVE;          !SET THE DRIVES DROPPED FLAG
174 ;          1564
175 ;          1565  !+
176 ;          1566  ! DECRIMENT THE GLOBAL VARIABLE 'NUM_DRIVES' WHICH
177 ;          1567  ! STORES THE NUMBER OF UUT'S WHICH ARE TESTED BY THIS
178 ;          1568  ! EXERCISER.
179 ;          1569  !
180 ;          1570  ! IF THE NUMBER OF DRIVES REMAINING TO TEST IS ZERO
181 ;          1571  ! THEN CALL THE CLEAN UP CODE SECTION AND EXIT THIS
182 ;          1572  ! PROGRAM ELSE CONTINUE TESTING THE REMAINING ACTIVE
183 ;          1573  ! UUT'S.
184 ;          1574  !-
185 ;MLX3
186 ;                   DROP UNIT SECTION                    25-Mar-1982 22:23:37    TOPS-20 Bliss-16 V2(212)
                                                             25-Mar-1982 22:21:30    PA:<NEALE>MLX3.BLI.1 (3)
```

SEQ 0043

```
187
188 ;          1575
189 ;          1576  NUM_DRIVES = .NUM_DRIVES - 1;          !DECRIMENT THE NUMBER OF DRIVES REMAINING TO TEST
190 ;          1577
191 ;          1578
192 ;          1579  IF .NUM_DRIVES EQL 0 THEN  DOCLN;      !DO CLEAN UP CODE AND EXIT PROG IF ZERO
193 ;          1580
194 ;          1581  RETURN;
195 ;          1582
196 ;          1583  ENDDU;
200
201                                    .GLOBL  L$LUN, DRIVE.STATUS, DROPT.DRIVES
202                                    .GLOBL  NUM.DRIVES
203
204
205                                    .SBTTL  LDU DROP UNIT SECTION
```

```
                                                                                                                    1562
                                                                                                                    1563
                                                                                                                    1576
                                                                                                                    1579
                                                                                                                    1522
                                                                                                                    1581
```

```
 210 005516  016700  174352          LDU:    MOV     L$LUN,R0                        ;
 211 005522  006200                          ASR     R0
 212 005524  006200                          ASR     R0
 213 005526  006200                          ASR     R0
 214 005530  062700  034442                  ADD     #DRIVE.STATUS,R0
 215 005534  010046                          MOV     R0,-(SP)
 216 005536  016746  174332                  MOV     L$LUN,-(SP)
 217 005542  042716  177770                  BIC     #177770,(SP)
 218 005546  012746  000001                  MOV     #1,-(SP)
 219 005552  005046                          CLR     -(SP)
 220 005554  004767  177034                  JSR     PC,BL$PU2
 221 005560  016700  174310                  MOV     L$LUN,R0                        ;
 222 005564  006200                          ASR     R0
 223 005566  006200                          ASR     R0
 224 005570  006200                          ASR     R0
 225 005572  062700  034444                  ADD     #DROPT.DRIVES,R0
 226 005576  010016                          MOV     R0,(SP)
 227 005600  016746  174270                  MOV     L$LUN,-(SP)
 228 005604  042716  177770                  BIC     #177770,(SP)
 229 005610  012746  000001                  MOV     #1,-(SP)
 230 005614  011646                          MOV     (SP),-(SP)
 231 005616  004767  176772                  JSR     PC,BL$PU2
 232 005622  005367  026630                  DEC     NUM.DRIVES                      ;
 233 005626  001001                          BNE     1$                              ;
 234 005630  104444                          TRAP    44
 235 005632  062706  000016          1$:     ADD     #16,SP                          ;
 236 005636  000207                          RTS     PC
 237
 238                                  ; Routine Size:  41 words
 239                                  ; Maximum stack depth per invocation:  7 words
 247
 248
 252
 253                                          .SBTTL  LSDU DROP UNIT SECTION
 257 005640  004767  177652          LSDU::  JSR     PC,LDU                          ;
 258 005644  104453                          TRAP    53
 259 005646  000207                          RTS     PC
 260
 261                                  ; Routine Size:  4 words
 262                                  ; Maximum stack depth per invocation:  0 words
 267
 268
```

```
                                                                25-Mar-1982 22:23:37    TOPS-20 Bliss-16 V2(212)
                        ADD UNIT SECTION                        25-Mar-1982 22:21:30    PA:<NEALE>MLX3.BLI.1 (4)

                1584    %SBTTL 'ADD UNIT SECTION'
                1585
                1586    !++
                1587    !   THE ADD UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
                1588    !   TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
                1589    !   TO THE TEST CYCLE.   SINCE THE INITIALIZATION CODE WILL HAVE
                1590    !   TO BE EXECUTED IMMEDIATELY AFTER AN 'ADD',  THERE IS NO NEED
                1591    !   FOR ANY CODE IN THIS SECTION.
                1592    !--
                1593
                1594    BGNAU;
                1595
                1596    RETURN;
                1597
                1598    ENDAU;

                                        .SBTTL  LAU ADD UNIT SECTION
005650  000207                  LAU:    RTS     PC                      ;                               1583
```

```
                                ; Routine Size:  1 word
                                ; Maximum stack depth per invocation:  0 words
                                
                                
                                
                                        .SBTTL  L$AU ADD UNIT SECTION
005652  004767  177772          L$AU::  JSR     PC,LAU                  ;                1596
005656  104452                          TRAP    52
005660  000207                          RTS     PC
                                
                                ; Routine Size:  4 words
                                ; Maximum stack depth per invocation:  0 words
;               1599
;MLX3                                                   25-Mar-1982 22:23:37    TOPS-20 Bliss-16 V2(212)
;                       ADD UNIT SECTION                25-Mar-1982 22:21:30    PA:<NEALE>MLX3.BLI.1 (4)
;               1600
;               1601    END
;               1602
;               1603    ELUDOM
```

```
                        ; OTS external references
                                .GLOBL  BL$PU2
;          1604
;          1605
; Size:           62 code + 0 data words
; Run Time:       00:03.3
; Elapsed Time:   00:05.2
; Memory Used:    26 pages
; Compilation Complete
```

```
;MLX4                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                        27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (1)

;          0001  MODULE MLX4 =
;          0002  BEGIN
;          0003  !
;          0004  ! PERTTY BLF COMMANDS
;          0005  !
;          0006  !<BLF/NOERRORS>
;          0007  !<BLF/LOWERCASE_KEY>
;          0008  !
;          0009
;          0010  require 'BLSMAC.REQ';
;          1500
;MLX4                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                  VARIABLES AND CONSTANTS               27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (2)

;          1501  %sbttl 'VARIABLES AND CONSTANTS'
;          1502
;          1503  Literal
;          1504  !
;          1505  ! VER CZMLBB ADDED LITERIAL TRUE, FALSE AND ZERO
;          1506  !
;          1507      ZERO = %o'000000',                  !DEFINE ZERO DATA
;          1508      TRUE = 1,                           !LOGICAL TRUE INDICATOR
;          1509      FALSE = 0,                          !LOGICAL FALSE INDICATOR
;          1510  !
;          1511  ! OTHER LITERIAL DEFINITIONS
;          1512  !
;          1513      ONE = 1,                            !NUMBER OF TIMES TO RETRY FOR DATA ERROR
;          1514      SIX = 6,                            !NUMBER OF TIMES TO RETRY FOR SYSTEM ERROR
;          1515      NUM_PATS = 10,                      !NUMBER OF REGULAR PATTERNS
;          1516      NUM_REGS = 22,                      !NUMBER OF ML11 REGISTERS
;          1517      TIMES_TO_LOOP = 2,                  !LOOP READING CONSTANT
;          1518      BUFSIZ = 256*8,                     !2048 16-BIT WORDS IN A FULL BUFFER
;          1519      !256 = NUMBER OF WORDS IN A SECTOR
;          1520      !  8 = NUMBER OF SECTORS IN THE BUFFER
;          1521      !
;          1522      !  ML11 DRIVE TYPES:
;          1523      !
;          1524      ML11A = %o'000110',                 !16K CHIPS
;          1525      ML11B = %o'000111',                 !64K CHIPS
;          1526      !
;          1527      !  FUNCTION CODES:
;          1528      !
;          1529      DRV_CLR = %o'11',
;          1530      WC_CMD = %o'51',
;          1531      WR_CMD = %o'61',
;          1532      RD_CMD = %o'71',
;          1533      !
;          1534      !  STATUS CODES:
;          1535      !
;          1536      INACTIVE = 0,
;          1537      ACTIVE = 1,
;          1538      !
;          1539      !  ERROR THRESHOLD VALUES:
;          1540      !
```

SEQ 0049

```
;        1541      S16K_LIMIT = 10,                        !SOFT ERROR, 16K ARRAYS
;        1542      H16K_LIMIT = 10,                        !HARD ERROR, 16K ARRAYS
;        1543      S64K_LIMIT = 10,                        !SOFT ERROR, 64K ARRAYS
;        1544      H64K_LIMIT = 10,                        !HARD ERROR, 64K ARRAYS
;        1545                                              !
;        1546      !  SUMMARY OF ERROR CODES:
;        1547      !
;        1548      !
;        1549      ! THE 'INTEGRITY' ROUTINE:
;        1550      !
;        1551      !WRITE COMMAND:
;        1552      !ERRDF(1,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 01 ****
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

;          1553      !ERRDF(2,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 02 ****
;          1554      !ERRDF(3,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 03 ****
;          1555      !READ COMMAND:
;          1556      !ERRDF(4,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 04 ****
;          1557      !ERRDF(5,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 05 ****
;          1558      !ERRDF(6,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 06 ****
;          1559      !ERRDF(7,MSG1,0);    !**** INTEGRITY ROUTINE ERROR 07 ****
;          1560      !ERRDF(8,MSG2,0);    !**** INTEGRITY ROUTINE ERROR 08 ****
;          1561      !ERRHRD(9,MSG4,0);   !**** INTEGRITY ROUTINE ERROR 09 ****
;          1562      !ERRSOFT(10,MSG3,0); !**** INTEGRITY ROUTINE ERROR 10 ****
;          1563      !ERRSOFT(11,MSG3,1); !**** INTEGRITY ROUTINE ERROR 10 ****
;          1564      !WRITE CHECK COMMAND:
;          1565      !ERRDF(12,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 12 ****
;          1566      !ERRDF(13,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 13 ****
;          1567      !ERRDF(14,MSG1,0);   !**** INTEGRITY ROUTINE ERROR 14 ****
;          1568      !ERRDF(15,MSG2,0);   !**** INTEGRITY ROUTINE ERROR 15 ****
;          1569      !ERRHRD(16,MSG4,0);  !**** INTEGRITY ROUTINE ERROR 16 ****
;          1570      !ERRSOFT(17,MSG3,8); !**** INTEGRITY ROUTINE ERROR 17 ****
;          1571      !ERRSOFT(18,MSG3,1); !**** INTEGRITY ROUTINE ERROR 18 ****
;          1572      !
;          1573      ! OPTION 1:
;          1574      !
;          1575      !WRITE COMMAND:
;          1576      !ERRDF(101,MSG1,0);   !**** OPTION 1 ERROR 01 ****
;          1577      !ERRDF(102,MSG1,0);   !**** OPTION 1 ERROR 02 ****
;          1578      !ERRDF(103,MSG1,0);   !**** OPTION 1 ERROR 03 ****
;          1579      !CHECK OR READ:
;          1580      !ERRDF(104,MSG1,0);   !**** OPTION 1 ERROR 04 ****
;          1581      !ERRDF(105,MSG1,0);   !**** OPTION 1 ERROR 05 ****
;          1582      !ERRDF(106,MSG1,0);   !**** OPTION 1 ERROR 06 ****
;          1583      !ERRDF(107,MSG1,0);   !**** OPTION 1 ERROR 07 ****
;          1584      !ERRDF(108,MSG2,0);   !**** OPTION 1 ERROR 08 ****
;          1585      !ERRHRD(109,MSG4,0);  !**** OPTION 1 ERROR 09 ****
;          1586      !ERRSOFT(110,MSG3,0); !**** OPTION 1 ERROR 10 ****
;          1587      !ERRSOFT(111,MSG3,0); !**** OPTION 1 ERROR 11 ****
;          1588                                                    !
;          1589      ! OPTION 2:
;          1590      !
;          1591      !WRITE COMMAND:
;          1592      !ERRDF(201,MSG1,0);   !**** OPTION 2 ERROR 01 ****
;          1593      !ERRDF(202,MSG1,0);   !**** OPTION 2 ERROR 02 ****
;          1594      !ERRDF(203,MSG1,0);   !**** OPTION 2 ERROR 03 ****
;          1595      !CHECK OR READ:
;          1596      !ERRDF(204,MSG1,0);   !**** OPTION 2 ERROR 04 ****
;          1597      !ERRDF(205,MSG1,0);   !**** OPTION 2 ERROR 05 ****
;          1598      !ERRDF(206,MSG1,0);   !**** OPTION 2 ERROR 06 ****
;          1599      !ERRDF(207,MSG1,0);   !**** OPTION 2 ERROR 07 ****
;          1600      !ERRDF(208,MSG2,0);   !**** OPTION 2 ERROR 08 ****
;          1601      !ERRHRD(209,MSG4,0);  !**** OPTION 2 ERROR 09 ****
;          1602      !ERRSOFT(210,MSG3,0); !**** OPTION 2 ERROR 10 ****
;          1603      !ERRSOFT(211,MSG3,1); !**** OPTION 2 ERROR 10 ****
;          1604      !LOOP CHECK OR READ:
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

;          1605      !ERRDF(212,MSG1,0);    !**** OPTION 2 ERROR 12 ****
;          1606      !ERRDF(213,MSG1,0);    !**** OPTION 2 ERROR 13 ****
;          1607      !ERRDF(214,MSG1,0);    !**** OPTION 2 ERROR 14 ****
;          1608      !ERRDF(215,MSG1,0);    !**** OPTION 2 ERROR 15 ****
;          1609      !ERRDF(216,MSG2,0);    !**** OPTION 2 ERROR 16 ****
;          1610      !ERRHRD(217,MSG4,0);   !**** OPTION 2 ERROR 17 ****
;          1611      !ERRSOFT(218,MSG3,0);  !**** OPTION 2 ERROR 18 ****
;          1612      !ERRSOFT(219,MSG3,0);  !**** OPTION 2 ERROR 19 ****
;          1613      !
;          1614      ! OPTION 3:
;          1615      !
;          1616      !WRITE COMMAND:
;          1617      !ERRDF(301,MSG1,0);    !**** OPTION 3 ERROR 01 ****
;          1618      !ERRDF(302,MSG1,0);    !**** OPTION 3 ERROR 02 ****
;          1619      !ERRDF(303,MSG1,0);    !**** OPTION 3 ERROR 03 ****
;          1620      !CHECK OR READ:
;          1621      !ERRDF(304,MSG1,0);    !**** OPTION 3 ERROR 04 ****
;          1622      !ERRDF(305,MSG1,0);    !**** OPTION 3 ERROR 05 ****
;          1623      !ERRDF(306,MSG1,0);    !**** OPTION 3 ERROR 06 ****
;          1624      !ERRDF(307,MSG1,0);    !**** OPTION 3 ERROR 07 ****
;          1625      !ERRDF(308,MSG2,0);    !**** OPTION 3 ERROR 08 ****
;          1626      !ERRHRD(309,MSG4,0);   !**** OPTION 3 ERROR 09 ****
;          1627      !ERRSOFT(310,MSG3,0);  !**** OPTION 3 ERROR 10 ****
;          1628      !ERRSOFT(311,MSG3,0);  !**** OPTION 3 ERROR 11 ****
;          1629      !
;          1630      ! OPTION 4:
;          1631      !
;          1632      !MARCHING UP:
;          1633      !WRITE DATA:
;          1634      !ERRDF(401,MSG1,0);    !**** OPTION 4 ERROR 01 ****
;          1635      !ERRDF(402,MSG1,0);    !**** OPTION 4 ERROR 02 ****
;          1636      !ERRDF(403,MSG1,0);    !**** OPTION 4 ERROR 03 ****
;          1637      !MARCHING UP:
;          1638      !CHECK OR READ DATA:
;          1639      !ERRDF(404,MSG1,0);    !**** OPTION 4 ERROR 04 ****
;          1640      !ERRDF(405,MSG1,0);    !**** OPTION 4 ERROR 05 ****
;          1641      !ERRDF(406,MSG1,0);    !**** OPTION 4 ERROR 06 ****
;          1642      !ERRDF(407,MSG1,0);    !**** OPTION 4 ERROR 07 ****
;          1643      !ERRDF(408,MSG2,0);    !**** OPTION 4 ERROR 08 ****
;          1644      !ERRHRD(409,MSG4,0);   !**** OPTION 4 ERROR 09 ****
;          1645      !ERRSOFT(410,MSG3,0);  !**** OPTION 4 ERROR 10 ****
;          1646      !ERRSOFT(411,MSG3,0);  !**** OPTION 4 ERROR 11 ****
;          1647      !WRITE COMP:
;          1648      !ERRDF(412,MSG1,0);    !**** OPTION 4 ERROR 12 ****
;          1649      !ERRDF(413,MSG1,0);    !**** OPTION 4 ERROR 13 ****
;          1650      !ERRDF(414,MSG1,0);    !**** OPTION 4 ERROR 14 ****
;          1651      !MARCHING DOWN:
;          1652      !CHECK OR READ COMP:
;          1653      !ERRDF(415,MSG1,0);    !**** OPTION 4 ERROR 15 ****
;          1654      !ERRDF(416,MSG1,0);    !**** OPTION 4 ERROR 16 ****
;          1655      !ERRDF(417,MSG1,0);    !**** OPTION 4 ERROR 17 ****
;          1656      !ERRDF(418,MSG1,0);    !**** OPTION 4 ERROR 18 ****
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188 ;MLX4
189 ;                    VARIABLES AND CONSTANTS                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
190 ;                                                               27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (2)
191 ;          1657      !ERRDF(419,MSG2,0);    !**** OPTION 4 ERROR 19 ****
192 ;          1658      !ERRHRD(420,MSG4,0);   !**** OPTION 4 ERROR 20 ****
193 ;          1659      !ERRSOFT(421,MSG3,0);  !**** OPTION 4 ERROR 21 ****
194 ;          1660      !ERRSOFT(422,MSG3,0);  !**** OPTION 4 ERROR 22 ****
195 ;          1661      !WRITE DATA:
196 ;          1662      !ERRDF(423,MSG1,0);    !**** OPTION 4 ERROR 23 ****
197 ;          1663      !ERRDF(424,MSG1,0);    !**** OPTION 4 ERROR 24 ****
198 ;          1664      !ERRDF(425,MSG1,0);    !**** OPTION 4 ERROR 25 ****
199 ;          1665      !MARCHING UP:
200 ;          1666      !CHECK OR READ DATA:
201 ;          1667      !ERRDF(426,MSG1,0);    !**** OPTION 4 ERROR 26 ****
202 ;          1668      !ERRDF(427,MSG1,0);    !**** OPTION 4 ERROR 27 ****
203 ;          1669      !ERRDF(428,MSG1,0);    !**** OPTION 4 ERROR 28 ****
204 ;          1670      !ERRDF(429,MSG1,0);    !**** OPTION 4 ERROR 29 ****
205 ;          1671      !ERRDF(430,MSG2,0);    !**** OPTION 4 ERROR 30 ****
206 ;          1672      !ERRHRD(431,MSG4,0);   !**** OPTION 4 ERROR 31 ****
207 ;          1673      !ERRSOFT(432,MSG3,0);  !**** OPTION 4 ERROR 32 ****
208 ;          1674      !ERRSOFT(433,MSG3,0);  !**** OPTION 4 ERROR 33 ****
209 ;          1675      !
210 ;          1676      ! OPTION 5:
211 ;          1677      !
212 ;          1678      !'RAND1' ROUTINE:
213 ;          1679      !WRITE COMMAND:
214 ;          1680      !ERRDF(5101,MSG1,0);    !**** OPTION 5, RAND1 ERROR 01 ****
215 ;          1681      !ERRDF(5102,MSG1,0);    !**** OPTION 5, RAND1 ERROR 02 ****
216 ;          1682      !ERRDF(5103,MSG1,0);    !**** OPTION 5, RAND1 ERROR 03 ****
217 ;          1683      !CHECK OR READ:
218 ;          1684      !ERRDF(5104,MSG1,0);    !**** OPTION 5, RAND1 ERROR 04 ****
219 ;          1685      !ERRDF(5105,MSG1,0);    !**** OPTION 5, RAND1 ERROR 05 ****
220 ;          1686      !ERRDF(5106,MSG1,0);    !**** OPTION 5, RAND1 ERROR 06 ****
221 ;          1687      !ERRDF(5107,MSG1,0);    !**** OPTION 5, RAND1 ERROR 07 ****
222 ;          1688      !ERRDF(5108,MSG2,0);    !**** OPTION 5, RAND1 ERROR 08 ****
223 ;          1689      !ERRHRD(5109,MSG4,0);   !**** OPTION 5, RAND1 ERROR 09 ****
224 ;          1690      !ERRSOFT(5110,MSG3,0);  !**** OPTION 5, RAND1 ERROR 10 ****
225 ;          1691      !ERRSOFT(5111,MSG3,0);  !**** OPTION 5, RAND1 ERROR 11 ****
226 ;          1692      !'RAND2' ROUTINE:
227 ;          1693      !WRITE COMMAND:
228 ;          1694      !ERRDF(5201,MSG1,0);    !**** OPTION 5, RAND2 ERROR 01 ****
229 ;          1695      !ERRDF(5202,MSG1,0);    !**** OPTION 5, RAND2 ERROR 02 ****
230 ;          1696      !ERRDF(5203,MSG1,0);    !**** OPTION 5, RAND2 ERROR 03 ****
231 ;          1697      !CHECK OR READ:
232 ;          1698      !ERRDF(5204,MSG1,0);    !**** OPTION 5, RAND2 ERROR 04 ****
233 ;          1699      !ERRDF(5205,MSG1,0);    !**** OPTION 5, RAND2 ERROR 05 ****
234 ;          1700      !ERRDF(5206,MSG1,0);    !**** OPTION 5, RAND2 ERROR 06 ****
235 ;          1701      !ERRDF(5207,MSG1,0);    !**** OPTION 5, RAND2 ERROR 07 ****
236 ;          1702      !ERRDF(5208,MSG2,0);    !**** OPTION 5, RAND2 ERROR 08 ****
237 ;          1703      !ERRHRD(5209,MSG4,0);   !**** OPTION 5, RAND2 ERROR 09 ****
238 ;          1704      !ERRSOFT(5210,MSG3,0);  !**** OPTION 5, RAND2 ERROR 10 ****
239 ;          1705      !ERRSOFT(5211,MSG3,0);  !**** OPTION 5, RAND2 ERROR 11 ****
240 ;          1706      !'RAND3' ROUTINE:
241 ;          1707      !WRITE COMMAND:
242 ;          1708      !ERRDF(5301,MSG1,0);    !**** OPTION 5, RAND3 ERROR 01 ****
```

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244 ;MLX4
245 ;                    VARIABLES AND CONSTANTS
246 ;
247 ;          1709      !ERRDF(5302,MSG1,0);    !**** OPTION 5, RAND3 ERROR 02 ****
248 ;          1710      !ERRDF(5303,MSG1,0);    !**** OPTION 5, RAND3 ERROR 03 ****
249 ;          1711      !CHECK OR READ:
250 ;          1712      !ERRDF(5304,MSG1,0);    !**** OPTION 5, RAND3 ERROR 04 ****
251 ;          1713      !ERRDF(5305,MSG1,0);    !**** OPTION 5, RAND3 ERROR 05 ****
252 ;          1714      !ERRDF(5306,MSG1,0);    !**** OPTION 5, RAND3 ERROR 06 ****
253 ;          1715      !ERRDF(5307,MSG1,0);    !**** OPTION 5, RAND3 ERROR 07 ****
254 ;          1716      !ERRDF(5308,MSG2,0);    !**** OPTION 5, RAND3 ERROR 08 ****
255 ;          1717      !ERRHRD(5309,MSG4,0);   !**** OPTION 5, RAND3 ERROR 09 ****
256 ;          1718      !ERRSOFT(5310,MSG3,0);  !**** OPTION 5, RAND3 ERROR 10 ****
257 ;          1719      !ERRSOFT(5311,MSG3,0);  !**** OPTION 5, RAND3 ERROR 11 ****
258 ;          1720      !'RAND4' ROUTINE:
259 ;          1721      !WRITE COMMAND:
260 ;          1722      !ERRDF(5401,MSG1,0);    !**** OPTION 5, RAND4 ERROR 01 ****
261 ;          1723      !ERRDF(5402,MSG1,0);    !**** OPTION 5, RAND4 ERROR 02 ****
262 ;          1724      !ERRDF(5403,MSG1,0);    !**** OPTION 5, RAND4 ERROR 03 ****
263 ;          1725      !CHECK OR READ:
264 ;          1726      !ERRDF(5404,MSG1,0);    !**** OPTION 5, RAND4 ERROR 04 ****
265 ;          1727      !ERRDF(5405,MSG1,0);    !**** OPTION 5, RAND4 ERROR 05 ****
266 ;          1728      !ERRDF(5406,MSG1,0);    !**** OPTION 5, RAND4 ERROR 06 ****
267 ;          1729      !ERRDF(5407,MSG1,0);    !**** OPTION 5, RAND4 ERROR 07 ****
268 ;          1730      !ERRDF(5408,MSG2,0);    !**** OPTION 5, RAND4 ERROR 08 ****
269 ;          1731      !ERRHRD(5409,MSG4,0);   !**** OPTION 5, RAND4 ERROR 09 ****
270 ;          1732      !ERRSOFT(5410,MSG3,0);  !**** OPTION 5, RAND4 ERROR 10 ****
271 ;          1733      !ERRSOFT(5411,MSG3,0);  !**** OPTION 5, RAND4 ERROR 11 ****
272 ;          1734      !
273 ;          1735      ! CODES FOR WHY A UNIT WAS DROPPED:
274 ;          1736      !
275 ;          1737      CODE_1 = 1,                         !DRIVE NOT POWERED UP
276 ;          1738      CODE_2 = 2,                         !DRIVE NOT AN ML11 UNIT
277 ;          1739      CODE_3 = 3,                         !OPERATOR SET TEST LIMITS INCORRECTLY
278 ;          1740      CODE_4 = 4,                         !FAILED ALL RETRIES FOR A NON-FATAL ERROR
279 ;          1741      CODE_5 = 5,                         !CONTROLLER FATAL ERROR
280 ;          1742      CODE_6 = 6,                         !DRIVE FATAL ERROR
281 ;          1743      CODE_7 = 7,                         !ECC HARD ERROR
282 ;          1744      CODE_8 = 8;                         !ECC LOGIC FAILED TO DETECT ERROR
283 ;          1745
284 ;          1746  !
285 ;          1747  ! FIELD DECLARTIONS
286 ;          1748  !
287 ;          1749
288 ;          1750  field
289 ;          1751  !
290 ;          1752  ! VER CZMLBB ADD FIELD DECLARATION
291 ;          1753  !
292 ;          1754  ! FIELD DECLARATION TO MAP THE SINGLE BIT
293 ;          1755  ! ERROR LOG TABLE.
294 ;          1756  !
295 ;          1757      SBE_TBL_MAP =
296 ;          1758          set
297 ;          1759              BNK$_SBE = [0, 0, 2, 0],        !LOG BANK OF SBE
298 ;          1760              BRD$_SBE = [0, 2, 4, 0],        !LOG BOARD OF SBE
```

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300 ;MLX4
301 ;                   VARIABLES AND CONSTANTS                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
302 ;                                                              27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (2)
303 ;          1761         BIT$_SBE = [0, 6, 7, 0],               !LOG BIT OF SBE
304 ;          1762         UNIT$_SBE = [0, 13, 3, 0],             !LOG UNIT OF SBE
305 ;          1763         SUM$_SBE = [1, 0, 16, 0],              !LOG NUMBER OF TIMES OCCURING
306 ;          1764         WRD$_0 = [0, 0, 16, 0],                !ACCESS FIRST WORD OF TABLE
307 ;          1765         WRD$_1 = [1, 0, 16, 0]                 !ACCESS SECOND WORD OF TABE
308 ;          1766         tes,
309 ;          1767 !
310 ;          1768 ! VER CZMLBB ADDED FIELD DECLARATION
311 ;          1769 !
312 ;          1770 ! FIELD DECLARATION FOR PROM MAINTENANCE
313 ;          1771 ! SUM TABLE
314 ;          1772 !
315 ;          1773    PM_SBE_MAP =
316 ;          1774         set
317 ;          1775         PM_SBE$_SUM = [0, 16, 0]               !ACCESS NUMBER OF SBE PER ARRAY
318 ;          1776         tes,
319 ;          1777 !
320 ;          1778 ! FIELD DECLARATION FOR PATTERN TABLE
321 ;          1779 !
322 ;          1780    PATMAP =
323 ;          1781         set
324 ;          1782         COUNT1 = [0, 0, 16, 0],
325 ;          1783         COUNT2 = [1, 0, 16, 0]
326 ;          1784         tes;
327 ;          1785
328 ;          1786 own
329 ;          1787         !
330 ;          1788         ! Single bit error logging and Prom Maint
331 ;          1789         ! program storage structures
332 ;          1790         !
333 ;          1791         ! VER CZMLBB ADDED FOLLOWING THREE DATA DECLARATIONS
334 ;          1792         !
335 ;          1793         SBE_LOG : blockvector [128, 2, word] field (SBE_TBL_MAP),   !SBE LOCATION TABLE
336 ;          1794         PM_SBE_CNT : blockvector [8, 16, word] field (PM_SBE_MAP),  !ARRAY SBE COUNT TALBE
337 ;          1795         SBE$_COUNT : word,                     !COUNTS NUMBER OF SBE LOCATION TABLE ENTRIES
338 ;          1796         BIT_NUM,                               !STORS FAILING SBE CHIP NUMBER
339 ;          1797         !
340 ;          1798         ! ML-11 EXERCISER STORAGE ALLOCATION
341 ;          1799         !
342 ;          1800         WBUFF : vector [BUFSIZ] volatile,      !IMPORTANT -- WBUFF AND RBUFF MUST
343 ;          1801         RBUFF : vector [BUFSIZ] volatile,      !BE CONTIGUOUS AND IN THAT ORDER!!
344 ;          1802         WPTR : volatile,
345 ;          1803         RPTR : volatile,
346 ;          1804         QUICK : volatile,
347 ;          1805         PATTERN : volatile,
348 ;          1806         DATA_COUNT : volatile,
349 ;          1807         COMP_COUNT : volatile,
350 ;          1808         EOP_COUNT : volatile,
351 ;          1809         BASE_ADDR,
352 ;          1810         VEC,
353 ;          1811         BR_LEVEL,
354 ;          1812         SOFTS : blockvector [8, 16],           !COUNTS FOR 8 LUNS, 16 ARRAYS EACH
```

```
356 ;MLX4
357 ;                   VARIABLES AND CONSTANTS
358 ;
359 ;        1813       HARDS : blockvector [8, 16],        !COUNTS FOR 8 LUNS, 16 ARRAYS EACH
360 ;        1814       TRIES : blockvector [8, 16],        !COUNTS FOR 8 LUNS, 16 ARRAYS EACH
361 ;        1815       WR_COUNT,                           !# BYTES TRANSFERED VIA 'WRITE'
362 ;        1816       WR_THOUSANDS,                       !THOUSANDS OF BYTES
363 ;        1817       WR_MILLIONS,                        !MILLIONS OF BYTES
364 ;        1818       RD_COUNT,                           !# BYTES TRANSFERED VIA 'READ'
365 ;        1819       RD_THOUSANDS,
366 ;        1820       RD_MILLIONS,
367 ;        1821       WC_COUNT,                           !# BYTES TRANSFERED VIA 'WRITE CHECK'
368 ;        1822       WC_THOUSANDS,
369 ;        1823       WC_MILLIONS,
370 ;        1824       I_AM_DONE,
371 ;        1825       RETRYING,
372 ;        1826       BOARD,
373 ;        1827       BANK;
374 ;        1828
375 ;        1829   global
376 ;        1830       ML_REG : vector [NUM_REGS] volatile,
377 ;        1831       PTABLE_ADDR : vector [8] volatile,
378 ;        1832       DRIVE_STATUS : bitvector [8] volatile,
379 ;        1833       DROPT_DRIVES : bitvector [8] volatile,
380 ;        1834       WHY_DROPT : vector [8, byte],
381 ;        1835       NUM_DRIVES,
382 ;        1836       LOW_SECT : vector [8] volatile,
383 ;        1837       TOP_SECT : vector [8] volatile;
384 ;        1838
385 ;        1839   EQUALS;
386 ;        1840
387 ;        1841   macro
388 ;        1842       !
389 ;        1843       ! TO CALCULATE THE TEST RANGES FOR A PARTICULAR LOGICAL UNIT:
390 ;        1844       !
391 ;      M 1845       LOWEST =
392 ;        1846   .LOW_SECT[.LUN]%,                       !THE FIRST SECTOR TO TEST
393 ;      M 1847       HIGHEST =
394 ;        1848   .TOP_SECT[.LUN]%,                       !THE LAST SECTOR TO TEST
395 ;        1849   !
396 ;        1850       ! ADDRESS IN MAIN MEMORY THAT CONTAINS THE PHYSICAL DRIVE
397 ;        1851       ! NUMBER THAT CORRESPONDS TO A PARTICULAR LOGICAL UNIT:
398 ;        1852       !
399 ;      M 1853       DRIVE =
400 ;        1854   (.PTABLE_ADDR[.LUN] + 6)%,
401 ;        1855       !
402 ;        1856       !  ML-11 REGISTER NAMES:
403 ;        1857       !
404 ;      M 1858       MLCS1 =
405 ;        1859   .ML_REG[0]%,                           !CONTROL AND STATUS REGISTER 1
406 ;      M 1860       MLWC =
407 ;        1861   .ML_REG[1]%,                           !WORD COUNT REGISTER
408 ;      M 1862       MLBA =
409 ;        1863   .ML_REG[2]%,                           !UNIBUS ADDRESS REGISTER
410 ;      M 1864       MLDA =
```

```
412 ;MLX4
413 ;                    VARIABLES AND CONSTANTS
414 ;
415 ;          1865    .ML_REG[3]%,                    !DESIRED ADDRESS REGISTER
416 ;        M 1866      MLCS2 =
417 ;          1867    .ML_REG[4]%,                    !CONTROL AND STATUS REGISTER 2
418 ;        M 1868      MLDS =
419 ;          1869    .ML_REG[5]%,                    !DRIVE STATUS REGISTER
420 ;        M 1870      MLER =
421 ;          1871    .ML_REG[6]%,                    !ERROR REGISTER
422 ;        M 1872      MLAS =
423 ;          1873    .ML_REG[7]%,                    !ATTENTION SUMMARY REGISTER
424 ;        M 1874      MLPA =
425 ;          1875    .ML_REG[8]%,                    !PROM ADDRESS REGISTER
426 ;        M 1876      MLDB =
427 ;          1877    .ML_REG[9]%,                    !DATA BUFFER REGISTER
428 ;        M 1878      MLMR =
429 ;          1879    .ML_REG[10]%,                   !MAINTENANCE REGISTER
430 ;        M 1880      MLDT =
431 ;          1881    .ML_REG[11]%,                   !DRIVE TYPE REGISTER
432 ;        M 1882      MLSN =
433 ;          1883    .ML_REG[12]%,                   !SERIAL NUMBER REGISTER
434 ;        M 1884      MLE1 =
435 ;          1885    .ML_REG[13]%,                   !ECC REGISTER 1
436 ;        M 1886      MLE2 =
437 ;          1887    .ML_REG[14]%,                   !ECC REGISTER 2
438 ;        M 1888      MLD1 =
439 ;          1889    .ML_REG[15]%,                   !DATA DIAGNOSTIC REGISTER 1
440 ;        M 1890      MLD2 =
441 ;          1891    .ML_REG[16]%,                   !DATA DIAGNOSTIC REGISTER 2
442 ;        M 1892      MLEE =
443 ;          1893    .ML_REG[17]%,                   !ECC ERROR REGISTER
444 ;        M 1894      MLEL =
445 ;          1895    .ML_REG[18]%,                   !ECC ERROR LOCATION REGISTER
446 ;        M 1896      MLPD =
447 ;          1897    .ML_REG[19]%,                   !PROM DATA REGISTER
448 ;        M 1898      MLBAE =
449 ;          1899    .ML_REG[20]%,                   !BUS ADDRESS EXTENSION REGISTER
450 ;        M 1900      MLCS3 =
451 ;          1901    .ML_REG[21]%,                   !CONTROL AND STATUS REGISTER 3
452 ;          1902    !
453 ;          1903        !  BIT ASSIGNMENTS:
454 ;          1904        !
455 ;          1905        !
456 ;          1906        !  MLCS1 BITS:
457 ;          1907        !
458 ;        M 1908      SC =
459 ;          1909    (MLCS1)<15,1>%,                 !SPECIAL CONDITION
460 ;        M 1910      TRE =
461 ;          1911    (MLCS1)<14,1>%,                 !TRANSFER ERROR
462 ;        M 1912      MCPE =
463 ;          1913    (MLCS1)<13,1>%,                 !MASSBUS CONTROL BUS PARITY ERROR
464 ;        M 1914      DVA =
465 ;          1915    (MLCS1)<11,1>%,                 !DRIVE AVAILABLE
466 ;        M 1916      RDY =
```

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```
;MLX4
;                    VARIABLES AND CONSTANTS

;          1917    (MLCS1)<7,1>%,                  !READY
;        M 1918      IE =
;          1919    (MLCS1)<6,1>%,                  !INTERRUPT ENABLE
;        M 1920      FUNC =
;          1921    (MLCS1)<0,6>%,                  !FUNCTION (COMMAND) CODE AND GO BIT
;          1922    !
;          1923    !  MLCS2 BITS:
;          1924    !
;        M 1925      DLT =
;          1926    (MLCS2)<15,1>%,                 !DATA LATE
;        M 1927      WCE =
;          1928    (MLCS2)<14,1>%,                 !WRITE CHECK ERROR
;        M 1929      PE =
;          1930    (MLCS2)<13,1>%,                 !PARITY ERROR
;        M 1931      NED =
;          1932    (MLCS2)<12,1>%,                 !NON-EXISTENT DRIVE
;        M 1933      NEM =
;          1934    (MLCS2)<11,1>%,                 !NON-EXISTENT MEMORY
;        M 1935      PGE =
;          1936    (MLCS2)<10,1>%,                 !PROGRAM ERROR
;        M 1937      MXF =
;          1938    (MLCS2)<9,1>%,                  !MISSED TRANSFER
;        M 1939      MDPE =
;          1940    (MLCS2)<8,1>%,                  !MASSBUS DATA BUS PARITY ERROR
;        M 1941      ORDY =
;          1942    (MLCS2)<7,1>%,                  !OUTPUT READY
;        M 1943      IRDY =
;          1944    (MLCS2)<6,1>%,                  !INPUT READY
;        M 1945      CLR =
;          1946    (MLCS2)<5,1>%,                  !CONTROLLER CLEAR
;        M 1947      PAT =
;          1948    (MLCS2)<4,1>%,                  !PARITY TEST
;        M 1949      BAI =
;          1950    (MLCS2)<3,1>%,                  !UNIBUS ADDRESS INCREMENT INHIBIT
;        M 1951      UNIT =
;          1952    (MLCS2)<0,3>%,                  !UNIT SELECT
;          1953    !
;          1954    !  MLDS BITS:
;          1955    !
;        M 1956      ATA =
;          1957    (MLDS)<15,1>%,                  !ATTENTION ACTIVE
;        M 1958      ERR =
;          1959    (MLDS)<14,1>%,                  !ERROR SUMMARY
;        M 1960      MOL =
;          1961    (MLDS)<12,1>%,                  !MEDIUM ON LINE
;        M 1962      LBT =
;          1963    (MLDS)<10,1>%,                  !LAST BLOCK TRANSFERRED
;        M 1964      DPR =
;          1965    (MLDS)<8,1>%,                   !DRIVE PRESENT
;        M 1966      DRY =
;          1967    (MLDS)<7,1>%,                   !DRIVE READY
;        M 1968      VV =
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

;          1969   (MLDS)<6,1>%,                    !VOLUME VALID
;          1970   !
;          1971       !  MLER BITS:
;          1972       !
;        M 1973       DCK =
;          1974   (MLER)<15,1>%,                   !DATA CHECK
;        M 1975       UNS =
;          1976   (MLER)<14,1>%,                   !DRIVE UNSAFE
;        M 1977       OPI =
;          1978   (MLER)<13,1>%,                   !OPERATION INCOMPLETE
;        M 1979       IAE =
;          1980   (MLER)<10,1>%,                   !INVALID ADDRESS ERROR
;        M 1981       AOE =
;          1982   (MLER)<9,1>%,                    !ADDRESS OVERFLOW ERROR
;        M 1983       ECH =
;          1984   (MLER)<6,1>%,                    !ECC HARD ERROR
;        M 1985       DPAR =
;          1986   (MLER)<5,1>%,                    !DATA PARITY ERROR
;        M 1987       CPAR =
;          1988   (MLER)<3,1>%,                    !CONTROL PARITY ERROR
;        M 1989       RMR =
;          1990   (MLER)<2,1>%,                    !REGISTER MODIFICATION REFUSED
;        M 1991       ILR =
;          1992   (MLER)<1,1>%,                    !ILLEGAL REGISTER
;        M 1993       ILF =
;          1994   (MLER)<0,1>%,                    !ILLEGAL FUNCTION
;          1995   !
;          1996       !  MLMR BITS:
;          1997       !
;        M 1998       SZ =
;          1999   (MLMR)<11,5>%,                   !SYSTEM SIZE (# ARRAY CARDS)
;        M 2000       ARR_TYP =
;          2001   (MLMR)<10,1>%,                   !ARRAY TYPE (0=16K;1=64K CHIPS)
;        M 2002       TRT =
;          2003   (MLMR)<8,2>%,                    !TRANSFER RATE
;        M 2004       REF_MAR =
;          2005   (MLMR)<7,1>%,                    !REFRESH MARGIN
;        M 2006       PROM_RW =
;          2007   (MLMR)<6,1>%,                    !PROM READ/WRITE
;        M 2008       PROM_DIS =
;          2009   (MLMR)<5,1>%,                    !PROM DISABLE
;        M 2010       DAT_CLK =
;          2011   (MLMR)<4,1>%,                    !DATA CLOCK
;        M 2012       DAT_DM =
;          2013   (MLMR)<3,1>%,                    !DATA DIAGNOSTIC MODE
;        M 2014       DCK_EN =
;          2015   (MLMR)<2,1>%,                    !DATA CHECK ENABLE
;        M 2016       ECC_DIS =
;          2017   (MLMR)<1,1>%,                    !ECC DISABLE
;        M 2018       ECC_DM =
;          2019   (MLMR)<0,1>%,                    !ECC DIAGNOSTIC MODE
;          2020   !
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```
;MLX4
;                    VARIABLES AND CONSTANTS

;                2021        !  MLSN BITS:
;                2022        !
;            M   2023        SN3 =
;                2024     (MLSN)<12,4>%,                    !HIGH ORDER DECADE
;            M   2025        SN2 =
;                2026     (MLSN)<8,4>%,                     !THIRD DECADE
;            M   2027        SN1 =
;                2028     (MLSN)<4,4>%,                     !SECOND DECADE
;            M   2029        SN0 =
;                2030     (MLSN)<0,4>%,                     !LOW ORDER DECADE
;                2031     !
;                2032        !  MLEE BITS:
;                2033        !
;            M   2034        UNC =
;                2035     (MLEE)<15,1>%,                    !UNCORRECTABLE ERROR
;            M   2036        SGL =
;                2037     (MLEE)<14,1>%,                    !SINGLE ERROR
;            M   2038        crc =
;                2039     (MLEE)<13,1>%,                    !CRC ERROR
;            M   2040        CHAN =
;                2041     (MLEE)<6,6>%,                     !CHANNEL IN ERROR
;            M   2042        EFUN =
;                2043     (MLEE)<0,6>%;                     !ERROR FUNCTION
;                2044
;                2045     external
;                2046        !
;                2047        !HEADER INFORMATION:
;                2048        !
;                2049        EFN$21,                                ! VER CZMLBB EVENT FLAG TO TURN ON SBE TESTING
;                2050        L$UNIT,
;                2051        L$LUN,
;                2052        !
;                2053        !ALL OF THE SOFTWARE P-TABLE LOCATIONS:
;                2054        !
;                2055        LIMIT,
;                2056        RANGE,
;                2057        LSECT,
;                2058        TSECT,
;                2059        ONLY,
;                2060        DROPNE,
;                2061        DROP1,
;                2062        DROP2,
;                2063        DROP3,
;                2064        DROP4,
;                2065        DROP5,
;                2066        MARPAT,
;                2067        REFRESH,
;                2068        ECCDIS,
;                2069        EOPSUM,
;                2070        ERROUT,
;                2071        !
;                2072        !RANDOM NUMBER GENERATION VALUES:
```

```
;MLX4
;                    VARIABLES AND CONSTANTS

                !
                SEED1,
                SEED2,
                SEED3,
                RANDOM;

external routine
    RN : novalue;                       !FOR 16-BIT RANDOM NUMBER GENERATION

!+
!
!  THE PATTERN TABLE:
!
!
!                          R E G U L A R   P A T T E R N S
!
!  PATTERN
!  NUMBER                THE TWO ASSOCIATED COUNTS                  VALUE OF DATA   VALUE OF COMP
!
!     1        0 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  0101            1010
!     2        1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP                  0101            1010
!     3        4 NIBBLES OF DATA,    4 NIBBLES OF COMP                  0101            1010
!     4        9 NIBBLES OF DATA,    9 NIBBLES OF COMP                  0101            1010
!     5     1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  0101            1010
!
!     6        0 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  0000            1111
!     7        1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP                  0000            1111
!     8        4 NIBBLES OF DATA,    4 NIBBLES OF COMP                  0000            1111
!     9        9 NIBBLES OF DATA,    9 NIBBLES OF COMP                  0000            1111
!    10     1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  0000            1111
!
!
!                          C O M P L E M E N T   P A T T E R N S
!
!  PATTERN
!  NUMBER                THE TWO ASSOCIATED COUNTS                  VALUE OF DATA   VALUE OF COMP
!
!    - 1        0 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  1010            0101
!    - 2        1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP                  1010            0101
!    - 3        4 NIBBLES OF DATA,    4 NIBBLES OF COMP                  1010            0101
!    - 4        9 NIBBLES OF DATA,    9 NIBBLES OF COMP                  1010            0101
!    - 5     1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  1010            0101
!
!    - 6        0 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  1111            0000
!    - 7        1 NIBBLE  OF DATA,    1 NIBBLE  OF COMP                  1111            0000
!    - 8        4 NIBBLES OF DATA,    4 NIBBLES OF COMP                  1111            0000
!    - 9        9 NIBBLES OF DATA,    9 NIBBLES OF COMP                  1111            0000
!   -10     1024 NIBBLES OF DATA, 1024 NIBBLES OF COMP                  1111            0000
!-

global
```

```
;MLX4
;                VARIABLES AND CONSTANTS

        2125  !<BLF/NOFORMAT>
        2126     PATTBL: blockvector [NUM_PATS/2,2] field(PATMAP)
        2127        preset (
        2128          [0,COUNT1]      = %decimal'0'      ,      !FOR PATTERNS 1, -1, 6, -6
        2129          [0,COUNT2]      = %decimal'1024',
        2130          [1,COUNT1]      = %decimal'1'      ,      !FOR PATTERNS 2, -2, 7, -7
        2131          [1,COUNT2]      = %decimal'1'      ,
        2132          [2,COUNT1]      = %decimal'4'      ,      !FOR PATTERNS 3, -3, 8, -8
        2133          [2,COUNT2]      = %decimal'4'      ,
        2134          [3,COUNT1]      = %decimal'9'      ,      !FOR PATTERNS 4, -4, 9, -9
        2135          [3,COUNT2]      = %decimal'9'      ,
        2136          [4,COUNT1]      = %decimal'1024',         !FOR PATTERNS 5, -5, 10, -10
        2137          [4,COUNT2]      = %decimal'1024'
        2138                        );
        2139  !<BLF/FORMAT>
        2140
        2141  bind
        2142      !
        2143      !  DEFINITIONS OF LOCATIONS WITHIN THE WRITE AND READ BUFFERS:
        2144      !
        2145      WDBUFF = WBUFF,                              !256-WORD WRITE DATA BUFFER
        2146      WCBUFF = WBUFF + 512,                        !256-WORD WRITE COMP BUFFER
        2147      RDBUFF = RBUFF,                              !256-WORD READ DATA BUFFER
        2148      RCBUFF = RBUFF + 512,                        !256-WORD READ COMP BUFFER
        2149      END_WBUFF = (WBUFF + BUFSIZ*2),              !JUST BEYOND END OF FULL WRITE BUFFER
        2150      END_RBUFF = (RBUFF + BUFSIZ*2),              !JUST BEYOND END OF FULL READ  BUFFER
```

```
;MLX4
;                    MESSAGES AND PRINT FORMATS                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (3)

;          2151  %sbttl 'MESSAGES AND PRINT FORMATS'
;          2152
;          2153      ! SINGLE BIT ERROR LOGGING TABLE MESSAGE STRINGS
;          2154      !
;          2155      PHR21 = uplit (%asciz'                    SINGLE BIT ERROR LOG SUMMARY REPORT'),
;          2156      FMT16 = uplit (%asciz'%N%D1%A(D)      %D2%A(D)      %D1%A(D)      %D2%A(D)      %D6%A(D)'),
;          2157      SBE$HEADER = uplit (%asciz'UNIT #:   ARRAY #:   BANK #:   BIT #:      COUNT #:'),
;          2158      !
;          2159      !  SPECIAL PURPOSE FORMATS (WITH SAMPLE PRINTOUTS):
;          2160      !
;          2161      FMT1A = uplit (%asciz'%N%T%S2%D2'),
;          2162      !'PATTERN NUMBER  XX'
;          2163      FMT1B = uplit (%asciz'%S7%T%S%A-%D2'),
;          2164      !'        PATTERN NUMBER -XX'
;          2165      FMT2 = uplit (%asciz'%S2%T'),
;          2166      !'  (NOT POWERED UP)'
;          2167      !'  (NOT AN ML11 UNIT)'
;          2168      !'  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
;          2169      !'  (ALL RETRIES FAILED FOR A NON-FATAL ERROR)'
;          2170      !'  (CONTROLLER FATAL ERROR)'
;          2171      !'  (DRIVE FATAL ERROR)'
;          2172      !'  (ECC HARD ERROR)'
;          2173      !'  UP'
;          2174      !'  DOWN'
;          2175      !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
;          2176      FMT3 = uplit (%asciz'%N%A**%S%T%S%T%D3%S%A**'),
;          2177      !'** END PASS  X **'
;          2178      FMT4A = uplit (%asciz'%N2%T%A:%S%D1%S4%T%A:%S%D1'),
;          2179      !'LOGICAL UNIT: X    DRIVE: Y'
;          2180      FMT4B = uplit (%asciz'%S4%T%A:%S%O6'),
;          2181      !'    SERIAL #: ZZZZZZ'
;          2182      !'    CSR ADDRESS: XXXXXX'
;          2183      FMT4C = uplit (%asciz'%S4%T%A:%S%D1%D1%D1%D1%D1'),
;          2184      !'    SERIAL #: DDDD'
;          2185      FMT5 = uplit (%asciz'%N%T%S3%ASECTORS UNDER TEST:%S%O6%S%AT0%S%O6'),
;          2186      !'ML11-X   SECTORS UNDER TEST: XXXXXX TO YYYYYY'
;          2187      FMT6 = uplit (%asciz'%N%ABEGAN %D4%A WORD%S%T%A AT%S%T%S%O6'),
;          2188      !'BEGAN YYYY WORD WRITE AT SECTOR ZZZZZZ'
;          2189      !'BEGAN YYYY WORD READ AT SECTOR ZZZZZZ'
;          2190      !'BEGAN YYYY WORD WRITE CHECK AT SECTOR ZZZZZZ'
;          2191      FMT7 = uplit (%asciz'%N%S2%T%A:%S%D5'),
;          2192      !'  SOFT ERROR COUNT: DDDDD'
;          2193      !'  HARD ERROR COUNT: DDDDD'
;          2194      !'  TRANSFER RETRIES: DDDDD'
;          2195      FMT8 = uplit (%asciz'%N%ATRANSFER RATE: %T%A MBYTES/SECOND'),
;          2196      !'TRANSFER RATE: X MBYTES/SECOND'
;          2197      FMT9 = uplit (%asciz'%N%S4%AARRAY%D3%A:%S%D5'),
;          2198      !'    ARRAY XX: YYYYY'
;          2199      FMT10A = uplit (%asciz'%N%T%A:%S2%T%S%O6%S2%ABOARD%D3%S2%ABANK%D2'),
;          2200      !'FAILED:  SECTOR XXXXXX  BOARD YY  BANK Z
;          2201      FMT10B = uplit (%asciz'%S2%ABIT%D3'),
;          2202      !'  BIT QQ'
```

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;MLX4
;                    MESSAGES AND PRINT FORMATS          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                        27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (3)

;          2203      FMT11 = uplit (%asciz'%N%T%S%O6%A EXCEEDS %T%S%O6'),
;          2204      !'TOP SECTOR OF XXXXXX EXCEEDS SYSTEM LIMIT OF YYYYYY'
;          2205      !'LOW SECTOR OF XXXXXX EXCEEDS TOP SECTOR OF YYYYYY'
;          2206      FMT12A = uplit (%asciz'%N%AGOOD DATA: %O6%A AT LOCATION %O6'),
;          2207      !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
;          2208      FMT12B = uplit (%asciz'%N%ABAD DATA:  %O6%A AT LOCATION %O6'),
;          2209      !'BAD DATA:  XXXXXX AT LOCATION YYYYYY'
;          2210      FMT13 = uplit (%asciz'%N%AARRAY%D3%S2%T'),
;          2211      !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
;          2212      FMT14 = uplit (%asciz'%N%D5%S%T'),
;          2213      !'XXXXX MBYTES WRITTEN'
;          2214      !'XXXXX MBYTES READ'
;          2215      !'XXXXX MBYTES WRITE CHECKED'
;          2216      FMT15 = uplit (%asciz'%S2%T'),
;          2217      !'  ECH'
;          2218      !'  NED'
;          2219      !(ANY OF THE ERROR BITS)
;          2220      CRLF = uplit (%asciz'%N'),
;          2221      !
;          2222      !  MESSAGE MAPS:
;          2223      !
;          2224      SAY1 = uplit (%asciz'%N%T'),
;          2225      SAY2 = uplit (%asciz'%N%T%S%T'),
;          2226      SAY3 = uplit (%asciz'%N%T%S%T%S%T'),
;          2227      SAY4 = uplit (%asciz'%N%T%S%T%S%T%S%T'),
;          2228      SAY5 = uplit (%asciz'%N%T%S%T%S%T%S%T%S%T'),
;          2229      !
;          2230      !  WORDS:
;          2231      !
;          2232      WRD2 = uplit (%asciz'BEGIN'),
;          2233      WRD3 = uplit (%asciz'END'),
;          2234      WRD4 = uplit (%asciz'PASS'),
;          2235      WRD6 = uplit (%asciz'ML11-A'),
;          2236      WRD7 = uplit (%asciz'ML11-B'),
;          2237      WRD11 = uplit (%asciz'DRIVE'),
;          2238      WRD15 = uplit (%asciz'SECTOR'),
;          2239      WRD16 = uplit (%asciz'WRITE'),
;          2240      WRD17 = uplit (%asciz'READ'),
;          2241      WRD18 = uplit (%asciz'RETRY'),
;          2242      WRD19 = uplit (%asciz'SUCCEEDED'),
;          2243      WRD20 = uplit (%asciz'FAILED'),
;          2244      WRD21 = uplit (%asciz'DROPPED'),
;          2245      WRD24 = uplit (%asciz'UP'),
;          2246      WRD25 = uplit (%asciz'DOWN'),
;          2247      WRD34 = uplit (%asciz'RUNNING'),
;          2248      WRD35 = uplit (%asciz'MARCHING:  '),
;          2249      WRD36 = uplit (%asciz'ENABLED'),
;          2250      WRD37 = uplit (%asciz'DISABLED'),
;          2251      WRD38 = uplit (%asciz'ECC'),
;          2252      WRD40 = uplit (%asciz'WITH'),
;          2253      WRD41 = uplit (%asciz'AND'),
;          2254      !
```

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```
834 ;MLX4
835 ;                   MESSAGES AND PRINT FORMATS
836 ;
837 ;          2255         !  ML-11 BITS:
838 ;          2256         !
839 ;          2257         MLB2 = uplit (%asciz'NED'),
840 ;          2258         MLB3 = uplit (%asciz'NEM'),
841 ;          2259         MLB4 = uplit (%asciz'PGE'),
842 ;          2260         MLB5 = uplit (%asciz'DLT'),
843 ;          2261         MLB6 = uplit (%asciz'WCE'),
844 ;          2262         MLB7 = uplit (%asciz'PE'),
845 ;          2263         MLB8 = uplit (%asciz'MXF'),
846 ;          2264         MLB9 = uplit (%asciz'MDPE'),
847 ;          2265         MLB10 = uplit (%asciz'MCPE'),
848 ;          2266         MLB11 = uplit (%asciz'UNS'),
849 ;          2267         MLB12 = uplit (%asciz'IAE'),
850 ;          2268         MLB13 = uplit (%asciz'AOE'),
851 ;          2269         MLB14 = uplit (%asciz'RMR'),
852 ;          2270         MLB15 = uplit (%asciz'ILR'),
853 ;          2271         MLB16 = uplit (%asciz'ILF'),
854 ;          2272         MLB17 = uplit (%asciz'OPI'),
855 ;          2273         MLB18 = uplit (%asciz'DPAR'),
856 ;          2274         MLB19 = uplit (%asciz'CPAR'),
857 ;          2275         MLB20 = uplit (%asciz'DCK'),
858 ;          2276         MLB21 = uplit (%asciz'ECH'),
859 ;          2277         MLB22 = uplit (%asciz'CRC'),
860 ;          2278         MLB23 = uplit (%asciz'SGL'),
861 ;          2279         MLB24 = uplit (%asciz'UNC'),
862 ;          2280         !
863 ;          2281         !  ROUTINE NAMES:
864 ;          2282         !
865 ;          2283         RTN0 = uplit (%asciz'COMMAND INTEGRITY ROUTINE'),
866 ;          2284         RTN1 = uplit (%asciz'OPT1'),
867 ;          2285         RTN2 = uplit (%asciz'OPT2'),
868 ;          2286         RTN3 = uplit (%asciz'OPT3'),
869 ;          2287         RTN4 = uplit (%asciz'OPT4'),
870 ;          2288         RTN5 = uplit (%asciz'OPT5'),
871 ;          2289         RTN5A = uplit (%asciz'RAND1'),          !RANDOM DATA
872 ;          2290         RTN5B = uplit (%asciz'RAND2'),          !DATA & WORD COUNTS
873 ;          2291         RTN5C = uplit (%asciz'RAND3'),          !DATA, WORD COUNTS & SECTORS
874 ;          2292         RTN5D = uplit (%asciz'RAND4'),          !DATA, WORD COUNTS, SECTORS & UNITS
875 ;          2293         !
876 ;          2294         !  PHRASES:
877 ;          2295         !
878 ;          2296         PHR1 = uplit (%asciz'WRITE CHECK'),
879 ;          2297         PHR2 = uplit (%asciz'QUICK VERIFY'),
880 ;          2298         PHR3 = uplit (%asciz'REFRESH MARGINING'),
881 ;          2299         PHR4 = uplit (%asciz'CSR ADDRESS'),
882 ;          2300         PHR5 = uplit (%asciz'SOFT ERROR COUNT'),
883 ;          2301         PHR6 = uplit (%asciz'TRANSFER RETRIES'),
884 ;          2302         PHR7 = uplit (%asciz'LOGICAL UNIT'),
885 ;          2303         PHR8 = uplit (%asciz'SERIAL #'),
886 ;          2304         PHR9 = uplit (%asciz'PATTERN NUMBER'),
887 ;          2305         PHR10 = uplit (%asciz'ERROR BITS SET:'),
888 ;          2306         PHR11 = uplit (%asciz'SC SET BUT NO SYSTEM ERRORS FOUND'),
```

```
890 ;MLX4
891 ;                   MESSAGES AND PRINT FORMATS
892 ;
893 ;          2307         PHR12 = uplit (%asciz'NUMBER OF MBYTES TRANSFERED:'),
894 ;          2308         PHR13 = uplit (%asciz'MBYTES WRITE CHECKED'),
895 ;          2309         PHR14 = uplit (%asciz'TOP SECTOR OF'),
896 ;          2310         PHR15 = uplit (%asciz'LOW SECTOR OF'),
897 ;          2311         PHR16 = uplit (%asciz'SYSTEM LIMIT OF'),
898 ;          2312         PHR17 = uplit (%asciz'PERFORMANCE SUMMARY'),
899 ;          2313         PHR18 = uplit (%asciz'HARD ERROR COUNT'),
900 ;          2314         PHR19 = uplit (%asciz'MBYTES WRITTEN'),
901 ;          2315         PHR20 = uplit (%asciz'MBYTES READ'),
902 ;          2316         !
903 ;          2317         !  TRANSFER RATES:
904 ;          2318         !
905 ;          2319         TRT00 = uplit (%asciz'2'),
906 ;          2320         TRT01 = uplit (%asciz'1'),
907 ;          2321         TRT10 = uplit (%asciz'.5'),
908 ;          2322         TRT11 = uplit (%asciz'.25'),
909 ;          2323         !
910 ;          2324         !  DROP MESSAGES:
911 ;          2325         !
912 ;          2326         CAUSE1 = uplit (%asciz'(NOT POWERED UP)'),
913 ;          2327         CAUSE2 = uplit (%asciz'(NOT AN ML11 UNIT)'),
914 ;          2328         CAUSE3 = uplit (%asciz'(OPERATOR SELECTED TEST LIMITS INCORRECTLY)'),
915 ;          2329         CAUSE4 = uplit (%asciz'(ALL RETRIES FAILED FOR A NON-FATAL ERROR)'),
916 ;          2330         CAUSE5 = uplit (%asciz'(CONTROLLER FATAL ERROR)'),
917 ;          2331         CAUSE6 = uplit (%asciz'(DRIVE FATAL ERROR)'),
918 ;          2332         CAUSE7 = uplit (%asciz'(ECC HARD ERROR)'),
919 ;          2333         CAUSE8 = uplit (%asciz'(ECC LOGIC FAILURE)'),
920 ;          2334         !
921 ;          2335         !  DIAGNOSES:
922 ;          2336         !
923 ;          2337         MSG0 = uplit (%asciz'INTERRUPT DID NOT OCCUR, BUT THE TRANSFER IS COMPLETE'),
924 ;          2338         MSG1 = uplit (%asciz'--> RUN ML11 LOGIC TEST'),
925 ;          2339         MSG2 = uplit (%asciz'--> RUN ML11 PROM MAINTENANCE PROGRAM'),
926 ;          2340         MSG3 = uplit (%asciz'SOFT ERROR'),
927 ;          2341         MSG4 = uplit (%asciz'HARD ERROR'),
928 ;          2342         MSG5 = uplit (%asciz'ECC LOGIC FAILED TO DETECT DATA ERROR');
929 ;          2343
```

```
931 ;MLX4
932 ;                   ML11 INTERRUPT SERVICE ROUTINE
933
934 ;           2344  %sbttl 'ML11 INTERRUPT SERVICE ROUTINE'
935 ;           2345  BGNSRV (SERVICE);
936 ;           2346  I_AM_DONE = ACTIVE;
937 ;           2347  ENDSRV;
941
942
943
944 005662  040  040  040  P.AAA:  .ASCII  /   /
945 005665  040  040  011          .ASCII  /  /<11>
946 005670  011  123  111          .ASCII  <11>/SI/
947 005673  116  107  114          .ASCII  /NGL/
948 005676  105  040  102          .ASCII  /E B/
949 005701  111  124  040          .ASCII  /IT /
950 005704  105  122  122          .ASCII  /ERR/
951 005707  117  122  040          .ASCII  /OR /
952 005712  114  117  107          .ASCII  /LOG/
953 005715  040  123  125          .ASCII  / SU/
954 005720  115  115  101          .ASCII  /MMA/
955 005723  122  131  040          .ASCII  /RY /
956 005726  122  105  120          .ASCII  /REP/
957 005731  117  122  124          .ASCII  /ORT/
958 005734  000  000               .ASCII  <00><00>
959 005736  045  116  045  P.AAB:  .ASCII  /%N%/
960 005741  104  061  045          .ASCII  /D1%/
961 005744  101  050  104          .ASCII  /A(D/
962 005747  051  040  040          .ASCII  /)  /
963 005752  040  040  040          .ASCII  /   /
964 005755  040  045  104          .ASCII  / %D/
965 005760  062  045  101          .ASCII  /2%A/
966 005763  050  104  051          .ASCII  /(D)/
967 005766  040  040  040          .ASCII  /   /
968 005771  040  040  040          .ASCII  /   /
969 005774  045  104  061          .ASCII  /%D1/
970 005777  045  101  050          .ASCII  /%A(/
971 006002  104  051  040          .ASCII  /D) /
972 006005  040  040  040          .ASCII  /   /
973 006010  040  040  045          .ASCII  /  %/
974 006013  104  062  045          .ASCII  /D2%/
975 006016  101  050  104          .ASCII  /A(D/
976 006021  051  040  040          .ASCII  /)  /
977 006024  040  040  040          .ASCII  /   /
978 006027  040  040  045          .ASCII  /  %/
979 006032  104  066  045          .ASCII  /D6%/
980 006035  101  050  104          .ASCII  /A(D/
981 006040  051  000               .ASCII  /)/<00>
982 006042  125  116  111  P.AAC:  .ASCII  /UNI/
983 006045  124  040  043          .ASCII  /T #/
984                     ;MLX4
985                     ;                   ML11 INTERRUPT SERVICE ROUTINE
986
987 006050  072  040  040          .ASCII  /:  /
988 006053  040  101  122          .ASCII  / AR/
989 006056  122  101  131          .ASCII  /RAY/
990 006061  040  043  072          .ASCII  / #:/
```

27-Mar-1982 19:24:42 TOPS-20 Bliss-16 V2(212)
27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (4)

27-Mar-1982 19:24:42 TOPS
27-Mar-1982 19:23:44 PA:<

```
 991 006064  040  040  040          .ASCII  /   /
 992 006067  102  101  116          .ASCII  /BAN/
 993 006072  113  040  043          .ASCII  /K #/
 994 006075  072  040  040          .ASCII  /:  /
 995 006100  040  102  111          .ASCII  / BI/
 996 006103  124  040  043          .ASCII  /T #/
 997 006106  072  040  040          .ASCII  /:  /
 998 006111  040  040  040          .ASCII  /   /
 999 006114  040  103  117          .ASCII  / CO/
1000 006117  125  116  124          .ASCII  /UNT/
1001 006122  040  043  072          .ASCII  / #:/
1002 006125  000                    .ASCII  <00>
1003 006126  045  116  045  P.AAD:  .ASCII  /%N%/
1004 006131  124  045  123          .ASCII  /T%S/
1005 006134  062  045  104          .ASCII  /2%D/
1006 006137  062  000  000          .ASCII  /2/<00><00>
1007 006142  045  123  067  P.AAE:  .ASCII  /%S7/
1008 006145  045  124  045          .ASCII  /%T%/
1009 006150  123  045  101          .ASCII  /S%A/
1010 006153  055  045  104          .ASCII  /-%D/
1011 006156  062  000               .ASCII  /2/<00>
1012 006160  045  123  062  P.AAF:  .ASCII  /%S2/
1013 006163  045  124  000          .ASCII  /%T/<00>
1014 006166  045  116  045  P.AAG:  .ASCII  /%N%/
1015 006171  101  052  052          .ASCII  /A**/
1016 006174  045  123  045          .ASCII  /%S%/
1017 006177  124  045  123          .ASCII  /T%S/
1018 006202  045  124  045          .ASCII  /%T%/
1019 006205  104  063  045          .ASCII  /D3%/
1020 006210  123  045  101          .ASCII  /S%A/
1021 006213  052  052  000          .ASCII  /**/<00>
1022 006216  045  116  062  P.AAH:  .ASCII  /%N2/
1023 006221  045  124  045          .ASCII  /%T%/
1024 006224  101  072  045          .ASCII  /A:%/
1025 006227  123  045  104          .ASCII  /S%D/
1026 006232  061  045  123          .ASCII  /1%S/
1027 006235  064  045  124          .ASCII  /4%T/
1028 006240  045  101  072          .ASCII  /%A:/
1029 006243  045  123  045          .ASCII  /%S%/
1030 006246  104  061  000          .ASCII  /D1/<00>
1031 006251  000                    .ASCII  <00>
1032 006252  045  123  064  P.AAI:  .ASCII  /%S4/
1033 006255  045  124  045          .ASCII  /%T%/
1034 006260  101  072  045          .ASCII  /A:%/
1035 006263  123  045  117          .ASCII  /S%O/
1036 006266  066  000               .ASCII  /6/<00>
1037 006270  045  123  064  P.AAJ:  .ASCII  /%S4/
1038 006273  045  124  045          .ASCII  /%T%/
```

```
1040                                    ;MLX4
1041                                    ;               ML11 INTERRUPT SERVICE ROUTINE
1042
1043 006276  101  072  045             .ASCII  /A:%/
1044 006301  123  045  104             .ASCII  /S%D/
1045 006304  061  045  104             .ASCII  /1%D/
1046 006307  061  045  104             .ASCII  /1%D/
1047 006312  061  045  104             .ASCII  /1%D/
1048 006315  061  000  000             .ASCII  /1/<00><00>
1049 006320  045  116  045  P.AAK:     .ASCII  /%N%/
1050 006323  124  045  123             .ASCII  /T%S/
1051 006326  063  045  101             .ASCII  /3%A/
1052 006331  123  105  103             .ASCII  /SEC/
1053 006334  124  117  122             .ASCII  /TOR/
1054 006337  123  040  125             .ASCII  /S U/
1055 006342  116  104  105             .ASCII  /NDE/
1056 006345  122  040  124             .ASCII  /R T/
1057 006350  105  123  124             .ASCII  /EST/
1058 006353  072  045  123             .ASCII  /:%S/
1059 006356  045  117  066             .ASCII  /%O6/
1060 006361  045  123  045             .ASCII  /%S%/
1061 006364  101  124  117             .ASCII  /ATO/
1062 006367  045  123  045             .ASCII  /%S%/
1063 006372  117  066  000             .ASCII  /O6/<00>
1064 006375  000                       .ASCII  <00>
1065 006376  045  116  045  P.AAL:     .ASCII  /%N%/
1066 006401  101  102  105             .ASCII  /ABE/
1067 006404  107  101  116             .ASCII  /GAN/
1068 006407  040  045  104             .ASCII  / %D/
1069 006412  064  045  101             .ASCII  /4%A/
1070 006415  040  127  117             .ASCII  / WO/
1071 006420  122  104  045             .ASCII  /RD%/
1072 006423  123  045  124             .ASCII  /S%T/
1073 006426  045  101  040             .ASCII  /%A /
1074 006431  101  124  045             .ASCII  /AT%/
1075 006434  123  045  124             .ASCII  /S%T/
1076 006437  045  123  045             .ASCII  /%S%/
1077 006442  117  066  000             .ASCII  /O6/<00>
1078 006445  000                       .ASCII  <00>
1079 006446  045  116  045  P.AAM:     .ASCII  /%N%/
1080 006451  123  062  045             .ASCII  /S2%/
1081 006454  124  045  101             .ASCII  /T%A/
1082 006457  072  045  123             .ASCII  /:%S/
1083 006462  045  104  065             .ASCII  /%D5/
1084 006465  000                       .ASCII  <00>
1085 006466  045  116  045  P.AAN:     .ASCII  /%N%/
1086 006471  101  124  122             .ASCII  /ATR/
1087 006474  101  116  123             .ASCII  /ANS/
1088 006477  106  105  122             .ASCII  /FER/
1089 006502  040  122  101             .ASCII  / RA/
1090 006505  124  105  072             .ASCII  /TE:/
1091 006510  040  045  124             .ASCII  / %T/
1092 006513  045  101  040             .ASCII  /%A /
1093 006516  115  102  131             .ASCII  /MBY/
1094 006521  124  105  123             .ASCII  /TES/
```

```
1096                                    ;MLX4
1097                                    ;                ML11 INTERRUPT SERVICE ROUTINE
1098
1099  006524  057  123  105                    .ASCII  <57>/SE/
1100  006527  103  117  116                    .ASCII  /CON/
1101  006532  104  000                         .ASCII  /D/<00>
1102  006534  045  116  045  P.AAO:            .ASCII  /%N%/
1103  006537  123  064  045                    .ASCII  /S4%/
1104  006542  101  101  122                    .ASCII  /AAR/
1105  006545  122  101  131                    .ASCII  /RAY/
1106  006550  045  104  063                    .ASCII  /%D3/
1107  006553  045  101  072                    .ASCII  /%A:/
1108  006556  045  123  045                    .ASCII  /%S%/
1109  006561  104  065  000                    .ASCII  /D5/<00>
1110  006564  045  116  045  P.AAP:            .ASCII  /%N%/
1111  006567  124  045  101                    .ASCII  /T%A/
1112  006572  072  045  123                    .ASCII  /:%S/
1113  006575  062  045  124                    .ASCII  /2%T/
1114  006600  045  123  045                    .ASCII  /%S%/
1115  006603  117  066  045                    .ASCII  /O6%/
1116  006606  123  062  045                    .ASCII  /S2%/
1117  006611  101  102  117                    .ASCII  /ABO/
1118  006614  101  122  104                    .ASCII  /ARD/
1119  006617  045  104  063                    .ASCII  /%D3/
1120  006622  045  123  062                    .ASCII  /%S2/
1121  006625  045  101  102                    .ASCII  /%AB/
1122  006630  101  116  113                    .ASCII  /ANK/
1123  006633  045  104  062                    .ASCII  /%D2/
1124  006636  000  000                         .ASCII  <00><00>
1125  006640  045  123  062  P.AAQ:            .ASCII  /%S2/
1126  006643  045  101  102                    .ASCII  /%AB/
1127  006646  111  124  045                    .ASCII  /IT%/
1128  006651  104  063  000                    .ASCII  /D3/<00>
1129  006654  045  116  045  P.AAR:            .ASCII  /%N%/
1130  006657  124  045  123                    .ASCII  /T%S/
1131  006662  045  117  066                    .ASCII  /%O6/
1132  006665  045  101  040                    .ASCII  /%A /
1133  006670  105  130  103                    .ASCII  /EXC/
1134  006673  105  105  104                    .ASCII  /EED/
1135  006676  123  040  045                    .ASCII  /S %/
1136  006701  124  045  123                    .ASCII  /T%S/
1137  006704  045  117  066                    .ASCII  /%O6/
1138  006707  000                            .ASCII  <00>
1139  006710  045  116  045  P.AAS:            .ASCII  /%N%/
1140  006713  101  107  117                    .ASCII  /AGO/
1141  006716  117  104  040                    .ASCII  /OD /
1142  006721  104  101  124                    .ASCII  /DAT/
1143  006724  101  072  040                    .ASCII  /A: /
1144  006727  045  117  066                    .ASCII  /%O6/
1145  006732  045  101  040                    .ASCII  /%A /
1146  006735  101  124  040                    .ASCII  /AT /
1147  006740  114  117  103                    .ASCII  /LOC/
1148  006743  101  124  111                    .ASCII  /ATI/
1149  006746  117  116  040                    .ASCII  /ON /
1150  006751  045  117  066                    .ASCII  /%O6/
```

```
                                        ;MLX4
                                        ;               ML11 INTERRUPT SERVICE ROUTINE

006754  000     000             P.AAT:  .ASCII  <00><00>
006756  045     116     045             .ASCII  /%N%/
007000  101     102     101             .ASCII  /ABA/
007003  104     040     104             .ASCII  /D D/
007006  101     124     101             .ASCII  /ATA/
007011  072     040     040             .ASCII  /:  /
007014  045     117     066             .ASCII  /%06/
007017  045     101     040             .ASCII  /%A /
007022  101     124     040             .ASCII  /AT /
007024  114     117     103             .ASCII  /LOC/
007027  101     124     111             .ASCII  /ATI/
007032  117     116     040             .ASCII  /ON /
007035  045     117     066             .ASCII  /%06/
007040  000     000                     .ASCII  <00><00>
007043  045     116     045     P.AAU:  .ASCII  /%N%/
007046  101     101     122             .ASCII  /AAR/
007051  122     101     131             .ASCII  /RAY/
007054  045     104     063             .ASCII  /%D3/
007057  045     123     062             .ASCII  /%S2/
007060  045     124     000             .ASCII  /%T/<00>
007063  045     116     045     P.AAV:  .ASCII  /%N%/
007066  104     065     045             .ASCII  /D5%/
007071  123     045     124             .ASCII  /S%T/
007072  000                             .ASCII  <00>
007075  045     123     062     P.AAW:  .ASCII  /%S2/
007100  045     124     000             .ASCII  /%T/<00>
007103  045     116     000     P.AAX:  .ASCII  /%N/<00>
007106  000                             .ASCII  <00>
007111  045     116     045     P.AAY:  .ASCII  /%N%/
007112  124     000     000             .ASCII  /T/<00><00>
007115  045     116     045     P.AAZ:  .ASCII  /%N%/
007120  124     045     123             .ASCII  /T%S/
007123  045     124     000             .ASCII  /%T/<00>
007126  000                             .ASCII  <00>
007130  045     116     045     P.ABA:  .ASCII  /%N%/
007133  124     045     123             .ASCII  /T%S/
007136  045     124     045             .ASCII  /%T%/
007141  123     045     124             .ASCII  /S%T/
007144  045     123     045             .ASCII  /%S%/
007147  124     000     000             .ASCII  /T/<00><00>
007152  045     116     045     P.ABB:  .ASCII  /%N%/
007155  124     045     123             .ASCII  /T%S/
007160  045     124     045             .ASCII  /%T%/
007163  123     045     124             .ASCII  /S%T/
007166  045     123     045             .ASCII  /%S%/
007171  124     045     123             .ASCII  /T%S/
007174  045     124     000             .ASCII  /%T/<00>
```

```
                                        ;MLX4
                                        ;                ML11 INTERRUPT SERVICE ROUTINE
1211 007177  000                                 .ASCII  <00>
1212 007200  102  105  107  P.ABD:      .ASCII  /BEG/
1213 007203  111  116  000               .ASCII  /IN/<00>
1214 007206  105  116  104  P.ABE:      .ASCII  /END/
1215 007211  000                         .ASCII  <00>
1216 007212  120  101  123  P.ABF:      .ASCII  /PAS/
1217 007215  123  000  000               .ASCII  /S/<00><00>
1218 007220  115  114  061  P.ABG:      .ASCII  /ML1/
1219 007223  061  055  101               .ASCII  /1-A/
1220 007226  000  000                    .ASCII  <00><00>
1221 007230  115  114  061  P.ABH:      .ASCII  /ML1/
1222 007233  061  055  102               .ASCII  /1-B/
1223 007236  000  000                    .ASCII  <00><00>
1224 007240  104  122  111  P.ABI:      .ASCII  /DRI/
1225 007243  126  105  000               .ASCII  /VE/<00>
1226 007246  123  105  103  P.ABJ:      .ASCII  /SEC/
1227 007251  124  117  122               .ASCII  /TOR/
1228 007254  000  000                    .ASCII  <00><00>
1229 007256  127  122  111  P.ABK:      .ASCII  /WRI/
1230 007261  124  105  000               .ASCII  /TE/<00>
1231 007264  122  105  101  P.ABL:      .ASCII  /REA/
1232 007267  104  000  000               .ASCII  /D/<00><00>
1233 007272  122  105  124  P.ABM:      .ASCII  /RET/
1234 007275  122  131  000               .ASCII  /RY/<00>
1235 007300  123  125  103  P.ABN:      .ASCII  /SUC/
1236 007303  103  105  105               .ASCII  /CEE/
1237 007306  104  105  104               .ASCII  /DED/
1238 007311  000                         .ASCII  <00>
1239 007312  106  101  111  P.ABO:      .ASCII  /FAI/
1240 007315  114  105  104               .ASCII  /LED/
1241 007320  000  000                    .ASCII  <00><00>
1242 007322  104  122  117  P.ABP:      .ASCII  /DRO/
1243 007325  120  120  105               .ASCII  /PPE/
1244 007330  104  000                    .ASCII  /D/<00>
1245 007332  125  120  000  P.ABQ:      .ASCII  /UP/<00>
1246 007335  000                         .ASCII  <00>
1247 007336  104  117  127  P.ABR:      .ASCII  /DOW/
1248 007341  116  000  000               .ASCII  /N/<00><00>
1249 007344  122  125  116  P.ABS:      .ASCII  /RUN/
1250 007347  116  111  116               .ASCII  /NIN/
1251 007352  107  000                    .ASCII  /G/<00>
1252 007354  115  101  122  P.ABT:      .ASCII  /MAR/
1253 007357  103  110  111               .ASCII  /CHI/
1254 007362  116  107  072               .ASCII  /NG:/
1255 007365  040  040  000               .ASCII  /  /<00>
1256 007370  105  116  101  P.ABU:      .ASCII  /ENA/
1257 007373  102  114  105               .ASCII  /BLE/
1258 007376  104  000                    .ASCII  /D/<00>
1259 007400  104  111  123  P.ABV:      .ASCII  /DIS/
1260 007403  101  102  114               .ASCII  /ABL/
1261 007406  105  104  000               .ASCII  /ED/<00>
1262 007411  000                         .ASCII  <00>
```

```
                                        ;MLX4
                                        ;                ML11 INTERRUPT SERVICE ROUTINE
1267 007412  105  103  103  P.ABW:  .ASCII  /ECC/
1268 007415  000                    .ASCII  <00>
1269 007416  127  111  124  P.ABX:  .ASCII  /WIT/
1270 007421  110  000  000          .ASCII  /H/<00><00>
1271 007424  101  116  104  P.ABY:  .ASCII  /AND/
1272 007427  000                    .ASCII  <00>
1273 007430  116  105  104  P.ABZ:  .ASCII  /NED/
1274 007433  000                    .ASCII  <00>
1275 007434  116  105  115  P.ACA:  .ASCII  /NEM/
1276 007437  000                    .ASCII  <00>
1277 007440  120  107  105  P.ACB:  .ASCII  /PGE/
1278 007443  000                    .ASCII  <00>
1279 007444  104  114  124  P.ACC:  .ASCII  /DLT/
1280 007447  000                    .ASCII  <00>
1281 007450  127  103  105  P.ACD:  .ASCII  /WCE/
1282 007453  000                    .ASCII  <00>
1283 007454  120  105  000  P.ACE:  .ASCII  /PE/<00>
1284 007457  000                    .ASCII  <00>
1285 007460  115  130  106  P.ACF:  .ASCII  /MXF/
1286 007463  000                    .ASCII  <00>
1287 007464  115  104  120  P.ACG:  .ASCII  /MDP/
1288 007467  105  000  000          .ASCII  /E/<00><00>
1289 007472  115  103  120  P.ACH:  .ASCII  /MCP/
1290 007475  105  000  000          .ASCII  /E/<00><00>
1291 007500  125  116  123  P.ACI:  .ASCII  /UNS/
1292 007503  000                    .ASCII  <00>
1293 007504  111  101  105  P.ACJ:  .ASCII  /IAE/
1294 007507  000                    .ASCII  <00>
1295 007510  101  117  105  P.ACK:  .ASCII  /AOE/
1296 007513  000                    .ASCII  <00>
1297 007514  122  115  122  P.ACL:  .ASCII  /RMR/
1298 007517  000                    .ASCII  <00>
1299 007520  111  114  122  P.ACM:  .ASCII  /ILR/
1300 007523  000                    .ASCII  <00>
1301 007524  111  114  106  P.ACN:  .ASCII  /ILF/
1302 007527  000                    .ASCII  <00>
1303 007530  117  120  111  P.ACO:  .ASCII  /OPI/
1304 007533  000                    .ASCII  <00>
1305 007534  104  120  101  P.ACP:  .ASCII  /DPA/
1306 007537  122  000  000          .ASCII  /R/<00><00>
1307 007542  103  120  101  P.ACQ:  .ASCII  /CPA/
1308 007545  122  000  000          .ASCII  /R/<00><00>
1309 007550  104  103  113  P.ACR:  .ASCII  /DCK/
1310 007553  000                    .ASCII  <00>
1311 007554  105  103  110  P.ACS:  .ASCII  /ECH/
1312 007557  000                    .ASCII  <00>
1313 007560  103  122  103  P.ACT:  .ASCII  /CRC/
1314 007563  000                    .ASCII  <00>
1315 007564  123  107  114  P.ACU:  .ASCII  /SGL/
1316 007567  000                    .ASCII  <00>
1317 007570  125  116  103  P.ACV:  .ASCII  /UNC/
1318 007573  000                    .ASCII  <00>
```

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27-Mar-1982 19:23:44 PA:<

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1320                                    ;MLX4
1321                                    ;               ML11 INTERRUPT SERVICE ROUTINE
1322
1323 007574  103  117  115  P.ACW:  .ASCII  /COM/
1324 007577  115  101  116           .ASCII  /MAN/
1325 007602  104  040  111           .ASCII  /D I/
1326 007605  116  124  105           .ASCII  /NTE/
1327 007610  107  122  111           .ASCII  /GRI/
1328 007613  124  131  040           .ASCII  /TY /
1329 007616  122  117  125           .ASCII  /ROU/
1330 007621  124  111  116           .ASCII  /TIN/
1331 007624  105  000                .ASCII  /E/<00>
1332 007626  117  120  124  P.ACX:  .ASCII  /OPT/
1333 007631  061  000  000           .ASCII  /1/<00><00>
1334 007634  117  120  124  P.ACY:  .ASCII  /OPT/
1335 007637  062  000  000           .ASCII  /2/<00><00>
1336 007642  117  120  124  P.ACZ:  .ASCII  /OPT/
1337 007645  063  000  000           .ASCII  /3/<00><00>
1338 007650  117  120  124  P.ADA:  .ASCII  /OPT/
1339 007653  064  000  000           .ASCII  /4/<00><00>
1340 007656  117  120  124  P.ADB:  .ASCII  /OPT/
1341 007661  065  000  000           .ASCII  /5/<00><00>
1342 007664  122  101  116  P.ADC:  .ASCII  /RAN/
1343 007667  104  061  000           .ASCII  /D1/<00>
1344 007672  122  101  116  P.ADD:  .ASCII  /RAN/
1345 007675  104  062  000           .ASCII  /D2/<00>
1346 007700  122  101  116  P.ADE:  .ASCII  /RAN/
1347 007703  104  063  000           .ASCII  /D3/<00>
1348 007706  122  101  116  P.ADF:  .ASCII  /RAN/
1349 007711  104  064  000           .ASCII  /D4/<00>
1350 007714  127  122  111  P.ADG:  .ASCII  /WRI/
1351 007717  124  105  040           .ASCII  /TE /
1352 007722  103  110  105           .ASCII  /CHE/
1353 007725  103  113  000           .ASCII  /CK/<00>
1354 007730  121  125  111  P.ADH:  .ASCII  /QUI/
1355 007733  103  113  040           .ASCII  /CK /
1356 007736  126  105  122           .ASCII  /VER/
1357 007741  111  106  131           .ASCII  /IFY/
1358 007744  000  000                .ASCII  <00><00>
1359 007746  122  105  106  P.ADI:  .ASCII  /REF/
1360 007751  122  105  123           .ASCII  /RES/
1361 007754  110  040  115           .ASCII  /H M/
1362 007757  101  122  107           .ASCII  /ARG/
1363 007762  111  116  111           .ASCII  /INI/
1364 007765  116  107  000           .ASCII  /NG/<00>
1365 007770  103  123  122  P.ADJ:  .ASCII  /CSR/
1366 007773  040  101  104           .ASCII  / AD/
1367 007776  104  122  105           .ASCII  /DRE/
1368 010001  123  123  000           .ASCII  /SS/<00>
1369 010004  123  117  106  P.ADK:  .ASCII  /SOF/
1370 010007  124  040  105           .ASCII  /T E/
1371 010012  122  122  117           .ASCII  /RRO/
1372 010015  122  040  103           .ASCII  /R C/
1373 010020  117  125  116           .ASCII  /OUN/
1374 010023  124  000  000           .ASCII  /T/<00><00>
```

```
                                        ;MLX4
                                        :                ML11 INTERRUPT SERVICE ROUTINE
1376
1377
1378
1379 010026  124  122  101  P.ADL:  .ASCII  /TRA/
1380 010031  116  123  106           .ASCII  /NSF/
1381 010034  105  122  040           .ASCII  /ER /
1382 010037  122  105  124           .ASCII  /RET/
1383 010042  122  111  105           .ASCII  /RIE/
1384 010045  123  000  000           .ASCII  /S/<00><00>
1385 010050  114  117  107  P.ADM:  .ASCII  /LOG/
1386 010053  111  103  101           .ASCII  /ICA/
1387 010056  114  040  125           .ASCII  /L U/
1388 010061  116  111  124           .ASCII  /NIT/
1389 010064  000  000               .ASCII  <00><00>
1390 010066  123  105  122  P.ADN:  .ASCII  /SER/
1391 010071  111  101  114           .ASCII  /IAL/
1392 010074  040  043  000           .ASCII  / #/<00>
1393 010077  000                     .ASCII  <00>
1394 010100  120  101  124  P.ADO:  .ASCII  /PAT/
1395 010103  124  105  122           .ASCII  /TER/
1396 010106  116  040  116           .ASCII  /N N/
1397 010111  125  115  102           .ASCII  /UMB/
1398 010114  105  122  000           .ASCII  /ER/<00>
1399 010117  000                     .ASCII  <00>
1400 010120  105  122  122  P.ADP:  .ASCII  /ERR/
1401 010123  117  122  040           .ASCII  /OR /
1402 010126  102  111  124           .ASCII  /BIT/
1403 010131  123  040  123           .ASCII  /S S/
1404 010134  105  124  072           .ASCII  /ET:/
1405 010137  000                     .ASCII  <00>
1406 010140  123  103  040  P.ADQ:  .ASCII  /SC /
1407 010143  123  105  124           .ASCII  /SET/
1408 010146  040  102  125           .ASCII  / BU/
1409 010151  124  040  116           .ASCII  /T N/
1410 010154  117  040  123           .ASCII  /O S/
1411 010157  131  123  124           .ASCII  /YST/
1412 010162  105  115  040           .ASCII  /EM /
1413 010165  105  122  122           .ASCII  /ERR/
1414 010170  117  122  123           .ASCII  /ORS/
1415 010173  040  106  117           .ASCII  / FO/
1416 010176  125  116  104           .ASCII  /UND/
1417 010201  000                     .ASCII  <00>
1418 010202  116  125  115  P.ADR:  .ASCII  /NUM/
1419 010205  102  105  122           .ASCII  /BER/
1420 010210  040  117  106           .ASCII  / OF/
1421 010213  040  115  102           .ASCII  / MB/
1422 010216  131  124  105           .ASCII  /YTE/
1423 010221  123  040  124           .ASCII  /S T/
1424 010224  122  101  116           .ASCII  /RAN/
1425 010227  123  106  105           .ASCII  /SFE/
1426 010232  122  105  104           .ASCII  /RED/
1427 010235  072  000  000           .ASCII  /:/<00><00>
1428 010240  115  102  131  P.ADS:  .ASCII  /MBY/
1429 010243  124  105  123           .ASCII  /TES/
1430 010246  040  127  122           .ASCII  / WR/
```

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```
                                ;MLX4
                                ;                ML11 INTERRUPT SERVICE ROUTINE
1435 010251  111  124  105            .ASCII  /ITE/
1436 010254  040  103  110            .ASCII  / CH/
1437 010257  105  103  113            .ASCII  /ECK/
1438 010262  105  104  000            .ASCII  /ED/<00>
1439 010265  000                      .ASCII  <00>
1440 010266  124  117  120  P.ADT:    .ASCII  /TOP/
1441 010271  040  123  105            .ASCII  / SE/
1442 010274  103  124  117            .ASCII  /CTO/
1443 010277  122  040  117            .ASCII  /R O/
1444 010302  106  000                 .ASCII  /F/<00>
1445 010304  114  117  127  P.ADU:    .ASCII  /LOW/
1446 010307  040  123  105            .ASCII  / SE/
1447 010312  103  124  117            .ASCII  /CTO/
1448 010315  122  040  117            .ASCII  /R O/
1449 010320  106  000                 .ASCII  /F/<00>
1450 010322  123  131  123  P.ADV:    .ASCII  /SYS/
1451 010325  124  105  115            .ASCII  /TEM/
1452 010330  040  114  111            .ASCII  / LI/
1453 010333  115  111  124            .ASCII  /MIT/
1454 010336  040  117  106            .ASCII  / OF/
1455 010341  000                      .ASCII  <00>
1456 010342  120  105  122  P.ADW:    .ASCII  /PER/
1457 010345  106  117  122            .ASCII  /FOR/
1458 010350  115  101  116            .ASCII  /MAN/
1459 010353  103  105  040            .ASCII  /CE /
1460 010356  123  125  115            .ASCII  /SUM/
1461 010361  115  101  122            .ASCII  /MAR/
1462 010364  131  000                 .ASCII  /Y/<00>
1463 010366  110  101  122  P.ADX:    .ASCII  /HAR/
1464 010371  104  040  105            .ASCII  /D E/
1465 010374  122  122  117            .ASCII  /RRO/
1466 010377  122  040  103            .ASCII  /R C/
1467 010402  117  125  116            .ASCII  /OUN/
1468 010405  124  000  000            .ASCII  /T/<00><00>
1469 010410  115  102  131  P.ADY:    .ASCII  /MBY/
1470 010413  124  105  123            .ASCII  /TES/
1471 010416  040  127  122            .ASCII  / WR/
1472 010421  111  124  124            .ASCII  /ITT/
1473 010424  105  116  000            .ASCII  /EN/<00>
1474 010427  000                      .ASCII  <00>
1475 010430  115  102  131  P.ADZ:    .ASCII  /MBY/
1476 010433  124  105  123            .ASCII  /TES/
1477 010436  040  122  105            .ASCII  / RE/
1478 010441  101  104  000            .ASCII  /AD/<00>
1479 010444  062  000       P.AEA:    .ASCII  /2/<00>
1480 010446  061  000       P.AEB:    .ASCII  /1/<00>
1481 010450  056  065  000  P.AEC:    .ASCII  /.5/<00>
1482 010453  000                      .ASCII  <00>
1483 010454  056  062  065  P.AED:    .ASCII  /.25/
1484 010457  000                      .ASCII  <00>
1485 010460  050  116  117  P.AEE:    .ASCII  /(NO/
1486 010463  124  040  120            .ASCII  /T P/
```

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1488                                    ;MLX4
1489                                    :               ML11 INTERRUPT SERVICE ROUTINE
1490
1491 010466  117  127  105             .ASCII  /OWE/
1492 010471  122  105  104             .ASCII  /RED/
1493 010474  040  125  120             .ASCII  / UP/
1494 010477  051  000  000             .ASCII  /)/<00><00>
1495 010502  050  116  117  P.AEF:     .ASCII  /(NO/
1496 010505  124  040  101             .ASCII  /T A/
1497 010510  116  040  115             .ASCII  /N M/
1498 010513  114  061  061             .ASCII  /L11/
1499 010516  040  125  116             .ASCII  / UN/
1500 010521  111  124  051             .ASCII  /IT)/
1501 010524  000  000                  .ASCII  <00><00>
1502 010526  050  117  120  P.AEG:     .ASCII  /(OP/
1503 010531  105  122  101             .ASCII  /ERA/
1504 010534  124  117  122             .ASCII  /TOR/
1505 010537  040  123  105             .ASCII  / SE/
1506 010542  114  105  103             .ASCII  /LEC/
1507 010545  124  105  104             .ASCII  /TED/
1508 010550  040  124  105             .ASCII  / TE/
1509 010553  123  124  040             .ASCII  /ST /
1510 010556  114  111  115             .ASCII  /LIM/
1511 010561  111  124  123             .ASCII  /ITS/
1512 010564  040  111  116             .ASCII  / IN/
1513 010567  103  117  122             .ASCII  /COR/
1514 010572  122  105  103             .ASCII  /REC/
1515 010575  124  114  131             .ASCII  /TLY/
1516 010600  051  000                  .ASCII  )/<00>
1517 010602  050  101  114  P.AEH:     .ASCII  /(AL/
1518 010605  114  040  122             .ASCII  /L R/
1519 010610  105  124  122             .ASCII  /ETR/
1520 010613  111  105  123             .ASCII  /IES/
1521 010616  040  106  101             .ASCII  / FA/
1522 010621  111  114  105             .ASCII  /ILE/
1523 010624  104  040  106             .ASCII  /D F/
1524 010627  117  122  040             .ASCII  /OR /
1525 010632  101  040  116             .ASCII  /A N/
1526 010635  117  116  055             .ASCII  /ON-/
1527 010640  106  101  124             .ASCII  /FAT/
1528 010643  101  114  040             .ASCII  /AL /
1529 010646  105  122  122             .ASCII  /ERR/
1530 010651  117  122  051             .ASCII  /OR)/
1531 010654  000  000                  .ASCII  <00><00>
1532 010656  050  103  117  P.AEI:     .ASCII  /(CO/
1533 010661  116  124  122             .ASCII  /NTR/
1534 010664  117  114  114             .ASCII  /OLL/
1535 010667  105  122  040             .ASCII  /ER /
1536 010672  106  101  124             .ASCII  /FAT/
1537 010675  101  114  040             .ASCII  /AL /
1538 010700  105  122  122             .ASCII  /ERR/
1539 010703  117  122  051             .ASCII  /OR)/
1540 010706  000  000                  .ASCII  <00><00>
1541 010710  050  104  122  P.AEJ:     .ASCII  /(DR/
1542 010713  111  126  105             .ASCII  /IVE/
```

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1544                                    ;MLX4
1545                                    ;               ML11 INTERRUPT SERVICE ROUTINE
1546
1547 010716  040  106  101                      .ASCII  / FA/
1548 010721  124  101  114                      .ASCII  /TAL/
1549 010724  040  105  122                      .ASCII  / ER/
1550 010727  122  117  122                      .ASCII  /ROR/
1551 010732  051  000                           .ASCII  /)/<00>
1552 010734  050  105  103  P.AEK:              .ASCII  /(EC/
1553 010737  103  040  110                      .ASCII  /C H/
1554 010742  101  122  104                      .ASCII  /ARD/
1555 010745  040  105  122                      .ASCII  / ER/
1556 010750  122  117  122                      .ASCII  /ROR/
1557 010753  051  000  000                      .ASCII  /)/<00><00>
1558 010756  050  105  103  P.AEL:              .ASCII  /(EC/
1559 010761  103  040  114                      .ASCII  /C L/
1560 010764  117  107  111                      .ASCII  /OGI/
1561 010767  103  040  106                      .ASCII  /C F/
1562 010772  101  111  114                      .ASCII  /AIL/
1563 010775  125  122  105                      .ASCII  /URE/
1564 011000  051  000                           .ASCII  /)/<00>
1565 011002  111  116  124  P.AEM:              .ASCII  /INT/
1566 011005  105  122  122                      .ASCII  /ERR/
1567 011010  125  120  124                      .ASCII  /UPT/
1568 011013  040  104  111                      .ASCII  / DI/
1569 011016  104  040  116                      .ASCII  /D N/
1570 011021  117  124  040                      .ASCII  /OT /
1571 011024  117  103  103                      .ASCII  /OCC/
1572 011027  125  122  054                      .ASCII  /UR,/
1573 011032  040  102  125                      .ASCII  / BU/
1574 011035  124  040  124                      .ASCII  /T T/
1575 011040  110  105  040                      .ASCII  /HE /
1576 011043  124  122  101                      .ASCII  /TRA/
1577 011046  116  123  106                      .ASCII  /NSF/
1578 011051  105  122  040                      .ASCII  /ER /
1579 011054  111  123  040                      .ASCII  /IS /
1580 011057  103  117  115                      .ASCII  /COM/
1581 011062  120  114  105                      .ASCII  /PLE/
1582 011065  124  105  000                      .ASCII  /TE/<00>
1583 011070  055  055  076  P.AEN:              .ASCII  /-->/
1584 011073  040  122  125                      .ASCII  / RU/
1585 011076  116  040  115                      .ASCII  /N M/
1586 011101  114  061  061                      .ASCII  /L11/
1587 011104  040  114  117                      .ASCII  / LO/
1588 011107  107  111  103                      .ASCII  /GIC/
1589 011112  040  124  105                      .ASCII  / TE/
1590 011115  123  124  000                      .ASCII  /ST/<00>
1591 011120  055  055  076  P.AEO:              .ASCII  /-->/
1592 011123  040  122  125                      .ASCII  / RU/
1593 011126  116  040  115                      .ASCII  /N M/
1594 011131  114  061  061                      .ASCII  /L11/
1595 011134  040  120  122                      .ASCII  / PR/
1596 011137  117  115  040                      .ASCII  /OM /
1597 011142  115  101  111                      .ASCII  /MAI/
1598 011145  116  124  105                      .ASCII  /NTE/
```

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                                        ;MLX4
                                        ;               ML11 INTERRUPT SERVICE ROUTINE

1603 011150  116  101  116              .ASCII  /NAN/
1604 011153  103  105  040              .ASCII  /CE /
1605 011156  120  122  117              .ASCII  /PRO/
1606 011161  107  122  101              .ASCII  /GRA/
1607 011164  115  000                   .ASCII  /M/<00>
1608 011166  123  117  106  P.AEP:      .ASCII  /SOF/
1609 011171  124  040  105              .ASCII  /T E/
1610 011174  122  122  117              .ASCII  /RRO/
1611 011177  122  000  000              .ASCII  /R/<00><00>
1612 011202  110  101  122  P.AEQ:      .ASCII  /HAR/
1613 011205  104  040  105              .ASCII  /D E/
1614 011210  122  122  117              .ASCII  /RRO/
1615 011213  122  000  000              .ASCII  /R/<00><00>
1616 011216  105  103  103  P.AER:      .ASCII  /ECC/
1617 011221  040  114  117              .ASCII  / LO/
1618 011224  107  111  103              .ASCII  /GIC/
1619 011227  040  106  101              .ASCII  / FA/
1620 011232  111  114  105              .ASCII  /ILE/
1621 011235  104  040  124              .ASCII  /D T/
1622 011240  117  040  104              .ASCII  /O D/
1623 011243  105  124  105              .ASCII  /ETE/
1624 011246  103  124  040              .ASCII  /CT /
1625 011251  104  101  124              .ASCII  /DAT/
1626 011254  101  040  105              .ASCII  /A E/
1627 011257  122  122  117              .ASCII  /RRO/
1628 011262  122  000                   .ASCII  /R/<00>
1629
1630
1631
1632 011264                     SBE.LOG:.BLKW   400
1633 012264                     PM.SBE.CNT:
1634 012264                             .BLKW   200
1635 012664                     SBE$.COUNT:
1636 012664                             .BLKW   1
1637 012666                     BIT.NUM:.BLKW   1
1638 012670                     WBUFF:  .BLKW   4000
1639 022670                     RBUFF:  .BLKW   4000
1640 032670                     WPTR:   .BLKW   1
1641 032672                     RPTR:   .BLKW   1
1642 032674                     QUICK:  .BLKW   1
1643 032676                     PATTERN:.BLKW   1
1644 032700                     DATA.COUNT:
1645 032700                             .BLKW   1
1646 032702                     COMP.COUNT:
1647 032702                             .BLKW   1
1648 032704                     EOP.COUNT:
1649 032704                             .BLKW   1
1650 032706                     BASE.ADDR:
1651 032706                             .BLKW   1
1652 032710                     VEC:    .BLKW   1
1653 032712                     BR.LEVEL:
```

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                        ;MLX4
                        ;                ML11 INTERRUPT SERVICE ROUTINE          27-Mar-1982 19:24:42   TOPS
                                                                                 27-Mar-1982 19:23:44   PA:<
                                .BLKW   1
                        SOFTS:  .BLKW   200
                        HARDS:  .BLKW   200
                        TRIES:  .BLKW   200
                        WR.COUNT:
                                .BLKW   1
                        WR.THOUSANDS:
                                .BLKW   1
                        WR.MILLIONS:
                                .BLKW   1
                        RD.COUNT:
                                .BLKW   1
                        RD.THOUSANDS:
                                .BLKW   1
                        RD.MILLIONS:
                                .BLKW   1
                        WC.COUNT:
                                .BLKW   1
                        WC.THOUSANDS:
                                .BLKW   1
                        WC.MILLIONS:
                                .BLKW   1
                        I.AM.DONE:
                                .BLKW   1
                        RETRYING:
                                .BLKW   1
                        BOARD:  .BLKW   1
                        BANK:   .BLKW   1


                        ML.REG::.BLKW   26
                        PTABLE.ADDR::
                                .BLKW   10
                        DRIVE.STATUS::
                                .BLKB   1
                                .EVEN
                        DROPT.DRIVES::
                                .BLKB   1
                                .EVEN
                        WHY.DROPT::
                                .BLKW   4
                        NUM.DRIVES::
                                .BLKW   1
                        LOW.SECT::
                                .BLKW   10
                        TOP.SECT::
                                .BLKW   10
                        PATTBL::.WORD   0
                                .WORD   2000
                                .WORD   1
```

```
1710                                    ;MLX4
1711                                    ;               ML11 INTERRUPT SERVICE ROUTINE          27-Mar-1982 19:24:42    TOPS
1712                                                                                            27-Mar-1982 19:23:44    PA:<
1713 034526  000001                              .WORD   1
1714 034530  000004                              .WORD   4
1715 034532  000004                              .WORD   4
1716 034534  000011                              .WORD   11
1717 034536  000011                              .WORD   11
1718 034540  002000                              .WORD   2000
1719 034542  002000                              .WORD   2000
1720
1721
1722                                    .GLOBL  EFN$21, L$UNIT, L$LUN, LIMIT, RANGE
1723                                    .GLOBL  LSECT, TSECT, ONLY, DROPNE, DROP1
1724                                    .GLOBL  DROP2, DROP3, DROP4, DROP5, MARPAT
1725                                    .GLOBL  REFRESH, ECCDIS, EOPSUM, ERROUT
1726                                    .GLOBL  SEED1, SEED2, SEED3, RANDOM, RN
1727
1728
1729          100000            BIT15==         -100000
1730          040000            BIT14==         40000
1731          020000            BIT13==         20000
1732          010000            BIT12==         10000
1733          004000            BIT11==         4000
1734          002000            BIT10==         2000
1735          001000            BIT09==         1000
1736          000400            BIT08==         400
1737          000200            BIT07==         200
1738          000100            BIT06==         100
1739          000040            BIT05==         40
1740          000020            BIT04==         20
1741          000010            BIT03==         10
1742          000004            BIT02==         4
1743          000002            BIT01==         2
1744          000001            BIT00==         1
1745          001000            BIT9==          1000
1746          000400            BIT8==          400
1747          000200            BIT7==          200
1748          000100            BIT6==          100
1749          000040            BIT5==          40
1750          000020            BIT4==          20
1751          000010            BIT3==          10
1752          000004            BIT2==          4
1753          000002            BIT1==          2
1754          000001            BIT0==          1
1755          000040            EF.START==      40
1756          000037            EF.RESTART==    37
1757          000036            EF.CONTINUE==   36
1758          000035            EF.NEW==        35
1759          000034            EF.PWR==        34
1760          000340            PRI07==         340
1761          000300            PRI06==         300
1762          000240            PRI05==         240
1763          000200            PRI04==         200
1764          000140            PRI03==         140
1765                                    ;MLX4
1766                                    ;               ML11 INTERRUPT SERVICE ROUTINE          27-Mar-1982 19:24:42    TOPS
                                                                                                27-Mar-1982 19:23:44    PA:<
```

```
1767
1768    000100          PRI02==         100
1769    000040          PRI01==         40
1770    000000          PRI00==         0
1771    000004          EVL==           4
1772    000010          LOT==           10
1773    000020          ADR==           20
1774    000040          IDU==           40
1775    000100          ISR==           100
1776    000200          UAM==           200
1777    000400          BDE==           400
1778    001000          PNT==           1000
1779    002000          PRI==           2000
1780    004000          IXE==           4000
1781    010000          IBE==           10000
1782    020000          IER==           20000
1783    040000          LOE==           40000
1784    100000          HOE==           -100000
1785    012670          WDBUFF=         WBUFF
1786    013670          WCBUFF=         WBUFF+1000
1787    022670          RDBUFF=         RBUFF
1788    023670          RCBUFF=         RBUFF+1000
1789    022670          END.WBUFF=      WBUFF+10000
1790    032670          END.RBUFF=      RBUFF+10000
1791    005662          PHR21=          P.AAA
1792    005736          FMT16=          P.AAB
1793    006042          SBE$HEADER=     P.AAC
1794    006126          FMT1A=          P.AAD
1795    006142          FMT1B=          P.AAE
1796    006160          FMT2=           P.AAF
1797    006166          FMT3=           P.AAG
1798    006216          FMT4A=          P.AAH
1799    006252          FMT4B=          P.AAI
1800    006270          FMT4C=          P.AAJ
1801    006320          FMT5=           P.AAK
1802    006376          FMT6=           P.AAL
1803    006446          FMT7=           P.AAM
1804    006466          FMT8=           P.AAN
1805    006534          FMT9=           P.AAO
1806    006564          FMT10A=         P.AAP
1807    006640          FMT10B=         P.AAQ
1808    006654          FMT11=          P.AAR
1809    006710          FMT12A=         P.AAS
1810    006756          FMT12B=         P.AAT
1811    007024          FMT13=          P.AAU
1812    007046          FMT14=          P.AAV
1813    007060          FMT15=          P.AAW
1814    007066          CRLF=           P.AAX
1815    007072          SAY1=           P.AAY
1816    007100          SAY2=           P.AAZ
1817    007112          SAY3=           P.ABA
1818    007130          SAY4=           P.ABB
1819    007152          SAY5=           P.ABC
1820                    ;MLX4                                   27-Mar-1982 19:24:42    TOPS
1821                    ;       ML11 INTERRUPT SERVICE ROUTINE  27-Mar-1982 19:23:44    PA:<
1822
1823    007200          WRD2=           P.ABD
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1824    007206          WRD3=           P.ABE
1825    007212          WRD4=           P.ABF
1826    007220          WRD6=           P.ABG
1827    007230          WRD7=           P.ABH
1828    007240          WRD11=          P.ABI
1829    007246          WRD15=          P.ABJ
1830    007256          WRD16=          P.ABK
1831    007264          WRD17=          P.ABL
1832    007272          WRD18=          P.ABM
1833    007300          WRD19=          P.ABN
1834    007312          WRD20=          P.ABO
1835    007322          WRD21=          P.ABP
1836    007332          WRD24=          P.ABQ
1837    007336          WRD25=          P.ABR
1838    007344          WRD34=          P.ABS
1839    007354          WRD35=          P.ABT
1840    007370          WRD36=          P.ABU
1841    007400          WRD37=          P.ABV
1842    007412          WRD38=          P.ABW
1843    007416          WRD40=          P.ABX
1844    007424          WRD41=          P.ABY
1845    007430          MLB2=           P.ABZ
1846    007434          MLB3=           P.ACA
1847    007440          MLB4=           P.ACB
1848    007444          MLB5=           P.ACC
1849    007450          MLB6=           P.ACD
1850    007454          MLB7=           P.ACE
1851    007460          MLB8=           P.ACF
1852    007464          MLB9=           P.ACG
1853    007472          MLB10=          P.ACH
1854    007500          MLB11=          P.ACI
1855    007504          MLB12=          P.ACJ
1856    007510          MLB13=          P.ACK
1857    007514          MLB14=          P.ACL
1858    007520          MLB15=          P.ACM
1859    007524          MLB16=          P.ACN
1860    007530          MLB17=          P.ACO
1861    007534          MLB18=          P.ACP
1862    007542          MLB19=          P.ACQ
1863    007550          MLB20=          P.ACR
1864    007554          MLB21=          P.ACS
1865    007560          MLB22=          P.ACT
1866    007564          MLB23=          P.ACU
1867    007570          MLB24=          P.ACV
1868    007574          RTN0=           P.ACW
1869    007626          RTN1=           P.ACX
1870    007634          RTN2=           P.ACY
1871    007642          RTN3=           P.ACZ
1872    007650          RTN4=           P.ADA
1873    007656          RTN5=           P.ADB
1874    007664          RTN5A=          P.ADC
1875                    ;MLX4
1876                    ;                       ML11 INTERRUPT SERVICE ROUTINE
1877
1878    007672          RTN5B=          P.ADD
1879    007700          RTN5C=          P.ADE
1880    007706          RTN5D=          P.ADF
```

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```
 1881          007714                  PHR1=           P.ADG
 1882          007730                  PHR2=           P.ADH
 1883          007746                  PHR3=           P.ADI
 1884          007770                  PHR4=           P.ADJ
 1885          010004                  PHR5=           P.ADK
 1886          010026                  PHR6=           P.ADL
 1887          010050                  PHR7=           P.ADM
 1888          010066                  PHR8=           P.ADN
 1889          010100                  PHR9=           P.ADO
 1890          010120                  PHR10=          P.ADP
 1891          010140                  PHR11=          P.ADQ
 1892          010202                  PHR12=          P.ADR
 1893          010240                  PHR13=          P.ADS
 1894          010266                  PHR14=          P.ADT
 1895          010304                  PHR15=          P.ADU
 1896          010322                  PHR16=          P.ADV
 1897          010342                  PHR17=          P.ADW
 1898          010366                  PHR18=          P.ADX
 1899          010410                  PHR19=          P.ADY
 1900          010430                  PHR20=          P.ADZ
 1901          010444                  TRT00=          P.AEA
 1902          010446                  TRT01=          P.AEB
 1903          010450                  TRT10=          P.AEC
 1904          010454                  TRT11=          P.AED
 1905          010460                  CAUSE1=         P.AEE
 1906          010502                  CAUSE2=         P.AEF
 1907          010526                  CAUSE3=         P.AEG
 1908          010602                  CAUSE4=         P.AEH
 1909          010656                  CAUSE5=         P.AEI
 1910          010710                  CAUSE6=         P.AEJ
 1911          010734                  CAUSE7=         P.AEK
 1912          010756                  CAUSE8=         P.AEL
 1913          011002                  MSG0=           P.AEM
 1914          011070                  MSG1=           P.AEN
 1915          011120                  MSG2=           P.AEO
 1916          011166                  MSG3=           P.AEP
 1917          011202                  MSG4=           P.AEQ
 1918          011216                  MSG5=           P.AER
 1919
 1920
 1921                                          .SBTTL  SERVICE ML11 INTERRUPT SERVICE ROUTINE
 1922
 1926 034544                            SERVICE::
 1927 034544  012767  000001  177564            MOV     #1,I.AM.DONE                    ;                       2346
 1928 034552  000002                            RTI                                     ;                       2345
 1929                                  ;MLX4
 1930                                  ;               ML11 INTERRUPT SERVICE ROUTINE          27-Mar-1982 19:24:42    TOPS
 1931                                                                                          27-Mar-1982 19:23:44    PA:<
 1932
 1933                                  ; Routine Size:  4 words
 1934                                  ; Maximum stack depth per invocation:  0 words
 1939
 1940
 1941 ;MLX4                                                      27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
 1942 ;                 ONCE-ONLY CODE                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (5)
 1943
 1944 ;          2348  %sbttl 'ONCE-ONLY CODE'
```

```
1945 ;          2349  routine CLRTBLS : novalue =
1946 ;          2350      begin                                          !* 1 *
1947 ;          2351
1948 ;          2352  !++
1949 ;          2353  !   ROUTINE:     CLRTBLS
1950 ;          2354  !
1951 ;          2355  !   PURPOSE:     THIS ROUTINE IS CALLED BY THE INITIALIZATION CODE WHEN
1952 ;          2356  !                A 'START' OR 'RESTART' COMMAND HAS BEEN USED TO BEGIN
1953 ;          2357  !                THE PROGRAM.  THE PURPOSES OF THE ROUTINE ARE:
1954 ;          2358  !
1955 ;          2359  !                (1)  TO INITIALIZE STATISTICS TABLES
1956 ;          2360  !
1957 ;          2361  !                (2)  TO SET ALL DRIVE AND ARRAY STATUS LOCATIONS TO ACTIVE
1958 ;          2362  !                     NOTE:  EVEN IF A UNIT WAS DROPPED DURING A PREVIOUS
1959 ;          2363  !                            RUN, THE START OR RESTART COMMAND GUARANTEES
1960 ;          2364  !                            THAT THE DRIVE WILL ONCE AGAIN BE TESTABLE.
1961 ;          2365  !
1962 ;          2366  !                (3)  TO ENABLE THE RUNNING OF ALL TEST OPTIONS IF THE
1963 ;          2367  !                     OPERATOR WANTED THEM ALL TO RUN.
1964 ;          2368  !--
1965 ;          2369
1966 ;          2370  !+
1967 ;          2371  !THIS IS THE CODE FOR PURPOSE 1:
1968 ;          2372  !-
1969 ;          2373
1970 ;          2374      incr LUN from 0 to (.LSUNIT - 1) do
1971 ;          2375          begin
1972 ;          2376
1973 ;          2377          incr ARRAY from 0 to 15 do
1974 ;          2378              begin
1975 ;          2379              SOFTS [.LUN, .ARRAY, 0, 16, 0] = 0;
1976 ;          2380              HARDS [.LUN, .ARRAY, 0, 16, 0] = 0;
1977 ;          2381              TRIES [.LUN, .ARRAY, 0, 16, 0] = 0;
1978 ;          2382              end;
1979 ;          2383
1980 ;          2384          end;
1981 ;          2385
1982 ;          2386      SBE$_COUNT = 0;                    ! VER CZMLBB ADDED CLEARING THIS VARIABLE
1983 ;          2387      EOP_COUNT = 0;
1984 ;          2388      NUM_DRIVES = 0;
1985 ;          2389      RETRYING = INACTIVE;
1986 ;          2390      WR_COUNT = 0;
1987 ;          2391      WR_THOUSANDS = 0;
1988 ;          2392      WR_MILLIONS = 0;
1989 ;          2393      RD_COUNT = 0;
1990 ;          2394      RD_THOUSANDS = 0;
1991 ;          2395      RD_MILLIONS = 0;
1992 ;          2396      WC_COUNT = 0;
1993 ;          2397      WC_THOUSANDS = 0;
1994 ;          2398      WC_MILLIONS = 0;
1995 ;          2399  !+
1996 ;MLX4
1997 ;                ONCE-ONLY CODE                     27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
1998                                                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (5)
1999 ;          2400  !THIS IS THE CODE FOR PURPOSE 2:
2000 ;          2401  !-
2001 ;          2402
```

```
;          2403      incr LUN from 0 to (.L$UNIT - 1) do
;          2404          begin                                          !* 2 *
;          2405          L$LUN = .LUN;
;          2406          LOW_SECT [.LUN] = 0;
;          2407          DRIVE_STATUS [.LUN] = ACTIVE;
;          2408          DROPT_DRIVES [.LUN] = INACTIVE;
;          2409          WHY_DROPT [.LUN] = 0;
;          2410          end;                                           !* 2 *
;          2411
;          2412  !+
;          2413  !THIS IS THE CODE FOR PURPOSE 3:
;          2414  !-
;          2415
;          2416      if .DROPNE eql 0
;          2417      then
;          2418          begin                                          !* 3 *
;          2419          DROP1 = 0;
;          2420          DROP2 = 0;
;          2421          DROP3 = 0;
;          2422          DROP4 = 0;
;          2423          DROP5 = 0;
;          2424          end;                                           !* 3 *
;          2425
;          2426      !+
;          2427      ! VER CZMLBB ADDED CLEARING OF THIS STRUCTURE
;          2428      !
;          2429      ! The single bit error log table stores all
;          2430      ! detected sbe's detected during the run time
;          2431      ! of the exerciser.  In this table is stored
;          2432      ! the sbe's: unit #, board #, bank #, bit #
;          2433      ! and a count of how many times this sbe has
;          2434      ! reoccured.
;          2435      !
;          2436      ! This code initializes this structure to zeroes
;          2437      ! before starting execution of the exerciser.
;          2438      !-
;          2439
;          2440      incr index from 0 to 127 do                        !Clear the single bit error log table
;          2441          begin
;          2442          SBE_LOG [.index, WRD$_0] = ZERO;               !Clear word zero
;          2443          SBE_LOG [.index, WRD$_1] = ZERO;               !Clear word one
;          2444          end;
;          2445
;          2446      !+
;          2447      ! VER CZMLBB ADDED CLEARING OF THIS STRUCTURE
;          2448      !
;          2449      ! The prom maintanence program is called out
;          2450      ! to be run on a particular array module when
;          2451      ! that array module has collected 10 unique
```

```
;MLX4
;                    ONCE-ONLY CODE                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                            27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (5)
;
;          2452      ! failing chips.  This structure stores for
;          2453      ! each array within each unit its total number
;          2454      ! of unique failing chips.
;          2455      !
;          2456      ! This code initializes this structure to zeroes
;          2457      ! before the exerciser is executed.
;          2458      !-
;          2459
;          2460      incr UNIT_SEL from 0 to 7 do                !Clear each units table
;          2461
;          2462          incr ARRAY_SEL from 0 to 15 do          !Clear each array within each unit
;          2463              PM_SBE_CNT [.UNIT_SEL, .ARRAY_SEL, PM_SBE$_SUM] = ZERO;     !Clear this array sum
;          2464
;          2465      return;
;          2466      end;
;
;                                .SBTTL  CLRTBLS ONCE-ONLY CODE
2078 034554  004167  150534  CLRTBLS:JSR     R1,$SAVE4                ;                                   2349
2079 034560  016704  145226            MOV     L$UNIT,R4                ;                                   2374
2080 034564  005001                    CLR     R1                       ; LUN
2081 034566  000424                    BR      3$
2082 034570  010100            1$:     MOV     R1,R0                    ; LUN,*                             2379
2083 034572  006300                    ASL     R0
2084 034574  006300                    ASL     R0
2085 034576  006300                    ASL     R0
2086 034600  006300                    ASL     R0
2087 034602  005003                    CLR     R3                       ; ARRAY                             2377
2088 034604  010002            2$:     MOV     R0,R2                    ;                                   2379
2089 034606  060302                    ADD     R3,R2                    ; ARRAY,*
2090 034610  006302                    ASL     R2
2091 034612  005062  032714            CLR     SOFTS(R2)
2092 034616  005062  033314            CLR     HARDS(R2)                ;                                   2380
2093 034622  005062  033714            CLR     TRIES(R2)                ;                                   2381
2094 034626  005203                    INC     R3                       ; ARRAY                             2377
2095 034630  020327  000017            CMP     R3,#17                   ; ARRAY,*
2096 034634  003763                    BLE     2$
2097 034636  005201                    INC     R1                       ; LUN                               2374
2098 034640  020104            3$:     CMP     R1,R4                    ; LUN,*
2099 034642  002752                    BLT     1$
2100 034644  005067  156014            CLR     SBE$.COUNT               ;                                   2386
2101 034650  005067  176030            CLR     EOP.COUNT                ;                                   2387
2102 034654  005067  177576            CLR     NUM.DRIVES               ;                                   2388
2103 034660  005067  177454            CLR     RETRYING                 ;                                   2389
2104 034664  005067  177424            CLR     WR.COUNT                 ;                                   2390
2105 034670  005067  177422            CLR     WR.THOUSANDS             ;                                   2391
2106 034674  005067  177420            CLR     WR.MILLIONS              ;                                   2392
```

```
                                        ;MLX4
                                        ;                ONCE-ONLY CODE                                  27-Mar-1982 19:24:42    TOPS
                                                                                                         27-Mar-1982 19:23:44    PA:<
2111 034700 005067 177416               CLR     RD.COUNT                ;                                                        2393
2112 034704 005067 177414               CLR     RD.THOUSANDS            ;                                                        2394
2113 034710 005067 177412               CLR     RD.MILLIONS             ;                                                        2395
2114 034714 005067 177410               CLR     WC.COUNT                ;                                                        2396
2115 034720 005067 177406               CLR     WC.THOUSANDS            ;                                                        2397
2116 034724 005067 177404               CLR     WC.MILLIONS             ;                                                        2398
2117 034730 005002                      CLR     R2                      ; LUN                                                    2403
2118 034732 000445                      BR      5$
2119 034734 010267 145134       4$:     MOV     R2,L$LUN                ; LUN,*                                                  2405
2120 034740 010201                      MOV     R2,R1                   ; LUN,*                                                  2406
2121 034742 006301                      ASL     R1
2122 034744 005061 034460               CLR     LOW.SECT(R1)
2123 034750 010201                      MOV     R2,R1                   ; LUN,*                                                  2407
2124 034752 006201                      ASR     R1
2125 034754 006201                      ASR     R1
2126 034756 006201                      ASR     R1
2127 034760 010146                      MOV     R1,-(SP)
2128 034762 062716 034442               ADD     #DRIVE.STATUS,(SP)
2129 034766 010246                      MOV     R2,-(SP)                ; LUN,*
2130 034770 042716 177770               BIC     #177770,(SP)
2131 034774 012746 000001               MOV     #1,-(SP)
2132 035000 011646                      MOV     (SP),-(SP)
2133 035002 004767 147606               JSR     PC,BL$PU2
2134 035006 010116                      MOV     R1,(SP)                 ;                                                        2408
2135 035010 062716 034444               ADD     #DROPT.DRIVES,(SP)
2136 035014 010246                      MOV     R2,-(SP)                ; LUN,*
2137 035016 042716 177770               BIC     #177770,(SP)
2138 035022 012746 000001               MOV     #1,-(SP)
2139 035026 005046                      CLR     -(SP)
2140 035030 004767 147560               JSR     PC,BL$PU2
2141 035034 105062 034446               CLRB    WHY.DROPT(R2)           ; *(LUN)                                                 2409
2142 035040 062706 000016               ADD     #16.,SP                 ;                                                        2404
2143 035044 005202                      INC     R2                      ; LUN                                                    2403
2144 035046 020204              5$:     CMP     R2,R4                   ; LUN,*
2145 035050 002731                      BLT     4$
2146 035052 005767 145156               TST     DROPNE                  ;                                                        2416
2147 035056 001012                      BNE     6$
2148 035060 005067 145152               CLR     DROP1                   ;                                                        2419
2149 035064 005067 145150               CLR     DROP2                   ;                                                        2420
2150 035070 005067 145146               CLR     DROP3                   ;                                                        2421
2151 035074 005067 145144               CLR     DROP4                   ;                                                        2422
2152 035100 005067 145144               CLR     DROP5                   ;                                                        2423
2153 035104 005003              6$:     CLR     R3                      ; INDEX                                                  2440
2154 035106 010302              7$:     MOV     R3,R2                   ; INDEX,*                                                2442
2155 035110 006302                      ASL     R2
2156 035112 006302                      ASL     R2
2157 035114 005062 011264               CLR     SBE.LOG(R2)
2158 035120 005062 011266               CLR     SBE.LOG+2(R2)
2159 035124 005203                      INC     R3                      ;                                                        2443
2160 035126 020327 000177               CMP     R3,#177                 ; INDEX                                                  2440
2161 035132 003765                      BLE     7$                      ; INDEX,*
2162 035134 005003                      CLR     R3                      ; UNIT.SEL                                               2460
```

```
                                ;MLX4
                                ;                       ONCE-ONLY CODE                                  27-Mar-1982 19:24:42    TOPS
                                ;                                                                       27-Mar-1982 19:23:44    PA:<

035136  010300                  8$:     MOV     R3,R0                   ; UNIT.SEL,*                                            2463
035140  006300                          ASL     R0
035142  006300                          ASL     R0
035144  006300                          ASL     R0
035146  006300                          ASL     R0
035150  005002                          CLR     R2                      ; ARRAY.SEL                                             2462
035152  010001                  9$:     MOV     R0,R1                   ;                                                       2463
035154  060201                          ADD     R2,R1                   ; ARRAY.SEL,*
035156  006301                          ASL     R1
035160  005061  012264                  CLR     PM.SBE.CNT(R1)
035164  005202                          INC     R2                      ; ARRAY.SEL                                             2462
035166  020227  000017                  CMP     R2,#17                  ; ARRAY.SEL,*
035172  003767                          BLE     9$
035174  005203                          INC     R3                      ; UNIT.SEL                                              2460
035176  020327  000007                  CMP     R3,#7                   ; UNIT.SEL,*
035202  003755                          BLE     8$
035204  000207                          RTS     PC                      ;                                                       2349

                                ; Routine Size:  141 words
                                ; Maximum stack depth per invocation:  12 words
```

```
;MLX4
;                ONCE-ONLY CODE                                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (6)

;          2467  routine INIT_ADDRESSES (PLOC) : novalue =
;          2468      begin                                                 !* 1 *
;          2469
;          2470  !++
;          2471  !   ROUTINE:      INIT_ADDRESSES(PLOC)
;          2472  !
;          2473  !   PURPOSE:      THIS ROUTINE IS CALLED ONLY ONCE DURING THE INITIALIZATION
;          2474  !                 CODE, EVEN IF THERE IS MORE THAN ONE DRIVE PRESENT.  THE
;          2475  !                 PURPOSES OF THE ROUTINE ARE:
;          2476  !
;          2477  !                 (1)  TO OBTAIN HARDWARE P-TABLE INFORMATION FROM
;          2478  !                      MAIN MEMORY WHICH PERTAINS TO ALL DRIVES.
;          2479  !
;          2480  !                 (2)  TO SET UP THE ADDRESSES FOR THE 22 ML-11 REGISTERS.
;          2481  !
;          2482  !                 (3)  TO SET UP THE INTERRUPT SERVICE ROUTINE AT THE
;          2483  !                      CORRECT PRIORITY, AND LOWER THE CPU PRIORITY TO
;          2484  !                      ALLOW INTERRUPTS TO OCCUR.
;          2485  !
;          2486  !   ARGUMENT:     PLOC = THE POINTER TO THE LOCATION IN MAIN MEMORY WHERE
;          2487  !                        THE HARDWARE P-TABLE IS TO BE FOUND.
;          2488  !--
;          2489
;          2490      local
;          2491          TEMP,
;          2492          PRIORITY,
;          2493          OFFSET;
;          2494
;          2495      !+
;          2496      !THIS IS THE CODE FOR PURPOSE 1:
;          2497      !-
;          2498
;          2499      BASE_ADDR = .(.PLOC + 0);
;          2500      VEC = .(.PLOC + 2);
;          2501      BR_LEVEL = .(.PLOC + 4);
;          2502      PRIORITY = .BR_LEVEL^5;
;          2503
;          2504      if .ECCDIS
;          2505      then
;          2506          TEMP = WRD37                                  !ECC IS DISABLED
;          2507      else
;          2508          TEMP = WRD36;                                 !ECC IS ENABLED (NORMAL OPERATION)
;          2509
;          2510      PRINTB (CRLF);
;          2511      PRINTB (SAY5, WRD34, WRD40, WRD38, .TEMP, WRD41);
;          2512      !'RUNNING WITH ECC ENABLED/DISABLED AND'
;          2513
;          2514      if .REFRESH
;          2515      then
;          2516          TEMP = WRD36                                  !REFRESH MARGINING IS ENABLED
;          2517      else
;          2518          TEMP = WRD37;                                 !REFRESH MARGINING IS DISABLED (NORMAL OPERATION)
```

```
;MLX4
;                ONCE-ONLY CODE                                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (6)
;
;          2519
;          2520      PRINTB (SAY3, WRD40, PHR3, .TEMP);
;          2521      !'WITH REFRESH MARGINING ENABLED/DISABLED'
;          2522      PRINTB (CRLF);
;          2523
;          2524      !+
;          2525      !THIS IS THE CODE FOR PURPOSE 2:
;          2526      !-
;          2527
;          2528      OFFSET = 0;
;          2529
;          2530      incr COUNT from 0 to (NUM_REGS - 1) do
;          2531          begin                                   !* 2 *
;          2532          ML_REG [.COUNT] = .BASE_ADDR + .OFFSET;
;          2533          OFFSET = .OFFSET + 2;
;          2534          end;                                    !* 2 *
;          2535
;          2536      !+
;          2537      !THIS IS THE CODE FOR PURPOSE 3:
;          2538      !-
;          2539
;          2540      SETPRI (PRI00);
;          2541      SETVEC (.VEC, SERVICE, .PRIORITY);
;          2542      return;
;          2543      end;                                        !* 1 *
2281
2282                                .SBTTL  INIT.ADDRESSES ONCE-ONLY CODE
2286 035206                     INIT.ADDRESSES:
2287 035206  004167  150102              JSR     R1,$SAVE4                       ;                       2467
2288 035212  016602  000014              MOV     14(SP),R2                       ; PLOC,*                2499
2289 035216  011267  175464              MOV     (R2),BASE.ADDR
2290 035222  016267  000002  175460      MOV     2(R2),VEC                       ;                       2500
2291 035230  016267  000004  175454      MOV     4(R2),BR.LEVEL                  ;                       2501
2292 035236  016746  175450              MOV     BR.LEVEL,-(SP)                  ;                       2502
2293 035242  012746  000005              MOV     #5,-(SP)
2294 035246  004767  147742              JSR     PC,BL$SHF
2295 035252  010003                      MOV     R0,R3                           ; *,PRIORITY
2296 035254  032767  000001  144772      BIT     #1,ECCDIS                       ;                       2504
2297 035262  001403                      BEQ     1$
2298 035264  012701  007400              MOV     #WRD37,R1                       ; *,TEMP                2506
2299 035270  000402                      BR      2$                              ;                       2504
2300 035272  012701  007370      1$:     MOV     #WRD36,R1                       ; *,TEMP                2508
2301 035276  012716  007066      2$:     MOV     #CRLF,(SP)                      ;                       2510
2302 035302  012746  000001              MOV     #1,-(SP)
2303 035306  010600                      MOV     SP,R0                           ; SP,*
2304 035310  104414                      TRAP    14
```

```
                                        ;MLX4
                                        ;               ONCE-ONLY CODE                                  27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<
035312  012716  007424                        MOV     #WRD41,(SP)             ;                                               2511
035316  010146                                MOV     R1,-(SP)                ; TEMP,*
035320  012746  007412                        MOV     #WRD38,-(SP)
035324  012746  007416                        MOV     #WRD40,-(SP)
035330  012746  007344                        MOV     #WRD34,-(SP)
035334  012746  007152                        MOV     #SAY5,-(SP)
035340  012746  000006                        MOV     #6,-(SP)
035344  010600                                MOV     SP,R0                   ; SP,*
035346  104414                                TRAP    14
035350  032767  000001  144674                BIT     #1,REFRESH              ;                                               2514
035356  001403                                BEQ     3$
035360  012701  007370                        MOV     #WRD36,R1               ; *,TEMP                                        2516
035364  000402                                BR      4$                      ;                                               2514
035366  012701  007400                3$:     MOV     #WRD37,R1               ; *,TEMP                                        2518
035372  010116                        4$:     MOV     R1,(SP)                 ; TEMP,*                                        2520
035374  012746  007746                        MOV     #PHR3,-(SP)
035400  012746  007416                        MOV     #WRD40,-(SP)
035404  012746  007112                        MOV     #SAY3,-(SP)
035410  012746  000004                        MOV     #4,-(SP)
035414  010600                                MOV     SP,R0                   ; SP,*
035416  104414                                TRAP    14
035420  012716  007066                        MOV     #CRLF,(SP)              ;                                               2522
035424  012746  000001                        MOV     #1,-(SP)
035430  010600                                MOV     SP,R0                   ; SP,*
035432  104414                                TRAP    14
035434  005002                                CLR     R2                      ; OFFSET                                        2528
035436  005000                                CLR     R0                      ; COUNT                                         2530
035440  010001                        5$:     MOV     R0,R1                   ; COUNT,*                                       2532
035442  006301                                ASL     R1
035444  016704  175236                        MOV     BASE.ADDR,R4
035450  060204                                ADD     R2,R4                   ; OFFSET,*
035452  010461  034346                        MOV     R4,ML.REG(R1)
035456  062702  000002                        ADD     #2,R2                   ; *,OFFSET                                      2533
035462  005200                                INC     R0                      ; COUNT                                         2530
035464  020027  000025                        CMP     R0,#25                  ; COUNT,*
035470  003763                                BLE     5$
035472  005000                                CLR     R0                      ;                                               2540
035474  104441                                TRAP    41
035476  010316                                MOV     R3,(SP)                 ; PRIORITY,*                                    2541
035500  012746  034544                        MOV     #SERVICE,-(SP)
035504  016746  175200                        MOV     VEC,-(SP)
035510  012746  000003                        MOV     #3,-(SP)
035514  104437                                TRAP    37
035516  062706  000042                        ADD     #42,SP                  ;                                               2467
035522  000207                                RTS     PC

                                ; Routine Size:  103 words
                                ; Maximum stack depth per invocation:  22 words
```

```
;MLX4                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                DRIVE IDENTIFICATION ROUTINES          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (7)

;       2544  %sbttl 'DRIVE IDENTIFICATION ROUTINES'
;       2545  routine SAYWHO (LUN) : novalue =
;       2546      begin
;       2547
;       2548  !++
;       2549  !  ROUTINE:     SAYWHO(LUN)
;       2550  !
;       2551  !  PURPOSE:     TO PRINT OUT AN IDENTIFICATION LINE WHICH INCLUDES:
;       2552  !                  LOGICAL UNIT: X    DRIVE: Y    SERIAL #: ZZZZ
;       2553  !
;       2554  !               THE UNIT'S SERIAL NUMBER IN EITHER BCD OR OCTAL FORMAT.
;       2555  !               BCD WILL BE PRINTED AS LONG AS THE DIGITS ARE ALL VALID.
;       2556  !--
;       2557
;       2558      local
;       2559          D3,
;       2560          D2,
;       2561          D1,
;       2562          D0;
;       2563
;       2564      D3 = .SN3;
;       2565      D2 = .SN2;
;       2566      D1 = .SN1;
;       2567      D0 = .SN0;
;       2568      PRINTB (FMT4A, PHR7, .LUN, WRD11, .DRIVE);
;       2569      !'LOGICAL UNIT: X    DRIVE: Y'
;       2570
;       2571      if ((.D3 gtr 9) or (.D2 gtr 9) or (.D1 gtr 9) or (.D0 gtr 9))
;       2572      then
;       2573          PRINTB (FMT4B, PHR8, .MLSN)
;       2574          !'    SERIAL #: ZZZZZZ'
;       2575      else
;       2576          PRINTB (FMT4C, PHR8, .D3, .D2, .D1, .D0);
;       2577
;       2578      !'    SERIAL #: DDDD'
;       2579      return;
;       2580      end;
;       2405
;       2406
;                                    .SBTTL  SAYWHO DRIVE IDENTIFICATION ROUTINES
2410 035524 004167 147604  SAYWHO: JSR     R1,$SAVE5                    ;
2411 035530 017705 176642          MOV     @ML.REG+30,R5                ; *,D3                    2545
2412 035534 006205                 ASR     R5                           ; D3                      2564
2413 035536 006205                 ASR     R5                           ; D3
2414 035540 006205                 ASR     R5                           ; D3
2415 035542 006205                 ASR     R5                           ; D3
2416 035544 000305                 SWAB    R5                           ; D3
2417                               ;MLX4                                                 27-Mar-1982 19:24:42    TOPS
2418                               ;                DRIVE IDENTIFICATION ROUTINES        27-Mar-1982 19:23:44    PA:<
2419
2420 035546 042705 177760                  BIC     #177760,R5                   ; *,D3
2421 035552 017704 176620                  MOV     @ML.REG+30,R4                ; *,D2                    2565
2422 035556 000304                         SWAB    R4                           ; D2
2423 035560 042704 177760                  BIC     #177760,R4                   ; *,D2
2424 035564 117701 176606                  MOVB    @ML.REG+30,R1                ; *,D1                    2566
```

```
2425 035570 006201                      ASR     R1                      ; D1
2426 035572 006201                      ASR     R1                      ; D1
2427 035574 006201                      ASR     R1                      ; D1
2428 035576 006201                      ASR     R1                      ; D1
2429 035600 042701 177760               BIC     #177760,R1              ; *,D1
2430 035604 117702 176566               MOVB    @ML.REG+30,R2           ; *,D0          2567
2431 035610 042702 177760               BIC     #177760,R2              ; *,D0
2432 035614 016603 000016               MOV     16(SP),R3               ; LUN,*         2568
2433 035620 006303                      ASL     R3
2434 035622 016303 034422               MOV     PTABLE.ADDR(R3),R3
2435 035626 016346 000006               MOV     6(R3),-(SP)
2436 035632 012746 007240               MOV     #WRD11,-(SP)
2437 035636 016646 000022               MOV     22(SP),-(SP)            ; LUN,*
2438 035642 012746 010050               MOV     #PHR7,-(SP)
2439 035646 012746 006216               MOV     #FMT4A,-(SP)
2440 035652 012746 000005               MOV     #5,-(SP)
2441 035656 010600                      MOV     SP,R0                   ; SP,*
2442 035660 104414                      TRAP    14
2443 035662 020527 000011               CMP     R5,#11                  ; D3,*          2571
2444 035666 003011                      BGT     1$
2445 035670 020427 000011               CMP     R4,#11                  ; D2,*
2446 035674 003006                      BGT     1$
2447 035676 020127 000011               CMP     R1,#11                  ; D1,*
2448 035702 003003                      BGT     1$
2449 035704 020227 000011               CMP     R2,#11                  ; D0,*
2450 035710 003413                      BLE     2$
2451 035712 017746 176460       1$:     MOV     @ML.REG+30,-(SP)        ;              2573
2452 035716 012746 010066               MOV     #PHR8,-(SP)
2453 035722 012746 006252               MOV     #FMT4B,-(SP)
2454 035726 012746 000003               MOV     #3,-(SP)
2455 035732 010600                      MOV     SP,R0                   ; SP,*
2456 035734 104414                      TRAP    14
2457 035736 000416                      BR      3$                      ;              2571
2458 035740 010246              2$:     MOV     R2,-(SP)                ; D0,*         2576
2459 035742 010146                      MOV     R1,-(SP)                ; D1,*
2460 035744 010446                      MOV     R4,-(SP)                ; D2,*
2461 035746 010546                      MOV     R5,-(SP)                ; D3,*
2462 035750 012746 010066               MOV     #PHR8,-(SP)
2463 035754 012746 006270               MOV     #FMT4C,-(SP)
2464 035760 012746 000006               MOV     #6,-(SP)
2465 035764 010600                      MOV     SP,R0                   ; SP,*
2466 035766 104414                      TRAP    14
2467 035770 062706 000006               ADD     #6,SP
2468 035774 062706 000024       3$:     ADD     #24,SP                  ;              2545
2469 036000 000207                      RTS     PC
2470
2471                                    ; Routine Size:  87 words
2472                                    ;MLX4
2473                                    ;               DRIVE IDENTIFICATION ROUTINES   27-Mar-1982 19:24:42    TOPS
2474                                                                                    27-Mar-1982 19:23:44    PA:<
2475                                    ; Maximum stack depth per invocation:  19 words
2480
2481
2482 ;MLX4                                                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
2483 ;                 DRIVE IDENTIFICATION ROUTINES                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (8)
2484
2485 ;          2581  routine CONFIG (LUN) : novalue =
```

```
2486 ;          2582      begin                                   !* 1 *
2487 ;          2583
2488 ;          2584  !++
2489 ;          2585  !  ROUTINE:     CONFIG(LUN)
2490 ;          2586  !
2491 ;          2587  !  PURPOSE:     CONFIG IS CALLED BY THE INITIALIZATION CODE FOR EACH DRIVE
2492 ;          2588  !               WHICH SUCCESSFULLY RESPONDS TO A REQUEST FOR ITS HARDWARE
2493 ;          2589  !               P-TABLE.  THE PURPOSES OF THIS ROUTINE ARE:
2494 ;          2590  !
2495 ;          2591  !               (1)  TO CHECK THAT THE DRIVE IS POWERED UP.
2496 ;          2592  !
2497 ;          2593  !               (2)  TO VERIFY THAT THE DRIVE IS AN ML11 UNIT.
2498 ;          2594  !
2499 ;          2595  !               (3)  TO VERIFY THAT THE OPERATOR DEFINED TEST RANGES ARE
2500 ;          2596  !                    WITHIN THE CALCULATED SYSTEM SIZE.
2501 ;          2597  !
2502 ;          2598  !               (4)  TO PRINT DRIVE IDENTIFICATION INFORMATION.
2503 ;          2599  !
2504 ;          2600  !  ARGUMENT:    LUN = THE LOGICAL UNIT NUMBER, COUNTING FROM 0 TO
2505 ;          2601  !                     NUMBER OF DRIVES MINUS 1.
2506 ;          2602  !--
2507 ;          2603
2508 ;          2604      local
2509 ;          2605          TYPE,
2510 ;          2606          TEMP,
2511 ;          2607          TOP;
2512 ;          2608
2513 ;          2609      !+
2514 ;          2610      !THIS IS THE CODE FOR PURPOSE 1:
2515 ;          2611      !-
2516 ;          2612
2517 ;          2613      UNIT = .DRIVE;
2518 ;          2614
2519 ;          2615      if .DPR neq 1
2520 ;          2616      then
2521 ;          2617          begin
2522 ;          2618          PRINTB (FMT4A, PHR7, .LUN, WRD11, .DRIVE);
2523 ;          2619          !'LOGICAL UNIT: X    DRIVE: Y'
2524 ;          2620          PRINTB (SAY2, WRD11, WRD21);
2525 ;          2621          !'DRIVE DROPPED'
2526 ;          2622          PRINTB (FMT2, CAUSE1);
2527 ;          2623          !'  (NOT POWERED UP)'
2528 ;          2624          WHY_DROPT [.LUN] = CODE_1;
2529 ;          2625          DODU (.LUN);
2530 ;          2626          return;
2531 ;          2627          end;
2532 ;          2628
2533 ;          2629      !+
2534 ;          2630      !THIS IS THE CODE FOR PURPOSE 2:
2535 ;          2631      !-
2536 ;          2632
```

```
:MLX4
;                    DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                     27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (8)

;          2633      SAYWHO (.LUN);
;          2634      !'LOGICAL UNIT: X    DRIVE: Y    SERIAL #: ZZZZ'
;          2635      TYPE = .MLDT;
;          2636
;          2637      if ((.TYPE neq ML11A) and (.TYPE neq ML11B))
;          2638      then
;          2639          begin
;          2640          PRINTB (SAY2, WRD11, WRD21);
;          2641          !'DRIVE DROPPED'
;          2642          PRINTB (FMT2, CAUSE2);
;          2643          !'  (NOT AN ML11 UNIT)'
;          2644          WHY_DROPT [.LUN] = CODE_2;
;          2645          DODO (.LUN);
;          2646          return;
;          2647          end
;          2648      else
;          2649          begin                                        !* 3 *
;          2650
;          2651          if .ARR_TYP eql 0
;          2652          then
;          2653              begin                                    !* 4 *
;          2654              TYPE = WRD6;
;          2655              TOP = 1;
;          2656              end                                      !* 4 *
;          2657          else
;          2658              begin                                    !* 5 *
;          2659              TYPE = WRD7;
;          2660              TOP = 4;
;          2661              end;                                     !* 5 *
;          2662
;          2663          !+
;          2664          !THIS IS THE CODE FOR PURPOSE 3:
;          2665          !-
;          2666
;          2667          TOP_SECT [.LUN] = (.TOP)*(512)*(.SZ) - 1;
;          2668
;          2669          if .LIMIT
;          2670          then
;          2671
;          2672          !+
;          2673          ! THE OPERATOR HAS CHOSEN LIMITS:
;          2674          !-
;          2675
;          2676              begin                                    !* 6 *
;          2677
;          2678              if .RANGE eql 0
;          2679              then
;          2680
;          2681              !+
;          2682              !THE BOARD NUMBER (0-15) IS CONTAINED IN 'ONLY'
;          2683              !-
;          2684
```

```
;MLX4
;                    DRIVE IDENTIFICATION ROUTINES          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                           27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (8)
;          2685                      begin                  !* 10 *
;          2686      !
;          2687      ! VER CZMLBB CHANGED .TYPE TO .ARR_TYP
;          2688      !
;          2689
;          2690                      if .ARR_TYP
;          2691                      then
;          2692
;          2693                      !+
;          2694                      !THE CHIPS ARE 64K
;          2695                      !-
;          2696
;          2697                          begin              !* 7 *
;          2698                          LSECT = 2048*.ONLY;
;          2699                          TSECT = .LSECT + 2047;
;          2700                          end                !* 7 *
;          2701                      else
;          2702
;          2703                      !+
;          2704                      !THE CHIPS ARE 16K
;          2705                      !-
;          2706
;          2707                          begin              !* 8 *
;          2708                          LSECT = 512*.ONLY;
;          2709                          TSECT = .LSECT + 511;
;          2710                          end;               !* 8 *
;          2711
;          2712                      end;                   !* 10 *
;          2713
;          2714                  if .TSECT leqa .TOP_SECT [.LUN]
;          2715                  then
;          2716                      TOP_SECT [.LUN] = .TSECT
;          2717                  else
;          2718                      begin
;          2719                      PRINTB (SAY2, WRD11, WRD21);
;          2720                      !'DRIVE DROPPED'
;          2721                      PRINTB (FMT2, CAUSE3);
;          2722                      !'  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
;          2723                      PRINTB (FMT11, PHR14, .TSECT, PHR16, .TOP_SECT [.LUN]);
;          2724                      !'TOP SECTOR OF XXXXXX EXCEEDS SYSTEM LIMIT OF YYYYYY'
;          2725                      WHY_DROPT [.LUN] = CODE_3;
;          2726                      DODO (.LUN);
;          2727                      return;
;          2728                      end;
;          2729
;          2730                  if .LSECT leqa .TSECT
;          2731                  then
;          2732                      LOW_SECT [.LUN] = .LSECT
;          2733                  else
;          2734                      begin
;          2735                      PRINTB (SAY2, WRD11, WRD21);
;          2736                      !'DRIVE DROPPED'
```

```
;          2737                    PRINTB (FMT2, CAUSE3);
;          2738                    !'  (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
;          2739                    PRINTB (FMT11, PHR15, .LSECT, PHR14, .TSECT);
;          2740                    !'LOW SECTOR OF XXXXXX EXCEEDS TOP SECTOR OF YYYYYY'
;          2741                    WHY_DROPT [.LUN] = CODE_3;
;          2742                    DODO (.LUN);
;          2743                    return;
;          2744                    end;
;          2745
;          2746                end;                                    !* 6 *
;          2747
;          2748            !+
;          2749            !THIS IS THE CODE FOR PURPOSE 4:
;          2750            !-
;          2751
;          2752            PRINTB (FMT5, .TYPE, LOWEST, HIGHEST);
;          2753            !'ML11-X     SECTORS UNDER TEST: XXXXXX TO YYYYYY'
;          2754
;          2755            selectone .TRT of
;          2756                set
;          2757
;          2758                [0] :
;          2759                    TEMP = TRT00;
;          2760
;          2761                [1] :
;          2762                    TEMP = TRT01;
;          2763
;          2764                [2] :
;          2765                    TEMP = TRT10;
;          2766
;          2767                [3] :
;          2768                    TEMP = TRT11;
;          2769                tes;
;          2770
;          2771            PRINTB (FMT8, .TEMP);
;          2772            !'TRANSFER RATE: X MBYTES/SECOND'
;          2773            PRINTB (FMT4B, PHR4, .BASE_ADDR);
;          2774            !'     CSR ADDRESS: XXXXXX'
;          2775            end;                                        !* 3 *
;          2776
;          2777        return;
;          2778        end;                                            !* 1 *
;          2698
;          2699
;          2703 036002 004167 147326          .SBTTL  CONFIG DRIVE IDENTIFICATION ROUTINES
;          2704 036006 016603 000016  CONFIG: JSR     R1,$SAVE5                    ;          2581
;                                             MOV     16(SP),R3                    ; LUN,*    2613
```

```
                                        ;MLX4
                                        ;       DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS
                                                                                                 27-Mar-1982 19:23:44    PA:<
036012  010304                                MOV     R3,R4
036014  006304                                ASL     R4
036016  016401  034422                        MOV     PTABLE.ADDR(R4),R1
036022  016105  000006                        MOV     6(R1),R5
036026  042705  177770                        BIC     #177770,R5
036032  142777  000007  176316                BICB    #7,@ML.REG+10
036040  150577  176312                        BISB    R5,@ML.REG+10
036044  032777  000400  176306                BIT     #400,@ML.REG+12                 ;               2615
036052  001051                                BNE     1$
036054  016401  034422                        MOV     PTABLE.ADDR(R4),R1              ;               2618
036060  016146  000006                        MOV     6(R1),-(SP)
036064  012746  007240                        MOV     #WRD11,-(SP)
036070  010346                                MOV     R3,-(SP)
036072  012746  010050                        MOV     #PHR7,-(SP)
036076  012746  006216                        MOV     #FMT4A,-(SP)
036102  012746  000005                        MOV     #5,-(SP)
036106  010600                                MOV     SP,R0                           ; SP,*
036110  104414                                TRAP    14
036112  012716  007322                        MOV     #WRD21,(SP)                     ;               2620
036116  012746  007240                        MOV     #WRD11,-(SP)
036122  012746  007100                        MOV     #SAY2,-(SP)
036126  012746  000003                        MOV     #3,-(SP)
036132  010600                                MOV     SP,R0                           ; SP,*
036134  104414                                TRAP    14
036136  012716  010460                        MOV     #CAUSE1,(SP)                    ;               2622
036142  012746  006160                        MOV     #FMT2,-(SP)
036146  012746  000002                        MOV     #2,-(SP)
036152  010600                                MOV     SP,R0                           ; SP,*
036154  104414                                TRAP    14
036156  112763  000001  034446                MOVB    #1,WHY.DROPT(R3)                ;               2624
036164  010300                                MOV     R3,R0                           ;               2625
036166  104451                                TRAP    51
036170  062706  000026                        ADD     #26,SP                          ;               2615
036174  000207                                RTS     PC                              ;               2617
036176  010346                        1$:     MOV     R3,-(SP)                        ;               2633
036200  004767  177320                        JSR     PC,SAYWHO
036204  017702  176164                        MOV     @ML.REG+26,R2                   ; *,TYPE        2635
036210  020227  000110                        CMP     R2,#110                         ; TYPE,*        2637
036214  001435                                BEQ     2$
036216  020227  000111                        CMP     R2,#111                         ; TYPE,*
036222  001432                                BEQ     2$
036224  012746  007322                        MOV     #WRD21,-(SP)                    ;               2640
036230  012746  007240                        MOV     #WRD11,-(SP)
036234  012746  007100                        MOV     #SAY2,-(SP)
036240  012746  000003                        MOV     #3,-(SP)
036244  010600                                MOV     SP,R0                           ; SP,*
036246  104414                                TRAP    14
036250  012716  010502                        MOV     #CAUSE2,(SP)                    ;               2642
036254  012746  006160                        MOV     #FMT2,-(SP)
036260  012746  000002                        MOV     #2,-(SP)
036264  010600                                MOV     SP,R0                           ; SP,*
036266  104414                                TRAP    14
```

```
2762                                    ;MLX4
2763                                    ;               DRIVE IDENTIFICATION ROUTINES                   27-Mar-1982 19:24:42    TOPS
2764                                                                                                    27-Mar-1982 19:23:44    PA:<
2765 036270 112763 000002 034446        MOVB    #2,WHY.DROPT(R3)        ;                                                       2644
2766 036276 010300                      MOV     R3,R0                   ;                                                       2645
2767 036300 104451                      TRAP    51
2768 036302 062706 000016               ADD     #16,SP                  ;                                                       2637
2769 036306 000207                      RTS     PC                      ;                                                       2639
2770 036310 032777 002000 176054 2$:    BIT     #2000,@ML.REG+24        ;                                                       2651
2771 036316 001005                      BNE     3$
2772 036320 012702 007220               MOV     #WRD6,R2                ; *,TYPE                                                2654
2773 036324 012701 000001               MOV     #1,R1                   ; *,TOP                                                 2655
2774 036330 000404                      BR      4$                      ;                                                       2651
2775 036332 012702 007230       3$:     MOV     #WRD7,R2                ; *,TYPE                                                2659
2776 036336 012701 000004               MOV     #4,R1                   ; *,TOP                                                 2660
2777 036342 012705 034500       4$:     MOV     #TOP.SECT,R5            ;                                                       2667
2778 036346 060405                      ADD     R4,R5
2779 036350 010146                      MOV     R1,-(SP)                ; TOP,*
2780 036352 017701 176014               MOV     @ML.REG+24,R1                                                                   2649
2781 036356 006201                      ASR     R1
2782 036360 006201                      ASR     R1
2783 036362 006201                      ASR     R1
2784 036364 000301                      SWAB    R1
2785 036366 042701 177740               BIC     #177740,R1
2786 036372 010146                      MOV     R1,-(SP)
2787 036374 004767 146344               JSR     PC,BL$MUL
2788 036400 000300                      SWAB    R0
2789 036402 105000                      CLRB    R0                      ;                                                       2667
2790 036404 006300                      ASL     R0
2791 036406 010001                      MOV     R0,R1
2792 036410 005301                      DEC     R1
2793 036412 010115                      MOV     R1,(R5)
2794 036414 032767 000001 143600        BIT     #1,LIMIT                ;                                                       2669
2795 036422 001575                      BEQ     11$
2796 036424 005767 143574               TST     RANGE                   ;                                                       2678
2797 036430 001037                      BNE     6$
2798 036432 032777 002000 175732        BIT     #2000,@ML.REG+24        ;                                                       2690
2799 036440 001417                      BEQ     5$
2800 036442 016700 143564               MOV     ONLY,R0                 ;                                                       2698
2801 036446 000300                      SWAB    R0
2802 036450 105000                      CLRB    R0
2803 036452 006300                      ASL     R0
2804 036454 006300                      ASL     R0
2805 036456 006300                      ASL     R0
2806 036460 010067 143542               MOV     R0,LSECT
2807 036464 010067 143540               MOV     R0,TSECT                ; LSECT,*
2808 036470 062767 003777 143532        ADD     #3777,TSECT                                                                     2699
2809 036476 000414                      BR      6$                      ;                                                       2690
2810 036500 016700 143526       5$:     MOV     ONLY,R0                 ;                                                       2708
2811 036504 000300                      SWAB    R0
2812 036506 105000                      CLRB    R0
2813 036510 006300                      ASL     R0
2814 036512 010067 143510               MOV     R0,LSECT
2815 036516 010067 143506               MOV     R0,TSECT                ; LSECT,*
2816 036522 062767 000777 143500        ADD     #777,TSECT                                                                      2709
```

```
                                ;MLX4                                                    27-Mar-1982 19:24:42    TOPS
                                ;       DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:23:44    PA:<
                        6$:     CMP     TSECT,(R5)              ;                                               2714
                                BHI     7$
                                MOV     TSECT,(R5)              ;                                               2716
                                BR      8$                      ;                                               2714
                        7$:     MOV     #WRD21,-(SP)            ;                                               2719
                                MOV     #WRD11,-(SP)
                                MOV     #SAY2,-(SP)
                                MOV     #3,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                MOV     #CAUSE3,(SP)            ;                                               2721
                                MOV     #FMT2,-(SP)
                                MOV     #2,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                MOV     (R5),(SP)               ;                                               2723
                                MOV     #PHR16,-(SP)
                                MOV     TSECT,-(SP)
                                MOV     #PHR14,-(SP)
                                MOV     #FMT11,-(SP)
                                MOV     #5,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                MOVB    #3,WHY.DROPT(R3)        ;                                               2725
                                MOV     R3,R0                   ;                                               2726
                                TRAP    51
                                BR      10$                     ;                                               2714
                        8$:     CMP     LSECT,TSECT             ;                                               2730
                                BHI     9$
                                MOV     LSECT,LOW.SECT(R4)      ;                                               2732
                                BR      11$                     ;                                               2730
                        9$:     MOV     #WRD21,-(SP)            ;                                               2735
                                MOV     #WRD11,-(SP)
                                MOV     #SAY2,-(SP)
                                MOV     #3,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                MOV     #CAUSE3,(SP)            ;                                               2737
                                MOV     #FMT2,-(SP)
                                MOV     #2,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                MOV     TSECT,(SP)              ;                                               2739
                                MOV     #PHR14,-(SP)
                                MOV     LSECT,-(SP)
                                MOV     #PHR15,-(SP)
                                MOV     #FMT11,-(SP)
                                MOV     #5,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                MOVB    #3,WHY.DROPT(R3)        ;                                               2741
                                MOV     R3,R0                   ;                                               2742
```

```
                                ;MLX4
                                ;                DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42   TOPS
                                ;                                                                 27-Mar-1982 19:23:44   PA:<

                                         TRAP    51
                                10$:     ADD     #34,SP                          ;                                      2730
                                         RTS     PC                              ;                                      2734
                                11$:     MOV     (R5),(SP)                       ;                                      2752
                                         MOV     LOW.SECT(R4),-(SP)
                                         MOV     R2,-(SP)                        ; TYPE,*
                                         MOV     #FMT5,-(SP)
                                         MOV     #4,-(SP)
                                         MOV     SP,R0                           ; SP,*
                                         TRAP    14
                                         MOV     @ML.REG+24,R1                   ;                                      2755
                                         SWAB    R1
                                         BIC     #177774,R1
                                         BNE     12$
                                         MOV     #TRT00,R0                       ; *,TEMP                               2759
                                         BR      15$                             ;                                      2755
                                12$:     CMP     R1,#1
                                         BNE     13$
                                         MOV     #TRT01,R0                       ; *,TEMP                               2762
                                         BR      15$                             ;                                      2755
                                13$:     CMP     R1,#2
                                         BNE     14$
                                         MOV     #TRT10,R0                       ; *,TEMP                               2765
                                         BR      15$                             ;                                      2755
                                14$:     CMP     R1,#3
                                         BNE     15$
                                         MOV     #TRT11,R0                       ; *,TEMP                               2768
                                15$:     MOV     R0,(SP)                         ; TEMP,*                               2771
                                         MOV     #FMT8,-(SP)
                                         MOV     #2,-(SP)
                                         MOV     SP,R0                           ; SP,*
                                         TRAP    14
                                         MOV     BASE.ADDR,(SP)                  ;                                      2773
                                         MOV     #PHR4,-(SP)
                                         MOV     #FMT48,-(SP)
                                         MOV     #3,-(SP)
                                         MOV     SP,R0                           ; SP,*
                                         TRAP    14
                                         ADD     #30,SP                          ;                                      2581
                                         RTS     PC

                                ; Routine Size:  318 words
                                ; Maximum stack depth per invocation:  20 words
```

```
;MLX4
;                    DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                     27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (9)

;          2779  routine DECODE (SECT) : novalue =
;          2780      begin
;          2781
;          2782  !++
;          2783  !   ROUTINE:     DECODE(SECT)
;          2784  !
;          2785  !   PURPOSE:     TO INTERPRET THE FIELDS OF THE FAILING SECTOR
;          2786  !                FOR BOTH 16K AND 64K CHIPS.
;          2787  !
;          2788  !   ARGUMENT:    SECT = FAILING SECTOR NUMBER
;          2789  !
;          2790  !   RESULTS:     (1)  BANK = WHICH ROW OF CHIPS (0-4)
;          2791  !
;          2792  !                (2)  BOARD = WHICH ARRAY MODULE (0-15)
;          2793  !--
;          2794
;          2795      if .MLDT
;          2796      then                                              !THE CHIPS ARE 64K
;          2797          begin
;          2798          BANK = .SECT<9, 2>;
;          2799          BOARD = .SECT<11, 4>;
;          2800          end
;          2801      else                                              !THE CHIPS ARE 16K
;          2802          begin
;          2803          BANK = .SECT<7, 2>;
;          2804          BOARD = .SECT<9, 4>;
;          2805          end;
;          2806
;          2807  !
;          2808  ! VER CZMLBB ADDED LOADING OF BIT_NUM TO ROUTINE
;          2809  !
;          2810      BIT_NUM = .CHAN;                                  !SAVE THE FAILING CHIP NUMBER
;          2811      return;
;          2812      end;
;          2967
;          2968
                                        .SBTTL  DECODE DRIVE IDENTIFICATION ROUTINES
;          2972 037176  032777  000001  175170  DECODE: BIT     #1,@ML.REG+26                   ;                    2795
;          2973 037204  001415                        BEQ     1$
;          2974 037206  016600  000002                MOV     2(SP),R0                        ; SECT,*             2798
;          2975 037212  006200                        ASR     R0
;          2976 037214  000300                        SWAB    R0
;          2977 037216  042700  177774                BIC     #177774,R0
;          2978 037222  010067  175116                MOV     R0,BANK
;          2979 037226  016600  000002                MOV     2(SP),R0                        ; SECT,*             2799
;          2980 037232  006200                        ASR     R0
;          2981 037234  006200                        ASR     R0
```

```
                                ;MLX4                                                    27-Mar-1982 19:24:42    TOPS
                                ;               DRIVE IDENTIFICATION ROUTINES            27-Mar-1982 19:23:44    PA:<
037236  000412                          BR      2$
037240  016600  000002          1$:     MOV     2(SP),R0                ; SECT,*                                2803
037244  006100                          ROL     R0
037246  000300                          SWAB    R0
037250  042700  177774                  BIC     #177774,R0
037254  010067  175064                  MOV     R0,BANK
037260  016600  000002                  MOV     2(SP),R0                ; SECT,*                                2804
037264  006200                  2$:     ASR     R0
037266  000300                          SWAB    R0
037270  042700  177760                  BIC     #177760,R0
037274  010067  175042                  MOV     R0,BOARD
037300  017700  175104                  MOV     @ML.REG+42,R0           ;                                       2810
037304  006200                          ASR     R0
037306  006200                          ASR     R0
037310  006200                          ASR     R0
037312  006200                          ASR     R0
037314  006200                          ASR     R0
037316  006200                          ASR     R0
037320  042700  177700                  BIC     #177700,R0
037324  010067  153336                  MOV     R0,BIT.NUM
037330  000207                          RTS     PC                      ;                                       2779

                                ; Routine Size:  46 words
                                ; Maximum stack depth per invocation:  0 words
```

```
3017 :MLX4
3018 :                  DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
3019                                                                     27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (10)
3020 ;          2813    routine ISOLATE : novalue =
3021 ;          2814        begin
3022 ;          2815
3023 ;          2816    !++
3024 ;          2817    !   ROUTINE:     ISOLATE
3025 ;          2818    !
3026 ;          2819    !   PURPOSE:     UPON THE DETECTION OF A DATA ERROR (EITHER RECOVERABLE OR
3027 ;          2820    !                NOT) TO EXAMINE THE SECTOR ADDRESS CONTAINED IN THE ECC
3028 ;          2821    !                ERROR LOCATION REGISTER AND PINPOINT THE LOCATION OF THE
3029 ;          2822    !                ERROR.  THE SECTOR, BOARD (0-15) AND BANK (0-3) WILL BE
3030 ;          2823    !                REPORTED.
3031 ;          2824    !--
3032 ;          2825
3033 ;          2826        DECODE (.MLEL);
3034 ;          2827
3035 ;          2828        if .ERROUT then PRINTB (FMT10A, WRD20, WRD15, .MLEL, .BOARD, .BANK);
3036 ;          2829
3037 ;          2830        !'FAILED:  SECTOR XXXXXX  BOARD YY  BANK Z'
3038 ;          2831        return;
3039 ;          2832        end;
3043
3044                                        .SBTTL  ISOLATE DRIVE IDENTIFICATION ROUTINES
3048 037332  017746  175054        ISOLATE:MOV     @ML.REG+44,-(SP)                ;                       2826
3049 037336  004767  177634                JSR     PC,DECODE
3050 037342  032767  000001  142710        BIT     #1,ERROUT                       ;                       2828
3051 037350  001422                        BEQ     1$
3052 037352  016746  174766                MOV     BANK,-(SP)
3053 037356  016746  174760                MOV     BOARD,-(SP)
3054 037362  017746  175024                MOV     @ML.REG+44,-(SP)
3055 037366  012746  007246                MOV     #WRD15,-(SP)
3056 037372  012746  007312                MOV     #WRD20,-(SP)
3057 037376  012746  006564                MOV     #FMT10A,-(SP)
3058 037402  012746  000006                MOV     #6,-(SP)
3059 037406  010600                        MOV     SP,R0                           ; SP,*
3060 037410  104414                        TRAP    14
3061 037412  062706  000016                ADD     #16,SP
3062 037416  005726                1$:     TST     (SP)+                           ;                       2813
3063 037420  000207                        RTS     PC
3064
3065                                    ; Routine Size:  28 words
3066                                    ; Maximum stack depth per invocation:  8 words
```

```
3072 ;MLX4
3073 ;                  DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
3074 ;                                                                   27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (11)
3075 ;          2833    routine UP_HARD_COUNT (LUN, ARRAY) : novalue =
3076 ;          2834        begin
3077 ;          2835
3078 ;          2836    !++
3079 ;          2837    !  ROUTINE:     UP_HARD_COUNT(LUN,ARRAY)
3080 ;          2838    !
3081 ;          2839    !  PURPOSE:     TO INCREMENT THE HARD ERROR COUNT FOR THE GIVEN
3082 ;          2840    !               ARRAY, AND TO SEE IF THE HARD ERROR THRESHOLD HAS
3083 ;          2841    !               BEEN REACHED.
3084 ;          2842    !
3085 ;          2843    !  ARGUMENTS:   LUN   = LOGICAL UNIT WHICH HAS THE HARD ERROR
3086 ;          2844    !               ARRAY = THE BOARD NUMBER (0-15)
3087 ;          2845    !--
3088 ;          2846
3089 ;          2847        local                                            ! VER CZMLBB ADDED THIS LOCAL STORAGE
3090 ;          2848            SBE_EXIST;                                   !Indicates if the searched sbe already exists
3091 ;          2849
3092 ;          2850        HARDS [.LUN, .ARRAY, 0, 16, 0] = .HARDS [.LUN, .ARRAY, 0, 16, 0] + 1;
3093 ;          2851        !
3094 ;          2852        ! VER CZMLBB ADDED FOLLOWING CODE TO LOG SBE'S
3095 ;          2853        !
3096 ;          2854        ! First search the sbe log table and see if
3097 ;          2855        ! this single bit error already exists in
3098 ;          2856        ! the table.  If it does exist then just
3099 ;          2857        ! increment its occurance count,  else
3100 ;          2858        ! record its failing location into the
3101 ;          2859        ! table.
3102 ;          2860        !
3103 ;          2861        ! Only log away 128 single bit errors.
3104 ;          2862        !
3105 ;          2863
3106 ;          2864        if .SBE$_COUNT lss 127                           !Have 128 errors been logged yet
3107 ;          2865        then
3108 ;          2866            begin                                        !There is room for at least one more sbe
3109 ;          2867            SBE_EXIST = FALSE;                           !Init the existance flag to false
3110 ;          2868
3111 ;          2869            !+
3112 ;          2870            ! Search the single bit error log table
3113 ;          2871            ! and see if this error already exist.
3114 ;          2872            !-
3115 ;          2873
3116 ;          2874            incr index from 0 to .SBE$_COUNT do
3117 ;          2875                begin
3118 ;          2876
3119 ;          2877                if (.SBE_LOG [.index, BIT$_SBE] eql .BIT_NUM) and   !Does this bit exist
3120 ;          2878                    (.SBE_LOG [.index, BNK$_SBE] eql .BANK) and     !Does this bank exist
3121 ;          2879                    (.SBE_LOG [.index, BRD$_SBE] eql .BOARD) and    !Does this board exist
3122 ;          2880                    (.SBE_LOG [.index, UNIT$_SBE] eql .LUN) !Does this unit exist
3123 ;          2881                then
3124 ;          2882                    begin                                !This sbe already exist so just up its occurance count
3125 ;          2883                    SBE_LOG [.index, SUM$_SBE] = .SBE_LOG [.index, SUM$_SBE] + 1;
3126 ;          2884                    SBE_EXIST = TRUE;                    !Indicate that this sbe already exist
```

```
;          2885                    exitloop;
;          2886                    end;
;          2887
;          2888                end;
;          2889
;          2890            !+
;          2891            ! Test to see if this sbe was already in the table
;          2892            ! by testing the flag sbe_exist.  If it did not exist then
;          2893            ! up the Prom Maintenance count, load this sbe into the table
;          2894            ! and test to see if this array module needs to be Prom Maintenanced.
;          2895            ! If the sbe did exist then return from this routine.
;          2896            !-
;          2897
;          2898            if not .SBE_EXIST                       !Was this sbe found in the table
;          2899            then
;          2900                begin                               !It was not found in the table so up the pm count
;          2901                PM_SBE_CNT [.LUN, .BOARD, PM_SBE$_SUM] = .PM_SBE_CNT [.LUN, .BOARD, PM_SBE$_SUM] + 1;
;          2902                !
;          2903                ! Now see if the Prom Maint Program needs to be
;          2904                ! run on this array module.
;          2905                !
;          2906
;          2907                if .PM_SBE_CNT [.LUN, .BOARD, PM_SBE$_SUM] eql 10   !Is the limit exceeded
;          2908                then
;          2909                    begin                           !The limit was exceeded
;          2910                    SAYWHO (.LUN);
;          2911                    PRINTB (FMT13, .ARRAY, MSG2);
;          2912                    !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
;          2913                    end;
;          2914
;          2915                !+
;          2916                ! This sbe was not found in the table so
;          2917                ! load this failing sbe into the table
;          2918                ! at the bottom of the list.
;          2919                !-
;          2920
;          2921                SBE_LOG [.SBE$_COUNT, BIT$_SBE] = .BIT_NUM; !Load the failing bit
;          2922                SBE_LOG [.SBE$_COUNT, BNK$_SBE] = .BANK;    !Load the failing bank
;          2923                SBE_LOG [.SBE$_COUNT, BRD$_SBE] = .BOARD;   !Load the failing board
;          2924                SBE_LOG [.SBE$_COUNT, UNIT$_SBE] = .LUN;    !Load the failing unit
;          2925                SBE_LOG [.SBE$_COUNT, SUM$_SBE] = 1;        !Indicate this is the first one
;          2926                SBE$_COUNT = .SBE$_COUNT + 1;       !Up the count of unique sbe's detected
;          2927                end;
;          2928
;          2929            end;
;          2930
;          2931    !
;          2932    ! VER COMMENTED OUT THIS CODE
;          2933    ! REPLACED BY ABOVE CODE
;          2934    !
;          2935    !       if (((.ARR_TYP eql 1) and (.HARDS [.LUN, .ARRAY, 0, 16, 0] eql H64K_LIMIT)) or ((.ARR_TYP eql 0) and (
;          2936    !           .HARDS [.LUN, .ARRAY, 0, 16, 0] eql H16K_LIMIT)))
```

```
;MLX4
;                    DRIVE IDENTIFICATION ROUTINES          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                           27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (11)
;          2937  !     then
;          2938  !        begin
;          2939  !        SAYWHO (.LUN);
;          2940  !        PRINTB (FMT13, .ARRAY, MSG2);
;          2941  !        !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
;          2942  !        end;
;          2943       return;
;          2944       end;

                                .SBTTL  UP.HARD.COUNT DRIVE IDENTIFICATION ROUTINES
037422                  UP.HARD.COUNT:
037422  004167  145706          JSR     R1,$SAVE5                       ;                       2833
037426  016605  000020          MOV     20(SP),R5                       ; LUN,*                 2850
037432  010500                  MOV     R5,R0
037434  006300                  ASL     R0
037436  006300                  ASL     R0
037440  006300                  ASL     R0
037442  006300                  ASL     R0
037444  010002                  MOV     R0,R2
037446  066602  000016          ADD     16(SP),R2                       ; ARRAY,*
037452  006302                  ASL     R2
037454  005262  033314          INC     HARDS(R2)
037460  026727  153200  000177  CMP     SBE$.COUNT,#177                 ;                       2864
037466  002401                  BLT     1$
037470  000207                  RTS     PC
037472  005004          1$:     CLR     R4                              ; SBE.EXIST             2867
037474  005001                  CLR     R1                              ; INDEX                 2874
037476  000463                  BR      4$
037500  010102          2$:     MOV     R1,R2                           ; INDEX,*               2877
037502  006302                  ASL     R2
037504  006302                  ASL     R2
037506  012703  011264          MOV     #SBE.LOG,R3
037512  060203                  ADD     R2,R3
037514  016746  153146          MOV     BIT.NUM,-(SP)
037520  011346                  MOV     (R3),-(SP)
037522  006216                  ASR     (SP)
037524  006216                  ASR     (SP)
037526  006216                  ASR     (SP)
037530  006216                  ASR     (SP)
037532  006216                  ASR     (SP)
037534  006216                  ASR     (SP)
037536  042716  177600          BIC     #177600,(SP)
037542  022626                  CMP     (SP)+,(SP)+
037544  001037                  BNE     3$
037546  016746  174572          MOV     BANK,-(SP)                      ;                       2878
037552  111346                  MOVB    (R3),-(SP)
```

```
                                ;MLX4
                                ;                       DRIVE IDENTIFICATION ROUTINES                   27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<
                                
037554  042716  177774                BIC     #177774,(SP)
037560  022626                      CMP     (SP)+,(SP)+
037562  001030                      BNE     3$
037564  016746  174552              MOV     BOARD,-(SP)             ;                               2879
037570  111346                      MOVB    (R3),-(SP)
037572  006216                      ASR     (SP)
037574  006216                      ASR     (SP)
037576  042716  177760              BIC     #177760,(SP)
037602  022626                      CMP     (SP)+,(SP)+
037604  001017                      BNE     3$
037606  010546                      MOV     R5,-(SP)
037610  011346                      MOV     (R3),-(SP)              ;                               2880
037612  006116                      ROL     (SP)
037614  006116                      ROL     (SP)
037616  006116                      ROL     (SP)
037620  006116                      ROL     (SP)
037622  042716  177770              BIC     #177770,(SP)
037626  022626                      CMP     (SP)+,(SP)+
037630  001005                      BNE     3$
037632  005262  011266              INC     SBE.LOG+2(R2)           ;                               2883
037636  012704  000001              MOV     #1,R4                   ; *,SBE.EXIST                   2884
037642  000404                      BR      5$                      ;                               2885
037644  005201          3$:         INC     R1                      ; INDEX                         2874
037646  020167  153012      4$:     CMP     R1,SBE$.COUNT           ; INDEX,*
037652  003712                      BLE     2$
037654  006004          5$:         ROR     R4                      ; SBE.EXIST                     2898
037656  103511                      BLO     7$
037660  010002                      MOV     R0,R2                   ;                               2901
037662  066702  174454              ADD     BOARD,R2
037666  006302                      ASL     R2
037670  005262  012264              INC     PM.SBE.CNT(R2)
037674  026227  012264  000012      CMP     PM.SBE.CNT(R2),#12      ;                               2907
037702  001017                      BNE     6$
037704  010546                      MOV     R5,-(SP)                ;                               2910
037706  004767  175612              JSR     PC,SAYWHO
037712  012716  011120              MOV     #MSG2,(SP)              ;                               2911
037716  016646  000020              MOV     20(SP),-(SP)            ; ARRAY,*
037722  012746  007024              MOV     #FMT13,-(SP)
037726  012746  000003              MOV     #3,-(SP)
037732  010600                      MOV     SP,R0                   ; SP,*
037734  104414                      TRAP    14
037736  062706  000010              ADD     #10,SP                  ;
037742  016702  152716      6$:     MOV     SBE$.COUNT,R2           ;                               2909
037746  006302                      ASL     R2                                                      2921
037750  006302                      ASL     R2
037752  012701  011264              MOV     #SBE.LOG,R1
037756  060201                      ADD     R2,R1
037760  016704  152702              MOV     BIT.NUM,R4
037764  000304                      SWAB    R4
037766  106004                      RORB    R4
037770  006004                      ROR     R4
037772  006004                      ROR     R4
```

```
                        ;MLX4
                        ;               DRIVE IDENTIFICATION ROUTINES                   27-Mar-1982 19:24:42    TOPS
                                                                                        27-Mar-1982 19:23:44    PA:<
 037774  042704  160077                 BIC     #160077,R4
 040000  042711  017700                 BIC     #17700,(R1)
 040004  050411                         BIS     R4,(R1)
 040006  016704  174332                 MOV     BANK,R4                         ;       2922
 040012  042704  177774                 BIC     #177774,R4
 040016  142711  000003                 BICB    #3,(R1)
 040022  150411                         BISB    R4,(R1)
 040024  016704  174312                 MOV     BOARD,R4                        ;       2923
 040030  006304                         ASL     R4
 040032  006304                         ASL     R4
 040034  042704  177703                 BIC     #177703,R4
 040040  142711  000074                 BICB    #74,(R1)
 040044  150411                         BISB    R4,(R1)
 040046  006005                         ROR     R5                              ;       2924
 040050  006005                         ROR     R5
 040052  006005                         ROR     R5
 040054  006005                         ROR     R5
 040056  042705  017777                 BIC     #17777,R5
 040062  042711  160000                 BIC     #160000,(R1)
 040066  050511                         BIS     R5,(R1)
 040070  012762  000001  011266         MOV     #1,SBE.LOG+2(R2)                ;       2925
 040076  005267  152562                 INC     SBE$.COUNT                      ;       2926
 040102  000207                 7$:     RTS     PC                              ;       2833

                        ; Routine Size:  153 words
                        ; Maximum stack depth per invocation:  10 words
```

```
;MLX4
;                DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                 27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (12)

;          2945  routine UP_SOFT_COUNT (LUN, ARRAY) : novalue =
;          2946      begin
;          2947
;          2948  !++
;          2949  !   ROUTINE:     UP_SOFT_COUNT(LUN,ARRAY)
;          2950  !
;          2951  !   PURPOSE:     TO INCREMENT THE SOFT ERROR COUNT FOR THE GIVEN
;          2952  !                ARRAY, AND TO SEE IF THE SOFT ERROR THRESHOLD HAS
;          2953  !                BEEN REACHED.
;          2954  !
;          2955  !   ARGUMENTS:   LUN   = LOGICAL UNIT WHICH HAS THE SOFT ERROR
;          2956  !                ARRAY = THE BOARD NUMBER (0-15)
;          2957  !--
;          2958
;          2959      local                                          ! VER CZMLBB ADD THIS LOCAL STORAGE
;          2960          SBE_EXIST;                                 !Flag to indicate if sbe already exists
;          2961
;          2962      SOFTS [.LUN, .ARRAY, 0, 16, 0] = .SOFTS [.LUN, .ARRAY, 0, 16, 0] + 1;
;          2963      !
;          2964      ! VER CZMLBB ADDED FOLLOWING CODE TO LOG SBE'S
;          2965      !
;          2966      ! First search the sbe log table and see if
;          2967      ! this single bit error already exists in
;          2968      ! the table.  If it does exist then just
;          2969      ! increment its occurance count,  else
;          2970      ! record its failing location into the
;          2971      ! table.
;          2972      !
;          2973      ! Only log away 128 single bit errors.
;          2974      !
;          2975
;          2976      if .SBE$_COUNT lss 127                         !Have 128 errors been logged yet
;          2977      then
;          2978          begin                                      !There is room for at least one more sbe
;          2979          SBE_EXIST = FALSE;                         !Init the existence flage to false
;          2980
;          2981          !+
;          2982          ! Search the single bit error log table
;          2983          ! and see if this error already exist.
;          2984          !-
;          2985
;          2986          incr index from 0 to .SBE$_COUNT do
;          2987              begin
;          2988
;          2989              if (.SBE_LOG [.index, BIT$_SBE] eql .BIT_NUM) and   !Does this bit exist
;          2990                  (.SBE_LOG [.index, BNK$_SBE] eql .BANK) and     !Does this bank exist
;          2991                  (.SBE_LOG [.index, BRD$_SBE] eql .BOARD) and    !Does this board exist
;          2992                  (.SBE_LOG [.index, UNIT$_SBE] eql .LUN) !Does this unit exist
;          2993              then
;          2994                  begin                              !This sbe already exist so just up its occurance count
;          2995                  SBE_LOG [.index, SUM$_SBE] = .SBE_LOG [.index, SUM$_SBE] + 1;
;          2996                  SBE_EXIST = TRUE;                  !Indicate that this sbe already exist
```

```
2997                    exitloop;
2998                    end;
2999
3000                end;
3001
3002            !+
3003            ! Test to see if this sbe was already in the table
3004            ! by testing the flag sbe_exist.  If it did not exist then
3005            ! enter this SBE into the table.
3006            !
3007            ! NOTE:
3008            !    Soft errors are not counted toward the Prom Maintenance
3009            !    call out.
3010            !-
3011
3012            if not .SBE_EXIST                       !Was this sbe found in the table
3013            then
3014                begin                               !It was not found in the table so up the pm count
3015
3016                !+
3017                ! This sbe was not found in the table so
3018                ! load this failing sbe into the table
3019                ! at the bottom of the list.
3020                !-
3021
3022                SBE_LOG [.SBE$_COUNT, BIT$_SBE] = .BIT_NUM; !Load the failing bit
3023                SBE_LOG [.SBE$_COUNT, BNK$_SBE] = .BANK;    !Load the failing bank
3024                SBE_LOG [.SBE$_COUNT, BRD$_SBE] = .BOARD;   !Load the failing board
3025                SBE_LOG [.SBE$_COUNT, UNIT$_SBE] = .LUN;    !Load the failing unit
3026                SBE_LOG [.SBE$_COUNT, SUM$_SBE] = 1;        !Indicate this is the first one
3027                SBE$_COUNT = .SBE$_COUNT + 1;       !Up the count of unique sbe's detected
3028                end;
3029
3030            end;
3031
3032        !
3033        ! VER CZMLBB THIS CODE WAS COMMENTED OUT AND REPLACED BY THE
3034        ! ABOVE CODE.
3035        !
3036        !    if (((.ARR_TYP eql 1) and (.SOFTS [.LUN, .ARRAY, 0, 16, 0] eql S64K_LIMIT)) or ((.ARR_TYP eql 0) and (
3037        !       .SOFTS [.LUN, .ARRAY, 0, 16, 0] eql S16K_LIMIT)))
3038        !    then
3039        !       begin
3040        !       SAYWHO (.LUN);
3041        !       PRINTB (FMT13, .ARRAY, MSG2);
3042        !       !'ARRAY XX  --> RUN ML11 PROM MAINTENANCE PROGRAM'
3043        !       end;
3044            return;
3045            end;
```

```
                                        ;MLX4
                                        ;               DRIVE IDENTIFICATION ROUTINES                    27-Mar-1982 19:24:42    TOPS
                                                                                                         27-Mar-1982 19:23:44    PA:<
                                                .SBTTL  UP.SOFT.COUNT DRIVE IDENTIFICATION ROUTINES
040104                                  UP.SOFT.COUNT:
040104  004167  145224                        JSR     R1,$SAVE5                       ;                                       2945
040110  016605  000020                        MOV     20(SP),R5                       ; LUN,*                                 2962
040114  010500                                MOV     R5,R0
040116  006300                                ASL     R0
040120  006300                                ASL     R0
040122  006300                                ASL     R0
040124  006300                                ASL     R0
040126  066600  000016                        ADD     16(SP),R0                       ; ARRAY,*
040132  006300                                ASL     R0
040134  005260  032714                        INC     SOFTS(R0)
040140  016701  152520                        MOV     SBE$.COUNT,R1                   ;                                       2976
040144  020127  000177                        CMP     R1,#177
040150  002150                                BGE     5$
040152  005003                                CLR     R3                              ; SBE.EXIST                             2979
040154  005000                                CLR     R0                              ; INDEX                                 2986
040156  000463                                BR      3$
040160  010004                          1$:   MOV     R0,R4                           ; INDEX,*                               2989
040162  006304                                ASL     R4
040164  006304                                ASL     R4
040166  012702  011264                        MOV     #SBE.LOG,R2
040172  060402                                ADD     R4,R2
040174  016746  152466                        MOV     BIT.NUM,-(SP)
040200  011246                                MOV     (R2),-(SP)
040202  006216                                ASR     (SP)
040204  006216                                ASR     (SP)
040206  006216                                ASR     (SP)
040210  006216                                ASR     (SP)
040212  006216                                ASR     (SP)
040214  006216                                ASR     (SP)
040216  042716  177600                        BIC     #177600,(SP)
040222  022626                                CMP     (SP)+,(SP)+
040224  001037                                BNE     2$
040226  016746  174112                        MOV     BANK,-(SP)                      ;                                       2990
040232  111246                                MOVB    (R2),-(SP)
040234  042716  177774                        BIC     #177774,(SP)
040240  022626                                CMP     (SP)+,(SP)+
040242  001030                                BNE     2$
040244  016746  174072                        MOV     BOARD,-(SP)                     ;                                       2991
040250  111246                                MOVB    (R2),-(SP)
040252  006216                                ASR     (SP)
040254  006216                                ASR     (SP)
040256  042716  177760                        BIC     #177760,(SP)
040262  022626                                CMP     (SP)+,(SP)+
040264  001017                                BNE     2$
040266  010546                                MOV     R5,-(SP)                        ;                                       2992
040270  011246                                MOV     (R2),-(SP)
```

```
                                ;MLX4                                                                   27-Mar-1982 19:24:42    TOPS
                                ;                DRIVE IDENTIFICATION ROUTINES                          27-Mar-1982 19:23:44    PA:<
                                        ROL     (SP)
                                        ROL     (SP)
                                        ROL     (SP)
                                        ROL     (SP)
040302  042716  177770                  BIC     #177770,(SP)
040306  022626                          CMP     (SP)+,(SP)+
040310  001005                          BNE     2$
040312  005264  011266                  INC     SBE.LOG+2(R4)           ;                               2995
040316  012703  000001                  MOV     #1,R3                   ; *,SBE.EXIST                   2996
040322  000403                          BR      4$                      ;                               2997
                                2$:     INC     R0                      ; INDEX                         2986
                                3$:     CMP     R0,R1                   ; INDEX,*
040330  003713                          BLE     1$
                                4$:     ROR     R3                      ; SBE.EXIST                     3012
040334  103456                          BLO     5$
040336  006301                          ASL     R1                      ;                               3022
040340  006301                          ASL     R1
040342  012700  011264                  MOV     #SBE.LOG,R0
040346  060100                          ADD     R1,R0
040350  016704  152312                  MOV     BIT.NUM,R4
040354  000304                          SWAB    R4
040356  106004                          RORB    R4
040360  006004                          ROR     R4
040362  006004                          ROR     R4
040364  042704  160077                  BIC     #160077,R4
040370  042710  017700                  BIC     #17700,(R0)
040374  050410                          BIS     R4,(R0)
040376  016704  173742                  MOV     BANK,R4                 ;                               3023
040402  042704  177774                  BIC     #177774,R4
040406  142710  000003                  BICB    #3,(R0)
040412  150410                          BISB    R4,(R0)
040414  016704  173722                  MOV     BOARD,R4                ;                               3024
040420  006304                          ASL     R4
040422  006304                          ASL     R4
040424  042704  177703                  BIC     #177703,R4
040430  142710  000074                  BICB    #74,(R0)
040434  150410                          BISB    R4,(R0)
040436  006005                          ROR     R5                      ;                               3025
040440  006005                          ROR     R5
040442  006005                          ROR     R5
040444  006005                          ROR     R5
040446  042705  017777                  BIC     #17777,R5
040452  042710  160000                  BIC     #160000,(R0)
040456  050510                          BIS     R5,(R0)
040460  012761  000001  011266          MOV     #1,SBE.LOG+2(R1)        ;                               3026
040466  005267  152172                  INC     SBE$.COUNT              ;                               3027
040472  000207                  5$:     RTS     PC                      ;                               2945

                                ; Routine Size:  124 words
                                ; Maximum stack depth per invocation:  8 words
```

```
;MLX4
;                INITIALIZATION CODE
;
;          3046  %sbttl 'INITIALIZATION CODE'
;          3047  BGNINIT;                                              !* 1 *
;          3048  !       INITIALIZATION CODE IS EXECUTED AT THE BEGINNING OF EACH
;          3049  !       PASS, WHEN POWER DOWN/POWER UP HAS OCCURRED, OR WHEN THE
;          3050  !       OPERATOR HAS ISSUED A START, RESTART OR CONTINUE COMMAND.
;          3051  !
;          3052  !       DURING INITIALIZATION, THE 'GPHARD' MACRO IS USED TO GET
;          3053  !       P-TABLE INFORMATION FOR THE LOGICAL UNIT UNDER TEST. THE
;          3054  !       NUMBER OF UNITS  AVAILABLE FOR TESTING IS CONTAINED IN A
;          3055  !       HEADER LOCATION ('L$UNIT').
;          3056  !
;          3057  !       THE CODE WITHIN THE INITIALIZATION SECTION IS DIVIDED
;          3058  !       INTO THREE CATEGORIES:
;          3059  !               1)  ONCE-ONLY CODE WHICH IS EXECUTED
;          3060  !                   ONLY ON THE VERY FIRST PASS (I.E.,
;          3061  !                   WHEN THE OPERATOR HAS JUST TYPED
;          3062  !                   IN THE 'START' COMMAND;
;          3063  !               2)  CODE WHICH SHOULD NOT BE EXECUTED
;          3064  !                   ON THE FIRST PASS, BUT WHICH IS
;          3065  !                   TO BE RUN ON EVERY SUBSEQUENT PASS;
;          3066  !               3)  COMMON CODE WHICH IS TO BE EXECUTED
;          3067  !                   ON EVERY PASS (INCLUDING THE FIRST).
;          3068
;          3069  local
;          3070      PLOC;
;          3071
;          3072  if ((READEF (EF_START)) or (READEF (EF_RESTART)))
;          3073  then                                                  !THIS IS CATEGORY 1 CODE
;          3074      begin                                             !* 2 *
;          3075      QUICK = 1;
;          3076      CLRTBLS ();
;          3077
;          3078      incr LUN from 0 to (.L$UNIT - 1) do
;          3079          begin                                         !* 3 *
;          3080          L$LUN = .LUN;
;          3081
;          3082          if GPHARD (.LUN, PLOC) neq 0
;          3083          then
;          3084              begin                                     !* 4 *
;          3085              PTABLE_ADDR [.LUN] = .PLOC;
;          3086
;          3087              if .NUM_DRIVES eql 0 then INIT_ADDRESSES (.PLOC);
;          3088
;          3089              NUM_DRIVES = .NUM_DRIVES + 1;
;          3090              DRIVE_STATUS [.LUN] = ACTIVE;
;          3091              CONFIG (.LUN);
;          3092              end                                       !* 4 *
;          3093          else
;          3094              DRIVE_STATUS [.LUN] = INACTIVE;
;          3095
;          3096          end;                                          !* 3 *
;          3097
```

```
;MLX4                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                INITIALIZATION CODE                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (13)

;          3098      end                                !* 2 *
;          3099  else                                   !THIS IS CATEGORY 2 CODE
;          3100      QUICK = 0;
;          3101
;          3102  !CATEGORY 3 CODE WOULD GO HERE, BUT THERE IS NONE.
;          3103  ENDINIT;                               !* 1 *

                                        .SBTTL  LINIT INITIALIZATION CODE
040474  004167  144614          LINIT:  JSR     R1,$SAVE4                       ;                       3045
040500  012700  000040                  MOV     #40,R0                          ;                       3072
040504  104447                          TRAP    47
040506  103404                          BCS     1$
040510  012700  000037                  MOV     #37,R0
040514  104447                          TRAP    47
040516  103076                          BHIS    7$
040520  012767  000001  172146  1$:     MOV     #1,QUICK                        ;                       3075
040526  004767  174022                  JSR     PC,CLRTBLS                      ;                       3076
040532  016704  141254                  MOV     L$UNIT,R4                       ;                       3078
040536  005003                          CLR     R3                              ; LUN
040540  000462                          BR      6$
040542  010367  141326          2$:     MOV     R3,L$LUN                        ; LUN,*                 3080
040546  010302                          MOV     R3,R2                           ; LUN,*                 3090
040550  006202                          ASR     R2
040552  006202                          ASR     R2
040554  006202                          ASR     R2
040556  062702  034442                  ADD     #DRIVE.STATUS,R2
040562  010300                          MOV     R3,R0                           ; LUN,*                 3082
040564  104442                          TRAP    42
040566  010001                          MOV     R0,R1                           ; *,PLOC
040570  001432                          BEQ     4$
040572  010300                          MOV     R3,R0                           ; LUN,*                 3085
040574  006300                          ASL     R0
040576  010160  034422                  MOV     R1,PTABLE.ADDR(R0)              ; PLOC,*
040602  005767  173650                  TST     NUM.DRIVES                      ;                       3087
040606  001004                          BNE     3$
040610  010146                          MOV     R1,-(SP)                        ; PLOC,*
040612  004767  174370                  JSR     PC,INIT.ADDRESSES
040616  005726                          TST     (SP)+
040620  005267  173632          3$:     INC     NUM.DRIVES                      ;                       3089
040624  010246                          MOV     R2,-(SP)                        ;                       3090
040626  010346                          MOV     R3,-(SP)                        ; LUN,*
040630  042716  177770                  BIC     #177770,(SP)
040634  012746  000001                  MOV     #1,-(SP)
040640  011646                          MOV     (SP),-(SP)
040642  004767  143746                  JSR     PC,BL$PU2
040646  010316                          MOV     R3,(SP)                         ; LUN,*                 3091
```

```
                                ;MLX4                                                                   27-Mar-1982 19:24:42    TOPS
                                ;                       INITIALIZATION CODE                             27-Mar-1982 19:23:44    PA:<

040650  004767  175126                    JSR     PC,CONFIG
040654  000411                            BR      5$
040656  010246                4$:         MOV     R2,-(SP)                ;                               3082
040660  010346                            MOV     R3,-(SP)                ;                               3094
040662  042716  177770                    BIC     #177770,(SP)            ; LUN,*
040666  012746  000001                    MOV     #1,-(SP)
040672  005046                            CLR     -(SP)
040674  004767  143714                    JSR     PC,BL$PU2
040700  062706  000010                5$:         ADD     #10,SP                  ;                       3079
040704  005203                            INC     R3                      ; LUN                           3078
040706  020304                6$:         CMP     R3,R4                   ; LUN,*
040710  002714                            BLT     2$
040712  000207                            RTS     PC
040714  005067  171754                7$:         CLR     QUICK                   ;                       3072
040720  000207                            RTS     PC                      ;                               3100
                                                                        ;                               3045

                                ; Routine Size:  75 words
                                ; Maximum stack depth per invocation:  9 words


                                        .SBTTL  L$INIT INITIALIZATION CODE
040722  004767  177546        L$INIT::JSR     PC,LINIT                ;                               3100
040726  104411                        TRAP    11
040730  000207                        RTS     PC

                                ; Routine Size:  4 words
                                ; Maximum stack depth per invocation:  0 words
```

27-Mar-1982 19:24:42 TOPS-20 Bliss-16 V2(212)
27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (14)

```
;MLX4
;                GENERATOR FOR OPTION 1

        %sbttl 'GENERATOR FOR OPTION 1'
        routine GEN1 (SECTOR, COMP_FLAG) : novalue =
            begin                                                   !* 1 *

        !++
        !  ROUTINE:     GEN1(SECTOR,COMP_FLAG)
        !
        !  PURPOSE:     TO GENERATE THE ENTIRE 4K-WORD WRITE BUFFER FOR OPTION 1.
        !               THE GENERATION IS IN 16 GROUPS OF 256 WORDS (THE SIZE
        !               OF 1 SECTOR).   EACH GROUP OF 256 WORDS RECEIVES THE
        !               SECTOR ADDRESS WHERE THE WORDS WILL BE TRANSFERRED.
        !
        !  ARGUMENTS:   (1)  SECTOR    - CURRENT SECTOR NUMBER.
        !
        !               (2)  COMP_FLAG - AN INDICATOR WHICH IS USED TO DECIDE
        !                                WHETHER THE LOCATION IN THE WRITE BUFFER
        !                                SHOULD BE COMPLEMENTED.
        !--

            local
                OFFSET;

            OFFSET = 0;

            if .COMP_FLAG
            then                                                    !GENERATE COMPLEMENT DATA

                incru SECT from (.SECTOR) to ((.SECTOR) + 15) do
                    begin
                    BREAK;

                    incru COUNT from 1 to 256 do
                        begin                                       !* 2A *
                        (WBUFF + (.OFFSET)) = not (.SECT);          !COMPLEMENT DATA
                        OFFSET = .OFFSET + 2;
                        end;                                        !* 2A *

                    end

            else                                                    !GENERATE REGULAR DATA

                incru SECT from (.SECTOR) to ((.SECTOR) + 15) do
                    begin
                    BREAK;

                    incru COUNT from 1 to 256 do
                        begin                                       !* 2B *
                        (WBUFF + (.OFFSET)) = (.SECT);              !REGULAR DATA
                        OFFSET = .OFFSET + 2;
                        end;                                        !* 2B *

                    end;
```

```
3779 ;MLX4
3780 ;                  GENERATOR FOR OPTION 1                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
3781                                                               27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (14)
3782 ;          3156
3783 ;          3157      return;
3784 ;          3158      end;                                    !* 1 *
3788
3789                                        .SBTTL  GEN1 GENERATOR FOR OPTION 1
3793 040732 004167 144356          GEN1:    JSR     R1,$SAVE4                ;                                  3105
3794 040736 005002                          CLR     R2                       ; OFFSET                           3126
3795 040740 016601 000016                   MOV     16(SP),R1                ; SECTOR,*                         3131
3796 040744 010104                          MOV     R1,R4
3797 040746 062704 000017                   ADD     #17,R4
3798 040752 032766 000001 000014            BIT     #1,14(SP)                ; *,COMP.FLAG                      3128
3799 040760 001437                          BEQ     6$
3800 040762 010103                          MOV     R1,R3                    ; *,SECT                           3131
3801 040764 000416                          BR      3$
3802 040766 104422                 1$:      TRAP    22                       ;                                  3132
3803 040770 010301                          MOV     R3,R1                    ; SECT,*                           3137
3804 040772 005101                          COM     R1
3805 040774 012700 000001                   MOV     #1,R0                    ; *,COUNT                          3135
3806 041000 010162 012670          2$:      MOV     R1,WBUFF(R2)             ; *,*(OFFSET)                      3137
3807 041004 062702 000002                   ADD     #2,R2                    ; *,OFFSET                         3138
3808 041010 005200                          INC     R0                       ; COUNT                            3135
3809 041012 020027 000400                   CMP     R0,#400                  ; COUNT,*
3810 041016 101770                          BLOS    2$
3811 041020 005203                          INC     R3                       ; SECT                             3131
3812 041022 020304                 3$:      CMP     R3,R4                    ; SECT,*
3813 041024 101760                          BLOS    1$
3814 041026 000207                          RTS     PC                       ;                                  3128
3815 041030 104422                 4$:      TRAP    22                       ;                                  3146
3816 041032 012700 000001                   MOV     #1,R0                    ; *,COUNT                          3149
3817 041036 010162 012670          5$:      MOV     R1,WBUFF(R2)             ; SECT,*(OFFSET)                   3151
3818 041042 062702 000002                   ADD     #2,R2                    ; *,OFFSET                         3152
3819 041046 005200                          INC     R0                       ; COUNT                            3149
3820 041050 020027 000400                   CMP     R0,#400                  ; COUNT,*
3821 041054 101770                          BLOS    5$
3822 041056 005201                          INC     R1                       ; SECT                             3145
3823 041060 020104                 6$:      CMP     R1,R4                    ; SECT,*
3824 041062 101762                          BLOS    4$
3825 041064 000207                          RTS     PC                       ;                                  3105
3826
3827
3828                                ; Routine Size:  46 words
                                    ; Maximum stack depth per invocation:  5 words
```

```
3837 ;          3159  %sbttl 'PATTERN NUMBER SELECTION'
3838 ;          3160  routine SELPAT : novalue =
3839 ;          3161      begin
3840 ;          3162
3841 ;          3163  !++
3842 ;          3164  !  ROUTINE:     SELPAT
3843 ;          3165  !
3844 ;          3166  !  PURPOSE:     TO SELECT THE NEXT PATTERN NUMBER IN OPTION 2.
3845 ;          3167  !
3846 ;          3168  !               THIS ROUTINE AUTOMATICALLY COMPLEMENTS THE CURRENT
3847 ;          3169  !               PATTERN NUMBER AND EXAMINES THE SIGN OF THE RESULT.
3848 ;          3170  !               IF THE RESULT IS NEGATIVE, THEN IT IS TAKEN TO BE
3849 ;          3171  !               THE PATTERN NUMBER OF A COMPLEMENT PATTERN AND A
3850 ;          3172  !               'RETURN' IS EXECUTED.  IF, HOWEVER, THE RESULT IS
3851 ;          3173  !               POSITIVE, THEN AN ENTIRELY NEW PATTERN NUMBER IS
3852 ;          3174  !               REQUIRED.  THE NEW PATTERN NUMBER IS OBTAINED BY
3853 ;          3175  !               INCREMENTING THE OLD.
3854 ;          3176  !--
3855 ;          3177
3856 ;          3178      PATTERN = -(.PATTERN);
3857 ;          3179
3858 ;          3180      if .PATTERN geq 0 then PATTERN = .PATTERN + 1;
3859 ;          3181
3860 ;          3182      return;
3861 ;          3183      end;
3865
3866                                  .SBTTL  SELPAT PATTERN NUMBER SELECTION
3870 041066  005467  171604  SELPAT: NEG     PATTERN                          ;  3178
3871 041072  005767  171600          TST     PATTERN                          ;  3180
3872 041076  002402                  BLT     1$
3873 041100  005267  171572          INC     PATTERN
3874 041104  000207          1$:     RTS     PC                               ;  3160
3875
3876                                  ; Routine Size:  8 words
3877                                  ; Maximum stack depth per invocation:  0 words
3882
3883
```

```
3184  %sbttl 'USING THE PATTERN TABLE'
3185  routine GETCNTS (PATTERN) =
3186      begin
3187
3188  !++
3189  !  ROUTINE:     GETCNTS(PATTERN)
3190  !
3191  !  PURPOSE:     TO POINT TO THE APPROPRIATE BLOCK OF THE PATTERN
3192  !               TABLE AND GRAB THE VALUES WHICH ARE REQUIRED FOR THE
3193  !               PATTERN GENERATOR FOR OPTIONS 2 AND 4.
3194  !
3195  !  ARGUMENT:    PATTERN = THE CURRENT PATTERN NUMBER.
3196  !
3197  !  RESULTS:     (1)  'VALUE' RECEIVES THE VALUE WHICH IS RETURNED FOR
3198  !                    THE SUBROUTINE.  IT IS THE 4-BIT BINARY AMOUNT WHICH
3199  !                    WILL BE USED AS THE CONTENTS OF A NIBBLE OF COMPLEMENT
3200  !                    DATA.
3201  !
3202  !               (2)  'DATA_COUNT' RECEIVES THE NUMBER OF NIBBLES OF DATA.
3203  !
3204  !               (3)  'COMP_COUNT' RECEIVES THE NUMBER OF NIBBLES OF
3205  !                    COMPLEMENT DATA.
3206  !--
3207
3208      local
3209          PATNUM,
3210          VALUE;
3211
3212      selectone .PATTERN of
3213          set
3214
3215          [1 to 5] :
3216              begin
3217              PATNUM = .PATTERN - 1;
3218              VALUE = %b'1010';
3219              end;
3220
3221          [-5 to -1] :
3222              begin
3223              PATNUM = -(.PATTERN) - 1;
3224              VALUE = %b'0101';
3225              end;
3226
3227          [6 to 10] :
3228              begin
3229              PATNUM = .PATTERN - 6;
3230              VALUE = %b'1111';
3231              end;
3232
3233          [-10 to -6] :
3234              begin
3235              PATNUM = -(.PATTERN) - 6;
```

```
                        3236                VALUE = %b'0000';
                        3237                end;
                        3238            tes;
                        3239
                        3240        DATA_COUNT = .PATTBL [.PATNUM, COUNT1];
                        3241        COMP_COUNT = .PATTBL [.PATNUM, COUNT2];
                        3242        return .VALUE;
                        3243        end;
                                                .SBTTL  GETCNTS USING THE PATTERN TABLE
041106  004167  144150          GETCNTS:JSR     R1,$SAVE2                       ;                                       3185
041112  016600  000010                  MOV     10(SP),R0                       ; PATTERN,*                             3212
041116  003410                          BLE     1$
041120  020027  000005                  CMP     R0,#5
041124  003005                          BGT     1$
041126  010001                          MOV     R0,R1                           ; *,PATNUM                              3217
041130  005301                          DEC     R1                              ; PATNUM
041132  012702  000012                  MOV     #12,R2                          ; *,VALUE                               3218
041136  000441                          BR      4$                              ;                                       3212
041140  020027  177773          1$:     CMP     R0,#-5
041144  002410                          BLT     2$
041146  005700                          TST     R0
041150  002006                          BGE     2$
041152  012701  177777                  MOV     #-1,R1                          ; *,PATNUM                              3223
041156  160001                          SUB     R0,R1                           ; *,PATNUM
041160  012702  000005                  MOV     #5,R2                           ; *,VALUE                               3224
041164  000426                          BR      4$                              ;                                       3212
041166  020027  000006          2$:     CMP     R0,#6
041172  002411                          BLT     3$
041174  020027  000012                  CMP     R0,#12
041200  003006                          BGT     3$
041202  010001                          MOV     R0,R1                           ; *,PATNUM                              3229
041204  162701  000006                  SUB     #6,R1                           ; *,PATNUM
041210  012702  000017                  MOV     #17,R2                          ; *,VALUE                               3230
041214  000412                          BR      4$                              ;                                       3212
041216  020027  177766          3$:     CMP     R0,#-12
041222  002407                          BLT     4$
041224  020027  177772                  CMP     R0,#-6
041230  003004                          BGT     4$
041232  012701  177772                  MOV     #-6,R1                          ; *,PATNUM                              3235
041236  160001                          SUB     R0,R1                           ; *,PATNUM
041240  005002                          CLR     R2                              ; VALUE                                 3236
041242  006301                  4$:     ASL     R1                              ;                                       3240
041244  006301                          ASL     R1
041246  016167  034520  171424          MOV     PATTBL(R1),DATA.COUNT
041254  016167  034522  171420          MOV     PATTBL+2(R1),COMP.COUNT         ;                                       3241
                        ;MLX4                                                                   27-Mar-1982 19:24:42    TOPS
                        ;               USING THE PATTERN TABLE                                 27-Mar-1982 19:23:44    PA:<
041262  010200                          MOV     R2,R0                           ; VALUE,*                               3186
041264  000207                          RTS     PC                              ;                                       3185

                        ; Routine Size:  56 words
                        ; Maximum stack depth per invocation:  3 words
```

```
;MLX4
;                NIBBLE GENERATOR

;          3244  %sbttl 'NIBBLE GENERATOR'
;          3245  routine FILLER (BUFFER, WRDCNT, VALUE) : novalue =
;          3246      begin                                          !* 1 *
;          3247
;          3248  !++
;          3249  !   ROUTINE:     FILLER(BUFFER,WRDCNT,VALUE)
;          3250  !
;          3251  !   PURPOSE:     TO LOAD A CHOSEN WRITE BUFFER, ONE NIBBLE AT A TIME, WITH A
;          3252  !                PARTICULAR PATTERN, FOR A SPECIFIED NUMBER OF 16-BIT WORDS.
;          3253  !                THIS ROUTINE IS THE HEART OF THE GENERATOR FOR OPTIONS 2 AND 4.
;          3254  !
;          3255  !                THE 'FILLER' ROUTINE IS A LOOP WHICH WILL ALTERNATE BETWEEN
;          3256  !                THE TWO COUNTS AND FILL THE APPROPRIATE NUMBER OF NIBBLES OF
;          3257  !                THE CHOSEN BUFFER WITH THE CONTENTS OF 'VALUE'.  EVERY TIME
;          3258  !                A COUNT IS EXHAUSTED, THE OTHER COUNT IS STARTED UP AGAIN,
;          3259  !                AND EACH TIME A NEW COUNT IS BEGUN, 'VALUE' IS COMPLEMENTED.
;          3260  !                NOTE THAT THE FIRST COUNT THAT WILL BE USED WILL ALWAYS BE
;          3261  !                'DATA_COUNT', SO THAT THE BUFFER WILL BE REPETITIONS OF:
;          3262  !                DATA, COMP, DATA, COMP ...
;          3263  !
;          3264  !   ARGUMENTS:   (1)  BUFFER = THE STARTING ADDRESS OF THE CHOSEN WRITE BUFFER.
;          3265  !
;          3266  !                (2)  WRDCNT = THE NUMBER OF WORDS OF PATTERN TO BE GENERATED.
;          3267  !
;          3268  !                (3)  VALUE = NIBBLE OF DATA TO BE PLACED IN THE WRITE BUFFER
;          3269  !--
;          3270
;          3271      local
;          3272          NIBBLE,
;          3273          OFFSET,
;          3274          FLAG,
;          3275          THE_COUNT;
;          3276
;          3277      FLAG = 0;
;          3278      OFFSET = 0;
;          3279      NIBBLE = 0;
;          3280
;          3281      while 1 do
;          3282          begin                                      !* 2 *
;          3283          FLAG = not .FLAG;                          !FLIP THE FLAG
;          3284          VALUE = not .VALUE;                        !AND THE DATA
;          3285
;          3286          if .FLAG eql 0                             !CHOOSE A COUNT
;          3287          then
;          3288              THE_COUNT = .COMP_COUNT
;          3289          else
;          3290              THE_COUNT = .DATA_COUNT;
;          3291
;          3292          decr COUNT from .THE_COUNT to 1 do         !EXHAUST THE COUNT
;          3293              begin                                  !* 3 *
;          3294              (.BUFFER + (.OFFSET))<.NIBBLE, 4, 0> = .VALUE;      !LOAD THE NIBBLE
;          3295              NIBBLE = (((.NIBBLE) + 4) mod 16);     !CHANGE NIBBLE POINTER
```

```
 4066 ;MLX4
 4067 ;                NIBBLE GENERATOR                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
 4068                                                           27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (17)
 4069 ;          3296
 4070 ;          3297              if .NIBBLE eql 0
 4071 ;          3298              then
 4072 ;          3299                  begin                                   !* 4 *
 4073 ;          3300                  BREAK;
 4074 ;          3301                  OFFSET = .OFFSET + 2;
 4075 ;          3302                  WRDCNT = .WRDCNT - 1;
 4076 ;          3303
 4077 ;          3304                  if .WRDCNT eql 0 then return;
 4078 ;          3305
 4079 ;          3306                  end;                                    !* 4 *
 4080 ;          3307
 4081 ;          3308              end;                                        !* 3 *
 4082 ;          3309
 4083 ;          3310          end;                                            !* 2 *
 4084 ;          3311
 4085 ;          3312      end;                                                !* 1 *
 4089
 4090                                  .SBTTL  FILLER NIBBLE GENERATOR
 4094 041266  004167  144042  FILLER: JSR     R1,$SAVE5                       ;
 4095 041272  005001                  CLR     R1                              ; FLAG                  3245
 4096 041274  005005                  CLR     R5                              ; OFFSET                3277
 4097 041276  005002                  CLR     R2                              ; NIBBLE                3278
 4098 041300  005101          1$:     COM     R1                              ; FLAG                  3279
 4099 041302  005166  000016          COM     16(SP)                          ; VALUE                 3283
 4100 041306  005701                  TST     R1                              ; FLAG                  3284
 4101 041310  001003                  BNE     2$                              ;                       3286
 4102 041312  016704  171364          MOV     COMP.COUNT,R4                   ; *,THE.COUNT           3288
 4103 041316  000402                  BR      3$                              ;                       3286
 4104 041320  016704  171354  2$:     MOV     DATA.COUNT,R4                   ; *,THE.COUNT           3290
 4105 041324  010403          3$:     MOV     R4,R3                           ; THE.COUNT,COUNT       3292
 4106 041326  003764                  BLE     1$
 4107 041330  010546          4$:     MOV     R5,-(SP)                        ; OFFSET,*              3294
 4108 041332  066616  000024          ADD     24(SP),(SP)                     ; BUFFER,*
 4109 041336  010246                  MOV     R2,-(SP)                        ; NIBBLE,*
 4110 041340  012746  000004          MOV     #4,-(SP)
 4111 041344  016646  000024          MOV     24(SP),-(SP)                    ; VALUE,*
 4112 041350  004767  143240          JSR     PC,BL$PU2
 4113 041354  010216                  MOV     R2,(SP)                         ; NIBBLE,*              3295
 4114 041356  062716  000004          ADD     #4,(SP)
 4115 041362  012746  000020          MOV     #20,-(SP)
 4116 041366  004767  143610          JSR     PC,BL$MOD
 4117 041372  010002                  MOV     R0,R2                           ; *,NIBBLE
 4118 041374  001011                  BNE     6$                              ;                       3297
 4119 041376  104422                  TRAP    22                              ;                       3299
 4120 041400  062705  000002          ADD     #2,R5                           ; *,OFFSET              3301
```

```
                                ;MLX4
                                ;               NIBBLE GENERATOR                                27-Mar-1982 19:24:42    TOPS
                                                                                                27-Mar-1982 19:23:44    PA:<

4125 041404  005366  000032                DEC     32(SP)                          ; WRDCNT                        3302
4126 041410  001003                        BNE     6$                              ;                               3304
4127 041412  062706  000012                ADD     #12,SP                          ;                               3245
4128 041416  000207                5$:     RTS     PC                              ;                               3304
4129 041420  062706  000012        6$:     ADD     #12,SP                          ;                               3293
4130 041424  005303                        DEC     R3                              ; COUNT                         3292
4131 041426  001340                        BNE     4$
4132 041430  000723                        BR      1$                              ;                               3281

                                ; Routine Size:  50 words
                                ; Maximum stack depth per invocation:  11 words
```

```
4143 ;MLX4
4144 ;                  GENERATOR FOR OPTION 2                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
4145                                                            27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (18)
4146 ;          3313  %sbttl 'GENERATOR FOR OPTION 2'
4147 ;          3314  routine GEN2 : novalue =
4148 ;          3315      begin
4149 ;          3316
4150 ;          3317  !++
4151 ;          3318  !  ROUTINE:     GEN2
4152 ;          3319  !
4153 ;          3320  !  PURPOSE:     TO GENERATE THE ENTIRE WRITE BUFFER (WHICH
4154 ;          3321  !               WILL BE USED IN CONJUNCTION WITH OPTION 2)
4155 ;          3322  !               BASED ON PATTERN TABLE ENTRIES.
4156 ;          3323  !--
4157 ;          3324
4158 ;          3325      local
4159 ;          3326          VALUE;
4160 ;          3327
4161 ;          3328      VALUE = GETCNTS (.PATTERN);
4162 ;          3329      FILLER (WBUFF, BUFSIZ, .VALUE);
4163 ;          3330      return;
4164 ;          3331      end;
4168
4169                                      .SBTTL  GEN2 GENERATOR FOR OPTION 2
4173 041432  016746  171240          GEN2:  MOV     PATTERN,-(SP)                ;                    3328
4174 041436  004767  177444                 JSR     PC,GETCNTS
4175 041442  012716  012670                 MOV     #WBUFF,(SP)                  ;                    3329
4176 041446  012746  004000                 MOV     #4000,-(SP)
4177 041452  010046                         MOV     R0,-(SP)                     ; VALUE,*
4178 041454  004767  177606                 JSR     PC,FILLER
4179 041460  062706  000006                 ADD     #6,SP                        ;                    3314
4180 041464  000207                         RTS     PC
4181
4182                                  ; Routine Size:  14 words
4183                                  ; Maximum stack depth per invocation:  3 words
4188
4189
```

```
;MLX4
;                GENERATOR FOR OPTION 3                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (19)

;        3332  %sbttl 'GENERATOR FOR OPTION 3'
;        3333  routine GEN3 (COMP_FLAG) : novalue =
;        3334      begin
;        3335
;        3336  !++
;        3337  !  ROUTINE:     GEN3(COMP_FLAG)
;        3338  !
;        3339  !  PURPOSE:     TO GENERATE THE ENTIRE WRITE BUFFER WHICH WILL BE MADE
;        3340  !               UP OF WORDS WHICH CONTAIN THE UNIQUE COUNT FROM ONE TO
;        3341  !               BUFSIZ.
;        3342  !
;        3343  !  ARGUMENT:    COMP_FLAG - THIS IS AN INDICATOR OF WHETHER OR NOT TO
;        3344  !                           COMPLEMENT EVERY WORD IN THE WRITE BUFFER.
;        3345  !--
;        3346
;        3347      local
;        3348          OFFSET;
;        3349
;        3350      OFFSET = 0;
;        3351
;        3352      if .COMP_FLAG
;        3353      then                                          !GENERATE COMPLEMENT DATA
;        3354
;        3355          incru COUNT from 1 to BUFSIZ do
;        3356              begin
;        3357              (WBUFF + (.OFFSET)) = not (.COUNT); !COMPLEMENT DATA
;        3358              OFFSET = .OFFSET + 2;
;        3359              end
;        3360
;        3361      else                                          !GENERATE REGULAR DATA
;        3362
;        3363          incru COUNT from 1 to BUFSIZ do
;        3364              begin
;        3365              (WBUFF + (.OFFSET)) = (.COUNT);     !REGULAR DATA
;        3366              OFFSET = .OFFSET + 2;
;        3367              end;
;        3368
;        3369      return;
;        3370      end;
;
;                          .SBTTL  GEN3 GENERATOR FOR OPTION 3
;041466  010146      GEN3:  MOV     R1,-(SP)                    ;                          3333
;041470  005001             CLR     R1                          ; OFFSET                   3350
;041472  032766  000001 000004  BIT  #1,4(SP)                   ; *,COMP.FLAG              3352
;041500  001415             BEQ     2$
;041502  012700  000001     MOV     #1,R0                       ; *,COUNT                  3355
```

```
4247                                    ;MLX4
4248                                    ;               GENERATOR FOR OPTION 3                  27-Mar-1982 19:24:42    TOPS
4249                                                                                            27-Mar-1982 19:23:44    PA:<
4250 041506  010061  012670           1$:     MOV     R0,WBUFF(R1)            ; COUNT,*(OFFSET)                       3357
4251 041512  005161  012670                   COM     WBUFF(R1)               ; *(OFFSET)
4252 041516  062701  000002                   ADD     #2,R1                   ; *,OFFSET                              3358
4253 041522  005200                           INC     R0                      ; COUNT                                 3355
4254 041524  020027  004000                   CMP     R0,#4000                ; COUNT,*
4255 041530  101766                           BLOS    1$
4256 041532  000412                           BR      4$                      ;                                       3352
4257 041534  012700  000001           2$:     MOV     #1,R0                   ; *,COUNT                               3363
4258 041540  010061  012670           3$:     MOV     R0,WBUFF(R1)            ; COUNT,*(OFFSET)                       3365
4259 041544  062701  000002                   ADD     #2,R1                   ; *,OFFSET                              3366
4260 041550  005200                           INC     R0                      ; COUNT                                 3363
4261 041552  020027  004000                   CMP     R0,#4000                ; COUNT,*
4262 041556  101770                           BLOS    3$
4263 041560  012601                   4$:     MOV     (SP)+,R1                ;                                       3333
4264 041562  000207                           RTS     PC
4265
4266                                    ; Routine Size:  31 words
4267                                    ; Maximum stack depth per invocation:  2 words
4272
4273
```

```
;MLX4
;                GENERATOR FOR OPTION 4

;          3371  %sbttl 'GENERATOR FOR OPTION 4'
;          3372  routine GEN4 (MARPAT, BUFFER) : novalue =
;          3373      begin
;          3374
;          3375  !++
;          3376  !  ROUTINE:     GEN4(MARPAT,BUFFER)
;          3377  !
;          3378  !  PURPOSE:     THIS IS THE GENERATOR WHICH IS USED FOR OPTION 4, THE
;          3379  !               MARCH TEST.  IT BEGINS AT THE START OF THE CHOSEN
;          3380  !               BUFFER AND GENERATES 256 WORDS IN THE EXACT WAY THAT
;          3381  !               OPTION 2 DOES.
;          3382  !
;          3383  !  ARGUMENTS:   (1)  MARPAT - THE MARCH PATTERN NUMBER
;          3384  !
;          3385  !               (2)  BUFFER - THE STARTING ADDRESS OF THE CHOSEN BUFFER
;          3386  !--
;          3387
;          3388      local
;          3389          VALUE;
;          3390
;          3391      VALUE = GETCNTS (.MARPAT);
;          3392      FILLER (.BUFFER, 256, .VALUE);
;          3393      return;
;          3394      end;
;
;
;                                .SBTTL  GEN4 GENERATOR FOR OPTION 4
;041564  016646  000004  GEN4:   MOV     4(SP),-(SP)             ; MARPAT,*          3391
;041570  004767  177312          JSR     PC,GETCNTS
;041574  016616  000004          MOV     4(SP),(SP)              ; BUFFER,*          3392
;041600  012746  000400          MOV     #400,-(SP)
;041604  010046                  MOV     R0,-(SP)                ; VALUE,*
;041606  004767  177454          JSR     PC,FILLER
;041612  062706  000006          ADD     #6,SP                   ;                   3372
;041616  000207                  RTS     PC
;
;                ; Routine Size:  14 words
;                ; Maximum stack depth per invocation:  3 words
;
;
```

```
;MLX4
;                GENERATOR FOR OPTION 5                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (21)
;
;        3395  %sbttl 'GENERATOR FOR OPTION 5'
;        3396  routine GEN5 : novalue =
;        3397      begin
;        3398
;        3399  !++
;        3400  !  ROUTINE:     GEN5
;        3401  !
;        3402  !  PURPOSE:     THIS IS THE GENERATOR WHICH IS USED FOR OPTION 5.
;        3403  !               IT BEGINS AT THE START OF THE WRITE BUFFER, AND GENERATES
;        3404  !               A FULL BUFFER OF RANDOM DATA.  THE FIRST 3 WORDS OF THE BUFFER
;        3405  !               RECEIVE THE 3 SEEDS WHICH WERE USED IN THE GENERATION.
;        3406  !--
;        3407
;        3408      local
;        3409          OFFSET;
;        3410
;        3411      (WBUFF + 0) = .SEED1;                       !THE FIRST 3 WORDS OF THE
;        3412      (WBUFF + 2) = .SEED2;                       !WRITE BUFFER RECEIVE THE
;        3413      (WBUFF + 4) = .SEED3;                       !3 GENERATING SEEDS.
;        3414      OFFSET = 6;
;        3415
;        3416      incru COUNT from 4 to BUFSIZ do
;        3417          begin
;        3418          RN ();                                  !NOTE: USING SIGNED VALUES (FULL 16 BITS)
;        3419          BREAK;
;        3420          (WBUFF + .OFFSET) = .RANDOM;
;        3421          OFFSET = .OFFSET + 2;
;        3422          end;
;        3423
;        3424      return;
;        3425      end;
;
```

```
 4367
 4371 041620  004167  143436                GEN5:   .SBTTL  GEN5 GENERATOR FOR OPTION 5
 4372 041624  016767  143626  151036                JSR     R1,$SAVE2                       ;                                                       3396
 4373 041632  016767  143622  151032                MOV     SEED1,WBUFF                     ;                                                       3411
 4374 041640  016767  143616  151026                MOV     SEED2,WBUFF+2                   ;                                                       3412
 4375 041646  012701  000006                        MOV     SEED3,WBUFF+4                   ;                                                       3413
 4376 041652  012702  000004                        MOV     #6,R1                           ; *,OFFSET                                              3414
 4377 041656  004767  143506                        MOV     #4,R2                           ; *,COUNT                                               3416
 4378 041662  104422                        1$:     JSR     PC,RN                           ;                                                       3418
 4379 041664  016761  143574  012670                TRAP    22
 4380 041672  062701  000002                        MOV     RANDOM,WBUFF(R1)                ; *,*(OFFSET)                                           3420
 4381 041676  005202                                ADD     #2,R1                           ; *,OFFSET                                              3421
 4382 041700  020227  004000                        INC     R2                              ; COUNT                                                 3416
 4383 041704  101764                                CMP     R2,#4000                        ; COUNT,*
 4384                                               BLOS    1$
 4385                                       ;MLX4
 4386                                       ;               GENERATOR FOR OPTION 5                          27-Mar-1982 19:24:42    TOPS
 4387 041706  000207                                RTS     PC                              ;               27-Mar-1982 19:23:44    PA:<    3396
 4388
 4389                                       ; Routine Size:  28 words
 4390                                       ; Maximum stack depth per invocation:  3 words
 4395
 4396
```

SEQ 0131


```
4398 ;MLX4
4399 ;                  SYSTEM ERROR DETECTOR
4400 ;
4401 ;          3426   %sbttl 'SYSTEM ERROR DETECTOR'
4402 ;          3427   routine SYSERR (LUN) =
4403 ;          3428       begin                                          !* 1 *
4404 ;          3429
4405 ;          3430   !++
4406 ;          3431   !  ROUTINE:     SYSERR(LUN)
4407 ;          3432   !
4408 ;          3433   !  PURPOSE:     (1)  TO SCAN FOR SYSTEM ERRORS AFTER A TRANSFER HAS ENDED.
4409 ;          3434   !
4410 ;          3435   !               (2)  PRINT ERROR MESSAGES IF APPROPRIATE:
4411 ;          3436   !
4412 ;          3437   !                    A) ERROR MESSAGES DURING RETRIES WILL NOT
4413 ;          3438   !                       BE PRINTED.
4414 ;          3439   !
4415 ;          3440   !                    B) THE OPERATOR HAS THE ABILITY TO INHIBIT THE
4416 ;          3441   !                       PRINTING OF DATA ERRORS, BUT NOT SYSTEM ERRORS.
4417 ;          3442   !
4418 ;          3443   !               (3)  DECIDE ON A VALUE TO RETURN WHICH WILL INDICATE THE
4419 ;          3444   !                    RELATIVE SEVERITY OF THE ERROR.
4420 ;          3445   !
4421 ;          3446   !  ARGUMENT:    LUN = THE CURRENT LOGICAL UNIT NUMBER
4422 ;          3447   !                     [0 TO NUMBER OF DRIVES MINUS 1].
4423 ;          3448   !
4424 ;          3449   !  RESULT:      VALUE RETURNED FOR THE SUBROUTINE SHOWS TYPE OF ERROR:
4425 ;          3450   !                     0 = NO ERRORS AT ALL
4426 ;          3451   !                     1 = RETRY ALLOWED FOR THESE TYPES OF ERRORS
4427 ;          3452   !                     2 = FATAL CONTROLLER ERROR
4428 ;          3453   !                     3 = FATAL DRIVE ERROR
4429 ;          3454   !                     4 = UNCORRECTABLE DATA ERROR
4430 ;          3455   !                     5 = CORRECTABLE DATA ERROR
4431 ;          3456   !
4432 ;          3457   !  FIGURE OUT WHICH VALUE TO RETURN BY THE FOLLOWING SCHEME:
4433 ;          3458   !
4434 ;          3459   !  (1)  IF THERE IS A CHOICE BETWEEN DATA ERROR AND SYSTEM ERROR,
4435 ;          3460   !       FIRST CHOOSE THE DATA ERROR.
4436 ;          3461   !  (2)  IF THERE IS A CHOICE BETWEEN FATAL AND NON-FATAL ERROR,
4437 ;          3462   !       FIRST CHOOSE THE FATAL ERROR.
4438 ;          3463   !  (3)  IF THERE IS A CHOICE BETWEEN CONTROLLER ERROR AND DRIVE ERROR,
4439 ;          3464   !       FIRST CHOOSE CONTROLLER ERROR.
4440 ;          3465   !--
4441 ;          3466
4442 ;          3467       label
4443 ;          3468           PURPOSE_2_CODE;
4444 ;          3469
4445 ;          3470       local
4446 ;          3471           ERR2,
4447 ;          3472           ERR3,
4448 ;          3473           ERR4,
4449 ;          3474           ERR5,
4450 ;          3475           ERR6,
4451 ;          3476           ERR7,
4452 ;          3477           ERR8,                                      ! VER CZMLBB ADDED THIS LOCAL
```

```
3478          ERR9;                                   ! VER CZMLBB ADDED THIS LOCAL
3479
3480      ERR2 = INACTIVE;
3481      ERR3 = INACTIVE;
3482      ERR4 = INACTIVE;
3483      ERR5 = INACTIVE;
3484      ERR6 = INACTIVE;
3485      ERR7 = INACTIVE;
3486      ERR8 = INACTIVE;                            ! VER CZMLBB
3487      ERR9 = INACTIVE;                            ! VER CZMLBB
3488
3489      !+
3490      ! THIS IS THE CODE FOR PURPOSE 1:
3491      !-
3492
3493      if .SC
3494      then                                        !THERE ARE SOME ERRORS -- FIND OUT WHAT KIND
3495          begin                                   !* 2 *
3496
3497          if ((.NED) or (.NEM) or (.PGE)) then ERR2 = ACTIVE;
3498
3499          if ((.DLT) or (.PE) or (.MXF) or (.MDPE) or (.MCPE)) then ERR3 = ACTIVE;
3500
3501  ! VER ADDED THIS ERR9
3502
3503          if (.MDPE) and ( not .SGL) then ERR9 = ACTIVE;
3504
3505  ! VER ADDED THIS ERR8
3506
3507          if ((.DLT) or (.PE) or (.MXF) or (.MCPE)) then ERR8 = ACTIVE;
3508
3509          if ((.WCE) and (.ECCDIS eql 0)) then ERR3 = ACTIVE;
3510
3511          if ((.UNS) or (.IAE) or (.AOE) or (.RMR) or (.ILR) or (.ILF)) then ERR4 = ACTIVE;
3512
3513          if ((.OPI) or (.DPAR) or (.CPAR)) then ERR5 = ACTIVE;
3514
3515          if ((.DCK) or (.crc) or (.SGL)) then ERR7 = ACTIVE;
3516
3517          if ((.WCE) and (.ECCDIS eql 1)) then ERR7 = ACTIVE;
3518
3519          if ((.ECH) or (.UNC)) then ERR6 = ACTIVE;
3520
3521      end                                         !* 2 *
3522  else                                            !THERE ARE NO ERRORS -- RETURN SUCCESSFULLY
3523      return 0;                                   !NO ERRORS AT ALL
3524
3525  !+
3526  ! THIS IS THE CODE FOR PURPOSE 2:
3527  !
3528  !     LABEL:
3529  !         BEGIN 3
```

```
;MLX4
;                    SYSTEM ERROR DETECTOR
;
;          3530      !       IF RETRYING
;          3531      !       THEN  LEAVE LABEL (NO PRINTOUTS AT ALL)
;          3532      !       ELSE
;          3533      !          BEGIN 4
;          3534      !          IF ERROR PRINTOUTS ARE ALLOWED
;          3535      !          THEN
;          3536      !             BEGIN 5A
;          3537      !             IDENTIFY THE LOGICAL UNIT
;          3538      !             SCAN FOR & PRINT DATA ERRORS
;          3539      !             END   5A
;          3540      !          ELSE
;          3541      !             BEGIN 5B
;          3542      !             IF THERE ARE SYSTEM ERRORS TO REPORT
;          3543      !             THEN  IDENTIFY THE LOGICAL UNIT
;          3544      !             ELSE  LEAVE LABEL
;          3545      !             END   5B
;          3546      !          SCAN FOR & PRINT SYSTEM ERRORS
;          3547      !          END   4
;          3548      !       END   3
;          3549      !-
;          3550
;          3551  PURPOSE_2_CODE :
;          3552      begin                                       !* 3 *
;          3553
;          3554      if .RETRYING
;          3555      then
;          3556          leave PURPOSE_2_CODE                    !(NO PRINTOUTS AT ALL)
;          3557      else
;          3558          begin                                   !* 4 *
;          3559
;          3560          if .ERROUT
;          3561          then
;          3562              begin                               !* 5A *
;          3563              SAYWHO (.LUN);
;          3564              PRINTB (SAY1, PHR10);
;          3565              !'ERROR BITS SET:
;          3566
;          3567              if .ERR7
;          3568              then
;          3569                  begin
;          3570
;          3571                  if .DCK then PRINTB (FMT15, MLB20);
;          3572
;          3573                  if .crc then PRINTB (FMT15, MLB22);
;          3574
;          3575                  if .SGL then PRINTB (FMT15, MLB23);
;          3576
;          3577                  if ((.WCE) and (.ECCDIS eql 1)) then PRINTB (FMT15, MLB6);
;          3578
;          3579                  end;
;          3580
;          3581              if .ERR6
```

```
3582                then
3583                    begin
3584
3585                    if .ECH then PRINTB (FMT15, MLB21);
3586
3587                    if .UNC then PRINTB (FMT15, MLB24);
3588
3589                    end;
3590
3591                end                                         !* 5A *
3592            else
3593                begin                                       !* 5B *
3594    ! VER CZMLBB CHANGED ERR3 TO ERR8
3595
3596                if ((.ERR2) or (.ERR8) or (.ERR4) or (.ERR5))
3597                then
3598                    begin
3599                    SAYWHO (.LUN);
3600                    PRINTB (SAY1, PHR10);
3601                    !'ERROR BITS SET:
3602                    end
3603                else
3604    ! VER CZMLBB ADDED TEST OF ERR9 HERE
3605
3606                    if .ERR9
3607                    then
3608                        begin
3609                        SAYWHO (.LUN);
3610                        PRINTB (SAY1, PHR10);
3611                        !'ERROR BITS SET:
3612                        end
3613                    else
3614                        begin
3615                        leave PURPOSE_2_CODE;
3616                        end;
3617
3618                end;                                        !* 5B *
3619
3620            if .ERR2
3621            then
3622                begin
3623
3624                if .NED then PRINTB (FMT15, MLB2);
3625
3626                if .NEM then PRINTB (FMT15, MLB3);
3627
3628                if .PGE then PRINTB (FMT15, MLB4);
3629
3630                end;
3631
3632            if .ERR3
3633            then
```

```
;MLX4
;                    SYSTEM ERROR DETECTOR
;
;          3634                  begin
;          3635
;          3636                  if .DLT then PRINTB (FMT15, MLB5);
;          3637
;          3638                  if ((.WCE) and (.ECCDIS eql 0)) then PRINTB (FMT15, MLB6);
;          3639
;          3640                  if .PE then PRINTB (FMT15, MLB7);
;          3641
;          3642                  if .MXF then PRINTB (FMT15, MLB8);
;          3643
;          3644  ! VER CZMLBB ADDED 'AND NOT .SGL'
;          3645
;          3646                  if ((.MDPE) and ( not .SGL)) then PRINTB (FMT15, MLB9);
;          3647
;          3648                  if .MCPE then PRINTB (FMT15, MLB10);
;          3649
;          3650                  end;
;          3651
;          3652              if .ERR4
;          3653              then
;          3654                  begin
;          3655
;          3656                  if .UNS then PRINTB (FMT15, MLB11);
;          3657
;          3658                  if .IAE then PRINTB (FMT15, MLB12);
;          3659
;          3660                  if .AOE then PRINTB (FMT15, MLB13);
;          3661
;          3662                  if .RMR then PRINTB (FMT15, MLB14);
;          3663
;          3664                  if .ILR then PRINTB (FMT15, MLB15);
;          3665
;          3666                  if .ILF then PRINTB (FMT15, MLB16);
;          3667
;          3668                  end;
;          3669
;          3670              if .ERR5
;          3671              then
;          3672                  begin
;          3673
;          3674                  if .OPI then PRINTB (FMT15, MLB17);
;          3675
;          3676                  if .DPAR then PRINTB (FMT15, MLB18);
;          3677
;          3678                  if .CPAR then PRINTB (FMT15, MLB19);
;          3679
;          3680                  end;
;          3681
;          3582              end;                                    !* 4 *
;          3683
;          3684          end;                                        !* 3 *
;          3685
```

```
4678 ;MLX4
4679 ;                  SYSTEM ERROR DETECTOR                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
4680 ;                                                           27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (22)
4681 ;          3686        !+
4682 ;          3687        ! THIS IS THE CODE FOR PURPOSE 3:
4683 ;          3688        !-
4684 ;          3689
4685 ;          3690        if .ERR6                                !UNRECOVERABLE DATA ERROR (NO RETRY ALLOWED)
4686 ;          3691        then
4687 ;          3692            return 4;
4688 ;          3693
4689 ;          3694        if .ERR7                                !RECOVERABLE DATA ERROR (RETRY TO CLASSIFY)
4690 ;          3695        then
4691 ;          3696            return 5;
4692 ;          3697
4693 ;          3698        if .ERR2                                !CONTROLLER FATAL ERROR
4694 ;          3699        then
4695 ;          3700            return 2;
4696 ;          3701
4697 ;          3702        if .ERR4                                !DRIVE FATAL ERROR
4698 ;          3703        then
4699 ;          3704            return 3;
4700 ;          3705
4701 ;          3706        if (.ERR3 or .ERR5)                     !NON-FATAL ERRORS
4702 ;          3707        then
4703 ;          3708            return 1
4704 ;          3709        else
4705 ;          3710            begin
4706 ;          3711
4707 ;          3712            if ((.ERROUT) and ( not .RETRYING)) then PRINTB (SAY1, PHR11);
4708 ;          3713
4709 ;          3714            !'SC SET BUT NO SYSTEM ERRORS FOUND'
4710 ;          3715            return 1;
4711 ;          3716            end;
4712 ;          3717
4713 ;          3718        end;                                    !* 1 *
4717
4718
4722 041710 004167 143420          SYSERR: JSR     R1,$SAVE5               ;                                       3427
4723 041714 005746                        TST     -(SP)
4724 041716 005046                        CLR     -(SP)                   ; ERR2                                  3480
4725 041720 005046                        CLR     -(SP)                   ; ERR3                                  3481
4726 041722 005001                        CLR     R1                      ; ERR4                                  3482
4727 041724 005002                        CLR     R2                      ; ERR5                                  3483
4728 041726 005066 000004                 CLR     4(SP)                   ; ERR6                                  3484
4729 041732 005003                        CLR     R3                      ; ERR7                                  3485
4730 041734 005004                        CLR     R4                      ; ERR8                                  3486
4731 041736 005005                        CLR     R5                      ; ERR9                                  3487
4732 041740 005777 172402                 TST     @ML.REG                 ;                                       3493
4733                              ;MLX4
4734                              ;               SYSTEM ERROR DETECTOR                   27-Mar-1982 19:24:42    TOPS
4735                                                                                      27-Mar-1982 19:23:44    PA:<
4736 041744 100402                        BMI     1$
4737 041746 000167 002344                 JMP     53$
4738 041752 032777 010000 172376  1$:     BIT     #10000,@ML.REG+10       ;                                       3497
4739 041760 001010                        BNE     2$
4740 041762 032777 004000 172366          BIT     #4000,@ML.REG+10
```

```
4741 041770 001004                      BNE     2$
4742 041772 032777 002000 172356        BIT     #2000,@ML.REG+10
4743 042000 001403                      BEQ     3$
4744 042002 012766 000001 000002 2$:    MOV     #1,2(SP)                ; *,ERR2
4745 042010 005777 172342        3$:    TST     @ML.REG+10              ;                       3499
4746 042014 100420                      BMI     4$
4747 042016 032777 020000 172332        BIT     #20000,@ML.REG+10
4748 042024 001014                      BNE     4$
4749 042026 032777 001000 172322        BIT     #1000,@ML.REG+10
4750 042034 001010                      BNE     4$
4751 042036 032777 000400 172312        BIT     #400,@ML.REG+10
4752 042044 001004                      BNE     4$
4753 042046 032777 020000 172272        BIT     #20000,@ML.REG
4754 042054 001402                      BEQ     5$
4755 042056 012716 000001        4$:    MOV     #1,(SP)                 ; *,ERR3
4756 042062 032777 000400 172266 5$:    BIT     #400,@ML.REG+10         ;                       3503
4757 042070 001406                      BEQ     6$
4758 042072 032777 040000 172310        BIT     #40000,@ML.REG+42
4759 042100 001002                      BNE     6$
4760 042102 012705 000001               MOV     #1,R5                   ; *,ERR9
4761 042106 005777 172244        6$:    TST     @ML.REG+10              ;                       3507
4762 042112 100414                      BMI     7$
4763 042114 032777 020000 172234        BIT     #20000,@ML.REG+10
4764 042122 001010                      BNE     7$
4765 042124 032777 001000 172224        BIT     #1000,@ML.REG+10
4766 042132 001004                      BNE     7$
4767 042134 032777 020000 172204        BIT     #20000,@ML.REG
4768 042142 001402                      BEQ     8$
4769 042144 012704 000001        7$:    MOV     #1,R4                   ; *,ERR8
4770 042150 032777 040000 172200 8$:    BIT     #40000,@ML.REG+10       ;                       3509
4771 042156 001405                      BEQ     9$
4772 042160 005767 140070               TST     ECCDIS
4773 042164 001002                      BNE     9$
4774 042166 012716 000001               MOV     #1,(SP)                 ; *,ERR3
4775 042172 032777 040000 172162 9$:    BIT     #40000,@ML.REG+14       ;                       3511
4776 042200 001024                      BNE     10$
4777 042202 032777 002000 172152        BIT     #2000,@ML.REG+14
4778 042210 001020                      BNE     10$
4779 042212 032777 001000 172142        BIT     #1000,@ML.REG+14
4780 042220 001014                      BNE     10$
4781 042222 132777 000004 172132        BITB    #4,@ML.REG+14
4782 042230 001010                      BNE     10$
4783 042232 132777 000002 172122        BITB    #2,@ML.REG+14
4784 042240 001004                      BNE     10$
4785 042242 132777 000001 172112        BITB    #1,@ML.REG+14
4786 042250 001402                      BEQ     11$
4787 042252 012701 000001       10$:    MOV     #1,R1                   ; *,ERR4
4788                            ;MLX4
4789                            ;       SYSTEM ERROR DETECTOR                   27-Mar-1982 19:24:42    TOPS
4790                                                                            27-Mar-1982 19:23:44    PA:<
4791 042256 032777 020000 172076 11$:   BIT     #20000,@ML.REG+14       ;                       3513
4792 042264 001010                      BNE     12$
4793 042266 132777 000040 172066        BITB    #40,@ML.REG+14
4794 042274 001004                      BNE     12$
4795 042276 132777 000010 172056        BITB    #10,@ML.REG+14
4796 042304 001402                      BEQ     13$
4797 042306 012702 000001       12$:    MOV     #1,R2                   ; *,ERR5
```

```
 4798 042312  005777  172044          13$:   TST   @ML.REG+14                ;                              3515
 4799 042316  100410                         BMI   14$
 4800 042320  032777  020000  172062         BIT   #20000,@ML.REG+42
 4801 042326  001004                         BNE   14$
 4802 042330  032777  040000  172052         BIT   #40000,@ML.REG+42
 4803 042336  001402                         BEQ   15$
 4804 042340  012703  000001          14$:   MOV   #1,R3                     ; *,ERR7
 4805 042344  032777  040000  172004  15$:   BIT   #40000,@ML.REG+10         ;                              3517
 4806 042352  001406                         BEQ   16$
 4807 042354  026727  137674  000001         CMP   ECCDIS,#1
 4808 042362  001002                         BNE   16$
 4809 042364  012703  000001                 MOV   #1,R3                     ; *,ERR7
 4810 042370  132777  000100  171764  16$:   BITB  #100,@ML.REG+14           ;                              3519
 4811 042376  001003                         BNE   17$
 4812 042400  005777  172004                 TST   @ML.REG+42
 4813 042404  100003                         BPL   18$
 4814 042406  012766  000001  000004  17$:   MOV   #1,4(SP)                   ; *,ERR6
 4815 042414  032767  000001  171716  18$:   BIT   #1,RETRYING               ;                              3554
 4816 042422  001402                         BEQ   19$                       ;                              3556
 4817 042424  000167  001520                 JMP   47$
 4818 042430  032767  000001  137622  19$:   BIT   #1,ERROUT                 ;                              3560
 4819 042436  001552                         BEQ   25$
 4820 042440  016646  000024                 MOV   24(SP),-(SP)              ; LUN,*                        3563
 4821 042444  004767  173054                 JSR   PC,SAYWHO
 4822 042450  012716  010120                 MOV   #PHR10,(SP)               ;                              3564
 4823 042454  012746  007072                 MOV   #SAY1,-(SP)
 4824 042460  012746  000002                 MOV   #2,-(SP)
 4825 042464  010600                         MOV   SP,R0
 4826 042466  104414                         TRAP  14                        ; SP,*
 4827 042470  032703  000001                 BIT   #1,R3                     ; *,ERR7                       3567
 4828 042474  001473                         BEQ   23$
 4829 042476  005777  171660                 TST   @ML.REG+14                ;                              3571
 4830 042502  100012                         BPL   20$
 4831 042504  012746  007550                 MOV   #MLB20,-(SP)
 4832 042510  012746  007060                 MOV   #FMT15,-(SP)
 4833 042514  012746  000002                 MOV   #2,-(SP)
 4834 042520  010600                         MOV   SP,R0                     ; SP,*
 4835 042522  104414                         TRAP  14
 4836 042524  062706  000006                 ADD   #6,SP
 4837 042530  032777  020000  171652  20$:   BIT   #20000,@ML.REG+42          ;                              3573
 4838 042536  001412                         BEQ   21$
 4839 042540  012746  007560                 MOV   #MLB22,-(SP)
 4840 042544  012746  007060                 MOV   #FMT15,-(SP)
 4841 042550  012746  000002                 MOV   #2,-(SP)
 4842 042554  010600                         MOV   SP,R0                     ; SP,*
 4843                             ;MLX4
 4844                             ;          SYSTEM ERROR DETECTOR                  27-Mar-1982 19:24:42  TOPS
 4845                                                                               27-Mar-1982 19:23:44  PA:<
 4846 042556  104414                         TRAP  14
 4847 042560  062706  000006                 ADD   #6,SP
 4848 042564  032777  040000  171616  21$:   BIT   #40000,@ML.REG+42          ;                              3575
 4849 042572  001412                         BEQ   22$
 4850 042574  012746  007564                 MOV   #MLB23,-(SP)
 4851 042600  012746  007060                 MOV   #FMT15,-(SP)
 4852 042604  012746  000002                 MOV   #2,-(SP)
 4853 042610  010600                         MOV   SP,R0                     ; SP,*
 4854 042612  104414                         TRAP  14
```

```
 4855 042614  062706  000006                 ADD     #6,SP
 4856 042620  032777  040000  171530  22$:   BIT     #40000,@ML.REG+10       ;                       3577
 4857 042626  001416                         BEQ     23$
 4858 042630  026727  137420  000001         CMP     ECCDIS,#1
 4859 042636  001012                         BNE     23$
 4860 042640  012746  007450                 MOV     #MLB6,-(SP)
 4861 042644  012746  007060                 MOV     #FMT15,-(SP)
 4862 042650  012746  000002                 MOV     #2,-(SP)
 4863 042654  010600                         MOV     SP,R0                   ; SP,*
 4864 042656  104414                         TRAP    14
 4865 042660  062706  000006                 ADD     #6,SP
 4866 042664  032766  000001  000012  23$:   BIT     #1,12(SP)               ; *,ERR6                3581
 4867 042672  001505                         BEQ     29$
 4868 042674  132777  000100  171460         BITB    #100,@ML.REG+14         ;                       3585
 4869 042702  001412                         BEQ     24$
 4870 042704  012746  007554                 MOV     #MLB21,-(SP)
 4871 042710  012746  007060                 MOV     #FMT15,-(SP)
 4872 042714  012746  000002                 MOV     #2,-(SP)
 4873 042720  010600                         MOV     SP,R0                   ; SP,*
 4874 042722  104414                         TRAP    14
 4875 042724  062706  000006                 ADD     #6,SP
 4876 042730  005777  171454          24$:   TST     @ML.REG+42              ;                       3587
 4877 042734  100064                         BPL     29$
 4878 042736  012746  007570                 MOV     #MLB24,-(SP)
 4879 042742  012746  007060                 MOV     #FMT15,-(SP)
 4880 042746  012746  000002                 MOV     #2,-(SP)
 4881 042752  010600                         MOV     SP,R0                   ; SP,*
 4882 042754  104414                         TRAP    14
 4883 042756  062706  000006                 ADD     #6,SP
 4884 042762  000451                         BR      29$                     ;                       3562
 4885 042764  032766  000001  000002  25$:   BIT     #1,2(SP)                ; *,ERR2                3596
 4886 042772  001010                         BNE     26$
 4887 042774  006004                         ROR     R4                      ; ERR8
 4888 042776  103406                         BLO     26$
 4889 043000  032701  000001                 BIT     #1,R1                   ; *,ERR4
 4890 043004  001003                         BNE     26$
 4891 043006  032702  000001                 BIT     #1,R2                   ; *,ERR5
 4892 043012  001415                         BEQ     27$
 4893 043014  016646  000024          26$:   MOV     24(SP),-(SP)            ; LUN,*                 3599
 4894 043020  004767  172500                 JSR     PC,SAYWHO
 4895 043024  012716  010120                 MOV     #PHR10,(SP)             ;                       3600
 4896 043030  012746  007072                 MOV     #SAY1,-(SP)
 4897 043034  012746  000002                 MOV     #2,-(SP)
 4898                              ;MLX4
 4899                              ;          SYSTEM ERROR DETECTOR                   27-Mar-1982 19:24:42    TOPS
 4900                                                                                  27-Mar-1982 19:23:44    PA:<
 4901 043040  010600                         MOV     SP,R0                   ; SP,*
 4902 043042  104414                         TRAP    14
 4903 043044  000420                         BR      29$                     ;                       3598
 4904 043046  006005                 27$:    ROR     R5                      ; ERR9                  3606
 4905 043050  103402                         BLO     28$
 4906 043052  000167  001072                 JMP     47$
 4907 043056  016646  000024          28$:   MOV     24(SP),-(SP)            ; LUN,*                 3609
 4908 043062  004767  172436                 JSR     PC,SAYWHO
 4909 043066  012716  010120                 MOV     #PHR10,(SP)             ;                       3610
 4910 043072  012746  007072                 MOV     #SAY1,-(SP)
 4911 043076  012746  000002                 MOV     #2,-(SP)
```

```
4912 043102 010600                          MOV     SP,R0                   ; SP,*
4913 043104 104414                          TRAP    14
4914 043106 062706 000006           29$:    ADD     #6,SP                   ;                       3608
4915 043112 032766 000001 000002            BIT     #1,2(SP)                ; *,ERR2                3620
4916 043120 001452                          BEQ     32$
4917 043122 032777 010000 171226            BIT     #10000,@ML.REG+10       ;                       3624
4918 043130 001412                          BEQ     30$
4919 043132 012746 007430                   MOV     #MLB2,-(SP)
4920 043136 012746 007060                   MOV     #FMT15,-(SP)
4921 043142 012746 000002                   MOV     #2,-(SP)
4922 043146 010600                          MOV     SP,R0                   ; SP,*
4923 043150 104414                          TRAP    14
4924 043152 062706 000006                   ADD     #6,SP
4925 043156 032777 004000 171172    30$:    BIT     #4000,@ML.REG+10        ;                       3626
4926 043164 001412                          BEQ     31$
4927 043166 012746 007434                   MOV     #MLB3,-(SP)
4928 043172 012746 007060                   MOV     #FMT15,-(SP)
4929 043176 012746 000002                   MOV     #2,-(SP)
4930 043202 010600                          MOV     SP,R0                   ; SP,*
4931 043204 104414                          TRAP    14
4932 043206 062706 000006                   ADD     #6,SP
4933 043212 032777 002000 171136    31$:    BIT     #2000,@ML.REG+10        ;                       3628
4934 043220 001412                          BEQ     32$
4935 043222 012746 007440                   MOV     #MLB4,-(SP)
4936 043226 012746 007060                   MOV     #FMT15,-(SP)
4937 043232 012746 000002                   MOV     #2,-(SP)
4938 043236 010600                          MOV     SP,R0                   ; SP,*
4939 043240 104414                          TRAP    14
4940 043242 062706 000006                   ADD     #6,SP
4941 043246 032716 000001           32$:    BIT     #1,(SP)                 ; *,ERR3                3632
4942 043252 001532                          BEQ     38$
4943 043254 005777 171076                   TST     @ML.REG+10              ;                       3636
4944 043260 100012                          BPL     33$
4945 043262 012746 007444                   MOV     #MLB5,-(SP)
4946 043266 012746 007060                   MOV     #FMT15,-(SP)
4947 043272 012746 000002                   MOV     #2,-(SP)
4948 043276 010600                          MOV     SP,R0                   ; SP,*
4949 043300 104414                          TRAP    14
4950 043302 062706 000006                   ADD     #6,SP
4951 043306 032777 040000 171042    33$:    BIT     #40000,@ML.REG+10       ;                       3638
4952 043314 001415                          BEQ     34$
4953                                ;MLX4
4954                                ;       SYSTEM ERROR DETECTOR           27-Mar-1982 19:24:42    TOPS
4955                                                                        27-Mar-1982 19:23:44    PA:<
4956 043316 005767 136732                   TST     ECCDIS
4957 043322 001012                          BNE     34$
4958 043324 012746 007450                   MOV     #MLB6,-(SP)
4959 043330 012746 007060                   MOV     #FMT15,-(SP)
4960 043334 012746 000002                   MOV     #2,-(SP)
4961 043340 010600                          MOV     SP,R0                   ; SP,*
4962 043342 104414                          TRAP    14
4963 043344 062706 000006                   ADD     #6,SP
4964 043350 032777 020000 171000    34$:    BIT     #20000,@ML.REG+10       ;                       3640
4965 043356 001412                          BEQ     35$
4966 043360 012746 007454                   MOV     #MLB7,-(SP)
4967 043364 012746 007060                   MOV     #FMT15,-(SP)
4968 043370 012746 000002                   MOV     #2,-(SP)
```

```
4969 043374 010600                          MOV     SP,R0           ; SP,*
4970 043376 104414                          TRAP    14
4971 043400 062706 000006                   ADD     #6,SP
4972 043404 032777 001000 170744 35$:       BIT     #1000,@ML.REG+10        ;      3642
4973 043412 001412                          BEQ     36$
4974 043414 012746 007460                   MOV     #MLB8,-(SP)
4975 043420 012746 007060                   MOV     #FMT15,-(SP)
4976 043424 012746 000002                   MOV     #2,-(SP)
4977 043430 010600                          MOV     SP,R0           ; SP,*
4978 043432 104414                          TRAP    14
4979 043434 062706 000006                   ADD     #6,SP
4980 043440 032777 000400 170710 36$:       BIT     #400,@ML.REG+10         ;      3646
4981 043446 001416                          BEQ     37$
4982 043450 032777 040000 170732            BIT     #40000,@ML.REG+42
4983 043456 001012                          BNE     37$
4984 043460 012746 007464                   MOV     #MLB9,-(SP)
4985 043464 012746 007060                   MOV     #FMT15,-(SP)
4986 043470 012746 000002                   MOV     #2,-(SP)
4987 043474 010600                          MOV     SP,R0           ; SP,*
4988 043476 104414                          TRAP    14
4989 043500 062706 000006                   ADD     #6,SP
4990 043504 032777 020000 170634 37$:       BIT     #20000,@ML.REG          ;      3648
4991 043512 001412                          BEQ     38$
4992 043514 012746 007472                   MOV     #MLB10,-(SP)
4993 043520 012746 007060                   MOV     #FMT15,-(SP)
4994 043524 012746 000002                   MOV     #2,-(SP)
4995 043530 010600                          MOV     SP,R0           ; SP,*
4996 043532 104414                          TRAP    14
4997 043534 062706 000006                   ADD     #6,SP
4998 043540 032701 000001       38$:        BIT     #1,R1           ; *,ERR4        3652
4999 043544 001524                          BEQ     44$
5000 043546 032777 040000 170606            BIT     #40000,@ML.REG+14       ;      3656
5001 043554 001412                          BEQ     39$
5002 043556 012746 007500                   MOV     #MLB11,-(SP)
5003 043562 012746 007060                   MOV     #FMT15,-(SP)
5004 043566 012746 000002                   MOV     #2,-(SP)
5005 043572 010600                          MOV     SP,R0           ; SP,*
5006 043574 104414                          TRAP    14
5007 043576 062706 000006                   ADD     #6,SP
5008                            ;MLX4
5009                            ;           SYSTEM ERROR DETECTOR   27-Mar-1982 19:24:42    TOPS
5010                                                                27-Mar-1982 19:23:44    PA:<
5011 043602 032777 002000 170552 39$:       BIT     #2000,@ML.REG+14        ;      3658
5012 043610 001412                          BEQ     40$
5013 043612 012746 007504                   MOV     #MLB12,-(SP)
5014 043616 012746 007060                   MOV     #FMT15,-(SP)
5015 043622 012746 000002                   MOV     #2,-(SP)
5016 043626 010600                          MOV     SP,R0           ; SP,*
5017 043630 104414                          TRAP    14
5018 043632 062706 000006                   ADD     #6,SP
5019 043636 032777 001000 170516 40$:       BIT     #1000,@ML.REG+14        ;      3660
5020 043644 001412                          BEQ     41$
5021 043646 012746 007510                   MOV     #MLB13,-(SP)
5022 043652 012746 007060                   MOV     #FMT15,-(SP)
5023 043656 012746 000002                   MOV     #2,-(SP)
5024 043662 010600                          MOV     SP,R0           ; SP,*
5025 043664 104414                          TRAP    14
```

```
5026 043666 062706 000006            ADD     #6,SP
5027 043672 132777 000004 170462 41$: BITB    #4,@ML.REG+14          ;                3662
5028 043700 001412                   BEQ     42$
5029 043702 012746 007514            MOV     #MLB14,-(SP)
5030 043706 012746 007060            MOV     #FMT15,-(SP)
5031 043712 012746 000002            MOV     #2,-(SP)
5032 043716 010600                   MOV     SP,R0                  ; SP,*
5033 043720 104414                   TRAP    14
5034 043722 062706 000006            ADD     #6,SP
5035 043726 132777 000002 170426 42$: BITB    #2,@ML.REG+14          ;                3664
5036 043734 001412                   BEQ     43$
5037 043736 012746 007520            MOV     #MLB15,-(SP)
5038 043742 012746 007060            MOV     #FMT15,-(SP)
5039 043746 012746 000002            MOV     #2,-(SP)
5040 043752 010600                   MOV     SP,R0                  ; SP,*
5041 043754 104414                   TRAP    14
5042 043756 062706 000006            ADD     #6,SP
5043 043762 132777 000001 170372 43$: BITB    #1,@ML.REG+14          ;                3666
5044 043770 001412                   BEQ     44$
5045 043772 012746 007524            MOV     #MLB16,-(SP)
5046 043776 012746 007060            MOV     #FMT15,-(SP)
5047 044002 012746 000002            MOV     #2,-(SP)
5048 044006 010600                   MOV     SP,R0                  ; SP,*
5049 044010 104414                   TRAP    14
5050 044012 062706 000006            ADD     #6,SP
5051 044016 032702 000001      44$:  BIT     #1,R2                  ; *,ERR5         3670
5052 044022 001452                   BEQ     47$
5053 044024 032777 020000 170330     BIT     #20000,@ML.REG+14      ;                3674
5054 044032 001412                   BEQ     45$
5055 044034 012746 007530            MOV     #MLB17,-(SP)
5056 044040 012746 007060            MOV     #FMT15,-(SP)
5057 044044 012746 000002            MOV     #2,-(SP)
5058 044050 010600                   MOV     SP,R0                  ; SP,*
5059 044052 104414                   TRAP    14
5060 044054 062706 000006            ADD     #6,SP
5061 044060 132777 000040 170274 45$: BITB    #40,@ML.REG+14         ;                3676
5062 044066 001412                   BEQ     46$
5063                           ;MLX4
5064                           ;     SYSTEM ERROR DETECTOR                  27-Mar-1982 19:24:42  TOPS
5065                                                                        27-Mar-1982 19:23:44  PA:<
5066 044070 012746 007534            MOV     #MLB18,-(SP)
5067 044074 012746 007060            MOV     #FMT15,-(SP)
5068 044100 012746 000002            MOV     #2,-(SP)
5069 044104 010600                   MOV     SP,R0                  ; SP,*
5070 044106 104414                   TRAP    14
5071 044110 062706 000006            ADD     #6,SP
5072 044114 132777 000010 170240 46$: BITB    #10,@ML.REG+14         ;                3678
5073 044122 001412                   BEQ     47$
5074 044124 012746 007542            MOV     #MLB19,-(SP)
5075 044130 012746 007060            MOV     #FMT15,-(SP)
5076 044134 012746 000002            MOV     #2,-(SP)
5077 044140 010600                   MOV     SP,R0                  ; SP,*
5078 044142 104414                   TRAP    14
5079 044144 062706 000006            ADD     #6,SP
5080 044150 032766 000001 000004 47$: BIT     #1,4(SP)               ; *,ERR6         3690
5081 044156 001403                   BEQ     48$
5082 044160 012700 000004            MOV     #4,R0                  ;                3692
```

```
5083 044164  000455                    BR      54$
5084 044166  006003              48$:  ROR     R3                ; ERR7                    3694
5085 044170  103003                    BCC     49$
5086 044172  012700  000005            MOV     #5,R0             ;                         3696
5087 044176  000450                    BR      54$
5088 044200  032766  000001  000002 49$:  BIT     #1,2(SP)          ; *,ERR2                  3698
5089 044206  001403                    BEQ     50$
5090 044210  012700  000002            MOV     #2,R0             ;                         3700
5091 044214  000441                    BR      54$
5092 044216  006001              50$:  ROR     R1                ; ERR4                    3702
5093 044220  103003                    BCC     51$
5094 044222  012700  000003            MOV     #3,R0             ;                         3704
5095 044226  000434                    BR      54$
5096 044230  032716  000001        51$:  BIT     #1,(SP)           ; *,ERR3                  3706
5097 044234  001024                    BNE     52$
5098 044236  006002                    ROR     R2                ; ERR5
5099 044240  103422                    BLO     52$
5100 044242  032767  000001  136010    BIT     #1,ERROUT         ;                         3712
5101 044250  001416                    BEQ     52$
5102 044252  032767  000001  170060    BIT     #1,RETRYING
5103 044260  001012                    BNE     52$
5104 044262  012746  010140            MOV     #PHR11,-(SP)
5105 044266  012746  007072            MOV     #SAY1,-(SP)
5106 044272  012746  000002            MOV     #2,-(SP)
5107 044276  010600                    MOV     SP,R0             ; SP,*
5108 044300  104414                    TRAP    14
5109 044302  062706  000006            ADD     #6,SP
5110 044306  012705  000001        52$:  MOV     #1,R5             ;                         3706
5111 044312  010500                    MOV     R5,R0             ;                         3428
5112 044314  000401                    BR      54$
5113 044316  005000              53$:  CLR     R0                ;                         3427
5114 044320  062706  000006        54$:  ADD     #6,SP
5115 044324  000207                    RTS     PC
5116
5117
5118                                   ; Routine Size:  647 words
5119                                   ;MLX4
5120                                   ;                SYSTEM ERROR DETECTOR
5121                                   ; Maximum stack depth per invocation:  15 words
5126
5127
```

27-Mar-1982 19:24:42 TOPS
27-Mar-1982 19:23:44 PA:<

```
5129 ;MLX4
5130 ;                  DATA COMPARISON ROUTINE                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
5131                                                               27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (23)
5132 ;          3719  %sbttl 'DATA COMPARISON ROUTINE'
5133 ;          3720  routine DOUBLE_CHECK (W_POINTER, R_POINTER, COUNT) =
5134 ;          3721      begin                                          !* 1 *
5135 ;          3722
5136 ;          3723  !++
5137 ;          3724  !   ROUTINE:     DOUBLE_CHECK(W_POINTER,R_POINTER,COUNT)
5138 ;          3725  !
5139 ;          3726  !   PURPOSE:     TO DOUBLE CHECK THE ECC DETECTION LOGIC AFTER A
5140 ;          3727  !                SUCCESSFUL READ COMMAND.  THE WRITE AND READ BUFFERS
5141 ;          3728  !                ARE COMPARED, AND NO ERRORS SHOULD BE FOUND UNDER
5142 ;          3729  !                NORMAL CIRCUMSTANCES.
5143 ;          3730  !
5144 ;          3731  !   ARGUMENTS:   W_POINTER = POINTER TO THE WRITE BUFFER
5145 ;          3732  !                R_POINTER = POINTER TO THE READ BUFFER
5146 ;          3733  !                COUNT = THE NUMBER OF WORDS TO COMPARE
5147 ;          3734  !
5148 ;          3735  !   RESULTS:     VALUE RETURNED IS EITHER:
5149 ;          3736  !                      0 = NO ERRORS WERE FOUND
5150 ;          3737  !                  N > 0 = ADDRESS IN WRITE BUFFER WHERE ERROR WAS FOUND
5151 ;          3738  !--
5152 ;          3739
5153 ;          3740      local
5154 ;          3741          VALUE,
5155 ;          3742          OFFSET,
5156 ;          3743          GOOD,
5157 ;          3744          BAD;
5158 ;          3745
5159 ;          3746      label
5160 ;          3747          LOOP;
5161 ;          3748
5162 ;          3749      OFFSET = 0;
5163 ;          3750      VALUE = 0;
5164 ;          3751  LOOP :
5165 ;          3752      begin                                          !* 2 *
5166 ;          3753
5167 ;          3754      incr I from 1 to .COUNT do
5168 ;          3755          begin                                      !* 3 *
5169 ;          3756          GOOD = .(.W_POINTER + .OFFSET);
5170 ;          3757          BAD = .(.R_POINTER + .OFFSET);
5171 ;          3758
5172 ;          3759          if .GOOD eql .BAD
5173 ;          3760          then
5174 ;          3761              OFFSET = .OFFSET + 2
5175 ;          3762          else
5176 ;          3763              begin                                  !* 4 *
5177 ;          3764              VALUE = (.W_POINTER + .OFFSET);        !ADDRESS OF GOOD
5178 ;          3765              leave LOOP;
5179 ;          3766              end;                                   !* 4 *
5180 ;          3767
5181 ;          3768          end;                                       !* 3 *
5182 ;          3769
5183 ;          3770      end;                                           !* 2 *
```

```
;MLX4
;                    DATA COMPARISON ROUTINE                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                               27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (23)

;          3771      return .VALUE;                             !EITHER 0 OR THE ADDRESS OF GOOD DATA
;          3772      end;                                       !* 1 *


                                .SBTTL  DOUBLE.CHECK DATA COMPARISON ROUTINE
044326                  DOUBLE.CHECK:
044326  004167  141002          JSR     R1,$SAVE5                       ;                               3720
044332  005746                  TST     -(SP)
044334  005003                  CLR     R3                              ; OFFSET                        3749
044336  005001                  CLR     R1                              ; VALUE                         3750
044340  005002                  CLR     R2                              ; I                             3754
044342  000417                  BR      3$
044344  010304          1$:     MOV     R3,R4                           ; OFFSET,*                      3756
044346  066604  000024          ADD     24(SP),R4                       ; W.POINTER,*
044352  011416                  MOV     (R4),(SP)                       ; *,GOOD
044354  010305                  MOV     R3,R5                           ; OFFSET,*                      3757
044356  066605  000022          ADD     22(SP),R5                       ; R.POINTER,*
044362  011500                  MOV     (R5),R0                         ; *,BAD
044364  021600                  CMP     (SP),R0                         ; *,BAD
044366  001003                  BNE     2$                                                              3759
044370  062703  000002          ADD     #2,R3                           ; *,OFFSET                      3761
044374  000402                  BR      3$                              ;                               3759
044376  010401          2$:     MOV     R4,R1                           ; *,VALUE                       3764
044400  000404                  BR      4$                              ;                               3765
044402  005202          3$:     INC     R2                              ; I                             3754
044404  020266  000020          CMP     R2,20(SP)                       ; I,COUNT
044410  003755                  BLE     1$
044412  010100          4$:     MOV     R1,R0                           ; VALUE,*                       3721
044414  005726                  TST     (SP)+                           ;                               3720
044416  000207                  RTS     PC

                        ; Routine Size:  29 words
                        ; Maximum stack depth per invocation:  7 words
```

```
;MLX4
;                    COMMAND INITIATION AND TERMINATION          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (24)

;            3773  %sbttl 'COMMAND INITIATION AND TERMINATION'
;            3774  routine WAITER : novalue =
;            3775      begin
;            3776  !+
;            3777  ! THIS ROUTINE DOES NOTHING, BUT IT IS CALLED BY 'START_IT' TO
;            3778  ! WASTE TIME WHILE WAITING TO BEGIN OR END AN ML11 TRANSFER.
;            3779  !-
;            3780      BREAK;
;            3781      return;
;            3782      end;

                                    .SBTTL  WAITER COMMAND INITIATION AND TERMINATION
044420  104422                WAITER: TRAP    22                              ;                       3775
044422  000207                        RTS     PC                              ;                       3774

                                    ; Routine Size:  2 words
                                    ; Maximum stack depth per invocation:  0 words
```

```
;MLX4
;                    COMMAND INITIATION AND TERMINATION          27-Mar-1982 19:24:42   TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44   PA:<NEALE>MLX4.BLI.5 (25)

;          3783  routine START_IT (COMMAND, LUN, WRDCNT, BUFFER, SECTOR) =
;          3784      begin
;          3785
;          3786  !++
;          3787  !   ROUTINE:      START_IT(COMMAND,LUN,WRDCNT,BUFFER,SECTOR)
;          3788  !
;          3789  !   PURPOSE:      TO INITIATE A TRANSFER TO OR FROM THE ML11,
;          3790  !                 TO WAIT FOR THE TRANSFER TO COMPLETE, AND TO CALL
;          3791  !                 THE 'SYSERR' ROUTINE TO LOOK FOR RESULTING ERRORS.
;          3792  !
;          3793  !   ARGUMENTS:    (1)  COMMAND - THE FUNCTION CODE FOR THE TYPE OF TRANSFER
;          3794  !                                DESIRED.  THIS CODE WILL BE SENT TO THE MLCS1
;          3795  !                                REGISTER TO START THE OPERATION, SINCE IT
;          3796  !                                ALSO CONTAINS THE GO BIT.
;          3797  !
;          3798  !                 (2)  LUN     - LOGICAL UNIT NUMBER
;          3799  !
;          3800  !                 (3)  WRDCNT  - NUMBER OF 16-BIT WORDS TO TRANSFER
;          3801  !
;          3802  !                 (4)  BUFFER  - THE ADDRESS IN MAIN MEMORY OF THE SELECTED
;          3803  !                                WRITE OR READ BUFFER
;          3804  !
;          3805  !                 (5)  SECTOR   THE TRANSFER'S STARTING ADDRESS IN THE ML11
;          3806  !
;          3807  !   RESULTS:      VALUES RETURNED ARE IDENTICAL TO THOSE DEFINED ABOVE IN
;          3808  !                 THE 'SYSERR' ROUTINE.
;          3809  !--
;          3810
;          3811      local
;          3812          TEMP,
;          3813          READY_BIT,
;          3814          RTN;
;          3815
;          3816      label
;          3817          LOOP;
;          3818
;          3819      !
;          3820      ! WAIT FOR DRIVE READY:
;          3821      !
;          3822      UNIT = .DRIVE;                          !SELECT THE UNIT
;          3823      READY_BIT = 0;
;          3824
;          3825      until .READY_BIT neq 0 do               !WAIT FOR DRIVE READY
;          3826          begin
;          3827          WAITER ();
;          3828          READY_BIT = .MLCS1 and BIT7;
;          3829          end;
;          3830
;          3831      !
;          3832      ! INITIALIZE BEFORE EACH TRANSFER:
;          3833      !
;          3834      CLR = 1;                                !CONTROLLER CLEAR
```

```
;MLX4
;                    COMMAND INITIATION AND TERMINATION                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (25)
;
;          3835      DELAY (1);                                            !DELAY FOR CLEAR TO COMPLETE
;          3836      MLCS1 = DRV_CLR;                                      !DRIVE CLEAR
;          3837      DELAY (1);                                            !DELAY FOR CLEAR TO COMPLETE
;          3838      UNIT = .DRIVE;                                        !PUT BACK THE DRIVE NUMBER
;          3839      !
;          3840      ! SET UP THE REQUIRED ENABLE/DISABLE BITS:
;          3841      !
;          3842      DCK_EN = 1;                                           !ALLOW REPORTING OF DATA CHECK ERRORS
;          3843
;          3844      if .REFRESH then REF_MAR = 1;                         !TURN ON REFRESH MARGINING IF OPERATOR SELECTED IT
;          3845
;          3846      if .ECCDIS then ECC_DIS = 1;                          !TURN OFF ECC IF OPERATOR SELECTED IT
;          3847
;          3848      !
;          3849      ! SEND REQUIRED INFORMATION TO DEVICE REGISTERS:
;          3850      !
;          3851      MLWC = -(.WRDCNT);                                    !WORD COUNT REGISTER
;          3852      MLBA = .BUFFER;                                       !BUS ADDRESS REGISTER (ADDRESS IN MAIN MEMORY)
;          3853      MLDA = .SECTOR;                                       !DESIRED SECTOR ADDRESS REGISTER (ADDRESS IN ML11)
;          3854      !
;          3855      ! GO:
;          3856      !
;          3857      I_AM_DONE = INACTIVE;
;          3858      TEMP = .COMMAND + BIT6;                               !SET THE INTERRUPT ENABLE BIT WHILE LOADING THE
;          3859      MLCS1 = .TEMP;                                        !CONTROL AND STATUS REGISTER WITH THE COMMAND
;          3860      !
;          3861      ! WAIT FOR DRIVE TO FINISH:
;          3862      !
;          3863  LOOP :
;          3864      begin
;          3865      READY_BIT = 0;
;          3866
;          3867      until .I_AM_DONE do
;          3868          begin
;          3869          WAITER ();
;          3870          READY_BIT = .MLCS1 and BIT7;
;          3871
;          3872          if ((.READY_BIT neq 0) and (.I_AM_DONE eql INACTIVE))
;          3873          then
;          3874              begin
;          3875
;          3876              if ( not .RETRYING)
;          3877              then
;          3878                  begin
;          3879                  SAYWHO (.LUN);
;          3880
;          3881                  if .COMMAND eql WR_CMD then RTN = WRD16;
;          3882
;          3883                  if .COMMAND eql RD_CMD then RTN = WRD17;
;          3884
;          3885                  if .COMMAND eql WC_CMD then RTN = PHR1;
;          3886
```

```
;MLX4
;                    COMMAND INITIATION AND TERMINATION          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (25)

;          3887                 PRINTB (FMT6, .WRDCNT, .RTN, WRD15, .SECTOR);
;          3888                 !'BEGAN YYYY WORD (???) AT SECTOR ZZZZZZ'
;          3889                 !WHERE (???) IS EITHER 'WRITE', 'READ' OR 'WRITE CHECK'
;          3890                 PRINTB (SAY1, MSG0);
;          3891                 !INTERRUPT DID NOT OCCUR, BUT THE TRANSFER IS COMPLETE
;          3892                 end;
;          3893
;          3894             leave LOOP;
;          3895             end;
;          3896
;          3897         end;
;          3898
;          3899     end;
;          3900     return SYSERR (.LUN);                  !PASS ALONG THE ERROR VALUES THAT 'SYSERR' OBTAINED.
;          3901     end;

                                .GLOBL  L$DLY


                                .SBTTL  START.IT COMMAND INITIATION AND TERMINATION
044424                  START.IT:
044424  004167  140664          JSR     R1,$SAVE4                       ;                       3783
044430  005746                  TST     -(SP)
044432  016604  000024          MOV     24(SP),R4                       ; LUN,*                 3822
044436  010401                  MOV     R4,R1
044440  006301                  ASL     R1
044442  016102  034422          MOV     PTABLE.ADDR(R1),R2
044446  016203  000006          MOV     6(R2),R3
044452  042703  177770          BIC     #177770,R3
044456  142777  000007  167672  BICB    #7,@ML.REG+10
044464  150377  167666          BISB    R3,@ML.REG+10
044470  005003                  CLR     R3                              ; READY.BIT             3823
044472  020707                  CMP     PC,PC                           ;                       3825
044474  001007          1$:     BNE     2$
044476  004767  177716          JSR     PC,WAITER                       ;                       3827
044502  017703  167640          MOV     @ML.REG,R3                      ; *,READY.BIT           3828
044506  042703  177577          BIC     #177577,R3                      ; *,READY.BIT
044512  000770                  BR      1$                              ;                       3825
044514  152777  000040  167634  2$:     BISB    #40,@ML.REG+10          ;                       3834
044522  012700  000001          MOV     #1,R0                           ; *,$STMP2              3835
044526  001410          3$:     BEQ     6$
044530  016702  135362          MOV     L$DLY,R2                        ; *,$STMP1
044534  001403                  BEQ     5$
044536  005016          4$:     CLR     (SP)                            ; $STMP
044540  005302                  DEC     R2                              ; $STMP1
044542  001375                  BNE     4$
```

```
                                        ;MLX4                                                                    27-Mar-1982 19:24:42    TOPS
                                        ;               COMMAND INITIATION AND TERMINATION                       27-Mar-1982 19:23:44    PA:<
                                5$:     DEC     R0                              ; $STMP2
                                        BR      3$
                        000011  6$:     MOV     #11,@ML.REG                     ;                                                        3836
                        000001          MOV     #1,R0                           ; *,$STMP2                                               3837
                                7$:     BEQ     10$
                        135326          MOV     L$DLY,R2                        ; *,$STMP1
                                        BEQ     9$
                                8$:     CLR     (SP)                            ; $STMP
                                        DEC     R2                              ; $STMP1
                                        BNE     8$
                                9$:     DEC     R0                              ; $STMP2
                                        BR      7$
                        034422  10$:    MOV     PTABLE.ADDR(R1),R2              ;                                                        3838
                        000006          MOV     6(R2),R1
                        177770          BIC     #177770,R1
                        000007  167530  BICB    #7,@ML.REG+10
                        167524  167530  BISB    R1,@ML.REG+10
                        000004  167532  BISB    #4,@ML.REG+24
                        000001  135404  BIT     #1,REFRESH                      ;                                                        3842
                                        BEQ     11$                             ;                                                        3844
                        000200  167514  BISB    #200,@ML.REG+24
                        000001  135370  11$:    BIT     #1,ECCDIS               ;                                                        3846
                                        BEQ     12$
                        000002  167476  BISB    #2,@ML.REG+24
                        000022  167446  12$:    MOV     22(SP),@ML.REG+2        ; WRDCNT,*                                               3851
                        167442          NEG     @ML.REG+2
                        000020  167436  MOV     20(SP),@ML.REG+4                ; BUFFER,*                                               3852
                        000016  167432  MOV     16(SP),@ML.REG+6                ; SECTOR,*                                               3853
                                        CLR     I.AM.DONE                       ;                                                        3857
                        000026          MOV     26(SP),R2                       ; COMMAND,*                                              3858
                                        MOV     R2,R1                           ; *,TEMP
                        000100          ADD     #100,R1                         ; *,TEMP
                        167402          MOV     R1,@ML.REG                      ; TEMP,*                                                 3859
                                        CLR     R3                              ; READY.BIT                                              3865
                        000001  167362  13$:    BIT     #1,I.AM.DONE            ;                                                        3867
                                        BNE     17$
                        177436          JSR     PC,WAITER                       ;                                                        3869
                        167360          MOV     @ML.REG,R3                      ; *,READY.BIT                                            3870
                        177577          BIC     #177577,R3                      ; *,READY.BIT
                                        BEQ     13$                             ;                                                        3872
                        167336          TST     I.AM.DONE
                                        BNE     13$
                        000001  167330  BIT     #1,RETRYING                     ;                                                        3876
                                        BNE     17$
                                        MOV     R4,-(SP)                        ;                                                        3879
                        170504          JSR     PC,SAYWHO
                        000061          CMP     R2,#61                          ;                                                        3881
                                        BNE     14$
                        007256          MOV     #WRD16,R1                       ; *,RTN
                        000071          14$:    CMP     R2,#71                  ;                                                        3883
                                        BNE     15$
                        007264          MOV     #WRD17,R1                       ; *,RTN
```

```
                                ;MLX4
                                ;                       COMMAND INITIATION AND TERMINATION              27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<

045044  020227  000051        15$:    CMP     R2,#51                          ;                                               3885
045050  001002                        BNE     16$
045052  012701  007714                MOV     #PHR1,R1                        ; *,RTN
045056  016616  000020        16$:    MOV     20(SP),(SP)                     ; SECTOR,*                                      3887
045062  012746  007246                MOV     #WRD15,-(SP)
045066  010146                        MOV     R1,-(SP)                        ; RTN,*
045070  016646  000030                MOV     30(SP),-(SP)                    ; WRDCNT,*
045074  012746  006376                MOV     #FMT6,-(SP)
045100  012746  000005                MOV     #5,-(SP)
045104  010600                        MOV     SP,R0                           ; SP,*
045106  104414                        TRAP    14
045110  012716  011002                MOV     #MSG0,(SP)                      ;                                               3890
045114  012746  007072                MOV     #SAY1,-(SP)
045120  012746  000002                MOV     #2,-(SP)
045124  010600                        MOV     SP,R0                           ; SP,*
045126  104414                        TRAP    14
045130  062706  000020                ADD     #20,SP                          ;                                               3878
045134  010446        17$:    MOV     R4,-(SP)                        ;                                               3900
045136  004767  174546                JSR     PC,SYSERR
045142  022626                        CMP     (SP)+,(SP)+                     ;                                               3783
045144  000207                        RTS     PC

                                ; Routine Size:  169 words
                                ; Maximum stack depth per invocation:  14 words
```

```
;MLX4                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                COUNTING BYTES TRANSFERED              27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (26)

          3902  %sbttl 'COUNTING BYTES TRANSFERED'
          3903  routine UP_WR_COUNT (WORD_COUNT) : novalue =
          3904      begin
          3905      WR_COUNT = .WR_COUNT + (.WORD_COUNT*2);
          3906
          3907      if .WR_COUNT geq 20000
          3908      then
          3909          begin
          3910          WR_THOUSANDS = .WR_THOUSANDS + 20;
          3911          WR_COUNT = .WR_COUNT - 20000;
          3912
          3913          if .WR_THOUSANDS geq 1000
          3914          then
          3915              begin
          3916              WR_THOUSANDS = .WR_THOUSANDS - 1000;
          3917              WR_MILLIONS = .WR_MILLIONS + 1;
          3918
          3919              if .WR_MILLIONS lss 0 then WR_MILLIONS = 0;
          3920
          3921              end;
          3922
          3923          end;
          3924
          3925      return;
          3926      end;


                            .SBTTL  UP.WR.COUNT COUNTING BYTES TRANSFERED
045146                  UP.WR.COUNT:
045146  016600  000002          MOV     2(SP),R0                ; WORD.COUNT,*          3905
045152  006300                  ASL     R0
045154  066700  167134          ADD     WR.COUNT,R0
045160  010067  167130          MOV     R0,WR.COUNT
045164  020027  047040          CMP     R0,#47040               ; WR.COUNT,*            3907
045170  002422                  BLT     1$
045172  062767  000024  167116  ADD     #24,WR.THOUSANDS        ;                       3910
045200  162767  047040  167106  SUB     #47040,WR.COUNT         ;                       3911
045206  026727  167104  001750  CMP     WR.THOUSANDS,#1750      ;                       3913
045214  002410                  BLT     1$
045216  162767  001750  167072  SUB     #1750,WR.THOUSANDS      ;                       3916
045224  005267  167070          INC     WR.MILLIONS             ;                       3917
045230  100002                  BPL     1$                      ;                       3919
045232  005067  167062          CLR     WR.MILLIONS
045236  000207          1$:     RTS     PC                      ;                       3903

; Routine Size:  29 words
; Maximum stack depth per invocation:  0 words
;MLX4                                                    27-Mar-1982 19:24:42    TOPS
;                COUNTING BYTES TRANSFERED              27-Mar-1982 19:23:44    PA:<
```

```
5589 ;MLX4
5590 ;                  COUNTING BYTES TRANSFERED                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
5591                                                                 27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (27)
5592 ;          3927   routine UP_RD_COUNT (WORD_COUNT) : novalue =
5593 ;          3928       begin
5594 ;          3929       RD_COUNT = .RD_COUNT + (.WORD_COUNT*2);
5595 ;          3930
5596 ;          3931       if .RD_COUNT geq 20000
5597 ;          3932       then
5598 ;          3933           begin
5599 ;          3934           RD_THOUSANDS = .RD_THOUSANDS + 20;
5600 ;          3935           RD_COUNT = .RD_COUNT - 20000;
5601 ;          3936
5602 ;          3937           if .RD_THOUSANDS geq 1000
5603 ;          3938           then
5604 ;          3939               begin
5605 ;          3940               RD_THOUSANDS = .RD_THOUSANDS - 1000;
5606 ;          3941               RD_MILLIONS = .RD_MILLIONS + 1;
5607 ;          3942
5608 ;          3943               if .RD_MILLIONS lss 0 then RD_MILLIONS = 0;
5609 ;          3944
5610 ;          3945               end;
5611 ;          3946
5612 ;          3947           end;
5613 ;          3948
5614 ;          3949       return;
5615 ;          3950       end;
5619
5620                                    .SBTTL  UP.RD.COUNT COUNTING BYTES TRANSFERED
5624 045240                        UP.RD.COUNT:
5625 045240 016600 000002                  MOV     2(SP),R0                ; WORD.COUNT,*          3929
5626 045244 006300                         ASL     R0
5627 045246 066700 167050                  ADD     RD.COUNT,R0
5628 045252 010067 167044                  MOV     R0,RD.COUNT
5629 045256 020027 047040                  CMP     R0,#47040               ; RD.COUNT,*            3931
5630 045262 002422                         BLT     1$
5631 045264 062767 000024 167032           ADD     #24,RD.THOUSANDS        ;                       3934
5632 045272 162767 047040 167022           SUB     #47040,RD.COUNT         ;                       3935
5633 045300 026727 167020 001750           CMP     RD.THOUSANDS,#1750      ;                       3937
5634 045306 002410                         BLT     1$
5635 045310 162767 001750 167006           SUB     #1750,RD.THOUSANDS      ;                       3940
5636 045316 005267 167004                  INC     RD.MILLIONS             ;                       3941
5637 045322 100002                         BPL     1$                      ;                       3943
5638 045324 005067 166776                  CLR     RD.MILLIONS
5639 045330 000207                 1$:     RTS     PC                      ;                       3927
5640
5641                               ; Routine Size:  29 words
5642                               ; Maximum stack depth per invocation:  0 words
5650
5651
```

```
;MLX4
;                       COUNTING BYTES TRANSFERED                       27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                       27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (28)

;               3951    routine UP_WC_COUNT (WORD_COUNT) : novalue =
;               3952        begin
;               3953        WC_COUNT = .WC_COUNT + (.WORD_COUNT*2);
;               3954
;               3955        if .WC_COUNT geq 20000
;               3956        then
;               3957            begin
;               3958            WC_THOUSANDS = .WC_THOUSANDS + 20;
;               3959            WC_COUNT = .WC_COUNT - 20000;
;               3960
;               3961            if .WC_THOUSANDS geq 1000
;               3962            then
;               3963                begin
;               3964                WC_THOUSANDS = .WC_THOUSANDS - 1000;
;               3965                WC_MILLIONS = .WC_MILLIONS + 1;
;               3966
;               3967                if .WC_MILLIONS lss 0 then WC_MILLIONS = 0;
;               3968
;               3969                end;
;               3970
;               3971            end;
;               3972
;               3973        return;
;               3974        end;
5683
5684                                    .SBTTL  UP.WC.COUNT COUNTING BYTES TRANSFERED
5688 045332                     UP.WC.COUNT:
5689 045332 016600 000002               MOV     2(SP),R0                ; WORD.COUNT,*          3953
5690 045336 006300                      ASL     R0
5691 045340 066700 166764               ADD     WC.COUNT,R0
5692 045344 010067 166760               MOV     R0,WC.COUNT
5693 045350 020027 047040               CMP     R0,#47040               ; WC.COUNT,*            3955
5694 045354 002422                      BLT     1$
5695 045356 062767 000024 166746        ADD     #24,WC.THOUSANDS        ;                       3958
5696 045364 162767 047040 166736        SUB     #47040,WC.COUNT         ;                       3959
5697 045372 026727 166734 001750        CMP     WC.THOUSANDS,#1750      ;                       3961
5698 045400 002410                      BLT     1$
5699 045402 162767 001750 166722        SUB     #1750,WC.THOUSANDS      ;                       3964
5700 045410 005267 166720               INC     WC.MILLIONS             ;                       3965
5701 045414 100002                      BPL     1$                      ;                       3967
5702 045416 005067 166712               CLR     WC.MILLIONS
5703 045422 000207              1$:     RTS     PC                      ;                       3951
5704
5705
5706                            ; Routine Size:  29 words
5714                            ; Maximum stack depth per invocation:  0 words
5715
```

```
;MLX4
;                ML11 TRANSFER COMMANDS                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (29)

;          3975  %sbttl 'ML11 TRANSFER COMMANDS'
;          3976  routine write (LUN, WRDCNT, BUFFER, SECTOR) =
;          3977      begin
;          3978
;          3979  !++
;          3980  !  ROUTINE:     WRITE(LUN,WRDCNT,BUFFER,SECTOR)
;          3981  !
;          3982  !  PURPOSE:     TO TRANSFER INFORMATION FROM MAIN MEMORY TO THE ML11
;          3983  !               AND TO DECIDE ON THE ADVISABILITY OF A RETRY.
;          3984  !
;          3985  !  ARGUMENTS:   SEE 'START_IT' ROUTINE ABOVE FOR DETAILS
;          3986  !
;          3987  !  RESULTS:     UPON TERMINATION OF THE TRANSFER, ERROR DETECTION OCCURS
;          3988  !               AND THE CONTENTS OF 'VALUE' BECOMES IMPORTANT IN TERMS OF
;          3989  !               WHETHER THE TRANSFER WAS COMPLETELY SUCCESSFUL OR WHETHER A
;          3990  !               RETRY SHOULD OR SHOULD NOT BE PERMITTED.
;          3991  !
;          3992  !               THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
;          3993  !               FOR THE SYSERR ROUTINE ABOVE.
;          3994  !--
;          3995
;          3996      local
;          3997          VALUE,
;          3998          COMMAND;
;          3999
;          4000      COMMAND = WR_CMD;
;          4001      VALUE = START_IT (.COMMAND, .LUN, .WRDCNT, .BUFFER, .SECTOR);
;          4002
;          4003      if ( not .RETRYING) then UP_WR_COUNT (.WRDCNT);
;          4004
;          4005      if .VALUE eql 0 then return 0;                  !NO ERRORS AT ALL
;          4006
;          4007      if ((.ERROUT) and ( not .RETRYING)) then PRINTB (FMT6, .WRDCNT, WRD16, WRD15, .SECTOR);
;          4008
;          4009      !'BEGAN YYYY WORD WRITE AT SECTOR ZZZZZZ'
;          4010      return .VALUE;
;          4011      end;
;
;
;                                .SBTTL  WRITE ML11 TRANSFER COMMANDS
;5765 045424 004167 137632  WRITE: JSR     R1,$SAVE2                       ;                                3976
;5766 045430 012700 000061          MOV     #61,R0                          ; *,COMMAND                      4000
;5767 045434 010046                 MOV     R0,-(SP)                        ; COMMAND,*                      4001
;5768 045436 016646 000020          MOV     20(SP),-(SP)                    ; LUN,*
;5769 045442 016601 000020          MOV     20(SP),R1                       ; WRDCNT,*
;5770 045446 010146                 MOV     R1,-(SP)
;5771 045450 016646 000020          MOV     20(SP),-(SP)                    ; BUFFER,*
```

```
                                        ;MLX4
                                        ;               ML11 TRANSFER COMMANDS                  27-Mar-1982 19:24:42    TOPS
                                                                                                27-Mar-1982 19:23:44    PA:<

045454  016646  000020                        MOV     20(SP),-(SP)            ; SECTOR,*
045460  004767  176740                        JSR     PC,START.IT
045464  010002                                MOV     R0,R2                   ; *,VALUE
045466  032767  000001  166644                BIT     #1,RETRYING             ;                                       4003
045474  001004                                BNE     1$
045476  010146                                MOV     R1,-(SP)
045500  004767  177442                        JSR     PC,UP.WR.COUNT
045504  005726                                TST     (SP)+
045506  005702                        1$:     TST     R2                      ; VALUE                                 4005
045510  001003                                BNE     2$
045512  062706  000012                        ADD     #12,SP
045516  000433                                BR      4$
045520  032767  000001  134532        2$:     BIT     #1,ERROUT               ;                                       4007
045526  001423                                BEQ     3$
045530  032767  000001  166602                BIT     #1,RETRYING
045536  001017                                BNE     3$
045540  016646  000022                        MOV     22(SP),-(SP)            ; SECTOR,*
045544  012746  007246                        MOV     #WRD15,-(SP)
045550  012746  007256                        MOV     #WRD16,-(SP)
045554  010146                                MOV     R1,-(SP)
045556  012746  006376                        MOV     #FMT6,-(SP)
045562  012746  000005                        MOV     #5,-(SP)
045566  010600                                MOV     SP,R0                   ; SP,*
045570  104414                                TRAP    14
045572  062706  000014                        ADD     #14,SP
045576  062706  000012                3$:     ADD     #12,SP                  ;                                       3976
045602  010200                                MOV     R2,R0                   ; VALUE,*                               3977
045604  000207                                RTS     PC
045606  005000                        4$:     CLR     R0                      ;                                       3976
045610  000207                                RTS     PC

                                        ; Routine Size:  59 words
                                        ; Maximum stack depth per invocation:  14 words
```

```
5816 ;MLX4
5817 ;                  ML11 TRANSFER COMMANDS                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
5818 ;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (30)
5819 ;          4012    routine read (LUN, WRDCNT, BUFFER, SECTOR) =
5820 ;          4013        begin
5821 ;          4014
5822 ;          4015    !++
5823 ;          4016    !   ROUTINE:    READ(LUN,WRDCNT,BUFFER,SECTOR)
5824 ;          4017    !
5825 ;          4018    !   PURPOSE:    TO TRANSFER INFORMATION FROM THE ML11 TO MAIN MEMORY
5826 ;          4019    !               USING A 'READ' COMMAND.
5827 ;          4020    !
5828 ;          4021    !   ARGUMENTS:  SEE 'START_IT' ROUTINE ABOVE FOR DETAILS
5829 ;          4022    !
5830 ;          4023    !   RESULTS:    UPON TERMINATION OF THE TRANSFER, ERROR DETECTION OCCURS
5831 ;          4024    !               AND THE CONTENTS OF 'VALUE' BECOMES IMPORTANT IN TERMS OF
5832 ;          4025    !               WHETHER THE TRANSFER WAS COMPLETELY SUCCESSFUL OR WHETHER A
5833 ;          4026    !               RETRY SHOULD OR SHOULD NOT BE PERMITTED.
5834 ;          4027    !
5835 ;          4028    !               THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
5836 ;          4029    !               FOR THE SYSERR ROUTINE ABOVE.
5837 ;          4030    !--
5838 ;          4031
5839 ;          4032        local
5840 ;          4033            VALUE,
5841 ;          4034            COMMAND;
5842 ;          4035
5843 ;          4036        COMMAND = RD_CMD;
5844 ;          4037        VALUE = START_IT (.COMMAND, .LUN, .WRDCNT, .BUFFER, .SECTOR);
5845 ;          4038
5846 ;          4039        if ( not .RETRYING) then UP_RD_COUNT (.WRDCNT);
5847 ;          4040
5848 ;          4041        if .VALUE eql 0 then return 0;                  !NO ERRORS AT ALL
5849 ;          4042
5850 ;          4043        if ((.ERROUT) and ( not .RETRYING)) then PRINTB (FMT6, .WRDCNT, WRD17, WRD15, .SECTOR);
5851 ;          4044
5852 ;          4045        !'BEGAN YYYY WORD READ AT SECTOR ZZZZZZ'
5853 ;          4046        return .VALUE;
5854 ;          4047        end;
5858
5859                                    .SBTTL  READ ML11 TRANSFER COMMANDS
5863 045612  004167  137444     READ:  JSR     R1,$SAVE2                ;                                          4012
5864 045616  012700  000071            MOV     #71,R0                   ; *,COMMAND                                4036
5865 045622  010046                    MOV     R0,-(SP)                 ; COMMAND,*                                4037
5866 045624  016646  000020            MOV     20(SP),-(SP)             ; LUN,*
5867 045630  016601  000020            MOV     20(SP),R1                ; WRDCNT,*
5868 045634  010146                    MOV     R1,-(SP)
5869 045636  016646  000020            MOV     20(SP),-(SP)             ; BUFFER,*
5870 045642  016646  000020            MOV     20(SP),-(SP)             ; SECTOR,*
```

```
                                        ;MLX4                                                                   27-Mar-1982 19:24:42    TOPS
                                        ;               ML11 TRANSFER COMMANDS                                  27-Mar-1982 19:23:44    PA:<

045646  004767  176552                        JSR     PC,START.IT
045652  010002                                MOV     R0,R2                   ; *,VALUE
045654  032767  000001  166456                BIT     #1,RETRYING             ;                                                       4039
045662  001004                                BNE     1$
045664  010146                                MOV     R1,-(SP)
045666  004767  177346                        JSR     PC,UP.RD.COUNT
045672  005726                                TST     (SP)+
045674  005702                        1$:     TST     R2                      ; VALUE                                                 4041
045676  001003                                BNE     2$
045700  062706  000012                        ADD     #12,SP
045704  000433                                BR      4$
045706  032767  000001  134344        2$:     BIT     #1,ERROUT               ;                                                       4043
045714  001423                                BEQ     3$
045716  032767  000001  166414                BIT     #1,RETRYING
045724  001017                                BNE     3$
045726  016646  000022                        MOV     22(SP),-(SP)            ; SECTOR,*
045732  012746  007246                        MOV     #WRD15,-(SP)
045736  012746  007264                        MOV     #WRD17,-(SP)
045742  010146                                MOV     R1,-(SP)
045744  012746  006376                        MOV     #FMT6,-(SP)
045750  012746  000005                        MOV     #5,-(SP)
045754  010600                                MOV     SP,R0                   ; SP,*
045756  104414                                TRAP    14
045760  062706  000014                        ADD     #14,SP
045764  062706  000012                3$:     ADD     #12,SP                  ;                                                       4012
045770  010200                                MOV     R2,R0                   ; VALUE,*                                               4013
045772  000207                                RTS     PC
045774  005000                        4$:     CLR     R0                      ;                                                       4012
045776  000207                                RTS     PC

                                        ; Routine Size:  59 words
                                        ; Maximum stack depth per invocation:  14 words
```

```
5914 ;MLX4
5915 ;                  ML11 TRANSFER COMMANDS                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
5916 ;                                                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (31)
5917 ;          4048    routine CHECK (LUN, WRDCNT, BUFFER, SECTOR) =
5918 ;          4049        begin
5919 ;          4050
5920 ;          4051    !++
5921 ;          4052    !   ROUTINE:    CHECK(LUN,WRDCNT,BUFFER,SECTOR)
5922 ;          4053    !
5923 ;          4054    !   PURPOSE:    TO TRANSFER INFORMATION FROM THE ML11 TO MAIN MEMORY
5924 ;          4055    !               USING A 'WRITE CHECK' COMMAND.
5925 ;          4056    !
5926 ;          4057    !   ARGUMENTS:  SEE 'START_IT' ROUTINE ABOVE FOR DETAILS
5927 ;          4058    !
5928 ;          4059    !   RESULTS:    UPON TERMINATION OF THE TRANSFER, ERROR DETECTION OCCURS
5929 ;          4060    !               AND THE CONTENTS OF 'VALUE' BECOMES IMPORTANT IN TERMS OF
5930 ;          4061    !               WHETHER THE TRANSFER WAS COMPLETELY SUCCESSFUL OR WHETHER A
5931 ;          4062    !               RETRY SHOULD OR SHOULD NOT BE PERMITTED.
5932 ;          4063    !
5933 ;          4064    !               THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
5934 ;          4065    !               FOR THE SYSERR ROUTINE ABOVE.
5935 ;          4066    !--
5936 ;          4067
5937 ;          4068        local
5938 ;          4069            VALUE,
5939 ;          4070            COMMAND;
5940 ;          4071
5941 ;          4072        COMMAND = WC_CMD;
5942 ;          4073        VALUE = START_IT (.COMMAND, .LUN, .WRDCNT, .BUFFER, .SECTOR);
5943 ;          4074
5944 ;          4075        if ( not .RETRYING) then UP_WC_COUNT (.WRDCNT);
5945 ;          4076
5946 ;          4077        if .VALUE eql 0 then return 0;              !NO ERRORS AT ALL
5947 ;          4078
5948 ;          4079        if ((.ERROUT) and ( not .RETRYING)) then PRINTB (FMT6, .WRDCNT, PHR1, WRD15, .SECTOR);
5949 ;          4080
5950 ;          4081        !'BEGAN YYYY WORD WRITE CHECK AT SECTOR ZZZZZZ'
5951 ;          4082        return .VALUE;
5952 ;          4083        end;
5956
5957                                 .SBTTL  CHECK ML11 TRANSFER COMMANDS
5961 046000 004167 137256   CHECK:  JSR     R1,$SAVE2                       ;                                   4048
5962 046004 012700 000051           MOV     #51,R0                          ; *,COMMAND                         4072
5963 046010 010046                  MOV     R0,-(SP)                        ; COMMAND,*                         4073
5964 046012 016646 000020           MOV     20(SP),-(SP)                    ; LUN,*
5965 046016 016601 000020           MOV     20(SP),R1                       ; WRDCNT,*
5966 046022 010146                  MOV     R1,-(SP)
5967 046024 016646 000020           MOV     20(SP),-(SP)                    ; BUFFER,*
5968 046030 016646 000020           MOV     20(SP),-(SP)                    ; SECTOR,*
```

```
5970                                    ;MLX4
5971                                    ;                ML11 TRANSFER COMMANDS                    27-Mar-1982 19:24:42    TOPS
5972                                                                                              27-Mar-1982 19:23:44    PA:<
5973 046034  004767  176364                      JSR     PC,START.IT
5974 046040  010002                      MOV     R0,R2
5975 046042  032767  000001  166270      BIT     #1,RETRYING             ; *,VALUE
5976 046050  001004                      BNE     1$                      ;                                                 4075
5977 046052  010146                      MOV     R1,-(SP)
5978 046054  004767  177252              JSR     PC,UP.WC.COUNT
5979 046060  005726                      TST     (SP)+
5980 046062  005702                1$:   TST     R2                      ; VALUE                                           4077
5981 046064  001003                      BNE     2$
5982 046066  062706  000012              ADD     #12,SP
5983 046072  000433                      BR      4$
5984 046074  032767  000001  134156  2$: BIT     #1,ERROUT               ;                                                 4079
5985 046102  001423                      BEQ     3$
5986 046104  032767  000001  166226      BIT     #1,RETRYING
5987 046112  001017                      BNE     3$
5988 046114  016646  000022              MOV     22(SP),-(SP)            ; SECTOR,*
5989 046120  012746  007246              MOV     #WRD15,-(SP)
5990 046124  012746  007714              MOV     #PHR1,-(SP)
5991 046130  010146                      MOV     R1,-(SP)
5992 046132  012746  006376              MOV     #FMT6,-(SP)
5993 046136  012746  000005              MOV     #5,-(SP)
5994 046142  010600                      MOV     SP,R0                   ; SP,*
5995 046144  104414                      TRAP    14
5996 046146  062706  000014              ADD     #14,SP
5997 046152  062706  000012        3$:   ADD     #12,SP                  ;                                                 4048
5998 046156  010200                      MOV     R2,R0                   ; VALUE,*                                         4049
5999 046160  000207                      RTS     PC
6000 046162  005000                4$:   CLR     R0                      ;                                                 4048
6001 046164  000207                      RTS     PC
6002
6003                                    ; Routine Size:  59 words
6004                                    ; Maximum stack depth per invocation:  14 words
6009
6010
```

```
6012 ;MLX4
6013 ;                  ML11 TRANSFER COMMANDS                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
6014                                                            27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (32)
6015 ;          4084    routine CHOOSE =
6016 ;          4085        begin
6017 ;          4086
6018 ;          4087    !++
6019 ;          4088    !   ROUTINE:        CHOOSE
6020 ;          4089    !
6021 ;          4090    !   PURPOSE:        TO DECIDE WHETHER TO DO A 'WRITE CHECK' OR A 'READ'.
6022 ;          4091    !                   THE 'READ' WILL BE SELECTED APPROXIMATELY 25% OF THE
6023 ;          4092    !                   TIME.  THIS IS ACCOMPLISHED BY EXAMINING THE MOST AND
6024 ;          4093    !                   THE LEAST SIGNIFICANT BITS OF A RANDOM NUMBER.  IF
6025 ;          4094    !                   BOTH ARE SET, THEN 'READ' IS CHOSEN.
6026 ;          4095    !
6027 ;          4096    !   RESULTS:        THE VALUE RETURNED FOR THIS ROUTINE IS THE ADDRESS OF
6028 ;          4097    !                   THE CHOSEN COMMAND (EITHER 'READ' OR 'CHECK').
6029 ;          4098    !--
6030 ;          4099
6031 ;          4100        local
6032 ;          4101            VALUE;
6033 ;          4102
6034 ;          4103        RN ();
6035 ;          4104
6036 ;          4105        if ((.RANDOM) and (.RANDOM lss 0))
6037 ;          4106        then
6038 ;          4107            VALUE = read                        !CHOOSE THE READ COMMAND
6039 ;          4108        else
6040 ;          4109            VALUE = CHECK;                      !CHOOSE THE WRITE CHECK COMMAND
6041 ;          4110
6042 ;          4111        return .VALUE;
6043 ;          4112        end;
6047
6048                                    .SBTTL  CHOOSE ML11 TRANSFER COMMANDS
6052 046166 004767 137176          CHOOSE: JSR     PC,RN                       ;                   4103
6053 046172 032767 000001 137264           BIT     #1,RANDOM                   ;                   4105
6054 046200 001406                         BEQ     1$
6055 046202 005767 137256                  TST     RANDOM
6056 046206 002003                         BGE     1$
6057 046210 012700 045612                  MOV     #READ,R0                    ; *,VALUE           4107
6058 046214 000207                         RTS     PC                          ;                   4105
6059 046216 012700 046000          1$:     MOV     #CHECK,R0                   ; *,VALUE           4109
6060 046222 000207                         RTS     PC                          ;                   4084
6061
6062                                ; Routine Size:  15 words
6063                                ; Maximum stack depth per invocation:  0 words
6071
6072
```

```
6074 ;MLX4
6075 ;                  ML11 TRANSFER COMMANDS                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
6076 ;                                                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (33)
6077 ;          4113  routine RETRY (TIMES, COMMAND, LUN, WRDCNT, BUFFER, SECTOR) =
6078 ;          4114      begin                                                !* 1 *
6079 ;          4115
6080 ;          4116  !++
6081 ;          4117  !   ROUTINE:     RETRY(TIMES,COMMAND,LUN,WRDCNT,BUFFER,SECTOR)
6082 ;          4118  !
6083 ;          4119  !   PURPOSE:     (1)  IF THE OPERATOR HAS ALLOWED ERROR PRINTOUTS, AND
6084 ;          4120  !                     IF THE RETRY IS NOT TO CATEGORIZE ERRORS, THEN SAY
6085 ;          4121  !                     THAT THE RETRY IS BEGINNING.
6086 ;          4122  !
6087 ;          4123  !                (2)  REISSUE THE WRITE, WRITE CHECK OR READ COMMAND
6088 ;          4124  !                     UNTIL THE COMMAND SUCCEEDS OR UNTIL ALL PERMITTED
6089 ;          4125  !                     RETRIES HAVE FAILED.
6090 ;          4126  !
6091 ;          4127  !                (3)  IF A 'BEGIN RETRY' MESSAGE WAS PRINTED, THEN A FINAL
6092 ;          4128  !                     MESSAGE ABOUT THE SUCCESS OR FAILURE OF THE RETRIES
6093 ;          4129  !                     SHOULD ALSO BE PRINTED.
6094 ;          4130  !
6095 ;          4131  !                (4)  INCREMENT THE RETRY COUNTER FOR EVERY RETRY DONE
6096 ;          4132  !                     WHICH WAS NOT FOR ERROR CLASSIFICATION.
6097 ;          4133  !
6098 ;          4134  !
6099 ;          4135  !   ARGUMENTS:   (1)  TIMES - THE NUMBER OF RETRIES PERMITTED BEFORE
6100 ;          4136  !                          IT IS CALLED A FAILURE.
6101 ;          4137  !
6102 ;          4138  !                (2)  OTHER ARGUMENTS ARE THE SAME AS FOR 'START_IT'
6103 ;          4139  !                     ROUTINE ABOVE.
6104 ;          4140  !
6105 ;          4141  !   RESULTS:     THE VALUES RETURNED FOR THIS SUBROUTINE ARE THE SAME AS
6106 ;          4142  !                FOR THE SYSERR ROUTINE ABOVE.
6107 ;          4143  !--
6108 ;          4144
6109 ;          4145      label
6110 ;          4146          LOOP;
6111 ;          4147
6112 ;          4148      local
6113 ;          4149          TEMP,
6114 ;          4150          VALUE,
6115 ;          4151          COUNT,
6116 ;          4152          TBOARD,
6117 ;          4153          TBANK;
6118 ;          4154
6119 ;          4155      !+
6120 ;          4156      ! THIS IS THE CODE FOR PURPOSE 1:
6121 ;          4157      !-
6122 ;          4158
6123 ;          4159      RETRYING = ACTIVE;
6124 ;          4160
6125 ;          4161      if ((.TIMES neq 1) and (.ERROUT))
6126 ;          4162      then
6127 ;          4163          begin                                        !* 2 *
6128 ;          4164
```

```
;        4165          if .COMMAND eql write then PRINTB (SAY3, WRD2, WRD16, WRD18);
;        4166
;        4167          !BEGIN WRITE RETRY
;        4168
;        4169          if .COMMAND eql CHECK then PRINTB (SAY3, WRD2, PHR1, WRD18);
;        4170
;        4171          !BEGIN WRITE CHECK RETRY
;        4172
;        4173          if .COMMAND eql read then PRINTB (SAY3, WRD2, WRD17, WRD18);
;        4174
;        4175          !BEGIN READ RETRY
;        4176          end;                                          !* 2 *
;        4177
;        4178      !+
;        4179      ! THIS IS THE CODE FOR PURPOSE 2:
;        4180      !-
;        4181
;        4182  LOOP :
;        4183      begin                                             !* 3 *
;        4184
;        4185      incr KOUNT from 1 to .TIMES do
;        4186          begin                                         !* 4 *
;        4187
;        4188          if .COMMAND eql write then VALUE = write (.LUN, .WRDCNT, .BUFFER, .SECTOR);
;        4189
;        4190          if .COMMAND eql CHECK
;        4191          then
;        4192              begin
;        4193              write (.LUN, .WRDCNT, .BUFFER, .SECTOR);
;        4194              VALUE = CHECK (.LUN, .WRDCNT, .BUFFER, .SECTOR);
;        4195              end;
;        4196
;        4197          if .COMMAND eql read
;        4198          then
;        4199              begin
;        4200              write (.LUN, .WRDCNT, (.BUFFER - BUFSIZ*2), .SECTOR);
;        4201              VALUE = read (.LUN, .WRDCNT, .BUFFER, .SECTOR);
;        4202              end;
;        4203
;        4204          !+
;        4205          ! THIS IS THE CODE FOR PURPOSE 3:
;        4206          !-
;        4207
;        4208          if .VALUE eql 0
;        4209          then                                          !THE RETRY WAS SUCCESSFUL
;        4210              begin                                     !* 5 *
;        4211
;        4212              if ((.TIMES neq 1) and (.ERROUT))
;        4213              then
;        4214                  begin
;        4215                  PRINTB (SAY2, WRD18, WRD19);
;        4216                  PRINTB (CRLF);
```

```
;MLX4
;                ML11 TRANSFER COMMANDS                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (33)

;          4217                  !RETRY SUCCEEDED
;          4218                  end;
;          4219
;          4220              COUNT = .KOUNT;
;          4221              leave LOOP;
;          4222              end;                                    !* 5 *
;          4223
;          4224          end;                                        !* 4 *
;          4225
;          4226      !+
;          4227      ! FALLS THROUGH HERE IF ALL RETRIES FAILED:
;          4228      !-
;          4229
;          4230      if ((.TIMES neq 1) and (.ERROUT))
;          4231      then
;          4232          begin
;          4233          PRINTB (SAY2, WRD18, WRD20);
;          4234  !
;          4235  ! VER CZMLBB COMMENTED OUT THIS PRINT CRLF
;          4236  !       PRINTB (CRLF);
;          4237          !RETRY FAILED
;          4238          COUNT = .TIMES;
;          4239          end;
;          4240
;          4241      end;                                            !* 3 *
;          4242
;          4243      !+
;          4244      ! THIS IS THE CODE FOR PURPOSE 4:
;          4245      !-
;          4246
;          4247      if .TIMES neq 1
;          4248      then
;          4249          begin
;          4250          TBOARD = .BOARD;
;          4251          TBANK = .BANK;
;          4252          DECODE (.SECTOR);
;          4253          TRIES [.LUN, .BOARD, 0, 16, 0] = .TRIES [.LUN, .BOARD, 0, 16, 0] + .COUNT;
;          4254          BOARD = .TBOARD;
;          4255          BANK = .TBANK;
;          4256          end;
;          4257
;          4258      RETRYING = INACTIVE;
;          4259      return .VALUE;
;          4260      end;                                                !* 1 *
;
;                                  .SBTTL  RETRY ML11 TRANSFER COMMANDS
```

```
                                ;MLX4                                                                   27-Mar-1982 19:24:42    TOPS
                                ;               ML11 TRANSFER COMMANDS                                  27-Mar-1982 19:23:44    PA:<

046224  004167  137104        RETRY:  JSR     R1,$SAVE5
046230  012767  000001  166102        MOV     #1,RETRYING             ;                                                       4113
046236  016601  000030                MOV     30(SP),R1               ;                                                       4159
046242  005046                        CLR     -(SP)                   ; TIMES,*                                               4161
046244  020127  000001                CMP     R1,#1
046250  001472                        BEQ     3$
046252  005216                        INC     (SP)
046254  032767  000001  133776        BIT     #1,ERROUT
046262  001465                        BEQ     3$
046264  016602  000030                MOV     30(SP),R2               ; COMMAND,*                                             4165
046270  020227  045424                CMP     R2,#WRITE
046274  001016                        BNE     1$
046276  012746  007272                MOV     #WRD18,-(SP)
046302  012746  007256                MOV     #WRD16,-(SP)
046306  012746  007200                MOV     #WRD2,-(SP)
046312  012746  007112                MOV     #SAY3,-(SP)
046316  012746  000004                MOV     #4,-(SP)
046322  010600                        MOV     SP,R0                   ; SP,*
046324  104414                        TRAP    14
046326  062706  000012                ADD     #12,SP
046332  020227  046000        1$:     CMP     R2,#CHECK               ;                                                       4169
046336  001016                        BNE     2$
046340  012746  007272                MOV     #WRD18,-(SP)
046344  012746  007714                MOV     #PHR1,-(SP)
046350  012746  007200                MOV     #WRD2,-(SP)
046354  012746  007112                MOV     #SAY3,-(SP)
046360  012746  000004                MOV     #4,-(SP)
046364  010600                        MOV     SP,R0                   ; SP,*
046366  104414                        TRAP    14
046370  062706  000012                ADD     #12,SP
046374  020227  045612        2$:     CMP     R2,#READ                ;                                                       4173
046400  001016                        BNE     3$
046402  012746  007272                MOV     #WRD18,-(SP)
046406  012746  007264                MOV     #WRD17,-(SP)
046412  012746  007200                MOV     #WRD2,-(SP)
046416  012746  007112                MOV     #SAY3,-(SP)
046422  012746  000004                MOV     #4,-(SP)
046426  010600                        MOV     SP,R0                   ; SP,*
046430  104414                        TRAP    14
046432  062706  000012                ADD     #12,SP
046436  016602  000030        3$:     MOV     30(SP),R2               ; COMMAND,*                                             4188
046442  005004                        CLR     R4                      ; KOUNT                                                 4185
046444  000543                        BR      9$
046446  020227  045424        4$:     CMP     R2,#WRITE               ;                                                       4188
046452  001015                        BNE     5$
046454  016646  000026                MOV     26(SP),-(SP)            ; LUN,*
046460  016646  000026                MOV     26(SP),-(SP)            ; WRDCNT,*
046464  016646  000026                MOV     26(SP),-(SP)            ; BUFFER,*
046470  016646  000026                MOV     26(SP),-(SP)            ; SECTOR,*
046474  004767  176724                JSR     PC,WRITE
046500  010003                        MOV     R0,R3                   ; *,VALUE
046502  062706  000010                ADD     #10,SP
```

```
                                        ;MLX4
                                        ;                ML11 TRANSFER COMMANDS                    27-Mar-1982 19:24:42   TOPS
                                                                                                   27-Mar-1982 19:23:44   PA:<
6301 046506 020227 046000       5$:     CMP     R2,#CHECK                ;                                                4190
6302 046512 001027                      BNE     6$
6303 046514 016646 000026               MOV     26(SP),-(SP)             ; LUN,*                                         4193
6304 046520 016646 000026               MOV     26(SP),-(SP)             ; WRDCNT,*
6305 046524 016646 000026               MOV     26(SP),-(SP)             ; BUFFER,*
6306 046530 016646 000026               MOV     26(SP),-(SP)             ; SECTOR,*
6307 046534 004767 176664               JSR     PC,WRITE
6308 046540 016616 000036               MOV     36(SP),(SP)              ; LUN,*                                         4194
6309 046544 016646 000034               MOV     34(SP),-(SP)             ; WRDCNT,*
6310 046550 016646 000034               MOV     34(SP),-(SP)             ; BUFFER,*
6311 046554 016646 000034               MOV     34(SP),-(SP)             ; SECTOR,*
6312 046560 004767 177214               JSR     PC,CHECK
6313 046564 010003                      MOV     R0,R3                    ; *,VALUE
6314 046566 062706 000016               ADD     #16,SP                   ;
6315 046572 020227 045612       6$:     CMP     R2,#READ                 ;                                               4192
6316 046576 001031                      BNE     7$                                                                       4197
6317 046600 016646 000026               MOV     26(SP),-(SP)             ; LUN,*                                         4200
6318 046604 016646 000026               MOV     26(SP),-(SP)             ; WRDCNT,*
6319 046610 016646 000026               MOV     26(SP),-(SP)             ; BUFFER,*
6320 046614 162716 010000               SUB     #10000,(SP)
6321 046620 016646 000026               MOV     26(SP),-(SP)             ; SECTOR,*
6322 046624 004767 176574               JSR     PC,WRITE
6323 046630 016616 000036               MOV     36(SP),(SP)              ; LUN,*                                         4201
6324 046634 016646 000034               MOV     34(SP),-(SP)             ; WRDCNT,*
6325 046640 016646 000034               MOV     34(SP),-(SP)             ; BUFFER,*
6326 046644 016646 000034               MOV     34(SP),-(SP)             ; SECTOR,*
6327 046650 004767 176736               JSR     PC,READ
6328 046654 010003                      MOV     R0,R3                    ; *,VALUE
6329 046656 062706 000016               ADD     #16,SP                   ;
6330 046662 005703              7$:     TST     R3                       ; VALUE                                         4199
6331 046664 001033                      BNE     9$                                                                       4208
6332 046666 032716 000001               BIT     #1,(SP)                  ;                                               4212
6333 046672 001426                      BEQ     8$
6334 046674 032767 000001 133356        BIT     #1,ERROUT
6335 046702 001422                      BEQ     8$
6336 046704 012746 007300               MOV     #WRD19,-(SP)             ;                                               4215
6337 046710 012746 007272               MOV     #WRD18,-(SP)
6338 046714 012746 007100               MOV     #SAY2,-(SP)
6339 046720 012746 000003               MOV     #3,-(SP)
6340 046724 010600                      MOV     SP,R0                    ; SP,*
6341 046726 104414                      TRAP    14
6342 046730 012716 007066               MOV     #CRLF,(SP)               ;                                               4216
6343 046734 012746 000001               MOV     #1,-(SP)
6344 046740 010600                      MOV     SP,R0                    ; SP,*
6345 046742 104414                      TRAP    14
6346 046744 062706 000012               ADD     #12,SP                   ;                                               4214
6347 046750 010405              8$:     MOV     R4,R5                    ; KOUNT,COUNT                                   4220
6348 046752 000427                      BR      10$                      ;                                               4221
6349 046754 005204              9$:     INC     R4                       ; KOUNT                                         4185
6350 046756 020401                      CMP     R4,R1                    ; KOUNT,*
6351 046760 003632                      BLE     4$
6352 046762 032716 000001               BIT     #1,(SP)                  ;                                               4230
```

```
                                        ;MLX4
                                        ;               ML11 TRANSFER COMMANDS                          27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<
                                                BEQ     11$
                                                BIT     #1,ERROUT
                                                BEQ     10$
                                                MOV     #WRD20,-(SP)            ;                                               4233
                                                MOV     #WRD18,-(SP)
                                                MOV     #SAY2,-(SP)
                                                MOV     #3,-(SP)
                                                MOV     SP,R0                   ; SP,*
                                                TRAP    14
                                                MOV     R1,R5                   ; *,COUNT                                       4238
                                                ADD     #10,SP                  ;                                               4232
                                        10$:    BIT     #1,(SP)                 ;                                               4247
                                                BEQ     11$
                                                MOV     BOARD,R1                ; *,TBOARD                                      4250
                                                MOV     BANK,R2                 ; *,TBANK                                       4251
                                                MOV     20(SP),-(SP)            ; SECTOR,*                                      4252
                                                JSR     PC,DECODE
                                                MOV     30(SP),R0               ; LUN,*                                         4253
                                                ASL     R0
                                                ASL     R0
                                                ASL     R0
                                                ASL     R0
                                                ADD     BOARD,R0
                                                ASL     R0
                                                ADD     R5,TRIES(R0)            ; COUNT,*
                                                MOV     R1,BOARD                ; TBOARD,*                                      4254
                                                MOV     R2,BANK                 ; TBANK,*                                       4255
                                                TST     (SP)+                   ;                                               4249
                                        11$:    CLR     RETRYING                ;                                               4258
                                                MOV     R3,R0                   ; VALUE,*                                       4114
                                                TST     (SP)+                   ;                                               4113
                                                RTS     PC

                                        ; Routine Size:  227 words
                                        ; Maximum stack depth per invocation:  14 words
```

```
6399 ;MLX4
6400 ;                  TO SET UP BUFFER POINTERS BEFORE A TRANSFER     27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
6401                                                                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (34)
6402 ;          4261  %sbttl 'TO SET UP BUFFER POINTERS BEFORE A TRANSFER'
6403 ;          4262  routine SET_PTRS (WRDCNT) : novalue =
6404 ;          4263      begin
6405 ;          4264
6406 ;          4265  !++
6407 ;          4266  !   ROUTINE:      SET_PTRS(WRDCNT)
6408 ;          4267  !
6409 ;          4268  !   PURPOSE:      TO MAKE SURE THAT THE BUFFER POINTERS ARE SUITABLY PLACED
6410 ;          4269  !                 BEFORE A TRANSFER, SO THAT THEY WILL SUPPORT THE CHOSEN WORD
6411 ;          4270  !                 COUNT WITHIN THE BUFFER SPACE.
6412 ;          4271  !
6413 ;          4272  !   ARGUMENT:     WRDCNT = THE NUMBER OF WORDS IN A TRANSFER.
6414 ;          4273  !
6415 ;          4274  !   RESULTS:      'WPTR' AND 'RPTR' ARE SET BACK TO THE START OF THE BUFFERS
6416 ;          4275  !                 ONLY IF THE WORD COUNT WON'T FIT.  OTHERWISE, THEY ARE LEFT
6417 ;          4276  !                 UNCHANGED.
6418 ;          4277  !
6419 ;          4278  !                 NOTE:  THE WRITE BUFFER IS LOCATED BEFORE THE READ BUFFER.
6420 ;          4279  !--
6421 ;          4280
6422 ;          4281      if (.WPTR + .WRDCNT*2) geqa END_WBUFF then WPTR = WBUFF;
6423 ;          4282
6424 ;          4283      RPTR = .WPTR + (BUFSIZ*2);
6425 ;          4284      return;
6426 ;          4285      end;
6430
6431                                .SBTTL  SET.PTRS TO SET UP BUFFER POINTERS BEFORE A TRANSFER
6435 047132                  SET.PTRS:
6436 047132  016600  000002            MOV     2(SP),R0                        ; WRDCNT,*      4281
6437 047136  006300                    ASL     R0
6438 047140  066700  163524            ADD     WPTR,R0
6439 047144  020027  022670            CMP     R0,#END.WBUFF
6440 047150  103403                    BLO     1$
6441 047152  012767  012670  163510    MOV     #WBUFF,WPTR
6442 047160  016700  163504    1$:     MOV     WPTR,R0                         ;               4283
6443 047164  062700  010000            ADD     #10000,R0
6444 047170  010067  163476            MOV     R0,RPTR
6445 047174  000207                    RTS     PC                              ;               4262
6446
6447                            ; Routine Size:  18 words
6448                            ; Maximum stack depth per invocation:  0 words
```

```
;MLX4                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                CHOOSING A WORD COUNT                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (35)

;          4286  %sbttl 'CHOOSING A WORD COUNT'
;          4287  routine GET_WRDCNT (SECTOR, LAST) =
;          4288      begin
;          4289
;          4290      local
;          4291          TEMP,
;          4292          WRDCNT;
;          4293
;          4294      TEMP = .LAST - .SECTOR + 1;                !NUMBER OF SECTORS LEFT TO TEST
;          4295
;          4296  !
;          4297  ! version czmlbb changed gtr to gtru
;          4298  !
;          4299      if (BUFSIZ/256) gtru .TEMP                 !LESS THAN A FULL BUFFER LEFT?
;          4300      then
;          4301          WRDCNT = .TEMP*256                     !YES -- USE AS LARGE A COUNT AS FITS
;          4302      else
;          4303          WRDCNT = BUFSIZ;                       !NO  -- USE THE ENTIRE BUFFER SIZE
;          4304
;          4305      return .WRDCNT;
;          4306      end;

                                .SBTTL  GET.WRDCNT CHOOSING A WORD COUNT
047176                  GET.WRDCNT:
047176  016600  000002          MOV     2(SP),R0                ; LAST,*                        4294
047202  166600  000004          SUB     4(SP),R0                ; SECTOR,*
047206  005200                  INC     R0
047210  020027  000010          CMP     R0,#10                  ; TEMP,*                        4299
047214  103003                  BHIS    1$
047216  000300                  SWAB    R0                      ;                               4301
047220  105000                  CLRB    R0
047222  000207                  RTS     PC                      ;                               4299
047224  012700  004000  1$:     MOV     #4000,R0                ; *,WRDCNT                      4303
047230  000207                  RTS     PC                      ;                               4287

                        ; Routine Size:  14 words
                        ; Maximum stack depth per invocation:  0 words
```

```
:MLX4
:                COMMAND INTEGRITY ROUTINE                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
                                                                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (36)

:          4307  %sbttl 'COMMAND INTEGRITY ROUTINE'
:          4308  routine INTEGRITY : novalue =
:          4309      begin                                          !* 1 *  START OF ROUTINE
:          4310
:          4311  !++
:          4312  !   ROUTINE:      INTEGRITY
:          4313  !
:          4314  !   PURPOSE:      TO MAKE SURE THAT THE BASIC ML11 TRANSFER COMMANDS
:          4315  !                 WHICH WILL BE USED BY THE EXERCISER (WRITE,READ,
:          4316  !                 WRITE CHECK) WORK PROPERLY.
:          4317  !
:          4318  !   THE CODE FOR 'INTEGRITY' IN BRIEF:
:          4319  !
:          4320  !   BEGIN 1 (START OF ROUTINE)
:          4321  !   SAY ROUTINE IS RUNNING
:          4322  !   INCR COMPLEMENT FLAG FROM 0 TO 1
:          4323  !   : BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
:          4324  !   : GENERATE THE PATTERN
:          4325  !   : INCR LOGICAL UNIT NUMBER FROM 0 TO LAST
:          4326  !   : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
:          4327  !   : : TESTLOOP:
:          4328  !   : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
:          4329  !   : : : IF UNIT IS ACTIVE
:          4330  !   : : : THEN
:          4331  !   : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
:          4332  !   : : : : SECTOR = LOWEST
:          4333  !   : : : : GET WRDCNT
:          4334  !   : : : : WRITE
:          4335  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
:          4336  !   : : : : READ
:          4337  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
:          4338  !   : : : : WRITE CHECK
:          4339  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
:          4340  !   : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
:          4341  !   : : : END 4 (END OF LOOP THAT COMPLETELY TESTS 1 UNIT)
:          4342  !   : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
:          4343  !   : END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
:          4344  !   RETURN
:          4345  !   END 1 (END OF ROUTINE)
:          4346  !--
:          4347
:          4348      label
:          4349          LOOP;
:          4350
:          4351      local
:          4352          VALUE,
:          4353          WRDCNT,
:          4354          OLDSEC,
:          4355          OLDCHN,
:          4356          SECTOR,
:          4357          DBL_VALUE;
:          4358
```

SEQ 0171

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27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (36)

```
6563 ;MLX4
6564 ;                  COMMAND INTEGRITY ROUTINE
6565 ;
6566 ;          4359       PRINTB (SAY2, WRD34, RTNO);
6567 ;          4360       !'RUNNING COMMAND INTEGRITY ROUTINE'
6568 ;          4361
6569 ;          4362       incr COMP_FLAG from 0 to 1 do
6570 ;          4363           begin                                  !* 2 *  START OF COMPLEMENT FLAG SELECTION LOOP
6571 ;          4364           GEN3 (.COMP_FLAG);
6572 ;          4365
6573 ;          4366           incr LUN from 0 to (.L$UNIT - 1) do
6574 ;          4367               begin                              !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
6575 ;          4368       LOOP :
6576 ;          4369               begin                              !* 4 *  START OF LOOP THAT COMPLETELY TESTS 1 UNIT
6577 ;          4370
6578 ;          4371               if .DRIVE_STATUS [.LUN] eql ACTIVE
6579 ;          4372               then
6580 ;          4373                   begin                          !* 5 *  START OF TEST FOR AN ACTIVE UNIT
6581 ;          4374                   L$LUN = .LUN;
6582 ;          4375                   SECTOR = LOWEST;
6583 ;          4376                   WRDCNT = GET_WRDCNT (.SECTOR, HIGHEST);
6584 ;          4377                   VALUE = write (.LUN, .WRDCNT, WBUFF, LOWEST);
6585 ;          4378
6586 ;          4379                   !+
6587 ;          4380                   ! SEE HOW SUCCESSFUL THE WRITE WAS:
6588 ;          4381                   !-
6589 ;          4382
6590 ;          4383                   selectone .VALUE of            !SEE 'SYSERR' FOR DEFINITION
6591 ;          4384                       set                        !OF ERROR # CONTAINED IN 'VALUE'
6592 ;          4385
6593 ;          4386                       [1] :
6594 ;          4387                           begin                  !* 5A * RETRY ALLOWED
6595 ;          4388
6596 ;          4389                           if RETRY (SIX, write, .LUN, .WRDCNT, WBUFF, LOWEST) neq 0
6597 ;          4390                           then                   !THE RETRY FAILED -- SYSTEM FATAL ERROR
6598 ;          4391                               begin
6599 ;          4392                               WHY_DROPT [.LUN] = CODE_4;
6600 ;          4393                               ERRDF (1, MSG1, 0); !**** INTEGRITY ROUTINE ERROR 01 ****
6601 ;          4394                               DODU (.LUN);
6602 ;          4395                               leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
6603 ;          4396                               end;
6604 ;          4397
6605 ;          4398                           end;                   !* 5A *
6606 ;          4399
6607 ;          4400                       [2] :
6608 ;          4401                           begin                  !* 5B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
6609 ;          4402                           WHY_DROPT [.LUN] = CODE_5;
6610 ;          4403                           ERRDF (2, MSG1, 0);    !**** INTEGRITY ROUTINE ERROR 02 ****
6611 ;          4404                           DODU (.LUN);
6612 ;          4405                           leave LOOP;            !JUMP JUST BEYOND END OF BLOCK * 4 *
6613 ;          4406                           end;                   !* 5B *
6614 ;          4407
6615 ;          4408                       [3] :
6616 ;          4409                           begin                  !* 5C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
6617 ;          4410                           ERRDF (3, MSG1, 0);    !**** INTEGRITY ROUTINE ERROR 03 ****
```

```
6619 ;MLX4
6620 ;
6621
6622 ;          4411                        WHY_DROPT [.LUN] = CODE_6;
6623 ;          4412                        DODO (.LUN);
6624 ;          4413                        leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
6625 ;          4414                        end;                    !* 5C *
6626 ;          4415                    tes;
6627 ;          4416
6628 ;          4417                VALUE = read (.LUN, .WRDCNT, RBUFF, LOWEST);
6629 ;          4418
6630 ;          4419                !+
6631 ;          4420                !  SEE HOW SUCCESSFUL THE READ WAS:
6632 ;          4421                !-
6633 ;          4422
6634 ;          4423                selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
6635 ;          4424                    set                         !OF ERROR # CONTAINED IN 'VALUE'
6636 ;          4425
6637 ;          4426                    [0] :
6638 ;          4427
6639 ;          4428                        if (DBL_VALUE = DOUBLE_CHECK (WBUFF, RBUFF, .WRDCNT)) neq 0
6640 ;          4429                        then
6641 ;          4430                            begin
6642 ;          4431                            SAYWHO (.LUN);
6643 ;          4432                            PRINTB (SAY1, MSG5);
6644 ;          4433                            !'ECC LOGIC FAILED TO DETECT DATA ERROR'
6645 ;          4434                            PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
6646 ;          4435                            !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
6647 ;          4436                            DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
6648 ;          4437                            PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
6649 ;          4438                            !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
6650 ;          4439                            WHY_DROPT [.LUN] = CODE_8;
6651 ;          4440                            ERRDF (4, MSG1, 0); !**** INTEGRITY ROUTINE ERROR 04 ****
6652 ;          4441                            DODU (.LUN);
6653 ;          4442                            leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
6654 ;          4443                            end;
6655 ;          4444
6656 ;          4445                    [1] :
6657 ;          4446                        begin                   !* 5D * RETRY ALLOWED
6658 ;          4447
6659 ;          4448                        if RETRY (SIX, read, .LUN, .WRDCNT, RBUFF, LOWEST) neq 0
6660 ;          4449                        then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
6661 ;          4450                            begin
6662 ;          4451                            WHY_DROPT [.LUN] = CODE_4;
6663 ;          4452                            ERRDF (5, MSG1, 0); !**** INTEGRITY ROUTINE ERROR 05 ****
6664 ;          4453                            DODU (.LUN);
6665 ;          4454                            leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
6666 ;          4455                            end;
6667 ;          4456
6668 ;          4457                        end;                    !* 5D *
6669 ;          4458
6670 ;          4459                    [2] :
6671 ;          4460                        begin                   !* 5E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
6672 ;          4461                        WHY_DROPT [.LUN] = CODE_5;
6673 ;          4462                        ERRDF (6, MSG1, 0);     !**** INTEGRITY ROUTINE ERROR 06 ****
```

```
4463                        DODU (.LUN);
4464                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
4465                        end;                        !* 5E *
4466
4467                    [3] :
4468                        begin                       !* 5F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
4469                        ERRDF (7, MSG1, 0);         !**** INTEGRITY ROUTINE ERROR 07 ****
4470                        WHY_DROPT [.LUN] = CODE_6;
4471                        DODU (.LUN);
4472                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
4473                        end;                        !* 5F *
4474
4475                    [4] :
4476                        begin                       !* 5G * UNRECOVERABLE DATA ERROR
4477                        ISOLATE ();
4478                        ERRDF (8, MSG2, 0);         !**** INTEGRITY ROUTINE ERROR 08 ****
4479                        WHY_DROPT [.LUN] = CODE_7;
4480                        DODU (.LUN);
4481                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
4482                        end;                        !* 5G *
4483
4484                    [5] :
4485                        begin                       !* 5H * RECOVERABLE DATA ERROR
4486                        ISOLATE ();
4487
4488                        if .ERROUT then PRINTB (FMT10B, .CHAN);
4489
4490                        !'    BIT 00'
4491                        OLDSEC = .MLEL;
4492                        OLDCHN = .CHAN;
4493
4494                        if RETRY (ONE, read, .LUN, .WRDCNT, RBUFF, LOWEST) eql 5
4495                        then
4496
4497                            if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
4498                            then
4499                                begin
4500
4501                                if .ERROUT then ERRHRD (9, MSG4, 0);
4502
4503                                                    !**** INTEGRITY ROUTINE ERROR 09 ****
4504                                UP_HARD_COUNT (.LUN, .BOARD);
4505                                end
4506                            else
4507                                begin
4508
4509                                if .ERROUT then ERRSOFT (10, MSG3, 0);
4510
4511                                                    !**** INTEGRITY ROUTINE ERROR 10 ****
4512                                UP_SOFT_COUNT (.LUN, .BOARD);
4513                                end
4514
```

```
4515                                else
4516                                    begin
4517
4518                                    if .ERROUT then ERRSOFT (11, MSG3, 0);
4519
4520                                                        !**** INTEGRITY ROUTINE ERROR 11 ****
4521                                    UP_SOFT_COUNT (.LUN, .BOARD);
4522                                    end;
4523
4524                                end;                    !* 5H *
4525                            tes;
4526
4527                        VALUE = CHECK (.LUN, .WRDCNT, WBUFF, LOWEST);
4528
4529                        !+
4530                        ! SEE HOW SUCCESSFUL THE WRITE CHECK WAS:
4531                        !-
4532
4533                        selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
4534                            set                         !OF ERROR # CONTAINED IN 'VALUE'
4535
4536                            [1] :
4537                                begin                   !* 5I * RETRY ALLOWED
4538
4539                                if RETRY (SIX, CHECK, .LUN, .WRDCNT, WBUFF, LOWEST) neq 0
4540                                then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
4541                                    begin
4542                                    WHY_DROPT [.LUN] = CODE_4;
4543                                    ERRDF (12, MSG1, 0);        !**** INTEGRITY ROUTINE ERROR 12 ****
4544                                    DODU (.LUN);
4545                                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
4546                                    end;
4547
4548                                end;                    !* 5I *
4549
4550                            [2] :
4551                                begin                   !* 5J * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
4552                                WHY_DROPT [.LUN] = CODE_5;
4553                                ERRDF (13, MSG1, 0);    !**** INTEGRITY ROUTINE ERROR 13 ****
4554                                DODU (.LUN);
4555                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
4556                                end;                    !* 5J *
4557
4558                            [3] :
4559                                begin                   !* 5K * FATAL DRIVE ERROR -- NO RETRY ALLOWED
4560                                ERRDF (14, MSG1, 0);    !**** INTEGRITY ROUTINE ERROR 14 ****
4561                                WHY_DROPT [.LUN] = CODE_6;
4562                                DODU (.LUN);
4563                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
4564                                end;                    !* 5K *
4565
4566                            [4] :
```

```
;MLX4
;                    COMMAND INTEGRITY ROUTINE                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                 27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (36)

;          4567                         begin                    !* 5L * UNRECOVERABLE DATA ERROR
;          4568                         ISOLATE ();
;          4569                         ERRDF (15, MSG2, 0);     !**** INTEGRITY ROUTINE ERROR 15 ****
;          4570                         WHY_DROPT [.LUN] = CODE_7;
;          4571                         DODU (.LUN);
;          4572                         leave LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4573                         end;                     !* 5L *
;          4574
;          4575                     [5] :
;          4576                         begin                    !* 5M * RECOVERABLE DATA ERROR
;          4577                         ISOLATE ();
;          4578
;          4579                         if .ERROUT then PRINTB (FMT10B, .CHAN);
;          4580
;          4581                         !'    BIT 00'
;          4582                         OLDSEC = .MLEL;
;          4583                         OLDCHN = .CHAN;
;          4584
;          4585                         if RETRY (ONE, CHECK, .LUN, .WRDCNT, WBUFF, LOWEST) eql 5
;          4586                         then
;          4587
;          4588                             if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
;          4589                             then
;          4590                                 begin
;          4591
;          4592                                 if .ERROUT then ERRHRD (16, MSG4, 0);
;          4593
;          4594                                                      !**** INTEGRITY ROUTINE ERROR 16 ****
;          4595                                 UP_HARD_COUNT (.LUN, .BOARD);
;          4596                                 end
;          4597                             else
;          4598                                 begin
;          4599
;          4600                                 if .ERROUT then ERRSOFT (17, MSG3, 0);
;          4601
;          4602                                                      !**** INTEGRITY ROUTINE ERROR 17 ****
;          4603                                 UP_SOFT_COUNT (.LUN, .BOARD);
;          4604                                 end
;          4605
;          4606                         else
;          4607                             begin
;          4608
;          4609                             if .ERROUT then ERRSOFT (18, MSG3, 0);
;          4610
;          4611                                                      !**** INTEGRITY ROUTINE ERROR 18 ****
;          4612                             UP_SOFT_COUNT (.LUN, .BOARD);
;          4613                             end;
;          4614
;          4615                         end;                         !* 5M *
;          4616                 tes;
;          4617
;          4618             end;                                     !* 5 *  END OF TEST FOR AN ACTIVE DRIVE
```

```
;MLX4
;                    COMMAND INTEGRITY ROUTINE                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                 27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (36)

;          4619
;          4620              end;                                 !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
;          4621              end;                                 !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
;          4622
;          4623          end;                                     !* 2 *  END OF COMPLEMENT FLAG SELECTION LOOP
;          4624
;          4625      return;
;          4626      end;                                         !* 1 *  END OF ROUTINE

                                    .SBTTL  INTEGRITY COMMAND INTEGRITY ROUTINE
047232                          INTEGRITY:
047232  004167  136076                 JSR     R1,$SAVE5                       ;                       4308
047236  162706  000012                 SUB     #12,SP
047242  012746  007574                 MOV     #RTN0,-(SP)                     ;                       4359
047246  012746  007344                 MOV     #WRD34,-(SP)
047252  012746  007100                 MOV     #SAY2,-(SP)
047256  012746  000003                 MOV     #3,-(SP)
047262  010600                         MOV     SP,R0                           ; SP,*
047264  104414                         TRAP    14
047266  005001                         CLR     R1                              ; COMP.FLAG             4362
047270  010146                 1$:     MOV     R1,-(SP)                        ; COMP.FLAG,*           4364
047272  004767  172170                 JSR     PC,GEN3
047276  016766  132510  000020         MOV     L$UNIT,20(SP)                   ;                       4366
047304  005004                         CLR     R4                              ; LUN
047306  000167  002110                 JMP     38$
047312  010400                 2$:     MOV     R4,R0                           ; LUN,*                 4371
047314  006200                         ASR     R0
047316  006200                         ASR     R0
047320  006200                         ASR     R0
047322  062700  034442                 ADD     #DRIVE.STATUS,R0
047326  010046                         MOV     R0,-(SP)
047330  010446                         MOV     R4,-(SP)                        ; LUN,*
047332  042716  177770                 BIC     #177770,(SP)
047336  012746  000001                 MOV     #1,-(SP)
047342  005046                         CLR     -(SP)
047344  004767  135006                 JSR     PC,BL$GT2
047350  062706  000010                 ADD     #10,SP
047354  005300                         DEC     R0
047356  001117                         BNE     6$
047360  010467  132510                 MOV     R4,L$LUN                        ; LUN,*                 4374
047364  010400                         MOV     R4,R0                           ; LUN,*                 4375
047366  006300                         ASL     R0
047370  012702  034460                 MOV     #LOW.SECT,R2
047374  060002                         ADD     R0,R2
047376  011266  000022                 MOV     (R2),22(SP)                     ; *,SECTOR
047402  016646  000022                 MOV     22(SP),-(SP)                    ; SECTOR,*              4376
```

SEQ 0177

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                                ;MLX4
                                ;                       COMMAND INTEGRITY ROUTINE                       27-Mar-1982 19:24:42    TOPS
                                ;                                                                       27-Mar-1982 19:23:44    PA:<
 047406  016046  034500                 MOV     TOP.SECT(R0),-(SP)
 047412  004767  177560                 JSR     PC,GET.WRDCNT
 047416  010003                         MOV     R0,R3                           ; *,WRDCNT
 047420  010416                         MOV     R4,(SP)                         ; LUN,*                                 4377
 047422  010346                         MOV     R3,-(SP)                        ; WRDCNT,*
 047424  012746  012670                 MOV     #WBUFF,-(SP)
 047430  011246                         MOV     (R2),-(SP)
 047432  004767  175766                 JSR     PC,WRITE
 047436  010005                         MOV     R0,R5                           ; *,VALUE
 047440  020527  000001                 CMP     R5,#1                           ; VALUE,*                               4383
 047444  001031                         BNE     3$
 047446  012746  000006                 MOV     #6,-(SP)                        ;                                       4389
 047452  012746  045424                 MOV     #WRITE,-(SP)
 047456  010446                         MOV     R4,-(SP)                        ; LUN,*
 047460  010346                         MOV     R3,-(SP)                        ; WRDCNT,*
 047462  012746  012670                 MOV     #WBUFF,-(SP)
 047466  011246                         MOV     (R2),-(SP)
 047470  004767  176530                 JSR     PC,RETRY
 047474  062706  000014                 ADD     #14,SP
 047500  005700                         TST     R0
 047502  001446                         BEQ     7$
 047504  112764  000004  034446         MOVB    #4,WHY.DROPT(R4)                ; *,*(LUN)                              4392
 047512  104455                         TRAP    55                              ;                                       4393
 047514  000001                         .WORD   1
 047516  011070                         .WORD   MSG1
 047520  000000                         .WORD   0
 047522  010400                         MOV     R4,R0                           ; LUN,*                                 4394
 047524  104451                         TRAP    51
 047526  000431                         BR      5$                              ;                                       4395
 047530  020527  000002         3$:     CMP     R5,#2                           ; VALUE,*                               4383
 047534  001012                         BNE     4$
 047536  112764  000005  034446         MOVB    #5,WHY.DROPT(R4)                ; *,*(LUN)                              4402
 047544  104455                         TRAP    55                              ;                                       4403
 047546  000002                         .WORD   2
 047550  011070                         .WORD   MSG1
 047552  000000                         .WORD   0
 047554  010400                         MOV     R4,R0                           ; LUN,*                                 4404
 047556  104451                         TRAP    51
 047560  000414                         BR      5$                              ;                                       4405
 047562  020527  000003         4$:     CMP     R5,#3                           ; VALUE,*                               4383
 047566  001014                         BNE     7$
 047570  104455                         TRAP    55                              ;                                       4410
 047572  000003                         .WORD   3
 047574  011070                         .WORD   MSG1
 047576  000000                         .WORD   0
 047600  112764  000006  034446         MOVB    #6,WHY.DROPT(R4)                ; *,*(LUN)                              4411
 047606  010400                         MOV     R4,R0                           ; LUN,*                                 4412
 047610  104451                         TRAP    51
 047612  062706  000012         5$:     ADD     #12,SP                          ;                                       4413
 047616  000502                 6$:     BR      8$
 047620  010416                 7$:     MOV     R4,(SP)                         ; LUN,*                                 4417
 047622  010346                         MOV     R3,-(SP)                        ; WRDCNT,*
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                        ;MLX4
                        ;               COMMAND INTEGRITY ROUTINE                    27-Mar-1982 19:24:42    TOPS
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6958 047624 012746 022670               MOV     #RBUFF,-(SP)
6959 047630 011246                      MOV     (R2),-(SP)
6960 047632 004767 175754               JSR     PC,READ
6961 047636 010005                      MOV     R0,R5                       ; *,VALUE
6962 047640 001072                      BNE     9$                          ;                                    4423
6963 047642 012746 012670               MOV     #WBUFF,-(SP)                ;                                    4428
6964 047646 012746 022670               MOV     #RBUFF,-(SP)
6965 047652 010346                      MOV     R3,-(SP)                    ; WRDCNT,*
6966 047654 004767 174446               JSR     PC,DOUBLE.CHECK
6967 047660 062706 000006               ADD     #6,SP
6968 047664 010066 000032               MOV     R0,32(SP)                   ; *,DBL.VALUE
6969 047670 001477                      BEQ     10$
6970 047672 010446                      MOV     R4,-(SP)                    ; LUN,*                              4431
6971 047674 004767 165624               JSR     PC,SAYWHO
6972 047700 012716 011216               MOV     #MSG5,(SP)                  ;                                    4432
6973 047704 012746 007072               MOV     #SAY1,-(SP)
6974 047710 012746 000002               MOV     #2,-(SP)
6975 047714 010600                      MOV     SP,R0                       ; SP,*
6976 047716 104414                      TRAP    14
6977 047720 016616 000040               MOV     40(SP),(SP)                 ; DBL.VALUE,*                        4434
6978 047724 017646 000040               MOV     @40(SP),-(SP)               ; DBL.VALUE,*
6979 047730 012746 006710               MOV     #FMT12A,-(SP)
6980 047734 012746 000003               MOV     #3,-(SP)
6981 047740 010600                      MOV     SP,R0                       ; SP,*
6982 047742 104414                      TRAP    14
6983 047744 062766 010000 000046        ADD     #10000,46(SP)               ; *,DBL.VALUE                        4436
6984 047752 016616 000046               MOV     46(SP),(SP)                 ; DBL.VALUE,*                        4437
6985 047756 017646 000046               MOV     @46(SP),-(SP)               ; DBL.VALUE,*
6986 047762 012746 006756               MOV     #FMT12B,-(SP)
6987 047766 012746 000003               MOV     #3,-(SP)
6988 047772 010600                      MOV     SP,R0                       ; SP,*
6989 047774 104414                      TRAP    14
6990 047776 112764 000010 034446        MOVB    #10,WHY.DROPT(R4)           ; *,*(LUN)                           4439
6991 050004 104455                      TRAP    55                          ;                                    4440
6992 050006 000004                      .WORD   4
6993 050010 011070                      .WORD   MSG1
6994 050012 000000                      .WORD   0
6995 050014 010400                      MOV     R4,R0                       ; LUN,*                              4441
6996 050016 104451                      TRAP    51
6997 050020 062706 000042               ADD     #42,SP                      ;                                    4442
6998 050024 000510              8$:     BR      16$
6999 050026 020527 000001       9$:     CMP     R5,#1                       ; VALUE,*                            4423
7000 050032 001033                      BNE     12$
7001 050034 012746 000006               MOV     #6,-(SP)                    ;                                    4448
7002 050040 012746 045612               MOV     #READ,-(SP)
7003 050044 010446                      MOV     R4,-(SP)                    ; LUN,*
7004 050046 010346                      MOV     R3,-(SP)                    ; WRDCNT,*
7005 050050 012746 022670               MOV     #RBUFF,-(SP)
7006 050054 011246                      MOV     (R2),-(SP)
7007 050056 004767 176142               JSR     PC,RETRY
7008 050062 062706 000014               ADD     #14,SP
7009 050066 005700                      TST     R0
```

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                                                                                                                    27-Mar-1982 19:24:42    TOPS
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 7011                                                ;MLX4
 7012                                                ;               COMMAND INTEGRITY ROUTINE
 7013
 7014 050070  001002                        10$:     BNE     11$
 7015 050072  000167  000520                         JMP     24$
 7016 050076  112764  000004  034446       11$:     MOVB    #4,WHY.DROPT(R4)        ; *,*(LUN)                      4451
 7017 050104  104455                                 TRAP    55                      ;                               4452
 7018 050106  000005                                 .WORD   5
 7019 050110  011070                                 .WORD   MSG1
 7020 050112  000000                                 .WORD   0
 7021 050114  010400                                 MOV     R4,R0                   ; LUN,*                         4453
 7022 050116  104451                                 TRAP    51
 7023 050120  000450                                 BR      15$                     ;                               4454
 7024 050122  020527  000002                 12$:    CMP     R5,#2                   ; VALUE,*                       4423
 7025 050126  001012                                 BNE     13$
 7026 050130  112764  000005  034446                MOVB    #5,WHY.DROPT(R4)        ; *,*(LUN)                      4461
 7027 050136  104455                                 TRAP    55                      ;                               4462
 7028 050140  000006                                 .WORD   6
 7029 050142  011070                                 .WORD   MSG1
 7030 050144  000000                                 .WORD   0
 7031 050146  010400                                 MOV     R4,R0                   ; LUN,*                         4463
 7032 050150  104451                                 TRAP    51
 7033 050152  000433                                 BR      15$                     ;                               4464
 7034 050154  020527  000003                 13$:    CMP     R5,#3                   ; VALUE,*                       4423
 7035 050160  001012                                 BNE     14$
 7036 050162  104455                                 TRAP    55                      ;                               4469
 7037 050164  000007                                 .WORD   7
 7038 050166  011070                                 .WORD   MSG1
 7039 050170  000000                                 .WORD   0
 7040 050172  112764  000006  034446                MOVB    #6,WHY.DROPT(R4)        ; *,*(LUN)                      4470
 7041 050200  010400                                 MOV     R4,R0                   ; LUN,*                         4471
 7042 050202  104451                                 TRAP    51
 7043 050204  000416                                 BR      15$                     ;                               4472
 7044 050206  020527  000004                 14$:    CMP     R5,#4                   ; VALUE,*                       4423
 7045 050212  001017                                 BNE     17$
 7046 050214  004767  167112                         JSR     PC,ISOLATE              ;                               4477
 7047 050220  104455                                 TRAP    55                      ;                               4478
 7048 050222  000010                                 .WORD   10
 7049 050224  011120                                 .WORD   MSG2
 7050 050226  000000                                 .WORD   0
 7051 050230  112764  000007  034446                MOVB    #7,WHY.DROPT(R4)        ; *,*(LUN)                      4479
 7052 050236  010400                                 MOV     R4,R0                   ; LUN,*                         4480
 7053 050240  104451                                 TRAP    51
 7054 050242  062706  000020                 15$:    ADD     #20,SP                  ;                               4481
 7055 050246  000167  001146                 16$:    JMP     37$
 7056 050252  020527  000005                 17$:    CMP     R5,#5                   ; VALUE,*                       4423
 7057 050256  001157                                 BNE     24$
 7058 050260  004767  167046                         JSR     PC,ISOLATE              ;                               4486
 7059 050264  032767  000001  131766                BIT     #1,ERROUT               ;                               4488
 7060 050272  001423                                 BEQ     18$
 7061 050274  017700  164110                         MOV     @ML.REG+42,R0
 7062 050300  006200                                 ASR     R0
 7063 050302  006200                                 ASR     R0
 7064 050304  006200                                 ASR     R0
 7065 050306  006200                                 ASR     R0
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                        ;MLX4                                                                    27-Mar-1982 19:24:42    TOPS
                        ;       COMMAND INTEGRITY ROUTINE                                        27-Mar-1982 19:23:44    PA:<
7070 050310 006200              ASR     R0
7071 050312 006200              ASR     R0
7072 050314 042700 177700       BIC     #177700,R0
7073 050320 010046              MOV     R0,-(SP)
7074 050322 012746 006640       MOV     #FMT10B,-(SP)
7075 050326 012746 000002       MOV     #2,-(SP)
7076 050332 010600              MOV     SP,R0                   ; SP,*
7077 050334 104414              TRAP    14
7078 050336 062706 000006       ADD     #6,SP
7079 050342 017766 164044 000036 18$:   MOV     @ML.REG+44,36(SP)       ; *,OLDSEC                      4491
7080 050350 017700 164034               MOV     @ML.REG+42,R0           ;                               4492
7081 050354 006200              ASR     R0
7082 050356 006200              ASR     R0
7083 050360 006200              ASR     R0
7084 050362 006200              ASR     R0
7085 050364 006200              ASR     R0
7086 050366 006200              ASR     R0
7087 050370 042700 177700       BIC     #177700,R0
7088 050374 010066 000034       MOV     R0,34(SP)               ; *,OLDCHN
7089 050400 012746 000001       MOV     #1,-(SP)                ;                               4494
7090 050404 012746 045612       MOV     #READ,-(SP)
7091 050410 010446              MOV     R4,-(SP)                ; LUN,*
7092 050412 010346              MOV     R3,-(SP)                ; WRDCNT,*
7093 050414 012746 022670       MOV     #RBUFF,-(SP)
7094 050420 011246              MOV     (R2),-(SP)
7095 050422 004767 175576       JSR     PC,RETRY
7096 050426 062706 000014       ADD     #14,SP
7097 050432 020027 000005       CMP     R0,#5
7098 050436 001051              BNE     21$
7099 050440 027766 163746 000036        CMP     @ML.REG+44,36(SP)       ; *,OLDSEC                      4497
7100 050446 001034              BNE     20$
7101 050450 016646 000034       MOV     34(SP),-(SP)            ; OLDCHN,*
7102 050454 017700 163730               MOV     @ML.REG+42,R0
7103 050460 006200              ASR     R0
7104 050462 006200              ASR     R0
7105 050464 006200              ASR     R0
7106 050466 006200              ASR     R0
7107 050470 006200              ASR     R0
7108 050472 006200              ASR     R0
7109 050474 042700 177700       BIC     #177700,R0
7110 050500 020026              CMP     R0,(SP)+
7111 050502 001016              BNE     20$
7112 050504 032767 000001 131546        BIT     #1,ERROUT               :                               4501
7113 050512 001404              BEQ     19$
7114 050514 104456              TRAP    56
7115 050516 000011              .WORD   11
7116 050520 011202              .WORD   MSG4
7117 050522 000000              .WORD   0
7118 050524 010446      19$:    MOV     R4,-(SP)                ; LUN,*                         4504
7119 050526 016746 163610               MOV     BOARD,-(SP)
7120 050532 004767 166664               JSR     PC,UP.HARD.COUNT
7121 050536 000426              BR      23$                     :                               4497
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                                        ;MLX4
                                        ;               COMMAND INTEGRITY ROUTINE                    27-Mar-1982 19:24:42   TOPS
                                                                                                     27-Mar-1982 19:23:44   PA:<
 7126 050540 032767 000001 131512 20$:  BIT     #1,ERROUT                       ;                                            4509
 7127 050546 001415                     BEQ     22$
 7128 050550 104457                     TRAP    57
 7129 050552 000012                     .WORD   12
 7130 050554 011166                     .WORD   MSG3
 7131 050556 000000                     .WORD   0
 7132 050560 000410                     BR      22$                             ;                                            4512
 7133 050562 032767 000001 131470 21$:  BIT     #1,ERROUT                       ;                                            4518
 7134 050570 001404                     BEQ     22$
 7135 050572 104457                     TRAP    57
 7136 050574 000013                     .WORD   13
 7137 050576 011166                     .WORD   MSG3
 7138 050600 000000                     .WORD   0
 7139 050602 010446                 22$:MOV     R4,-(SP)                        ; LUN,*                                      4521
 7140 050604 016746 163532              MOV     BOARD,-(SP)
 7141 050610 004767 167270              JSR     PC,UP.SOFT.COUNT
 7142 050614 022626                 23$:CMP     (SP)+,(SP)+                     ;                                            4485
 7143 050616 010416                 24$:MOV     R4,(SP)                         ; LUN,*                                      4527
 7144 050620 010346                     MOV     R3,-(SP)                        ; WRDCNT,*
 7145 050622 012746 012670              MOV     #WBUFF,-(SP)
 7146 050626 011246                     MOV     (R2),-(SP)
 7147 050630 004767 175144              JSR     PC,CHECK
 7148 050634 010005                     MOV     R0,R5                           ; *,VALUE
 7149 050636 020527 000001              CMP     R5,#1                           ; VALUE,*                                    4533
 7150 050642 001031                     BNE     25$
 7151 050644 012746 000006              MOV     #6,-(SP)                        ;                                            4539
 7152 050650 012746 046000              MOV     #CHECK,-(SP)
 7153 050654 010446                     MOV     R4,-(SP)                        ; LUN,*
 7154 050656 010346                     MOV     R3,-(SP)                        ; WRDCNT,*
 7155 050660 012746 012670              MOV     #WBUFF,-(SP)
 7156 050664 011246                     MOV     (R2),-(SP)
 7157 050666 004767 175332              JSR     PC,RETRY
 7158 050672 062706 000014              ADD     #14,SP
 7159 050676 005700                     TST     R0
 7160 050700 001462                     BEQ     28$
 7161 050702 112764 000004 034446       MOVB    #4,WHY.DROPT(R4)                ; *,*(LUN)                                   4542
 7162 050710 104455                     TRAP    55                              ;                                            4543
 7163 050712 000014                     .WORD   14
 7164 050714 011070                     .WORD   MSG1
 7165 050716 000000                     .WORD   0
 7166 050720 010400                     MOV     R4,R0                           ; LUN,*                                      4544
 7167 050722 104451                     TRAP    51
 7168 050724 000450                     BR      28$                             ;                                            4545
 7169 050726 020527 000002          25$:CMP     R5,#2                           ; VALUE,*                                    4533
 7170 050732 001012                     BNE     26$
 7171 050734 112764 000005 034446       MOVB    #5,WHY.DROPT(R4)                ; *,*(LUN)                                   4552
 7172 050742 104455                     TRAP    55                              ;                                            4553
 7173 050744 000015                     .WORD   15
 7174 050746 011070                     .WORD   MSG1
 7175 050750 000000                     .WORD   0
 7176 050752 010400                     MOV     R4,R0                           ; LUN,*                                      4554
 7177 050754 104451                     TRAP    51
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                                        ;MLX4
                                        ;                COMMAND INTEGRITY ROUTINE                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                    27-Mar-1982 19:23:44    PA:<
                                                 BR      28$                                                                                4555
                                        26$:     CMP     R5,#3           ; VALUE,*                                                          4533
                                                 BNE     27$
                                                 TRAP    55              ;                                                                  4560
                                                 .WORD   16
                                                 .WORD   MSG1
                                                 .WORD   0
                                                 MOVB    #6,WHY.DROPT(R4) ; *,*(LUN)                                                        4561
                                                 MOV     R4,R0           ; LUN,*                                                            4562
                                                 TRAP    51
                                                 BR      28$             ;                                                                  4563
                                        27$:     CMP     R5,#4           ; VALUE,*                                                          4533
                                                 BNE     29$
                                                 JSR     PC,ISOLATE      ;                                                                  4568
                                                 TRAP    55              ;                                                                  4569
                                                 .WORD   17
                                                 .WORD   MSG2
                                                 .WORD   0
                                                 MOVB    #7,WHY.DROPT(R4) ; *,*(LUN)                                                        4570
                                                 MOV     R4,R0           ; LUN,*                                                            4571
                                                 TRAP    51
                                        28$:     BR      36$             ;                                                                  4572
                                        29$:     CMP     R5,#5           ; VALUE,*                                                          4533
                                                 BNE     36$
                                                 JSR     PC,ISOLATE      ;                                                                  4577
                                                 BIT     #1,ERROUT       ;                                                                  4579
                                                 BEQ     30$
                                                 MOV     @ML.REG+42,R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 BIC     #177700,R0
                                                 MOV     R0,-(SP)
                                                 MOV     #FMT10B,-(SP)
                                                 MOV     #2,-(SP)
                                                 MOV     SP,R0           ; SP,*
                                                 TRAP    14
                                                 ADD     #6,SP
                                        30$:     MOV     @ML.REG+44,44(SP) ; *,OLDSEC                                                       4582
                                                 MOV     @ML.REG+42,R0   ;                                                                  4583
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 ASR     R0
                                                 BIC     #177700,R0
                                                 MOV     R0,42(SP)       ; *,OLDCHN
                                                 MOV     #1,-(SP)        ;                                                                  4585
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                                        ;MLX4
                                        ;               COMMAND INTEGRITY ROUTINE                    27-Mar-1982 19:24:42    TOPS
                                                                                                     27-Mar-1982 19:23:44    PA:<
 7238 051202  012746  046000                    MOV     #CHECK,-(SP)
 7239 051206  010446                            MOV     R4,-(SP)                ; LUN,*
 7240 051210  010346                            MOV     R3,-(SP)                ; WRDCNT,*
 7241 051212  012746  012670                    MOV     #WBUFF,-(SP)
 7242 051216  011246                            MOV     (R2),-(SP)
 7243 051220  004767  175000                    JSR     PC,RETRY
 7244 051224  062706  000014                    ADD     #14,SP
 7245 051230  020027  000005                    CMP     R0,#5
 7246 051234  001051                            BNE     33$
 7247 051236  027766  163150  000044           CMP     @ML.REG+44,44(SP)       ; *,OLDSEC                                  4588
 7248 051244  001034                            BNE     32$
 7249 051246  016600  000042                    MOV     42(SP),R0               ; OLDCHN,*
 7250 051252  017702  163132                    MOV     @ML.REG+42,R2
 7251 051256  006202                            ASR     R2
 7252 051260  006202                            ASR     R2
 7253 051262  006202                            ASR     R2
 7254 051264  006202                            ASR     R2
 7255 051266  006202                            ASR     R2
 7256 051270  006202                            ASR     R2
 7257 051272  042702  177700                    BIC     #177700,R2
 7258 051276  020200                            CMP     R2,R0
 7259 051300  001016                            BNE     32$
 7260 051302  032767  000001  130750           BIT     #1,ERROUT               ;                                           4592
 7261 051310  001404                            BEQ     31$
 7262 051312  104456                            TRAP    56
 7263 051314  000020                            .WORD   20
 7264 051316  011202                            .WORD   MSG4
 7265 051320  000000                            .WORD   0
 7266 051322  010446                    31$:    MOV     R4,-(SP)                ; LUN,*                                     4595
 7267 051324  016746  163012                    MOV     BOARD,-(SP)
 7268 051330  004767  166066                    JSR     PC,UP.HARD.COUNT
 7269 051334  000426                            BR      35$
 7270 051336  032767  000001  130714   32$:    BIT     #1,ERROUT               ;                                           4588
 7271 051344  001415                            BEQ     34$                     ;                                           4600
 7272 051346  104457                            TRAP    57
 7273 051350  000021                            .WORD   21
 7274 051352  011166                            .WORD   MSG3
 7275 051354  000000                            .WORD   0
 7276 051356  000410                            BR      34$
 7277 051360  032767  000001  130672   33$:    BIT     #1,ERROUT               ;                                           4603
 7278 051366  001404                            BEQ     34$                     ;                                           4609
 7279 051370  104457                            TRAP    57
 7280 051372  000022                            .WORD   22
 7281 051374  011166                            .WORD   MSG3
 7282 051376  000000                            .WORD   0
 7283 051400  010446                    34$:    MOV     R4,-(SP)                ; LUN,*                                     4612
 7284 051402  016746  162734                    MOV     BOARD,-(SP)
 7285 051406  004767  166472                    JSR     PC,UP.SOFT.COUNT
 7286 051412  022626                    35$:    CMP     (SP)+,(SP)+             ;                                           4576
 7287 051414  062706  000026            36$:    ADD     #26,SP                  ;                                           4373
 7288 051420  005204                    37$:    INC     R4                      ; LUN                                       4366
 7289 051422  020466  000020            38$:    CMP     R4,20(SP)               ; LUN,*
```

SEQ 0184

```
                                        ;MLX4
                                        ;               COMMAND INTEGRITY ROUTINE                    27-Mar-1982 19:24:42    TOPS
                                                                                                     27-Mar-1982 19:23:44    PA:<
                                                BGE     39$
                                                JMP     2$
                                        39$:    TST     (SP)+                   ;
                                                INC     R1                      ; COMP.FLAG                                 4363
                                                CMP     R1,#1                   ; COMP.FLAG,*                               4362
                                                BGT     40$
                                                JMP     1$
                                        40$:    ADD     #22,SP                  ;                                           4308
                                                RTS     PC

                                        ; Routine Size:  587 words
                                        ; Maximum stack depth per invocation:  33 words
```

```
7313 ;MLX4
7314 ;                  DEFINITION OF OPTION 1                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
7315 ;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (37)
7316 ;          4627  %sbttl 'DEFINITION OF OPTION 1'
7317 ;          4628  routine OPT1 : novalue =
7318 ;          4629      begin                                         !* 1 *  START OF ROUTINE
7319 ;          4630
7320 ;          4631  !++
7321 ;          4632  !   ROUTINE:     OPT1
7322 ;          4633  !
7323 ;          4634  !   PURPOSE:     TO CHECK ADDRESSES USING DATA = SECTOR NUMBER.
7324 ;          4635  !                TRANSFERS ARE 4K WORDS IN LENGTH, AND ALL SECTORS
7325 ;          4636  !                ARE TESTED.
7326 ;          4637  !
7327 ;          4638  !   THE CODE FOR 'OPT1' IN BRIEF:
7328 ;          4639  !
7329 ;          4640  !   BEGIN 1 (START OF ROUTINE)
7330 ;          4641  !   SAY ROUTINE IS RUNNING
7331 ;          4642  !   INCR COMPLEMENT FLAG FROM 0 TO 1
7332 ;          4643  !   : BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
7333 ;          4644  !   : INCR LOGICAL UNIT FROM 0 TO LAST
7334 ;          4645  !   : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
7335 ;          4646  !   : : TESTLOOP:
7336 ;          4647  !   : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS ONE UNIT)
7337 ;          4648  !   : : : IF UNIT IS ACTIVE
7338 ;          4649  !   : : : THEN
7339 ;          4650  !   : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
7340 ;          4651  !   : : : : INITIALIZE WRITE AND READ BUFFER POINTERS
7341 ;          4652  !   : : : : SECTOR = LOWEST
7342 ;          4653  !   : : : : WHILE SECTOR LEQ HIGHEST DO
7343 ;          4654  !   : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
7344 ;          4655  !   : : : : : GET WRDCNT
7345 ;          4656  !   : : : : : GENERATE THE PATTERN
7346 ;          4657  !   : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
7347 ;          4658  !   : : : : : WRITE
7348 ;          4659  !   : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
7349 ;          4660  !   : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
7350 ;          4661  !   : : : : : DO THE WRITE CHECK OR READ
7351 ;          4662  !   : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
7352 ;          4663  !   : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
7353 ;          4664  !   : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
7354 ;          4665  !   : : : : : END 6 (END OF SECTOR SELECTION LOOP)
7355 ;          4666  !   : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
7356 ;          4667  !   : : : END 4 (END OF TESTLOOP)
7357 ;          4668  !   : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
7358 ;          4669  !   : END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
7359 ;          4670  !   RETURN
7360 ;          4671  !   END 1 (END OF ROUTINE)
7361 ;          4672  !--
7362 ;          4673
7363 ;          4674      label
7364 ;          4675          LOOP;
7365 ;          4676
7366 ;          4677      local
7367 ;          4678          VALUE,
```

```
7369 ;MLX4
7370 ;                  DEFINITION OF OPTION 1
7371
7372 ;          4679           WRDCNT,
7373 ;          4680           COMMAND,
7374 ;          4681           PTR,
7375 ;          4682           OLDSEC,
7376 ;          4683           OLDCHN,
7377 ;          4684           SECTOR,
7378 ;          4685           DBL_VALUE;
7379 ;          4686
7380 ;          4687       PRINTB (SAY2, WRD34, RTN1);
7381 ;          4688       !'RUNNING OPT1'
7382 ;          4689
7383 ;          4690       incr COMP_FLAG from 0 to 1 do
7384 ;          4691           begin                                  !* 2 *  START OF COMPLEMENT FLAG SELECTION LOOP
7385 ;          4692
7386 ;          4693           incr LUN from 0 to (.L$UNIT - 1) do
7387 ;          4694               begin                              !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
7388 ;          4695   LOOP :
7389 ;          4696               begin                              !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS ONE UNIT
7390 ;          4697
7391 ;          4698               if .DRIVE_STATUS [.LUN] eql ACTIVE
7392 ;          4699               then
7393 ;          4700                   begin                          !* 5 *  START OF TEST FOR AN ACTIVE UNIT
7394 ;          4701                   L$LUN = .LUN;
7395 ;          4702                   WPTR = WBUFF;
7396 ;          4703                   RPTR = RBUFF;
7397 ;          4704                   SECTOR = LOWEST;
7398 ;          4705
7399 ;          4706                   while .SECTOR lequ HIGHEST do
7400 ;          4707                       begin                      !* 6 *  START OF SECTOR SELECTION LOOP
7401 ;          4708                       GEN1 (.SECTOR, .COMP_FLAG);
7402 ;          4709                       WRDCNT = GET_WRDCNT (.SECTOR, HIGHEST);
7403 ;          4710                       SET_PTRS (.WRDCNT);
7404 ;          4711                       VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);
7405 ;          4712
7406 ;          4713                       !+
7407 ;          4714                       ! SEE HOW SUCCESSFUL THE WRITE WAS:
7408 ;          4715                       !-
7409 ;          4716
7410 ;          4717                       selectone .VALUE of        !SEE 'SYSERR' FOR DEFINITION
7411 ;          4718                           set                    !OF ERROR # CONTAINED IN 'VALUE'
7412 ;          4719
7413 ;          4720                           [1] :
7414 ;          4721                               begin              !* 6A * RETRY ALLOWED
7415 ;          4722
7416 ;          4723                               if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
7417 ;          4724                               then               !THE RETRY FAILED -- SYSTEM FATAL ERROR
7418 ;          4725                                   begin
7419 ;          4726                                   WHY_DROPT [.LUN] = CODE_4;
7420 ;          4727                                   ERRDF (101, MSG1, 0);   !**** OPTION 1 ERROR 01 ****
7421 ;          4728                                   DODU (.LUN);
7422 ;          4729                                   leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
7423 ;          4730                                   end;
```

```
7425 ;MLX4
7426 ;                  DEFINITION OF OPTION 1
7427 ;
7428 ;          4731
7429 ;          4732                                    end;                    !* 6A *
7430 ;          4733
7431 ;          4734                                [2] :
7432 ;          4735                                    begin                   !* 6B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
7433 ;          4736                                    WHY_DROPT [.LUN] = CODE_5;
7434 ;          4737                                    ERRDF (102, MSG1, 0);       !**** OPTION 1 ERROR 02 ****
7435 ;          4738                                    DODU (.LUN);
7436 ;          4739                                    leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
7437 ;          4740                                    end;                    !* 6B *
7438 ;          4741
7439 ;          4742                                [3] :
7440 ;          4743                                    begin                   !* 6C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
7441 ;          4744                                    ERRDF (103, MSG1, 0);       !**** OPTION 1 ERROR 03 ****
7442 ;          4745                                    WHY_DROPT [.LUN] = CODE_6;
7443 ;          4746                                    DODU (.LUN);
7444 ;          4747                                    leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
7445 ;          4748                                    end;                    !* 6C *
7446 ;          4749                                tes;
7447 ;          4750
7448 ;          4751                            COMMAND = CHOOSE ();
7449 ;          4752
7450 ;          4753                            if .COMMAND eql read
7451 ;          4754                            then
7452 ;          4755                                begin
7453 ;          4756                                PTR = .RPTR;
7454 ;          4757                                VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
7455 ;          4758                                end
7456 ;          4759                            else
7457 ;          4760                                begin
7458 ;          4761                                PTR = .WPTR;
7459 ;          4762                                VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
7460 ;          4763                                end;
7461 ;          4764
7462 ;          4765                            !+
7463 ;          4766                            !  SEE HOW SUCCESSFUL THE OPERATION WAS:
7464 ;          4767                            !-
7465 ;          4768
7466 ;          4769                            selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
7467 ;          4770                                set                         !OF ERROR # CONTAINED IN 'VALUE'
7468 ;          4771
7469 ;          4772                                [0] :
7470 ;          4773
7471 ;          4774                                    if .COMMAND eql read
7472 ;          4775                                    then
7473 ;          4776                                        begin
7474 ;          4777
7475 ;          4778                                        if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
7476 ;          4779                                        then
7477 ;          4780                                            begin
7478 ;          4781                                            SAYWHO (.LUN);
7479 ;          4782                                            PRINTB (SAY1, MSG5);        !'ECC LOGIC FAILED TO DETECT DATA ERROR'
```

```
;MLX4
;                DEFINITION OF OPTION 1                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                          27-Mar-1982 19:23:44    PS:<NEALE>MLX4.BLI.5 (37)
;
;          4783                                    PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
;          4784                                            !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
;          4785                                    DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
;          4786                                    PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
;          4787                                            !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
;          4788                                    WHY_DROPT [.LUN] = CODE_8;
;          4789                                    ERRDF (104, MSG1, 0);       !**** OPTION 1 ERROR 04 ****
;          4790                                    DODU (.LUN);
;          4791                                    leave LOOP; !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4792                                    end;
;          4793
;          4794                                end;
;          4795
;          4796                            [1] :
;          4797                                begin                   !* 6D * RETRY ALLOWED
;          4798
;          4799                                if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
;          4800                                then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
;          4801                                    begin
;          4802                                    WHY_DROPT [.LUN] = CODE_4;
;          4803                                    ERRDF (105, MSG1, 0);   !**** OPTION 1 ERROR 05 ****
;          4804                                    DODU (.LUN);
;          4805                                    leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4806                                    end;
;          4807
;          4808                                end;                    !* 6D *
;          4809                            [2] :
;          4810                                begin                   !* 6E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
;          4811                                WHY_DROPT [.LUN] = CODE_5;
;          4812                                ERRDF (106, MSG1, 0);       !**** OPTION 1 ERROR 06 ****
;          4813                                DODU (.LUN);
;          4814                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4815                                end;                    !* 6E *
;          4816                            [3] :
;          4817                                begin                   !* 6F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
;          4818                                WHY_DROPT [.LUN] = CODE_6;
;          4819                                ERRDF (107, MSG1, 0);       !**** OPTION 1 ERROR 07 ****
;          4820                                DODU (.LUN);
;          4821                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4822                                end;                    !* 6F *
;          4823                            [4] :
;          4824                                begin                   !* 6G * UNRECOVERABLE DATA ERROR
;          4825                                ISOLATE ();
;          4826                                ERRDF (108, MSG2, 0);       !**** OPTION 1 ERROR 08 ****
;          4827                                WHY_DROPT [.LUN] = CODE_7;
;          4828                                DODU (.LUN);
;          4829                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
;          4830                                end;                    !* 6G *
;          4831
;          4832
;          4833
;          4834
```

```
;MLX4
;                    DEFINITION OF OPTION 1                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                              27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (37)
;
;          4835                                [5] :
;          4836                                    begin                   !* 6H * RECOVERABLE DATA ERROR
;          4837                                    ISOLATE ();
;          4838
;          4839                                    if .ERROUT then PRINTB (FMT10B, .CHAN);
;          4840
;          4841                                    !'    BIT QQ'
;          4842                                    OLDSEC = .MLEL;
;          4843                                    OLDCHN = .CHAN;
;          4844
;          4845                                    if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
;          4846                                    then
;          4847
;          4848                                        if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
;          4849                                        then
;          4850                                            begin
;          4851
;          4852                                            if .ERROUT then ERRHRD (109, MSG4, 0);      !**** OPTION 1 ERROR 09 ****
;          4853
;          4854                                            UP_HARD_COUNT (.LUN, .BOARD);
;          4855                                            end
;          4856                                        else
;          4857                                            begin
;          4858
;          4859                                            if .ERROUT then ERRSOFT (110, MSG3, 0);     !**** OPTION 1 ERROR 10 ****
;          4860
;          4861                                            UP_SOFT_COUNT (.LUN, .BOARD);
;          4862                                            end
;          4863
;          4864                                    else
;          4865                                        begin
;          4866
;          4867                                        if .ERROUT then ERRSOFT (111, MSG3, 0); !**** OPTION 1 ERROR 11 ****
;          4868
;          4869                                        UP_SOFT_COUNT (.LUN, .BOARD);
;          4870                                        end;
;          4871
;          4872                                    end;                    !* 6H *
;          4873                                tes;
;          4874
;          4875                                WPTR = .WPTR + (.WRDCNT*2);
;          4876                                SECTOR = .SECTOR + (.WRDCNT/256);
;          4877                                end;                        !* 6 *  END OF SECTOR SELECTION LOOP
;          4878
;          4879                            end;                            !* 5 *  END OF TEST FOR AN ACTIVE UNIT
;          4880
;          4881                    !+
;          4882                    ! Test to see if this uut's address space is
;          4883                    ! to be read for soft errors.  This test is
;          4884                    ! is intended for DMT purposes.
;          4885                    !-
;          4886
```

```
;MLX4
;                DEFINITION OF OPTION 1                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (37)
;          4887                  if .EFN$21                      !Is the background pattern to be read
;          4888                  then
;          4889                      begin
;          4890
;          4891  !
;          4892  ! version czmlbb changed incr to incru
;          4893  !
;          4894                  incru SECTOR from LOWEST to HIGHEST do
;          4895
;          4896                      if read (.LUN, 256, RBUFF, .SECTOR) eql 5
;          4897                      then
;          4898                          begin
;          4899                          ISOLATE ();             !Find the failing bank and board no.
;          4900
;          4901                          if .ERROUT then PRINTB (FMT10B, .CHAN);
;          4902
;          4903                          ! Print where the error is
;          4904                          !
;          4905                          ! Save the contents of the ML error location
;          4906                          ! register so we can compare it to the new
;          4907                          ! contents of this register after the retry.
;          4908                          ! This is done to classify the error.
;          4909                          !
;          4910                          OLDSEC = .MLEL;
;          4911                          OLDCHN = .CHAN;
;          4912                          !
;          4913                          ! Do a classify retry call.  If the same error
;          4914                          ! occures then classify it as a hard error.  If
;          4915                          ! a different error occured or the error went away
;          4916                          ! then classify it as a soft error.
;          4917                          !
;          4918
;          4919                          if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
;          4920                          then
;          4921                          !
;          4922                          ! The same error occured so see if it is at the same
;          4923                          ! sector and channel number, if so then classify
;          4924                          ! it as a hard error else classiy it as a soft
;          4925                          ! error.
;          4926                          !
;          4927
;          4928                              if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
;          4929                              then
;          4930                                  begin           !Same error occured 'hard'
;          4931
;          4932                                  if .ERROUT      !Print error if enabled
;          4933                                  then
;          4934                                      begin
;        P 4935                                      ERRHRD (112,        !Error number
;        P 4936                                          MSG4,   !Error message
;          4937                                          0);     !Additional message routine
;          4938                                      end;
```

```
;MLX4
;                DEFINITION OF OPTION 1

;        4939
;        4940                        UP_HARD_COUNT (.LUN, .BOARD);
;        4941                        end
;        4942                    else
;        4943                        begin               !Not the same error 'soft'
;        4944
;        4945                        if .ERROUT          !Print error if enabled
;        4946                        then
;        4947                            begin
;      P 4948                            ERRSOFT (113,       !Error number
;      P 4949                                MSG3,   !Error message
;        4950                                0);     !Additional message routine
;        4951                            end;
;        4952
;        4953                        UP_SOFT_COUNT (.LUN, .BOARD);
;        4954                        end
;        4955
;        4956                else                    !Not the same error 'soft'
;        4957                    begin
;        4958
;        4959                    if .ERROUT          !Print error if enabled
;        4960                    then
;        4961                        begin
;      P 4962                        ERRSOFT (114,   !Error number
;      P 4963                            MSG3,       !Error message
;        4964                            0);         !Additional message routine
;        4965                        end;
;        4966
;        4967                    UP_SOFT_COUNT (.LUN, .BOARD);
;        4968                    end;
;        4969
;        4970                end;
;        4971
;        4972            end;
;        4973
;        4974        end;                            !* 4 *  END OF LOOP THAT COMPLETELY TESTS ONE UNIT
;        4975        end;                            !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
;        4976
;        4977    end;                                !* 2 *  END OF COMPLEMENT FLAG SELECTION LOOP
;        4978
;        4979    return;
;        4980    end;                                !* 1 *  END OF ROUTINE
;
;
;
7702 051460  004167  133650          OPT1:   .SBTTL  OPT1 DEFINITION OF OPTION 1
7703 051464  162706  000020                  JSR     R1,$SAVE5                       ;                4628
                                             SUB     #20,SP
```

SEQ 0192

```
                                ;MLX4                                                                    27-Mar-1982 19:24:42    TOPS
                                ;       DEFINITION OF OPTION 1                                           27-Mar-1982 19:23:44    PA:<
                                MOV     #RTN1,-(SP)             ;                                                               4687
                                MOV     #WRD34,-(SP)
                                MOV     #SAY2,-(SP)
                                MOV     #3,-(SP)
                                MOV     SP,R0                   ; SP,*
                                TRAP    14
                                CLR     26(SP)                  ; COMP.FLAG                                                     4690
000012                  1$:     MOV     L$UNIT,12(SP)           ;                                                               4693
                                CLR     10(SP)                  ; LUN
                                JMP     41$
                        2$:     MOV     10(SP),R0               ; LUN,*                                                         4698
                                ASR     R0
                                ASR     R0
                                ASR     R0
                                ADD     #DRIVE.STATUS,R0
                                MOV     R0,-(SP)
                                MOV     12(SP),-(SP)            ; LUN,*
                                BIC     #177770,(SP)
                                MOV     #1,-(SP)
                                CLR     -(SP)
                                JSR     PC,BL$GT2
                                ADD     #10,SP
                                DEC     R0
                                BEQ     4$
                        3$:     JMP     29$
130252                  4$:     MOV     10(SP),L$LUN            ; LUN,*                                                         4701
161040                          MOV     #WBUFF,WPTR             ;                                                               4702
161034                          MOV     #RBUFF,RPTR             ;                                                               4703
                                MOV     10(SP),R5               ; LUN,*                                                         4704
                                ASL     R5
                                MOV     LOW.SECT(R5),R4         ; *,SECTOR
                        5$:     CMP     R4,TOP.SECT(R5)         ; SECTOR,*                                                      4706
                                BHI     3$
                                MOV     R4,-(SP)                ; SECTOR,*                                                      4708
                                MOV     30(SP),-(SP)            ; COMP.FLAG,*
                                JSR     PC,GEN1
                                MOV     R4,(SP)                 ; SECTOR,*                                                      4709
                                MOV     TOP.SECT(R5),-(SP)
                                JSR     PC,GET.WRDCNT
                                MOV     R0,R2                   ; *,WRDCNT
                                MOV     R2,(SP)                 ; WRDCNT,*                                                      4710
                                JSR     PC,SET.PTRS
                                MOV     16(SP),(SP)             ; LUN,*                                                         4711
                                MOV     R2,-(SP)                ; WRDCNT,*
                                MOV     WPTR,-(SP)
                                MOV     R4,-(SP)                ; SECTOR,*
                                JSR     PC,WRITE
                                MOV     R0,R3                   ; *,VALUE
                                CMP     R3,#1                   ; VALUE,*                                                       4717
                                BNE     6$
                                MOV     #6,-(SP)                ;                                                               4723
                                MOV     #WRITE,-(SP)
```

SEQ 0193

```
                                ;MLX4
                                ;                       DEFINITION OF OPTION 1                  27-Mar-1982 19:24:42    TOPS
                                ;                                                               27-Mar-1982 19:23:44    PA:<
7764 051752  016646  000030                    MOV     30(SP),-(SP)            ; LUN,*
7765 051756  010246                            MOV     R2,-(SP)                ; WRDCNT,*
7766 051760  016746  160704                    MOV     WPTR,-(SP)
7767 051764  010446                            MOV     R4,-(SP)                ; SECTOR,*
7768 051766  004767  174232                    JSR     PC,RETRY
7769 051772  062706  000014                    ADD     #14,SP
7770 051776  005700                            TST     R0
7771 052000  001456                            BEQ     9$
7772 052002  016601  000024                    MOV     24(SP),R1
7773 052006  112761  000004  034446            MOVB    #4,WHY.DROPT(R1)        ; LUN,*                 4726
7774 052014  104455                            TRAP    55                      ;                       4727
7775 052016  000145                            .WORD   145
7776 052020  011070                            .WORD   MSG1
7777 052022  000000                            .WORD   0
7778 052024  016600  000024                    MOV     24(SP),R0               ; LUN,*                 4728
7779 052030  104451                            TRAP    51
7780 052032  000436                            BR      8$                      ;                       4729
7781 052034  020327  000002            6$:     CMP     R3,#2                   ; VALUE,*               4717
7782 052040  001015                            BNE     7$
7783 052042  016601  000024                    MOV     24(SP),R1
7784 052046  112761  000005  034446            MOVB    #5,WHY.DROPT(R1)        ; LUN,*                 4736
7785 052054  104455                            TRAP    55                      ;                       4737
7786 052056  000146                            .WORD   146
7787 052060  011070                            .WORD   MSG1
7788 052062  000000                            .WORD   0
7789 052064  016600  000024                    MOV     24(SP),R0               ; LUN,*                 4738
7790 052070  104451                            TRAP    51
7791 052072  000416                            BR      8$                      ;                       4739
7792 052074  020327  000003            7$:     CMP     R3,#3                   ; VALUE,*               4717
7793 052100  001016                            BNE     9$
7794 052102  104455                            TRAP    55                      ;                       4744
7795 052104  000147                            .WORD   147
7796 052106  011070                            .WORD   MSG1
7797 052110  000000                            .WORD   0
7798 052112  016601  000024                    MOV     24(SP),R1
7799 052116  112761  000006  034446            MOVB    #6,WHY.DROPT(R1)        ; LUN,*                 4745
7800 052124  010100                            MOV     R1,R0                   ; LUN,*                 4746
7801 052126  104451                            TRAP    51
7802 052130  062706  000014            8$:     ADD     #14,SP                  ;                       4747
7803 052134  000543                            BR      14$
7804 052136  004767  174024            9$:     JSR     PC,CHOOSE               ;                       4751
7805 052142  010066  000034                    MOV     R0,34(SP)               ; *,COMMAND
7806 052146  005001                            CLR     R1                      ;                       4753
7807 052150  020027  045612                    CMP     R0,#READ                ; COMMAND,*
7808 052154  001015                            BNE     10$
7809 052156  005201                            INC     R1
7810 052160  016766  160506  000036            MOV     RPTR,36(SP)             ; *,PTR                 4756
7811 052166  016646  000024                    MOV     24(SP),-(SP)            ; LUN,*                 4757
7812 052172  010246                            MOV     R2,-(SP)                ; WRDCNT,*
7813 052174  016746  160472                    MOV     RPTR,-(SP)
7814 052200  010446                            MOV     R4,-(SP)                ; SECTOR,*
7815 052202  004767  173404                    JSR     PC,READ
```

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                                        ;MLX4
                                        ;                DEFINITION OF OPTION 1                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                 27-Mar-1982 19:23:44    PA:<
052206  000413                                BR      11$
052210  016766  160454  000036  10$:        MOV     WPTR,36(SP)             ; *,PTR                                                 4761
052216  016646  000024                        MOV     24(SP),-(SP)            ; LUN,*                                                 4762
052222  010246                                MOV     R2,-(SP)                ; WRDCNT,*
052224  016746  160440                        MOV     WPTR,-(SP)
052230  010446                                MOV     R4,-(SP)                ; SECTOR,*
052232  004767  173542                        JSR     PC,CHECK
052236  010003                        11$:    MOV     R0,R3                   ; *,VALUE
052240  001102                                BNE     15$                     ;                                               4769
052242  006001                                ROR     R1                      ;                                               4774
052244  103402                                BLO     13$
052246  000167  001016                12$:    JMP     28$
052252  016746  160412                13$:    MOV     WPTR,-(SP)              ;                                               4778
052256  016746  160410                        MOV     RPTR,-(SP)
052262  010246                                MOV     R2,-(SP)                ; WRDCNT,*
052264  004767  172036                        JSR     PC,DOUBLE.CHECK
052270  062706  000006                        ADD     #6,SP
052274  010066  000042                        MOV     R0,42(SP)               ; *,DBL.VALUE
052300  001762                                BEQ     12$
052302  016646  000034                        MOV     34(SP),-(SP)            ; LUN,*                                         4781
052306  004767  163212                        JSR     PC,SAYWHO
052312  012716  011216                        MOV     #MSG5,(SP)              ;                                               4782
052316  012746  007072                        MOV     #SAY1,-(SP)
052322  012746  000002                        MOV     #2,-(SP)
052326  010600                                MOV     SP,R0                   ; SP,*
052330  104414                                TRAP    14
052332  016616  000050                        MOV     50(SP),(SP)             ; DBL.VALUE,*                                   4783
052336  017646  000050                        MOV     @50(SP),-(SP)           ; DBL.VALUE,*
052342  012746  006710                        MOV     #FMT12A,-(SP)
052346  012746  000003                        MOV     #3,-(SP)
052352  010600                                MOV     SP,R0                   ; SP,*
052354  104414                                TRAP    14
052356  062766  010000  000056                ADD     #10000,56(SP)           ; *,DBL.VALUE                                   4785
052364  016616  000056                        MOV     56(SP),(SP)             ; DBL.VALUE,*                                   4786
052370  017646  000056                        MOV     @56(SP),-(SP)           ; DBL.VALUE,*
052374  012746  006756                        MOV     #FMT12B,-(SP)
052400  012746  000003                        MOV     #3,-(SP)
052404  010600                                MOV     SP,R0                   ; SP,*
052406  104414                                TRAP    14
052410  016601  000056                        MOV     56(SP),R1               ; LUN,*                                         4788
052414  112761  000010  034446                MOVB    #10,WHY.DROPT(R1)
052422  104455                                TRAP    55                      ;                                               4789
052424  000150                                .WORD   150
052426  011070                                .WORD   MSG1
052430  000000                                .WORD   0
052432  016600  000056                        MOV     56(SP),R0               ; LUN,*                                         4790
052436  104451                                TRAP    51
052440  062706  000046                        ADD     #46,SP                  ;                                               4791
052444  000522                        14$:    BR      20$
052446  020327  000001                15$:    CMP     R3,#1                   ; VALUE,*                                       4769
052452  001035                                BNE     16$
052454  012746  000006                        MOV     #6,-(SP)                ;                                               4799
```

SEQ 0195

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                                ;MLX4
                                ;                DEFINITION OF OPTION 1                                  27-Mar-1982 19:24:42    TOPS
                                                                                                         27-Mar-1982 19:23:44    PA:<
7873
7874
7875
7876 052460  016646  000046                MOV     46(SP),-(SP)            ; COMMAND,*
7877 052464  016646  000040                MOV     40(SP),-(SP)            ; LUN,*
7878 052470  010246                        MOV     R2,-(SP)                ; WRDCNT,*
7879 052472  016646  000056                MOV     56(SP),-(SP)            ; PTR,*
7880 052476  010446                        MOV     R4,-(SP)                ; SECTOR,*
7881 052500  004767  173520                JSR     PC,RETRY
7882 052504  062706  000014                ADD     #14,SP
7883 052510  005700                        TST     R0
7884 052512  001655                        BEQ     12$
7885 052514  016601  000034                MOV     34(SP),R1               ; LUN,*                                                 4802
7886 052520  112761  000004  034446        MOVB    #4,WHY.DROPT(R1)
7887 052526  104455                        TRAP    55                      ;                                                       4803
7888 052530  000151                        .WORD   151
7889 052532  011070                        .WORD   MSG1
7890 052534  000000                        .WORD   0
7891 052536  016600  000034                MOV     34(SP),R0               ; LUN,*                                                 4804
7892 052542  104451                        TRAP    51
7893 052544  000460                        BR      19$                     ;                                                       4805
7894 052546  020327  000002        16$:    CMP     R3,#2                   ; VALUE,*                                               4769
7895 052552  001015                        BNE     17$
7896 052554  016601  000034                MOV     34(SP),R1               ; LUN,*                                                 4812
7897 052560  112761  000005  034446        MOVB    #5,WHY.DROPT(R1)
7898 052566  104455                        TRAP    55                      ;                                                       4813
7899 052570  000152                        .WORD   152
7900 052572  011070                        .WORD   MSG1
7901 052574  000000                        .WORD   0
7902 052576  016600  000034                MOV     34(SP),R0               ; LUN,*                                                 4814
7903 052602  104451                        TRAP    51
7904 052604  000440                        BR      19$                     ;                                                       4815
7905 052606  020327  000003        17$:    CMP     R3,#3                   ; VALUE,*                                               4769
7906 052612  001015                        BNE     18$
7907 052614  016601  000034                MOV     34(SP),R1               ; LUN,*                                                 4820
7908 052620  112761  000006  034446        MOVB    #6,WHY.DROPT(R1)
7909 052626  104455                        TRAP    55                      ;                                                       4821
7910 052630  000153                        .WORD   153
7911 052632  011070                        .WORD   MSG1
7912 052634  000000                        .WORD   0
7913 052636  016600  000034                MOV     34(SP),R0               ; LUN,*                                                 4822
7914 052642  104451                        TRAP    51
7915 052644  000420                        BR      19$                     ;                                                       4823
7916 052646  020327  000004        18$:    CMP     R3,#4                   ; VALUE,*                                               4769
7917 052652  001021                        BNE     21$
7918 052654  004767  164452                JSR     PC,ISOLATE              ;                                                       4828
7919 052660  104455                        TRAP    55                      ;                                                       4829
7920 052662  000154                        .WORD   154
7921 052664  011120                        .WORD   MSG2
7922 052666  000000                        .WORD   0
7923 052670  016601  000034                MOV     34(SP),R1               ; LUN,*                                                 4830
7924 052674  112761  000007  034446        MOVB    #7,WHY.DROPT(R1)
7925 052702  010100                        MOV     R1,R0                   ; LUN,*                                                 4831
7926 052704  104451                        TRAP    51
7927 052706  062706  000024        19$:    ADD     #24,SP                  ;                                                       4832
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                                ;MLX4
                                ;                       DEFINITION OF OPTION 1                  27-Mar-1982 19:24:42    TOPS
                                                                                                27-Mar-1982 19:23:44    PA:<
 7932 052712  000167  001070          20$:    JMP     40$
 7933 052716  020327  000005          21$:    CMP     R3,#5                   ; VALUE,*
 7934 052722  001162                          BNE     28$                                                             4769
 7935 052724  004767  164402                  JSR     PC,ISOLATE              ;
 7936 052730  032767  000001  127322          BIT     #1,ERROUT               ;                                       4837
 7937 052736  001423                          BEQ     22$                                                             4839
 7938 052740  017701  161444                  MOV     @ML.REG+42,R1
 7939 052744  006201                          ASR     R1
 7940 052746  006201                          ASR     R1
 7941 052750  006201                          ASR     R1
 7942 052752  006201                          ASR     R1
 7943 052754  006201                          ASR     R1
 7944 052756  006201                          ASR     R1
 7945 052760  042701  177700                  BIC     #177700,R1
 7946 052764  010146                          MOV     R1,-(SP)
 7947 052766  012746  006640                  MOV     #FMT10B,-(SP)
 7948 052772  012746  000002                  MOV     #2,-(SP)
 7949 052776  010600                          MOV     SP,R0                   ; SP,*
 7950 053000  104414                          TRAP    14
 7951 053002  062706  000006                  ADD     #6,SP
 7952 053006  017766  161400  000050  22$:    MOV     @ML.REG+44,50(SP)       ; *,OLDSEC                              4842
 7953 053014  017701  161370                  MOV     @ML.REG+42,R1           ;                                       4843
 7954 053020  006201                          ASR     R1
 7955 053022  006201                          ASR     R1
 7956 053024  006201                          ASR     R1
 7957 053026  006201                          ASR     R1
 7958 053030  006201                          ASR     R1
 7959 053032  006201                          ASR     R1
 7960 053034  042701  177700                  BIC     #177700,R1
 7961 053040  010166  000040                  MOV     R1,40(SP)               ; *,OLDCHN
 7962 053044  012746  000001                  MOV     #1,-(SP)                ;                                       4845
 7963 053050  016646  000046                  MOV     46(SP),-(SP)            ; COMMAND,*
 7964 053054  016646  000040                  MOV     40(SP),-(SP)            ; LUN,*
 7965 053060  010246                          MOV     R2,-(SP)                ; WRDCNT,*
 7966 053062  016646  000056                  MOV     56(SP),-(SP)            ; PTR,*
 7967 053066  010446                          MOV     R4,-(SP)                ; SECTOR,*
 7968 053070  004767  173130                  JSR     PC,RETRY
 7969 053074  062706  000014                  ADD     #14,SP
 7970 053100  020027  000005                  CMP     R0,#5
 7971 053104  001052                          BNE     25$
 7972 053106  027766  161300  000050          CMP     @ML.REG+44,50(SP)       ; *,OLDSEC                              4848
 7973 053114  001035                          BNE     24$
 7974 053116  016600  000040                  MOV     40(SP),R0               ; OLDCHN,*
 7975 053122  017701  161262                  MOV     @ML.REG+42,R1
 7976 053126  006201                          ASR     R1
 7977 053130  006201                          ASR     R1
 7978 053132  006201                          ASR     R1
 7979 053134  006201                          ASR     R1
 7980 053136  006201                          ASR     R1
 7981 053140  006201                          ASR     R1
 7982 053142  042701  177700                  BIC     #177700,R1
 7983 053146  020100                          CMP     R1,R0
```

SEQ 0197

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7985                                    ;MLX4
7986                                    :                   DEFINITION OF OPTION 1                  27-Mar-1982 19:24:42    TOPS
7987                                                                                                    27-Mar-1982 19:23:44    PA:<
7988 053150  001017                                BNE     24$
7989 053152  032767  000001  127100              BIT     #1,ERROUT               :                                       4852
7990 053160  001404                                BEQ     23$
7991 053162  104456                                TRAP    56
7992 053164  000155                                .WORD   155
7993 053166  011202                                .WORD   MSG4
7994 053170  000000                                .WORD   0
7995 053172  016646  000034          23$:          MOV     34(SP),-(SP)            ; LUN,*                                 4854
7996 053176  016746  161140                        MOV     BOARD,-(SP)
7997 053202  004767  164214                        JSR     PC,UP.HARD.COUNT
7998 053206  000427                                BR      27$
7999 053210  032767  000001  127042  24$:          BIT     #1,ERROUT               :                                       4848
8000 053216  001415                                BEQ     26$                     :                                       4859
8001 053220  104457                                TRAP    57
8002 053222  000156                                .WORD   156
8003 053224  011166                                .WORD   MSG3
8004 053226  000000                                .WORD   0
8005 053230  000410                                BR      26$
8006 053232  032767  000001  127020  25$:          BIT     #1,ERROUT               :                                       4861
8007 053240  001404                                BEQ     26$                     :                                       4867
8008 053242  104457                                TRAP    57
8009 053244  000157                                .WORD   157
8010 053246  011166                                .WORD   MSG3
8011 053250  000000                                .WORD   0
8012 053252  016646  000034          26$:          MOV     34(SP),-(SP)            ; LUN,*                                 4869
8013 053256  016746  161060                        MOV     BOARD,-(SP)
8014 053262  004767  164616                        JSR     PC,UP.SOFT.COUNT
8015 053266  022626                    27$:        CMP     (SP)+,(SP)+             :
8016 053270  010200                    28$:        MOV     R2,R0                   ; WRDCNT,*                              4836
8017 053272  006300                                ASL     R0                                                              4875
8018 053274  066700  157370                        ADD     WPTR,R0
8019 053300  010067  157364                        MOV     R0,WPTR
8020 053304  010216                                MOV     R2,(SP)                 ; WRDCNT,*
8021 053306  012746  000400                        MOV     #400,-(SP)                                                      4876
8022 053312  004767  131652                        JSR     PC,BL$DIV
8023 053316  060400                                ADD     R4,R0                   ; SECTOR,*
8024 053320  010004                                MOV     R0,R4                   ; *,SECTOR
8025 053322  062706  000026                        ADD     #26,SP                  :
8026 053326  000167  176316                        JMP     5$                      :                                       4707
8027 053332  032767  000001  126722  29$:          BIT     #1,EFN$21               :                                       4706
8028 053340  001002                                BNE     30$                                                             4887
8029 053342  000167  000440                        JMP     40$
8030 053346  016600  000010          30$:          MOV     10(SP),R0               ; LUN,*                                 4894
8031 053352  006300                                ASL     R0
8032 053354  016001  034500                        MOV     TOP.SECT(R0),R1
8033 053360  016005  034460                        MOV     LOW.SECT(R0),R5         ; *,SECTOR
8034 053364  000167  000406                        JMP     39$
8035 053370  016646  000010          31$:          MOV     10(SP),-(SP)            ; LUN,*                                 4896
8036 053374  012746  000400                        MOV     #400,-(SP)
8037 053400  012746  022670                        MOV     #RBUFF,-(SP)
8038 053404  010546                                MOV     R5,-(SP)                ; SECTOR,*
8039 053406  004767  172200                        JSR     PC,READ
```

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                                        ;MLX4
                                        ;               DEFINITION OF OPTION 1                          27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<
 8044 053412 062706 000010                      ADD     #10,SP
 8045 053416 020027 000005                      CMP     R0,#5
 8046 053422 001164                             BNE     38$
 8047 053424 004767 163702                      JSR     PC,ISOLATE
 8048 053430 032767 000001 126622               BIT     #1,ERROUT               ;                       4899
 8049 053436 001423                             BEQ     32$                     ;                       4901
 8050 053440 017700 160744                      MOV     @ML.REG+42,R0
 8051 053444 006200                             ASR     R0
 8052 053446 006200                             ASR     R0
 8053 053450 006200                             ASR     R0
 8054 053452 006200                             ASR     R0
 8055 053454 006200                             ASR     R0
 8056 053456 006200                             ASR     R0
 8057 053460 042700 177700                      BIC     #177700,R0
 8058 053464 010046                             MOV     R0,-(SP)
 8059 053466 012746 006640                      MOV     #FMT10B,-(SP)
 8060 053472 012746 000002                      MOV     #2,-(SP)
 8061 053476 010600                             MOV     SP,R0                   ; SP,*
 8062 053500 104414                             TRAP    14
 8063 053502 062706 000006                      ADD     #6,SP
 8064 053506 017766 160700 000024 32$:          MOV     @ML.REG+44,24(SP)       ; *,OLDSEC              4910
 8065 053514 017700 160670                      MOV     @ML.REG+42,R0           ;                       4911
 8066 053520 006200                             ASR     R0
 8067 053522 006200                             ASR     R0
 8068 053524 006200                             ASR     R0
 8069 053526 006200                             ASR     R0
 8070 053530 006200                             ASR     R0
 8071 053532 006200                             ASR     R0
 8072 053534 042700 177700                      BIC     #177700,R0
 8073 053540 010066 000014                      MOV     R0,14(SP)               ; *,OLDCHN              4919
 8074 053544 012746 000001                      MOV     #1,-(SP)                ;
 8075 053550 016646 000022                      MOV     22(SP),-(SP)            ; COMMAND,*
 8076 053554 016646 000014                      MOV     14(SP),-(SP)            ; LUN,*
 8077 053560 012746 000400                      MOV     #400,-(SP)
 8078 053564 016646 000032                      MOV     32(SP),-(SP)            ; PTR,*
 8079 053570 016646 000036                      MOV     36(SP),-(SP)            ; OLDSEC,*
 8080 053574 004767 172424                      JSR     PC,RETRY
 8081 053600 062706 000014                      ADD     #14,SP
 8082 053604 020027 000005                      CMP     R0,#5
 8083 053610 001052                             BNE     35$
 8084 053612 027766 160574 000024               CMP     @ML.REG+44,24(SP)       ; *,OLDSEC              4928
 8085 053620 001035                             BNE     34$
 8086 053622 016646 000014                      MOV     14(SP),-(SP)            ; OLDCHN,*
 8087 053626 017700 160556                      MOV     @ML.REG+42,R0
 8088 053632 006200                             ASR     R0
 8089 053634 006200                             ASR     R0
 8090 053636 006200                             ASR     R0
 8091 053640 006200                             ASR     R0
 8092 053642 006200                             ASR     R0
 8093 053644 006200                             ASR     R0
 8094 053646 042700 177700                      BIC     #177700,R0
 8095 053652 020026                             CMP     R0,(SP)+
```

SEQ 0199

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                                ;MLX4
                                ;                DEFINITION OF OPTION 1                    27-Mar-1982 19:24:42   TOPS
                                                                                           27-Mar-1982 19:23:44   PA:<
 8097
 8098
 8099
 8100 053654 001017                       BNE     34$
 8101 053656 032767 000001 126374         BIT     #1,ERROUT                 ;                                    4932
 8102 053664 001404                       BEQ     33$
 8103 053666 104456                       TRAP    56                        ;                                    4937
 8104 053670 000160                       .WORD   160
 8105 053672 011202                       .WORD   MSG4
 8106 053674 000000                       .WORD   0
 8107 053676 016646 000010        33$:    MOV     10(SP),-(SP)              ; LUN,*                              4940
 8108 053702 016746 160434                MOV     BOARD,-(SP)
 8109 053706 004767 163510                JSR     PC,UP.HARD.COUNT
 8110 053712 000427                       BR      37$
 8111 053714 032767 000001 126336 34$:    BIT     #1,ERROUT                 ;                                    4928
 8112 053722 001415                       BEQ     36$                       ;                                    4945
 8113 053724 104457                       TRAP    57
 8114 053726 000161                       .WORD   161                       ;                                    4950
 8115 053730 011166                       .WORD   MSG3
 8116 053732 000000                       .WORD   0
 8117 053734 000410                       BR      36$
 8118 053736 032767 000001 126314 35$:    BIT     #1,ERROUT                 ;                                    4953
 8119 053744 001404                       BEQ     36$                       ;                                    4959
 8120 053746 104457                       TRAP    57
 8121 053750 000162                       .WORD   162                       ;                                    4964
 8122 053752 011166                       .WORD   MSG3
 8123 053754 000000                       .WORD   0
 8124 053756 016646 000010        36$:    MOV     10(SP),-(SP)              ; LUN,*                              4967
 8125 053762 016746 160354                MOV     BOARD,-(SP)
 8126 053766 004767 164112                JSR     PC,UP.SOFT.COUNT
 8127 053772 022626               37$:    CMP     (SP)+,(SP)+               ;                                    4898
 8128 053774 005205               38$:    INC     R5                        ; SECTOR                             4894
 8129 053776 020501               39$:    CMP     R5,R1                     ; SECTOR,*
 8130 054000 101002                       BHI     40$
 8131 054002 000167 177362                JMP     31$
 8132 054006 005266 000010        40$:    INC     10(SP)                    ; LUN                                4693
 8133 054012 026666 000010 000012 41$:    CMP     10(SP),12(SP)             ; LUN,*
 8134 054020 002002                       BGE     42$
 8135 054022 000167 175510                JMP     2$
 8136 054026 005266 000026        42$:    INC     26(SP)                    ; COMP.FLAG                          4690
 8137 054032 026627 000026 000001         CMP     26(SP),#1                 ; COMP.FLAG,*
 8138 054040 003002                       BGT     43$
 8139 054042 000167 175452                JMP     1$
 8140 054046 062706 000030        43$:    ADD     #30,SP                    ;                                    4628
 8141 054052 000207                       RTS     PC
 8142
 8143                            ; Routine Size:  638 words
 8144                            ; Maximum stack depth per invocation:  37 words
 8149
 8150
```

SEQ 0200


```
8152 ;MLX4
8153 ;                  DEFINITION OF OPTION 2
8154 ;
8155 ;          4981   %sbttl 'DEFINITION OF OPTION 2'
8156 ;          4982   routine OPT2 : novalue =
8157 ;          4983       begin                                   !* 1 *  START OF ROUTINE
8158 ;          4984
8159 ;          4985   !++
8160 ;          4986   !  ROUTINE:     OPT2
8161 ;          4987   !
8162 ;          4988   !  PURPOSE:     TO CHECK ON DATA RELIABILITY USING THE PATTERNS FROM
8163 ;          4989   !               THE PATTERN TABLE.
8164 ;          4990   !
8165 ;          4991   !  THE CODE FOR 'OPT2' IN BRIEF:
8166 ;          4992   !
8167 ;          4993   !  BEGIN 1 (START OF ROUTINE)
8168 ;          4994   !  SAY THE ROUTINE IS RUNNING
8169 ;          4995   !  CHOOSE A MAXIMUM PATTERN NUMBER
8170 ;          4996   !  INCR COUNT FROM 1 TO (2*MAX)
8171 ;          4997   !  : BEGIN 2 (START OF PATTERN SELECTION LOOP)
8172 ;          4998   !  : GENERATE THE PATTERN
8173 ;          4999   !  : INCR LUN FROM 0 TO LAST
8174 ;          5000   !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
8175 ;          5001   !  : : TESTLOOP:
8176 ;          5002   !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
8177 ;          5003   !  : : : IF UNIT IS ACTIVE
8178 ;          5004   !  : : : THEN
8179 ;          5005   !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
8180 ;          5006   !  : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
8181 ;          5007   !  : : : : SECTOR = LOWEST
8182 ;          5008   !  : : : : WHILE SECTOR LEQ HIGHEST DO
8183 ;          5009   !  : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
8184 ;          5010   !  : : : : : GET_WRDCNT
8185 ;          5011   !  : : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
8186 ;          5012   !  : : : : : WRITE
8187 ;          5013   !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
8188 ;          5014   !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
8189 ;          5015   !  : : : : : DO THE WRITE CHECK OR READ
8190 ;          5016   !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
8191 ;          5017   !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
8192 ;          5018   !  : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
8193 ;          5019   !  : : : : : END 6 (END OF SECTOR SELECTION LOOP)
8194 ;          5020   !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
8195 ;          5021   !  : : : END 4 (END OF TESTLOOP)
8196 ;          5022   !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
8197 ;          5023   !  : IF NOT THE QUICK VERIFY PASS THEN 'LOOP READ' (DESCRIBED BELOW)
8198 ;          5024   !  : END 2 (END OF PATTERN SELECTION LOOP)
8199 ;          5025   !  RETURN
8200 ;          5026   !  END 1 (END OF ROUTINE)
8201 ;          5027   !--
8202 ;          5028
8203 ;          5029       label
8204 ;          5030           LOOP,
8205 ;          5031           LOOP2;
8206 ;          5032
```

```
8208 ;MLX4
8209 ;                  DEFINITION OF OPTION 2                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
8210 ;                                                            27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (38)
8211 ;          5033        local
8212 ;          5034            WRDCNT,
8213 ;          5035            VALUE,
8214 ;          5036            TEMP,
8215 ;          5037            MAXPAT,
8216 ;          5038            OLDSEC,
8217 ;          5039            OLDCHN,
8218 ;          5040            SECTOR,
8219 ;          5041            PTR,
8220 ;          5042            COMMAND,
8221 ;          5043            DBL_VALUE;
8222 ;          5044
8223 ;          5045        PRINTB (SAY2, WRD34, RTN2);
8224 ;          5046        !'RUNNING OPT2'
8225 ;          5047        PATTERN = 0;
8226 ;          5048
8227 ;          5049        if .QUICK neq 0 then MAXPAT = 1 else MAXPAT = NUM_PATS;
8228 ;          5050
8229 ;          5051        incr COUNT from 1 to (.MAXPAT*2) do
8230 ;          5052            begin                                 !* 2 *  START OF PATTERN SELECTION LOOP
8231 ;          5053            SELPAT ();
8232 ;          5054
8233 ;          5055            if .PATTERN gtr 0
8234 ;          5056            then
8235 ;          5057                PRINTB (FMT1A, PHR9, .PATTERN)
8236 ;          5058                !'PATTERN NUMBER   XX'
8237 ;          5059            else
8238 ;          5060                begin
8239 ;          5061                TEMP = -(.PATTERN);
8240 ;          5062                PRINTB (FMT1B, PHR9, .TEMP);
8241 ;          5063                !'       PATTERN NUMBER - XX'
8242 ;          5064                end;
8243 ;          5065
8244 ;          5066            GEN2 (.PATTERN);
8245 ;          5067
8246 ;          5068            incr LUN from 0 to (.L$UNIT - 1) do
8247 ;          5069                begin                             !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
8248 ;          5070    LOOP :
8249 ;          5071                begin                             !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
8250 ;          5072
8251 ;          5073                if .DRIVE_STATUS [.LUN] eql ACTIVE
8252 ;          5074                then
8253 ;          5075                    begin                         !* 5 *  START OF TEST FOR AN ACTIVE UNIT
8254 ;          5076                    L$LUN = .LUN;
8255 ;          5077                    WPTR = WBUFF;
8256 ;          5078                    RPTR = RBUFF;
8257 ;          5079                    SECTOR = LOWEST;
8258 ;          5080
8259 ;          5081                    while .SECTOR lequ HIGHEST do
8260 ;          5082                        begin                     !* 6 *  START OF SECTOR SELECTION LOOP
8261 ;          5083                        WRDCNT = GET_WRDCNT (.SECTOR, HIGHEST);
8262 ;          5084                        SET_PTRS (.WRDCNT);
```

SEQ 0202


```
;MLX4
;                DEFINITION OF OPTION 2

                        VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);

                        !+
                        ! SEE HOW SUCCESSFUL THE WRITE WAS:
                        !-

                        selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
                            set                         !OF ERROR # CONTAINED IN 'VALUE'

                            [1] :
                                begin                   !* 6A * RETRY ALLOWED

                                if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
                                then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
                                    begin
                                    WHY_DROPT [.LUN] = CODE_4;
                                    ERRDF (201, MSG1, 0);   !**** OPTION 2 ERROR 01 ****
                                    DODU (.LUN);
                                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
                                    end;

                                end;                    !* 6A *

                            [2] :
                                begin                   !* 6B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
                                WHY_DROPT [.LUN] = CODE_5;
                                ERRDF (202, MSG1, 0);       !**** OPTION 2 ERROR 02 ****
                                DODU (.LUN);
                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
                                end;                    !* 6B *

                            [3] :
                                begin                   !* 6C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
                                ERRDF (203, MSG1, 0);       !**** OPTION 2 ERROR 03 ****
                                WHY_DROPT [.LUN] = CODE_6;
                                DODU (.LUN);
                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
                                end;                    !* 6C *
                            tes;

                        COMMAND = CHOOSE ();

                        if .COMMAND eql read
                        then
                            begin
                            PTR = .RPTR;
                            VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
                            end
                        else
                            begin
                            PTR = .WPTR;
                            VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
```

```
8320 ;MLX4
8321 ;                  DEFINITION OF OPTION 2
8322 ;
8323 ;          5137                        end;
8324 ;          5138
8325 ;          5139                    !+
8326 ;          5140                    ! SEE HOW SUCCESSFUL THE OPERATION WAS:
8327 ;          5141                    !-
8328 ;          5142
8329 ;          5143                    selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
8330 ;          5144                        set                         !OF ERROR # CONTAINED IN 'VALUE'
8331 ;          5145
8332 ;          5146                        [0] :
8333 ;          5147
8334 ;          5148                            if .COMMAND eql read
8335 ;          5149                            then
8336 ;          5150                                begin
8337 ;          5151
8338 ;          5152                                if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
8339 ;          5153                                then
8340 ;          5154                                    begin
8341 ;          5155                                    SAYWHO (.LUN);
8342 ;          5156                                    PRINTB (SAY1, MSG5);        !'ECC LOGIC FAILED TO DETECT DATA ERROR'
8343 ;          5157                                    PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
8344 ;          5158                                                !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
8345 ;          5159                                    DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
8346 ;          5160                                    PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
8347 ;          5161                                                !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
8348 ;          5162                                    WHY_DROPT [.LUN] = CODE_8;
8349 ;          5163                                    ERRDF (204, MSG1, 0);       !**** OPTION 2 ERROR 04 ****
8350 ;          5164                                    DODU (.LUN);
8351 ;          5165                                    leave LOOP; !JUMP JUST BEYOND END OF BLOCK * 4 *
8352 ;          5166                                    end;
8353 ;          5167
8354 ;          5168                                end;
8355 ;          5169
8356 ;          5170                        [1] :
8357 ;          5171                            begin               !* 6D * RETRY ALLOWED
8358 ;          5172
8359 ;          5173                            if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
8360 ;          5174                            then                !THE RETRY FAILED -- SYSTEM FATAL ERROR
8361 ;          5175                                begin
8362 ;          5176                                WHY_DROPT [.LUN] = CODE_4;
8363 ;          5177                                ERRDF (205, MSG1, 0);   !**** OPTION 2 ERROR 05 ****
8364 ;          5178                                DODU (.LUN);
8365 ;          5179                                leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
8366 ;          5180                                end;
8367 ;          5181
8368 ;          5182                            end;                !* 6D *
8369 ;          5183
8370 ;          5184                        [2] :
8371 ;          5185                            begin               !* 6E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
8372 ;          5186                            WHY_DROPT [.LUN] = CODE_5;
8373 ;          5187                            ERRDF (206, MSG1, 0);       !**** OPTION 2 ERROR 06 ****
8374 ;          5188                            DODU (.LUN);
```

```
8376 ;MLX4
8377 ;                  DEFINITION OF OPTION 2                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
8378 ;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (38)
8379 ;          5189                                    leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
8380 ;          5190                                    end;                    !* 6E *
8381 ;          5191
8382 ;          5192                                [3] :
8383 ;          5193                                    begin                   !* 6F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
8384 ;          5194                                    ERRDF (207, MSG1, 0);       !**** OPTION 2 ERROR 07 ****
8385 ;          5195                                    WHY_DROPT [.LUN] = CODE_6;
8386 ;          5196                                    DODO (.LUN);
8387 ;          5197                                    leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
8388 ;          5198                                    end;                    !* 6F *
8389 ;          5199
8390 ;          5200                                [4] :
8391 ;          5201                                    begin                   !* 6G * UNRECOVERABLE DATA ERROR
8392 ;          5202                                    ISOLATE ();
8393 ;          5203                                    ERRDF (208, MSG2, 0);       !**** OPTION 2 ERROR 08 ****
8394 ;          5204                                    WHY_DROPT [.LUN] = CODE_7;
8395 ;          5205                                    DODO (.LUN);
8396 ;          5206                                    leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
8397 ;          5207                                    end;                    !* 6G *
8398 ;          5208
8399 ;          5209                                [5] :
8400 ;          5210                                    begin                   !* 6H * RECOVERABLE DATA ERROR
8401 ;          5211                                    ISOLATE ();
8402 ;          5212
8403 ;          5213                                    if .ERROUT then PRINTB (FMT10B, .CHAN);
8404 ;          5214
8405 ;          5215                                    !'    BIT QQ'
8406 ;          5216                                    OLDSEC = .MLEL;
8407 ;          5217                                    OLDCHN = .CHAN;
8408 ;          5218
8409 ;          5219                                    if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
8410 ;          5220                                    then
8411 ;          5221
8412 ;          5222                                        if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
8413 ;          5223                                        then
8414 ;          5224                                            begin
8415 ;          5225
8416 ;          5226                                            if .ERROUT then ERRHRD (209, MSG4, 0);      !**** OPTION 2 ERROR 09 ****
8417 ;          5227
8418 ;          5228                                            UP_HARD_COUNT (.LUN, .BOARD);
8419 ;          5229                                            end
8420 ;          5230                                        else
8421 ;          5231                                            begin
8422 ;          5232
8423 ;          5233                                            if .ERROUT then ERRSOFT (210, MSG3, 0);     !**** OPTION 2 ERROR 10 ****
8424 ;          5234
8425 ;          5235                                            UP_SOFT_COUNT (.LUN, .BOARD);
8426 ;          5236                                            end
8427 ;          5237
8428 ;          5238                                    else
8429 ;          5239                                        begin
8430 ;          5240
```

```
8432 ;MLX4
8433 ;                DEFINITION OF OPTION 2
8434
8435 ;          5241                                    if .ERROUT then ERRSOFT (211, MSG3, 0); !**** OPTION 2 ERROR 11 ****
8436 ;          5242
8437 ;          5243                                    UP_SOFT_COUNT (.LUN, .BOARD);
8438 ;          5244                                    end;
8439 ;          5245
8440 ;          5246                                end;                    !* 6H *
8441 ;          5247                            tes;
8442 ;          5248
8443 ;          5249                        WPTR = .WPTR + (.WRDCNT*2);
8444 ;          5250                        SECTOR = .SECTOR + (.WRDCNT/256);
8445 ;          5251                        end;                            !* 6 *  END OF SECTOR SELECTION LOOP
8446 ;          5252
8447 ;          5253                    end;                                !* 5 *  END OF TEST FOR AN ACTIVE UNIT
8448 ;          5254
8449 ;          5255                end;                                    !* 4 *  END OF TESTLOOP
8450 ;          5256                end;                                    !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
8451 ;          5257
8452 ;          5258            if .QUICK eql 0
8453 ;          5259            then
8454 ;          5260                begin                                   !* 11 *  START OF LOOP READING SECTION
8455 ;          5261
8456 ;          5262                !++
8457 ;          5263                !  THIS IS THE 'LOOP READ' SECTION WHICH WAS MENTIONED IN
8458 ;          5264                !  THE DOCUMENTATION AT THE BEGINNING OF THIS ROUTINE.  IT
8459 ;          5265                !  IS NOT EXECUTED DURING THE QUICK VERIFY PASS, BUT IT IS
8460 ;          5266                !  FOR EVERY OTHER PASS THROUGH OPT2.
8461 ;          5267                !
8462 ;          5268                !  THE CODE IN BRIEF:
8463 ;          5269                !
8464 ;          5270                !  BEGIN 11 (START OF LOOP READING SECTION)
8465 ;          5271                !  INCR LUN FROM 0 TO LAST
8466 ;          5272                !  : BEGIN 12 (START OF LOGICAL UNIT SELECTION LOOP)
8467 ;          5273                !  : TESTLOOP2:
8468 ;          5274                !  : : BEGIN 13 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
8469 ;          5275                !  : : IF UNIT IS ACTIVE
8470 ;          5276                !  : : THEN
8471 ;          5277                !  : : : BEGIN 14 (START OF TEST FOR AN ACTIVE UNIT)
8472 ;          5278                !  : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
8473 ;          5279                !  : : : SECTOR = LOWEST
8474 ;          5280                !  : : : WHILE SECTOR LEQ HIGHEST DO
8475 ;          5281                !  : : : : BEGIN 15 (START OF SECTOR SELECTION LOOP)
8476 ;          5282                !  : : : : GET_WRDCNT
8477 ;          5283                !  : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
8478 ;          5284                !  : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
8479 ;          5285                !  : : : : INCR KOUNT FROM 1 TO TIMES
8480 ;          5286                !  : : : : : BEGIN 16 (START OF COUNTING LOOP FOR LOOP READING)
8481 ;          5287                !  : : : : : DO THE WRITE CHECK OR READ
8482 ;          5288                !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP2)
8483 ;          5289                !  : : : : : END 16 (END OF COUNTING LOOP FOR LOOP READING)
8484 ;          5290                !  : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
8485 ;          5291                !  : : : : UPDATE SECTOR NUMBER BY # SECTORS IN PREVIOUS TRANSFER
8486 ;          5292                !  : : : : END 15 (END OF SECTOR SELECTION LOOP)
```

SEQ 0206

```
;MLX4
;                DEFINITION OF OPTION 2                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (38)

;          5293                !  : : : END 14 (END OF TEST FOR AN ACTIVE UNIT)
;          5294                !  : : END 13 (END OF TESTLOOP2)
;          5295                !  : END 12 (END OF LOGICAL UNIT SELECTION LOOP)
;          5296                !  END 11 (END OF LOOP READING SECTION)
;          5297                !--
;          5298
;          5299                incr LUN from 0 to (.L$UNIT - 1) do
;          5300                    begin                               !* 12 *  START OF LOGICAL UNIT SELECTION LOOP
;          5301  LOOP2 :
;          5302                    begin                               !* 13 *  START OF THE 2ND LOOP THAT COMPLETELY TESTS 1 UNIT
;          5303
;          5304                    if .DRIVE_STATUS [.LUN] eql ACTIVE
;          5305                    then
;          5306                        begin                           !* 14 *  START OF LOOP THAT TESTS AN ACTIVE UNIT
;          5307                        L$LUN = .LUN;
;          5308                        WPTR = WBUFF;
;          5309                        RPTR = RBUFF;
;          5310                        SECTOR = LOWEST;
;          5311
;          5312                        while .SECTOR lequ HIGHEST do
;          5313                            begin                       !* 15 *  START OF SECTOR SELECTION LOOP
;          5314                            WRDCNT = GET_WRDCNT (.SECTOR, HIGHEST);
;          5315                            SET_PTRS (.WRDCNT);
;          5316                            COMMAND = CHOOSE ();
;          5317
;          5318                            incr KOUNT from 1 to TIMES_TO_LOOP do
;          5319                                begin                   !* 16 *  START OF COUNTING LOOP FOR LOOP READING
;          5320
;          5321                            if .COMMAND eql read
;          5322                            then
;          5323                                begin
;          5324                                PTR = .RPTR;
;          5325                                VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
;          5326                                end
;          5327                            else
;          5328                                begin
;          5329                                PTR = .WPTR;
;          5330                                VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
;          5331                                end;
;          5332
;          5333                            !+
;          5334                            !  SEE HOW SUCCESSFUL THE OPERATION WAS:
;          5335                            !-
;          5336
;          5337                            selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
;          5338                                set                 !OF ERROR # CONTAINED IN 'VALUE'
;          5339
;          5340                                [0] :
;          5341
;          5342                                    if .COMMAND eql read
;          5343                                    then
;          5344                                        begin
```

SEQ 0207


```
8544 ;MLX4
8545 ;                  DEFINITION OF OPTION 2
8546
8547 ;          5345
8548 ;          5346                    if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
8549 ;          5347                    then
8550 ;          5348                        begin
8551 ;          5349                        SAYWHO (.LUN);
8552 ;          5350                        PRINTB (SAY1, MSG5);
8553 ;          5351                            !'ECC LOGIC FAILED TO DETECT DATA ERROR'
8554 ;          5352                        PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
8555 ;          5353                            !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
8556 ;          5354                        DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
8557 ;          5355                        PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
8558 ;          5356                            !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
8559 ;          5357                        WHY_DROPT [.LUN] = CODE_8;
8560 ;          5358                        ERRDF (212, MSG1, 0);       !**** OPTION 2 ERROR 12 ****
8561 ;          5359                        DODU (.LUN);
8562 ;          5360                        leave LOOP2;        !JUMP JUST BEYOND END OF BLOCK * 4 *
8563 ;          5361                        end;
8564 ;          5362
8565 ;          5363                    end;
8566 ;          5364
8567 ;          5365                [1] :
8568 ;          5366                    begin       !* 16A *         RETRY ALLOWED
8569 ;          5367
8570 ;          5368                    if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
8571 ;          5369                    then        !THE RETRY FAILED -- SYSTEM FATAL ERROR
8572 ;          5370                        begin
8573 ;          5371                        WHY_DROPT [.LUN] = CODE_4;
8574 ;          5372                        ERRDF (213, MSG1, 0);   !**** OPTION 2 ERROR 13 ****
8575 ;          5373                        DODU (.LUN);
8576 ;          5374                        leave LOOP2;    !JUMP JUST BEYOND END OF BLOCK * 13 *
8577 ;          5375                        end;
8578 ;          5376
8579 ;          5377                    end;        !* 16A *
8580 ;          5378
8581 ;          5379                [2] :
8582 ;          5380                    begin       !* 16B *         FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
8583 ;          5381                    WHY_DROPT [.LUN] = CODE_5;
8584 ;          5382                    ERRDF (214, MSG1, 0);       !**** OPTION 2 ERROR 14 ****
8585 ;          5383                    DODU (.LUN);
8586 ;          5384                    leave LOOP2;        !JUMP JUST BEYOND END OF BLOCK * 13 *
8587 ;          5385                    end;        !* 16B *
8588 ;          5386
8589 ;          5387                [3] :
8590 ;          5388                    begin       !* 16C *         FATAL DRIVE ERROR -- NO RETRY ALLOWED
8591 ;          5389                    ERRDF (215, MSG1, 0);       !**** OPTION 2 ERROR 15 ****
8592 ;          5390                    WHY_DROPT [.LUN] = CODE_6;
8593 ;          5391                    DODU (.LUN);
8594 ;          5392                    leave LOOP2;        !JUMP JUST BEYOND END OF BLOCK * 13 *
8595 ;          5393                    end;        !* 16C *
8596 ;          5394
8597 ;          5395                [4] :
8598 ;          5396                    begin       !* 16D *         UNRECOVERABLE DATA ERROR
```

```
8600 ;MLX4
8601 ;                  DEFINITION OF OPTION 2
8602
8603 ;          5397                        ISOLATE ();
8604 ;          5398                        ERRDF (216, MSG2, 0);       !**** OPTION 2 ERROR 16 ****
8605 ;          5399                        WHY_DROPT [.LUN] = CODE_7;
8606 ;          5400                        DODO (.LUN);
8607 ;          5401                        leave LOOP2;            !JUMP JUST BEYOND END OF BLOCK * 13 *
8608 ;          5402                        end;            !* 16D *
8609 ;          5403
8610 ;          5404                    [5] :
8611 ;          5405                        begin           !* 16E *         RECOVERABLE DATA ERROR
8612 ;          5406                        ISOLATE ();
8613 ;          5407
8614 ;          5408                        if .ERROUT then PRINTB (FMT10B, .CHAN);     !'    BIT QQ'
8615 ;          5409
8616 ;          5410                        OLDSEC = .MLEL;
8617 ;          5411                        OLDCHN = .CHAN;
8618 ;          5412
8619 ;          5413                        if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
8620 ;          5414                        then
8621 ;          5415
8622 ;          5416                            if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
8623 ;          5417                            then
8624 ;          5418                                begin
8625 ;          5419
8626 ;          5420                                if .ERROUT then ERRHRD (217, MSG4, 0);
8627 ;          5421
8628 ;          5422                                    !**** OPTION 2 ERROR 17 ****
8629 ;          5423                                UP_HARD_COUNT (.LUN, .BOARD);
8630 ;          5424                                end
8631 ;          5425                            else
8632 ;          5426                                begin
8633 ;          5427
8634 ;          5428                                if .ERROUT then ERRSOFT (218, MSG3, 0);
8635 ;          5429
8636 ;          5430                                    !**** OPTION 2 ERROR 18 ****
8637 ;          5431                                UP_SOFT_COUNT (.LUN, .BOARD);
8638 ;          5432                                end
8639 ;          5433
8640 ;          5434                            else
8641 ;          5435                                begin
8642 ;          5436
8643 ;          5437                                if .ERROUT then ERRSOFT (219, MSG3, 0); !**** OPTION 2 ERROR 19 ****
8644 ;          5438
8645 ;          5439                                UP_SOFT_COUNT (.LUN, .BOARD);
8646 ;          5440                                end;
8647 ;          5441
8648 ;          5442                            end;        !* 16E *
8649 ;          5443                        tes;
8650 ;          5444
8651 ;          5445                    end;                !* 16 *  END OF COUNTING LOOP FOR LOOP READING
8652 ;          5446
8653 ;          5447                WPTR = .WPTR + (.WRDCNT*2);
8654 ;          5448                SECTOR = .SECTOR + (.WRDCNT/256);
```

```
8656 ;MLX4
8657 ;                  DEFINITION OF OPTION 2
8658
8659 ;          5449                        end;                    !* 15 *  END OF SECTOR SELECTION LOOP
8660 ;          5450
8661 ;          5451                    end;                        !* 14 *  END OF  TEST FOR AN ACTIVE UNIT
8662 ;          5452
8663 ;          5453                !+
8664 ;          5454                ! Test to see if this uut's address space is
8665 ;          5455                ! to be read for soft errors.  This test is
8666 ;          5456                  is intended for DMT purposes.
8667 ;          5457                !-
8668 ;          5458
8669 ;          5459                if .EFN$21                      !Is the background pattern to be read
8670 ;          5460                then
8671 ;          5461                    begin
8672 ;          5462
8673 ;          5463 !
8674 ;          5464 ! version czmlbb changed incr to incru
8675 ;          5465 !
8676 ;          5466                        incru SECTOR from LOWEST to HIGHEST do
8677 ;          5467
8678 ;          5468                            if read (.LUN, 256, RBUFF, .SECTOR) eql 5
8679 ;          5469                            then
8680 ;          5470                                begin
8681 ;          5471                                ISOLATE ();         !Find the failing bank and board no.
8682 ;          5472
8683 ;          5473                                if .ERROUT then PRINTB (FMT10B, .CHAN);
8684 ;          5474
8685 ;          5475                                ! Print where the error is
8686 ;          5476                                !
8687 ;          5477                                ! Save the contents of the ML error location
8688 ;          5478                                ! register so we can compare it to the new
8689 ;          5479                                ! contents of this register after the retry.
8690 ;          5480                                ! This is done to classify the error.
8691 ;          5481                                !
8692 ;          5482                                OLDSEC = .MLEL;
8693 ;          5483                                OLDCHN = .CHAN;
8694 ;          5484                                !
8695 ;          5485                                ! Do a classify retry call.  If the same error
8696 ;          5486                                ! occures then classify it as a hard error.  If
8697 ;          5487                                ! a different error occured or the error went away
8698 ;          5488                                ! then classify it as a soft error.
8699 ;          5489                                !
8700 ;          5490
8701 ;          5491                                if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
8702 ;          5492                                then
8703 ;          5493                                !
8704 ;          5494                                ! The same error occured so see if it is at the same
8705 ;          5495                                ! sector and channel number, if so then classify
8706 ;          5496                                ! it as a hard error else classiy it as a soft
8707 ;          5497                                ! error.
8708 ;          5498                                !
8709 ;          5499
8710 ;          5500                                    if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
```

SEQ 0210

```
;MLX4
;                DEFINITION OF OPTION 2                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (38)
;       5501                                                 then
;       5502                                                     begin       !Same error occured 'hard'
;       5503
;       5504                                                     if .ERROUT  !Print error if enabled
;       5505                                                     then
;       5506                                                         begin
;     P 5507                                                         ERRHRD (220,     !Error number
;     P 5508                                                             MSG4,        !Error message
;       5509                                                             0); !Additional message routine
;       5510                                                         end;
;       5511
;       5512                                                     UP_HARD_COUNT (.LUN, .BOARD);
;       5513                                                     end
;       5514                                                 else
;       5515                                                     begin       !Not the same error 'soft'
;       5516
;       5517                                                     if .ERROUT  !Print error if enabled
;       5518                                                     then
;       5519                                                         begin
;     P 5520                                                         ERRSOFT (221,    !Error number
;     P 5521                                                             MSG3,        !Error message
;       5522                                                             0); !Additional message routine
;       5523                                                         end;
;       5524
;       5525                                                     UP_SOFT_COUNT (.LUN, .BOARD);
;       5526                                                     end
;       5527
;       5528                                             else                !Not the same error 'soft'
;       5529                                                 begin
;       5530
;       5531                                                 if .ERROUT      !Print error if enabled
;       5532                                                 then
;       5533                                                     begin
;     P 5534                                                     ERRSOFT (222,       !Error number
;     P 5535                                                         MSG3,   !Error message
;       5536                                                         0);     !Additional message routine
;       5537                                                     end;
;       5538
;       5539                                                 UP_SOFT_COUNT (.LUN, .BOARD);
;       5540                                                 end;
;       5541
;       5542                                             end;
;       5543
;       5544                                 end;
;       5545
;       5546                             end;                            !* 13 *  END OF TESTLOOP2
;       5547                             end;                            !* 12 *  END OF LOGICAL UNIT SELECTION LOOP
;       5548
;       5549                         end;                                !* 11 *  END OF LOOP READING SECTION
;       5550
;       5551                 end;                                        !* 2 *  END OF PATTERN SELECTION LOOP
;       5552
```

SEQ 0211

```
8768 ;MLX4
8769 ;                  DEFINITION OF OPTION 2                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
8770                                                            27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (38)
8771 ;          5553       return;
8772 ;          5554       end;                                 !* 1 *  END OF ROUTINE
8776
8777
                                    .SBTTL  OPT2 DEFINITION OF OPTION 2
8781 054054  004167  131254   OPT2:  JSR     R1,$SAVE5                       ;                                       4982
8782 054060  162706  000026          SUB     #26,SP
8783 054064  012746  007634          MOV     #RTN2,-(SP)                     ;                                       5045
8784 054070  012746  007344          MOV     #WRD34,-(SP)
8785 054074  012746  007100          MOV     #SAY2,-(SP)
8786 054100  012746  000003          MOV     #3,-(SP)
8787 054104  010600                  MOV     SP,R0                           ; SP,*
8788 054106  104414                  TRAP    14
8789 054110  005067  156562          CLR     PATTERN                         ;                                       5047
8790 054114  005767  156554          TST     QUICK                           ;                                       5049
8791 054120  001403                  BEQ     1$
8792 054122  012705  000001          MOV     #1,R5                           ; *,MAXPAT
8793 054126  000402                  BR      2$
8794 054130  012705  000012   1$:    MOV     #12,R5                          ; *,MAXPAT
8795 054134  010566  000032   2$:    MOV     R5,32(SP)                       ; MAXPAT,*                              5051
8796 054140  006366  000032          ASL     32(SP)
8797 054144  005066  000030          CLR     30(SP)                          ; COUNT
8798 054150  000167  003650          JMP     74$
8799 054154  004767  164706   3$:    JSR     PC,SELPAT                       ;                                       5053
8800 054160  005767  156512          TST     PATTERN                         ;                                       5055
8801 054164  003413                  BLE     4$
8802 054166  016746  156504          MOV     PATTERN,-(SP)                   ;                                       5057
8803 054172  012746  010100          MOV     #PHR9,-(SP)
8804 054176  012746  006126          MOV     #FMT1A,-(SP)
8805 054202  012746  000003          MOV     #3,-(SP)
8806 054206  010600                  MOV     SP,R0                           ; SP,*
8807 054210  104414                  TRAP    14
8808 054212  000417                  BR      5$
8809 054214  016766  156456  000034 4$:    MOV     PATTERN,34(SP)          ;                                       5055
8810 054222  005466  000034          NEG     34(SP)                          ; *,TEMP                                5061
8811 054226  016646  000034          MOV     34(SP),-(SP)                    ; TEMP
8812 054232  012746  010100          MOV     #PHR9,-(SP)                     ; TEMP,*                                5062
8813 054236  012746  006142          MOV     #FMT1B,-(SP)
8814 054242  012746  000003          MOV     #3,-(SP)
8815 054246  010600                  MOV     SP,R0                           ; SP,*
8816 054250  104414                  TRAP    14
8817 054252  016716  156420   5$:    MOV     PATTERN,(SP)                    ;                                       5066
8818 054256  004767  165150          JSR     PC,GEN2
8819 054262  016766  125524  000034 MOV     L$UNIT,34(SP)                   ;                                       5068
8820 054270  005005                  CLR     R5                              ; LUN
8821 054272  000167  001462          JMP     33$
8822 054276  010500           6$:    MOV     R5,R0                           ; LUN,*                                 5073
```

```
                        ;MLX4
                        ;                DEFINITION OF OPTION 2                    27-Mar-1982 19:24:42    TOPS
                                                                                   27-Mar-1982 19:23:44    PA:<
8827 054300 006200              ASR     R0
8828 054302 006200              ASR     R0
8829 054304 006200              ASR     R0
8830 054306 062700 034442       ADD     #DRIVE.STATUS,R0
8831 054312 010046              MOV     R0,-(SP)
8832 054314 010546              MOV     R5,-(SP)
8833 054316 042716 177770       BIC     #177770,(SP)            ; LUN,*
8834 054322 012746 000001       MOV     #1,-(SP)
8835 054326 005046              CLR     -(SP)
8836 054330 004767 130022       JSR     PC,BL$GT2
8837 054334 062706 000010       ADD     #10,SP
8838 054340 005300              DEC     R0
8839 054342 001127              BNE     11$
8840 054344 010567 125524       MOV     R5,L$LUN                ; LUN,*                                  5076
8841 054350 012767 012670 156312 MOV    #WBUFF,WPTR             ;                                        5077
8842 054356 012767 022670 156306 MOV    #RBUFF,RPTR             ;                                        5078
8843 054364 010501              MOV     R5,R1                   ; LUN,*                                  5079
8844 054366 006301              ASL     R1
8845 054370 016104 034460       MOV     LOW.SECT(R1),R4         ; *,SECTOR
8846 054374 020461 034500 7$:   CMP     R4,TOP.SECT(R1)         ; SECTOR,*                               5081
8847 054400 101110              BHI     11$
8848 054402 010446              MOV     R4,-(SP)                ; SECTOR,*                               5083
8849 054404 016146 034500       MOV     TOP.SECT(R1),-(SP)
8850 054410 004767 172562       JSR     PC,GET.WRDCNT
8851 054414 010002              MOV     R0,R2                   ; *,WRDCNT
8852 054416 010216              MOV     R2,(SP)                 ; WRDCNT,*
8853 054420 004767 172506       JSR     PC,SET.PTRS                                                      5084
8854 054424 010516              MOV     R5,(SP)                 ; LUN,*
8855 054426 010246              MOV     R2,-(SP)                ; WRDCNT,*                               5085
8856 054430 016746 156234       MOV     WPTR,-(SP)
8857 054434 010446              MOV     R4,-(SP)                ; SECTOR,*
8858 054436 004767 170762       JSR     PC,WRITE
8859 054442 010003              MOV     R0,R3                   ; *,VALUE
8860 054444 020327 000001       CMP     R3,#1                   ; VALUE,*
8861 054450 001031              BNE     8$                                                               5091
8862 054452 012746 000006       MOV     #6,-(SP)                ;                                        5097
8863 054456 012746 045424       MOV     #WRITE,-(SP)
8864 054462 010546              MOV     R5,-(SP)                ; LUN,*
8865 054464 010246              MOV     R2,-(SP)                ; WRDCNT,*
8866 054466 016746 156176       MOV     WPTR,-(SP)
8867 054472 010446              MOV     R4,-(SP)                ; SECTOR,*
8868 054474 004767 171524       JSR     PC,RETRY
8869 054500 062706 000014       ADD     #14,SP
8870 054504 005700              TST     R0
8871 054506 001446              BEQ     12$
8872 054510 112765 000004 034446 MOVB   #4,WHY.DROPT(R5)        ; *,*(LUN)                               5100
8873 054516 104455              TRAP    55                      ;                                        5101
8874 054520 000311              .WORD   311
8875 054522 011070              .WORD   MSG1
8876 054524 000000              .WORD   0
8877 054526 010500              MOV     R5,R0                   ; LUN,*
8878 054530 104451              TRAP    51                                                               5102
```

SEQ 0213

```
                                ;MLX4
                                ;                DEFINITION OF OPTION 2                                  27-Mar-1982 19:24:42   TOPS
                                                                                                         27-Mar-1982 19:23:44   PA:<
                                                 BR      10$
                                8$:              CMP     R3,#2                   ;                                              5103
                                                 BNE     9$                      ; VALUE,*                                      5091
                                                 MOVB    #5,WHY.DROPT(R5)        ; *,*(LUN)                                     5110
                                                 TRAP    55                      ;                                              5111
                                                 .WORD   312
                                                 .WORD   MSG1
                                                 .WORD   0
                                                 MOV     R5,R0                   ; LUN,*                                        5112
                                                 TRAP    51
                                                 BR      10$                     ;                                              5113
                                9$:              CMP     R3,#3                   ; VALUE,*                                      5091
                                                 BNE     12$                     ;                                              5118
                                                 TRAP    55
                                                 .WORD   313
                                                 .WORD   MSG1
                                                 .WORD   0
                                                 MOVB    #6,WHY.DROPT(R5)        ; *,*(LUN)                                     5119
                                                 MOV     R5,R0                   ; LUN,*                                        5120
                                                 TRAP    51
                                10$:             ADD     #12,SP                  ;                                              5121
                                11$:             BR      15$
                                12$:             JSR     PC,CHOOSE               ;                                              5125
                                                 MOV     R0,34(SP)               ; *,COMMAND
                                                 CLR     40(SP)                  ;                                              5127
                                                 CMP     R0,#READ                ; COMMAND,*
                                                 BNE     13$
                                                 INC     40(SP)
                                                 MOV     RPTR,36(SP)             ; *,PTR                                        5130
                                                 MOV     R5,-(SP)                ; LUN,*                                        5131
                                                 MOV     R2,-(SP)                ; WRDCNT,*
                                                 MOV     RPTR,-(SP)
                                                 MOV     R4,-(SP)                ; SECTOR,*
                                                 JSR     PC,READ
                                                 BR      14$
                                13$:             MOV     WPTR,36(SP)             ; *,PTR                                        5135
                                                 MOV     R5,-(SP)                ; LUN,*                                        5136
                                                 MOV     R2,-(SP)                ; WRDCNT,*
                                                 MOV     WPTR,-(SP)
                                                 MOV     R4,-(SP)                ; SECTOR,*
                                                 JSR     PC,CHECK
                                14$:             MOV     R0,R3                   ; *,VALUE
                                                 BNE     16$                     ;                                              5143
                                                 BIT     #1,50(SP)               ;                                              5148
                                                 BEQ     17$
                                                 MOV     WPTR,-(SP)              ;                                              5152
                                                 MOV     RPTR,-(SP)
                                                 MOV     R2,-(SP)                ; WRDCNT,*
                                                 JSR     PC,DOUBLE.CHECK
                                                 ADD     #6,SP
                                                 MOV     R0,60(SP)               ; *,DBL.VALUE
                                                 BEQ     17$
```

```
                                ;MLX4
                                ;               DEFINITION OF OPTION 2                                  27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<
054770  010546                          MOV     R5,-(SP)
054772  004767  160526                  JSR     PC,SAYWHO               ; LUN,*                                         5155
054776  012716  011216                  MOV     #MSG5,(SP)
055002  012746  007072                  MOV     #SAY1,-(SP)             ;                                               5156
055006  012746  000002                  MOV     #2,-(SP)
055012  010600                          MOV     SP,R0
055014  104414                          TRAP    14                      ; SP,*
055016  016616  000066                  MOV     66(SP),(SP)             ; DBL.VALUE,*
055022  017646  000066                  MOV     @66(SP),-(SP)           ; DBL.VALUE,*                                   5157
055026  012746  006710                  MOV     #FMT12A,-(SP)
055032  012746  000003                  MOV     #3,-(SP)
055036  010600                          MOV     SP,R0
055040  104414                          TRAP    14                      ; SP,*
055042  062766  010000  000074          ADD     #10000,74(SP)           ; *,DBL.VALUE                                   5159
055050  016616  000074                  MOV     74(SP),(SP)             ; DBL.VALUE,*                                   5160
055054  017646  000074                  MOV     @74(SP),-(SP)           ; DBL.VALUE,*
055060  012746  006756                  MOV     #FMT12B,-(SP)
055064  012746  000003                  MOV     #3,-(SP)
055070  010600                          MOV     SP,R0
055072  104414                          TRAP    14                      ; SP,*
055074  112765  000010  034446          MOVB    #10,WHY.DROPT(R5)       ; *,*(LUN)                                      5162
055102  104455                          TRAP    55                      ;                                               5163
055104  000314                          .WORD   314
055106  011070                          .WORD   MSG1
055110  000000                          .WORD   0
055112  010500                          MOV     R5,R0                   ; LUN,*
055114  104451                          TRAP    51                                                                      5164
055116  062706  000044                  ADD     #44,SP                  ;                                               5165
055122  000510                  15$:    BR      23$
055124  020327  000001          16$:    CMP     R3,#1                   ; VALUE,*                                       5143
055130  001033                          BNE     19$
055132  012746  000006                  MOV     #6,-(SP)                ;                                               5173
055136  016646  000046                  MOV     46(SP),-(SP)            ; COMMAND,*
055142  010546                          MOV     R5,-(SP)                ; LUN,*
055144  010246                          MOV     R2,-(SP)                ; WRDCNT,*
055146  016646  000056                  MOV     56(SP),-(SP)            ; PTR,*
055152  010446                          MOV     R4,-(SP)                ; SECTOR,*
055154  004767  171044                  JSR     PC,RETRY
055160  062706  000014                  ADD     #14,SP
055164  005700                          TST     R0
055166  001002                  17$:    BNE     18$
055170  000167  000520                  JMP     31$
055174  112765  000004  034446  18$:    MOVB    #4,WHY.DROPT(R5)        ; *,*(LUN)                                      5176
055202  104455                          TRAP    55                      ;                                               5177
055204  000315                          .WORD   315
055206  011070                          .WORD   MSG1
055210  000000                          .WORD   0
055212  010500                          MOV     R5,R0                   ; LUN,*
055214  104451                          TRAP    51                                                                      5178
055216  000450                          BR      22$                     ;
055220  020327  000002          19$:    CMP     R3,#2                   ; VALUE,*                                       5179
055224  001012                          BNE     20$                                                                     5143
```

SEQ 0215

```
8992                                    ;MLX4
8993                                    ;
8994                                    ;       DEFINITION OF OPTION 2                  27-Mar-1982 19:24:42    TOPS
8995                                    ;                                               27-Mar-1982 19:23:44    PA:<
8996 055226  112765  000005  034446            MOVB    #5,WHY.DROPT(R5)        ; *,*(LUN)                      5186
8997 055234  104455                            TRAP    55                      ;                               5187
8998 055236  000316                            .WORD   316
8999 055240  011070                            .WORD   MSG1
9000 055242  000000                            .WORD   0
9001 055244  010500                            MOV     R5,R0                   ; LUN,*                         5188
9002 055246  104451                            TRAP    51
9003 055250  000433                            BR      22$                     ;                               5189
9004 055252  020327  000003            20$:    CMP     R3,#3                   ; VALUE,*                       5143
9005 055256  001012                            BNE     21$
9006 055260  104455                            TRAP    55                      ;                               5194
9007 055262  000317                            .WORD   317
9008 055264  011070                            .WORD   MSG1
9009 055266  000000                            .WORD   0
9010 055270  112765  000006  034446            MOVB    #6,WHY.DROPT(R5)        ; *,*(LUN)                      5195
9011 055276  010500                            MOV     R5,R0                   ; LUN,*                         5196
9012 055300  104451                            TRAP    51
9013 055302  000416                            BR      22$                     ;                               5197
9014 055304  020327  000004            21$:    CMP     R3,#4                   ; VALUE,*                       5143
9015 055310  001017                            BNE     24$
9016 055312  004767  162014                    JSR     PC,ISOLATE              ;                               5202
9017 055316  104455                            TRAP    55                      ;                               5203
9018 055320  000320                            .WORD   320
9019 055322  011120                            .WORD   MSG2
9020 055324  000000                            .WORD   0
9021 055326  112765  000007  034446            MOVB    #7,WHY.DROPT(R5)        ; *,*(LUN)                      5204
9022 055334  010500                            MOV     R5,R0                   ; LUN,*                         5205
9023 055336  104451                            TRAP    51
9024 055340  062706  000022            22$:    ADD     #22,SP                  ;                               5206
9025 055344  000167  000406            23$:    JMP     32$
9026 055350  020327  000005            24$:    CMP     R3,#5                   ; VALUE,*                       5143
9027 055354  001157                            BNE     31$
9028 055356  004767  161750                    JSR     PC,ISOLATE              ;                               5211
9029 055362  032767  000001  124670            BIT     #1,ERROUT               ;                               5213
9030 055370  001423                            BEQ     25$
9031 055372  017700  157012                    MOV     @ML.REG+42,R0
9032 055376  006200                            ASR     R0
9033 055400  006200                            ASR     R0
9034 055402  006200                            ASR     R0
9035 055404  006200                            ASR     R0
9036 055406  006200                            ASR     R0
9037 055410  006200                            ASR     R0
9038 055412  042700  177700                    BIC     #177700,R0
9039 055416  010046                            MOV     R0,-(SP)
9040 055420  012746  006640                    MOV     #FMT10B,-(SP)
9041 055424  012746  000002                    MOV     #2,-(SP)
9042 055430  010600                            MOV     SP,R0                   ; SP,*
9043 055432  104414                            TRAP    14
9044 055434  062706  000006                    ADD     #6,SP
9045 055440  017766  156746  000052    25$:    MOV     @ML.REG+44,52(SP)       ; *,OLDSEC                      5216
9046 055446  017700  156736                    MOV     @ML.REG+42,R0           ;                               5217
9047 055452  006200                            ASR     R0
```

```
                                ;MLX4
                                ;                       DEFINITION OF OPTION 2                                  27-Mar-1982 19:24:42    TOPS
                                ;                                                                               27-Mar-1982 19:23:44    PA:<
 9051 055454  006200                            ASR     R0
 9052 055456  006200                            ASR     R0
 9053 055460  006200                            ASR     R0
 9054 055462  006200                            ASR     R0
 9055 055464  006200                            ASR     R0
 9056 055466  042700  177700                    BIC     #177700,R0
 9057 055472  010066  000054                    MOV     R0,54(SP)               ; *,OLDCHN
 9058 055476  012746  000001                    MOV     #1,-(SP)                ;                                       5219
 9059 055502  016646  000046                    MOV     46(SP),-(SP)            ; COMMAND,*
 9060 055506  010546                            MOV     R5,-(SP)                ; LUN,*
 9061 055510  010246                            MOV     R2,-(SP)                ; WRDCNT,*
 9062 055512  016646  000056                    MOV     56(SP),-(SP)            ; PTR,*
 9063 055516  010446                            MOV     R4,-(SP)                ; SECTOR,*
 9064 055520  004767  170500                    JSR     PC,RETRY
 9065 055524  062706  000014                    ADD     #14,SP
 9066 055530  020027  000005                    CMP     R0,#5
 9067 055534  001051                            BNE     28$
 9068 055536  027766  156650  000052            CMP     @ML.REG+44,52(SP)       ; *,OLDSEC                              5222
 9069 055544  001034                            BNE     27$
 9070 055546  016646  000054                    MOV     54(SP),-(SP)            ; OLDCHN,*
 9071 055552  017700  156632                    MOV     @ML.REG+42,R0
 9072 055556  006200                            ASR     R0
 9073 055560  006200                            ASR     R0
 9074 055562  006200                            ASR     R0
 9075 055564  006200                            ASR     R0
 9076 055566  006200                            ASR     R0
 9077 055570  006200                            ASR     R0
 9078 055572  042700  177700                    BIC     #177700,R0
 9079 055576  020026                            CMP     R0,(SP)+
 9080 055600  001016                            BNE     27$
 9081 055602  032767  000001  124450            BIT     #1,ERROUT               ;                                       5226
 9082 055610  001404                            BEQ     26$
 9083 055612  104456                            TRAP    56
 9084 055614  000321                            .WORD   321
 9085 055616  011202                            .WORD   MSG4
 9086 055620  000000                            .WORD   0
 9087 055622  010546                    26$:    MOV     R5,-(SP)                ; LUN,*                                 5228
 9088 055624  016746  156512                    MOV     BOARD,-(SP)
 9089 055630  004767  161566                    JSR     PC,UP.HARD.COUNT
 9090 055634  000426                            BR      30$
 9091 055636  032767  000001  124414    27$:    BIT     #1,ERROUT               ;                                       5222
 9092 055644  001415                            BEQ     29$                     ;                                       5233
 9093 055646  104457                            TRAP    57
 9094 055650  000322                            .WORD   322
 9095 055652  011166                            .WORD   MSG3
 9096 055654  000000                            .WORD   0
 9097 055656  000410                            BR      29$
 9098 055660  032767  000001  124372    28$:    BIT     #1,ERROUT               ;                                       5235
 9099 055666  001404                            BEQ     29$                     ;                                       5241
 9100 055670  104457                            TRAP    57
 9101 055672  000323                            .WORD   323
 9102 055674  011166                            .WORD   MSG3
```

SEQ 0217

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                                ;MLX4
                                ;                       DEFINITION OF OPTION 2                          27-Mar-1982 19:24:42    TOPS
                                                                                                        27-Mar-1982 19:23:44    PA:<
055676  000000                          .WORD   0
055700  010546                  29$:    MOV     R5,-(SP)                ; LUN,*                                                 5243
055702  016746  156434                  MOV     BOARD,-(SP)
055706  004767  162172                  JSR     PC,UP.SOFT.COUNT
055712  022626                  30$:    CMP     (SP)+,(SP)+             ;
055714  010200                  31$:    MOV     R2,R0                   ; WRDCNT,*                                              5210
055716  006300                          ASL     R0                                                                              5249
055720  066700  154744                  ADD     WPTR,R0
055724  010067  154740                  MOV     R0,WPTR
055730  010216                          MOV     R2,(SP)                 ; WRDCNT,*
055732  012746  000400                  MOV     #400,-(SP)                                                                      5250
055736  004767  127226                  JSR     PC,BL$DIV
055742  060400                          ADD     R4,R0                   ; SECTOR,*
055744  010004                          MOV     R0,R4                   ; *,SECTOR
055746  062706  000024                  ADD     #24,SP                  ;
055752  000167  176416                  JMP     7$                      ;                                                       5082
055756  005205                  32$:    INC     R5                      ; LUN                                                   5081
055760  020566  000034          33$:    CMP     R5,34(SP)               ; LUN,*                                                 5068
055764  002002                          BGE     34$
055766  000167  176304                  JMP     6$
055772  005767  154676          34$:    TST     QUICK                   ;                                                       5258
055776  001402                          BEQ     35$
056000  000167  002014                  JMP     73$
056004  016766  124002  000034  35$:    MOV     L$UNIT,34(SP)           ;                                                       5299
056012  005005                          CLR     R5                      ; LUN
056014  000167  001766                  JMP     72$
056020  010500                  36$:    MOV     R5,R0                   ; LUN,*                                                 5304
056022  006200                          ASR     R0
056024  006200                          ASR     R0
056026  006200                          ASR     R0
056030  062700  034442                  ADD     #DRIVE.STATUS,R0
056034  010046                          MOV     R0,-(SP)
056036  010546                          MOV     R5,-(SP)                ; LUN,*
056040  042716  177770                  BIC     #177770,(SP)
056044  012746  000001                  MOV     #1,-(SP)
056050  005046                          CLR     -(SP)
056052  004767  126300                  JSR     PC,BL$GT2
056056  062706  000010                  ADD     #10,SP
056062  005300                          DEC     R0
056064  001402                          BEQ     38$
056066  000167  001246          37$:    JMP     60$
056072  010567  123776          38$:    MOV     R5,L$LUN                ; LUN,*                                                 5307
056076  012767  012670  154564          MOV     #WBUFF,WPTR             ;                                                       5308
056104  012767  022670  154560          MOV     #RBUFF,RPTR             ;                                                       5309
056112  010501                          MOV     R5,R1                   ; LUN,*                                                 5310
056114  006301                          ASL     R1
056116  016104  034460                  MOV     LOW.SECT(R1),R4         ; *,SECTOR
056122  020461  034500          39$:    CMP     R4,TOP.SECT(R1)         ; SECTOR,*                                              5312
056126  101357                          BHI     37$
056130  010446                          MOV     R4,-(SP)                ; SECTOR,*                                              5314
056132  016146  034500                  MOV     TOP.SECT(R1),-(SP)
056136  004767  171034                  JSR     PC,GET.WRDCNT
```

SEQ 0218

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                                ;MLX4
                                ;                       DEFINITION OF OPTION 2                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                27-Mar-1982 19:23:44    PA:<
056142  010002                          MOV     R0,R2                   ; *,WRDCNT
056144  010216                          MOV     R2,(SP)                 ; WRDCNT,*                                              5315
056146  004767  170760                  JSR     PC,SET.PTRS
056152  004767  170010                  JSR     PC,CHOOSE               ;                                               5316
056156  010066  000026                  MOV     R0,26(SP)               ; *,COMMAND
056162  012766  000001  000032          MOV     #1,32(SP)               ; *,KOUNT                                       5318
056170  005066  000024          40$:    CLR     24(SP)                  ;                                               5321
056174  026627  000026  045612          CMP     26(SP),#READ            ; COMMAND,*
056202  001015                          BNE     41$
056204  005266  000024                  INC     24(SP)
056210  016766  154456  000030          MOV     RPTR,30(SP)             ; *,PTR                                         5324
056216  010546                          MOV     R5,-(SP)                ; LUN,*                                         5325
056220  010246                          MOV     R2,-(SP)                ; WRDCNT,*
056222  016746  154444                  MOV     RPTR,-(SP)
056226  010446                          MOV     R4,-(SP)                ; SECTOR,*
056230  004767  167356                  JSR     PC,READ
056234  000412                          BR      42$
056236  016766  154426  000030  41$:    MOV     WPTR,30(SP)             ; *,PTR                                         5329
056244  010546                          MOV     R5,-(SP)                ; LUN,*                                         5330
056246  010246                          MOV     R2,-(SP)                ; WRDCNT,*
056250  016746  154414                  MOV     WPTR,-(SP)
056254  010446                          MOV     R4,-(SP)                ; SECTOR,*
056256  004767  167516                  JSR     PC,CHECK
056262  010003                  42$:    MOV     R0,R3                   ; *,VALUE
056264  001076                          BNE     43$                     ;                                               5337
056266  032766  000001  000034          BIT     #1,34(SP)               ;                                               5342
056274  001513                          BEQ     44$
056276  016746  154366                  MOV     WPTR,-(SP)              ;                                               5346
056302  016746  154364                  MOV     RPTR,-(SP)
056306  010246                          MOV     R2,-(SP)                ; WRDCNT,*
056310  004767  166012                  JSR     PC,DOUBLE.CHECK
056314  062706  000006                  ADD     #6,SP
056320  010066  000052                  MOV     R0,52(SP)               ; *,DBL.VALUE
056324  001477                          BEQ     44$
056326  010546                          MOV     R5,-(SP)                ; LUN,*                                         5349
056330  004767  157170                  JSR     PC,SAYWHO
056334  012716  011216                  MOV     #MSG5,(SP)              ;                                               5350
056340  012746  007072                  MOV     #SAY1,-(SP)
056344  012746  000002                  MOV     #2,-(SP)
056350  010600                          MOV     SP,R0                   ; SP,*
056352  104414                          TRAP    14
056354  016616  000060                  MOV     60(SP),(SP)             ; DBL.VALUE,*                                   5352
056360  017646  000060                  MOV     @60(SP),-(SP)           ; DBL.VALUE,*
056364  012746  006710                  MOV     #FMT12A,-(SP)
056370  012746  000003                  MOV     #3,-(SP)
056374  010600                          MOV     SP,R0                   ; SP,*
056376  104414                          TRAP    14
056400  062766  010000  000066          ADD     #10000,66(SP)           ; *,DBL.VALUE                                   5354
056406  016616  000066                  MOV     66(SP),(SP)             ; DBL.VALUE,*                                   5355
056412  017646  000066                  MOV     @66(SP),-(SP)           ; DBL.VALUE,*
056416  012746  006756                  MOV     #FMT12B,-(SP)
056422  012746  000003                  MOV     #3,-(SP)
```

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                                                                                                                    SEQ 0219
 9216                                ;MLX4
 9217                                :                                                                  27-Mar-1982 19:24:42    TOPS
 9218                                                                                                   27-Mar-1982 19:23:44    PA:<
 9219 056426  010600                                MOV     SP,R0                       ; SP,*
 9220 056430  104414                                TRAP    14
 9221 056432  112765  000010  034446                MOVB    #10,WHY.DROPT(R5)           ; *,*(LUN)                          5357
 9222 056440  104455                                TRAP    55                          :                                   5358
 9223 056442  000324                                .WORD   324
 9224 056444  011070                                .WORD   MSG1
 9225 056446  000000                                .WORD   0
 9226 056450  010500                                MOV     R5,R0                       ; LUN,*                             5359
 9227 056452  104451                                TRAP    51
 9228 056454  062706  000036                        ADD     #36,SP                      ;                                   5360
 9229 056460  000510                                BR      50$
 9230 056462  020327  000001          43$:          CMP     R3,#1                       ; VALUE,*                           5337
 9231 056466  001033                                BNE     46$
 9232 056470  012746  000006                        MOV     #6,-(SP)                    ;                                   5368
 9233 056474  016646  000040                        MOV     40(SP),-(SP)                ; COMMAND,*
 9234 056500  010546                                MOV     R5,-(SP)                    ; LUN,*
 9235 056502  010246                                MOV     R2,-(SP)                    ; WRDCNT,*
 9236 056504  016646  000050                        MOV     50(SP),-(SP)                ; PTR,*
 9237 056510  010446                                MOV     R4,-(SP)                    ; SECTOR,*
 9238 056512  004767  167506                        JSR     PC,RETRY
 9239 056516  062706  000014                        ADD     #14,SP
 9240 056522  005700                                TST     R0
 9241 056524  001002                                BNE     45$
 9242 056526  000167  000520          44$:          JMP     58$
 9243 056532  112765  000004  034446  45$:          MOVB    #4,WHY.DROPT(R5)            ; *,*(LUN)                          5371
 9244 056540  104455                                TRAP    55                          :                                   5372
 9245 056542  000325                                .WORD   325
 9246 056544  011070                                .WORD   MSG1
 9247 056546  000000                                .WORD   0
 9248 056550  010500                                MOV     R5,R0                       ; LUN,*                             5373
 9249 056552  104451                                TRAP    51
 9250 056554  000450                                BR      49$
 9251 056556  020327  000002          46$:          CMP     R3,#2                       ;                                   5374
 9252 056562  001012                                BNE     47$                         ; VALUE,*                           5337
 9253 056564  112765  000005  034446                MOVB    #5,WHY.DROPT(R5)            ; *,*(LUN)                          5381
 9254 056572  104455                                TRAP    55                          :                                   5382
 9255 056574  000326                                .WORD   326
 9256 056576  011070                                .WORD   MSG1
 9257 056600  000000                                .WORD   0
 9258 056602  010500                                MOV     R5,R0                       ; LUN,*                             5383
 9259 056604  104451                                TRAP    51
 9260 056606  000433                                BR      49$
 9261 056610  020327  000003          47$:          CMP     R3,#3                       ;                                   5384
 9262 056614  001012                                BNE     48$                         ; VALUE,*                           5337
 9263 056616  104455                                TRAP    55
 9264 056620  000327                                .WORD   327                         ;                                   5389
 9265 056622  011070                                .WORD   MSG1
 9266 056624  000000                                .WORD   0
 9267 056626  112765  000006  034446                MOVB    #6,WHY.DROPT(R5)            ; *,*(LUN)                          5390
 9268 056634  010500                                MOV     R5,R0                       ; LUN,*                             5391
 9269 056636  104451                                TRAP    51
 9270 056640  000416                                BR      49$                         ;                                   5392
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SEQ 0220

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                                        ;MLX4
                                        ;                DEFINITION OF OPTION 2                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                 27-Mar-1982 19:23:44    PA:<
056642  020327  000004        48$:    CMP     R3,#4                   ; VALUE,*                                               5337
056646  001017                        BNE     51$
056650  004767  160456                JSR     PC,ISOLATE              ;                                               5397
056654  104455                        TRAP    55                      ;                                               5398
056656  000330                        .WORD   330
056660  011120                        .WORD   MSG2
056662  000000                        .WORD   0
056664  112765  000007  034446        MOVB    #7,WHY.DROPT(R5)        ; *,*(LUN)                                      5399
056672  010500                        MOV     R5,R0                   ; LUN,*                                         5400
056674  104451                        TRAP    51
056676  062706  000014        49$:    ADD     #14,SP                  ;                                               5401
056702  000167  001076        50$:    JMP     71$
056706  020327  000005        51$:    CMP     R3,#5                   ; VALUE,*                                       5337
056712  001157                        BNE     58$
056714  004767  160412                JSR     PC,ISOLATE              ;                                               5406
056720  032767  000001  123332        BIT     #1,ERROUT               ;                                               5408
056726  001423                        BEQ     52$
056730  017700  155454                MOV     @ML.REG+42,R0
056734  006200                        ASR     R0
056736  006200                        ASR     R0
056740  006200                        ASR     R0
056742  006200                        ASR     R0
056744  006200                        ASR     R0
056746  006200                        ASR     R0
056750  042700  177700                BIC     #177700,R0
056754  010046                        MOV     R0,-(SP)
056756  012746  006640                MOV     #FMT10B,-(SP)
056762  012746  000002                MOV     #2,-(SP)
056766  010600                        MOV     SP,R0
056770  104414                        TRAP    14                      ; SP,*
056772  062706  000006                ADD     #6,SP
056776  017766  155410  000044  52$:  MOV     @ML.REG+44,44(SP)       ; *,OLDSEC                                      5410
057004  017700  155400                MOV     @ML.REG+42,R0           ;                                               5411
057010  006200                        ASR     R0
057012  006200                        ASR     R0
057014  006200                        ASR     R0
057016  006200                        ASR     R0
057020  006200                        ASR     R0
057022  006200                        ASR     R0
057024  042700  177700                BIC     #177700,R0
057030  010066  000046                MOV     R0,46(SP)               ; *,OLDCHN
057034  012746  000001                MOV     #1,-(SP)                ;                                               5413
057040  016646  000040                MOV     40(SP),-(SP)            ; COMMAND,*
057044  010546                        MOV     R5,-(SP)                ; LUN,*
057046  010246                        MOV     R2,-(SP)                ; WRDCNT,*
057050  016646  000050                MOV     50(SP),-(SP)            ; PTR,*
057054  010446                        MOV     R4,-(SP)                ; SECTOR,*
057056  004767  167142                JSR     PC,RETRY
057062  062706  000014                ADD     #14,SP
057066  020027  000005                CMP     R0,#5
057072  001051                        BNE     55$
057074  027766  155312  000044        CMP     @ML.REG+44,44(SP)       ; *,OLDSEC                                      5416
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                                ;MLX4
                                ;                       DEFINITION OF OPTION 2                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                27-Mar-1982 19:23:44    PA:<
 9331 057102  001034                            BNE     54$
 9332 057104  016646  000046                    MOV     46(SP),-(SP)                    ; OLDCHN,*
 9333 057110  017700  155274                    MOV     @ML.REG+42,R0
 9334 057114  006200                            ASR     R0
 9335 057116  006200                            ASR     R0
 9336 057120  006200                            ASR     R0
 9337 057122  006200                            ASR     R0
 9338 057124  006200                            ASR     R0
 9339 057126  006200                            ASR     R0
 9340 057130  042700  177700                    BIC     #177700,R0
 9341 057134  020026                            CMP     R0,(SP)+
 9342 057136  001016                            BNE     54$
 9343 057140  032767  000001  123112            BIT     #1,ERROUT                       ;                       5420
 9344 057146  001404                            BEQ     53$
 9345 057150  104456                            TRAP    56
 9346 057152  000331                            .WORD   331
 9347 057154  011202                            .WORD   MSG4
 9348 057156  000000                            .WORD   0
 9349 057160  010546                    53$:    MOV     R5,-(SP)                        ; LUN,*
 9350 057162  016746  155154                    MOV     BOARD,-(SP)                     ;                       5423
 9351 057166  004767  160230                    JSR     PC,UP.HARD.COUNT
 9352 057172  000426                            BR      57$
 9353 057174  032767  000001  123056  54$:     BIT     #1,ERROUT                       ;                       5416
 9354 057202  001415                            BEQ     56$                             ;                       5428
 9355 057204  104457                            TRAP    57
 9356 057206  000332                            .WORD   332
 9357 057210  011166                            .WORD   MSG3
 9358 057212  000000                            .WORD   0
 9359 057214  000410                            BR      56$
 9360 057216  032767  000001  123034  55$:     BIT     #1,ERROUT                       ;                       5431
 9361 057224  001404                            BEQ     56$                             ;                       5437
 9362 057226  104457                            TRAP    57
 9363 057230  000333                            .WORD   333
 9364 057232  011166                            .WORD   MSG3
 9365 057234  000000                            .WORD   0
 9366 057236  010546                    56$:    MOV     R5,-(SP)
 9367 057240  016746  155076                    MOV     BOARD,-(SP)                     ; LUN,*                 5439
 9368 057244  004767  160634                    JSR     PC,UP.SOFT.COUNT
 9369 057250  022626                    57$:    CMP     (SP)+,(SP)+
 9370 057252  062706  000010            58$:    ADD     #10,SP                          ;                       5405
 9371 057256  005266  000032                    INC     32(SP)                          ;                       5319
 9372 057262  026627  000032  000002            CMP     32(SP),#2                       ; KOUNT                 5318
 9373 057270  003002                            BGT     59$                             ; KOUNT,*
 9374 057272  000167  176672                    JMP     40$
 9375 057276  010200                    59$:    MOV     R2,R0                           ; WRDCNT,*              5447
 9376 057300  006300                            ASL     R0
 9377 057302  066700  153362                    ADD     WPTR,R0
 9378 057306  010067  153356                    MOV     R0,WPTR
 9379 057312  010216                            MOV     R2,(SP)                         ; WRDCNT,*
 9380 057314  012746  000400                    MOV     #400,-(SP)                      ;                       5448
 9381 057320  004767  125644                    JSR     PC,BL$DIV
 9382 057324  060400                            ADD     R4,R0                           ; SECTOR,*
```

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                                                                                                                    SEQ 0222
                                ;MLX4
                                ;                       DEFINITION OF OPTION 2                                      27-Mar-1982 19:24:42    TOPS
                                                                                                                    27-Mar-1982 19:23:44    PA:<
9387 057326 010004                      MOV     R0,R4                           ; *,SECTOR
9388 057330 062706 000006               ADD     #6,SP                           ;
9389 057334 000167 176562               JMP     39$                             ;                                                       5313
9390 057340 032767 000001 122714 60$:   BIT     #1,EFN$21                       ;                                                       5312
9391 057346 001002                      BNE     61$                                                                                     5459
9392 057350 000167 000430               JMP     71$
9393 057354 010500               61$:   MOV     R5,R0                           ; LUN,*                                                 5466
9394 057356 006300                      ASL     R0
9395 057360 016066 034500 000026        MOV     TOP.SECT(R0),26(SP)
9396 057366 016001 034460               MOV     LOW.SECT(R0),R1                 ; *,SECTOR
9397 057372 000577                      BR      70$
9398 057374 010546               62$:   MOV     R5,-(SP)                        ; LUN,*                                                 5468
9399 057376 012746 000400               MOV     #400,-(SP)
9400 057402 012746 022670               MOV     #RBUFF,-(SP)
9401 057406 010146                      MOV     R1,-(SP)                        ; SECTOR,*
9402 057410 004767 166176               JSR     PC,READ
9403 057414 062706 000010               ADD     #10,SP
9404 057420 020027 000005               CMP     R0,#5
9405 057424 001161                      BNE     69$
9406 057426 004767 157700               JSR     PC,ISOLATE                      ;
9407 057432 032767 000001 122620        BIT     #1,ERROUT                       ;                                                       5471
9408 057440 001423                      BEQ     63$                                                                                     5473
9409 057442 017700 154742               MOV     @ML.REG+42,R0
9410 057446 006200                      ASR     R0
9411 057450 006200                      ASR     R0
9412 057452 006200                      ASR     R0
9413 057454 006200                      ASR     R0
9414 057456 006200                      ASR     R0
9415 057460 006200                      ASR     R0
9416 057462 042700 177700               BIC     #177700,R0
9417 057466 010046                      MOV     R0,-(SP)
9418 057470 012746 006640               MOV     #FMT10B,-(SP)
9419 057474 012746 000002               MOV     #2,-(SP)
9420 057500 010600                      MOV     SP,R0                           ; SP,*
9421 057502 104414                      TRAP    14
9422 057504 062706 000006               ADD     #6,SP
9423 057510 017766 154676 000030 63$:   MOV     @ML.REG+44,30(SP)               ; *,OLDSEC                                              5482
9424 057516 017700 154666               MOV     @ML.REG+42,R0                   ;                                                       5483
9425 057522 006200                      ASR     R0
9426 057524 006200                      ASR     R0
9427 057526 006200                      ASR     R0
9428 057530 006200                      ASR     R0
9429 057532 006200                      ASR     R0
9430 057534 006200                      ASR     R0
9431 057536 042700 177700               BIC     #177700,R0
9432 057542 010066 000032               MOV     R0,32(SP)                       ; *,OLDCHN
9433 057546 012746 000001               MOV     #1,-(SP)                        ;
9434 057552 016646 000024               MOV     24(SP),-(SP)                    ; COMMAND,*                                             5491
9435 057556 010546                      MOV     R5,-(SP)                        ; LUN,*
9436 057560 012746 000400               MOV     #400,-(SP)
9437 057564 016646 000034               MOV     34(SP),-(SP)                    ; PTR,*
9438 057570 016646 000042               MOV     42(SP),-(SP)                    ; OLDSEC,*
```

SEQ 0223

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9440                                    ;MLX4
9441                                    :
9442                                    :       DEFINITION OF OPTION 2                  27-Mar-1982 19:24:42    TOPS
9443                                                                                    27-Mar-1982 19:23:44    PA:<
9443 057574  004767  166424                    JSR     PC,RETRY
9444 057600  062706  000014                    ADD     #14,SP
9445 057604  020027  000005                    CMP     R0,#5
9446 057610  001051                            BNE     66$
9447 057612  027766  154574  000030            CMP     @ML.REG+44,30(SP)       ; *,OLDSEC                      5500
9448 057620  001034                            BNE     65$
9449 057622  016646  000032                    MOV     32(SP),-(SP)            ; OLDCHN,*
9450 057626  017700  154556                    MOV     @ML.REG+42,R0
9451 057632  006200                            ASR     R0
9452 057634  006200                            ASR     R0
9453 057636  006200                            ASR     R0
9454 057640  006200                            ASR     R0
9455 057642  006200                            ASR     R0
9456 057644  006200                            ASR     R0
9457 057646  042700  177700                    BIC     #177700,R0
9458 057652  020026                            CMP     R0,(SP)+
9459 057654  001016                            BNE     65$
9460 057656  032767  000001  122374            BIT     #1,ERROUT               ;                               5504
9461 057664  001404                            BEQ     64$
9462 057666  104456                            TRAP    56                      ;                               5509
9463 057670  000334                            .WORD   334
9464 057672  011202                            .WORD   MSG4
9465 057674  000000                            .WORD   0
9466 057676  010546                    64$:    MOV     R5,-(SP)                ; LUN,*                         5512
9467 057700  016746  154436                    MOV     BOARD,-(SP)
9468 057704  004767  157512                    JSR     PC,UP.HARD.COUNT
9469 057710  000426                            BR      68$
9470 057712  032767  000001  122340  65$:      BIT     #1,ERROUT               ;                               5500
9471 057720  001415                            BEQ     67$                     ;                               5517
9472 057722  104457                            TRAP    57
9473 057724  000335                            .WORD   335                     ;                               5522
9474 057726  011166                            .WORD   MSG3
9475 057730  000000                            .WORD   0
9476 057732  000410                            BR      67$
9477 057734  032767  000001  122316  66$:      BIT     #1,ERROUT               ;                               5525
9478 057742  001404                            BEQ     67$                     ;                               5531
9479 057744  104457                            TRAP    57
9480 057746  000336                            .WORD   336                     ;                               5536
9481 057750  011166                            .WORD   MSG3
9482 057752  000000                            .WORD   0
9483 057754  010546                    67$:    MOV     R5,-(SP)                ; LUN,*                         5539
9484 057756  016746  154360                    MOV     BOARD,-(SP)
9485 057762  004767  160116                    JSR     PC,UP.SOFT.COUNT
9486 057766  022626                    68$:    CMP     (SP)+,(SP)+             ;                               5470
9487 057770  005201                    69$:    INC     R1                      ; SECTOR                        5466
9488 057772  020166  000026            70$:    CMP     R1,26(SP)               ; SECTOR,*
9489 057776  101002                            BHI     71$
9490 060000  000167  177370                    JMP     62$
9491 060004  005205                    71$:    INC     R5                      ; LUN
9492 060006  020566  000034            72$:    CMP     R5,34(SP)               ; LUN,*                         5299
9493 060012  002002                            BGE     73$
9494 060014  000167  176000                    JMP     36$
```

```
                                ;MLX4                                                                   27-Mar-1982 19:24:42    TOPS
                                ;               DEFINITION OF OPTION 2                                  27-Mar-1982 19:23:44    PA:<
9499 060020 062706 000010       73$:    ADD     #10,SP
9500 060024 005266 000030       74$:    INC     30(SP)                          ;                                               5052
9501 060030 026666 000030 000032        CMP     30(SP),32(SP)                   ; COUNT                                         5051
9502 060036 003002                      BGT     75$                             ; COUNT,*
9503 060040 000167 174110               JMP     3$
9504 060044 062706 000036       75$:    ADD     #36,SP                          ;                                               4982
9505 060050 000207                      RTS     PC
9506
9507
9508                            ; Routine Size:  1023 words
9513                            ; Maximum stack depth per invocation:  43 words
9514
```

SEQ 0225


```
;MLX4
;                DEFINITION OF OPTION 3
;
;          5555  %sbttl 'DEFINITION OF OPTION 3'
;          5556  routine OPT3 : novalue =
;          5557      begin                                   !* 1 *  START OF ROUTINE
;          5558
;          5559  !++
;          5560  !  ROUTINE:     OPT3
;          5561  !
;          5562  !  PURPOSE:     TO DO A UNIQUE DATA CHECK ON ALL AVAILABLE UNITS.
;          5563  !
;          5564  !  THE CODE FOR 'OPT3' IN BRIEF:
;          5565  !
;          5566  !  BEGIN 1 (START OF ROUTINE)
;          5567  !  SAY ROUTINE IS RUNNING
;          5568  !  INCR COMPLEMENT FLAG FROM 0 TO 1
;          5569  !  : BEGIN 2 (START OF COMPLEMENT FLAG SELECTION LOOP)
;          5570  !  : GENERATE THE PATTERN
;          5571  !  : INCR LUN FROM 0 TO LAST
;          5572  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
;          5573  !  : : TESTLOOP:
;          5574  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
;          5575  !  : : : IF UNIT IS ACTIVE
;          5576  !  : : : THEN
;          5577  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
;          5578  !  : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
;          5579  !  : : : : SECTOR = LOWEST
;          5580  !  : : : : WHILE SECTOR LEQ HIGHEST DO
;          5581  !  : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
;          5582  !  : : : : : GET_WRDCNT
;          5583  !  : : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
;          5584  !  : : : : : WRITE
;          5585  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;          5586  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
;          5587  !  : : : : : DO THE WRITE CHECK OR READ
;          5588  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;          5589  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
;          5590  !  : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
;          5591  !  : : : : : END 6 (END OF SECTOR SELECTION LOOP)
;          5592  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
;          5593  !  : : : END 4 (END OF TESTLOOP)
;          5594  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
;          5595  !  : END 2 (END OF COMPLEMENT FLAG SELECTION LOOP)
;          5596  !  RETURN
;          5597  !  END 1 (END OF ROUTINE)
;          5598  !--
;          5599
;          5600      label
;          5601          LOOP;
;          5602
;          5603      local
;          5604          WRDCNT,
;          5605          VALUE,
;          5606          OLDSEC,
```

SEQ 0226

27-Mar-1982 19:24:42 TOPS-20 Bliss-16 V2(212)
27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (39)

```
;MLX4
;                    DEFINITION OF OPTION 3

;          5607          OLDCHN,
;          5608          SECTOR,
;          5609          PTR,
;          5610          COMMAND,
;          5611          DBL_VALUE;
;          5612
;          5613      PRINTB (SAY2, WRD34, RTN3);
;          5614      !'RUNNING OPT3'
;          5615
;          5616      incr COMP_FLAG from 0 to 1 do
;          5617          begin                          !* 2 *  START OF COMPLEMENT FLAG SELECTION LOOP
;          5618          GEN3 (.COMP_FLAG);
;          5619
;          5620          incr LUN from 0 to (.L$UNIT - 1) do
;          5621              begin                      !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
;          5622      LOOP :
;          5623              begin                      !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
;          5624
;          5625              if .DRIVE_STATUS [.LUN] eql ACTIVE
;          5626              then
;          5627                  begin                  !* 5 *  START OF TEST FOR AN ACTIVE UNIT
;          5628                  L$LUN = .LUN;
;          5629                  WPTR = WBUFF;
;          5630                  RPTR = RBUFF;
;          5631                  SECTOR = LOWEST;
;          5632
;          5633              while .SECTOR lequ HIGHEST do
;          5634                  begin                  !* 6 *  START OF SECTOR SELECTION LOOP
;          5635                  WRDCNT = GET_WRDCNT (.SECTOR, HIGHEST);
;          5636                  SET_PTRS (.WRDCNT);
;          5637                  VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);
;          5638
;          5639                  !+
;          5640                  !  SEE HOW SUCCESSFUL THE WRITE WAS:
;          5641                  !-
;          5642
;          5643                  selectone .VALUE of        !SEE 'SYSERR' FOR DEFINITION
;          5644                      set                    !OF ERROR # CONTAINED IN 'VALUE'
;          5645
;          5646                      [1] :
;          5647                          begin              !* 6A * RETRY ALLOWED
;          5648
;          5649                          if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
;          5650                          then               !THE RETRY FAILED -- SYSTEM FATAL ERROR
;          5651                              begin
;          5652                              WHY_DROPT [.LUN] = CODE_4;
;          5653                              ERRDF (301, MSG1, 0);   !**** OPTION 3 ERROR 01 ****
;          5654                              DODU (.LUN);
;          5655                              leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
;          5656                              end;
;          5657
;          5658                          end;               !* 6A *
```

SEQ 0227


```
9628 ;MLX4
9629 ;
9630
9631 ;          5659
9632 ;          5660                        [2] :
9633 ;          5661                            begin                   !* 6B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
9634 ;          5662                            WHY_DROPT [.LUN] = CODE_5;
9635 ;          5663                            ERRDF (302, MSG1, 0);       !**** OPTION 3 ERROR 02 ****
9636 ;          5664                            DODU (.LUN);
9637 ;          5665                            leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
9638 ;          5666                            end;                    !* 6B *
9639 ;          5667
9640 ;          5668                        [3] :
9641 ;          5669                            begin                   !* 6C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
9642 ;          5670                            ERRDF (303, MSG1, 0);       !**** OPTION 3 ERROR 03 ****
9643 ;          5671                            WHY_DROPT [.LUN] = CODE_6;
9644 ;          5672                            DODU (.LUN);
9645 ;          5673                            leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
9646 ;          5674                            end;                    !* 6C *
9647 ;          5675                        tes;
9648 ;          5676
9649 ;          5677                    COMMAND = CHOOSE ();
9650 ;          5678
9651 ;          5679                    if .COMMAND eql read
9652 ;          5680                    then
9653 ;          5681                        begin
9654 ;          5682                        PTR = .RPTR;
9655 ;          5683                        VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
9656 ;          5684                        end
9657 ;          5685                    else
9658 ;          5686                        begin
9659 ;          5687                        PTR = .WPTR;
9660 ;          5688                        VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
9661 ;          5689                        end;
9662 ;          5690
9663 ;          5691                    !+
9664 ;          5692                    !  SEE HOW SUCCESSFUL THE OPERATION WAS:
9665 ;          5693                    !-
9666 ;          5694
9667 ;          5695                    selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
9668 ;          5696                        set                         !OF ERROR # CONTAINED IN 'VALUE'
9669 ;          5697
9670 ;          5698                        [0] :
9671 ;          5699
9672 ;          5700                            if .COMMAND eql read
9673 ;          5701                            then
9674 ;          5702                                begin
9675 ;          5703
9676 ;          5704                                if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
9677 ;          5705                                then
9678 ;          5706                                    begin
9679 ;          5707                                    SAYWHO (.LUN);
9680 ;          5708                                    PRINTB (SAY1, MSG5);        !'ECC LOGIC FAILED TO DETECT DATA ERROR'
9681 ;          5709                                    PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
9682 ;          5710                                                !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
```

```
;MLX4
;                DEFINITION OF OPTION 3                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                          27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (39)

;        5711                                  DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
;        5712                                  PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
;        5713                                          !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
;        5714                                  WHY_DROPT [.LUN] = CODE_8;
;        5715                                  ERRDF (304, MSG1, 0);       !**** OPTION 3 ERROR 04 ****
;        5716                                  DODU (.LUN);
;        5717                                  leave LOOP; !JUMP JUST BEYOND END OF BLOCK * 4 *
;        5718                                  end;
;        5719
;        5720                              end;
;        5721
;        5722                          [1] :
;        5723                              begin                   !* 6D * RETRY ALLOWED
;        5724
;        5725                              if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
;        5726                              then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
;        5727                                  begin
;        5728                                  WHY_DROPT [.LUN] = CODE_4;
;        5729                                  ERRDF (305, MSG1, 0);   !**** OPTION 3 ERROR 05 ****
;        5730                                  DODU (.LUN);
;        5731                                  leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
;        5732                                  end;
;        5733
;        5734                              end;                    !* 6D *
;        5735
;        5736                          [2] :
;        5737                              begin                   !* 6E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
;        5738                              WHY_DROPT [.LUN] = CODE_5;
;        5739                              ERRDF (306, MSG1, 0);       !**** OPTION 3 ERROR 06 ****
;        5740                              DODU (.LUN);
;        5741                              leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
;        5742                              end;                    !* 6E *
;        5743
;        5744                          [3] :
;        5745                              begin                   !* 6F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
;        5746                              ERRDF (307, MSG1, 0);       !**** OPTION 3 ERROR 07 ****
;        5747                              WHY_DROPT [.LUN] = CODE_6;
;        5748                              DODU (.LUN);
;        5749                              leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
;        5750                              end;                    !* 6F *
;        5751
;        5752                          [4] :
;        5753                              begin                   !* 6G * UNRECOVERABLE DATA ERROR
;        5754                              ISOLATE ();
;        5755                              ERRDF (308, MSG2, 0);       !**** OPTION 3 ERROR 08 ****
;        5756                              WHY_DROPT [.LUN] = CODE_7;
;        5757                              DODU (.LUN);
;        5758                              leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
;        5759                              end;                    !* 6G *
;        5760
;        5761                          [5] :
;        5762                              begin                   !* 6H * RECOVERABLE DATA ERROR
```

```
9740 ;MLX4
9741 ;
9742
9743 ;          5763                    ISOLATE ();
9744 ;          5764
9745 ;          5765                    if .ERROUT then PRINTB (FMT10B, .CHAN);
9746 ;          5766
9747 ;          5767                    !'    BIT QQ'
9748 ;          5768                    OLDSEC = .MLEL;
9749 ;          5769                    OLDCHN = .CHAN;
9750 ;          5770
9751 ;          5771                    if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
9752 ;          5772                    then
9753 ;          5773
9754 ;          5774                        if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
9755 ;          5775                        then
9756 ;          5776                            begin
9757 ;          5777
9758 ;          5778                            if .ERROUT then ERRHRD (309, MSG4, 0);      !**** OPTION 3 ERROR 09 ****
9759 ;          5779
9760 ;          5780                            UP_HARD_COUNT (.LUN, .BOARD);
9761 ;          5781                            end
9762 ;          5782                        else
9763 ;          5783                            begin
9764 ;          5784
9765 ;          5785                            if .ERROUT then ERRSOFT (310, MSG3, 0);     !**** OPTION 3 ERROR 10 ****
9766 ;          5786
9767 ;          5787                            UP_SOFT_COUNT (.LUN, .BOARD);
9768 ;          5788                            end
9769 ;          5789
9770 ;          5790                    else
9771 ;          5791                        begin
9772 ;          5792
9773 ;          5793                        if .ERROUT then ERRSOFT (311, MSG3, 0); !**** OPTION 3 ERROR 11 ****
9774 ;          5794
9775 ;          5795                        UP_SOFT_COUNT (.LUN, .BOARD);
9776 ;          5796                        end;
9777 ;          5797
9778 ;          5798                    end;                        !* 6H *
9779 ;          5799                tes;
9780 ;          5800
9781 ;          5801                WPTR = .WPTR + (.WRDCNT*2);
9782 ;          5802                SECTOR = .SECTOR + (.WRDCNT/256);
9783 ;          5803                end;                            !* 6 *  END OF SECTOR SELECTION LOOP
9784 ;          5804
9785 ;          5805            end;                                !* 5 *  END OF TEST FOR AN ACTIVE UNIT
9786 ;          5806
9787 ;          5807            !+
9788 ;          5808            ! Test to see if this uut's address space is
9789 ;          5809            ! to be read for soft errors.  This test is
9790 ;          5810            ! is intended for DMT purposes.
9791 ;          5811            !-
9792 ;          5812
9793 ;          5813            if .EFN$21                          !Is the background pattern to be read
9794 ;          5814            then
```

```
;MLX4
;                DEFINITION OF OPTION 3

;         5815                  begin
;         5816
;         5817  !
;         5818  ! version czmlbb changed incr to incru
;         5819  !
;         5820                  incru SECTOR from LOWEST to HIGHEST do
;         5821
;         5822                      if read (.LUN, 256, RBUFF, .SECTOR) eql 5
;         5823                      then
;         5824                          begin
;         5825                          ISOLATE ();             !Find the failing bank and board no.
;         5826
;         5827                          if .ERROUT then PRINTB (FMT10B, .CHAN);
;         5828
;         5829                          ! Print where the error is
;         5830                          !
;         5831                          ! Save the contents of the ML error location
;         5832                          ! register so we can compare it to the new
;         5833                          ! contents of this register after the retry.
;         5834                          ! This is done to classify the error.
;         5835                          !
;         5836                          OLDSEC = .MLEL;
;         5837                          OLDCHN = .CHAN;
;         5838                          !
;         5839                          ! Do a classify retry call.  If the same error
;         5840                          ! occures then classify it as a hard error.  If
;         5841                          ! a different error occured or the error went away
;         5842                          ! then classify it as a soft error.
;         5843                          !
;         5844
;         5845                          if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
;         5846                          then
;         5847                          !
;         5848                          ! The same error occured so see if it is at the same
;         5849                          ! sector and channel number, if so then classify
;         5850                          ! it as a hard error else classiy it as a soft
;         5851                          ! error.
;         5852                          !
;         5853
;         5854                              if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
;         5855                              then
;         5856                                  begin           !Same error occured 'hard'
;         5857
;         5858                                  if .ERROUT      !Print error if enabled
;         5859                                  then
;         5860                                      begin
;       P 5861                                      ERRHRD (312,        !Error number
;       P 5862                                          MSG4,   !Error message
;         5863                                          0);     !Additional message routine
;         5864                                      end;
;         5865
;         5866                                  UP_HARD_COUNT (.LUN, .BOARD);
```

```
;          5867                                    end
;          5868                                else
;          5869                                    begin               !Not the same error 'soft'
;          5870
;          5871                                    if .ERROUT          !Print error if enabled
;          5872                                    then
;          5873                                        begin
;        P 5874                                        ERRSOFT (313,       !Error number
;        P 5875                                            MSG3,   !Error message
;          5876                                            0);     !Additional message routine
;          5877                                        end;
;          5878
;          5879                                    UP_SOFT_COUNT (.LUN, .BOARD);
;          5880                                    end
;          5881
;          5882                                else                        !Not the same error 'soft'
;          5883                                    begin
;          5884
;          5885                                    if .ERROUT          !Print error if enabled
;          5886                                    then
;          5887                                        begin
;        P 5888                                        ERRSOFT (314,   !Error number
;        P 5889                                            MSG3,       !Error message
;          5890                                            0);         !Additional message routine
;          5891                                        end;
;          5892
;          5893                                    UP_SOFT_COUNT (.LUN, .BOARD);
;          5894                                    end;
;          5895
;          5896                                end;
;          5897
;          5898                            end;
;          5899
;          5900                        end;                                !* 4 *  END OF TESTLOOP
;          5901                        end;                                !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
;          5902
;          5903                    end;                                    !* 2 *  END OF COMPLEMENT FLAG SELECTION LOOP
;          5904
;          5905            return;
;          5906            end;                                            !* 1 *  END OF ROUTINE
9898
9899
9903 060052 004167 125256          OPT3:   .SBTTL  OPT3 DEFINITION OF OPTION 3
9904 060056 162706 000020                  JSR     R1,$SAVE5                       ;                   5556
9905 060062 012746 007642                  SUB     #20,SP
9906 060066 012746 007344                  MOV     #RTN3,-(SP)                     ;                   5613
                                           MOV     #WRD34,-(SP)
```

```
                        ;MLX4
                        ;                DEFINITION OF OPTION 3                    27-Mar-1982 19:24:42   TOPS
                                                                                   27-Mar-1982 19:23:44   PA:<
 9911 060072 012746 007100          MOV     #SAY2,-(SP)
 9912 060076 012746 000003          MOV     #3,-(SP)
 9913 060102 010600                 MOV     SP,R0                    ; SP,*
 9914 060104 104414                 TRAP    14
 9915 060106 005066 000026          CLR     26(SP)                   ; COMP.FLAG                          5616
 9916 060112 016646 000026    1$:   MOV     26(SP),-(SP)             ; COMP.FLAG,*                        5618
 9917 060116 004767 161344          JSR     PC,GEN3
 9918 060122 016766 121664 000014   MOV     L$UNIT,14(SP)            ;                                    5620
 9919 060130 005066 000012          CLR     12(SP)                   ; LUN
 9920 060134 000167 002240          JMP     41$
 9921 060140 016600 000012    2$:   MOV     12(SP),R0                ; LUN,*                              5625
 9922 060144 006200                 ASR     R0
 9923 060146 006200                 ASR     R0
 9924 060150 006200                 ASR     R0
 9925 060152 062700 034442          ADD     #DRIVE.STATUS,R0
 9926 060156 010046                 MOV     R0,-(SP)
 9927 060160 016646 000014          MOV     14(SP),-(SP)             ; LUN,*
 9928 060164 042716 177770          BIC     #177770,(SP)
 9929 060170 012746 000001          MOV     #1,-(SP)
 9930 060174 005046                 CLR     -(SP)
 9931 060176 004767 124154          JSR     PC,BL$GT2
 9932 060202 062706 000010          ADD     #10,SP
 9933 060206 0C5300                 DEC     R0
 9934 060210 001402                 BEQ     4$
 9935 060212 000167 001502    3$:   JMP     29$
 9936 060216 016667 000012 121650 4$:   MOV     12(SP),L$LUN             ; LUN,*                              5628
 9937 060224 012767 012670 152436   MOV     #WBUFF,WPTR              ;                                    5629
 9938 060232 012767 022670 152432   MOV     #RBUFF,RPTR              ;                                    5630
 9939 060240 016605 000012          MOV     12(SP),R5                ; LUN,*                              5631
 9940 060244 006305                 ASL     R5
 9941 060246 016503 034460          MOV     LOW.SECT(R5),R3          ; *,SECTOR
 9942 060252 020365 034500    5$:   CMP     R3,TOP.SECT(R5)          ; SECTOR,*                           5633
 9943 060256 101355                 BHI     3$
 9944 060260 010346                 MOV     R3,-(SP)                 ; SECTOR,*                           5635
 9945 060262 016546 034500          MOV     TOP.SECT(R5),-(SP)
 9946 060266 004767 166704          JSR     PC,GET.WRDCNT
 9947 060272 010002                 MOV     R0,R2
 9948 060274 010216                 MOV     R2,(SP)                  ; *,WRDCNT
 9949 060276 004767 166630          JSR     PC,SET.PTRS              ; WRDCNT,*                           5636
 9950 060302 016616 000016          MOV     16(SP),(SP)
 9951 060306 010246                 MOV     R2,-(SP)                 ; LUN,*                              5637
 9952 060310 016746 152354          MOV     WPTR,-(SP)               ; WRDCNT,*
 9953 060314 010346                 MOV     R3,-(SP)
 9954 060316 004767 165102          JSR     PC,WRITE                 ; SECTOR,*
 9955 060322 010004                 MOV     R0,R4
 9956 060324 020427 000001          CMP     R4,#1                    ; *,VALUE
 9957 060330 001035                 BNE     6$                       ; VALUE,*                            5643
 9958 060332 012746 000006          MOV     #6,-(SP)
 9959 060336 012746 045424          MOV     #WRITE,-(SP)             ;                                    5649
 9960 060342 016646 000030          MOV     30(SP),-(SP)
 9961 060346 010246                 MOV     R2,-(SP)                 ; LUN,*
 9962 060350 016746 152314          MOV     WPTR,-(SP)               ; WRDCNT,*
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SEQ 0233

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                                ;MLX4
                                ;                       DEFINITION OF OPTION 3                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                27-Mar-1982 19:23:44    PA:<
 9967 060354 010346                             MOV     R3,-(SP)                ; SECTOR,*
 9968 060356 004767 165642                      JSR     PC,RETRY
 9969 060362 062706 000014                      ADD     #14,SP
 9970 060366 005700                             TST     R0                                                                              1
 9971 060370 001456                             BEQ     9$
 9972 060372 016601 000024                      MOV     24(SP),R1
 9973 060376 112761 000004 034446               MOVB    #4,WHY.DROPT(R1)        ; LUN,*                                         5652
 9974 060404 104455                             TRAP    55                      ;                                               5653
 9975 060406 000455                             .WORD   455
 9976 060410 011070                             .WORD   MSG1
 9977 060412 000000                             .WORD   0
 9978 060414 016600 000024                      MOV     24(SP),R0               ; LUN,*                                         5654
 9979 060420 104451                             TRAP    51
 9980 060422 000436                             BR      8$                      ;                                               5655
 9981 060424 020427 000002              6$:     CMP     R4,#2                   ; VALUE,*                                       5643
 9982 060430 001015                             BNE     7$
 9983 060432 016601 000024                      MOV     24(SP),R1
 9984 060436 112761 000005 034446               MOVB    #5,WHY.DROPT(R1)        ; LUN,*                                         5662
 9985 060444 104455                             TRAP    55                      ;                                               5663
 9986 060446 000456                             .WORD   456
 9987 060450 011070                             .WORD   MSG1
 9988 060452 000000                             .WORD   0
 9989 060454 016600 000024                      MOV     24(SP),R0               ; LUN,*                                         5664
 9990 060460 104451                             TRAP    51
 9991 060462 000416                             BR      8$                      ;                                               5665
 9992 060464 020427 000003              7$:     CMP     R4,#3                   ; VALUE,*                                       5643
 9993 060470 001016                             BNE     9$
 9994 060472 104455                             TRAP    55                      ;                                               5670
 9995 060474 000457                             .WORD   457
 9996 060476 011070                             .WORD   MSG1
 9997 060500 000000                             .WORD   0
 9998 060502 016601 000024                      MOV     24(SP),R1
 9999 060506 112761 000006 034446               MOVB    #6,WHY.DROPT(R1)        ; LUN,*                                         5671
10000 060514 010100                             MOV     R1,R0                   ; LUN,*                                         5672
10001 060516 104451                             TRAP    51
10002 060520 062706 000012             8$:     ADD     #12,SP                  ;                                               5673
10003 060524 000543                             BR      14$
10004 060526 004767 165434             9$:     JSR     PC,CHOOSE               ;                                               5677
10005 060532 010066 000040                      MOV     R0,40(SP)               ; *,COMMAND
10006 060536 005001                             CLR     R1                      ;                                               5679
10007 060540 020027 045612                      CMP     R0,#READ                ; COMMAND,*
10008 060544 001015                             BNE     10$
10009 060546 005201                             INC     R1
10010 060550 016766 152116 000036               MOV     RPTR,36(SP)             ; *,PTR                                         5682
10011 060556 016646 000024                      MOV     24(SP),-(SP)            ; LUN,*                                         5683
10012 060562 010246                             MOV     R2,-(SP)                ; WRDCNT,*
10013 060564 016746 152102                      MOV     RPTR,-(SP)
10014 060570 010346                             MOV     R3,-(SP)                ; SECTOR,*
10015 060572 004767 165014                      JSR     PC,READ
10016 060576 000413                             BR      11$
10017 060600 016766 152064 000036      10$:     MOV     WPTR,36(SP)             ; *,PTR                                         5687
10018 060606 016646 000024                      MOV     24(SP),-(SP)            ; LUN,*                                         5688
```

SEQ 0234

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10020                                   ;MLX4
10021                                   ;
10022                                   ;       DEFINITION OF OPTION 3                  27-Mar-1982 19:24:42    TOPS
10023 060612 010246                             MOV     R2,-(SP)                        27-Mar-1982 19:23:44    PA:<
10024 060614 016746 152050                      MOV     WPTR,-(SP)              ; WRDCNT,*
10025 060620 010346                             MOV     R3,-(SP)
10026 060622 004767 165152                      JSR     PC,CHECK                ; SECTOR,*
10027 060626 010004                     11$:    MOV     R0,R4
10028 060630 001102                             BNE     15$                     ; *,VALUE
10029 060632 006001                             ROR     R1                      ;                               5695
10030 060634 103402                             BLO     13$                     ;                               5700
10031 060636 000167 001014              12$:    JMP     28$
10032 060642 016746 152022              13$:    MOV     WPTR,-(SP)              ;                               5704
10033 060646 016746 152020                      MOV     RPTR,-(SP)
10034 060652 010246                             MOV     R2,-(SP)                ; WRDCNT,*
10035 060654 004767 163446                      JSR     PC,DOUBLE.CHECK
10036 060660 062706 000006                      ADD     #6,SP
10037 060664 010066 000042                      MOV     R0,42(SP)               ; *,DBL.VALUE
10038 060670 001762                             BEQ     12$
10039 060672 016646 000034                      MOV     34(SP),-(SP)            ; LUN,*                         5707
10040 060676 004767 154622                      JSR     PC,SAYWHO
10041 060702 012716 011216                      MOV     #MSG5,(SP)              ;                               5708
10042 060706 012746 007072                      MOV     #SAY1,-(SP)
10043 060712 012746 000002                      MOV     #2,-(SP)
10044 060716 010600                             MOV     SP,R0
10045 060720 104414                             TRAP    14                      ; SP,*
10046 060722 016616 000050                      MOV     50(SP),(SP)             ; DBL.VALUE,*                   5709
10047 060726 017646 000050                      MOV     @50(SP),-(SP)           ; DBL.VALUE,*
10048 060732 012746 006710                      MOV     #FMT12A,-(SP)
10049 060736 012746 000003                      MOV     #3,-(SP)
10050 060742 010600                             MOV     SP,R0
10051 060744 104414                             TRAP    14                      ; SP,*
10052 060746 062766 010000 000056               ADD     #10000,56(SP)           ; *,DBL.VALUE                   5711
10053 060754 016616 000056                      MOV     56(SP),(SP)             ; DBL.VALUE,*                   5712
10054 060760 017646 000056                      MOV     @56(SP),-(SP)           ; DBL.VALUE,*
10055 060764 012746 006756                      MOV     #FMT12B,-(SP)
10056 060770 012746 000003                      MOV     #3,-(SP)
10057 060774 010600                             MOV     SP,R0
10058 060776 104414                             TRAP    14                      ; SP,*
10059 061000 016601 000056                      MOV     56(SP),R1
10060 061004 112761 000010 034446               MOVB    #10,WHY.DROPT(R1)       ; LUN,*                         5714
10061 061012 104455                             TRAP    55
10062 061014 000460                             .WORD   460                     ;                               5715
10063 061016 011070                             .WORD   MSG1
10064 061020 000000                             .WORD   0
10065 061022 016600 000056                      MOV     56(SP),R0
10066 061026 104451                             TRAP    51                      ; LUN,*                         5716
10067 061030 062706 000044                      ADD     #44,SP
10068 061034 000521                     14$:    BR      20$                     ;                               5717
10069 061036 020427 000001              15$:    CMP     R4,#1
10070 061042 001035                             BNE     16$                     ; VALUE,*                       5695
10071 061044 012746 000006                      MOV     #6,-(SP)                ;
10072 061050 016646 000052                      MOV     52(SP),-(SP)            ; COMMAND,*                     5725
10073 061054 016646 000040                      MOV     40(SP),-(SP)            ; LUN,*
10074 061060 010246                             MOV     R2,-(SP)                ; WRDCNT,*
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SEQ 0235

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10076                                   ;MLX4
10077                                   ;                       DEFINITION OF OPTION 3                          27-Mar-1982 19:24:42    TOPS
10078                                                                                                           27-Mar-1982 19:23:44    PA:<
10079 061062  016646  000056                       MOV     56(SP),-(SP)            ; PTR,*
10080 061066  010346                               MOV     R3,-(SP)                ; SECTOR,*
10081 061070  004767  165130                       JSR     PC,RETRY
10082 061074  062706  000014                       ADD     #14,SP
10083 061100  005700                               TST     R0
10084 061102  001655                               BEQ     12$
10085 061104  016601  000034                       MOV     34(SP),R1               ; LUN,*
10086 061110  112761  000004  034446               MOVB    #4,WHY.DROPT(R1)                                        5728
10087 061116  104455                               TRAP    55                      ;                               5729
10088 061120  000461                               .WORD   461
10089 061122  011070                               .WORD   MSG1
10090 061124  000000                               .WORD   0
10091 061126  016600  000034                       MOV     34(SP),R0               ; LUN,*
10092 061132  104451                               TRAP    51                                                      5730
10093 061134  000457                               BR      19$                     ;                               5731
10094 061136  020427  000002             16$:      CMP     R4,#2                   ; VALUE,*                       5695
10095 061142  001015                               BNE     17$
10096 061144  016601  000034                       MOV     34(SP),R1               ; LUN,*
10097 061150  112761  000005  034446               MOVB    #5,WHY.DROPT(R1)                                        5738
10098 061156  104455                               TRAP    55                      ;                               5739
10099 061160  000462                               .WORD   462
10100 061162  011070                               .WORD   MSG1
10101 061164  000000                               .WORD   0
10102 061166  016600  000034                       MOV     34(SP),R0               ; LUN,*
10103 061172  104451                               TRAP    51                                                      5740
10104 061174  000437                               BR      19$                     ;                               5741
10105 061176  020427  000003             17$:      CMP     R4,#3                   ; VALUE,*                       5695
10106 061202  001014                               BNE     18$
10107 061204  104455                               TRAP    55
10108 061206  000463                               .WORD   463                     ;                               5746
10109 061210  011070                               .WORD   MSG1
10110 061212  000000                               .WORD   0
10111 061214  016601  000034                       MOV     34(SP),R1
10112 061220  112761  000006  034446               MOVB    #6,WHY.DROPT(R1)        ; LUN,*                         5747
10113 061226  010100                               MOV     R1,R0
10114 061230  104451                               TRAP    51                      ; LUN,*                         5748
10115 061232  000420                               BR      19$                     ;                               5749
10116 061234  020427  000004             18$:      CMP     R4,#4                   ; VALUE,*                       5695
10117 061240  001021                               BNE     21$
10118 061242  004767  156064                       JSR     PC,ISOLATE              ;                               5754
10119 061246  104455                               TRAP    55                      ;                               5755
10120 061250  000464                               .WORD   464
10121 061252  011120                               .WORD   MSG2
10122 061254  000000                               .WORD   0
10123 061256  016601  000034                       MOV     34(SP),R1
10124 061262  112761  000007  034446               MOVB    #7,WHY.DROPT(R1)        ; LUN,*                         5756
10125 061270  010100                               MOV     R1,R0
10126 061272  104451                               TRAP    51                      ; LUN,*                         5757
10127 061274  062706  000022             19$:      ADD     #22,SP                  ;                               5758
10128 061300  000167  001070             20$:      JMP     40$
10129 061304  020427  000005             21$:      CMP     R4,#5                   ; VALUE,*                       5695
10130 061310  001162                               BNE     28$
```

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10132                                   ;MLX4
10133                                   ;       DEFINITION OF OPTION 3                  27-Mar-1982 19:24:42    TOPS
10134                                                                                   27-Mar-1982 19:23:44    PA:<
10135 061312 004767 156014                      JSR     PC,ISOLATE
10136 061316 032767 000001 120734               BIT     #1,ERROUT               ;                               5763
10137 061324 001423                             BEQ     22$                     ;                               5765
10138 061326 017701 153056                      MOV     @ML.REG+42,R1
10139 061332 006201                             ASR     R1
10140 061334 006201                             ASR     R1
10141 061336 006201                             ASR     R1
10142 061340 006201                             ASR     R1
10143 061342 006201                             ASR     R1
10144 061344 006201                             ASR     R1
10145 061346 042701 177700                      BIC     #177700,R1
10146 061352 010146                             MOV     R1,-(SP)
10147 061354 012746 006640                      MOV     #FMT10B,-(SP)
10148 061360 012746 000002                      MOV     #2,-(SP)
10149 061364 010600                             MOV     SP,R0
10150 061366 104414                             TRAP    14                      ; SP,*
10151 061370 062706 000006                      ADD     #6,SP
10152 061374 017766 153012 000044 22$:          MOV     @ML.REG+44,44(SP)       ; *,OLDSEC
10153 061402 017701 153002                      MOV     @ML.REG+42,R1           ;                               5768
10154 061406 006201                             ASR     R1                                                      5769
10155 061410 006201                             ASR     R1
10156 061412 006201                             ASR     R1
10157 061414 006201                             ASR     R1
10158 061416 006201                             ASR     R1
10159 061420 006201                             ASR     R1
10160 061422 042701 177700                      BIC     #177700,R1
10161 061426 010166 000040                      MOV     R1,40(SP)               ; *,OLDCHN
10162 061432 012746 000001                      MOV     #1,-(SP)                ;
10163 061436 016646 000052                      MOV     52(SP),-(SP)            ;                               5771
10164 061442 016646 000040                      MOV     40(SP),-(SP)            ; COMMAND,*
10165 061446 010246                             MOV     R2,-(SP)                ; LUN,*
10166 061450 016646 000056                      MOV     56(SP),-(SP)            ; WRDCNT,*
10167 061454 010346                             MOV     R3,-(SP)                ; PTR,*
10168 061456 004767 164542                      JSR     PC,RETRY                ; SECTOR,*
10169 061462 062706 000014                      ADD     #14,SP
10170 061466 020027 000005                      CMP     R0,#5
10171 061472 001052                             BNE     25$
10172 061474 027766 152712 000044               CMP     @ML.REG+44,44(SP)       ; *,OLDSEC                      5774
10173 061502 001035                             BNE     24$
10174 061504 016600 000040                      MOV     40(SP),R0               ; OLDCHN,*
10175 061510 017701 152674                      MOV     @ML.REG+42,R1
10176 061514 006201                             ASR     R1
10177 061516 006201                             ASR     R1
10178 061520 006201                             ASR     R1
10179 061522 006201                             ASR     R1
10180 061524 006201                             ASR     R1
10181 061526 006201                             ASR     R1
10182 061530 042701 177700                      BIC     #177700,R1
10183 061534 020100                             CMP     R1,R0
10184 061536 001017                             BNE     24$
10185 061540 032767 000001 120512               BIT     #1,ERROUT               ;                               5778
10186 061546 001404                             BEQ     23$
```

SEQ 0237

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10188                                   ;MLX4
10189                                   ;                DEFINITION OF OPTION 3                  27-Mar-1982 19:24:42    TOPS
10190                                                                                           27-Mar-1982 19:23:44    PA:<
10191 061550  104456                                     TRAP    56
10192 061552  000465                                     .WORD   465
10193 061554  011202                                     .WORD   MSG4
10194 061556  000000                                     .WORD   0
10195 061560  016646  000034                   23$:      MOV     34(SP),-(SP)            ; LUN,*                         5780
10196 061564  016746  152552                             MOV     BOARD,-(SP)
10197 061570  004767  155626                             JSR     PC,UP.HARD.COUNT
10198 061574  000427                                     BR      27$
10199 061576  032767  000001  120454   24$:      BIT     #1,ERROUT               ;                               5774
10200 061604  001415                                     BEQ     26$             ;                               5785
10201 061606  104457                                     TRAP    57
10202 061610  000466                                     .WORD   466
10203 061612  011166                                     .WORD   MSG3
10204 061614  000000                                     .WORD   0
10205 061616  000410                                     BR      26$
10206 061620  032767  000001  120432   25$:      BIT     #1,ERROUT               ;                               5787
10207 061626  001404                                     BEQ     26$             ;                               5793
10208 061630  104457                                     TRAP    57
10209 061632  000467                                     .WORD   467
10210 061634  011166                                     .WORD   MSG3
10211 061636  000000                                     .WORD   0
10212 061640  016646  000034                   26$:      MOV     34(SP),-(SP)            ; LUN,*                         5795
10213 061644  016746  152472                             MOV     BOARD,-(SP)
10214 061650  004767  156230                             JSR     PC,UP.SOFT.COUNT
10215 061654  022626                           27$:      CMP     (SP)+,(SP)+
10216 061656  010200                           28$:      MOV     R2,R0                   ;                               5762
10217 061660  006300                                     ASL     R0                      ; WRDCNT,*                      5801
10218 061662  066700  151002                             ADD     WPTR,R0
10219 061666  010067  150776                             MOV     R0,WPTR
10220 061672  010216                                     MOV     R2,(SP)
10221 061674  012746  000400                             MOV     #400,-(SP)              ; WRDCNT,*                      5802
10222 061700  004767  123264                             JSR     PC,BL$DIV
10223 061704  060300                                     ADD     R3,R0
10224 061706  010003                                     MOV     R0,R3                   ; SECTOR,*
10225 061710  062706  000024                             ADD     #24,SP                  ; *,SECTOR
10226 061714  000167  176332                             JMP     5$                      ;                               5634
10227 061720  032767  000001  120334   29$:      BIT     #1,EFN$21               ;                               5633
10228 061726  001002                                     BNE     30$             ;                               5813
10229 061730  000167  000440                             JMP     40$
10230 061734  016600  000012                   30$:      MOV     12(SP),R0               ; LUN,*                         5820
10231 061740  006300                                     ASL     R0
10232 061742  016001  034500                             MOV     TOP.SECT(R0),R1
10233 061746  016005  034460                             MOV     LOW.SECT(R0),R5         ; *,SECTOR
10234 061752  000167  000406                             JMP     39$
10235 061756  016646  000012                   31$:      MOV     12(SP),-(SP)            ; LUN,*                         5822
10236 061762  012746  000400                             MOV     #400,-(SP)
10237 061766  012746  022670                             MOV     #RBUFF,-(SP)
10238 061772  010546                                     MOV     R5,-(SP)                ; SECTOR,*
10239 061774  004767  163612                             JSR     PC,READ
10240 062000  062706  000010                             ADD     #10,SP
10241 062004  020027  000005                             CMP     R0,#5
10242 062010  001164                                     BNE     38$
```

SEQ 0238

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10244                                   ;MLX4
10245                                   :
10246                                   :       DEFINITION OF OPTION 3                                  27-Mar-1982 19:24:42    TOPS
10247                                                                                                   27-Mar-1982 19:23:44    PA:<
10248 062012  004767  155314                    JSR     PC,ISOLATE
10249 062016  032767  000001  120234            BIT     #1,ERROUT                       ;               ;                       5825
10250 062024  001423                            BEQ     32$                                                                     5827
10251 062026  017700  152356                    MOV     @ML.REG+42,R0
10252 062032  006200                            ASR     R0
10253 062034  006200                            ASR     R0
10254 062036  006200                            ASR     R0
10255 062040  006200                            ASR     R0
10256 062042  006200                            ASR     R0
10257 062044  006200                            ASR     R0
10258 062046  042700  177700                    BIC     #177700,R0
10259 062052  010046                            MOV     R0,-(SP)
10260 062054  012746  006640                    MOV     #FMT10B,-(SP)
10261 062060  012746  000002                    MOV     #2,-(SP)
10262 062064  010600                            MOV     SP,R0                           ; SP,*
10263 062066  104414                            TRAP    14
10264 062070  062706  000006                    ADD     #6,SP
10265 062074  017766  152312  000022  32$:      MOV     @ML.REG+44,22(SP)               ; *,OLDSEC
10266 062102  017700  152302                    MOV     @ML.REG+42,R0                   ;                       5836
10267 062106  006200                            ASR     R0                                                      5837
10268 062110  006200                            ASR     R0
10269 062112  006200                            ASR     R0
10270 062114  006200                            ASR     R0
10271 062116  006200                            ASR     R0
10272 062120  006200                            ASR     R0
10273 062122  042700  177700                    BIC     #177700,R0
10274 062126  010066  000016                    MOV     R0,16(SP)                       ; *,OLDCHN
10275 062132  012746  000001                    MOV     #1,-(SP)                        ;                       5845
10276 062136  016646  000030                    MOV     30(SP),-(SP)                    ; COMMAND,*
10277 062142  016646  000016                    MOV     16(SP),-(SP)                    ; LUN,*
10278 062146  012746  000400                    MOV     #400,-(SP)
10279 062152  016646  000034                    MOV     34(SP),-(SP)                    ; PTR,*
10280 062156  016646  000034                    MOV     34(SP),-(SP)                    ; OLDSEC,*
10281 062162  004767  164036                    JSR     PC,RETRY
10282 062166  062706  000014                    ADD     #14,SP
10283 062172  020027  000005                    CMP     R0,#5
10284 062176  001052                            BNE     35$
10285 062200  027766  152206  000022            CMP     @ML.REG+44,22(SP)               ; *,OLDSEC              5854
10286 062206  001035                            BNE     34$
10287 062210  016646  000016                    MOV     16(SP),-(SP)                    ; OLDCHN,*
10288 062214  017700  152170                    MOV     @ML.REG+42,R0
10289 062220  006200                            ASR     R0
10290 062222  006200                            ASR     R0
10291 062224  006200                            ASR     R0
10292 062226  006200                            ASR     R0
10293 062230  006200                            ASR     R0
10294 062232  006200                            ASR     R0
10295 062234  042700  177700                    BIC     #177700,R0
10296 062240  020026                            CMP     R0,(SP)+
10297 062242  001017                            BNE     34$
10298 062244  032767  000001  120006            BIT     #1,ERROUT                       ;                       5858
10299 062252  001404                            BEQ     33$
```

```
                                                                                                                    SEQ 0239
10300                                ;MLX4
10301                                ;                                                          27-Mar-1982 19:24:42    TOPS
10302                                ;                  DEFINITION OF OPTION 3                  27-Mar-1982 19:23:44    PA:<
10303 062254  104456                          TRAP    56
10304 062256  000470                          .WORD   470                         ;                                   5863
10305 062260  011202                          .WORD   MSG4
10306 062262  000000                          .WORD   0
10307 062264  016646  000012          33$:    MOV     12(SP),-(SP)                ; LUN,*                             5866
10308 062270  016746  152046                  MOV     BOARD,-(SP)
10309 062274  004767  155122                  JSR     PC,UP.HARD.COUNT
10310 062300  000427                          BR      37$
10311 062302  032767  000001  117750  34$:    BIT     #1,ERROUT                   ;                                   5854
10312 062310  001415                          BEQ     36$                         ;                                   5871
10313 062312  104457                          TRAP    57
10314 062314  000471                          .WORD   471                         ;                                   5876
10315 062316  011166                          .WORD   MSG3
10316 062320  000000                          .WORD   0
10317 062322  000410                          BR      36$
10318 062324  032767  000001  117726  35$:    BIT     #1,ERROUT                   ;                                   5879
10319 062332  001404                          BEQ     36$                         ;                                   5885
10320 062334  104457                          TRAP    57
10321 062336  000472                          .WORD   472                         ;                                   5890
10322 062340  011166                          .WORD   MSG3
10323 062342  000000                          .WORD   0
10324 062344  016646  000012          36$:    MOV     12(SP),-(SP)                ; LUN,*                             5893
10325 062350  016746  151766                  MOV     BOARD,-(SP)
10326 062354  004767  155524                  JSR     PC,UP.SOFT.COUNT
10327 062360  022626                  37$:    CMP     (SP)+,(SP)+                 ;
10328 062362  005205                  38$:    INC     R5                          ; SECTOR                            5824
10329 062364  020501                  39$:    CMP     R5,R1                       ; SECTOR,*                          5820
10330 062366  101002                          BHI     40$
10331 062370  000167  177362                  JMP     31$
10332 062374  005266  000012          40$:    INC     12(SP)                      ; LUN
10333 062400  026666  000012  000014  41$:    CMP     12(SP),14(SP)               ; LUN,*                             5620
10334 062406  002002                          BGE     42$
10335 062410  000167  175524                  JMP     2$
10336 062414  005726                  42$:    TST     (SP)+                       ;
10337 062416  005266  000026                  INC     26(SP)                      ; COMP.FLAG                         5617
10338 062422  026627  000026  000001          CMP     26(SP),#1                   ; COMP.FLAG,*                       5616
10339 062430  003002                          BGT     43$
10340 062432  000167  175454                  JMP     1$
10341 062436  062706  000030          43$:    ADD     #30,SP                      ;                                   5556
10342 062442  000207                          RTS     PC
10343
10344                                ; Routine Size:  637 words
10345                                ; Maximum stack depth per invocation:  37 words
10350
10351
```

SEQ 0240


```
10353 ;MLX4
10354 ;                 DEFINITION OF OPTION 4
10355 ;
10356 ;          5907  %sbttl 'DEFINITION OF OPTION 4'
10357 ;          5908  routine OPT4 : novalue =
10358 ;          5909      begin                                   !* 1 *  START OF ROUTINE
10359 ;          5910
10360 ;          5911  !++
10361 ;          5912  !   ROUTINE:     OPT4
10362 ;          5913  !
10363 ;          5914  !   PURPOSE:     TO LOOK FOR INTEREACTIONS BETWEEN SECTORS
10364 ;          5915  !                USING A MARCH TEST.
10365 ;          5916  !
10366 ;          5917  !   THE CODE IN BRIEF:
10367 ;          5918  !
10368 ;          5919  !   BEGIN 1 (START OF ROUTINE)
10369 ;          5920  !   SAY ROUTINE IS RUNNING
10370 ;          5921  !   WORD COUNT = 256
10371 ;          5922  !   GENERATE A BUFFER OF DATA
10372 ;          5923  !   GENERATE A BUFFER OF COMP
10373 ;          5924  !   INITIALIZE POINTERS TO 4 BUFFERS FOR WRITE/READ DATA/COMP
10374 ;          5925  !   INCR LUN FROM 0 TO LAST
10375 ;          5926  !   : BEGIN 2 (START OF LOGICAL UNIT SELECTION LOOP)
10376 ;          5927  !   : TESTLOOP:
10377 ;          5928  !   : : BEGIN 3 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
10378 ;          5929  !   : : IF UNIT IS ACTIVE
10379 ;          5930  !   : : THEN
10380 ;          5931  !   : : : BEGIN 4 (START OF TEST FOR AN ACTIVE UNIT)
10381 ;          5932  !   : : : INCR SECTOR FROM LOWEST TO HIGHEST
10382 ;          5933  !   : : : : BEGIN 4A (START OF 1ST SECTOR SELECTION LOOP)
10383 ;          5934  !   : : : : WRITE 'DATA'
10384 ;          5935  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10385 ;          5936  !   : : : : END 4A (END OF 1ST SECTOR SELECTION LOOP)
10386 ;          5937  !   : : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
10387 ;          5938  !   : : : INCR SECTOR FROM LOWEST TO HIGHEST
10388 ;          5939  !   : : : : BEGIN 4B (START OF 2ND SECTOR SELECTION LOOP)
10389 ;          5940  !   : : : : DO THE WRITE CHECK OR READ OF 'DATA'
10390 ;          5941  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10391 ;          5942  !   : : : : WRITE 'COMP'
10392 ;          5943  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10393 ;          5944  !   : : : : END 4B (END OF 2ND SECTOR SELECTION LOOP)
10394 ;          5945  !   : : : CHOOSE WHETHER TO WRITE CHECK OR READ 'COMP'
10395 ;          5946  !   : : : DECR SECTOR FROM HIGHEST TO LOWEST
10396 ;          5947  !   : : : : BEGIN 4C (START OF 3RD SECTOR SELECTION LOOP)
10397 ;          5948  !   : : : : DO THE WRITE CHECK OR READ OF 'COMP'
10398 ;          5949  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10399 ;          5950  !   : : : : WRITE DATA
10400 ;          5951  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10401 ;          5952  !   : : : : END 4C (END OF 3RD SECTOR SELECTION LOOP)
10402 ;          5953  !   : : : CHOOSE WHETHER TO WRITE CHECK OR READ 'DATA'
10403 ;          5954  !   : : : INCR SECTOR FROM LOWEST TO HIGHEST
10404 ;          5955  !   : : : : BEGIN 4D (START OF 4TH SECTOR SELECTION LOOP)
10405 ;          5956  !   : : : : DO THE WRITE CHECK OR READ OF 'DATA'
10406 ;          5957  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
10407 ;          5958  !   : : : : END 4D (END OF 4TH SECTOR SELECTION LOOP)
```

```
;MLX4
;                DEFINITION OF OPTION 4                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (40)
;          5959  !  : : : END 4 (END OF TEST FOR AN ACTIVE UNIT)
;          5960  !  : : END 3 (END OF TESTLOOP)
;          5961  !  : END 2 (END OF LOGICAL UNIT SELECTION LOOP)
;          5962  !  RETURN
;          5963  !  END 1 (END OF ROUTINE)
;          5964  !--
;          5965
;          5966      label
;          5967          LOOP;
;          5968
;          5969      local
;          5970          VALUE,
;          5971          OLDSEC,
;          5972          OLDCHN,
;          5973          PTR,
;          5974          COMMAND,
;          5975          DBL_VALUE,
;          5976          WDPTR,
;          5977          RDPTR,
;          5978          WCPTR,
;          5979          RCPTR;
;          5980
;          5981      PRINTB (SAY2, WRD34, RTN4);
;          5982      !;RUNNING OPT4'
;          5983      GEN4 (.MARPAT, WDBUFF);
;          5984      GEN4 ((-.MARPAT), WCBUFF);
;          5985      WDPTR = WDBUFF;                             !POINTER TO 256-WORD WRITE DATA BUFFER
;          5986      WCPTR = WCBUFF;                             !POINTER TO 256-WORD WRITE COMP BUFFER
;          5987      RDPTR = RDBUFF;                             !POINTER TO 256-WORD READ  DATA BUFFER
;          5988      RCPTR = RCBUFF;                             !POINTER TO 256-WORD READ  COMP BUFFER
;          5989
;          5990      incr LUN from 0 to (.L$UNIT - 1) do
;          5991          begin                                   !* 2 *  START OF LOGICAL UNIT SELECTION LOOP
;          5992  LOOP :
;          5993          begin                                   !* 3 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
;          5994
;          5995          if .DRIVE_STATUS [.LUN] eql ACTIVE
;          5996          then
;          5997              begin
;          5998              L$LUN = .LUN;                       !* 4 *  START OF TEST FOR AN ACTIVE UNIT
;          5999              PRINTB (SAY1, WRD35);
;          6000              !'MARCHING'
;          6001              PRINTB (FMT2, WRD24);
;          6002              !'  UP'
;          6003
;          6004  !
;          6005  ! version czmlbb changed incr to incru
;          6006  !
;          6007              incru SECTOR from LOWEST to HIGHEST do
;          6008                  begin                           !* 4A *  START OF 1ST SECTOR SELECTION LOOP
;          6009                  VALUE = write (.LUN, 256, .WDPTR, .SECTOR);
;          6010
```

SEQ 0242


```
10465 ;MLX4
10466 ;                 DEFINITION OF OPTION 4
10467
10468 ;          6011                   !+
10469 ;          6012                   ! SEE HOW SUCCESSFUL THE WRITE WAS:
10470 ;          6013                   !-
10471 ;          6014
10472 ;          6015                   selectone .VALUE of                 !SEE 'SYSERR' FOR DEFINITION
10473 ;          6016                       set                             !OF ERROR # CONTAINED IN 'VALUE'
10474 ;          6017
10475 ;          6018                       [1] :
10476 ;          6019                           begin                       !* 4A1 *        RETRY ALLOWED
10477 ;          6020
10478 ;          6021                           if RETRY (SIX, write, .LUN, 256, .WDPTR, .SECTOR) neq 0
10479 ;          6022                           then                        !THE RETRY FAILED -- SYSTEM FATAL ERROR
10480 ;          6023                               begin
10481 ;          6024                               WHY_DROPT [.LUN] = CODE_4;
10482 ;          6025                               ERRDF (401, MSG1, 0);       !**** OPTION 4 ERROR 01 ****
10483 ;          6026                               DODU (.LUN);
10484 ;          6027                               leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 3 *
10485 ;          6028                               end;
10486 ;          6029
10487 ;          6030                           end;                        !* 4A1 *
10488 ;          6031
10489 ;          6032                       [2] :
10490 ;          6033                           begin                       !* 4A2 *        FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10491 ;          6034                           WHY_DROPT [.LUN] = CODE_5;
10492 ;          6035                           ERRDF (402, MSG1, 0);   !**** OPTION 4 ERROR 02 ****
10493 ;          6036                           DODU (.LUN);
10494 ;          6037                           leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10495 ;          6038                           end;                        !* 4A2 *
10496 ;          6039
10497 ;          6040                       [3] :
10498 ;          6041                           begin                       !* 4A3 *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
10499 ;          6042                           ERRDF (403, MSG1, 0);   !**** OPTION 4 ERROR 03 ****
10500 ;          6043                           WHY_DROPT [.LUN] = CODE_6;
10501 ;          6044                           DODU (.LUN);
10502 ;          6045                           leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10503 ;          6046                           end;                        !* 4A3 *
10504 ;          6047                       tes;
10505 ;          6048
10506 ;          6049                       end;                            !* 4A *  END OF 1ST SECTOR SELECTION LOOP
10507 ;          6050
10508 ;          6051                   PRINTB (FMT2, WRD24);
10509 ;          6052                   !' UP'
10510 ;          6053                   COMMAND = CHOOSE ();
10511 ;          6054
10512 ;          6055 !
10513 ;          6056 ! version czmlbb changed incr to incru
10514 ;          6057 !
10515 ;          6058                   incru SECTOR from LOWEST to HIGHEST do
10516 ;          6059                       begin                           !* 4B *  START OF 2ND SECTOR SELECTION LOOP
10517 ;          6060
10518 ;          6061                       if .COMMAND eql read
10519 ;          6062                       then
```

```
10521 ;MLX4
10522 ;                 DEFINITION OF OPTION 4
10523 ;
10524 ;         6063                    begin
10525 ;         6064                    PTR = .RDPTR;
10526 ;         6065                    VALUE = read (.LUN, 256, .PTR, .SECTOR);
10527 ;         6066                    end
10528 ;         6067                else
10529 ;         6068                    begin
10530 ;         6069                    PTR = .WDPTR;
10531 ;         6070                    VALUE = CHECK (.LUN, 256, .PTR, .SECTOR);
10532 ;         6071                    end;
10533 ;         6072
10534 ;         6073                    !+
10535 ;         6074                    ! SEE HOW SUCCESSFUL THE OPERATION WAS:
10536 ;         6075                    !-
10537 ;         6076
10538 ;         6077                    selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
10539 ;         6078                        set                         !OF ERROR # CONTAINED IN 'VALUE'
10540 ;         6079
10541 ;         6080                        [0] :
10542 ;         6081
10543 ;         6082                            if .COMMAND eql read
10544 ;         6083                            then
10545 ;         6084                                begin
10546 ;         6085
10547 ;         6086                                if (DBL_VALUE = DOUBLE_CHECK (.WDPTR, .RDPTR, 256)) neq 0
10548 ;         6087                                then
10549 ;         6088                                    begin
10550 ;         6089                                    SAYWHO (.LUN);
10551 ;         6090                                    PRINTB (SAY1, MSG5);
10552 ;         6091                                    !'ECC LOGIC FAILED TO DETECT DATA ERROR'
10553 ;         6092                                    PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
10554 ;         6093                                    !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
10555 ;         6094                                    DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
10556 ;         6095                                    PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
10557 ;         6096                                    !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
10558 ;         6097                                    WHY_DROPT [.LUN] = CODE_8;
10559 ;         6098                                    ERRDF (404, MSG1, 0);   !**** OPTION 4 ERROR 04 ****
10560 ;         6099                                    DODU (.LUN);
10561 ;         6100                                    leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
10562 ;         6101                                    end;
10563 ;         6102
10564 ;         6103                                end;
10565 ;         6104
10566 ;         6105                [1] :
10567 ;         6106                    begin                       !* 4B1 *        RETRY ALLOWED
10568 ;         6107
10569 ;         6108                    if RETRY (SIX, .COMMAND, .LUN, 256, .PTR, .SECTOR) neq 0
10570 ;         6109                    then                        !THE RETRY FAILED -- SYSTEM FATAL ERROR
10571 ;         6110                        begin
10572 ;         6111                        WHY_DROPT [.LUN] = CODE_4;
10573 ;         6112                        ERRDF (405, MSG1, 0);       !**** OPTION 4 ERROR 05 ****
10574 ;         6113                        DODU (.LUN);
10575 ;         6114                        leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 3 *
```

SEQ 0244


```
10577 ;MLX4
10578 ;
10579
10580 ;        6115                            end;
10581 ;        6116
10582 ;        6117                        end;                        !* 4B1 *
10583 ;        6118
10584 ;        6119                    [2] :
10585 ;        6120                        begin                       !* 4B2 *        FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10586 ;        6121                        WHY_DROPT [.LUN] = CODE_5;
10587 ;        6122                        ERRDF (406, MSG1, 0);       !**** OPTION 4 ERROR 06 ****
10588 ;        6123                        DODU (.LUN);
10589 ;        6124                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10590 ;        6125                        end;                        !* 4B2 *
10591 ;        6126
10592 ;        6127                    [3] :
10593 ;        6128                        begin                       !* 4B3 *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
10594 ;        6129                        ERRDF (407, MSG1, 0);       !**** OPTION 4 ERROR 07 ****
10595 ;        6130                        WHY_DROPT [.LUN] = CODE_6;
10596 ;        6131                        DODU (.LUN);
10597 ;        6132                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10598 ;        6133                        end;                        !* 4B3 *
10599 ;        6134
10600 ;        6135                    [4] :
10601 ;        6136                        begin                       !* 4B4 *        UNRECOVERABLE DATA ERROR
10602 ;        6137                        ISOLATE ();
10603 ;        6138                        ERRDF (408, MSG2, 0);       !**** OPTION 4 ERROR 08 ****
10604 ;        6139                        WHY_DROPT [.LUN] = CODE_7;
10605 ;        6140                        DODU (.LUN);
10606 ;        6141                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10607 ;        6142                        end;                        !* 4B4 *
10608 ;        6143
10609 ;        6144                    [5] :
10610 ;        6145                        begin                       !* 4B5 *        RECOVERABLE DATA ERROR
10611 ;        6146                        ISOLATE ();
10612 ;        6147
10613 ;        6148                        if .ERROUT then PRINTB (FMT10B, .CHAN);
10614 ;        6149
10615 ;        6150                        !'    BIT QQ'
10616 ;        6151                        OLDSEC = .MLEL;
10617 ;        6152                        OLDCHN = .CHAN;
10618 ;        6153
10619 ;        6154                        if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .SECTOR) eql 5
10620 ;        6155                        then
10621 ;        6156
10622 ;        6157                            if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
10623 ;        6158                            then
10624 ;        6159                                begin
10625 ;        6160
10626 ;        6161                                if .ERROUT then ERRHRD (409, MSG4, 0);  !**** OPTION 4 ERROR 09 ****
10627 ;        6162
10628 ;        6163                                UP_HARD_COUNT (.LUN, .BOARD);
10629 ;        6164                                end
10630 ;        6165                            else
10631 ;        6166                                begin
```

```
10633 ;MLX4
10634 ;                 DEFINITION OF OPTION 4                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
10635                                                                   27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (40)
10636 ;         6167
10637 ;         6168                                  if .ERROUT then ERRSOFT (410, MSG3, 0); !**** OPTION 4 ERROR 10 ****
10638 ;         6169                                  UP_SOFT_COUNT (.LUN, .BOARD);
10639 ;         6170                                  end
10640 ;         6171
10641 ;         6172                              else
10642 ;         6173                                  begin
10643 ;         6174                                  if .ERROUT then ERRSOFT (411, MSG3, 0);     !**** OPTION 4 ERROR 11 ****
10644 ;         6175                                  UP_SOFT_COUNT (.LUN, .BOARD);
10645 ;         6176                                  end;
10646 ;         6177                              end;                        !* 4B5 *
10647 ;         6178                          tes;
10648 ;         6179                      VALUE = write (.LUN, 256, .WCPTR, .SECTOR);
10649 ;         6180
10650 ;         6181                      !+
10651 ;         6182                      !  SEE HOW SUCCESSFUL THE WRITE WAS:
10652 ;         6183                      !-
10653 ;         6184
10654 ;         6185                      selectone .VALUE of               !SEE 'SYSERR' FOR DEFINITION
10655 ;         6186                          set                           !OF ERROR # CONTAINED IN 'VALUE'
10656 ;         6187
10657 ;         6188                          [1] :
10658 ;         6189                              begin                     !* 4B6 *       RETRY ALLOWED
10659 ;         6190
10660 ;         6191                              if RETRY (SIX, write, .LUN, 256, .WCPTR, .SECTOR) neg 0
10661 ;         6192                              then                      !THE RETRY FAILED -- SYSTEM FATAL ERROR
10662 ;         6193                                  begin
10663 ;         6194                                  WHY_DROPT [.LUN] = CODE_4;
10664 ;         6195                                  ERRDF (412, MSG1, 0);       !**** OPTION 4 ERROR 12 ****
10665 ;         6196                                  DODU (.LUN);
10666 ;         6197                                  leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 3 *
10667 ;         6198                                  end;
10668 ;         6199
10669 ;         6200                              end;                      !* 4B6 *
10670 ;         6201
10671 ;         6202                          [2] :
10672 ;         6203                              begin                     !* 4B7 *       FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10673 ;         6204                              WHY_DROPT [.LUN] = CODE_5;
10674 ;         6205                              ERRDF (413, MSG1, 0);     !**** OPTION 4 ERROR 13 ****
10675 ;         6206                              DODU (.LUN);
10676 ;         6207                              leave LOOP;               !JUMP JUST BEYOND END OF BLOCK * 3 *
10677 ;         6208                              end;                      !* 4B7 *
10678 ;         6209
10679 ;         6210                          [3] :
10680 ;         6211                              begin                     !* 4B8 *       FATAL DRIVE ERROR -- NO RETRY ALLOWED
10681 ;         6212                              ERRDF (414, MSG1, 0);     !**** OPTION 4 ERROR 14 ****
10682 ;         6213                              WHY_DROPT [.LUN] = CODE_6;
10683 ;         6214
10684 ;         6215
10685 ;         6216
10686 ;         6217
10687 ;         6218
```

SEQ 0246


```
10689 ;MLX4
10690 ;                 DEFINITION OF OPTION 4
10691
10692 ;         6219                        DODU (.LUN);
10693 ;         6220                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10694 ;         6221                        end;                        !* 4B8 *
10695 ;         6222                    tes;
10696 ;         6223
10697 ;         6224                end;                                !* 4B *  END OF 2ND SECTOR SELECTION LOOP
10698 ;         6225
10699 ;         6226            PRINTB (FMT2, WRD25);
10700 ;         6227            !'  DOWN'
10701 ;         6228            COMMAND = CHOOSE ();
10702 ;         6229
10703 ;         6230            decr SECTOR from HIGHEST to LOWEST do
10704 ;         6231                begin                               !* 4C *  START OF 3RD SECTOR SELECTION LOOP
10705 ;         6232
10706 ;         6233                if .COMMAND eql read
10707 ;         6234                then
10708 ;         6235                    begin
10709 ;         6236                    PTR = .RCPTR;
10710 ;         6237                    VALUE = read (.LUN, 256, .PTR, .SECTOR);
10711 ;         6238                    end
10712 ;         6239                else
10713 ;         6240                    begin
10714 ;         6241                    PTR = .WCPTR;
10715 ;         6242                    VALUE = CHECK (.LUN, 256, .PTR, .SECTOR);
10716 ;         6243                    end;
10717 ;         6244
10718 ;         6245                !+
10719 ;         6246                !  SEE HOW SUCCESSFUL THE OPERATION WAS:
10720 ;         6247                !-
10721 ;         6248
10722 ;         6249            selectone .VALUE of                     !SEE 'SYSERR' FOR DEFINITION
10723 ;         6250                set                                 !OF ERROR # CONTAINED IN 'VALUE'
10724 ;         6251
10725 ;         6252                [0] :
10726 ;         6253
10727 ;         6254                    if .COMMAND eql read
10728 ;         6255                    then
10729 ;         6256                        begin
10730 ;         6257
10731 ;         6258                        if (DBL_VALUE = DOUBLE_CHECK (.WCPTR, .RCPTR, 256)) neq 0
10732 ;         6259                        then
10733 ;         6260                            begin
10734 ;         6261                            SAYWHO (.LUN);
10735 ;         6262                            PRINTB (SAY1, MSG5);
10736 ;         6263                            !'ECC LOGIC FAILED TO DETECT DATA ERROR'
10737 ;         6264                            PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
10738 ;         6265                            !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
10739 ;         6266                            DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
10740 ;         6267                            PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
10741 ;         6268                            !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
10742 ;         6269                            WHY_DROPT [.LUN] = CODE_8;
10743 ;         6270                            ERRDF (415, MSG1, 0);   !**** OPTION 4 ERROR 15 ****
```

SEQ 0247


```
10745 ;MLX4
10746 ;                 DEFINITION OF OPTION 4
10747
10748 ;          6271                                   DODU (.LUN);
10749 ;          6272                                   leave LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
10750 ;          6273                                   end;
10751 ;          6274
10752 ;          6275                               end;
10753 ;          6276
10754 ;          6277                           [1] :
10755 ;          6278                               begin                !* 4C1 *        RETRY ALLOWED
10756 ;          6279
10757 ;          6280                               if RETRY (SIX, .COMMAND, .LUN, 256, .PTR, .SECTOR) neq 0
10758 ;          6281                               then                 !THE RETRY FAILED -- SYSTEM FATAL ERROR
10759 ;          6282                                   begin
10760 ;          6283                                   WHY_DROPT [.LUN] = CODE_4;
10761 ;          6284                                   ERRDF (416, MSG1, 0);       !**** OPTION 4 ERROR 16 ****
10762 ;          6285                                   DODU (.LUN);
10763 ;          6286                                   leave LOOP;      !JUMP JUST BEYOND END OF BLOCK * 3 *
10764 ;          6287                                   end;
10765 ;          6288
10766 ;          6289                               end;                 !* 4C1 *
10767 ;          6290
10768 ;          6291                           [2] :
10769 ;          6292                               begin                !* 4C2 *        FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10770 ;          6293                               WHY_DROPT [.LUN] = CODE_5;
10771 ;          6294                               ERRDF (417, MSG1, 0);  !**** OPTION 4 ERROR 17 ****
10772 ;          6295                               DODU (.LUN);
10773 ;          6296                               leave LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
10774 ;          6297                               end;                 !* 4C2 *
10775 ;          6298
10776 ;          6299                           [3] :
10777 ;          6300                               begin                !* 4C3 *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
10778 ;          6301                               ERRDF (418, MSG1, 0);  !**** OPTION 4 ERROR 18 ****
10779 ;          6302                               WHY_DROPT [.LUN] = CODE_6;
10780 ;          6303                               DODU (.LUN);
10781 ;          6304                               leave LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
10782 ;          6305                               end;                 !* 4C3 *
10783 ;          6306
10784 ;          6307                           [4] :
10785 ;          6308                               begin                !* 4C4 *        UNRECOVERABLE DATA ERROR
10786 ;          6309                               ISOLATE ();
10787 ;          6310                               ERRDF (419, MSG2, 0);  !**** OPTION 4 ERROR 19 ****
10788 ;          6311                               WHY_DROPT [.LUN] = CODE_7;
10789 ;          6312                               DODU (.LUN);
10790 ;          6313                               leave LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
10791 ;          6314                               end;                 !* 4C4 *
10792 ;          6315
10793 ;          6316                           [5] :
10794 ;          6317                               begin                !* 4C5 *        RECOVERABLE DATA ERROR
10795 ;          6318                               ISOLATE ();
10796 ;          6319
10797 ;          6320                               if .ERROUT then PRINTB (FMT10B, .CHAN);
10798 ;          6321
10799 ;          6322                               !'    BIT QQ'
```

```
10801 ;MLX4
10802 ;                 DEFINITION OF OPTION 4
10803 ;
10804 ;          6323                           OLDSEC = .MLEL;
10805 ;          6324                           OLDCHN = .CHAN;
10806 ;          6325
10807 ;          6326                           if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .SECTOR) eql 5
10808 ;          6327                           then
10809 ;          6328
10810 ;          6329                               if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
10811 ;          6330                               then
10812 ;          6331                                   begin
10813 ;          6332
10814 ;          6333                                   if .ERROUT then ERRHRD (420, MSG4, 0);  !**** OPTION 4 ERROR 20 ****
10815 ;          6334
10816 ;          6335                                   UP_HARD_COUNT (.LUN, .BOARD);
10817 ;          6336                                   end
10818 ;          6337                               else
10819 ;          6338                                   begin
10820 ;          6339
10821 ;          6340                                   if .ERROUT then ERRSOFT (421, MSG3, 0); !**** OPTION 4 ERROR 21 ****
10822 ;          6341
10823 ;          6342                                   UP_SOFT_COUNT (.LUN, .BOARD);
10824 ;          6343                                   end
10825 ;          6344
10826 ;          6345                           else
10827 ;          6346                               begin
10828 ;          6347
10829 ;          6348                               if .ERROUT then ERRSOFT (422, MSG3, 0);     !**** OPTION 4 ERROR 22 ****
10830 ;          6349
10831 ;          6350                               UP_SOFT_COUNT (.LUN, .BOARD);
10832 ;          6351                               end;
10833 ;          6352
10834 ;          6353                           end;                        !* 4C5 *
10835 ;          6354                       tes;
10836 ;          6355
10837 ;          6356                   VALUE = write (.LUN, 256, .WDPTR, .SECTOR);
10838 ;          6357
10839 ;          6358                   !+
10840 ;          6359                   ! SEE HOW SUCCESSFUL THE WRITE WAS:
10841 ;          6360                   !-
10842 ;          6361
10843 ;          6362                   selectone .VALUE of                 !SEE 'SYSERR' FOR DEFINITION
10844 ;          6363                       set                             !OF ERROR # CONTAINED IN 'VALUE'
10845 ;          6364
10846 ;          6365                       [1] :
10847 ;          6366                           begin                       !* 4C6 *        RETRY ALLOWED
10848 ;          6367
10849 ;          6368                           if RETRY (SIX, write, .LUN, 256, .WDPTR, .SECTOR) neg 0
10850 ;          6369                           then                        !THE RETRY FAILED -- SYSTEM FATAL ERROR
10851 ;          6370                               begin
10852 ;          6371                               WHY_DROPT [.LUN] = CODE_4;
10853 ;          6372                               ERRDF (423, MSG1, 0);       !**** OPTION 4 ERROR 23 ****
10854 ;          6373                               DODU (.LUN);
10855 ;          6374                               leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 3 *
```

SEQ 0249


```
10857 ;MLX4
10858 ;                 DEFINITION OF OPTION 4
10859 ;
10860 ;         6375                        end;
10861 ;         6376
10862 ;         6377                    end;                        !* 4C6 *
10863 ;         6378
10864 ;         6379                [2] :
10865 ;         6380                    begin                       !* 4C7 *        FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10866 ;         6381                    WHY_DROPT [.LUN] = CODE_5;
10867 ;         6382                    ERRDF (424, MSG1, 0);       !**** OPTION 4 ERROR 24 ****
10868 ;         6383                    DODU (.LUN);
10869 ;         6384                    leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10870 ;         6385                    end;                        !* 4C7 *
10871 ;         6386
10872 ;         6387                [3] :
10873 ;         6388                    begin                       !* 4C8 *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
10874 ;         6389                    ERRDF (425, MSG1, 0);       !**** OPTION 4 ERROR 25 ****
10875 ;         6390                    WHY_DROPT [.LUN] = CODE_6;
10876 ;         6391                    DODU (.LUN);
10877 ;         6392                    leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10878 ;         6393                    end;                        !* 4C8 *
10879 ;         6394                tes;
10880 ;         6395
10881 ;         6396                end;                            !* 4C * END OF 3RD SECTOR SELECTION LOOP
10882 ;         6397
10883 ;         6398            PRINTB (FMT2, WRD24);
10884 ;         6399            !' UP'
10885 ;         6400            COMMAND = CHOOSE ();
10886 ;         6401
10887 ;         6402 !
10888 ;         6403 ! version czmlbb changed incr to incru
10889 ;         6404 !
10890 ;         6405            incru SECTOR from LOWEST to HIGHEST do
10891 ;         6406                begin                           !* 4D * START OF 4TH SECTOR SELECTION LOOP
10892 ;         6407
10893 ;         6408                if .COMMAND eql read
10894 ;         6409                then
10895 ;         6410                    begin
10896 ;         6411                    PTR = .RDPTR;
10897 ;         6412                    VALUE = read (.LUN, 256, .PTR, .SECTOR);
10898 ;         6413                    end
10899 ;         6414                else
10900 ;         6415                    begin
10901 ;         6416                    PTR = .WDPTR;
10902 ;         6417                    VALUE = CHECK (.LUN, 256, .PTR, .SECTOR);
10903 ;         6418                    end;
10904 ;         6419
10905 ;         6420                !+
10906 ;         6421                ! SEE HOW SUCCESSFUL THE OPERATION WAS:
10907 ;         6422                !-
10908 ;         6423
10909 ;         6424                selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
10910 ;         6425                    set                         !OF ERROR # CONTAINED IN 'VALUE'
10911 ;         6426
```

SEQ 0250


```
10913 ;MLX4
10914 ;                 DEFINITION OF OPTION 4
10915
10916 ;          6427                           [0] :
10917 ;          6428
10918 ;          6429                               if .COMMAND eql read
10919 ;          6430                               then
10920 ;          6431                                   begin
10921 ;          6432
10922 ;          6433                                   if (DBL_VALUE = DOUBLE_CHECK (.WDPTR, .RDPTR, 256)) neq 0
10923 ;          6434                                   then
10924 ;          6435                                       begin
10925 ;          6436                                       SAYWHO (.LUN);
10926 ;          6437                                       PRINTB (SAY1, MSG5);
10927 ;          6438                                       !'ECC LOGIC FAILED TO DETECT DATA ERROR'
10928 ;          6439                                       PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
10929 ;          6440                                       !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
10930 ;          6441                                       DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
10931 ;          6442                                       PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
10932 ;          6443                                       !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
10933 ;          6444                                       WHY_DROPT [.LUN] = CODE_8;
10934 ;          6445                                       ERRDF (426, MSG1, 0);    !**** OPTION 4 ERROR 26 ****
10935 ;          6446                                       DODU (.LUN);
10936 ;          6447                                       leave LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
10937 ;          6448                                       end;
10938 ;          6449
10939 ;          6450                                   end;
10940 ;          6451
10941 ;          6452                           [1] :
10942 ;          6453                               begin                    !* 4D1 *        RETRY ALLOWED
10943 ;          6454
10944 ;          6455                               if RETRY (SIX, .COMMAND, .LUN, 256, .PTR, .SECTOR) neq 0
10945 ;          6456                               then                     !THE RETRY FAILED -- SYSTEM FATAL ERROR
10946 ;          6457                                   begin
10947 ;          6458                                   WHY_DROPT [.LUN] = CODE_4;
10948 ;          6459                                   ERRDF (427, MSG1, 0);        !**** OPTION 4 ERROR 27 ****
10949 ;          6460                                   DODU (.LUN);
10950 ;          6461                                   leave LOOP;          !JUMP JUST BEYOND END OF BLOCK * 3 *
10951 ;          6462                                   end;
10952 ;          6463
10953 ;          6464                               end;                     !* 4D1 *
10954 ;          6465
10955 ;          6466                           [2] :
10956 ;          6467                               begin                    !* 4D2 *        FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
10957 ;          6468                               WHY_DROPT [.LUN] = CODE_5;
10958 ;          6469                               ERRDF (428, MSG1, 0);    !**** OPTION 4 ERROR 28 ****
10959 ;          6470                               DODU (.LUN);
10960 ;          6471                               leave LOOP;              !JUMP JUST BEYOND END OF BLOCK * 3 *
10961 ;          6472                               end;                     !* 4D2 *
10962 ;          6473
10963 ;          6474                           [3] :
10964 ;          6475                               begin                    !* 4D3 *        FATAL DRIVE ERROR -- NO RETRY ALLOWED
10965 ;          6476                               ERRDF (429, MSG1, 0);    !**** OPTION 4 ERROR 29 ****
10966 ;          6477                               WHY_DROPT [.LUN] = CODE_6;
10967 ;          6478                               DODU (.LUN);
```

SEQ 0251


```
10969 ;MLX4
10970 ;                 DEFINITION OF OPTION 4
10971
10972 ;          6479                           leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10973 ;          6480                           end;                        !* 4D3 *
10974 ;          6481
10975 ;          6482                       [4] :
10976 ;          6483                           begin                       !* 4D4 *        UNRECOVERABLE DATA ERROR
10977 ;          6484                           ISOLATE ();
10978 ;          6485                           ERRDF (430, MSG2, 0);       !**** OPTION 4 ERROR 30 ****
10979 ;          6486                           WHY_DROPT [.LUN] = CODE_7;
10980 ;          6487                           DODO (.LUN);
10981 ;          6488                           leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 3 *
10982 ;          6489                           end;                        !* 4D4 *
10983 ;          6490
10984 ;          6491                       [5] :
10985 ;          6492                           begin                       !* 4D5 *        RECOVERABLE DATA ERROR
10986 ;          6493                           ISOLATE ();
10987 ;          6494
10988 ;          6495                           if .ERROUT then PRINTB (FMT10B, .CHAN);
10989 ;          6496
10990 ;          6497                           !'    BIT QQ'
10991 ;          6498                           OLDSEC = .MLEL;
10992 ;          6499                           OLDCHN = .CHAN;
10993 ;          6500
10994 ;          6501                           if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .SECTOR) eql 5
10995 ;          6502                           then
10996 ;          6503
10997 ;          6504                               if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
10998 ;          6505                               then
10999 ;          6506                                   begin
11000 ;          6507
11001 ;          6508                                   if .ERROUT then ERRHRD (431, MSG4, 0);  !**** OPTION 4 ERROR 31 ****
11002 ;          6509
11003 ;          6510                                   UP_HARD_COUNT (.LUN, .BOARD);
11004 ;          6511                                   end
11005 ;          6512                               else
11006 ;          6513                                   begin
11007 ;          6514
11008 ;          6515                                   if .ERROUT then ERRSOFT (432, MSG3, 0); !**** OPTION 4 ERROR 32 ****
11009 ;          6516
11010 ;          6517                                   UP_SOFT_COUNT (.LUN, .BOARD);
11011 ;          6518                                   end
11012 ;          6519
11013 ;          6520                           else
11014 ;          6521                               begin
11015 ;          6522
11016 ;          6523                               if .ERROUT then ERRSOFT (433, MSG3, 0);     !**** OPTION 4 ERROR 33 ****
11017 ;          6524
11018 ;          6525                               UP_SOFT_COUNT (.LUN, .BOARD);
11019 ;          6526                               end;
11020 ;          6527
11021 ;          6528                           end;                        !* 4D5 *
11022 ;          6529                   tes;
11023 ;          6530
```

```
11025 ;MLX4
11026 ;                 DEFINITION OF OPTION 4
11027 ;
11028 ;       6531                  end;                          !* 4D *  END OF 4TH SECTOR SELECTION LOOP
11029 ;       6532
11030 ;       6533              end;                              !* 4 *  END OF TEST FOR AN ACTIVE UNIT
11031 ;       6534
11032 ;       6535          !+
11033 ;       6536          ! Test to see if this uut's address space is
11034 ;       6537          ! to be read for soft errors.  This test is
11035 ;       6538          ! is intended for DMT purposes.
11036 ;       6539          !-
11037 ;       6540
11038 ;       6541          if .EFN$21                            !Is the background pattern to be read
11039 ;       6542          then
11040 ;       6543              begin
11041 ;       6544
11042 ;       6545  !
11043 ;       6546  ! version czmlbb changed incr to incru
11044 ;       6547  !
11045 ;       6548              incru SECTOR from LOWEST to HIGHEST do
11046 ;       6549
11047 ;       6550                  if read (.LUN, 256, RBUFF, .SECTOR) eql 5
11048 ;       6551                  then
11049 ;       6552                      begin
11050 ;       6553                      ISOLATE ();               !Find the failing bank and board no.
11051 ;       6554
11052 ;       6555                      if .ERROUT then PRINTB (FMT10B, .CHAN);
11053 ;       6556
11054 ;       6557                      ! Print where the error is
11055 ;       6558                      !
11056 ;       6559                      ! Save the contents of the ML error location
11057 ;       6560                      ! register so we can compare it to the new
11058 ;       6561                      ! contents of this register after the retry.
11059 ;       6562                      ! This is done to classify the error.
11060 ;       6563                      !
11061 ;       6564                      OLDSEC = .MLEL;
11062 ;       6565                      OLDCHN = .CHAN;
11063 ;       6566                      !
11064 ;       6567                      ! Do a classify retry call.  If the same error
11065 ;       6568                      ! occures then classify it as a hard error.  If
11066 ;       6569                      ! a different error occured or the error went away
11067 ;       6570                      ! then classify it as a soft error.
11068 ;       6571                      !
11069 ;       6572
11070 ;       6573                      if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
11071 ;       6574                      then
11072 ;       6575                      !
11073 ;       6576                      ! The same error occured so see if it is at the same
11074 ;       6577                      ! sector and channel number, if so then classify
11075 ;       6578                      ! it as a hard error else classiy it as a soft
11076 ;       6579                      ! error.
11077 ;       6580                      !
11078 ;       6581
11079 ;       6582                          if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
```

```
11081 ;MLX4
11082 ;                 DEFINITION OF OPTION 4
11083
11084 ;          6583                           then
11085 ;          6584                               begin                    !Same error occured 'hard'
11086 ;          6585
11087 ;          6586                               if .ERROUT               !Print error if enabled
11088 ;          6587                               then
11089 ;          6588                                   begin
11090 ;        P 6589                                   ERRHRD (434,         !Error number
11091 ;        P 6590                                       MSG4,            !Error message
11092 ;          6591                                       0);              !Additional message routine
11093 ;          6592                                   end;
11094 ;          6593
11095 ;          6594                               UP_HARD_COUNT (.LUN, .BOARD);
11096 ;          6595                               end
11097 ;          6596                           else
11098 ;          6597                               begin                    !Not the same error 'soft'
11099 ;          6598
11100 ;          6599                               if .ERROUT               !Print error if enabled
11101 ;          6600                               then
11102 ;          6601                                   begin
11103 ;        P 6602                                   ERRSOFT (435,        !Error number
11104 ;        P 6603                                       MSG3,            !Error message
11105 ;          6604                                       0);              !Additional message routine
11106 ;          6605                                   end;
11107 ;          6606
11108 ;          6607                               UP_SOFT_COUNT (.LUN, .BOARD);
11109 ;          6608                               end
11110 ;          6609
11111 ;          6610                       else                             !Not the same error 'soft'
11112 ;          6611                           begin
11113 ;          6612
11114 ;          6613                           if .ERROUT                   !Print error if enabled
11115 ;          6614                           then
11116 ;          6615                               begin
11117 ;        P 6616                               ERRSOFT (436,            !Error number
11118 ;        P 6617                                   MSG3,                !Error message
11119 ;          6618                                   0);                  !Additional message routine
11120 ;          6619                               end;
11121 ;          6620
11122 ;          6621                           UP_SOFT_COUNT (.LUN, .BOARD);
11123 ;          6622                           end;
11124 ;          6623
11125 ;          6624                       end;
11126 ;          6625
11127 ;          6626                   end;
11128 ;          6627
11129 ;          6628               end;                                     !* 3 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
11130 ;          6629               end;                                     !* 2 *  END OF LOGICAL UNIT SELECTION LOOP
11131 ;          6630
11132 ;          6631           return;
11133 ;          6632           end;                                         !* 1 *  END OF ROUTINE
```

SEQ 0254

```
11141
11142
11146 062444 004167 122664                 OPT4:  .SBTTL  OPT4 DEFINITION OF OPTION 4
11147 062450 162706 000030                        JSR     R1,$SAVE5                       ;                    5908
11148 062454 012746 007650                        SUB     #30,SP
11149 062460 012746 007344                        MOV     #RTN4,-(SP)                     ;                    5981
11150 062464 012746 007100                        MOV     #WRD34,-(SP)
11151 062470 012746 000003                        MOV     #SAY2,-(SP)
11152 062474 010600                               MOV     #3,-(SP)
11153 062476 104414                               MOV     SP,R0                           ; SP,*
11154 062500 016716 117542                        TRAP    14
11155 062504 012746 012670                        MOV     MARPAT,(SP)                     ;                    5983
11156 062510 004767 157050                        MOV     #WDBUFF,-(SP)
11157 062514 016716 117526                        JSR     PC,GEN4
11158 062520 005416                               MOV     MARPAT,(SP)                     ;                    5984
11159 062522 012746 013670                        NEG     (SP)
11160 062526 004767 157032                        MOV     #WCBUFF,-(SP)
11161 062532 012766 012670 000016                 JSR     PC,GEN4
11162 062540 012766 013670 000026                 MOV     #WDBUFF,16(SP)                  ; *,WDPTR            5985
11163 062546 012766 022670 000024                 MOV     #WCBUFF,26(SP)                  ; *,WCPTR            5986
11164 062554 012766 023670 000034                 MOV     #RDBUFF,24(SP)                  ; *,RDPTR            5987
11165 062562 016766 117224 000042                 MOV     #RCBUFF,34(SP)                  ; *,RCPTR            5988
11166 062570 005066 000014                        MOV     L$LUNIT,42(SP)                  ;                    5990
11167 062574 000167 005362                        CLR     14(SP)                          ; LUN
11168 062600 016600 000014                        JMP     95$
11169 062604 006200                        1$:    MOV     14(SP),R0                       ; LUN,*              5995
11170 062606 006200                               ASR     R0
11171 062610 006200                               ASR     R0
11172 062612 062700 034442                        ASR     R0
11173 062616 010046                               ADD     #DRIVE.STATUS,R0
11174 062620 016646 000016                        MOV     R0,-(SP)
11175 062624 042716 177770                        MOV     16(SP),-(SP)                    ; LUN,*
11176 062630 012746 000001                        BIC     #177770,(SP)
11177 062634 005046                               MOV     #1,-(SP)
11178 062636 004767 121514                        CLR     -(SP)
11179 062642 062706 000010                        JSR     PC,BL$GT2
11180 062646 005300                               ADD     #10,SP
11181 062650 001402                               DEC     R0
11182 062652 000167 004630                        BEQ     2$
11183 062656 016667 000014 117210          2$:    JMP     83$
11184 062664 012746 007354                        MOV     14(SP),L$LUN                    ; LUN,*              5998
11185 062670 012746 007072                        MOV     #WRD35,-(SP)                    ;                    5999
11186 062674 012746 000002                        MOV     #SAY1,-(SP)
11187 062700 010600                               MOV     #2,-(SP)
11188 062702 104414                               MOV     SP,R0                           ; SP,*
11189 062704 012716 007332                        TRAP    14
11190 062710 012746 006160                        MOV     #WRD24,(SP)                     ;                    6001
11191 062714 012746 000002                        MOV     #FMT2,-(SP)
                                                  MOV     #2,-(SP)
```

SEQ 0255

```
11193                                   ;MLX4
11194                                   ;                       DEFINITION OF OPTION 4                                  27-Mar-1982 19:24:42    TOPS
11195                                                                                                                   27-Mar-1982 19:23:44    PA:<
11196 062720 010600                             MOV     SP,R0                           ; SP,*
11197 062722 104414                             TRAP    14
11198 062724 016600 000026                      MOV     26(SP),R0                       ; LUN,*                                                 6007
11199 062730 006300                             ASL     R0
11200 062732 012766 034460 000052               MOV     #LOW.SECT,52(SP)
11201 062740 060066 000052                      ADD     R0,52(SP)
11202 062744 012766 034500 000050               MOV     #TOP.SECT,50(SP)
11203 062752 060066 000050                      ADD     R0,50(SP)
11204 062756 017601 000050                      MOV     @50(SP),R1
11205 062762 017604 000052                      MOV     @52(SP),R4
11206 062766 000516                             BR      8$                              ; *,SECTOR
11207 062770 016646 000026              3$:     MOV     26(SP),-(SP)                    ; LUN,*                                                 6009
11208 062774 012746 000400                      MOV     #400,-(SP)
11209 063000 016646 000034                      MOV     34(SP),-(SP)                    ; WDPTR,*
11210 063004 010446                             MOV     R4,-(SP)                        ; SECTOR,*
11211 063006 004767 162412                      JSR     PC,WRITE
11212 063012 010005                             MOV     R0,R5                           ; *,VALUE
11213 063014 020527 000001                      CMP     R5,#1                           ; VALUE,*
11214 063020 001036                             BNE     4$                                                                              6015
11215 063022 012746 000006                      MOV     #6,-(SP)                        ;                                               6021
11216 063026 012746 045424                      MOV     #WRITE,-(SP)
11217 063032 016646 000042                      MOV     42(SP),-(SP)                    ; LUN,*
11218 063036 012746 000400                      MOV     #400,-(SP)
11219 063042 016646 000050                      MOV     50(SP),-(SP)                    ; WDPTR,*
11220 063046 010446                             MOV     R4,-(SP)                        ; SECTOR,*
11221 063050 004767 163150                      JSR     PC,RETRY
11222 063054 062706 000014                      ADD     #14,SP
11223 063060 005700                             TST     R0
11224 063062 001455                             BEQ     7$
11225 063064 016600 000036                      MOV     36(SP),R0
11226 063070 112760 000004 034446               MOVB    #4,WHY.DROPT(R0)                ; LUN,*                                                 6024
11227 063076 104455                             TRAP    55
11228 063100 000621                             .WORD   621                             ;                                               6025
11229 063102 011070                             .WORD   MSG1
11230 063104 000000                             .WORD   0
11231 063106 016600 000036                      MOV     36(SP),R0
11232 063112 104451                             TRAP    51                              ; LUN,*                                         6026
11233 063114 000435                             BR      6$
11234 063116 020527 000002              4$:     CMP     R5,#2                           ;                                               6027
11235 063122 001015                             BNE     5$                              ; VALUE,*                                       6015
11236 063124 016600 000036                      MOV     36(SP),R0
11237 063130 112760 000005 034446               MOVB    #5,WHY.DROPT(R0)                ; LUN,*                                                 6034
11238 063136 104455                             TRAP    55
11239 063140 000622                             .WORD   622                             ;                                               6035
11240 063142 011070                             .WORD   MSG1
11241 063144 000000                             .WORD   0
11242 063146 016600 000036                      MOV     36(SP),R0
11243 063152 104451                             TRAP    51                              ; LUN,*                                         6036
11244 063154 000415                             BR      6$
11245 063156 020527 000003              5$:     CMP     R5,#3                           ;                                               6037
11246 063162 001015                             BNE     7$                              ; VALUE,*                                       6015
11247 063164 104455                             TRAP    55                              ;                                               6042
```

SEQ 0256

```
11249                                   ;MLX4
11250                                   ;                       DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
11251                                   ;                                                               27-Mar-1982 19:23:44    PA:<
11252 063166  000623                              .WORD   623
11253 063170  011070                              .WORD   MSG1
11254 063172  000000                              .WORD   0
11255 063174  016600  000036                      MOV     36(SP),R0                       ; LUN,*
11256 063200  112760  000006  034446              MOVB    #6,WHY.DROPT(R0)                                        6043
11257 063206  104451                              TRAP    51
11258 063210  062706  000022              6$:     ADD     #22,SP                          ;                       6044
11259 063214  000565                              BR      14$                             ;                       6045
11260 063216  062706  000010              7$:     ADD     #10,SP                          ;                       6008
11261 063222  005204                              INC     R4                              ;                       6007
11262 063224  020401                      8$:     CMP     R4,R1                           ; SECTOR
11263 063226  101660                              BLOS    3$                              ; SECTOR,*
11264 063230  012716  007332                      MOV     #WRD24,(SP)                     ;                       6051
11265 063234  012746  006160                      MOV     #FMT2,-(SP)
11266 063240  012746  000002                      MOV     #2,-(SP)
11267 063244  010600                              MOV     SP,R0                           ; SP,*
11268 063246  104414                              TRAP    14
11269 063250  004767  162712                      JSR     PC,CHOOSE                       ;                       6053
11270 063254  010002                              MOV     R0,R2                           ; *,COMMAND
11271 063256  017666  000054  000046              MOV     @54(SP),46(SP)                  ;                       6058
11272 063264  017604  000056                      MOV     @56(SP),R4                      ; *,SECTOR
11273 063270  000167  001350                      JMP     33$
11274 063274  005001              9$:     CLR     R1                              ;                       6061
11275 063276  020227  045612                      CMP     R2,#READ                        ; COMMAND,*
11276 063302  001014                              BNE     10$
11277 063304  005201                              INC     R1
11278 063306  016603  000042                      MOV     42(SP),R3                       ; RDPTR,PTR             6064
11279 063312  016646  000032                      MOV     32(SP),-(SP)                    ; LUN,*                 6065
11280 063316  012746  000400                      MOV     #400,-(SP)
11281 063322  010346                              MOV     R3,-(SP)                        ; PTR,*
11282 063324  010446                              MOV     R4,-(SP)                        ; SECTOR,*
11283 063326  004767  162260                      JSR     PC,READ
11284 063332  000412                              BR      11$
11285 063334  016603  000034              10$:    MOV     34(SP),R3                       ; WDPTR,PTR             6069
11286 063340  016646  000032                      MOV     32(SP),-(SP)                    ; LUN,*                 6070
11287 063344  012746  000400                      MOV     #400,-(SP)
11288 063350  010346                              MOV     R3,-(SP)                        ; PTR,*
11289 063352  010446                              MOV     R4,-(SP)                        ; SECTOR,*
11290 063354  004767  162420                      JSR     PC,CHECK
11291 063360  010005              11$:    MOV     R0,R5                           ; *,VALUE
11292 063362  001103                              BNE     15$                             ;                       6077
11293 063364  006001                              ROR     R1                              ;                       6082
11294 063366  103402                              BLO     13$
11295 063370  000167  001012              12$:    JMP     28$
11296 063374  016646  000044              13$:    MOV     44(SP),-(SP)                    ; WDPTR,*               6086
11297 063400  016646  000054                      MOV     54(SP),-(SP)                    ; RDPTR,*
11298 063404  012746  000400                      MOV     #400,-(SP)
11299 063410  004767  160712                      JSR     PC,DOUBLE.CHECK
11300 063414  062706  000006                      ADD     #6,SP
11301 063420  010066  000060                      MOV     R0,60(SP)                       ; *,DBL.VALUE
11302 063424  001761                              BEQ     12$
11303 063426  016646  000042                      MOV     42(SP),-(SP)                    ; LUN,*                 6089
```

SEQ 0257

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11305                                   ;MLX4
11306                                   ;
11307                                   ;       DEFINITION OF OPTION 4                                  27-Mar-1982 19:24:42    TOPS
11308 063432  004767  152066                     JSR     PC,SAYWHO                                       27-Mar-1982 19:23:44    PA:<
11309 063436  012716  011216                     MOV     #MSG5,(SP)
11310 063442  012746  007072                     MOV     #SAY1,-(SP)             ;                                               6090
11311 063446  012746  000002                     MOV     #2,-(SP)
11312 063452  010600                             MOV     SP,R0
11313 063454  104414                             TRAP    14                      ; SP,*
11314 063456  016616  000066                     MOV     66(SP),(SP)
11315 063462  017646  000066                     MOV     @66(SP),-(SP)           ; DBL.VALUE,*                                   6092
11316 063466  012746  006710                     MOV     #FMT12A,-(SP)           ; DBL.VALUE,*
11317 063472  012746  000003                     MOV     #3,-(SP)
11318 063476  010600                             MOV     SP,R0
11319 063500  104414                             TRAP    14                      ; SP,*
11320 063502  062766  010000  000074             ADD     #10000,74(SP)           ; *,DBL.VALUE                                   6094
11321 063510  016616  000074                     MOV     74(SP),(SP)             ; DBL.VALUE,*                                   6095
11322 063514  017646  000074                     MOV     @74(SP),-(SP)           ; DBL.VALUE,*
11323 063520  012746  006756                     MOV     #FMT12B,-(SP)
11324 063524  012746  000003                     MOV     #3,-(SP)
11325 063530  010600                             MOV     SP,R0
11326 063532  104414                             TRAP    14                      ; SP,*
11327 063534  016601  000064                     MOV     64(SP),R1
11328 063540  112761  000010  034446             MOVB    #10,WHY.DROPT(R1)       ; LUN,*                                         6097
11329 063546  104455                             TRAP    55                      ;                                               6098
11330 063550  000624                             .WORD   624
11331 063552  011070                             .WORD   MSG1
11332 063554  000000                             .WORD   0
11333 063556  016600  000064                     MOV     64(SP),R0               ; LUN,*
11334 063562  104451                             TRAP    51                                                                      6099
11335 063564  062706  000050                     ADD     #50,SP
11336 063570  000520                     14$:    BR      20$                     ;                                               6100
11337 063572  020527  000001             15$:    CMP     R5,#1                   ; VALUE,*                                       6077
11338 063576  001034                             BNE     16$
11339 063600  012746  000006                     MOV     #6,-(SP)                ;                                               6108
11340 063604  010246                             MOV     R2,-(SP)                ; COMMAND,*
11341 063606  016646  000046                     MOV     46(SP),-(SP)            ; LUN,*
11342 063612  012746  000400                     MOV     #400,-(SP)
11343 063616  010346                             MOV     R3,-(SP)                ; PTR,*
11344 063620  010446                             MOV     R4,-(SP)                ; SECTOR,*
11345 063622  004767  162376                     JSR     PC,RETRY
11346 063626  062706  000014                     ADD     #14,SP
11347 063632  005700                             TST     R0
11348 063634  001655                             BEQ     12$
11349 063636  016601  000042                     MOV     42(SP),R1
11350 063642  112761  000004  034446             MOVB    #4,WHY.DROPT(R1)        ; LUN,*                                         6111
11351 063650  104455                             TRAP    55                      ;                                               6112
11352 063652  000625                             .WORD   625
11353 063654  011070                             .WORD   MSG1
11354 063656  000000                             .WORD   0
11355 063660  016600  000042                     MOV     42(SP),R0               ; LUN,*
11356 063664  104451                             TRAP    51                                                                      6113
11357 063666  000457                             BR      19$                     ;                                               6114
11358 063670  020527  000002             16$:    CMP     R5,#2                   ; VALUE,*                                       6077
11359 063674  001015                             BNE     17$
```

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                                                                                                                    SEQ 0258
11361                                ;MLX4
11362                                ;                                                                  27-Mar-1982 19:24:42   TOPS
11363                                ;          DEFINITION OF OPTION 4                                  27-Mar-1982 19:23:44   PA:<
11364 063676 016601 000042                   MOV     42(SP),R1
11365 063702 112761 000005 034446            MOVB    #5,WHY.DROPT(R1)          ; LUN,*                                  6121
11366 063710 104455                          TRAP    55                        ;                                        6122
11367 063712 000626                          .WORD   626
11368 063714 011070                          .WORD   MSG1
11369 063716 000000                          .WORD   0
11370 063720 016600 000042                   MOV     42(SP),R0                 ; LUN,*                                  6123
11371 063724 104451                          TRAP    51                        ;                                        6124
11372 063726 000437                          BR      19$                       ; VALUE,*                                6077
11373 063730 020527 000003          17$:     CMP     R5,#3                     ;                                        6129
11374 063734 001014                          BNE     18$
11375 063736 104455                          TRAP    55
11376 063740 000627                          .WORD   627
11377 063742 011070                          .WORD   MSG1
11378 063744 000000                          .WORD   0
11379 063746 016601 000042                   MOV     42(SP),R1                 ; LUN,*                                  6130
11380 063752 112761 000006 034446            MOVB    #6,WHY.DROPT(R1)          ; LUN,*                                  6131
11381 063760 010100                          MOV     R1,R0                     ;                                        6132
11382 063762 104451                          TRAP    51                        ; VALUE,*                                6077
11383 063764 000420                          BR      19$                       ;                                        6137
11384 063766 020527 000004          18$:     CMP     R5,#4                     ;                                        6138
11385 063772 001021                          BNE     21$
11386 063774 004767 153332                   JSR     PC,ISOLATE
11387 064000 104455                          TRAP    55
11388 064002 000630                          .WORD   630
11389 064004 011120                          .WORD   MSG2
11390 064006 000000                          .WORD   0
11391 064010 016601 000042                   MOV     42(SP),R1
11392 064014 112761 000007 034446            MOVB    #7,WHY.DROPT(R1)          ; LUN,*                                  6139
11393 064022 010100                          MOV     R1,R0                     ; LUN,*                                  6140
11394 064024 104451                          TRAP    51                        ;                                        6141
11395 064026 062706 000026          19$:     ADD     #26,SP                    ; VALUE,*                                6077
11396 064032 000167 004120          20$:     JMP     94$                       ;                                        6146
11397 064036 020527 000005          21$:     CMP     R5,#5                     ;                                        6148
11398 064042 001161                          BNE     28$
11399 064044 004767 153262                   JSR     PC,ISOLATE
11400 064050 032767 000001 116202            BIT     #1,ERROUT
11401 064056 001423                          BEQ     22$
11402 064060 017701 150324                   MOV     @ML.REG+42,R1
11403 064064 006201                          ASR     R1
11404 064066 006201                          ASR     R1
11405 064070 006201                          ASR     R1
11406 064072 006201                          ASR     R1
11407 064074 006201                          ASR     R1
11408 064076 006201                          ASR     R1
11409 064100 042701 177700                   BIC     #177700,R1
11410 064104 010146                          MOV     R1,-(SP)
11411 064106 012746 006640                   MOV     #FMT10B,-(SP)
11412 064112 012746 000002                   MOV     #2,-(SP)
11413 064116 010600                          MOV     SP,R0
11414 064120 104414                          TRAP    14                        ; SP,*
11415 064122 062706 000006                   ADD     #6,SP
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                                        ;MLX4
                                        ;                DEFINITION OF OPTION 4                                  27-Mar-1982 19:24:42    TOPS
                                                                                                                 27-Mar-1982 19:23:44    PA:<
11420 064126  017766  150260  000046  22$:    MOV     @ML.REG+44,46(SP)       ; *,OLDSEC                                      6151
11421 064134  017701  150250                   MOV     @ML.REG+42,R1           ;                                               6152
11422 064140  006201                           ASR     R1
11423 064142  006201                           ASR     R1
11424 064144  006201                           ASR     R1
11425 064146  006201                           ASR     R1
11426 064150  006201                           ASR     R1
11427 064152  006201                           ASR     R1
11428 064154  042701  177700                   BIC     #177700,R1
11429 064160  010166  000050                   MOV     R1,50(SP)
11430 064164  012746  000001                   MOV     #1,-(SP)                ; *,OLDCHN
11431 064170  010246                           MOV     R2,-(SP)                ;                                               6154
11432 064172  016646  000046                   MOV     46(SP),-(SP)            ; COMMAND,*
11433 064176  012746  000400                   MOV     #400,-(SP)              ; LUN,*
11434 064202  010346                           MOV     R3,-(SP)
11435 064204  010446                           MOV     R4,-(SP)                ; PTR,*
11436 064206  004767  162012                   JSR     PC,RETRY                ; SECTOR,*
11437 064212  062706  000014                   ADD     #14,SP
11438 064216  020027  000005                   CMP     R0,#5
11439 064222  001052                           BNE     25$
11440 064224  027766  150162  000046           CMP     @ML.REG+44,46(SP)       ; *,OLDSEC                                      6157
11441 064232  001035                           BNE     24$
11442 064234  016600  000050                   MOV     50(SP),R0               ; OLDCHN,*
11443 064240  017701  150144                   MOV     @ML.REG+42,R1
11444 064244  006201                           ASR     R1
11445 064246  006201                           ASR     R1
11446 064250  006201                           ASR     R1
11447 064252  006201                           ASR     R1
11448 064254  006201                           ASR     R1
11449 064256  006201                           ASR     R1
11450 064260  042701  177700                   BIC     #177700,R1
11451 064264  020100                           CMP     R1,R0
11452 064266  001017                           BNE     24$
11453 064270  032767  000001  115762           BIT     #1,ERROUT               ;                                               6161
11454 064276  001404                           BEQ     23$
11455 064300  104456                           TRAP    56
11456 064302  000631                           .WORD   631
11457 064304  011202                           .WORD   MSG4
11458 064306  000000                           .WORD   0
11459 064310  016646  000042          23$:     MOV     42(SP),-(SP)            ; LUN,*                                         6163
11460 064314  016746  150022                   MOV     BOARD,-(SP)
11461 064320  004767  153076                   JSR     PC,UP.HARD.COUNT
11462 064324  000427                           BR      27$
11463 064326  032767  000001  115724  24$:     BIT     #1,ERROUT               ;                                               6157
11464 064334  001415                           BEQ     26$                     ;                                               6168
11465 064336  104457                           TRAP    57
11466 064340  000632                           .WORD   632
11467 064342  011166                           .WORD   MSG3
11468 064344  000000                           .WORD   0
11469 064346  000410                           BR      26$
11470 064350  032767  000001  115702  25$:     BIT     #1,ERROUT               ;                                               6170
11471 064356  001404                           BEQ     26$                     ;                                               6176
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11473                                   ;MLX4
11474                                   ;
11475                                   ;               DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
11476 064360  104457                                    TRAP    57                              27-Mar-1982 19:23:44    PA:<
11477 064362  000633                                    .WORD   633
11478 064364  011166                                    .WORD   MSG3
11479 064366  000000                                    .WORD   0
11480 064370  016646  000042           26$:             MOV     42(SP),-(SP)            ; LUN,*                         6178
11481 064374  016746  147742                            MOV     BOARD,-(SP)
11482 064400  004767  153500                            JSR     PC,UP.SOFT.COUNT
11483 064404  022626                   27$:             CMP     (SP)+,(SP)+             ;                               6145
11484 064406  016616  000042           28$:             MOV     42(SP),(SP)             ; LUN,*                         6184
11485 064412  012746  000400                            MOV     #400,-(SP)
11486 064416  016646  000056                            MOV     56(SP),-(SP)            ; WCPTR,*
11487 064422  010446                                    MOV     R4,-(SP)                ; SECTOR,*
11488 064424  004767  160774                            JSR     PC,WRITE
11489 064430  010005                                    MOV     R0,R5                   ; *,VALUE
11490 064432  020527  000001                            CMP     R5,#1                   ; VALUE,*                       6190
11491 064436  001036                                    BNE     29$
11492 064440  012746  000006                            MOV     #6,-(SP)                ;                               6196
11493 064444  012746  045424                            MOV     #WRITE,-(SP)
11494 064450  016646  000054                            MOV     54(SP),-(SP)            ; LUN,*
11495 064454  012746  000400                            MOV     #400,-(SP)
11496 064460  016646  000072                            MOV     72(SP),-(SP)            ; WCPTR,*
11497 064464  010446                                    MOV     R4,-(SP)                ; SECTOR,*
11498 064466  004767  161532                            JSR     PC,RETRY
11499 064472  062706  000014                            ADD     #14,SP
11500 064476  005700                                    TST     R0
11501 064500  001456                                    BEQ     32$
11502 064502  016601  000050                            MOV     50(SP),R1               ; LUN,*                         6199
11503 064506  112761  000004  034446                    MOVB    #4,WHY.DROPT(R1)
11504 064514  104455                                    TRAP    55                      ;                               6200
11505 064516  000634                                    .WORD   634
11506 064520  011070                                    .WORD   MSG1
11507 064522  000000                                    .WORD   0
11508 064524  016600  000050                            MOV     50(SP),R0               ; LUN,*                         6201
11509 064530  104451                                    TRAP    51
11510 064532  000436                                    BR      31$                     ;                               6202
11511 064534  020527  000002           29$:             CMP     R5,#2                   ; VALUE,*                       6190
11512 064540  001015                                    BNE     30$
11513 064542  016601  000050                            MOV     50(SP),R1               ; LUN,*                         6209
11514 064546  112761  000005  034446                    MOVB    #5,WHY.DROPT(R1)
11515 064554  104455                                    TRAP    55                      ;                               6210
11516 064556  000635                                    .WORD   635
11517 064560  011070                                    .WORD   MSG1
11518 064562  000000                                    .WORD   0
11519 064564  016600  000050                            MOV     50(SP),R0               ; LUN,*                         6211
11520 064570  104451                                    TRAP    51
11521 064572  000416                                    BR      31$                     ;                               6212
11522 064574  020527  000003           30$:             CMP     R5,#3                   ; VALUE,*                       6190
11523 064600  001016                                    BNE     32$
11524 064602  104455                                    TRAP    55                      ;                               6217
11525 064604  000636                                    .WORD   636
11526 064606  011070                                    .WORD   MSG1
11527 064610  000000                                    .WORD   0
```

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                                                                                                                    SEQ 0261

                                ;MLX4                                                                  27-Mar-1982 19:24:42   TOPS
                                ;       DEFINITION OF OPTION 4                                         27-Mar-1982 19:23:44   PA:<
11529
11530
11531
11532 064612 016601 000050              MOV     50(SP),R1
11533 064616 112761 000006 034446       MOVB    #6,WHY.DROPT(R1)        ; LUN,*                                 6218
11534 064624 010100                     MOV     R1,R0                   ; LUN,*                                 6219
11535 064626 104451                     TRAP    51
11536 064630 062706 000034      31$:    ADD     #34,SP                  ;                                       6220
11537 064634 000570                     BR      40$
11538 064636 062706 000016      32$:    ADD     #16,SP                  ;                                       6059
11539 064642 005204                     INC     R4                      ; SECTOR                                6058
11540 064644 020466 000046      33$:    CMP     R4,46(SP)               ; SECTOR,*
11541 064650 101002                     BHI     34$
11542 064652 000167 176416              JMP     9$
11543 064656 012716 007336      34$:    MOV     #WRD25,(SP)             ;                                       6226
11544 064662 012746 006160              MOV     #FMT2,-(SP)
11545 064666 012746 000002              MOV     #2,-(SP)
11546 064672 010600                     MOV     SP,R0                   ; SP,*
11547 064674 104414                     TRAP    14
11548 064676 004767 161264              JSR     PC,CHOOSE               ;                                       6228
11549 064702 010002                     MOV     R0,R2                   ; *,COMMAND
11550 064704 017666 000062 000052       MOV     @62(SP),52(SP)          ;                                       6230
11551 064712 017604 000060              MOV     @60(SP),R4              ; *,SECTOR
11552 064716 000167 001350              JMP     59$
11553 064722 005001             35$:    CLR     R1                      ;                                       6233
11554 064724 020227 045612              CMP     R2,#READ                ; COMMAND,*
11555 064730 001014                     BNE     36$
11556 064732 005201                     INC     R1
11557 064734 016603 000056              MOV     56(SP),R3               ; RCPTR,PTR                             6236
11558 064740 016646 000036              MOV     36(SP),-(SP)            ; LUN,*                                 6237
11559 064744 012746 000400              MOV     #400,-(SP)
11560 064750 010346                     MOV     R3,-(SP)                ; PTR,*
11561 064752 010446                     MOV     R4,-(SP)                ; SECTOR,*
11562 064754 004767 160632              JSR     PC,READ
11563 064760 000412                     BR      37$
11564 064762 016603 000050      36$:    MOV     50(SP),R3               ; WCPTR,PTR                             6241
11565 064766 016646 000036              MOV     36(SP),-(SP)            ; LUN,*                                 6242
11566 064772 012746 000400              MOV     #400,-(SP)
11567 064776 010346                     MOV     R3,-(SP)                ; PTR,*
11568 065000 010446                     MOV     R4,-(SP)                ; SECTOR,*
11569 065002 004767 160772              JSR     PC,CHECK
11570 065006 010005             37$:    MOV     R0,R5                   ; *,VALUE
11571 065010 001103                     BNE     41$                     ;
11572 065012 006001                     ROR     R1                      ;                                       6249
11573 065014 103402                     BLO     39$                     ;                                       6254
11574 065016 000167 001012      38$:    JMP     54$
11575 065022 016646 000060      39$:    MOV     60(SP),-(SP)            ; WCPTR,*                               6258
11576 065026 016646 000070              MOV     70(SP),-(SP)            ; RCPTR,*
11577 065032 012746 000400              MOV     #400,-(SP)
11578 065036 004767 157264              JSR     PC,DOUBLE.CHECK
11579 065042 062706 000006              ADD     #6,SP
11580 065046 010066 000064              MOV     R0,64(SP)               ; *,DBL.VALUE
11581 065052 001761                     BEQ     38$
11582 065054 016646 000046              MOV     46(SP),-(SP)            ; LUN,*                                 6261
11583 065060 004767 150440              JSR     PC,SAYWHO
```

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11585                                   ;MLX4
11586                                   ;                DEFINITION OF OPTION 4                                  27-Mar-1982 19:24:42    TOPS
11587                                                                                                            27-Mar-1982 19:23:44    PA:<
11588 065064  012716  011216                       MOV     #MSG5,(SP)
11589 065070  012746  007072                       MOV     #SAY1,-(SP)             ;                                                       6262
11590 065074  012746  000002                       MOV     #2,-(SP)
11591 065100  010600                               MOV     SP,R0
11592 065102  104414                               TRAP    14                      ; SP,*
11593 065104  016616  000072                       MOV     72(SP),(SP)             ; DBL.VALUE,*
11594 065110  017646  000072                       MOV     @72(SP),-(SP)           ; DBL.VALUE,*                                           6264
11595 065114  012746  006710                       MOV     #FMT12A,-(SP)
11596 065120  012746  000003                       MOV     #3,-(SP)
11597 065124  010600                               MOV     SP,R0
11598 065126  104414                               TRAP    14                      ; SP,*
11599 065130  062766  010000  000100                 ADD     #10000,100(SP)        ; *,DBL.VALUE
11600 065136  016616  000100                       MOV     100(SP),(SP)            ; DBL.VALUE,*                                           6266
11601 065142  017646  000100                       MOV     @100(SP),-(SP)          ; DBL.VALUE,*                                           6267
11602 065146  012746  006756                       MOV     #FMT12B,-(SP)
11603 065152  012746  000003                       MOV     #3,-(SP)
11604 065156  010600                               MOV     SP,R0
11605 065160  104414                               TRAP    14                      ; SP,*
11606 065162  016601  000070                       MOV     70(SP),R1
11607 065166  112761  000010  034446                 MOVB    #10,WHY.DROPT(R1)     ; LUN,*                                                 6269
11608 065174  104455                               TRAP    55                      ;                                                       6270
11609 065176  000637                               .WORD   637
11610 065200  011070                               .WORD   MSG1
11611 065202  000000                               .WORD   0
11612 065204  016600  000070                       MOV     70(SP),R0
11613 065210  104451                               TRAP    51                      ; LUN,*                                                 6271
11614 065212  062706  000054                       ADD     #54,SP
11615 065216  000520                       40$:    BR      46$                     ;                                                       6272
11616 065220  020527  000001               41$:    CMP     R5,#1                   ; VALUE,*                                               6249
11617 065224  001034                               BNE     42$
11618 065226  012746  000006                       MOV     #6,-(SP)                ;                                                       6280
11619 065232  010246                               MOV     R2,-(SP)                ; COMMAND,*
11620 065234  016646  000052                       MOV     52(SP),-(SP)            ; LUN,*
11621 065240  012746  000400                       MOV     #400,-(SP)
11622 065244  010346                               MOV     R3,-(SP)                ; PTR,*
11623 065246  010446                               MOV     R4,-(SP)                ; SECTOR,*
11624 065250  004767  160750                       JSR     PC,RETRY
11625 065254  062706  000014                       ADD     #14,SP
11626 065260  005700                               TST     R0
11627 065262  001655                               BEQ     38$
11628 065264  016601  000046                       MOV     46(SP),R1
11629 065270  112761  000004  034446                 MOVB    #4,WHY.DROPT(R1)      ; LUN,*                                                 6283
11630 065276  104455                               TRAP    55                      ;                                                       6284
11631 065300  000640                               .WORD   640
11632 065302  011070                               .WORD   MSG1
11633 065304  000000                               .WORD   0
11634 065306  016600  000046                       MOV     46(SP),R0
11635 065312  104451                               TRAP    51                      ; LUN,*                                                 6285
11636 065314  000457                               BR      45$                     ;                                                       6286
11637 065316  020527  000002               42$:    CMP     R5,#2                   ; VALUE,*                                               6249
11638 065322  001015                               BNE     43$
11639 065324  016601  000046                       MOV     46(SP),R1               ; LUN,*                                                 6293
```

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                                                                                                                                SEQ 0263
11641                                   ;MLX4
11642                                   ;                       DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
11643                                                                                                   27-Mar-1982 19:23:44    PA:<
11644 065330 112761 000005 034446               MOVB    #5,WHY.DROPT(R1)
11645 065336 104455                             TRAP    55
11646 065340 000641                             .WORD   641                     ;                                               6294
11647 065342 011070                             .WORD   MSG1
11648 065344 000000                             .WORD   0
11649 065346 016600 000046                      MOV     46(SP),R0               ; LUN,*                                         6295
11650 065352 104451                             TRAP    51
11651 065354 000437                             BR      45$                     ;                                               6296
11652 065356 020527 000003              43$:    CMP     R5,#3                   ; VALUE,*                                       6249
11653 065362 001014                             BNE     44$
11654 065364 104455                             TRAP    55                      ;                                               6301
11655 065366 000642                             .WORD   642
11656 065370 011070                             .WORD   MSG1
11657 065372 000000                             .WORD   0
11658 065374 016601 000046                      MOV     46(SP),R1               ; LUN,*                                         6302
11659 065400 112761 000006 034446               MOVB    #6,WHY.DROPT(R1)
11660 065406 010100                             MOV     R1,R0                   ; LUN,*                                         6303
11661 065410 104451                             TRAP    51
11662 065412 000420                             BR      45$                     ;                                               6304
11663 065414 020527 000004              44$:    CMP     R5,#4                   ; VALUE,*                                       6249
11664 065420 001021                             BNE     47$
11665 065422 004767 151704                      JSR     PC,ISOLATE              ;                                               6309
11666 065426 104455                             TRAP    55                      ;                                               6310
11667 065430 000643                             .WORD   643
11668 065432 011120                             .WORD   MSG2
11669 065434 000000                             .WORD   0
11670 065436 016601 000046                      MOV     46(SP),R1               ; LUN,*                                         6311
11671 065442 112761 000007 034446               MOVB    #7,WHY.DROPT(R1)
11672 065450 010100                             MOV     R1,R0                   ; LUN,*                                         6312
11673 065452 104451                             TRAP    51
11674 065454 062706 000032              45$:    ADD     #32,SP                  ;                                               6313
11675 065460 000167 002472              46$:    JMP     94$
11676 065464 020527 000005              47$:    CMP     R5,#5                   ; VALUE,*                                       6249
11677 065470 001161                             BNE     54$
11678 065472 004767 151634                      JSR     PC,ISOLATE              ;                                               6318
11679 065476 032767 000001 114554               BIT     #1,ERROUT               ;                                               6320
11680 065504 001423                             BEQ     48$
11681 065506 017701 146676                      MOV     @ML.REG+42,R1
11682 065512 006201                             ASR     R1
11683 065514 006201                             ASR     R1
11684 065516 006201                             ASR     R1
11685 065520 006201                             ASR     R1
11686 065522 006201                             ASR     R1
11687 065524 006201                             ASR     R1
11688 065526 042701 177700                      BIC     #177700,R1
11689 065532 010146                             MOV     R1,-(SP)
11690 065534 012746 006640                      MOV     #FMT10B,-(SP)
11691 065540 012746 000002                      MOV     #2,-(SP)
11692 065544 010600                             MOV     SP,R0                   ; SP,*
11693 065546 104414                             TRAP    14
11694 065550 062706 000006                      ADD     #6,SP
11695 065554 017766 146632 000052       48$:    MOV     @ML.REG+44,52(SP)       ; *,OLDSEC                              6323
```

SEQ 0264

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11697                                   ;MLX4
11698                                   ;                       DEFINITION OF OPTION 4
11699
11700 065562  017701  146622                      MOV     @ML.REG+42,R1           ;
11701 065566  006201                              ASR     R1
11702 065570  006201                              ASR     R1
11703 065572  006201                              ASR     R1
11704 065574  006201                              ASR     R1
11705 065576  006201                              ASR     R1
11706 065600  006201                              ASR     R1
11707 065602  042701  177700                      BIC     #177700,R1
11708 065606  010166  000054                      MOV     R1,54(SP)               ; *,OLDCHN
11709 065612  012746  000001                      MOV     #1,-(SP)                ;
11710 065616  010246                              MOV     R2,-(SP)                ; COMMAND,*
11711 065620  016646  000052                      MOV     52(SP),-(SP)            ; LUN,*
11712 065624  012746  000400                      MOV     #400,-(SP)
11713 065630  010346                              MOV     R3,-(SP)                ; PTR,*
11714 065632  010446                              MOV     R4,-(SP)                ; SECTOR,*
11715 065634  004767  160364                      JSR     PC,RETRY
11716 065640  062706  000014                      ADD     #14,SP
11717 065644  020027  000005                      CMP     R0,#5
11718 065650  001052                              BNE     51$
11719 065652  027766  146534  000052              CMP     @ML.REG+44,52(SP)       ; *,OLDSEC
11720 065660  001035                              BNE     50$
11721 065662  016600  000054                      MOV     54(SP),R0               ; OLDCHN,*
11722 065666  017701  146516                      MOV     @ML.REG+42,R1
11723 065672  006201                              ASR     R1
11724 065674  006201                              ASR     R1
11725 065676  006201                              ASR     R1
11726 065700  006201                              ASR     R1
11727 065702  006201                              ASR     R1
11728 065704  006201                              ASR     R1
11729 065706  042701  177700                      BIC     #177700,R1
11730 065712  020100                              CMP     R1,R0
11731 065714  001017                              BNE     50$
11732 065716  032767  000001  114334              BIT     #1,ERROUT               ;
11733 065724  001404                              BEQ     49$
11734 065726  104456                              TRAP    56
11735 065730  000644                              .WORD   644
11736 065732  011202                              .WORD   MSG4
11737 065734  000000                              .WORD   0
11738 065736  016646  000046          49$:        MOV     46(SP),-(SP)            ; LUN,*
11739 065742  016746  146374                      MOV     BOARD,-(SP)
11740 065746  004767  151450                      JSR     PC,UP.HARD.COUNT
11741 065752  000427                              BR      53$
11742 065754  032767  000001  114276  50$:        BIT     #1,ERROUT               ;
11743 065762  001415                              BEQ     52$
11744 065764  104457                              TRAP    57
11745 065766  000645                              .WORD   645
11746 065770  011166                              .WORD   MSG3
11747 065772  000000                              .WORD   0
11748 065774  000410                              BR      52$
11749 065776  032767  000001  114254  51$:        BIT     #1,ERROUT               ;
11750 066004  001404                              BEQ     52$
11751 066006  104457                              TRAP    57
```

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SEQ 0265

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11753                                   ;MLX4
11754                                   ;               DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
11755                                                                                           27-Mar-1982 19:23:44    PA:<
11756 066010  000646                              .WORD   646
11757 066012  011166                              .WORD   MSG3
11758 066014  000000                              .WORD   0
11759 066016  016646  000046             52$:     MOV     46(SP),-(SP)            ; LUN,*                         6350
11760 066022  016746  146314                      MOV     BOARD,-(SP)
11761 066026  004767  152052                      JSR     PC,UP.SOFT.COUNT
11762 066032  022626                      53$:    CMP     (SP)+,(SP)+             ;                               6317
11763 066034  016616  000046             54$:     MOV     46(SP),(SP)             ; LUN,*                         6356
11764 066040  012746  000400                      MOV     #400,-(SP)
11765 066044  016646  000052                      MOV     52(SP),-(SP)            ; WDPTR,*
11766 066050  010446                              MOV     R4,-(SP)                ; SECTOR,*
11767 066052  004767  157346                      JSR     PC,WRITE
11768 066056  010005                              MOV     R0,R5                   ; *,VALUE
11769 066060  020527  000001                      CMP     R5,#1                   ; VALUE,*
11770 066064  001036                              BNE     55$                             6362
11771 066066  012746  000006                      MOV     #6,-(SP)                ;       6368
11772 066072  012746  045424                      MOV     #WRITE,-(SP)
11773 066076  016646  000060                      MOV     60(SP),-(SP)            ; LUN,*
11774 066102  012746  000400                      MOV     #400,-(SP)
11775 066106  016646  000066                      MOV     66(SP),-(SP)            ; WDPTR,*
11776 066112  010446                              MOV     R4,-(SP)                ; SECTOR,*
11777 066114  004767  160104                      JSR     PC,RETRY
11778 066120  062706  000014                      ADD     #14,SP
11779 066124  005700                              TST     R0
11780 066126  001456                              BEQ     58$
11781 066130  016601  000054                      MOV     54(SP),R1               ; LUN,*                         6371
11782 066134  112761  000004  034446             MOVB    #4,WHY.DROPT(R1)
11783 066142  104455                              TRAP    55
11784 066144  000647                              .WORD   647                     ;                               6372
11785 066146  011070                              .WORD   MSG1
11786 066150  000000                              .WORD   0
11787 066152  016600  000054                      MOV     54(SP),R0               ; LUN,*                         6373
11788 066156  104451                              TRAP    51
11789 066160  000436                              BR      57$                     ;                               6374
11790 066162  020527  000002             55$:     CMP     R5,#2                   ; VALUE,*                       6362
11791 066166  001015                              BNE     56$
11792 066170  016601  000054                      MOV     54(SP),R1               ; LUN,*                         6381
11793 066174  112761  000005  034446             MOVB    #5,WHY.DROPT(R1)
11794 066202  104455                              TRAP    55
11795 066204  000650                              .WORD   650                     ;                               6382
11796 066206  011070                              .WORD   MSG1
11797 066210  000000                              .WORD   0
11798 066212  016600  000054                      MOV     54(SP),R0               ; LUN,*                         6383
11799 066216  104451                              TRAP    51
11800 066220  000416                              BR      57$                     ;                               6384
11801 066222  020527  000003             56$:     CMP     R5,#3                   ; VALUE,*                       6362
11802 066226  001016                              BNE     58$
11803 066230  104455                              TRAP    55
11804 066232  000651                              .WORD   651                     ;                               6389
11805 066234  011070                              .WORD   MSG1
11806 066236  000000                              .WORD   0
11807 066240  016601  000054                      MOV     54(SP),R1               ; LUN,*                         6390
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SEQ 0266

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11809                                   ;MLX4
11810                                   ;
11811                                   ;       DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
11812                                                                                   27-Mar-1982 19:23:44    PA:<
11812 066244  112761  000006  034446            MOVB    #6,WHY.DROPT(R1)
11813 066252  010100                            MOV     R1,R0
11814 066254  104451                            TRAP    51                      ; LUN,*                         6391
11815 066256  062706  000040          57$:      ADD     #40,SP                  ;                               6392
11816 066262  000570                            BR      66$
11817 066264  062706  000016          58$:      ADD     #16,SP                  ;                               6231
11818 066270  005304                            DEC     R4                      ; SECTOR                        6230
11819 066272  020466  000052          59$:      CMP     R4,52(SP)               ; SECTOR,*
11820 066276  002402                            BLT     60$
11821 066300  000167  176416                    JMP     35$
11822 066304  012716  007332          60$:      MOV     #WRD24,(SP)             ;                               6398
11823 066310  012746  006160                    MOV     #FMT2,-(SP)
11824 066314  012746  000002                    MOV     #2,-(SP)
11825 066320  010600                            MOV     SP,R0
11826 066322  104414                            TRAP    14                      ; SP,*
11827 066324  004767  157636                    JSR     PC,CHOOSE
11828 066330  010002                            MOV     R0,R2                   ;                               6400
11829 066332  017666  000064  000064            MOV     @64(SP),64(SP)          ; *,COMMAND
11830 066340  017604  000066                    MOV     @66(SP),R4              ;                               6405
11831 066344  000167  001120                    JMP     81$                     ; *,SECTOR
11832 066350  005001          61$:      CLR     R1
11833 066352  020227  045612                    CMP     R2,#READ                ;                               6408
11834 066356  001014                            BNE     62$                     ; COMMAND,*
11835 066360  005201                            INC     R1
11836 066362  016603  000052                    MOV     52(SP),R3               ; RDPTR,PTR                     6411
11837 066366  016646  000042                    MOV     42(SP),-(SP)            ; LUN,*                         6412
11838 066372  012746  000400                    MOV     #400,-(SP)
11839 066376  010346                            MOV     R3,-(SP)                ; PTR,*
11840 066400  010446                            MOV     R4,-(SP)                ; SECTOR,*
11841 066402  004767  157204                    JSR     PC,READ
11842 066406  000412                            BR      63$
11843 066410  016603  000044          62$:      MOV     44(SP),R3               ; WDPTR,PTR                     6416
11844 066414  016646  000042                    MOV     42(SP),-(SP)            ; LUN,*                         6417
11845 066420  012746  000400                    MOV     #400,-(SP)
11846 066424  010346                            MOV     R3,-(SP)                ; PTR,*
11847 066426  010446                            MOV     R4,-(SP)                ; SECTOR,*
11848 066430  004767  157344                    JSR     PC,CHECK
11849 066434  010005          63$:      MOV     R0,R5                   ; *,VALUE
11850 066436  001103                            BNE     67$                     ;
11851 066440  006001                            ROR     R1                      ;                               6424
11852 066442  103402                            BLO     65$                     ;                               6429
11853 066444  000167  001012          64$:      JMP     80$
11854 066450  016646  000054          65$:      MOV     54(SP),-(SP)            ; WDPTR,*                       6433
11855 066454  016646  000064                    MOV     64(SP),-(SP)            ; RDPTR,*
11856 066460  012746  000400                    MOV     #400,-(SP)
11857 066464  004767  155636                    JSR     PC,DOUBLE.CHECK
11858 066470  062706  000006                    ADD     #6,SP
11859 066474  010066  000070                    MOV     R0,70(SP)               ; *,DBL.VALUE
11860 066500  001761                            BEQ     64$
11861 066502  016646  000052                    MOV     52(SP),-(SP)            ; LUN,*                         6436
11862 066506  004767  147012                    JSR     PC,SAYWHO
11863 066512  012716  011216                    MOV     #MSG5,(SP)              ;                               6437
```

SEQ 0267

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11865                                   ;MLX4
11866                                   ;                       DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
11867                                                                                                   27-Mar-1982 19:23:44    PA:<
11868 066516  012746  007072                      MOV     #SAY1,-(SP)
11869 066522  012746  000002                      MOV     #2,-(SP)
11870 066526  010600                            MOV     SP,R0
11871 066530  104414                            TRAP    14                      ; SP,*
11872 066532  016616  000076                      MOV     76(SP),(SP)             ; DBL.VALUE,*
11873 066536  017646  000076                      MOV     @76(SP),-(SP)           ; DBL.VALUE,*           6439
11874 066542  012746  006710                      MOV     #FMT12A,-(SP)
11875 066546  012746  000003                      MOV     #3,-(SP)
11876 066552  010600                            MOV     SP,R0
11877 066554  104414                            TRAP    14                      ; SP,*
11878 066556  062766  010000  000104              ADD     #10000,104(SP)          ; *,DBL.VALUE           6441
11879 066564  016616  000104                      MOV     104(SP),(SP)            ; DBL.VALUE,*           6442
11880 066570  017646  000104                      MOV     @104(SP),-(SP)          ; DBL.VALUE,*
11881 066574  012746  006756                      MOV     #FMT12B,-(SP)
11882 066600  012746  000003                      MOV     #3,-(SP)
11883 066604  010600                            MOV     SP,R0
11884 066606  104414                            TRAP    14                      ; SP,*
11885 066610  016601  000074                      MOV     74(SP),R1
11886 066614  112761  000010  034446              MOVB    #10,WHY.DROPT(R1)       ; LUN,*                 6444
11887 066622  104455                            TRAP    55                                              6445
11888 066624  000652                            .WORD   652                     ;
11889 066626  011070                            .WORD   MSG1
11890 066630  000000                            .WORD   0
11891 066632  016600  000074                      MOV     74(SP),R0
11892 066636  104451                            TRAP    51                      ; LUN,*                 6446
11893 066640  062706  000060                      ADD     #60,SP                  ;                       6447
11894 066644  000520                    66$:    BR      72$
11895 066646  020527  000001            67$:    CMP     R5,#1                   ; VALUE,*               6424
11896 066652  001034                            BNE     68$
11897 066654  012746  000006                      MOV     #6,-(SP)                ;                       6455
11898 066660  010246                            MOV     R2,-(SP)                ; COMMAND,*
11899 066662  016646  000056                      MOV     56(SP),-(SP)            ; LUN,*
11900 066666  012746  000400                      MOV     #400,-(SP)
11901 066672  010346                            MOV     R3,-(SP)                ; PTR,*
11902 066674  010446                            MOV     R4,-(SP)                ; SECTOR,*
11903 066676  004767  157322                      JSR     PC,RETRY
11904 066702  062706  000014                      ADD     #14,SP
11905 066706  005700                            TST     R0
11906 066710  001655                            BEQ     64$
11907 066712  016601  000052                      MOV     52(SP),R1
11908 066716  112761  000004  034446              MOVB    #4,WHY.DROPT(R1)        ; LUN,*                 6458
11909 066724  104455                            TRAP    55                      ;                       6459
11910 066726  000653                            .WORD   653
11911 066730  011070                            .WORD   MSG1
11912 066732  000000                            .WORD   0
11913 066734  016600  000052                      MOV     52(SP),R0               ; LUN,*                 6460
11914 066740  104451                            TRAP    51
11915 066742  000457                            BR      71$                     ;                       6461
11916 066744  020527  000002            68$:    CMP     R5,#2                   ; VALUE,*               6424
11917 066750  001015                            BNE     69$
11918 066752  016601  000052                      MOV     52(SP),R1               ; LUN,*
11919 066756  112761  000005  034446              MOVB    #5,WHY.DROPT(R1)                                6468
```

SEQ 0268

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11921                                   ;MLX4
11922                                   ;                       DEFINITION OF OPTION 4                          27-Mar-1982 19:24:42    TOPS
11923                                                                                                           27-Mar-1982 19:23:44    PA:<
11924 066764  104455                             TRAP    55
11925 066766  000654                             .WORD   654                     ;                                                       6469
11926 066770  011070                             .WORD   MSG1
11927 066772  000000                             .WORD   0
11928 066774  016600  000052                     MOV     52(SP),R0               ; LUN,*                                                 6470
11929 067000  104451                             TRAP    51
11930 067002  000437                             BR      71$                     ;                                                       6471
11931 067004  020527  000003              69$:   CMP     R5,#3                   ; VALUE,*                                               6424
11932 067010  001014                             BNE     70$
11933 067012  104455                             TRAP    55                      ;                                                       6476
11934 067014  000655                             .WORD   655
11935 067016  011070                             .WORD   MSG1
11936 067020  000000                             .WORD   0
11937 067022  016601  000052                     MOV     52(SP),R1
11938 067026  112761  000006  034446             MOVB    #6,WHY.DROPT(R1)        ; LUN,*                                         6477
11939 067034  010100                             MOV     R1,R0
11940 067036  104451                             TRAP    51                      ; LUN,*                                         6478
11941 067040  000420                             BR      71$                     ;                                               6479
11942 067042  020527  000004              70$:   CMP     R5,#4                   ; VALUE,*                                       6424
11943 067046  001021                             BNE     73$
11944 067050  004767  150256                     JSR     PC,ISOLATE              ;                                               6484
11945 067054  104455                             TRAP    55                      ;                                               6485
11946 067056  000656                             .WORD   656
11947 067060  011120                             .WORD   MSG2
11948 067062  000000                             .WORD   0
11949 067064  016601  000052                     MOV     52(SP),R1
11950 067070  112761  000007  034446             MOVB    #7,WHY.DROPT(R1)        ; LUN,*                                         6486
11951 067076  010100                             MOV     R1,R0
11952 067100  104451                             TRAP    51                      ; LUN,*                                         6487
11953 067102  062706  000036              71$:   ADD     #36,SP                  ;                                               6488
11954 067106  000167  001044              72$:   JMP     94$
11955 067112  020527  000005              73$:   CMP     R5,#5                   ; VALUE,*                                       6424
11956 067116  001161                             BNE     80$
11957 067120  004767  150206                     JSR     PC,ISOLATE              ;                                               6493
11958 067124  032767  000001  113126             BIT     #1,ERROUT               ;                                               6495
11959 067132  001423                             BEQ     74$
11960 067134  017701  145250                     MOV     @ML.REG+42,R1
11961 067140  006201                             ASR     R1
11962 067142  006201                             ASR     R1
11963 067144  006201                             ASR     R1
11964 067146  006201                             ASR     R1
11965 067150  006201                             ASR     R1
11966 067152  006201                             ASR     R1
11967 067154  042701  177700                     BIC     #177700,R1
11968 067160  010146                             MOV     R1,-(SP)
11969 067162  012746  006640                     MOV     #FMT10B,-(SP)
11970 067166  012746  000002                     MOV     #2,-(SP)
11971 067172  010600                             MOV     SP,R0
11972 067174  104414                             TRAP    14                      ; SP,*
11973 067176  062706  000006                     ADD     #6,SP
11974 067202  017766  145204  000056  74$:       MOV     @ML.REG+44,56(SP)       ; *,OLDSEC                                      6498
11975 067210  017701  145174                     MOV     @ML.REG+42,R1           ;                                               6499
```

SEQ 0269

```
11977
11978                                   ;MLX4
11979                                   ;               DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
                                                                                                27-Mar-1982 19:23:44    PA:<
11980 067214  006201                              ASR     R1
11981 067216  006201                              ASR     R1
11982 067220  006201                              ASR     R1
11983 067222  006201                              ASR     R1
11984 067224  006201                              ASR     R1
11985 067226  006201                              ASR     R1
11986 067230  042701  177700                     BIC     #177700,R1
11987 067234  010166  000060                     MOV     R1,60(SP)               ; *,OLDCHN
11988 067240  012746  000001                     MOV     #1,-(SP)                ;                               6501
11989 067244  010246                             MOV     R2,-(SP)                ; COMMAND,*
11990 067246  016646  000056                     MOV     56(SP),-(SP)            ; LUN,*
11991 067252  012746  000400                     MOV     #400,-(SP)
11992 067256  010346                             MOV     R3,-(SP)                ; PTR,*
11993 067260  010446                             MOV     R4,-(SP)                ; SECTOR,*
11994 067262  004767  156736                     JSR     PC,RETRY
11995 067266  062706  000014                     ADD     #14,SP
11996 067272  020027  000005                     CMP     R0,#5
11997 067276  001052                             BNE     77$
11998 067300  027766  145106  000056             CMP     @ML.REG+44,56(SP)       ; *,OLDSEC                      6504
11999 067306  001035                             BNE     76$
12000 067310  016600  000060                     MOV     60(SP),R0               ; OLDCHN,*
12001 067314  017701  145070                     MOV     @ML.REG+42,R1
12002 067320  006201                             ASR     R1
12003 067322  006201                             ASR     R1
12004 067324  006201                             ASR     R1
12005 067326  006201                             ASR     R1
12006 067330  006201                             ASR     R1
12007 067332  006201                             ASR     R1
12008 067334  042701  177700                     BIC     #177700,R1
12009 067340  020100                             CMP     R1,R0
12010 067342  001017                             BNE     76$
12011 067344  032767  000001  112706             BIT     #1,ERROUT               ;                               6508
12012 067352  001404                             BEQ     75$
12013 067354  104456                             TRAP    56
12014 067356  000657                             .WORD   657
12015 067360  011202                             .WORD   MSG4
12016 067362  000000                             .WORD   0
12017 067364  016646  000052          75$:       MOV     52(SP),-(SP)            ; LUN,*                         6510
12018 067370  016746  144746                     MOV     BOARD,-(SP)
12019 067374  004767  150022                     JSR     PC,UP.HARD.COUNT
12020 067400  000427                             BR      79$
12021 067402  032767  000001  112650  76$:       BIT     #1,ERROUT               ;                               6504
12022 067410  001415                             BEQ     78$                     ;                               6515
12023 067412  104457                             TRAP    57
12024 067414  000660                             .WORD   660
12025 067416  011166                             .WORD   MSG3
12026 067420  000000                             .WORD   0
12027 067422  000410                             BR      78$
12028 067424  032767  000001  112626  77$:       BIT     #1,ERROUT               ;                               6517
12029 067432  001404                             BEQ     78$                     ;                               6523
12030 067434  104457                             TRAP    57
12031 067436  000661                             .WORD   661
```

```
12033                                   ;MLX4
12034                                   ;                       DEFINITION OF OPTION 4                          27-Mar-1982 19:24:42    TOPS
12035                                                                                                           27-Mar-1982 19:23:44    PA:<
12036 067440  011166                              .WORD   MSG3
12037 067442  000000                              .WORD   0
12038 067444  016646  000052            78$:     MOV     52(SP),-(SP)            ; LUN,*                                         6525
12039 067450  016746  144666                      MOV     BOARD,-(SP)
12040 067454  004767  150424                      JSR     PC,UP.SOFT.COUNT
12041 067460  022626                    79$:     CMP     (SP)+,(SP)+             ;                                               6492
12042 067462  062706  000010            80$:     ADD     #10,SP                  ;                                               6406
12043 067466  005204                              INC     R4                      ; SECTOR                                        6405
12044 067470  020466  000064            81$:     CMP     R4,64(SP)               ; SECTOR,*
12045 067474  101002                              BHI     82$
12046 067476  000167  176646                      JMP     61$
12047 067502  062706  000026            82$:     ADD     #26,SP                  ;                                               5997
12048 067506  032767  000001  112546    83$:     BIT     #1,EFN$21               ;                                               6541
12049 067514  001002                              BNE     84$
12050 067516  000167  000434                      JMP     94$
12051 067522  016600  000014            84$:     MOV     14(SP),R0               ; LUN,*                                         6548
12052 067526  006300                              ASL     R0
12053 067530  016001  034500                      MOV     TOP.SECT(R0),R1
12054 067534  016004  034460                      MOV     LOW.SECT(R0),R4         ; *,SECTOR
12055 067540  000167  000402                      JMP     93$
12056 067544  016646  000014            85$:     MOV     14(SP),-(SP)            ; LUN,*                                         6550
12057 067550  012746  000400                      MOV     #400,-(SP)
12058 067554  012746  022670                      MOV     #RBUFF,-(SP)
12059 067560  010446                              MOV     R4,-(SP)                ; SECTOR,*
12060 067562  004767  156024                      JSR     PC,READ
12061 067566  062706  000010                      ADD     #10,SP
12062 067572  020027  000005                      CMP     R0,#5
12063 067576  001162                              BNE     92$
12064 067600  004767  147526                      JSR     PC,ISOLATE
12065 067604  032767  000001  112446            BIT     #1,ERROUT               ;                                               6553
12066 067612  001423                              BEQ     86$                     ;                                               6555
12067 067614  017700  144570                      MOV     @ML.REG+42,R0
12068 067620  006200                              ASR     R0
12069 067622  006200                              ASR     R0
12070 067624  006200                              ASR     R0
12071 067626  006200                              ASR     R0
12072 067630  006200                              ASR     R0
12073 067632  006200                              ASR     R0
12074 067634  042700  177700                      BIC     #177700,R0
12075 067640  010046                              MOV     R0,-(SP)
12076 067642  012746  006640                      MOV     #FMT10B,-(SP)
12077 067646  012746  000002                      MOV     #2,-(SP)
12078 067652  010600                              MOV     SP,R0
12079 067654  104414                              TRAP    14                      ; SP,*
12080 067656  062706  000006                      ADD     #6,SP
12081 067662  017766  144524  000020  86$:       MOV     @ML.REG+44,20(SP)       ; *,OLDSEC
12082 067670  017700  144514                      MOV     @ML.REG+42,R0           ;                                               6564
12083 067674  006200                              ASR     R0                                                                      6565
12084 067676  006200                              ASR     R0
12085 067700  006200                              ASR     R0
12086 067702  006200                              ASR     R0
12087 067704  006200                              ASR     R0
```

SEQ 0271

```
12089                                   ;MLX4
12090                                   ;               DEFINITION OF OPTION 4                  27-Mar-1982 19:24:42    TOPS
12091                                                                                           27-Mar-1982 19:23:44    PA:<
12092 067706  006200                             ASR     R0
12093 067710  042700  177700                     BIC     #177700,R0
12094 067714  010066  000022                     MOV     R0,22(SP)               ; *,OLDCHN
12095 067720  012746  000001                     MOV     #1,-(SP)                ;                                       6573
12096 067724  010246                             MOV     R2,-(SP)                ; COMMAND,*
12097 067726  016646  000020                     MOV     20(SP),-(SP)            ; LUN,*
12098 067732  012746  000400                     MOV     #400,-(SP)
12099 067736  010346                             MOV     R3,-(SP)                ; PTR,*
12100 067740  016646  000032                     MOV     32(SP),-(SP)            ; OLDSEC,*
12101 067744  004767  156254                     JSR     PC,RETRY
12102 067750  062706  000014                     ADD     #14,SP
12103 067754  020027  000005                     CMP     R0,#5
12104 067760  001052                             BNE     89$
12105 067762  027766  144424  000020             CMP     @ML.REG+44,20(SP)       ; *,OLDSEC                              6582
12106 067770  001035                             BNE     88$
12107 067772  016646  000022                     MOV     22(SP),-(SP)            ; OLDCHN,*
12108 067776  017700  144406                     MOV     @ML.REG+42,R0
12109 070002  006200                             ASR     R0
12110 070004  006200                             ASR     R0
12111 070006  006200                             ASR     R0
12112 070010  006200                             ASR     R0
12113 070012  006200                             ASR     R0
12114 070014  006200                             ASR     R0
12115 070016  042700  177700                     BIC     #177700,R0
12116 070022  020026                             CMP     R0,(SP)+
12117 070024  001017                             BNE     88$
12118 070026  032767  000001  112224             BIT     #1,ERROUT               ;                                       6586
12119 070034  001404                             BEQ     87$
12120 070036  104456                             TRAP    56                      ;                                       6591
12121 070040  000662                             .WORD   662
12122 070042  011202                             .WORD   MSG4
12123 070044  000000                             .WORD   0
12124 070046  016646  000014           87$:      MOV     14(SP),-(SP)            ; LUN,*                                 6594
12125 070052  016746  144264                     MOV     BOARD,-(SP)
12126 070056  004767  147340                     JSR     PC,UP.HARD.COUNT
12127 070062  000427                             BR      91$
12128 070064  032767  000001  112166  88$:       BIT     #1,ERROUT               ;                                       6582
12129 070072  001415                             BEQ     90$                     ;                                       6599
12130 070074  104457                             TRAP    57
12131 070076  000663                             .WORD   663                     ;                                       6604
12132 070100  011166                             .WORD   MSG3
12133 070102  000000                             .WORD   0
12134 070104  000410                             BR      90$
12135 070106  032767  000001  112144  89$:       BIT     #1,ERROUT               ;                                       6607
12136 070114  001404                             BEQ     90$                     ;                                       6613
12137 070116  104457                             TRAP    57
12138 070120  000664                             .WORD   664                     ;                                       6618
12139 070122  011166                             .WORD   MSG3
12140 070124  000000                             .WORD   0
12141 070126  016646  000014           90$:      MOV     14(SP),-(SP)            ; LUN,*                                 6621
12142 070132  016746  144204                     MOV     BOARD,-(SP)
12143 070136  004767  147742                     JSR     PC,UP.SOFT.COUNT
```

SEQ 0272

```
12145                                   ;MLX4
12146                                   ;                       DEFINITION OF OPTION 4
12147
12148 070142  022626                    91$:    CMP     (SP)+,(SP)+                     ;
12149 070144  005204                    92$:    INC     R4                              ; SECTOR
12150 070146  020401                    93$:    CMP     R4,R1                           ; SECTOR,*
12151 070150  101002                            BHI     94$
12152 070152  000167  177366                      JMP     85$
12153 070156  005266  000014              94$:    INC     14(SP)                          ; LUN
12154 070162  026666  000014  000042      95$:    CMP     14(SP),42(SP)                   ; LUN,*
12155 070170  002002                            BGE     96$
12156 070172  000167  172402                      JMP     1$
12157 070176  062706  000044              96$:    ADD     #44,SP                          ;
12158 070202  000207                            RTS     PC
12159
12160                                   ; Routine Size:  1456 words
12161                                   ; Maximum stack depth per invocation:  48 words
12166
12167
```

```
  12169 ;MLX4
  12170 ;                 SELECTING A RANDOM WORD COUNT                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
  12171                                                                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (41)
  12172 ;          6633   %sbttl 'SELECTING A RANDOM WORD COUNT'
  12173 ;          6634   routine RNDWC =
  12174 ;          6635       begin
  12175 ;          6636
  12176 ;          6637   !++
  12177 ;          6638   !  ROUTINE:     RNDWC
  12178 ;          6639   !
  12179 ;          6640   !  PURPOSE:     TO SELECT A RANDOM WORD COUNT WITHIN THE RANGE
  12180 ;          6641   !               1 TO BUFSIZ.
  12181 ;          6642   !
  12182 ;          6643   !  RESULT:      THE VALUE RETURNED WILL BE USED BY THE CALLER
  12183 ;          6644   !               AS ITS 'WRDCNT'
  12184 ;          6645   !--
  12185 ;          6646
  12186 ;          6647       local
  12187 ;          6648           WRDCNT;
  12188 ;          6649
  12189 ;          6650       RN ();
  12190 ;          6651       RANDOM = .RANDOM and %o'077777';          !IGNORE SIGN BIT
  12191 ;          6652       WRDCNT = ((.RANDOM mod BUFSIZ) + 1);      !FORCE THE RANGE
  12192 ;          6653       return .WRDCNT;
  12193 ;          6654       end;
  12197
  12198                                          .SBTTL  RNDWC SELECTING A RANDOM WORD COUNT
  12202 070204  004767  115160          RNDWC:  JSR     PC,RN                                    ;
  12203 070210  042767  100000  115246          BIC     #100000,RANDOM                           ;                    6650
  12204 070216  016746  115242                  MOV     RANDOM,-(SP)                             ;                    6651
  12205 070222  012746  004000                  MOV     #4000,-(SP)                              ;                    6652
  12206 070226  004767  114750                  JSR     PC,BL$MOD
  12207 070232  005200                          INC     R0
  12208 070234  022626                          CMP     (SP)+,(SP)+
  12209 070236  000207                          RTS     PC                                       ;                    6634
  12210
  12211
  12212                                  ; Routine Size:  14 words
  12217                                  ; Maximum stack depth per invocation:  2 words
  12218
```

SEQ 0274


```
12220 ;MLX4
12221 ;
12222
12223 ;          6655  %sbttl 'SELECTING A RANDOM SECTOR'
12224 ;          6656  routine RNDSEC (LUN) =
12225 ;          6657      begin
12226 ;          6658
12227 ;          6659  !++
12228 ;          6660  !  ROUTINE:     RNDSEC(LUN)
12229 ;          6661  !
12230 ;          6662  !  PURPOSE:     TO SELECT A RANDOM SECTOR NUMBER WITHIN THE RANGE
12231 ;          6663  !               OF TESTABLE SECTORS (LOWEST TO HIGHEST)
12232 ;          6664  !
12233 ;          6665  !  ARGUMENT:    LUN = THE CURRENT LOGICAL UNIT
12234 ;          6666  !               NOTE: 'LUN' IS REQUIRED TO CALCULATE LOWEST/HIGHEST
12235 ;          6667  !               FOR THE PARTICULAR LOGICAL UNIT.
12236 ;          6668  !
12237 ;          6669  !  RESULT:      THE VALUE RETURNED WILL BE USED BY THE CALLER
12238 ;          6670  !               AS ITS 'SECTOR'.
12239 ;          6671  !--
12240 ;          6672
12241 ;          6673      local
12242 ;          6674          SECTOR,
12243 ;          6675          SIZE;
12244 ;          6676
12245 ;          6677  !
12246 ;          6678  ! version czmlbb changed eql to eqlu
12247 ;          6679  !
12248 ;          6680      if LOWEST eqlu HIGHEST
12249 ;          6681      then
12250 ;          6682          SECTOR = LOWEST
12251 ;          6683      else
12252 ;          6684          begin
12253 ;          6685          RN ();
12254 ;          6686          RANDOM = .RANDOM and %o'077777';        !IGNORE THE SIGN BIT
12255 ;          6687  !
12256 ;          6688  ! version czmlbb
12257 ;          6689  !
12258 ;          6690  ! 'Highest - Lowest + 1' when testing an ML-11B with
12259 ;          6691  ! 16 array modules results in a negitive number which
12260 ;          6692  ! causes the Bliss operator 'mod' to hang the CPU.
12261 ;          6693  ! Due to this malfunction the '+ 1' has been deleted
12262 ;          6694  ! which will avoid this malfunction
12263 ;          6695  !
12264 ;          6696          SIZE = HIGHEST - LOWEST;                        !FIND THE SECTOR RANGE
12265 ;          6697          SECTOR = (LOWEST + (.RANDOM mod .SIZE));        !FORCE RANGE
12266 ;          6698          end;
12267 ;          6699
12268 ;          6700      return .SECTOR;
12269 ;          6701      end;
12273
12274

                                .SBTTL  RNDSEC SELECTING A RANDOM SECTOR
```

```
                                        ;MLX4
                                        ;               SELECTING A RANDOM SECTOR                    27-Mar-1982 19:24:42    TOPS
                                                                                                     27-Mar-1982 19:23:44    PA:<
12276
12277
12278
12282 070240  004167  115032            RNDSEC: JSR     R1,$SAVE3                    ;                                       6656
12283 070244  016601  000012                    MOV     12(SP),R1                    ; LUN,*                                 6680
12284 070250  006301                            ASL     R1
12285 070252  012703  034460                    MOV     #LOW.SECT,R3
12286 070256  060103                            ADD     R1,R3
12287 070260  021361  034500                    CMP     (R3),TOP.SECT(R1)
12288 070264  001002                            BNE     1$
12289 070266  011302                            MOV     (R3),R2                      ; *,SECTOR                              6682
12290 070270  000420                            BR      2$                           ;                                       6680
12291 070272  004767  115072            1$:     JSR     PC,RN                        ;                                       6685
12292 070276  042767  100000  115160            BIC     #100000,RANDOM               ;                                       6686
12293 070304  016101  034500                    MOV     TOP.SECT(R1),R1              ; *,SIZE                                6696
12294 070310  161301                            SUB     (R3),R1                      ; *,SIZE
12295 070312  016746  115146                    MOV     RANDOM,-(SP)                 ;                                       6697
12296 070316  010146                            MOV     R1,-(SP)                     ; SIZE,*
12297 070320  004767  114656                    JSR     PC,BL$MOD
12298 070324  061300                            ADD     (R3),R0
12299 070326  010002                            MOV     R0,R2                        ; *,SECTOR
12300 070330  022626                            CMP     (SP)+,(SP)+                  ;                                       6684
12301 070332  010200                    2$:     MOV     R2,R0                        ; SECTOR,*                              6657
12302 070334  000207                            RTS     PC                           ;                                       6656
12303
12304
12305                                   ; Routine Size:  31 words
12310                                   ; Maximum stack depth per invocation:  6 words
12311
```

```
                                                        27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
                SELECTING A RANDOM UNIT                 27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (43)

        6702  %sbttl 'SELECTING A RANDOM UNIT'
        6703  routine RNDU =
        6704      begin                                             !* 1 *
        6705
        6706  !++
        6707  !  ROUTINE:     RNDU
        6708  !
        6709  !  PURPOSE:     TO SELECT A RANDOM LOGICAL UNIT NUMBER WITHIN
        6710  !               THE RANGE OF TESTABLE UNITS (0 TO .L$UNIT-1)
        6711  !--
        6712
        6713      local
        6714          LUN;
        6715
        6716      if .L$UNIT eql 1
        6717      then
        6718          LUN = 0
        6719      else
        6720          begin                                         !* 2 *
        6721          RN ();
        6722          RANDOM = .RANDOM and %o'077777';              !IGNORE THE SIGN BIT
        6723          RANDOM = (.RANDOM mod .L$UNIT);               !FORCE THE RANGE
        6724
        6725          !+
        6726          ! MAKE SURE THE DRIVE IS ACTIVE.  IF IT ISN'T,
        6727          ! THEN FIND THE NEXT AVAILABLE ACTIVE DRIVE:
        6728          !-
        6729
        6730          incr COUNT from 0 to (.L$UNIT - 1) do
        6731
        6732              if .DRIVE_STATUS [.RANDOM] eql ACTIVE
        6733              then
        6734                  begin
        6735                  LUN = .RANDOM;
        6736                  exitloop;
        6737                  end
        6738              else
        6739                  RANDOM = ((.RANDOM + 1) mod .L$UNIT);
        6740
        6741          end;                                          !* 2 *
        6742
        6743      return .LUN;
        6744      end;                                              !* 1 *
12362
12363
12367 070336  004167  114752          RNDU:   .SBTTL  RNDU SELECTING A RANDOM UNIT
                                              JSR     R1,$SAVE4                       ;                6703
```

SEQ 0277

```
12369                                   ;MLX4
12370                                   ;
12371                                   ;       SELECTING A RANDOM UNIT                 27-Mar-1982 19:24:42    TOPS
12372 070342  026727  111444  000001            CMP     L$UNIT,#1                       27-Mar-1982 19:23:44    PA:<
12373 070350  001002                            BNE     1$                                                      6716
12374 070352  005004                            CLR     R4                              ; LUN                   6718
12375 070354  000467                            BR      6$                              ;                       6716
12376 070356  004767  115006          1$:       JSR     PC,RN                           ;                       6721
12377 070362  042767  100000  115074            BIC     #100000,RANDOM                  ;                       6722
12378 070370  016746  115070                    MOV     RANDOM,-(SP)                    ;                       6723
12379 070374  016746  111412                    MOV     L$UNIT,-(SP)
12380 070400  004767  114576                    JSR     PC,BL$MOD
12381 070404  010067  115054                    MOV     R0,RANDOM
12382 070410  016703  111376                    MOV     L$UNIT,R3
12383 070414  005001                            CLR     R1                              ;                       6730
12384 070416  000443                            BR      4$                              ; COUNT
12385 070420  016702  115040          2$:       MOV     RANDOM,R2                       ;                       6732
12386 070424  006202                            ASR     R2
12387 070426  006202                            ASR     R2
12388 070430  006202                            ASR     R2
12389 070432  062702  034442                    ADD     #DRIVE.STATUS,R2
12390 070436  010246                            MOV     R2,-(SP)
12391 070440  016746  115020                    MOV     RANDOM,-(SP)
12392 070444  042716  177770                    BIC     #177770,(SP)
12393 070450  012746  000001                    MOV     #1,-(SP)
12394 070454  005046                            CLR     -(SP)
12395 070456  004767  113674                    JSR     PC,BL$GT2
12396 070462  062706  000010                    ADD     #10,SP
12397 070466  005300                            DEC     R0
12398 070470  001003                            BNE     3$
12399 070472  016704  114766                    MOV     RANDOM,R4                       ; *,LUN                 6735
12400 070476  000415                            BR      5$                              ;                       6736
12401 070500  016746  114760          3$:       MOV     RANDOM,-(SP)                    ;                       6739
12402 070504  005216                            INC     (SP)
12403 070506  016746  111300                    MOV     L$UNIT,-(SP)
12404 070512  004767  114464                    JSR     PC,BL$MOD
12405 070516  010067  114742                    MOV     R0,RANDOM
12406 070522  022626                            CMP     (SP)+,(SP)+
12407 070524  005201                            INC     R1                              ; COUNT
12408 070526  020103                  4$:       CMP     R1,R3                           ; COUNT,*               6730
12409 070530  002733                            BLT     2$
12410 070532  022626                  5$:       CMP     (SP)+,(SP)+                     ;                       6720
12411 070534  010400                  6$:       MOV     R4,R0                           ; LUN,*                 6704
12412 070536  000207                            RTS     PC                              ;                       6703
12413
12414
12415                                   ; Routine Size:  65 words
12420                                   ; Maximum stack depth per invocation:  11 words
12421
```

SEQ 0278


```
12423 ;MLX4
12424 ;                 TESTING RANDOM DATA
12425 ;
12426 ;          6745  %sbttl 'TESTING RANDOM DATA'
12427 ;          6746  routine RAND1 (REPEAT) : novalue =
12428 ;          6747      begin                                          !* 1 *  START OF ROUTINE
12429 ;          6748
12430 ;          6749  !++
12431 ;          6750  !   ROUTINE:      RAND1(REPEAT)
12432 ;          6751  !
12433 ;          6752  !   PURPOSE:      TO TEST USING RANDOM DATA
12434 ;          6753  !
12435 ;          6754  !   ARGUMENT:     REPEAT = NUMBER OF TIMES TO EXECUTE THIS ROUTINE
12436 ;          6755  !                          BEFORE RETURNING TO THE CALLER (OPT5).
12437 ;          6756  !
12438 ;          6757  !       NOTE:     THIS TEST CODE FOLLOWS THE SAME FLOW AS OPT3,
12439 ;          6758  !                 BUT USES A RANDOM DATA PATTERN.
12440 ;          6759  !
12441 ;          6760  !   THE CODE FOR 'RAND1' IN BRIEF:
12442 ;          6761  !
12443 ;          6762  !   BEGIN 1  (START OF ROUTINE)
12444 ;          6763  !   SAY ROUTINE IS RUNNING
12445 ;          6764  !   INCR COUNT FROM 1 TO REPEAT
12446 ;          6765  !   : BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
12447 ;          6766  !   : GENERATE THE RANDOM PATTERN
12448 ;          6767  !   : INCR LUN FROM 0 TO LAST
12449 ;          6768  !   : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
12450 ;          6769  !   : : TESTLOOP:
12451 ;          6770  !   : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
12452 ;          6771  !   : : : IF UNIT IS ACTIVE
12453 ;          6772  !   : : : THEN
12454 ;          6773  !   : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
12455 ;          6774  !   : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
12456 ;          6775  !   : : : : SECTOR = LOWEST
12457 ;          6776  !   : : : : WHILE SECTOR LEQ HIGHEST DO
12458 ;          6777  !   : : : : : BEGIN 6 (START OF SECTOR SELECTION LOOP)
12459 ;          6778  !   : : : : : GET_WRDCNT
12460 ;          6779  !   : : : : : SET_UP BUFFER POINTERS BEFORE TRANSFER
12461 ;          6780  !   : : : : : WRITE
12462 ;          6781  !   : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
12463 ;          6782  !   : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
12464 ;          6783  !   : : : : : DO THE WRITE CHECK OR READ
12465 ;          6784  !   : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
12466 ;          6785  !   : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
12467 ;          6786  !   : : : : : UPDATE SECTOR NUMBER BY NUMBER OF SECTORS IN PREVIOUS TRANSFER
12468 ;          6787  !   : : : : : END 6 (END OF SECTOR SELECTION LOOP)
12469 ;          6788  !   : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
12470 ;          6789  !   : : : END 4 (END OF TESTLOOP)
12471 ;          6790  !   : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
12472 ;          6791  !   : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
12473 ;          6792  !   RETURN
12474 ;          6793  !   END 1 (END OF ROUTINE)
12475 ;          6794  !--
12476 ;          6795
12477 ;          6796      label
```

```
12479 ;MLX4
12480 ;                 TESTING RANDOM DATA
12481
12482 ;         6797            LOOP;
12483 ;         6798
12484 ;         6799        local
12485 ;         6800            WRDCNT,
12486 ;         6801            VALUE,
12487 ;         6802            OLDSEC,
12488 ;         6803            OLDCHN,
12489 ;         6804            SECTOR,
12490 ;         6805            PTR,
12491 ;         6806            COMMAND,
12492 ;         6807            DBL_VALUE;
12493 ;         6808
12494 ;         6809        PRINTB (SAY1, RTN5A);
12495 ;         6810        !'RAND1'
12496 ;         6811
12497 ;         6812        incr COUNT from 1 to .REPEAT do
12498 ;         6813            begin
12499 ;         6814            GEN5 ();                        !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
12500 ;         6815                                            !FIRST 3 WORDS OF WBUFF ARE THE SEEDS
125C1 ;         6816            incr LUN from 0 to (.L$UNIT - 1) do
12502 ;         6817                begin
12503 ;         6818  LOOP :                                   !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
12504 ;         6819                begin
12505 ;         6820                                            !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
12506 ;         6821                if .DRIVE_STATUS [.LUN] eql ACTIVE
12507 ;         6822                then
12508 ;         6823                    begin
12509 ;         6824                    L$LUN = .LUN;           !* 5 *  START OF TEST FOR AN ACTIVE UNIT
12510 ;         6825                    WPTR = WBUFF;
12511 ;         6826                    RPTR = RBUFF;
12512 ;         6827                    SECTOR = LOWEST;
12513 ;         6828
12514 ;         6829                    while .SECTOR lequ HIGHEST do
12515 ;         6830                        begin               !* 6 *  START OF SECTOR SELECTION LOOP
12516 ;         6831                        WRDCNT = GET_WRDCNT (.SECTOR, HIGHEST);
12517 ;         6832                        SET_PTRS (.WRDCNT);
12518 ;         6833                        VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);
12519 ;         6834
12520 ;         6835                        !+
12521 ;         6836                        ! SEE HOW SUCCESSFUL THE WRITE WAS:
12522 ;         6837                        !-
12523 ;         6838
12524 ;         6839                        selectone .VALUE of         !SEE 'SYSERR' FOR DEFINITION
12525 ;         6840                            set                     !OF ERROR # CONTAINED IN 'VALUE'
12526 ;         6841
12527 ;         6842                            [1] :
12528 ;         6843                                begin               !* 6A * RETRY ALLOWED
12529 ;         6844
12530 ;         6845                                if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
12531 ;         6846                                then                !THE RETRY FAILED -- SYSTEM FATAL ERROR
12532 ;         6547                                    begin
12533 ;         6848                                    WHY_DROPT [.LUN] = CODE_4;
```

```
12535 ;MLX4
12536 ;                 TESTING RANDOM DATA
12537
12538 ;         6849                        ERRDF (5101, MSG1, 0);  !**** OPTION 5, RAND1 ERROR 01 ****
12539 ;         6850                        DODU (.LUN);
12540 ;         6851                        leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
12541 ;         6852                        end;
12542 ;         6853
12543 ;         6854                    end;                !* 6A *
12544 ;         6855
12545 ;         6856                [2] :
12546 ;         6857                    begin               !* 6B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
12547 ;         6858                    WHY_DROPT [.LUN] = CODE_5;
12548 ;         6859                    ERRDF (5102, MSG1, 0);      !**** OPTION 5, RAND1 ERROR 02 ****
12549 ;         6860                    DODU (.LUN);
12550 ;         6861                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
12551 ;         6862                    end;                !* 6B *
12552 ;         6863
12553 ;         6864                [3] :
12554 ;         6865                    begin               !* 6C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
12555 ;         6866                    ERRDF (5103, MSG1, 0);      !**** OPTION 5, RAND1 ERROR 03 ****
12556 ;         6867                    WHY_DROPT [.LUN] = CODE_6;
12557 ;         6868                    DODU (.LUN);
12558 ;         6869                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
12559 ;         6870                    end;                !* 6C *
12560 ;         6871                tes;
12561 ;         6872
12562 ;         6873            COMMAND = CHOOSE ();
12563 ;         6874
12564 ;         6875            if .COMMAND eql read
12565 ;         6876            then
12566 ;         6877                begin
12567 ;         6878                PTR = .RPTR;
12568 ;         6879                VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
12569 ;         6880                end
12570 ;         6881            else
12571 ;         6882                begin
12572 ;         6883                PTR = .WPTR;
12573 ;         6884                VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
12574 ;         6885                end;
12575 ;         6886
12576 ;         6887            !+
12577 ;         6888            !  SEE HOW SUCCESSFUL THE OPERATION WAS:
12578 ;         6889            !-
12579 ;         6890
12580 ;         6891            selectone .VALUE of         !SEE 'SYSERR' FOR DEFINITION
12581 ;         6892                set                     !OF ERROR # CONTAINED IN 'VALUE'
12582 ;         6893
12583 ;         6894                [0] :
12584 ;         6895
12585 ;         6896                    if .COMMAND eql read
12586 ;         6897                    then
12587 ;         6898                        begin
12588 ;         6899
12589 ;         6900                        if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
```

```
12591 ;MLX4
12592 ;                 TESTING RANDOM DATA
12593
12594 ;          6901                                   then
12595 ;          6902                                       begin
12596 ;          6903                                       SAYWHO (.LUN);
12597 ;          6904                                       PRINTB (SAY1, MSG5);          !'ECC LOGIC FAILED TO DETECT DATA ERROR'
12598 ;          6905                                       PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
12599 ;          6906                                                 !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
12600 ;          6907                                       DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
12601 ;          6908                                       PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
12602 ;          6909                                                 !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
12603 ;          6910                                       WHY_DROPT [.LUN] = CODE_8;
12604 ;          6911                                       ERRDF (5104, MSG1, 0);        !**** OPTION 5, RAND1 ERROR 04 ****
12605 ;          6912                                       DODU (.LUN);
12606 ;          6913                                       leave LOOP; !JUMP JUST BEYOND END OF BLOCK * 4 *
12607 ;          6914                                       end;
12608 ;          6915
12609 ;          6916                                   end;
12610 ;          6917
12611 ;          6918                               [1] :
12612 ;          6919                                   begin                  !* 6D * RETRY ALLOWED
12613 ;          6920
12614 ;          6921                                   if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
12615 ;          6922                                   then                   !THE RETRY FAILED -- SYSTEM FATAL ERROR
12616 ;          6923                                       begin
12617 ;          6924                                       WHY_DROPT [.LUN] = CODE_4;
12618 ;          6925                                       ERRDF (5105, MSG1, 0);  !**** OPTION 5, RAND1 ERROR 05 ****
12619 ;          6926                                       DODU (.LUN);
12620 ;          6927                                       leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
12621 ;          6928                                       end;
12622 ;          6929
12623 ;          6930                                   end;                   !* 6D *
12624 ;          6931
12625 ;          6932                               [2] :
12626 ;          6933                                   begin                  !* 6E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
12627 ;          6934                                   WHY_DROPT [.LUN] = CODE_5;
12628 ;          6935                                   ERRDF (5106, MSG1, 0);      !**** OPTION 5, RAND1 ERROR 06 ****
12629 ;          6936                                   DODU (.LUN);
12630 ;          6937                                   leave LOOP;            !JUMP JUST BEYOND END OF BLOCK * 4 *
12631 ;          6938                                   end;                   !* 6E *
12632 ;          6939
12633 ;          6940                               [3] :
12634 ;          6941                                   begin                  !* 6F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
12635 ;          6942                                   ERRDF (5107, MSG1, 0);      !**** OPTION 5, RAND1 ERROR 07 ****
12636 ;          6943                                   WHY_DROPT [.LUN] = CODE_6;
12637 ;          6944                                   DODU (.LUN);
12638 ;          6945                                   leave LOOP;            !JUMP JUST BEYOND END OF BLOCK * 4 *
12639 ;          6946                                   end;                   !* 6F *
12640 ;          6947
12641 ;          6948                               [4] :
12642 ;          6949                                   begin                  !* 6G * UNRECOVERABLE DATA ERROR
12643 ;          6950                                   ISOLATE ();
12644 ;          6951                                   ERRDF (5108, MSG2, 0);      !**** OPTION 5, RAND1 ERROR 08 ****
12645 ;          6952                                   WHY_DROPT [.LUN] = CODE_7;
```

```
12647 ;MLX4
12648 ;                 TESTING RANDOM DATA
12649
12650 ;          6953                       DODU (.LUN);
12651 ;          6954                       leave LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
12652 ;          6955                       end;                     !* 6G *
12653 ;          6956
12654 ;          6957                   [5] :
12655 ;          6958                       begin                    !* 6H * RECOVERABLE DATA ERROR
12656 ;          6959                       ISOLATE ();
12657 ;          6960
12658 ;          6961                       if .ERROUT then PRINTB (FMT10B, .CHAN);
12659 ;          6962
12660 ;          6963                       !'    BIT QQ'
12661 ;          6964                       OLDSEC = .MLEL;
12662 ;          6965                       OLDCHN = .CHAN;
12663 ;          6966
12664 ;          6967                       if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
12665 ;          6968                       then
12666 ;          6969
12667 ;          6970                           if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
12668 ;          6971                           then
12669 ;          6972                               begin
12670 ;          6973
12671 ;          6974                               if .ERROUT then ERRHRD (5109, MSG4, 0);
12672 ;          6975
12673 ;          6976                                                !**** OPTION 5, RAND1 ERROR 09 ****
12674 ;          6977                               UP_HARD_COUNT (.LUN, .BOARD);
12675 ;          6978                               end
12676 ;          6979                           else
12677 ;          6980                               begin
12678 ;          6981
12679 ;          6982                               if .ERROUT then ERRSOFT (5110, MSG3, 0);
12680 ;          6983
12681 ;          6984                                                !**** OPTION 5, RAND1 ERROR 10 ****
12682 ;          6985                               UP_SOFT_COUNT (.LUN, .BOARD);
12683 ;          6986                               end
12684 ;          6987
12685 ;          6988                       else
12686 ;          6989                           begin
12687 ;          6990
12688 ;          6991                           if .ERROUT then ERRSOFT (5111, MSG3, 0);
12689 ;          6992
12690 ;          6993                                                !**** OPTION 5, RAND1 ERROR 11 ****
12691 ;          6994                           UP_SOFT_COUNT (.LUN, .BOARD);
12692 ;          6995                           end;
12693 ;          6996
12694 ;          6997                       end;                     !* 6H *
12695 ;          6998                   tes;
12696 ;          6999
12697 ;          7000                   WPTR = .WPTR + (.WRDCNT*2);
12698 ;          7001                   SECTOR = .SECTOR + (.WRDCNT/256);
12699 ;          7002                   end;                         !* 6 *  END OF SECTOR SELECTION LOOP
12700 ;          7003
12701 ;          7004               end;                             !* 5 *  END OF TEST FOR AN ACTIVE UNIT
```

SEQ 0283

27-Mar-1982 19:24:42 TOPS-20 Bliss-16 V2(212)
27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (44)

```
;MLX4
;                TESTING RANDOM DATA

                !+
                ! Test to see if this uut's address space is
                ! to be read for soft errors.  This test is
                ! is intended for DMT purposes.
                !-

                if .EFN$21                              !Is the background pattern to be read
                then
                    begin

!
! version czmlbb changed incr to incru
!
                    incru SECTOR from LOWEST to HIGHEST do

                        if read (.LUN, 256, RBUFF, .SECTOR) eql 5
                        then
                            begin
                            ISOLATE ();                 !Find the failing bank and board no.

                            if .ERROUT then PRINTB (FMT10B, .CHAN);

                            ! Print where the error is
                            !
                            ! Save the contents of the ML error location
                            ! register so we can compare it to the new
                            ! contents of this register after the retry.
                            ! This is done to classify the error.
                            !
                            OLDSEC = .MLEL;
                            OLDCHN = .CHAN;
                            !
                            ! Do a classify retry call.  If the same error
                            ! occures then classify it as a hard error.  If
                            ! a different error occured or the error went away
                            ! then classify it as a soft error.
                            !

                            if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
                            then
                            !
                            ! The same error occured so see if it is at the same
                            ! sector and channel number, if so then classify
                            ! it as a hard error else classiy it as a soft
                            ! error.
                            !

                                if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
                                then
                                    begin           !Same error occured 'hard'
```

```
7057                                    if .ERROUT          !Print error if enabled
7058                                    then
7059                                        begin
P 7060                                      ERRHRD (5112,       !Error number
P 7061                                          MSG4,   !Error message
7062                                            0);     !Additional message routine
7063                                        end;
7064
7065                                    UP_HARD_COUNT (.LUN, .BOARD);
7066                                    end
7067                                else
7068                                    begin           !Not the same error 'soft'
7069
7070                                    if .ERROUT          !Print error if enabled
7071                                    then
7072                                        begin
P 7073                                      ERRSOFT (5113,      !Error number
P 7074                                          MSG3,   !Error message
7075                                            0);     !Additional message routine
7076                                        end;
7077
7078                                    UP_SOFT_COUNT (.LUN, .BOARD);
7079                                    end
7080
7081                                else                    !Not the same error 'soft'
7082                                    begin
7083
7084                                    if .ERROUT          !Print error if enabled
7085                                    then
7086                                        begin
P 7087                                      ERRSOFT (5114,  !Error number
P 7088                                          MSG3,       !Error message
7089                                            0);         !Additional message routine
7090                                        end;
7091
7092                                    UP_SOFT_COUNT (.LUN, .BOARD);
7093                                    end;
7094
7095                                end;
7096
7097                            end;
7098
7099                        end;                            !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
7100                        end;                            !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
7101
7102                    end;                                !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
7103
7104                return;
7105                end;                                    !* 1 *  END OF ROUTINE
```

```
                                        ;MLX4
                                        ;                TESTING RANDOM DATA                    27-Mar-1982 19:24:42    TOPS
                                                                                               27-Mar-1982 19:23:44    PA:<


                                RAND1:  .SBTTL  RAND1 TESTING RANDOM DATA
070540  004167  114570                JSR     R1,$SAVE5
070544  162706  000020                SUB     #20,SP                          ;                                       6746
070550  012746  007664                MOV     #RTN5A,-(SP)
070554  012746  007072                MOV     #SAY1,-(SP)                     ;                                       6809
070560  012746  000002                MOV     #2,-(SP)
070564  010600                        MOV     SP,R0
070566  104414                        TRAP    14                              ; SP,*
070570  005066  000024                CLR     24(SP)                          ; COUNT
070574  000167  002276                JMP     42$                                                                     6812
070600  004767  151014        1$:     JSR     PC,GEN5
070604  016766  111202  000010        MOV     L$UNIT,10(SP)                   ;                                       6814
070612  005066  000006                CLR     6(SP)                           ;                                       6816
070616  000167  002240                JMP     41$                             ; LUN
070622  016600  000006        2$:     MOV     6(SP),R0                        ; LUN,*                                 6821
070626  006200                        ASR     R0
070630  006200                        ASR     R0
070632  006200                        ASR     R0
070634  062700  034442                ADD     #DRIVE.STATUS,R0
070640  010046                        MOV     R0,-(SP)
070642  016646  000010                MOV     10(SP),-(SP)                    ; LUN,*
070646  042716  177770                BIC     #177770,(SP)
070652  012746  000001                MOV     #1,-(SP)
070656  005046                        CLR     -(SP)
070660  004767  113472                JSR     PC,BL$GT2
070664  062706  000010                ADD     #10,SP
070670  005300                        DEC     R0
070672  001402                        BEQ     4$
070674  000167  001502        3$:     JMP     29$
070700  016667  000006  111166  4$:   MOV     6(SP),L$LUN                     ; LUN,*
070706  012767  012670  141754        MOV     #WBUFF,WPTR                     ;                                       6824
070714  012767  022670  141750        MOV     #RBUFF,RPTR                     ;                                       6825
070722  016605  000006                MOV     6(SP),R5                        ; LUN,*                                 6826
070726  006305                        ASL     R5                                                                      6827
070730  016503  034460                MOV     LOW.SECT(R5),R3                 ; *,SECTOR
070734  020365  034500        5$:     CMP     R3,TOP.SECT(R5)                 ; SECTOR,*
070740  101355                        BHI     3$                                                                      6829
070742  010346                        MOV     R3,-(SP)                        ; SECTOR,*                              6831
070744  016546  034500                MOV     TOP.SECT(R5),-(SP)
070750  004767  156222                JSR     PC,GET.WRDCNT
070754  010002                        MOV     R0,R2
070756  010216                        MOV     R2,(SP)                         ; *,WRDCNT
070760  004767  156146                JSR     PC,SET.PTRS                     ; WRDCNT,*                              6832
070764  016616  000012                MOV     12(SP),(SP)
070770  010246                        MOV     R2,-(SP)                        ; LUN,*                                 6833
070772  016746  141672                MOV     WPTR,-(SP)                      ; WRDCNT,*
070776  010346                        MOV     R3,-(SP)
071000  004767  154420                JSR     PC,WRITE                        ; SECTOR,*
                                        ;MLX4
                                        ;                TESTING RANDOM DATA                    27-Mar-1982 19:24:42    TOPS
                                                                                               27-Mar-1982 19:23:44    PA:<

071004  010004                        MOV     R0,R4                           ; *,VALUE
071006  020427  000001                CMP     R4,#1                           ; VALUE,*                               6839
```

```
12875 071012  001035                    BNE     6$
12876 071014  012746  000006            MOV     #6,-(SP)
12877 071020  012746  045424            MOV     #WRITE,-(SP)            ;                                       6845
12878 071024  016646  000024            MOV     24(SP),-(SP)
12879 071030  010246                    MOV     R2,-(SP)                ; LUN,*
12880 071032  016746  141632            MOV     WPTR,-(SP)              ; WRDCNT,*
12881 071036  010346                    MOV     R3,-(SP)
12882 071040  004767  155160            JSR     PC,RETRY                ; SECTOR,*
12883 071044  062706  000014            ADD     #14,SP
12884 071050  005700                    TST     R0
12885 071052  001456                    BEQ     9$
12886 071054  016601  000020            MOV     20(SP),R1
12887 071060  112761  000004  034446    MOVB    #4,WHY.DROPT(R1)        ; LUN,*                                 6848
12888 071066  104455                    TRAP    55
12889 071070  011755                    .WORD   11755                   ;                                       6849
12890 071072  011070                    .WORD   MSG1
12891 071074  000000                    .WORD   0
12892 071076  016600  000020            MOV     20(SP),R0               ; LUN,*
12893 071102  104451                    TRAP    51                                                              6850
12894 071104  000436                    BR      8$
12895 071106  020427  000002      6$:   CMP     R4,#2                   ;                                       6851
12896 071112  001015                    BNE     7$                      ; VALUE,*                               6839
12897 071114  016601  000020            MOV     20(SP),R1
12898 071120  112761  000005  034446    MOVB    #5,WHY.DROPT(R1)        ; LUN,*                                 6858
12899 071126  104455                    TRAP    55
12900 071130  011756                    .WORD   11756                   ;                                       6859
12901 071132  011070                    .WORD   MSG1
12902 071134  000000                    .WORD   0
12903 071136  016600  000020            MOV     20(SP),R0               ; LUN,*
12904 071142  104451                    TRAP    51                                                              6860
12905 071144  000416                    BR      8$
12906 071146  020427  000003      7$:   CMP     R4,#3                   ;                                       6861
12907 071152  001016                    BNE     9$                      ; VALUE,*                               6839
12908 071154  104455                    TRAP    55
12909 071156  011757                    .WORD   11757                   ;                                       6866
12910 071160  011070                    .WORD   MSG1
12911 071162  000000                    .WORD   0
12912 071164  016601  000020            MOV     20(SP),R1
12913 071170  112761  000006  034446    MOVB    #6,WHY.DROPT(R1)        ; LUN,*                                 6867
12914 071176  010100                    MOV     R1,R0
12915 071200  104451                    TRAP    51                      ; LUN,*                                 6868
12916 071202  062706  000012      8$:   ADD     #12,SP                  ;                                       6869
12917 071206  000543                    BR      14$
12918 071210  004767  154752      9$:   JSR     PC,CHOOSE               ;                                       6873
12919 071214  010066  000034            MOV     R0,34(SP)               ; *,COMMAND
12920 071220  005001                    CLR     R1                      ;                                       6875
12921 071222  020027  045612            CMP     R0,#READ                ; COMMAND,*
12922 071226  001015                    BNE     10$
12923 071230  005201                    INC     R1
12924 071232  016766  141434  000032    MOV     RPTR,32(SP)             ; *,PTR                                 6878
12925                           ;MLX4
12926                           ;               TESTING RANDOM DATA                     27-Mar-1982 19:24:42    TOPS
12927                                                                                   27-Mar-1982 19:23:44    PA:<
12928 071240  016646  000020            MOV     20(SP),-(SP)            ; LUN,*                                 6879
12929 071244  010246                    MOV     R2,-(SP)                ; WRDCNT,*
12930 071246  016746  141420            MOV     RPTR,-(SP)
12931 071252  010346                    MOV     R3,-(SP)                ; SECTOR,*
```

```
12932 071254 004767 154332                    JSR     PC,READ
12933 071260 000413                           BR      11$
12934 071262 016766 141402 000032  10$:       MOV     WPTR,32(SP)
12935 071270 016646 000020                    MOV     20(SP),-(SP)        ; *,PTR                 6883
12936 071274 010246                           MOV     R2,-(SP)            ; LUN,*                 6884
12937 071276 016746 141366                    MOV     WPTR,-(SP)          ; WRDCNT,*
12938 071302 010346                           MOV     R3,-(SP)
12939 071304 004767 154470                    JSR     PC,CHECK            ; SECTOR,*
12940 071310 010004                 11$:      MOV     R0,R4
12941 071312 001102                           BNE     15$                 ; *,VALUE
12942 071314 006001                           ROR     R1                  ;                       6891
12943 071316 103402                           BLO     13$                 ;                       6896
12944 071320 000167 001014          12$:      JMP     28$
12945 071324 016746 141340          13$:      MOV     WPTR,-(SP)
12946 071330 016746 141336                    MOV     RPTR,-(SP)          ;                       6900
12947 071334 010246                           MOV     R2,-(SP)
12948 071336 004767 152764                    JSR     PC,DOUBLE.CHECK     ; WRDCNT,*
12949 071342 062706 000006                    ADD     #6,SP
12950 071346 010066 000036                    MOV     R0,36(SP)
12951 071352 001762                           BEQ     12$                 ; *,DBL.VALUE
12952 071354 016646 000030                    MOV     30(SP),-(SP)
12953 071360 004767 144140                    JSR     PC,SAYWHO           ; LUN,*                 6903
12954 071364 012716 011216                    MOV     #MSG5,(SP)
12955 071370 012746 007072                    MOV     #SAY1,-(SP)         ;                       6904
12956 071374 012746 000002                    MOV     #2,-(SP)
12957 071400 010600                           MOV     SP,R0
12958 071402 104414                           TRAP    14                  ; SP,*
12959 071404 016616 000044                    MOV     44(SP),(SP)
12960 071410 017646 000044                    MOV     @44(SP),-(SP)       ; DBL.VALUE,*           6905
12961 071414 012746 006710                    MOV     #FMT12A,-(SP)       ; DBL.VALUE,*
12962 071420 012746 000003                    MOV     #3,-(SP)
12963 071424 010600                           MOV     SP,R0
12964 071426 104414                           TRAP    14                  ; SP,*
12965 071430 062766 010000 000052             ADD     #10000,52(SP)
12966 071436 016616 000052                    MOV     52(SP),(SP)         ; *,DBL.VALUE           6907
12967 071442 017646 000052                    MOV     @52(SP),-(SP)       ; DBL.VALUE,*           6908
12968 071446 012746 006756                    MOV     #FMT12B,-(SP)       ; DBL.VALUE,*
12969 071452 012746 -000003                   MOV     #3,-(SP)
12970 071456 010600                           MOV     SP,R0
12971 071460 104414                           TRAP    14                  ; SP,*
12972 071462 016601 000052                    MOV     52(SP),R1
12973 071466 112761 000010 034446             MOVB    #10,WHY.DROPT(R1)   ; LUN,*                 6910
12974 071474 104455                           TRAP    55
12975 071476 011760                           .WORD   11760               ;                       6911
12976 071500 011070                           .WORD   MSG1
12977 071502 000000                           .WORD   0
12978 071504 016600 000052                    MOV     52(SP),R0
12979 071510 104451                           TRAP    51                  ; LUN,*                 6912
12980
12981                             ;MLX4                                                   27-Mar-1982 19:24:42    TOPS
12982                             ;           TESTING RANDOM DATA                         27-Mar-1982 19:23:44    PA:<
12983 071512 062706 000044                    ADD     #44,SP
12984 071516 000521                 14$:      BR      20$                 ;                       6913
12985 071520 020427 000001          15$:      CMP     R4,#1               ; VALUE,*               6891
12986 071524 001035                           BNE     16$
12987 071526 012746 000006                    MOV     #6,-(SP)            ;                       6921
12988 071532 016646 000046                    MOV     46(SP),-(SP)        ; COMMAND,*
```

SEQ 0288

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12989 071536  016646  000034                    MOV     34(SP),-(SP)          ; LUN,*
12990 071542  010246                            MOV     R2,-(SP)              ; WRDCNT,*
12991 071544  016646  000052                    MOV     52(SP),-(SP)          ; PTR,*
12992 071550  010346                            MOV     R3,-(SP)              ; SECTOR,*
12993 071552  004767  154446                    JSR     PC,RETRY
12994 071556  062706  000014                    ADD     #14,SP
12995 071562  005700                            TST     R0
12996 071564  001655                            BEQ     12$
12997 071566  016601  000030                    MOV     30(SP),R1
12998 071572  112761  000004  034446            MOVB    #4,WHY.DROPT(R1)      ; LUN,*                          6924
12999 071600  104455                            TRAP    55                    ;                                6925
13000 071602  011761                            .WORD   11761
13001 071604  011070                            .WORD   MSG1
13002 071606  000000                            .WORD   0
13003 071610  016600  000030                    MOV     30(SP),R0             ; LUN,*                          6926
13004 071614  104451                            TRAP    51
13005 071616  000457                            BR      19$                   ;                                6927
13006 071620  020427  000002          16$:      CMP     R4,#2                 ; VALUE,*                        6891
13007 071624  001015                            BNE     17$
13008 071626  016601  000030                    MOV     30(SP),R1             ; LUN,*                          6934
13009 071632  112761  000005  034446            MOVB    #5,WHY.DROPT(R1)      ;                                6935
13010 071640  104455                            TRAP    55
13011 071642  011762                            .WORD   11762
13012 071644  011070                            .WORD   MSG1
13013 071646  000000                            .WORD   0
13014 071650  016600  000030                    MOV     30(SP),R0             ; LUN,*                          6936
13015 071654  104451                            TRAP    51
13016 071656  000437                            BR      19$                   ;                                6937
13017 071660  020427  000003          17$:      CMP     R4,#3                 ; VALUE,*                        6891
13018 071664  001014                            BNE     18$
13019 071666  104455                            TRAP    55                    ;                                6942
13020 071670  011763                            .WORD   11763
13021 071672  011070                            .WORD   MSG1
13022 071674  000000                            .WORD   0
13023 071676  016601  000030                    MOV     30(SP),R1             ; LUN,*                          6943
13024 071702  112761  000006  034446            MOVB    #6,WHY.DROPT(R1)      ; LUN,*                          6944
13025 071710  010100                            MOV     R1,R0
13026 071712  104451                            TRAP    51
13027 071714  000420                            BR      19$                   ;                                6945
13028 071716  020427  000004          18$:      CMP     R4,#4                 ; VALUE,*                        6891
13029 071722  001021                            BNE     21$
13030 071724  004767  145402                    JSR     PC,ISOLATE            ;                                6950
13031 071730  104455                            TRAP    55                    ;                                6951
13032 071732  011764                            .WORD   11764
13033 071734  011120                            .WORD   MSG2
13034 071736  000000                            .WORD   0
13035                               ;MLX4
13036                               ;                                                    27-Mar-1982 19:24:42  TOPS
13037                                           TESTING RANDOM DATA                      27-Mar-1982 19:23:44  PA:<
13038 071740  016601  000030                    MOV     30(SP),R1             ; LUN,*                          6952
13039 071744  112761  000007  034446            MOVB    #7,WHY.DROPT(R1)      ; LUN,*                          6953
13040 071752  010100                            MOV     R1,R0
13041 071754  104451                            TRAP    51
13042 071756  062706  000022          19$:      ADD     #22,SP                ;                                6954
13043 071762  000167  001070          20$:      JMP     40$
13044 071766  020427  000005          21$:      CMP     R4,#5                 ; VALUE,*                        6891
13045 071772  001162                            BNE     28$
```

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                                                                                                                    SEQ 0289
13046 071774  004767  145332                JSR     PC,ISOLATE
13047 072000  032767  000001  110252        BIT     #1,ERROUT                       ;                                  6959
13048 072006  001423                        BEQ     22$                             ;                                  6961
13049 072010  017701  142374                MOV     @ML.REG+42,R1
13050 072014  006201                        ASR     R1
13051 072016  006201                        ASR     R1
13052 072020  006201                        ASR     R1
13053 072022  006201                        ASR     R1
13054 072024  006201                        ASR     R1
13055 072026  006201                        ASR     R1
13056 072030  042701  177700                BIC     #177700,R1
13057 072034  010146                        MOV     R1,-(SP)
13058 072036  012746  006640                MOV     #FMT10B,-(SP)
13059 072042  012746  000002                MOV     #2,-(SP)
13060 072046  010600                        MOV     SP,R0                           ; SP,*
13061 072050  104414                        TRAP    14
13062 072052  062706  000006                ADD     #6,SP
13063 072056  017766  142330  000040  22$:  MOV     @ML.REG+44,40(SP)               ; *,OLDSEC
13064 072064  017701  142320                MOV     @ML.REG+42,R1                   ;                                  6964
13065 072070  006201                        ASR     R1                              ;                                  6965
13066 072072  006201                        ASR     R1
13067 072074  006201                        ASR     R1
13068 072076  006201                        ASR     R1
13069 072100  006201                        ASR     R1
13070 072102  006201                        ASR     R1
13071 072104  042701  177700                BIC     #177700,R1
13072 072110  010166  000034                MOV     R1,34(SP)                       ; *,OLDCHN
13073 072114  012746  000001                MOV     #1,-(SP)                        ;
13074 072120  016646  000046                MOV     46(SP),-(SP)                    ; COMMAND,*                        6967
13075 072124  016646  000034                MOV     34(SP),-(SP)                    ; LUN,*
13076 072130  010246                        MOV     R2,-(SP)                        ; WRDCNT,*
13077 072132  016646  000052                MOV     52(SP),-(SP)                    ; PTR,*
13078 072136  010346                        MOV     R3,-(SP)                        ; SECTOR,*
13079 072140  004767  154060                JSR     PC,RETRY
13080 072144  062706  000014                ADD     #14,SP
13081 072150  020027  000005                CMP     R0,#5
13082 072154  001052                        BNE     25$
13083 072156  027766  142230  000040        CMP     @ML.REG+44,40(SP)               ; *,OLDSEC                         6970
13084 072164  001035                        BNE     24$
13085 072166  016600  000034                MOV     34(SP),R0                       ; OLDCHN,*
13086 072172  017701  142212                MOV     @ML.REG+42,R1
13087 072176  006201                        ASR     R1
13088 072200  006201                        ASR     R1
13089 072202  006201                        ASR     R1
13090
13091                               ;MLX4
13092                               ;         TESTING RANDOM DATA                   27-Mar-1982 19:24:42  TOPS
                                                                                    27-Mar-1982 19:23:44  PA:<
13093 072204  006201                ASR     R1
13094 072206  006201                ASR     R1
13095 072210  006201                ASR     R1
13096 072212  042701  177700        BIC     #177700,R1
13097 072216  020100                CMP     R1,R0
13098 072220  001017                BNE     24$
13099 072222  032767  000001  110030  BIT     #1,ERROUT                       ;                                  6974
13100 072230  001404                BEQ     23$
13101 072232  104456                TRAP    56
13102 072234  011765                .WORD   11765
```

SEQ 0290

```
13103 072236  011202                        .WORD   MSG4
13104 072240  000000                        .WORD   0
13105 072242  016646  000030         23$:   MOV     30(SP),-(SP)          ; LUN,*                    6977
13106 072246  016746  142070               MOV     BOARD,-(SP)
13107 072252  004767  145144               JSR     PC,UP.HARD.COUNT
13108 072256  000427                       BR      27$
13109 072260  032767  000001  107772 24$:   BIT     #1,ERROUT             ;                          6970
13110 072266  001415                       BEQ     26$                   ;                          6982
13111 072270  104457                       TRAP    57
13112 072272  011766                       .WORD   11766
13113 072274  011166                       .WORD   MSG3
13114 072276  000000                       .WORD   0
13115 072300  000410                       BR      26$
13116 072302  032767  000001  107750 25$:   BIT     #1,ERROUT             ;                          6985
13117 072310  001404                       BEQ     26$                   ;                          6991
13118 072312  104457                       TRAP    57
13119 072314  011767                       .WORD   11767
13120 072316  011166                       .WORD   MSG3
13121 072320  000000                       .WORD   0
13122 072322  016646  000030         26$:   MOV     30(SP),-(SP)          ; LUN,*                    6994
13123 072326  016746  142010               MOV     BOARD,-(SP)
13124 072332  004767  145546               JSR     PC,UP.SOFT.COUNT
13125 072336  022626               27$:    CMP     (SP)+,(SP)+           ;
13126 072340  010200               28$:    MOV     R2,R0                 ; WRDCNT,*                 6958
13127 072342  006300                       ASL     R0                                               7000
13128 072344  066700  140320               ADD     WPTR,R0
13129 072350  010067  140314               MOV     R0,WPTR
13130 072354  010216                       MOV     R2,(SP)               ; WRDCNT,*                 7001
13131 072356  012746  000400               MOV     #400,-(SP)
13132 072362  004767  112602               JSR     PC,BL$DIV
13133 072366  060300                       ADD     R3,R0                 ; SECTOR,*
13134 072370  010003                       MOV     R0,R3                 ; *,SECTOR
13135 072372  062706  000024               ADD     #24,SP                ;
13136 072376  000167  176332               JMP     5$                    ;                          6830
13137 072402  032767  000001  107652 29$:   BIT     #1,EFN$21             ;                          6829
13138 072410  001002                       BNE     30$                   ;                          7012
13139 072412  000167  000440               JMP     40$
13140 072416  016600  000006         30$:   MOV     6(SP),R0              ; LUN,*                    7019
13141 072422  006300                       ASL     R0
13142 072424  016001  034500               MOV     TOP.SECT(R0),R1
13143 072430  016005  034460               MOV     LOW.SECT(R0),R5       ; *,SECTOR
13144 072434  000167  000406               JMP     39$
13145                       ;MLX4
13146                       ;                 TESTING RANDOM DATA                27-Mar-1982 19:24:42  TOPS
13147                                                                          27-Mar-1982 19:23:44  PA:<
13148 072440  016646  000006         31$:   MOV     6(SP),-(SP)           ; LUN,*                    7021
13149 072444  012746  000400               MOV     #400,-(SP)
13150 072450  012746  022670               MOV     #RBUFF,-(SP)
13151 072454  010546                       MOV     R5,-(SP)              ; SECTOR,*
13152 072456  004767  153130               JSR     PC,READ
13153 072462  062706  000010               ADD     #10,SP
13154 072466  020027  000005               CMP     R0,#5
13155 072472  001164                       BNE     38$
13156 072474  004767  144632               JSR     PC,ISOLATE
13157 072500  032767  000001  107552       BIT     #1,ERROUT             ;                          7024
13158 072506  001423                       BEQ     32$                   ;                          7026
13159 072510  017700  141674               MOV     @ML.REG+42,R0
```

```
13160 072514  006200                        ASR     R0
13161 072516  006200                        ASR     R0
13162 072520  006200                        ASR     R0
13163 072522  006200                        ASR     R0
13164 072524  006200                        ASR     R0
13165 072526  006200                        ASR     R0
13166 072530  042700  177700                BIC     #177700,R0
13167 072534  010046                        MOV     R0,-(SP)
13168 072536  012746  006640                MOV     #FMT10B,-(SP)
13169 072542  012746  000002                MOV     #2,-(SP)
13170 072546  010600                        MOV     SP,R0                   ; SP,*
13171 072550  104414                        TRAP    14
13172 072552  062706  000006                ADD     #6,SP
13173 072556  017766  141630  000016  32$:  MOV     @ML.REG+44,16(SP)       ; *,OLDSEC                      7035
13174 072564  017700  141620                MOV     @ML.REG+42,R0           ;                               7036
13175 072570  006200                        ASR     R0
13176 072572  006200                        ASR     R0
13177 072574  006200                        ASR     R0
13178 072576  006200                        ASR     R0
13179 072600  006200                        ASR     R0
13180 072602  006200                        ASR     R0
13181 072604  042700  177700                BIC     #177700,R0
13182 072610  010066  000012                MOV     R0,12(SP)               ; *,OLDCHN
13183 072614  012746  000001                MOV     #1,-(SP)                ;
13184 072620  016646  000024                MOV     24(SP),-(SP)            ; COMMAND,*                     7044
13185 072624  016646  000012                MOV     12(SP),-(SP)            ; LUN,*
13186 072630  012746  000400                MOV     #400,-(SP)
13187 072634  016646  000030                MOV     30(SP),-(SP)            ; PTR,*
13188 072640  016646  000030                MOV     30(SP),-(SP)            ; OLDSEC,*
13189 072644  004767  153354                JSR     PC,RETRY
13190 072650  062706  000014                ADD     #14,SP
13191 072654  020027  000005                CMP     R0,#5
13192 072660  001052                        BNE     35$
13193 072662  027766  141524  000016        CMP     @ML.REG+44,16(SP)       ; *,OLDSEC                      7053
13194 072670  001035                        BNE     34$
13195 072672  016646  000012                MOV     12(SP),-(SP)            ; OLDCHN,*
13196 072676  017700  141506                MOV     @ML.REG+42,R0
13197 072702  006200                        ASR     R0
13198 072704  006200                        ASR     R0
13199 072706  006200                        ASR     R0
13200
13201                             ;MLX4                                     27-Mar-1982 19:24:42    TOPS
13202                             ;         TESTING RANDOM DATA             27-Mar-1982 19:23:44    PA:<
13203 072710  006200                        ASR     R0
13204 072712  006200                        ASR     R0
13205 072714  006200                        ASR     R0
13206 072716  042700  177700                BIC     #177700,R0
13207 072722  020026                        CMP     R0,(SP)+
13208 072724  001017                        BNE     34$
13209 072726  032767  000001  107324        BIT     #1,ERROUT               ;                               7057
13210 072734  001404                        BEQ     33$
13211 072736  104456                        TRAP    56                      ;                               7062
13212 072740  011770                        .WORD   11770
13213 072742  011202                        .WORD   MSG4
13214 072744  000000                        .WORD   0
13215 072746  016646  000006        33$:    MOV     6(SP),-(SP)             ; LUN,*                         7065
13216 072752  016746  141364                MOV     BOARD,-(SP)
```

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13217 072756 004767 144440            JSR     PC,UP.HARD.COUNT
13218 072762 000427                   BR      37$
13219 072764 032767 000001 107266 34$:BIT     #1,ERROUT                ;                    7053
13220 072772 001415                   BEQ     36$                      ;                    7070
13221 072774 104457                   TRAP    57                       ;                    7075
13222 072776 011771                   .WORD   11771
13223 073000 011166                   .WORD   MSG3
13224 073002 000000                   .WORD   0
13225 073004 000410                   BR      36$
13226 073006 032767 000001 107244 35$:BIT     #1,ERROUT                ;                    7078
13227 073014 001404                   BEQ     36$                      ;                    7084
13228 073016 104457                   TRAP    57                       ;                    7089
13229 073020 011772                   .WORD   11772
13230 073022 011166                   .WORD   MSG3
13231 073024 000000                   .WORD   0
13232 073026 016646 000006      36$:  MOV     6(SP),-(SP)              ; LUN,*              7092
13233 073032 016746 141304            MOV     BOARD,-(SP)
13234 073036 004767 145042            JSR     PC,UP.SOFT.COUNT
13235 073042 022626             37$:  CMP     (SP)+,(SP)+              ;
13236 073044 005205             38$:  INC     R5                       ; SECTOR             7023
13237 073046 020501             39$:  CMP     R5,R1                    ; SECTOR,*           7019
13238 073050 101002                   BHI     40$
13239 073052 000167 177362            JMP     31$
13240 073056 005266 000006      40$:  INC     6(SP)                    ; LUN
13241 073062 026666 000006 000010 41$:CMP     6(SP),10(SP)             ; LUN,*              6816
13242 073070 002002                   BGE     42$
13243 073072 000167 175524            JMP     2$
13244 073076 005266 000024      42$:  INC     24(SP)                   ; COUNT
13245 073102 026666 000024 000044     CMP     24(SP),44(SP)            ; COUNT,REPEAT       6812
13246 073110 003002                   BGT     43$
13247 073112 000167 175462            JMP     1$
13248 073116 062706 000026      43$:  ADD     #26,SP                   ;                    6746
13249 073122 000207                   RTS     PC
13250
13251
13252                         ; Routine Size:  634 words
13260                         ; Maximum stack depth per invocation:  35 words
13261
```

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```
;MLX4
;                TESTING RANDOM DATA & WORD COUNTS

;       7106  %sbttl 'TESTING RANDOM DATA & WORD COUNTS'
;       7107  routine RAND2 (REPEAT) : novalue =
;       7108      begin                                          !* 1 * START OF ROUTINE
;       7109
;       7110  !++
;       7111  !   ROUTINE:      RAND2(REPEAT)
;       7112  !
;       7113  !   PURPOSE:      TO TEST ALL UNITS IN A SEQUENTIAL FASHION, BUT
;       7114  !                 USING RANDOM WORD COUNTS
;       7115  !
;       7116  !   ARGUMENT:     REPEAT = NUMBER OF TIMES TO EXECUTE THIS ROUTINE
;       7117  !                 BEFORE RETURNING TO THE CALLER (OPT5).
;       7118  !
;       7119  !      NOTE:      SINCE ONLY THE WORD COUNTS AND THE DATA ARE RANDOM,
;       7120  !                 THE OTHER TRANSFER VALUES MUST BE SET UP BY THIS
;       7121  !                 ROUTINE.  THESE VALUES INCLUDE:
;       7122  !                    THE LUN, SECTOR AND BUFFER POINTERS.
;       7123  !
;       7124  !   THE CODE FOR 'RAND2' IN BRIEF:
;       7125  !
;       7126  !   BEGIN 1 (START OF ROUTINE)
;       7127  !   SAY ROUTINE IS RUNNING
;       7128  !   INCR COUNT FROM 1 TO REPEAT
;       7129  !   : BEGIN 2 (START OF REPEAT LOOP FOR THE ROUTINE)
;       7130  !   : INCR LUN FROM 0 TO LAST
;       7131  !   : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
;       7132  !   : : GENERATE THE RANDOM PATTERN
;       7133  !   : : TESTLOOP:
;       7134  !   : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
;       7135  !   : : : IF UNIT IS ACTIVE
;       7136  !   : : : THEN
;       7137  !   : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
;       7138  !   : : : : SECTOR = LOWEST
;       7139  !   : : : : INITIALIZE THE WRITE AND READ BUFFER POINTERS
;       7140  !   : : : : WHILE SECTOR LEQ HIGHEST DO
;       7141  !   : : : : : BEGIN 6 (START OF A PASS THROUGH ALL SECTORS)
;       7142  !   : : : : : CHOOSE A RANDOM WORD COUNT
;       7143  !   : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
;       7144  !   : : : : : CALCULATE NEXT STARTING SECTOR (BASED ON WORD COUNT)
;       7145  !   : : : : : IF NEXT STARTING SECTOR GTR HIGHEST
;       7146  !   : : : : : : THEN ADJUST THE WORD COUNT & NEXT SECTOR SO THEY FIT
;       7147  !   : : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
;       7148  !   : : : : : WRITE
;       7149  !   : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       7150  !   : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
;       7151  !   : : : : : DO THE WRITE CHECK OR READ
;       7152  !   : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
;       7153  !   : : : : : SECTOR = THE CALCULATED NEXT STARTING SECTOR
;       7154  !   : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
;       7155  !   : : : : : END 6 (END OF A PASS THROUGH ALL SECTORS)
;       7156  !   : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
;       7157  !   : : : END 4 (END TESTLOOP)
```

```
13319 ;MLX4
13320 ;                 TESTING RANDOM DATA & WORD COUNTS
13321 ;
13322 ;          7158  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
13323 ;          7159  !  : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
13324 ;          7160  !  RETURN
13325 ;          7161  !  END 1 (END OF ROUTINE)
13326 ;          7162  !--
13327 ;          7163
13328 ;          7164      local
13329 ;          7165          WRDCNT,
13330 ;          7166          SECTOR,
13331 ;          7167          NEXT_SECT,
13332 ;          7168          VALUE,
13333 ;          7169          OLDSEC,
13334 ;          7170          OLDCHN,
13335 ;          7171          PTR,
13336 ;          7172          COMMAND,
13337 ;          7173          DBL_VALUE;
13338 ;          7174
13339 ;          7175      label
13340 ;          7176          LOOP;
13341 ;          7177
13342 ;          7178      PRINTB (SAY1, RTN5B);
13343 ;          7179      !'RAND2'
13344 ;          7180
13345 ;          7181      incr COUNT from 1 to .REPEAT do
13346 ;          7182          begin                                   !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
13347 ;          7183
13348 ;          7184      incr LUN from 0 to (.L$UNIT - 1) do
13349 ;          7185          begin                                   !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
13350 ;          7186          GEN5 ();                                !RANDOM DATA PATTERN
13351 ;          7187  LOOP :
13352 ;          7188          begin                                   !* 4 *  START OF THE LOOP FOR COMPLETELY TESTING 1 UNIT
13353 ;          7189
13354 ;          7190          if .DRIVE_STATUS [.LUN] eql ACTIVE
13355 ;          7191          then
13356 ;          7192              begin                               !* 5 *  START OF TEST FOR AN ACTIVE UNIT
13357 ;          7193              L$LUN = .LUN;
13358 ;          7194              SECTOR = LOWEST;
13359 ;          7195              WPTR = WBUFF;
13360 ;          7196              RPTR = RBUFF;
13361 ;          7197
13362 ;          7198              while .SECTOR leqa HIGHEST do
13363 ;          7199                  begin                           !* 6 *  START OF A PASS THROUGH ALL SECTORS
13364 ;          7200                  WRDCNT = RNDWC ();              !EXPECT VALUE BETWEEN 1 AND BUFSIZ
13365 ;          7201                  SET_PTRS (.WRDCNT);
13366 ;          7202                  NEXT_SECT = .SECTOR + (.WRDCNT/256);
13367 ;          7203
13368 ;          7204                  if .SECTOR eql .NEXT_SECT then NEXT_SECT = .NEXT_SECT + 1;
13369 ;          7205
13370 ;          7206                  if .NEXT_SECT gtra HIGHEST
13371 ;          7207                  then
13372 ;          7208                      begin
13373 ;          7209                      WRDCNT = 256*(HIGHEST - .SECTOR + 1);
```

```
13375 ;MLX4
13376 ;                 TESTING RANDOM DATA & WORD COUNTS
13377
13378 ;          7210                       NEXT_SECT = HIGHEST + 1;
13379 ;          7211                       end;
13380 ;          7212
13381 ;          7213                   VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);
13382 ;          7214
13383 ;          7215                   !+
13384 ;          7216                   !  SEE HOW SUCCESSFUL THE WRITE WAS:
13385 ;          7217                   !-
13386 ;          7218
13387 ;          7219                   selectone .VALUE of              !SEE 'SYSERR' FOR DEFINITION
13388 ;          7220                       set                          !OF ERROR # CONTAINED IN 'VALUE'
13389 ;          7221
13390 ;          7222                       [1] :
13391 ;          7223                           begin                    !* 6A * RETRY ALLOWED
13392 ;          7224
13393 ;          7225                           if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
13394 ;          7226                           then                     !THE RETRY FAILED -- SYSTEM FATAL ERROR
13395 ;          7227                               begin
13396 ;          7228                               WHY_DROPT [.LUN] = CODE_4;
13397 ;          7229                               ERRDF (5201, MSG1, 0);  !**** OPTION 5, RAND2 ERROR 01 ****
13398 ;          7230                               DODU (.LUN);
13399 ;          7231                               leave LOOP;      !JUMP JUST BEYOND END OF BLOCK * 4 *
13400 ;          7232                               end;
13401 ;          7233
13402 ;          7234                           end;                     !* 6A *
13403 ;          7235
13404 ;          7236                       [2] :
13405 ;          7237                           begin                    !* 6B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
13406 ;          7238                           WHY_DROPT [.LUN] = CODE_5;
13407 ;          7239                           ERRDF (5202, MSG1, 0);       !**** OPTION 5, RAND2 ERROR 02 ****
13408 ;          7240                           DODU (.LUN);
13409 ;          7241                           leave LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
13410 ;          7242                           end;                     !* 6B *
13411 ;          7243
13412 ;          7244                       [3] :
13413 ;          7245                           begin                    !* 6C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
13414 ;          7246                           ERRDF (5203, MSG1, 0);       !**** OPTION 5, RAND2 ERROR 03 ****
13415 ;          7247                           WHY_DROPT [.LUN] = CODE_6;
13416 ;          7248                           DODU (.LUN);
13417 ;          7249                           leave LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
13418 ;          7250                           end;                     !* 6C *
13419 ;          7251                       tes;
13420 ;          7252
13421 ;          7253                   COMMAND = CHOOSE ();
13422 ;          7254
13423 ;          7255                   if .COMMAND eql read
13424 ;          7256                   then
13425 ;          7257                       begin
13426 ;          7258                       PTR = .RPTR;
13427 ;          7259                       VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
13428 ;          7260                       end
13429 ;          7261                   else
```

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```
13431 ;MLX4
13432 ;                 TESTING RANDOM DATA & WORD COUNTS
13433
13434 ;          7262                           begin
13435 ;          7263                           PTR = .WPTR;
13436 ;          7264                           VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
13437 ;          7265                           end;
13438 ;          7266
13439 ;          7267                       !+
13440 ;          7268                       ! SEE HOW SUCCESSFUL THE OPERATION WAS:
13441 ;          7269                       !-
13442 ;          7270
13443 ;          7271                       selectone .VALUE of          !SEE 'SYSERR' FOR DEFINITION
13444 ;          7272                           set                      !OF ERROR # CONTAINED IN 'VALUE'
13445 ;          7273
13446 ;          7274                           [0] :
13447 ;          7275
13448 ;          7276                               if .COMMAND eql read
13449 ;          7277                               then
13450 ;          7278                                   begin
13451 ;          7279
13452 ;          7280                                   if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
13453 ;          7281                                   then
13454 ;          7282                                       begin
13455 ;          7283                                       SAYWHO (.LUN);
13456 ;          7284                                       PRINTB (SAY1, MSG5);        !'ECC LOGIC FAILED TO DETECT DATA ERROR'
13457 ;          7285                                       PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
13458 ;          7286                                                   !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
13459 ;          7287                                       DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
13460 ;          7288                                       PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
13461 ;          7289                                                   !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
13462 ;          7290                                       WHY_DROPT [.LUN] = CODE_8;
13463 ;          7291                                       ERRDF (5204, MSG1, 0);      !**** OPTION 5, RAND2 ERROR 04 ****
13464 ;          7292                                       DODU (.LUN);
13465 ;          7293                                       leave LOOP; !JUMP JUST BEYOND END OF BLOCK * 4 *
13466 ;          7294                                       end;
13467 ;          7295
13468 ;          7296                               end;
13469 ;          7297
13470 ;          7298                           [1] :
13471 ;          7299                               begin                !* 6D * RETRY ALLOWED
13472 ;          7300
13473 ;          7301                               if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, PTR, .SECTOR) neq 0
13474 ;          7302                               then                 !THE RETRY FAILED -- SYSTEM FATAL ERROR
13475 ;          7303                                   begin
13476 ;          7304                                   WHY_DROPT [.LUN] = CODE_4;
13477 ;          7305                                   ERRDF (5205, MSG1, 0);  !**** OPTION 5, RAND2 ERROR 05 ****
13478 ;          7306                                   DODU (.LUN);
13479 ;          7307                                   leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
13480 ;          7308                                   end;
13481 ;          7309
13482 ;          7310                               end;                 !* 6D *
13483 ;          7311
13484 ;          7312                           [2] :
13485 ;          7313                               begin                !* 6E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
```

```
13487 ;MLX4
13488 ;
13489
13490 ;          7314                        WHY_DROPT [.LUN] = CODE_5;
13491 ;          7315                        ERRDF (5206, MSG1, 0);      !**** OPTION 5, RAND2 ERROR 06 ****
13492 ;          7316                        DODU (.LUN);
13493 ;          7317                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
13494 ;          7318                        end;                        !* 6E *
13495 ;          7319
13496 ;          7320                    [3] :
13497 ;          7321                        begin                       !* 6F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
13498 ;          7322                        ERRDF (5207, MSG1, 0);      !**** OPTION 5, RAND2 ERROR 07 ****
13499 ;          7323                        WHY_DROPT [.LUN] = CODE_6;
13500 ;          7324                        DODU (.LUN);
13501 ;          7325                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
13502 ;          7326                        end;                        !* 6F *
13503 ;          7327
13504 ;          7328                    [4] :
13505 ;          7329                        begin                       !* 6G * UNRECOVERABLE DATA ERROR
13506 ;          7330                        ISOLATE ();
13507 ;          7331                        ERRDF (5208, MSG2, 0);      !**** OPTION 5, RAND2 ERROR 08 ****
13508 ;          7332                        WHY_DROPT [.LUN] = CODE_7;
13509 ;          7333                        DODU (.LUN);
13510 ;          7334                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
13511 ;          7335                        end;                        !* 6G *
13512 ;          7336
13513 ;          7337                    [5] :
13514 ;          7338                        begin                       !* 6H * RECOVERABLE DATA ERROR
13515 ;          7339                        ISOLATE ();
13516 ;          7340
13517 ;          7341                        if .ERROUT then PRINTB (FMT10B, .CHAN);
13518 ;          7342
13519 ;          7343                        !'    BIT QQ'
13520 ;          7344                        OLDSEC = .MLEL;
13521 ;          7345                        OLDCHN = .CHAN;
13522 ;          7346
13523 ;          7347                        if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
13524 ;          7348                        then
13525 ;          7349
13526 ;          7350                            if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
13527 ;          7351                            then
13528 ;          7352                                begin
13529 ;          7353
13530 ;          7354                                if .ERROUT then ERRHRD (5209, MSG4, 0);
13531 ;          7355
13532 ;          7356                                                    !**** OPTION 5, RAND2 ERROR 09 ****
13533 ;          7357                                UP_HARD_COUNT (.LUN, .BOARD);
13534 ;          7358                                end
13535 ;          7359                            else
13536 ;          7360                                begin
13537 ;          7361
13538 ;          7362                                if .ERROUT then ERRSOFT (5210, MSG3, 0);
13539 ;          7363
13540 ;          7364                                                    !**** OPTION 5, RAND2 ERROR 10 ****
13541 ;          7365                                UP_SOFT_COUNT (.LUN, .BOARD);
```

```
;  7366                                        end
;  7367
;  7368                                    else
;  7369                                        begin
;  7370
;  7371                                        if .ERROUT then ERRSOFT (5211, MSG3, 0);
;  7372
;  7373                                                                !**** OPTION 5, RAND2 ERROR 11 ****
;  7374                                        UP_SOFT_COUNT (.LUN, .BOARD);
;  7375                                        end;
;  7376
;  7377                                    end;                        !* 6H *
;  7378                                tes;
;  7379
;  7380                                SECTOR = .NEXT_SECT;
;  7381                                WPTR = .WPTR + 2;
;  7382                                end;                            !* 6 *  END OF A PASS THROUGH ALL SECTORS
;  7383
;  7384                            end;                                !* 5 *  END OF TEST FOR AN ACTIVE UNIT
;  7385
;  7386                        !+
;  7387                        ! Test to see if this uut's address space is
;  7388                        ! to be read for soft errors.  This test is
;  7389                        ! is intended for DMT purposes.
;  7390                        !-
;  7391
;  7392                        if .EFN$21                              !Is the background pattern to be read
;  7393                        then
;  7394                            begin
;  7395
;  7396 !
;  7397 ! version czmlbb changed incr to incru
;  7398 !
;  7399                        incru SECTOR from LOWEST to HIGHEST do
;  7400
;  7401                            if read (.LUN, 256, RBUFF, .SECTOR) eql 5
;  7402                            then
;  7403                                begin
;  7404                                ISOLATE ();                     !Find the failing bank and board no.
;  7405
;  7406                                if .ERROUT then PRINTB (FMT10B, .CHAN);
;  7407
;  7408                                ! Print where the error is
;  7409                                !
;  7410                                ! Save the contents of the ML error location
;  7411                                ! register so we can compare it to the new
;  7412                                ! contents of this register after the retry.
;  7413                                ! This is done to classify the error.
;  7414                                !
;  7415                                OLDSEC = .MLEL;
;  7416                                OLDCHN = .CHAN;
;  7417                                !
```

```
13599 ;MLX4
13600 ;                 TESTING RANDOM DATA & WORD COUNTS
13601
13602 ;          7418                           ! Do a classify retry call.  If the same error
13603 ;          7419                           ! occures then classify it as a hard error.  If
13604 ;          7420                           ! a different error occured or the error went away
13605 ;          7421                           ! then classify it as a soft error.
13606 ;          7422                           !
13607 ;          7423
13608 ;          7424                           if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
13609 ;          7425                           then
13610 ;          7426                           !
13611 ;          7427                           ! The same error occured so see if it is at the same
13612 ;          7428                           ! sector and channel number, if so then classify
13613 ;          7429                           ! it as a hard error else classiy it as a soft
13614 ;          7430                           ! error.
13615 ;          7431                           !
13616 ;          7432
13617 ;          7433                               if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
13618 ;          7434                               then
13619 ;          7435                                   begin           !Same error occured 'hard'
13620 ;          7436
13621 ;          7437                                   if .ERROUT      !Print error if enabled
13622 ;          7438                                   then
13623 ;          7439                                       begin
13624 ;        P 7440                                       ERRHRD (5212,       !Error number
13625 ;        P 7441                                           MSG4,   !Error message
13626 ;          7442                                           0);     !Additional message routine
13627 ;          7443                                       end;
13628 ;          7444
13629 ;          7445                                   UP_HARD_COUNT (.LUN, .BOARD);
13630 ;          7446                                   end
13631 ;          7447                               else
13632 ;          7448                                   begin           !Not the same error 'soft'
13633 ;          7449
13634 ;          7450                                   if .ERROUT      !Print error if enabled
13635 ;          7451                                   then
13636 ;          7452                                       begin
13637 ;        P 7453                                       ERRSOFT (5213,      !Error number
13638 ;        P 7454                                           MSG3,   !Error message
13639 ;          7455                                           0);     !Additional message routine
13640 ;          7456                                       end;
13641 ;          7457
13542 ;          7458                                   UP_SOFT_COUNT (.LUN, .BOARD);
13643 ;          7459                                   end
13644 ;          7460
13645 ;          7461                           else                    !Not the same error 'soft'
13646 ;          7462                               begin
13647 ;          7463
13648 ;          7464                               if .ERROUT          !Print error if enabled
13649 ;          7465                               then
13650 ;          7466                                   begin
13651 ;        P 7467                                   ERRSOFT (5214,  !Error number
13652 ;        P 7468                                       MSG3,       !Error message
13653 ;          7469                                       0);         !Additional message routine
```

SEQ 0300

```
 13655 ;MLX4
 13656 ;                TESTING RANDOM DATA & WORD COUNTS                27-Mar-1982 19:24:42   TOPS-20 Bliss-16 V2(212)
 13657                                                                   27-Mar-1982 19:23:44   PA:<NEALE>MLX4.BLI.5 (45)
 13658 ;          7470                                end;
 13659 ;          7471
 13660 ;          7472                            UP_SOFT_COUNT (.LUN, .BOARD);
 13661 ;          7473                            end;
 13662 ;          7474
 13663 ;          7475                        end;
 13664 ;          7476
 13665 ;          7477                    end;
 13666 ;          7478
 13667 ;          7479                end;                                 !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
 13668 ;          7480                end;                                 !* 3 * END OF LOGICAL UNIT SELECTION LOOP
 13669 ;          7481
 13670 ;          7482            end;                                     !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
 13671 ;          7483
 13672 ;          7484        return;
 13673 ;          7485        end;                                         !* 1 *  END OF ROUTINE
 13677
 13678                                        .SBTTL  RAND2 TESTING RANDOM DATA & WORD COUNTS
 13682 073124  004167  112204          RAND2:  JSR     R1,$SAVE5                       ;                       7107
 13683 073130  162706  000022                  SUB     #22,SP
 13684 073134  012746  007672                  MOV     #RTN5B,-(SP)                    ;                       7178
 13685 073140  012746  007072                  MOV     #SAY1,-(SP)
 13686 073144  012746  000002                  MOV     #2,-(SP)
 13687 073150  010600                          MOV     SP,R0
 13688 073152  104414                          TRAP    14                              ; SP,*
 13689 073154  005066  000022                  CLR     22(SP)                          ; COUNT
 13690 073160  000167  002232                  JMP     44$                             ;                       7181
 13691 073164  016766  106622  000026  1$:     MOV     L$UNIT,26(SP)                   ;                       7184
 13692 073172  005001                          CLR     R1                              ; LUN
 13693 073174  000167  002204                  JMP     43$
 13694 073200  004767  146414          2$:     JSR     PC,GEN5                         ;                       7186
 13695 073204  010100                          MOV     R1,R0                           ; LUN,*                 7190
 13696 073206  006200                          ASR     R0
 13697 073210  006200                          ASR     R0
 13698 073212  006200                          ASR     R0
 13699 073214  062700  034442                  ADD     #DRIVE.STATUS,R0
 13700 073220  010046                          MOV     R0,-(SP)
 13701 073222  010146                          MOV     R1,-(SP)                        ; LUN,*
 13702 073224  042716  177770                  BIC     #177770,(SP)
 13703 073230  012746  000001                  MOV     #1,-(SP)
 13704 073234  005046                          CLR     -(SP)
 13705 073236  004767  111114                  JSR     PC,BL$GT2
 13706 073242  062706  000010                  ADD     #10,SP
 13707 073246  005300                          DEC     R0
 13708 073250  001402                          BEQ     4$
 13709 073252  000167  001460          3$:     JMP     31$
```

```
13711                                   ;MLX4
13712                                   ;                       TESTING RANDOM DATA & WORD COUNTS                27-Mar-1982 19:24:42    TOPS
13713                                   ;                                                                        27-Mar-1982 19:23:44    PA:<
13714 073256  010167  106612           4$:     MOV     R1,L$LUN                        ; LUN,*                                         7193
13715 073262  010100                           MOV     R1,R0                           ; LUN,*                                         7194
13716 073264  006300                           ASL     R0
13717 073266  016003  034460                   MOV     LOW.SECT(R0),R3                 ; *,SECTOR
13718 073272  012767  012670  137370           MOV     #WBUFF,WPTR                     ;                                               7195
13719 073300  012767  022670  137364           MOV     #RBUFF,RPTR                     ;                                               7196
13720 073306  012766  034500  000024           MOV     #TOP.SECT,24(SP)                ;                                               7198
13721 073314  060066  000024                   ADD     R0,24(SP)
13722 073320  020376  000024           5$:     CMP     R3,@24(SP)                      ; SECTOR,*
13723 073324  101352                           BHI     3$
13724 073326  004767  174652                   JSR     PC,RNDWC                        ;                                               7200
13725 073332  010002                           MOV     R0,R2                           ; *,WRDCNT
13726 073334  010246                           MOV     R2,-(SP)                        ; WRDCNT,*                                      7201
13727 073336  004767  153570                   JSR     PC,SET.PTRS
13728 073342  010216                           MOV     R2,(SP)                         ; WRDCNT,*                                      7202
13729 073344  012746  000400                   MOV     #400,-(SP)
13730 073350  004767  111614                   JSR     PC,BL$DIV
13731 073354  060300                           ADD     R3,R0                           ; SECTOR,*
13732 073356  010066  000012                   MOV     R0,12(SP)                       ; *,NEXT.SECT
13733 073362  020300                           CMP     R3,R0                           ; SECTOR,NEXT.SECT                              7204
13734 073364  001002                           BNE     6$
13735 073366  005266  000012                   INC     12(SP)                          ; NEXT.SECT
13736 073372  026676  000012  000030   6$:     CMP     12(SP),@30(SP)                  ; NEXT.SECT,*                                   7206
13737 073400  101415                           BLOS    7$
13738 073402  017600  000030                   MOV     @30(SP),R0                      ;                                               7209
13739 073406  160300                           SUB     R3,R0                           ; SECTOR,*
13740 073410  000300                           SWAB    R0                              ;                                               7208
13741 073412  105000                           CLRB    R0
13742 073414  010002                           MOV     R0,R2                           ; *,WRDCNT                                      7209
13743 073416  062702  000400                   ADD     #400,R2                         ; *,WRDCNT
13744 073422  017666  000030  000012           MOV     @30(SP),12(SP)                  ; *,NEXT.SECT                                   7210
13745 073430  005266  000012                   INC     12(SP)                          ; NEXT.SECT
13746 073434  010116                   7$:     MOV     R1,(SP)                         ; LUN,*                                         7213
13747 073436  010246                           MOV     R2,-(SP)                        ; WRDCNT,*
13748 073440  016746  137224                   MOV     WPTR,-(SP)
13749 073444  010346                           MOV     R3,-(SP)                        ; SECTOR,*
13750 073446  004767  151752                   JSR     PC,WRITE
13751 073452  010004                           MOV     R0,R4                           ; *,VALUE
13752 073454  020427  000001                   CMP     R4,#1                           ; VALUE,*                                       7219
13753 073460  001031                           BNE     8$
13754 073462  012746  000006                   MOV     #6,-(SP)                        ;                                               7225
13755 073466  012746  045424                   MOV     #WRITE,-(SP)
13756 073472  010146                           MOV     R1,-(SP)                        ; LUN,*
13757 073474  010246                           MOV     R2,-(SP)                        ; WRDCNT,*
13758 073476  016746  137166                   MOV     WPTR,-(SP)
13759 073502  010346                           MOV     R3,-(SP)                        ; SECTOR,*
13760 073504  004767  152514                   JSR     PC,RETRY
13761 073510  062706  000014                   ADD     #14,SP
13762 073514  005700                           TST     R0
13763 073516  001446                           BEQ     11$
13764 073520  112761  000004  034446           MOVB    #4,WHY.DROPT(R1)                ; *,*(LUN)                                      7228
13765 073526  104455                           TRAP    55                              ;                                               7229
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                                ;MLX4
                                ;                       TESTING RANDOM DATA & WORD COUNTS                27-Mar-1982 19:24:42    TOPS
                                ;                                                                        27-Mar-1982 19:23:44    PA:<
13770 073530  012121                          .WORD   12121
13771 073532  011070                          .WORD   MSG1
13772 073534  000000                          .WORD   0
13773 073536  010100                          MOV     R1,R0                   ; LUN,*                                         7230
13774 073540  104451                          TRAP    51
13775 073542  000431                          BR      10$                     ;                                               7231
13776 073544  020427  000002          8$:     CMP     R4,#2                   ; VALUE,*                                       7219
13777 073550  001012                          BNE     9$
13778 073552  112761  000005  034446        MOVB    #5,WHY.DROPT(R1)        ; *,*(LUN)                                      7238
13779 073560  104455                          TRAP    55                      ;                                               7239
13780 073562  012122                          .WORD   12122
13781 073564  011070                          .WORD   MSG1
13782 073566  000000                          .WORD   0
13783 073570  010100                          MOV     R1,R0                   ; LUN,*                                         7240
13784 073572  104451                          TRAP    51
13785 073574  000414                          BR      10$                     ;                                               7241
13786 073576  020427  000003          9$:     CMP     R4,#3                   ; VALUE,*                                       7219
13787 073602  001014                          BNE     11$
13788 073604  104455                          TRAP    55                      ;                                               7246
13789 073606  012123                          .WORD   12123
13790 073610  011070                          .WORD   MSG1
13791 073612  000000                          .WORD   0
13792 073614  112761  000006  034446        MOVB    #6,WHY.DROPT(R1)        ; *,*(LUN)                                      7247
13793 073622  010100                          MOV     R1,R0                   ; LUN,*                                         7248
13794 073624  104451                          TRAP    51
13795 073626  062706  000012          10$:    ADD     #12,SP                  ;                                               7249
13796 073632  000535                          BR      16$
13797 073634  004767  152326          11$:    JSR     PC,CHOOSE               ;                                               7253
13798 073640  010066  000022                  MOV     R0,22(SP)               ; *,COMMAND
13799 073644  005005                          CLR     R5                      ;
13800 073646  020027  045612                  CMP     R0,#READ                ; COMMAND,*                                     7255
13801 073652  001014                          BNE     12$
13802 073654  005205                          INC     R5
13803 073656  016766  137010  000024        MOV     RPTR,24(SP)             ; *,PTR                                         7258
13804 073664  010146                          MOV     R1,-(SP)                ; LUN,*                                         7259
13805 073666  010246                          MOV     R2,-(SP)                ; WRDCNT,*
13806 073670  016746  136776                  MOV     RPTR,-(SP)
13807 073674  010346                          MOV     R3,-(SP)                ; SECTOR,*
13808 073676  004767  151710                  JSR     PC,READ
13809 073702  000412                          BR      13$
13810 073704  016766  136760  000024  12$:   MOV     WPTR,24(SP)             ; *,PTR                                         7263
13811 073712  010146                          MOV     R1,-(SP)                ; LUN,*                                         7264
13812 073714  010246                          MOV     R2,-(SP)                ; WRDCNT,*
13813 073716  016746  136746                  MOV     WPTR,-(SP)
13814 073722  010346                          MOV     R3,-(SP)                ; SECTOR,*
13815 073724  004767  152050                  JSR     PC,CHECK
13816 073730  010004                  13$:    MOV     R0,R4                   ; *,VALUE
13817 073732  001075                          BNE     17$                     ;
13818 073734  006005                          ROR     R5                      ;                                               7271
13819 073736  103402                          BLO     15$                     ;                                               7276
13820 073740  000167  000750          14$:    JMP     30$
13821 073744  016746  136720          15$:    MOV     WPTR,-(SP)              ;                                               7280
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13823                                   ;MLX4
13824                                   ;               TESTING RANDOM DATA & WORD COUNTS                27-Mar-1982 19:24:42    TOPS
13825                                   ;                                                                27-Mar-1982 19:23:44    PA:<
13826 073750  016746  136716                    MOV     RPTR,-(SP)
13827 073754  010246                            MOV     R2,-(SP)                ; WRDCNT,*
13828 073756  004767  150344                    JSR     PC,DOUBLE.CHECK
13829 073762  062706  000006                    ADD     #6,SP
13830 073766  010066  000040                    MOV     R0,40(SP)               ; *,DBL.VALUE
13831 073772  001762                            BEQ     14$
13832 073774  010146                            MOV     R1,-(SP)                ; LUN,*                                          7283
13833 073776  004767  141522                    JSR     PC,SAYWHO
13834 074002  012716  011216                    MOV     #MSG5,(SP)              ;                                                7284
13835 074006  012746  007072                    MOV     #SAY1,-(SP)
13836 074012  012746  000002                    MOV     #2,-(SP)
13837 074016  010600                            MOV     SP,R0
13838 074020  104414                            TRAP    14                      ; SP,*
13839 074022  016616  000046                    MOV     46(SP),(SP)             ; DBL.VALUE,*
13840 074026  017646  000046                    MOV     @46(SP),-(SP)           ; DBL.VALUE,*                                    7285
13841 074032  012746  006710                    MOV     #FMT12A,-(SP)
13842 074036  012746  000003                    MOV     #3,-(SP)
13843 074042  010600                            MOV     SP,R0
13844 074044  104414                            TRAP    14                      ; SP,*
13845 074046  062766  010000  000054            ADD     #10000,54(SP)           ; *,DBL.VALUE                                    7287
13846 074054  016616  000054                    MOV     54(SP),(SP)             ; DBL.VALUE,*                                    7288
13847 074060  017646  000054                    MOV     @54(SP),-(SP)           ; DBL.VALUE,*
13848 074064  012746  006756                    MOV     #FMT12B,-(SP)
13849 074070  012746  000003                    MOV     #3,-(SP)
13850 074074  010600                            MOV     SP,R0
13851 074076  104414                            TRAP    14                      ; SP,*
13852 074100  112761  000010  034446            MOVB    #10,WHY.DROPT(R1)       ; *,*(LUN)                                       7290
13853 074106  104455                            TRAP    55                      ;                                                7291
13854 074110  012124                            .WORD   12124
13855 074112  011070                            .WORD   MSG1
13856 074114  000000                            .WORD   0
13857 074116  010100                            MOV     R1,R0                   ; LUN,*
13858 074120  104451                            TRAP    51                                                                       7292
13859 074122  062706  000044                    ADD     #44,SP
13860 074126  000506                    16$:    BR      22$                     ;                                                7293
13861 074130  020427  000001            17$:    CMP     R4,#1                   ; VALUE,*                                        7271
13862 074134  001031                            BNE     18$
13863 074136  012746  000006                    MOV     #6,-(SP)                ;                                                7301
13864 074142  016646  000034                    MOV     34(SP),-(SP)            ; COMMAND,*
13865 074146  010146                            MOV     R1,-(SP)                ; LUN,*
13866 074150  010246                            MOV     R2,-(SP)                ; WRDCNT,*
13867 074152  016646  000044                    MOV     44(SP),-(SP)            ; PTR,*
13868 074156  010346                            MOV     R3,-(SP)                ; SECTOR,*
13869 074160  004767  152040                    JSR     PC,RETRY
13870 074164  062706  000014                    ADD     #14,SP
13871 074170  005700                            TST     R0
13872 074172  001662                            BEQ     14$
13873 074174  112761  000004  034446            MOVB    #4,WHY.DROPT(R1)        ; *,*(LUN)                                       7304
13874 074202  104455                            TRAP    55                      ;                                                7305
13875 074204  012125                            .WORD   12125
13876 074206  011070                            .WORD   MSG1
13877 074210  000000                            .WORD   0
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13879
13880                                   ;MLX4
13881                                   ;               TESTING RANDOM DATA & WORD COUNTS
13882 074212  010100                            MOV     R1,R0                   ; LUN,*
13883 074214  104451                            TRAP    51
13884 074216  000450                            BR      21$                     ;
13885 074220  020427  000002              18$:  CMP     R4,#2                   ; VALUE,*
13886 074224  001012                            BNE     19$
13887 074226  112761  000005  034446            MOVB    #5,WHY.DROPT(R1)        ; *,*(LUN)
13888 074234  104455                            TRAP    55                      ;
13889 074236  012126                            .WORD   12126
13890 074240  011070                            .WORD   MSG1
13891 074242  000000                            .WORD   0
13892 074244  010100                            MOV     R1,R0                   ; LUN,*
13893 074246  104451                            TRAP    51
13894 074250  000433                            BR      21$                     ;
13895 074252  020427  000003              19$:  CMP     R4,#3                   ; VALUE,*
13896 074256  001012                            BNE     20$
13897 074260  104455                            TRAP    55                      ;
13898 074262  012127                            .WORD   12127
13899 074264  011070                            .WORD   MSG1
13900 074266  000000                            .WORD   0
13901 074270  112761  000006  034446            MOVB    #6,WHY.DROPT(R1)        ; *,*(LUN)
13902 074276  010100                            MOV     R1,R0                   ; LUN,*
13903 074300  104451                            TRAP    51
13904 074302  000416                            BR      21$                     ;
13905 074304  020427  000004              20$:  CMP     R4,#4                   ; VALUE,*
13906 074310  001017                            BNE     23$
13907 074312  004767  143014                    JSR     PC,ISOLATE              ;
13908 074316  104455                            TRAP    55                      ;
13909 074320  012130                            .WORD   12130
13910 074322  011120                            .WORD   MSG2
13911 074324  000000                            .WORD   0
13912 074326  112761  000007  034446            MOVB    #7,WHY.DROPT(R1)        ; *,*(LUN)
13913 074334  010100                            MOV     R1,R0                   ; LUN,*
13914 074336  104451                            TRAP    51
13915 074340  062706  000022        21$:  ADD     #22,SP                  ;
13916 074344  000167  001032        22$:  JMP     42$
13917 074350  020427  000005        23$:  CMP     R4,#5                   ; VALUE,*
13918 074354  001157                            BNE     30$
13919 074356  004767  142750                    JSR     PC,ISOLATE              ;
13920 074362  032767  000001  105670            BIT     #1,ERROUT               ;
13921 074370  001423                            BEQ     24$
13922 074372  017705  140012                    MOV     @ML.REG+42,R5
13923 074376  006205                            ASR     R5
13924 074400  006205                            ASR     R5
13925 074402  006205                            ASR     R5
13926 074404  006205                            ASR     R5
13927 074406  006205                            ASR     R5
13928 074410  006205                            ASR     R5
13929 074412  042705  177700                    BIC     #177700,R5
13930 074416  010546                            MOV     R5,-(SP)
13931 074420  012746  006640                    MOV     #FMT10B,-(SP)
13932 074424  012746  000002                    MOV     #2,-(SP)
13933 074430  010600                            MOV     SP,R0                   ; SP,*
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SEQ 0305

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13935                                   ;MLX4
13936                                   ;                       TESTING RANDOM DATA & WORD COUNTS                27-Mar-1982 19:24:42    TOPS
13937                                                                                                            27-Mar-1982 19:23:44    PA:<
13938 074432  104414                              TRAP    14
13939 074434  062706  000006                      ADD     #6,SP
13940 074440  017766  137746  000036  24$:        MOV     @ML.REG+44,36(SP)       ; *,OLDSEC                              7344
13941 074446  017705  137736                      MOV     @ML.REG+42,R5           ;                                       7345
13942 074452  006205                              ASR     R5
13943 074454  006205                              ASR     R5
13944 074456  006205                              ASR     R5
13945 074460  006205                              ASR     R5
13946 074462  006205                              ASR     R5
13947 074464  006205                              ASR     R5
13948 074466  042705  177700                      BIC     #177700,R5
13949 074472  010566  000042                      MOV     R5,42(SP)               ; *,OLDCHN
13950 074476  012746  000001                      MOV     #1,-(SP)                ;
13951 074502  016646  000034                      MOV     34(SP),-(SP)            ;                                       7347
13952 074506  010146                              MOV     R1,-(SP)                ; COMMAND,*
13953 074510  010246                              MOV     R2,-(SP)                ; LUN,*
13954 074512  016646  000044                      MOV     44(SP),-(SP)            ; WRDCNT,*
13955 074516  010346                              MOV     R3,-(SP)                ; PTR,*
13956 074520  004767  151500                      JSR     PC,RETRY                ; SECTOR,*
13957 074524  062706  000014                      ADD     #14,SP
13958 074530  020027  000005                      CMP     R0,#5
13959 074534  001051                              BNE     27$
13960 074536  027766  137650  000036              CMP     @ML.REG+44,36(SP)       ; *,OLDSEC                              7350
13961 074544  001034                              BNE     26$
13962 074546  016600  000042                      MOV     42(SP),R0               ; OLDCHN,*
13963 074552  017705  137632                      MOV     @ML.REG+42,R5
13964 074556  006205                              ASR     R5
13965 074560  006205                              ASR     R5
13966 074562  006205                              ASR     R5
13967 074564  006205                              ASR     R5
13968 074566  006205                              ASR     R5
13969 074570  006205                              ASR     R5
13970 074572  042705  177700                      BIC     #177700,R5
13971 074576  020500                              CMP     R5,R0
13972 074600  001016                              BNE     26$
13973 074602  032767  000001  105450              BIT     #1,ERROUT               ;                                       7354
13974 074610  001404                              BEQ     25$
13975 074612  104456                              TRAP    56
13976 074614  012131                              .WORD   12131
13977 074616  011202                              .WORD   MSG4
13978 074620  000000                              .WORD   0
13979 074622  010146                  25$:        MOV     R1,-(SP)                ; LUN,*                                 7357
13980 074624  016746  137512                      MOV     BOARD,-(SP)
13981 074630  004767  142566                      JSR     PC,UP.HARD.COUNT
13982 074634  000426                              BR      29$
13983 074636  032767  000001  105414  26$:        BIT     #1,ERROUT               ;                                       7350
13984 074644  001415                              BEQ     28$                     ;                                       7362
13985 074646  104457                              TRAP    57
13986 074650  012132                              .WORD   12132
13987 074652  011166                              .WORD   MSG3
13988 074654  000000                              .WORD   0
13989 074656  000410                              BR      28$                     ;                                       7365
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SEQ 0306

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                                        ;MLX4
                                        ;                TESTING RANDOM DATA & WORD COUNTS          27-Mar-1982 19:24:42   TOPS
                                                                                                    27-Mar-1982 19:23:44   PA:<
13994 074660  032767  000001  105372  27$:    BIT     #1,ERROUT                ;                                          7371
13995 074666  001404                          BEQ     28$
13996 074670  104457                          TRAP    57
13997 074672  012133                          .WORD   12133
13998 074674  011166                          .WORD   MSG3
13999 074676  000000                          .WORD   0
14000 074700  010146                  28$:    MOV     R1,-(SP)                 ; LUN,*                                  7374
14001 074702  016746  137434                    MOV     BOARD,-(SP)
14002 074706  004767  143172                    JSR     PC,UP.SOFT.COUNT
14003 074712  022626                  29$:    CMP     (SP)+,(SP)+
14004 074714  016603  000030          30$:    MOV     30(SP),R3                ;                                        7338
14005 074720  062767  000002  135742          ADD     #2,WPTR                  ; NEXT.SECT,SECTOR                       7380
14006 074726  062706  000022                  ADD     #22,SP                   ;                                        7381
14007 074732  000167  176362                  JMP     5$                       ;                                        7199
14008 074736  032767  000001  105316  31$:    BIT     #1,EFN$21                ;                                        7198
14009 074744  001002                          BNE     32$                      ;                                        7392
14010 074746  000167  000430                  JMP     42$
14011 074752  010100                  32$:    MOV     R1,R0                    ; LUN,*                                  7399
14012 074754  006300                          ASL     R0
14013 074756  016066  034500  000024          MOV     TOP.SECT(R0),24(SP)
14014 074764  016005  034460                  MOV     LOW.SECT(R0),R5          ; *,SECTOR
14015 074770  000577                          BR      41$
14016 074772  010146                  33$:    MOV     R1,-(SP)                 ; LUN,*                                  7401
14017 074774  012746  000400                  MOV     #400,-(SP)
14018 075000  012746  022670                  MOV     #RBUFF,-(SP)
14019 075004  010546                          MOV     R5,-(SP)                 ; SECTOR,*
14020 075006  004767  150600                  JSR     PC,READ
14021 075012  062706  000010                  ADD     #10,SP
14022 075016  020027  000005                  CMP     R0,#5
14023 075022  001161                          BNE     40$
14024 075024  004767  142302                  JSR     PC,ISOLATE
14025 075030  032767  000001  105222          BIT     #1,ERROUT                ;                                        7404
14026 075036  001423                          BEQ     34$                      ;                                        7406
14027 075040  017700  137344                  MOV     @ML.REG+42,R0
14028 075044  006200                          ASR     R0
14029 075046  006200                          ASR     R0
14030 075050  006200                          ASR     R0
14031 075052  006200                          ASR     R0
14032 075054  006200                          ASR     R0
14033 075056  006200                          ASR     R0
14034 075060  042700  177700                  BIC     #177700,R0
14035 075064  010046                          MOV     R0,-(SP)
14036 075066  012746  006640                  MOV     #FMT10B,-(SP)
14037 075072  012746  000002                  MOV     #2,-(SP)
14038 075076  010600                          MOV     SP,R0
14039 075100  104414                          TRAP    14                       ; SP,*
14040 075102  062706  000006                  ADD     #6,SP
14041 075106  017766  137300  000014  34$:    MOV     @ML.REG+44,14(SP)        ; *,OLDSEC                               7415
14042 075114  017700  137270                  MOV     @ML.REG+42,R0            ;                                        7416
14043 075120  006200                          ASR     R0
14044 075122  006200                          ASR     R0
14045 075124  006200                          ASR     R0
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14047                                   ;MLX4
14048                                   ;
14049                                   ;       TESTING RANDOM DATA & WORD COUNTS                27-Mar-1982 19:24:42    TOPS
14050                                                                                            27-Mar-1982 19:23:44    PA:<
14051 075126  006200                            ASR     R0
14052 075130  006200                            ASR     R0
14053 075132  006200                            ASR     R0
14054 075134  042700  177700                    BIC     #177700,R0
14055 075140  010066  000020                    MOV     R0,20(SP)               ; *,OLDCHN
14056 075144  012746  000001                    MOV     #1,-(SP)                ;                                       7424
14057 075150  016646  000012                    MOV     12(SP),-(SP)            ; COMMAND,*
14058 075154  010146                            MOV     R1,-(SP)                ; LUN,*
14059 075156  012746  000400                    MOV     #400,-(SP)
14060 075162  016646  000022                    MOV     22(SP),-(SP)            ; PTR,*
14061 075166  016646  000026                    MOV     26(SP),-(SP)            ; OLDSEC,*
14062 075172  004767  151026                    JSR     PC,RETRY
14063 075176  062706  000014                    ADD     #14,SP
14064 075202  020027  000005                    CMP     R0,#5
14065 075206  001051                            BNE     37$
14066 075210  027766  137176  000014            CMP     @ML.REG+44,14(SP)       ; *,OLDSEC                              7433
14067 075216  001034                            BNE     36$
14068 075220  016646  000020                    MOV     20(SP),-(SP)            ; OLDCHN,*
14069 075224  017700  137160                    MOV     @ML.REG+42,R0
14070 075230  006200                            ASR     R0
14071 075232  006200                            ASR     R0
14072 075234  006200                            ASR     R0
14073 075236  006200                            ASR     R0
14074 075240  006200                            ASR     R0
14075 075242  006200                            ASR     R0
14076 075244  042700  177700                    BIC     #177700,R0
14077 075250  020026                            CMP     R0,(SP)+
14078 075252  001016                            BNE     36$
14079 075254  032767  000001  104776            BIT     #1,ERROUT               ;                                       7437
14080 075262  001404                            BEQ     35$
14081 075264  104456                            TRAP    56                      ;                                       7442
14082 075266  012134                            .WORD   12134
14083 075270  011202                            .WORD   MSG4
14084 075272  000000                            .WORD   0
14085 075274  010146                    35$:    MOV     R1,-(SP)                ; LUN,*                                 7445
14086 075302  016746  137040                    MOV     BOARD,-(SP)
14087 075306  004767  142114                    JSR     PC,UP.HARD.COUNT
14088 075310  000426                            BR      39$
14089 075312  032767  000001  104742    36$:    BIT     #1,ERROUT               ;                                       7433
14090 075320  001415                            BEQ     38$                     ;                                       7450
14091 075322  104457                            TRAP    57
14092 075324  012135                            .WORD   12135                   ;                                       7455
14093 075326  011166                            .WORD   MSG3
14094 075330  000000                            .WORD   0
14095 075332  000410                            BR      38$
14096 075334  032767  000001  104720    37$:    BIT     #1,ERROUT               ;                                       7458
14097 075342  001404                            BEQ     38$                     ;                                       7464
14098 075344  104457                            TRAP    57
14099 075346  012136                            .WORD   12136                   ;                                       7469
14100 075350  011166                            .WORD   MSG3
14101 075352  000000                            .WORD   0
14102 075354  010146                    38$:    MOV     R1,-(SP)                ; LUN,*                                 7472
```

SEQ 0308

```
14103                                   ;MLX4
14104                                   ;
14105                                                   TESTING RANDOM DATA & WORD COUNTS
14106 075354  016746  136762                     MOV   BOARD,-(SP)
14107 075360  004767  142520                     JSR   PC,UP.SOFT.COUNT
14108 075364  022626                     39$:    CMP   (SP)+,(SP)+
14109 075366  005205                     40$:    INC   R5                                ;
14110 075370  020566  000024               41$:  CMP   R5,24(SP)                         ; SECTOR
14111 075374  101002                           BHI   42$                                 ; SECTOR,*
14112 075376  000167  177370                     JMP   33$
14113 075402  005201                     42$:    INC   R1
14114 075404  020166  000026               43$:  CMP   R1,26(SP)                         ; LUN
14115 075410  002002                           BGE   44$                                 ; LUN,*
14116 075412  000167  175562                     JMP   2$
14117 075416  005266  000022               44$:  INC   22(SP)                            ; COUNT
14118 075422  026666  000022  000046           CMP   22(SP),46(SP)                       ; COUNT,REPEAT
14119 075430  003002                           BGT   45$
14120 075432  000167  175526                     JMP   1$
14121 075436  062706  000030               45$:  ADD   #30,SP                            ;
14122 075442  000207                           RTS   PC
14123
14124                                   ; Routine Size:  616 words
14125                                   ; Maximum stack depth per invocation:  36 words
14130
14131
```

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```
14133 ;MLX4
14134 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
14135 ;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (46)
14136 ;          7486  %sbttl 'TESTING RANDOM SECTORS, DATA, WORD COUNTS'
14137 ;          7487  routine RAND3 (REPEAT) : novalue =
14138 ;          7488      begin                                          !* 1 *  START OF ROUTINE
14139 ;          7489
14140 ;          7490  !++
14141 ;          7491  !  ROUTINE:     RAND3(REPEAT)
14142 ;          7492  !
14143 ;          7493  !  PURPOSE:     TO CHECK RANDOM SECTORS
14144 ;          7494  !
14145 ;          7495  !  ARGUMENT:    REPEAT = NUMBER OF TIMES TO EXECUTE ENTIRE ROUTINE
14146 ;          7496  !
14147 ;          7497  !  THE CODE FOR 'RAND3' IN BRIEF:
14148 ;          7498  !
14149 ;          7499  !  BEGIN 1 (START OF ROUTINE)
14150 ;          7500  !  SAY ROUTINE IS RUNNING
14151 ;          7501  !  INCR COUNT FROM 1 TO REPEAT
14152 ;          7502  !  : BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
14153 ;          7503  !  : GENERATE THE RANDOM PATTERN
14154 ;          7504  !  : INCR LUN FROM 0 TO LAST
14155 ;          7505  !  : : BEGIN 3 (START OF LOGICAL UNIT SELECTION LOOP)
14156 ;          7506  !  : : INITIALIZE BUFFER POINTERS
14157 ;          7507  !  : : TESTLOOP:
14158 ;          7508  !  : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
14159 ;          7509  !  : : : IF UNIT IS ACTIVE
14160 ;          7510  !  : : : THEN
14161 ;          7511  !  : : : : BEGIN 5 (START OF TEST FOR AN ACTIVE UNIT)
14162 ;          7512  !  : : : : TIMES = (HIGHEST - LOWEST)/2 + 1
14163 ;          7513  !  : : : : INCR KOUNT FROM 1 TO TIMES
14164 ;          7514  !  : : : : : BEGIN 6 (START OF COUNTING LOOP FOR SECTOR SELECTION)
14165 ;          7515  !  : : : : : CHOOSE A RANDOM WORD COUNT
14166 ;          7516  !  : : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
14167 ;          7517  !  : : : : : CHOOSE A RANDOM SECTOR
14168 ;          7518  !  : : : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
14169 ;          7519  !  : : : : : IF CALCULATED VALUE GTR HIGHEST
14170 ;          7520  !  : : : : : : THEN ADJUST THE WORD COUNT SO IT FITS
14171 ;          7521  !  : : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
14172 ;          7522  !  : : : : : WRITE
14173 ;          7523  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
14174 ;          7524  !  : : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
14175 ;          7525  !  : : : : : DO THE WRITE CHECK OR READ
14176 ;          7526  !  : : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE LABEL)
14177 ;          7527  !  : : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
14178 ;          7528  !  : : : : : END 6 (END OF COUNTING LOOP FOR SECTOR SELECTION)
14179 ;          7529  !  : : : : END 5 (END OF TEST FOR AN ACTIVE UNIT)
14180 ;          7530  !  : : : END 4 (END OF TESTLOOP)
14181 ;          7531  !  : : END 3 (END OF LOGICAL UNIT SELECTION LOOP)
14182 ;          7532  !  : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE)
14183 ;          7533  !  RETURN
14184 ;          7534  !  END 1 (END OF ROUTINE)
14185 ;          7535  !--
14186 ;          7536
14187 ;          7537      local
```

```
14189 ;MLX4
14190 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS
14191
14192 ;          7538           WRDCNT,
14193 ;          7539           SECTOR,
14194 ;          7540           TIMES,
14195 ;          7541           VALUE,
14196 ;          7542           OLDSEC,
14197 ;          7543           OLDCHN,
14198 ;          7544           PTR,
14199 ;          7545           COMMAND,
14200 ;          7546           DBL_VALUE;
14201 ;          7547
14202 ;          7548       label
14203 ;          7549           LOOP;
14204 ;          7550
14205 ;          7551       PRINTB (SAY1, RTN5C);
14206 ;          7552       !'RAND3'
14207 ;          7553
14208 ;          7554       incr COUNT from 1 to .REPEAT do
14209 ;          7555           begin                                  !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
14210 ;          7556
14211 ;          7557           incr LUN from 0 to (.L$UNIT - 1) do
14212 ;          7558               begin                              !* 3 *  START OF LOGICAL UNIT SELECTION LOOP
14213 ;          7559               GEN5 ();
14214 ;          7560   LOOP :
14215 ;          7561               begin                              !* 4 *  START OF THE LOOP THAT COMPLETELY TESTS 1 UNIT
14216 ;          7562
14217 ;          7563               if .DRIVE_STATUS [.LUN] eql ACTIVE
14218 ;          7564               then
14219 ;          7565                   begin                          !* 5 *  START OF TEST FOR AN ACTIVE UNIT
14220 ;          7566                   L$LUN = .LUN;
14221 ;          7567                   WPTR = WBUFF;
14222 ;          7568                   RPTR = RBUFF;
14223 ;          7569                   TIMES = (HIGHEST - LOWEST)/2 + 1;
14224 ;          7570
14225 ;          7571                   incr KOUNT from 1 to .TIMES do
14226 ;          7572                       begin                      !* 6 *  START OF COUNTING LOOP FOR SECTOR SELECTION
14227 ;          7573                       WRDCNT = RNDWC ();         !VALUE BETWEEN 1 AND BUFSIZ
14228 ;          7574                       SET_PTRS (.WRDCNT);
14229 ;          7575                       SECTOR = RNDSEC (.LUN);    !VALUE BETWEEN LOWEST AND HIGHEST
14230 ;          7576
14231 ;          7577                       if (.SECTOR + .WRDCNT/256) gtra HIGHEST then WRDCNT = 256*(HIGHEST - .SECTOR + 1);
14232 ;          7578
14233 ;          7579                       VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);
14234 ;          7580
14235 ;          7581                       !+
14236 ;          7582                       ! SEE HOW SUCCESSFUL THE WRITE WAS:
14237 ;          7583                       !-
14238 ;          7584
14239 ;          7585                       selectone .VALUE of        !SEE 'SYSERR' FOR DEFINITION
14240 ;          7586                           set                    !OF ERROR # CONTAINED IN 'VALUE'
14241 ;          7587
14242 ;          7588                           [1] :
14243 ;          7589                               begin              !* 6A * RETRY ALLOWED
```

```
14245 ;MLX4
14246 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
14247                                                                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (46)
14248 ;          7590
14249 ;          7591                                    if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
14250 ;          7592                                    then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
14251 ;          7593                                        begin
14252 ;          7594                                        WHY_DROPT [.LUN] = CODE_4;
14253 ;          7595                                        ERRDF (5301, MSG1, 0);  !**** OPTION 5, RAND3 ERROR 01 ****
14254 ;          7596                                        DODU (.LUN);
14255 ;          7597                                        leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
14256 ;          7598                                        end;
14257 ;          7599
14258 ;          7600                                    end;                !* 6A *
14259 ;          7601
14260 ;          7602                                [2] :
14261 ;          7603                                    begin               !* 6B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
14262 ;          7604                                    WHY_DROPT [.LUN] = CODE_5;
14263 ;          7605                                    ERRDF (5302, MSG1, 0);      !**** OPTION 5, RAND3 ERROR 02 ****
14264 ;          7606                                    DODU (.LUN);
14265 ;          7607                                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
14266 ;          7608                                    end;                !* 6B *
14267 ;          7609
14268 ;          7610                                [3] :
14269 ;          7611                                    begin               !* 6C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
14270 ;          7612                                    ERRDF (5303, MSG1, 0);      !**** OPTION 5, RAND3 ERROR 03 ****
14271 ;          7613                                    WHY_DROPT [.LUN] = CODE_6;
14272 ;          7614                                    DODU (.LUN);
14273 ;          7615                                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
14274 ;          7616                                    end;                !* 6C *
14275 ;          7617                                tes;
14276 ;          7618
14277 ;          7619                            COMMAND = CHOOSE ();
14278 ;          7620
14279 ;          7621                            if .COMMAND eql read
14280 ;          7622                            then
14281 ;          7623                                begin
14282 ;          7624                                PTR = .RPTR;
14283 ;          7625                                VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
14284 ;          7626                                end
14285 ;          7627                            else
14286 ;          7628                                begin
14287 ;          7629                                PTR = .WPTR;
14288 ;          7630                                VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
14289 ;          7631                                end;
14290 ;          7632
14291 ;          7633                            !+
14292 ;          7634                            ! SEE HOW SUCCESSFUL THE OPERATION WAS:
14293 ;          7635                            !-
14294 ;          7636
14295 ;          7637                            selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
14296 ;          7638                                set                         !OF ERROR # CONTAINED IN 'VALUE'
14297 ;          7639
14298 ;          7640                                [0] :
14299 ;          7641
```

```
14301 ;MLX4
14302 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
14303 ;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (46)
14304 ;         7642                                    if .COMMAND eql read
14305 ;         7643                                    then
14306 ;         7644                                        begin
14307 ;         7645
14308 ;         7646                                        if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
14309 ;         7647                                        then
14310 ;         7648                                            begin
14311 ;         7649                                            SAYWHO (.LUN);
14312 ;         7650                                            PRINTB (SAY1, MSG5);          !'ECC LOGIC FAILED TO DETECT DATA ERROR'
14313 ;         7651                                            PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
14314 ;         7652                                                          !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
14315 ;         7653                                            DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
14316 ;         7654                                            PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
14317 ;         7655                                                          !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
14318 ;         7656                                            WHY_DROPT [.LUN] = CODE_8;
14319 ;         7657                                            ERRDF (5304, MSG1, 0);        !**** OPTION 5, RAND3 ERROR 04 ****
14320 ;         7658                                            DODU (.LUN);
14321 ;         7659                                            leave LOOP; !JUMP JUST BEYOND END OF BLOCK * 4 *
14322 ;         7660                                            end;
14323 ;         7661
14324 ;         7662                                        end;
14325 ;         7663
14326 ;         7664                                    [1] :
14327 ;         7665                                        begin                 !* 6D * RETRY ALLOWED
14328 ;         7666
14329 ;         7667                                        if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
14330 ;         7668                                        then                  !THE RETRY FAILED -- SYSTEM FATAL ERROR
14331 ;         7669                                            begin
14332 ;         7670                                            WHY_DROPT [.LUN] = CODE_4;
14333 ;         7671                                            ERRDF (5305, MSG1, 0);  !**** OPTION 5, RAND3 ERROR 05 ****
14334 ;         7672                                            DODU (.LUN);
14335 ;         7673                                            leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
14336 ;         7674                                            end;
14337 ;         7675
14338 ;         7676                                        end;                  !* 6D *
14339 ;         7677
14340 ;         7678                                    [2] :
14341 ;         7679                                        begin                 !* 6E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
14342 ;         7680                                        WHY_DROPT [.LUN] = CODE_5;
14343 ;         7681                                        ERRDF (5306, MSG1, 0);        !**** OPTION 5, RAND3 ERROR 06 ****
14344 ;         7682                                        DODU (.LUN);
14345 ;         7683                                        leave LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
14346 ;         7684                                        end;
14347 ;         7685
14348 ;         7686                                    [3] :
14349 ;         7687                                        begin                 !* 6F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
14350 ;         7688                                        ERRDF (5307, MSG1, 0);        !**** OPTION 5, RAND3 ERROR 07 ****
14351 ;         7689                                        WHY_DROPT [.LUN] = CODE_6;
14352 ;         7690                                        DODU (.LUN);
14353 ;         7691                                        leave LOOP;           !JUMP JUST BEYOND END OF BLOCK * 4 *
14354 ;         7692                                        end;                  !* 6F *
14355 ;         7693
```

```
14357 ;MLX4
14358 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS
14359
14360 ;          7694                           [4] :
14361 ;          7695                               begin                    !* 6G * UNRECOVERABLE DATA ERROR
14362 ;          7696                               ISOLATE ();
14363 ;          7697                               ERRDF (5308, MSG2, 0);       !**** OPTION 5, RAND3 ERROR 08 ****
14364 ;          7698                               WHY_DROPT [.LUN] = CODE_7;
14365 ;          7699                               DODO (.LUN);
14366 ;          7700                               leave LOOP;              !JUMP JUST BEYOND END OF BLOCK * 4 *
14367 ;          7701                               end;                     !* 6G *
14368 ;          7702
14369 ;          7703                           [5] :
14370 ;          7704                               begin                    !* 6H * RECOVERABLE DATA ERROR
14371 ;          7705                               ISOLATE ();
14372 ;          7706
14373 ;          7707                               if .ERROUT then PRINTB (FMT10B, .CHAN);
14374 ;          7708
14375 ;          7709                               !'    BIT QQ'
14376 ;          7710                               OLDSEC = .MLEL;
14377 ;          7711                               OLDCHN = .CHAN;
14378 ;          7712
14379 ;          7713                               if RETRY (ONE, CHECK, .LUN, .WRDCNT, .WPTR, .SECTOR) eql 5
14380 ;          7714                               then
14381 ;          7715
14382 ;          7716                                   if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
14383 ;          7717                                   then
14384 ;          7718                                       begin
14385 ;          7719
14386 ;          7720                                       if .ERROUT then ERRHRD (5309, MSG4, 0);
14387 ;          7721
14388 ;          7722                                                       !**** OPTION 5, RAND3 ERROR 09 ****
14389 ;          7723                                       UP_HARD_COUNT (.LUN, .BOARD);
14390 ;          7724                                       end
14391 ;          7725                                   else
14392 ;          7726                                       begin
14393 ;          7727
14394 ;          7728                                       if .ERROUT then ERRSOFT (5310, MSG3, 0);
14395 ;          7729
14396 ;          7730                                                       !**** OPTION 5, RAND3 ERROR 10 ****
14397 ;          7731                                       UP_SOFT_COUNT (.LUN, .BOARD);
14398 ;          7732                                       end
14399 ;          7733
14400 ;          7734                               else
14401 ;          7735                                   begin
14402 ;          7736
14403 ;          7737                                   if .ERROUT then ERRSOFT (5311, MSG3, 0);
14404 ;          7738
14405 ;          7739                                                       !**** OPTION 5, RAND3 ERROR 11 ****
14406 ;          7740                                   UP_SOFT_COUNT (.LUN, .BOARD);
14407 ;          7741                                   end;
14408 ;          7742
14409 ;          7743                               end;                     !* 6H *
14410 ;          7744                       tes;
14411 ;          7745
```

```
14413 ;MLX4
14414 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS
14415 ;
14416 ;          7746                       WPTR = .WPTR + 2;
14417 ;          7747                       end;                          !* 6 *  END OF COUNTING LOOP FOR SECTOR SELECTION
14418 ;          7748
14419 ;          7749                   end;                              !* 5 *  END OF TEST FOR AN ACTIVE UNIT
14420 ;          7750
14421 ;          7751               !+
14422 ;          7752               ! Test to see if this uut's address space is
14423 ;          7753               ! to be read for soft errors.  This test is
14424 ;          7754               ! is intended for DMT purposes.
14425 ;          7755               !-
14426 ;          7756
14427 ;          7757               if .EFN$21                            !Is the background pattern to be read
14428 ;          7758               then
14429 ;          7759                   begin
14430 ;          7760
14431 ;          7761   !
14432 ;          7762   ! version czmlbb changed incr to incru
14433 ;          7763   !
14434 ;          7764                   incru SECTOR from LOWEST to HIGHEST do
14435 ;          7765
14436 ;          7766                       if read (.LUN, 256, RBUFF, .SECTOR) eql 5
14437 ;          7767                       then
14438 ;          7768                           begin
14439 ;          7769                           ISOLATE ();               !Find the failing bank and board no.
14440 ;          7770
14441 ;          7771                           if .ERROUT then PRINTB (FMT10B, .CHAN);
14442 ;          7772
14443 ;          7773                           ! Print where the error is
14444 ;          7774                           !
14445 ;          7775                           ! Save the contents of the ML error location
14446 ;          7776                           ! register so we can compare it to the new
14447 ;          7777                           ! contents of this register after the retry.
14448 ;          7778                           ! This is done to classify the error.
14449 ;          7779                           !
14450 ;          7780                           OLDSEC = .MLEL;
14451 ;          7781                           OLDCHN = .CHAN;
14452 ;          7782                           !
14453 ;          7783                           ! Do a classify retry call.  If the same error
14454 ;          7784                           ! occures then classify it as a hard error.  If
14455 ;          7785                           ! a different error occured or the error went away
14456 ;          7786                           ! then classify it as a soft error.
14457 ;          7787                           !
14458 ;          7788
14459 ;          7789                           if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
14460 ;          7790                           then
14461 ;          7791                           !
14462 ;          7792                           ! The same error occured so see if it is at the same
14463 ;          7793                           ! sector and channel number, if so then classify
14464 ;          7794                           ! it as a hard error else classiy it as a soft
14465 ;          7795                           ! error.
14466 ;          7796                           !
14467 ;          7797
```

```
14469 ;MLX4
14470 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
14471 ;                                                                  27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (46)
14472 ;          7798                                  if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
14473 ;          7799                                  then
14474 ;          7800                                      begin               !Same error occured 'hard'
14475 ;          7801
14476 ;          7802                                      if .ERROUT          !Print error if enabled
14477 ;          7803                                      then
14478 ;          7804                                          begin
14479 ;        P 7805                                          ERRHRD (5312,       !Error number
14480 ;        P 7806                                              MSG4,   !Error message
14481 ;          7807                                              0);     !Additional message routine
14482 ;          7808                                          end;
14483 ;          7809
14484 ;          7810                                      UP_HARD_COUNT (.LUN, .BOARD);
14485 ;          7811                                      end
14486 ;          7812                                  else
14487 ;          7813                                      begin               !Not the same error 'soft'
14488 ;          7814
14489 ;          7815                                      if .ERROUT          !Print error if enabled
14490 ;          7816                                      then
14491 ;          7817                                          begin
14492 ;        P 7818                                          ERRSOFT (5313,      !Error number
14493 ;        P 7819                                              MSG3,   !Error message
14494 ;          7820                                              0);     !Additional message routine
14495 ;          7821                                          end;
14496 ;          7822
14497 ;          7823                                      UP_SOFT_COUNT (.LUN, .BOARD);
14498 ;          7824                                      end
14499 ;          7825
14500 ;          7826                                  else                    !Not the same error 'soft'
14501 ;          7827                                      begin
14502 ;          7828
14503 ;          7829                                      if .ERROUT          !Print error if enabled
14504 ;          7830                                      then
14505 ;          7831                                          begin
14506 ;        P 7832                                          ERRSOFT (5314,  !Error number
14507 ;        P 7833                                              MSG3,       !Error message
14508 ;          7834                                              0);         !Additional message routine
14509 ;          7835                                          end;
14510 ;          7836
14511 ;          7837                                      UP_SOFT_COUNT (.LUN, .BOARD);
14512 ;          7838                                      end;
14513 ;          7839
14514 ;          7840                                  end;
14515 ;          7841
14516 ;          7842                          end;
14517 ;          7843
14518 ;          7844                      end;                                !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
14519 ;          7845                      end;                                !* 3 *  END OF LOGICAL UNIT SELECTION LOOP
14520 ;          7846
14521 ;          7847                  end;                                    !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
14522 ;          7848
14523 ;          7849              return;
```

```
14525 ;MLX4
14526 ;                 TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
14527                                                                    27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (46)
14528 ;         7850        end;                                         !* 1 *  END OF ROUTINE
14532
14533
14537 075444  004167  107664                 RAND3:  .SBTTL  RAND3 TESTING RANDOM SECTORS, DATA, WORD COUNTS
14538 075450  162706  000024                         JSR     R1,$SAVE5                                       ;                       7487
14539 075454  012746  007700                         SUB     #24,SP
14540 075460  012746  007072                         MOV     #RTN5C,-(SP)                                    ;                       7551
14541 075464  012746  000002                         MOV     #SAY1,-(SP)
14542 075470  010600                                 MOV     #2,-(SP)
14543 075472  104414                                 MOV     SP,R0                                           ; SP,*
14544 075474  005066  000030                         TRAP    14
14545 075500  000167  002254                         CLR     30(SP)                                          ; COUNT
14546 075504  016766  104302  000012     1$:         JMP     44$                                             ;                       7554
14547 075512  005003                                 MOV     L$UNIT,12(SP)                                   ;                       7557
14548 075514  000167  002226                         CLR     R3                                              ; LUN
14549 075520  004767  144074              2$:         JMP     43$                                             ;                       7559
14550 075524  010300                                 JSR     PC,GEN5                                         ;                       7563
14551 075526  006200                                 MOV     R3,R0                                           ; LUN,*
14552 075530  006200                                 ASR     R0
14553 075532  006200                                 ASR     R0
14554 075534  062700  034442                         ASR     R0
14555 075540  010046                                 ADD     #DRIVE.STATUS,R0
14556 075542  010346                                 MOV     R0,-(SP)
14557 075544  042716  177770                         MOV     R3,-(SP)                                        ; LUN,*
14558 075550  012746  000001                         BIC     #177770,(SP)
14559 075554  005046                                 MOV     #1,-(SP)
14560 075556  004767  106574                         CLR     -(SP)
14561 075562  062706  000010                         JSR     PC,BL$GT2
14562 075566  005300                                 ADD     #10,SP
14563 075570  001402                                 DEC     R0
14564 075572  000167  001502                         BEQ     3$
14565 075576  010367  104272                         JMP     31$
14566 075602  012767  012670  135060     3$:         MOV     R3,L$LUN                                        ; LUN,*                 7566
14567 075610  012767  022670  135054                 MOV     #WBUFF,WPTR                                     ;                       7567
14568 075616  010300                                 MOV     #RBUFF,RPTR                                     ;                       7568
14569 075620  006300                                 MOV     R3,R0                                           ; LUN,*                 7569
14570 075622  012766  034500  000010                 ASL     R0
14571 075630  060066  000010                         MOV     #TOP.SECT,10(SP)
14572 075634  017646  000010                         ADD     R0,10(SP)
14573 075640  166016  034460                         MOV     @10(SP),-(SP)
14574 075644  012746  000002                         SUB     LOW.SECT(R0),(SP)
14575 075650  004767  107314                         MOV     #2,-(SP)
14576 075654  010066  000020                         JSR     PC,BL$DIV
14577 075660  005266  000020                         MOV     R0,20(SP)                                       ; *,TIMES
14578 075664  005066  000012                         INC     20(SP)                                          ; TIMES
14579 075670  000167  001362                         CLR     12(SP)                                          ; KOUNT
                                                     JMP     29$                                             ;                       7571
```

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                                        ;MLX4
                                        ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS      27-Mar-1982 19:24:42   TOPS
                                                                                                       27-Mar-1982 19:23:44   PA:<
14584 075674  004767  172304    4$:     JSR     PC,RNDWC                                                                      7573
14585 075700  010002                    MOV     R0,R2                   ;                                                     7574
14586 075702  010246                    MOV     R2,-(SP)                ; *,WRDCNT
14587 075704  004767  151222            JSR     PC,SET.PTRS             ; WRDCNT,*                                            7575
14588 075710  010316                    MOV     R3,(SP)                 ; LUN,*
14589 075712  004767  172322            JSR     PC,RNDSEC                                                                     7577
14590 075716  010001                    MOV     R0,R1                   ; *,SECTOR
14591 075720  010246                    MOV     R2,-(SP)                ; WRDCNT,*
14592 075722  012746  000400            MOV     #400,-(SP)
14593 075726  004767  107236            JSR     PC,BL$DIV
14594 075732  022626                    CMP     (SP)+,(SP)+
14595 075734  060100                    ADD     R1,R0
14596 075736  020076  000016            CMP     R0,@16(SP)              ; SECTOR,*
14597 075742  101410                    BLOS    5$
14598 075744  017600  000016            MOV     @16(SP),R0
14599 075750  160100                    SUB     R1,R0
14600 075752  000300                    SWAB    R0                      ; SECTOR,*
14601 075754  105000                    CLRB    R0
14602 075756  010002                    MOV     R0,R2
14603 075760  062702  000400            ADD     #400,R2                 ; *,WRDCNT
14604 075764  010316            5$:     MOV     R3,(SP)                 ; *,WRDCNT
14605 075766  010246                    MOV     R2,-(SP)                ; LUN,*                                               7579
14606 075770  016746  134674            MOV     WPTR,-(SP)              ; WRDCNT,*
14607 075774  010146                    MOV     R1,-(SP)
14608 075776  004767  147422            JSR     PC,WRITE                ; SECTOR,*
14609 076002  010004                    MOV     R0,R4
14610 076004  020427  000001            CMP     R4,#1                   ; *,VALUE
14611 076010  001031                    BNE     6$                      ; VALUE,*                                             7585
14612 076012  012746  000006            MOV     #6,-(SP)
14613 076016  012746  045424            MOV     #WRITE,-(SP)            ;                                                     7591
14614 076022  010346                    MOV     R3,-(SP)                ; LUN,*
14615 076024  010246                    MOV     R2,-(SP)                ; WRDCNT,*
14616 076026  016746  134636            MOV     WPTR,-(SP)
14617 076032  010146                    MOV     R1,-(SP)                ; SECTOR,*
14618 076034  004767  150164            JSR     PC,RETRY
14619 076040  062706  000014            ADD     #14,SP
14620 076044  005700                    TST     R0
14621 076046  001446                    BEQ     9$
14622 076050  112763  000004  034446    MOVB    #4,WHY.DROPT(R3)        ; *,*(LUN)                                            7594
14623 076056  104455                    TRAP    55                      ;                                                     7595
14624 076060  012265                    .WORD   12265
14625 076062  011070                    .WORD   MSG1
14626 076064  000000                    .WORD   0
14627 076066  010300                    MOV     R3,R0                   ; LUN,*
14628 076070  104451                    TRAP    51                                                                            7596
14629 076072  000431                    BR      8$
14630 076074  020427  000002    6$:     CMP     R4,#2                   ;                                                     7597
14631 076100  001012                    BNE     7$                      ; VALUE,*                                             7585
14632 076102  112763  000005  034446    MOVB    #5,WHY.DROPT(R3)        ; *,*(LUN)                                            7604
14633 076110  104455                    TRAP    55                      ;                                                     7605
14634 076112  012266                    .WORD   12266
14635 076114  011070                    .WORD   MSG1
```

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14637                                   ;MLX4
14638                                   ;                       TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42    TOPS
14639                                                                                                            27-Mar-1982 19:23:44    PA:<
14640 076116 000000                             .WORD   0
14641 076120 010300                             MOV     R3,R0
14642 076122 104451                             TRAP    51                      ; LUN,*                                                 7606
14643 076124 000414                             BR      8$
14644 076126 020427 000003              7$:     CMP     R4,#3                   ;                                                       7607
14645 076132 001014                             BNE     9$                      ; VALUE,*                                               7585
14646 076134 104455                             TRAP    55
14647 076136 012267                             .WORD   12267                   ;                                                       7612
14648 076140 011070                             .WORD   MSG1
14649 076142 000000                             .WORD   0
14650 076144 112763 000006 034446               MOVB    #6,WHY.DROPT(R3)        ; *,*(LUN)                                      7613
14651 076152 010300                             MOV     R3,R0                   ; LUN,*                                         7614
14652 076154 104451                             TRAP    51
14653 076156 062706 000014              8$:     ADD     #14,SP                  ;                                               7615
14654 076162 000535                             BR      14$
14655 076164 004767 147776              9$:     JSR     PC,CHOOSE               ;                                               7619
14656 076170 010066 000036                      MOV     R0,36(SP)               ; *,COMMAND
14657 076174 005005                             CLR     R5                      ;                                               7621
14658 076176 020027 045612                      CMP     R0,#READ                ; COMMAND,*
14659 076202 001014                             BNE     10$
14660 076204 005205                             INC     R5
14661 076206 016766 134460 000034               MOV     RPTR,34(SP)             ; *,PTR                                         7624
14662 076214 010346                             MOV     R3,-(SP)                ; LUN,*                                         7625
14663 076216 010246                             MOV     R2,-(SP)                ; WRDCNT,*
14664 076220 016746 134446                      MOV     RPTR,-(SP)
14665 076224 010146                             MOV     R1,-(SP)                ; SECTOR,*
14666 076226 004767 147360                      JSR     PC,READ
14667 076232 000412                             BR      11$
14668 076234 016766 134430 000034       10$:    MOV     WPTR,34(SP)             ; *,PTR                                         7629
14669 076242 010346                             MOV     R3,-(SP)                ; LUN,*                                         7630
14670 076244 010246                             MOV     R2,-(SP)                ; WRDCNT,*
14671 076246 016746 134416                      MOV     WPTR,-(SP)
14672 076252 010146                             MOV     R1,-(SP)                ; SECTOR,*
14673 076254 004767 147520                      JSR     PC,CHECK
14674 076260 010004                     11$:    MOV     R0,R4                   ; *,VALUE
14675 076262 001076                             BNE     15$                     ;
14676 076264 006005                             ROR     R5                      ;                                               7637
14677 076266 103402                             BLO     13$                     ;                                               7642
14678 076270 000167 000750              12$:    JMP     28$
14679 076274 016746 134370              13$:    MOV     WPTR,-(SP)              ;                                               7646
14680 076300 016746 134366                      MOV     RPTR,-(SP)
14681 076304 010246                             MOV     R2,-(SP)                ; WRDCNT,*
14682 076306 004767 146014                      JSR     PC,DOUBLE.CHECK
14683 076312 062706 000006                      ADD     #6,SP
14684 076316 010066 000050                      MOV     R0,50(SP)               ; *,DBL.VALUE
14685 076322 001762                             BEQ     12$
14686 076324 010346                             MOV     R3,-(SP)                ; LUN,*                                         7649
14687 076326 004767 137172                      JSR     PC,SAYWHO
14688 076332 012716 011216                      MOV     #MSG5,(SP)              ;                                               7650
14689 076336 012746 007072                      MOV     #SAY1,-(SP)
14690 076342 012746 000002                      MOV     #2,-(SP)
14691 076346 010600                             MOV     SP,R0                   ; SP,*
```

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                        ;MLX4
                        ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42   TOPS
                                                                                          27-Mar-1982 19:23:44   PA:<
076350  104414                  TRAP    14
076352  016616  000056          MOV     56(SP),(SP)
076356  017646  000056          MOV     @56(SP),-(SP)           ; DBL.VALUE,*                                  7651
076362  012746  006710          MOV     #FMT12A,-(SP)           ; DBL.VALUE,*
076366  012746  000003          MOV     #3,-(SP)
076372  010600                  MOV     SP,R0
076374  104414                  TRAP    14                      ; SP,*
076376  062766  010000  000064  ADD     #10000,64(SP)           ; *,DBL.VALUE                                  7653
076404  016616  000064          MOV     64(SP),(SP)             ; DBL.VALUE,*                                  7654
076410  017646  000064          MOV     @64(SP),-(SP)           ; DBL.VALUE,*
076414  012746  006756          MOV     #FMT12B,-(SP)           ; DBL.VALUE,*
076420  012746  000003          MOV     #3,-(SP)
076424  010600                  MOV     SP,R0
076426  104414                  TRAP    14                      ; SP,*
076430  112763  000010  034446  MOVB    #10,WHY.DROPT(R3)       ; *,*(LUN)                                     7656
076436  104455                  TRAP    55                      ;                                              7657
076440  012270                  .WORD   12270
076442  011070                  .WORD   MSG1
076444  000000                  .WORD   0
076446  010300                  MOV     R3,R0
076450  104451                  TRAP    51                      ; LUN,*                                        7658
076452  062706  000046          ADD     #46,SP
076456  000506          14$:    BR      20$                     ;                                              7659
076460  020427  000001  15$:    CMP     R4,#1                   ; VALUE,*                                      7637
076464  001031                  BNE     16$
076466  012746  000006          MOV     #6,-(SP)                ;                                              7667
076472  016646  000050          MOV     50(SP),-(SP)            ; COMMAND,*
076476  010346                  MOV     R3,-(SP)                ; LUN,*
076500  010246                  MOV     R2,-(SP)                ; WRDCNT,*
076502  016646  000054          MOV     54(SP),-(SP)            ; PTR,*
076506  010146                  MOV     R1,-(SP)                ; SECTOR,*
076510  004767  147510          JSR     PC,RETRY
076514  062706  000014          ADD     #14,SP
076520  005700                  TST     R0
076522  001662                  BEQ     12$
076524  112763  000004  034446  MOVB    #4,WHY.DROPT(R3)        ; *,*(LUN)                                     7670
076532  104455                  TRAP    55                      ;                                              7671
076534  012271                  .WORD   12271
076536  011070                  .WORD   MSG1
076540  000000                  .WORD   0
076542  010300                  MOV     R3,R0
076544  104451                  TRAP    51                      ; LUN,*                                        7672
076546  000450                  BR      19$
076550  020427  000002  16$:    CMP     R4,#2                   ;                                              7673
076554  001012                  BNE     17$                     ; VALUE,*                                      7637
076556  112763  000005  034446  MOVB    #5,WHY.DROPT(R3)        ; *,*(LUN)                                     7680
076564  104455                  TRAP    55                      ;                                              7681
076566  012272                  .WORD   12272
076570  011070                  .WORD   MSG1
076572  000000                  .WORD   0
076574  010300                  MOV     R3,R0
076576  104451                  TRAP    51                      ; LUN,*                                        7682
```

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14749                                   ;MLX4
14750                                   ;                    TESTING RANDOM SECTORS, DATA, WORD COUNTS      27-Mar-1982 19:24:42   TOPS
14751                                                                                                          27-Mar-1982 19:23:44   PA:<
14752 076600 000433                             BR      19$
14753 076602 020427 000003              17$:    CMP     R4,#3                           ;
14754 076606 001012                             BNE     18$                             ; VALUE,*                                  7683
14755 076610 104455                             TRAP    55                                                                         7637
14756 076612 012273                             .WORD   12273                           ;                                          7688
14757 076614 011070                             .WORD   MSG1
14758 076616 000000                             .WORD   0
14759 076620 112763 000006 034446               MOVB    #6,WHY.DROPT(R3)                ; *,*(LUN)                                 7689
14760 076626 010300                             MOV     R3,R0                           ; LUN,*                                    7690
14761 076630 104451                             TRAP    51
14762 076632 000416                             BR      19$                             ;
14763 076634 020427 000004              18$:    CMP     R4,#4                           ; VALUE,*                                  7691
14764 076640 001017                             BNE     21$                                                                        7637
14765 076642 004767 140464                      JSR     PC,ISOLATE                      ;
14766 076646 104455                             TRAP    55                              ;                                          7696
14767 076650 012274                             .WORD   12274                                                                      7697
14768 076652 011120                             .WORD   MSG2
14769 076654 000000                             .WORD   0
14770 076656 112763 000007 034446               MOVB    #7,WHY.DROPT(R3)                ; *,*(LUN)                                 7698
14771 076664 010300                             MOV     R3,R0                           ; LUN,*                                    7699
14772 076666 104451                             TRAP    51
14773 076670 062706 000024              19$:    ADD     #24,SP                          ;                                          7700
14774 076674 000167 001044              20$:    JMP     42$
14775 076700 020427 000005              21$:    CMP     R4,#5                           ; VALUE,*                                  7637
14776 076704 001157                             BNE     28$
14777 076706 004767 140420                      JSR     PC,ISOLATE                      ;
14778 076712 032767 000001 103340               BIT     #1,ERROUT                       ;                                          7705
14779 076720 001423                             BEQ     22$                                                                        7707
14780 076722 017705 135462                      MOV     @ML.REG+42,R5
14781 076726 006205                             ASR     R5
14782 076730 006205                             ASR     R5
14783 076732 006205                             ASR     R5
14784 076734 006205                             ASR     R5
14785 076736 006205                             ASR     R5
14786 076740 006205                             ASR     R5
14787 076742 042705 177700                      BIC     #177700,R5
14788 076746 010546                             MOV     R5,-(SP)
14789 076750 012746 006640                      MOV     #FMT10B,-(SP)
14790 076754 012746 000002                      MOV     #2,-(SP)
14791 076760 010600                             MOV     SP,R0                           ; SP,*
14792 076762 104414                             TRAP    14
14793 076764 062706 000006                      ADD     #6,SP
14794 076770 017766 135416 000052       22$:    MOV     @ML.REG+44,52(SP)               ; *,OLDSEC                                 7710
14795 076776 017705 135406                      MOV     @ML.REG+42,R5                   ;                                          7711
14796 077002 006205                             ASR     R5
14797 077004 006205                             ASR     R5
14798 077006 006205                             ASR     R5
14799 077010 006205                             ASR     R5
14800 077012 006205                             ASR     R5
14801 077014 006205                             ASR     R5
14802 077016 042705 177700                      BIC     #177700,R5
14803 077022 010566 000042                      MOV     R5,42(SP)                       ; *,OLDCHN
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                                ;MLX4
                                ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS      27-Mar-1982 19:24:42   TOPS
                                                                                               27-Mar-1982 19:23:44   PA:<
077026  012746  000001                MOV     #1,-(SP)
077032  012746  046000                MOV     #CHECK,-(SP)                  ;                                        7713
077036  010346                      MOV     R3,-(SP)
077040  010246                      MOV     R2,-(SP)                      ; LUN,*
077042  016746  133622                MOV     WPTR,-(SP)                    ; WRDCNT,*
077046  010146                      MOV     R1,-(SP)
077050  004767  147150                JSR     PC,RETRY                      ; SECTOR,*
077054  062706  000014                ADD     #14,SP
077060  020027  000005                CMP     R0,#5
077064  001051                      BNE     25$
077066  027766  135320  000052        CMP     @ML.REG+44,52(SP)             ; *,OLDSEC                               7716
077074  001034                      BNE     24$
077076  016600  000042                MOV     42(SP),R0                     ; OLDCHN,*
077102  017705  135302                MOV     @ML.REG+42,R5
077106  006205                      ASR     R5
077110  006205                      ASR     R5
077112  006205                      ASR     R5
077114  006205                      ASR     R5
077116  006205                      ASR     R5
077120  006205                      ASR     R5
077122  042705  177700                BIC     #177700,R5
077126  020500                      CMP     R5,R0
077130  001016                      BNE     24$
077132  032767  000001  103120        BIT     #1,ERROUT                     ;                                        7720
077140  001404                      BEQ     23$
077142  104456                      TRAP    56
077144  012275                      .WORD   12275
077146  011202                      .WORD   MSG4
077150  000000                      .WORD   0
077152  010346                23$:   MOV     R3,-(SP)                      ; LUN,*                                  7723
077154  016746  135162                MOV     BOARD,-(SP)
077160  004767  140236                JSR     PC,UP.HARD.COUNT
077164  000426                      BR      27$
077166  032767  000001  103064  24$:  BIT     #1,ERROUT                     ;                                        7716
077174  001415                      BEQ     26$                           ;                                        7728
077176  104457                      TRAP    57
077200  012276                      .WORD   12276
077202  011166                      .WORD   MSG3
077204  000000                      .WORD   0
077206  000410                      BR      26$
077210  032767  000001  103042  25$:  BIT     #1,ERROUT                     ;                                        7731
077216  001404                      BEQ     26$                           ;                                        7737
077220  104457                      TRAP    57
077222  012277                      .WORD   12277
077224  011166                      .WORD   MSG3
077226  000000                      .WORD   0
077230  010346                26$:   MOV     R3,-(SP)                      ; LUN,*                                  7740
077232  016746  135104                MOV     BOARD,-(SP)
077236  004767  140642                JSR     PC,UP.SOFT.COUNT
077242  022626                27$:   CMP     (SP)+,(SP)+
077244  062767  000002  133416  28$:  ADD     #2,WPTR                       ;                                        7704
077252  062706  000020                ADD     #20,SP                        ;                                        7746
                                                                           ;                                        7572
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                                        ;MLX4
                                        ;                TESTING RANDOM SECTORS, DATA, WORD COUNTS        27-Mar-1982 19:24:42   TOPS
                                                                                                         27-Mar-1982 19:23:44   PA:<
                                29$:    INC     12(SP)                                                                          7571
                                        CMP     12(SP),20(SP)           ; KOUNT,TIMES
                                        BGT     30$
                                        JMP     4$
                                30$:    CMP     (SP)+,(SP)+
                                31$:    BIT     #1,EFN$21               ;                                                       7565
                                        BNE     32$                     ;                                                       7757
                                        JMP     42$
                                32$:    MOV     R3,R0                   ; LUN,*                                                 7764
                                        ASL     R0
                                        MOV     TOP.SECT(R0),10(SP)
                                        MOV     LOW.SECT(R0),R5         ; *,SECTOR
                                        BR      41$
                                33$:    MOV     R3,-(SP)                ; LUN,*                                                 7766
                                        MOV     #400,-(SP)
                                        MOV     #RBUFF,-(SP)
                                        MOV     R5,-(SP)                ; SECTOR,*
                                        JSR     PC,READ
                                        ADD     #10,SP
                                        CMP     R0,#5
                                        BNE     40$
                                        JSR     PC,ISOLATE              ;                                                       7769
                                        BIT     #1,ERROUT               ;                                                       7771
                                        BEQ     34$
                                        MOV     @ML.REG+42,R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        BIC     #177700,R0
                                        MOV     R0,-(SP)
                                        MOV     #FMT10B,-(SP)
                                        MOV     #2,-(SP)
                                        MOV     SP,R0                   ; SP,*
                                        TRAP    14
                                        ADD     #6,SP
                                34$:    MOV     @ML.REG+44,26(SP)       ; *,OLDSEC                                              7780
                                        MOV     @ML.REG+42,R0           ;                                                       7781
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        ASR     R0
                                        BIC     #177700,R0
                                        MOV     R0,16(SP)               ; *,OLDCHN
                                        MOV     #1,-(SP)                ;
                                        MOV     24(SP),-(SP)            ; COMMAND,*                                             7789
                                        MOV     R3,-(SP)                ; LUN,*
                                        MOV     #400,-(SP)
```

```
14917                                   ;MLX4
14918                                   ;                                                    27-Mar-1982 19:24:42    TOPS
14919                                   ;       TESTING RANDOM SECTORS, DATA, WORD COUNTS    27-Mar-1982 19:23:44    PA:<
14920 077524  016646  000030                    MOV     30(SP),-(SP)                    ; PTR,*
14921 077530  016646  000040                    MOV     40(SP),-(SP)                    ; OLDSEC,*
14922 077534  004767  146464                    JSR     PC,RETRY
14923 077540  062706  000014                    ADD     #14,SP
14924 077544  020027  000005                    CMP     R0,#5
14925 077550  001051                            BNE     37$
14926 077552  027766  134634  000026            CMP     @ML.REG+44,26(SP)               ; *,OLDSEC                              7798
14927 077560  001034                            BNE     36$
14928 077562  016646  000016                    MOV     16(SP),-(SP)                    ; OLDCHN,*
14929 077566  017700  134616                    MOV     @ML.REG+42,R0
14930 077572  006200                            ASR     R0
14931 077574  006200                            ASR     R0
14932 077576  006200                            ASR     R0
14933 077600  006200                            ASR     R0
14934 077602  006200                            ASR     R0
14935 077604  006200                            ASR     R0
14936 077606  042700  177700                    BIC     #177700,R0
14937 077612  020026                            CMP     R0,(SP)+
14938 077614  001016                            BNE     36$
14939 077616  032767  000001  102434            BIT     #1,ERROUT                       ;                                       7802
14940 077624  001404                            BEQ     35$
14941 077626  104456                            TRAP    56                              ;                                       7807
14942 077630  012300                            .WORD   12300
14943 077632  011202                            .WORD   MSG4
14944 077634  000000                            .WORD   0
14945 077636  010346                    35$:    MOV     R3,-(SP)                        ; LUN,*
14946 077640  016746  134476                    MOV     BOARD,-(SP)                                                             7810
14947 077644  004767  137552                    JSR     PC,UP.HARD.COUNT
14948 077650  000426                            BR      39$
14949 077652  032767  000001  102400  36$:      BIT     #1,ERROUT                       ;                                       7798
14950 077660  001415                            BEQ     38$                             ;                                       7815
14951 077662  104457                            TRAP    57
14952 077664  012301                            .WORD   12301                           ;                                       7820
14953 077666  011166                            .WORD   MSG3
14954 077670  000000                            .WORD   0
14955 077672  000410                            BR      38$
14956 077674  032767  000001  102356  37$:      BIT     #1,ERROUT                       ;                                       7823
14957 077702  001404                            BEQ     38$                             ;                                       7829
14958 077704  104457                            TRAP    57
14959 077706  012302                            .WORD   12302                           ;                                       7834
14960 077710  011166                            .WORD   MSG3
14961 077712  000000                            .WORD   0
14962 077714  010346                    38$:    MOV     R3,-(SP)                        ; LUN,*
14963 077716  016746  134420                    MOV     BOARD,-(SP)                                                             7837
14964 077722  004767  140156                    JSR     PC,UP.SOFT.COUNT
14965 077726  022626                    39$:    CMP     (SP)+,(SP)+                     ;
14966 077730  005205                    40$:    INC     R5                              ;                                       7768
14967 077732  020566  000010            41$:    CMP     R5,10(SP)                       ; SECTOR                                7764
14968 077736  101002                            BHI     42$                             ; SECTOR,*
14969 077740  000167  177370                    JMP     33$
14970 077744  005203                    42$:    INC     R3                              ; LUN
14971 077746  020366  000012            43$:    CMP     R3,12(SP)                       ; LUN,*                                 7557
```

```
14973                                   ;MLX4
14974                                   ;
14975                                   ;               TESTING RANDOM SECTORS, DATA, WORD COUNTS
14976 077752  002002                             BGE     44$
14977 077754  000167  175540                       JMP     2$
14978 077760  005266  000030               44$:    INC     30(SP)                          ; COUNT
14979 077764  026666  000030  000050               CMP     30(SP),50(SP)                   ; COUNT,REPEAT
14980 077772  003002                             BGT     45$
14981 077774  000167  175504                       JMP     1$
14982 100000  062706  000032               45$:    ADD     #32,SP                          ;
14983 100004  000207                             RTS     PC
14984
14985                                   ; Routine Size:  625 words
14986                                   ; Maximum stack depth per invocation:  38 words
14991
14992
```

```
14994 ;MLX4
14995 ;                                                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
14996 ;             TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (47)
14997 ;          7851  %sbttl 'TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNTS'
14998 ;          7852  routine RAND4 (REPEAT) : novalue =
14999 ;          7853      begin                                       !* 1 *  START OF ROUTINE
15000 ;          7854
15001 ;          7855  !++
15002 ;          7856  !   ROUTINE:     RAND4(REPEAT)
15003 ;          7857  !
15004 ;          7858  !   PURPOSE:     TO CHECK RANDOM UNITS
15005 ;          7859  !
15006 ;          7860  !   ARGUMENT:    REPEAT = NUMBER OF TIMES TO EXECUTE ENTIRE ROUTINE
15007 ;          7861  !
15008 ;          7862  !   THE CODE FOR 'RAND4' IN BRIEF:
15009 ;          7863  !
15010 ;          7864  !   BEGIN 1 (START OF ROUTINE)
15011 ;          7865  !   SAY ROUTINE IS RUNNING
15012 ;          7866  !   INCR COUNT FROM 1 TO REPEAT
15013 ;          7867  !   : BEGIN 2 (START OF REPEAT LOOP FOR THIS ROUTINE)
15014 ;          7868  !   : GENERATE THE RANDOM PATTERN
15015 ;          7869  !   : TIMES = NUMBER OF UNITS * 4
15016 ;          7870  !   : INCR KOUNT FROM 1 TO TIMES
15017 ;          7871  !   : : BEGIN 3 (START OF COUNTING LOOP FOR UNIT SELECTION)
15018 ;          7872  !   : : CHOOSE A RANDOM LOGICAL UNIT WHICH IS ACTIVE
15019 ;          7873  !   : : INITIALIZE BUFFER POINTERS
15020 ;          7874  !   : : TESTLOOP:
15021 ;          7875  !   : : : BEGIN 4 (START OF LOOP THAT COMPLETELY TESTS 1 UNIT)
15022 ;          7876  !   : : : INCR KOUNT2 FROM 1 TO 10
15023 ;          7877  !   : : : : BEGIN 5 (START OF COUNTING LOOP FOR SECTOR SELECTION)
15024 ;          7878  !   : : : : CHOOSE A RANDOM WORD COUNT
15025 ;          7879  !   : : : : SET UP BUFFER POINTERS BEFORE TRANSFER
15026 ;          7880  !   : : : : CHOOSE A RANDOM SECTOR
15027 ;          7881  !   : : : : CALCULATE WHERE TRANSFER WILL END (BASED ON WORD COUNT)
15028 ;          7882  !   : : : : IF CALCULATED VALUE GTR HIGHEST
15029 ;          7883  !   : : : : : THEN ADJUST THE WORD COUNT SO IT FITS
15030 ;          7884  !   : : : : : :    WITHIN THE TESTABLE SECTOR LIMITS
15031 ;          7885  !   : : : : WRITE
15032 ;          7886  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
15033 ;          7887  !   : : : : CHOOSE WHETHER TO WRITE CHECK OR READ
15034 ;          7888  !   : : : : DO THE WRITE CHECK OR READ
15035 ;          7889  !   : : : : LOOK FOR ERRORS (IF DROP UNIT, LEAVE TESTLOOP)
15036 ;          7890  !   : : : : CHANGE BUFFER POINTERS AFTER TRANSFER
15037 ;          7891  !   : : : : END 5 (END OF COUNTING LOOP FOR SECTOR SELECTION)
15038 ;          7892  !   : : : END 4 (END OF TESTLOOP)
15039 ;          7893  !   : : END 3 (END OF COUNTING LOOP FOR UNIT SELECTION)
15040 ;          7894  !   : END 2 (END OF REPEAT LOOP FOR THIS ROUTINE
15041 ;          7895  !   RETURN
15042 ;          7896  !   END 1 (END OF ROUTINE)
15043 ;          7897  !--
15044 ;          7898
15045 ;          7899      local
15046 ;          7900          LUN,
15047 ;          7901          WRDCNT,
15048 ;          7902          SECTOR,
```

```
7903            VALUE,
7904            OLDSEC,
7905            OLDCHN,
7906            PTR,
7907            COMMAND,
7908            DBL_VALUE;
7909
7910        label
7911            LOOP;
7912
7913        PRINTB (SAY1, RTN5D);
7914        !'RAND4'
7915
7916        incr COUNT from 1 to .REPEAT do
7917            begin                                   !* 2 *  START OF REPEAT LOOP FOR THIS ROUTINE
7918            GEN5 ();
7919
7920            incr KOUNT from 1 to (.NUM_DRIVES*4) do
7921                begin                               !* 3 *  START OF COUNTING LOOP FOR UNIT SELECTION
7922                LUN = RNDU ();
7923                L$LUN = .LUN;
7924                WPTR = WBUFF;
7925                RPTR = RBUFF;
7926  LOOP :
7927                begin                               !* 4 *  START OF LOOP THAT COMPLETELY TESTS 1 UNIT
7928
7929                incr KOUNT2 from 1 to 10 do
7930                    begin                           !* 5 *  START OF COUNTING LOOP FOR SECTOR SELECTION
7931                    WRDCNT = RNDWC ();              !EXPECT VALUE BETWEEN 1 AND BUFSIZ
7932                    SET_PTRS (.WRDCNT);
7933                    SECTOR = RNDSEC (.LUN);         !EXPECT VALUE BETWEEN LOWEST AND HIGHEST
7934
7935                if (.SECTOR + .WRDCNT/256) gtra HIGHEST then WRDCNT = 256*(HIGHEST - .SECTOR + 1);
7936
7937                VALUE = write (.LUN, .WRDCNT, .WPTR, .SECTOR);
7938
7939                !+
7940                !  SEE HOW SUCCESSFUL THE WRITE WAS:
7941                !-
7942
7943                selectone .VALUE of             !SEE 'SYSERR' FOR DEFINITION
7944                    set                         !OF ERROR # CONTAINED IN 'VALUE'
7945
7946                    [1] :
7947                        begin                   !* 5A * RETRY ALLOWED
7948
7949                        if RETRY (SIX, write, .LUN, .WRDCNT, .WPTR, .SECTOR) neq 0
7950                        then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
7951                            begin
7952                            WHY_DROPT [.LUN] = CODE_4;
7953                            ERRDF (5401, MSG1, 0);      !**** OPTION 5, RAND4 ERROR 01 ****
7954                            DODU (.LUN);
```

```
15106 ;MLX4
15107 ;
15108
15109 ;          7955                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
15110 ;          7956                                end;
15111 ;          7957
15112 ;          7958                            end;                        !* 5A *
15113 ;          7959
15114 ;          7960                        [2] :
15115 ;          7961                            begin                       !* 5B * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
15116 ;          7962                            WHY_DROPT [.LUN] = CODE_5;
15117 ;          7963                            ERRDF (5402, MSG1, 0);      !**** OPTION 5, RAND4 ERROR 02 ****
15118 ;          7964                            DODU (.LUN);
15119 ;          7965                            leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
15120 ;          7966                            end;                        !* 5B *
15121 ;          7967
15122 ;          7968                        [3] :
15123 ;          7969                            begin                       !* 5C * FATAL DRIVE ERROR -- NO RETRY ALLOWED
15124 ;          7970                            ERRDF (5403, MSG1, 0);      !**** OPTION 5, RAND4 ERROR 03 ****
15125 ;          7971                            WHY_DROPT [.LUN] = CODE_6;
15126 ;          7972                            DODU (.LUN);
15127 ;          7973                            leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
15128 ;          7974                            end;                        !* 5C *
15129 ;          7975                        tes;
15130 ;          7976
15131 ;          7977                    COMMAND = CHOOSE ();
15132 ;          7978
15133 ;          7979                    if .COMMAND eql read
15134 ;          7980                    then
15135 ;          7981                        begin
15136 ;          7982                        PTR = .RPTR;
15137 ;          7983                        VALUE = read (.LUN, .WRDCNT, .RPTR, .SECTOR);
15138 ;          7984                        end
15139 ;          7985                    else
15140 ;          7986                        begin
15141 ;          7987                        PTR = .WPTR;
15142 ;          7988                        VALUE = CHECK (.LUN, .WRDCNT, .WPTR, .SECTOR);
15143 ;          7989                        end;
15144 ;          7990
15145 ;          7991                    !+
15146 ;          7992                    ! SEE HOW SUCCESSFUL THE OPERATION WAS:
15147 ;          7993                    !-
15148 ;          7994
15149 ;          7995                    selectone .VALUE of                 !SEE 'SYSERR' FOR DEFINITION
15150 ;          7996                        set                             !OF ERROR # CONTAINED IN 'VALUE'
15151 ;          7997
15152 ;          7998                        [0] :
15153 ;          7999
15154 ;          8000                            if .COMMAND eql read
15155 ;          8001                            then
15156 ;          8002                                begin
15157 ;          8003
15158 ;          8004                                if (DBL_VALUE = DOUBLE_CHECK (.WPTR, .RPTR, .WRDCNT)) neq 0
15159 ;          8005                                then
15160 ;          8006                                    begin
```

```
15162 ;MLX4
15163 ;
15164
15165 ;          8007                                    SAYWHO (.LUN);
15166 ;          8008                                    PRINTB (SAY1, MSG5);
15167 ;          8009                                    !'ECC LOGIC FAILED TO DETECT DATA ERROR'
15168 ;          8010                                    PRINTB (FMT12A, ..DBL_VALUE, .DBL_VALUE);
15169 ;          8011                                    !'GOOD DATA: XXXXXX AT LOCATION YYYYYY'
15170 ;          8012                                    DBL_VALUE = .DBL_VALUE + BUFSIZ*2;
15171 ;          8013                                    PRINTB (FMT12B, ..DBL_VALUE, .DBL_VALUE);
15172 ;          8014                                    !'BAD DATA:  PPPPPP AT LOCATION QQQQQQ'
15173 ;          8015                                    WHY_DROPT [.LUN] = CODE_8;
15174 ;          8016                                    ERRDF (5404, MSG1, 0);  !**** OPTION 5, RAND4 ERROR 04 ****
15175 ;          8017                                    DODU (.LUN);
15176 ;          8018                                    leave LOOP;     !JUMP JUST BEYOND END OF BLOCK * 4 *
15177 ;          8019                                    end;
15178 ;          8020
15179 ;          8021                                end;
15180 ;          8022
15181 ;          8023                            [1] :
15182 ;          8024                                begin                   !* 5D * RETRY ALLOWED
15183 ;          8025
15184 ;          8026                                if RETRY (SIX, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) neq 0
15185 ;          8027                                then                    !THE RETRY FAILED -- SYSTEM FATAL ERROR
15186 ;          8028                                    begin
15187 ;          8029                                    WHY_DROPT [.LUN] = CODE_4;
15188 ;          8030                                    ERRDF (5405, MSG1, 0);      !**** OPTION 5, RAND4 ERROR 05 ****
15189 ;          8031                                    DODU (.LUN);
15190 ;          8032                                    leave LOOP;         !JUMP JUST BEYOND END OF BLOCK * 4 *
15191 ;          8033                                    end;
15192 ;          8034
15193 ;          8035                                end;                    !* 5D *
15194 ;          8036
15195 ;          8037                            [2] :
15196 ;          8038                                begin                   !* 5E * FATAL CONTROLLER ERROR -- NO RETRY ALLOWED
15197 ;          8039                                WHY_DROPT [.LUN] = CODE_5;
15198 ;          8040                                ERRDF (5406, MSG1, 0);  !**** OPTION 5, RAND4 ERROR 06 ****
15199 ;          8041                                DODU (.LUN);
15200 ;          8042                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
15201 ;          8043                                end;                    !* 5E *
15202 ;          8044
15203 ;          8045                            [3] :
15204 ;          8046                                begin                   !* 5F * FATAL DRIVE ERROR -- NO RETRY ALLOWED
15205 ;          8047                                ERRDF (5407, MSG1, 0);  !**** OPTION 5, RAND4 ERROR 07 ****
15206 ;          8048                                WHY_DROPT [.LUN] = CODE_6;
15207 ;          8049                                DODU (.LUN);
15208 ;          8050                                leave LOOP;             !JUMP JUST BEYOND END OF BLOCK * 4 *
15209 ;          8051                                end;                    !* 5F *
15210 ;          8052
15211 ;          8053                            [4] :
15212 ;          8054                                begin                   !* 5G * UNRECOVERABLE DATA ERROR
15213 ;          8055                                ISOLATE ();
15214 ;          8056                                ERRDF (5408, MSG2, 0);  !**** OPTION 5, RAND4 ERROR 08 ****
15215 ;          8057                                WHY_DROPT [.LUN] = CODE_7;
15216 ;          8058                                DODU (.LUN);
```

```
15218 ;MLX4
15219 ;
15220 ;
15221 ;          8059                        leave LOOP;                 !JUMP JUST BEYOND END OF BLOCK * 4 *
15222 ;          8060                        end;                        !* 5G *
15223 ;          8061
15224 ;          8062                    [5] :
15225 ;          8063                        begin                       !* 5H * RECOVERABLE DATA ERROR
15226 ;          8064                        ISOLATE ();
15227 ;          8065
15228 ;          8066                        if .ERROUT then PRINTB (FMT10B, .CHAN);
15229 ;          8067
15230 ;          8068                        !'    BIT 00'
15231 ;          8069                        OLDSEC = .MLEL;
15232 ;          8070                        OLDCHN = .CHAN;
15233 ;          8071
15234 ;          8072                        if RETRY (ONE, .COMMAND, .LUN, .WRDCNT, .PTR, .SECTOR) eql 5
15235 ;          8073                        then
15236 ;          8074
15237 ;          8075                            if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
15238 ;          8076                            then
15239 ;          8077                                begin
15240 ;          8078
15241 ;          8079                                if .ERROUT then ERRHRD (5409, MSG4, 0); !**** OPTION 5, RAND4 ERROR 09 ****
15242 ;          8080
15243 ;          8081                                UP_HARD_COUNT (.LUN, .BOARD);
15244 ;          8082                                end
15245 ;          8083                            else
15246 ;          8084                                begin
15247 ;          8085
15248 ;          8086                                if .ERROUT then ERRSOFT (5410, MSG3, 0);
15249 ;          8087
15250 ;          8088                                                    !**** OPTION 5, RAND4 ERROR 10 ****
15251 ;          8089                                UP_SOFT_COUNT (.LUN, .BOARD);
15252 ;          8090                                end
15253 ;          8091
15254 ;          8092                        else
15255 ;          8093                            begin
15256 ;          8094
15257 ;          8095                            if .ERROUT then ERRSOFT (5411, MSG3, 0);    !**** OPTION 5, RAND4 ERROR 11 ****
15258 ;          8096
15259 ;          8097                            UP_SOFT_COUNT (.LUN, .BOARD);
15260 ;          8098                            end;
15261 ;          8099
15262 ;          8100                        end;                        !* 5H *
15263 ;          8101                    tes;
15264 ;          8102
15265 ;          8103                WPTR = .WPTR + 2;
15266 ;          8104                end;                                !* 5 *  END OF COUNTING LOOP FOR SECTOR SELECTION
15267 ;          8105
15268 ;          8106            !+
15269 ;          8107            ! Test to see if this uut's address space is
15270 ;          8108            ! to be read for soft errors.  This test is
15271 ;          8109            ! is intended for DMT purposes.
15272 ;          8110            !-
```

```
;MLX4
;                TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:24:42   TOPS-20 Bliss-16 V2(212)
;                                                                27-Mar-1982 19:23:44   PA:<NEALE>MLX4.BLI.5 (47)

;          8111
;          8112                 if .EFN$21                              !Is the background pattern to be read
;          8113                 then
;          8114                     begin
;          8115
;          8116 !
;          8117 ! version czmlbb changed incr to incru
;          8118 !
;          8119                         incru SECTOR from LOWEST to HIGHEST do
;          8120
;          8121                             if read (.LUN, 256, RBUFF, .SECTOR) eql 5
;          8122                             then
;          8123                                 begin
;          8124                                 ISOLATE ();             !Find the failing bank and board no.
;          8125
;          8126                                 if .ERROUT then PRINTB (FMT10B, .CHAN);
;          8127
;          8128                                 ! Print where the error is
;          8129                                 !
;          8130                                 ! Save the contents of the ML error location
;          8131                                 ! register so we can compare it to the new
;          8132                                 ! contents of this register after the retry.
;          8133                                 ! This is done to classify the error.
;          8134                                 !
;          8135                                 OLDSEC = .MLEL;
;          8136                                 OLDCHN = .CHAN;
;          8137                                 !
;          8138                                 ! Do a classify retry call.  If the same error
;          8139                                 ! occures then classify it as a hard error.  If
;          8140                                 ! a different error occured or the error went away
;          8141                                 ! then classify it as a soft error.
;          8142                                 !
;          8143
;          8144                                 if RETRY (ONE, .COMMAND, .LUN, 256, .PTR, .OLDSEC) eql 5
;          8145                                 then
;          8146                                 !
;          8147                                 ! The same error occured so see if it is at the same
;          8148                                 ! sector and channel number, if so then classify
;          8149                                 ! it as a hard error else classiy it as a soft
;          8150                                 ! error.
;          8151                                 !
;          8152
;          8153                                     if ((.MLEL eql .OLDSEC) and (.CHAN eql .OLDCHN))
;          8154                                     then
;          8155                                         begin           !Same error occured 'hard'
;          8156
;          8157                                         if .ERROUT      !Print error if enabled
;          8158                                         then
;          8159                                             begin
;        P 8160                                             ERRHRD (5412,       !Error number
;        P 8161                                                 MSG4,   !Error message
;          8162                                                 0);     !Additional message routine
```

SEQ 0331


```
15330 ;MLX4
15331 ;
15332
15333 ;          8163                                    end;
15334 ;          8164
15335 ;          8165                                UP_HARD_COUNT (.LUN, .BOARD);
15336 ;          8166                                end
15337 ;          8167                            else
15338 ;          8168                                begin               !Not the same error 'soft'
15339 ;          8169
15340 ;          8170                                if .ERROUT          !Print error if enabled
15341 ;          8171                                then
15342 ;          8172                                    begin
15343 ;        P 8173                                    ERRSOFT (5413,      !Error number
15344 ;        P 8174                                        MSG3,   !Error message
15345 ;          8175                                        0);     !Additional message routine
15346 ;          8176                                    end;
15347 ;          8177
15348 ;          8178                                UP_SOFT_COUNT (.LUN, .BOARD);
15349 ;          8179                                end
15350 ;          8180
15351 ;          8181                            else                    !Not the same error 'soft'
15352 ;          8182                                begin
15353 ;          8183
15354 ;          8184                                if .ERROUT          !Print error if enabled
15355 ;          8185                                then
15356 ;          8186                                    begin
15357 ;        P 8187                                    ERRSOFT (5414,  !Error number
15358 ;        P 8188                                        MSG3,       !Error message
15359 ;          8189                                        0);         !Additional message routine
15360 ;          8190                                    end;
15361 ;          8191
15362 ;          8192                                UP_SOFT_COUNT (.LUN, .BOARD);
15363 ;          8193                                end;
15364 ;          8194
15365 ;          8195                            end;
15366 ;          8196
15367 ;          8197                    end;
15368 ;          8198
15369 ;          8199                end;                                !* 4 *  END OF LOOP THAT COMPLETELY TESTS 1 UNIT
15370 ;          8200                end;                                !* 3 *  END OF COUNTING LOOP FOR UNIT SELECTION
15371 ;          8201
15372 ;          8202            end;                                    !* 2 *  END OF REPEAT LOOP FOR THIS ROUTINE
15373 ;          8203
15374 ;          8204        return;
15375 ;          8205        end;                                        !* 1 *  END OF ROUTINE
15379
15380
15384 100006  004167  105322          RAND4:  JSR     R1,$SAVE5                                   ;                    7852
```

SEQ 0332

```
15386                                   ;MLX4
15387                                   ;                                                                  27-Mar-1982 19:24:42    TOPS
15388                                                   TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT    27-Mar-1982 19:23:44    PA:<
15389 100012  162706  000026                    SUB     #26,SP
15390 100016  012746  007706                    MOV     #RTN5D,-(SP)
15391 100022  012746  007072                    MOV     #SAY1,-(SP)                     ;                                       7913
15392 100026  012746  000002                    MOV     #2,-(SP)
15393 100032  010600                            MOV     SP,R0                           ; SP,*
15394 100034  104414                            TRAP    14
15395 100036  005066  000032                    CLR     32(SP)                          ; COUNT
15396 100042  000167  002176                    JMP     41$                                                                     7916
15397 100046  004767  141546            1$:     JSR     PC,GEN5
15398 100052  016766  134400  000016            MOV     NUM.DRIVES,16(SP)               ;                                       7918
15399 100060  006366  000016                    ASL     16(SP)                          ;                                       7920
15400 100064  006366  000016                    ASL     16(SP)
15401 100070  005066  000014                    CLR     14(SP)                          ; KOUNT
15402 100074  000563                            BR      8$
15403 100076  004767  170234            2$:     JSR     PC,RNDU                         ;
15404 100102  010002                            MOV     R0,R2                           ;                                       7922
15405 100104  010267  101764                    MOV     R2,L$LUN                        ; *,LUN
15406 100110  012767  012670  132552            MOV     #WBUFF,WPTR                     ; LUN,*                                 7923
15407 100116  012767  022670  132546            MOV     #RBUFF,RPTR                     ;                                       7924
15408 100124  010266  000012                    MOV     R2,12(SP)                       ;                                       7925
15409 100130  006366  000012                    ASL     12(SP)                          ; LUN,*                                 7935
15410 100134  012766  034500  000010            MOV     #TOP.SECT,10(SP)
15411 100142  066666  000012  000010            ADD     12(SP),10(SP)
15412 100150  012766  000001  000006            MOV     #1,6(SP)
15413 100156  004767  170022            3$:     JSR     PC,RNDWC                        ; *,KOUNT2                              7929
15414 100162  010003                            MOV     R0,R3                           ;                                       7931
15415 100164  010346                            MOV     R3,-(SP)                        ; *,WRDCNT
15416 100166  004767  146740                    JSR     PC,SET.PTRS                     ; WRDCNT,*                              7932
15417 100172  010216                            MOV     R2,(SP)
15418 100174  004767  170040                    JSR     PC,RNDSEC                       ; LUN,*                                 7933
15419 100200  010001                            MOV     R0,R1
15420 100202  010346                            MOV     R3,-(SP)                        ; *,SECTOR
15421 100204  012746  000400                    MOV     #400,-(SP)                      ; WRDCNT,*                              7935
15422 100210  004767  104754                    JSR     PC,BL$DIV
15423 100214  022626                            CMP     (SP)+,(SP)+
15424 100216  060100                            ADD     R1,R0
15425 100220  020076  000012                    CMP     R0,@12(SP)                      ; SECTOR,*
15426 100224  101410                            BLOS    4$
15427 100226  017600  000012                    MOV     @12(SP),R0
15428 100232  160100                            SUB     R1,R0                           ; SECTOR,*
15429 100234  000300                            SWAB    R0
15430 100236  105000                            CLRB    R0
15431 100240  010003                            MOV     R0,R3                           ; *,WRDCNT
15432 100242  062703  000400                    ADD     #400,R3                         ; *,WRDCNT
15433 100246  010216            4$:     MOV     R2,(SP)                         ; LUN,*                                 7937
15434 100250  010346                    MOV     R3,-(SP)                        ; WRDCNT,*
15435 100252  016746  132412                    MOV     WPTR,-(SP)
15436 100256  010146                            MOV     R1,-(SP)                        ; SECTOR,*
15437 100260  004767  145140                    JSR     PC,WRITE
15438 100264  010004                            MOV     R0,R4                           ; *,VALUE
15439 100266  020427  000001                    CMP     R4,#1                           ; VALUE,*
15440 100272  001031                            BNE     5$                                                                      7943
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                                ;MLX4
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100274  012746  000006                MOV     #6,-(SP)                                                                    7949
100300  012746  045424                MOV     #WRITE,-(SP)
100304  010246                        MOV     R2,-(SP)        ; LUN,*
100306  010346                        MOV     R3,-(SP)        ; WRDCNT,*
100310  016746  132354                MOV     WPTR,-(SP)
100314  010146                        MOV     R1,-(SP)        ; SECTOR,*
100316  004767  145702                JSR     PC,RETRY
100322  062706  000014                ADD     #14,SP
100326  005700                        TST     R0
100330  001446                        BEQ     9$
100332  112762  000004  034446        MOVB    #4,WHY.DROPT(R2)        ; *,*(LUN)                                          7952
100340  104455                        TRAP    55              ;                                                           7953
100342  012431                        .WORD   12431
100344  011070                        .WORD   MSG1
100346  000000                        .WORD   0
100350  010200                        MOV     R2,R0           ; LUN,*                                                     7954
100352  104451                        TRAP    51
100354  000431                        BR      7$              ;                                                           7955
100356  020427  000002        5$:     CMP     R4,#2           ; VALUE,*                                                   7943
100362  001012                        BNE     6$
100364  112762  000005  034446        MOVB    #5,WHY.DROPT(R2)        ; *,*(LUN)                                          7962
100372  104455                        TRAP    55              ;                                                           7963
100374  012432                        .WORD   12432
100376  011070                        .WORD   MSG1
100400  000000                        .WORD   0
100402  010200                        MOV     R2,R0           ; LUN,*                                                     7964
100404  104451                        TRAP    51
100406  000414                        BR      7$              ;                                                           7965
100410  020427  000003        6$:     CMP     R4,#3           ; VALUE,*                                                   7943
100414  001014                        BNE     9$
100416  104455                        TRAP    55              ;                                                           7970
100420  012433                        .WORD   12433
100422  011070                        .WORD   MSG1
100424  000000                        .WORD   0
100426  112762  000006  034446        MOVB    #6,WHY.DROPT(R2)        ; *,*(LUN)                                          7971
100434  010200                        MOV     R2,R0           ; LUN,*                                                     7972
100436  104451                        TRAP    51
100440  062706  000010        7$:     ADD     #10,SP          ;                                                           7973
100444  000535        8$:     BR      14$
100446  004767  145514        9$:     JSR     PC,CHOOSE       ;                                                           7977
100452  010066  000040                MOV     R0,40(SP)       ; *,COMMAND
100456  005005                        CLR     R5              ;                                                           7979
100460  020027  045612                CMP     R0,#READ        ; COMMAND,*
100464  001014                        BNE     10$
100466  005205                        INC     R5
100470  016766  132176  000036        MOV     RPTR,36(SP)     ; *,PTR                                                     7982
100476  010246                        MOV     R2,-(SP)        ; LUN,*                                                     7983
100500  010346                        MOV     R3,-(SP)        ; WRDCNT,*
100502  016746  132164                MOV     RPTR,-(SP)
100506  010146                        MOV     R1,-(SP)        ; SECTOR,*
100510  004767  145076                JSR     PC,READ
100514  000412                        BR      11$
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15498                                   ;MLX4
15499                                   ;                       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:24:42  TOPS
15500                                                                                                           27-Mar-1982 19:23:44  PA:<
15501 100516 016766 132146 000036 10$:  MOV     WPTR,36(SP)             ; *,PTR                                                 7987
15502 100524 010246                     MOV     R2,-(SP)                ; LUN,*                                                 7988
15503 100526 010346                     MOV     R3,-(SP)                ; WRDCNT,*
15504 100530 016746 132134              MOV     WPTR,-(SP)
15505 100534 010146                     MOV     R1,-(SP)                ; SECTOR,*
15506 100536 004767 145236              JSR     PC,CHECK
15507 100542 010004             11$:    MOV     R0,R4                   ; *,VALUE
15508 100544 001076                     BNE     15$                     ;                                                       7995
15509 100546 006005                     ROR     R5                      ;                                                       8000
15510 100550 103402                     BLO     13$
15511 100552 000167 000750      12$:    JMP     28$
15512 100556 016746 132106      13$:    MOV     WPTR,-(SP)              ;                                                       8004
15513 100562 016746 132104              MOV     RPTR,-(SP)
15514 100566 010346                     MOV     R3,-(SP)                ; WRDCNT,*
15515 100570 004767 143532              JSR     PC,DOUBLE.CHECK
15516 100574 062706 000006              ADD     #6,SP
15517 100600 010066 000042              MOV     R0,42(SP)               ; *,DBL.VALUE
15518 100604 001762                     BEQ     12$
15519 100606 010246                     MOV     R2,-(SP)                ; LUN,*                                                 8007
15520 100610 004767 134710              JSR     PC,SAYWHO
15521 100614 012716 011216              MOV     #MSG5,(SP)              ;                                                       8008
15522 100620 012746 007072              MOV     #SAY1,-(SP)
15523 100624 012746 000002              MOV     #2,-(SP)
15524 100630 010600                     MOV     SP,R0                   ; SP,*
15525 100632 104414                     TRAP    14
15526 100634 016616 000050              MOV     50(SP),(SP)             ; DBL.VALUE,*                                           8010
15527 100640 017646 000050              MOV     @50(SP),-(SP)           ; DBL.VALUE,*
15528 100644 012746 006710              MOV     #FMT12A,-(SP)
15529 100650 012746 000003              MOV     #3,-(SP)
15530 100654 010600                     MOV     SP,R0                   ; SP,*
15531 100656 104414                     TRAP    14
15532 100660 062766 010000 000056       ADD     #10000,56(SP)           ; *,DBL.VALUE                                           8012
15533 100666 016616 000056              MOV     56(SP),(SP)             ; DBL.VALUE,*                                           8013
15534 100672 017646 000056              MOV     @56(SP),-(SP)           ; DBL.VALUE,*
15535 100676 012746 006756              MOV     #FMT12B,-(SP)
15536 100702 012746 000003              MOV     #3,-(SP)
15537 100706 010600                     MOV     SP,R0                   ; SP,*
15538 100710 104414                     TRAP    14
15539 100712 112762 000010 034446       MOVB    #10,WHY.DROPT(R2)       ; *,*(LUN)                                              8015
15540 100720 104455                     TRAP    55                      ;                                                       8016
15541 100722 012434                     .WORD   12434
15542 100724 011070                     .WORD   MSG1
15543 100726 000000                     .WORD   0
15544 100730 010200                     MOV     R2,R0                   ; LUN,*                                                 8017
15545 100732 104451                     TRAP    51
15546 100734 062706 000042              ADD     #42,SP                  ;                                                       8018
15547 100740 000506             14$:    BR      20$
15548 100742 020427 000001      15$:    CMP     R4,#1                   ; VALUE,*                                               7995
15549 100746 001031                     BNE     16$
15550 100750 012746 000006              MOV     #6,-(SP)                ;                                                       8026
15551 100754 016646 000052              MOV     52(SP),-(SP)            ; COMMAND,*
15552 100760 010246                     MOV     R2,-(SP)                ; LUN,*
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15554                                   ;MLX4
15555                                   ;                                                                  27-Mar-1982 19:24:42    TOPS
15556                                                   TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT    27-Mar-1982 19:23:44    PA:<
15557 100762 010346                             MOV     R3,-(SP)                        ; WRDCNT,*
15558 100764 016646 000056                      MOV     56(SP),-(SP)                    ; PTR,*
15559 100770 010146                             MOV     R1,-(SP)                        ; SECTOR,*
15560 100772 004767 145226                      JSR     PC,RETRY
15561 100776 062706 000014                      ADD     #14,SP
15562 101002 005700                             TST     R0
15563 101004 001662                             BEQ     12$
15564 101006 112762 000004 034446               MOVB    #4,WHY.DROPT(R2)                ; *,*(LUN)                              8029
15565 101014 104455                             TRAP    55                              ;                                       8030
15566 101016 012435                             .WORD   12435
15567 101020 011070                             .WORD   MSG1
15568 101022 000000                             .WORD   0
15569 101024 010200                             MOV     R2,R0                           ; LUN,*                                 8031
15570 101026 104451                             TRAP    51
15571 101030 000450                             BR      19$                             ;                                       8032
15572 101032 020427 000002              16$:    CMP     R4,#2                           ; VALUE,*                               7995
15573 101036 001012                             BNE     17$
15574 101040 112762 000005 034446               MOVB    #5,WHY.DROPT(R2)                ; *,*(LUN)                              8039
15575 101046 104455                             TRAP    55                              ;                                       8040
15576 101050 012436                             .WORD   12436
15577 101052 011070                             .WORD   MSG1
15578 101054 000000                             .WORD   0
15579 101056 010200                             MOV     R2,R0                           ; LUN,*                                 8041
15580 101060 104451                             TRAP    51
15581 101062 000433                             BR      19$                             ;                                       8042
15582 101064 020427 000003              17$:    CMP     R4,#3                           ; VALUE,*                               7995
15583 101070 001012                             BNE     18$
15584 101072 104455                             TRAP    55                              ;                                       8047
15585 101074 012437                             .WORD   12437
15586 101076 011070                             .WORD   MSG1
15587 101100 000000                             .WORD   0
15588 101102 112762 000006 034446               MOVB    #6,WHY.DROPT(R2)                ; *,*(LUN)                              8048
15589 101110 010200                             MOV     R2,R0                           ; LUN,*                                 8049
15590 101112 104451                             TRAP    51
15591 101114 000416                             BR      19$                             ;                                       8050
15592 101116 020427 000004              18$:    CMP     R4,#4                           ; VALUE,*                               7995
15593 101122 001017                             BNE     21$
15594 101124 004767 136202                      JSR     PC,ISOLATE
15595 101130 104455                             TRAP    55                              ;                                       8055
15596 101132 012440                             .WORD   12440                           ;                                       8056
15597 101134 011120                             .WORD   MSG2
15598 101136 000000                             .WORD   0
15599 101140 112762 000007 034446               MOVB    #7,WHY.DROPT(R2)                ; *,*(LUN)                              8057
15600 101146 010200                             MOV     R2,R0                           ; LUN,*                                 8058
15601 101150 104451                             TRAP    51
15602 101152 062706 000020              19$:    ADD     #20,SP                          ;                                       8059
15603 101156 000167 001042              20$:    JMP     40$
15604 101162 020427 000005              21$:    CMP     R4,#5                           ; VALUE,*                               7995
15605 101166 001157                             BNE     28$
15606 101170 004767 136136                      JSR     PC,ISOLATE
15607 101174 032767 000001 101056               BIT     #1,ERROUT                       ;                                       8064
15608 101202 001423                             BEQ     22$                             ;                                       8066
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15610                                   ;MLX4
15611                                   ;                                                                  27-Mar-1982 19:24:42    TOPS
15612                                                       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:23:44    PA:<
15613 101204  017705  133200                        MOV     @ML.REG+42,R5
15614 101210  006205                                ASR     R5
15615 101212  006205                                ASR     R5
15616 101214  006205                                ASR     R5
15617 101216  006205                                ASR     R5
15618 101220  006205                                ASR     R5
15619 101222  006205                                ASR     R5
15620 101224  042705  177700                        BIC     #177700,R5
15621 101230  010546                                MOV     R5,-(SP)
15622 101232  012746  006640                        MOV     #FMT10B,-(SP)
15623 101236  012746  000002                        MOV     #2,-(SP)
15624 101242  010600                                MOV     SP,R0                           ; SP,*
15625 101244  104414                                TRAP    14
15626 101246  062706  000006                        ADD     #6,SP
15627 101252  017766  133134  000044  22$:         MOV     @ML.REG+44,44(SP)               ; *,OLDSEC                              8069
15628 101260  017705  133124                        MOV     @ML.REG+42,R5                   ;                                       8070
15629 101264  006205                                ASR     R5
15630 101266  006205                                ASR     R5
15631 101270  006205                                ASR     R5
15632 101272  006205                                ASR     R5
15633 101274  006205                                ASR     R5
15634 101276  006205                                ASR     R5
15635 101300  042705  177700                        BIC     #177700,R5
15636 101304  010566  000040                        MOV     R5,40(SP)                       ; *,OLDCHN
15637 101310  012746  000001                        MOV     #1,-(SP)                        ;
15638 101314  016646  000052                        MOV     52(SP),-(SP)                    ; COMMAND,*                             8072
15639 101320  010246                                MOV     R2,-(SP)                        ; LUN,*
15640 101322  010346                                MOV     R3,-(SP)                        ; WRDCNT,*
15641 101324  016646  000056                        MOV     56(SP),-(SP)                    ; PTR,*
15642 101330  010146                                MOV     R1,-(SP)                        ; SECTOR,*
15643 101332  004767  144666                        JSR     PC,RETRY
15644 101336  062706  000014                        ADD     #14,SP
15645 101342  020027  000005                        CMP     R0,#5
15646 101346  001051                                BNE     25$
15647 101350  027766  133036  000044                CMP     @ML.REG+44,44(SP)               ; *,OLDSEC                              8075
15648 101356  001034                                BNE     24$
15649 101360  016600  000040                        MOV     40(SP),R0                       ; OLDCHN,*
15650 101364  017705  133020                        MOV     @ML.REG+42,R5
15651 101370  006205                                ASR     R5
15652 101372  006205                                ASR     R5
15653 101374  006205                                ASR     R5
15654 101376  006205                                ASR     R5
15655 101400  006205                                ASR     R5
15656 101402  006205                                ASR     R5
15657 101404  042705  177700                        BIC     #177700,R5
15658 101410  020500                                CMP     R5,R0
15659 101412  001016                                BNE     24$
15660 101414  032767  000001  100636                BIT     #1,ERROUT                       ;                                       8079
15661 101422  001404                                BEQ     23$
15662 101424  104456                                TRAP    56
15663 101426  012441                                .WORD   12441
15664 101430  011202                                .WORD   MSG4
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15666                                   ;MLX4
15667                                   :                       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:24:42  TOPS
15668                                                                                                           27-Mar-1982 19:23:44  PA:<
15669 101432 000000                             .WORD   0
15670 101434 010246                     23$:    MOV     R2,-(SP)                        ; LUN,*
15671 101436 016746 132700                      MOV     BOARD,-(SP)                                                             8081
15672 101442 004767 135754                      JSR     PC,UP.HARD.COUNT
15673 101446 000426                             BR      27$
15674 101450 032767 000001 100602       24$:    BIT     #1,ERROUT                       ;                                       8075
15675 101456 001415                             BEQ     26$                             ;                                       8086
15676 101460 104457                             TRAP    57
15677 101462 012442                             .WORD   12442
15678 101464 011166                             .WORD   MSG3
15679 101466 000000                             .WORD   0
15680 101470 000410                             BR      26$
15681 101472 032767 000001 100560       25$:    BIT     #1,ERROUT                       ;                                       8089
15682 101500 001404                             BEQ     26$                             ;                                       8095
15683 101502 104457                             TRAP    57
15684 101504 012443                             .WORD   12443
15685 101506 011166                             .WORD   MSG3
15686 101510 000000                             .WORD   0
15687 101512 010246                     26$:    MOV     R2,-(SP)                        ; LUN,*
15688 101514 016746 132622                      MOV     BOARD,-(SP)                                                             8097
15689 101520 004767 136360                      JSR     PC,UP.SOFT.COUNT
15690 101524 022626                     27$:    CMP     (SP)+,(SP)+
15691 101526 062767 000002 131134       28$:    ADD     #2,WPTR                         ;                                       8063
15692 101534 062706 000020                      ADD     #20,SP                          ;                                       8103
15693 101540 005266 000006                      INC     6(SP)                           ;                                       7930
15694 101544 026627 000006 000012               CMP     6(SP),#12                       ; KOUNT2                                7929
15695 101552 003002                             BGT     29$                             ; KOUNT2,*
15696 101554 000167 176376                      JMP     3$
15697 101560 032767 000001 100474       29$:    BIT     #1,EFN$21                       ;                                       8112
15698 101566 001002                             BNE     30$
15699 101570 000167 000430                      JMP     40$
15700 101574 017666 000010 000010       30$:    MOV     @10(SP),10(SP)                  ;                                       8119
15701 101602 016600 000012                      MOV     12(SP),R0
15702 101606 016005 034460                      MOV     LOW.SECT(R0),R5                 ; *,SECTOR
15703 101612 000577                             BR      39$
15704 101614 010246                     31$:    MOV     R2,-(SP)                        ; LUN,*
15705 101616 012746 000400                      MOV     #400,-(SP)                                                              8121
15706 101622 012746 022670                      MOV     #RBUFF,-(SP)
15707 101626 010546                             MOV     R5,-(SP)                        ; SECTOR,*
15708 101630 004767 143756                      JSR     PC,READ
15709 101634 062706 000010                      ADD     #10,SP
15710 101640 020027 000005                      CMP     R0,#5
15711 101644 001161                             BNE     38$
15712 101646 004767 135460                      JSR     PC,ISOLATE
15713 101652 032767 000001 100400               BIT     #1,ERROUT                       ;                                       8124
15714 101660 001423                             BEQ     32$                             ;                                       8126
15715 101662 017700 132522                      MOV     @ML.REG+42,R0
15716 101666 006200                             ASR     R0
15717 101670 006200                             ASR     R0
15718 101672 006200                             ASR     R0
15719 101674 006200                             ASR     R0
15720 101676 006200                             ASR     R0
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                                ;MLX4
                                ;                       TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:24:42  TOPS
                                ;                                                                       27-Mar-1982 19:23:44  PA:<
101700 006200                          ASR     R0
101702 042700 177700                    BIC     #177700,R0
101706 010046                           MOV     R0,-(SP)
101710 012746 006640                    MOV     #FMT10B,-(SP)
101714 012746 000002                    MOV     #2,-(SP)
101720 010600                           MOV     SP,R0                   ; SP,*
101722 104414                           TRAP    14
101724 062706 000006                    ADD     #6,SP
101730 017766 132456 000024  32$:       MOV     @ML.REG+44,24(SP)       ; *,OLDSEC                              8135
101736 017700 132446                    MOV     @ML.REG+42,R0           ;                                       8136
101742 006200                           ASR     R0
101744 006200                           ASR     R0
101746 006200                           ASR     R0
101750 006200                           ASR     R0
101752 006200                           ASR     R0
101754 006200                           ASR     R0
101756 042700 177700                    BIC     #177700,R0
101762 010066 000020                    MOV     R0,20(SP)               ; *,OLDCHN
101766 012746 000001                    MOV     #1,-(SP)                ;                                       8144
101772 016646 000032                    MOV     32(SP),-(SP)            ; COMMAND,*
101776 010246                           MOV     R2,-(SP)                ; LUN,*
102000 012746 000400                    MOV     #400,-(SP)
102004 016646 000036                    MOV     36(SP),-(SP)            ; PTR,*
102010 016646 000036                    MOV     36(SP),-(SP)            ; OLDSEC,*
102014 004767 144204                    JSR     PC,RETRY
102020 062706 000014                    ADD     #14,SP
102024 020027 000005                    CMP     R0,#5
102030 001051                           BNE     35$
102032 027766 132354 000024             CMP     @ML.REG+44,24(SP)       ; *,OLDSEC                              8153
102040 001034                           BNE     34$
102042 016646 000020                    MOV     20(SP),-(SP)            ; OLDCHN,*
102046 017700 132336                    MOV     @ML.REG+42,R0
102052 006200                           ASR     R0
102054 006200                           ASR     R0
102056 006200                           ASR     R0
102060 006200                           ASR     R0
102062 006200                           ASR     R0
102064 006200                           ASR     R0
102066 042700 177700                    BIC     #177700,R0
102072 020026                           CMP     R0,(SP)+
102074 001016                           BNE     34$
102076 032767 000001 100154             BIT     #1,ERROUT               ;                                       8157
102104 001404                           BEQ     33$
102106 104456                           TRAP    56                      ;                                       8162
102110 012444                           .WORD   12444
102112 011202                           .WORD   MSG4
102114 000000                           .WORD   0
102116 010246                33$:       MOV     R2,-(SP)                ; LUN,*                                 8165
102120 016746 132216                    MOV     BOARD,-(SP)
102124 004767 135272                    JSR     PC,UP.HARD.COUNT
102130 000426                           BR      37$
102132 032767 000001 100120  34$:       BIT     #1,ERROUT               ;                                       8153
                                                                        ;                                       8170
```

SEQ 0339

```
15778                                   ;MLX4
15779                                   ;                                                    27-Mar-1982 19:24:42    TOPS
15780                                                TESTING RANDOM UNITS, SECTORS, DATA, WORD COUNT 27-Mar-1982 19:23:44    PA:<
15781 102140 001415                             BEQ     36$
15782 102142 104457                             TRAP    57
15783 102144 012445                             .WORD   12445                                ;                          8175
15784 102146 011166                             .WORD   MSG3
15785 102150 000000                             .WORD   0
15786 102152 000410                             BR      36$
15787 102154 032767 000001 100076 35$:          BIT     #1,ERROUT                            ;                          8178
15788 102162 001404                             BEQ     36$                                  ;                          8184
15789 102164 104457                             TRAP    57
15790 102166 012446                             .WORD   12446                                ;                          8189
15791 102170 011166                             .WORD   MSG3
15792 102172 000000                             .WORD   0
15793 102174 010246                     36$:    MOV     R2,-(SP)
15794 102176 016746 132140                      MOV     BOARD,-(SP)                          ; LUN,*                    8192
15795 102202 004767 135676                      JSR     PC,UP.SOFT.COUNT
15796 102206 022626                     37$:    CMP     (SP)+,(SP)+
15797 102210 005205                     38$:    INC     R5                                   ;                          8123
15798 102212 020566 000010              39$:    CMP     R5,10(SP)                            ; SECTOR                   8119
15799 102216 101002                             BHI     40$                                  ; SECTOR,*
15800 102220 000167 177370                      JMP     31$
15801 102224 005266 000014              40$:    INC     14(SP)                               ; KOUNT                    7920
15802 102230 026666 000014 000016               CMP     14(SP),16(SP)                        ; KOUNT,*
15803 102236 003002                             BGT     41$
15804 102240 000167 175632                      JMP     2$
15805 102244 005266 000032              41$:    INC     32(SP)                               ; COUNT                    7916
15806 102250 026666 000032 000052               CMP     32(SP),52(SP)                        ; COUNT,REPEAT
15807 102256 003002                             BGT     42$
15808 102260 000167 175562                      JMP     1$
15809 102264 062706 000034              42$:    ADD     #34,SP                               ;                          7852
15810 102270 000207                             RTS     PC
15811
15812
15813                                   ; Routine Size:  602 words
15818                                   ; Maximum stack depth per invocation:  37 words
15819
```

```
15821 ;MLX4
15822 ;                 DEFINITION OF OPTION 5
15823 ;
15824 ;         8206  %sbttl 'DEFINITION OF OPTION 5'
15825 ;         8207  routine OPT5 : novalue =
15826 ;         8208      begin                                          !* 1 *
15827 ;         8209
15828 ;         8210  !++
15829 ;         8211  !   ROUTINE:     OPT5
15830 ;         8212  !
15831 ;         8213  !   PURPOSE:     TO EXERCISE THE ML11 SYSTEMS UNDER TEST IN A RANDOM
15832 ;         8214  !                MANNER, SO AS TO SIMULATE THE FLEXIBILITY OF TESTING
15833 ;         8215  !                THAT WOULD BE DONE BY AN OPERATING SYSTEM.
15834 ;         8216  !
15835 ;         8217  !                THERE ARE 4 RANDOM TESTS WHICH ARE CALLED BY 'OPT5'
15836 ;         8218  !                TO ACCOMPLISH ALL TESTING.  IT IS THE RESPONSIBILITY
15837 ;         8219  !                OF THIS ROUTINE TO DECIDE HOW MANY TIMES THOSE 4
15838 ;         8220  !                RANDOM TESTS WILL BE EXECUTED.  REFER TO 'RAND1' TO
15839 ;         8221  !                'RAND4' ABOVE FOR MORE INFORMATION.
15840 ;         8222  !--
15841 ;         8223
15842 ;         8224      local
15843 ;         8225          REPEAT;
15844 ;         8226
15845 ;         8227      PRINTB (SAY2, WRD34, RTN5);
15846 ;         8228      !'RUNNING OPT5'
15847 ;         8229      REPEAT = 9 - .NUM_DRIVES;                      !THE MORE UNITS THERE ARE ON THE SYSTEM, THE
15848 ;         8230      !FEWER TIMES EACH RANDOM TEST WILL BE RUN.
15849 ;         8231
15850 ;         8232      incr LUN from 0 to (.L$UNIT - 1) do            !SEE IF THERE ARE ANY UNITS
15851 ;         8233          begin                                      !* 2 *                    !WHICH HAVE 64K CHIPS (ML11-B)
15852 ;         8234
15853 ;         8235          if .DRIVE_STATUS [.LUN] eql ACTIVE
15854 ;         8236          then
15855 ;         8237              begin                                  !* 3 *
15856 ;         8238              UNIT = .DRIVE;
15857 ;         8239
15858 ;         8240              if .MLDT
15859 ;         8241              then
15860 ;         8242                  begin                              !* 4 *
15861 ;         8243                  REPEAT = 1;                        !THERE IS AT LEAST 1 UNIT WHICH IS AN ML11-B, SO
15862 ;         8244                  !LOWER THE REPEAT TIME FOR ALL TESTABLE UNITS.
15863 ;         8245                  exitloop;
15864 ;         8246                  end;                               !* 4 *
15865 ;         8247
15866 ;         8248              end;                                   !* 3 *
15867 ;         8249
15868 ;         8250          end;                                       !* 2 *
15869 ;         8251
15870 ;         8252  !+
15871 ;         8253  ! AT THIS POINT, 'REPEAT' IS BASED ON THE SYSTEM CONFIGURATION.
15872 ;         8254  ! NOW WEIGHT THE LOOP COUNTS OF THE 4 RANDOM TESTS SO THAT RAND1
15873 ;         8255  ! AND RAND2 ARE MUCH QUICKER THAN RAND3 AND RAND4.  RAND3 IS LONGEST.
15874 ;         8256  !-
15875 ;         8257      RAND1 (.REPEAT);                               !TEST USING RANDOM DATA
```

```
15877 ;MLX4
15878 ;.                DEFINITION OF OPTION 5                          27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
15879                                                                   27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (48)
15880 ;         8258        RAND2 (.REPEAT);                            !TEST USING RANDOM DATA, WORD COUNTS
15881 ;         8259        RAND3 (.REPEAT);                            !TEST USING RANDOM SECTORS, DATA, WORD COUNTS
15882 ;         8260        RAND4 ((.REPEAT*16));                       !TEST USING RANDOM UNITS, SECTORS, DATA, WORD COUNTS
15883 ;         8261        return;
15884 ;         8262        end;                                        !* 1 *
15888
15889                                   .SBTTL  OPT5 DEFINITION OF OPTION 5
15893 102272 004167 103016      OPT5:   JSR     R1,$SAVE4
15894 102276 012746 007656              MOV     #RTN5,-(SP)             ;                                       8207
15895 102302 012746 007344              MOV     #WRD34,-(SP)            ;                                       8227
15896 102306 012746 007100              MOV     #SAY2,-(SP)
15897 102312 012746 000003              MOV     #3,-(SP)
15898 102316 010600                     MOV     SP,R0
15899 102320 104414                     TRAP    14                      ; SP,*
15900 102322 012703 000011              MOV     #11,R3
15901 102326 166703 132124              SUB     NUM.DRIVES,R3           ; *,REPEAT                              8229
15902 102332 016704 077454              MOV     L$UNIT,R4               ; *,REPEAT
15903 102336 005001                     CLR     R1                      ;                                       8232
15904 102340 000450                     BR      3$                      ; LUN
15905 102342 010102              1$:    MOV     R1,R2
15906 102344 006202                     ASR     R2                      ; LUN,*                                 8235
15907 102346 006202                     ASR     R2
15908 102350 006202                     ASR     R2
15909 102352 062702 034442              ADD     #DRIVE.STATUS,R2
15910 102356 010246                     MOV     R2,-(SP)
15911 102360 010146                     MOV     R1,-(SP)
15912 102362 042716 177770              BIC     #177770,(SP)            ; LUN,*
15913 102366 012746 000001              MOV     #1,-(SP)
15914 102372 005046                     CLR     -(SP)
15915 102374 004767 101756              JSR     PC,BL$GT2
15916 102400 062706 000010              ADD     #10,SP
15917 102404 005300                     DEC     R0
15918 102406 001024                     BNE     2$
15919 102410 010102                     MOV     R1,R2
15920 102412 006302                     ASL     R2                      ; LUN,*                                 8238
15921 102414 016202 034422              MOV     PTABLE.ADDR(R2),R2
15922 102420 016200 000006              MOV     6(R2),R0
15923 102424 042700 177770              BIC     #177770,R0
15924 102430 142777 000007 131720       BICB    #7,@ML.REG+10
15925 102436 150077 131714              BISB    R0,@ML.REG+10
15926 102442 032777 000001 131724       BIT     #1,@ML.REG+26           ;                                       8240
15927 102450 001403                     BEQ     2$
15928 102452 012703 000001              MOV     #1,R3                   ; *,REPEAT                              8243
15929 102456 000403                     BR      4$                      ;                                       8245
15930 102460 005201              2$:    INC     R1                      ; LUN                                   8232
15931 102462 020104              3$:    CMP     R1,R4                   ; LUN,*
```

SEQ 0342

```
15933                                   ;MLX4
15934                                   ;
15935                                   ;               DEFINITION OF OPTION 5
15936 102464  002726                              BLT     1$
15937 102466  010316                    4$:       MOV     R3,(SP)
15938 102470  004767  166044                      JSR     PC,RAND1                ; REPEAT,*
15939 102474  010316                              MOV     R3,(SP)
15940 102476  004767  170422                      JSR     PC,RAND2                ; REPEAT,*
15941 102502  010316                              MOV     R3,(SP)
15942 102504  004767  172734                      JSR     PC,RAND3                ; REPEAT,*
15943 102510  010300                              MOV     R3,R0                   ; REPEAT,*
15944 102512  006300                              ASL     R0                      ; REPEAT,*
15945 102514  006300                              ASL     R0
15946 102516  006300                              ASL     R0
15947 102520  006300                              ASL     R0
15948 102522  010016                              MOV     R0,(SP)
15949 102524  004767  175256                      JSR     PC,RAND4
15950 102530  062706  000010                      ADD     #10,SP
15951 102534  000207                              RTS     PC                      ;
15952
15953                                   ; Routine Size:  82 words
15954                                   ; Maximum stack depth per invocation:  13 words
15959
15960
```

27-Mar-1982 19:24:42 TOPS
27-Mar-1982 19:23:44 PA:<

8257 8258 8259 8260 8207

SEQ 0343

27-Mar-1982 19:24:42 TOPS-20 Bliss-16 V2(212)
27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (49)

```
15962 ;MLX4
15963 ;                 THE OPTION SCHEDULER
15964 ;
15965 ;          8263  %sbttl 'THE OPTION SCHEDULER'
15966 ;          8264  BGNTST;
15967 ;          8265
15968 ;          8266  !++
15969 ;          8267  !  ROUTINE:     T1
15970 ;          8268  !
15971 ;          8269  !  PURPOSE:     THIS IS THE ONE MAIN TEST OF THE EXERCISER.  IT LOOKS
15972 ;          8270  !               AT THE AVAILABILITY OF TEST OPTIONS AND MAKES CALLS TO
15973 ;          8271  !               THE OPTIONS WHEN APPROPRIATE.
15974 ;          8272  !
15975 ;          8273  !               THE QUICK VERIFY PASS INCLUDES THE FOLLOWING ROUTINES:
15976 ;          8274  !
15977 ;          8275  !               (1)  INTEGRITY
15978 ;          8276  !               (2)  OPT1
15979 ;          8277  !               (3)  OPT2
15980 ;          8278  !               (4)  OPT3
15981 ;          8279  !
15982 ;          8280  !               SUBSEQUENT PASSES INCLUDE:
15983 ;          8281  !
15984 ;          8282  !               (1)  OPT1
15985 ;          8283  !               (2)  OPT2
15986 ;          8284  !               (3)  OPT3
15987 ;          8285  !               (4)  OPT4
15988 ;          8286  !               (5)  OPT5
15989 ;          8287  !--
15990 ;          8288
15991 ;          8289  if .QUICK neq 0
15992 ;          8290  then
15993 ;          8291      begin                                   !THIS IS THE QUICK VERIFY PASS
15994 ;          8292      PRINTB (CRLF);
15995 ;          8293      PRINTB (SAY3, WRD2, PHR2, WRD4);
15996 ;          8294      !'BEGIN QUICK VERIFY PASS'
15997 ;          8295      INTEGRITY ();
15998 ;          8296      end;
15999 ;          8297
16000 ;          8298  if .DROP1 eql 0
16001 ;          8299  then
16002 ;          8300      OPT1 ();                                !OPTION 1 IS AVAILABLE
16003 ;          8301
16004 ;          8302  if .DROP2 eql 0
16005 ;          8303  then
16006 ;          8304      OPT2 ();                                !OPTION 2 IS AVAILABLE
16007 ;          8305
16008 ;          8306  if .DROP3 eql 0
16009 ;          8307  then
16010 ;          8308      OPT3 ();                                !OPTION 3 IS AVAILABLE
16011 ;          8309
16012 ;          8310  if .QUICK eql 0
16013 ;          8311  then
16014 ;          8312      begin
16015 ;          8313
16016 ;          8314      if .DROP4 eql 0
```

SEQ 0344

```
 16018 ;MLX4
 16019 ;                 THE OPTION SCHEDULER                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
 16020                                                           27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (49)
 16021 ;          8315       then
 16022 ;          8316           OPT4 ();                        !OPTION 4 IS AVAILABLE
 16023 ;          8317
 16024 ;          8318       if .DROP5 eql 0
 16025 ;          8319       then
 16026 ;          8320           OPT5 ();                        !OPTION 5 IS AVAILABLE
 16027 ;          8321
 16028 ;          8322       end;
 16029 ;          8323
 16030 ;          8324  ENDTST;
 16034
 16035
                                .SBTTL  $T1 THE OPTION SCHEDULER
 16039 102536  005767  130132  $T1:   TST     QUICK                   ;                       8289
 16040 102542  001426                  BEQ     1$
 16041 102544  012746  007066          MOV     #CRLF,-(SP)             ;                       8292
 16042 102550  012746  000001          MOV     #1,-(SP)
 16043 102554  010600                  MOV     SP,R0                   ; SP,*
 16044 102556  104414                  TRAP    14
 16045 102560  012716  007212          MOV     #WRD4,(SP)              ;                       8293
 16046 102564  012746  007730          MOV     #PHR2,-(SP)
 16047 102570  012746  007200          MOV     #WRD2,-(SP)
 16048 102574  012746  007112          MOV     #SAY3,-(SP)
 16049 102600  012746  000004          MOV     #4,-(SP)
 16050 102604  010600                  MOV     SP,R0                   ; SP,*
 16051 102606  104414                  TRAP    14
 16052 102610  004767  144416          JSR     PC,INTEGRITY            ;                       8295
 16053 102614  062706  000014          ADD     #14,SP                  ;                       8291
 16054 102620  005767  077412  1$:     TST     DROP1                   ;                       8298
 16055 102624  001002                  BNE     2$
 16056 102626  004767  146626          JSR     PC,OPT1
 16057 102632  005767  077402  2$:     TST     DROP2                   ;                       8300
 16058 102636  001002                  BNE     3$                      ;                       8302
 16059 102640  004767  151210          JSR     PC,OPT2
 16060 102644  005767  077372  3$:     TST     DROP3                   ;                       8304
 16061 102650  001002                  BNE     4$                      ;                       8306
 16062 102652  004767  155174          JSR     PC,OPT3
 16063 102656  005767  130012  4$:     TST     QUICK                   ;                       8308
 16064 102662  001012                  BNE     6$                      ;                       8310
 16065 102664  005767  077354          TST     DROP4
 16066 102670  001002                  BNE     5$                      ;                       8314
 16067 102672  004767  157546          JSR     PC,OPT4
 16068 102676  005767  077346  5$:     TST     DROP5                   ;                       8316
 16069 102702  001002                  BNE     6$                      ;                       8318
 16070 102704  004767  177362          JSR     PC,OPT5
 16071 102710  000207        6$:       RTS     PC                      ;                       8320
 16072                                                                                         8262
```

```
                                ;MLX4
                                ;                       THE OPTION SCHEDULER                    27-Mar-1982 19:24:42    TOPS
                                                                                                27-Mar-1982 19:23:44    PA:<

                                ; Routine Size:  54 words
                                ; Maximum stack depth per invocation:  6 words


                                        .SBTTL  T1 THE OPTION SCHEDULER
                                T1::
102712                          1$:     JSR     PC,$T1                          ;               8322
004767  177620
102716  104466                          TRAP    66
102720  006000                          ROR     R0
102722  103773                          BLO     1$
102724  000207                          RTS     PC

                                ; Routine Size:  6 words
                                ; Maximum stack depth per invocation:  0 words
```

SEQ 0346

```
16109 ;MLX4
16110 ;                 END OF PASS SUMMARY                                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
16111 ;                                                                      27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (50)
16112 ;          8325  %sbttl 'END OF PASS SUMMARY'
16113 ;          8326  routine EOP : novalue =
16114 ;          8327      begin                                              !* 1 *
16115 ;          8328
16116 ;          8329  !++
16117 ;          8330  !   ROUTINE:      EOP
16118 ;          8331  !
16119 ;          8332  !   PURPOSE:      TO PRINT A STATUS REPORT FOR EACH DRIVE.  IF AN
16120 ;          8333  !                 ARRAY HAS ANY HARD OR SOFT ERRORS, THEN ITS ERROR
16121 ;          8334  !                 COUNT WILL APPEAR, AND IF THE COUNT IS TOO HIGH,
16122 ;          8335  !                 THEN A DIAGNOSIS TO RUN THE ML11 PROM MAINTENANCE
16123 ;          8336  !                 PROGRAM WILL ALSO APPEAR.
16124 ;          8337  !
16125 ;          8338  !                 THE FOLLOWING IS A SAMPLE REPORT FOR 2 DRIVES:
16126 ;          8339  !
16127 ;          8340  !
16128 ;          8341  !   PERFORMANCE SUMMARY
16129 ;          8342  !
16130 ;          8343  !   NUMBER OF MBYTES TRANSFERRED:
16131 ;          8344  !    1028 MBYTES WRITTEN
16132 ;          8345  !     250 MBYTES READ
16133 ;          8346  !    1145 MBYTES WRITE CHECKED
16134 ;          8347  !
16135 ;          8348  !   LOGICAL UNIT: 0    DRIVE: 1    SERIAL #: 1234
16136 ;          8349  !     SOFT ERROR COUNT:     9
16137 ;          8350  !       ARRAY  3:       9
16138 ;          8351  !     HARD ERROR COUNT:    11
16139 ;          8352  !       ARRAY  0:       6
16140 ;          8353  !       ARRAY 10:       2
16141 ;          8354  !       ARRAY 15:       3
16142 ;          8355  !     TRANSFER RETRIES:     0
16143 ;          8356  !
16144 ;          8357  !   LOGICAL UNIT: 1    DRIVE: 1    SERIAL #: 9876
16145 ;          8358  !   DRIVE DROPPED   (CONTROLLER FATAL ERROR)
16146 ;          8359  !     SOFT ERROR COUNT:   100
16147 ;          8360  !       ARRAY  1:       9
16148 ;          8361  !       ARRAY 13:      10  --> RUN ML11 PROM MAINTENANCE PROGRAM
16149 ;          8362  !       ARRAY 14:       1
16150 ;          8363  !       ARRAY 15:      80  --> RUN ML11 PROM MAINTENANCE PROGRAM
16151 ;          8364  !     HARD ERROR COUNT:     2
16152 ;          8365  !       ARRAY 14:       1
16153 ;          8366  !       ARRAY 15:       1
16154 ;          8367  !     TRANSFER RETRIES:     0
16155 ;          8368  !--
16156 ;          8369
16157 ;          8370      local
16158 ;          8371          SFT_TOT,
16159 ;          8372          HRD_TOT,
16160 ;          8373          TRY_TOT;
16161 ;          8374
16162 ;          8375      if .EOPSUM
16163 ;          8376      then                                               !THE OPERATOR HAS ALLOWED THE SUMMARY TO PRINT
```

```
16165 ;MLX4
16166 ;                 END OF PASS SUMMARY                                  27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
16167 ;                                                                      27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (50)
16168 ;          8377           begin                                        !* 2 *
16169 ;          8378           PRINTB (CRLF);
16170 ;          8379           PRINTB (SAY1, PHR17);
16171 ;          8380           !'PERFORMANCE SUMMARY'
16172 ;          8381           PRINTB (CRLF);
16173 ;          8382           PRINTB (SAY1, PHR12);
16174 ;          8383           !NUMBER OF MBYTES TRANSFERED:
16175 ;          8384           PRINTB (FMT14, .WR_MILLIONS, PHR19);
16176 ;          8385           !'XXXXX MBYTES WRITTEN'
16177 ;          8386           PRINTB (FMT14, .RD_MILLIONS, PHR20);
16178 ;          8387           !'XXXXX MBYTES READ'
16179 ;          8388           PRINTB (FMT14, .WC_MILLIONS, PHR13);
16180 ;          8389           !'XXXXX MBYTES WRITE CHECKED'
16181 ;          8390
16182 ;          8391           incr LUN from 0 to (.L$UNIT - 1) do
16183 ;          8392               begin                                    !* 3 *
16184 ;          8393               UNIT = .DRIVE;
16185 ;          8394
16186 ;          8395               if .DPR eql 0
16187 ;          8396               then
16188 ;          8397                   PRINTB (FMT4A, PHR7, .LUN, WRD11, .DRIVE)
16189 ;          8398                   !'LOGICAL UNIT: X    DRIVE: Y'
16190 ;          8399               else
16191 ;          8400                   SAYWHO (.LUN);
16192 ;          8401
16193 ;          8402           !'LOGICAL UNIT: X    DRIVE: Y    SERIAL #: ZZZZ'
16194 ;          8403
16195 ;          8404           if .DROPT_DRIVES [.LUN] eql ACTIVE
16196 ;          8405           then
16197 ;          8406               begin                                    !* 4 *
16198 ;          8407               PRINTB (SAY2, WRD11, WRD21);
16199 ;          8408               !'DRIVE DROPPED'
16200 ;          8409
16201 ;          8410               selectone .WHY_DROPT [.LUN] of
16202 ;          8411                   set
16203 ;          8412
16204 ;          8413                   [CODE_1] :
16205 ;          8414                       PRINTB (FMT2, CAUSE1);
16206 ;          8415                       !'   (NOT POWERED UP)'
16207 ;          8416
16208 ;          8417                   [CODE_2] :
16209 ;          8418                       PRINTB (FMT2, CAUSE2);
16210 ;          8419                       !'   (NOT AN ML11 UNIT)'
16211 ;          8420
16212 ;          8421                   [CODE_3] :
16213 ;          8422                       PRINTB (FMT2, CAUSE3);
16214 ;          8423                       !'   (OPERATOR SELECTED TEST LIMITS INCORRECTLY)'
16215 ;          8424
16216 ;          8425                   [CODE_4] :
16217 ;          8426                       PRINTB (FMT2, CAUSE4);
16218 ;          8427                       !'   (ALL RETRIES FAILED FOR A NON-FATAL ERROR)'
16219 ;          8428
```

```
16221 ;MLX4
16222 ;                END OF PASS SUMMARY                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
16223 ;                                                       27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (50)
16224 ;          8429                    [CODE 5] :
16225 ;          8430                        PRINTB (FMT2, CAUSE5);
16226 ;          8431                    !'   (CONTROLLER FATAL ERROR)'
16227 ;          8432
16228 ;          8433                    [CODE 6] :
16229 ;          8434                        PRINTB (FMT2, CAUSE6);
16230 ;          8435                    !'   (DRIVE FATAL ERROR)'
16231 ;          8436
16232 ;          8437                    [CODE 7] :
16233 ;          8438                        PRINTB (FMT2, CAUSE7);
16234 ;          8439                    !'   (ECC HARD ERROR)'
16235 ;          8440
16236 ;          8441                    [CODE 8] :
16237 ;          8442                        PRINTB (FMT2, CAUSE8);
16238 ;          8443                    !'   (ECC LOGIC FAILURE)'
16239 ;          8444                    tes;
16240 ;          8445
16241 ;          8446                end;                                !* 4 *
16242 ;          8447
16243 ;          8448            SFT_TOT = 0;
16244 ;          8449            HRD_TOT = 0;
16245 ;          8450            TRY_TOT = 0;
16246 ;          8451
16247 ;          8452            incr ARRAY from 0 to 15 do
16248 ;          8453                begin
16249 ;          8454                SFT_TOT = .SFT_TOT + .SOFTS [.LUN, .ARRAY, 0, 16, 0];
16250 ;          8455                HRD_TOT = .HRD_TOT + .HARDS [.LUN, .ARRAY, 0, 16, 0];
16251 ;          8456                TRY_TOT = .TRY_TOT + .TRIES [.LUN, .ARRAY, 0, 16, 0];
16252 ;          8457                end;
16253 ;          8458
16254 ;          8459            PRINTB (FMT7, PHR5, .SFT_TOT);
16255 ;          8460            !'  SOFT ERROR COUNT: DDDDD'
16256 ;          8461
16257 ;          8462            if .SFT_TOT neq 0
16258 ;          8463            then
16259 ;          8464
16260 ;          8465                incr ARRAY from 0 to 15 do
16261 ;          8466
16262 ;          8467                    if .SOFTS [.LUN, .ARRAY, 0, 16, 0] neq 0
16263 ;          8468                    then
16264 ;          8469                        begin
16265 ;          8470                        PRINTB (FMT9, .ARRAY, .SOFTS [.LUN, .ARRAY, 0, 16, 0]);
16266 ;          8471                        !'     ARRAY XX: YYYYY'
16267 ;          8472    !
16268 ;          8473    ! VER CZMLBB THE FOLLOWING CODE HAS BEEN COMMENTED OUT BECAUSE SOFT ERRORS
16269 ;          8474    ! SHOULD NOT BE COUNTED TOWARD THE CALLING OUT OF THE PROM MAINENANCE PROGRAM
16270 ;          8475    !                       !+
16271 ;          8476    !                       ! NOW SEE IF THRESHOLDS FOR SOFT ERRORS
16272 ;          8477    !                       ! HAVE BEEN REACHED FOR THIS ARRAY BOARD:
16273 ;          8478    !                       !-
16274 ;          8479    !
16275 ;          8480    !                       if ((.ARR_TYP eql 0) and (.SOFTS [.LUN, .ARRAY, 0, 16, 0] geq S16K_LIMIT))
```

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27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (50)

```
16277 ;MLX4
16278 ;                 END OF PASS SUMMARY
16279
16280 ;          8481  !                          then
16281 ;          8482  !                              PRINTB (FMT2, MSG2);
16282 ;          8483  !
16283 ;          8484  !                          !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
16284 ;          8485  !
16285 ;          8486  !                          if ((.ARR_TYP eql 1) and (.SOFTS [.LUN, .ARRAY, 0, 16, 0] geq S64K_LIMIT))
16286 ;          8487  !                          then
16287 ;          8488  !                              PRINTB (FMT2, MSG2);
16288 ;          8489  !
16289 ;          8490  !                          !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
16290 ;          8491                            end;
16291 ;          8492
16292 ;          8493                    PRINTB (FMT7, PHR18, .HRD_TOT);
16293 ;          8494                    !'  HARD ERROR COUNT: DDDDD'
16294 ;          8495
16295 ;          8496                    if .HRD_TOT neq 0
16296 ;          8497                    then
16297 ;          8498
16298 ;          8499                        incr ARRAY from 0 to 15 do
16299 ;          8500
16300 ;          8501                            if .HARDS [.LUN, .ARRAY, 0, 16, 0] neq 0
16301 ;          8502                            then
16302 ;          8503                                begin
16303 ;          8504                                PRINTB (FMT9, .ARRAY, .HARDS [.LUN, .ARRAY, 0, 16, 0]);
16304 ;          8505                                !'    ARRAY XX: YYYYY'
16305 ;          8506
16306 ;          8507                                !+
16307 ;          8508                                ! NOW SEE IF THRESHOLDS FOR HARD ERRORS
16308 ;          8509                                ! HAVE BEEN REACHED FOR THIS ARRAY BOARD:
16309 ;          8510                                !-
16310 ;          8511
16311 ;          8512  !
16312 ;          8513  ! VER CZMLBB CHANGED TESTING HARDS [TABLE] TO TESTING PM_SBE_CNT [TABLE]
16313 ;          8514  !
16314 ;          8515
16315 ;          8516                            if ((.ARR_TYP eql 0) and (.PM_SBE_CNT [.LUN, .ARRAY, PM_SBE$_SUM] geq H16K_LIMIT))
16316 ;          8517                            then
16317 ;          8518                                PRINTB (FMT2, MSG2);
16318 ;          8519
16319 ;          8520                            !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
16320 ;          8521  !
16321 ;          8522  ! VER CZMLBB CHANGED TESTING HARDS [TABLE] TO TESTING PM_SBE_CNT [TABLE]
16322 ;          8523  !
16323 ;          8524
16324 ;          8525                            if ((.ARR_TYP eql 1) and (.PM_SBE_CNT [.LUN, .ARRAY, PM_SBE$_SUM] geq H64K_LIMIT))
16325 ;          8526                            then
16326 ;          8527                                PRINTB (FMT2, MSG2);
16327 ;          8528
16328 ;          8529                            !'  --> RUN ML11 PROM MAINTENANCE PROGRAM'
16329 ;          8530                            end;
16330 ;          8531
16331 ;          8532                    PRINTB (FMT7, PHR6, .TRY_TOT);
```

```
16333 ;MLX4
16334 ;                 END OF PASS SUMMARY
16335
16336 ;          8533                !'  TRANSFER RETRIES: DDDDD'
16337 ;          8534
16338 ;          8535                if .TRY_TOT neq 0
16339 ;          8536                then
16340 ;          8537
16341 ;          8538                    incr ARRAY from 0 to 15 do
16342 ;          8539
16343 ;          8540                        if .TRIES [.LUN, .ARRAY, 0, 16, 0] neq 0
16344 ;          8541                        then
16345 ;        P 8542                            PRINTB (FMT9, .ARRAY,
16346 ;        P 8543                                .TRIES [.LUN,
16347 ;          8544                                    .ARRAY, 0, 16, 0]);
16348 ;          8545
16349 ;          8546                    !'    ARRAY XX: YYYYY'
16350 ;          8547                    end;                                    !* 3 *
16351 ;          8548
16352 ;          8549            !+
16353 ;          8550            ! Examine the number of single
16354 ;          8551            ! bit errors detected during
16355 ;          8552            ! execution of the exerciser
16356 ;          8553            ! thus far.  If any were detected
16357 ;          8554            ! then print them out to the
16358 ;          8555            ! operator.
16359 ;          8556            !-
16360 ;          8557
16361 ;          8558            if .SBE$_COUNT gtr ZERO
16362 ;          8559            then
16363 ;          8560                begin
16364 ;          8561                PRINTB (CRLF);
16365 ;          8562                PRINTB (SAY1, PHR21);               !Print single bit log summary report
16366 ;          8563                PRINTB (CRLF);
16367 ;          8564                PRINTB (SAY1, SBE$HEADER);          !Print the column headings
16368 ;          8565
16369 ;          8566                !+
16370 ;          8567                ! Print to the console terminal for the
16371 ;          8568                ! operator review all the detected single
16372 ;          8569                ! bit errors during the execution of this
16373 ;          8570                ! exerciser thus far.
16374 ;          8571                !-
16375 ;          8572
16376 ;          8573                incr index from 0 to .SBE$_COUNT - 1 do     !Print all errors logged in this table
16377 ;          8574                    begin
16378 ;        P 8575                    PRINTB (FMT16,                        !This is the printing format
16379 ;        P 8576                        .SBE_LOG [.index, UNIT$_SBE],     !Print the failing unit of this sbe
16380 ;        P 8577                        .SBE_LOG [.index, BRD$_SBE],      !Print the failing board number
16381 ;        P 8578                        .SBE_LOG [.index, BNK$_SBE],      !Print the failing bank number
16382 ;        P 8579                        .SBE_LOG [.index, BIT$_SBE],      !Print the failing bit number
16383 ;          8580                        .SBE_LOG [.index, SUM$_SBE]);     !Print the total sbe's found
16384 ;          8581                    end;
16385 ;          8582
16386 ;          8583                end;
16387 ;          8584
```

SEQ 0351

```
;MLX4
;                    END OF PASS SUMMARY                    27-Mar-1982 19:24:42    TOPS-20 Bliss-16 V2(212)
;                                                           27-Mar-1982 19:23:44    PA:<NEALE>MLX4.BLI.5 (50)
;          8585          PRINTB (CRLF);
;          8586          end;                                !* 2 *
;          8587
;          8588      return;
;          8589      end;                                    !* 1 *
```

```
                                        .SBTTL  EOP END OF PASS SUMMARY
102726 004167 102402            EOP:    JSR     R1,$SAVE5                       ;                       8326
102732 162706 000010                    SUB     #10,SP
102736 032767 000001 077312             BIT     #1,EOPSUM                       ;                       8375
102744 001002                           BNE     1$
102746 000167 001744                    JMP     32$
102752 012746 007066            1$:     MOV     #CRLF,-(SP)                     ;                       8378
102756 012746 000001                    MOV     #1,-(SP)
102762 010600                           MOV     SP,R0                           ; SP,*
102764 104414                           TRAP    14
102766 012716 010342                    MOV     #PHR17,(SP)                     ;                       8379
102772 012746 007072                    MOV     #SAY1,-(SP)
102776 012746 000002                    MOV     #2,-(SP)
103002 010600                           MOV     SP,R0                           ; SP,*
103004 104414                           TRAP    14
103006 012716 007066                    MOV     #CRLF,(SP)                      ;                       8381
103012 012746 000001                    MOV     #1,-(SP)
103016 010600                           MOV     SP,R0                           ; SP,*
103020 104414                           TRAP    14
103022 012716 010202                    MOV     #PHR12,(SP)                     ;                       8382
103026 012746 007072                    MOV     #SAY1,-(SP)
103032 012746 000002                    MOV     #2,-(SP)
103036 010600                           MOV     SP,R0                           ; SP,*
103040 104414                           TRAP    14
103042 012716 010410                    MOV     #PHR19,(SP)                     ;                       8384
103046 016746 131246                    MOV     WR.MILLIONS,-(SP)
103052 012746 007046                    MOV     #FMT14,-(SP)
103056 012746 000003                    MOV     #3,-(SP)
103062 010600                           MOV     SP,R0                           ; SP,*
103064 104414                           TRAP    14
103066 012716 010430                    MOV     #PHR20,(SP)                     ;                       8386
103072 016746 131230                    MOV     RD.MILLIONS,-(SP)
103076 012746 007046                    MOV     #FMT14,-(SP)
103102 012746 000003                    MOV     #3,-(SP)
103106 010600                           MOV     SP,R0                           ; SP,*
103110 104414                           TRAP    14
103112 012716 010240                    MOV     #PHR13,(SP)                     ;                       8388
103116 016746 131212                    MOV     WC.MILLIONS,-(SP)
103122 012746 007046                    MOV     #FMT14,-(SP)
103126 012746 000003                    MOV     #3,-(SP)
```

SEQ 0352

```
16445                                   ;MLX4
16446                                   ;       END OF PASS SUMMARY                     27-Mar-1982 19:24:42    TOPS
16447                                                                                   27-Mar-1982 19:23:44    PA:<
16448 103132 010600                             MOV     SP,R0                   ; SP,*
16449 103134 104414                             TRAP    14
16450 103136 016766 076650 000046               MOV     L$UNIT,46(SP)           ;                               8391
16451 103144 005005                             CLR     R5                      ; LUN
16452 103146 000167 001246                      JMP     27$
16453 103152 010500                     2$:     MOV     R5,R0                   ; LUN,*                         8393
16454 103154 006300                             ASL     R0
16455 103156 016003 034422                      MOV     PTABLE.ADDR(R0),R3
16456 103162 016304 000006                      MOV     6(R3),R4
16457 103166 042704 177770                      BIC     #177770,R4
16458 103172 142777 000007 131156               BICB    #7,@ML.REG+10
16459 103200 150477 131152                      BISB    R4,@ML.REG+10
16460 103204 032777 000400 131146               BIT     #400,@ML.REG+12         ;                               8395
16461 103212 001022                             BNE     3$
16462 103214 016003 034422                      MOV     PTABLE.ADDR(R0),R3      ;                               8397
16463 103220 016346 000006                      MOV     6(R3),-(SP)
16464 103224 012746 007240                      MOV     #WRD11,-(SP)
16465 103230 010546                             MOV     R5,-(SP)                ; LUN,*
16466 103232 012746 010050                      MOV     #PHR7,-(SP)
16467 103236 012746 006216                      MOV     #FMT4A,-(SP)
16468 103242 012746 000005                      MOV     #5,-(SP)
16469 103246 010600                             MOV     SP,R0                   ; SP,*
16470 103250 104414                             TRAP    14
16471 103252 062706 000012                      ADD     #12,SP
16472 103256 000403                             BR      4$
16473 103260 010546                     3$:     MOV     R5,-(SP)                ;                               8395
16474 103262 004767 132236                      JSR     PC,SAYWHO               ; LUN,*                         8400
16475 103266 010500                     4$:     MOV     R5,R0                   ; LUN,*                         8404
16476 103270 006200                             ASR     R0
16477 103272 006200                             ASR     R0
16478 103274 006200                             ASR     R0
16479 103276 062700 034444                      ADD     #DROPT.DRIVES,R0
16480 103302 010046                             MOV     R0,-(SP)
16481 103304 010546                             MOV     R5,-(SP)
16482 103306 042716 177770                      BIC     #177770,(SP)            ; LUN,*
16483 103312 012746 000001                      MOV     #1,-(SP)
16484 103316 005046                             CLR     -(SP)
16485 103320 004767 101032                      JSR     PC,BL$GT2
16486 103324 062706 000010                      ADD     #10,SP
16487 103330 005300                             DEC     R0
16488 103332 001160                             BNE     14$
16489 103334 012746 007322                      MOV     #WRD21,-(SP)            ;                               8407
16490 103340 012746 007240                      MOV     #WRD11,-(SP)
16491 103344 012746 007100                      MOV     #SAY2,-(SP)
16492 103350 012746 000003                      MOV     #3,-(SP)
16493 103354 010600                             MOV     SP,R0                   ; SP,*
16494 103356 104414                             TRAP    14
16495 103360 005003                             CLR     R3
16496 103362 156503 034446                      BISB    WHY.DROPT(R5),R3        ; *(LUN),*                      8410
16497 103366 020327 000001                      CMP     R3,#1
16498 103372 001011                             BNE     5$
16499 103374 012746 010460                      MOV     #CAUSE1,-(SP)           ;                               8414
```

SEQ 0353

```
16501                                   ;MLX4
16502                                   ;                       END OF PASS SUMMARY                                     27-Mar-1982 19:24:42    TOPS
16503                                                                                                                   27-Mar-1982 19:23:44    PA:<
16504 103400  012746  006160                      MOV     #FMT2,-(SP)
16505 103404  012746  000002                      MOV     #2,-(SP)
16506 103410  010600                            MOV     SP,R0
16507 103412  104414                            TRAP    14                              ; SP,*
16508 103414  000523                            BR      12$
16509 103416  020327  000002              5$:   CMP     R3,#2
16510 103422  001011                            BNE     6$                              ;                                       8410
16511 103424  012746  010502                      MOV     #CAUSE2,-(SP)                   ;                                       8418
16512 103430  012746  006160                      MOV     #FMT2,-(SP)
16513 103434  012746  000002                      MOV     #2,-(SP)
16514 103440  010600                            MOV     SP,R0
16515 103442  104414                            TRAP    14                              ; SP,*
16516 103444  000507                            BR      12$
16517 103446  020327  000003              6$:   CMP     R3,#3
16518 103452  001011                            BNE     7$                              ;                                       8410
16519 103454  012746  010526                      MOV     #CAUSE3,-(SP)                   ;                                       8422
16520 103460  012746  006160                      MOV     #FMT2,-(SP)
16521 103464  012746  000002                      MOV     #2,-(SP)
16522 103470  010600                            MOV     SP,R0
16523 103472  104414                            TRAP    14                              ; SP,*
16524 103474  000473                            BR      12$
16525 103476  020327  000004              7$:   CMP     R3,#4
16526 103502  001011                            BNE     8$                              ;                                       8410
16527 103504  012746  010602                      MOV     #CAUSE4,-(SP)                   ;                                       8426
16528 103510  012746  006160                      MOV     #FMT2,-(SP)
16529 103514  012746  000002                      MOV     #2,-(SP)
16530 103520  010600                            MOV     SP,R0
16531 103522  104414                            TRAP    14                              ; SP,*
16532 103524  000457                            BR      12$
16533 103526  020327  000005              8$:   CMP     R3,#5
16534 103532  001011                            BNE     9$                              ;                                       8410
16535 103534  012746  010656                      MOV     #CAUSE5,-(SP)                   ;                                       8430
16536 103540  012746  006160                      MOV     #FMT2,-(SP)
16537 103544  012746  000002                      MOV     #2,-(SP)
16538 103550  010600                            MOV     SP,R0
16539 103552  104414                            TRAP    14                              ; SP,*
16540 103554  000443                            BR      12$
16541 103556  020327  000006              9$:   CMP     R3,#6
16542 103562  001011                            BNE     10$                             ;                                       8410
16543 103564  012746  010710                      MOV     #CAUSE6,-(SP)                   ;                                       8434
16544 103570  012746  006160                      MOV     #FMT2,-(SP)
16545 103574  012746  000002                      MOV     #2,-(SP)
16546 103600  010600                            MOV     SP,R0
16547 103602  104414                            TRAP    14                              ; SP,*
16548 103604  000427                            BR      12$
16549 103606  020327  000007              10$:  CMP     R3,#7
16550 103612  001011                            BNE     11$                             ;                                       8410
16551 103614  012746  010734                      MOV     #CAUSE7,-(SP)                   ;                                       8438
16552 103620  012746  006160                      MOV     #FMT2,-(SP)
16553 103624  012746  000002                      MOV     #2,-(SP)
16554 103630  010600                            MOV     SP,R0
16555 103632  104414                            TRAP    14                              ; SP,*
```

```
16557                                   ;MLX4
16558                                   ;                       END OF PASS SUMMARY                     27-Mar-1982 19:24:42    TOPS
16559                                                                                                   27-Mar-1982 19:23:44    PA:<
16560 103634 000413                             BR      12$
16561 103636 020327 000010              11$:    CMP     R3,#10
16562 103642 001012                             BNE     13$                             ;                                       8410
16563 103644 012746 010756                      MOV     #CAUSE8,-(SP)                   ;                                       8442
16564 103650 012746 006160                      MOV     #FMT2,-(SP)
16565 103654 012746 000002                      MOV     #2,-(SP)
16566 103660 010600                             MOV     SP,R0
16567 103662 104414                             TRAP    14                              ; SP,*
16568 103664 062706 000006              12$:    ADD     #6,SP
16569 103670 062706 000010              13$:    ADD     #10,SP                          ;
16570 103674 005066 000046              14$:    CLR     46(SP)                          ; SFT.TOT                               8406
16571 103700 005066 000044                      CLR     44(SP)                          ; HRD.TOT                               8448
16572 103704 005066 000042                      CLR     42(SP)                          ; TRY.TOT                               8449
16573 103710 010500                             MOV     R5,R0                           ; LUN,*                                 8450
16574 103712 006300                             ASL     R0                                                                      8454
16575 103714 006300                             ASL     R0
16576 103716 006300                             ASL     R0
16577 103720 006300                             ASL     R0
16578 103722 010004                             MOV     R0,R4
16579 103724 005002                             CLR     R2
16580 103726 010403                     15$:    MOV     R4,R3                           ; ARRAY                                 8452
16581 103730 060203                             ADD     R2,R3                           ;                                       8454
16582 103732 006303                             ASL     R3                              ; ARRAY,*
16583 103734 066366 032714 000046               ADD     SOFTS(R3),46(SP)                ; *,SFT.TOT
16584 103742 066366 033314 000044               ADD     HARDS(R3),44(SP)                ; *,HRD.TOT                             8455
16585 103750 066366 033714 000042               ADD     TRIES(R3),42(SP)                ; *,TRY.TOT                             8456
16586 103756 005202                             INC     R2                              ; ARRAY                                 8452
16587 103760 020227 000017                      CMP     R2,#17                          ; ARRAY,*
16588 103764 003760                             BLE     15$
16589 103766 016616 000046                      MOV     46(SP),(SP)                     ; SFT.TOT,*                             8459
16590 103772 012746 010004                      MOV     #PHR5,-(SP)
16591 103776 012746 006446                      MOV     #FMT7,-(SP)
16592 104002 012746 000003                      MOV     #3,-(SP)
16593 104006 010600                             MOV     SP,R0
16594 104010 104414                             TRAP    14                              ; SP,*
16595 104012 005766 000054                      TST     54(SP)                          ; SFT.TOT
16596 104016 001425                             BEQ     18$                                                                     8462
16597 104020 005002                             CLR     R2
16598 104022 010403                     16$:    MOV     R4,R3                           ; ARRAY                                 8465
16599 104024 060203                             ADD     R2,R3                           ;                                       8467
16600 104026 006303                             ASL     R3                              ; ARRAY,*
16601 104030 016303 032714                      MOV     SOFTS(R3),R3
16602 104034 001412                             BEQ     17$
16603 104036 010346                             MOV     R3,-(SP)
16604 104040 010246                             MOV     R2,-(SP)                        ;                                       8470
16605 104042 012746 006534                      MOV     #FMT9,-(SP)                     ; ARRAY,*
16606 104046 012746 000003                      MOV     #3,-(SP)
16607 104052 010600                             MOV     SP,R0
16608 104054 104414                             TRAP    14                              ; SP,*
16609 104056 062706 000010                      ADD     #10,SP
16610 104062 005202                     17$:    INC     R2                              ;                                       8469
16611 104064 020227 000017                      CMP     R2,#17                          ; ARRAY                                 8465
                                                                                        ; ARRAY,*
```

```
16613                                   ;MLX4
16614                                   ;
16615                                   ;       END OF PASS SUMMARY                                     27-Mar-1982 19:24:42    TOPS
16616                                                                                                   27-Mar-1982 19:23:44    PA:<
16617 104070 003754                             BLE     16$
16618 104072 016616 000052      18$:    MOV     52(SP),(SP)             ; HRD.TOT,*                                             8493
16619 104076 012746 010366              MOV     #PHR18,-(SP)
16620 104102 012746 006446              MOV     #FMT7,-(SP)
16621 104106 012746 000003              MOV     #3,-(SP)
16622 104112 010600                     MOV     SP,R0
16623 104114 104414                     TRAP    14                      ; SP,*
16624 104116 005766 000060              TST     60(SP)                  ; HRD.TOT                                               8496
16625 104122 001471                     BEQ     23$
16626 104124 005001                     CLR     R1                      ; ARRAY                                                 8499
16627 104126 010403             19$:    MOV     R4,R3                   ;                                                       8501
16628 104130 060103                     ADD     R1,R3                   ; ARRAY,*
16629 104132 006303                     ASL     R3
16630 104134 016302 033314              MOV     HARDS(R3),R2
16631 104140 001456                     BEQ     22$
16632 104142 010246                     MOV     R2,-(SP)                ;                                                       8504
16633 104144 010146                     MOV     R1,-(SP)                ; ARRAY,*
16634 104146 012746 006534              MOV     #FMT9,-(SP)
16635 104152 012746 000003              MOV     #3,-(SP)
16636 104156 010600                     MOV     SP,R0
16637 104160 104414                     TRAP    14                      ; SP,*
16638 104162 032777 002000 130202       BIT     #2000,@ML.REG+24        ;                                                       8516
16639 104170 001016                     BNE     20$
16640 104172 026327 012264 000012       CMP     PM.SBE.CNT(R3),#12
16641 104200 002412                     BLT     20$
16642 104202 012746 011120              MOV     #MSG2,-(SP)             ;                                                       8518
16643 104206 012746 006160              MOV     #FMT2,-(SP)
16644 104212 012746 000002              MOV     #2,-(SP)
16645 104216 010600                     MOV     SP,R0
16646 104220 104414                     TRAP    14                      ; SP,*
16647 104222 062706 000006              ADD     #6,SP
16648 104226 032777 002000 130136 20$:  BIT     #2000,@ML.REG+24        ;                                                       8525
16649 104234 001416                     BEQ     21$
16650 104236 026327 012264 000012       CMP     PM.SBE.CNT(R3),#12
16651 104244 002412                     BLT     21$
16652 104246 012746 011120              MOV     #MSG2,-(SP)             ;                                                       8527
16653 104252 012746 006160              MOV     #FMT2,-(SP)
16654 104256 012746 000002              MOV     #2,-(SP)
16655 104262 010600                     MOV     SP,R0
16656 104264 104414                     TRAP    14                      ; SP,*
16657 104266 062706 000006              ADD     #6,SP
16658 104272 062706 000010      21$:    ADD     #10,SP                  ;                                                       8503
16659 104276 005201             22$:    INC     R1                      ; ARRAY                                                 8499
16660 104300 020127 000017              CMP     R1,#17                  ; ARRAY,*
16661 104304 003710                     BLE     19$
16662 104306 016616 000056      23$:    MOV     56(SP),(SP)             ; TRY.TOT,*                                             8532
16663 104312 012746 010026              MOV     #PHR6,-(SP)
16664 104316 012746 006446              MOV     #FMT7,-(SP)
16665 104322 012746 000003              MOV     #3,-(SP)
16666 104326 010600                     MOV     SP,R0
16667 104330 104414                     TRAP    14                      ; SP,*
16668 104332 005766 000064              TST     64(SP)                  ; TRY.TOT                                               8535
```

SEQ 0356

```
16669                                   ;MLX4
16670                                   ;                       END OF PASS SUMMARY                                     27-Mar-1982 19:24:42    TOPS
16671                                                                                                                   27-Mar-1982 19:23:44    PA:<
16672 104336  001425                            BEQ     26$
16673 104340  005002                            CLR     R2
16674 104342  010403                    24$:    MOV     R4,R3                   ; ARRAY                                                 8538
16675 104344  060203                            ADD     R2,R3                   ;                                                       8540
16676 104346  006303                            ASL     R3                      ; ARRAY,*
16677 104350  016303  033714                    MOV     TRIES(R3),R3
16678 104354  001412                            BEQ     25$
16679 104356  010346                            MOV     R3,-(SP)
16680 104360  010246                            MOV     R2,-(SP)                ;                                                       8544
16681 104362  012746  006534                    MOV     #FMT9,-(SP)             ; ARRAY,*
16682 104366  012746  000003                    MOV     #3,-(SP)
16683 104372  010600                            MOV     SP,R0
16684 104374  104414                            TRAP    14                      ; SP,*
16685 104376  062706  000010                    ADD     #10,SP
16686 104402  005202                    25$:    INC     R2                      ; ARRAY
16687 104404  020227  000017                    CMP     R2,#17                  ; ARRAY,*                                               8538
16688 104410  003754                            BLE     24$
16689 104412  062706  000024            26$:    ADD     #24,SP                  ;                                                       8392
16690 104416  005205                            INC     R5                      ; LUN                                                   8391
16691 104420  020566  000046            27$:    CMP     R5,46(SP)               ; LUN,*
16692 104424  002002                            BGE     28$
16693 104426  000167  176520                    JMP     2$
16694 104432  005767  106226            28$:    TST     SBE$.COUNT              ;                                                       8558
16695 104436  003517                            BLE     31$
16696 104440  012746  007066                    MOV     #CRLF,-(SP)             ;                                                       8561
16697 104444  012746  000001                    MOV     #1,-(SP)
16698 104450  010600                            MOV     SP,R0                   ; SP,*
16699 104452  104414                            TRAP    14
16700 104454  012716  005662                    MOV     #PHR21,(SP)             ;                                                       8562
16701 104460  012746  007072                    MOV     #SAY1,-(SP)
16702 104464  012746  000002                    MOV     #2,-(SP)
16703 104470  010600                            MOV     SP,R0                   ; SP,*
16704 104472  104414                            TRAP    14
16705 104474  012716  007065                    MOV     #CRLF,(SP)              ;                                                       8563
16706 104500  012746  000001                    MOV     #1,-(SP)
16707 104504  010600                            MOV     SP,R0                   ; SP,*
16708 104506  104414                            TRAP    14
16709 104510  012716  006042                    MOV     #SBE$HEADER,(SP)        ;                                                       8564
16710 104514  012746  007072                    MOV     #SAY1,-(SP)
16711 104520  012746  000002                    MOV     #2,-(SP)
16712 104524  010600                            MOV     SP,R0                   ; SP,*
16713 104526  104414                            TRAP    14
16714 104530  016705  106130                    MOV     SBE$.COUNT,R5           ;                                                       8573
16715 104534  005002                            CLR     R2                      ; INDEX
16716 104536  000453                            BR      30$
16717 104540  010203                    29$:    MOV     R2,R3                   ; INDEX,*                                               8580
16718 104542  006303                            ASL     R3
16719 104544  006303                            ASL     R3
16720 104546  016346  011266                    MOV     SBE.LOG+2(R3),-(SP)
16721 104552  062703  011264                    ADD     #SBE.LOG,R3
16722 104556  011304                            MOV     (R3),R4
16723 104560  006204                            ASR     R4
```

SEQ 0357

```
16725                                   ;MLX4
16726                                   ;                       END OF PASS SUMMARY                     27-Mar-1982 19:24:42    TOPS
16727                                                                                                   27-Mar-1982 19:23:44    PA:<
16728 104562  006204                                     ASR     R4
16729 104564  006204                                     ASR     R4
16730 104566  006204                                     ASR     R4
16731 104570  006204                                     ASR     R4
16732 104572  006204                                     ASR     R4
16733 104574  042704  177600                           BIC     #177600,R4
16734 104600  010446                                     MOV     R4,-(SP)
16735 104602  111346                                     MOVB    (R3),-(SP)
16736 104604  042716  177774                           BIC     #177774,(SP)
16737 104610  111304                                     MOVB    (R3),R4
16738 104612  006204                                     ASR     R4
16739 104614  006204                                     ASR     R4
16740 104616  042704  177760                           BIC     #177760,R4
16741 104622  010446                                     MOV     R4,-(SP)
16742 104624  011304                                     MOV     (R3),R4
16743 104626  006104                                     ROL     R4
16744 104630  006104                                     ROL     R4
16745 104632  006104                                     ROL     R4
16746 104634  006104                                     ROL     R4
16747 104636  042704  177770                           BIC     #177770,R4
16748 104642  010446                                     MOV     R4,-(SP)
16749 104644  012746  005736                           MOV     #FMT16,-(SP)
16750 104650  012746  000006                           MOV     #6,-(SP)
16751 104654  010600                                     MOV     SP,R0
16752 104656  104414                                     TRAP    14                              ; SP,*
16753 104660  062706  000016                           ADD     #16,SP                          ;
16754 104664  005202                                     INC     R2                              ; INDEX                                 8574
16755 104666  020205                           30$:      CMP     R2,R5                           ; INDEX,*                               8573
16756 104670  002723                                     BLT     29$
16757 104672  062706  000016                           ADD     #16,SP
16758 104676  012716  007066                 31$:      MOV     #CRLF,(SP)                      ;                                       8560
16759 104702  012746  000001                           MOV     #1,-(SP)                        ;                                       8585
16760 104706  010600                                     MOV     SP,R0
16761 104710  104414                                     TRAP    14                              ; SP,*
16762 104712  062706  000042                           ADD     #42,SP
16763 104716  062706  000010                 32$:      ADD     #10,SP                          ;                                       8377
16764 104722  000207                                     RTS     PC                              ;                                       8326
16765
16766                                   ; Routine Size:  511 words
16767                                   ; Maximum stack depth per invocation:  40 words
16772
16773
```

SEQ 0358

27-Mar-1982 19:24:42 TOPS-20 Bliss-16 V2(212)
27-Mar-1982 19:23:44 PA:<NEALE>MLX4.BLI.5 (51)

```
                ;MLX4
                ;                       CLEANUP CODING SECTION
                ;
                ;          8590  %sbttl 'CLEANUP CODING SECTION'
                ;          8591  BGNCLN;
                ;          8592  !+
                ;          8593  ! THE CLEANUP CODING SECTION IS EXECUTED AFTER
                ;          8594  ! EACH PASS THROUGH THE EXERCISER.
                ;          8595  !-
                ;          8596  EOP_COUNT = .EOP_COUNT + 1;
                ;          8597
                ;          8598  if .EOP_COUNT eql 1
                ;          8599  then
                ;          8600      PRINTB (SAY3, WRD3, PHR2, WRD4)
                ;          8601      !'END QUICK VERIFY PASS'
                ;          8602  else
                ;          8603      PRINTB (FMT3, WRD3, WRD4, .EOP_COUNT);
                ;          8604
                ;          8605  !'** END PASS XX **'
                ;          8606  EOP ();
                ;          8607  return;
                ;          8608  ENDCLN;
                
                                          .SBTTL  LCLEAN CLEANUP CODING SECTION
104724 005267 125754      LCLEAN:         INC     EOP.COUNT                       ;                       8596
104730 026727 125750 000001               CMP     EOP.COUNT,#1                    ;                       8598
104736 001015                             BNE     1$
104740 012746 007212                      MOV     #WRD4,-(SP)                     ;                       8600
104744 012746 007730                      MOV     #PHR2,-(SP)
104750 012746 007206                      MOV     #WRD3,-(SP)
104754 012746 007112                      MOV     #SAY3,-(SP)
104760 012746 000004                      MOV     #4,-(SP)
104764 010600                             MOV     SP,R0                           ; SP,*
104766 104414                             TRAP    14
104770 000414                             BR      2$
104772 016746 125706      1$:             MOV     EOP.COUNT,-(SP)                 ;                       8598
104776 012746 007212                      MOV     #WRD4,-(SP)                     ;                       8603
105002 012746 007206                      MOV     #WRD3,-(SP)
105006 012746 006166                      MOV     #FMT3,-(SP)
105012 012746 000004                      MOV     #4,-(SP)
105016 010600                             MOV     SP,R0                           ; SP,*
105020 104414                             TRAP    14
105022 004767 175700      2$:             JSR     PC,EOP                          ;
105026 062706 000012                      ADD     #12,SP                          ;                       8606
105032 000207                             RTS     PC                              ;                       8589

                ; Routine Size:  36 words
                ; Maximum stack depth per invocation:  5 words
```

SEQ 0359

```
16837
16838
16842
16843
16847 105034                            .SBTTL  L$CLEAN CLEANUP CODING SECTION
16848 105034  004767  177664     L$CLEAN::
16849 105040  104412                    JSR     PC,LCLEAN                       ;  8607
16850 105042  000207                    TRAP    12
16851                                   RTS     PC
16852
16853                                   ; Routine Size:  4 words
16858                                   ; Maximum stack depth per invocation:  0 words
16859
16860 ;          8609  LASTAD;
16861 ;          8610  BGNSETUP (0);
16862 ;          8611  ENDSETUP;
16866
16867
16868 105044  105050                    BL$LAS::.WORD   T$FREE
16869 105046  000000                            .WORD   <<T$FREE-<BL$LAS+4>>/2>
16870 105050  000000                    T$FREE::.WORD   0
16871
16872
16873         105050                    L$LAST==            BL$LAS+4
16874         000000                    T$PTHV==            0
16875
16876
16877
16881 105052                            .SBTTL  $END.LINK CLEANUP CODING SECTION
16882 105052  000207             $END.LINK::
16883                                   RTS     PC                              ;  8608
16884
                                        ; Routine Size:  1 word
```

```
                                ;MLX4
                                ;                CLEANUP CODING SECTION                    27-Mar-1982 19:24:42    TOPS
                                                                                           27-Mar-1982 19:23:44    PA:<
                                ; Maximum stack depth per invocation:  0 words

;       8612  end
;       8613
;       8614  eludom

                                ; OTS external references
                                        .GLOBL  BL$GT2, $SAVE5, $SAVE4, $SAVE3
                                        .GLOBL  $SAVE2, BL$PU2, BL$SHF, BL$DIV
                                        .GLOBL  BL$MOD, BL$MUL




                                ; Size:         10337 code + 5852 data words
                                ; Run Time:     01:43.8
                                ; Elapsed Time: 02:08.4
                                ; Memory Used:  161 pages
                                ; Compilation Complete

000001                                  .END
```

SYMBOL TABLE

```
ADR    = 000020 G
ASSEMB= 000010
BANK     034344
BASE.A   032706
BIT.NU   012666
BIT0   = 000001 G
BIT00  = 000001 G
BIT01  = 000002 G
BIT02  = 000004 G
BIT03  = 000010 G
BIT04  = 000020 G
BIT05  = 000040 G
BIT06  = 000100 G
BIT07  = 000200 G
BIT08  = 000400 G
BIT09  = 001000 G
BIT1   = 000002 G
BIT10  = 002000 G
BIT11  = 004000 G
BIT12  = 010000 G
BIT13  = 020000 G
BIT14  = 040000 G
BIT15  = 100000 G
BIT2   = 000004 G
BIT3   = 000010 G
BIT4   = 000020 G
BIT5   = 000040 G
BIT6   = 000100 G
BIT7   = 000200 G
BIT8   = 000400 G
BIT9   = 001000 G
BL$DIV   005170 G
BL$GT1   004234 G
BL$GT2   004356 G
BL$LAS   105044 G
BL$MOD   005202 G
BL$MUL   004744 G
BL$PU1   004520 G
BL$PU2   004614 G
BL$SHF   005214 G
BOARD    034342
BOE    = 000400 G
BR.LEV   032712
CAUSE1= 010460
CAUSE2= 010502
CAUSE3= 010526
CAUSE4= 010602
CAUSE5= 010656
CAUSE6= 010710
CAUSE7= 010734
CAUSE8= 010756
CHECK    046000
CHOOSE   046166
CLRTBL   034554
COMP.C   032702
CONFIG   036002
CRLF   = 007066
C$AU   = 000052
C$AUTO= 000061
C$BRK  = 000022
C$BSEG= 000004
C$BSUB= 000002
C$CEFG= 000045
C$CLCK= 000062
C$CLEA= 000012
C$CLOS= 000035
C$CLP1= 000006
C$CVEC= 000036
C$DCLN= 000044
C$DODU= 000051
C$DRPT= 000024
C$DU   = 000053
C$EDIT= 000003
C$ERDF= 000055
C$ERHR= 000056
C$ERRO= 000060
C$ERSF= 000054
C$ERSO= 000057
C$ESCA= 000010
C$ESEG= 000005
C$ESUB= 000003
C$ETST= 000001
C$EXIT= 000032
C$GETB= 000026
C$GETW= 000027
C$GMAN= 000043
C$GPHR= 000042
C$GPLO= 000030
C$GPRI= 000040
C$INIT= 000011
C$INLP= 000020
C$MANI= 000050
C$MEM  = 000031
C$MSG  = 000023
C$OPEN= 000034
C$PNTB= 000014
C$PNTF= 000017
C$PNTS= 000016
C$PNTX= 000015
C$QIO  = 000377
C$RDBU= 000007
C$REFG= 000047
C$RESE= 000033
C$REVI= 000003
C$RFLA= 000021
C$RPT  = 000025
C$SEFG= 000046
C$SPRI= 000041
C$SVEC= 000037
C$TPRI= 000013
DATA.C   032700
DECODE   037176
DFPTBL   002210 G
DIAGMC= 000000
DIVMOD   005006
DOUBLE   044326
DRIVE.   034442 G
DROPNE   002234 G
DROPT.   034444 G
DROP1    002236 G
DROP2    002240 G
DROP3    002242 G
DROP4    002244 G
DROP5    002250 G
ECCDIS   002254 G
EFN$21   002262 G
EF.CON= 000036 G
EF.NEW= 000035 G
EF.PWR= 000034 G
EF.RES= 000037 G
EF.STA= 000040 G
END.RB= 032670
END.WB= 022670
EOP      102726 G
EOPSUM   002256 G
EOP.CO   032704
ERRBLK   002200 G
ERRMSG   002176 G
ERRNBR   002174 G
ERROUT   002260 G
ERRTYP   002172 G
EVL    = 000004 G
E$END  = 002100
E$LOAD= 000035
FILLER   041266
FMT1A  = 006126
FMT1B  = 006142
FMT10A= 006564
FMT10B= 006640
FMT11  = 006654
FMT12A= 006710
FMT12B= 006756
FMT13  = 007024
FMT14  = 007046
FMT15  = 007060
FMT16  = 005736
FMT2   = 006160
FMT3   = 006166
FMT4A  = 006216
FMT4B  = 006252
FMT4C  = 006270
FMT5   = 006320
FMT6   = 006376
FMT7   = 006446
FMT8   = 006466
FMT9   = 006534
F$AU   = 000015
F$AUTO= 000020
F$BGN  = 000040
F$CLEA= 000007
F$DU   = 000016
F$END  = 000041
F$HARD= 000004
F$HW   = 000013
F$INIT= 000006
F$JMP  = 000050
F$MOD  = 000000
F$MSG  = 000011
F$PROT= 000021
F$PWR  = 000017
F$RPT  = 000012
F$SEG  = 000003
F$SOFT= 000005
F$SRV  = 000010
F$SUB  = 000002
F$SW   = 000014
F$TEST= 000001
GEN1     040732
GEN2     041432
GEN3     041466
GEN4     041564
GEN5     041620
GETCNT   041106
GET.WR   047176
G$CNTO= 000200
G$DELM= 000372
G$DISP= 000003
G$EXCP= 000400
G$HILI= 000002
G$LOLI= 000001
G$NO   = 000000
G$OFFS= 000400
G$OFSI= 000376
G$PRMA= 000001
G$PRMD= 000002
G$PRML= 000000
G$RADA= 000140
G$RADB= 000100
G$RADD= 000040
G$RADL= 000120
G$RADO= 000020
G$XFER= 000004
G$YES  = 000010
HARDS    033314
HELP   = 000000
HOE    = 100000 G
IBE    = 010000 G
IDU    = 000040 G
IER    = 020000 G
INIT.A   035206
INTEGR   047232
ISOLAT   037332
ISR    = 000100 G
IXE    = 004000 G
I$AU   = 000041
I$AUTO= 000041
I$CLN  = 000041
I$DU   = 000041
I$HRD  = 000041
I$INIT= 000041
I$MOD  = 000041
I$MSG  = 000041
I$PROT= 000040
I$PTAB= 000041
I$PWR  = 000041
I$RPT  = 000041
I$SEG  = 000041
I$SETU= 000041
I$SFT  = 000041
I$SRV  = 000041
I$SUB  = 000041
I$TST  = 000041
I.AM.D   034336
J$JMP  = 000167
LAU      005650
LAUTO    005504
LCLEAN   104724
LDU      005516
LIMIT    002222 G
LINIT    040474
LOE    = 040000 G
LOT    = 000010 G
LOW.SE   034460 G
LRPT     005466
LSECT    002226 G
L$ACP    002110 G
L$APT    002036 G
L$AU     005652 G
L$AUT    002070 G
L$AUTO   005506 G
L$CCP    002106 G
L$CLEA   105034 G
L$CO     002032 G
L$DEPO   002011 G
L$DESC   002130 G
L$DESP   002076 G
L$DEVP   002060 G
L$DISP   002204 G
L$DLY    002116 G
L$DTP    002040 G
L$DTYP   002034 G
L$DU     005640 G
L$DUT    002072 G
L$DVTY   002122 G
L$EF     002052 G
L$ENVI   002044 G
L$ERRT   002172 G
L$ETP    002102 G
L$EXP1   002046 G
L$EXP4   002064 G
L$EXP5   002066 G
L$HARD   002266 G
L$HIME   002120 G
L$HPCP   002016 G
L$HPTP   002022 G
```

```
L$HW     002210 G
L$ICP    002104 G
L$INIT   040722 G
L$LADP   002026 G
L$LAST=  105050 G
L$LOAD   002100 G
L$LUN    002074 G
L$MREV   002050 G
L$NAME   002000 G
L$PRIO   002042 G
L$PROT   004126 G
L$PRT    002112 G
L$REPP   002062 G
L$REV    002010 G
L$RPT    005474 G
L$SOFT   002450 G
L$SPC    002056 G
L$SPCP   002020 G
L$SPTP   002024 G
L$STA    002030 G
L$SW     002222 G
L$TEST   002114 G
L$TIML   002014 G
L$UNIT   002012 G
L10000   002220
L10001   002264
L10002   002332
L10003   002664
MARPAT   002246 G
MLB10 =  007472
MLB11 =  007500
MLB12 =  007504
MLB13 =  007510
MLB14 =  007514
MLB15 =  007520
MLB16 =  007524
MLB17 =  007530
MLB18 =  007534
MLB19 =  007542
MLB2  =  007430
MLB20 =  007550
MLB21 =  007554
MLB22 =  007560
MLB23 =  007564
MLB24 =  007570
MLB3  =  007434
MLB4  =  007440
MLB5  =  007444
MLB6  =  007450
MLB7  =  007454
MLB8  =  007460
MLB9  =  007464
ML.REG   034346 G
MSG0  =  011002
MSG1  =  011070
MSG2  =  011120
MSG3  =  011166
MSG4  =  011202
MSG5  =  011216
NUM.DR   034456 G
ONEFIL=  000001
ONLY     002232 G
OPT1     051460
OPT2     054054
OPT3     060052
OPT4     062444
OPT5     102272
O$APTS=  000001
O$AU  =  000001
O$BGNR=  000001
O$BGNS=  000001
O$DU  =  000001
O$ERRT=  000001
O$GNSW=  000001
O$POIN=  000001
O$SETU=  000001
PATTBL   034520 G
PATTER   032676
PHR1  =  007714
PHR10 =  010120
PHR11 =  010140
PHR12 =  010202
PHR13 =  010240
PHR14 =  010266
PHR15 =  010304
PHR16 =  010322
PHR17 =  010342
PHR18 =  010366
PHR19 =  010410
PHR2  =  007730
PHR20 =  010430
PHR21 =  005662
PHR3  =  007746
PHR4  =  007770
PHR5  =  010004
PHR6  =  010026
PHR7  =  010050
PHR8  =  010066
PHR9  =  010100
PM.SBE   012264
PNT   =  001000 G
PRI   =  002000 G
PRI00 =  000000 G
PRI01 =  000040 G
PRI02 =  000100 G
PRI03 =  000140 G
PRI04 =  000200 G
PRI05 =  000240 G
PRI06 =  000300 G
PRI07 =  000340 G
PTABLE   034422 G
P.AAA    005662
P.AAB    005736
P.AAC    006042
P.AAD    006126
P.AAE    006142
P.AAF    006160
P.AAG    006166
P.AAH    006216
P.AAI    006252
P.AAJ    006270
P.AAK    006320
P.AAL    006376
P.AAM    006446
P.AAN    006466
P.AAO    006534
P.AAP    006564
P.AAQ    006640
P.AAR    006654
P.AAS    006710
P.AAT    006756
P.AAU    007024
P.AAV    007046
P.AAW    007060
P.AAX    007066
P.AAY    007072
P.AAZ    007100
P.ABA    007112
P.ABB    007130
P.ABC    007152
P.ABD    007200
P.ABE    007206
P.ABF    007212
P.ABG    007220
P.ABH    007230
P.ABI    007240
P.ABJ    007246
P.ABK    007256
P.ABL    007264
P.ABM    007272
P.ABN    007300
P.ABO    007312
P.ABP    007322
P.ABQ    007332
P.ABR    007336
P.ABS    007344
P.ABT    007354
P.ABU    007370
P.ABV    007400
P.ABW    007412
P.ABX    007416
P.ABY    007424
P.ABZ    007430
P.ACA    007434
P.ACB    007440
P.ACC    007444
P.ACD    007450
P.ACE    007454
P.ACF    007460
P.ACG    007464
P.ACH    007472
P.ACI    007500
P.ACJ    007504
P.ACK    007510
P.ACL    007514
P.ACM    007520
P.ACN    007524
P.ACO    007530
P.ACP    007534
P.ACQ    007542
P.ACR    007550
P.ACS    007554
P.ACT    007560
P.ACU    007564
P.ACV    007570
P.ACW    007574
P.ACX    007626
P.ACY    007634
P.ACZ    007642
P.ADA    007650
P.ADB    007656
P.ADC    007664
P.ADD    007672
P.ADE    007700
P.ADF    007706
P.ADG    007714
P.ADH    007730
P.ADI    007746
P.ADJ    007770
P.ADK    010004
P.ADL    010026
P.ADM    010050
P.ADN    010066
P.ADO    010100
P.ADP    010120
P.ADQ    010140
P.ADR    010202
P.ADS    010240
P.ADT    010266
P.ADU    010304
P.ADV    010322
P.ADW    010342
P.ADX    010366
P.ADY    010410
P.ADZ    010430
P.AEA    010444
P.AEB    010446
P.AEC    010450
P.AED    010454
P.AEE    010460
P.AEF    010502
P.AEG    010526
P.AEH    010602
P.AEI    010656
P.AEJ    010710
P.AEK    010734
P.AEL    010756
P.AEM    011002
P.AEN    011070
P.AEO    011120
P.AEP    011166
P.AEQ    011202
P.AER    011216
QH1      002332
QH2      002351
QH3      002374
QH4      002425
QS1      002664
QS10     003534
QS11     003554
QS12     003637
QS13     003657
QS14     003724
QS15     003763
QS16     004030
QS17     004066
QS2      002732
QS3      003007
QS4      003047
QS5      003107
QS6      003147
QS7      003454
QS8      003474
QS9      003514
QUICK    032674
RANDOM   005464 G
RAND1    070540
RAND2    073124
RAND3    075444
RAND4    100006
RANGE    002224 G
RBUFF    022670
RCBUFF=  023670
RDBUFF=  022670
RD.COU   034322
RD.MIL   034326
RD.THO   034324
READ     045612
REFRES   002252 G
RETRY    046224
RETRYI   034340
RE2      005362
RE3      005360
RE4      005356
RN       005370 G
RNDSEC   070240
RNDU     070336
RNDWC    070204
RPTR     032672
RTN0  =  007574
RTN1  =  007626
RTN2  =  007634
RTN3  =  007642
RTN4  =  007650
RTN5  =  007656
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RTN5A = 007664          SVCSUB= 000001          T$NS1 = 000021          VEC     032710          WRD36 = 007370
RTN5B = 007672          SVCTAG= 000001          T$PTHV= 000000 G        WAITER  044420          WRD37 = 007400
RTN5C = 007700          SVCTST= 000001          T$PTNU= 000000          WBUFF   012670          WRD38 = 007412
RTN5D = 007706          SYSERR  041710          T$SAVL= 177777          WCBUFF= 013670          WRD4  = 007212
SAYWHO  035524          S$LSYM= 010000          T$SEGL= 177777          WC.COU  034330          WRD40 = 007416
SAY1  = 007072          TOP.SE  034500 G        T$SUBN= 000000          WC.MIL  034334          WRD41 = 007424
SAY2  = 007100          TRIES   033714          T$TAGL= 177777          WC.THO  034332          WRD6  = 007220
SAY3  = 007112          TRT00 = 010444          T$TAGN= 010005          WDBUFF= 012670          WRD7  = 007230
SAY4  = 007130          TRT01 = 010446          T$TEMP= 000000          WHY.DR  034446 G        WRITE   045424
SAY5  = 007152          TRT10 = 010450          T$TEST= 000000          WPTR    032670          WR.COU  034314
SBE$HE= 006042          TRT11 = 010454          T$TSTM= 177777          WRD11 = 007240          WR.MIL  034320
SBE$.C  012664          TSECT   002230 G        T$TSTS= 000000          WRD15 = 007246          WR.THO  034316
SBE.LO  011264          T$ARGC= 000002          T$$HAR= 010002          WRD16 = 007256          X$ALWA= 000000
SEED1   005456 G        T$CODE= 020130          T$$HW = 010000          WRD17 = 007264          X$FALS= 000040
SEED2   005460 G        T$ERRN= 000000          T$$PRO= 010004          WRD18 = 007272          X$OFFS= 000400
SEED3   005462 G        T$EXCP= 000000          T$$SOF= 010003          WRD19 = 007300          X$TRUE= 000020
SELPAT  041066          T$FREE  105050 G        T$$SW = 010001          WRD2  = 007200          $END.L  105052 G
SERVIC  034544 G        T$GMAN= 000000          T1      102712 G        WRD20 = 007312          $PATCH  004134 G
SET.PT  047132          T$HILI= 000012          UAM   = 000200 G        WRD21 = 007322          $SAVE2  005262 G
SFPTBL  002222 G        T$LAST= 000000          UP.HAR  037422          WRD24 = 007332          $SAVE3  005276 G
SOFTS   032714          T$LOLI= 000001          UP.RD.  045240          WRD25 = 007336          $SAVE4  005314 G
START.  044424          T$LSYM= 010000          UP.SOF  040104          WRD3  = 007206          $SAVE5  005334 G
SVCGBL= 000001          T$NEST= 177777          UP.WC.  045332          WRD34 = 007344          $T1     102536
SVCINS= 000001          T$NS0 = 000000          UP.WR.  045146          WRD35 = 007354

. ABS.  105054      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  31919 WORDS  ( 125 PAGES)
DYNAMIC MEMORY:  21558 WORDS  ( 82 PAGES)
ELAPSED TIME:  00:09:52
CZMLBB.BIN,CZMLBB/CR/-SP=SVC/ML,CZMLBB.DOC,MLX2,OTS,RANDOM,MLX3,MLX4
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CZMLBB CREATED BY MACRO ON 29-MAR-82 AT 13:44 PAGE 1
SYMBOL CROSS REFERENCE CREF SEQ 0364

SYMBOL	VALUE		REFERENCES								
ADR	= 000020	G	#83-1773								
ASSEMB	= 000010		6-13	6-13							
BANK	034344		#82-1685	*98-2978	*99-2991	100-3052	103-3237	105-3302	108-3485	109-3530	155-6371
			*155-6383								
BASE.A	032706		#81-1650	*88-2289	89-2338	97-2909					
BIT.NU	012666		#81-1637	*99-3005	103-3226	104-3290	108-3474	109-3522			
BIT0	= 000001	G	#83-1754								
BIT00	= 000001	G	#83-1744								
BIT01	= 000002	G	#83-1743								
BIT02	= 000004	G	#83-1742								
BIT03	= 000010	G	#83-1741								
BIT04	= 000020	G	#83-1740								
BIT05	= 000040	G	#83-1739								
BIT06	= 000100	G	#83-1738								
BIT07	= 000200	G	#83-1737								
BIT08	= 000400	G	#83-1736								
BIT09	= 001000	G	#83-1735								
BIT1	= 000002	G	#83-1753								
BIT10	= 002000	G	#83-1734								
BIT11	= 004000	G	#83-1733								
BIT12	= 010000	G	#83-1732								
BIT13	= 020000	G	#83-1731								
BIT14	= 040000	G	#83-1730								
BIT15	= 100000	G	#83-1729								
BIT2	= 000004	G	#83-1752								
BIT3	= 000010	G	#83-1751								
BIT4	= 000020	G	#83-1750								
BIT5	= 000040	G	#83-1749								
BIT6	= 000100	G	#83-1748								
BIT7	= 000200	G	#83-1747								
BIT8	= 000400	G	#83-1746								
BIT9	= 001000	G	#83-1745								
BL$DIV	005170	G	#37-1170	185-8022	205-9118	209-9381	225-10222	273-13132	282-13730	297-14575	298-14593
			313-15422	341-16905							
BL$GT1	004234	G	#13-169								
BL$GT2	004356	G	#18-384	164-6887	180-7728	200-8836	205-9143	220-9931	242-11178	265-12395	273-12846
			281-13705	297-14560	322-15915	333-16485	341-16904				
BL$LAS	105044	G	#340-16868	340-16869	340-16873						
BL$MOD	005202	G	#38-1201	118-4116	261-12206	263-12297	265-12380	265-12404	341-16906		
BL$MUL	004744	G	#34-1022	95-2787	341-16906						
BL$PU1	004520	G	#23-592								
BL$PU2	004614	G	#29-829	47-220	47-231	50-339	85-2133	85-2140	111-3672	112-3685	118-4112
			341-16905								
BL$SHF	005214	G	13-181	13-184	13-188	13-192	14-217	19-406	19-409	19-413	19-417
			19-438	23-595	23-599	23-605	24-632	29-838	29-842	29-848	30-880
			#39-1236	88-2294	341-16905						
BOARD	034342		#82-1684	*99-2996	100-3053	104-3246	104-3271	105-3306	108-3490	109-3534	155-6370
			155-6379	*155-6382	168-7119	169-7140	171-7267	171-7284	185-7996	185-8013	187-8108
			187-8125	204-9088	205-9109	209-9350	209-9367	211-9467	211-9484	225-10196	225-10213
			227-10308	227-10325	247-11460	248-11481	252-11739	253-11760	257-12018	258-12039	259-12125
			259-12142	273-13106	273-13123	273-13216	273-13233	286-13980	287-14001	288-14085	289-14106
			302-14838	302-14855	304-14946	304-14963	318-15671	318-15688	319-15773	320-15794	

CZMLBB CREATED BY MACRO ON 29-MAR-82 AT 13:44 PAGE 2
SYMBOL CROSS REFERENCE CREF SEQ 0365

SYMBOL	VALUE		REFERENCES								
BOE	= 000400	G	#83-1777								
BR.LEV	032712		#81-1653	*88-2291	88-2292						
CAUSE1	= 010460		#83-1905	94-2733	333-16499						
CAUSE2	= 010502		#83-1906	94-2756	334-16511						
CAUSE3	= 010526		#83-1907	96-2831	96-2858	334-16519					
CAUSE4	= 010602		#83-1908	334-16527							
CAUSE5	= 010656		#83-1909	334-16535							
CAUSE6	= 010710		#83-1910	334-16543							
CAUSE7	= 010734		#83-1911	334-16551							
CAUSE8	= 010756		#83-1912	335-16563							
CHECK	046000		#147-5961	149-6059	153-6265	154-6301	154-6312	169-7147	169-7152	171-7238	182-7826
			201-8923	206-9185	222-10026	244-11290	249-11569	254-11848	273-12939	283-13815	299-14673
			302-14809	315-15506							
CHOOSE	046166		#149-6052	181-7804	201-8905	206-9166	221-10004	244-11269	249-11548	254-11827	273-12918
			283-13797	299-14655	314-15484						
CLRTBL	034554		#84-2078	111-3644							
COMP.C	032702		#81-1646	*116-3994	118-4102						
CONFIG	036002		#93-2703	112-3678							
CRLF	= 007066		#83-1814	88-2301	89-2330	154-6342	325-16041	332-16410	332-16419	337-16696	337-16705
			338-16758								
C$AU	= 000052		#6-13								
C$AUTO	= 000061		#6-13								
C$BRK	= 000022		#6-13								
C$BSEG	= 000004		#6-13								
C$BSUB	= 000002		#6-13								
C$CEFG	= 000045		#6-13								
C$CLCK	= 000062		#6-13								
C$CLEA	= 000012		#6-13								
C$CLOS	= 000035		#6-13								
C$CLP1	= 000006		#6-13								
C$CVEC	= 000036		#6-13								
C$DCLN	= 000044		#6-13								
C$DODU	= 000051		#6-13								
C$DRPT	= 000024		#6-13								
C$DU	= 000053		#6-13								
C$EDIT	= 000003		#6-13								
C$ERDF	= 000055		#6-13								
C$ERHR	= 000056		#6-13								
C$ERRO	= 000060		#6-13								
C$ERSF	= 000054		#6-13								
C$ERSO	= 000057		#6-13								
C$ESCA	= 000010		#6-13								
C$ESEG	= 000005		#6-13								
C$ESUB	= 000003		#6-13								
C$ETST	= 000001		#6-13								
C$EXIT	= 000032		#6-13								
C$GETB	= 000026		#6-13								
C$GETW	= 000027		#6-13								
C$GMAN	= 000043		#6-13								
C$GPHR	= 000042		#6-13								
C$GPLO	= 000030		#6-13								
C$GPRI	= 000040		#6-13								

CZMLBB CREATED BY MACRO ON 29-MAR-82 AT 13:44 PAGE 3
SYMBOL CROSS REFERENCE CREF SEQ 0366

SYMBOL	VALUE		REFERENCES								
C$INIT	= 000011		#6-13								
C$INLP	= 000020		#6-13								
C$MANI	= 000050		#6-13								
C$MEM	= 000031		#6-13								
C$MSG	= 000023		#6-13								
C$OPEN	= 000034		#6-13								
C$PNTB	= 000014		#6-13								
C$PNTF	= 000017		#6-13								
C$PNTS	= 000016		#6-13								
C$PNTX	= 000015		#6-13								
C$QIO	= 000377		#6-13								
C$RDBU	= 000007		#6-13								
C$REFG	= 000047		#6-13								
C$RESE	= 000033		#6-13	#6-13							
C$REVI	= 000003		#6-13	6-65							
C$RFLA	= 000021		#6-13								
C$RPT	= 000025		#6-13								
C$SFFG	= 000046		#6-13								
C$SPRI	= 000041		#6-13								
C$SVEC	= 000037		#6-13								
C$TPRI	= 000013		#6-13								
DATA.C	032700		#81-1644	*116-3993	118-4104						
DECODE	037176		#98-2972	100-3049	155-6373						
DFPTBL	002210	G	#7-117								
DIAGMC	= 000000		6-13	6-13							
DIVMOD	005006		#35-1091	37-1171	38-1202						
DOUBLE	044326		#133-5198	166-6966	182-7835	201-8931	206-9193	222-10035	244-11299	249-11578	254-11857
			273-12948	284-13828	299-14682	315-15515					
DRIVE.	034442	G	46-201	47-214	#82-1692	85-2128	111-3653	164-6881	180-7722	200-8830	205-9137
			220-9925	242-11172	265-12389	273-12840	281-13699	297-14554	322-15909		
DROPNE	002234	G	#8-160	83-1723	85-2146						
DROPT.	034444	G	46-201	47-225	#82-1695	85-2135	333-16479				
DROP1	002236	G	#8-161	83-1723	*85-2148	325-16054					
DROP2	002240	G	#8-162	83-1724	*85-2149	325-16057					
DROP3	002242	G	#8-163	83-1724	*85-2150	325-16060					
DROP4	002244	G	#8-164	83-1724	*85-2151	325-16065					
DROP5	002250	G	#8-166	83-1724	*85-2152	325-16068					
ECCDIS	002254	G	#8-169	83-1725	88-2296	131-4772	131-4807	131-4858	131-4956	138-5458	
EFN$21	002262	G	#8-192	83-1722	185-8027	210-9390	225-10227	258-12048	273-13137	287-14008	303-14869
			318-15697								
EF.CON	= 000036	G	#83-1757								
EF.NEW	= 000035	G	#83-1758								
EF.PWR	= 000034	G	#83-1759								
EF.RES	= 000037	G	#83-1756								
EF.STA	= 000040	G	#83-1755								
END.RB	= 032670		#83-1790								
END.WB	= 022670		#83-1789	156-6439							
EOP	102726	G	44-31	44-39	#332-16405	339-16823					
EOPSUM	002256	G	#8-188	83-1725	332-16407						
EOP.CO	032704		#81-1648	*84-2101	*339-16805	339-16806	339-16816				
ERRBLK	002200	G	#7-94								
ERRMSG	002176	G	#7-94								

CZMLBB CREATED BY MACRO ON 29-MAR-82 AT 13:44 PAGE 4
SYMBOL CROSS REFERENCE CREF
SEQ 0367

SYMBOL	VALUE		REFERENCES
ERRNBR	002174	G	#7-94
ERROUT	002260	G	#8-190 83-1725 100-3050 131-4818 131-5100 144-5788 146-5886 148-5984 153-6252 154-6334 155-6358 167-7059 168-7112 169-7126 169-7133 170-7207 171-7260 171-7270 171-7277 184-7936 185-7989 185-7999 185-8006 186-8048 187-8101 187-8111 187-8118 203-9028 204-9081 204-9091 204-9098 208-9290 209-9343 209-9353 209-9360 210-9407 211-9460 211-9470 211-9477 224-10136 224-10185 225-10199 225-10206 226-10248 226-10297 227-10311 227-10318 246-11400 247-11453 247-11463 247-11470 251-11679 252-11732 252-11742 252-11749 256-11958 257-12011 257-12021 257-12028 258-12065 259-12118 259-12128 259-12135 273-13047 273-13099 273-13109 273-13116 273-13157 273-13209 273-13219 273-13226 285-13920 286-13973 286-13983 287-13994 287-14025 288-14078 288-14088 288-14095 301-14778 302-14831 302-14841 302-14848 303-14886 304-14939 304-14949 304-14956 316-15607 317-15660 318-15674 318-15681 318-15713 319-15766 319-15776 320-15787
ERRTYP	002172	G	#7-94
EVL	= 000004	G	#83-1771
E$END	= 002100		#6-13
E$LOAD	= 000035		#6-13 6-65
FILLER	041266		#118-4094 120-4178 123-4315
FMT1A	= 006126		#83-1794 199-8804
FMT1B	= 006142		#83-1795 199-8813
FMT10A	= 006564		#83-1806 100-3057
FMT10B	= 006640		#83-1807 168-7074 170-7218 184-7947 186-8059 203-9039 208-9301 210-9418 224-10147 226-10259 246-11411 251-11690 256-11969 258-12076 273-13058 273-13168 285-13931 287-14036 301-14789 303-14897 317-15622 319-15728
FMT11	= 006654		#83-1808 96-2840 96-2867
FMT12A	= 006710		#83-1809 166-6979 182-7848 202-8948 206-9206 222-10048 245-11316 250-11595 255-11874 273-12961 284-13841 300-14699 315-15528
FMT12B	= 006756		#83-1810 166-6986 182-7855 202-8955 206-9213 222-10055 245-11323 250-11602 255-11881 273-12968 284-13848 300-14706 315-15535
FMT13	= 007024		#83-1811 104-3280
FMT14	= 007046		#83-1812 332-16430 332-16436 332-16442
FMT15	= 007060		#83-1813 131-4832 131-4840 131-4851 131-4861 131-4871 131-4879 131-4920 131-4928 131-4936 131-4946 131-4959 131-4967 131-4975 131-4985 131-4993 131-5003 131-5014 131-5022 131-5030 131-5038 131-5046 131-5056 131-5067 131-5075
FMT16	= 005736		#83-1792 338-16749
FMT2	= 006160		#83-1796 94-2734 94-2757 96-2832 96-2859 242-11190 244-11265 249-11544 254-11823 334-16504 334-16512 334-16520 334-16528 334-16536 334-16544 334-16552 335-16564 336-16642 336-16652
FMT3	= 006166		#83-1797 339-16819
FMT4A	= 006216		#83-1798 90-2439 94-2723 333-16467
FMT4B	= 006252		#83-1799 90-2453 97-2911
FMT4C	= 006270		#83-1800 90-2463
FMT5	= 006320		#83-1801 97-2883
FMT6	= 006376		#83-1802 139-5500 144-5796 146-5894 148-5992
FMT7	= 006446		#83-1803 335-16591 336-16619 336-16663
FMT8	= 006466		#83-1804 97-2905
FMT9	= 006534		#83-1805 335-16605 336-16633 337-16681
F$AU	= 000015		#6-13
F$AUTO	= 000020		#6-13
F$BGN	= 000040		#6-13 6-39 8-259 8-302 9-379 9-411
F$CLEA	= 000007		#6-13
F$DU	= 000016		#6-13
F$END	= 000041		#6-13 6-13 6-13 6-13 6-13 6-13 6-13 6-13 6-13

SYMBOL CROSS REFERENCE
SYMBOL VALUE REFERENCES CREF

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                        6-13    6-13    6-13    6-13    6-13    6-13    6-13    6-13    6-39
                        8-277   8-339   9-411
F$HARD  = 000004        #6-13   8-259   8-277   8-314   8-316   8-319   8-322   8-324   8-329
F$HW    = 000013        #6-13   7-117   7-134
F$INIT  = 000006        #6-13
F$JMP   = 000050        #6-13
F$MOD   = 000000        #6-13   6-39    9-411
F$MSG   = 000011        #6-13
F$PROT  = 000021        #6-13   9-379   9-385
F$PWR   = 000017        #6-13
F$RPT   = 000012        #6-13
F$SEG   = 000003        #6-13
F$SOFT  = 000005        #6-13   8-302   8-314   8-316   8-319   8-322   8-324   8-329   8-339
F$SRV   = 000010        #6-13
F$SUB   = 000002        #6-13
F$SW    = 000014        #6-13   8-143   8-196
F$TEST  = 000001        #6-13
GEN1      040732        #114-3793 180-7743
GEN2      041432        #120-4173 199-8818
GEN3      041466        #121-4241 164-6873 220-9917
GEN4      041564        #123-4310 242-11156 242-11160
GEN5      041620        #125-4371 273-12832 281-13694 297-14549 313-15397
GETCNT    041106        #116-3959 120-4174 123-4311
GET.WR    047176        #157-6486 165-6903 180-7746 200-8850 205-9158 220-9946 273-12861
G$CNTO  = 000200        #6-13
G$DELM  = 000372        #6-13
G$DISP  = 000003        #6-13
G$EXCP  = 000400        #6-13
G$HILI  = 000002        #6-13
G$LOLI  = 000001        #6-13
G$NO    = 000000        #6-13
G$OFFS  = 000400        #6-13   8-272   8-273   8-274   8-275   8-313   8-315   8-317   8-318
                          8-320 8-321   8-323   8-325   8-326   8-327   8-328   8-330   8-331
                          8-332 8-333   8-334   8-335   8-336
G$OFSI  = 000376        #6-13   8-272   8-273   8-274   8-275   8-313   8-315   8-317   8-318
                          8-320 8-321   8-323   8-325   8-326   8-327   8-328   8-330   8-331
                          8-332 8-333   8-334   8-335   8-336
G$PRMA  = 000001        #6-13   8-272   8-273
G$PRMD  = 000002        #6-13   8-274   8-275   8-317   8-318   8-320   8-323   8-330
G$PRML  = 000000        #6-13   8-313   8-315   8-321   8-325   8-326   8-327   8-328   8-331
                          8-332 8-333   8-334   8-335   8-336
G$RADA  = 000140        #6-13
G$RADB  = 000000        #6-13
G$RADD  = 000040        #6-13   8-320   8-323   8-330
G$RADL  = 000120        #6-13   8-313   8-315   8-321   8-325   8-326   8-327   8-328   8-331
                          8-332 8-333   8-334   8-335   8-336
G$RADO  = 000020        #6-13   8-272   8-273   8-274   8-275   8-317   8-318
G$XFER  = 000004        #6-13   8-314   8-316   8-319   8-322   8-324   8-329
G$YES   = 000010        #6-13   8-272   8-273   8-274   8-275   8-313   8-315   8-317   8-318
                          8-320 8-321   8-323   8-325   8-326   8-327   8-328   8-330   8-331
                          8-332 8-333   8-334   8-335   8-336
HARDS     033314        #82-1660 *84-2092 *103-3214 335-16584 336-16629
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SYMBOL	VALUE		REFERENCES
HELP	= 000000		#6-4 6-8 6-30 6-48 6-67 7-103 7-119 8-145 #8-200 8-261 8-279 8-304 9-341 9-387 9-404 9-416
HOE	= 100000	G	#83-1784
IBE	= 010000	G	#83-1781
IDU	= 000040	G	#83-1774
IER	= 020000	G	#83-1782
INIT.A	035206		#88-2286 111-3664
INTEGR	047232		#164-6862 325-16052
ISOLAT	037332		#100-3048 167-7046 167-7058 170-7195 170-7206 183-7918 184-7935 186-8047 203-9015 203-9027 208-9277 208-9289 210-9406 223-10118 224-10135 226-10247 246-11386 246-11399 251-11665 251-11678 256-11944 256-11957 258-12064 273-13030 273-13046 273-13156 285-13907 285-13919 287-14024 301-14765 301-14777 303-14885 316-15594 316-15606 318-15712
ISR	= 000100	G	#83-1775
IXE	= 004000	G	#83-1780
I$AU	= 000041		#6-13
I$AUTO	= 000041		#6-13
I$CLN	= 000041		#6-13
I$DU	= 000041		#6-13
I$HRD	= 000041		#8-259 #8-277
I$INIT	= 000041		#6-13
I$MOD	= 000041		#6-13 6-39 #6-39 9-411 #9-411
I$MSG	= 000041		#6-13
I$PROT	= 000040		#6-13 #9-379
I$PTAB	= 000041		#6-13
I$PWR	= 000041		#6-13
I$RPT	= 000041		#6-13
I$SEG	= 000041		#6-13
I$SETU	= 000041		#6-13
I$SFT	= 000041		#8-302 #8-339
I$SRV	= 000041		#6-13
I$SUB	= 000041		#6-13
I$TST	= 000041		#6-13
I.AM.D	034336		#82-1680 *83-1927 *138-5465 138-5471 138-5477
J$JMP	= 000167		#6-13
LAU	005650		#48-296 49-315
LAUTO	005504		#45-101 45-119
LCLEAN	104724		#339-16805 340-16848
LDU	005516		#47-210 47-257
LIMIT	002222	G	#8-153 83-1722 95-2794
LINIT	040474		#111-3636 112-3710
LOE	= 040000	G	#83-1783
LOT	= 000010	G	#83-1772
LOW.SE	034460	G	#82-1702 *85-2122 *96-2850 97-2881 164-6894 180-7738 185-8033 200-8845 205-9153 210-9396 220-9941 225-10233 243-11200 258-12054 263-12285 273-12856 273-13143 282-13717 287-14014 297-14573 303-14875 318-15702
LRPT	005466		#44-39 44-58
LSECT	002226	G	#8-157 83-1723 *95-2806 *95-2814 96-2848 96-2850 96-2865
L$ACP	002110	G	#6-65
L$APT	002036	G	#6-65
L$AU	005652	G	6-65 #49-315
L$AUT	002070	G	#6-65
L$AUTO	005506	G	6-65 #45-119

SYMBOL VALUE REFERENCES

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L$CCP     002106  G   #6-65
L$CLEA    105034  G    6-65      #340-16847
L$CO      002032  G   #6-65
L$DEPO    002011  G   #6-65
L$DESC    002130  G    6-65      #7-85
L$DESP    002076  G   #6-65
L$DEVP    002060  G   #6-65
L$DISP    002204  G    6-65      #7-101
L$DLY     002116  G   #6-65       137-5400   137-5428   138-5442
L$DTP     002040  G   #6-65
L$DTYP    002034  G   #6-65
L$DU      005640  G    6-65      #47-257
L$DUT     002072  G   #6-65
L$DVTY    002122  G    6-65      #6-80
L$EF      002052  G   #6-65
L$ENVI    002044  G   #6-65
L$ERRT    002172  G    6-65      #7-94
L$ETP     002102  G   #6-65
L$EXP1    002046  G   #6-65
L$EXP4    002064  G   #6-65
L$EXP5    002066  G   #6-65
L$HARD    002266  G    6-65       8-259      #8-259
L$HIME    002120  G   #6-65
L$HPCP    002016  G   #6-65
L$HPTP    002022  G   #6-65
L$HW      002210  G    6-65       7-117      #7-117
L$ICP     002104  G   #6-65
L$INIT    040722  G    6-65      #112-3710
L$LADP    002026  G   #6-65
L$LAST  = 105050  G    6-65      #340-16873
L$LOAD    002100  G   #6-65
L$LUN     002074  G   #6-65       46-201     47-210     47-216     47-221     47-227     83-1722    *85-2119   *111-3648
                      *164-6891  *180-7733  *200-8840  *205-9148  *220-9936  *242-11183 *273-12851 *282-13714 *297-14565
                      *313-15405
L$MREV    002050  G   #6-65
L$NAME    002000  G   #6-65
L$PRIO    002042  G   #6-65
L$PROT    004126  G    6-65      #9-379
L$PRT     002112  G   #6-65
L$REPP    002062  G   #6-65
L$REV     002010  G   #6-65
L$RPT     005474  G    6-65      #44-58
L$SOFT    002450  G    6-65       8-302      #8-302
L$SPC     002056  G   #6-65
L$SPCP    002020  G   #6-65
L$SPTP    002024  G   #6-65
L$STA     002030  G   #6-65
L$SW      002222  G    6-65       8-143      #8-143
L$TEST    002114  G   #6-65
L$TIML    002014  G   #6-65
L$UNIT    002012  G   #6-65       83-1722    84-2079    111-3645   164-6874   180-7715   199-8819   205-9130   220-9918
                      242-11165  265-12372  265-12379  265-12382  265-12403  273-12833  281-13691  297-14546  322-15902
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SYMBOL CROSS REFERENCE CREF
SYMBOL VALUE REFERENCES SEQ 0371

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                    333-16450
L10000    002220    7-117     #7-134
L10001    002264    8-143     #8-196
L10002    002332    8-259     #8-277
L10003    002664    8-302     #8-339
MARPAT    002246 G  #8-165    83-1724   242-11154  242-11157
MLB10   = 007472    #83-1853  131-4992
MLB11   = 007500    #83-1854  131-5002
MLB12   = 007504    #83-1855  131-5013
MLB13   = 007510    #83-1856  131-5021
MLB14   = 007514    #83-1857  131-5029
MLB15   = 007520    #83-1858  131-5037
MLB16   = 007524    #83-1859  131-5045
MLB17   = 007530    #83-1860  131-5055
MLB18   = 007534    #83-1861  131-5066
MLB19   = 007542    #83-1862  131-5074
MLB2    = 007430    #83-1845  131-4919
MLB20   = 007550    #83-1863  131-4831
MLB21   = 007554    #83-1864  131-4870
MLB22   = 007560    #83-1865  131-4839
MLB23   = 007564    #83-1866  131-4850
MLB24   = 007570    #83-1867  131-4878
MLB3    = 007434    #83-1846  131-4927
MLB4    = 007440    #83-1847  131-4935
MLB5    = 007444    #83-1848  131-4945
MLB6    = 007450    #83-1849  131-4860  131-4958
MLB7    = 007454    #83-1850  131-4966
MLB8    = 007460    #83-1851  131-4974
MLB9    = 007464    #83-1852  131-4984
ML.REG    034346 G  #82-1689  *89-2340  90-2411  90-2421  90-2424  90-2430  90-2451  94-2714  94-2715
                    94-2716   94-2745   95-2770  95-2780  95-2798  97-2887  98-2972  99-2997  100-3048
                    100-3054  131-4732  131-4738 131-4740 131-4742 131-4745 131-4747 131-4749 131-4751
                    131-4753  131-4756  131-4758 131-4761 131-4763 131-4765 131-4767 131-4770 131-4775
                    131-4777  131-4779  131-4781 131-4783 131-4785 131-4791 131-4793 131-4795 131-4798
                    131-4800  131-4802  131-4805 131-4810 131-4812 131-4829 131-4837 131-4848 131-4856
                    131-4868  131-4876  131-4917 131-4925 131-4933 131-4943 131-4951 131-4964 131-4972
                    131-4980  131-4982  131-4990 131-5000 131-5011 131-5019 131-5027 131-5035 131-5043
                    131-5053  131-5061  131-5072 137-5416 137-5417 137-5422 137-5425 138-5439 138-5452
                    138-5453  138-5454  138-5457 138-5460 138-5461 138-5462 138-5463 138-5464 138-5469
                    138-5474  167-7061  168-7079 168-7080 168-7099 168-7102 170-7209 170-7223 170-7224
                    171-7247  171-7250  184-7938 184-7952 184-7953 184-7972 184-7975 186-8050 186-8064
                    186-8065  186-8084  186-8087 203-9030 203-9044 203-9045 204-9068 204-9071 208-9292
                    208-9306  208-9307  208-9326 209-9333 210-9409 210-9423 210-9424 211-9447 211-9450
                    224-10138 224-10152 224-10153 224-10172 224-10175 226-10250 226-10264 226-10265 226-10284
                    226-10287 246-11402 247-11420 247-11421 247-11440 247-11443 251-11681 251-11695 252-11700
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                    273-13173 273-13174 273-13193 273-13196 285-13922 286-13940 286-13941 286-13960 286-13963
                    287-14027 287-14041 287-14042 288-14065 288-14068 301-14780 301-14794 301-14795 302-14818
                    302-14821 303-14888 303-14902 303-14903 304-14926 304-14929 317-15613 317-15627 317-15628
                    317-15647 317-15650 318-15715 319-15733 319-15734 319-15753 319-15756 322-15924 322-15925
                    322-15926 333-16458 333-16459 333-16460 336-16637 336-16647
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CZMLBB CREATED BY MACRO ON 29-MAR-82 AT 13:44 PAGE 9 SEQ 0372
SYMBOL CROSS REFERENCE CREF

SYMBOL	VALUE		REFERENCES								
MSG0	= 011002		#83-1913	139-5504							
MSG1	= 011070		#83-1914	165-6926	165-6936	165-6945	166-6993	167-7019	167-7029	167-7038	169-7164
			169-7174	170-7187	181-7776	181-7787	181-7796	182-7863	183-7889	183-7900	183-7911
			200-8875	201-8889	201-8898	202-8962	202-8984	203-8998	203-9007	207-9224	207-9246
			207-9256	207-9265	221-9976	221-9987	221-9996	222-10063	223-10089	223-10100	223-10109
			243-11229	243-11240	244-11253	245-11331	245-11353	246-11368	246-11377	248-11506	248-11517
			248-11526	250-11610	250-11632	251-11647	251-11656	253-11785	253-11[illegible]	253-11805	255-11889
			255-11911	256-11926	256-11935	273-12890	273-12901	273-12910	273-129[illegible]	273-13001	273-13012
			273-13021	283-13771	283-13781	283-13790	284-13855	284-13876	285-13890	285-13899	298-14625
			298-14635	299-14648	300-14713	300-14734	300-14744	301-14757	314-15458	314-15468	314-15477
			315-15542	316-15567	316-15577	316-15586					
MSG2	= 011120		#83-1915	104-3278	167-7049	170-7198	183-7921	203-9018	208-9280	223-10121	246-11389
			251-11668	256-11947	273-13033	285-13910	301-14768	316-15597	336-16641	336-16651	
MSG3	= 011166		#83-1916	169-7130	169-7137	171-7274	171-7281	185-8003	185-8010	187-8115	187-8122
			204-9095	204-9102	209-9357	209-9364	211-9474	211-9481	225-10203	225-10210	227-10315
			227-10322	247-11467	248-11478	252-11746	253-11757	257-12025	258-12036	259-12132	259-12139
			273-13113	273-13120	273-13223	273-13230	286-13987	287-13998	288-14092	288-14099	302-14845
			302-14852	304-14953	304-14960	318-15678	318-15685	320-15784	320-15791		
MSG4	= 011202		#83-1917	168-7116	171-7264	185-7993	187-8105	204-9085	209-9347	211-9464	225-10193
			227-10305	247-11457	252-11736	257-12015	259-12122	273-13103	273-13213	286-13977	288-14082
			302-14835	304-14943	317-15664	319-15770					
MSG5	= 011216		#83-1918	166-6972	182-7841	202-8941	206-9199	222-10041	245-11309	250-11588	254-11863
			273-12954	284-13834	299-14688	315-15521					
NUM.DR	034456	G	46-202	*47-232	#82-1700	*84-2102	111-3661	*111-3666	313-15398	322-15901	
ONEFIL	= 000001		#2-5	4-1665	5-1666	6-34	8-223	9-429			
ONLY	002232	G	#8-159	83-1723	95-2800	95-2810					
OPT1	051460		#179-7702	325-16056							
OPT2	054054		#199-8781	325-16059							
OPT3	060052		#219-9903	325-16062							
OPT4	062444		#242-11146	325-16067							
OPT5	102272		#322-15893	325-16070							
O$APTS	= 000001		#6-13	#6-46	6-65						
O$AU	= 000001		#6-13	#6-46	6-65						
O$BGNR	= 000001		#6-13	#6-46	6-65						
O$BGNS	= 000001		#6-13	#6-46	6-65						
O$DU	= 000001		#6-13	#6-46	6-65						
O$ERRT	= 000001		#6-13	#6-46	6-65						
O$GNSW	= 000001		#6-13	#6-46	6-65						
O$POIN	= 000001		#6-13	#6-46	6-46	6-65					
O$SETU	= 000001		#6-13	#6-46	6-65						
PATTBL	034520	G	#82-1706	116-3993	116-3994						
PATTER	032676		#81-1643	*115-3870	115-3871	*115-3873	120-4173	*199-8789	199-8800	199-8802	199-8809
			199-8817								
PHR1	= 007714		#83-1881	139-5495	148-5990	153-6268					
PHR10	= 010120		#83-1890	131-4822	131-4895	131-4909					
PHR11	= 010140		#83-1891	131-5104							
PHR12	= 010202		#83-1892	332-16423							
PHR13	= 010240		#83-1893	332-16440							
PHR14	= 010266		#83-1894	96-2839	96-2864						
PHR15	= 010304		#83-1895	96-2866							
PHR16	= 010322		#83-1896	96-2837							
PHR17	= 010342		#83-1897	332-16414							

PHR18	= 010366		#83-1898	336-16618						
PHR19	= 010410		#83-1899	332-16428						
PHR2	= 007730		#83-1882	325-16046	339-16809					
PHR20	= 010430		#83-1900	332-16434						
PHR21	= 005662		#83-1791	337-16700						
PHR3	= 007746		#83-1883	89-2324						
PHR4	= 007770		#83-1884	97-2910						
PHR5	= 010004		#83-1885	335-16590						
PHR6	= 010026		#83-1886	336-16662						
PHR7	= 010050		#83-1887	90-2438	94-2722	333-16466				
PHR8	= 010066		#83-1888	90-2452	90-2462					
PHR9	= 010100		#83-1889	199-8803	199-8812					
PM.SBE	012264		#81-1633	*86-2176	*104-3273	104-3274	336-16639	336-16649		
PNT	= 001000	G	#83-1778							
PRI	= 002000	G	#83-1779							
PRI00	= 000000	G	#83-1770							
PRI01	= 000040	G	#83-1769							
PRI02	= 000100	G	#83-1768							
PRI03	= 000140	G	#83-1764							
PRI04	= 000200	G	#83-1763							
PRI05	= 000240	G	#83-1762							
PRI06	= 000300	G	#83-1761							
PRI07	= 000340	G	#83-1760							
PTABLE	034422	G	#82-1690	90-2434	94-2711	94-2718	*111-3660	137-5413	138-5449	322-15921
			333-16462							333-16455
P.AAA	005662		#70-944	83-1791						
P.AAB	005736		#70-959	83-1792						
P.AAC	006042		#70-982	83-1793						
P.AAD	006126		#70-1003	83-1794						
P.AAE	006142		#70-1007	83-1795						
P.AAF	006160		#70-1012	83-1796						
P.AAG	006166		#70-1014	83-1797						
P.AAH	006216		#70-1022	83-1798						
P.AAI	006252		#70-1032	83-1799						
P.AAJ	006270		#70-1037	83-1800						
P.AAK	006320		#71-1049	83-1801						
P.AAL	006376		#71-1065	83-1802						
P.AAM	006446		#71-1079	83-1803						
P.AAN	006466		#71-1085	83-1804						
P.AAO	006534		#72-1102	83-1805						
P.AAP	006564		#72-1110	83-1806						
P.AAQ	006640		#72-1125	83-1807						
P.AAR	006654		#72-1129	83-1808						
P.AAS	006710		#72-1139	83-1809						
P.AAT	006756		#73-1156	83-1810						
P.AAU	007024		#73-1169	83-1811						
P.AAV	007046		#73-1175	83-1812						
P.AAW	007060		#73-1179	83-1813						
P.AAX	007066		#73-1181	83-1814						
P.AAY	007072		#73-1183	83-1815						
P.AAZ	007100		#73-1185	83-1816						
P.ABA	007112		#73-1189	83-1817						

SYMBOL CROSS REFERENCE CREF

SYMBOL	VALUE	REFERENCES	
P.ABB	007130	#73-1194	83-1818
P.ABC	007152	#73-1200	83-1819
P.ABD	007200	#74-1212	83-1823
P.ABE	007206	#74-1214	83-1824
P.ABF	007212	#74-1216	83-1825
P.ABG	007220	#74-1218	83-1826
P.ABH	007230	#74-1221	83-1827
P.ABI	007240	#74-1224	83-1828
P.ABJ	007246	#74-1226	83-1829
P.ABK	007256	#74-1229	83-1830
P.ABL	007264	#74-1231	83-1831
P.ABM	007272	#74-1233	83-1832
P.ABN	007300	#74-1235	83-1833
P.ABO	007312	#74-1239	83-1834
P.ABP	007322	#74-1242	83-1835
P.ABQ	007332	#74-1245	83-1836
P.ABR	007336	#74-1247	83-1837
P.ABS	007344	#74-1249	83-1838
P.ABT	007354	#74-1252	83-1839
P.ABU	007370	#74-1256	83-1840
P.ABV	007400	#74-1259	83-1841
P.ABW	007412	#75-1267	83-1842
P.ABX	007416	#75-1269	83-1843
P.ABY	007424	#75-1271	83-1844
P.ABZ	007430	#75-1273	83-1845
P.ACA	007434	#75-1275	83-1846
P.ACB	007440	#75-1277	83-1847
P.ACC	007444	#75-1279	83-1848
P.ACD	007450	#75-1281	83-1849
P.ACE	007454	#75-1283	83-1850
P.ACF	007460	#75-1285	83-1851
P.ACG	007464	#75-1287	83-1852
P.ACH	007472	#75-1289	83-1853
P.ACI	007500	#75-1291	83-1854
P.ACJ	007504	#75-1293	83-1855
P.ACK	007510	#75-1295	83-1856
P.ACL	007514	#75-1297	83-1857
P.ACM	007520	#75-1299	83-1858
P.ACN	007524	#75-1301	83-1859
P.ACO	007530	#75-1303	83-1860
P.ACP	007534	#75-1305	83-1861
P.ACQ	007542	#75-1307	83-1862
P.ACR	007550	#75-1309	83-1863
P.ACS	007554	#75-1311	83-1864
P.ACT	007560	#75-1313	83-1865
P.ACU	007564	#75-1315	83-1866
P.ACV	007570	#75-1317	83-1867
P.ACW	007574	#76-1323	83-1868
P.ACX	007626	#76-1332	83-1869
P.ACY	007634	#76-1334	83-1870
P.ACZ	007642	#76-1336	83-1871
P.ADA	007650	#76-1338	83-1872

SYMBOL	VALUE	REFERENCES		
P.ADB	007656	#76-1340	83-1873	
P.ADC	007664	#76-1342	83-1874	
P.ADD	007672	#76-1344	83-1878	
P.ADE	007700	#76-1346	83-1879	
P.ADF	007706	#76-1348	83-1880	
P.ADG	007714	#76-1350	83-1881	
P.ADH	007730	#76-1354	83-1882	
P.ADI	007746	#76-1359	83-1883	
P.ADJ	007770	#76-1365	83-1884	
P.ADK	010004	#76-1369	83-1885	
P.ADL	010026	#77-1379	83-1886	
P.ADM	010050	#77-1385	83-1887	
P.ADN	010066	#77-1390	83-1888	
P.ADO	010100	#77-1394	83-1889	
P.ADP	010120	#77-1400	83-1890	
P.ADQ	010140	#77-1406	83-1891	
P.ADR	010202	#77-1418	83-1892	
P.ADS	010240	#77-1428	83-1893	
P.ADT	010266	#78-1440	83-1894	
P.ADU	010304	#78-1445	83-1895	
P.ADV	010322	#78-1450	83-1896	
P.ADW	010342	#78-1456	83-1897	
P.ADX	010366	#78-1463	83-1898	
P.ADY	010410	#78-1469	83-1899	
P.ADZ	010430	#78-1475	83-1900	
P.AEA	010444	#78-1479	83-1901	
P.AEB	010446	#78-1480	83-1902	
P.AEC	010450	#78-1481	83-1903	
P.AED	010454	#78-1483	83-1904	
P.AEE	010460	#78-1485	83-1905	
P.AEF	010502	#79-1495	83-1906	
P.AEG	010526	#79-1502	83-1907	
P.AEH	010602	#79-1517	83-1908	
P.AEI	010656	#79-1532	83-1909	
P.AEJ	010710	#79-1541	83-1910	
P.AEK	010734	#80-1552	83-1911	
P.AEL	010756	#80-1558	83-1912	
P.AEM	011002	#80-1565	83-1913	
P.AEN	011070	#80-1583	83-1914	
P.AEO	011120	#80-1591	83-1915	
P.AEP	011166	#81-1608	83-1916	
P.AEQ	011202	#81-1612	83-1917	
P.AER	011216	#81-1616	83-1918	
QH1	002332	8-272	#8-286	
QH2	002351	8-273	#8-287	
QH3	002374	8-274	#8-288	
QH4	002425	8-275	#8-289	
QS1	002664	8-313	#9-347	
QS10	003534	8-328	#9-362	
QS11	003554	8-323	8-330	#9-363
QS12	003637	8-331	#9-364	
QS13	003657	8-332	#9-365	

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SYMBOL CROSS REFERENCE CREF SEQ 0376

SYMBOL	VALUE		REFERENCES								
QS14	003724		8-333	#9-366							
QS15	003763		8-334	#9-367							
QS16	004030		8-335	#9-368							
QS17	004066		8-336	#9-369							
QS2	002732		8-315	#9-348							
QS3	003007		8-317	#9-349							
QS4	003047		8-318	#9-350							
QS5	003107		8-320	#9-351							
QS6	003147		8-321	#9-352							
QS7	003454		8-325	#9-359							
QS8	003474		8-326	#9-360							
QS9	003514		8-327	#9-361							
QUICK	032674		#81-1642	*111-3643	*112-3691	199-8790	205-9127	325-16039	325-16063		
RANDOM	005464	G	*42-27	#42-37	83-1726	125-4379	149-6053	149-6055	*261-12203	261-12204	*263-12292
			263-12295	*265-12377	265-12378	*265-12381	265-12385	265-12391	265-12399	265-12401	*265-12405
RAND1	070540		#273-12823	323-15938							
RAND2	073124		#281-13682	323-15940							
RAND3	075444		#297-14537	323-15942							
RAND4	100006		#312-15384	323-15949							
RANGE	002224	G	#8-155	83-1722	95-2796						
RBUFF	022670		#81-1639	83-1787	83-1788	83-1790	166-6958	166-6964	166-7005	168-7093	180-7735
			185-8037	200-8842	205-9150	210-9400	220-9938	225-10237	258-12058	273-12853	273-13150
			282-13719	287-14018	297-14567	303-14879	313-15407	318-15706			
RCBUFF	= 023670		#83-1788	242-11164							
RDBUFF	= 022670		#83-1787	242-11163							
RD.COU	034322		#82-1668	*85-2111	141-5627	*141-5628	*141-5632				
RD.MIL	034326		#82-1672	*85-2113	*141-5636	*141-5638	332-16435				
RD.THO	034324		#82-1670	*85-2112	*141-5631	141-5633	*141-5635				
READ	045612		#145-5863	149-6057	153-6275	154-6315	154-6327	166-6960	166-7002	168-7090	181-7807
			181-7815	185-8039	201-8908	201-8916	206-9170	206-9178	210-9402	221-10007	221-10015
			225-10239	244-11275	244-11283	249-11554	249-11562	254-11833	254-11841	258-12060	273-12921
			273-12932	273-13152	283-13800	283-13808	287-14020	299-14658	299-14666	303-14881	314-15487
			314-15495	318-15708							
REFRES	002252	G	#8-167	83-1725	89-2318	138-5455					
RETRY	046224		#153-6245	165-6919	166-7007	168-7095	169-7157	171-7243	181-7768	183-7881	184-7968
			186-8080	200-8868	202-8976	204-9064	207-9238	208-9322	211-9443	221-9968	223-10081
			224-10168	226-10280	243-11221	245-11345	247-11436	248-11498	250-11624	252-11715	253-11777
			255-11903	257-11994	259-12101	273-12882	273-12993	273-13079	273-13189	282-13760	284-13869
			286-13956	288-14061	298-14618	300-14727	302-14814	304-14922	314-15451	316-15560	317-15643
			319-15749								
RETRY1	034340		#82-1682	*84-2103	131-4815	131-5102	138-5479	144-5779	144-5790	146-5877	146-5888
			148-5975	148-5986	*153-6246	*155-6385					
RE2	005362		41-1349	#41-1379							
RE3	005360		41-1357	#41-1378							
RE4	005356		41-1366	#41-1377							
RN	005370	G	#42-12	83-1726	125-4377	149-6052	261-12202	263-12291	265-12376		
RNDSEC	070240		#263-12282	298-14589	313-15418						
RNDU	070336		#264-12367	313-15403							
RNDWC	070204		#261-12202	282-13724	298-14584	313-15413					
RPTR	032672		#81-1641	*156-6444	*180-7735	181-7810	181-7813	182-7833	*200-8842	201-8911	201-8914
			201-8929	*205-9150	206-9173	206-9176	206-9191	*220-9938	221-10010	221-10013	222-10033
			*273-12853	273-12924	273-12930	273-12946	*282-13719	283-13803	283-13806	284-13826	*297-14567

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                                                                   C 14
CZMLBB      CREATED BY  MACRO  ON 29-MAR-82 AT 13:44        PAGE 14
SYMBOL CROSS REFERENCE                                      CREF
SYMBOL   VALUE              REFERENCES                                                                                                        SEQ 0377
                             299-14661   299-14664   299-14680  *313-15407   314-15490   314-15493   315-15513
RTN0      = 007574          #83-1868     164-6865
RTN1      = 007626          #83-1869     180-7708
RTN2      = 007634          #83-1870     199-8783
RTN3      = 007642          #83-1871     219-9905
RTN4      = 007650          #83-1872     242-11148
RTN5      = 007656          #83-1873     322-15894
RTN5A     = 007664          #83-1874     273-12825
RTN5B     = 007672          #83-1878     281-13684
RTN5C     = 007700          #83-1879     297-14539
RTN5D     = 007706          #83-1880     313-15390
SAYWHO      035524          #90-2410     94-2744     104-3277    131-4821    131-4894    131-4908    138-5482    166-6971    182-7840
                             202-8940    206-9198    222-10040   245-11308   249-11583   254-11862   273-12953   284-13833   299-14687
                             315-15520   333-16474
SAY1      = 007072          #83-1815     131-4823    131-4896    131-4910    131-5105    139-5505    166-6973    182-7842    202-8942
                             206-9200    222-10042   242-11185   245-11310   250-11589   255-11868   273-12826   273-12955   281-13685
                             284-13835   297-14540   299-14689   313-15391   315-15522   332-16415   332-16424   337-16701   337-16710
SAY2      = 007100          #83-1816     94-2729     94-2752     96-2827     96-2854     154-6338    155-6362    164-6867    180-7710
                             199-8785    220-9911    242-11150   322-15896   333-16491
SAY3      = 007112          #83-1817     89-2326     153-6260    153-6270    153-6280    325-16048   339-16811
SAY4      = 007130          #83-1818
SAY5      = 007152          #83-1819     89-2314
SBE$HE    = 006042          #83-1793     337-16709
SBE$.C      012664          #81-1635    *84-2100     103-3215    104-3266    104-3285   *105-3320    108-3463   *109-3548    337-16694
                             337-16714
SBE.LO      011264          #81-1632    *85-2157    *85-2158     103-3224   *104-3262    104-3288   *105-3319    108-3472   *109-3510
                             109-3520   *109-3547    337-16720   337-16721
SEED1       005456    G     *42-15       42-18      #42-33       83-1726     125-4372
SEED2       005460    G      42-13      *42-20       42-27      #42-34       83-1726     125-4373
SEED3       005462    G      42- 9       42-23      *42-26      #42-35       83-1726     125-4374
SELPAT      041066          #115-3870    199-8799
SERVIC      034544    G     #83-1926     89-2348
SET.PT      047132          #156-6435    180-7749    200-8853    206-9165    220-9949    273-12864   282-13727   298-14587   313-15416
SFPTBL      002222    G     #8-143
SOFTS       032714          #82-1659    *84-2091    *108-3462    335-16583   335-16601
START.      044424          #137-5407    144-5777    146-5875    148-5973
SVCGBL    = 000001          #6-13       #6-22        6-65        6-65        6-65        6-65        6-65        6-65        6-65
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                             7-117       8-143       8-143       8-259       8-302       9-379
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SYMBOL VALUE REFERENCES

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SVCSUB = 000001 #6-13 #6-21
SVCTAG = 000001 #6-13 #6-23 7-134 8-196 8-277 8-339
SVCTST = 000001 #6-13 #6-20
SYSERR 041710 #131-4722 139-5511
S$LSYM = 010000 #6-13 #7-134 #8-196 #8-277 #8-339
TOP.SE 034500 G #82-1704 95-2777 165-6902 180-7739 180-7745 185-8032 200-8846 200-8849 205-9154
205-9157 210-9395 220-9942 220-9945 225-10232 243-11202 258-12053 263-12287 263-12293
273-12857 273-12860 273-13142 282-13720 287-14013 297-14570 303-14874 313-15410
TRIES 033714 #82-1661 *84-2093 *155-6381 335-16585 337-16677
TRT00 = 010444 #83-1901 97-2891
TRT01 = 010446 #83-1902 97-2895
TRT10 = 010450 #83-1903 97-2899

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SYMBOL  VALUE                REFERENCES
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                             96-2848     96-2863
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T$FREE    105050  G          340-16868   340-16869  #340-16870
T$GMAN  = 000000             #6-13
T$HILI  = 000012             #8-272      8-272       #8-273      8-273       #8-274       8-274      #8-275      8-275       #8-317
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T$LAST  = 000000             #6-13
T$LOLI  = 000001             #8-272      8-272       #8-273      8-273       #8-274       8-274      #8-275      8-275       #8-317
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T$LSYM  = 010000             #6-13       6-13        7-134       8-196       8-277        8-339
T$NEST  = 177777             #6-13       6-39       #6-39        6-39        7-117      #7-117       7-117      7-134        7-134
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T$NS0   = 000000             #6-39       9-411
T$NS1   = 000021             #7-117      7-134       #8-143      8-196       #8-259       8-277      #8-302      8-314        8-316
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T$PTHV  = 000000  G           6-65      #340-16874
T$PTNU  = 000000             #6-13
T$SAVL  = 177777             #6-13
T$SEGL  = 177777             #6-13
T$SUBN  = 000000             #6-13
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SYMBOL VALUE REFERENCES

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T$TAGN = 010005 #6-13 7-117 7-117 #7-117 8-143 8-143 #8-143 8-259 8-259
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#9-385 9-385 #9-411 9-411
T$TEST = 000000 #6-13
T$TSTM = 177777 #6-13
T$TSTS = 000000 #6-13
T$$HAR = 010002 #8-259 8-259 8-277
T$$HW = 010000 #7-117 7-117 7-134
T$$PRO = 010004 #9-379
T$$SOF = 010003 #8-302 8-302 8-339
T$$SW = 010001 #8-143 8-143 8-196
T1 102712 G 7-101 #326-16093
UAM = 000200 G #83-1776
UP.HAR 037422 #103-3203 168-7120 171-7268 185-7997 187-8109 204-9089 209-9351 211-9468 225-10197
227-10309 247-11461 252-11740 257-12019 259-12126 273-13107 273-13217 286-13981 288-14086
302-14839 304-14947 318-15672 319-15774
UP.RD. 045240 #141-5624 146-5880
UP.SOF 040104 #108-3452 169-7141 171-7285 185-8014 187-8126 205-9110 209-9368 211-9485 225-10214
227-10326 248-11482 253-11761 258-12040 259-12143 273-13124 273-13234 287-14002 289-14107
302-14856 304-14964 318-15689 320-15795
UP.WC. 045332 #142-5688 148-5978
UP.WR. 045146 #140-5560 144-5782
VEC 032710 #81-1652 *88-2290 89-2349
WAITER 044420 #134-5254 137-5421 138-5473
WBUFF 012670 #81-1638 83-1785 83-1786 83-1789 *114-3806 *114-3817 120-4175 *122-4250 *122-4251
*122-4258 *125-4372 *125-4373 *125-4374 *125-4379 156-6441 165-6907 165-6917 166-6963
169-7145 169-7155 171-7241 180-7734 200-8841 205-9149 220-9937 273-12852 282-13718
297-14566 313-15406
WCBUFF = 013670 #83-1786 242-11159 242-11162
WC.COU 034330 #82-1674 *85-2114 142-5691 *142-5692 *142-5696
WC.MIL 034334 #82-1678 *85-2116 *142-5700 *142-5702 332-16441
WC.THO 034332 #82-1676 *85-2115 *142-5695 142-5697 *142-5699
WDBUFF = 012670 #83-1785 242-11155 242-11161
WHY.DR 034446 G #82-1698 *85-2141 *94-2738 *95-2765 *96-2844 *96-2871 *165-6923 *165-6933 *165-6947
*166-6990 *167-7016 *167-7026 *167-7040 *167-7051 *169-7161 *169-7171 *170-7189 *170-7200

SYMBOL VALUE REFERENCES

*181-7773 *181-7784 *181-7799 *182-7860 *183-7886 *183-7897 *183-7908 *183-7924 *200-8872
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*207-9253 *207-9267 *208-9282 *221-9973 *221-9984 *221-9999 *222-10060 *223-10086 *223-10097
*223-10112 *223-10124 *243-11226 *243-11237 *244-11256 *245-11328 *245-11350 *246-11365 *246-11380
*246-11392 *248-11503 *248-11514 *249-11533 *250-11607 *250-11629 *251-11644 *251-11659 *251-11671
*253-11782 *253-11793 *254-11812 *255-11886 *255-11908 *255-11919 *256-11938 *256-11950 *273-12887
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*283-13792 *284-13852 *284-13873 *285-13887 *285-13901 *285-13912 *298-14622 *298-14632 *299-14650
*300-14710 *300-14731 *300-14741 *301-14759 *301-14770 *314-15455 *314-15465 *314-15479 *315-15539
*316-15564 *316-15574 *316-15588 *316-15599 333-16496

WPTR 032670 #81-1640 156-6438 *156-6441 156-6442 *180-7734 180-7752 181-7766 182-7821 182-7824
182-7832 185-8018 *185-8019 *200-8841 200-8856 200-8866 201-8918 201-8921 201-8928
205-9114 *205-9115 *205-9149 206-9180 206-9183 206-9190 209-9377 *209-9378 *220-9937
220-9952 220-9962 221-10017 222-10024 222-10032 225-10218 *225-10219 *273-12852 273-12867
273-12880 273-12934 273-12937 273-12945 273-13128 *273-13129 *282-13718 282-13748 282-13758
283-13810 283-13813 283-13821 *287-14005 *297-14566 298-14606 298-14616 299-14668 299-14671
299-14679 302-14812 *302-14858 *313-15406 313-15435 314-15449 315-15501 315-15504 315-15512
*318-15691

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WRD15 = 007246 #83-1829 100-3055 139-5497 144-5793 146-5891 148-5989
WRD16 = 007256 #83-1830 138-5485 144-5794 153-6258
WRD17 = 007264 #83-1831 138-5488 146-5892 153-6278
WRD18 = 007272 #83-1832 153-6257 153-6267 153-6277 154-6337 155-6361
WRD19 = 007300 #83-1833 154-6336
WRD2 = 007200 #83-1823 153-6259 153-6269 153-6279 325-16047
WRD20 = 007312 #83-1834 100-3056 155-6360
WRD21 = 007322 #83-1835 94-2727 94-2750 96-2825 96-2852 333-16489
WRD24 = 007332 #83-1836 242-11189 244-11264 254-11822
WRD25 = 007336 #83-1837 249-11543
WRD3 = 007206 #83-1824 339-16810 339-16818
WRD34 = 007344 #83-1838 89-2313 164-6866 180-7709 199-8784 219-9906 242-11149 322-15895
WRD35 = 007354 #83-1839 242-11184
WRD36 = 007370 #83-1840 88-2300 89-2320
WRD37 = 007400 #83-1841 88-2298 89-2322
WRD38 = 007412 #83-1842 89-2311
WRD4 = 007212 #83-1825 325-16045 339-16808 339-16817
WRD40 = 007416 #83-1843 89-2312 89-2325
WRD41 = 007424 #83-1844 89-2309
WRD6 = 007220 #83-1826 95-2772
WRD7 = 007230 #83-1827 95-2775

WRITE 045424 #143-5765 153-6255 153-6288 153-6294 154-6307 154-6322 165-6909 165-6914 180-7754
180-7759 200-8858 200-8863 220-9954 220-9959 243-11211 243-11216 248-11488 248-11493
253-11767 253-11772 273-12869 273-12877 282-13750 282-13755 298-14608 298-14613 313-15437
314-15446

WR.COU 034314 #82-1662 *84-2104 140-5563 *140-5564 *140-5568
WR.MIL 034320 #82-1666 *84-2106 *140-5572 *140-5574 332-16429
WR.THO 034316 #82-1664 *84-2105 *140-5567 140-5569 *140-5571
X$ALWA = 000000 #6-13 8-319 8-324
X$FALS = 000040 #6-13 8-314 8-316
X$OFFS = 000400 #6-13 8-314 8-316 8-319 8-322 8-324 8-329
X$TRUE = 000020 #6-13 8-322 8-329
$END.L 105052 G #340-16881

SYMBOL	VALUE		REFERENCES								
$PATCH	004134	G	#9-402								
$SAVE2	005262	G	34-1022	39-1269	#41-1344	116-3959	125-4371	143-5765	145-5863	147-5961	341-16905
$SAVE3	005276	G	13-169	14-217	18-384	19-438	29-829	30-880	#41-1351	263-12282	341-16904
$SAVE4	005314	G	#41-1359	84-2078	88-2287	111-3636	114-3793	137-5408	264-12367	322-15893	341-16904
$SAVE5	005334	G	35-1091	39-1269	#41-1368	90-2410	93-2703	103-3204	108-3453	118-4094	131-4722
			133-5199	153-6245	164-6863	179-7702	199-8781	219-9903	242-11146	273-12823	281-13682
			297-14537	312-15384	332-16405	341-16904					
$T1	102536		#325-16039	326-16094							

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MACRO CROSS REFERENCE                                      CREF
MACRO NAME     REFERENCES
BGNHRD          8-259
BGNHW          #7-117
BGNMOD          6-39
BGNPRO          9-379
BGNSFT         #8-302
BGNSW          #8-143
DESCRI         #7-85
DEVTYP         #6-80
DISPAT          7-101
ENDHRD         #8-277
ENDHW           7-134
ENDMOD          9-411
ENDPRO         #9-385
ENDSFT          8-339
ENDSW           8-196
ERRTBL          7-94
GPRMA          #8-272   #8-273
GPRMD           8-274    8-275    8-317    8-318    8-320    8-323    8-330
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	#8-315	#8-315	#8-317	#8-317	#8-318	#8-318	#8-320	#8-320	#8-321	#8-321
	#8-323	#8-323	#8-325	#8-325	#8-326	#8-326	#8-327	#8-327	#8-328	#8-328
	#8-330	#8-330	#8-331	#8-331	#8-332	#8-332	#8-333	#8-333	#8-334	#8-334
	#8-335	#8-335	#8-336	#8-336						
M$SETS	#6-39	#6-39	#7-117	#7-117	#8-143	#8-143	#8-259	#8-259	#8-302	#8-302
	#9-379	#9-379								
M$WORD	#6-65	#6-65	#7-101	#7-101	#7-101	#8-272	#8-272	#8-273	#8-273	#8-274
	#8-274	#8-275	#8-275	#8-313	#8-313	#8-314	#8-314	#8-315	#8-315	#8-316
	#8-316	#8-317	#8-317	#8-318	#8-318	#8-319	#8-319	#8-320	#8-320	#8-321
	#8-321	#8-322	#8-322	#8-323	#8-323	#8-324	#8-324	#8-325	#8-325	#8-326
	#8-326	#8-327	#8-327	#8-328	#8-328	#8-329	#8-329	#8-330	#8-330	#8-331
	#8-331	#8-332	#8-332	#8-333	#8-333	#8-334	#8-334	#8-335	#8-335	#8-336
	#8-336									
M$XFER	#8-314	#8-314	#8-316	#8-316	#8-319	#8-319	#8-322	#8-322	#8-324	#8-324
	#8-329	#8-329								
POINTE	6-46									
SVC	#6-12	6-13								
XFER	8-319	8-324								
XFERF	8-314	8-316								
XFERT	#8-322	#8-329								