

TM78, TU78

TM78 CTRL/LGC TST
CZTMIBO

AH-E643B-MC
FICHE 1 OF 1

FEB 1981
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MADE IN USA



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IDENTIFICATION

PRODUCT CODE: AC-E642B-MC
PRODUCT NAME: CZTMIB0 TM78 CTRL/LGC TST
MAINTAINER: DIAGNOSTIC ENGINEERING
DATE: OCTOBER 1,1980
AUTHOR: G. COOKE

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DIGITAL	PDP	UNIBUS	MASSBUS
DEC	DECUS	DECTAPE	

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.SBTTL HISTORY
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HISTORY

JUNE 1, 1980
OCTOBER 1, 1980

INITIAL RELEASE
SECOND RELEASE

CZTMIA
CZTMIB

CHANGES TO CZTMIA

1. CHANGED MODULE CALLOUT AFTER FAULT INSERTION INFORMATION WAS AVAILABLE.
2. EXACT ROUTINE PRINTS 2 SETS OF ACTUAL AND EXPECTED MESSAGES
3. CALX9 WAS MULTIPLYING BY WRONG NUMBER
4. TEST 17 WAS NOT READING ALL CAS
5. CHANGE DXTUID FROM KKTMAA TO KKTMA8 SO WE USE NEW MICRO DIAGNOSTIC PAK FILE

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66 .REM \

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1.2.2 SOFTWARE REQUIREMENTS

TM78 CONTROL LOGIC TEST PROGRAM
MICRO DIAGNOSTIC FILE

1.3 RELATED DOCUMENTS AND STANDARDS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

1.5 ASSUMPTIONS

THIS DIAGNOSTIC ASSUMES THAT ALL HARDWARE OTHER THAN THE TM78/TU78 ARE OPERATIONAL. THIS ALSO INCLUDES THE RH11/RH70 AS THE BASIC TESTS PERFORMED ON THE RH11/RH70 THAT ARE UNSUCCESSFUL DEDUCE THAT THE SUBSYSTEM UNDER TEST IS RESPONSIBLE FOR THE FAILURE, NOT THE RH11/RH70.

2.0 OPERATING INSTRUCTIONS

2.1 HARDWARE QUESTIONS

THE FOLLOWING SERIES OF QUESTIONS COMPRISE THE PARAMETERS NECESSARY TO IDENTIFY EACH TU78 TO BE TESTED.

2.1.1 RH ADDRESS

THIS PARAMETER DEFINES THE BASE UNIBUS ADDRESS OF THE MASSBUS CONTROLLER FOR THE TU78 TO BE TESTED.

2.1.2 RH VECTOR ADDRESS

THIS PARAMETER DEFINES THE INTERRUPT VECTOR ADDRESS FOR THE RH SPECIFIED BY RH ADDRESS. THE LOCATION SPECIFIED WILL BE LOADED WITH THE INTERRUPT SERVICE ROUTINE ADDRESS AND THE VALUE SPECIFIED PLUS TWO WILL BE LOADED WITH THE INTERRUPT SERVICE ROUTINE PSW.

2.1.3 TM78

THIS PARAMETER DEFINES THE MASSBUS DRIVE NUMBER (0-7) ASSIGNED TO THE TM78 UNDER TEST.

2.1.4 TU78

THIS PARAMETER DEFINES THE NUMBER (0-3) OF THE TU78 UNDER TEST.

2.1.5 TM78 PORT

THIS PARAMETER DEFINES THE PORT (0-1) ON THE TM78 THAT THE MASSBUS IS CONNECTED TO.

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2.1.6 RH TYPE

THIS PARAMETER DEFINES THE RH TYPE (RH11 OR RH70) ON THE SYSTEM AND DETERMINES WHETHER SILO TESTS (RH11 ONLY) WILL BE RUN.

2.2 SOFTWARE QUESTIONS

THE FOLLOWING SERIES OF QUESTIONS ARE INTENDED TO PROVIDE A MECHANISM OF ALTERING THE NORMAL OPERATION OF THE PROGRAM. THEY ARE ONLY USED BY TEST 40.

2.2.1 SKIP MTA MICRO-DIAGNOSTICS

ANSWERING YES TO THIS QUESTION WILL INHIBIT THE RUNNING OF ALL MICRO-DIAGNOSTICS THAT REQUIRE A TU78 TO BE ATTACHED. THIS IS NECESSARY FOR FORMATTER (TM78) ONLY TESTING. ANSWERING NO WILL RUN ALL MICRO-DIAGNOSTICS AND REQUIRE A TU78 TO BE ATTACHED.

2.2.2 MICRO-DIAGNOSTIC RELIABILITY MODE

THIS PARAMETER CONTROLS WHETHER THE MICRO DIAGNOSTICS WILL BE EXECUTED 1 TIME OR 11 TIMES:

N = 1 TIME
Y = 11 TIMES

2.2.3 MANUAL MICRO-DIAGNOSTIC SELECTION

THIS PARAMETER CONTROLS WHETHER THE MICRO DIAGNOSTICS WILL BE RUN AS A SCRIPT OR ALLOW THE OPERATOR TO SELECT THE MICRO DIAGNOSTICS INDIVIDUALLY.

NOTE: IF THIS OPTION IS SELECTED, THE FLAG SWITCH UAM CANNOT BE SET OR AN ERROR WILL BE PRINTED AND THE TEST ABORTED.

2.2.4 INDIVIDUAL MICRO-DIAGNOSTIC RUN/SKIP

THIS PARAMETER ALLOWS THE USER TO DECIDE ON A MICRO-DIAGNOSTIC MODULE BASIS, IF IT SHOULD BE EXECUTED OR NOT.

N = RUN NORMAL MICRO DIAGNOSTIC SCRIPT

Y = RUN NORMAL MICRO DIAGNOSTIC SCRIP, BUT ALLOW USER TO ANSWER YES OR NO TO SKIPPING ANY TEST DESIRED.

NOTES: IF THE MANUAL MICRO-DIAGNOSTIC SELECTION OPTION IS SELECTED, THIS OPTION HAS NO EFFECT.

IF THE FLAG SWITCH UAM (UNATTENDED MODE) IS SET, THIS
OPTION WILL BE IGNORED AND THE NORMAL MICRO-DIAGNOSTIC
SCRIPT WILL RUN.

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2.3 AUTO DROP MODE

USING THE DRS COMMAND "/FLAG:ADR" WILL CAUSE THE AUTODROP
FEATURE TO BE ENABLED. WHEN THIS OCCURS ALL DEVICES TO BE
TESTED WILL BE VERIFIED FOR PROPER RESPONSE BEFORE EXECUTING
HARDWARE TEST NO. 1. IF A DEVICE DOES NOT RESPOND IT WILL
BE DROPPED FROM THE TESTING LIST. CAUTION MUST BE EXERSIZED
WHEN USING THIS FEATURE TO AVOID DROPPING A DEVICE, OR
ATTEMPTING TO TEST A NON EXISTENT DEVICE BECAUSE OF A
HARDWARE MALFUNCTION.

2.4 MANUAL INTERVENTION TESTS

IF THE USER HAS NOT STARTED THE DIAGNOSTIC WITH
THE FLAG "/FLAG:UAM" (UNATTENDED MODE), THE
MANUAL INTERVENTION TESTS WILL BE PERFORMED.
IN ORDER FOR THIS TO BE SUCCESSFUL A TU78 MAGNETIC
TAPE DRIVE MUST BE INSTALLED AND A SCRATCH TAPE
MUST BE LOADED AND WRITE ENABLED. THESE TESTS WILL
VERIFY THE CORRECT OPERATION OF THE TU78 PANEL SWITCHES
AND BASIC TAPE MOTION. OPERATOR INPUT IS REQUIRED
DURING EXECUTION OF THESE TESTS. THESE TESTS CAN
ALSO BE AVOIDED BY SETTING THE SOFTWARE SWITCH
MENTIONED AT 2.2.1 .

3.0 ERROR INFORMATION

THIS PROGRAM HAS TWO TYPES OF ERROR CLASSIFICATIONS, SYSTEM FATAL
AND DEVICE FATAL.

3.1 SYSTEM FATAL ERRORS

SYSTEM FATAL ERRORS ARE USED TO INDICATE THAT AN ERROR WAS
DETECTED IN RELATION TO LOADING/CONTROLLING THE MICRO DIAGNOSTIC
PROCESS. WHEN A SYSTEM FATAL ERROR IS DETECTED THE TEST IN PROGRESS
IS ABORTED AND THE NEXT TEST (IF ANY) IS EXECUTED.

THE FORMAT OF A SYSTEM FATAL ERROR IS AS FOLLOWS AND IS PRINTED
ON THE SYSTEM CONSOLE DEVICE UNLESS A LINE PRINTER IS BEING
UTILIZED. THE CONTENT OF EACH ERROR IS SUCH THAT IT SHOULD BE
SELF EXPLANATORY. HOWEVER, THE MESSAGES UTILIZE SOME TERMS THAT
ARE SPECIFIC TO THE TM78.

3.2 DEVICE FATAL ERRORS

4.0 PERFORMANCE AND PROGRESS REPORTS

NONE

5.0 DEVICE INFORMATION TABLES

RH11/RH70 ADDRESS SUMMARY

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UNIBUS ADDRESS	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
BASE +0	SC ! TRE!MCPE! 0 ! DVA!PSEL! A17! A16! RDY! IE ! DT. FUNCTION CODE ! GO															
2	WORD COUNT															
4	BUS ADDRESS															
6	BYTE COUNT															
10	DLT! WCE! PE ! NED! NEM! PGE! MXF!MDPE! OR ! IR ! CLR! PAT! BAI! UNIT															
12	DT. FAILURE CODE ! 0 ! DPR! 0 ! DT. INTERRUPT CODE															
14	SER! FORMAT ! SKIP COUNT ! RECORD COUNT ! CMD ADR															
16	0 ! ATTENTION BIT															
20	RDY!PRES! ONL! REW! PE ! BOT! EOT! FPT!AVIL! SHR!MANT! DSE! 0															
22	DATA BUFFER															
24	PRNT FLGS! ERROR MSG NR ! DIAG TEST NR															
26	NSA! TAP! 0 !2/MB! 0 ! WCS! DRIVE TYPE (101)															
30	BCD SN 3 ! BCD SN 2 ! BCD SN 1 ! BCD SN 0															
32	AUX PRINT NR ! DATA PATTERN NR !LOOP! QV ! 0 !COMP! DIAG REQ															
34	EXPECTED DIAG DATA ! ACTUAL DIAG DATA															
36	NDT FAILURE CODE !ATTN ADR ! 0 ! NDT INTERRUPT CODE															
40	COMMAND COUNT 0 ! 0 ! NDT FUNCTION CODE 0 ! GO															
42	COMMAND COUNT 1 ! 0 ! NDT FUNCTION CODE 1 ! GO															
44	COMMAND COUNT 2 ! 0 ! NDT FUNCTION CODE 2 ! GO															
46	COMMAND COUNT 3 ! 0 ! NDT FUNCTION CODE 3 ! GO															
50	INTERNAL ADDRESS															
52	TM ! TM ! MC ! ILR ! CPE ! EV ! PAR!HLDA!HOLD! RDY! CLR! PE ! INTERNAL DATA															
	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00

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- 1 COMMON ADDRESS SPACE (CAS)
 - 2 TM78 HARDWARE CONTROL REGISTERS
 - 3 RH11/RH70 REGISTERS

* = DIAGNOSTIC USE ONLY
** = SEE PDP-11 PERIPHERALS HANDBOOK

TM78 REGISTER CROSS REFERENCE CHART

UNIBUS ADDRESS	MASSBUS ADDRESS	8085 ADDRESS	LOCATION
BASE + 0	0	200-201	RH & CAS
2	***	***	RH ONLY
4	***	***	RH ONLY
6	5	212-213	CAS
10	***	***	RH ONLY
12	1	202-203	CAS
14	2	204-205	CAS
16	4	210-211	TM78 F/F
20	7	216-217	CAS
22	***	***	RH ONLY
24	3	206-207	CAS DIAG REG
26	6	214-215	CAS
30	10	220-221	CAS
32	11	222-223	CAS DIAG REG
34	12	224-225	CAS DIAG REG
36	13	226-227	CAS
40	14	230-231	CAS
42	15	232-233	CAS
44	16	234-235	CAS
46	17	236-237	CAS

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50	20	***	TM78 HDWR REG
52	22	***	TM78 HDWR REG

*** = NON EXISTENT REGISTER
DEFAULT BASE = 172400
CAS = COMMON ADDRESS SPACE
RH = RH11 OR RH70

TM78 RH11/70 BIT DEFINITION TABLE

RH CS1 BIT DEFINITIONS

UNIBUS ADDRESS	BIT PLACE	ABRIEV	NAME	LOCATION
BASE+0	100000	SC	SPECIAL CONDITION	RH
0	40000	TRE	TRANSFER ERROR	RH & CAS
0	20000	MCPE	MASSBUS CBUS PAR ERR	RH
0	4000	DVA	DRIVE AVAILABLE	RH & CAS
0	2000	PSEL	UNIBUS PORT SELECT	RH
0	1000	A17	UNIBUS ADDRESS BIT 17	RH
0	400	A16	UNIBUS ADDRESS BIT 16	RH
0	200	RDY	RH READY	RH
0	100	IE	INTERUPT ENABLE	RH
0	1	GO	DATA XFER GO BIT	RH & CAS

RH CS2 REGISTER BITS

10	100000	DLT	DATA LATE	RH
10	40000	WCE	WRITE CHECK ERROR	RH
10	20000	UPE	UNIBUS PARITY ERROR	RH
10	10000	NED	NON EXISTENT DRIVE	RH
10	4000	NEM	NON EXISTENT MEMORY	RH
10	2000	PGE	PROGRAM ERROR	RH
10	1000	MXF	MISSED TRANSFER	RH

458	10	400	MDPE	MASSBUS DATA BUS PAR ERR	RH
459					
460	10	200	OR	OUTPUT READY	RH
461					
462	10	100	IR	INPUT READY	RH
463					
464	10	40	CLR	CONTROLLER CLEAR	RH
465					
466	10	20	PAT	PARITY TEST	RH
467					
468	10	10	BAI	BUS ADDRESS INCREMENT INHIBIT	RH
469					

TU78 DRIVE STATUS REGISTER BITS

470					
471					
472	20	100000	RDY	TU78 READY BIT	CAS
473					
474	20	40000	PRES	TU78 PRESENT BIT	CAS
475					
476	20	20000	ONL	TU78 ONLINE	CAS
477					
478	20	10000	REW	TU78 REWINDING	CAS
479					
480	20	4000	PE	1600 BPI MODE SET	CAS
481					
482	20	2000	BOT	TU78 AT BEGINNING OF TAPE	CAS
483					
484	20	1000	EOT	TU78 AT END-OF-TAPE	CAS
485					
486	20	400	FPT	FILE PROTECTED	CAS
487					
488	20	200	AVAIL	AVAILABLE TO MASSBUS	CAS
489					
490	20	100	SHR	SHARED	CAS
491					
492	20	40	MAINT	MAINTENANCE MODE	CAS
493					
494	20	20	DSE	SECURITY ERASE IN PROGRESS	CAS
495					
496					
497					
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TM78 HARDWARE CONTROL REGISTER BITS

499					
500	52	100000	TM RDY	TM78 READY	TM78
501					
502	52	40000	TM CLR	TM78 CLEAR BIT	TM78
503					
504	52	2000	MCPE	TM78 ROM PARITY ERROR	TM78
505					
506	52	1000	ILR	ILLEGAL REGISTER ACCESSED	TM78
507					
508	52	4000	CPE	MASSBUS CBUS PAR ERROR	TM78
509					
510	52	2000	EV PAR	EVEN PARITY	TM78
511					
512	52	1000	HLDA	HOLD ACKNOWLEDGED	TM78
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! 52 ! 400 ! HOLD ! 8085 HOLD ! TM78 !
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BASE DEFAULT ADDRESS = 172400
RH = RH11 OR RH70
CAS = COMMON ADDRESS SPACE
TM78 = BITS RESIDE WITHIN TM78
NOTE : SEE TM78 HARDWARE MANUAL FOR BIT DESCRIPTIONS

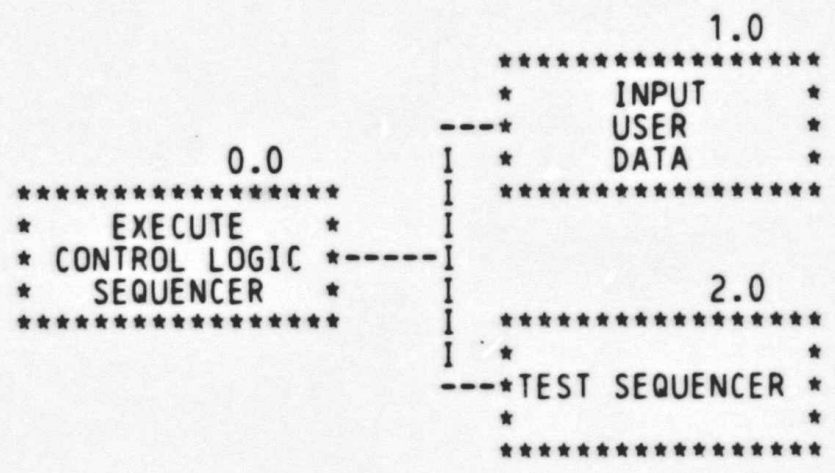
\.NLIST CND

.SBTTL PROGRAM HEADER

:++
: THE PROGRAM HEADER IS THE INTERFACE BETWEEN
: THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
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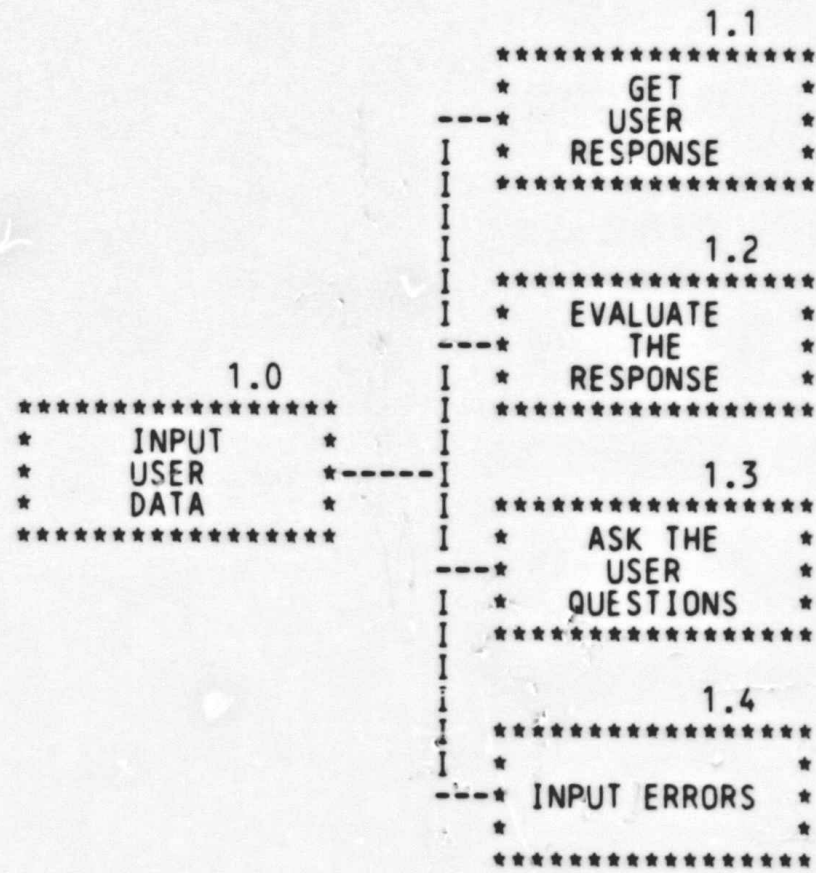
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* TEST SEQUENCER *
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*                *
* TEST MODULES  *
*                *
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                2.1.1
*****
*      OPEN      *
*      A         *
*      FILE      *
*                *
*****
                2.1.2
*****
* INPUT/LOAD THE *
* TM78 MICRO-    *
* DIAGNOSTIC     *
*                *
*****
                2.1.3
*****
*      TM78 MP   *
* TEST CONTROL  *
*      MODULE    *
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                2.1.4
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*      CLOSE THE *
*      FILE      *
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                2.1.2.1
                *****
                *   STOP THE   *
                * TM78 MICRO- *
                * PROCESSOR  *
                *****
                2.1.2.2
                *****
                *   WRITE A   *
                * PROGRAM TO  *
                * TM78 MP WCS *
                *****
                2.1.2.3
                *****
                * VERIFY TM78 *
                * MP WCS     *
                * WITH WRITTEN *
                *****
                2.1.2
                *****
                * INPUT/LOAD THE *
                * TM78 MICRO- *
                * DIAGNOSTIC  *
                *****
                2.1.2.4
                *****
                *   START TM78 *
                * MP DIAGNOSTIC *
                * MONITOR     *
                *****
                2.1.2.5
                *****
                * PACK TM78 MP *
                * LOAD MODULE *
                * FROM LOAD MEDIA *
                *****
                2.1.2.5.1
                *****
                *   READ     *
                *   A       *
                * CHARACTER  *
                *****
                2.1.2.6
                *****
                *   LOAD THE   *
                * MESSAGE    *
                * MODULE     *
                *****
                2.1.2.7
                *****
                *DIAGNOSTIC MON.*
                * SYSTEM ERROR *
                * REPORTING   *
                *****
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                2.1.3.1
                *****
                *   START   *
                * THE TM78  *
                *   MP TEST *
                *****
                2.1.3.2
                *****
                * WAIT/TIMEOUT *
                * TM78 MP-HOST *
                * COMMUNICATION *
                *****
                2.1.3
                *****
                *   TM78 MP   *
                * TEST CONTROL *
                *   MODULE   *
                *****
                2.1.3.3
                *****
                * PROCESS TM78 *
                * MP DETECTED *
                *   ERRORS   *
                *****
                2.1.3.3.1
                *****
                *   PRINT   *
                * ACTUAL/EXPECTED *
                *   DATA   *
                *****
                2.1.3.4
                *****
                * PROCESS TM78 *
                * MP UTILITY *
                *   REQUEST *
                *****
                2.1.3.4.1
                *****
                * QUEUE A PRINT *
                * LINE/MANUAL *
                * INTERVENTION *
                *****
                2.1.3.4.2
                *****
                *   GENERATE *
                *   A DATA *
                *   PATTERN *
                *****

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.TITLE TM78 CONTROLLER LOGIC TEST

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855
856 002000          POINTER BGNSW,BGNSFT,BGNAU,BGNDU
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866          .NLIST BEX
867 002000          HEADER CZTMIB,0,0,1800.,0
868 002122          DEVTYP <TU78>
869 002130          DESCRIPT <TEST TM78 CONTROLLER LOGIC>
870
876          .SBTTL DISPATCH TABLE
877
878          :++
879          : THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
880          : IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
881          :--
882
883 002164          DISPATCH          40
884
889          .SBTTL DEFAULT HARDWARE P-TABLE
890          :++
891          : THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
892          : THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE
893          : IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
894          :--
895          BGNHW      DFPTBL
896          .WORD      172400          ;RH ADDRESS DEFAULT VALUE
897          .WORD      0              ;TM78 NUMBER DEFAULT VAULE
898          .WORD      0              ;TU78 NUMBER DEFAULT VALUE
899          .WORD      0              ;TM78 PORT NUMBER
900          .WORD      224           ;RH VECTOR ADDRESS DEFAULT VALUE
901          .WORD      70           ;RH TYPE (RH70)
902          ENDSW
903
904          .SBTTL SOFTWARE P-TABLE
905          :++
906          : THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
907          : PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
908          :--
909          BGNHW      SFPTBL
910          MTATST: .WORD      0              ;SKIP MTA TESTING FLAG DEVAULT = NO
911          RELI78: .WORD      0              ;TM78 RELIABILITY FLAG DEFAULT = NO
912          MANTST: .WORD      0              ;MANUAL TEST SELECTION FLAG DEFAULT = NO
913          RUNSKP: .WORD      0              ;INDIV. MICRO MODULE RUN/SKIP FLAG DEFAULT - NO
914          ENDSW
915
922          :++
923          : THE REPORT CODING SECTION CONTAINS THE
924          : 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
925          :--
926
927          BGNRPT
928 002336
929
935
936 002336          EXIT      RPT
937
944
945 002342          ENDRPT
```

```

946      .SBTTL  INITIALIZE SECTION
947
948      :++
949      : THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
950      : AT THE BEGINNING OF EACH PASS.
951      :--
952
953      002344      BGNINIT
954      002344      SETPRI  #PRI07
955      002352      READEF  #EF.CONT      ;IS THIS A CONTINUE?
956      002360      BCOMPLETE 2$      ;NO-CHECK FOR NEW PASS
957      002362      READEF  #EF.NEW
958      002370      BCOMPLETE 1$
959      002372      005237 004326      3$:  INC      UNINUM      ;UPDATE UNIT UNDER TEST
960      002376      023737 004326 002012  CMP      UNINUM,L$UNIT ;REACHED LIMIT?
961      002404      001002      BNE      2$      ;NO-DO THIS UNIT
962
963      002406      005037 004326      1$:  CLR      UNINUM
964      002412      2$:  GPHARD UNINUM,HARDPT
965      002424      BNCOMPLETE 3$
966      002426      013701 004324      MOV      HARDPT,R1      ;GET THE POINTER IN R1
967      002432      016102 000000      MOV      0(R1),R2      ;GET THE RH ADDRESS
968      002436      012703 004230      MOV      #XFRCMD,R3     ;GET THE START OF TABLE
969      ;STORE THE RH POINTER
970      002442      010223      INTO:  MOV      R2,(R3)+      ;INTO THE RH ADDRESS TABLE
971      002444      005202      INC      R2
972      002446      005202      INC      R2
973      002450      020327 004324      CMP      R3,#NON72+2    ;FINISHED?
974      002454      001372      BNE      INTO          ;NO - CONTINUE
975      ;YES
976      002456      016137 000002 004352      MOV      2(R1),MBDRIV   ;GET THE TM78 NUMBER
977      002464      012703 000001      MOV      #1,R3         ;LOAD THE BINARY UNIT VALUE
978      002470      016102 000004      MOV      4(R1),R2     ;GET THE TU78 NUMBER
979      002474      010237 004356      MOV      R2,TMUNIT    ;SAVE THE TU78 NUMBER
980      002500      001403      1$:  BEQ      2$          ;IF USER ENTERED 0 THEN EXIT
981      002502      006303      ASL      R3           ;SHIFT THE BINARY UNIT NUMBER
982      002504      005302      DEC      R2           ;DECREMENT THE TU78 NUMBER
983      002506      001374      BNE      1$          ;LOOP UNTIL 0
984      002510      010337 004354      2$:  MOV      R3,BINUNT   ;STORE THE BINARY UNIT NUMBER
985      002514      016137 000006 004360      MOV      6(R1),TMPORT ;GET THE TM78 PORT NUMBER
986      002522      016137 000010 004362      MOV      10(R1),RHVEC ;GET THE RH VECTOR ADDRESS
987      002530      016137 000012 004416      MOV      12(R1),RHTYP ;GET THE RHTYPE
988      002536      CLRVEC  RHVEC
989      002544      005037 004412      CLR      CASLD       ;CLEAR THE CAS PROGRAM LOADED FLAG
990      002550      BRESET
991      002552      EXIT  INIT      ;ISSUE A BUS RESET
992
993      002556      ENDINIT
994
995      002560      BGNPROT
996      002560      000000      .WORD  0           ;CSR OFFSET
997      002562      000002      .WORD  2           ;TM #
998      002564      000004      .WORD  4           ;TU #
999      002566      ENDPROT
1000
1001      ; AUTO DROP CODE

```

```

1002
1003      ; THIS CODE IS ENVOKED BY THE "/FLAG:ADR" COMMAND UNDER THE
1004      ; DRS. CAUTION MUST BE TAKEN TO AVOID DROPPING A FAULTY UNIT
1005      ; OR ATTEMPTING TO TEST A NON EXISTENT DEVICE BECAUSE OF
1006      ; FAULTY HARDWARE.
1007
1008      ; AUTO DROP LOCAL SYMBOLS
1009
1010      000004      NXMLOC = 4      ;NXM VECTOR LOCATION
1011      000011      SENSGO = 11     ;NDT SENSE+GO COMMAND
1012      000001      SENSDN = 01    ;DONE INTERRUPT CODE
1013      040000      PRES = 40000   ;TU78 PRESENT FLAG IN TUSTAT REGISTER
1014
1015      002566      BGNAUTO
1016
1017      002566 005037 003450      CLR      NXMFLG      ;CLEAR NXM TRAPPED FLAG
1018      002572      SETVEC #NXMLOC,#NXMTRP,#PRI07 ;SET UP NXM TRAP VECTOR
1019      002620 013701 004230      MOV      XFRCMD,R1   ;GET RH11/70 ADDRESS
1020      002624 005711      TST      (R1)      ;ACCESS RH11/70 CS1 REGISTER
1021      002626      CLRVEC #NXMLOC      ;RELEASE NXM VECTOR LOCATION
1022      002634 005737 003450      TST      NXMFLG      ;DID WE TRAP ?
1023      002640 001412      BEQ      1$      ;NO , CHECK TM78 #
1024      002642      PRINTF #AU.RH,R1      ;TELL OPERATOR RH TIME OUT
1025      002664 000533      BR       DROPIE      ;DROP UNIT
1026
1027      ; NOW CHECK THE TM78# FOR 'NED'
1028
1029      002666 013702 004240      1$:      MOV      CS2,R2      ;GET CS2 ADDRESS
1030      002672 013712 004352      MOV      MBDRIV,(R2)   ;SET UNIT #
1031      002676 052711 040000      BIS      #TRE,(R1)   ;SET UNIT CLEAR
1032      002702 005011      CLR      (R1)      ;CLEAR 'TRE' BIT
1033      002704 032712 010000      BIT      #NED,(R2)  ;NON EXISTENT DRIVE ?
1034      002710 001413      BEQ      2$      ;NO , CHECK TU78
1035      002712      PRINTF #AU.TM,MBDRIV   ;TELL OPERATOR TM78 NED
1036      002736 000506      BR       DROPIE      ;DROP UNIT
1037
1038      ; NOW CHECK FOR TU78 AVAILABILITY BY ISSUING A SENSE COMMAND
1039
1040      002740 005077 001322      2$:      CLR      @MOINT      ;CLEAR INTERRUPT CODE
1041      002744 013702 004356      MOV      TMUNIT,R2   ;GET TU78 #
1042      002750 006302      ASL      R2          ;MAKE OFFSET FOR COMMAND REG.
1043      002752 012772 000011 004270      MOV      #SENSGO,@MOO(R2) ;ISSUE SENSE COMMAND
1044      002760 012704 000100      MOV      #100,R4    ;SET UP TIMEOUT TIMER
1045      002764 005777 001256      3$:      TST      @AS      ;COMMAND DONE ?
1046      002770 001030      BNE      4$      ;YES , PROCESS INT CODE
1047      002772      DELAY      250      ;DELAY FOR COMMAND TO FINISH
1048      003022      BREAK      ;CHECK FOR OPER PANIC '^C'
1049      003024 005304      DEC      R4          ;DECREMENT TIMER
1050      003026 001356      BNE      3$      ;LOOP UNTIL TIMER EXPIRES
1051      003030      PRINTF #AU.TO      ;TELL OPERATOR ATTENTION TIME OUT
1052      003050 000441      BR       DROPIE      ;TIME OUT DROP UNIT
1053      003052 117703 001210      4$:      MOVB     @MOINT,R3   ;GET INTERRUPT CODE
1054      003056 122703 000001      CMPB    #SENSDN,R3  ;SENSE DONE CODE ?
1055      003062 001412      BEQ      5$      ;YES , CHECK FOR PRESENT
1056      003064      PRINTF #AU.TU,TMUNIT   ;TELL OPERATOR TU78 NOT AVAILABLE
1057      003110 017703 001134      5$:      MOV      @TUSTAT,R3 ;GET STATUS OF TU78

```

```
1058 003114 053777 004354 001124     BIS     BINUNT,@AS      ;RELEASE ATTENTION
1059 003122 032703 040000             BIT     #PRES,R3      ;DRIVE PRESENT ?
1060 003126 001027             BNE     EXAUTO        ;YES , EXIT AUTODROP CODE
1061 003130             PRINTF  #AU.TU, TMUNIT ;WRONG TU78 #
1062
1063 003154             DROPIT: DODU     UNINUM      ;DROP UNIT UNINUM
1064 003162             PRINTF  #AU.DRP, UNINUM ;DROP UNIT MESSAGE
1065 003206             EXAUTO: ENDAUTO      ;END OF AUTO DROP CODE
1066
1067 003210 047045 040445 052101 AU.TO:  .ASCIZ/%N%AATTENTION TIME OUT FOR TM78 # %02/
1068             .EVEN
1069 003256 047045 040445 047516 AU.RH:  .ASCIZ/%N%ANON EXISTENT RH ADDRESS %06/
1070             .EVEN
1071 003316 047045 040445 047516 AU.TM:  .ASCIZ/%N%ANON EXISTENT TM78 # %02/
1072             .EVEN
1073 003352 047045 040445 047516 AU.TU:  .ASCIZ/%N%ANON EXISTENT TU78 # %02/
1074             .EVEN
1075 003406 047045 040445 051104 AU.DRP: .ASCIZ/%N%ADROPPING LOGICAL UNIT # %02%N/
1076             .EVEN
1077
1078             ; NXM FLAG FOR AUTO DROP CODE
1079
1080 003450 000000             NXMFLG: .WORD 0          ;NXM FLAG
1081
1082             ; NON EXISTENT DEVICE TRAP DURING AUTO DROP CODE
1083
1084 003452             BGNSRV  NXMTRP
1085
1086 003452 005237 003450             INC     NXMFLG
1087
1088 003456             ENDSRV
1089
1090
1091
1092             .SBTTL  CLEANUP CODING SECTION
1093
1094             :++
1095             : THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
1096             : AT THE END OF EACH PASS.
1097             :--
1098
1099 003460             BGNCLN
1106 003460 012777 000040 000552     MOV     #MBINIT,@CS2  ;ISSUE A MASSBUS INIT.
1107 003466             DELAY  100      ;WAIT FOR IT TO FINISH
1108 003516             EXIT     CLN
1109
1110
1111
1112
1113
1114
1115
1116
1117 003522             ENDCLN
1118
1119             :++
1120             : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
1121             : TO NO LONGER BE TESTED.
1122             :--
1122 003524             BGNDU
1128 003524             EXIT     DU
1135 003530             ENDDU
```

1137
1138
1139
1140
1141
1142 003532
1148 003532
1155 003536
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1162
1163
1164 003540
1165 003542
1166 003552
1167 003560
1168 003572
1169 003604
1170 003616
1171 003630
1172 003630 044122 040440 042104
1173 003643 124 033515 020070
1174 003652 052524 034067 021440
1175 003661 124 033515 020070
1176 003675 123 044513 020120
1177 003750 044515 051103 026517
1178 004012 044122 053040 041505
1179 004034 040515 052516 046101
1180 004076 047111 044504 044526
1181 004135 057
1182 004136 045523 050111 000
1183 004143 122 033510 037460
1184 004164
1185
1186
1187
1188
1189
1190
1191
1192
1193
1194
1195
1196 004164
1203 004166
1204 004174
1205 004202
1206 004210
1213 004216

;++
: THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
: TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING. IF
: 'EF.AUNIT' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
:--

BGNAU
EXIT AU
ENDAU

;++
: THE HARDWARE 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.
:--

BGNHRD
GPRMA MSG1,0,0,0,177777,YES
GPRML MSG10,12,100000,YES
GPRMD MSG7,10,0,777,0,777,YES
GPRMD MSG2,2,0,7,0,7,YES
GPRMD MSG3,4,0,3,0,3,YES
GPRMD MSG4,6,0,1,0,1,YES
ENDHRD
MSG1: .ASCIZ /RH ADDRESS/
MSG2: .ASCIZ /TM78 #/
MSG3: .ASCIZ /TU78 #/
MSG4: .ASCIZ /TM78 PORT #/
MSG5: .ASCIZ /SKIP MTA MICRODIAGNOSTICS (NO TU ATTACHED)/
MSG6: .ASCIZ /MICRO-DIAGNOSTIC RELIABILITY MODE/
MSG7: .ASCIZ /RH VECTOR ADDRESS/
MSG8: .ASCIZ /MANUAL MICRO-DIAGNOSTIC SELECTION/
MSG9: .ASCII /INDIVIDUAL MICRO-DIAGNOSTIC RUN/
.BYTE 57
.ASCIZ /SKIP/
MSG10: .ASCIZ /RH70? (NO=RH11)/
.EVEN

.SBTTL SOFTWARE PARAMETER CODING SECTION

;++
: 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.
:--

BGNSFT
GPRML MSG5,0,1,YES
GPRML MSG6,2,1,YES
GPRML MSG8,4,1,YES
GPRML MSG9,6,1,YES
ENDSFT


```

(1)          000000          PRI0== 0
(1)
(1)          :OPERATOR FLAG BITS
(1)          :
(1)          000004          EVL==      4
(1)          000010          LOT==      10
(1)          000020          ADR==      20
(1)          000040          IDU==      40
(1)          000100          ISR==     100
(1)          000200          UAM==     200
(1)          000400          BOE==     400
(1)          001000          PNT==    1000
(1)          002000          PRI==    2000
(1)          004000          IXE==    4000
(1)          010000          IBE==   10000
(1)          020000          IER==   20000
(1)          040000          LOE==   40000
(1)          100000          HOE==  100000

1220
1221          .DSABL  REG
1222          :
1223          :REGISTER DEFINITIONS
1224          000000          R0=%0          ;REGISTER 0 DEFINITION
1225          000001          R1=%1          ;REGISTER 1 DEFINITION
1226          000002          R2=%2          ;REGISTER 2 DEFINITION
1227          000003          R3=%3          ;REGISTER 3 DEFINITION
1228          000004          R4=%4          ;REGISTER 4 DEFINITION
1229          000005          R5=%5          ;REGISTER 5 DEFINITION
1230          000005          ERRCOD=%5      ;ERROR CODE
1231          000006          SP=%6          ;STACK PCINTER
1232          000007          PC=%7          ;PROGRAM COUNTER
1233
1234          004216 000000          ROMIDT: .WORD 0          ;ROM IDENTIFICATION INFORMATION STORAGE
1235          004220 000000          .WORD 0
1236          004222 000000          .WORD 0
1237          004224 000000          .WORD 0
1238
1239          004226 000000          ERRLP: .WORD 0          ;ROM ERROR LOOP FLAG
1240
1241          :MASS BUS COMMAND BYTES
1242          000037          DIGMON=000037 ;BEGIN DIAGNOSTIC MONITOR
1243          000035          TSTART=000035 ;BEGIN TM78 MP TEST
1244          000031          CONERR=000031 ;CONTINUE ON ERROR
1245          000033          LOPERR=000033 ;LOOP ON ERROR
1246
1247          :TM78 REGISTER 21 COMMAND/STATUS BITS
1248          010000          NED=010000 ;NON EXISTENT DRIVE
1249          004000          CPE=004000 ;CONTROL BUS PARITY ERROR
1250          002000          EVPAR=002000 ;FORCE PARITY ERROR FROM TM78
1251          010000          ILR=010000 ;ILLEGAL REGISTER STATUS BIT
1252          020000          MCPE=020000 ;CONTROL BUS PARITY ERROR
1253          000400          HOLD=000400 ;HOLD COMMAND BIT
1254          001000          HLDA=001000 ;HOLD STATUS BIT
1255          040000          TMCLR=040000 ;TM CLEAR COMMAND BIT
1256          100000          TMRDY=100000 ;TM READY STATUS BIT
1257

```



```
1258 ;TM78 STATUS MASKS
1259 035400 CLRSTA=035400 ;STATUS ERROR ON CLEAR COMMAND
1260 034000 HLDSTA=034000 ;STATUS ERROR ON HOLD COMMAND
1261
1262 ;MASS BUS COMMAND/STATUS BITS
1263 000020 PAT=000020 ;RH PARITY TEST BIT
1264 000040 MBINIT=000040 ;MASS BUS INITIALIZE
1265 040000 TRE=040000 ;TRANSFER ERROR
1266
1267 ;TM78 INTERNAL ADDRESSES
1268 100340 MBSEL=100340 ;TM78 PORT SELECT ADDRESS
1269 100240 TMRDST=100240 ;ADDRESS OF TM READY CONTROL WORD
1270
1271 ;TM78 INTERNAL COMMAND BITS
1272 000100 STMRDY=000100 ;SET TM READY
1273
1274 ;CAS.A78 MEMORY ADDRESS EQUATES
1275 041420 CASCMD=041420 ;CAS READ/WRITE COMMAND ADDRESS X'4300'
1276 042000 CASBUF=042000 ;CAS READ BUFFER ADDRESS X'4210'
1277 042040 CASDAL=042040 ;CAS WRITE DATA BYTE LOW X'4320'
1278 042041 CASDAH=042041 ;CAS WRITE DATA BYTE HIGH X'4321'
1279
1280 000015 CR=000015 ;CARRIAGE RETURN
1281 000012 LF=000012 ;LINE FEED
1282 000011 TAB=000011 ;TAB CHARACTER
1283 000040 SPACE=000040 ;SPACE CHARACTER
1291 .SBTTL GLOBAL DATA SECTION
1292
1293 ;++
1294 ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
1295 ; IN MORE THAN ONE TEST.
1296 ;--
1297
1298 ;
1299 004230 000000 XFRCMD: 0 ;MASS BUS/TM78 DATA TRANSFER WORD
1300 004232 000000 WC: 0 ;MASS BUS WORD COUNT
1301 004234 000000 BA: 0 ;TRANSFER MEMORY ADDRESS
1302 004236 000000 FC: 0 ;FRAME COUNT
1303 004240 000000 CS2: 0 ;MASS BUS CONTROL/STATUS WORD
1304 004242 000000 XFRINT: 0 ;DATA TRANSFER INTERRUPT CODE
1305 004244 000000 TC: 0 ;TAPE CONTROL
1306 004246 000000 AS: 0 ;ATTENTION SUMMARY
1307 004250 000000 TUSTAT: 0 ;TAPE STATUS
1308 004252 000000 DB: 0 ;DATA BUFFER
1309 004254 000000 DI1: 0 ;DIAGNOSTIC REGISTER 1
1310 004256 000000 DT: 0 ;DRIVE TYPE
1311 004260 000000 SN: 0 ;SERIAL NUMBER
1312 004262 000000 DI2: 0 ;DIAGNOSTIC REGISTER 2
1313 004264 000000 DI3: 0 ;DIAGNOSTIC REGISTER 3
1314 004266 000000 MOINT: 0 ;MOTION INTERRUPT CODE
1315 004270 000000 MO0: 0 ;MOTION COMMAND FOR TU0
1316 004272 000000 MO1: 0 ;MOTION COMMAND FOR TU1
1317 004274 000000 MO2: 0 ;MOTION COMMAND FOR TU2
1318 004276 000000 MO3: 0 ;MOTION COMMAND FOR TU3
1319 004300 000000 AD80: 0 ;TM78 MP ADDRESS WORD
1320 004302 000000 DS80: 0 ;TM78 MP DATA/STATUS
```

1321	004304	000000	NON54:	0	:NON EXISTENT REG. 1
1322	004306	000000	NON56:	0	:NON EXISTENT REG. 2
1323	004310	000000	NON60:	0	:NON EXISTENT REG. 3
1324	004312	000000	NON62:	0	:NON EXISTENT REG. 4
1325	004314	000000	NON64:	0	:NON EXISTENT REG. 5
1326	004316	000000	NON66:	0	:NON EXISTENT REG. 6
1327	004320	000000	NON70:	0	:NON EXISTENT REG. 7
1328	004322	000000	NON72:	0	:NON EXISTENT REG. 10
1329			:		
1330	004324	000000	HARDPT:	.WORD 0	:RUN TIME P TABLE POINTER
1331	004326	000000	UNINUM:	.WORD 0	:UNIT UNDER TEST-CURRENTLY
1332	004330	000000	CASDTA:	.WORD 0	:DIAGNOSTIC TEST NUMBER
1333	004332	000000	DIAGTS:	.WORD 0	:DIAGNOSTIC TEST NUMBER
1334	004334	000000	DIAGER:	.WORD 0	:DIAGNOSTIC ERROR NUMBER
1335	004336	000000	BYTCNT:	.WORD 0	:BYTE COUNT
1336	004340	000000	CKSUM:	.WORD 0	:FILE SERVICES CHECKSUM LOCATION
1337	004342	000000	FILERR:	.WORD 0	:FILE HANDLING ERROR
1338	004344	000000	CHAR:	.WORD 0	:DATA CHARACTER FROM DISK
1339	004346	000000	COUNT:	.WORD 0	:ITERATION COUNTER
1340	004350	000000	CHKSUM:	.WORD 0	:CHECK SUM WORK REGISTER
1341	004352	000000	MBDRIV:	.WORD 0	:MASS BUS DRIVE NUMBER
1342	004354	000000	BINUNT:	.WORD 0	:TM78 BINARY UNIT NUMBER
1343	004356	000000	TMUNIT:	.WORD 0	:TM78 UNIT UNDER TEST
1344	004360	000000	TMPORT:	.WORD 0	:TM78 PORT NUMBER
1345	004362	000000	RHVEC:	.WORD 0	:RH VECTOR ADDRESS
1346	004364	000000	DINTCD:	.WORD 0	:TM78 MP DIAGNOSTIC MONITOR INTERRUPT CODE
1347	004366	000000	STAT80:	.WORD 0	:TM78 MP STATUS WORD (MASS BUS REG. 52)
1348	004370	000000	ADATA:	.WORD 0	:ACTUAL DATA
1349	004372	000000	EDATA:	.WORD 0	:EXPECTED DATA
1350	004374	000000	PC80:	.WORD 0	:TM78 MP PROGRAM COUNTER
1351	004376	000	LOAD80:	.BYTE 0	:LOW ORDER WCS ADDRESS
1352	004377	000	HIAD80:	.BYTE 0	:HIGH ORDER WCS ADDRESS
1353	004400	000000	FILNAM:	.WORD 0	:FILE NAME TO BE LOADED
1354	004402	000000	EOF:	.WORD 0	:END OF FILE FLAG
1355	004404	000000	BYPFLG:	.WORD 0	:BYPASS MICRO MODULE FLAG
1356	004406	000000	SEQNUM:	.WORD 0	:SEQUENCE NUMBER MANUAL MICRO MODULE SELECTION
1357	004410	000000	INTFLG:	.WORD 0	:INTERRUPT FLAG
1358	004412	000000	CASLD:	.WORD 0	:CAS PROGRAM LOADED FLAG
1359	004414	000000	SAVE:	.WORD 0	:LINE TERMINATOR BUFFER WORD
1360	004416	000000	RHTYP:	.WORD 0	:RH TYPE (RH70=1, RH11=0)
1361	004420	000000	DUMFLG:	.WORD 0	:DUMMY FLAG FOR SUPERVISOR COMPATABILITY
1362			.	EVEN	

1369
1370 004422
 (1)
 (1)
 (1)
1371
1372 004422
 (1)
 (1)
 (1)
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383 004422
 (1)
 (1)
 (1)
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```
.SBTTL TEST 01 - MASS BUS READY TEST
ST
:*****
:*TEST TITLE
:-----
:*TEST 1                MASS BUS READY TEST
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST CONSISTS OF 2 SUBTESTS.  THE FIRST SUBTEST IS A TEST OF THE
:*RH11 SILO, IT IS PERFORMED ONLY IF THE TU/TM 78 IS INTERFACED WITH AN
:*RH11 AND SKIPPED IF THE SYSTEM IS INTERFACED WITH AN RH70.  THE RH11
:*SUBTEST CONSISTS OF 5 SEGMENTS WHICH TEST THR RH11 SILO FOR:  READ
:*FROM EMPTY SILO, IR/OR, SILO DATA, SILO OVERFLOW, AND SILO RESET RES-
:*PECTIVELY.  THE SECOND SUBTEST IS PERFORMED REGARDLESSOF RH TYPE AND
:*TESTS CS2 BY LOADING -1 TO MASS BUS REGISTER 10 (CS2) WHICH SHOULD
:*CAUSE A MASS BUS INIT TO TAKE PLACE.  A 100 MICROSECOND TIMEOUT
:*IS PERFORMED, AND THE CS1 REGISTER IS THEN TESTED TO VERIFY
:*THAT ALL BITS ARE RESET EXCEPT BIT #6 WHICH IS NOT TESTED.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:*  CLEAR CAS PROGRAM LOADED FLAG
:*  TEST RHTYP
:*  IF RH70
:*  : THEN-BRANCH MASS BUS READY
:*  : ELSE-CONTINUE
:*  ENDF
:*  BGNSUB-RH11 TESTS
:*  : BGNSEG-CS1 BITS
:*  :   INIT THE RH
:*  :   CONNECT TO TM UNDER TEST
:*  :   WAIT FOR TM TO INITIALIZE
:*  :   CLEAR CS1
:*  :   TEST ALL BUT 'RDY' CLEARED
:*  :   IF CLEAR
:*  :   : THEN-CONTINUE
:*  :   : ELSE-ERROR
:*  :   ENDF
:*  : ENDSEG-CS1 BITS
:*  : BGNSEG-EMPTY SILO READ
:*  :   INIT RH
:*  :   READ DATA BUFFER
:*  :   IF 'DLT' SET
:*  :   : THEN-CONTINUE
:*  :   : ELSE-ERROR
:*  :   ENDF
:*  :   IF 'SC' SET
:*  :   : THEN-CONTINUE
:*  :   : ELSE-ERROR
:*  :   ENDF
:*  :   IF 'TRE' SET
:*  :   : THEN-CONTINUE
```

```
1416 : * : : ELSE-ERROR
1417 : * : : ENDF
1418 : * : : ENDSEG EMPTY SILO READ
1419 : * : : BGNSEG IR/OR CHECK
1420 : * : : INIT RH
1421 : * : : IF 'IR' SET
1422 : * : : : THEN-CONTINUE
1423 : * : : : ELSE-ERROR
1424 : * : : ENDF
1425 : * : : IF 'OR' CLEAR
1426 : * : : : THEN-CONTINUE
1427 : * : : : ELSE-ERROR
1428 : * : : ENDF
1429 : * : : LOAD SILO WITH 0
1430 : * : : IF 'OR' CLEAR
1431 : * : : : THEN-CONTINUE
1432 : * : : : ELSE-ERROR
1433 : * : : ENDF
1434 : * : : LOAD SILO WITH -1
1435 : * : : IF 'OR' SET
1436 : * : : : THEN-CONTINUE
1437 : * : : : ELSE-ERROR
1438 : * : : ENDF
1439 : * : : ENDSEG IR/OR CHECK
1440 : * : : BGNSEG-SILO DATA TEST
1441 : * : : INIT RH
1442 : * : : LOAD SILO WITH DATA
1443 : * : : DO FOR DATA=0 TO DATA=102
1444 : * : : : LOAD DATA INTO SILO
1445 : * : : : INCREMENT DATA
1446 : * : : ENDDO FOR
1447 : * : : IF 'IR' RESET
1448 : * : : : THEN-CONTINUE
1449 : * : : : ELSE-ERROR
1450 : * : : ENDF
1451 : * : : READ DATA FROM SILO
1452 : * : : DO FOR DATA=0 TO DATA=102
1453 : * : : : READ DATA
1454 : * : : : COMPARE TO EXPECTED
1455 : * : : : IF MISCOMPARE
1456 : * : : : : THEN-ERROR
1457 : * : : : ENDF
1458 : * : : ENDDO FOR
1459 : * : : ENDSEG-SILO DATA TEST
1460 : * : : BGNSEG-SILO OVERFLOW
1461 : * : : INIT RH
1462 : * : : LOAD SILO FULL PLUS 1 WORD
1463 : * : : DO FOR DATA=0 TO DATA=103
1464 : * : : : LOAD DATA INTO SILO
1465 : * : : ENDDO FOR
1466 : * : : IF 'DLT' SET
1467 : * : : : THEN-CONTINUE
1468 : * : : : ELSE-ERROR
1469 : * : : ENDF
1470 : * : : ENDSEG-SILO OVERFLOW
1471 : * : : BGNSEG-SILO RESET
```

```
1472 : * : : INIT RH
1473 : * : : LOAD SILO WITH 4 WORDS
1474 : * : : DO FOR DATA=0 TO DATA=4
1475 : * : : : LOAD SILO
1476 : * : : ENDDO FOR
1477 : * : : LOAD 1 WORD INTO SILO
1478 : * : : READ 2 WORDS FROM SILO
1479 : * : : DO FOR DATA=0 TO DATA=1
1480 : * : : : READ SILO
1481 : * : : ENDDO FOR
1482 : * : : IF 'DLT' SET
1483 : * : : : THEN-CONTINUE
1484 : * : : : ELSE-ERROR
1485 : * : : ENDF
1486 : * : : ENDSEG-SILO RESET
1487 : * : : ENDSUB-RH TESTS
1488 : * : : BGNSUB-CAS MASSBUS READY
1489 : * : : SELECT THE TM78 UNDER TEST
1490 : * : : CLEAR MASSBUS REGISTER 0 (CS1)
1491 : * : : STORE 17770(8) IN MASSBUS REGISTER 10(8) (CS2)
1492 : * : : DELAY
1493 : * : : AND MASSBUS REGISTER 10(8) (CS2) WITH 177670(8)
1494 : * : : IF RESULT OF THE AND=0
1495 : * : : : THEN-CONTINUE
1496 : * : : : ELSE-ERROR 1
1497 : * : : ENDF
1498 : * : : SELECT THE TM78 UNDER TEST
1499 : * : : AND MASSBUS REGISTER 0 (CS1) WITH 177577(8)
1500 : * : : IF RESULT OF THE AND=0
1501 : * : : : THEN-CONTINUE
1502 : * : : : ELSE-ERROR 1
1503 : * : : ENDF
1504 : * : : ENDSUB-CAS MASSBUS READY
1505 : * : : *ENDTST
1506 : * : : SE
004422 : * : : *****
(1) : * : : *ERRORS
(1) : * : : *-----
(1) : * : : *CZTMIA DVC FTL ERR 000001 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1507 : * : : *M8956, M8957, MASSBUS
1508 : * : : *RH: AAAAAA TM:X TU:X PORT:X
1509 : * : : *MB REG. 000000=XXXXXX AFTER MB CLEAR
1510 : * : : *
1511 : * : : *CZTMIA DVC FTL ERR 000040 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1512 : * : : *RH11 FAILURE
1513 : * : : *NO 'DLT' AFTER READ FROM EMPTY SILO
1514 : * : : *
1515 : * : : *CZTMIA DVC FTL ERR 000041 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1516 : * : : *RH11 FAILURE
1517 : * : : *NO 'SC' AFTER READ FROM EMPTY SILO
1518 : * : : *
1519 : * : : *CZTMIA DVC FTL ERR 000042 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1520 : * : : *RH11 FAILURE
1521 : * : : *NO 'TRE' AFTER READ FROM EMPTY SILO
1522 : * : : *
1523 : * : : *CZTMIA DVC FTL ERR 000043 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1524 : * : : *
```

1525 : *RH11 FAILURE
1526 : *'IR' NOT SET AFTER RH CLEAR
1527 : *
1528 : *CZTMIA DVC FTL ERR 000044 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1529 : *RH11 FAILURE
1530 : *'OR' SET AFTER RH CLEAR
1531 : *
1532 : *CZTMIA DVC FTL ERR 000045 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1533 : *RH11 FAILURE
1534 : *'OR' SET AFTER 1 SILO LOAD
1535 : *
1536 : *CZTMIA DVC FTL ERR 000046 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1537 : *RH11 FAILURE
1538 : *'OR' RESET AFTER SECOND SILO LOAD
1539 : *
1540 : *CZTMIA DVC FTL ERR 000047 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1541 : *RH11 FAILURE
1542 : *'IR' NOT RESET BY SILO FULL
1543 : *
1544 : *CZTMIA DVC FTL ERR 000048 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1545 : *RH11 FAILURE
1546 : *'OR' NOT SET AFTER SILO FULL
1547 : *
1548 : *CZTMIA DVC FTL ERR 000049 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1549 : *RH11 FAILURE
1550 : *BAD SILO READ
1551 : *ACT=000000
1552 : *EXP=000000
1553 : *
1554 : *CZTMIA DVC FTL ERR 000050 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1555 : *RH11 FAILURE
1556 : *'DLT' NOT SET BY FILO OVERFLOW

1557 004422

(1)

1558

1559 004422

1560 004422 005037 004412

1561 004426 005737 004416

1562 004432 001402

1563 004434 000137 005262

1564

1565 004440

1566 004442

1567 004444 052777 000040 177566

1568 004452 013777 004352 177560

1569 004460 005001

1570 004462

1571 004512 012777 040000 177510

1572 004520 005077 177504

1573 004524 032777 177577 177476

1574 004532 001404

1575 004534

1576 004544

1577 004546

1578 004550

1579

S
: *****

BGNTST
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
TST RHTYP ;RH11 OR RH70?
BEQ 1\$;BR IF RH11
JMP RDTST ;JUMP IF RH70

1\$: BGNSUB ;RH11 TESTS
BGNSEG ;CS1 BITS
BIS #40,@CS2 ;INIT
MOV MBDRIV,@CS2 ;SELECT THE TM78 NUMBER
CLR R1 ;LOAD MASS BUS REGISTER NUMBER
DELAY 2. ;WAIT .2 MS.
MOV #4000,@XFRCMD ;CLR TRE
CLR @XFRCMD ;CLR CS1
BIT #177577,@XFRCMD ;CS1 STILL CLEAR EXCEPT 'RDY'?
BEQ 2\$;IF OK CONTINUE
ERRDF 1,RHCAS,ERM01 ;YES-PRINT MASS BUS ERROR

2\$: CKLOOP
ENDSEG ;CS1 BITS
BGNSEG ;EMPTY SILO READ

```

1580 004552 012777 000040 177460      MOV      #40,@CS2      ;INIT RH11
1581 004560 013777 004352 177452      MOV      MBDIV,@CS2   ;SELECT THE TM78 NUMBER
1582 004566                      DELAY      2.         ;WAIT .2 MS.
1583 004616 012777 040000 177404      MOV      #40000,@XFRCMD ;CLEAR TRE
1584 004624 005077 177400      CLR      @XFRCMD      ;CLEAR CS1
1585 004630 017701 177416      MOV      @DB,R1       ;READ DATA BUFFER
1586 004634 005777 177400      TST      @CS2        ;SEE IF 'DLT' SET
1587 004640 100404                      BMI      3$          ;IF SO BR
1588 004642                      ERRDF     40.,RH11,ERM040 ;NO 'DLT' ON READ FROM EMPTY SILO
1589 004652                      3$:      CKLOOP
1590 004654 005777 177350      TST      @XFRCMD      ;SEE IF 'SC' IS SET
1591 004660 100404                      BMI      4$          ;IF SO BR
1592 004662                      ERRDF     41.,RH11,ERM041 ;NO 'SC' ON READ FROM EMPTY SILO
1593 004672                      4$:      CKLOOP
1594 004674 032777 040000 177326      BIT      #40000,@XFRCMD ;SEE IF 'TRE' IS SET
1595 004702 001004                      BNE      5$          ;IF SO BR
1596 004704                      ERRDF     42.,RH11,ERM042 ;NO 'TRE' ON READ FROM EMPTY SILO
1597 004714                      5$:      CKLOOP
1598 004716                      ENDSEG           ;EMPTY SILO READ
1599
1600 004720                      BGNSEG           ;IR/OR CHECK
1601
1602 004722 012777 000040 177310      MOV      #40,@CS2      ;INIT THE RH11
1603 004730 032777 000100 177302      BIT      #100,@CS2    ;SEE IF 'IR' IS SET
1604 004736 001004                      BNE      6$          ;IF SO BR
1605 004740                      ERRDF     43.,RH11,ERM043 ;NO 'IR' AFTER INIT
1606 004750                      6$:      CKLOOP
1607 004752 032777 000200 177260      BIT      #200,@CS2    ;SEE IF 'OR' IS RESET
1608 004760 001404                      BEQ      7$          ;IF SO BR
1609 004762                      ERRDF     44.,RH11,ERM044 ;'OR' SET AFTER INIT
1610 004772                      7$:      CKLOOP
1611 004774 012777 000000 177250      MOV      #0,@DB        ;LOAD 0 INTO SILO
1612 005002 032777 000200 177230      BIT      #200,@CS2    ;SEE THAT 'OR' RESET
1613 005010 001404                      BEQ      8$          ;IF IT DOES BR
1614 005012                      ERRDF     45.,RH11,ERM045 ;'OR' SET AFTER 1 SILO LOAD
1615 005022                      8$:      CKLOOP
1616 005024 012777 177777 177220      MOV      #-1,@DB      ;LOAD SILO WITH -1
1617 005032 032777 000200 177200      BIT      #200,@CS2    ;SEE IF 'OR' IS SET
1618 005040 001004                      BNE      9$          ;IF SO BR
1619 005042                      ERRDF     46.,RH11,ERM046 ;'OR' RESET AFTER 2 SILO LOADS
1620
1621 005052                      9$:      CKLOOP
1622 005054                      ENDSEG
1623
1624 005056                      BGNSEG           ;SILO DATA TEST
1625
1626 005060 012777 000040 177152      MOV      #40,@CS2      ;INIT THE RH11
1627 005066 005001                      CLR      R1           ;PRESET DATA
1628 005070 010177 177156      10$:     MOV      R1,@DB        ;LOAD SILO
1629 005074 005201                      INC      R1           ;BUMP DATA
1630 005076 022701 000102      CMP      #102,R1      ;SEE IF DONE
1631 005102 001372                      BNE      10$         ;IF NOT BR
1632 005104 032777 000100 177126      BIT      #100,@CS2    ;SEE IF 'IR' IS RESET
1633 005112 001404                      BEQ      11$         ;IF SO BR
1634 005114                      ERRDF     47.,RH11,ERM047 ;'IR' NOT RESET BY SILO FULL
1635 005124                      11$:     CKLOOP

```

```
1636 005126 032777 000200 177104 BIT #200,@CS2 ;SEE IF 'OR' IS SET
1637 005134 001004 BNE 12$ ;IF SO BR
1638 005136 ERRDF 48.,RH11,ERM048 ;'OR' NOT SET AFTER FILLING SILO
1639 005146 12$: CKLOOP
1640 005150 005001 CLR R1 ;PRESET DATA
1641 005152 017702 177074 13$: MOV @DB,R2 ;READ SILO
1642 005156 020102 CMP R1,R2 ;SEE IF EXPT=RCVD
1643 005160 001005 BNE 14$ ;
1644 005162 005201 INC R1 ;BUMP DATA
1645 005164 022701 000102 CMP #102,R1 ;SEE IF DONE
1646 005170 001370 BNE 13$ ;IF NOT BR
1647 005172 000404 BR 15$ ;CONTINUE TESTING
1648 005174 14$: ERRDF 49.,RH11,ERM049 ;SILO DATA COMPARE ERROR
1649
1650 005204 15$: CKLOOP
1651 005206 ENDSEG ;SILO DATA TEST
1652
1653 005210 BGNSEG ;SILO OVERFLOW
1654
1655 005212 012777 000040 177020 MOV #40,@CS2 ;INIT THE RH11
1656 005220 012701 000103 MOV #103,R1 ;SET SIZE OF SILO+1
1657 005224 010177 177022 16$: MOV R1,@DB ;LOAD DILO
1658 005230 005301 DEC R1 ;SEE IF DONE
1659 005232 001374 BNE 16$ ;IF NOT BR
1660 005234 005777 177000 TST @CS2 ;SEE IF DLT SET
1661 005240 100404 BMI 17$ ;CONTINUE TESTING
1662 005242 ERRDF 50.,RH11,ERM050 ;'DLT' NOT SET BY SILO OVERFLOW
1663
1664 005252 17$: CKLOOP
1665 005254 ENDSEG ;SILO OVERFLOW
1666
1667 005256 ENDSUB ;RH11 TESTS
1668
1669 005260 BGNSUB ;MASSBUS READY TEST
1670
1671 005262 013777 004352 176750 RDYTEST: MOV MBDRIV,@CS2 ;SELECT THE TM78 NUMBER
1672 005270 005077 176734 CLR @XFRCMD ;CLEAR CAS REGISTER 0
1673 005274 052777 177770 176736 BIS #177770,@CS2 ;SET ALL OTHER BITS
1674 005302 012701 000010 MOV #10,R1 ;LOAD THE MASS BUS REGISTER NUMBER
1675 005306 DELAY 3. ;WAIT .3 MS.
1676 005336 032777 177670 176674 BIT #177670,@CS2 ;ANY ERRORS?
1677 005344 001404 BEQ 18$ ;NO-CONTINUE
1678 005346 ERRDF 1.,RHCAS,ERM001 ;YES-PRINT MASS BUS ERROR
1679 005356 18$: CKLOOP
1680 005360 013777 004352 176652 MOV MBDRIV,@CS2
1681 005366 005001 CLR R1 ;LOAD THE MASS BUS REGISTER NUMBER
1682 005370 032777 173577 176632 BIT #173577,@XFRCMD ;ANY ERRORS?
1683 005376 001404 BEQ 19$ ;NO-CONTINUE
1684 005400 ERRDF 1.,RHCAS,ERM001 ;YES
1685 005410 19$: CKLOOP
1686 005412 ENDSUB
1687 005414 ENDTST
```

.SBTTL TEST 02 - TM78 HANDSHAKE TEST

ST

;

(1)
(1)
1691
1692 005416
(1)
(1)
(1)
1693
1694
1695
1696
1697
1698
1699 005416
(1)
(1)
(1)
1700
1701
1702
1703
1704
1705
1706
1707
1708
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1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1720 005416
(1)
(1)
(1)
1721
1722
1723
1724
1725 005416
(1)
1726 005416
1727 005416 005037 004412
1728 005422 013777 004352 176610
1729 005430 005077 176574
1730 005434 005001
1731 005436 020127 000054
1732 005442 001456
1733 005444
1734 005446 017102 004230

```
: *TEST TITLE
: *-----*
: *TEST 2                TM78 HANDSHAKE TEST
SD
: *****
: *DESCRIPTION
: *-----*
: *THIS TEST READS EACH COMMON ADDRESS SPACE (CAS) LOCATION BY
: *SEQUENTIALLY READING MASS BUS REGISTERS 0, 6, 12, 14, 16, 20,
: *24, 26, 30, 32, 34, 36, 40, 42, 44, 46; 50 AND 52(8). THE DATA
: *RECEIVED IS NOT USED BUT AFTER EACH ACCESS THE 'NON-EXISTENT-
: *DRIVE' (NED) STATUS BIT IN MASS BUS REGISTER 10(8) IS EXAMINED.
: *ANY OTHER ERROR CONDITIONS ARE IGNORED.
SP
: *****
: *PROCEDURE
: *-----*
: *BGNTST
: * SELECT THE TM78 UNDER TEST
: * CLEAR MASSBUS REGISTER 0 (CS1)
: * CLEAR LOOP COUNT
: * BGND0
: * : DO WHILE LOOP COUNT < 54(8)
: * : READ MASSBUS REGISTER (LOOP COUNTER)
: * : IF MASSBUS STATUS BIT 'NED'=1
: * : : THEN-ERROR 2
: * : : ISSUE MASSBUS INIT
: * : : DELAY
: * : : SELECT THE TM78 UNDER TEST
: * : : ELSE-CONTINUE
: * : ENDF
: * : BGND0
: * : LET LOOP COUNT=LOOP COUNT+2
: * : : DO UNTIL LOOP COUNT NOT=2,4,10(8),22(8)
: * : ENDDO
: * ENDDO
: *ENDTST
SE
: *****
: *ERRORS
: *-----*
: *CZTMIA DVC FTL ERR 000002 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA TM: X TU: X PORT: X
: *'NED' WHEN READING MB REG. 000000
S
: *****
: BGNTST
: CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
: MOV MBDRIV,@CS2 ;LOAD TM78 UNIT NUMBER
: CLR @XFRCMD ;CLEAR CAS REGISTER 0
: CLR R1 ;CLEAR MASS BUS REGISTER PTR.
1$: CMP R1,#54 ;FINISHED?
: BEQ 3$ ;YES-EXIT
: BGNSEG
: MOV @XFRCMD(R1),R2 ;READ MB
```

```

1735 005452 032777 010000 176560 BIT #NED,@CS2 ;NON-EXISTENT DRIVE SET
1736 005460 001426 BEQ 4$
1737 005462 ERRDF 2.,RHCAS,ERM002
1738 005472 012777 000040 176540 MOV #MBINIT,@CS2 ;CLEAR THE NED ERROR
1739 005500 DELAY 5 ;WAIT 1 MS.
1740 005530 013777 004352 176502 MOV MBDRIV,@CS2
1741 005536 4$: CKLOOP
1742 005540 ENDSEG
1743 005542 005201 2$: INC R1 ;INCREMENT THE REGISTER NUMBER
1744 005544 005201 INC R1 ;INCREMENT THE REGISTER NUMBER
1745 005546 020127 000002 CMP R1,#2 ;REGISTER NUMBER=2?
1746 005552 001773 BEQ 2$ ;YES-DON'T TEST
1747 005554 020127 000004 CMP R1,#4 ;REGISTER NUMBER=4?
1748 005560 001770 BEQ 2$ ;YES-DON'T TEST
1749 005562 020127 000010 CMP R1,#10 ;REGISTER NUMBER=10?
1750 005566 001765 BEQ 2$ ;YES-DON'T TEST
1751 005570 020127 000022 CMP R1,#22 ;REGISTER=22?
1752 005574 001762 BEQ 2$ ;YES-DON'T TEST
1753 005576 000717 BR 1$ ;CONTINUE
1754 005600 3$: ENDTST ;END OF TEST

```

1755 .SBTTL TEST 03 - NON-EXISTENT REGISTER TEST
 1756 005602 ST

```

(1) : *****
(1) : *TEST TITLE
(1) : *-----
1757 : *TEST 3 NON-EXISTENT REGISTER TEST
1758 005602 SD

```

```

(1) : *****
(1) : *DESCRIPTION
(1) : *-----

```

```

1759 : *THIS TEST READS THE NON-EXISTENT MB REGISTERS (54, 56,
1760 : *60, 62, 64, 66, 70 AND 72(8) AND EXPECTS THE READ DATA
1761 : *TO BE ZERO, AND THE ILLEGAL REGISTER "ILR" BIT IN MB
1762 : *REGISTER 52(8) CAS REGISTER 21(8) TO BE SET. THEN A MASS
1763 : *BUS INIT IS ISSUED AND A 100 MICROSECOND TIME PREFORMED.
1764 : *THE "ILR" BIT IS AGAIN TESTED BUT SHOULD NOW BE RESET.
1765 005602 SP

```

```

(1) : *****
(1) : *PROCEDURE
(1) : *-----

```

```

1766 : *BGNTST
1767 : * SELECT THE TM78 UNDER TEST
1768 : * CLEAR MASSBUS REGISTER 0 (CS1)
1769 : * SET THE LOOP COUNTER TO 54(8)
1770 : * BGND0
1771 : * : READ MASSBUS REGISTER (LOOP COUNTER)
1772 : * : IF MASSBUS STATUS BIT "NED"=1
1773 : * : : THEN-ERROR 2
1774 : * : : ISSUE MASSBUS INIT
1775 : * : : DELAY
1776 : * : : SELECT THE TM78 UNDER TEST
1777 : * : : ELSE-CONTINUE
1778 : * : : ENDIF
1779 : * : IF THE DATA READ FROM THE MASSBUS REGISTER=0
1780 : * : : THEN-ERROR 5
1781 : * : : ELSE-CONTINUE

```

```
1782          : * : ENDF
1783          : * : READ TM78 CAS REGISTER 21(8)
1784          : * : IF TM78 STATUS BIT 'ILR'=0
1785          : * : : THEN-ERROR 6
1786          : * : : ELSE-CONTINUE
1787          : * : ENDF
1788          : * : ISSUE MASSBUS INIT
1789          : * : DELAY
1790          : * : SELECT THE TM78 UNDER TEST
1791          : * : SET THE 'HOLD' BIT IN TM78 CAS REGISTER 21(8)
1792          : * : READ TM78 CAS REGISTER 21(8)
1793          : * : IF THE 'ILR' BIT IN TM78 CAS REGISTER 21(8)=1
1794          : * : : THEN-ERROR 19
1795          : * : : ELSE-CONTINUE
1796          : * : ENDF
1797          : * : LET LOOP COUNTER=LOOP COUNTER+2
1798          : * : DO UNTIL LOOP COUNTER=74(8)
1799          : * ENDDO
1800          : *ENDTST
1801 005602 SE
1802          : *****
1803          : *ERRORS
1804          : *-----
1805          : *CZTMIA DVC FTL ERR 000002 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1806          : *M8956, M8957, MASSBUS
1807          : *RH: AAAAAA TM: X TU: X PORT: X
1808          : *'NED' WHEN READING MB REG. 000000
1809          : *
1810          : *CZTMIA DVC FTL ERR 000005 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1811          : *M8956, M8957, MASSBUS
1812          : *RH: AAAAAA TM: X TU: X PORT: X
1813          : *NON-EXISTENT REG. 00 = 000000 SHOULD BE ZERO
1814          : *
1815          : *CZTMIA DVC FTL ERR 000006 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1816          : *M8956, M8956, MASSBUS
1817          : *RH: AAAAAA TM: X TU: X PORT: X
1818          : *TM78 'ILR' NOT SET AFTER REG. 00 READ
1819          : *
1820          : *CZTMIA DVC FTL ERR 000019 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1821          : *M8956, M8957, MASSBUS
1822          : *RH: AAAAAA TM: X TU: X PORT: X
1823          : *'ILR' NOT CLEAR WHEN WRITTEN CLEAR
1824          : S
1825          : *****
1826          : BGNTST
1827          : CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
1828          : MOV MBDIV,@CS2 ;LOAD TM78 UNIT NUMBER
1829          : CLR @XFRCMD ;CLEAR CAS REGISTER 0
1830          : MOV #54,R1 ;SET UP THE REGISTER POINTER
1831          : 3$: BGNSEG
1832          : MOV @XFRCMD(R1),R2 ;READ NON EXISTENT MB REGISTER
1833          : BIT #NED,@CS2
1834          : BEQ 5$
1835          : ERRDF 2.,RHCAS,ERM002
1836          : MOV #MBINIT,@CS2 ;CLEAR THE NED ERROR
1837          : DELAY 5 ;WAIT 1 MS.
```



```
1881      : * READ TM78 CAS REGISTER 20(8)
1882      : * CALL SUBROUTINE NONEX
1883      : * DELAY
1884      : * READ TM78 CAS REGISTER 20(8) AGAIN
1885      : * CALL SUBROUTINE NONEX
1886      : * IF FIRST READ OF CAS REGISTER 20=SECOND READ
1887      : * : THEN-CONTINUE
1888      : * : ERROR 11
1889      : * ENDIF
1890      : * READ TM78 CAS REGISTER 21(8)
1891      : * CALL SUBROUTINE NONEX
1892      : * DELAY
1893      : * READ TM78 CAS REGISTER 21(8) AGAIN
1894      : * IF FIRST READ OF CAS REGISTER 21(8)=SECOND READ
1895      : * : THEN-CONTINUE
1896      : * : ELSE-ERROR 10
1897      : * ENDIF
1898      : * WRITE -1 TO TM78 CAS REGISTER 20(8)
1899      : * CLEAR TM78 CAS REGISTER 21(8)
1900      : * CALL SUBROUTINE NONEX
1901      : * IF TM78 CONTROL BIT "HOLD"=0
1902      : * : THEN-CONTINUE
1903      : * : ELSE-ERROR 12
1904      : * ENDIF
1905      : * IF TM78 STATUS BIT "HLDA"=0
1906      : * : THEN-CONTINUE
1907      : * : ELSE-ERROR 13
1908      : * ENDIF
1909      : *ENDTST
1910 006076 SE
1911      : *****
1912      : *ERRORS
1913      : *-----
1914      : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1915      : *M8956, M8957, MASSBUS
1916      : *RH: AAAAAA TM: X TU: X PORT: X
1917      : *'NED' WHEN READING MB REG.
1918      : *
1919      : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1920      : *M8957, M8960
1921      : *RH: AAAAAA TM: X TU: X PORT: X
1922      : *'HLDA' NOT SET STATUS = 000000
1923      : *
1924      : *CZTMIA DVC FTL ERR 000010 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1925      : *M8957, M8960
1926      : *RH: AAAAAA TM: X TU: X PORT: X
1927      : *TM78 DATA BUS CHANGING WHEN "HLDA" SET
1928      : *
1929      : *CZTMIA DVC FTL ERR 000011 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1930      : *M8957, M8960
1931      : *RH: AAAAAA TM: X TU: X PORT: X
1932      : *TM78 ADDR BUS CHANGING WHEN "HLDA" SET
1933      : *
1934      : *CZTMIA DVC FTL ERR 000012 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1935      : *M8957, M8960
1936      : *RH: AAAAAA TM: X TU: X PORT: X
```

```

1934      ;*'HOLD'' DID NOT RESET
1935      ;*
1936      ;*CZTMIA DVC FTL ERR 000013 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1937      ;*M8957, M8960
1938      ;*RH: AAAAAA TM: X TU: X PORT: X
1939      ;*'HLDA'' DID NOT RESET
1940      ;*
1941      S
1941 006076 ;*****
1942      ;
1943      BGNTST
1944 006076 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
1945 006102 BGNSEG
1946 006104 004737 033414 CALL HOLDMP ;HOLD THE TM78 MP-WAIT FOR HLDA
1947 006110 012777 000000 176162 MOV #0,@AD80 ;LOAD THE TM78 ADDRESS BUS REGISTER WITH ZERO
1948 006116 000240 NOP ;WAIT
1949 006120 000240 NOP ;WAIT
1950 006122 017702 176152 MOV @AD80,R2 ;READ TM78 MP ADDRESS BUS
1951 006126 004737 033372 CALL NONEX ;CHECK FOR NONEX
1952 006132 CKLOOP
1953      ;
1954 006134 DELAY 1. ;WAIT 100 MICRO SECONDS
1955      ;
1956 006164 017703 176110 MOV @AD80,R3 ;READ TM78 MP ADDRESS BUS AGAIN
1957 006170 004737 033372 CALL NONEX ;CHECK FOR NONEX
1958 006174 CKLOOP
1959 006176 020203 CMP R2,R3 ;COMPARE BOTH ADDRESSES
1960 006200 001404 BEQ 2$ ;CONTINUE IF EQUAL
1961 006202 ERRDF 11.,PROCAS,ERM011
1962 006212 2$: CKLOOP
1963 006214 ENDSEG
1964 006216 BGNSEG
1965 006220 017702 176056 MOV @DS80,R2 ;READ TM78 MP DATA BUS
1966 006224 004737 033372 CALL NONEX ;CHECK FOR NONEX
1967 006230 CKLOOP
1968 006232 DELAY 1. ;WAIT 100 MICRO SECONDS
1969 006262 017703 176014 MOV @DS80,R3 ;READ TM78 MP DATA BUS AGAIN
1970 006266 004737 033372 CALL NONEX ;CHECK FOR NONEX
1971 006272 CKLOOP
1972 006274 120203 CMPB R2,R3 ;COMPARE BOTH BUS ADDRESSES
1973 006276 001404 BEQ 1$
1974 006300 ERRDF 10.,PROCAS,ERM010 ;ERROR
1975 006310 1$: CKLOOP
1976 006312 ENDSEG
1977 006314 012777 177777 175756 MOV #-1,@AD80 ;LOAD A NONEXISTENT ADDRESS
1978 006322 005077 175754 CLR @DS80 ;DROP HOLD
1979 006326 004737 033372 CALL NONEX ;
1980 006332 CKLOOP
1981 006334 017702 175742 MOV @DS80,R2 ;READ THE STATUS
1982 006340 032702 000400 BIT #HOLD,R2 ;HOLD=0?
1983 006344 001404 BEQ 3$ ;YES CONTINUE
1984 006346 ERRDF 12.,PROCAS,ERM012 ;NO
1985      ;
1986 006356 3$: CKLOOP
1987 006360 032702 001000 BIT #HLDA,R2 ;HLDA=0?
1988 006364 001404 BEQ 4$ ;YES-CONTINUE

```

1989 006366
1990
1991 006376
1992 006400
1993
1994
1995 006402
(1)
(1)
(1)
1996
1997 006402
(1)
(1)
(1)
1998
1999
2000
2001
2002
2003 006402
(1)
(1)
(1)
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018 006402
(1)
(1)
(1)
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030 006402
(1)
2031 006402

ERRDF 13.,PROCAS,ERM013 ;NO
4\$: CKLOOP
ENDTST
.SBTTL TEST 05 - REGISTER 20 INTEGRITY CHECK
ST
: *****
:*TEST TITLE
:-----
:*TEST 5 REGISTER 20 INTEGRITY CHECK
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST SETS "HOLD" AND WAITS FOR "HLDA" TO SET, THEN
:*DATA FROM 000000(8)-177777(8) IS WRITTEN TO THE MB
:*REGISTER 50(8), CAS REGISTER 20 READ BACK AN COMPARED.
:*THIS PROVIDES A TEST OF BOTH THE ADDRESS REGISTER AND
:*THE MASS BUS TRANSCEIVERS.
SP
: *****
:*PROCEDURE
:-----
:*BGNTST
:* CALL SUBROUTINE HOLDMP
:* CLEAR THE LOOP COUNTER
:* BGND0
:* : WRITE (LOOP COUNTER) TO CAS REGISTER 20(8)
:* : READ CAS REGISTER 20(8)
:* : IF VALUE WRITTEN=VALUE READ
:* : : THEN-CONTINUE
:* : : ELSE-ERROR 16
:* : ENDIF
:* : LET LOOP COUNTER=LOOP COUNTER+1
:* : DO UNTIL THE LOOP COUNTER=0
:* ENDD0
:*ENDTST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*"HLDA" NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000016 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*REG. 20 COMPARE FAIL
:*ACT = 000000
:*EXP = 000000
S
: *****
: BGNTST

2032 006402 005037 004412
2033 006406 004737 033414
2034 006412 005003
2035 006414 005001
2036 006416
2037 006420 010177 175654
2038 006424 017702 175650
2039 006430 020102
2040 006432 001406
2041 006434
2042 006444 012703 000001
2043 006450 005703
2044 006452 001401
2045 006454
2046 006456 005201
2047 006460 001357
2048 006462
2049 006464
2050
2051 006466
(1)
(1)
(1)
2052
2053 006466
(1)
(1)
(1)
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065 006466
(1)
(1)
(1)
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078

```
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG  
CALL HOLDMP ;HOLD TM78 MP-WAIT FOR HLDA  
CLR R3  
CLR R1 ;CLEAR THE ADDRESS  
BGNSEG  
1$: MOV R1,@AD80 ;MOVE TO ADDRESS REG IN TM78  
MOV @AD80,R2 ;READ THE ADDRESS FROM REG IN TM78  
CMP R1,R2 ;=?  
BEQ 2$ ;YES-CONTINUE  
ERRDF 16,CASX,ERM016 ;NO-ERROR  
MOV #1,R3  
2$: TST R3  
BEQ 3$  
CKLOOP  
3$: INC R1 ;INCREMENT THE ADDRESS  
BNE 1$ ;CONTINUE UNTIL DONE  
ENDSEG  
ENDTST
```

.SBTTL TEST 06 - CLEAR FROM HOLD TEST

```
ST  
: *****  
:*TEST TITLE  
:-----  
:*TEST 6 CLEAR FROM HOLD TEST  
SD  
: *****  
:*DESCRIPTION  
:-----  
:*THIS TEST SETS THE TM78MP "HOLD" BIT IN MB REGISTER 52(8),  
:*CAS REGISTER 21 AND TESTS FOR "HLDA". THEN THE PDP11  
:*PROCESSOR ATTEMPTS TO SET "iMRDY", AND CHECKS THAT  
:*IT SETS.  
:*  
:*THEN MB REGISTER 52(8), CAS REGISTER 21 IS WRITTEN WITH  
:*THE "CLEAR" AND "HOLD" BITS SET, AND THE FOLLOWING CON-  
:*DITIONS ARE TESTED.  
:*  
:* "HLDA" IS STILL SET  
:* "TMRDY" IS RESET  
SP  
: *****  
:*PROCEDURE  
:-----  
:*BGNTST  
:* CALL SUBROUTINE HOLDMP  
:* LOAD THE TM78 INTERNAL ADDRESS FOR TM READY BIT 100240(8) TO TM78  
:* CAS REGISTER 20(8)  
:* LOAD THE "HOLD" BIT+200(8) TO CAS REGISTER 21(8)  
:* READ CAS REGISTER 21(8)  
:* IF STATUS BIT "TMRDY"=0  
:* : THEN-ERROR 4  
:* : ELSE-CONTINUE  
:* ENDIF  
:* LOAD -1 TO CAS REGISTER 20(8)  
:* LOAD THE "HOLD" AND "CLR" BITS IN CAS REGISTER 21(8)  
:* WAIT
```



```
2079      ;* IF THE 'HODA' STATUS BIT IN CAS REGISTER 21(8)=0
2080      ;* : THEN-ERROR 14
2081      ;* : ELSE-CONTINUE
2082      ;* ENDF
2083      ;* IF THE 'TMRDY' STATUS BIT IN CAS REGISTER 21(8)=0
2084      ;* : THEN-CONTINUE
2085      ;* : ELSE-ERROR 15
2086      ;* ENDF
2087      ;*ENDTST
2088 006466 SE
(1)      ;*****
(1)      ;*ERRORS
(1)      ;-----
2089      ;*CZTMIA DVC FTL ERR 000004 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2090      ;*M8956, M8957
2091      ;*RH: AAAAAA TM: X TU: X PORT: X
2092      ;*'TMRDY' NOT SET
2093      ;*
2094      ;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2095      ;*M8957, M8960
2096      ;*RH: AAAAAA TM: X TU: X PORT: X
2097      ;*'HLDA' NOT SET STATUS = 000000
2098      ;*
2099      ;*CZTMIA DVC FTL ERR 000014 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2100      ;*M8960
2101      ;*RH: AAAAAA TM: X TU: X PORT: X
2102      ;*'HLDA' RESETS WHEN 'HOLD' + 'CLEAR' SET
2103      ;*
2104      ;*CZTMIA DVC FTL ERR 000015 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2105      ;*M8957, M8960
2106      ;*RH: AAAAAA TM: X TU: X PORT: X
2107      ;*'TMRDY' DID NOT RESET
2108      ;*
2109 006466 S
(1)      ;*****
2110
2111 006466      BGNTST
2112 006466 005037 004412      CLR      CASLD      ;CLEAR THE CAS PROGRAM LOADED FLAG
2113 006472 004737 033414      CALL     HOLDMP     ;HOLD THE TM78 MP-WAIT FOR HLDA
2114 006476 012777 100240 175574      MOV      #TMRDST,@AD80 ;LOAD ADDRESS OF TM-READY
2115 006504 012777 000500 175570      MOV      #HOLD+#STMRDY,@DS80 ;SET TM READY
2116 006512 000240      NOP
2117 006514 017702 175562      MOV      @DS80,R2      ;GET THE STATUS
2118 006520 032702 100000      BIT      #TMRDY,R2     ;TM READY SET?
2119 006524 001004      BNE      1$           ;YES-CONTINUE
2120 006526      ERRDF 04.,CASX,ERM004 ;NO ERROR
2121 006536      1$: CKLOOP
2122 006540 012777 077777 175532      MOV      #077777,@AD80 ;LOAD A NON EXISTENT ADDRESS
2123 006546 012777 040400 175526      MOV      #TMCLR+#HOLD,@DS80 ;SET HOLD AND CLEAR
2124 006554      DELAY 1.           ;WAIT 100 MICRO SECONDS
2125 006604 017702 175472      MOV      @DS80,R2     ;GET TM78 MP STATUS
2126 006610 032702 001000      BIT      #HLDA,R2     ;HLDA SET?
2127 006614 001004      BNE      2$           ;YES-CONTINUE
2128 006616      ERRDF 14.,PRO,ERM014 ;NO-ERROR
2129
2130 006626      2$: CKLOOP
```

2131 006630 032702 100000
2132 006634 001404
2133 006636
2134
2135 006646
2136 006650
2137
2138
2139 006652
(1)
(1)
(1)
2140
2141 006652
(1)
(1)
(1)
2142
2143
2144 006652
(1)
(1)
(1)
2145
2146
2147
2148
2149
2150
2151
2152
2153
2154
2155
2156
2157
2158
2159
2160
2161
2162 006652
(1)
(1)
(1)
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172 006652
(1)
2173

```
BIT #TMRDY,R2 ;TM READY SET?
BEQ 3$ ;NO-CONTINUE
ERRDF 15.,PROCAS,ERM015 ;YES-ERROR

3$: CKLOOP
ENDTST

.SBTTL TEST 07 - PORT SELECT TEST
ST
: *****
: *TEST TITLE
: *-----
: *TEST 7 PORT SELECT TEST
SD
: *****
: *DESCRIPTION
: *-----
: *THIS TEST CHECKS THE ABILITY OF THE PORT SELECT LOGIC IN THE TM78 TO
: *SELECT TO THE USER SPECIFIED MASS BUS PORT.
SP
: *****
: *PROCEDURE
: *-----
: *BGNTST
: * CALL SUBROUTINE HOLDMP
: * LOAD THE INTERNAL ADDRESS OF THE PORT SELECT BYTE 100340(8) TO CAS
: * REGISTER 20(8)
: * GET THE USER SPECIFIED MASS BUS PORT # (0 OR 1)
: * IF USER SPECIFIED PORT=0
: * : THEN-LOAD THE "HOLD" BIT TO CAS REGISTER 21(8)
: * : ELSE-LOAD THE "HOLD" BIT+200(8) TO CAS REGISTER 21(8)
: * ENDIF
: * LOAD THE INTERNAL ADDRESS OF THE PORT SELECT BYTE 100340(8) TO CAS
: * REGISTER 20(8)
: * READ CAS REGISTER 21(8)
: * IF THE VALUE READ=THE VALUE WRITTEN
: * : THEN-CONTINUE
: * : ELSE-ERROR 17
: * ENDIF
: *ENDTST
SE
: *****
: *ERRORS
: *-----
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA TM: X TU: X PORT: X
: *'HLDA' NOT SET STATUS = 000000
: *
: *CZTMIA DVC FTL ERR 000017 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8960
: *RH: AAAAAA TM: X TU: X PORT: X
: *PORT X SELECT BIT NOT SET
S
: *****
```

```
2174 006652          BGNTST
2175 006652 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2176 006656 004737 033414 CALL HOLDMP ;HOLD TM78MP-WAIT FOR HLDA
2177 006662 012777 100340 175410 MOV #MBSEL,@AD80 ;ADDRESS THE PORT SELECT BYTE
2178 006670 005003 CLR R3 ;CLEAR THE EXPECTED DATA BYTE
2179 006672 013701 004360 MOV TMPORT,R1 ;GET THE PORT SELECTED
2180 006676 001403 BEQ 1$ ;BRANCH IF PORT 0
2181 006700 012701 000200 MOV #200,R1 ;ELSE-LOAD PORT 1 SELECT BIT
2182 006704 005203 INC R3 ;UPDATE THE EXPECTED DATA BYTE
2183 006706 062701 000400 1$: ADD #HOLD,R1 ;ADD IN HOLD BIT
2184 006712 010177 175364 MOV R1,@DS80 ;LOAD PORT SELECT BYTE
2185 006716 000240 NOP
2186 006720 012777 100340 175352 MOV #MBSEL,@AD80
2187 006726 017702 175350 MOV @DS80,R2
2188 006732 042701 177400 BIC #177400,R1 ;REMOVE HOLD BIT FROM PORT BYTE
2189 006736 042702 177577 BIC #177577,R2 ;REMOVE BITS FROM ACTUAL
2190 006742 020102 CMP R1,R2 ;PROPER PORT SELECTED
2191 006744 001404 BEQ 2$ ;YES-EXIT TEST
2192 ;NO-ERROR
2193 006746 ERRDF 17.,PRO,ERM017
2194
2195 006756 2$: CKLOOP
2196 006760 ENDTST
2197
2198 .SBTTL TEST 08 - MASS BUS INIT FROM HOLD TEST
2199 006762 ST
(1) ;*****
(1) ;*TEST TITLE
(1) ;*-----
2200 ;*TEST 8 MASS BUS INIT FROM HOLD TEST
2201 006762 SD
(1) ;*****
(1) ;*DESCRIPTION
(1) ;*-----
2202 ;*THIS TEST SETS THE TM78MP 'HOLD' BIT IN MB REGISTER 52(8),
2203 ;*CAS REGISTER 21 AND TESTS FOR 'HLDA'. THEN THE PDP11
2204 ;*PROCESSOR ATTEMPTS TO SET 'TMRDY', AND CHECKS THAT IT
2205 ;*SETS.
2206 ;*
2207 ;*MB CLEAR IS THEN ISSUED, AND THE FOLLOWING CONDITIONS
2208 ;*ARE TESTED:
2209 ;*
2210 ;* . 'HOLD' IS RESET
2211 ;* . 'HLDA' IS RESET
2212 ;* . 'TMRDY' IS RESET
2213 006762 SP
(1) ;*****
(1) ;*PROCEDURE
(1) ;*-----
2214 ;*BGNTST
2215 ;* CALL SUBROUTINE HOLDMP
2216 ;* LOAD THE TM78 INTERNAL ADDRESS FOR TM READY 100240(8) TO CAS
2217 ;* REGISTER 20(8)
2218 ;* LOAD THE 'HOLD' BIT+100(8) TO CAS REGISTER 21(8)
2219 ;* CLEAR CAS REGISTER 20(8)
2220 ;* IF 'TMRDY'=1
```

```
2221 : * : THEN-CONTINUE
2222 : * : ELSE-ERROR 4
2223 : * ENDF
2224 : * SET THE "CLEAR" BIT IN MB REGISTER 10(8)
2225 : * DELAY
2226 : * SELECT THE TM78 UNDER TEST
2227 : * IF THE "HOLD" CONTROL BIT IN CAS REGISTER 21(8)=0
2228 : * : THEN-CONTINUE
2229 : * : ELSE-ERROR 12
2230 : * ENDF
2231 : * IF THE "HOLD ACTIVE" STATUS BIT IN CAS REGISTER 21(8)=0
2232 : * : THEN-CONTINUE
2233 : * : ELSE-ERROR 13
2234 : * ENDF
2235 : * IF "TM READY" STATUS BIT IN CAS REGISTER 21(8)=0
2236 : * : THEN-CONTINUE
2237 : * : ELSE-ERROR 15
2238 : * ENDF
2239 : *ENDTST
2240 006762 SE
(1) : *****
(1) : *ERRORS
(1) : *-----
2241 : *CZTMIA DVC FTL ERR 000004 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2242 : *M8956, M8957
2243 : *RH: AAAAAA TM: X TU: X PORT: X
2244 : *"TMRDY" NOT SET
2245 : *
2246 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2247 : *M8957, M8960
2248 : *RH: AAAAAA TM: X TU: X PORT: X
2249 : *"HLDA" NOT SET STATUS = 000000
2250 : *
2251 : *CZTMIA DVC FTL ERR 000012 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2252 : *M8957, M8960
2253 : *RH: AAAAAA TM: X TU: X PORT: X
2254 : *"HOLD" DID NOT RESET
2255 : *
2256 : *CZTMIA DVC FTL ERR 000013 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2257 : *M8957, M8960
2258 : *RH: AAAAAA TM: X TU: X PORT: X
2259 : *"HLDA" DID NOT RESET
2260 : *
2261 : *CZTMIA DVC FTL ERR 000015 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2262 : *M8957, M8960
2263 : *RH: AAAAAA TM: X TU: X PORT: X
2264 : *"TMRDY" DID NOT RESET
2265 : *
2266 006762 S
(1) : *****
2267
2268 006762 BGNTST
2269 006762 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2270 006766 CALL HOLDMP ;HOLD TM78 MP-WAIT FOR HLDA
2271 006772 MOV #TMRDST,@AD80 ;LOAD ADDRESS OF TM READY
2272 007000 MOV #HOLD+#STMRDY,@DS80 ;SET TM READY
```

```
2273 007006 017702 175270      MOV    @DS80,R2      ;GET THE STATUS
2274 007012 032702 100000      BIT    #TMRDY,R2    ;TM READY SET?
2275 007016 001004              BNE    1$           ;YES-CONTINUE
2276 007020                      ERRDF  4.,CASX,ERM004 ;NO-ERROR
2277
2278 007030                      1$:   CKLOOP
2279 007032 052777 000040 175200  BIS    #MBINIT,@CS2 ;ISSUE MASS BUS INIT
2280 007040 000240              NOP
2281 007042 000240              NOP
2282 007044 013777 004352 175166  MOV    MBDRIV,@CS2  ;LOAD THE MASS BUSS DRIVE NUMBER
2283 007052 017702 175224      MOV    @DS80,R2    ;READ THE STATUS
2284 007056 032702 000400      BIT    #HOLD,R2    ;HOLD SET?
2285 007062 001404              BEQ    2$           ;NO-CONTINUE
2286 007064                      ERRDF  12.,PROCAS,ERM012 ;YES-ERROR
2287 007074                      2$:   CKLOOP
2288 007076 032702 001000      BIT    #HLDA,R2    ;HLDA SET?
2289 007102 001404              BEQ    3$           ;NO-CONTINUE
2290 007104                      ERRDF  13.,PROCAS,ERM013 ;YES-ERROR
2291 007114                      3$:   CKLOOP
2292 007116 032702 100000      BIT    #TMRDY,R2  ;TM READY SET?
2293 007122 001404              BEQ    4$           ;NO-CONTINUE
2294 007124                      ERRDF  15.,PROCAS,ERM015 ;YES-ERROR
2295
2296 007134                      4$:   CKLOOP
2297 007136                      ENDTST
```

2298 .SBTTL TEST 09 - TM78 CONTROL BUS PARITY ERROR DETECT TEST

2299 007140 ST *****

(1) ;*TEST TITLE

(1) ;*-----

2300 (1) ;*TEST 9 TM78 CONTROL BUS PARITY ERROR DETECT TEST

2301 007140 SD *****

(1) ;*DESCRIPTION

(1) ;*-----

2302 (1) ;*THIS TEST SETS THE "PAT" BIT IN MB CONTROLLER AND THEN

2303 (1) ;*WRITES CAS REGISTER 3 (MB REGISTER 24) WITH THE TM78 MP

2304 (1) ;*IN "HOLD". CAS REGISTER 21 (MB REGISTER 52) IS READ AND

2305 (1) ;*THE "CPE" BIT IS EXPECTED. THEN THE "PAT" BIT IN THE MB

2306 (1) ;*CONTROLLER IS RESET, THE "CPE" BIT IN CAS REGISTER 21

2307 (1) ;*(MB REGISTER 52) IS RESET, AND CAS REGISTER 3 (MB REGISTER 24)

2308 (1) ;*IS AGAIN WRITTEN. THE "CPE" BIT IS THEN TESTED FOR THE

2309 (1) ;*RESET CONDITION.

2310 007140 SP *****

(1) ;*PROCEDURE

(1) ;*-----

2311 (1) ;*BGNTST

2312 (1) ;* CALL SUBROUTINE HOLDMP

2313 (1) ;* SET THE "PAT" BIT IN MB REGISTER 10(8)

2314 (1) ;* CLEAR CAS REGISTER 3

2315 (1) ;* IF THE "CPE" STATUS BIT IN CAS REGISTER 21(8)=1

2316 (1) ;* : THEN-CONTINUE

2317 (1) ;* : ELSE-ERROR 23

2318 (1) ;* ENDIF

2319 (1) ;* SET THE "CLEAR" BIT IN MB REGISTER 10(8)

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2321
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2332
2333 007140
(1)
(1)
(1)
2334
2335
2336
2337
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2351
2352
2353
2354 007140
(1)
2355
2356 007140
2357 007140 005037 004412
2358 007144 004737 033414
2359 007150 013701 004352
2360 007154 052701 000020
2361 007160 010177 175054
2362 007164 005077 175064
2363 007170 017701 175106
2364 007174 032701 004000
2365 007200 001004
2366 007202
2367
2368 007212
2369 007214 052777 000040 175016
2370 007222
2371 007252 013777 004352 174760

```
;* DELAY  
;* SELECT THE TM78 UNDER TEST  
;* SET THE "HOLD" BIT IN CAS REGISTER 21(8)  
;* IF THE "CPE" STATUS BIT IN CAS REGISTER 21(8)=0  
* : THEN-CONTINUE  
* : ELSE-ERROR 24  
;* ENDF  
;* CLEAR CAS REGISTER 3  
;* IF THE "CPE" STATUS BIT IN CAS REGISTER 21(8)=0  
* : THEN-CONTINUE  
* : ELSE-ERROR 25  
;* ENDF  
;*ENDTST  
SE  
:*****  
: *ERRORS  
:-----  
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8957, M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *"HLDA" NOT SET STATUS = 000000  
: *  
: *CZTMIA DVC FTL ERR 000023 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8956, M8957, MASSBUS  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *TM78 "CPE" NOT SET WHEN "PAT" IS SET  
: *  
: *CZTMIA DVC FTL ERR 000024 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8956, M8957, MASSBUS  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *TM78 "CPE" NOT RESET WHEN "PAT" IS CLEAR  
: *  
: *CZTMIA DVC FTL ERR 000025 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8956, M8957, MASSBUS  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *TM78 "CPE" SET WHEN "PAT" CLEAR  
: *  
S  
:*****  
BGNTST  
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG.  
CALL HOLDMP ;HOLD TM78 MP - WAIT FOR HLDA  
MOV MBDRIV,R1  
BIS #PAT,R1  
MOV R1,@CS2  
CLR @DI1 ;WRITE A MB REGISTER  
MOV @DS80,R1 ;GET TM78 CONTROL BUS STATUS  
BIT #CPE,R1 ;CPE SET?  
BNE 1$ ;YES-CONTINUE  
ERRDF 23.,RHCAS,ERM023 ;NO-ERROR  
1$: CKLOOP  
BIS #MBINIT,@CS2 ;CLEAR "PAT"  
DELAY 5 ;WAIT 1 MS.  
MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
```

2372 007260 012777 000400 175014 MOV #HOLD,ADS80 ;CLEAR "CPE" IN THE TM78
2373 007266 017701 175010 MOV ADS80,R1 ;DID IT CLEAR?
2374 007272 032701 004000 BIT #CPE,R1
2375 007276 001404 BEQ 2\$;YES-CONTINUE
2376 007300 ERRDF 24.,RHCAS,ERM024 ;NO-ERROR

2377
2378 007310 2\$: CKLOOP
2379 007312 005077 174736 CLR @DI1 ;WRITE AGAIN
2380 007316 017701 174760 MOV ADS80,R1 ;"CPE" SET?
2381 007322 032701 004000 BIT #CPE,R1
2382 007326 001404 BEQ 3\$;NO-EXIT TEST
2383 007330 ERRDF 25.,RHCAS,ERM025 ;YES-ERROR
2384 007340 3\$: CKLOOP
2385 007342 ENDTST ;END OF TEST
2386

2387 .SBTTL TEST 10 - TM78 CONTROL BUS PARITY ERROR FORCE TEST
2388 007344 ST

(1) : *****
(1) : *TEST TITLE
(1) : *-----
2389 : *TEST 10 TM78 CONTROL BUS PARITY ERROR FORCE TEST
2390 007344 SD

(1) : *****
(1) : *DESCRIPTION
(1) : *-----
2391 : *THIS TEST "HOLDS" THE TM78 MICRO PROCESSOR AND SETS THE EVEN
2392 : *PARITY "EVPAR" BIT IN CAS REGISTER 21 (MB REGISTER 52).
2393 : *THEN CAS REGISTER 3 (MB REGISTER 24) IS READ AND THE MB
2394 : *STATUS BIT "MCPE" IS EXPECTED. THEN A MB INIT IS ISSUED
2395 : *AND THE TM78 MP AGAIN HELD. CAS REGISTER 3 (MB REGISTER 24)
2396 : *IS THEN READ AGAIN, AND NO ERROR IS EXPECTED.
2397 007344 SP

(1) : *****
(1) : *PROCEDURE
(1) : *-----
2398 : *BGNTST
2399 : * CALL SUBROUTINE HOLDMP
2400 : * LOAD THE "HOLD" BIT AND "EVPAR" BIT IN CAS REGISTER 21(8)
2401 : * READ CAS REGISTER 3
2402 : * IF THE "MCPE" STATUS BIT IN MB REGISTER 0=1
2403 : * : THEN-CONTINUE
2404 : * : ELSE-ERROR 26
2405 : * ENDF
2406 : * LOAD THE "CLEAR" BIT IN MB REGISTER 10(8)
2407 : * DELAY
2408 : * SELECT THE TM78 UNDER TEST
2409 : * LOAD THE "HOLD" BIT IN CAS REGISTER 21(8) CLEAR "EVPAR"
2410 : * READ CAS REGISTER 3
2411 : * IF THE "MCPE" BIT IN MB REGISTER 0=0
2412 : * : THEN-CONTINUE
2413 : * : ELSE-ERROR 27
2414 : * ENDF
2415 : *ENDTST

2416 007344 SE
(1) : *****
(1) : *ERRORS

(1)
2417
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2420
2421
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2423
2424
2425
2426
2427
2428
2429
2430
2431 007344

```
:*-----  
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS = 000000  
:*  
:*CZTMIA DVC FTL ERR 000026 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MP 'MCPE' NOT SET  
:*  
:*CZTMIA DVC FTL ERR 000027 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MB 'MCPE' SET
```

(1)

: *****

2432
2433 007344
2434 007344 005037 004412
2435 007350 004737 033414
2436 007354 012777 002400 174720
2437 007362 017701 174666
2438 007366 017701 174636
2439 007372 032701 020000
2440 007376 001004
2441 007400

```
BGNTST  
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG  
CALL HOLDMP ;HOLD TM78 MP-WAIT FOR HLDA  
MOV #HOLD+#EVPAR,@DS80 ;SET THE EVEN PARITY BIT  
MOV @DI1,R1 ;READ A CAS REGISTER  
MOV @XFRCMD,R1 ;GET MASS BUS REGISTER 0  
BIT #MCPE,R1 ;MASS BUS PARITY ERROR  
BNE 1$ ;YES-CONTINUE  
ERRDF 26.,RHCAS,ERM026 ;NO-ERROR
```

2442
2443 007410
2444 007412 052777 000040 174620
2445 007420
2446 007450 013777 004352 174562
2447 007456 012777 000400 174616
2448 007464 000240
2449 007466 017701 174562
2450 007472 017701 174532
2451 007476 032701 020000
2452 007502 001404
2453 007504

```
1$: CKLOOP  
BIS #MBINIT,@CS2 ;ISSUE MB INIT  
DELAY 5 ;WAIT 1 MS.  
MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER  
MOV #HOLD,@DS80 ;HOLD THE TM78 MP  
NOP  
MOV @DI1,R1 ;READ A CAS REGISTER  
MOV @XFRCMD,R1 ;GET THE MASS BUS REG. 0  
BIT #MCPE,R1 ;MASS BUS PARITY ERROR?  
BEQ 2$ ;NO-EXIT  
ERRDF 27.,RHCAS,ERM027 ;YES-ERROR
```

2454
2455 007514
2456 007516

```
2$: CKLOOP  
ENDTST ;END OF TEST
```

2457
2458
2459 007520

```
.SBTTL TEST 11 - TM78 ROM MEMORY TEST
```

(1)
(1)
(1)
2460
2461 007520

```
ST  
: *****
```

```
:*TEST TITLE  
:-----  
:* TEST 11 TM78 ROM MEMORY TEST
```

(1)
(1)
(1)
2462
2463
2464

```
SD  
: *****  
:*DESCRIPTION  
:-----  
:* THIS TEST CHECKS PARITY IN ROM FROM 00000 (8) TO 37777 (8)  
:* BY READING FROM THE LAST 4 LOCATIONS IN EACH ROM CHIP. THESE  
:* 4 LOCATIONS CONTAIN ROM SEGMENT IDENTIFICATION NUMBER, VERSION NUMBER.
```


2465
2466
2467
2468 007520
(1)
(1)
(1)
2469
2470
2471
2472
2473
2474
2475
2476
2477
2478
2479
2480
2481
2482
2483
2484
2485
2486
2487
2488
2489
2490
2491
2492
2493
2494
2495
2496
2497
2498
2499
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515 007520
(1)
(1)

```
;* AND ADDRESS OF LAST LOCATION USED IN THE ROM. BY CHECKING PARITY  
;* BIT THERE SHOULD BE PARITY ERRORS FOR ALL UNUSED LOCATIONS. ANY DEVIATION  
;* FROM THIS WILL CAUSE AN ERROR TO BE PRINTED.  
SP  
:*****  
;*PROCEDURE  
:-----  
;* BGNTST  
: CALL SUBROUTINE HOLD MP  
: INITIALIZE THE ADDRESS TO 37777 (8)  
: INITIALIZE ROM SEGMENT IDENTIFICATION #  
: BGND0  
: : CLEAR ERROR LOOP FLAG  
: : INITIALIZE COUNTER 2K  
: : DECREMENT ROM ID #  
: : INITIALIZE ROM INFORMATION COUNTER = 4  
: : BGND0  
: : : LOAD ROM ADDRESS  
: : : READ ROM  
: : : IF PARITY ERROR  
: : : : THEN - ERROR IN ROM INFORMATION  
: : : : CLEAR PARITY ERROR  
: : : : ENDF  
: : : DEC ROM INFORMATION COUNTER  
: : : DEC ROM ADDRESS  
: : : DEC COUNTER 2K  
: : UNTIL COUNTER = 0 OR ERROR IN ROM INFORMATION  
: : GET ROM ID #  
: : IF NO PARITY ERROR IN ROM INFORMATION  
: : : THEN-IF NOT EXPECTED #  
: : : : THEN-ERROR  
: : : : : SET ERROR FLAG FOR ROM INFORMATION  
: : : : ELSE-DO UNTIL FIND ABOVE ADDRESS  
: : : : : DECREMENT COUNTER  
: : : : : DECREMENT ADDRESS  
: : : : : CHECK PARITY  
: : : : : IF PARITY ERROR NOT SET  
: : : : : : THEN-ERROR  
: : : : : ENDF  
: : : : : CLEAR PARITY ERROR BIT  
: : : : ENDDO  
: : : : DO UNTIL COUNTER = -1  
: : : : : DECREMENT ADDRESS  
: : : : : DECREMENT COUNTER  
: : : : : IF PARITY ERROR SET  
: : : : : : THEN-ERROR  
: : : : : : CLEAR PARITY ERROR  
: : : : : ENDF  
: : : : ENDDO  
: : : ENDF  
: : : ENDF  
: : UNTIL ALL IDENTIFICATION #'S USED OR ERROR IN ROM INFORMATION  
: : ENDTST  
SE  
:*****  
;*ERRORS
```

(1)
2516
2517
2518
2519
2520
2521
2522
2523
2524
2525
2526
2527
2528
2529
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2543
2544

```
-----  
* TM78CLT DVC FTL ERR 000034 ON UNIT NN TST NNN SUB 000 PL: XXXXXX  
* M8960  
* RH: AAAAAA TM: X TU: X PORT: X  
* TM78 ROM PARITY FAILURE  
* ADD = 000000  
*  
* TM78CLT DVC FTL ERR 000035 ON UNIT NN TST NNN SUB 000 PL: XXXXXX  
* M8960  
* RH: AAAAAA TM: X TU: X PORT: X  
* TM78 ROM IDENTIFICATION WRONG, CAN'T LOOP ON THIS ERROR  
* ADD = 000000  
* IDEN = 000  
* VER = 000  
*  
* TM78CLT DVC FTL ERROR 000036 ON UNIT NN TST NNN SUB 000 PL: XXXXXX  
* M8960  
* RH: AAAAAA TM: X TU: X PORT: X  
* ROM PARITY ERROR NOT SET AND SHOULD BE  
* ADD = 000000  
* IDEN = 000  
* VER = 000  
*  
* TM78CLT DVC FTL ERR 000037 ON UNIT NN TST NNN SUB 000 PL: XXXXXX  
* M8960  
* RH: AAAAAA TM: X TU: X PORT: X  
* ROM PARITY ERROR  
* ADD = 000000  
* IDEN = 000  
* VER = 000
```

2545 007520

```
S  
(1)  
2546 007520  
2547 007520 005037 004412  
2548 007524 004737 033414  
2549 007530 012703 037777  
2550 007534 012702 000010  
2551 007540 005037 004226  
2552 007544 012704 004000  
2553 007550 005302  
2554 007552 002002  
2555 007554 000137 010116  
2556 007560 012705 004216  
2557 007564 012701 000004  
2558 007570  
2559 007572 010377 174502  
2560 007576 017725 174500  
2561 007602 032777 020000 174472  
2562 007610 001414  
2563 007612  
2564 007622 052777 040400 174452  
2565 007630 012737 000001 004226  
2566 007636 162705 000002  
2567 007642  
2568 007644  
2569 007646 005737 004226
```

```
*****  
; BGNTST ;CLEAR ERROR LOOP FLAG  
; CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG  
; CALL HOLDMP ;HOLD THE TM78 - WAIT FOR HLDA  
; MOV #37777,R3 ;GET LAST ADDRESS  
; MOV #10,R2 ;GET ROM ID #  
1$: CLR ERRLP  
; MOV #4000,R4 ;INITIALIZE COUNTER  
; DEC R2 ;DECREMENT ROM ID #  
; BGE 2$ ;BRANCH IF NOT DONE  
; JMP 10$ ;DONE  
2$: MOV #ROMIDT,R5 ;R5 CONTAINS ROM STORAGE INFORMATION ADDRESS  
; MOV #4,R1 ;SET UP COUNTER  
3$: BGNSEG  
; MOV R3,@AD80 ;LOAD STARTING ADDRESS  
; MOV @DS80,(R5)+ ;STORE ROM INFORMATION  
; BIT #20000,@DS80 ;SEE IF PARITY ERROR  
; BEQ 4$ ;BRANCH IF NO ERROR  
; ERDF 34,PRO,ERM034  
; BIS #40400,@DS80 ;CLEAR PARITY ERROR  
; MOV #1,ERRLP ;SET ERROR FLAG  
; SUB #2,R5 ;RESTORE ERROR INFORMATION  
4$: CKLOOP  
; ENDSEG  
; TST ERRLP ;SEE IF ERROR
```

```

2570 007652 001404          BEQ      11$          ;ERROR, GO GET ANOTHER ROM
2571 007654 062701 003774  ADD      #3774,R1
2572 007660 160103          SUB      R1,R3
2573 007662 000726          BR       1$
2574 007664 005304          11$: DEC    R4          ;DECREMENT # OF ADDRESSES LEFT TO TEST
2575 007666 005303          DEC    R3          ;DECREMENT ADDRESS
2576 007670 005301          DEC    R1          ;DECREMENT ROM INFORMATION COUNTER
2577 007672 001336          BNE     3$          ;BRANCH IF NOT DONE
2578 007674 012705 004216  MOV     #ROMIDT,R5 ;GET ROM ID #
2579 007700 042715 177400  BIC     #177400,(R5) ;CLEAR OFF GARBAGE BITS
2580 007704 020215          CMP     R2,(R5)    ;SEE IF ROM HAS CORRECT ID #
2581 007706 001411          BEQ     5$          ;BRANCH IF YES
2582 007710 062703 000004  ADD     #4,R3      ;GET ID ADDRESS
2583 007714          ERRDF  35.,PRO,ERM035
2584 007724 162703 004000  SUB     #4000,R3   ;GET ADDRESS OF NEXT ROM
2585 007730 000703          BR       1$          ;GO GET ANOTHER ROM
2586 007732 042765 177400 000004  5$: BIC     #177400,4(R5) ;MASK OFF HIGH BITS
2587 007740 042765 177400 000006  BIC     #177400,6(R5) ;MASK OFF HIGH BITS
2588 007746 000365 000004          SWAB   4(R5)      ;COMBINED HIGH & LOW BYTES TO MAKE ADDRESS
2589 007752 056565 000006 000004  BIS     6(R5),4(R5) ;
2590 007760 020365 000004          6$: CMP     R3,4(R5) ;SEE IF LAST USED ADDRESS IN ROM
2591 007764 001426          BEQ     8$          ;BRANCH IF YES
2592 007766          BGNSEG
2593 007770 010377 174304  MOV     R3,@AD80   ;LOAD ADDRESS
2594 007774 017701 174302  MOV     @DS80,R1   ;DUMMY READ
2595 010000 032777 020000 174274  BIT     #20000,@DS80 ;SEE IF PARITY ERROR SET
2596 010006 001004          BNE     7$          ;BRANCH IF YES (NO ERROR)
2597 010010          ERRDF  36.,PRO,ERM036
2598 010020 052777 040400 174254  7$: BIS     #40400,@DS80 ;RESET PARITY ERROR BIT
2599 010026          CKLOOP
2600 010030          ENDSEG
2601 010032 005303          DEC     R3          ;GET NEXT ADDRESS
2602 010034 005304          DEC     R4          ;DECREMENT COUNTER
2603 010036 001640          BEQ     1$          ;BRANCH IF DONE WITH ROM
2604 010040 000747          BR       6$          ;CONTINUE LOOP
2605 010042          8$: BGNSEG
2606 010044 010377 174230  MOV     R3,@AD80   ;LOAD ADDRESS
2607 010050 017701 174226  MOV     @DS80,R1   ;DUMMY READ
2608 010054 032777 020000 174220  BIT     #20000,@DS80 ;SEE IF PARITY ERROR
2609 010062 001407          BEQ     9$          ;BRANCH IF NO PARITY ERROR
2610 010064          ERRDF  37.,PRO,ERM037
2611 010074 052777 040400 174200  9$: BIS     #40400,@DS80 ;RESET PARITY ERROR
2612 010102          CKLOOP
2613 010104          ENDSEG
2614 010106 005303          DEC     R3          ;GET NEXT ADDRESS
2615 010110 005304          DEC     R4          ;AM I DONE YET
2616 010112 001612          BEQ     1$          ;YES?
2617 010114 000752          BR       8$          ;GO GET MORE
2618 010116          10$: ENDTST

```

```

2619
2620
2621          .SBTTL TEST 12 - TM78 MEMORY TEST - LOW ADDRESS LINES
2622
2623 010120  ST
(1)          ;*****
(1)          ;*TEST TITLE

```

```
(1) :-----  
2624 :*TEST 12      TM78 MEMORY TEST - LOW ADDRESS BITS AS DATA  
2625 010120 SD  
(1) :*****  
(1) :*DESCRIPTION  
(1) :-----  
2626 :*THIS TEST CHECKS THE TM78 RAM FROM LOCATION 40000(8) TO 50000(8) BY  
2627 :*WRITING THE LEAST SIGNIFICANT 8 BITS OF THE ADDRESS INTO THE BYTE AT  
2628 :*THAT ADDRESS.  
2629 010120 SP  
(1) :*****  
(1) :*PROCEDURE  
(1) :-----  
2630 :*BGNTST  
2631 :* CALL SUBROUTINE HOLDMP  
2632 :* INITIALIZE THE ADDRESS TO 40000(8)  
2633 :* BGND0  
2634 :* : LOAD THE ADDRESS IN CAS REGISTER 20(8)  
2635 :* : LOAD THE LEAST SIGNIFICANT 8 BITS OF THE ADDRESS AND THE HOLD BIT  
2636 :* : IN CAS REGISTER 21(8)  
2637 :* : INCREMENT THE ADDRESS BY 1  
2638 :* : DO UNTIL THE ADDRESS=50000(8)  
2639 :* ENDD0  
2640 :* INITIALIZE THE ADDRESS TO 40000(8)  
2641 :* BGND0  
2642 :* : LOAD THE ADDRESS IN CAS REGISTER 20(8)  
2643 :* : INPUT CAS REGISTER 21(8) LOW 8 BITS  
2644 :* : IF LOW 8 BITS OF CAS REGISTER 21(8)=LOW 8 BITS OF ADDRESS  
2645 :* : : THEN-CONTINUE  
2646 :* : : ELSE-ERROR 28  
2647 :* : ENDIF  
2648 :* : INCREMENT THE ADDRESS BY 1  
2649 :* : DO UNTIL THE ADDRESS=50000(8)  
2650 :* ENDD0  
2651 :*ENDTST  
2652 010120 SE  
(1) :*****  
(1) :*ERRORS  
(1) :-----  
2653 :*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
2654 :*M8957, M8960  
2655 :*RH: AAAAAA TM: X TU: X PORT: X  
2656 :*'HLDA' NOT SET STATUS = 000000  
2657 :*  
2658 :*CZTMIA DVC FTL ERR 000028 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
2659 :*M8960  
2660 :*RH: AAAAAA TM: X TU: X PORT: X  
2661 :*TM78 MEMORY FAILURE  
2662 :*ADD = 000000  
2663 :*ACT = 000000  
2664 :*EXP = 000000  
2665 010120 S  
(1) :*****  
2666 :  
2667 010120 BGNTST  
2668 010120 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
```

```

2669 010124 004737 033414          CALL  HOLDMP          ;HOLD THE TM78MP-WAIT FOR HLDA
2670 010130 012703 040000          MOV   #040000,R3     ;LOAD STARTING MEMORY ADDRESS
2671 010134 010377 174140          1$:  MOV   R3,@AD80    ;ADDRESS THE TM78
2672 010140 010302 177400          MOV   R3,R2         ;COPY THE ADDRESS
2673 010142 042702 177400          BIC   #177400,R2    ;AND OFF LO BYTE
2674 010146 052702 000400          BIS   #HOLD,R2      ;ADD IN THE HOLD BIT
2675 010152 010277 174124          MOV   R2,@DS80     ;WRITE IT TO THE TM78MP
2676 010156 005203 050000          INC   R3            ;INCREMENT THE MEMORY ADDRESS
2677 010160 022703 050000          CMP   #050000,R3   ;COMPARE TO FINAL ADDRESS
2678 010164 001363 174124          BNE   1$            ;CONTINUE UNTIL DONE
2679
2680 010166 012703 040000          MOV   #040000,R3   ;LOAD THE STARTING MEMORY ADDRESS
2681 010172 010377 174100          3$:  BGNSEG
2682 010174 010377 174100          MOV   R3,@AD80    ;ADDRESS TM78 RAM
2683 010200 010302 174100          MOV   R3,R2       ;COPY ADDRESS TO R2
2684 010202 042702 177400          BIC   #177400,R2  ;REMOVE LO BYTE
2685 010206 017704 174070          MOV   @DS80,R4    ;GET CONTENTS OF TM78 RAM
2686 010212 042704 177400          BIC   #177400,R4  ;REMOVE DATA BYTE
2687 010216 020204 177400          CMP   R2,R4       ;EXPECTED=ACTUAL?
2688 010220 001410 177400          BEQ   2$          ;YES-CONTINUE
2689
2690 010222 052702 000400          ERRDF 28.,PRO,ERM028
2691 010232 010277 174040          BIS   #HOLD,R2    ;REWRITE THE FAILING LOCATION
2692 010236 010277 174040          MOV   R2,@DS80
2693
2694 010242 005203 050000          2$:  CKLOOP
2695 010244 022703 050000          ENDSEG
2696 010246 005203 050000          INC   R3          ;INCREMENT THE TM78 ADDRESS
2697 010250 022703 050000          CMP   #050000,R3 ;DONE?
2698 010254 001346 050000          BNE   3$          ;NO-KEEP ON TRUKIN'
2699 010256 001346 050000          ENDTST           ;YES-HANG IT UP

```

```

2700
2701
2702          .SBTTL TEST 13 - TM78 MEMORY TEST - HIGH ADDRESS LINES
2703

```

```

2704 010260          ST
(1)          : *****
(1)          : *TEST TITLE
(1)          : *-----
2705          : TEST 13          TM78 MEMORY TEST - HIGH ADDRESS BITS AS DATA
2706 010260          SD
(1)          : *****
(1)          : *DESCRIPTION
(1)          : *-----
2707          : *THIS TEST CHECKS THE TM78 RAM FROM LOCATION 40000(8) TO 50000(8) BY
2708          : *WRITING THE MOST SIGNIFICANT 8 BITS OF THE ADDRESS INTO THE BYTE AT
2709          : *THAT ADDRESS.
2710 010260          SP
(1)          : *****
(1)          : *PROCEDURE
(1)          : *-----
2711          : *BGNTST
2712          : * CALL SUBROUTINE HOLDMP
2713          : * INITIALIZE THE ADDRESS TO 40000(8)
2714          : * BGND0
2715          : * : LOAD THE ADDRESS IN CAS REGISTER 20(8)

```

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2733 010260
(1)
(1)
(1)
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2736
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2738
2739
2740
2741
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2745
2746 010260
(1)
2747
2748 010260
2749 010260 005037 004412
2750 010264 004737 033414
2751 010270 012703 040000
2752 010274 010377 174000
2753 010300 010302
2754 010302 000302
2755 010304 042702 177400
2756 010310 052702 000400
2757 010314 010277 173762
2758 010320 005203
2759 010322 022703 050000
2760 010326 001362
2761
2762 010330 012703 040000
2763 010334
2764 010336 010377 173736
2765 010342 010302
2766 010344 000302
2767 010346 042702 177400

```
;* : LOAD THE MOST SIGNIFICANT 8 BITS OF THE ADDRESS AND THE HOLD BIT  
;* : IN CAS REGISTER 21(8)  
;* : INCREMENT THE ADDRESS BY 1  
;* : DO UNTIL THE ADDRESS=50000(8)  
;* ENDDO  
;* INITIALIZE THE ADDRESS TO 40000(8)  
;* BGNDO  
;* : LOAD THE ADDRESS IN CAS REGISTER 20(8)  
;* : INPUT CAS REGISTER 21(8) LOW 8 BITS  
;* : IF LOW 8 BITS OF CAS REGISTER 21(8)=HIGH 8 BITS OF ADDRESS  
;* : THEN-CONTINUE  
;* : ELSE-ERROR 28  
;* : ENDIF  
;* : INCREMENT THE ADDRESS BY 1  
;* : DO UNTIL THE ADDRESS=50000(8)  
;* ENDDO  
;*ENDTST
```

```
SE  
: *****  
: *ERRORS  
: *-----  
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8957, M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *'HLDA' NOT SET STATUS = 000000  
: *  
: *CZTMIA DVC FTL ERR 000028 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *TM78 MEMORY FAILURE  
: *ADD = 000000  
: *ACT = 000000  
: *EXP = 000000
```

```
S  
: *****
```

```
1$: BGNTST  
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG  
CALL HOLDMP ;HOLD THE TM78MP-WAIT FOR HLDA  
MOV #040000,R3 ;LOAD STARTING MEMORY ADDRESS  
MOV R3,@AD80 ;ADDRESS THE TM78  
MOV R3,R2 ;COPY THE ADDRESS  
SWAB R2 ;SWAP HI/LO BYTES  
BIC #177400,R2 ;AND OFF LO BYTE  
BIS #HOLD,R2 ;ADD IN THE HOLD BIT  
MOV R2,@DS80 ;WRITE IT TO THE TM78MP  
INC R3 ;INCREMENT THE MEMORY ADDRESS  
CMP #050000,R3 ;COMPARE TO FINAL ADDRESS  
BNE 1$ ;CONTINUE UNTIL DONE  
  
3$: MOV #040000,R3 ;LOAD THE STARTING MEMORY ADDRESS  
BGNSEG  
MOV R3,@AD80 ;ADDRESS TM78 RAM  
MOV R3,R2 ;COPY ADDRESS TO R2  
SWAB R2 ;SWAP HI/LO BYTES  
BIC #177400,R2 ;REMOVE LO BYTE
```

```
2768 010352 017704 173724      MOV    @DS80,R4      ;GET CONTENTS OF TM78 RAM
2769 010356 042704 177400      BIC    #177400,R4   ;REMOVE DATA BYTE
2770 010362 020204              CMP    R2,R4        ;EXPECTED=ACTUAL?
2771 010364 001410              BEQ    2$           ;YES-CONTINUE
2772                                ;NO-PRINT ERROR
2773 010366              ERRDF  28.,PRO,ERM028
2774 010376 052702 000400      BIS    #HOLD,R2     ;REWRITE FAILING LOCATION
2775 010402 010277 173674      MOV    R2,@DS80
2776
2777 010406              2$:   CKLOOP
2778 010410              ENDSEG
2779 010412 005203              INC    R3           ;INCREMENT THE TM78 ADDRESS
2780 010414 022703 050000      CMP    #050000,R3  ;DONE?
2781 010420 001345              BNE   3$           ;NO-KEEP ON TRUKIN'
2782 010422              ENDTST          ;YES-HANG IT UP
2783
```

```
2784                                .SBTTL TEST 14 - TM78 MEMORY TEST - DATA RELIABILITY
2785 010424      ST
(1) ; *****
(1) ; *TEST TITLE
(1) ; *-----*
2786 ; *TEST 14          TM78 MEMORY TEST - DATA RELIABILITY
2787 010424      SD
(1) ; *****
(1) ; *DESCRIPTION
(1) ; *-----*
2788 ; *THIS TEST CHECKS THE TM78 RAM FROM LOCATION 40000(8) TO 50000(8) BY
2789 ; *WRITING DATA OF 000-377(8) TO EACH RAM LOCATION AND CHECKING THE DATA.
2790 010424      SP
(1) ; *****
(1) ; *PROCEDURE
(1) ; *-----*
2791 ; *BGNTST
2792 ; * CALL SUBROUTINE HOLDMP
2793 ; * CLEAR THE DATA PATTERN
2794 ; * BGND0
2795 ; * : INITIALIZE THE ADDRESS TO 40000(8)
2796 ; * : BGND0
2797 ; * : : LOAD THE ADDRESS IN CAS REGISTER 20(8)
2798 ; * : : LOAD THE DATA PATTERN + THE HOLD BIT IN CAS REGISTER 21(8)
2799 ; * : : INCREMENT THE ADDRESS BY 1
2800 ; * : : DO UNTIL THE ADDRESS=50000(8)
2801 ; * : ENDD0
2802 ; * : INITIALIZE THE ADDRESS TO 40000(8)
2803 ; * : BGND0
2804 ; * : : LOAD THE ADDRESS IN CAS REGISTER 20(8)
2805 ; * : : INPUT CAS REGISTER 21(8) LOW 8 BITS
2806 ; * : : IF LOW 8 BITS OF CAS REGISTER 21(8)=
2807 ; * : : : THEN-CONTINUE
2808 ; * : : : ELSE-ERROR 28
2809 ; * : : ENDF
2810 ; * : : INCREMENT THE ADDRESS BY 1
2811 ; * : : DO UNTIL THE ADDRESS=50000(8)
2812 ; * : ENDD0
2813 ; * : INCREMENT THE DATA PATTERN BY 1
2814 ; * : DO UNTIL THE DATA PATTERN=0
```

2815
2816
2817 010424
(1)
(1)
(1)
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2827
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2829
2830 010424
(1)
2831
2832 010424
2833 010424 005037 004412
2834 010430 004737 033414
2835 010434 005002
2836 010436 005001
2837 010440 012703 040000
2838 010444 010377 173630
2839 010450 042702 177400
2840 010454 052702 000400
2841 010460 010277 173616
2842 010464 005203
2843 010466 022703 050000
2844 010472 001364
2845 010474 012703 040000
2846 010500
2847 010502 010377 173572
2848 010506 042702 177400
2849 010512 017704 173564
2850 010516 042704 177400
2851 010522 020204
2852 010524 001412
2853 010526
2854 010536 012701 000001
2855 010542 052702 000400
2856 010546 010277 173530
2857 010552 005701
2858 010554 001401
2859 010556
2860 010560 005203
2861 010562 022703 050000
2862 010566 001345
2863 010570
2864 010572 005202
2865 010574 020227 000400
2866 010600 001317

```
;* ENDDO
;*ENDTST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000028 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*TM78 MEMORY FAILURE
:*ADD = 000000
:*ACT = 000000
:*EXP = 000000
S
: *****

BGNTST
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
CALL HOLDMP ;HOLD THE TM78MP-WAIT FOR HLDA
CLR R2 ;SET UP STARTING DATA PATTERN
CLR R1 ;CLEAR THE ERROR OCCURED FLAG
4$: MOV #040000,R3 ;LOAD STARTING MEMORY ADDRESS
1$: MOV R3,@AD80 ;ADDRESS THE TM78
BIC #177400,R2 ;REMOVE JUNK BITS
BIS #HOLD,R2 ;ADD IN THE HOLD BIT
MOV R2,@DS80 ;WRITE IT TO THE TM78MP
INC R3 ;INCREMENT THE MEMORY ADDRESS
CMP #050000,R3 ;COMPARE TO FINAL ADDRESS
BNE 1$ ;CONTINUE UNTIL DONE
MOV #040000,R3 ;LOAD THE STARTING MEMORY ADDRESS

BGNSEG
3$: MOV R3,@AD80 ;ADDRESS TM78 RAM
BIC #177400,R2 ;REMOVE JUNK BITS
MOV @DS80,R4 ;GET CONTENTS OF TM78 RAM
BIC #177400,R4 ;REMOVE DATA BYTE
CMP R2,R4 ;EXPECTED=ACTUAL?
BEQ 2$ ;YES-CONTINUE
ERRDF 28.,PRO,ERM028 ;NO - PRINT ERROR
MOV #1,R1 ;SET THE ERROR OCCURED FLAG
BIS #HOLD,R2 ;REWRITE THE FAILING LOCATION
MOV R2,@DS80

2$: TST R1 ;HAVE ANY ERRORS OCCURED?
BEQ 5$ ;NO - SKIP THE CKLOOP TO SAVE TIME

CKLOOP
5$: INC R3 ;INCREMENT THE TM78 ADDRESS
CMP #050000,R3 ;DONE?
BNE 3$ ;NO-KEEP ON TRUKIN'
ENDSEG
INC R2 ;YES-INCREMENT THE DATA BYTE
CMP R2,#400 ;ALL PATTERNS RUN?
BNE 4$ ;NO-KEEP ON TRUKIN'
```


2867 010602
2868
2869 010604
(1)
(1)
(1)
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2871 010604
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(1)
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2875 010604
(1)
(1)
(1)
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2889
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2891 010604
(1)
(1)
(1)
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```
ENDTST ;YES-HANG IT UP
.SBTTL TEST 15 - CAS WRITE/READ TEST - ADDRESS TO ADDRESS
ST
:*****
:*TEST TITLE
:-----
:*TEST 15 CAS WRITE/READ TEST - ADDRESS TO ADDRESS
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST PERFORMS A BASIC CHECK OF THE COMMON ADDRESS SPACE (CAS)
:*ADDRESSING LOGIC BY WRITING THE NUMBER OF THE CAS REGISTER TO ITS
:*RESPECTIVE REGISTER.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:* CALL SUBROUTINE HOLDMP
:* SET CPU INTERRUPT PRIORITY TO IGNORE INTERRUPTS
:* INITIALIZE N TO ZERO
:* INITIALIZE THE DATA BYTE TO 2
:* BGND0
:* : WRITE DATA BYTE TO CAS N
:* : INCREMENT THE CAS REGISTER NUMBER BY 1
:* : INCREMENT THE DATA BYTE BY 1
:* : DO UNTIL ALL CAS REGISTERS WRITTEN
:* ENDD0
:* CALL SUBROUTINE CASWRT
:* CALL SUBROUTINE CASRED
:* CALL SUBROUTINE CASCMP
:*ENDTST
SE
:*****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING M3 REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
:*
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
```

2911
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2917 010604
 (1)
2918 010604
2919 010604 005037 004412
2920 010610 004737 033414
2921 010614 012702 000002
2922 010620 005001
2923 010622 010261 032102
2924 010626 005201
2925 010630 005201
2926 010632 005202
2927 010634 020127 000036
2928 010640 001370
2929 010642 004737 032610
2930 010646 004737 032712
2931 010652 004737 033260
2932 010656
2933
2934 010660
 (1)
 (1)
 (1)
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2936 010660
 (1)
 (1)
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2941 010660
 (1)
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```
;*PARITY ERR. READING CAS REG. 000000  
;*  
;*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
;*M8956, M8957, MASSBUS  
;*RH: AAAAAA IM: X TU: X PORT: X  
;*PARITY ERR. WRITING CAS REG. 000000  
S  
: *****  
:          BGNTST  
:          CLR      CASLD      ;CLEAR THE CAS PROGRAM LOADED FLAG  
:          CALL     HOLDMP     ;STOP THE 8085  
:          MOV      #2,R2      ;INITIALIZE THE DATA BYTE  
:          CLR      R1         ;CLEAR THE BUFFER POINTER  
1$:      MOV      R2,MBBUF(R1) ;WRITE DATA TO THE BUFFER  
:          INC      R1         ;ADD #2 TO THE BUFFER POINTER  
:          INC      R1  
:          INC      R2         ;ADD #1 TO THE DATA BYTE  
:          CMP      R1,#30.    ;END OF BUFFER?  
:          BNE     1$         ;NO-CONTINUE  
:          CALL     CASWRT     ;GO WRITE CAS FROM HOST  
:          CALL     CASRED     ;GO READ CAS FROM HOST  
:          CALL     CASCMP     ;GO COMPARE DATA  
:          ENDTST  
:          .SBTTL  TEST 16 - TM78 BASIC CONFIDENCE TEST  
ST  
: *****  
:          *TEST TITLE  
:          *-----  
:          *TEST 16          TM78 BASIC CONFIDENCE TEST  
SD  
: *****  
:          *DESCRIPTION  
:          *-----  
:          *THIS TEST LOADS A PROGRAM (MICRO-DIAGNOSTIC) TO THE TM78 RAM AND  
:          *STARTS IT RUNNING. THE PURPOSE OF THE DIAGNOSTIC IS TO GAIN CON-  
:          *FIDENCE IN THE TM78 MICRO-DIAGNOSTIC RAM THE ADDRESSING CAPABILITY  
:          *OF THE 8085.  
SP  
: *****  
:          *PROCEDURE  
:          *-----  
:          *BGNTST  
:          * CALL SUBROUTINE CASBOT  
:          * IF ERRCOD=0  
:          * : THEN-CALL SUBROUTINE HOLDMP  
:          * : DEPOSIT 3 INTO TM78 RAM LOCATION 41420(8)  
:          * : CALL SUBROUTINE DIAGST  
:          * : IF ERRCOD=0  
:          * : : THEN-LOAD 35(8) INTO CAS LOCATION 0  
:          * : : DELAY  
:          * : : IF INTERRUPT CODE=372(8)  
:          * : : : THEN-CONTINUE  
:          * : : : ELSE-ERROR  
:          * : : : ENDIF  
:          * : : ENDIF  
:          * : ENDIF
```

```
2957          : *ENDTST
2958 010660    SE
(1)          : *****
(1)          : *ERRORS
(1)          : -----
2959          : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2960          : *M8957, M8960
2961          : *RH: AAAAAA TM: X TU: X PORT: X
2962          : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
2963 010660    S
(1)          : *****
2964          :
2965 010660    BGNTST
2966 010660    004737 032502  CALL CASBOT
2967 010664    005705  TST  ERRCOD
2968 010666    001402  BEQ  2$
2969 010670    EXIT  TST
2970 010674    004737 033414 2$: CALL HOLDMP ;STOP THE TM78
2971 010700    012777 041420 173372 MOV #CASCMD,@AD80 ;ADDRESS THE COMMAND LOCATION
2972 010706    012777 000403 173366 MOV #HOLD+3,@DS80 ;STORE THE MEMORY TEST COMMAND
2973 010714    004737 014762  CALL DIAGST ;START THE DIAGNOSTIC MONITOR
2974 010720    005705  TST  ERRCOD ;ERROR?
2975 010722    001402  BEQ  5$ ;NO - CONTINUE
2976 010724    EXIT  TST ;YES - EXIT THE TEST
2977 010730    012777 000035 173272 5$: MOV #TSTART,@XFRCMD ;ISSUE CODE 35
2978 010736    012702 000214  MOV #140.,R2 ;TIMES TO DELAY TO EQUAL 35 SEC.
2979 010742    6$: DELAY 250 ;DELAY 25 MS.
2980 010772    BREAK
2981 010774    005302  DEC  R2 ;DECREMENT LOOP COUNT
2982 010776    001361  BNE  6$ ;DO IT AGAIN
2983 011000    013777 004352 173232 MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
2984 011006    122777 000372 173214 CMPB #372,@XFRCMD ;DID PROC TEST FINISH.
2985 011014    001404  BEQ  1$ ;YES-DONE
2986 011016    ERRDF 8.,PROCAS,ERM008
2987 011026    1$: CKLOOP
2988 011030    004737 021660  CALL CLOSEX ;CLOSE THE CHANNEL
2989          :
2990 011034    ENDTST
2991          :
2992          :
2993          : .SBTTL TEST 17 - CAS CONTENTION INTERRUPT TEST
2994 011036    ST
(1)          : *****
(1)          : *TEST TITLE
(1)          : -----
2995          : *TEST 17 CAS CONTENTION INTERRUPT TEST
2996 011036    SD
(1)          : *****
(1)          : *DESCRIPTION
(1)          : -----
2997          : *THIS TEST CHECKS THE OPERATION OF THE CAS CONTENTION (BETWEEN THE
2998          : *HOST AND THE 8085.) ERROR LOGIC. TO TEST THE PROPER OPERATION OF
2999          : *THE LOGIC A PROGRAM MUST BE LOADED AND EXECUTED IN THE TM78 THAT
3000          : *ACCESSES CAS WHILE THE HOST ACCESSES CAS.
3001 011036    SP
(1)          : *****
```

```
(1)
(1)
3002
3003
3004
3005
3006
3007
3008
3009
3010
3011
3012
3013
3014
3015
3016
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3018
3019
3020
3021
3022
3023
3024
3025 011036
(1)
(1)
(1)
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3031
3032
3033
3034
3035 011036
(1)
3036
3037 011036
3038 011036 004737 032502
3039 011042 005705
3040 011044 001402
3041 011046
3042 011052 004737 033414
3043 011056 012737 000777 004346
3044 011064 012777 041420 173206
3045 011072 012777 000402 173202
3046 011100 004737 014762
3047 011104 005705
3048 011106 001402
3049 011110
3050 011114 012777 000035 173106
3051 011122 013701 004230
```

```
;*PROCEDURE
;*-----
;*BGNTST
;* CALL SUBROUTINE CASBOT (LOAD THE CAS PROGRAM)
;* IF A BOOT ERROR
;* : THEN-EXIT TEST
;* : ELSE-CONTINUE
;* ENDF
;* CALL SUBROUTINE HOLDMP
;*
;* LOAD THE ADDRESS OF THE CAS CONTROL BYTE 41420 TO CAS REGISTER 20(8)
;* LOAD THE "HOLD" BIT+002 TO CAS REGISTER 21(8)
;* CALL SUBROUTINE CONT
;* LOAD THE DIAGNOSTIC START/RESTART COMMAND 35(8) TO MB REGISTER 0
;* SET UP A TIMEOUT COUNT
;* BGND0
;* : READ ALL THE MB REGISTERS 000-052(8)
;* : DECREMENT THE TIMEOUT COUNT
;* : DO UNTIL TIMEOUT COUNT=0 OR MB REGISTER 0=372(8)
;* ENDD0
;* IF TIMEOUT COUNT=0
;* : THEN-ERROR 18
;* : ELSE-CONTINUE
;* ENDF
;*ENDTST
SE
```

```
*****
;*ERRORS
;*-----
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*'HLDA' NOT SET STATUS = 000000
;*
;*CZTMIA DVC FTL ERR 000018 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*NO CONTENTION ERROR OCCURRED
S
*****
```

```

3037 011036
3038 011036 004737 032502
3039 011042 005705
3040 011044 001402
3041 011046
3042 011052 004737 033414
3043 011056 012737 000777 004346
3044 011064 012777 041420 173206
3045 011072 012777 000402 173202
3046 011100 004737 014762
3047 011104 005705
3048 011106 001402
3049 011110
3050 011114 012777 000035 173106
3051 011122 013701 004230
```

```

BGNTST
CALL CASBOT ;BOOT UP THE CAS PROGRAM
TST ERRCOD
BEQ 5$
EXIT TST
5$: CALL HOLDMP
MOV #777,COUNT ;LOAD TIMEOUT COUNT
MOV #CASCMD,@AD80 ;ADDRESS THE COMMAND BYTE
MOV #HOLD+2,@DS80 ;WRITE THE CONTENTION TEST COMMAND
CALL DIAGST
TST ERRCOD ;ERROR?
BEQ 4$ ;NO - CONTINUE
EXIT TST ;YES - EXIT THE TEST
4$: MOV #TSTART,@XFRCMD
2$: MOV XFRCMD,R1 ;LOAD STARTING CAS ADDRESS
```

```
3052 011126 012100 1$: MOV (R1)+,R0 ;READ MASS BUS REGISTER
3053 011130 023701 004300 CMP AD80,R1
3054 011134 001374 BNE 1$
3055 011136 122777 000372 173064 CMPB #372,@XFRCMD ;DID A CONTENTION INTERRUPT OCCUR?
3056 011144 001407 BEQ 6$ ;YES-CONTENTION ERROR OCCURRED
3057 011146 005337 004346 DEC COUNT ;NO-TRY AGAIN?
3058 011152 001363 BNE 2$ ;YES-CONTINUE
3059 ;NO-ERROR
3060 011154 ERRDF 18.,CASX,ERM018
3061
3062 011164 6$: CKLOOP
3063 011166 ENDTST
3064
3065 .SBTTL TEST 18 - CAS WRITE TEST - ALL ZEROS
3066 011170 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----*
3067 *TEST 18 CAS WRITE TEST - ALL ZEROS
3068 011170 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----*
3069 *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3070 *HOST CPU WITH A DATA PATTERN OF 000000(8), READING THE PATTERN FROM
3071 *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3072 *ARE LOGGED.
3073 011170 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----*
3074 *BGNTST
3075 * SET UP THE DATA PATTERN 000000(8)
3076 * CALL SUBROUTINE CASOW
3077 *ENDTST
3078 011170 SE
(1) : *****
(1) : *ERRORS
(1) : *-----*
3079 *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3080 *M8956, M8957, MASSBUS
3081 *RH: AAAAAA TM: X TU: X PORT: X
3082 *'NED' WHEN READING MB REG.
3083 *
3084 *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3085 *M8957, M8960
3086 *RH: AAAAAA TM: X TU: X PORT: X
3087 *'HLDA' NOT SET STATUS = 000000
3088 *
3089 *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3090 *M8957, M8960
3091 *RH: AAAAAA TM: X TU: X PORT: X
3092 *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3093 *
3094 *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3095 *M8956, M8957
```

```
3096 ;*RH: AAAAAA TM: X TU: X PORT: X
3097 ;*CAS DATA COMPARE FAIL
3098 ;*CAS REG. 000000
3099 ;*
3100 ;*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3101 ;*M8956, M8957, MASSBUS
3102 ;*RH: AAAAAA TM: X TU: X PORT: X
3103 ;*PARITY ERR. WRITING CAS REG. 000000
3104 011170 S
(1) ; *****
3105
3106 011170 BGNTST
3107 011170 005002 CLR R2
3108 011172 004737 032246 CALL CASCOV
3109 011176 ENDTST
3110 .SBTTL TEST 19 - CAS WRITE TEST - ALL ONES
3111 011200 ST
(1) ; *****
(1) ;*TEST TITLE
(1) ;*-----
3112 ;*TEST 19 CAS WRITE TEST - ALL ONES
3113 011200 SD
(1) ; *****
(1) ;*DESCRIPTION
(1) ;*-----
3114 ;*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3115 ;*HOST CPU WITH A DATA PATTERN OF 177777(8), READING THE PATTERN FROM
3116 ;*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3117 ;*ARE LOGGED.
3118 011200 SP
(1) ; *****
(1) ;*PROCEDURE
(1) ;*-----
3119 ;*BGNTST
3120 ;* SET UP THE DATA PATTERN 177777(8)
3121 ;* CALL SUBROUTINE CASCOV
3122 ;*ENDTST
3123 011200 SE
(1) ; *****
(1) ;*ERRORS
(1) ;*-----
3124 ;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3125 ;*M8956, M8957, MASSBUS
3126 ;*RH: AAAAAA TM: X TU: X PORT: X
3127 ;*'NED' WHEN READING MB REG.
3128 ;*
3129 ;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3130 ;*M8957, M8960
3131 ;*RH: AAAAAA TM: X TU: X PORT: X
3132 ;*'HLDA' NOT SET STATUS = 000000
3133 ;*
3134 ;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3135 ;*M8957, M8960
3136 ;*RH: AAAAAA TM: X TU: X PORT: X
3137 ;*MICRO DIAGNOSTIC RESPONSE TIMEOUT
3138 ;*
```

```
3139 ;*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3140 ;*M8956, M8957
3141 ;*RH: AAAAAA TM: X TU: X PORT: X
3142 ;*CAS DATA COMPARE FAIL
3143 ;*CAS REG. 000000
3144 ;*
3145 ;*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3146 ;*M8956, M8957, MASSBUS
3147 ;*RH: AAAAAA TM: X TU: X PORT: X
3148 ;*PARITY ERR. WRITING CAS REG. 000000
3149 011200 S
(1) ; *****
3150
3151 011200 BGNTST
3152 011200 012702 177777 MOV #177777,R2 ;LOAD ALL ONES DATA PATTERN
3153 011204 004737 032246 CALL CASCOW ;
3154 011210 ENDTST
3155
3156 .SBTTL TEST 20 - CAS WRITE TEST - DATA PATTERN 153271
3157 011212 ST
(1) ; *****
(1) ;*TEST TITLE
(1) ;*-----
3158 ;*TEST 20 CAS WRITE TEST - DATA PATTERN 153271
3159 011212 SD
(1) ; *****
(1) ;*DESCRIPTION
(1) ;*-----
3160 ;*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3161 ;*HOST CPU WITH A DATA PATTERN OF 153271(8), READING THE PATTERN FROM
3162 ;*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3163 ;*ARE LOGGED.
3164 011212 SP
(1) ; *****
(1) ;*PROCEDURE
(1) ;*-----
3165 ;*BGNTST
3166 ;* SET UP THE DATA PATTERN 153271(8)
3167 ;* CALL SUBROUTINE CASCOW
3168 ;*ENDTST
3169 011212 SE
(1) ; *****
(1) ;*ERRORS
(1) ;*-----
3170 ;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3171 ;*M8956, M8957, MASSBUS
3172 ;*RH: AAAAAA TM: X TU: X PORT: X
3173 ;*'NED' WHEN READING MB REG.
3174 ;*
3175 ;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3176 ;*M8957, M8960
3177 ;*RH: AAAAAA TM: X TU: X PORT: X
3178 ;*'HLDA' NOT SET STATUS = 000000
3179 ;*
3180 ;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3181 ;*M8957, M8960
```

```
3182 : *RH: AAAAAA TM: X TU: X PORT: X
3183 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3184 : *
3185 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3186 : *M8956, M8957
3187 : *RH: AAAAAA TM: X TU: X PORT: X
3188 : *CAS DATA COMPARE FAIL
3189 : *CAS REG. 000000
3190 : *
3191 : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3192 : *M8956, M8957, MASSBUS
3193 : *RH: AAAAAA TM: X TU: X PORT: X
3194 : *PARITY ERR. WRITING CAS REG. 000000
3195 011212 S
(1) : *****
3196
3197 011212 BGNTST
3198 011212 012702 153271 MOV #153271,R2 ;LOAD ALTERNATE ZEROS AND ONES
3199 011216 004737 032246 CALL CASCOV
3200 011222 ENDTST
3201
3202 .SBTTL TEST 21 - CAS WRITE TEST - DATA PATTERN 175747
3203 011224 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----
3204 : *TEST 21 CAS WRITE TEST - DATA PATTERN 175747
3205 011224 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----
3206 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3207 : *HOST CPU WITH A DATA PATTERN OF 175747(8), READING THE PATTERN FROM
3208 : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3209 : *ARE LOGGED.
3210 011224 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
3211 : *BGNTST
3212 : * SET UP THE DATA PATTERN 175747(8)
3213 : * CALL SUBROUTINE CASCOV
3214 : *ENDTST
3215 011224 SE
(1) : *****
(1) : *ERRORS
(1) : *-----
3216 : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3217 : *M8956, M8957, MASSBUS
3218 : *RH: AAAAAA TM: X TU: X PORT: X
3219 : *'NED' WHEN READING MB REG.
3220 : *
3221 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3222 : *M8957, M8960
3223 : *RH: AAAAAA TM: X TU: X PORT: X
3224 : *'HLDA' NOT SET STATUS = 000000
```



```
3225 : *
3226 : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3227 : *M8957, M8960
3228 : *RH: AAAAAA TM: X TU: X PORT: X
3229 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3230 : *
3231 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3232 : *M8956, M8957
3233 : *RH: AAAAAA TM: X TU: X PORT: X
3234 : *CAS DATA COMPARE FAIL
3235 : *CAS REG. 000000
3236 : *
3237 : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3238 : *M8956, M8957, MASSBUS
3239 : *RH: AAAAAA TM: X TU: X PORT: X
3240 : *PARITY ERR. WRITING CAS REG. 000000
3241 011224 S
3242 (1) : *****
3243 (1) :
3244 011224 012702 175747 BGNTST
3245 011230 004737 032246 MOV #175747,R2 ;LOAD ALTERNATE ZEROS AND ONES
3246 011234 CALL CASCOV
3247 ENDTST
3248 .SBTTL TEST 22 - CAS WRITE TEST - DATA PATTERN 062232
3249 011236 ST
3250 (1) : *****
3251 (1) : *TEST TITLE
3252 (1) : *-----*
3253 : *TEST 22 CAS WRITE TEST - DATA PATTERN 062232
3254 SD
3255 (1) : *****
3256 (1) : *DESCRIPTION
3257 (1) : *-----*
3258 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3259 : *HOST CPU WITH A DATA PATTERN OF 062132(8), READING THE PATTERN FROM
3260 : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3261 011236 : *ARE LOGGED.
3262 (1) SP
3263 (1) : *****
3264 (1) : *PROCEDURE
3265 : *-----*
3266 : *BGNTST
3267 : * SET UP THE DATA PATTERN 062132(8)
3268 : * CALL SUBROUTINE CASCOV
3269 : *ENDTST
3270 SE
3271 (1) : *****
3272 (1) : *ERRORS
3273 (1) : *-----*
3274 : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3275 : *M8956, M8957, MASSBUS
3276 : *RH: AAAAAA TM: X TU: X PORT: X
3277 : *'NED' WHEN READING MB REG.
3278 : *
3279 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
```

```
3268      : *M8957, M8960
3269      : *RH: AAAAAA TM: X TU: X PORT: X
3270      : *'HLDA' NOT SET STATUS = 000000
3271      : *
3272      : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3273      : *M8957, M8960
3274      : *RH: AAAAAA TM: X TU: X PORT: X
3275      : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3276      : *
3277      : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3278      : *M8956, M8957
3279      : *RH: AAAAAA TM: X TU: X PORT: X
3280      : *CAS DATA COMPARE FAIL
3281      : *CAS REG. 000000
3282      : *
3283      : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3284      : *M8956, M8957, MASSBUS
3285      : *RH: AAAAAA TM: X TU: X PORT: X
3286      : *PARITY ERR. WRITING CAS REG. 000000
3287 011236 S
3288      : *****
3289 011236      BGNTST
3290 011236 012702 062132      MOV #062132,R2 ;LOAD ALTERNATE ZEROS AND ONES
3291 011242 004737 032246      CALL CASCOW
3292 011246      ENDTST
3293
3294      .SBTTL TEST 23 - CAS WRITE TEST - DATA PATTERN 042002
3295 011250 ST
3296      : *****
3297 011250      : *TEST TITLE
3298      : *-----
3299      : *TEST 23 CAS WRITE TEST - DATA PATTERN 042002
3300      : *
3301      : *DESCRIPTION
3302 011250      : *-----
3303      : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3304      : *HOST CPU WITH A DATA PATTERN OF 042002(8), READING THE PATTERN FROM
3305      : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3306      : *ARE LOGGED.
3307 011250 SP
3308      : *****
3309      : *PROCEDURE
3310      : *-----
3311      : *BGNTST
3312      : * SET UP THE DATA PATTERN 042002(8)
3313      : * CALL SUBROUTINE CASCOW
3314      : *ENDTST
3315      : *
3316      : *ERRORS
3317      : *-----
3318      : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3319      : *M8956, M8957, MASSBUS
3320      : *RH: AAAAAA TM: X TU: X PORT: X
```

```
3311 :*'NED' WHEN READING MB REG.
3312 :*
3313 :*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3314 :*M8957, M8960
3315 :*RH: AAAAAA TM: X TU: X PORT: X
3316 :*'HLDA' NOT SET STATUS = 000000
3317 :*
3318 :*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3319 :*M8957, M8960
3320 :*RH: AAAAAA TM: X TU: X PORT: X
3321 :*MICRO DIAGNOSTIC RESPONSE TIMEOUT
3322 :*
3323 :*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3324 :*M8956, M8957
3325 :*RH: AAAAAA TM: X TU: X PORT: X
3326 :*CAS DATA COMPARE FAIL
3327 :*CAS REG. 000000
3328 :*
3329 :*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3330 :*M8956, M8957, MASSBUS
3331 :*RH: AAAAAA TM: X TU: X PORT: X
3332 :*PARITY ERR. WRITING CAS REG. 000000
3333 011250 S
(1) : *****
3334
3335
3336 011250 BGNTST
3337 011250 012702 042002 MOV #042002,R2 ;LOAD ALTERNATE ZEROS AND ONES
3338 011254 004737 032246 CALL CASCOW
3339 011260 ENDTST
3340
3341 .SBTTL TEST 24 - CAS WRITE TEST - DATA PATTERN 070066
3342 011262 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----
3343 : *TEST 24 CAS WRITE TEST - DATA PATTERN 070066
3344 011262 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----
3345 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3346 : *HOST CPU WITH A DATA PATTERN OF 070066(8), READING THE PATTERN FROM
3347 : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3348 : *ARE LOGGED.
3349 011262 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
3350 : *BGNTST
3351 : * SET UP THE DATA PATTERN 070066(8)
3352 : * CALL SUBROUTINE CASCOW
3353 : *ENDTST
3354 011262 SE
(1) : *****
(1) : *ERRORS
```

(1)
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3391
3392
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(1)
3396
3397
3398
3399

011262
011262 012702 070066
011266 004737 032246
011272
011274
011274
011274

```

:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
*
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
*
:*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. WRITING CAS REG. 000000
S
: *****
          BGNTST
          MOV      #070066,R2      ;LOAD ALTERNATE ZEROS AND ONES
          CALL    CASCOW
          ENDTST

.SBTTL TEST 25 - CAS WRITE TEST - DATA PATTERN 102332
ST
: *****
:*TEST TITLE
:-----
:*TEST 25          CAS WRITE TEST - DATA PATTERN 102332
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*HOST CPU WITH A DATA PATTERN OF 102332(8), READING THE PATTERN FROM
:*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
:*ARE LOGGED.
SP
: *****
:*PROCEDURE
:-----
:*BGNTST
:* SET UP THE DATA PATTERN 102332(8)
:* CALL SUBROUTINE CASCOW
:*ENDTST

```

3400 011274

(1)
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(1)

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3426 011274

(1)
3427

3428 011274

3429 011274 012702 102332

3430 011300 004737 032246

3431 011304

3432

3433 011306

(1)

(1)

(1)

3435 011306

(1)

(1)

(1)

3437

3438

3439

3440

3441 011306

(1)

(1)

(1)

3442

SE

```
: *****  
: *ERRORS  
: *-----  
: *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8956, M8957, MASSBUS  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *'NED' WHEN READING MB REG.  
: *  
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8957, M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *'HLDA' NOT SET STATUS = 000000  
: *  
: *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8957, M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *MICRO DIAGNOSTIC RESPONSE TIMEOUT  
: *  
: *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8956, M8957  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *CAS DATA COMPARE FAIL  
: *CAS REG. 000000  
: *  
: *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8956, M8957, MASSBUS  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *PARITY ERR. WRITING CAS REG. 000000  
S  
: *****
```

```
BGNTST  
MOV #102332,R2 ;LOAD ALTERNATE ZEROS AND ONES  
CALL CASOW  
ENDTST
```

.SBTTL TEST 26 - CAS WRITE TEST - FLOAT A 1

ST

```
: *****  
: *TEST TITLE  
: *-----  
: *TEST 26 CAS WRITE TEST - FLOAT A 1
```

SD

```
: *****  
: *DESCRIPTION  
: *-----  
: *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE  
: *HOST CPU WITH A DATA PATTERN THAT FLOATS A ONE THROUGH A FIELD OF ZEROS,  
: *READING THE PATTERN FROM THE TM78 SIDE, AND COMPARING THE WRITTEN WITH  
: *THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.
```

SP

```
: *****  
: *PROCEDURE  
: *-----  
: *BGNTST
```

```
3443 : * CALL SUBROUTINE CASBOT
3444 : * IF ERRCOD=0
3445 : * : THEN-CONTINUE
3446 : * : ELSE-EXIT TEST
3447 : * ENDIF
3448 : * LOAD STARTING DATA PATTERN 000001(8)
3449 : * BGND0
3450 : * : CALL SUBROUTINE CASDAT
3451 : * : CALL SUBROUTINE CASWRT
3452 : * : CALL SUBROUTINE CASTMR
3453 : * : CALL SUBROUTINE CASCMP
3454 : * : ROTATE THE DATA PATTERN LEFT
3455 : * : DO UNTIL THE DATA PATTERN=ZERO
3456 : * ENDDO
3457 : *ENDTST
3458 011306 SE
(1) : *****
(1) : *ERRORS
(1) : *-----
3459 : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3460 : *M8956, M8957, MASSBUS
3461 : *RH: AAAAAA TM: X TU: X PORT: X
3462 : *'NED' WHEN READING MB REG.
3463 : *
3464 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3465 : *M8957, M8960
3466 : *RH: AAAAAA TM: X TU: X PORT: X
3467 : *'HLDA' NOT SET STATUS = 000000
3468 : *
3469 : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3470 : *M8957, M8960
3471 : *RH: AAAAAA TM: X TU: X PORT: X
3472 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3473 : *
3474 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3475 : *M8956, M8957
3476 : *RH: AAAAAA TM: X TU: X PORT: X
3477 : *CAS DATA COMPARE FAIL
3478 : *CAS REG. 000000
3479 : *
3480 : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3481 : *M8956, M8957, MASSBUS
3482 : *RH: AAAAAA TM: X TU: X PORT: X
3483 : *PARITY ERR. WRITING CAS REG. 000000
3484 011306 S
(1) : *****
```

```
3485
3486 011306 BGNTST
3487 011306 004737 032502 CALL CASBOT ;BOOT UP THE CAS PROGRAM
3488 011312 005705 TST ERRCOD
3489 011314 001402 BEQ 5$
3490 011316 EXIT TST
3491 011322 012702 000001 5$: MOV #1,R2 ;LOAD THE STARTING DATA PATTERN
3492 011326 010237 004330 1$: MOV R2,CASDTA ;STORE THE DATA PATTERN
3493 011332
3494 011334 004737 014566 CALL START ;START THE TM78
```

```
3495 011340 004737 032564 CALL CASDAT ;FILL THE CAS DATA BUFFER
3496 011344 004737 035414 CALL HOLDMP
3497 011350 012777 041420 172722 MOV #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
3498 011356 012777 000400 172716 MOV #HOLD,@DS80 ;ISSUE THE READ CAS FROM TM78MP COMMAND
3499 011364 004737 014566 CALL START
3500 011370 004737 032610 CALL CASWRT ;GO WRITE CAS FROM HOST
3501 011374 CKLOOP
3502 011376 012777 000035 172624 MOV #TSTART,@XFRCMD
3503 011404 DELAY 100 ;PERFORM A 10MS. TIMEOUT
3504 011434 122777 000372 172566 CMPB #372,@XFRCMD ;DONE
3505 011442 001406 BEQ 3$ ;YES-CONTINUE
3506 011444 ERRDF 8.,PROCAS,ERM008 ;NO-PRINT THE ERROR
3507 011454 CKLOOP
3508 011456 000406 BR 6$ ;EXIT THE MODULE
3509 011460 3$: CKLOOP
3510 011462 004737 033020 CALL CASTMR ;GO READ CAS FROM TM78
3511 011466 004737 033260 CALL CASCMP ;GO COMPARE WRITTEN/READ
3512 011472 CKLOOP
3513 011474 6$: ENDSEG
3514 011476 013702 004330 MOV CASDTA,R2 ;GET THE PATTERN JUST WRITTEN
3515 011502 000241 CLC ;CLEAR THE C BIT
3516 011504 006102 ROL R2 ;SHIFT THE PATTERN LEFT
3517 011506 103307 BCC 1$
3518 011510 ENDTST
```

```
3519
3520 .SBTTL TEST 27 - CAS WRITE TEST - FLOAT A ZERO
3521 011512 ST
(1) ; *****
(1) ; *TEST TITLE
(1) ; *-----*
3522 ; *TEST 27 CAS WRITE TEST - FLOAT A ZERO
3523 011512 SD
(1) ; *****
(1) ; *DESCRIPTION
(1) ; *-----*
3524 ; *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3525 ; *HOST CPU WITH A DATA PATTERN THAT FLOATS A ZERO THROUGH A FIELD OF ONES.
3526 ; *READING THE PATTERN FROM THE TM78 SIDE, AND COMPARING THE WRITTEN WITH
3527 ; *THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.
3528 011512 SP
(1) ; *****
(1) ; *PROCEDURE
(1) ; *-----*
3529 ; *BGNTST
3530 ; * CALL SUBROUTINE CASBOT
3531 ; * IF ERRCOD=0
3532 ; * : THEN-CONTINUE
3533 ; * : ELSE-EXIT TEST
3534 ; * ENDF
3535 ; * LOAD STARTING DATA PATTERN 177776(8)
3536 ; * BGND0
3537 ; * : CALL SUBROUTINE CASDAT
3538 ; * : CALL SUBROUTINE CASWRT
3539 ; * : CALL SUBROUTINE CASTMR
3540 ; * : CALL SUBROUTINE CASCMP
3541 ; * : ROTATE THE DATA PATTERN LEFT
```

3542
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3545 011512
(1)
(1)
(1)
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3567
3568
3569
3570
3571 011512
(1)
3572
3573 011512
3574 011512 004737 032502
3575 011516 005705
3576 011520 001402
3577 011522
3578 011526 012702 177776
3579 011532 010237 004330
3580 011536
3581 011540 004737 014566
3582 011544 004737 032564
3583 011550 004737 033414
3584 011554 012777 041420 172516
3585 011562 012777 000400 172512
3586 011570 004737 014566
3587 011574 004737 032610
3588 011600
3589 011602 012777 000035 172420
3590 011610
3591 011640 122777 000372 172362
3592 011646 001406
3593 011650

```
;* : DO UNTIL THE DATA PATTERN=177777(8)
;* ENDDO
;*ENDTST
SE
*****
;*ERRORS
*-----
;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;*'NED' WHEN READING MB REG.
*
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*'HLDA' NOT SET STATUS = 000000
*
;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*MICRO DIAGNOSTIC RESPONSE TIMEOUT
*
;*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*CAS DATA COMPARE FAIL
;*CAS REG. 000000
*
;*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*RH: AAAAAA TM: X TU: X PORT: X
;*PARITY ERR. WRITING CAS REG. 000000
;*M8956, M8957, MASSBUS
S
*****
```

```
BGNTST
CALL CASBOT ;BOOT UP THE CAS PROGRAM
TST ERRCOD
BEQ 5$
EXIT TST
5$: MOV #177776,R2 ;LOAD THE DATA PATTERN
1$: MOV R2,CASDIA ;STORE THE DATA PATTERN
BGNSEG
CALL START ;START THE TM78
CALL CASDAT ;FILL THE CAS DATA BUFFER
CALL HOLDMP
MOV #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
MOV #HGLD,@DS80 ;ISSUE THE READ CAS FROM TM78MP COMMAND
CALL START
CALL CASWRT ;GO WRITE CAS FROM HOST
CKLOOP
MOV #TSTART,@XFRCMD
DELAY 100 ;PERFORM A 10MS. TIMEOUT
CMPB #372,@XFRCMD ;DONE
BEQ 3$ ;YES-CONTINUE
ERRDF 8.,PROCAS,ERM008 ;NO-PRINT THE ERROR
```


3594 011660
3595 011662 000406
3596 011664
3597 011666 004737 033020
3598 011672 004737 033260
3599 011676
3600 011700
3601 011702 013702 004330
3602 011706 000261
3603 011710 006102
3604 011712 103707
3605 011714

```
CKLOOP  
BR 6$ ;EXIT THE MODULE  
3$: CKLOOP  
CALL CASTMR ;GO READ CAS FROM TM78  
CALL CASCMP ;GO COMPARE WRITTEN/READ  
CKLOOP  
6$: ENDSEG  
MOV CASDTA,R2 ;GET THE PATTERN JUST WRITTEN  
SEC ;SET THE C BIT  
ROL R2 ;MAKE NEXT DATA PATTERN  
BCS 1$  
ENDTST
```

3606
3607
3608 011716

.SBTTL TEST 28 - CAS READ TEST - ALL ZEROS
ST

(1)
(1)
(1)

```
:*****  
:*TEST TITLE  
:*-----*  
:*TEST 28 CAS READ TEST - ALL ZEROS
```

3609
3610 011716

SD

(1)
(1)
(1)

```
:*****  
:*DESCRIPTION  
:*-----*  
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE  
:*TM78 SIDE WITH A DATA PATTERN OF 000000(8), READING THE PATTERN FROM  
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE  
:*ERRORS ARE LOGGED.
```

3611
3612
3613
3614

SP

3615 011716
(1)
(1)
(1)

```
:*****  
:*PROCEDURE  
:*-----*  
:*BGNTST  
:* SET UP THE DATA PATTERN 000000(8)  
:* CALL SUBROUTINE CASCOR  
:*ENDTST
```

3616
3617
3618
3619

SE

3620 011716
(1)
(1)
(1)

```
:*****  
:*ERRORS  
:*-----*  
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'NED' WHEN READING MB REG.
```

3621
3622
3623
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3625

```
:*  
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS = 000000
```

3626
3627
3628
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3630

```
:*  
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
```

3631
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3637

```
:*  
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957
```

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3640
3641
3642
3643
3644
3645
3646 011716
(1)
3647
3648 011716
3649 011716 005002
3650 011720 004737 032430
3651 011724
3652
3653
3654 011726
(1)
(1)
(1)
3655
3656 011726
(1)
(1)
(1)
3657
3658
3659
3660
3661 011726
(1)
(1)
(1)
3662
3663
3664
3665
3666 011726
(1)
(1)
(1)
3667
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3672
3673
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3679
3680

```
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
:
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. READING CAS REG. 000000
S
: *****
          BGNTST
          CLR      R2
          CALL     CASCOR
          ENDTST
.SBTTL TEST 29 - CAS READ TEST - ALL ONES
ST
: *****
:*TEST TITLE
:-----
:*TEST 29      CAS READ TEST - ALL ONES
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*TM78 SIDE WITH A DATA PATTERN OF 177777(8), READING THE PATTERN FROM
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
:*ERRORS ARE LOGGED.
SP
: *****
:*PROFEDURE
:-----
:*BGNTST
:* SET UP THE DATA PATTERN 177777(8)
:* CALL SUBROUTINE CASCOR
:*ENDTST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
```

```

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3691
3692 011726
  (1)
3693
3694 011726
3695 011726 012702 177777
3696 011732 004737 032430
3697 011736
3698
3699
3700 011740
  (1)
  (1)
  (1)
3701
3702 011740
  (1)
  (1)
  (1)
3703
3704
3705 011740
  (1)
  (1)
  (1)
3706
3707
3708
3709
3710
3711
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3726

:
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
:
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. READING CAS REG. 000000
S
: *****
:
      BGNTST
      MOV      #177777,R2      ;LOAD THE DATA PATTERN
      CALL     CASCOR
      ENDTST

.SBTTL TEST 30 - CAS READ TEST - DATA PATTERN 153271
ST
: *****
:*TEST TITLE
:-----
:*TEST 30      CAS READ TEST - DATA PATTERN 153271
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE PROPER OPERATION OF THE ATTENTION BIT SET/CLEAR
:*OPERATION.
SP
: *****
:*PROCEDURE
:-----
:*BGNTST
:* CALL SUBROUTINE CASBOT
:* IF ERRCOD=0
:* : THEN-SET A 16 BIT DATA PATTERN TO ALL 1'S
:* :
:* :       BGND0
:* :       : CALL SUBROUTINE CASDAT
:* :       : CALL SUBROUTINE CASTMW
:* :       : IF TM78 ATTENTION SUMMARY REG.=DATA PATTERN
:* :       : : THEN-CONTINUE
:* :       : : ELSE-ERROR
:* :       : :
:* :       : ENDF
:* :       : LOAD THE ATTENTION SUMMARY REGISTER WITH ALL 1'S
:* :       : IF THE TM78 ATTENTION SUMMARY REGISTER=0
:* :       : : THEN-CONTINUE
:* :       : : ELSE-ERROR
:* :       : :
:* :       : ENDF
:* :       : SHIFT THE DATA PATTERN LEFT 1 BIT
:* :       : DO UNTIL THE DATA PATTERN=177400(8)
:* :       : ENDD0
:* :       : ELSE-CONTINUE
:* ENDF

```

3727
3728 011740
(1)
(1)
(1)
3729
3730
3731
3732
3733 011740
(1)
(1)
(1)
3734
3735
3736
3737
3738 011740
(1)
(1)
(1)
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3740
3741
3742
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3745
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3759
3760
3761
3762
3763
3764 011740
(1)
3765
3766 011740
3767 011740 012702 153271
3768 011744 004737 032430
3769 011750
3770
3771
3772 011752

```

;*ENDTST
SD
:*****
;*DESCRIPTION
:-----
;*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
;*TM78 SIDE WITH A DATA PATTERN OF 153271(8), READING THE PATTERN FROM
;*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
;*ERRORS ARE LOGGED.
SP
:*****
;*PROCEDURE
:-----
;*BGNTST
;* SET UP THE DATA PATTERN 153271(8)
;* CALL SUBROUTINE CASCOR
;*ENDTST
SE
:*****
;*ERRORS
:-----
;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;*'NED' WHEN READING MB REG.
;*
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*'HLDA' NOT SET STATUS = 000000
;*
;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*MICRO DIAGNOSTIC RESPONSE TIMEOUT
;*
;*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*CAS DATA COMPARE FAIL
;*CAS REG. 000000
;*
;*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;*PARITY ERR. READING CAS REG. 000000
S
:*****
BGNTST
MOV #153271,R2 ;LOAD THE DATA PATTERN
CALL CASCOR
ENDTST
.SBTTL TEST 31 - CAS READ TEST - DATA PATTERN 175747
ST
```

(1)
(1)
(1)
3773
3774 011752
(1)
(1)
(1)
3775
3776
3777
3778
3779 011752
(1)
(1)
(1)
3780
3781
3782
3783
3784 011752
(1)
(1)
(1)
3785
3786
3787
3788
3789
3790
3791
3792
3793
3794
3795
3796
3797
3798
3799
3800
3801
3802
3803
3804
3805
3806
3807
3808
3809
3810 011752
(1)
3811
3812 011752
3813 011752 012702 175747
3814 011756 004737 032430
3815 011762

```
*****
*TEST TITLE
*-----
*TEST 31      CAS READ TEST - DATA PATTERN 175747
SD
*****
*DESCRIPTION
*-----
*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
*TM78 SIDE WITH A DATA PATTERN OF 175747(8), READING THE PATTERN FROM
*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ.  DATA COMPARE
*ERRORS ARE LOGGED.
SP
*****
*PROCEDURE
*-----
*BGNTST
*  SET UP THE DATA PATTERN 175747(8)
*  CALL SUBROUTINE CASCOR
*ENDTST
SE
*****
*ERRORS
*-----
*CZTMIA DVC FTL ERR 000003 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
*M8956, M8957, MASSBUS
*RH: AAAAAA  TM: X  TU: X  PORT: X
*'NED' WHEN READING MB REG.
*
*CZTMIA DVC FTL ERR 000007 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
*M8957, M8960
*RH: AAAAAA  TM: X  TU: X  PORT: X
*'HLDA' NOT SET  STATUS = 000000
*
*CZTMIA DVC FTL ERR 000008 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
*M8957, M8960
*RH: AAAAAA  TM: X  TU: X  PORT: X
*MICRO DIAGNOSTIC RESPONSE TIMEOUT
*
*CZTMIA DVC FTL ERR 000009 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
*M8956, M8957
*RH: AAAAAA  TM: X  TU: X  PORT: X
*CAS DATA COMPARE FAIL
*CAS REG. 000000
*
*CZTMIA DVC FTL ERR 000029 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
*M8956, M8957, MASSBUS
*RH: AAAAAA  TM: X  TU: X  PORT: X
*PARITY ERR. READING CAS REG. 000000
S
*****
```

```
BGNTST
MOV      #175747,R2      ;LOAD THE DATA PATTERN
CALL    CASCOR
ENDTST
```

3816
3817
3818 011764
(1)
(1)
(1)
3819
3820 011764
(1)
(1)
(1)
3821
3822
3823
3824
3825 011764
(1)
(1)
(1)
3826
3827
3828
3829
3830 011764
(1)
(1)
(1)
3831
3832
3833
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3842
3843
3844
3845
3846
3847
3848
3849
3850
3851
3852
3853
3854
3855
3856 011764
(1)
3857
3858 011764

```
.SBTTL TEST 32 - CAS READ TEST - DATA PATTERN 062132
ST
: *****
: *TEST TITLE
: *-----
: *TEST 32      CAS READ TEST - DATA PATTERN 062132
SD
: *****
: *DESCRIPTION
: *-----
: *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
: *TM78 SIDE WITH A DATA PATTERN OF 062132(8), READING THE PATTERN FROM
: *THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ.  DATA COMPARE
: *ERRORS ARE LOGGED.
SP
: *****
: *PROCEDURE
: *-----
: *BGNTST
: *  SET UP THE DATA PATTERN 062132(8)
: *  CALL SUBROUTINE CASCOR
: *ENDTST
SE
: *****
: *ERRORS
: *-----
: *CZTMIA DVC FTL ERR 000003 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *'NED' WHEN READING MB REG.
: *
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *'HLDA' NOT SET  STATUS = 000000
: *
: *CZTMIA DVC FTL ERR 000008 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *MICRO DIAGNOSTIC RESPONSE TIMEOUT
: *
: *CZTMIA DVC FTL ERR 000009 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8956, M8957
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *CAS DATA COMPARE FAIL
: *CAS REG. 000000
: *
: *CZTMIA DVC FTL ERR 000029 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *PARITY ERR. READING CAS REG. 000000
S
: *****
BGNTST
```

3859 011764 012702 062132
3860 011770 004737 032430
3861 011774

MOV #062132,R2 ;LOAD THE DATA PATTERN
CALL CASCOR
ENDTST

3862
3863
3864 011776
(1)
(1)
(1)

.SBTTL TEST 33 - CAS READ TEST - DATA PATTERN 042002

ST

:*****

:*TEST TITLE

:*-----*

:*TEST 33 CAS READ TEST - DATA PATTERN 042002

3865
3866 011776
(1)
(1)
(1)

SD

:*****

:*DESCRIPTION

:*-----*

:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*TM78 SIDE WITH A DATA PATTERN OF 042002(8), READING THE PATTERN FROM
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
:*ERRORS ARE LOGGED.

3867
3868
3869
3870
3871 011776
(1)
(1)
(1)

SP

:*****

:*PROCEDURE

:*-----*

:*BGNTST

:* SET UP THE DATA PATTERN 042002(8)

:* CALL SUBROUTINE CASCOR

:*ENDTST

3872
3873
3874
3875
3876 011776
(1)
(1)
(1)

SE

:*****

:*ERRORS

:*-----*

:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M8956, M8957, MASSBUS

:*RH: AAAAAA TM: X TU: X PORT: X

:*'NED' WHEN READING MB REG.

3877
3878
3879
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3881
3882

:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M8957, M8960

:*RH: AAAAAA TM: X TU: X PORT: X

:*'HLDA' NOT SET STATUS = 000000

3883
3884
3885
3886
3887

:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M8957, M8960

:*RH: AAAAAA TM: X TU: X PORT: X

:*MICRO DIAGNOSTIC RESPONSE TIMEOUT

3888
3889
3890
3891
3892

:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M8956, M8957

:*RH: AAAAAA TM: X TU: X PORT: X

:*CAS DATA COMPARE FAIL

:*CAS REG. 000000

3893
3894
3895
3896
3897

:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M8956, M8957, MASSBUS

:*RH: AAAAAA TM: X TU: X PORT: X

:*PARITY ERR. READING CAS REG. 000000

3898
3899
3900
3901
3902 011776

S

(1)
3903
3904 011776
3905 011776 012702 042002
3906 012002 004737 032430
3907 012006
3908
3909
3910 012010
(1)
(1)
(1)
3911 012010
3912 012010
(1)
(1)
(1)
3913
3914
3915
3916
3917 012010
(1)
(1)
(1)
3918
3919
3920
3921
3922 012010
(1)
(1)
(1)
3923
3924
3925
3926
3927
3928
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3942
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3945

```
; *****  
BGNTST  
MOV #042002,R2 ;LOAD THE DATA PATTERN  
CALL CASCOR  
ENDTST  
  
SBTTL TEST 34 - CAS READ TEST - DATA PATTERN 070066  
ST  
; *****  
; *TEST TITLE  
; *-----  
; *TEST 34 CAS READ TEST - DATA PATTERN 070066  
SD  
; *****  
; *DESCRIPTION  
; *-----  
; *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE  
; *TM78 SIDE WITH A DATA PATTERN OF 070066(8), READING THE PATTERN FROM  
; *THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE  
; *ERRORS ARE LOGGED.  
SP  
; *****  
; *PROCEDURE  
; *-----  
; *BGNTST  
; * SET UP THE DATA PATTERN 070066(8)  
; * CALL SUBROUTINE CASCOR  
; *ENDTST  
SE  
; *****  
; *ERRORS  
; *-----  
; *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
; *M8956, M8957, MASSBUS  
; *RH: AAAAAA TM: X TU: X PORT: X  
; *'NED' WHEN READING MB REG.  
; *  
; *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
; *M8957, M8960  
; *RH: AAAAAA TM: X TU: X PORT: X  
; *'HLDA' NOT SET STATUS = 000000  
; *  
; *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
; *M8957, M8960  
; *RH: AAAAAA TM: X TU: X PORT: X  
; *MICRO DIAGNOSTIC RESPONSE TIMEOUT  
; *  
; *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
; *RH: AAAAAA TM: X TU: X PORT: X  
; *CAS DATA COMPARE FAIL  
; *CAS REG. 000000  
; *M8956, M8957  
; *  
; *CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
; *M8956, M8957, MASSBUS
```


3946
3947
3948 012010
(1)
3949
3950 012010
3951 012010 012702 070066
3952 012014 004737 032430
3953 012020
3954
3955
3956 012022
(1)
(1)
(1)
3957
3958 012022
(1)
(1)
(1)
3959
3960
3961
3962
3963 012022
(1)
(1)
(1)
3964
3965
3966
3967
3968 012022
(1)
(1)
(1)
3969
3970
3971
3972
3973
3974
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3985
3986
3987
3988

```
;*RH: AAAAAA TM: X TU: X PORT: X
;*PARITY ERR. READING CAS REG. 000000
S
; *****
          BGNTST
          MOV #070066,R2 ;LOAD THE DATA PATTERN
          CALL CASCOR
          ENDTST

.SBTTL TEST 35 - CAS READ TEST - DATA PATTERN 102332
ST
; *****
;*TEST TITLE
;-----
;*TEST 35 CAS READ TEST - DATA PATTERN 102332
SD
; *****
;*DESCRIPTION
;-----
;*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
;*TM78 SIDE WITH A DATA PATTERN OF 102332(8), READING THE PATTERN FROM
;*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
;*ERRORS ARE LOGGED.
SP
; *****
;*PROCEDURE
;-----
;*BGNTST
;* SET UP THE DATA PATTERN 102332(8)
;* CALL SUBROUTINE CASCOR
;*ENDTST
SE
; *****
;*ERRORS
;-----
;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'NED' WHEN READING MB REG.
;*
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'HLDA' NOT SET STATUS = 000000
;*
;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*MICRO DIAGNOSTIC RESPONSE TIMECUT
;*
;*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*CAS DATA COMPARE FAIL
;*CAS REG. 000000
```

```
3989 :*
3990 :*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3991 :*M8956, M8957, MASSBUS
3992 :*RH: AAAAAA TM: X TU: X PORT: X
3993 :*PARITY ERR. READING CAS REG. 000000
3994 012022 S
(1) : *****
3995
3996 012022          BGNTST
3997 012022 012702 102332      MOV      #102332,R2      ;LOAD THE DATA PATTERN
3998 012026 004737 032430      CALL     CASCOR
3999 012032          ENDTST
4000
4001          .SBTTL TEST 36 - CAS READ TEST - FLOAT A 1
4002 012034 ST
(1) : *****
(1) : *TEST TITLE
(1) : -----
4003 :*TEST 36          CAS READ TEST - FLOAT A 1
4004 012034 SD
(1) : *****
(1) : *DESCRIPTION
(1) : -----
4005 :*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
4006 :*TM78 SIDE WITH A DATA PATTERN THAT FLOATS A 1 THROUGH A FIELD OF ZEROS,
4007 :*READING THE PATTERN FROM THE HOST CPU, AND COMPARING THE WRITTEN WITH
4008 :*THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.
4009 012034 SP
(1) : *****
(1) : *PROCEDURE
(1) : -----
4010 :*BGNTST
4011 :* CALL SUBROUTINE CASBOT
4012 :* IF ERRCOD=0
4013 :* : THEN-CONTINUE
4014 :* : ELSE-EXIT TEST
4015 :* ENDF
4016 :* LOADING STARTING DATA PATTERN 000001(8)
4017 :* BGNDO
4018 :* : CALL SUBROUTINE CASDAT
4019 :* : CALL SUBROUTINE CASTMW
4020 :* : CALL SUBROUTINE CASRED
4021 :* : CALL SUBROUTINE CASCMP
4022 :* : ROTATE THE DATA PATTERN LEFT
4023 :* : DO UNTIL THE DATA PATTERN=ZERO
4024 :* ENDDO
4025 :*ENDTST
4026 012034 SE
(1) : *****
(1) : *ERRORS
(1) : -----
4027 :*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4028 :*M8956, M8957, MASSBUS
4029 :*RH: AAAAAA TM: X TU: X PORT: X
4030 :*'NED' WHEN READING MB REG.
4031 :*
```

```
4032 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4033 : *M8957, M8960
4034 : *RH: AAAAAA TM: X TU: X PORT: X
4035 : *'HLDA' NOT SET STATUS = 000000
4036 : *
4037 : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4038 : *M8957, M8960
4039 : *RH: AAAAAA TM: X TU: X PORT: X
4040 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
4041 : *
4042 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4043 : *M8956, M8957
4044 : *RH: AAAAAA TM: X TU: X PORT: X
4045 : *CAS DATA COMPARE FAIL
4046 : *CAS REG. 000000
4047 : *
4048 : *CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4049 : *M8956, M8957, MASSBUS
4050 : *RH: AAAAAA TM: X TU: X PORT: X
4051 : *PARITY ERR. READING CAS REG. 000000
4052 012034 S
(1) : *****
4053
4054 012034 BGNTST
4055 012034 004737 032502 CALL CASBOT ;BOOT THE CAS PROGRAM
4056 012040 005705 TST ERRCOD
4057 012042 001402 BEQ 5$
4058 012044 EXIT TST
4059 012050 012702 000001 5$: MOV #1,R2 ;LOAD THE DATA PATTERN
4060 012054 010237 004330 1$: MOV R2,CASDTA ;STORE THE DATA PATTERN
4061 012060 BGNSEG
4062 012062 004737 014566 CALL START ;START THE TM78
4063 012066 004737 032564 CALL CASDAT ;FILL THE CAS DATA BUFFER
4064 012072 004737 033070 CALL CASTMW ;GO WRITE CAS FROM TM78
4065 012076 004737 032712 CALL CASRED ;GO READ CAS FROM HOST
4066 012102 CKLOOP
4067 012104 004737 033260 CALL CASCMP ;COMPARE WRITTEN/READ
4068 012110 CKLOOP
4069 012112 ENDSEG
4070 012114 013702 004330 MOV CASDTA,R2 ;GET THE PATTERN JUST WRITTEN
4071 012120 000241 CLC ;CLEAR THE C BIT
4072 012122 006102 ROL R2 ;SHIFT THE PATTERN LEFT
4073 012124 103353 BCC 1$ ;DO UNTIL THE ONE IS SHIFTED OUT
4074 012126 ENDTST
4075
4076
4077 012130 .SBTTL TEST 37 - CAS READ TEST - FLOAT A 0
(1) ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----*
4078 : *TEST 37 CAS READ TEST - FLOAT A 0
4079 012130 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----*
4080 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
```

4081
4082
4083
4084 012130
(1)
(1)
(1)
4085
4086
4087
4088
4089
4090
4091
4092
4093
4094
4095
4096
4097
4098
4099
4100
4101 012130
(1)
(1)
(1)
4102
4103
4104
4105
4106
4107
4108
4109
4110
4111
4112
4113
4114
4115
4116
4117
4118
4119
4120
4121
4122
4123
4124
4125
4126
4127 012130
(1)
4128
4129 012130

```
:*TM78 SIDE WITH A DATA PATTERN THAT FLOATS A 0 THROUGH A FIELD OF ONES,  
:*READING THE PATTERN FROM THE HOST CPU, AND COMPARING THE WRITTEN WITH  
:*THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.  
SP  
:*****  
:*PROCEDURE  
:-----  
:*BGNTST  
:* CALL SUBROUTINE CASBOT  
:* IF ERRCOD=0  
:* : THEN-CONTINUE  
:* : ELSE-EXIT TEST  
:* ENDIF  
:* LOADING STARTING DATA PATTERN 177776(8)  
:* BGND0  
:* : CALL SUBROUTINE CASDAT  
:* : CALL SUBROUTINE CASTMW  
:* : CALL SUBROUTINE CASRED  
:* : CALL SUBROUTINE CASCMP  
:* : ROTATE THE DATA PATTERN LEFT  
:* : DO UNTIL THE DATA PATTERN=177777(8)  
:* ENDD0  
:*ENDTST  
SE  
:*****  
:*ERRORS  
:-----  
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'NED' WHEN READING MB REG.  
:*  
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS = 000000  
:*  
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT  
:*  
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*CAS DATA COMPARE FAIL  
:*CAS REG. 000000  
:*  
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*PARITY ERR. READING CAS REG. 000000  
S  
:*****  
BGNTST
```

```
4130 012130 004737 032502      CALL  CASBOT      ;BOOT THE CAS PROGRAM
4131 012134 005705              TST  ERRCOD
4132 012136 001402              BEQ  5$
4133 012140                      EXIT  TST
4134 012144 012702 177776      5$: MOV  #177776,R2    ;LOAD THE DATA PATTERN
4135 012150 010237 004330      1$: MOV  R2,CASDTA  ;STORE THE DATA PATTERN
4136 012154                      BGNSEG
4137 012156 004737 014566      CALL  START      ;START THE TM78
4138 012162 004737 032564      CALL  CASDAT     ;FILL THE CAS DATA BUFFER
4139 012166 004737 033070      CALL  CASTMW     ;GO WRITE CAS FROM TM78
4140 012172 004737 032712      CALL  CASRED     ;GO READ CAS FROM HOST
4141 012176                      CKLOOP
4142 012200 004737 033260      CALL  CASCMP     ;COMPARE WRITTEN/READ
4143 012204                      CKLOOP
4144 012206                      ENDSEG
4145 012210 013702 004330      MOV  CASDTA,R2   ;GET THE PATTERN JUST WRITTEN
4146 012214 000261              SEC                ;SET THE C BIT
4147 012216 006102              ROL  R2           ;ROTATE THE PATTERN LEFT
4148 012220 103753              BCS  1$          ;DO UNTIL CARRY IS SET
4149 012222                      ENDTST
4150
```

```
4151      .SBTTL TEST 38 - CAS REGISTER 4 TEST
4152 012224 ST
(1)      : *****
(1)      : *TEST TITLE
(1)      : *-----
4153      : *TEST 38          CAS REGISTER 4 TEST
4154 012224 SE
(1)      : *****
(1)      : *ERRORS
(1)      : *-----
4155      : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4156      : *M8957, M8960
4157      : *RH: AAAAAA TM: X TU: X PORT: X
4158      : *'HLDA' NOT SET STATUS = 000000
4159      : *
4160      : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4161      : *M8957, M8960
4162      : *RH: AAAAAA TM: X TU: X PORT: X
4163      : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
4164      : *
4165      : *CZTMIA DVC FTL ERR 000020 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4166      : *M8956, M8957
4167      : *RH: AAAAAA TM: X TU: X PORT: X
4168      : *DATA FROM CAS REG 4 NOT AS EXPECTED
4169      : *ACT = 000000
4170      : *EXP = 000000
4171      : *
4172      : *CZTMIA DVC FTL ERR 000021 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4173      : *M8956, M8957
4174      : *RH: AAAAAA TM: X TU: X PORT: X
4175      : *ATTEN. REG. = 000000 AFTER WRITTEN CLEAR
4176 012224 S
(1)      : *****
4177
4178      BGNTST
```

```
4179 012224 004737 032502          CALL  CASBOT          ;BOOT THE CAS PROGRAM
4180 012230 005705                   TST  ERRCOD
4181 012232 001402                   BEQ  5$
4182 012234                   EXIT  TST
4183 012240 012702 177777          5$:  MOV  #-1,R2          ;LOAD THE DATA PATTERN
4184 012244 010237 004330          3$:  MOV  R2,CASDTA      ;STORE THE DATA PATTERN
4185 012250 004737 032564          CALL  CASDAT          ;FILL THE COMPARE BUFFER
4186 012254 004737 033070          CALL  CASTMW         ;GO WRITE CAS FROM TM78
4187 012260 017702 171762          MOV  @AS,R2          ;READ THE ATTENTION SUMMARY
4188 012264 020237 032102          CMP  R2,MBBUF        ;=EXPECTED?
4189 012270 001404                   BEQ  1$               ;YES-CONTINUE
4190 012272                   ERRDF 20.,CASX,ERM020
4191
4192 012302                   1$:  CKLOOP
4193 012304 012777 177777 171734  MOV  #-1,@AS         ;WRITE ALL 1'S TO ATTENTION
4194 012312 000240                   NOP                    ;WAIT
4195 012314 017702 171726          MOV  @AS,R2          ;GET THE ATTENTION SUMMARY
4196 012320 001404                   BEQ  2$               ;ZERO-CONTINUE
4197
4198 012322                   ERRDF 21.,CASX,ERM021 ;ELSE-ERROR
4199
4200 012332                   2$:  CKLOOP
4201 012334 013702 004330          MOV  CASDTA,R2       ;GET LAST DATA USED
4202 012340 000241                   CLC                    ;CLEAR THE C BIT
4203 012342 006102                   ROL  R2               ;SHIFT IT LEFT
4204 012344 020227 177400          CMP  R2,#177400      ;ALL ATTENTION BITS SET?
4205 012350 001335                   BNE  3$               ;NO-CONTINUE
4206 012352                   ENDTST                ;YES-END OF TEST
4207
4208 .SBTTL TEST 39 - INTERRUPT TEST
```

```
4209 012354 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----
4210 : *TEST 39 INTERRUPT TEST
4211 012354 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----
4212 : *THIS TEST CHECKS THE ABILITY OF THE TM78 TO PROPERLY INTERRUPT THE CPU
4213 : *THROUGH THE MASS BUS.
4214 012354 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
4215 : *BGNTST
4216 : * ISSUE MASS BUS INIT
4217 : * WAIT
4218 : * CALL SUBROUTINE HOLDMP
4219 : * CLEAR THE ATTENTION SUMMARY REGISTER
4220 : * SET UP THE INTERRUPT VECTOR ADDRESS
4221 : * SET THE CPU PRIORITY TO ZERO
4222 : * LOAD 100241(8) IN CAS REGISTER 20(8)
4223 : * LOAD 'HOLD' BIT IN CAS REGISTER 21(8)
4224 : * IF INTERRUPT OCCURED
4225 : * : THEN - CONTINUE
```

```
4226      ;* : ELSE - ERROE
4227      ;* ENDIF
4228      ;*ENDTST
4229 012354 SE
(1)      : *****
(1)      ;*ERRORS
(1)      ;*-----
4230      ;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4231      ;*M8957, M8960
4232      ;*RH: AAAAAA TM: X TU: X PORT: X
4233      ;*'HLDA' NOT SET STATUS = 000000
4234      ;*
4235      ;*CZTMIA DVC FTL ERR 000022 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4236      ;*M8957, M8960
4237      ;*UNIT U RH: AAAAAA TM: X TU: X PORT: X
4238      ;*CPU WAS NOT INTERRUPTED BY TM78 SETTING ATTENTION
4239 012354 S
(1)      : *****
4240
4241 012354      BGNTST
4242 012354 005037 004412      CLR      CASLD      ;CLEAR THE CAS PROGRAM LOADED FLAG
4243 012360 005037 004410      CLR      INTFLG     ;CLEAR THE INTERRUPT FLAG
4244 012364 012777 000040 171646      MOV      #MBINIT,@CS2 ;ISSUE MASS BUS INIT
4245 012372      DELAY      10      ;WAIT
4246 012422 004737 033414      CALL     HOLDMP     ;HOLD THE TM78 MP
4247 012426 012777 000377 171612      MOV      #377,@AS   ;CLEAR THE ATTENTION BITS
4248 012434 012777 000100 171566      MOV      #100,@XFRCMD ;SET THE INTERRUPT ENABLE BIT
4249 012442 013701 004362      MOV      RHVEC,R1   ;GET THE USER ENTERED VECTOR
4250 012446 062701 000002      ADD      #2,R1     ;POINT TO THE PSW PORTION
4251 012452 005011      CLR      (R1)      ;CLEAR THE NEW PSW
4252 012454      SETVEC     RHVEC,#INTMB,#PRIO7 ;SET UP THE INTERRUPT VECTOR
4253 012502      SETPRI     #PRIO0      ;SET CPU PRIORITY TO 0
4254 012510 012777 100240 171562      MOV      #100240,@AD80 ;SET THE TM READY BIT
4255 012516 012777 000500 171556      MOV      #500,@DS80
4256 012524 000240      NOP
4257 012526 012777 100241 171544      MOV      #100241,@AD80 ;GENERATE AN INTERRUPT
4258 012534 012777 000400 171540      MOV      #HOLD,@DS80
4259 012542 000240      NOP
4260 012544 000240      NOP
4261 012546 000240      NOP
4262 012550 005737 004410      TST      INTFLG     ;DID THE INTERRUPT OCCUR?
4263 012554 001004      BNE      1$        ;YES-CONTINUE
4264 012556      ERRDF      22.,PROCAS,ERM022 ;NO-ERROR
4265 012566      1$:      SETPRI     #PRIO7      ;SET CPU PRIORITY TO 7
4266 012574      CKLOOP     ;CHECK LOOP ON ERROR
4267 012576      CLRVEC     RHVEC     ;CLEAR THE VECTOR
4268 012604      ENDTST
4269 012606      BGNSRV     INTMB
4270 012606 005237 004410      INC      INTFLG
4271 012612      ENDSRV
4272
4273      .SBTTL TEST 40 - TM78 MICRO TESTS
4274 012614 ST
(1)      : *****
(1)      ;*TEST TITLE
(1)      ;*-----
```

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4276 012614
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```
.*TEST 40          TM78 MICRO DIAGNOSTICS
SD
*****
.*DESCRIPTION
-----
.*THIS TEST HAS TWO MODES OF RUNNING THE MICRO DIAGNOSTIC SCRIPT FILE.
.*THE DEFAULT MODE WILL RUN ALL MICRO DIAGNOSTICS FROM TOP TO BOTTOM.
.*THE ALTERNATE MODE ALLOWS FOR MANUAL EXECUTION OF A SINGLE MICRO
.*DIAGNOSTIC, OR OPERATOR ACKNOWLEDGEMENT BEFORE EACH TEST SECTION IS
.*EXECUTED.
SP
*****
.*PROCEDURE
-----
.*BGNTST
.*      IF MANUAL MICRO MODULE SELECTION=0
.*      : THEN-LOAD POINTER TO MICRODIAGNOSTIC FILE NAME
.*      : CALL SUBROUTINE MICCTL
.*      : ELSE-IF MANUAL INTERVENTION FLAG=1
.*      : : THEN-PRINT WARNING MESSAGE
.*      : : ELSE-ASK USER IF DIRECTORY IS WANTED
.*      : : : IF RESPONSE=YES
.*      : : : : THEN-PRINT DIRECTORY HEADER
.*      : : : : : INITIALIZE THE SEQUENCE NUMBER TO 1
.*      : : : : : LOAD POINTER TO FILE NAME
.*      : : : : : CALL SUBROUTINE DIRLST
.*      : : : : : IF ERRCOD NOT=0
.*      : : : : : : THEN-EXIT TEST
.*      : : : : : : ELSE-CONTINUE
.*      : : : : : ENDIF
.*      : : : ELSE-CONTINUE
.*      : : ENDIF
.*      : BGND0
.*      : : ASK USER FOR THE NUMBER OF THE DESIRED DIAG.
.*      : : : LOAD POINTER TO FILE NAME
.*      : : : : CALL SUBROUTINE DIRSRC
.*      : : : : IF ERRCOD NOT=0
.*      : : : : : THEN-EXIT TEST
.*      : : : : : ELSE-CONTINUE
.*      : : : : ENDIF
.*      : : : IF SEQNUM=0
.*      : : : : THEN-CONTINUE
.*      : : : : ELSE-LOAD ERRCOD WITH 14.
.*      : : : : : CALL SUBROUTINE SYSERR
.*      : : : : : : EXIT TEST
.*      : : : : : ENDIF
.*      : : : CALL SUBROUTINE LOADER
.*      : : : : IF ERRCOD NOT=0
.*      : : : : : THEN-EXIT TEST
.*      : : : : : ELSE-CONTINUE
.*      : : : : ENDIF
.*      : : : PRINT THE MICRO DIAGNOSTIC HEADER
.*      : : : : CLEAR BYPFLG
.*      : : : : BGND0
.*      : : : : : CALL SUBROUTINE CONTRL
.*      : : : : : IF ERRCOD NOT=0
```



```
4325 : : : : : THEN-EXIT TEST
4326 : : : : : ELSE-CONTINUE
4327 : : : : : ENDIF
4328 : : : : : IF BYPFLG=0
4329 : : : : : THEN-ASK USER IF LOOP THIS MODULE
4330 : : : : : ELSE-CONTINUE
4331 : : : : : ENDIF
4332 : : : : : IF BYPFLG=0
4333 : : : : : THEN-CONTINUE
4334 : : : : : ELSE-CALL SUBROUTINE DIAGST
4335 : : : : : IF ERRCOD NOT=0
4336 : : : : : THEN-EXIT TEST
4337 : : : : : ELSE-CONTINUE
4338 : : : : : ENDIF
4339 : : : : : ENDIF
4340 : : : : : DO WHILE BYPFLG NOT=0
4341 : : : : : ENDDO
4342 : : : : : DO FOREVER
4343 : : : : : ENDDO
4344 : : : : : ENDIF
4345 : : : : : ENDIF
```

```
4346 : *ENDTST
4347 012614 SE
(1) : *****
```

```
(1) : *ERRORS
(1) : -----
```

```
4348 : *CZTMIA DVC FTL ERR 000031 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4349 : *MODULE UNDER TEST AS PER MICRO DIAGNOSTIC HEADER LINE
4350 : *RH: AAAAAA TM: X TU: X PORT: X
4351 : *TM78 MICRO TEST = 000000
4352 : *TM78 MICRO PC = 000000
4353 : *MB STATUS ERROR - CS2 = U00000
4354 : *
```

```
4355 : *CZTMIA DVC FTL ERR 000032 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4356 : *MODULE UNDER TEST AS PER MICRO DIAGNOSTIC HEADER LINE
4357 : *RH: AAAAAA TM: X TU: X PORT: X
4358 : *TM78 MICRO TEST = 000000
4359 : *TM78 MICRO PC = 000000
4360 : *MB DATA COMP. FAIL
```

```
4361 : *BYTE COUNT = 000000
4362 : *ACT = 000000
4363 : *EXP = 000000
4364 : *
```

```
4365 : *CZTMIA DVC FTL ERR 000033 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4366 : *MODULE UNDER TEST AS PER MICRO DIAGNOSTIC HEADER LINE
4367 : *RH: AAAAAA TM: X TU: X PORT: X
4368 : *TM78 MICRO TEST = 000000
4369 : *TM78 MICRO PC = 000000
4370 : *NO MB STATUS ERROR WHEN EXPECTED
```

```
4371 012614 S
(1) : *****
```

```
4372 :
4373 012614 BGNTST
4374 012614 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
4375 012620 005737 002332 TST MANTST ;MANUAL MICRO MODULE SELECTION?
4376 012624 001007 BNE 1$ ;YES - GO TRY IT
```

```

4377 012626 012737 013662 004400      MOV    #DXTUID,FILNAM ;LOAD ADDRESS OF MODULE
4378 012634 004737 013402                CALL   MICCTL          ;CALL THE MICRO DIAGNOSTIC CONTROL MODULE
4379 012640 000137 013146                JMP    3$             ;END OF THE TEST
4380
4381 012644                1$:    MANUAL          ;CAN MANUAL INTERVENTION BE DONE?
4382 012646                BCOMPLETE 2$        ;YES - CONTINUE
4383 012650                PRINTF #FATAL
4384 012670 000526                BR     3$             ;END OF THE TEST
4385 012672                2$:    GMANIL DIRQUE,BYPFLG,1,NO
4386 012706 005737 004404                TST   BYPFLG          ;PRINT THE DIRECTORY
4387 012712 001422                BEQ   5$             ;NO - GO INPUT DESIRED FILE
4388 012714                PRINTF #DIRHED
4389 012734 012737 000001 004406      MOV    #1,SEQNUM      ;INITIALIZE THE SEQUENCE NUMBER
4390 012742 012737 013662 004400      MOV    #DXTUID,FILNAM ;LOAD THE FIRST FILE NAME
4391 012750 004737 015552                CALL  DIRLST          ;GO MAKE A DIRECTORY
4392 012754 005705                TST   ERRCOD          ;WAS THERE AN ERROR?
4393 012756 001073                BNE   3$             ;YES - END IT
4394 012760                5$:    GMANID SEQ,SEQNUM,0,177777,1,77,NO
4395 013000 012737 013662 004400      MOV    #DXTUID,FILNAM ;LOAD THE FIRST FILE NAME
4396 013006 004737 015546                CALL  DIRSRC          ;GO SEARCH FOR THE PROPER SEQUENCE NUMBER
4397 013012 005705                TST   ERRCOD          ;ERROR?
4398 013014 001054                BNE   3$             ;YES - END THE ROUTINE
4399 013016 005737 004406                TST   SEQNUM          ;DID WE FIND THE USER SPECIFIED FILE?
4400 013022 001405                BEQ   4$             ;YES - GO LOAD IT
4401 013024 012705 000014                MOV    #14,ERRCOD     ;LOAD THE EOF ERROR
4402 013030 004737 015340                CALL  SYSERR          ;GO LOG THE ERROR
4403 013034 000444                BR     3$             ;END THE ROUTINE
4404 013036 004737 013742                4$:    CALL  LOADER          ;GO LOAD THE PROGRAM
4405 013042 005705                TST   ERRCOD          ;LOAD ERROR?
4406 013044 001040                BNE   3$             ;END THE ROUTINE
4407 013046                PRINTF #MICRO,#BUFER
4408 013072 005037 004404                CLR   BYPFLG          ;SET RESPONSE TO - NO
4409 013076 004737 016102                6$:    CALL  CONTRL          ;START THE TEST
4410 013102 005705                TST   ERRCOD          ;CONTROL ERROR?
4411 013104 001020                BNE   3$             ;YES - END THE ROUTINE
4412 013106 005737 004404                TST   BYPFLG          ;IS RESPONSE YES?
4413 013112 001011                BNE   8$             ;YES - LOOP MICRO MODULE
4414 013114                GMANIL RERET,BYPFLG,1,NO ;DO IT AGAIN?
4415 013130 005737 004404                TST   BYPFLG          ;LOOP MICRO MODULE?
4416 013134 001711                BEQ   5$             ;NO - GO WAIT FOR ANOTHER ONE
4417 013136 004737 014762                8$:    CALL  DIAGST          ;RESTART THE CODE
4418 013142 005705                TST   ERRCOD          ;RESTART ERROR?
4419 013144 001754                BEQ   6$             ;NO - GO DO IT AGAIN
4420 013146                3$:    ENDTST
4421 013150 047514 050117 052040      RERET: .ASCIZ /LOOP THIS MICRO MODULE?/
4422
4423 013200 051120 047111 020124      DIRQUE: .ASCIZ /PRINT DIRECTORY OF MICRO MODULES?/
4424
4425 013242 047105 042524 020122      SEQ:   .ASCIZ /ENTER SEQUENCE NUMBER OF MICRO MODULE/
4426
4427 013310 047045 040445 040515      FATAL: .ASCIZ /%N%AMANUAL SELECTION NOT ALLOWED WITH THE UAM FLAG SET%N/
4428
4429 013402 004737 021660                MICCTL: CALL  CLOSEX          ;CLOSE THE CHANNEL
4430 013406 004737 013730                CALL  OPENX           ;OPEN THE CHANNEL
4431 013412 005705                TST   ERRCOD          ;OPEN CHANNEL ERROR?
4432 013414 001114                BNE   NOREX          ;YES-EXIT

```

```

4433 013416 004737 013742          CALL    LOADER          ;SKIP OVER THE BCT PROGRAM
4434 013422 004737 013742          3$:    CALL    LOADER          ;NO-LOAD A SEGMENT
4435 013426 005705                   TST     ERRCOD          ;LOAD ERROR?
4436 013430 001106                   BNE     NOREX           ;YES-EXIT
4437 013432 005737 004402          TST     EOF             ;NO-END OF FILE?
4438 013436 001103                   BNE     NOREX           ;EXIT THE MODULE
4439 013440 012702 021666          MOV     #BUFER,R2
4440 013444 122227 000073          6$:    CMPB   (R2)+,#073   ;SEARCH FOR ;
4441 013450 001375                   BNE     6$
4442 013452 122227 000040          1$:    CMPB   (R2)+,#040   ;IS IT A SPACE?
4443 013456 001775                   BEQ     1$              ;YES-IGNORE IT
4444 013460 005302                   DEC     R2              ;NO - ADJUST THE POINTER
4445 013462 122227 000115          CMPB   (R2)+,#115     ;IS IT A M?
4446 013466 001011                   BNE     2$              ;NO-GET OUT
4447 013470 122227 000124          CMPB   (R2)+,#124     ;YES-IS NEXT CHARACTER A T?
4448 013474 001006                   BNE     2$              ;NO-GET OUT
4449 013476 121227 000101          CMPB   (R2),#101      ;IS NEXT CHARACTER AN A?
4450 013502 001003                   BNE     2$              ;NO-GET OUT
4451 013504 005737 002326          TST     MTATST         ;YES-SHOULD MTA TESTS BE SKIPPED?
4452 013510 001344                   BNE     3$              ;YES-SKIP THEM
4453 013512                   2$:    MANUAL
4454 013514                   BNCOMPLETE 4$          ;CAN I ENTER DIALOG WITH THE OPERATOR
4455 013516 005737 002334          TST     RUNSKP         ;NO - JUST RUN THE TESTS
4456 013522 001426                   BEQ     4$              ;YES - BUT DOES USER WANT RUN/SKIP?
4457 013524                   PRINTF #MICRO,#BUFER ;NO - JUST RUN
4458 013550 005037 004404          CLR     BYPFLG         ;PRINT TEST HEADER
4459 013554                   GMANIL  SKIP,BYPFLG,1,YES ;DEFAULT THE QUESTION RESPONSE TO NO
4460 013570 005737 004404          TST     BYPFLG         ;ASK THE QUESTION
4461 013574 001312                   BNE     3$              ;SKIP THE MICRO MODULE
4462 013576 000417                   BR      5$              ;YES - GO GET THE NEXT MODULE
4463 013600                   4$:    RFLAGS  R2          ;NO-GO START TEST
4464 013604 032702 001000          BIT     #PNT,R2        ;GET USER FLAGS
4465 013610 001412                   BEQ     5$              ;PNT FLAG SET
4466 013612                   PRINTF #MICRO,#BUFER ;NO-RUN THE TEST
4467 013636 004737 016102          5$:    CALL    CONTRL       ;YES-PRINT TEST HEADER
4468 013642 005705                   TST     ERRCOD         ;GO START THE TEST
4469 013644 001666                   BEQ     3$
4470 013646 004737 021660          NOREX: CALL    CLOSEX        ;CLOSE THE CHANNEL
4471 013652 000207                   RTS     PC
4472
4473
4474 013654 047045 052045 000 MICRO: .ASCIZ /%N%T/
4475                   013662                   .EVEN
4476
4477
4478
4479 013662 045513 046524 041101 DXTUID: .ASCIZ /KKTMA.B.PAK/
4480                   013676                   .EVEN
4481
4482 013676 054502 040520 051523 SKIP:  .ASCIZ /BYPASS THIS MICRO MODULE?/
4483                   .EVEN

```

```
4484 .SBTTL MODULE 2.1.1 - OPENX
4485 013730 SSUB
(1) : *****
(1) : *SUBROUTINE TITLE
(1) : *-----
4486 : *MODULE 2.1.1 OPEN A FILE
4487 013730 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
4488 : *BGNSUB
4489 : * CLEAR THE ERROR CODE
4490 : * ISSUE OPEN FILE CALL TO DIAGNOSTIC SUPERVISOR
4491 : *ENDSUB
4492 013730 SIO
(1) : *****
(1) : *SUBROUTINE INPUT/OUTPUT
(1) : *-----
4493 : * INPUT:
4494 : *
4495 : * FILNAM CONTAINING A POINTER TO AN .ASCIZ CHARACTER STRING,
4496 : * WITH THE NAME OF THE FILE TO BE OPENED.
4497 : *
4498 013730 S
(1) : *****
4499 013730 OPENX: OPEN FILNAM ;OPEN A FILE
4500 013736 005005 CLR ERRCOD ;CLEAR THE ERROR CODE
4501 013740 000207 RTS PC
4502 :
4503 013742 .SBTTL MODULE 2.1.2 - LOADER
(1) SSUB
(1) : *****
(1) : *SUBROUTINE TITLE
(1) : *-----
4504 : *MODULE 2.1.2 INPUT/LOAD THE TM78 MICRO-DIAGNOSTIC
4505 013742 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
4506 : *BGNSUB
4507 : * CLEAR THE ERROR CODE
4508 : * CLEAR THE EOF FLAG
4509 : * CALL SUBROUTINE "LDMOD"
4510 : * IF ERROR CODE=0
4511 : * : THEN-CONTINUE
4512 : * : ELSE-CALL SUBROUTINE "SYSERR"
4513 : * : EXIT SUBROUTINE
4514 : * ENDF
4515 : * SELECT THE TM78 UNIT UNDER TEST
4516 : * CALL SUBROUTINE "STOP"
4517 : * IF ERROR CODE=0
4518 : * : THEN-CONTINUE
4519 : * : ELSE-CALL SUBROUTINE "SYSERR"
4520 : * : EXIT SUBROUTINE
4521 : * ENDF
4522 : * CALL SUBROUTINE "WRITE"
4523 : * IF ERROR CODE=0
```

```

4524      : *      : THEN-CONTINUE
4525      : *      : ELSE-CALL SUBROUTINE "SYSERR"
4526      : *      : EXIT SUBROUTINE
4527      : *      :
4528      : *      : ENDIF
4529      : *      : CALL SUBROUTINE "COMP"
4530      : *      : IF ERROR CODE=0
4531      : *      : THEN-CONTINUE
4532      : *      : ELSE-CALL SUBROUTINE "SYSERR"
4533      : *      : EXIT SUBROUTINE
4534      : *      : ENDIF
4535      : *      : CALL SUBROUTINE "START"
4536      : *      : IF ERROR CODE=0
4537      : *      : THEN-CONTINUE
4538      : *      : ELSE-CALL SUBROUTINE "SYSERR"
4539      : *      : EXIT SUBROUTINE
4540      : *      : ENDIF
4541      : *      : CALL SUBROUTINE "MESS"
4542      : *      : IF ERROR CODE=0
4543      : *      : THEN-CONTINUE
4544      : *      : ELSE-CALL SUBROUTINE "SYSERR"
4545      : *      : EXIT SUBROUTINE
4546      : *      : ENDIF
4547      : *      : *ENDSUB
013742   SIO
(1)      : *-----*
(1)      : *SUBROUTINE INPUT/OUTPUT
(1)      : *-----*
4548      : *
4549      : *      INPUT:
4550      : *      BINBUF  CONTAINING THE LOAD MODULE OF THE TEST TO BE WRITTEN
4551      : *
4552      : *      OUTPUT:
4553      : *      EOF      END OF FILE FLAG
4554      : *              =0 IF NORMAL EOF NOT DETECTED
4555      : *              >0 IF NORMAL EOF DETECTED
4556      : *      ERRCOD  ERROR CODE-AS FOLLOWS
4557      : *              =0- NO LOAD ERROR OCCURED
4558      : *              >0- LOAD ERROR OCCURED
4559      : *              ABORT THE TEST
4560      : *
013742   S
(1)      : *-----*
4561      : *
4562      : *      LOADER: CLR      ERRCOD      ;CLEAR THE ERROR CODE
4563      : *              CLR      EOF          ;CLEAR END OF FILE FLAG
4564      : *              CALL     LDMOD        ;BUILD A LOAD MODULE
4565      : *              TST      ERRCOD      ;BUILD ERROR?
4566      : *              BNE      ERLOAD      ;YES-GO PRINT ERROR
4567      : *              TST      EOF          ;END OF FILE?
4568      : *              BNE      LOADEX      ;YES - EXIT THE MODULE
4569      : *              MOV      MBDRIV,%CS2 ;SET UP TM78 UNIT #
4570      : *              CALL     STOP         ;STOP THE TM78 MP FOR LOADING
4571      : *              TST      ERRCOD      ;DID AN TM78 MP STATUS ERROR OCCUR?
4572      : *              BNE      ERLOAD      ;YES - GO LOG THE ERROR
4573      : *              CALL     WRITE        ;NO-GO WRITE THE TM78 MP RAM
4574      : *              TST      ERRCOD      ;DID AN TM78 MP LOAD ERROR OCCUR?
4575      : *              BNE      ERLOAD      ;YES - GO LOG THE ERROR

```

```
4576 014014 004737 014432          CALL    COMP          ;NO - GO COMPARE TM78 MP MEMORY WITH
4577                                     ;WHAT WAS WRITTEN
4578 014020 005705          TST     ERRCOD        ;DID A COMPARE ERROR OCCUR?
4579 014022 001010          BNE     ERLOAD        ;YES - GO LOG THE ERROR
4580 014024 004737 014566          CALL    START        ;NO - GO START THE TM78 MP MONITOR?
4581 014030 005705          TST     ERRCOD        ;DID THE MONITOR START?
4582 014032 001004          BNE     ERLOAD        ;NO-GO LOG A ERROR
4583 014034 004737 015204          CALL    MESS         ;GO INPUT/BUILD MESSAGE FILE
4584 014040 005705          TST     ERRCOD        ;MESSAGE FILE ERROR
4585 014042 001402          BEQ     LOADEX        ;NO-EXIT MODULE
4586 014044 004737 015340          ERLOAD: CALL    SYSERR ;NO - GO LOG THE ERROR
4587 014050 000207          LOADEX: RTS     PC    ;RETURN
4588                                     .SBTTL  MODULE 2.1.2.1 - STOP
4589 014052          SSUB
(1)          ;*****
(1)          ;*SUBROUTINE TITLE
(1)          ;-----
4590          ;*MODULE 2.1.2.1          STOP THE TM78 MICRO PROCESSOR
4591 014052          SP
(1)          ;*****
(1)          ;*PROCEDURE
(1)          ;-----
4592          ;*BGNSUB
4593          ;*   LOAD A NON-EXISTENT TM78 MICROPROCESSOR MEMORY ADDRESS
4594          ;*   SET THE HOLD BIT IN CAS REGISTER 21
4595          ;*   TIMEOUT 100 MICRO SECONDS
4596          ;*   IF TM78 MICROPROCESSOR STATUS ERROR
4597          ;*   :   THEN-LOAD ERROR CODE 01
4598          ;*   :   -EXIT SUBROUTINE
4599          ;*   :   ELSE-CONTINUE
4600          ;*   ENDIF
4601          ;*   IF HOLD ACTIVE SET
4602          ;*   :   THEN-CONTINUE
4603          ;*   :   -EXIT SUBROUTINE
4604          ;*   :   ELSE-LOAD ERROR CODE 02
4605          ;*   ENDIF
4606          ;*ENDSUB
4607 014052          SIO
(1)          ;*****
(1)          ;*SUBROUTINE INPUT/OUTPUT
(1)          ;-----
4608          ;*
4609          ;*   INPUT:
4610          ;*   ERRCOD  ERROR CODE SET TO 0
4611          ;*
4612          ;*   OUTPUT:
4613          ;*   STAT80  TM78 MP STATUS FOR ERROR CODE 01 AND 02
4614          ;*   ERRCOD  ERROR CODE -AS FOLLOWS
4615          ;*           =00-IF NO ERROR DETECTED
4616          ;*           =01-IF AN TM78 MP STATUS ERROR
4617          ;*           WAS DETECTED
4618          ;*           =02-IF THE TM78 MP WILL NOT STOP
4619          ;*
4620 014052          S
(1)          ;*****
4621 014052 012777 077777 170220          STOP:  MOV     #077777,@AD80 ;LOAD A NON-EXISTENT TM78 MP ADDRESS
```


4672
4673
4674
4675 014212
(1)
(1)
(1)
4676
4677
4678
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4680
4681
4682
4683
4684
4685
4686
4687
4688
4689 014212
(1)
4690 014212 012703 021666
4691 014216 112301
4692 014220 042701 177400
4693 014224 005705
4694 014226 001002
4695 014230 005701
4696 014232 001001
4697 014234 000207
4698
4699 014236 010137 004350
4700 014242 112302
4701 014244 042702 177400
4702 014250 060237 004350
4703 014254 110237 004377
4704
4705 014260 112302
4706 014262 042702 177400
4707 014266 060237 004350
4708 014272 110237 004376
4709 014276 112302
4710 014300 042702 177400
4711 014304 060237 004350
4712
4713
4714 014310 013777 004376 167762
4715 014316 111302
4716 014320 042702 177400
4717 014324 052702 000400
4718 014330 010277 167746
4719 014334 000240
4720 014336 017737 167740 004366
4721 014344 032737 034000 004366
4722 014352 001402
4723 014354 012705 000001

```

: *      : ENDDO
: *      : ENDSUB
: *      : SIO
: *****
: *SUBROUTINE INPUT/OUTPUT
:-----
: *      INPUT:
: *      BINBUF  CONTAINING THE LOAD MODULE FOR THE TEST TO BE WRITTEN
: *      ERRCOD  ERROR CODE SET TO 0
: *
: *      OUTPUT:
: *      ERRCOD  ERROR CODE - AS FOLLOWS
: *                  =00-IF NO ERROR DETECTED
: *                  =01-IF AN TM78 MP STATUS ERROR
: *                      WAS DETECTED
: *                  =03-IF A CHECK SUM ERROR
: *                      WAS DETECTED
: *
: *      STAT80  TM78 MP STATUS FOR ERROR CODE 01
: *
: S
: *****
WRITE:  MOV    #BUFER,R3      ;GET THE BUFFER ADDRESS
WRIT:   MOVB   (R3)+,R1      ;GET THE BYTE COUNT FOR THIS RECORD
        BIC    #177400,R1    ;REMOVE ANY SIGN EXTENSION BITS
WRITE0: TST    ERRCOD        ;IS THE ERROR CODE ZERO?
        BNE   WRITEX        ;NO- EXIT THE MODULE
        TST   R1            ;YES- IS THE BYTE COUNT ZERO?
        BNE   WRITE1        ;NO- CONTINUE TO LOAD
WRITE1: RTS    PC           ;YES- EXIT THE MODULE
:
WRITE1: MOV    R1,CHKSUM      ;LOAD THE CHECK SUM WITH THE BYTE COUNT
        MOVB  (R3)+,R2      ;GET THE HO WCS ADDRESS BYTE
        BIC   #177400,R2    ;REMOVE ANY SIGN EXTENTION BITS
        ADD   R2,CHKSUM     ;ADD HO WCS ADDRESS BYTE TO THE CHKSUM
        MOVB  R2,HIAD80     ;STORE IN THE TEMP HO WCS ADDRESS
:
        MOVB  (R3)+,R2      ;GET THE LO WCS ADDRESS BYTE
        BIC   #177400,R2    ;REMOVE ANY SIGN EXTENTION BITS
        ADD   R2,CHKSUM     ;ADD LO WCS ADDRESS BYTE TO THE CHKSUM
        MOVB  R2,LOAD80     ;STORE IN THE TEMP LO WCS ADDRESS
        MOVB  (R3)+,R2      ;GET THE "DUMMY" BYTE IN THE RECORD
        BIC   #177400,R2    ;REMOVE ANY SIGN EXTENTION BITS
        ADD   R2,CHKSUM     ;ADD THE "DUMMY" BYTE TO THE CHKSUM
:
: R3 NOW POINTS TO THE FIRST DATA BYTE
WRITE2: MOV    LOAD80,@AD80   ;LOAD THE TM78 MP WCS ADDRESS
        MOVB  (R3),R2        ;LOAD THE TM78 MP WCS DATA BYTE
        BIC   #177400,R2    ;REMOVE ANY SIGN EXTENTION BITS
        BIS   #HOLD,R2
        MOV   R2,@DS80
        NOP
        MOV   @DS80,STAT80  ;GET THE TM78 MP STATUS
        BIT   #HLDSTA,STAT80 ;IS THERE A STATUS ERROR?
        BEQ  WRITE3         ;NO- CONTINUE
        MOV   #01.,ERRCOD   ;YES- LOAD THE STATUS ERROR CODE

```



```
4724 014360 112302 WRITE3: MOVB (R3)+,R2 ;GET THE DATA BYTE
4725 014362 042702 177400 BIC #177400,R2 ;REMOVE ANY SIGN EXTENTION BITS
4726 014366 060237 004350 ADD R2,CHKSUM ;ADD THE DATA BYTE TO THE CHKSUM
4727 ;
4728 014372 062737 000001 004376 ADD #1,LOAD80 ;INCREMENT THE TM78 MP WCS ADDRESS
4729 014400 005301 DEC R1 ;DECREMENT THE BYTE COUNT
4730 014402 001342 BNE WRITE2 ;CONTINUE IF NOT ZERO
4731 014404 112302 MOVB (R3)+,R2 ;GET THE CHKSUM BYTE FROM THE INPUT
4732 ;RECORD
4733 014406 042702 177400 BIC #177400,R2 ;REMOVE ANY SIGN EXTENTION BITS
4734 014412 060237 004350 ADD R2,CHKSUM ;ADD THE CHKSUM BYTE FROM THE RECORD
4735 ;TO THE CHKSUM CALCULATED
4736 014416 105737 004350 TSTB CHKSUM ;IS THE CHKSUM RESULT ZERO?
4737 014422 001675 BEQ WRIT ;YES- GET NEXT BYTE COUNT
4738 014424 012705 000003 MOV #03,ERRCOD ;NO- CHECK SUM ERROR
4739 014430 000675 BR WRIT0 ;
4740 ;
4741 014432 .SBTTL MODULE 2.1.2.3 - COMP
(1) SSUB
(1) ;*****
(1) ;*SUBROUTINE TITLE
4742 ;*-----
4743 014432 ;*MODULE 2.1.2.3 VERIFY TM78 MP WCS WITH WRITTEN
(1) SP
(1) ;*****
(1) ;*PROCEDURE
(1) ;*-----
4744 ;*BGNSUB
4745 ;* GET THE BYTE COUNT FOR THE RECORD FROM THE BINARY TEST FILE
4746 ;* BGND0
4747 ;* : DO WHILE THE ERROR CODE=0 AND THE BYTE COUNT NOT=0
4748 ;* : GET THE HIGH ORDER BYTE OF THE TM78 MP WCS ADDRESS FROM THE RECORD
4749 ;* : GET THE LOW ORDER BYTE OF THE TM78 MP WCS ADDRESS FROM THE RECORD
4750 ;* : SKIP OVER THE UNUSED BYTE IN THE RECORD
4751 ;* : BGND0
4752 ;* : : LOAD THE TM78 MP WCS ADDRESS INTO CAS REGISTER 20
4753 ;* : : READ THE TM78 MP DATA FROM CAS REGISTER 21
4754 ;* : : IF TM78 MP STATUS ERROR
4755 ;* : : : THEN-LOAD ERROR CODE 01
4756 ;* : : : ELSE-CONTINUE
4757 ;* : : : IF DATA BYTE EQUAL
4758 ;* : : : : THEN-INCREMENT THE TM78 MP WCS ADDRESS
4759 ;* : : : : -DECREMENT THE BYTE COUNT
4760 ;* : : : : ELSE-STORE THE EXPECTED DATA BYTE
4761 ;* : : : : -STORE THE ACTUAL DATA BYTE
4762 ;* : : : : -LOAD ERROR CODE 04
4763 ;* : : : : ENDIF
4764 ;* : : : : ENDIF
4765 ;* : : : DO UNTIL THE BYTE COUNT IS DECREMENTED TO 0 OR ERROR CODE NOT = 0
4766 ;* : : : ENDDO
4767 ;* : : IF ERROR CODE = ZERO
4768 ;* : : : THEN-GET THE BYTE COUNT OF THE NEXT RECORD
4769 ;* : : : ELSE-CONTINUE
4770 ;* : : : ENDIF
4771 ;* : : ENDDO
4772 ;*ENDSUB
4773 014432 SIO
```

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4794 014432
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4795 014432 012703 021666
4796 014436 112301
4797 014440 042701 177400
4798
4799 014444 005705
4800 014446 001002
4801 014450 005701
4802 014452 001001
4803 014454 000207
4804
4805 014456 112337 004377
4806 014462 112337 004376
4807 014466 105723
4808
4809 014470 013777 004376 167602
4810 014476 017737 167600 004366
4811 014504 032737 034000 004366
4812 014512 001403
4813 014514 012705 000001
4814 014520 000755
4815
4816 014522 122337 004366
4817 014526 001410
4818 014530 114337 004372
4819 014534 113737 004366 004370
4820 014542 012705 000004
4821 014546 000742
4822
4823 014550 062737 000001 004376
4824 014556 005301
4825 014560 001343
```

```
*****
*SUBROUTINE INPUT/OUTPUT
*****
*
* INPUT:
* BINBUF CONTAINING THE LOAD MODULE FOR THE TEST BEING VERIFIED
* ERRCOD ERROR CODE SET TO 0
*
* OUTPUT:
* ERRCOD ERROR CODE - AS FOLLOWS
* =00 - NO ERROR DETECTED
* =01 - IF AN TM78 MP STATUS ERROR
* WAS DETECTED
* =04 - IF A WCS COMPARE ERROR
* WAS DETECTED
*
* STAT80 TM78 MP STATUS FOR ERROR CODE 01 AND FAILING DATA BYTE
* FOR ERROR CODE 04.
*
* ADATA CONTAINS THE ACTUAL DATA BYTE ON COMPARE ERROR
*
* EDATA CONTAINS THE EXPECTED DATA BYTE ON COMPARE ERROR
*
S
*****
COMP: MOV #BUFFER,R3 ;GET THE BUFFER ADDRESS
COMPO: MOVB (R3)+,R1 ;GET THE BYTE COUNT FOR THE RECORD
BIC #177400,R1 ;REMOVE ANY SIGN EXTENTION BITS
;
; IS THE ERROR CODE ZERO?
TST ERRCOD ;NO -EXIT THE MODULE
BNE COMPEX ;YES - IS THE BYTE COUNT ZERO?
TST R1 ;NO - CONTINUE WITH COMPARE
BNE COMP1 ;YES -EXIT THE MODULE
COMPEX: RTS PC
;
; GET THE HO WCS ADDRESS BYTE
COMP1: MOVB (R3)+,HIAD80 ;GET THE LO WCS ADDRESS BYTE
MOVB (R3)+,LOAD80 ;SKIP OVER THE UNUSED BYTE
TSTB (R3)+
;
; LOAD THE TM78 MP WCS ADDRESS
COMP2: MOV LOAD80,@AD80 ;GET THE TM78 MP DATA/STATUS WORD
MOV @DS80,STAT80 ;IS THERE A STATUS ERROR?
BIT #HLDSTA,STAT80 ;NO - CHECK THE DATA
BEQ COMP3 ;YES - LOAD THE ERROR CODE
MOV #01,,ERRCOD ;EXIT THE MODULE
BR COMPEX
;
; IS THE DATA VALID?
COMP3: CMPB (R3)+,STAT80 ;YES - PROCEED
BEQ COMP4 ;SAVE THE EXPECTED DATA
MOVB -(R3),EDATA ;SAVE THE ACTUAL DATA
MOV STAT80,ADATA ;NO - LOAD THE ERROR CODE
MOV #04,,ERRCOD ;EXIT THE MODULE
BR COMPEX
;
; INCREMENT THE TM78 MP WCS ADDRESS
COMP4: ADD #1,LOAD80 ;DECREMENT THE BYTE COUNT
DEC R1 ;CONTINUE COMPARE IF NOT ZERO
BNE COMP2
```

4826 014562 105723
4827 014564 000724
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4829 014566
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4831 014566
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4852 014566
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(1)
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4868 014566
(1)
4869 014566 052777 000040 167444
4870 014574
4871 014624 013777 004352 167406

```
TSTB (R3)+ ;SKIP OVER THE CHECKSUM BYTE
BR COMPO
.SBTTL MODULE 2.1.2.4 - START
SSUB
*****
*SUBROUTINE TITLE
-----
*MODULE 2.1.2.4 START TM78 MP DIAGNOSTIC MONITOR
SP
*****
*PROCEDURE
-----
*BGNSUB
* ISSUE MASS BUS INIT
* WAIT 10 MILLISECONDS
* IF TM78 MP STATUS ERROR
* : THEN-LOAD ERROR CODE 01
* : -EXIT SUBROUTINE
* ELSE-
* : IF TM READY RESET
* : : THEN-LOAD ERROR CODE 05
* : : -EXIT SUBROUTINE
* : : ELSE-ISSUE FUNCTION CODE 37 TO TM78
* : : -WAIT 10 MILLISECONDS
* : : IF COMMAND GO BIT=0
* : : : THEN-CONTINUE
* : : : ELSE-LOAD ERROR CODE 06
* : : : -EXIT SUBROUTINE
* : : ENDIF
* : ENDIF
* ENDIF
* ENDSUB
SIO
*****
*SUBROUTINE INPUT/OUTPUT
-----
* INPUT:
* ERRCOD ERROR CODE SET TO 0
* OUTPUT:
* ERRCOD ERROR CODE SET AS FOLLOWS
* =00 IF NO ERROR DETECTED
* =01-IF AN TM78 MP STATUS ERROR
* WAS DETECTED
* =05-IF TM READY IS NOT ACTIVE
* AFTER A 10 MS. TIMEOUT
* =06-DIAGNOSTIC MONITOR NOT READY
* AFTER ISSUEING
* CODE 37 AND A TIMEOUT
* STAT80
S
*****
START: BIS #MBINIT,@CS2 ;START THE TM78
DELAY 50 ;PERFORM A 5 MILLISECOND TIMEOUT
MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS PORT NUMBER
```

```
4872
4873 014632 017737 167444 004366      MOV    @DS80,STAT80      ;GET THE TM78 MP STATUS
4874 014640 032737 035400 004366      BIT    #CLRSTA,STAT80   ;IS THERE A STATUS ERROR
4875 014646 001403                BEQ    START1           ;NO - CONTINUE
4876 014650 012705 000001                MOV    #01.,ERRCOD     ;YES - LOAD THE ERROR CODE
4877 014654 000436                BR     STAREX          ;EXIT THE MODULE
4878 014656 032737 100000 004366  START1: BIT    #TMRDY,STAT80 ;IS TM READY ACTIVE
4879 014664 001003                BNE    START2         ;YES - GO START THE DIAGNOSTIC MONITER
4880 014666 012705 000005                MOV    #05.,ERRCOD     ;NO - LOAD THE ERROR CODE
4881 014672 000427                BR     STAREX          ;EXIT THE MODULE
4882 014674 005077 167342                START2: CLR @XFRINT     ;CLEAR THE DATA TRANSFER INTERRUPT CODE
4883 014700 012777 000037 167322                MOV    #DIGMON,@XFRCMD ;ISSUE CODE 37
4884
4885 014706                DELAY 100              ;PERFORM A 100 MILLISECOND TIMEOUT
4886
4887 014736 032777 000001 167264                BIT    #1,@XFRCMD      ;TEST FOR CODE ACCEPTED
4888 014744 001402                BEQ    STAREX          ;YES - EXIT THE MODULE
4889 014746 012705 000006                MOV    #06.,ERRCOD     ;NO - LOAD THE ERROR CODE
4890 014752 012777 000377 167266  STAREX: MOV    #377,@AS ;CLEAR THE ATTENTION INTERRUPT
4891 014760 000207                RTS     PC              ;MODULE EXIT
4892
4893 014762 005005                DIAGST: CLR    ERRCOD   ;CLEAR THE ERROR CODE
4894 014764 004737 014566                CALL   START          ;START THE TM78
4895 014770 005705                TST    ERRCOD         ;ANY START ERRORS
4896 014772 001402                BEQ    1$             ;NO EXIT
4897 014774 004737 015340                CALL   SYSERR         ;GO LOG THE ERROR
4898 015000 000207                1$:    RTS     PC      ;RETURN TO THE USER
4899
4900 015002                .SBTTL MODULE 2.1.2.5 - LDMOD
4901 (1)                SSUB
4902 (1)                ;*****
4903 (1)                ;*SUBROUTINE TITLE
4904 (1)                ;*-----
4905 015002                ;*MODULE 2.1.2.5          PACK TM78 MP LOAD MODULE FROM THE LOAD MEDIA
4906 (1)                ;*
4907 (1)                ;*PROCEDURE
4908 (1)                ;*-----
4909 015002                ;*BGNSUB
4910 015002                ;* BGND0
4911 015002                ;* : CALL SUBROUTINE READ
4912 015002                ;* : IF ERROR CODE=0
4913 015002                ;* : : THEN-CONTINUE
4914 015002                ;* : : ELSE-IF ERROR CODE=14(8)
4915 015002                ;* : : : THEN-CLEAR ERROR CODE
4916 015002                ;* : : : INCREMENT THE END OF FILE FLAG
4917 015002                ;* : : : EXIT SUBROUTINE
4918 015002                ;* : : : ELSE-EXIT SUBROUTINE
4919 015002                ;* : : : ENDIF
4920 015002                ;* : : ENDIF
4921 015002                ;* : DO UNTIL CHARACTER READ=:
4922 015002                ;* ENDDO
4923 015002                ;* CLEAR BUFFER POINTER
4924 015002                ;* CLEAR RIGHT/LEFT NIBBLE FLAG
4925 015002                ;* BGND0
4926 015002                ;* : CALL SUBROUTINE READ
4927 015002                ;* : IF ERROR CODE=0
```

```

4922 : * : : THEN-CONTINUE
4923 : * : : ELSE-EXIT SUBROUTINE
4924 : * : : ENDF
4925 : * : : IF CHARACTER=0-9 OR A-F
4926 : * : : THEN-SAVE LEAST SIGNIFICANT 4 BITS
4927 : * : : IF RIGHT/LEFT FLAG=0
4928 : * : : THEN-SHIFT THE 4 LS BITS LEFT 4
4929 : * : : SET THE RIGHT/LEFT FLAG
4930 : * : : ELSE-OR THE 4 BITS WITH 4 PREVIOUS BITS
4931 : * : : CLEAR THE RIGHT/LEFT FLAG
4932 : * : : SAVE THE COMPLETED BYTE IN THE BUFFER
4933 : * : : INCREMENT THE BUFFER POINTER
4934 : * : : ENDF
4935 : * : : ELSE-CONTINUE
4936 : * : : ENDF
4937 : * : : DO UNTIL CHARACTER=$ OR BUFFER POINTER=MAXIMUM
4938 : * : : ENDDO
4939 : * : : IF BUFFER POINTER=MAX
4940 : * : : THEN-LOAD ERROR CODE 17(8)
4941 : * : : ELSE-CONTINUE
4942 : * : : ENDF
4943 : * : : *ENDSUB

```

015002

(1)
(1)
(1)

SIO

*SUBROUTINE INPUT/OUTPUT

```

4945 : * : : INPUT:
4946 : * : : EOF      END OF FILE FLAG SET TO ZERO
4947 : * : :
4948 : * : : ERRCOD   ERROR CODE SET TO ZERO
4949 : * : :
4950 : * : : OUTPUT:
4951 : * : :
4952 : * : : ERRCOD   ERROR CODE SET AS FOLLOWS:
4953 : * : :
4954 : * : :
4955 : * : :           =0 - NO ERROR DETECTED
4956 : * : :           =014 - UNEXPECTED EOF
4957 : * : :           =015 - DISK ACCESS ERROR
4958 : * : :           =017 - BINARY BUFFER FULL

```

015002

(1)

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4959 : * : : S
4960 : * : : *****
4960 : * : : LDMOD: JSR      PC,READ      ;READ A CHARACTER
4961 : * : :         TST      ERRCOD      ;READ ERROR?
4962 : * : :         BEQ      LDMOD1      ;YES-EXIT LOOP
4963 : * : :         CMP      #14,ERRCOD
4964 : * : :         BNE      LDMOD2
4965 : * : :         CLR      ERRCOD
4966 : * : :         INC      EOF
4967 : * : :         BR       LMODEX
4968 : * : : LDMOD1: CMPB    CHAR,#' : ;NO-CHARACTER=?
4969 : * : :         BNE      LDMOD      ;NO-CONTINUE
4970 : * : :
4971 : * : : LDMOD2: TST      ERRCOD      ;ERROR?
4972 : * : :         BNE      LMODEX      ;YES-EXIT THE MODULE
4973 : * : :

```

4974	015044	005004		LDMOD3: CLR	R4	:CLEAR BUFFER POINTER
4975	015046	005003			R3	:CLEAR NIBBLE FLAG
4976						:
4977	015050	004737	015524	LDMOD4: JSR	PC,READ	:READ A CHARACTER
4978	015054	005705			ERRCOD	:READ ERROR?
4979	015056	001051			LINDEX	:YES-EXIT THE LOOP
4980	015060	113702	004344		CHAR,R2	:GET THE CHARACTER
4981	015064	120227	000060		R2,#'0	:IS THE CHARACTER <0?
4982	015070	100433			LDMOD8	:YES - BAD CHARACTER - DO NOT PROCESS
4983	015072	120227	000072		R2,#':	:NO - IS THE CHARACTER 0-9?
4984	015076	100410			LDMOD6	:YES - VALID CHARACTER
4985	015100	120227	000101		R2,#'A	:NO - IS THE CHARACTER <A?
4986	015104	100425			LDMOD8	:YES - BAD CHARACTER - DO NOT PROCESS
4987	015106	120227	000107		R2,#'G	:NO - IS THE CHARACTER A-F?
4988	015112	100022			LDMOD8	:NO - BAD CHARACTER - DO NOT PROCESS
4989	015114	062702	000011		#11,R2	:ADD THE ALPHA CAHRACTER CONVERSION FACTOR
4990						:
4991	015120	042702	177760	LDMOD6: BIC	#177760,R2	:REMOVE JUNK BITS
4992	015124	005703			R3	:TEST THE NIBBLE PACK FLAG
4993	015126	001007			LDMOD7	:NON-ZERO - PACK THE LOW NIBBLE
4994	015130	006302			R2	:PACK THE HIGH NIBBLE
4995	015132	006302			R2	
4996	015134	006302			R2	
4997	015136	006302			R2	
4998	015140	110201			R2,R1	:STORE THE BYTE FOR NEXT PASS
4999	015142	005203			R3	:SET THE LOW NIBBLE INDICATOR
5000	015144	000405			LDMOD8	:CONTINUE
5001						:
5002	015146	050201		LDMOD7: BIS	R2,R1	:FORM THE FINAL BYTE
5003	015150	110164	021666		R1,BUFER(R4)	:STORE THE BYTE IN THE LOAD MODULE
5004	015154	005204			R4	:INC. THE LOAD MODULE BYTE POINTER
5005	015156	005003			R3	:SET THE HIGH NIBBLE INDICATOR
5006						:
5007	015160	123727	004344 000044	LDMOD8: CMPB	CHAR,#'\$:CHARACTER=\$?
5008	015166	001405			LINDEX	:YES-EXIT THE MODULE
5009	015170	020427	010050		R4,#BUFEND-BUFER	:NO-END OF BUFFER?
5010	015174	001325			LDMOD4	:NO-CONTINUE
5011	015176	012705	000017		#17,ERRCOD	:YES-QUEUE THE BINARY BUFFER FULL ERROR
5012	015202	000207		LMODEX: RTS	PC	:RETURN TO CALLING MODULE
5013						:
5014						:
5015						:
5016				.SBTTL	MODULE 2.1.2.6 - MESS	
5017	015204			SSUB		
(1)				:	*****	
(1)				:	*SUBROUTINE TITLE	
(1)				:	-----	
5018				:	*MODULE 2.1.2.6	LOAD THE MESSAGE MODULE
5019	015204			SP		
(1)				:	*****	
(1)				:	*PROCEDURE	
(1)				:	-----	
5020				:	*BGNSUB	
5021				:	* CLEAR MESSAGE BUFFER POINTER	
5022				:	* BGND0	
5023				:	* : CALL SUBROUTINE 'READ'	

```
5024 : * : IF ERROR CODE=ZERO
5025 : * : : THEN-CONTINUE
5026 : * : : ELSE-EXIT SUBROUTINE
5027 : * : : ENDF
5028 : * : DO UNTIL CHARACTER READ=% OR !
5029 : * ENDDO
5030 : * STORE THE % OF ! IN THE MESSAGE BUFFER
5031 : * INCREMENT THE MESSAGE BUFFER POINTER
5032 : * BGNDO
5033 : * : CALL SUBROUTINE "READ"
5034 : * : IF ERROR CODE=ZERO
5035 : * : : THEN-CONTINUE
5036 : * : : ELSE-EXIT SUBROUTINE
5037 : * : : ENDF
5038 : * : IF CHARACTER = TAB
5039 : * : : THEN - REPLACE THE TAB WITH A SPACE
5040 : * : : ELSE - CONTINUE
5041 : * : : ENDF
5042 : * : STORE THE CHARACTER IN THE MESSAGE BUFFER
5043 : * : INCREMENT THE MESSAGE BUFFER POINTER
5044 : * : IF CHARACTER STORED WAS A LINE FEED
5045 : * : : THEN-STORE A ZERO IN THE MESSAGE BUFFER
5046 : * : : -INCREMENT THE MESSAGE BUFFER POINTER
5047 : * : : ELSE-CONTINUE
5048 : * : : ENDF
5049 : * : DO UNTIL BUFFER POINTER=MAX OR CHARACTER=$
5050 : * ENDDO
5051 : * IF BUFFER POINTER=MAX
5052 : * : THEN-LOAD ERROR CODE 16
5053 : * : ELSE-CONTINUE
5054 : * : ENDF
5055 : * ENDSUB
5056 015204 SIO
5057 : * *****
5058 : * SUBROUTINE INPUT/OUTPUT
5059 : * -----
5060 : * INPUT:
5061 : * ERRCOD ERROR CODE EQUAL TO ZERO
5062 : * OUTPUT:
5063 : * ERRCOD ERROR CODE AS FOLLOWS:
5064 : * =0 - NO ERROR DETECTED
5065 : * =14 - UNEXPECTED EOF
5066 : * =15 - DISK ACCESS ERROR
5067 : * =16 - MESSAGE BUFFER FULL
5068 : *
5069 : *
5070 015204 S
5071 : * *****
5072 015204 005004 MESS: CLR R4 ;CLEAR THE MESSAGE BUFFER PTR
5073
5074 015206 004737 015524 MESS1: JSR PC,READ ;READ A CHARACTER
5075 015212 005705 TST ERRCOD ;READ ERROR?
```

```

5076 015214 001050      BNE    MESSEX      ;YES-EXIT THE MODULE
5077 015216 123727 004344 000073    CMPB   CHAR,#';    ;NO-IS IT A ;?
5078 015224 001370      BNE    MESS1       ;NO-KEEP LOOKING
5079 015226 113764 004344 021666    MOVB   CHAR,BUFER(R4) ;STORE THE CHARACTER
5080 015234 005204      INC    R4          ;BUMP THE BUFFER POINTER
5081
5082 015236 004737 015524    MESS3: JSR    PC,READ ;GET A CHARACTER
5083 015242 005705      TST    ERRCOD      ;READ ERROR?
5084 015244 001034      BNE    MESSEX      ;YES-EXIT THE MODULE
5085 015246 123727 004344 000011    CMPB   CHAR,#TAB   ;IS THE CHARACTER A TAB
5086 015254 001003      BNE    MESS2       ;NO - CONTINUE
5087 015256 112737 000040 004344    MOVB   #SPACE,CHAR ;YES - REPLACE IT WITH A SPACE
5088 015264 113764 004344 021666    MESS2: MOVB   CHAR,BUFER(R4) ;NO-STORE THE CHARACTER
5089 015272 005204      INC    R4          ;INCREMENT THE BUFFER POINTER
5090 015274 123727 004344 000012    CMPB   CHAR,#LF    ;IS IT A LF?
5091 015302 001004      BNE    MESS4       ;NO-CONTINUE
5092 015304 112764 000000 021666    MOVB   #0,BUFER(R4) ;YES-STORE A LINE TERMINATOR
5093 015312 005204      INC    R4          ;INCREMENT THE BUFFER POINTER
5094 015314 123727 004344 000044    MESS4: CMPB   CHAR,#'$ ;CHARACTER=$?
5095 015322 001405      BEQ    MESSEX      ;YES-EXIT
5096 015324 020427 010046    CMP    R4,#BUFEND-BUFER-2 ;NO-END OF BUFFER?
5097 015330 003742      BLE    MESS3       ;NO-CONTINUE
5098
5099 015332 012705 000016    MOV    #16,ERRCOD ;YES-QUEUE THE ERROR
5100 015336 000207      MESSEX: RTS   PC   ;LOAD-END OF MESSAGE BUFFER AREA ERROR
5101
5102      .SBTTL  MODULE 2.1.2.7 - SYSERR
5103 015340    SSUB
5104      (1)
5105      (1)
5106      (1)
5107      (1)
5108      (1)
5109      (1)
5110      (1)
5111      (1)
5112      (1)
5113      (1)
5114 015340    SIO
5115      (1)
5116      (1)
5117      (1)
5118      (1)
5119 015340    S
5120 015340 010501      SYSERR: MOV    ERRCOD,R1 ;GET THE ERROR CODE
5121 015342 010137 015400    MOV    R1,SYSERM+2 ;PUT THE ERROR NUMBER IN THE MESSAGE

```



```
5122 015346 020127 000022          CMP      R1,#HEDMPE-HEDJMP/#2  ;VALID MESSAGE NUMBER?
5123 015352 003402                BLE      1$                    ;YES - CONTINUE
5124 015354 000137 033524          2$:    JMP      SERFAL          ;NO - ERROR
5125 015360 006301                1$:    ASL      R1              ;MULTIPLY BY 2
5126 015362 016137 015410 015402    MOV     HEDJMP(R1),SYSERM+4    ;PUT THE HEADER MESSAGE IN THE ERROR
5127 015370 016137 015456 015404    MOV     MSGJMP(R1),SYSERM+6    ;PUT THE MESSAGE IN THE ERROR
5128 015376                SYSERM: ERRSF 1.,HEAD1,MSG001
5129 015406 000207                RTS      PC                    ;RETURN
5130
5131 015410 000000          HEDJMP: .WORD 0                ;DUMMY TABLE ENTRY
5132 015412 033536                .WORD  HEAD1                  ;ERROR 01 HEADING VECTOR
5133 015414 033536                .WORD  HEAD1                  ;ERROR 02 HEADING VECTOR
5134 015416 033536                .WORD  HEAD1                  ;ERROR 03 HEADING VECTOR
5135 015420 033536                .WORD  HEAD1                  ;ERROR 04 HEADING VECTOR
5136 015422 033536                .WORD  HEAD1                  ;ERROR 05 HEADING VECTOR
5137 015424 033536                .WORD  HEAD1                  ;ERROR 06 HEADING VECTOR
5138 015426 033574                .WORD  HEAD2                  ;ERROR 07 HEADING VECTOR
5139 015430 033574                .WORD  HEAD2                  ;ERROR 08 HEADING VECTOR
5140 015432 033574                .WORD  HEAD2                  ;ERROR 09 HEADING VECTOR
5141 015434 033634                .WORD  HEAD3                  ;ERROR 10 HEADING VECTOR
5142 015436 033634                .WORD  HEAD3                  ;ERROR 11 HEADING VECTOR
5143 015440 033634                .WORD  HEAD3                  ;ERROR 12 HEADING VECTOR
5144 015442 033634                .WORD  HEAD3                  ;ERROR 13 HEADING VECTOR
5145 015444 033634                .WORD  HEAD3                  ;ERROR 14 HEADING VECTOR
5146 015446 033634                .WORD  HEAD3                  ;ERROR 15 HEADING VECTOR
5147 015450 033574                .WORD  HEAD2                  ;ERROR 16 HEADING VECTOR
5148 015452 033574                .WORD  HEAD2                  ;ERROR 17 HEADING VECTOR
5149 015454 033574          HEDMPE: .WORD  HEAD2          ;ERROR 18 HEADING VECTOR
5150
5151 015456 000000          MSGJMP: .WORD 0                ;DUMMY TABLE ENTRY
5152 015460 033674                .WORD  MSG001                 ;ERROR 01 MESSAGE VECTOR
5153 015462 034034                .WORD  MSG002                 ;ERROR 02 MESSAGE VECTOR
5154 015464 034132                .WORD  MSG003                 ;ERROR 03 MESSAGE VECTOR
5155 015466 034204                .WORD  MSG004                 ;ERROR 04 MESSAGE VECTOR
5156 015470 034426                .WORD  MSG005                 ;ERROR 05 MESSAGE VECTOR
5157 015472 034544                .WORD  MSG006                 ;ERROR 06 MESSAGE VECTOR
5158 015474 034632                .WORD  MSG007                 ;ERROR 07 MESSAGE VECTOR
5159 015476 034716                .WORD  MSG008                 ;ERROR 08 MESSAGE VECTOR
5160 015500 035004                .WORD  MSG009                 ;ERROR 09 MESSAGE VECTOR
5161 015502 035056                .WORD  MSG010                 ;ERROR 10 MESSAGE VECTOR
5162 015504 035124                .WORD  MSG011                 ;ERROR 11 MESSAGE VECTOR
5163 015506 035210                .WORD  MSG012                 ;ERROR 12 MESSAGE VECTOR
5164 015510 035272                .WORD  MSG013                 ;ERROR 13 MESSAGE VECTOR
5165 015512 035346                .WORD  MSG014                 ;ERROR 14 MESSAGE VECTOR
5166 015514 035420                .WORD  MSG015                 ;ERROR 15 MESSAGE VECTOR
5167 015516 035472                .WORD  MSG016                 ;ERROR 16 MESSAGE VECTOR
5168 015520 035544                .WORD  MSG017                 ;ERROR 17 MESSAGE VECTOR
5169 015522 035616                .WORD  MSG018                 ;ERROR 18 MESSAGE VECTOR
5170
5171
5172
5173 015524          .SBTTL  MODULE 2.1.2.5.1 - READ
          SSUB
          ; *****
          ; *SUBROUTINE TITLE
          ; -----
          ; *MODULE 2.1.2.5.1      READ A CHARACTER
```

(1)
(1)
(1)
5174

5175 015524
(1)
(1)
(1)
5176
5177
5178
5179
5180
5181
5182
5183 015524

```
SP
: *****
: *PROCEDURE
: *-----
: *BGNSUB
: * ISSUE GET BYTE CALL TO THE DIAGNOSTIC SUPERVISOR
: * IF END OF FILE
: * : THEN - LOAD ERROR CODE 14(8)
: * : ELSE - CONTINUE
: * ENDIF
: *ENDSUB
```

(1)
(1)
(1)
5184
5185
5186
5187
5188
5189
5190
5191
5192
5193
5194
5195
5196
5197
5198
5199 015524

```
SIO
: *****
: *SUBROUTINE INPUT/OUTPUT
: *-----
: *
: * INPUT:
: * ERRCOD ERROR CODE EQUAL TO ZERO
: *
: * OUTPUT:
: *
: * CHAR THE CHARACTER FROM THE DISK
: *
: * ERRCOD SET AS FOLLOWS:
: *
: * =0 - IF NO ERROR DETECTED
: * =14 - IF NO MORE DATA AVAILABLE END OF FILE
: * DETECTED
: * =15 - IF DISK ACCESS ERROR DETECTED
: *
: *
: S
: *****
```

(1)
5200
5201 015524
5202 015532
5203 015534 012705 000014
5204 015540 000207
5205 015542 005005
5206 015544 000207
5207 015546 005003
5208 015550 000402
5209 015552 012703 000001
5210 015556 005005
5211 015560 004737 021660
5212 015564 004737 013730
5213 015570 005705
5214 015572 001100
5215 015574 004737 015524
5216 015600 005705
5217 015602 001065
5218 015604 123727 004344 000133
5219 015612 001370
5220 015614 004737 015524
5221 015620 005705
5222 015622 001055
5223 015624 123727 004344 000133

```
READ: GETBYTE CHAR ;REQUEST A BYTE FROM THE SUPERVISOR
BCOMPLETE 1$ ;IF NOT END OF FILE CONTINUE
MOV #14,ERRCOD ;IF END OF FILE LOAD THE ERROR CODE
RTS PC ;RETURN TO CALLING MODULE
1$: CLR ERRCOD ;CLEAR THE ERROR CODE
RTS PC ;RETURN TO CALLING MODULE
DIRSRC: CLR R3 ;SET THE SEARCH FLAG
BR DIR1 ;CONTINUE
DIRLST: MOV #1,R3 ;SET THE DIRECTORY LIST FLAG
DIR1: CLR ERRCOD ;CLEAR THE ERROR CODE
CALL CLOSEX ;CLOSE THE FILE
CALL OPENX ;OPEN THE DESIRED FILE
TST ERRCOD ;OPEN ERROR?
BNE DIREX ;YES - LOG THE ERROR
6$: CALL READ ;GET A CHARACTER FROM THE OPEN FILE
TST ERRCOD ;READ ERROR?
BNE DIRERR ;YES - LOG THE ERROR
CMPB CHAR,#'[' ;IS THE CHARACTER A [
BNE 6$ ;NO - KEEP ON LOOKING
1$: CALL READ ;GET A CHARACTER FROM THE OPEN FILE
TST ERRCOD ;READ ERROR?
BNE DIRERR ;YES - LOG THE ERROR
CMPB CHAR,#'[' ;IS THE CHARACTER A [
```

```
5224 015632 001370      BNE      1$      ;NO - KEEP ON LOOKING
5225 015634 005703      TST      R3      ;SEARCH ?
5226 015636 001004      BNE      5$      ;NO - DIRECTORY
5227 015640 005337 004406  DEC      SEQNUM  ;DECREMENT THE SEQUENCE NUMBER
5228 015644 001453      BEQ      DIREX   ;EXIT IF FOUND
5229 015646 000762      BR       1$      ;CONTINUE IF NOT
5230 015650 005037 015776  5$:     CLR      NAME   ;CLEAR THE PROGRAM NAME
5231 015654 005037 016000      CLR      NAME+2
5232 015660 005037 016002      CLR      NAME+4
5233 015664 005002      CLR      R2      ;CLEAR THE CHARACTER COUNTER
5234 015666 004737 015524  2$:     CALL     READ   ;READ A CHARACTER FROM THE OPER FILE
5235 015672 123727 004344 000135  CMPB    CHAR,#'] ;IS THE CHARACTER A ]?
5236 015700 001407      BEQ      4$      ;YES - END OF THE PROGRAM NAME
5237 015702 113762 004344 015776  MOVB    CHAR,NAME(R2) ;SAVE THE CHARACTER
5238 015710 005202      INC      R2      ;UPDATE THE CHARACTER COUNT
5239 015712 020227 000006  CMP     R2,#6    ;REACHED CHARACTER MAX?
5240 015716 001363      BNE      2$      ;NO - CONTINUE
5241 015720      4$:     PRINTF  #DIRENT,SEQNUM,#NAME
5242 015750 005237 004406      INC      SEQNUM  ;UPDATE THE SEQUENCE NUMBER
5243 015754 000717      BR       1$      ;
5244 015756 020527 000014  DIRERR: CMP     ERRCOD,#14 ;EOF?
5245 015762 001002      BNE      3$      ;NO - ERROR
5246 015764 005005      CLR      ERRCOD  ;EOF IS NOT A ERROR FOR THE ROUTINE
5247 015766 000402      BR       DIREX   ;CONTINUE
5248 015770 004737 015340  3$:     CALL     SYSERR ;LOG THE ERROR
5249 015774 000207  DIREX:  RTS      PC  ;RETURN TO THE USER
5250
5251 015776 000000      NAME:   .WORD   0      ;PROGRAM NAME
5252 016000 000000      .WORD   0
5253 016002 000000      .WORD   0
5254 016004 000000      .WORD   0
5255
5256 016006 047045 040445 042523  DIRHED: .ASCIZ  /%N%ASEQUENCE NUMBER  NAME%/
5257      .EVEN
5258 016044 040445 020040 020040  DIRENT: .ASCIZ  /%A      %02%A      %T%/
5259      016102      .EVEN
5260      .SBTTL  MODULE 2.1.3 - CONTRL
5261 016102  SSUB
(1) ; *****
(1) ; *SUBROUTINE TITLE
(1) ; *-----
5262 ; *MODULE 2.1.3 - TM78 TEST CONTROL MODULE
5263 016102  SP
(1) ; *****
(1) ; *PROCEDURE
(1) ; *-----
5264 ; *BGNSUB
5265 ; * CLEAR THE ERROR CODE
5266 ; * SELECT THE TM78 UNDER TEST
5267 ; * CALL SUBROUTINE DIAGO
5268 ; * IF ERROR CODE=0
5269 ; * : THEN-CONTINUE
5270 ; * : ELSE-CALL SUBROUTINE SYSERR
5271 ; * : EXIT SUBROUTINE
5272 ; * ENDF
5273 ; * BGND0
```

```
5274 : * : CALL SUBROUTINE WAIT
5275 : * : IF ERROR CODE=0
5276 : * : : THEN-CONTINUE
5277 : * : : ELSE-CALL SUBROUTINE SYSERR
5278 : * : : EXIT SUBROUTINE
5279 : * : ENDF
5280 : * : INPUT CAS REGISTER 3 (MICRO TEST # + ERROR #)
5281 : * : IF CAS REGISTER 1=374(8)
5282 : * : : THEN-CALL SUBROUTINE ERR78
5283 : * : : ELSE-CONTINUE
5284 : * : ENDF
5285 : * : IF CAS REGISTER 1=376(8)
5286 : * : : THEN-CALL SUBROUTINE UTIL80
5287 : * : : ELSE-CONTINUE
5288 : * : ENDF
5289 : * : IF CAS REGISTER 1=375(8)
5290 : * : : THEN-DEPOSIT 377(8) CAS REGISTER 0
5291 : * : : DEPOSIT 33(8) CAS REGISTER 0
5292 : * : : ELSE-CONTINUE
5293 : * : ENDF
5294 : * : IF CAS REGISTER 1=373(8)
5295 : * : : THEN-CALL SUBROUTINE QUEUE
5296 : * : : ELSE-CONTINUE
5297 : * : ENDF
5298 : * : IF CAS REGISTER 1=377(8)
5299 : * : : THEN-CALL SUBROUTINE QUEUEM
5300 : * : : ELSE-CONTINUE
5301 : * : ENDF
5302 : * : DO UNTIL CAS REGISTER 1=372(*)
5303 : * ENDDO
5304 : * ENDSUB
5305 016102 SIO
5306 (1) : *****
5307 (1) : *SUBROUTINE INPUT/OUTPUT
5308 (1) : -----
5309 : * INPUT:
5310 : * NO REQUIRED INPUT
5311 : * OUTPUT:
5312 : * ERRCOD ERROR CODE AS FOLLOWS
5313 : * =0- NO CONTROL ERRORS DETECTED
5314 : * >0- CONTROL ERROR OCCURED
5315 : * ABORT THE TEST
5316 016102 S
5317 (1) : *****
5318 016102 005005 CONTRL: CLR ERRCOD ;CLEAR THE ERROR CODE
5319 016104 013777 004352 166126 MOV MBDRIV,@CS2 ;LOAD THE TM78 UNIT NUMBER
5320 016112 004737 016304 JSR PC,DIAGO ;GO START THE TM78 MP TEST LOADED
5321 016116 005705 TST ERRCOD ;DIAGNOSTIC START ERROR
5322 016120 001034 BNE CTLERR ;YES - GO LOG THE ERROR
5323 016122 004737 016424 CONTR1: JSR PC,WAIT ;GO WAIT FOR A TM78 MP-INTERRUPT CODE
5324 016126 005705 TST ERRCOD ;TEST WAIT FAILURE?
5325 016130 001030 BNE CTLERR ;YES - GO LOG THE ERROR
5326 016132 017701 166116 MOV @DI1,R1 ;GET THE DIAG. 1 REGISTER
```

```
5326 016136 110137 004332          MOVB    R1,DIAGTS          ;STORE THE DIAGNOSTIC TEST NUM.
5327 016142 000301                   SWAB    R1                ;SWAP THE BYTES
5328 016144 042701 177700          BIC     #177700,R1        ;LEAVE THE DIAGNOSTIC ERROR NUM.
5329 016150 010137 004334          MOV     R1,DIAGER        ;STORE THE DIAGNOSTIC ERROR NUM.
5330 016154 022737 000374 004364    CMP     #374,DINTCD      ;TM78 MP RUN TIME ERROR?
5331 016162 001003                   BNE     CONTR3           ;NO - CONTINUE
5332 016164 004737 016552          JSR     PC,ERR78         ;YES - GO PROCESS THE ERROR
5333 016170 000754                   BR      CONTR1           ;GO WAIT FOR OTHER EVENTS
5334
5335 016172 022737 000376 004364    CONTR3: CMP    #376,DINTCD ;TM78 MP RUN TIME UTILITY REQUEST?
5336 016200 001007                   BNE     CONTR4           ;NO - CONTINUE
5337 016202 004737 020604          JSR     PC,UTIL80        ;YES-GO PROCESS THE UTILITY REQ
5338 016206 005705                   TST     ERRCOD           ;UTILITY REQUEST ERROR
5339 016210 001744                   BEQ     CONTR1           ;NO-CONTINUE LOOP
5340 016212 004737 015340          CTLERR: CALL  SYSERR      ;YES-PRINT THE ERROR
5341 016216 000207                   RTS     PC                ;ABORT THE MODULE
5342
5343 016220 022737 000375 004364    CONTR4: CMP    #375,DINTCD ;TM78 MP LOOP ON ERROR - NO ERROR
5344 016226 001007                   BNE     CONTR5           ;NO - CONTINUE
5345 016230 012777 000377 166010    MOV     #377,@AS        ;CLEAR THE INTERRUPT
5346 016236 012777 000033 165764    MOV     #LOPERR,@XFRCMD ;ISSUE LOOP ON ERROR
5347 016244 000726                   BR      CONTR1           ;YES - BUT NOT IMPLEMENTED
5348 016246 022737 000373 004364    CONTR5: CMP    #373,DINTCD ;PRINT MESSAGE REQUEST?
5349 016254 001003                   BNE     CONTR6           ;NO - CONTINUE
5350 016256 004737 021534          CALL   QUEUE            ;YES - GO PRINT THE MICRO MESSAGE
5351 016262 000717                   BR      CONTR1           ;CONTINUE TO LOOP
5352 016264 022737 000377 004364    CONTR6: CMP    #377,DINTCD ;MANUAL INTERVENTION REQUEST?
5353 016272 001003                   BNE     CONTR7           ;NO - CONTINUE
5354 016274 004737 021532          JSR     PC,QUEUEM        ;YES - GO DO PRINT/WAIT SEQUENCE
5355 016300 000710                   BR      CONTR1           ;CONTINUE TO LOOP
5356 016302 000207          CONTR7: RTS     PC        ;ASSUME DONE INTERRUPT - RETURN
5357          .SBTTL  MODULE 2.1.3.1 - DIAGO
5358 016304          SSUB
(1)          ; *****
(1)          ; *SUBROUTINE TITLE
(1)          ; -----
5359          ; *MODULE      2.1.3.1 START THE TM78 MP TEST
5360 016304          SP
(1)          ; *****
(1)          ; *PROCEDURE
(1)          ; -----
5361          ; *BGNSUB
5362          ; * CLEAR THE RELIABILITY, SCOPE LOOP & MANUAL FLAG IN CAS REGISTER 11
5363          ; * IF USER SPECIFIED RELIABILITY MODE
5364          ; * : THEN-SET THE RELIABILITY FLAG IN CAS REGISTER 11
5365          ; * : ELSE-CONTINUE
5366          ; * ENDIF
5367          ; * IF MANUAL INTERVENTION ALLOWED
5368          ; * : THEN-SET THE MANUAL INTERVENTION FALG IN CAS REGISTER 11
5369          ; * : ELSE-CONTINUE
5370          ; * ENDIF
5371          ; * LOAD 377(8) IN CAS REGISTER 4
5372          ; * LOAD 35(8) IN CAS REGISTER 0
5373          ; * WAIT 10 MILLISECONDS
5374          ; * IF CAS REGISTER 0 BITS 5:0=0
5375          ; * : THEN-CONTINUE
```

```
5376 ;* : ELSE-LOAD ERROR CODE 7(10)
5377 ;* ENDIF
5378 ;*ENDSUB
5379 016304 SIO
(1) ;*****
(1) ;*SUBROUTINE INPUT/OUTPUT
(1) ;-----
5380 ;*
5381 ;* INPUT:
5382 ;* ERRCOD ERROR CODE SET TO 0
5383 ;*
5384 ;* OUTPUT:
5385 ;* ERRCOD ERROR CODE SET AS FOLLOWS
5386 ;* =0-IF NO ERROR DETECTED
5387 ;* =07-IF A TEST STARTED INDICATION
5388 ;* IS NOT RECEIVED IN 5MS.
5389 ;*
5390 016304 S
(1) ;*****
5391
5392 016304 042777 000340 165750 DIAGO: BIC #340,@D12 ;CLEAR THE REL.,SCOPE LOOP & MANUAL FLAG
5393 016312 005737 002330 TST RELI78 ;WAS RELIABILITY MODE SET?
5394 016316 001403 BEQ 2$ ;NO-CONTINUE
5395 016320 052777 000100 165734 BIS #100,@D12
5396 016326 2$: MANUAL
5397 016330 BNCOMPLETE 3$
5398 016332 052777 000040 165722 BIS #40,@D12 ;SET THE MANUAL FLAG
5399 016340 012777 000377 165700 3$: MOV #377,@AS ;CLEAR THE ATTENTION SUMMARY REGISTER
5400 016346 112777 000035 165654 MOVB #TSTART,@XFRCMD ;ISSUE THE TEST START CMD.
5401
5402 016354 1$: DELAY 100 ;WAIT 10 MILLISECONDS
5403
5404 016404 017701 165620 MOV @XFRCMD,R1 ;GET THE COMMAND REGISTER
5405 016410 042701 177700 BIC #177700,R1 ;REMOVE JUNK BITS
5406 016414 001402 BEQ DIAGEX ;YES-RETURN
5407 016416 012705 000007 MOV #07.,ERRCOD ;NO - LOAD ERROR CODE
5408 016422 000207 DIAGEX: RTS PC ;RETURN TO CALLING ROUTINE
5409
5410 016424 .SBTTL MODULE 2.1.3.2 - WAIT
SSUB
(1) ;*****
(1) ;*SUBROUTINE TITLE
(1) ;-----
5411 ;*MODULE 2.1.3.2 WAIT/TIMEOUT TM78 MP-HOST COMMUNICATION
5412 016424 SP
(1) ;*****
(1) ;*PROCEDURE
(1) ;-----
5413 ;*BGNSUB
5414 ;* SET UP THE LOOP COUNTER TO 1200(10)
5415 ;* BGND0
5416 ;* : PERFORM A 100 MILLISECOND TIMEOUT
5417 ;* : IF SCOPE LOOP SPECIFIED
5418 ;* : : THEN-CONTINUE
5419 ;* : : ELSE-DECREMENT THE LOOP COUNTER
5420 ;* : ENDIF
5421 ;* : DO UNTIL INTERRUPT CODE NOT=0 OR LOOP COUNTER=0
```

```
5422      ;* ENDDO
5423      ;* IF LOOP COUNTER=0
5424      ;* : THEN-LOAD ERROR CODE 10(8)
5425      ;* : EXIT SUBROUTINE
5426      ;* : ELSE-CONTINUE
5427      ;* ENDF
5428      ;* IF INTERRUPT CODE > 371
5429      ;* : THEN-CONTINUE
5430      ;* : ELSE-LOAD ERROR CODE 11(8)
5431      ;* ENDF
5432      ;*ENDSUB
5433 016424 SIO
5434      ;*****
5435      ;SUBROUTINE INPUT/OUTPUT
5436      ;-----
5437      ;
5438      ; INPUT:
5439      ; ERRCOD ERROR CODE SET TO 0
5440      ;
5441      ; OUTPUT:
5442      ; ERRCOD ERROR CODE SET AS FOLLOWS
5443      ; =0-IF NO ERROR DETECTED
5444      ; =10-IF THE HOST TIMED OUT
5445      ; THE TM78 MP-HOST COMMUNICATION.
5446      ; =11-IF THE HOST RECEIVED AN
5447      ; ILLEGAL REQUEST CODE
5448      ;
5449      ;
5450      ;
5451      ;
5452      ;
5453      ;*****
5454 016424 005037 004364 WAIT: CLR DINTCD ;CLEAR THE INTERRUPT CODE LOC.
5455      ;
5456 016430 012701 002260 WAIT0: MOV #1200.,R1 ;INITIALIZE R1 TO 1200
5457 016434 WAIT1: DELAY 100 ;PERFORM A 100 SEC. TIMEOUT
5458 016466 033777 004354 165552 BIT BINUNT,@AS ;IS THE ATTENTION LINE
5459      ; STILL ZERO?
5460 016474 001012 BNE WAIT2 ;NO - GO SAVE THE CODE
5461 016476 005301 DEC R1 ;YES - DECREMENT THE COUNT
5462 016500 001355 BNE WAIT1 ;LOOP UNTIL TIMEOUT
5463 016502 RFLAGS R2
5464 016506 032702 040000 BIT #LOE,R2
5465 016512 001346 BNE WAIT0
5466 016514 012705 000010 MOV #10,ERRCOD ;LOAD TIMEOUT ERROR CODE
5467 016520 000413 BR WAIT3 ;EXIT THE MODULE
5468      ;
5469 016522 117737 165514 004364 WAIT2: MOVB @XFRINT,DINTCD ;STORE THE INTERRUPT CODE
5470 016530 005077 165506 CLR @XFRINT ;CLEAR THE INTERRUPT CODE
5471 016534 123727 004364 000371 CMPB DINTCD,#371 ;VALID INTERRUPT CODE?
5472 016542 003002 BGT WAIT3 ;YES - RETURN TO CALLING ROUTINE
5473 016544 012705 000011 MOV #11,ERRCOD ;NO - LOAD ERROR CODE
5474 016550 000207 WAIT3: RTS PC ;RETURN
5475      ;
5476      ;SBTTL MODULE 2.1.3.3 - ERR78
5477      ;
5478      ;MODULE 2.1.3.3 PROCESS TM78 MP DETECTED ERRORS
5479      ;
5480      ; INPUT:
5481      ; CAS MASS BUS REGISTERS CONTAINING THE ERROR MESSAGE
```

```

5474      :      INFORMATION FOR PRINTOUT
5475      :      BUFFER CONTAINS THE MESSAGE FILE READ IN FROM THE BULK
5476      :      STORAGE DEVICE
5477      :
5478      :      OUTPUT:
5479      :      ERROR MESSAGE OUTPUT TO THE SYSTEM LOG DEVICE
5480      :
5481      :
5482 016552 005001      ERR78: CLR      R1      ;CLEAR THE MESS. BUFFER PTR.
5483
5484 016554 126127 021666 000041 10$:  CMPB    BUFER(R1),#'! ;IS THE CHAR. A !?
5485 016562 001402      BEQ      1$      ;YES-CONTINUE
5486 016564 005201      INC      R1      ;NO-UPDATE BUFFER POINTER
5487 016566 000772      BR       10$     ;LOOP
5488 016570 005201      1$:     INC      R1      ;
5489
5490      :      HAVE FOUND THE ! THE NEXT N CHARACTERS ARE THE TEST #
5491      :
5492 016572 005003      CLR      R3      ;CLEAR RESULT LOCATION
5493 016574 116102 021666 2$:     MOVB    BUFER(R1),R2 ;GET A CHAR.
5494 016600 005201      INC      R1      ;UPDATE THE POINTER
5495 016602 120227 000060  CMPB    R2,#'0    ;IS THE CHARACTER < ASCII ZERO?
5496 016606 100412      BMI     3$      ;YES - END OF TEST NUMBER
5497 016610 120227 000070  CMPB    R2,#'8    ;NO - IS THE CHARACTER < ASCII 8?
5498 016614 100007      BPL     3$      ;NO - END OF TEST NUMBER
5499 016616 042702 177770  BIC     #177770,R2 ;NO-GET THE CHAR
5500 016622 006303      ASL     R3      ;SHIFT
5501 016624 006303      ASL     R3      ;THE
5502 016626 006303      ASL     R3      ;RESULT
5503 016630 050203      BIS     R2,R3   ;UPDATE THE RESULT
5504 016632 000760      BR      2$      ;CONTINUE UNTIL A NON-OCTAL CHARACTER
5505
5506 016634 042703 177400 3$:     BIC     #177400,R3 ;LEAVE ONLY 8 BITS
5507 016640 120337 004332  CMPB    R3,DIAGS ;THIS TEST?
5508 016644 001343      BNE     10$     ;NO - CONTINUE
5509
5510 016646 116102 021666 6$:     MOVB    BUFER(R1),R2 ;YES-GET NEXT CHAR.
5511 016652 005201      INC      R1      ;INC THE BUFFER POINTER
5512 016654 120227 000045  CMPB    R2,#'%'   ;IS IT A %?
5513 016660 001372      BNE     6$      ;NO-CONTINUE
5514 016662 010103      MOV     R1,R3   ;SAVE THE POINTER
5515 016664 116102 021666 5$:     MOVB    BUFER(R1),R2 ;GET THE NEXT CHARACTER
5516 016670 005201      INC      R1      ;UPDATE THE CHARACTER POINTER
5517 016672 120227 000046  CMPB    R2,#'&'   ;IS IT A & ?
5518 016676 001372      BNE     5$      ;NO - CONTINUE TO LOOK
5519 016700 012702 021666  MOV     #BUFER,R2 ;GET THE BASE BUFFER ADDRESS
5520 016704 060102      ADD     R1,R2   ;BUILD POINTER TO MODULE CALLOUTS
5521 016706 010237 016736  MOV     R2,ERR78X+4
5522
5523 016712 105722      7$:     TSTB   (R2)+    ;LOOK FOR LINE TERMINATOR
5524 016714 001376      BNE     7$      ;LOOP UNTIL FOUND
5525 016716 005302      DEC     R2      ;MOVE POINTER BACK TO THE
5526 016720 005302      DEC     R2      ;CARRIAGE RETURN
5527 016722 005302      DEC     R2      ;LINE FEED
5528 016724 111237 004414  MOVB    (R2),SAVE ;SAVE THE LINE TERMINATOR
5529 016730 105012      CLRB   (R2)    ;PUT IN A NEW

```


5530														
5531	016732								ERR78X:	ERRDF	0,ERR78X,MPPC			:LINE TERMINATOR
5532	016742	113712	004414							MOVVB	SAVE,(R2)			:PRINT THE ERROR
5533	016746	010301								MOV	R3,R1			:RESTORE THE ORIGINAL LINE TERMINATOR
5534	016750	004737	017234							CALL	ERR78P			:RESTORE THE % VECTOR
5535	016754	005003							MSGPAR:	CLR	R3			:PRINT THE % LINE
5536	016756	116102	021666						9\$:	MOVVB	BUFER(R1),R2			:GET A CHAR
5537	016762	005201								INC	R1			:UPDATE THE POINTER
5538	016764	120227	000076							CMPB	R2,#'>			:>?
5539	016770	001372								BNE	9\$:NO-LOOP
5540	016772	005203								INC	R3			:INC. THE MESSAGE PAIR COUNT
5541	016774	020337	004334							CMP	R3,DIAGER			:MSG. PAIR=ERROR #
5542	017000	001407								BEQ	FOUND			:YES-EXIT LOOP
5543														
5544	017002	116102	021666						8\$:	MOVVB	BUFER(R1),R2			:MESSAGE PAIR
5545	017006	005201								INC	R1			:UPDATE BUFFER POINTER
5546	017010	120227	000074							CMPB	R2,#'<			:<?
5547	017014	001372								BNE	8\$:NO-KEEP ON LOOPING
5548														:YES-END OF PAIR
5549	017016	000757								BR	9\$:TRY TO MATCH ON NEXT
5550														:PAIR
5551														
5552	017020	004737	017234						FOUND:	CALL	ERR78P			:GO PRINT THE LINE
5553														
5554	017024	116102	021666						3\$:	MOVVB	BUFER(R1),R2			:GET A CHARACTER
5555	017030	005201								INC	R1			:UPDATE THE POINTER
5556	017032	120227	000076							CMPB	R2,#'>			:>?
5557	017036	001770								BEQ	FOUND			:YES-PRINT THE LINE
5558	017040	120227	000074							CMPB	R2,#'<			:NO-<?
5559	017044	001367								BNE	3\$:NO-KEEP LOOPING
5560	017046	122737	000374	004364						CMPB	#374,DINTCD			:ERROR INTERRUPT
5561	017054	001004								BNE	SECPAR			:NO - SKIP EXP/ACT & AUX. PRINT
5562	017056	004737	017450							CALL	EXACT			
5563	017062	004737	017560							CALL	AUXPNT			
5564														
5565	017066	004737	017234						SECPAR:	CALL	ERR78P			:PRINT THE LINE
5566														
5567	017072	116102	021666						2\$:	MOVVB	BUFER(R1),R2			:GET A CHARACTER
5568	017076	005201								INC	R1			:UPDATE THE POINTER
5569	017100	120227	000074							CMPB	R2,#'<			:<?
5570	017104	001770								BEQ	SECPAR			:YES-GO PRINT IT
5571	017106	120227	000076							CMPB	R2,#'>			:NO >?
5572	017112	001410								BEQ	RESPON			:YES - EXIT
5573	017114	120227	000043							CMPB	R2,#'##			:END OF BUFFER?
5574	017120	001364								BNE	2\$:NO - KEEP LOOKING
5575														
5576	017122	122737	000374	004364						CMPB	#374,DINTCD			:ERROR INTERRUPT?
5577	017130	001401								BEQ	RESPON			:YES - CONTINUE
5578	017132	000207								RTS	PC			:NO - RETURN TO CALLING MODULE
5579	017134	042777	000200	165120					RESPON:	BIC	#200,@DI2			:CLEAR THE SCOPE LOOP FLAG
5580	017142	012777	040000	165060						MOV	#TRE,@XFRCMD			:CLEAR THE MB ERROR
5581	017150	005077	165054							CLR	@XFRCMD			:FIX UP THE HARDWARE HACK
5582	017154									INLOOP				:LOOP ON ERROR SPECIFIED?
5583	017156									BCOMPLETE	1\$:YES
5584	017160	012777	000377	165060						MOV	#377,@AS			:CLEAR THE ATTENTION BIT
5585	017166	012777	000031	165034						MOV	#CONERR,@XFRCMD			:NO - ISSUE CONTINUE ON ERROR COMMAND

```
5586 017174 000207          RTS      PC          ;RETURN
5587
5588 017176          1$:    RFLAGS  R2          ;GET THE USER FLAGS
5589 017202 032702 040000    BIT      #LOE,R2      ;SCOPE LOOP INDICATED?
5590 017206 001403          BEQ      2$          ;NO-CONTINUE
5591 017210 052777 000200 165044    BIS      #200,@D12    ;YES-SET THE SCOPE LOOP BIT
5592
5593 017216 012777 000377 165022 2$:    MOV      #377,@AS     ;CLEAR THE ATTENTION BIT
5594 017224 012777 000033 164776    MOV      #LOPERR,@XFRCMD ;ISSUE LOOP ON ERROR COMMAND
5595 017232 000207          RTS      PC          ;
5596
5597
5598 017234 012704 021666    ERR78P: MOV      #BUFER,R4 ;CALCULATE STARTING ADDRESS
5599 017240 060104          ADD      R1,R4       ;OF A CHARACTER STRING
5600 017242 122737 000374 004364    CMPB    #374,DINTCD  ;ERROR INTERRUPT?
5601 017250 001412          BEQ      1$          ;YES - PRINT THE ERROR LINES WITH DISTINCTION
5602 017252          PRINTF  #FMT78P,R4 ;NO - FORCE PRINT THE MESSAGE LINES
5603 017274 000411          BR      -2$
5604 017276          1$:    PRINTX  #FMT78P,R4 ;PRINT THE LINE
5605 017320 000207          2$:    RTS      PC          ;RETURN TO USER
5606
5607 017322 052045 000          FMT78P: .ASCIZ  /%T/
5608 017326 017326          .EVEN
5609 017326          BGNMSG  MPPC
5610 017326 004737 044352    CALL    HEADER
5611 017332          PRINTB  #XTNOPC,DIAGER,DIAGTS,@TUSTAT
5612 017366          ENDMSG
5613
5614 017370 040445 046524 034067  XTNOPC: .ASCIZ  /%ATM78 MICRO ERROR %05%A TST %03%A PC: %06%N/
5615          .EVEN
5616
5617          .SBTTL  MODULE 2.1.3.3.1 - EXACT
5618 017450          SSUB
5619          (1)          ; *****
5620          (1)          ; *SUBROUTINE TITLE
5621          (1)          ; -----
5622          017450      ; *MODULE 2.1.3.3.1 PRINT ACTUAL/EXPECTED DATA
5623          (1)          SP
5624          (1)          ; *****
5625          (1)          ; *PROCEDURE
5626          (1)          ; -----
5627          017450      ; *BGNSUB
5628          (1)          ; * IF BIT 15 IN CAS REGISTER 3=1
5629          (1)          ; * : THEN-PRINT LOW BYTE OF CAS REGISTER 12 AS ACTUAL DATA
5630          (1)          ; * : ELSE-CONTINUE
5631          (1)          ; * ENDF
5632          (1)          ; * IF BIT 14 IN CAS REGISTER 3=1
5633          (1)          ; * : THEN-PRINT HIGH BYTE OF CAS REGISTER 12 AS EXPECTED DATA
5634          (1)          ; * : ELSE-CONTINUE
5635          (1)          ; * ENDF
5636          (1)          ; *ENDSUB
5637          (1)          S
5638          (1)          ; *****
5639          (1)          EXACT: BIT      #100000,@D11 ;ACTUAL DATA TO PRINT?
5640          (1)          BEQ      1$          ;NO-GO CHECK EXPECTED
```

```
5635 017460 017704 164600      MOV    @D13,R4      ;YES
5636 017464 042704 177400      BIC    #177400,R4   ;GET THE ACTUAL DATA BYTE
5637 017470                      PRINTX #FMTACT,R4   ;PRINT IT
5638
5639 017512 032777 040000 164534 1$: BIT    #040000,@D11 ;EXPECTED DATA TO PRINT?
5640 017520 001416                      BEQ    2$           ;NO - RETURN
5641 017522 017704 164536      MOV    @D13,R4      ;YES
5642 017526 000304                      SWAB   R4
5643 017530 042704 177400      BIC    #177400,R4   ;GET THE EXPECTED DATA BYTE
5644 017534                      PRINTX #FMTEXP,R4
5645 017556 000207      2$: RTS    PC
```

.SBTTL MODULE 2.1.3.3.2 - AUXPNT

```
5646
5647
5648 017560      SSUB
(1) : *****
(1) : *SUBROUTINE TITLE
(1) : *-----
5649 : *MODULE 2.1.3.3.2 AUXILIARY PRINT REQUESTS
5650 017560      SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
5651 : *BGNSUB
5652 : * IF CAS REGISTER 11 BIT 15:12=0
5653 : * : THEN-CONTINUE
5654 : * : ELSE-IF BITS 15:12 RIGHT JUSTIFIED=0 > OR 7
5655 : * : : THEN-CONTINUE
5656 : * : : ELSE-IF BITS 15:12 RIGHT JUSTIFIED=1
5657 : * : : : THEN-PRINT MESSAGE 1 BELOW
5658 : * : : : ELSE-CONTINUE
5659 : * : : : ENDF
5660 : * : : : IF BITS 15:12 RIGHT JUSTIFIED=2
5661 : * : : : : THEN-PRINT MESSAGE 2 BELOW
5662 : * : : : : ELSE-CONTINUE
5663 : * : : : : ENDF
5664 : * : : : : IF BITS 15:12 RIGHT JUSTIFIED=3
5665 : * : : : : : THEN-PRINT MESSAGE 3 BELOW
5666 : * : : : : : ELSE-CONTINUE
5667 : * : : : : : ENDF
5668 : * : : : : : IF BITS 15:12 RIGHT JUSTIFIED=4
5669 : * : : : : : : THEN-PRINT MESSAGE 4 BELOW
5670 : * : : : : : : ELSE-CONTINUE
5671 : * : : : : : : ENDF
5672 : * : : : : : : IF BITS 15:12 RIGHT JUSTIFIED=5
5673 : * : : : : : : : THEN-PRINT MESSAGE 5 BELOW
5674 : * : : : : : : : ELSE-CONTINUE
5675 : * : : : : : : : ENDF
5676 : * : : : : : : : IF BITS 15:12 RIGHT JUSTIFIED=6
5677 : * : : : : : : : : THEN-PRINT MESSAGE 6 BELOW
5678 : * : : : : : : : : PRINT MESSAGE 5 BELOW
5679 : * : : : : : : : : ELSE-CONTINUE
5680 : * : : : : : : : : ENDF
5681 : * : : : : : : : : IF BITS 15:12 RIGHT JUSTIFIED=7
5682 : * : : : : : : : : : THEN-PRINT MESSAGE 7 BELOW
5683 : * : : : : : : : : : ELSE-CONTINUE
5684 : * : : : : : : : : : ENDF
```


5740
5741
5742
5743
5744
5745 017560
(1)
5746
5747 017560 017704 164476
5748 017564 032704 170000
5749 017570 001410
5750 017572 042704 007777
5751 017576 000304
5752 017600 006204
5753 017602 006204
5754 017604 006204
5755 017606 000174 017614
5756 017612 000207
5757
5758 017614 017612
5759 017616 017654
5760 017620 017662
5761 017622 017670
5762 017624 017702
5763 017626 017710
5764 017630 017716
5765 017632 017730
5766 017634 017756
5767 017636 017612
5768 017640 017612
5769 017642 017612
5770 017644 017612
5771 017646 017612
5772 017650 017612
5773 017652 017612
5774
5775 017654 004737 020026
5776 017660 000207
5777 017662 004737 020106
5778 017666 000207
5779 017670 004737 020026
5780 017674 004737 020106
5781 017700 000207
5782 017702 004737 020264
5783 017706 000207
5784 017710 004737 020346
5785 017714 000207
5786 017716 004737 020026
5787 017722 004737 020346
5788 017726 000207
5789 017730
5790 017754 000207
5791 017756 004737 020026
5792 017762 004737 020106
5793 017766 004737 020346
5794 017772 000207

```

;*
;*
;*
;*
;*          10          REQUEST THE HOST TO PRINT ROUTINES #1, #2, & #5
S
: *****
AUXPNT: MOV      @D12,R4
        BIT      #170000,R4      ;AUXILIARY PRINT REQ?
        BEQ      AUXILL          ;NO-GO DO SECOND MSG. PAIR
        BIC      #007777,R4     ;REMOVE UNWANTED BITS
        SWAB     R4              ;SWAP BYTES
        ASR      R4              ;SHIFT RIGHT
        ASR      R4              ;SHIFT RIGHT
        ASR      R4              ;SHIFT RIGHT
        JMP      @AUXTBL(R4)
AUXILL: RTS      PC
AUXTBL: .WORD    AUXILL          ;AUXILIARY PRINT REQUEST 0 - ILLEGAL
        .WORD    AUX1           ;AUXILIARY PRINT REQUEST 1
        .WORD    AUX2           ;AUXILIARY PRINT REQUEST 2
        .WORD    AUX3           ;AUXILIARY PRINT REQUEST 3
        .WORD    AUX4           ;AUXILIARY PRINT REQUEST 4
        .WORD    AUX5           ;AUXILIARY PRINT REQUEST 5
        .WORD    AUX6           ;AUXILIARY PRINT REQUEST 6
        .WORD    AUX7           ;AUXILIARY PRINT REQUEST 7
        .WORD    AUX8           ;AUXILIARY PRINT REQUEST 8
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 9 - ILLEGAL
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 10 - ILLEGAL
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 11 - ILLEGAL
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 12 - ILLEGAL
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 13 - ILLEGAL
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 14 - ILLEGAL
        .WORD    AUXILL        ;AUXILIARY PRINT REQUEST 15 - ILLEGAL
AUX1:   CALL     AUX1X          ;GO PRINT AUXILIARY LINE 1
        RTS      PC            ;RETURN TO CALLING MODULE
AUX2:   CALL     AUX2X          ;GO PRINT AUXILIARY LINE 2
        RTS      PC            ;RETURN TO CALLING MODULE
AUX3:   CALL     AUX1X          ;GO PRINT AUXILIARY LINE 1
        CALL     AUX2X          ;GO PRINT AUXILIARY LINE 2
        RTS      PC            ;RETURN TO CALLING MODULE
AUX4:   CALL     AUX4X          ;GO PRINT AUXILIARY LINE 4
        RTS      PC            ;RETURN TO CALLING MODULE
AUX5:   CALL     AUX5X          ;GO PRINT AUXILIARY LINE 5
        RTS      PC            ;RETURN TO CALLING MODULE
AUX6:   CALL     AUX1X          ;GO PRINT AUXILIARY LINE 1
        CALL     AUX5X          ;GO PRINT AUXILIARY LINE 5
        RTS      PC            ;RETURN TO CALLING MODULE
AUX7:   PRINTX   #AUXMS7,@FC
        RTS      PC
AUX8:   CALL     AUX1X          ;GO PRINT AUXILIARY LINE 1
        CALL     AUX2X          ;GO PRINT AUXILIARY LINE 2
        CALL     AUX5X          ;GO PRINT AUXILIARY LINE 5
        RTS      PC            ;RETURN TO CALLING MODULE

```

```

5795
5796
5797 017774 040445 052523 043502 AUXMS7: .ASCIZ  /%ASUBGROUP NUMBER = %06%N/
5798 .EVEN
5799
5800 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT THE SCLK/BYTE COUNT BASED ON
5801 ;THE CONTENTS OF THE CAS REGISTER 5.
5802
5803 020026 AUX1X: PRINTX #AUXMS1,@FC
5804 020052 000207 RTS PC
5805 020054 040445 054502 042524 AUXMS1: .ASCIZ  /%ABYTE-SCLK COUNT = %06%N/
5806 .EVEN
5807
5808 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT THE DATA FORMAT AND SKIP COUNT
5809 ;BASED ON THE DATA FORMAT AND SKIP COUNT INFORMATION IN CAS REGISTER 2
5810 ;(MASS BUS REGISTER 14).
5811
5812 020106 017702 164132 AUX2X: MOV @TC,R2 ;GET THE TAPE CONTROL REGISTER
5813 020112 000302 SWAB R2 ;SWAP THE BYTES
5814 020114 042702 177760 BIC #177760,R2 ;GET ONLY THE SKIP COUNT
5815 020120 017704 164120 MOV @TC,R4 ;GET THE TAPE CONTROL REGISTER
5816 020124 000304 SWAB R4 ;SWAP THE BYTES
5817 020126 042704 177617 BIC #177617,R4 ;MASK OUT ONLY THE FORMAT BITS
5818 020132 006204 ASR R4 ;JUSTIFY RIGHT
5819 020134 006204 ASR R4
5820 020136 006204 ASR R4
5821 020140 006204 ASR R4
5822 020142 PRINTX #AUXMS2,R4 ;GET ONLY THE DATA FORMAT
5823 020164 PRINTX #AUXMO2,R2
5824 020206 000207 RTS PC
5825 020210 040445 040504 040524 AUXMS2: .ASCIZ  /%ADATA FORMAT = %06%N/
5826 020236 040445 045523 050111 AUXMO2: .ASCIZ  /%ASKIP COUNT = %06%N/
5827 020264 .EVEN
5828
5829 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT THE TRANSITION COUNT BASED
5830 ;ON THE CONTENTS OF CAS REGISTER 5.
5831 020264 AUX4X: PRINTX #AUXMS4,@FC
5832 020310 000207 RTS PC
5833
5834 020312 040445 051124 047101 AUXMS4: .ASCIZ  /%ATRANSITION COUNT = %06%N/
5835 020346 .EVEN
5836
5837 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT EXPECTED DATA AND/OR ACTUAL
5838 ;DATA IN 18 BIT FORMAT (6 OCTAL CHARACTERS). THE ACTUAL DATA (BITS
5839 ;15:0) IS CONTAINED IN CAS REGISTER 16 AND (BITS 17:16) IN CAS REGISTER
5840 ;17. THE EXPECTED DATA (BITS 15:0) IS CONTAINED IN CAS REGISTER 14 AND
5841 ;(BITS 17:16) IN CAS REGISTER 15. ASSOCIATED WITH BOTH THE ACTUAL AND
5842 ;EXPECTED DATA IS A PRINT FLAG INDICATING IF THE INFORMATION IS TO BE
5843 ;PRINTED. THE ACTUAL DATA PRINT FLAG IS BIT 7 OF CAS REGISTER 17, AND
5844 ;THE PRINT FLAG FOR THE EXPECTED DATA IS BIT 7 OF CAS REGISTER 15.
5845 020346 032777 000200 163716 AUX5X: BIT #200,@M01 ;EXPECTED DATA TO PRINT?
5846 020354 001415 BEQ 1$ ;NO-GO CHECK FOR ACTUAL
5847 020356 005003 CLR R3 ;YES-LOAD THE DISPLACEMENT VALUE
5848 020360 004737 020456 CALL AUX18 ;GET THE DATA
5849 020364 PRINTX #AUXMS5,R2,R4
5850 020410 032777 000200 163660 1$: BIT #200,@M03 ;ACTUAL DATA TO PRINT?

```

```
5851 020416 001416          BEQ      2$          ;NO-RETURN TO USER
5852 020420 012703 000002    MOV      #2,R3      ;YES-LOAD THE DISPLACEMENT VALUE
5853 020424 004737 020456    CALL    AUX18      ;GET THE DATA
5854 020430          PRINTX  #AUXM05,R2,R4
5855 020454 000207          RTS      PC          ;RETURN
5856
5857 020456 017302 004272    AUX18: MOV      @M01(R3),R2 ;GET BIT 17:16
5858 020462 042702 177774    BIC     #177774,R2 ;REMOVE UNWANTED BITS
5859 020466 006302          ASL     R2          ;JUSTIFY THE CHARACTER
5860 020470 017304 004270    MOV      @M00(R3),R4 ;GET THE MISSING BIT
5861 020474 042704 077777    BIC     #077777,R4 ;JUSTIFY THE BIT
5862 020500 000241          CLC
5863 020502 006304          ASL     R4
5864 020504 006304          ASL     R4
5865 020506 050402          BIS     R4,R2      ;COMPLETE THE PARTIAL CHARACTER
5866 020510 017304 004270    MOV      @M00(R3),R4 ;GET THE OTHER 5 CHARACTERS
5867 020514 000207          RTS      PC          ;RETURN
5868
5869 020516 040445 054105 027124  AUXM5: .ASCIZ  /%AEXT. EXPECTED = %01%05%/
5870          020552          .EVEN
5871 020552 040445 054105 027124  AUXM05: .ASCIZ  /%AEXT. ACTUAL = %01%05%/
5872          020604          .EVEN
5873          .SBTTL  MODULE 2.1.3.4 - UTIL80
5874 020604          SSUB
(1)          : *****
(1)          : *SUBROUTINE TITLE
(1)          : *-----
5875          : *MODULE      2.1.3.4 PROCESS TM78 MP UTILITY REQUEST
5876 020604          SP
(1)          : *****
(1)          : *PROCEDURE
(1)          : *-----
5877          : *BGNSUB
5878          : * IF CAS REGISTER 11 BITS 3:0=0 OR 4 OR > 7
5879          : * : THEN-LOAD ERRCOD WITH 16(10)
5880          : * : EXIT SUBROUTINE
5881          : * : ELSE-IF REGISTER 11 BITS 3:0=1 OR 2
5882          : * : : THEN-CALL SUBROUTINE CALBYT
5883          : * : : IF ERRCOD=0
5884          : * : : : THEN-CALL SUBROUTINE PATGEN
5885          : * : : : IF ERRCOD=0
5886          : * : : : : THEN-LOAD 377(8) CAS REGISTER 4
5887          : * : : : : SET UP THE WRITE BUFFER ADDRESS
5888          : * : : : : LOAD 65(8) CAS REGISTER 0
5889          : * : : : : ELSE-EXIT SUBROUTINE
5890          : * : : : : ENDF
5891          : * : : : : ELSE-EXIT SUBROUTINE
5892          : * : : : : ENDF
5893          : * : : : : ELSE-CONTINUE
5894          : * : : : : ENDF
5895          : * : : IF CAS REGISTER 11 BITS 3:0=3
5896          : * : : : THEN-CALL SUBROUTINE CALBYT
5897          : * : : : IF ERRCOD=0
5898          : * : : : : THEN-CALL SUBROUTINE PATGEN
5899          : * : : : : IF ERRCOD=0
5900          : * : : : : THEN-LOAD 377(8) TO CAS REGISTER 4
```



```
5957 : : : : : LOAD 31(8) IN CAS REGISTER 0
5958 : * : : : : ENDIF
5959 : * : : : : ELSE-CONTINUE
5960 : * : : : : ENDIF
5961 : * : : : : IF CAS REGISTER 11 BITS 3:0=7
5962 : * : : : : THEN-LOAD THE BIT UNIT NUMBER IN CAS REGISTER 12
5963 : * : : : : LOAD 377(8) TO CAS REGISTER 4
5964 : * : : : : LOAD 31(8) TO CAS REGISTER 0
5965 : * : : : : ELSE-CONTINUE
5966 : * : : : : ENDIF
5967 : * : : : : ENDIF
5968 : * : : : : *ENDSUB
5969 020604 S
(1) : *****
5970 020604 017701 163452 UTIL80: MOV @DI2,R1 ;GET THE UTILITY REQ #
5971 020610 042701 177760 BIC #177760,R1 ;MASK OUT DESIRED BITS
5972 020614 006301 ASL R1 ;MULTIPLY BY 2
5973 020616 000171 020622 JMP @UTILTB(R1) ;JUMP TO REQUIRED REQUEST
5974
5975 020622 020772 UTILTB: .WORD UTLILL ;REQUEST CODE 0 INVALID
5976 020624 020662 .WORD WGCRPE ;REQUEST CODE 1 WRITE PE
5977 020626 020662 .WORD WGCRPE ;REQUEST CODE 2 WRITE GCR
5978 020630 020726 .WORD RFWD ;REQUEST CODE 3 READ FORWARD
5979 020632 020772 .WORD UTLILL ;REQUEST CODE 4 INVALID
5980 020634 021000 .WORD STNER ;REQUEST CODE 5 STATUS CHECK-NO ERR
5981 020636 021066 .WORD STER ;REQUEST CODE 6 STATUS CHECK-ERROR
5982 020640 021110 .WORD UNITS ;REQUEST CODE 7 UNITS UNDER TEST
5983 020642 020772 .WORD UTLILL ;REQUEST CODE 8 INVALID
5984 020644 020772 .WORD UTLILL ;REQUEST CODE 9 INVALID
5985 020646 020772 .WORD UTLILL ;REQUEST CODE A INVALID
5986 020650 020772 .WORD UTLILL ;REQUEST CODE B INVALID
5987 020652 020772 .WORD UTLILL ;REQUEST CODE C INVALID
5988 020654 020772 .WORD UTLILL ;REQUEST CODE D INVALID
5989 020656 020772 .WORD UTLILL ;REQUEST CODE E INVALID
5990 020660 020772 .WORD UTLILL ;REQUEST CODE F INVALID
5991
5992
5993 :WRITE GCR/PE UTILITY REQUEST
5994
5995 020662 004737 021142 WGCRPE: CALL CALBYT ;CALCULATE BYTE COUNT
5996 020666 005705 TST ERRCOD ;TEST ERROR CODE
5997 020670 001015 BNE WGCRX ;EXIT IF SET
5998 020672 004737 021312 CALL PATGEN ;GENERATE THE DATA PATTERN
5999 020676 005705 TST ERRCOD ;TEST ERROR CODE
6000 020700 001011 BNE WGCRX ;EXIT IF SET
6001 020702 012777 000377 163336 MOV #377,@AS ;CLEAR THE ATTENTION SUMMARY REGISTER
6002 020710 012777 032102 163316 MOV #WRTBUF,@BA ;LOAD THE BUFFER ADDRESS FOR WRITE
6003 020716 012777 000065 163304 MOV #65,@XFRCMD ;ISSUE WRITE GCR-NOT 18 BIT COMPAT.
6004 020724 000207 WGCRX: RTS PC
6005
6006
6007 :READ FORWARD UTILITY REQUEST
6008
6009 020726 004737 021142 RFWD: CALL CALBYT ;CALCULATE THE BYTE COUNT
6010 020732 005705 TST ERRCOD ;TEST ERROR CODE
6011 020734 001015 BNE RFWDX ;EXIT IF SET
```

```
6012 020736 004737 021312          CALL    PATGEN          ;GENERATE THE DATA PATTERN
6013 020742 005705                   TST     ERRCOD          ;TEST ERROR CODE
6014 020744 001011                   BNE     RFWDX           ;EXIT IF SET
6015 020746 012777 031736 163260    MOV     #REDBUF,@BA     ;LOAD THE BUFFER ADDRESS FOR READ
6016 020754 012777 000377 163264    MOV     #377,@AS        ;CLEAR THE ATTENTION SUMMARY REGISTER
6017 020762 012777 000071 163240    MOV     #71,@XFRCMD     ;ISSUE READ FORWARD
6018 020770 000207                   RFWDX:  RTS            PC          ;
6019
6020
6021                               ;ILLEGAL UTILITY REQUEST CODE ERROR TRAP
6022
6023 020772 012705 000020           UTLILL: MOV     #16.,ERRCOD      ;LOAD THE ILLEGAL HOST REQUEST ERROR CODE
6024 020776 000207                   RTS            PC
6025
6026 021000 032777 040000 163222    STNER:  BIT     #040000,@XFRCMD ;TEST THE MASS BUS STATUS
6027 021006 001404                   BEQ     STNER1          ;CONTINUE IF NONE
6028 021010                   ERRDF   #31.,,ERM031      ;ELSE - ERROR
6029
6030 021020 032777 000020 163234    STNER1: BIT     #000020,@DI2     ;SHOULD DATA BE COMPARED?
6031 021026 001415                   BEQ     2$              ;NO-EXIT
6032 021030 005002                   CLR     R2              ;CLEAR THE BUFFER POINTER
6033 021032 126262 031736 032102    3$:    CMPB    REDBUF(R2),WRTBUF(R2)
6034 021040 001404                   BEQ     1$              ;
6035 021042                   ERRDF   #32.,,ERM032      ;ELSE - DATA COMPARE FAILURE
6036 021052 005202                   1$:    INC     R2          ;UPDATE THE POINTER
6037 021054 020237 004336                   CMP     R2,BYTCNT       ;DONE?
6038 021060 001364                   BNE     3$              ;NO - CONTINUE
6039 021062 000137 017134                   2$:    JMP     RESPON      ;GO SPECIFY CONTINUE/LOOP ON ERROR
6040
6041 021066 032777 040000 163134    STER:   BIT     #040000,@XFRCMD
6042 021074 001351                   BNE     STNER1
6043 021076                   ERRDF   #33.,,ERM033
6044
6045 021106 000744                   BR     STNER1
6046
6047
6048                               ;UNIT NUMBERS UTILITY REQUEST
6049
6050 021110 013701 004354           UNITS:  MOV     BINUNT,R1      ;GET THE UNITS WORD
6051 021114 042701 177760                   BIC     #177760,R1       ;REMOVE UNUSED BITS
6052 021120 010177 163140                   MOV     R1,@DI3         ;STORE IN CAS REGISTER 12 LOW
6053 021124 012777 000377 163114    MOV     #377,@AS        ;CLEAR THE ATTENTION SUMMARY REGISTER
6054 021132 012777 000031 163070    MOV     #31,@XFRCMD     ;ISSUE DIAGNOSTIC CONTINUE COMMAND
6055 021140 000207                   RTS     PC              ;RETURN
6056
6057 021142           .SBTTL  MODULE 2.1.3.4.1 - CALBYT
6058 (1)           SSUB
6059 (1)           ;*****
6060 (1)           ;*SUBROUTINE TITLE
6061 (1)           ;*-----
6062           ;*MODULE      2.1.4.1 - CALCULATE BYTE COUNT
6063           SD
6064           ;*****
6065           ;*DESCRIPTION
6066           ;*-----
6067           ;*THIS ROUTINE WILL CALCUALTE THE BYTE COUNT FOR A GIVEN TM78 DATA
6068           ;*TRANSFER REQUEST. THIS BYTE COUNT IS BASED ON THE "SCLOCK" COUNT
```

```
6062 ;*RETURNED IN CAS REGISTER 5, MASS BUS REGISTER 6, AND THE DATA FORMAT
6063 ;*IN CAS REGISTER 2, MASS BUS REGISTER 14.
6064 021142 S
(1) ; *****
6065
6066 021142 017701 163070 CALBYT: MOV @FC,R1 ;GET THE NUMBER OF 'SCLK'S
6067 021146 010102 MOV R1,R2 ;COPY TO R2
6068 021150 006302 ASL R2 ;MULTIPLY BY 2
6069 021152 010237 004336 MOV R2,BYTCNT ;SAVE FOR LATER USE
6070 021156 010102 MOV R1,R2 ;COPY TO R2
6071 021160 005402 NEG R2 ;TAKE TWOS COMPLEMENT
6072 021162 010277 163044 MOV R2,@WC ;SET UP THE WORD COUNT
6073 021166 017702 163052 MOV @TC,R2 ;GET THE DATA FORMAT
6074 021172 042702 107777 BIC #107777,R2 ;REMOVE JUNK BITS
6075 021176 000302 SWAB R2 ;SWAP THE BYTES
6076 021200 006202 ASR R2
6077 021202 006202 ASR R2
6078 021204 006202 ASR R2 ;R2=DATA FORMAT CODE X 2
6079 021206 000172 021212 JMP @CALTBL(R2)
6080 021212 021232 CALTBL: .WORD CALX2 ;11 NORMAL FORMAT
6081 021214 021232 .WORD CALX2 ;15 NORMAL FORMAT
6082 021216 021242 .WORD CALX4 ;10 COMPAT. FORMAT
6083 021220 021246 .WORD CALX5 ;10 DUMP FORMAT
6084 021222 021264 .WORD CALX9 ;10 HIGH DENSITY FORMAT
6085 021224 021234 .WORD CALX1 ;IMAGE FORMAT
6086 021226 021304 .WORD CALILL ;ILLEGAL
6087 021230 021304 .WORD CALILL ;ILLEGAL
6088
6089 021232 006301 CALX2: ASL R1 ;MULTIPLY 'SCLK' COUNT BY 2
6090 021234 010177 162776 CALX1: MOV R1,@FC ;SET UP THE FRAMC COUNT
6091 021240 000207 RTS PC
6092 021242 006301 CALX4: ASL R1 ;MULTIPLY 'SCLK' COUNT BY 2
6093 021244 000772 BR CALX2 ;GO MULTIPLY AGAIN
6094 021246 010102 CALX5: MOV R1,R2 ;COPY THE 'SCLK' COUNT
6095 021250 006301 ASL R1 ;MULTIPLY BY 2
6096 021252 006202 ASR R2 ;DIVIDE BY 2
6097 021254 060201 ADD R2,R1 ;MULTIPLY BY 5
6098 021256 010177 162754 MOV R1,@FC ;STORE IN THE FRAME COUNT
6099 021262 000207 RTS PC ;RETURN
6100 021264 010102 CALX9: MOV R1,R2 ;COPY THE 'SCLK' COUNT
6101 021266 006301 ASL R1 ;MULTIPLY BY 2
6102 021270 006202 ASR R2 ;DIVIDE COPY BY 2
6103 021272 006202 ASR R2 ;DIVIDE COPY BY 4
6104 021274 060201 ADD R2,R1 ;MULTIPLY BY 2.25
6105 021276 010177 162734 MOV R1,@FC
6106 021302 000207 RTS PC
6107
6108 021304 012705 000021 CALILL: MOV #21,ERRCOD ;LOAD THE ILLEGAL
6109 021310 000207 RTS PC ;RETURN TO CALLING MODULE
6110
6111
6112 .SBTTL MODULE 2.1.3.4.2 - PATGEN
6113 021312 SSUB
(1) ; *****
(1) ;*SUBROUTINE TITLE
(1) ;-----
```

```

6114      ;*MODULE          2.1.3.4.2 - GENERATE THE DATA PATTERN
6115 021312 SD
(1)      ; *****
(1)      ; *DESCRIPTION
(1)      ; -----
6116      ; *THIS ROUTINE IS CALLED TO GENERATE THE PROPER DATA PATTERN FOR THE
6117      ; *REQUESTED TRANSFER ON A WRITE OR FOR COMPARE BUFFER GENERATION
6118      ; *ON A READ.
6119 021312 S
(1)      ; *****
6120 021312 017701 162744 PATGEN: MOV @DI2,R1 ;GET MASS BUS REGISTER
6121 021316 000301 SWAB R1 ;SWAP THE HIGH-LOW BYTE
6122 021320 042701 177776 BIC #177776,R1 ;REMOVE JUNK BITS
6123 021324 006301 ASL R1 ;MULTIPLY BY 2
6124 021326 005002 CLR R2 ;CLEAR THE BYTE COUNTER
6125 021330 000171 021334 JMP @PATTBL(R1)
6126
6127 021334 021340 PATTBL: .WORD PATILL ;PATTERN 0 - UNDEFINED
6128 021336 021364 .WORD MPDPAR ;PATTERN 1 - MASS BUS PARITY
6129
6130 021340 012705 000022 PATILL: MOV #22,ERRCOD ;LOAD ILLEGAL DATA PATTERN ERROR CODE
6131 021344 000207 RTS PC
6132
6133 021346 010162 032102 FILLX: MOV R1,WRTBUF(R2) ;STORE THE DATA IN THE BUFFER
6134 021352 005202 INC R2 ;INC THE COUNT
6135 021354 005202 INC R2 ;INC THE COUNT
6136 021356 020237 004336 CMP R2,BYTCNT ;DONE?
6137 021362 000207 RTS PC ;YES-RETURN
6138
6139
6140
6141
6142      ;
6143      ; *WORST CASE MASSBUS DATA PATTERN
6144      ;
6145 021364 012701 000001 MPDPAR: MOV #1,R1 ;LOAD STARTING DATA PATTERN
6146 021370 004737 021346 2$: CALL FILLX ;WRITE TO THE BUFFER
6147 021374 002055 BGE 4$ ;DONE?
6148 021376 006301 ASL R1 ;GENERATE NEXT PATTERN
6149 021400 103373 BCC 2$
6150 021402 005001 CLR R1 ;LOAD DATA OF ZEROS
6151 021404 004737 021346 CALL FILLX ;WRITE TO THE BUFFER
6152 021410 002047 BGE 4$ ;DONE?
6153 021412 004737 021346 CALL FILLX ;WRITE TO THE BUFFER
6154 021416 002044 BGE 4$ ;DONE?
6155
6156 021420 012701 177777 MOV #-1,R1 ;LOAD ALL ONES DATA
6157 021424 004737 021346 CALL FILLX ;WRITE THE BUFFER
6158 021430 002037 BGE 4$ ;DONE?
6159 021432 004737 021346 CALL FILLX ;WRITE THE BUFFER
6160 021436 002034 BGE 4$ ;DONE?
6161
6162 021440 012701 077777 3$: MOV #77777,R1 ;LOAD STARTING DATA PATTERN
6163 021444 004737 021346 CALL FILLX ;WRITE THE BUFFER
6164 021450 002027 BGE 4$ ;DONE?
6165 021452 006201 ASR R1 ;GENERATE NEXT PATTERN

```

```
6166 021454 052701 100000      BIS    #100000,R1      ;
6167 021460 103771              BCS    3$              ;
6168                               ;
6169 021462 012701 177777      MOV    #177777,R1     ;LOAD ALL ONES DATA
6170 021466 004737 021346      CALL   FILLX          ;WRITE TO BUFFER
6171 021472 002016              BGE    4$              ;DONE?
6172                               ;
6173 021474 005001              CLR    R1              ;LOAD ALL ZEROS DATA
6174 021476 004737 021346      CALL   FILLX          ;WRITE TO BUFFER
6175 021502 002012              BGE    4$              ;DONE?
6176                               ;
6177 021504 012701 052525      MOV    #052525,R1     ;LOAD ALTERNATE ONES DATA
6178 021510 004737 021346      CALL   FILLX          ;WRITE TO BUFFER
6179 021514 002005              BGE    4$              ;DONE?
6180                               ;
6181 021516 012701 125252      MOV    #125252,R1     ;WRITE COMP. ALTER. ONES DATA
6182 021522 004737 021346      CALL   FILLX          ;WRITE TO BUFFER
6183 021526 003716              BLE    MPDPAR         ;DONE?-NO CONTINUE
6184                               ;
6185 021530 000207              4$:   RTS    PC        ;RETURN
6186                               ;
6187 021532      .SBTTL  MODULE 2.1.3.5 - QUEUEM
(1)      SSUB
(1)      ; *****
(1)      ; *SUBROUTINE TITLE
6188      ; *-----*
6189 021532      ; *MODULE 2.1.3.5 - QUEUE A PRINT LINE/MANUAL INTERVENTION
(1)      SP
(1)      ; *****
(1)      ; *PROCEDURE
(1)      ; *-----*
6190      ; *BGNSUB
6191      ; * PRINT DEVICE HEADER
6192      ; * CALL SUBROUTINE MSGPAR
6193      ; * IF DATA TRANSFER INTERRUPT CODE=373(8)
6194      ; * : THEN-CONTINUE
6195      ; * : ELSE-PRINT "TYPE CARRIAGE RETURN TO CONTINUE"
6196      ; * : WAIT FOR CARRIAGE RETURN
6197      ; * ENDIF
6198      ; * LOAD 377(8) IN CAS REGISTER 4
6199      ; * LOAD 31(8) IN CAS REGISTER 1
6200      ; *ENDSUB
6201 021532      S
(1)      ; *****
6202 021532 000240      QUEUEM: NOP              ;MANUAL INTERVENTION ENTRY
6203 021534 004737 044352      QUEUE: CALL   HEADER
6204 021540 005001              CLR    R1              ;CLEAR THE BUFFER POINTER
6205 021542 004737 016754      CALL   MSGPAR         ;GO PRINT THE MESSAGE
6206 021546 122737 000373 004364  CMPB   #373,DINTCD     ;PRINT ONLY REQUEST?
6207 021554 001411              BEQ    1$              ;YES - DONE
6208 021556 012737 000001 004420  MOV    #1,DUMFLG      ;
6209 021564              GMANIL MANMSG,DUMFLG,1,YES
6210 021600 012777 000377 162440 1$:  MOV    #377,@AS       ;CLEAR THE ATTENTION SUMMARY REGISTER
6211 021606 012777 000031 162414  MOV    #CONERR,@XFRCMD ;ISSUE CODE 31
6212 021614 000207              RTS    PC              ;RETURN TO THE CALLING MODULE
6213
6214 021616 054524 042520 041440  MANMSG: .ASCIZ /TYPE CARRIAGE RETURN TO CONTINUE/
```

```
6215          021660          .EVEN
6216          .SBTTL  MODULE 2.1.4 - CLOSEX
6217 021660  SSUB
(1)          : *****
(1)          : *SUBROUTINE TITLE
(1)          : *-----*
6218          : *MODULE 2.1.4 - CLOSEX
6219 021660  SP
(1)          : *****
(1)          : *PROCEDURE
(1)          : *-----*
6220          : *BGNSUB
6221          : * ISSUE CLOSE FILE CALL TO SUPERVISOR
6222          : *ENDSUB
6223 021660  SIG
(1)          : *****
(1)          : *SUBROUTINE INPUT/OUTPUT
(1)          : *-----*
6224          : * INPUT: NONE
6225          :
6226          : * OUTPUT: NONE
6227          :
6228          :
6229 021660  S
(1)          : *****
6230 021660  CLOSEX: CLOSE          ;CLOSE FILE
6231 021662 005005 CLR          ERRCOD          ;CLEAR THE ERROR CODE
6232 021664 000207 RTS          PC
6233
6234
6235          .SBTTL  BUFFERS
6236
6237 021666  S
(1)          : *****
6238          : *MICRO-DIAGNOSTIC/ERROR MESSAGE BUFFER
6239 021666 010050 BUFBUF: .BLKB 4136.          ;4.0K BUFFER
6240 031736 BUFBEND:
6241
6242 031736  S
(1)          : *****
6243          : *READ DATA BUFFER
6244 031736 MBREAD:          ;MASS BUS DATA READ
6245 031736 000144 REDBUF: .BLKB 100.          ;READ DATA TRANSFER BUFFER
6246          :
6247 032102  S
(1)          : *****
6248          : *WRITE DATA BUFFER
6249 032102 MBBUF:          ;MASS BUS DATA WRITTEN
6250 032102 000144 WRTBUF: .BLKB 100.          ;WRITE DATA TRANSFER BUFFER
```

```

6251
6252 032246 010237 004330      CASCOW: MOV      R2,CASDTA
6253 032252 004737 032502      CALL     CASBOT      ;BOOT UP THE CAS PROGRAM
6254 032256 005705              TST      ERRCOD
6255 032260 001062              BNE      5$
6256 032262              BGNSEG
6257 032264 004737 014566      CALL     START       ;START THE TM78
6258 032270 004737 032564      CALL     CASDAT      ;FILL THE CAS DATA BUFFER
6259 032274 004737 033414      CALL     HOLDMP
6260 032300 012777 041420 151772  MOV      #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
6261 032306 012777 000400 151766  MOV      #HOLD,@DS80  ;ISSUE THE READ CAS FROM TM78MP COMMAND
6262 032314 004737 014566      CALL     START
6263 032320 004737 032610      CALL     CASWRT      ;GO WRITE CAS FROM HOST
6264 032324              CKLOOP
6265 032326 012777 000035 151674  MOV      #TSTART,@XFRCMD
6266 032334              DELAY     100         ;PERFORM A 10MS. TIMEOUT
6267 032364 122777 000372 151636  CMPB    #372,@XFRCMD ;DONE
6268 032372 001406              BEQ      3$         ;YES-CONTINUE
6269 032374              ERDF     8.,PROCAS,ERM008 ;NO-PRINT THE ERROR
6270 032404              CKLOOP
6271 032406 000406              BR       6$         ;EXIT THE MODULE
6272 032410              3$: CKLOOP
6273 032412 004737 033020      CALL     CASTMR      ;GO READ CAS FROM TM78
6274 032416 004737 033260      CALL     CASCMP      ;GO COMPARE DATA
6275 032422              CKLOOP
6276 032424              6$: ENDSEG
6277 032426 000207              5$: RTS      PC       ;RETURN
6278 032430 010237 004330      CASCOR: MOV      R2,CASDTA
6279 032434 004737 032502      CALL     CASBOT      ;BOOT THE CAS PROGRAM
6280 032440 005705              TST      ERRCOD
6281 032442 001016              BNE      5$
6282 032444              BGNSEG
6283 032446 004737 014566      CALL     START       ;START THE TM78
6284 032452 004737 032564      CALL     CASDAT      ;FILL THE CAS DATA BUFFER
6285 032456 004737 033070      CALL     CASTMW      ;GO WRITE CAS FROM TM78
6286 032462 004737 032712      CALL     CASRED      ;GO READ CAS FROM HOST
6287 032466              CKLOOP
6288 032470 004737 033260      CALL     CASCMP      ;GO COMPARE DATA
6289 032474              CKLOOP
6290 032476              ENDSEG
6291 032500 000207              5$: RTS      PC       ;RETURN
6292
6293      ;CASBOT
6294      ;CASBOT: CAS BOOT SUBROUTINE
6295 032502 005737 004412      CASBOT: TST      CASLD      ;IS THE CAS PROGRAM ALREADY LOADED?
6296 032506 001402              BEQ     3$         ;NO - LOAD IT
6297 032510 005005              CLR     ERRCOD      ;YES - DON'T LOAD IT BUT CLEAR THE ERRCOD
6298 032512 000422              BR      2$         ;GET OUT
6299 032514 012737 013662 004400 3$: MOV      #DXTUID,FILNAM ;LOAD THE FILE NAME
6300 032522 004737 021660      CALL     CLOSEX      ;CLOSE THE CHANNEL
6301 032526 004737 013730      CALL     OPENX       ;OPEN THE CHANNEL
6302 032532 005705              TST     ERRCOD      ;OPEN CHANNEL ERROR
6303 032534 001007              BNE     1$         ;YES - RETURN TO USER
6304 032536 004737 013742      CALL     LOADER      ;NO-LOAD THE TM78
6305 032542 005705              TST     ERRCOD      ;LOAD ERROR?
6306 032544 001003              BNE     1$         ;YES - EXIT

```

```

6307 032546 012737 000001 004412      MOV    #1,CASLD      ;SET THE CAS PROGRAM LOADED FLAG
6308 032554 004737 021660      1$:   CALL   CLOSEX   ;CLOSE THE CHANNEL
6309 032560 000207                2$:   RTS    PC
6310
6311
6312      .SBTTL  SUBROUTINE FILL CAS DATA BUFFER - CASDAT
6313      :CASDAT      FILL CAS DATA BUFFER ROUTINE
6314
6315      :
6316      :   INPUT:
6317      :   CASDTA  DATA WORD TO BE WRITTEN IN THE BUFFER
6318
6319      :   OUTPUT:
6320      :   MBBUF   FILLED WITH DESIRED DATA BYTE
6321      :
6322      :   REGISTER USED
6323      :   R1
6324 032562 000001      CASDAT: CLR    R1      ;CLEAR THE COUNTER
6325 032564 005001      1$:   MOV    CASDTA,MBBUF(R1) ;STORE DATA IN THE BUFFER
6326 032566 013761 004330 032102      INC    R1      ;BUMP THE COUNTER
6327 032574 005201      INC    R1      ;BUMP THE COUNTER
6328 032576 005201      CMP    R1,#30.   ;DONE?
6329 032600 020127 000036      BNE    1$       ;NO-CONTINUE
6330 032604 001370      RTS    PC       ;YES-RETURN
6331 032606 000207
6332
6333      .SBTTL  SUBROUTINE CAS WRITE FROM HOST - CASWRT
6334      :CASWRT  CAS WRITE SUBROUTINE-FROM HOST
6335
6336      :   INPUT:
6337      :   MBBUF   CONTAINING THE DATA TO BE
6338      :           WRITTEN TO THE CAS
6339
6340      :   OUTPUT:
6341      :   NONE
6342
6343      :   REGISTERS USED:
6344      :   R1
6345      :   R2
6346      :   R3
6347
6348      :CASWRT: BGNSEG
6349 032610 013777 004352 151420      MOV    MBDRIV,@CS2 ;LOAD THE UNIT NUMBER
6350 032612 005001      CLR    R1      ;CLEAR MB REGISTER TABLE COUNT
6351 032620 005002      CLR    R2      ;CLEAR DATA BUFFER POINTER
6352 032622 005002      1$:   MOVB   MBTBL(R1),R3 ;GET MASS BUS REGISTER #
6353 032624 116103 033352      MOV    MBBUF(R2),@XFRCMD(R3) ;LOAD THE MASS BUS
6354 032630 016273 032102 004230      INC    R1      ;INCREMENT THE CAS REGISTER NUMBER
6355 032636 005201      CALL   NONEX    ;CHECK FOR NONEXISTENT DRIVE
6356 032640 004737 033372      BIT    #CPE,@DS80 ;PARITY ERROR?
6357 032644 032777 004000 151430      BEQ    2$       ;NO-EXIT
6358 032652 001407      ERRDF 30.,RHCAS,ERM030 ;YES-ERROR
6359 032654 052777 040400 151410      BIS    #040400,@DS80 ;DO TM CLR AND KEEP HOLD SET
6360 032664 052777 040400 151410      2$:   CKLOOP
6361 032672 005202      INC    R2      ;INCREMENT THE BUFFER POINTER
6362 032674 005202      INC    R2

```



```

6363 032700 020127 000017
6364 032704 001347
6365 032706
6366 032710 000207
6367
6368
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6380
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6382
6383 032712
6384 032714 013777 004352 151316
6385 032722 005001
6386 032724 005002
6387 032726 116103 033352
6388 032732 017362 004230 031736
6389 032740 005201
6390 032742 004737 033372
6391 032746 032777 020000 151254
6392 032754 001411
6393 032756
6394 032766 052777 040000 151234
6395 032774 005077 151230
6396 033000
6397 033002 005202
6398 033004 005202
6399 033006 020127 000017
6400 033012 001345
6401 033014
6402 033016 000207
6403
6404
6405 033020
6406 033022 004737 033414
6407 033026 005001
6408 033030 012702 042000
6409 033034 010277 151240
6410 033040 000240
6411 033042 017703 151234
6412 033046 110361 031736
6413 033052 005202
6414 033054 005201
6415 033056 020127 000036
6416 033062 001364
6417 033064
6418 033066 000207
    
```

```

;FINISHED?
;NO=CONTINUE
3$: ENDSEG
RTS PC ;YES-RETURN
.SBTTL SUBROUTINE CAS READ FROM HOST - CASRED
;CASRED CAS READ SUBROUTINE-FROM HOST
INPUT:
NONE
OUTPUT:
MBREAD THE DATA READ FROM
CAS VIA THE MASS BUS.
REGISTERS USED
R1
R2
R3
CASRED: BGNSEG
MOV MBDRIV,@CS2 ;LOAD THE UNIT NUMBER
CLR R1 ;CLEAR MASS BUS REGISTER TABLE COUNT
CLR R2 ;CLEAR DATA BUFFER POINTER
1$: MOV MBTBL(R1),R3 ;GET MASS BUS REGISTER NUMBER
MOV @XFRCMD(R3),MBREAD(R2) ;GET THE CAS DATA
INC R1 ;INCREMENT THE REGISTER NUMBER
CALL NONEX ;CHECK FOR NON-EXISTENT DRIVE
BIT #MCPE,@XFRCMD ;PARITY ERROR?
BEQ 2$ ;NO-EXIT
ERRDF 29,,RHCAS,ERM029 ;YES-ERROR
BIS #TRÉ,@XFRCMD ;RH CLR TO CLR MCPE
CLR @XFRCMD
2$: CKLOOP
INC R2 ;INCREMENT THE BUFFER POINTER
INC R2
CMP R1,#15. ;FINISHED?
BNE 1$ ;NO-CONTINUE
3$: ENDSEG
RTS PC ;YES-RETURN
.SBTTL SUBROUTINE CAS READ FROM TM78 MICROPROCESSOR - CASTMR
CASTMR: BGNSEG
CALL HOLDMP ;HALT THE TM78 MP
CLR R1 ;CLEAR THE READ DATA BYTE COUNT
MOV #CASBUF,R2 ;LOAD THE TM78 MP DATA BUFFER ADDRESS
4$: MOV R2,@AD80 ;ADDRESS THE TM78 MP DATA BUFFER
NOP
MOV @DS80,R3 ;GET THE DATA BYTE
MOV R3,MBREAD(R1) ;STORE THE DATA
INC R2 ;INCREMENT TM78 MP ADDRESS
INC R1 ;INCREMENT BYTE POINTER
CMP R1,#30. ;DONE?
BNE 4$ ;NO-CONTINUE
6$: ENDSEG
RTS PC ;YES-RETURN
    
```

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6419          .SBTTL SUBROUTINE CAS WRITE FROM TM78 MICROPROCESSOR - CASTMW
6420 033070 CASTMW: BGNSEG
6421 033072 004737 033414 CALL HOLDMP
6422 033076 012777 041420 151174 MOV #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
6423 033104 012777 000401 151170 MOV #HOLD+1,@DS80 ;WRITE THE WRITE CAS FROM TM78MP COMMAND
6424 033112 000240 NOP
6425 033114 012777 042040 151156 MOV #CASDAL,@AD80 ;ADDRESS CAS WRITE DATA LOW BYTE
6426 033122 113701 032102 MOVBB MBBUF,R1 ;GET THE CAS LOW BYTE DATA
6427 033126 042701 177400 BIC #177400,R1 ;REMOVE ANY SIGN EXTENTION BITS
6428 033132 062701 000400 ADD #HOLD,R1 ;ADD IN THE HOLD BIT
6429 033136 010177 151140 MOV R1,@DS80 ;WRITE THE LOW BYTE TO TM78
6430 033142 012777 042041 151130 MOV #CASDAH,@AD80 ;ADDRESS CAS WRITE DATA HIGH BYTE
6431 033150 113701 032103 MOVBB MBBUF+1,R1 ;GET THE CAS HIGH BYTE DATA
6432 033154 042701 177400 BIC #177400,R1 ;REMOVE ANY SIGN EXTENTION BITS
6433 033160 062701 000400 ADD #HOLD,R1 ;ADD IN THE HOLD BIT
6434 033164 010177 151112 MOV R1,@DS80 ;WRITE HIGH BYTE TO TM78
6435 033170 004737 014566 CALL START
6436 033174 012777 000035 151026 MOV #TSTART,@XFRCMD
6437 033202 DELAY 100 ;PERFORM A 100 MS. TIMEOUT
6438 033232 122777 000372 150770 CMPB #372,@XFRCMD ;DONE?
6439 033240 001404 BEQ 3$ ;YES-CONTINUE
6440 033242 ERRDF 8.,PROCAS,ERM008 ;NO-ERROR
6441 033252 3$: CKLOOP
6442 033254 ENDSEG
6443 033256 000207 RTS PC
6444          .SBTTL SUBROUTINE CAS DATA COMPARE - CASCMP
6445 033260 CASCMP: BGNSEG
6446 033262 005001 CLR R1 ;YES-COMPARE THE DATA
6447 033264 026161 032102 031736 7$: CMP MBBUF(R1),MBREAD(R1) ;
6448 033272 001420 BEQ 5$ ;
6449 033274 010105 MOV R1,R5 ;COPY INDEX
6450 033276 005205 INC R5 ;ADJUST R5
6451 033300 005205 INC R5 ;ADJUST R5
6452 033302 006205 ASR R5 ;DIVIDE BY 2
6453 033304 020527 000001 CMP R5,#1 ;CAS REG 1
6454 033310 001411 BEQ 5$ ;YES - IGNORE THE ERROR
6455 033312 020527 000004 CMP R5,#4 ;CAS REG 4
6456 033316 001406 BEQ 5$ ;YES - IGNORE THE ERROR
6457 033320 ERRDF 9.,CASX,ERM009
6458 033330 INLOOP ;ARE WE LOOPING ON AN ERROR?
6459 033332 BCOMPLETE 2$ ;YES - GET OUT OF THE COMPARE BUSINESS
6460 033334 005201 5$: INC R1 ;INCREMENT THE BUFFER POINTER
6461 033336 005201 INC R1 ;
6462 033340 020127 000036 CMP R1,#30. ;DONE
6463 033344 001347 BNE 7$ ;NO-CONTINUE
6464 033346 2$: ENDSEG
6465 033350 000207 RTS PC
6466          .SBTTL TABLE MASS BUS VS. CAS REGISTER
6467 033352 012 MBTBL: .BYTE 12 ;CAS REGISTER 1
6468 033353 014 .BYTE 14 ;CAS REGISTER 2
6469 033354 024 .BYTE 24 ;CAS REGISTER 3
6470 033355 016 .BYTE 16 ;CAS REGISTER 4
6471 033356 006 .BYTE 6 ;CAS REGISTER 5
6472 033357 026 .BYTE 26 ;CAS REGISTER 6
6473 033360 020 .BYTE 20 ;CAS REGISTER 7
6474 033361 030 .BYTE 30 ;CAS REGISTER 10

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6475 033362 032 .BYTE 32 ;CAS REGISTER 11
6476 033363 034 .BYTE 34 ;CAS REGISTER 12
6477 033364 036 .BYTE 36 ;CAS REGISTER 13
6478 033365 040 .BYTE 40 ;CAS REGISTER 14
6479 033366 042 .BYTE 42 ;CAS REGISTER 15
6480 033367 044 .BYTE 44 ;CAS REGISTER 16
6481 033370 046 .BYTE 46 ;CAS REGISTER 17
6482 033372 .EVEN
6483
6490 .SBTTL NON EXISTENT DRIVE CHECK SUBROUTINE
6491 :NON EXISTENT DRIVE (NED) SUBROUTINE
6492 :
6493 : INPUT:
6494 : NONE
6495 :
6496 : OUTPUT:
6497 : CKLOOP ERROR CONTROL
6498 : ERROR3 PRINTED ON CONSOLE IF 'NED' IS ACTIVE
6499 :
6500 :
6501 033372 032777 010000 150640 NONEX: BIT #NED,@CS2 ;'NED' SET?
6502 033400 001404 BEQ MBREGX ;NO-EXIT
6503 033402 ERRDF 3,RHCAS,ERM003 ;YES-PRINT 'NED' ERROR
6504 033412 000207 MBREGX: RTS PC ;EXIT THE SUBROUTINE
6505 .SBTTL HOLD TM78 MICRO PROCESSOR SUBROUTINE
6506 :
6507 :HOLDMP SUBROUTINE
6508 :
6509 : INPUT: NONE
6510 :
6511 : OUTPUT:
6512 :
6513 : ERR7 IF HOLD ACTIVE (HLDA) NOT SET
6514 :
6515 033414 HOLDMP: BGNSEG
6516 033416 013777 004352 150614 MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
6517 033424 005077 150600 CLR @XFRCMD ;CLEAR CAS REGISTER 0
6518 033430 052777 000400 150644 BIS #HOLD,@DS80 ;STOP THE TM78MP
6519 033436 000240 NOP
6520 033440 000240 NOP
6521 033442 000240 NOP
6522 033444 017701 150632 MOV @DS80,R1 ;GET THE TM78MP STATUS
6523 033450 032701 001000 BIT #HLDA,R1 ;IS 'HLDA' SET?
6524 033454 001004 BNE 1$ ;YES-CONTINUE
6525 033456 ERRDF 7.,PROCAS,ERM007 ;NO-
6526 033466 1$: CKLOOP
6527 033470 013701 004360 MOV TMPORT,R1 ;GET THE PORT NUMBER
6528 033474 001402 BEQ 2$
6529 033476 012701 000200 MOV #200,R1 ;LOAD PORT 1 SELECT CODE
6530 033502 012777 100340 150570 2$: MOV #MBSSEL,@AD80 ;ADDRESS THE MB SELECT BYTE
6531 033510 062701 000400 ADD #HOLD,R1 ;SET HOLD BIT IN DATA
6532 033514 010177 150562 MOV R1,@DS80 ;SELECT DESIRED PORT
6533 033520 ENDSEG
6534 033522 000207 RTS PC ;RETURN TO CALLING ROUTINE

```

```
6535 .SBTTL GLOBAL TEXT SECTION
6536 :++
6537 : THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
6538 : MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
6539 : MORE THAN ONE TEST.
6540 :--
6546 :
6547 : FORMAT STATEMENTS USED IN PRINT CALLS
6548 :
6549 033524 SERFAL: ERRSF 19.,HEAD2,MSG019
6550 033534 000207 RTS PC
6551 033536 046524 034067 046040 HEAD1: .ASCIZ /TM78 LOAD ERROR-TEST ABORTED/
6552 033574 033574 .EVEN
6553 033574 046524 034067 041440 HEAD2: .ASCIZ /TM78 CONTROL ERROR-TEST ABORTED/
6554 033634 044506 042514 051440 HEAD3: .ASCIZ /FILE SERVICE ERROR-TEST ABORTED/
6555 .EVEN
6556 :
6557 :*
6558 :*SYSTEM ERROR MESSAGES
6559 :*
6560 033674 S
6561 (1) : *****
6562 :*TM78CLT SYS FTL ERR 000001 TST 000 SUB 000 PC: 000000
6563 :*UNIT: X RH: 000000 TM: X TU: X PORT: X
6564 :*TM78 STATUS ERROR
6565 :*TM78 LOAD ERROR-TEST ABORTED
6566 :*MB. REG. 52 (CAS 21) = 000000
6567 033674 BGNMSG MSG001
6568 033674 004737 044352 CALL HEADER
6569 033700 PRINTB #FMT001
6570 033720 PRINTB #FMTSTA,STAT80
6571 033744 ENDMSG
6572 033746 040445 046524 034067 FMT001: .ASCIZ /%ATM78 STATUS ERROR%/
6573 .EVEN
6574 033774 040445 041115 020056 FMTSTA: .ASCIZ /%AMB. REG. 52 (CAS 21) = %06%/
6575 034034 .EVEN
6576 :
6577 034034 S
6578 (1) : *****
6579 :*TM78CLT SYS FTL ERR 000002 TST 000 SUB 000 PC: 000000
6580 :*UNIT: X RH: 000000 TM: X TU: X PORT: X
6581 :*'HLDA' NOT SET
6582 :*TM78 LOAD ERROR-TEST ABORTED
6583 :*STATUS = 000000
6584 034034 BGNMSG MSG002
6585 034034 004737 044352 CALL HEADER
6586 034040 PRINTB #FMT002
6587 034060 PRINTB #FMTSTA,STAT80
6588 034104 ENDMSG
6589 :
6590 034106 040445 044042 042114 FMT002: .ASCIZ /%A'HLDA' NOT SET%/
6591 034132 .EVEN
6592 :
6593 034132 S
```

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(1)
6594 ; *****
6595 ; *TM78CLT SYS FTL ERR 000003 TST 000 SUB 000 PC: 000000
6596 ; *UNIT: X RH: 000000 TM: X TU: X PORT: X
6597 ; *TM78 LOAD ERROR-TEST ABORTED
6598 ; *WMC CKSUM ERROR
6599 034132 BGNMSG MSG003
6600 034132 004737 044352 CALL HEADER
6601 034136 PRINTB #FMT003
6602 034156 ENDMSG
6603
6604 034160 040445 041527 020123 FMT003: .ASCIZ /%AWCS CKSUM ERROR%/
6605 .EVEN
6606
6607 034204 S
(1) ; *****
6608 ; *TM78CLT SYS FTL ERR 000004 TST 000 SUB 000 PC: 000000
6609 ; *UNIT: X RH: 000000 TM: X TU: X PORT: X
6610 ; *TM78 LOAD ERROR-TEST ABORTED
6611 ; *WCS VERIFY ERROR
6612 ; *ADD = 000000
6613 ; *ACT = 000000
6614 ; *EXP = 000000
6615
6616 034204 BGNMSG MSG004
6617 034204 004737 044352 CALL HEADER
6618 034210 PRINTB #FMT004
6619 034230 PRINTB #FMTWAD,LOAD80
6620 034254 PRINTB #FMTACT,ADATA
6621 034300 PRINTB #FMTEXP,EDATA
6622 034324 ENDMSG
6623
6624 034326 040445 041527 020123 FMT004: .ASCIZ /%AWCS VERIFY ERROR%/
6625 034354 .EVEN
6626 034354 040445 042101 020104 FMTWAD: .ASCIZ /%AADD = %06%/
6627 .EVEN
6628 034372 040445 041501 020124 FMTACT: .ASCIZ /%AACT = %06%/
6629 .EVEN
6630 034410 040445 054105 020120 FMTEXP: .ASCIZ /%AEXP = %06%/
6631 .EVEN
6632
6633 034426 S
(1) ; *****
6634 ; *TM78CLT SYS FTL ERR 000005 TST 000 SUB 000 PC: 000000
6635 ; *UNIT: X RH: 000000 TM: X TU: X PORT: X
6636 ; *TM78 LOAD ERROR-TEST ABORTED
6637 ; *'TMRDY' RESET AFTER CLEAR CMD.
6638 ; *STATUS = 000000
6639
6640 034426 BGNMSG MSG005
6641 034426 004737 044352 CALL HEADER
6642 034432 PRINTB #FMT005
6643 034452 PRINTB #FMTSTA,STAT80
6644 034476 ENDMSG
6645
6646 034500 040445 052042 051115 FMT005: .ASCIZ /%'TMRDY' RESET AFTER CLEAR CMD.%%/
```

```
6647          034544          .EVEN
6648
6649 034544          S
(1)          : *****
6650          : *TM78CLT SYS FTL ERR 000006 TST 000 SUB 000 PC: 000000
6651          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6652          : *TM78 LOAD ERROR-TEST ABORTED
6653          : *TM78 MONITOR DID NOT START
6654
6655 034544          BGNMSG MSG006
6656 034544 004737 044352 CALL HEADER
6657 034550          PRINTB #FMT006
6658 034570          ENDMSG
6659
6660 034572 040445 046524 034067 FMT006: .ASCIZ /%ATM78 MONITOR DID NOT START%/
6661          034632          .EVEN
6662
6663 034632          S
(1)          : *****
6664          : *TM78CLT SYS FTL ERR 000007 TST 000 SUB 000 PC: 000000
6665          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6666          : *TM78 CONTROL ERROR-TEST ABORTED
6667          : *MICRO TEST DID NOT START
6668
6669 034632          BGNMSG MSG007
6670 034632 004737 044352 CALL HEADER
6671 034636          PRINTB #FMT007
6672 034656          ENDMSG
6673
6674 034660 040445 044515 051103 FMT007: .ASCIZ /%AMICRO TEST DID NOT START%/
6675          034716          .EVEN
6676
6677 034716          S
(1)          : *****
6678          : *TM78CLT SYS FTL ERR 000008 TST 000 SUB 000 PC: 000000
6679          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6680          : *TM78 CONTROL ERROR-TEST ABORTED
6681          : *TM78 COMMUNICATION TIMEOUT
6682
6683 034716          BGNMSG MSG008
6684 034716 004737 044352 CALL HEADER
6685 034722          PRINTB #FMT008
6686 034742          ENDMSG
6687
6688 034744 040445 046524 034067 FMT008: .ASCIZ /%ATM78 COMMUNICATION TIMEOUT%/
6689          035004          .EVEN
6690
6691 035004          S
(1)          : *****
6692          : *TM78CLT SYS FTL ERR 000009 TST 000 SUB 000 PC: 000000
6693          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6694          : *TM78 CONTROL ERROR-TEST ABORTED
6695          : *ILL. REQ. CODE
6696
6697 035004          BGNMSG MSG009
6698 035004 004737 044352 CALL HEADER
```

```
6699 035010 PRINTB #FMT009
6700 035030 ENDMSG
6701
6702 035032 040445 046111 027114 FMT009: .ASCIZ /%AILL. REQ. CODE%/
6703 035056 .EVEN
6704
6705 035056 S
(1) : *****
6706 : *TM78CLT SYS FTL ERR 000010 TST 000 SUB 000 PC: 000000
6707 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6708 : *FIELD SERVICE ERROR-TEST ABORTED
6709 : *OPEN FAILED
6710
6711 035056 BGNMSG MSG010
6712 035056 004737 044352 CALL HEADER
6713 035062 PRINTB #FMT010
6714 035102 ENDMSG
6715 035104 040445 050117 047105 FMT010: .ASCIZ /%AOPEN FAILED%/
6716 .EVEN
6717
6718 035124 S
(1) : *****
6719 : *TM78CLT SYS FTL ERR 000011 TST 000 SUB 000 PC: 000000
6720 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6721 : *FIELD SERVICE ERROR-TEST ABORTED
6722 : *FILE NOT FOUND "FILNAM.EXT"
6723
6724 035124 BGNMSG MSG011
6725 035124 004737 044352 CALL HEADER
6726 035130 PRINTB #FMT011,FILNAM
6727 035154 ENDMSG
6728 035156 040445 044506 042514 FMT011: .ASCIZ /%AFILE NOI FOUND "%T%A"%N/
6729 .EVEN
6730
6731 035210 S
(1) : *****
6732 : *TM78CLT SYS FTL ERR 000012 TST 000 SUB 000 PC: 000000
6733 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6734 : *FIELD SERVICE ERROR-TEST ABORTED
6735 : *EOF READING "FILNAM.EXT"
6736
6737 035210 BGNMSG MSG012
6738 035210 004737 044352 CALL HEADER
6739 035214 PRINTB #FMT012,FILNAM
6740 035240 ENDMSG
6741 035242 040445 047505 020106 FMT012: .ASCIZ /%AE0F READING "%T%A"%N/
6742 035272 .EVEN
6743
6744 035272 S
(1) : *****
6745 : *TM78CLT SYS FTL ERR 000013 TST 000 SUB 000 PC: 000000
6746 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6747 : *FIELD SERVICE ERROR-TEST ABORTED
6748 : *LOAD DEVICE ERROR
6749
6750 035272 BGNMSG MSG013
```

```
6751 035272 004737 044352          CALL  HEADER
6752 035276          PRINTB #FMT013
6753 035316          ENDMSG
6754 035320 040445 047514 042101 FMT013: .ASCIZ  /%ALOAD DEVICE ERROR%/
6755          .EVEN
6756
6757 035346          S
(1)          : *****
6758          : *TM78CLT SYS FTL ERR 000014 TST 000 SUB 000 PC: 000000
6759          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6760          : *FIELD SERVICE ERROR-TEST ABORTED
6761          : *MSG. BUF. FULL
6762
6763 035346          BGNMSG MSG014
6764 035346 004737 044352          CALL  HEADER
6765 035352          PRINTB #FMT014
6766 035372          ENDMSG
6767 035374 040445 051515 027107 FMT014: .ASCIZ  /%AMSG. BUF. FULL%/
6768          035420          .EVEN
6769
6770 035420          S
(1)          : *****
6771          : *TM78CLT SYS FTL ERR 000015 TST 000 SUB 000 PC: 000000
6772          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6773          : *FIELD SERVICE ERROR-TEST ABORTED
6774          : *BIN. BUF. FULL
6775
6776 035420          BGNMSG MSG015
6777 035420 004737 044352          CALL  HEADER
6778 035424          PRINTB #FMT015
6779 035444          ENDMSG
6780 035446 040445 044502 027116 FMT015: .ASCIZ  /%ABIN. BUF. FULL%/
6781          035472          .EVEN
6782
6783 035472          S
(1)          : *****
6784          : *TM78CLT SYS FTL ERR 000016 TST 000 SUB 000 PC: 000000
6785          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6786          : *TM78 CONTROL ERROR-TEST ABORTED
6787          : *ILL. UTIL. REQ.
6788
6789 035472          BGNMSG MSG016
6790 035472 004737 044352          CALL  HEADER
6791 035476          PRINTB #FMT016
6792 035516          ENDMSG
6793 035520 040445 046111 027114 FMT016: .ASCIZ  /%AILL. UTIL. REQ.%/
6794          .EVEN
6795
6796 035544          S
(1)          : *****
6797          : *TM78CLT SYS FTL ERR 000017 TST 000 SUB 000 PC: 000000
6798          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6799          : *TM78 CONTROL ERROR-TEST ABORTED
6800          : *ILL. DATA FMT.
6801
6802 035544          BGNMSG MSG017
```


6803 035544 004737 044352 CALL HEADER
6804 035550 PRINTB #FMT017
6805 035570 ENDMSG
6806 035572 040445 046111 027114 FMT017: .ASCIZ /%AILL. DATA FMT.%N/
6807 035616 .EVEN

6808
6809 035616 S
(1) : *****
6810 : *TM78CLT SYS FTL ERR 000018 TST 000 SUB 000 PC: 000000
6811 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6812 : *TM78 CONTROL ERROR-TEST ABORTED
6813 : *ILL. DATA PAT.

6814
6815 035616 BGNMSG MSG018
6816 035616 004737 044352 CALL HEADER
6817 035622 PRINTB #FMT018
6818 035642 ENDMSG
6819 035644 040445 046111 027114 FMT018: .ASCIZ /%AILL. DATA PAT.%N/
6820 035670 .EVEN

6821
6822 035670 S
(1) : *****
6823 : *TM78CLT SYS FTL ERR 000019 TST 000 SUB 000 PC: 000000
6824 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6825 : *ILL. ERR CODE.

6826 035670 S
(1) : *****
6827 035670 BGNMSG MSG019
6828 035670 004737 044352 CALL HEADER
6829 035674 PRINTB #FMT019
6830 035714 ENDMSG

6831
6832
6833 035716 040445 046111 027114 FMT019: .ASCIZ /%AILL. ERR CODE.%N/
6834 035742 .EVEN

6835
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035742
035742 004737 044352
035746
035774 040445 041115 051040
036050
036050 004737 044352
036054
036076
036100 040445 047042 042105
036144
036144 004737 044352
036150
036170
036172 040445 047042 042105
036232
036232 004737 044352
036236
036256
036260 040445 052042 051115
036304
036304 004737 044352
036310
036334
036336 040445 047516 026516
036407 102 020105 042532
036422
036422 004737 044352
036426
036450
036452 040445 046524 034067
036530
036530 004737 044352
036534
036554
036576

.SBTTL ERROR MESSAGE AREA

:*
:*ERROR MESSAGES
:*

BGNMSG ERM001
CALL HEADER
PRINTB #FMM001,R1,@XFRCMD(R1)
ENDMSG
FMM001: .ASCIZ /%AMB REG. %06%A = %06%A AFTER MB CLEAR%/
.EVEN
BGNMSG ERM002
CALL HEADER
PRINTB #FMM002,R1
ENDMSG
FMM002: .ASCIZ /%A'NED' WHEN READING MB REG. %06%/
.EVEN
BGNMSG ERM003
CALL HEADER
PRINTB #FMM003
ENDMSG
FMM003: .ASCIZ /%A'NED' WHEN READING MB REG.%/
.EVEN
BGNMSG ERM004
CALL HEADER
PRINTB #FMM004
ENDMSG
FMM004: .ASCIZ /%A'TMRDY' NOT SET%/
.EVEN
BGNMSG ERM005
CALL HEADER
PRINTB #FMM005,R1,R2
ENDMSG
FMM005: .ASCIZ /%ANON-EXISTENT REG. %02%A = %06%A SHOULD /
.ASCIZ /BE ZERO%/
.EVEN
BGNMSG ERM006
CALL HEADER
PRINTB #FMM006,R1
ENDMSG
FMM006: .ASCIZ /%ATM78 'ILR' NOT SET AFTER REG. %02%A READ%/
.EVEN
BGNMSG ERM007
CALL HEADER
PRINTB #FMT002
PRINTB #FMTSTA,R1
ENDMSG

6891										
6892	036600					BGNMSG	ERM008			
6893	036600	004737	044352			CALL	HEADER			
6894	036604					PRINTB	#FMM008			
6895	036624					ENDMSG				
6896	036626	040445	044515	051103	FMM008:	.ASCIZ	/ %AMICRO DIAGNOSTIC RESPONSE TIMEOUT%N/			
6897						.EVEN				
6898										
6899	036674					BGNMSG	ERM009			
6900	036674	004737	044352			CALL	HEADER			
6901	036700					PRINTB	#FMM009			
6902	036720					PRINTB	#FNN009,R5			
6903	036742					PRINTB	#FMTACT,MBREAD(R1)			
6904	036766					PRINTB	#FMTEXP,MBBUF(R1)			
6905	037012					ENDMSG				
6906	037014	040445	040503	020123	FMM009:	.ASCIZ	/ %ACAS DATA COMPARE FAIL%N/			
6907	037046	040445	040503	020123	FNN009:	.ASCIZ	/ %ACAS REG. %06%N/			
6908		037070				.EVEN				
6909										
6910	037070					BGNMSG	ERM010			
6911	037070	004737	044352			CALL	HEADER			
6912	037074					PRINTB	#FMM010			
6913	037114					ENDMSG				
6914	037116	040445	046524	034067	FMM010:	.ASCIZ	/ %ATM78 DATA BUS CHANGING WHEN 'HLDA' SET%N/			
6915		037172				.EVEN				
6916										
6917	037172					BGNMSG	ERM011			
6918	037172	004737	044352			CALL	HEADER			
6919	037176					PRINTB	#FMM011			
6920	037216					ENDMSG				
6921	037220	040445	046524	034067	FMM011:	.ASCIZ	/ %ATM78 ADDR BUS CHANGING WHEN 'HLDA' SET%N/			
6922		037274				.EVEN				
6923										
6924	037274					BGNMSG	ERM012			
6925	037274	004737	044352			CALL	HEADER			
6926	037300					PRINTB	#FMM012			
6927	037320					ENDMSG				
6928	037322	040445	044042	046117	FMM012:	.ASCIZ	/ %A'HOLD' DID NOT RESET%N/			
6929		037354				.EVEN				
6930										
6931	037354					BGNMSG	ERM013			
6932	037354	004737	044352			CALL	HEADER			
6933	037360					PRINTB	#FMM013			
6934	037400					ENDMSG				
6935	037402	040445	044042	042114	FMM013:	.ASCIZ	/ %A'HLDA' DID NOT RESET%N/			
6936		037434				.EVEN				
6937										
6938	037434					BGNMSG	ERM014			
6939	037434	004737	044352			CALL	HEADER			
6940	037440					PRINTB	#FMM014			
6941	037460					ENDMSG				
6942	037462	040445	044042	042114	FMM014:	.ASCIZ	/ %A'HLDA' RESETS WHEN 'HOLD' + 'CLEAR' SET%N/			
6943						.EVEN				
6944										
6945	037536					BGNMSG	ERM015			
6946	037536	004737	044352			CALL	HEADER			

6947	037542					PRINTB	#FMM015
6948	037562					ENDMSG	
6949	037564	040445	052042	051115	FMM015:	.ASCIZ	/%A'TMRDY'' DID NOT RESET%N/
6950						.EVEN	
6951							
6952	037616					BGNMSG	ERM016
6953	037616	004737	044352			CALL	HEADER
6954	037622					PRINTB	#FMM016
6955	037642					PRINTB	#FMTACT,R2
6956	037664					PRINTB	#FMTEXP,R1
6957	037706					ENDMSG	
6958							
6959	037710	040445	042522	027107	FMM016:	.ASCIZ	/%AREG. 20 COMPARE FAIL%N/
6960		037742				.EVEN	
6961							
6962	037742					BGNMSG	ERM017
6963	037742	004737	044352			CALL	HEADER
6964	037746					PRINTB	#FMM017,R3
6965	037770					ENDMSG	
6966	037772	040445	047520	052122	FMM017:	.ASCIZ	/%APORT %01%A SELECT BIT NOT SET%N/
6967						.EVEN	
6968							
6969	040034					BGNMSG	ERM018
6970	040034	004737	044352			CALL	HEADER
6971	040040					PRINTB	#FMM018
6972	040060					ENDMSG	
6973	040062	040445	047516	041440	FMM018:	.ASCIZ	/%ANO CONTENTION ERROR OCCURRED%N/
6974		040124				.EVEN	
6975							
6976	040124					BGNMSG	ERM019
6977	040124	004737	044352			CALL	HEADER
6978	040130					PRINTB	#FMM019
6979	040150					ENDMSG	
6980	040152	040445	044442	051114	FMM019:	.ASCIZ	/%A'ILR'' NOT CLEAR WHEN WRITTEN CLEAR%N/
6981		040222				.EVEN	
6982							
6983	040222					BGNMSG	ERM020
6984	040222	004737	044352			CALL	HEADER
6985	040226					PRINTB	#FMM020
6986	040246					PRINTB	#FMTACT,@AS
6987	040272					PRINTB	#FMTEXP,MBBUF
6988	040316					ENDMSG	
6989	040320	040445	040504	040524	FMM020:	.ASCIZ	/%ADATA FROM CAS REG. 4 NOT AS EXPECTED%N/
6990		040372				.EVEN	
6991							
6992	040372					BGNMSG	ERM021
6993	040372	004737	044352			CALL	HEADER
6994	040376					PRINTB	#FMM021,R2
6995	040420					ENDMSG	
6996	040422	040445	052101	042524	FMM021:	.ASCIZ	/%AATTEN. REG. = %06%AAFTER WRITTEN CLEAR%N/
6997		040476				.EVEN	
6998	040476					BGNMSG	ERM022
6999	040476	004737	044352			CALL	HEADER
7000	040502					PRINTB	#FMM022
7001	040522					ENDMSG	
7002	040524	040445	050103	020125	FMM022:	.ASCIZ	/%ACPU WAS NOT INTERRUPTED BY TM78 SETTING ATTENTION%N/

Line	Code	Subcode	Address	Priority	Message	Event
7003						.EVEN
7004						
7005	040612				BGNMSG	ERM023
7006	040612	004737	044352		CALL	HEADER
7007	040616				PRINTB	#FMM023
7008	040636				ENDMSG	
7009	040640	040445	046524	034067	FMM023:	.ASCIZ /%ATM78 "CPE" NOT SET WHEN "PAT" IS SET%N/ .EVEN
7010		040712				
7011						
7012	040712				BGNMSG	ERM024
7013	040712	004737	044352		CALL	HEADER
7014	040716				PRINTB	#FMM024
7015	040736				ENDMSG	
7016	040740	040445	046524	034067	FMM024:	.ASCIZ /%ATM78 "CPE" NOT RESET WHEN "PAT" IS CLEAR%N/ .EVEN
7017		041016				
7018						
7019	041016				BGNMSG	ERM025
7020	041016	004737	044352		CALL	HEADER
7021	041022				PRINTB	#FMM025
7022	041042				ENDMSG	
7023	041044	040445	046524	034067	FMM025:	.ASCIZ /%ATM78 "CPE" SET WHEN "PAT" CLEAR%N/ .EVEN
7024						
7025						
7026	041110				BGNMSG	ERM026
7027	041110	004737	044352		CALL	HEADER
7028	041114				PRINTB	#FMM026
7029	041134				ENDMSG	
7030	041136	040445	050115	021040	FMM026:	.ASCIZ /%AMP "MCPE" NOT SET%N/ .EVEN
7031						
7032						
7033	041164				BGNMSG	ERM027
7034	041164	004737	044352		CALL	HEADER
7035	041170				PRINTB	#FMM027
7036	041210				ENDMSG	
7037	041212	040445	041115	021040	FMM027:	.ASCIZ /%AMB "MCPE" SET%N/ .EVEN
7038						
7039						
7040	041234				BGNMSG	ERM028
7041	041234	004737	044352		CALL	HEADER
7042	041240				PRINTB	#FMM028
7043	041260				PRINTB	#FMTWAD,R3
7044	041302				PRINTB	#FMTACT,R4
7045	041324				PRINTB	#FMTEXP,R2
7046	041346				ENDMSG	
7047	041350	040445	046524	034067	FMM028:	.ASCIZ /%ATM78 MEMORY FAILURE%N/ .EVEN
7048						
7049						
7050	041400				BGNMSG	ERM029
7051	041400	004737	044352		CALL	HEADER
7052	041404				PRINTB	#FMM029,R1
7053	041426				ENDMSG	
7054	041430	040445	040520	044522	FMM029:	.ASCIZ /%APARITY ERR. READING CAS REG. %06%N/ .EVEN
7055		041476				
7056						
7057	041476				BGNMSG	ERM030
7058	041476	004737	044352		CALL	HEADER

7059	041502					PRINTB	#FMM030,R1
7060	041524					ENDMSG	
7061	041526	040445	040520	044522	FMM030:	.ASCIZ	/%APARITY ERR. WRITING CAS REG. %06%N/
7062		041574				.EVEN	
7063							
7064	041574					BGNMSG	ERM031
7065	041574	004737	044352			CALL	HEADER
7066	041600					PRINTB	#TNOPC,DIAGTS
7067	041624					PRINTB	#FMMPPC,@TUSTAT
7068	041650					PRINTB	#FMM031,@CS2
7069	041674					ENDMSG	
7070	041676	040445	046524	034067	FMMPPC:	.ASCIZ	/%ATM78 MICRO PC = %06%N/
7071						.EVEN	
7072	041726	040445	046524	034067	TNOPC:	.ASCIZ	/%ATM78 MICRO TEST = %06%N/
7073						.EVEN	
7074	041760	040445	041115	051440	FMM031:	.ASCIZ	/%AMB STATUS ERROR - CS2 = %06%N/
7075						.EVEN	
7076							
7077	042020					BGNMSG	ERM032
7078	042020	004737	044352			CALL	HEADER
7079	042024					PRINTB	#TNOPC,DIAGTS
7080	042050					PRINTB	#FMMPPC,@TUSTAT
7081	042074					PRINTB	#FMM032
7082	042114					PRINTB	#FNN032,R2
7083	042136					PRINTB	#FMTACT,<B,REDBUF(R2)>
7084	042164					PRINTB	#FMTEXP,<B,WRTBUF(R2)>
7085	042212					ENDMSG	
7086	042214	040445	041115	042040	FMM032:	.ASCIZ	/%AMB DATA COMP. FAIL%N/
7087		042244				.EVEN	
7088	042244	040445	054502	042524	FNN032:	.ASCIZ	/%ABYTE COUNT = %06%N/
7089		042272				.EVEN	
7090							
7091	042272					BGNMSG	ERM033
7092	042272	004737	044352			CALL	HEADER
7093	042276					PRINTB	#TNOPC,DIAGTS
7094	042322					PRINTB	#FMMPPC,@TUSTAT
7095	042346					PRINTB	#FMM033
7096	042366					ENDMSG	
7097	042370	040445	047516	046440	FMM033:	.ASCIZ	/%AND MB STATUS ERROR WHEN EXPECTED%N/
7098		042436				.EVEN	
7099	042436					BGNMSG	ERM034
7100	042436	004737	044352			CALL	HEADER
7101	042442					PRINTB	#FMM034,R3
7102	042464					ENDMSG	
7103							
7104	042466	040445	046524	034067	FMM034:	.ASCIZ	/%ATM78 ROM INFORMATION PARITY ERROR %N%AADR %06%N/
7105						.EVEN	
7106							
7107	042550					BGNMSG	ERM035
7108	042550	004737	044352			CALL	HEADER
7109	042554					PRINTB	#FMM035
7110	042574					PRINTB	#FMMA35,R3,(R5),2(R5)
7111	042624					ENDMSG	
7112	042626	040445	046524	034067	FMM035:	.ASCIZ	/%ATM78 ROM ID# WRONG (CAN NOT LOOP ON THIS ERROR) %N/
7113	042713	045	040501	051104	FMMA35:	.ASCIZ	/%AADR %06%N%AIDEN %01%N%AVER # %03%N/
7114						.EVEN	


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7171 043656 040445 047447 023522 FMM045: .ASCIZ  /%A'OR' SET AFTER 1 SILO LOAD%N/
7172      043716      .EVEN
7173
7174 043716      BGNMSG  ERM046
7175 043716      PRINTB  #FMM046
7176 043736      ENDMSG
7177
7178 043740 040445 047447 023522 FMM046: .ASCIZ  /%A'OR' RESET AFTER SECOND SILO LOAD%N/
7179      .EVEN
7180
7181 044006      BGNMSG  ERM047
7182 044006      PRINTB  #FMM047
7183 044026      ENDMSG
7184
7185 044030 040445 044447 023522 FMM047: .ASCIZ  /%A'IR' NOT RESET BY SILO FULL%N/
7186      .EVEN
7187
7188 044070      BGNMSG  ERM048
7189 044070      PRINTB  #FMM048
7190 044110      ENDMSG
7191
7192 044112 040445 047447 023522 FMM048: .ASCIZ  /%A'OR' NOT SET AFTER SILO FULL%N/
7193      044154      .EVEN
7194
7195 044154      BGNMSG  ERM049
7196 044154      PRINTB  #FMM049
7197 044174      PRINTB  #FM TACT,R2
7198 044216      PRINTB  #FM TEXP,R1
7199 044240      ENDMSG
7200
7201 044242 040445 040502 020104 FMM049: .ASCIZ  /%ABAD SILO READ%N/
7202      .EVEN
7203
7204 044264      BGNMSG  ERM050
7205 044264      PRINTB  #FMM050
7206 044304      ENDMSG
7207
7208 044306 040445 042047 052114 FMM050: .ASCIZ  /%A'DLT' NOT SET BY SILO OVERFLOW%N/
7209      044352      .EVEN
7210 044352      HEADER: PRINTB  #FHEAD,XFRCMD,MBDRIV,TMUNIT,MPOR
7211 044412 000207      RTS      PC
7212
7213 044414 040445 044122 020072 FHEAD:  .ASCIZ  /%ARH: %06% TM: %01% TU: %01% PORT: %01%N/
7214      .EVEN
7215 044470 034115 032471 026066 RHCAS:  .ASCIZ  /M8956, M8957, MASSBUS/
7216 044516 034115 032471 026066 CASX:   .ASCIZ  /M8956, M8957, M8960, M8958, M8953/
7217 044560 034115 032471 026067 PROCAS: .ASCIZ  /M8957, M8960/
7218 044575      115 034470 030066 PRO:    .ASCIZ  /M8960, M8958, M8953/
7219 044621      115 034470 034465 WMC:    .ASCIZ  /M8959/
7220 044627      122 030510 020061 RH11:  .ASCIZ  /RH11 FAILURE/
7221      .EVEN
7222      .LIST  BEX
7223 044644      LASTAD
(3) 044650      L$LAST::

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BIT2 = 000004	G	1219#													
BIT3 = 000010	G	1219#													
BIT4 = 000020	G	1219#													
BIT5 = 000040	G	1219#													
BIT6 = 000100	G	1219#													
BIT7 = 000200	G	1219#													
BIT8 = 000400	G	1219#													
BIT9 = 001000	G	1219#													
BOE = 000400	G	1219#													
BUFEND	031736	5009	5096	6240#											
BUFER	021666	4407	4439	4457	4466	4690	4795	5003*	5009	5079*	5088*	5092*	5096	5484	
		5493	5510	5515	5519	5536	5544	5554	5567	5598	6239#				
BYPFLG	004404	1355#	4385	4386	4408*	4412	4414	4415	4458*	4459	4460				
BYTCNT	004336	1335#	6037	6069*	6136										
CALBYT	021142	5995*	6009*	6066#											
CALILL	021304	6086	6087	6108#											
CALTBL	021212	6079	6080#												
CALX1	021234	6085	6090#												
CALX2	021232	6080	6081	6089#	6093										
CALX4	021242	6082	6092#												
CALX5	021246	6083	6094#												
CALX9	021264	6084	6100#												
CASBOT	032502	2966*	3038*	3487*	3574*	4055*	4130*	4179*	6253*	6279*	6295#				
CASBUF =	042000	1276#	6408												
CASCMD =	041420	1275#	2971	3044	3497	3584	6260	6422							
CASCMP	033260	2931*	3511*	3598*	4067*	4142*	6274*	6288*	6445#						
CASCOR	032430	3650*	3696*	3768*	3814*	3860*	3906*	3952*	3998*	6278#					
CASCOW	032246	3108*	3153*	3199*	3245*	3291*	3338*	3384*	3430*	6252#					
CASDAH =	042041	1278#	6430												
CASDAL =	042040	1277#	6425												
CASDAT	032564	3495*	3582*	4063*	4138*	4185*	6258*	6284*	6324#						
CASDTA	004330	1332#	3492*	3514	3579*	3601	4060*	4070	4135*	4145	4184*	4201	6252*	6278*	
		6325													
CASLD	004412	989*	1358#	1560*	1727*	1823*	1944*	2032*	2112*	2175*	2269*	2357*	2434*	2547*	
		2668*	2749*	2833*	2919*	4242*	4374*	6295	6307*						
CASRED	032712	2930*	4065*	4140*	6286*	6383#									
CASTMR	033020	3510*	3597*	6273*	6405#										
CASTMW	033070	4064*	4139*	4186*	6285*	6420#									
CASWRT	032610	2929*	3500*	3587*	6263*	6348#									
CASX	044516	1852	2041	2120	2276	3060	4190	4198	6457	7216#					
CHAR	004344	1338#	4968	4980	5007	5077	5079	5085	5087*	5088	5090	5094	5201*	5218	
		5223	5235	5237											
CHKSUM	004350	1340#	4699*	4702*	4707*	4711*	4726*	4734*	4736						
CKSUM	004340	1336#													
CLOSEX	021660	2988*	4429*	4470*	5211*	6230#	6300*	6308*							
CLRSTA =	035400	1259#	4874												
COMP	014432	4576*	4795#												
COMPEX	014454	4800	4803#	4814	4821										
COMP0	014436	4796#	4827												
COMP1	014456	4802	4805#												
COMP2	014470	4809#	4825												
COMP3	014522	4812	4816#												
COMP4	014550	4817	4823#												
CONERR =	000031	1244#	5585	6211											
CONTRL	016102	4409*	4467*	5316#											
CONTR1	016122	5321#	5333	5339	5347	5351	5355								

FMM027	041212	7035	7037#															
FMM028	041350	7042	7047#															
FMM029	041430	7052	7054#															
FMM030	041526	7059	7061#															
FMM031	041760	7068	7074#															
FMM032	042214	7081	7086#															
FMM033	042370	7095	7097#															
FMM034	042466	7101	7104#															
FMM035	042626	7109	7112#															
FMM036	043036	7118	7121#															
FMM037	043170	7126	7130#															
FMM040	043240	7133	7136#															
FMM041	043332	7140	7143#															
FMM042	043424	7147	7150#															
FMM043	043516	7154	7157#															
FMM044	043600	7161	7164#															
FMM045	043656	7168	7171#															
FMM046	043740	7175	7178#															
FMM047	044030	7182	7185#															
FMM048	044112	7189	7192#															
FMM049	044242	7196	7201#															
FMM050	044306	7205	7208#															
FMTACT	034372	5637	6620	6628#	6903	6955	6986	7044	7083	7197								
FMTEXP	034410	5644	6621	6630#	6904	6956	6987	7045	7084	7198								
FMTSTA	033774	6570	6574#	6587	6643	6889												
FMTWAD	034354	6619	6626#	7043														
FMT001	033746	6569	6572#															
FMT002	034106	6586	6590#	6888														
FMT003	034160	6601	6604#															
FMT004	034326	6618	6624#															
FMT005	034500	6642	6646#															
FMT006	034572	6657	6660#															
FMT007	034660	6671	6674#															
FMT008	034744	6685	6688#															
FMT009	035032	6699	6702#															
FMT010	035104	6713	6715#															
FMT011	035156	6726	6728#															
FMT012	035242	6739	6741#															
FMT013	035320	6752	6754#															
FMT014	035374	6765	6767#															
FMT015	035446	6778	6780#															
FMT016	035520	6791	6793#															
FMT017	035572	6804	6806#															
FMT018	035644	6817	6819#															
FMT019	035716	6829	6833#															
FMT78P	017322	5602	5604	5607#														
FNN009	037046	6902	6907#															
FNN032	042244	7082	7088#															
FOUND	017020	5542	5552#	5557														
F\$AU =	000015	540#	1142	1155														
F\$AUTO=	000020	540#	1015	1065														
F\$BGN =	000040	540#	928	936	953	991	995	1015	1084	1099	1108	1122	1128	1142				
		1148	1164	1196	1559	1565	1566	1578	1600	1624	1653	1667	1669	1686				
		1687	1726	1733	1754	1822	1827	1858	1943	1945	1964	1992	2031	2036				
		2049	2111	2136	2174	2196	2268	2297	2356	2385	2433	2456	2546	2558				
		2592	2605	2618	2667	2681	2699	2748	2763	2782	2832	2846	2867	2918				

2932	2965	2969	2976	2990	3037	3041	3049	3063	3106	3109	3151	3154
3197	3200	3243	3246	3289	3292	3336	3339	3382	3385	3428	3431	3486
3490	3493	3518	3573	3577	3580	3605	3648	3651	3694	3697	3766	3769
3812	3815	3858	3861	3904	3907	3950	3953	3996	3999	4054	4058	4061
4074	4129	4133	4136	4149	4178	4182	4206	4241	4268	4269	4373	4420
5609	6256	6282	6348	6383	6405	6420	6445	6515	6567	6584	6599	6616
6640	6655	6669	6683	6697	6711	6724	6737	6750	6763	6776	6789	6802
6815	6827	6843	6850	6857	6864	6871	6879	6886	6892	6899	6910	6917
6924	6931	6938	6945	6952	6962	6969	6976	6983	6992	6998	7005	7012
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F\$END = 000041

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F\$INIT= 000006
F\$JMP = 000050

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F\$MSG = 000011

F\$PROT= 000021
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F\$RPT = 000012
F\$SEG = 000003

F\$SOFT= 000005
F\$SRV = 000010

TM78 CONTROLLER LOGIC TEST
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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0155

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L\$TEST	002114	G	867#		
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PAGE 8-12
CROSS REFERENCE TABLE -- USER SYMBOLS

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L10070	033744	6571#	
L10071	034104	6588#	
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MSG010	035056	G	5161	6711#						
MSG011	035124	G	5162	6724#						
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MSG018	035616	G	5169	6815#						
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NON64	004314		1325#							
NON66	004316		1326#							
NON70	004320		1327#							
NON72	004322		973	1328#						
NOREX	013646		4432	4436	4438	4470#				
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RERET 013150	4414	4421#															
RESPON 017134	5572	5577	5579#	6039													
RFWD 020726	5978	6009#															
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RHVEC 004362	986*	988	1345#	4249	4252	4267											
RH11 044627	1588	1592	1596	1605	1609	1614	1619	1634	1638	1648	1662	7220#					
ROMIDT 004216	1234#	2556	2578														
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STOPEX 014210	4629	4633	4640#														
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SVCINS= 177777

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7146	7153	7160	7167	7174	7181	7188	7195	7204	7223#			
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957	958	964	965	988	990	991	993	1018	1021	1024	1035	1047
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1853	1854	1858	1945	1952	1954	1958	1961	1962	1963	1964	1967	1968
1971	1974	1975	1976	1980	1984	1986	1989	1991	1992	2036	2041	2045
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5456	5531	5582	5583	5588	5602	5604	5611	5612	5637	5644	5789	5803
5822	5823	5831	5849	5854	6028	6035	6043	6209	6230	6256	6264	6266
6269	6270	6272	6275	6276	6282	6287	6289	6290	6348	6358	6360	6365
6383	6393	6396	6401	6405	6417	6420	6437	6440	6441	6442	6445	6457
6458	6459	6464	6503	6515	6525	6526	6533	6549	6569	6570	6571	6586
6587	6588	6601	6602	6618	6619	6620	6621	6622	6642	6643	6644	6657
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7154	7155	7161	7162	7168	7169	7175	7176	7182	7183	7189	7190	7196
7197	7198	7199	7205	7206	7210	7223						
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3292	3339	3385	3431	3513	3518	3600	3605	3651	3697	3769	3815	3861
3907	3953	3999	4069	4074	4144	4149	4206	4268	4271	4385	4394	4414
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6588	6602	6622	6644	6658	6672	6686	6700	6714	6727	6740	6753	6766
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SVCTAG= 177777

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	1827#	1854#	1945#	1963#	1964#	1976#	2036#	2048#	2558#	2568#	2592#	2600#	2605#
	2613#	2681#	2695#	2763#	2778#	2846#	2863#	3493#	3513#	3580#	3600#	4061#	4069#
	4136#	4144#	6256#	6276#	6282#	6290#	6348#	6365#	6383#	6401#	6405#	6417#	6420#
	6442#	6445#	6464#	6515#	6533#								
T\$SEKO= 010010	1566#	1577	1578#	1598	1600#	1622	1624#	1651	1653#	1665	1733#	1742	1827#
	1854	1945#	1963	1964#	1976	2036#	2048	2558#	2568	2592#	2600	2605#	2613
	2681#	2695	2763#	2778	2846#	2863	3493#	3513	3580#	3600	4061#	4069	4136#
	4144	6256#	6276	6282#	6290	6348#	6365	6383#	6401	6405#	6417	6420#	6442
	6445#	6464	6515#	6533									
T\$SUBN= 000000	540#	1559#	1565#	1669#	1726#	1822#	1943#	2031#	2111#	2174#	2268#	2356#	2433#
	2546#	2667#	2748#	2832#	2918#	2965#	3037#	3106#	3151#	3197#	3243#	3289#	3336#
	3382#	3428#	3486#	3573#	3648#	3694#	3766#	3812#	3858#	3904#	3950#	3996#	4054#
	4129#	4178#	4241#	4373#									
T\$TAGL= 177777	540#												
T\$TAGN= 010173	540#	897#	910#	928#	953#	995#	1015#	1084#	1099#	1122#	1142#	1164#	1196#
	1559#	1565#	1669#	1726#	1822#	1943#	2031#	2111#	2174#	2268#	2356#	2433#	2546#
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	3428#	3486#	3573#	3648#	3694#	3766#	3812#	3858#	3904#	3950#	3996#	4054#	4129#
	4178#	4241#	4269#	4373#	5609#	6567#	6584#	6599#	6616#	6640#	6655#	6669#	6683#
	6697#	6711#	6724#	6737#	6750#	6763#	6776#	6789#	6802#	6815#	6827#	6843#	6850#
	6857#	6864#	6871#	6879#	6886#	6892#	6899#	6910#	6917#	6924#	6931#	6938#	6945#
	6952#	6962#	6969#	6976#	6983#	6992#	6998#	7005#	7012#	7019#	7026#	7033#	7040#
	7050#	7057#	7064#	7077#	7091#	7099#	7107#	7116#	7124#	7132#	7139#	7146#	7153#
	7160#	7167#	7174#	7181#	7188#	7195#	7204#						
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	1206#	1213#	1577#	1598#	1622#	1651#	1665#	1667#	1686#	1687#	1742#	1754#	1854#
	1858#	1963#	1976#	1992#	2048#	2049#	2136#	2196#	2297#	2385#	2456#	2568#	2600#
	2613#	2618#	2695#	2699#	2778#	2782#	2863#	2867#	2932#	2969#	2976#	2990#	3041#
	3049#	3063#	3109#	3154#	3200#	3246#	3292#	3339#	3385#	3431#	3490#	3513#	3518#
	3577#	3600#	3605#	3651#	3697#	3769#	3815#	3861#	3907#	3953#	3999#	4058#	4069#
	4074#	4133#	4144#	4149#	4182#	4206#	4268#	4271#	4385#	4394#	4414#	4420#	4459#
	5612#	6209#	6276#	6290#	6365#	6401#	6417#	6442#	6464#	6533#	6571#	6588#	6602#
	6622#	6644#	6658#	6672#	6686#	6700#	6714#	6727#	6740#	6753#	6766#	6779#	6792#
	6805#	6818#	6830#	6846#	6853#	6860#	6867#	6874#	6882#	6890#	6895#	6905#	6913#
	6920#	6927#	6934#	6941#	6948#	6957#	6965#	6972#	6979#	6988#	6995#	7001#	7008#
	7015#	7022#	7029#	7036#	7046#	7053#	7060#	7069#	7085#	7096#	7102#	7111#	7120#
	7128#	7134#	7141#	7148#	7155#	7162#	7169#	7176#	7183#	7190#	7199#	7206#	
T\$TEST= 000050	540#	1559#	1565	1669	1726#	1822#	1943#	2031#	2111#	2174#	2268#	2356#	2433#
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T\$STM= 177777	540#	945	954	955	957	964	988	990	991	993	1018	1021	1024
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	1566	1575	1576	1577	1578	1588	1589	1592	1593	1596	1597	1598	1600
	1605	1606	1609	1610	1614	1615	1619	1621	1622	1624	1634	1635	1638
	1639	1648	1650	1651	1653	1662	1664	1665	1667	1669	1678	1679	1684
	1685	1686	1687	1733	1737	1741	1742	1754	1827	1831	1835	1838	1839
	1843	1844	1852	1853	1854	1858	1945	1952	1958	1961	1962	1963	1964

1967	1971	1974	1975	1976	1980	1984	1986	1989	1991	1992	2036	2041
2045	2048	2049	2120	2121	2128	2130	2133	2135	2136	2193	2195	2196
2276	2278	2286	2287	2290	2291	2294	2296	2297	2366	2368	2376	2378
2383	2384	2385	2441	2443	2453	2455	2456	2558	2563	2567	2568	2583
2592	2597	2599	2600	2605	2610	2612	2613	2618	2681	2690	2694	2695
2699	2763	2773	2777	2778	2782	2846	2853	2859	2863	2867	2932	2969
2976	2980	2986	2987	2990	3041	3049	3060	3062	3063	3109	3154	3200
3246	3292	3339	3385	3431	3490	3493	3501	3506	3507	3509	3512	3513
3518	3577	3580	3588	3593	3594	3596	3599	3600	3605	3651	3697	3769
3815	3861	3907	3953	3999	4058	4061	4066	4068	4069	4074	4133	4136
4141	4143	4144	4149	4182	4190	4192	4198	4200	4206	4252	4253	4264
4265	4266	4267	4268	4381	4383	4385	4388	4394	4407	4414	4420	4453
4457	4459	4463	4466	4499	5128	5201	5241	5396	5450	5456	5531	5582
5588	5602	5604	5611	5612	5637	5644	5789	5803	5822	5823	5831	5849
5854	6028	6035	6043	6209	6230	6256	6264	6269	6270	6272	6275	6276
6282	6287	6289	6290	6348	6358	6360	6365	6383	6393	6396	6401	6405
6417	6420	6440	6441	6442	6445	6457	6458	6464	6503	6515	6525	6526
6533	6549	6569	6570	6571	6586	6587	6588	6601	6602	6618	6619	6620
6621	6622	6642	6643	6644	6657	6658	6671	6672	6685	6686	6699	6700
6713	6714	6726	6727	6739	6740	6752	6753	6765	6766	6778	6779	6791
6792	6804	6805	6817	6818	6829	6830	6845	6846	6852	6853	6859	6860
6866	6867	6873	6874	6881	6882	6888	6889	6890	6894	6895	6901	6902
6903	6904	6905	6912	6913	6919	6920	6926	6927	6933	6934	6940	6941
6947	6948	6954	6955	6956	6957	6964	6965	6971	6972	6978	6979	6985
6986	6987	6988	6994	6995	7000	7001	7007	7008	7014	7015	7021	7022
7028	7029	7035	7036	7042	7043	7044	7045	7046	7052	7053	7059	7060
7066	7067	7068	7069	7079	7080	7081	7082	7083	7084	7085	7093	7094
7095	7096	7101	7102	7109	7110	7111	7118	7119	7120	7126	7127	7128
7133	7134	7140	7141	7147	7148	7154	7155	7161	7162	7168	7169	7175
7176	7182	7183	7189	7190	7196	7197	7198	7199	7205	7206	7210	
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2748#	2832#	2918#	2965#	3037#	3106#	3151#	3197#	3243#	3289#	3336#	3382#	3428#
3486#	3573#	3648#	3694#	3766#	3812#	3858#	3904#	3950#	3996#	4054#	4129#	4178#
4241#	4373#											
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1122#	1128	1135										
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897#	904											
953#	991	993										
5609#	5612	6567#	6571	6584#	6588	6599#	6602	6616#	6622	6640#	6644	6655#
6658	6669#	6672	6683#	6686	6697#	6700	6711#	6714	6724#	6727	6737#	6740
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6830	6843#	6846	6850#	6853	6857#	6860	6864#	6867	6871#	6874	6879#	6882
6886#	6890	6892#	6895	6899#	6905	6910#	6913	6917#	6920	6924#	6927	6931#
6934	6938#	6941	6945#	6948	6952#	6957	6962#	6965	6969#	6972	6976#	6979
6983#	6988	6992#	6995	6998#	7001	7005#	7008	7012#	7015	7019#	7022	7026#
7029	7033#	7036	7040#	7046	7050#	7053	7057#	7060	7064#	7069	7077#	7085
7091#	7096	7099#	7102	7107#	7111	7116#	7120	7124#	7128	7132#	7134	7139#
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7188#	7190	7195#	7199	7204#	7206							
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TSTSTS= 000001

TSSAU = 010011
TSSAUT= 010005
TSSCLE= 010007
TSSDU = 010010
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TSSHW = 010000
TSSINI= 010003
TSSMSG= 010172

TSSPRO= 010004
TSSRPT= 010002
TSSSEG= 010010

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UNITS 021110	5982	6050#											
UTILTB 020622	5973	5975#											
UTIL80 020604	5337	5970#											
UTLILL 020772	5975	5979	5983	5984	5985	5986	5987	5988	5989	5990	6023#		
WAIT 016424	5321	5446#											
WAIT0 016430	5448#	5458											
WAIT1 016434	5449#	5455											
WAIT2 016522	5453	5462#											
WAIT3 016550	5460	5465	5467#										
WC 004232	1300#	6072*											
WGCRPE 020662	5976	5977	5995#										
WGCRX 020724	5997	6000	6004#										
WMC 044621	7219#												
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WRITE 014212	4573*	4690#											
WRITEX 014234	4694	4697#											
WRITE0 014224	4693#	4739											
WRITE1 014236	4696	4699#											
WRITE2 014310	4714#	4730											
WRITE3 014360	4722	4724#											
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XFRCMD 004230	968	1019	1299#	1571*	1572*	1573	1583*	1584*	1590	1594	1672*	1682	1729*
	1734	1825*	1828	2438	2450	2977*	2984	3050*	3051	3055	3502*	3504	3589*
	3591	4248*	4883*	4887	5346*	5400*	5404	5580*	5581*	5585*	5594*	6003*	6017*
	6026	6041	6054*	6211*	6265*	6267	6353*	6388	6391	6394*	6395*	6436*	6438
	6517*	6845	7210										
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	3049	3490	3503	3577	3590	4058	4133	4182	4245	4428#	4475#	4480#	4624
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	7089#	7098#	7144#	7172#	7193#	7209#							

B	COMPL	956	958	4382	5202	5583	6459									
B	GNAU	1142														
B	GNAUT	1015														
B	GNCN	1099														
B	GNDU	1122														
B	GNGHRD	1164														
B	GNGHW	897														
B	GNINI	953														
B	GNGMSG	5609	6567	6584	6599	6616	6640	6655	6669	6683	6697	6711	6724	6737	6750	6763
		6776	6789	6802	6815	6827	6843	6850	6857	6864	6871	6879	6886	6892	6899	6910
		6917	6924	6931	6938	6945	6952	6962	6969	6976	6983	6992	6998	7005	7012	7019
		7026	7033	7040	7050	7057	7064	7077	7091	7099	7107	7116	7124	7132	7139	7146
		7153	7160	7167	7174	7181	7188	7195	7204							
B	GNGPRO	995														
B	GNGRPT	928														
B	GNGSEG	1566	1578	1600	1624	1653	1733	1827	1945	1964	2036	2558	2592	2605	2681	2763
		2846	3493	3580	4061	4136	6256	6282	6348	6383	6405	6420	6445	6515		
B	GNGSFT	1196														
B	GNGSRV	1084	4269													
B	GNGSUB	1565	1669													
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B	GNGTST	1559	1726	1822	1943	2031	2111	2174	2268	2356	2433	2546	2667	2748	2832	2918
		2965	3037	3106	3151	3197	3243	3289	3336	3382	3428	3486	3573	3648	3694	3766
		3812	3858	3904	3950	3996	4054	4129	4178	4241	4373					
B	NGCOMP	965	4454	5397												
B	NGBREAK	1048	2980	5450												
B	NGRESET	990														
B	NGCKLOOP	1576	1589	1593	1597	1606	1610	1615	1621	1635	1639	1650	1664	1679	1685	1741
		1835	1839	1844	1853	1952	1958	1962	1967	1971	1975	1980	1936	1991	2045	2121
		2130	2135	2195	2278	2287	2291	2296	2368	2378	2384	2443	2455	2567	2599	2612
		2694	2777	2859	2987	3062	3501	3507	3509	3512	3588	3594	3596	3599	4066	4068
		4141	4143	4192	4200	4266	6264	6270	6272	6275	6287	6289	6360	6396	6441	6526
B	NGCLOSE	6230														
B	NGCLRVEC	988	1021	4267												
B	NGDELAY	1047	1107	1570	1582	1675	1739	1833	1846	1954	1968	2124	2370	2445	2979	3503
		3590	4245	4624	4870	4885	5402	5449	6266	6437						
B	NGDESCRI	869														
B	NGDEVTYP	868														
B	NGDISPAT	883														
B	NGDODU	1063														
B	NGENDAU	1155														
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B	NGENDCLN	1117														
B	NGENDDU	1135														
B	NGENDHRD	1171														
B	NGENDHW	904														
B	NGENDINI	993														
B	NGENDMSG	5612	6571	6588	6602	6622	6644	6658	6672	6686	6700	6714	6727	6740	6753	6766
		6779	6792	6805	6818	6830	6846	6853	6860	6867	6874	6882	6890	6895	6905	6913
		6920	6927	6934	6941	6948	6957	6965	6972	6979	6988	6995	7001	7008	7015	7022
		7029	7036	7046	7053	7060	7069	7085	7096	7102	7111	7120	7128	7134	7141	7148
		7155	7162	7169	7176	7183	7190	7199	7206							
B	NGENDPRO	999														
B	NGENDRPT	945														
B	NGENDSEG	1577	1598	1622	1651	1665	1742	1854	1963	1976	2048	2568	2600	2613	2695	2778
		2863	3513	3600	4069	4144	6276	6290	6365	6401	6417	6442	6464	6533		

ENDSFT	1213														
ENDSRV	1088	4271													
ENDSUB	1667	1686													
ENDSW	921														
ENDTST	1687	1754	1858	1992	2049	2136	2196	2297	2385	2456	2618	2699	2782	2867	2932
	2990	3063	3109	3154	3200	3246	3292	3339	3385	3431	3518	3605	3651	3697	3769
	3815	3861	3907	3953	3999	4074	4149	4206	4268	4420					
EQUALS	1219														
ERRDF	1575	1588	1592	1596	1605	1609	1614	1619	1634	1638	1648	1662	1678	1684	1737
	1831	1838	1843	1852	1961	1974	1984	1989	2041	2120	2128	2133	2193	2276	2286
	2290	2294	2366	2376	2383	2441	2453	2563	2583	2597	2610	2690	2773	2853	2986
	3060	3506	3593	4190	4198	4264	5531	6028	6035	6043	6269	6358	6393	6440	6457
	6503	6525													
ERRSF	5128	6549													
EXIT	936	991	1108	1128	1148	2969	2976	3041	3049	3490	3577	4058	4133	4182	
GETBYT	5201														
GMANID	4394														
GMANIL	4385	4414	4459	6209											
GPHARD	964														
GPRMA	1165														
GPRMD	1167	1168	1169	1170	4394#										
GPRML	1166	1203	1204	1205	1206	4385#	4414#	4459#	6209#						
HEADER	867														
INLOOP	5582	6458													
LASTAD	7223														
MANUAL	4381	4453	5396												
MSBYTE	867#														
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MSCNTO	1165#	1166#	1167#	1168#	1169#	1170#	1203#	1204#	1205#	1206#	4385#	4394#	4414#	4459#	6209#
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	5637#	5644#	5789#	5803#	5822#	5823#	5831#	5849#	5854#	6569#	6570#	6586#	6587#	6601#	6618#
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	6873	6881	6888	6889	6894	6901	6902	6903	6904	6912	6919	6926	6933	6940	6947
	6954	6955	6956	6964	6971	6978	6985	6986	6987	6994	7000	7007	7014	7021	7028
	7035	7042	7043	7044	7045	7052	7059	7066	7067	7068	7079	7080	7081	7082	7083
	7084	7093	7094	7095	7101	7109	7110	7118	7119	7126	7127	7133	7140	7147	7154
	7161	7168	7175	7182	7189	7196	7197	7198	7205	7210					
PRINTF PRINTX READEF RFLAGS	1024	1035	1051	1056	1061	1064	4383	4388	4407	4457	4466	5241	5602		
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	955	957													
S	4463	5456	5588												
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	6718	6731	6744	6757	6770	6783	6796	6809	6822	6826					
SD	805#	1372	1692	1758	1862	1997	2053	2141	2201	2301	2390	2461	2625	2706	2787

TM78 CONTROLLER LOGIC TEST
ZTMIB7.P11 27-AUG-80 15:25

MACY11 30(1046) 17-OCT-80 16:27 PAGE 9-8
CROSS REFERENCE TABLE -- MACRO NAMES

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SE	816#	1506	1720	1801	1910	2018	2088	2162	2240	2333	2416	2515	2652	2733	2817
	2891	2958	3025	3078	3123	3169	3215	3261	3307	3354	3400	3458	3545	3620	3666
	3738	3784	3830	3876	3922	3968	4026	4101	4154	4229	4347				
SETPRI	954	4253	4265												
SETVEC	1018	4252													
SIO	836#	4492	4547	4607	4675	4773	4852	4944	5056	5114	5183	5305	5379	5433	6223
SP	826#	1383	1699	1765	1877	2003	2065	2144	2213	2310	2397	2468	2629	2710	2790
	2875	2941	3001	3073	3118	3164	3210	3256	3302	3349	3395	3441	3528	3615	3661
	3705	3733	3779	3825	3871	3917	3963	4009	4084	4214	4282	4487	4505	4591	4644
	4743	4831	4902	5019	5105	5175	5263	5360	5412	5620	5650	5876	6189	6219	
SSUB	795#	4485	4503	4589	4642	4741	4829	4900	5017	5103	5173	5261	5358	5410	5618
	5648	5874	6057	6113	6187	6217									
ST	785#	1370	1690	1756	1860	1995	2051	2139	2199	2299	2388	2459	2623	2704	2785
	2869	2934	2994	3066	3111	3157	3203	3249	3295	3342	3388	3434	3521	3608	3654
	3700	3772	3818	3864	3910	3956	4002	4077	4152	4209	4274				
SVC	539#	540													
XFER	936#	991#	1108#	1128#	1148#	2969#	2976#	3041#	3049#	3490#	3577#	4058#	4133#	4182#	

. ABS. 044650 000

ERRORS DETECTED: 0

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RUN-TIME: 59 64 6 SECONDS
RUN-TIME RATIO: 1360/131=10.3
CORE USED: 23K (46 PAGES)