

DM11BB

MODEM CONTROL DIAG
MD-11-DZDMD-B

EP-DZDMD-B-DL-A
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The image displays a grid of 100 small diagrams or data tables, arranged in 10 rows and 10 columns. Each cell contains technical information, likely related to modem control, such as bit patterns, timing diagrams, or state transition logic. The diagrams are small and dense with text and symbols. The grid is located on the left side of the page, with the right side being a large, mostly blank area.

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDMD-B-D
 PRODUCT NAME: DM11-BB MODEM CONTROL
 MULTIPLEXER DIAGNOSTIC
 PROGRAM DATE: APRIL 1976
 MAINTAINER: DIAGNOSTIC GROUP

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1.0 ABSTRACT

THIS PROGRAM IS A TEST OF THE DM11-BB MODEM CONTROL MULTIPLEXER.
THE PROGRAM IS DIVIDED INTO FUNCTIONAL TEST GROUPS AS
FOLLOWS:

- GROUP 0: ALL LINE SCANNER AND LINE MULTIPLEXER FUNCTIONS ARE TESTED USING THE H861 TEST CONNECTOR
- GROUP 1: A SINGLE LINE IS TESTED USING THE MODEM CABLE AND A DC11 TEST CONNECTOR
- GROUP 2: CONNECT-DISCONNECT TEST FOR 103A MODEMS
- GROUP 3: CONNECT-DISCONNECT TEST FOR 202C MODEMS

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11 COMPUTER WITH AT LEAST 8K OF MEMORY
ASR-33 TELETYPE OR EQUIVALENT
DM11-BB

2.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

DM11-DC (4 LEVEL CONVERTERS AND 4 CABLES
CONNECTED TO DISTRIBUTION PANEL)
DC11 TEST CONNECTOR

2.1.3 FOR ON LINE TESTS

M974 DM11 MAINTENANCE JUMPER (NEEDED TO PREVENT LONG
SPACE DISCONNECTS IF DM11-AA IS NOT CONNECTED
TO THE DISTRIBUTION PANEL)
2 BELL 103A MODEMS (FOR 103A TEST)
2 BELL 202C MODEMS (FOR 202C TEST)

2.2 MEMORY

THE PROGRAM RUNS IN 8K MEMORY

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3.0

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LCC. 176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

- 1. <CR> IF NO CHANGES ARE TO BE MADE
- 2. 6 DIGITS 0-7 TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
- 3. ↑U TO ALLOW REENTER ↑G VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

4.0

LOADING AND STARTING PROCEDURE

4.1

THE STANDARD PROCEDURS FOR LOADING BINARY TAPES IS TO BE USED STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200.

RESTART ADDRESS FOR ALL TESTS IS 000200

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4.2 OPERATOR AND/OR PROGRAM ACTION

4.2.1 INITIAL PROGRAM START

4.2.1A WITH HARDWARE SWITCH REGISTER
LOAD ADDRESS 000200
SET SW00 = 1
PRESS START

4.2.1B WITHOUT HARDWARE SWITCH REGISTER

LOAD ADDRESS 200
PRESS START

4.2.1.2 PROGRAM WILL TYPE
"DM11-BB DIAGNOSTIC (ONCE ONLY)

4.2.1.3 PROGRAM WILL TYPE (WITH SW00 = 1)
VECTOR ADDRESS-" AND WILL WAIT FOR AN INPUT
FROM THE TELETYPE KEYBOARD.

4.2.1.4 TYPE A THREE DIGIT NUMBER (OCTAL) WHICH IS THE
ADDRESS THAT THE DM11-BB WILL INTERRUPT TO, FOLLOWED BY
<RETURN>. IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL
TYPE "?" AND THEN REPEAT 4.2.1.3.

NOTE: IF THE ADDRESS ENTERED IS ACCEPTIBLE TO THE PROGRAM,
BUT IS NOT THE INTERRUPT VECTOR ADDRESS OF THE DM11-BB
UNDER TEST, A HALT WILL OCCUR AT THAT ADDRESS+2, WHEN
THE DM11-BB INTERRUPTS.

TO RECOVER, PERFORM 4.2.2.1.

4.2.1.5 THE PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-" AND WAIT FOR
AN INPUT FROM THE TELETYPE KEYBOARD.

4.2.1.6 TYPE A 6 DIGIT (OCTAL NUMBER) WHICH IS THE ADDRESS OF THE
DM11-BB CONTROL REGISTER FOLLOWED BY <RETURN>.
IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL
TYPE "?" AND THEN REPEAT 4.2.1.6.

NOTE: IF THE ADDRESS ENTERED IS ACCEPTIBLE TO THE PROGRAM
BUT IS A NON-EXISTANT REGISTER, A BUS ERROR TRAP WILL
OCCUR WHEN THE PROGRAM ADDRESSES THE REGISTER, AND THE
PROGRAM WILL HALT AT LOCATION 6.

TO RECOVER, PERFORM 4.2.2.1.

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4.2.1.7 THE PROGRAM WILL TYPE
"TEST-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

4.2.1.8 TYPE A THREE DIGIT OCTAL NUMBER CORRESPONDING TO THE
NUMBER OF THE TEST TO BE RUN FOLLOWED BY (RETURN).
IF AN INCORRECT TEST NUMBER IS TYPED THE PROGRAM WILL
TYPE "?" AND THEN REPEAT 4.2.1.7
THE AVAILABLE TESTS TOGETHER WITH THE NUMBER TO BE TYPED
ARE GIVEN BELOW.

TEST GROUP 0:
OFF LINE TESTS USING H861 TEST CONNECTOR-FIRST TEST=0
TEST GROUP 1:
OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100
TEST GROUP 2:
CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200
TEST GROUP 3:
CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300

4.2.1.9 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART WITH HARDWARE SWITCH REGISTER

4.2.2.1 WITH SW00=1

LOAD ADDRESS 200
SET SW00=1 BEFORE PRESSING START.
PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.9.

4.2.2.2 WITH SW00=0

LOAD ADDRESS 200
PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.9

4.2.3 PROGRAM RESTART WITHOUT HARDWARE SWITCH REGISTER

LOAD ADDRESS 200
PRESS START

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5.0 OPERATING PROCEDURE

5.1 TEST GROUP 0 16 LINE SCANNER TEST

5.1.1 TEST INITIALIZATION

NONE REQUIRED, PROGRAM TYPES "16 LINE SCANNER TEST"
AND BEGINS TEST EXECUTION.

5.1.2 OPERATIONAL SWITCH SETTINGS

SW15=1, HALT ON ERROR
SW14=1, LOOP ON CURRENT TEST
SW13=1, SUPPRESS ERROR TYPEOUT
SW11=1, SUPPRESS ITERATIONS
SW10=1, ESCAPE TO NEXT TEST ON ERROR
SW09=1, FREEZE DATA

5.1.3 PROGRAM AND/OR OPERATOR ACTION

5.1.3.1 WITH ALL SWITCHES DOWN, THE PROGRAM WILL RUN
ALL TESTS IN THE SELECTED GROUP, SEQUENTIALLY. EACH TEST IS REPEATED
A FIXED NUMBER OF TIMES (SEE LISTING FOR DETAILS),
EXCEPT FOR TO WHICH IS EXECUTED ONCE ONLY AFTER START OF TEST. WHEN AL
TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL RING THE TELETYPE
BELL AND RESTART AT THE FIRST TEST OF THE SELECTED GROUP.

IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE
ERROR MESSAGE AND CONTINUE TESTING.

5.1.3.2 WITH SW15=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT
A HALT WILL OCCUR AFTER ERROR TYPEOUT.

5.1.3.3 WITH SW13=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT
NO ERROR TYPEOUT WILL OCCUR. THE PC OF THE TEST THAT FAILED
WILL BE DISPLAYED IN THE COMPUTER DATA LIGHTS.

5.1.3.4 THIS PROGRAM WILL NO LONGER TRACE TRAP WITH THIS RELEASE

5.1.3.5 WITH SW10=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT
AFTER AN ERROR HAS OCCURED, THE PROGRAM WILL IMMEDIATELY
START THE NEXT TEST IN SEQUENCE.

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5.2 TEST GROUP 1 SINGLE LINE CABLE TEST

5.2.1 TEST INITIALIZATION

THE PROGRAM WILL TYPE "SINGLE LINE CABLE TEST
LINE NUMBER-" AND WILL WAIT FOR AN INPUT FROM
THE TELETYPE KEYBOARD.

TYPE A 2 DIGIT OCTAL NUMBER BETWEEN 0 AND 17, CORRESPONDING
TO THE NUMBER OF THE LINE TO BE TESTED, FOLLOWED BY
<RETURN>. THE PROGRAM WILL THEN BEGIN TEST EXECUTION.
IF THE TELETYPE INPUT IS INCORRECT, THE PROGRAM
WILL TYPE "?" AND REPEAT THE MESSAGE.

5.2.2 OPERATIONAL SWITCH SETTINGS

SAME AS 5.1.2

5.2.3 PROGRAM AND/OR OPERATOR ACTION

SAME AS 5.1.3

5.3 TEST GROUP 2 BELL 103A MODEM CONNECT-DISCONNECT TEST

5.3.1 TEST INITIALIZATION

THE PROGRAM WILL TYPE "103A CONNECT-DISCONNECT TEST
ORIGINATE LINE-" AND WAIT FOR AN INPUT FROM THE TELETYPE
KEYBOARD.

TYPE THE NUMBER OF THE LINE THAT WILL ORIGINATE THE
CALL (0-17 OCTAL) FOLLOWED BY RETURN.

THE PROGRAM WILL TYPE "ANSWER LINE-" AND WILL WAIT
FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE THE NUMBER OF THE LINE THAT WILL ANSWER THE CALL
(0-17 OCTAL) FOLLOWED BY <RETURN>.

THE PROGRAM WILL TYPE "DIAL ANSWERING DATA SET"
AND WILL WAIT FOR THE ORIGINATE AND ANSWERING MODEMS
TO GENERATE INTERRUPTS.

5.3.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

AFTER THE MESSAGE "DIAL ANSWERING DATA SET" IS TYPED
THE OPERATOR HAS APPROXIMATELY 5 MINUTES TO ESTABLISH
A CONNECTION BETWEEN THE 2 DATA SETS.

5.3.2.1 PLACE ANSWERING DATA SET IN "AUTO ANSWER" MODE

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5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE

5.3.2.3 DIAL DIAL ANSWERING DATA SET FROM ORIGINATING DATA SET

5.3.2.4 LISTEN FOR TONE IN HANDSET OF ORIGINATING DATA SET.

WHEN TONE IS HEARD, PRESS "DATA" BUTTON ON ORIGINATING DATA SET.

"DATA" LIGHT SHOULD ILLUMINATE

5.3.2.5 "DATA" LIGHT ON ANSWERING DATA SET SHOULD BE LIT.

5.3.2.6 THE PROGRAM WILL NOW WAIT FOR INTERRUPTS FROM THE DM11-BB.

5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED, THE PROGRAM TYPES "STRIKE ANY TTY KEY TO DISCONNECT".

WHEN A TTY KEY IS STRUCK, THE PROGRAM WILL BEGIN THE DISCONNECT SEQUENCE.

5.3.2.8 WHEN THE DISCONNECT SEQUENCE HAS BEEN COMPLETED THE PROGRAM WILL TYPE "103A TEST COMPLETE", AND WILL REQUEST THE OPERATOR TO SELECT NEW LINES.

5.3.3 PROGRAM ACTION IN CASE OF ERROR

5.3.3.1 RING ON INCORRECT LINE

IF THE PROGRAM DETECTS A RING SIGNAL ON AN INCORRECT LINE, OR IF ANY OTHER TRANSITION BESIDES RING IS DETECTED BEFORE RING, THE PROGRAM WILL TYPE A FATAL ERROR MESSAGE AND REQUEST THE OPERATOR TO RESELECT LINES AND REDIAL.

5.3.3.2 OTHER ERRORS

IF ANY ERRORS OCCUR AFTER THE FIRST RING HAS BEEN DETECTED, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING TO COMPLETION.

THE ONLY EXCEPTION TO THIS IS IF AN INTERRUPT OCCURS ON A LINE NOT SELECTED, IN WHICH CASE A FATAL ERROR WILL BE REPORTED, AND THE PROGRAM WILL PROCEED AS DESCRIBED IN 5.3.3.1

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5.3.4 OPERATION SWITCH SETTINGS

SW15=1, HALT ON ERROR
 SW13=1, SUPPRESS ERROR TYPEOUT

5.3.5 DATA SET MODE SWITCHING

AFTER THE PROGRAM HAS TYPED THE MESSAGE DESCRIBED
 IN 5.3.2.7, BUT BEFORE SW01 IS SET, THE OPERATOR
 MAY SWITCH EITHER DATA SET FROM THE MODE THAT
 IT IS IN TO ANOTHER MODE.
 ALL TRANSITIONS DETECTED AT THIS TIME WILL
 BE REPORTED.

NOTE: THE ORIGINATE DATA SET MUST BE RETURNED TO "TALK" MODE
 AND THE ANSWERING DATA SET TO "AUTO ANSWER" BEFORE
 DISCONNECT IS STARTED TO PREVENT ERRORS FROM BEING
 DETECTED THAT ARE CAUSED BY THE FACT THAT THE MODEM IS
 IN THE INCORRECT STATE.

5.4 TEST GROUP 3 BELL 202C MODEM CONNECT-DISCONNECT TEST

5.4.1 TEST INITIALIZATION

SAME AS 5.3.1 EXCEPT PROGRAM WILL TYPE "202C CONNECT
 DISCONNECT TEST".

5.4.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

SAME AS 5.3.2 EXCEPT AT END OF TEST, PROGRAM WILL TYPE
 "202C TEST COMPLETE".

5.4.3 PROGRAM ACTION IN CASE OF ERRORS

SAME AS 5.3.3

5.4.4 OPERATIONAL SWITCH SETTINGS

SAME AS 5.3.4

5.4.5 DATA SET MODE SWITCHING

SAME AS 5.3.5

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5.5 TEST RESELECTION

TO ESCAPE FROM THE TEST IN PROGRESS, AND SELECT A NEW TEST, TYPE <CONTROL C>.

THE PROGRAM WILL STOP EXECUTION OF THE TEST IN PROGRESS AND THEN TYPE "TEST-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

PROCEED AS DESCRIBED IN 4.2.1.8

5.5 ADDRESS CHANGE

TO CHANGE THE VECTOR AND REGISTER ADDRESS OF THE DM11-BB UNDER TEST, TYPE <CONTROL V>. THE PROGRAM WILL STOP EXECUTION OF THE TEST IN PROGRESS AND PROCEED AS DESCRIBED IN SECTION 4.2.1, EXCEPT THAT "DM11-BB DIAGNOSTIC" WILL NOT BE TYPED.

5.6 LINE NUMBER CHANGE

TO CHANGE THE LINE NUMBER(S) UNDER TEST, TYPE <CONTROL L>. THE PROGRAM WILL SUSPEND THE TEST IN PROGRESS AND RETURN TO THE INITIALIZATION STAGE OF THE SELECTED TEST.

WHEN THE LINE NUMBER(S) HAS BEEN CHANGED, THE PROGRAM WILL RESTART THE SELECTED TEST USING THE NEW LINE NUMBER(S).

5.7 ERROR IN ENTERING DATA

TO ALLOW RE-ENTERING DATA TYPE ↑U <CNTRL U> BEFORE DEPRESSING <CR> WHEN ENTERING DATA. THIS WILL RESULT IN THE QUESTION BEING RE-ASKED.

5.8 POWER FAILURE

IF A POWER FAIL TRAP OCCURS DURING TEST EXECUTION THE PROGRAM WILL SAVE THE GENERAL REGISTERS OF THE PROCESSOR AND HALT.

WHEN POWER UP OCCURS, THE PROGRAM WILL TYPE "POWER FAILURE-CURRENT TEST WILL BE RESTARTED".

THE PROGRAM WILL THEN RESUME TEST EXECUTION.

NOTE: IF A TEST IS NOT IN PROGRESS, I.E., IF THE PROGRAM IS WAITING FOR AN INPUT FROM THE TELETYPE KEYBOARD, THE ERROR MESSAGE WILL BE "POWER FAILURE". THE PROGRAM WILL THEN REQUEST THE OPERATOR TO SELECT A TEST.

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6.0 ERRORS

6.1 NORMAL OPERATION

IF AN ERROR OCCURS WITH ALL SWITCHES DOWN, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND THEN RESUME TESTING.

THERE ARE SEVERAL ERROR MESSAGE FORMATS, AND THE PARTICULAR MESSAGE TYPED DEPENDS UPON THE TEST IN PROGRESS.

6.1.1 ERROR MESSAGES

6.1.1.1 UNIQUE ERROR

ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER

AN EXAMPLE OF THIS TYPE OF ERROR IS:

1. AN INTERRUPT OCCURED AT THE WRONG PRIORITY
2. A REGISTER BIT WAS NOT CLEARED BY RESET

6.1.1.2 TRANSITION DETECTION ERROR

THIS ERROR WILL OCCUR IN ONE OF THE ON-LINE TESTS IF AN EXPECTED INTERRUPT DOES NOT OCCUR, OR IF AN UNEXPECTED INTERRUPT DOES OCCUR, ON THE LINES UNDER TEST.

FORMAT FOR ERROR TYPEOUT IS

```
XXXXXX TRANSITION ERROR
EXP  REC  LINE
AA   BB   CC
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGIS
BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
CC=LINE ON WHICH ERROR OCCURED

6.1.1.3 SINGLE LINE STATUS ERROR

THIS ERROR WILL OCCUR IN ANY TEST, OFF LINE OR ON-LINE WHEN THE EXPECTED AND RECEIVED LINE STATUS ARE NOT THE SAME.

FORMAT FOR SINGLE LINE STATUS ERROR IS

```
XXXX LINE ERROR
EXP  REC  LINE
AAA  BBB  CC
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
AAA=EXPECTED LINE STATUS AT TIME OF ERROR
BBB=RECEIVED LINE STATUS AT TIME OF ERROR
CC=LINE ON WHICH ERROR OCCURED

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6.1.1.4 FATAL TRANSITION ERROR

THIS ERROR WILL OCCUR IN AN ON-LINE TEST IF AN INTERRUPT OCCURS ON A LINE NOT SELECTED FOR TESTING.

FORMAT FOR FATAL ERROR TYPEOUT IS

```
XXXXXX FATAL ERROR
CSTAT LSTAT
AAAAAA BBB
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
AAAAAA=RECEIVED CONTROL STATUS ON LINE THAT INTERRUPTED
BBB=RECEIVED LINE STATUS ON LINE THAT INTERRUPTED

6.1.1.4 CONTROL STATUS ERROR

THIS ERROR WILL OCCUR IN A TEST THAT PRIMARILY INVOLVES THE LINE SCANNER

FORMAT FOR CONTROL STATUS ERROR IS

```
XXXXXX STATUS ERROR
EXP REC
AAAAAA BBBB
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
AAAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
BBBBBB=RECEIVED(ACTUAL) CONTROL STATUS AT TIME OF ERROR

6.1.1.5 LINE STATUS ERROR

THIS ERROR WILL OCCUR IN THOSE OFF LINE TESTS THAT SET ONE LINE TO A PARTICULAR STATE, AND THEN CHECK ALL OTHER LINES

FORMAT FOR LINE STATUS ERROR IS

```
XXXX LINE ERROR
EXP REC LINE SEL
AAA DDD CC DD
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
AAA=EXPECTED LINE STATUS AT TIME OF ERROR
BBB=RECEIVED LINE STATUS AT TIME OF ERROR
CC=LINE ON WHICH ERROR OCCURED
DD=THE LINE ON WHICH THE PROGRAM WAS OPERATING

6.1.2 REPEATED ERRORS

IF THE SAME ERROR OCCURS REPEATEDLY IN A GIVEN TEST ONLY THE DATA RELATING TO THAT ERROR WILL BE TYPED IF THE ERROR OCCURS IN THE SAME TEST ON THE SAME PASS

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6.2 SCOPE LOOPS

NOTE: SCOPE LOOPING APPLIES ONLY TO TEST GROUPS 0 AND 1

6.2.1 AFTER ERROR HALT

TO LOOP ON A GIVEN TEST AFTER AN ERROR HALT,
 SET SW15=0 TO RUN WITHOUT STOPPING
 SET SW14=1 TO LOOP ON CURRENT TEST
 SET SW13=1 TO SUPPRESS ERROR TYPEOUT
 SET SW10=0 (IF IT IS 1)
 SET SW09=1 TO LOOP ON SAME DATA (IF REQUIRED)

PRESS CONTINUE

THE PROGRAM WILL LOOP ON THE SAME TEST.

6.2.2 FROM PROGRAM START

6.2.2.1 PROCEED AS DESCRIBED IN 4.2.1.1 TO 4.2.1.4

6.2.2.2 WHEN THE PROGRAM TYPES "TEST-", SET SW14=1 TO LOOP ON THE TEST THAT WILL BE SELECTED.

6.2.2.3 TYPE IN THE NUMBER OF THE TEST THAT IS TO BE LOOPE
 ON (SEE LISTING FOR TEST NUMBER REFERENCE DESIGNATIONS)

6.2.2.4 THE PROGRAM WILL LOOP ON THE SELECTED TEST UNTIL SW14=0.

6.2.3 AFTER <CONTROL>

SAME AS 6.2.2.2 TO 6.2.2.4

7.0 RESTRICTIONS

7.1 STARTING

7.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR MUST BE INSTALLED.

7.1.2 FOR SINGLE LINE CABLE TEST

DC11 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

7.1.3 FOR ON LINE TESTS

IF THE DM11-AA IS NOT CONNECTED TO THE DISTRIBUTION PANEL, AN M974 DM11 MAINTENANCE JUMPER CARD MUST BE INSTALLED IN SLOT B1 OR B3 OF THE DISTRIBUTION PANEL TO PREVENT LONG SPACE DISCONNECTS.

7.2 OPERATING

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- 8.0 EXECUTION TIME
- 8.1 16 LINE SCANNER TEST
THE TIME FOR 2 PASSES OF THE 16 LINE SCANNER TEST IS APPROXIMATELY 1.5 MINUTES.
- 8.2 SINGLE LINE CABLE TEST
THE TIME FOR 12 PASSES OF THE SINGLE LINE CABLE TEST IS APPROXIMATELY 1 MINUTE.
- 8.3 103A MODEM CONNECT-DISCONNECT TEST
APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET FIRST DETECTS A RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SW01=1 TO DISCONNECT".
APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE PROGRAM TYPES THE ABOVE MESSAGE UNTIL THE TIME THAT THE PROGRAM TYPES "103A TEST COMPLETE".
- 8.4 202C MODEM CONNECT-DISCONNECT TEST
APPROXIMATELY 1.5 MINUTES WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET DETECTS THE FIRST RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SW01=1 TO DISCONNECT".
APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE PROGRAM TYPES THE ABOVE MESSAGE UNTIL THE PROGRAM TYPES "202C TEST COMPLETE".
9. PROGRAM DESCRIPTION
THIS PROGRAM CONSISTS OF A SERIES OF TEST GROUPS LINKED BY A SET OF COMMON SERVICE ROUTINES AND A KEYBOARD MONITOR.
WHEN INITIALLY LOADED AND STARTED ...SW00 MUST BE SET =1. THE PROGRAM WILL BEGIN A DIALOG WITH THE OPERATOR TO INPUT THE PARAMETERS REQUIRED BY THE PROGRAM.
WHEN ALL INFORMATION HAS BEEN INPUTTED, THE PROGRAM WILL REQUEST THE OPERATOR TO SELECT A TEST BY TYPING THE NUMBER OF THE TEST TO BE RUN. WHEN A CORRECT TEST NUMBER IS RECEIVED, THE PROGRAM WILL BEGIN EXECUTION OF THE SELECTED TEST.
AT ANY TIME DURING TEST EXECUTION, THE OPERATOR MAY CHANGE A TEST PARAMETER BY ENTERING THE APPROPRIATE COMMAND VIA THE TELETYPE KEYBOARD.

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745100000
040000
020000

9. CONT'D

IF AN OFF LINE TEST HAS BEEN SELECTED, THAT TEST WILL BE REPEATED UNTIL THE OPERATOR INTERVENES.

IF AN ON LINE TEST HAS BEEN SELECTED, THE OPERATOR IS REQUIRED TO TAKE ACTION EACH TIME THE TEST IS COMPLETED.

AT THE END OF EVERY OFF LINE TEST PASS, THE PROGRAM WILL RING THE TELETYPE BELL.

AT THE END OF AN ON LINE TEST, A TEST COMPLETE MESSAGE WILL BE TYPED.

10. LISTING%

```
.TITLE DZDMD-B
.ENABLE ABS,AMA
;DM11-BB DIAGNOSTIC
;THIS PROGRAM CONTAINS TEST OF THE DM11-BB IN
;THE OFF LINE MODE OF OPERATION ONLY

;SWITCH REGISTER OPTIONS

;SW15=1, HALT ON ERROR
;SW14=1, LOOP ON CURRENT TEST
;SW13=1, SUPPRESS ERROR TYPEOUT
;SW11=1, SUPPRESS ITERATIONS
;SW10=1, ESCAPE TO NEXT TEST ON ERROR
;SW09=1, FREEZE DATA
;SW01=1, START DISCONNECT SEQUENCE
;SW00=1, RESELECT VECTOR AND CONTROL REGISTER ADDRESS
;AFTER PROGRAM RESTART

;STARTING ADDRESS FOR ALL TESTS IS 000200
;RESTART ADDRESS=000200

;TESTS AVAILABLE

;TEST GROUP 0-
;OFF LINE TESTS USING H861 TEST CONNECTOR-FIRST TEST=0
;TEST GROUP 1-
;OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100
;TEST GROUP 2-
;CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200
;TEST GROUP 3-
;CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300

;SYMBOL DEFINITIONS
SW15=100000
SW14=40000
SW13=20000
```


9
8
7
6
5
4
3
2
1

010000
004000
002000
001000
000400
000100

SW12=10000
SW11=4000
SW10=2000
SW09=1000
SW08=400
SW06=100

.NLIST MC,MD,CND
.LIST ME

```

757
758
759
760      000000      RO=%0      ;GENERAL REGISTER
761      000001      R1=%1      ;GENERAL REGISTER
762      000002      R2=%2      ;GENERAL REGISTER
763      000003      R3=%3      ;GENERAL REGISTER
764      000004      R4=%4      ;GENERAL REGISTER
765      000005      R5=%5      ;GENERAL REGISTER
766      000006      SP=%6      ;PROCESSOR STACK POINTER
767      000007      PC=%7      ;PROGRAM COUNTER

;REGISTER DEFINITIONS

768
769
770
771      177776      PS=177776
772      .EQUIV PS,PSW
773      014660      RADIX=DIVIS ;CONVERSION FACTOR FOR DECIMAL OUTPUT
774      014654      BINWRD=DIVIDL ;WORD TO BE CONVERTED TO OCTAL ASCII
775      014656      DIGIT=DIVIDH ;ASCII OCTAL DIGIT

;LOCATION EQUIVALENCIES

776
777
778
779      000020      BUSY=20      ;LINE SCANNER RUNNING
780      000040      SCENEA=40     ;LINE SCANNER ENABLE
781      000100      INTENA=100    ;INTERRUPT ENABLE
782      000200      DONE=200     ;SCANNER DONE
783      000400      STEP=400     ;CAUSES LINE COUNTER TO BE INCREMENTED BY 1 COUNT
784      001000      MAINT=1000   ;FORCES IS TO INPUT OF SCRATCH PAD MEMORY
785      002000      CLRMUX=2000  ;CLEAR MULTIPLEXER FUNCTION FLIPFLOPS
786      004000      CLRSCN=4000  ;CLEARS SCANNER SCRATCHPAD MEMORY
787      010000      SECRXF=10000 ;SECONDARY RECEIVE TRANSITION WAS DETECTED BY SCANNER
788      020000      CSF=20000   ;CLEAR TO SEND TRANSITION WAS DETECTED BY SCANNER
789      040000      COF=40000   ;CARRIER TRANSITION WAS DETECTED BY SCANNER
790      100000      RINGF=100000 ;RING SIGNAL WAS DETECTED BY SCANNER

;CONTROL STATUS REGISTER BIT FUNCTIONS

791
792
793
794      000001      LINENA=1      ;=1, RECOGNIZE TRANSITIONS ON THIS LINE
795      000002      TRMRDY=2     ;=1, SEND TERMINAL READY TO MODEM
796      000004      RS=4         ;=1, SEND REQUEST TO SEND TO MODEM
797      000010      SECTX=10     ;=1, SEND SECONDARY TRANSMIT TO MODEM
798      000020      SECRX=20     ;=1, SECONDARY RECEIVE TURNED ON BY MODEM
799      000040      CS=40        ;=1, CLEAR TO SEND TURNED ON BY MODEM
800      000100      CO=100       ;=1, CARRIER TURNED ON BY MODEM
801      000200      RING=200     ;=1, RING TURNED ON BY MODEM

;LINE REGISTER BIT FUNCTIONS

802
803
804
805      000004      XCO=4         ;CARRIER TRANSITION WAS DETECTED
806      000002      XCS=2         ;CLEAR TO SEND TRANSITION WAS DETECTED
807      000001      XSCRX=1       ;SECONDARY RECEIVE TRANSITION WAS DETECTED

;SOFTWARE TRANSITION FLAGS

```

```

808
809
810
811      005746      PUSH1SP=5746      ; DECREMENT PROCESSOR STACK 1 WORD
812      005726      POP1SP=5726       ; INCREMENT PROCESSOR STACK 1 WORD
813      010046      PUSHRO=10046     ; SAVE RO ON STACK
814      012600      POPRO=12600     ; RESTORE RO FROM STACK
815      024646      PUSH2SP=24646  ; DECREMENT STACK TWICE
816      022626      POP2SP=22626  ; INCREMENT STACK TWICE
817
818
819
820      104000      ERRORC=EMT+X    ; CONTROL STATUS ERROR SERVICE
821      104001      ERRORL=EMT+X    ; LINE STATUS ERROR SERVICE
822      104002      SCOPE=EMT+X    ; SCOPE LOOP AND ITERATION SERVICE
823      104003      SCOPEF=EMT+X   ; DATA FREEZE SERVICE
824      104004      TYPE=EMT+X    ; TELETYPE OUTPUT
825      104005      SAVOSP=EMT+X   ; SAVE RO-RS, PC+2 OF CALL
826      104006      OCTASC=EMT+X   ; CONVERT DATA TO ASCII AND TYPE
827      104007      RESOS=EMT+X    ; RESTORE RO-RS
828      104010      CONVERT=EMT+X  ; ASCII CONVERSION ROUTINE
829      104011      EXTRACT=EMT+X  ; DIGIT EXTRACTION ROUTINE
830      104012      ERROR=EMT+X    ; TYPE PC OF FAILING TESTS ONLY
831      104013      INSTRG=EMT+X   ; INPUT OCTAL DATA STRING
832      104014      ERRORT=EMT+X   ; TRANSITION ERROR
833      104015      ERRORS=EMT+X   ; ON LINE STATUS ERROR
834      104016      ERRORN=EMT+X   ; FATAL TRANSITION
835      104017      GETLNS=EMT+X   ; INPUT LINE NUMBERS
836      104020      SETUP=EMT+X    ; SET UP FOR ON LINE TEST
837      104021      CKRING=EMT+X   ; CHECK FOR RING ON CORRERT LINE
838      104022      WAITRN=EMT+X   ; WAIT FOR TRANSITIONS
839      104023      CKTRAN=EMT+X   ; CHECK TRANSITIONS
840      104024      WAITS=EMT+X    ; DELAY FOR TRANSIENTS
841      104025      CNTLUU=EMT+X   ; CHANGE SWREG ROUTINE
842      104026      CKINTT=EMT+X   ; CHECK FOR INTERRUPTS-FLAG STYLE
843      104027      KBDIN=EMT+X    ; FAKE INTERRUPT ENTRY POINT
844
845      ;TRAPCATCAER FOR ILLEGAL INTERRUPTS

```

```

846
847
848 ; STANDARD INTERRUPT VECTORS
849
850 000024 000024 . =24
851 000026 015346 PFAIL ; POWER FAIL HANDLER
852 000030 000340 340 ; SERVICE AT LEVEL 7
853 000032 013350 EMTSRV ; EMT DISPATCH SERVICE
854 000032 000340 340 ; SERVICE AT LEVEL 7
855
856 000060 000060 . =60
857 000062 001732 KBDINT ; KEYBOARD MONITOR
858 000062 000340 340 ; SERVICE AT LEVEL 7
859
860 000174 000174 . =174
861 000174 000000 DISPREG:0
862 00017E 000000 SWREG: 0
863
864 000200 000137 001100 . =200
865 JMP START ; GO TO START OF PROGRAM
866
867
868
869
870

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871											
872		001100									
873	001100										
874	001100	012737	015346	000024							
875											
876	001106	005037	001730								
877	001112	005077	014642								
878	001116	012706	001100								
879	001122	013746	000006								
880	001126	013746	000004								
881	001132	012737	001152	000004							
882	001140	022777	177777	014622							
883	001146	001402									
884	001150	000407									
885	001152	022626									
886	001154	012737	000176	015770							
887	001162	012737	000174	015772							
888	001170	012637	000004								
889	001174	012637	000006								
890	001200	005037	001242								
891	001204	013746	000004								
892	001210	012737	001246	000004							
893	001216	005737	177060								
894	001222	012637	000004								
895	001226	005137	001242								
896	001232	004737	015470								
897	001236	000137	001254								
898	001242	000000									
899	001244	000000									
900	001246	022626									
901	001250	012637	000004								
902	001254	005737	016060								
903	001260	001005									
904	001262	104004									
905	001264	016646									
906	001266	012737	000001	015060							
907	001274	005737	001242								
908	001300	100417									
909	001302	005737	000042								
910	001306	001403									
911	001310	004737	015470								
912	001314	000411									
913	001316	022737	000176	015770							
914	001324	001001									
915	001326	104025									
916	001330	032777	000001	014432							
917	001336	001503									
918	001340	012706	001100								
919	001344	012737	000300	013274							
920	001352	012737	000302	013276							
921	001360	013777	013276	011706							
922	001366	005077	011704								
923											
924	001372	062737	000004	013274							
925	001400	062737	000004	013276							
926	001406	023727	013274	001000							

927	001414	001361			BNE	VECSTA				;IF NOT, CONTINUE
928	001416	005737	001242		TST	XFLAG			:XOR ?	
929	001422	100516			BMI	TSTGO			:YES	
930	001424	005737	000042		TST	42			:ACT 11 ?	
931	001430	001113			BNE	TSTGO			:YES	
932	001432	104013			INSTRG					;GET VECTOR ADDRESS
933	001434	016724			MVECTOR					;MESSAGE "VECTOR ADDRESS--"
934	001436	000300			300					;LOWER LIMIT FOR ADDRESS
935	001440	000774			774					;UPPER LIMIT FOR ADDRESS
936	001442	015750			DMBVEC					;STORAGE FOR ADDRESS
937	001444	032737	000003	015750	15:	BIT	#3,DMBVEC			;TEST 2 LSB OF ADDRESS
938	001452	001404			BEQ	VECST1				;IF 0, CONTINUE
939	001454	012716	001444		MOV	#15,(SP)				
940	001460	000137	015176		JMP	INSTR				;INCORRECT ADDRESS, TRY AGAIN
941	001464	013737	015750	015752	VECST1:	MOV	DMBVEC,DMBLVL			;GENERATE ADDRESS OF
942	001472	062737	000002	015752	ADD	#2,DMBLVL				;INTERRUPT STATUS WORD
943	001500	104013			INSTRG					;GET ADDRESS OF CONTROL REGISTER
944	001502	016746			MREGAD					;MESSAGE "REGISTER ADDRESS--"
945	001504	170500			170500					;LOWER LIMIT FOR ADDRESS
946	001506	170670			170670					;UPPER LIMIT FOR ADDRESS
947	001510	015754			DMBCSR					;STORAGE FOR ADDRESS
948	001512	032737	000007	015754	15:	BIT	#7,DMBCSR			;IF 3 LSB ARE NOT 0
949	001520	001404			BEQ	REGST1				
950	001522	012716	001512		MOV	#15,(SP)				
951	001526	000137	015176		JMP	INSTR				;INCORRECT ADDRESS, TRY AGAIN
952	001532	013737	015754	015756	REGST1:	MOV	DMBCSR,DMBLSR			;SET UP ADDRESS OF LINE STATUS REGISTER
953	001540	062737	000002	015756	ADD	#2,DMBLSR				

954											
955	001546	012706	001100			STARTN:	MOV	#STACK,SP			;SET UP PROCESSOR STACK
956	001552	104013					INSTRG				;GET TEST NUMBER
957	001554	017002					MTEST				;MESSAGE "TEST-"
958	001556	000000					0				;LOWER LIMIT FOR TEST NUMBER
959	001560	000777					777				;UPPER LIMIT FOR TEST NUMBER
960	001562	016002					TSTNO				;STORAGE FOR TEST NUMBER
961	001564	013705	016002			X1A:	MOV	TSTNO,R5			;GET TEST NUMBER
962	001570	042705	177077				BIC	#177077,R5			;EXTRACT TEST GROUP NUMBER
963	001574	006205					ASR	R5			
964	001576	006205					ASR	R5			
965	001600	006205					ASR	R5			
966	001602	006205					ASR	R5			
967	001604	006205					ASR	R5			
968	001606	016537	017524	016036			MOV	GRO(R5),TSTMAX			;GET HIGHEST TEST IN GROUP
969	001614	016537	017504	016034			MOV	TSTLST(R5),TSTPNT			;GET POINTER TO TEST TABLE
970	001622	005737	016034				TST	TSTPNT			;IF 0, INVALID TEST GROUP
971	001626	001004					BNE	STRTOA			
972	001630	012716	001564			X1B:	MOV	#X1A,(SP)			
973	001634	000137	015176				JMP	INSTER			;TRY AGAIN
974	001640	042737	177700	016002		STRTOA:	BIC	#177700,TSTNO			;GET NUMBER OF FIRST TEST
975											;TO BE EXECUTED IN SELECTED GROUP
976	001646	023737	016002	016036			CMP	TSTNO,TSTMAX			;IS NUMBER TOO LARGE
977	001654	003401					BLE	TSTGO			
978	001656	000764					BR	X1B			
979	001660	012746	000340			TSTGO:	MOV	#340,-(SP)			;SET UP PRIORITY LEVEL
980	001664	005746					PUSH1SP				
981	001666	000005					RESET				
982	001670	012737	002146	002150			MOV	#DMYRTI,KRET			;SET UP DUMMY KEYBOARD RETURN
983	001676	005037	016040				CLR	LINFLG			;CLEAR LINE SELECTED FLAG
984	001702	005037	015776				CLR	TRACON			;CLEAR TRACE TRAP FLAG
985	001706	005037	016000				CLR	PASCNT			;CLEAR PASS COUNT
986	001712	104004					TYPE				
987	001714	017016					MCRLF				
988	001716	012737	000001	001730		IS:	MOV	#1,TIPFLG			;SET TEST IN PROGRESS FLAG
989	001724	000137	013564				JMP	TSTENT			;START TESTING
990	001730	000000				TIPFLG:	0				

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991
992                                     ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
993
994 001732 005037 001730      KBDINT: CLR      TIPFLG                ;CLEAR TEST IN PROGRESS FLAG
995 001736 005037 014504      CLR      TMP1
996 001742 005037 002152      CLR      SINTFL                ;CLEAR SOFTWARE INTERRUPT FLAG
997 001746 117737 014010 014504  MOVB    @TKDBR, TMP1
998 001754 142737 000200 014504  BICB    #200, TMP1
999 001762 122737 000003 014504  CMPB    #3, TMP1                ;IF <CONTROL C> WAS TYPED
1000 001770 001011                BNE     KBDIN1                ;TYPE "↑C" AND
1001 001772 104004                TYPE                    ;SELECT NEW TEST
1002 001774 017246                MCONTC
1003 001776 022626                POP2SP
1004 002000 005077 013750      CLR      @DMBCSR
1005 002004 005077 013750      CLR      @TKCSR
1006 002010 000137 001546      JMP      STARTN
1007 002014 122737 000026 014504  KBDIN1: CMPB    #26, TMP1        ;IF <CONTROL V> WAS TYPED
1008 002022 001011                BNE     KBDIN2                ;TYPE "↑V" AND GET NEW
1009 002024 104004                TYPE                    ;VECTOR AND REGISTER ADDRESS
1010 002026 017251                MCONTV
1011 002030 022626                POP2SP
1012 002032 005077 013716      CLR      @DMBCSR
1013 002036 005077 013716      CLR      @TKCSR
1014 002042 000137 001340      JMP      VECSTR
1015 002046 122737 000014 014504  KBDIN2: CMPB    #14, TMP1        ;IF <CONTROL L> WAS TYPED
1016 002054 001015                BNE     KBDIN3                ;TYPE "↑L" AND GET NEW
1017 002056 104004                TYPE                    ;LINE NUMBERS, UNLESS
1018 002060 017254                MCONTL                    ;TEST GROUP 0 WAS IN PROGRESS
1019 002062 022737 002146 002150  CMP      #DMYRTI, KRET        ;IF <CONTROL L> WAS TYPED IN TEST
1020 002070 001426                BEQ     DMYRTI                ;GROUP 0, IGNORE
1021 002072 022626                POP2SP
1022 002074 005077 013654      CLR      @DMBCSR
1023 002100 005077 013654      CLR      @TKCSR
1024 002104 000177 000040      JMP      @KRET
1025 002110 022737 000176 015770  KBDIN3: CMP      #SWREG, SWR
1026 002116 001005                BNE     1$
1027 002120 122737 000007 014504  CMPB    #7, TMP1
1028 002126 001001                BNE     1$
1029 002130 104025                CNTLUU
1030 002132 012737 000001 002152  1$:    MOV      #1, SINTFL        ;SET SOFTWARE INTERRUPT FLAG
1031 002140 012737 000001 001730  MOV      #1, TIPFLG        ;SET TEST IN PROGRESS FLAG
1032 002146 000002
1033
1034 002150 000000
1035 002152 000000
DMYRTI: RTI
.EVEN
KRET: 0
SINTFL: 0

```



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1090
1091
1092
1093 002350
1094 002350 012777 000040 013376
1095 002356 032777 000040 013370
1096 002364 001001
1097
1098 002366 104012
1099 002370 042777 000040 013356
1100 002376 032777 000040 013350
1101 002404 001401
1102
1103 002406 104012
1104 002410 104002
1105
1106
1107
1108
1109 002412
1110 002412 012777 000040 013334
1111 002420 032777 000020 013326
1112 002426 001001
1113 002430 104012
1114 002432 042777 000040 013314
1115 002440 032777 000020 013306
1116 002446 001401
1117 002450 104012
1118 002452 104002
1119
1120
1121
1122
1123 002454
1124 002454 052737 000340 177776
1125 002462 005077 013266
1126 002466 012777 002522 013254
1127 002474 013777 177776 013250
1128 002502 052777 000200 013244
1129 002510 042737 000340 177776
1130 002516 000240
1131 002520 000402
1132 002522 022626
1133 002524 104012
1134 002526 104002

;VERIFY THAT "SCAN ENABLE" CAN BE SET AND CLEARED.
T4:
CSTR4: MOV #SCNENA, @DMBCSR ;REFERENCE DESIGNATION
        BIT #SCNENA, @DMBCSR ;SET SCAN ENABLE
        BNE .+4 ;WAS SCAN ENABLE SET

ERROR ;NO, ERROR
BIC #SCNENA, @DMBCSR ;CLEAR SCAN ENABLE
BIT #SCNENA, @DMBCSR ;WAS SCAN ENABLE CLEARED
BEQ .+4

ERROR ;NO, ERROR
SCOPE ;CHECK FOR ITERATIONS, LOOP

;VERIFY THAT "BUSY" IS SET WHEN "SCAN ENABLE" IS SET
;VERIFY THAT "BUSY" IS CLEARED WHEN "SCAN ENABLE" IS CLEARED
T5:
CSTR5: MOV #SCNENA, @DMBCSR ;REFERENCE DESIGNATION
        BIT #BUSY, @DMBCSR ;SET SCAN ENABLE
        BNE .+4 ;IS BUSY BIT SET

ERROR ;BUSY NOT SET, ERROR
BIC #SCNENA, @DMBCSR ;CLEAR SCAN ENABLE
BIT #BUSY, @DMBCSR ;IS BUSY BIT CLEARED
BEQ .+4

ERROR ;BUSY NOT CLEARED, ERROR
SCOPE ;CHECK FOR LOOP, ITERATIONS

;VERIFY THAT SETTING "DONE" DOES NOT CAUSE AN
;INTERRUPT IF "INTERRUPT ENABLE" IS CLEARED.
T6:
INT1: BIS #340, PS ;REFERENCE DESIGNATION
        CLR @DMBCSR ;LOCK OUT INTERRUPTS
        MOV #INT1A, @DMBVEC ;CLEAR CONTROL REGISTER
        MOV PS, @DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
        BIS #DONE, @DMBCSR ;SET UP INTERRUPT PRIORITY
        BIC #340, PS ;SET DONE
        NOP ;ALLOW INTERRUPTS
        BR INT1B ;DELAY FOR INTERRUPT
        ;NO INTERRUPT, CONTINUE
INT1A: POP2SP ;RESTORE STACK, INTERRUPT
        ERROR ;OCCURED, ERROR
INT1B: SCOPE ;CHECK FOR LOOP, ITERATIONS
  
```



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1135
1136
1137
1138
1139 002530
1140 002530 052737 000340 177776
1141 002536 005077 013212
1142 002542 012777 002576 013200
1143 002550 013777 177776 013174
1144 002556 052777 000100 013170
1145 002564 042737 000340 177776
1146 002572 000240
1147 002574 000402
1148 002576 022626
1149 002600 104012
1150 002602 104002
1151
1152
1153
1154
1155 002604
1156 002604 052737 000340 177776
1157 002612 005077 013136
1158 002616 012777 002670 013124
1159 002624 012777 000100 013122
1160 002632 013777 177776 013112
1161 002640 042737 000340 177776
1162 002646 052777 000200 013100
1163 002654 000240
1164 002656 000240
1165 002660 005077 013070
1166 002664 104012
1167 002666 000401
1168 002670 022626
1169 002672 104002
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1174 002674
1175 002674 005077 013054
1176 002700 042737 000340 177776
1177 002706 052737 000340 177776
1178 002714 012777 002756 013026
1179 002722 013777 177776 013022
1180 002730 012777 000100 013016
1181 002736 052777 000200 013010
1182 002744 000240
1183 002746 000240
1184 002750 005077 013000
1185 002754 000402
1186 002756 022626
1187 002760 104012
1188 002762 104002

;VERIFY THAT NO INTERRUPT OCCURS WITH "INTERRUPT ENABLE"
;SET AND "DONE" CLEARED.

T7:
INT2: BIS #340,PS ;REFERENCE DESIGNATION
      CLR @DMBCSR ;LOCK OUT INTERRUPTS
      MOV #INT2A,@DMBVEC ;CLEAR CONTROL REGISTER
      MOV PS,@DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      BIS #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIC #340,PS ;SET INTERRUPT ENABLE
      NOP ;ALLOW INTERRUPTS
      BR INT2B ;DELAY FOR INTERRUPTS
      ;NO INTERRUPT, CONTINUE
      ;RESTORE STACK
      ;INTERRUPT OCCURED, ERROR
      ;CHECK FOR ITERATIONS, LOOP

INT2A: POP2SP
      ERROR
INT2B: SCOPE

;VERIFY THAT SETTING "DONE" CAUSES AN INTERRUPT
;WITH "INTERRUPT ENABLE" SET

T10:
INT3: BIS #340,PS ;REFERENCE DESIGNATION
      CLR @DMBCSR ;LOCK OUT INTERRUPTS
      MOV #INT3A,@DMBVEC ;CLEAR CONTROL REGISTER
      MOV #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE ADDRESS
      MOV PS,@DMBLVL ;SET "INTERRUPT ENABLE"
      BIC #340,PS ;SET "INTERRUPT LEVEL"
      BIS #DONE,@DMBCSR ;ALLOW INTERRUPTS
      NOP ;SET "DONE"
      NOP ;DELAY FOR INTERRUPT
      CLR @DMBCSR
      ERROR ;INTERRUPT OCCURED, ERROR
      BR INT3B ;CONTINUE
      ;INTERRUPT OCCURED, RESTOR STACK
      ;CHECK FOR ITERATION, LOOP

INT3A: POP2SP
INT3B: SCOPE

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 7.

T11:
INT4: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #340,PS ;SET PROCESSOR PRIORITY
      MOV #INT4A,@DMBVEC ;TO LEVEL 7.
      MOV PS,@DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      MOV #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      CLR @DMBCSR
      BR INT4B ;NO INTERRUPT, CONTINUE
      ;RESTORE STACK
      ;INTERRUPT OCCURED, ERROR
      ;CHECK FOR ITERATION, LOOP

INT4A: POP2SP
      ERROR
INT4B: SCOPE
  
```

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1189
1190
1191
1192 002764
1193 002764 005077 012764
1194 002770 042737 000340 177776
1195 002776 052737 000300 177776
1196 003004 012777 003046 012736
1197 003012 013777 177776 012732
1198 003020 012777 000100 012726
1199 003026 052777 000200 012720
1200 003034 000240
1201 003036 000240
1202 003040 005077 012710
1203 003044 000402
1204 003046 022626
1205 003050 104012
1206 003052 104002
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1210 003054
1211 003054 005077 012674
1212 003060 042737 000340 177776
1213 003066 052737 000240 177776
1214 003074 012777 003136 012646
1215 003102 013777 177776 012642
1216 003110 012777 000100 012636
1217 003116 052777 000200 012630
1218 003124 000240
1219 003126 000240
1220 003130 005077 012620
1221 003134 000402
1222 003136 022626
1223 003140 104012
1224 003142 104002
1225
1226
1227
1228 003144
1229 003144 005077 012604
1230 003150 042737 000340 177776
1231 003156 052737 000200 177776
1232 003164 012777 003226 012556
1233 003172 013777 177776 012552
1234 003200 012777 000100 012546
1235 003206 052777 000200 012540
1236 003214 000240
1237 003216 000240
1238 003220 005077 012530
1239 003224 000402
1240 003226 022626
1241 003230 104012
1242 003232 104002

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 6.
;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 6.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT

T12:
INT5: CLR @DMBCSR
      BIC #340,PS
      BIS #300,PS
      MOV #INT5A,@DMBVEC
      MOV PS,@DMBLVL
      MOV #INTENA,@DMBCSR
      BIS #DONE,@DMBCSR
      NOP
      NOP
      CLR @DMBCSR
      BR INT5B
      INT5A: POP2SP
            ERROR
            INT5B: SCOPE

;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 5.
;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 5.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT

T13:
INT6: CLR @DMBCSR
      BIC #340,PS
      BIS #240,PS
      MOV #INT6A,@DMBVEC
      MOV PS,@DMBLVL
      MOV #INTENA,@DMBCSR
      BIS #DONE,@DMBCSR
      NOP
      NOP
      CLR @DMBCSR
      BR INT6B
      INT6A: POP2SP
            ERROR
            INT6B: SCOPE

;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 4.
;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 4.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT

T14:
INT7: CLR @DMBCSR
      BIC #340,PS
      BIS #200,PS
      MOV #INT7A,@DMBVEC
      MOV PS,@DMBLVL
      MOV #INTENA,@DMBCSR
      BIS #DONE,@DMBCSR
      NOP
      NOP
      CLR @DMBCSR
      BR INT7B
      INT7A: POP2SP
            ERROR
            INT7B: SCOPE

;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATION, LOOP

```

1243
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 1250
 1251
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 1255
 1256
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003234
 003234 005077 012514
 003240 042737 000340 177776
 003246 012777 003316 012474
 003254 005077 012472
 003260 052737 000000 177776
 003266 012777 000100 012460
 003274 052777 000200 012452
 003302 000240
 003304 000240
 003306 005077 012442
 003312 104012
 003314 000401
 003316 022626
 003320 104002
 003322
 003322 005077 012426
 003326 042737 000340 177776
 003334 012777 003404 012406
 003342 005077 012404
 003346 052737 000040 177776
 003354 012777 000100 012372
 003362 052777 000200 012364
 003370 000240
 003372 000240
 003374 005077 012354
 003400 104012
 003402 000401
 003404 022626
 003406 104002
 003410
 003410 005077 012340
 003414 042737 000340 177776
 003422 012777 003472 012320
 003430 005077 012316
 003434 052737 000100 177776
 003442 012777 000100 012304
 003450 052777 000200 012276
 003456 000240
 003460 000240
 003462 005077 012266
 003466 104012
 003470 000401
 003472 022626
 003474 104002

```

:VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
:ENABLE" SET AND "DONE" SET AT PRIORITY 0.
T15:
INT10: CLR      0DMBCSR      ;REFERENCE DESIGNATION
        BIC      #340,PS    ;CLEAR CONTROL REGISTER
        MOV      #INT10A,0DMBVEC ;ALLOW INTERRUPTS
        CLR      0DMBLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #0,PS      ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      #INTENA,0DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 0.
        BIS      #DONE,0DMBCSR ;SET INTERRUPT ENABLE
        NOP      ;GENERATE INTERRUPT
        NOP      ;WAIT FOR INTERRUPT
        ERROR   ;NO INTERRUPT, ERROR
        BR      INT10B      ;CONTINUE
INT10A: POP2SP  ;INTERRUPT OCCURED, RESTORE STACK
INT10B: SCOPE   ;CHECK FOR INTERATIONS, LOOP.

:VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
:ENABLE" SET AND "DONE" SET AT PRIORITY 1.
T16:
INT11: CLR      0DMBCSR      ;REFERENCE DESIGNATION
        BIC      #340,PS    ;CLEAR CONTROL REGISTER
        MOV      #INT11A,0DMBVEC ;ALLOW INTERRUPTS
        CLR      0DMBLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #40,PS     ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      #INTENA,0DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 1.
        BIS      #DONE,0DMBCSR ;SET INTERRUPT ENABLE
        NOP      ;GENERATE INTERRUPT
        NOP      ;WAIT FOR INTERRUPT
        ERROR   ;NO INTERRUPT, ERROR
        BR      INT11B      ;CONTINUE
INT11A: POP2SP  ;INTERRUPT OCCURED, RESTORE STACK
INT11B: SCOPE   ;CHECK FOR INTERATIONS, LOOP.

:VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
:ENABLE" SET AND "DONE" SET AT PRIORITY 2.
T17:
INT12: CLR      0DMBCSR      ;REFERENCE DESIGNATION
        BIC      #340,PS    ;CLEAR CONTROL REGISTER
        MOV      #INT12A,0DMBVEC ;ALLOW INTERRUPTS
        CLR      0DMBLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #100,PS    ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      #INTENA,0DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 2.
        BIS      #DONE,0DMBCSR ;SET INTERRUPT ENABLE
        NOP      ;GENERATE INTERRUPT
        NOP      ;WAIT FOR INTERRUPT
        ERROR   ;NO INTERRUPT, ERROR
        BR      INT12B      ;CONTINUE
INT12A: POP2SP  ;INTERRUPT OCCURED, RESTORE STACK
INT12B: SCOPE   ;CHECK FOR INTERATIONS, LOOP.
  
```

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1298
1299
1300
1301 003476
1302 003476 005077 012252
1303 003502 042737 000340 177776
1304 003510 012777 003560 012232
1305 003516 005077 012230
1306 003522 052737 000140 177776
1307 003530 012777 000100 012216
1308 003536 052777 000200 012210
1309 003544 000240
1310 003546 000240
1311 003550 005077 012200
1312 003554 104012
1313 003556 000401
1314 003560 022626
1315 003562 104002

```

T20:

```

INT13:  CLR      @DMBCSR          ;REFERENCE DESIGNATION
        BIC      #340,PS         ;CLEAR CONTROL REGISTER
        MOV      @INT13A,@DMBVEC ;ALLOW INTERRUPTS
        CLR      @DMBLVL         ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #140,PS         ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      @INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 3.
        BIS      @DONE,@DMBCSR  ;SET INTERRUPT ENABLE
        NOP                       ;GENERATE INTERRUPT
        NOP                       ;WAIT FOR INTERRUPT

        CLR      @DMBCSR          ;NO INTERRUPT, ERROR
        ERROR                               ;CONTINUE
        BR       INT13B
INT13A: POP2SP
INT13B: SCOPE

```

```

1316
1317
1318
1319
1320 003564
1321 003564 005077 012164
1322 003570 042737 000340 177776
1323 003576 005005
1324 003600 012700 000020
1325 003604 010577 012144
1326 003610 017704 012140
1327 003614 020504
1328 003616 001401
1329 003620 104000
1330 003622 104003
1331 003624 003604
1332 003626 005205
1333 003630 005300
1334 003632 001364
1335 003634 104002
1336
1337
1338
1339
1340 003636
1341 003636 042737 000340 177776
1342 003644 005077 012104
1343 003650 005005
1344 003652 012700 000020
1345 003656 012777 000017 012070
1346 003664 052777 000400 012062
1347 003672 017704 012056
1348 003676 020504
1349 003700 001401
1350 003702 104000
1351 003704 104003
1352 003706 003636
1353 003710 005205
1354 003712 005300
1355 003714 001363
1356 003716 104002

```

;VERIFY THAT ALL LINE NUMBERS CAN BE WRITTEN INTO AND
;READ BACK FROM LINE COUNTER

```

T21:
LINT1: CLR      JDMBCSR
      BIC      #340,PS
      CLR      R5
      MOV      #16,R0
LINT1A: MOV      R5,JDMBCSR
      MOV      JDMBCSR,R4
      CMP      R5,R4
      BEQ      LINT1B
      ERRORC
LINT1B: SCOPEF
      LINT1A
      INC      R5
      DEC      R0
      BNE      LINT1A
      SCOPE

```

```

;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;CLEAR EXPECTED LINE NUMBER
;SET UP TO TEST 16 LINE NUMBERS
;SET LINE NUMBER
;READ BACK LINE NUMBER
;ARE EXPECTED AND RECEIVED
;LINE NUMBERS THE SAME
;LINE NUMBERS DIFFERENT, ERROR
;CHECK FOR DATA FREEZE
;RETURN FOR DATA FREEZE
;UPDATE LINE COUNT
;UPDATE LINE NUMBER
;CONTINUE
;CHECK FOR ITERATION, LOOP

```

;USING "STEP" MODE, VERIFY THAT THE
;LINE COUNTER CAN BE STEPPED THRU ALL STATES.

```

T22:
LINT2: BIC      #340,PS
      CLR      JDMBCSR
      CLR      R5
      MOV      #16,R0
      MOV      #17,JDMBCSR
LINT2A: BIS      #STEP,JDMBCSR
      MOV      JDMBCSR,R4
      CMP      R5,R4
      BEQ      LINT2B
      ERRORC
LINT2B: SCOPEF
      LINT2
      INC      R5
      DEC      R0
      BNE      LINT2A
      SCOPE

```

```

;REFERENCE DESIGNATION
;ENABLE INTERRUPTS
;CLEAR CONTROL STATUS REGISTER
;CLEAR EXPECTED LINE COUNT
;SET UP TO TEST 16 VALUES
;FIRST VALUE =0
;STEP LINE COUNTER
;READ LINE COUNTER
;COMPARE EXPECTED AND
;RECEIVED LINE NUMBERS
;LINE COUNTER ERROR
;CHECK FOR DATA FREEZE
;UPDATE EXPECTED LINE NUMBER
;CHECK FOR ITERATIONS, LOOP

```



```

1357
1358
1359
1360
1361
1362
1363
1364 003720
1365 003720 012777 002000 012026
1366 003726 042737 000340 177776
1367 003734 012700 000020
1368 003740 052777 001017 012006
1369 003746 052777 000400 012000
1370 003754 005300
1371 003756 001373
1372 003760 012700 000020
1373 003764 012705 070000
1374 003770 012777 000017 011756
1375 003776 052777 000400 011750
1376 004004 017704 011744
1377 004010 020504
1378 004012 001403
1379 004014 104000
1380 004016 104003
1381 004020 003720
1382 004022 005205
1383 004024 005300
1384 004026 001363
1385 004030 012777 004000 011716
1386 004036 032777 000020 011710
1387 004044 001374
1388 004046 012700 000020
1389 004052 005005
1390 004054 012777 000017 011672
1391 004062 052777 000400 011664
1392 004070 017704 011660
1393 004074 020504
1394 004076 001403
1395 004100 104000
1396 004102 104003
1397 004104 004030
1398 004106 005205
1399 004110 005300
1400 004112 001363
1401 004114 104002
  
```

```

;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS.
;VERIFY THAT ALL LOCATIONS HAVE BEEN WRITTEN
;TO 1'S.
;VERIFY THAT "CLEAR SCAN" CLEARS ALL SCANNER
;MEMORY LOCATIONS.

T23:
MENT1: MOV #CLRMUX, @DMBCSR ; REFERENCE DESIGNATION
      BIC #340, PS ; CLEAR CONTROL STATUS REGISTER
      MOV #16, R0 ; ENABLE INTERRUPTS
      BIS #MAINT+17, @DMBCSR ; SET UP TO TEST 16 LOCATIONS
MENT1A: BIS #STEP, @DMBCSR ; SET MAINTENANCE MODE
      DEC R0 ; SET LINE COUNTER THRU ALL
      BNE MENT1A ; STATES, WRITING 1'S INTO
      MOV #16, R0 ; ALL MEMORY WORDS
      MOV #70000, R5 ; SET UP TO TEST 16 WORDS
      MOV #17, @DMBCSR ; SET UP EXPECTED STATUS REGISTER
MENT1B: BIS #STEP, @DMBCSR ; START WITH LINE 0
      MOV @DMBCSR, R4 ; ACCESS SCANNER MEMORY
      CMP R5, R4 ; READ DATA
      BEQ MENT1C ; COMPARE EXPECTED AND RECEIVED
      ERRORC ; DATA
      SCOPEF ; CONTROL STATUS OR MEMORY ERROR
MENT1C: INC R5 ; CHECK FOR DATA FREEZE
      DEC R0 ; UPDATE EXPECTED STATUS
      BNE MENT1B ; UPDATE LINE COUNT
MENT1D: MOV #CLRSN, @DMBCSR ; CONTINUE
      BIT #BUSY, @DMBCSR ; SET "CLEAR SCAN"
      BNE .-6 ; WAIT FOR "CLEAR CYCLES"
      MOV #16, R0 ; SET UP TO TEST 16 MEMORY
      CLR R5 ; LOCATIONS
      MOV #17, @DMBCSR ; FIRST TO BE TESTED=0
MENT1E: BIS #STEP, @DMBCSR ; ACCESS SCANNER MEMORY
      MOV @DMBCSR, R4 ; READ DATA
      CMP R5, R4 ; COMPARE EXPECTED AND RECEIVED
      BEQ MENT1F ; DATA
      ERRORC ; CONTROL STATUS OF MEMORY ERROR
      SCOPEFF ; CHECK FOR DATA FREEZE
MENT1F: INC R5 ; UPDATE EXPECTED DATA
      DEC R0 ; UPDATE LINE COUNT
      BNE MENT1E ; CONTINUE
      SCOPE ; CHECK FOR ITERATIONS, LOOP
  
```

```

1402
1403
1404
1405
1406 004116
1407 004116 005077 011632
1408 004122 042737 000340 177776
1409 004130 012700 000020
1410 004134 012702 000017
1411 004140 012777 004000 011606
1412 004146 032777 000020 011600
1413 004154 001374
1414 004156 012777 001000 011570
1415 004164 050277 011564
1416 004170 052777 000400 011556
1417 004176 042777 001000 011550
1418 004204 012703 000020
1419 004210 012777 000017 011536
1420 004216 005202
1421 004220 005001
1422 004222 052777 000400 011524
1423 004230 117704 011520
1424 004234 010105
1425 004236 120402
1426 004240 001002
1427 004242 052705 070000
1428 004246 020405
1429 004250 001403
1430 004252 104000
1431 004254 104003
1432 004256 004140
1433 004260 005201
1434 004262 005303
1435 004264 001356
1436 004266 005300
1437 004270 001323
1438 004272 104002
  
```

```

;WRITE 1'S INTO SELECTED SCANNER MEMORY LOCATION.
;VERIFY THAT ONLY SELECTED LOCATION WAS WRITTEN INTO.

T24:
MEMT2: CLR @DMBCSR ;REFERENCE DESIGNATION
        BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
        MOV #16,R0 ;ENABLE INTERRUPTS
        MOV #17,R2 ;SET UP TO TEST 16 ADDRESSES
MEMT2A: MOV #CLASCN,@DMBCSR ;FIRST ADDRESS TO BE TESTED=0
        BIT #BUSY,@DMBCSR ;CLEAR ACANNER MEMORY
        BNE .-6 ;WAIT FOR CLEAR CYCLE
        MOV #MAINT,@DMBCSR ;SET "MAINTENANCE MODE"
        BIS R2,@DMBCSR ;SET LINE COUNTER TO TEST ADDRESS-1
        BIS #STEP,@DMBCSR ;WRITE 1'S INTO TEST ADDRESS
        BIC #MAINT,@DMBCSR ;CLEAR "MAINTENANCE MODE"
        MOV #16,R3 ;SET UP TO TEST ALL 16
        MOV #17,@DMBCSR ;SCANNER MEMORY LOCATIONS
        INC R2
        CLR R1
MEMT2B: BIS #STEP,@DMBCSR ;ACCESS SCANNER MEMORY
        MOVB @DMBCSR,R4 ;READ CONTENTS OF MEMORY
        MOV R1,R5 ;SET UP EXPECTED CONTENTS
        CMPB R4,R2 ;OF SCANNER MEMORY
        BNE MEMT2C
MEMT2C: BIS #70000,R5
        CMP R4,R5 ;COMPARE EXPECTED AND RECEIVED
        BEQ MEMT2D ;VALUES
        ERRORC ;SCANNER MEMORY ERROR
        SCOPEF ;CHECK FOR DATA FREEZE
MEMT2D: INC R1
        DEC R3 ;TEST NEXT SCANNER LOCATION
        BNE MEMT2B
        DEC R0 ;UPDATE LINE COUNT
        BNE MEMT2A
        SCOPE ;CHECK FOR ITERATION, LOOP
  
```



```

1439
1440
1441
1442
1443
1444 004274
1445 004274 005077 011454
1446 004300 042737 000340 177776
1447 004306 012700 000020
1448 004312 012702 000017
1449 004316 012703 000020
1450 004322 012777 001017 011424
1451 004330 052777 000400 011416
1452 004336 005303
1453 004340 001373
1454 004342 010277 011406
1455 004346 052777 000400 011400
1456 004354 012703 000020
1457 004360 012777 000017 011366
1458 004366 005202
1459 004370 005001
1460 004372 052777 000400 011354
1461 004400 117704 01135C
1462 004404 010105
1463 004406 120402
1464 004410 001002
1465 004412 052705 070000
1466 004416 020405
1467 004420 001403
1468 004422 104000
1469 004424 104003
1470 004426 004316
1471 004430 005201
1472 004432 005303
1473 004434 001356
1474 004436 005300
1475 004440 001326
1476 004442 104002
  
```

```

;WITH ALL SCANNER MEMORY LOCATIONS SET TO 1'S,
;WRITE 0'S INTO SELECTED LOCATION
;VERIFY THAT ONLY SELECTED LOCATION WAS CLEARED.
  
```

```

T25:
MEMT3: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
      MOV #16,R0 ;ENABLE INTERRUPTS
      MOV #17,R2 ;SET UP TO TEST 16 ADDRESSES
MEMT3A: MOV #16,R3 ;FIRST ADDRESS TO BE TESTED=0
      MOV #MAINT+17,@DMBCSR ;WRITE 1'S INTO ALL SCANNER
MEMT3B: BIS #STEP,@DMBCSR ;MEMORY LOCATIONS
      DEC R3
      BNE MEMT3B
      MOV R2,@DMBCSR ;SET LINE COUNTER TO TEST ADDRESS-1
      BIS #STEP,@DMBCSR ;WRITE 0'S INTO TEST ADDRESS
      MOV #16,R3 ;SET UP TO TEST ALL 16
      MOV #17,@DMBCSR ;SCANNER MEMORY LOCATIONS
      INC R2
      CLR R1
MEMT3C: BIS #STEP,@DMBCSR ;ACCESS SCANNER MEMORY
      MOVB @DMBCSR,R4 ;READ CONTENTS OF MEMORY
      MOV R1,R5 ;SET UP EXPECTED CONTENTS
      CMPB R4,R2 ;OF SCANNER MEMORY
      BNE MEMT3D
MEMT3D: BIS #70000,R5
      CMP R4,R5 ;COMPARE EXPECTED AND
      BEQ MEMT3E ;RECEIVED VALUES
      ERRORC ;SCANNER MEMORY ERROR
      SCOPEF ;CHECK FOR DATA FREEZE
MEMT3E: INC R1
      DEC R3 ;TEST NEXT SCANNER LOCATION
      BNE MEMT3C
      DEC R0 ;UPDATE ADDRESS COUNT
      BNE MEMT3A
      SCOPE ;CHECK FOR ITERATION, LOOP
  
```



```

1567                                     ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
1568                                     ;BE SET AND CLEARED FOR SELECTED LINE
1569
1570 005030                                T30:                                     ;REFERENCE DESIGNATION
1571 005030 005077 010720                 MUX3:  CLR      @DMBCSR                ;CLEAR CONTROL STATUS REGISTER
1572 005034 042737 000340 177776         BIC      #340,PS                    ;ENABLE INTERRUPTS
1573 005042 012700 000020                 MOV      #16.,R0                    ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
1574 005046 005001                         CLR      R1                          ;START AT LINE 0
1575 005050 012777 002000 010676         MUX3A: MOV      #CLRMUX,@DMBCSR
1576 005056 012702 000020                 MOV      #16.,R2
1577 005062 010177 010666                 MOV      R1,@DMBCSR                ;SELECT LINE TO BE TESTED
1578 005066 012777 000004 010662         MOV      #RS,@DMBLSR                ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
1579 005074 005077 010654                 CLR      @DMBCSR
1580 005100 005005                         MUX3B: CLR      R5
1581 005102 017704 010650                 MOV      @DMBLSR,R4                ;READ LINE STATUS REGISTER
1582 005106 117703 010642                 MOVB     @DMBCSR,R3                ;READ CONTROL STATUS REGISTER
1583 005112 042703 177760                 BIC      #177760,R3                ;CLEAR UNWANTED BITS
1584 005116 020103                         CMP      R1,R3                      ;IF LINE NUMBER=SELECTED LINE NUMBER
1585 005120 001002                         BNE      MUX3C                      ;EXCEPT REQUEST TO SEND FUNCTION FLIP FL
1586 005122 012705 000004                 MOV      #RS,R5
1587
1588 005126 020504                         MUX3C: CMP      R5,R4                ;TO BE SET
1589 005130 001403                         BEQ      MUX3D                      ;COMPARE EXPECTED AND RECEIVED
1590 005132 104001                         ERRORL                                     ;RESULTS
1591 005134 104003                         SCOPEF                                     ;LINE STATUS ERROR
1592 005136 005140                         MUX3D
1593 005140 052777 000400 010606         MUX3D: BIS      #STEP,@DMBCSR        ;EXAMINE NEXT LINE
1594 005146 005302                         DEC      R2
1595 005150 001353                         BNE      MUX3B
1596 005152 005005                         CLR      R5
1597 005154 010177 010574                 MUX3E: MOV      R1,@DMBCSR
1598 005160 010103                         MOV      R1,R3
1599 005162 005077 010570                 CLR      @DMBLSR                    ;SET LINE COUNTER TO SELECTED LINE
1600 005166 105227 000000                 INCB     #0                          ;CLEAR REQUEST TO SEND FLIP FLOP
1601 005172 001375                         BNE     .-4                          ;DELAY FOR CABLE
1602 005174 017704 010556                 MOV      @DMBLSR,R4                ;DITTO
1603 005200 005704                         TST     R4                          ;READ LINE STATUS REGISTER
1604 005202 001401                         BEQ     MUX3F                        ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
1605 005204 104001                         ERRORL                                     ;CLEARED
1606 005206 104003                         SCOPEF                                     ;NO LINE STATUS ERROR
1607 005210 005050                         MUX3A: MUX3A                          ;CHECK FOR LOOP ON SAME DATA
1608 005212 005201                         INC      R1                          ;SELECT NEXT LINE
1609 005214 005300                         DEC      R0                          ;DECREMENT LINE COUNT
1610 005216 001314                         BNE     MUX3A                        ;CONTINU IF NOT DONE
1611 005220 104002                         SCOPE

```


1657											
1658											
1659											
1660											
1661	005414										
1662	005414	005077	010334								
1663	005420	042737	000340	177776							
1664	005426	012700	000020								
1665	005432	005001									
1666	005434	012702	000020								
1667	005440	010177	010310								
1668	005444	012777	000003	010304							
1669	005452	005077	010276								
1670	005456	005005									
1671	005460	017704	010272								
1672	005464	117703	010264								
1673	005470	042703	177760								
1674	005474	020103									
1675	005476	001002									
1676	005500	012705	000143								
1677											
1678	005504	020405									
1679	005506	001403									
1680	005510	104001									
1681	005512	104003									
1682	005514	005516									
1683	005516	052777	000400	010230							
1684	005524	005302									
1685	005526	001353									
1686	005530	012705	000001								
1687	005534	010103									
1688	005536	010177	010212								
1689	005542	042777	000002	010206							
1690	005550	105227	000000								
1691	005554	001375									
1692	005556	017704	010174								
1693	005562	020504									
1694	005564	001401									
1695	005566	104001									
1696	005570	104003									
1697	005572	005434									
1698	005574	005201									
1699	005576	005077	010154								
1700	005602	005300									
1701	005604	001313									
1702	005606	104002									

```

;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
;AND TERMINAL ARE SET FOR SELECTED LINE.

T32:
MUX5: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #16.,R0 ;ENABLE INTERRUPTS
      CLR R1 ;SET UP TO TEST 16 LINES
      MOV #16.,R2 ;START AT LINE 0
      MOV R1,@DMBCSR ;16 LINES
      MOV #LINENA+TRMRDY,@DMBLSR ;SELECT A LINE
      CLR @DMBCSR ;SET LINE ENABLE +TRMRDY
      CLR R5 ;CLEAR CONTROL REGISTER
      MOV @DMBLSR,R4 ;CLEAR EXPECTED RESULT
      MOVB @DMBCSR,R3 ;READ LINE STATUS
      BIC #177760,R3 ;READ LINE NUMBER
      CMP R1,R3 ;CLEAR UNWANTED BITS
      BNE MUX5C ;IF RECEIVED LINE=SELECTED LINE
      MOV #LINENA+TRMRDY+CO+CS,R5 ;EXPECT LINE ENABLE AND

MUX5C: CMP R4,R5 ;CLEAR TO SEND AND CARRIER ARE SET
      BEQ MUX5D ;COMPARE EXPECTED AND
      ERRORL SCOPEF ;RECEIVED RESULTS
      MUX5D ;LINE STATUS ERROR

MUX5D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX5E ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
      MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #TRMRDY,@DMBLSR ;CLEAR TERMINAL
      INCB #0 ;DELAY FOR CABLE
      BNE .-4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX5F ;SET ON THIS LINE
      ERRORL SCOPEF ;LINE STATUS ERROR
      MUX5A ;CHECK FOR LOOP ON SAME DATA

MUX5E: INC R1 ;UPDATE LINE NUMBER
      CLR @DMBLSR ;CLEAR LINE STATUS REGISTER
      DEC R0 ;CONTINUE IF ALL LINES NOT
      BNE MUX5A ;TESTED
      SCOPE ;CHECK FOR ITERATIONS, LOOP
  
```

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1703
1704
1705
1706
1707 005610
1708 005610 005077 010140
1709 005614 042737 000340 177776
1710 005622 012700 000020
1711 005626 005001
1712 005630 012702 000020
1713 005634 010177 010114
1714 005640 012777 000005 010110
1715 005646 005077 010102
1716 005652 005005
1717 005654 017704 010076
1718 005660 117703 010070
1719 005664 042703 177760
1720 005670 020103
1721 005672 001002
1722 005674 012705 000205
1723
1724 005700 020405
1725 005702 001403
1726 005704 104001
1727 005706 104003
1728 005710 005712
1729 005712 052777 000400 010034
1730 005720 005302
1731 005722 001353
1732 005724 012705 000001
1733 005730 010103
1734 005732 010177 010016
1735 005736 042777 000004 010012
1736 005744 105227 000000
1737 005750 001375
1738 005752 017704 010000
1739 005756 020504
1740 005760 001401
1741 005762 104001
1742 005764 104003
1743 005766 005630
1744 005770 005201
1745 005772 005077 007760
1746 005776 005300
1747 006000 001313
1748 006002 104002

;VERIFY THAT RING IS SET IF "LINE ENABLE"
;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.

T33:
MUX6: CLR @DMBCSR
      BIC #340,PS
      MOV #16.,R0
      CLR R1
MUX6A: MOV #16.,R2
      MOV R1,@DMBCSR
      MOV #LINENA+RS,@DMBLSR
      CLR @DMBCSR
MUX6B: CLR R5
      MOV @DMBLSR,R4
      MOV @DMBCSR,R3
      BIC #177760,R3
      CMP R1,R3
      BNE MUX6C
      MOV #LINENA+RS+RING,R5
MUX6C: CMP R4,R5
      BEQ MUX6D
      ERRORL SCOPEF
      MUX6D
MUX6D: BIS #STEP,@DMBCSR
      DEC R2
      BNE MUX6B
      MOV #LINENA,R5
MUX6E: MOV R1,R3
      MOV R1,@DMBCSR
      BIC #RS,@DMBLSR
      INCB #0
      BNE -4
      MOV @DMBLSR,R4
      CMP R5,R4
      BEQ MUX6F
      ERRORL SCOPEF
      MUX6A
      INC R1
      CLR @DMBLSR
      DEC R0
      BNE MUX6A
      SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LINES
;START AT LINE 0
;16 LINES
;SELECT A LINE
;SET LINE ENABLE +RS
;CLEAR CONTROL REGISTER
;CLEAR EXPECTED RESULT
;READ LINE STATUS
;READ LINE NUMBER
;CLEAR UNWANTED BITS
;IF RECEIVED LINE=SELECTED LINE
;EXPECT LINE ENABLE AND
;RING IS SET
;COMPARE EXPECTED AND
;RECEIVED RESULTS
;LINE STATUS ERROR
;UPDATE LINE COUNTER
;CONTINUE IF ALL CHECKS
;ARE NOT DONE FOR THIS LINE
;EXPECT LINE ENABLE
;ON SELECTED LINE
;SELECT LINE
;CLEAR REQUEST TO SEND
;DELAY FOR CABLE
;DITTO
;READ LINE STATUS REGISTER
;ONLY LINE ENABLE SHOULD BE
;SET ON THIS LINE
;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA
;UPDATE LINE NUMBER
;CLEAR LINE STATUS REGISTER
;CONTINUE IF ALL LINES NOT
;TESTED
;CHECK FOR ITERATIONS, LOOP

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1749
1750
1751
1752
1753 006004
1754 006004 005077 007744
1755 006010 042737 000340 177776
1756 006016 012700 000020
1757 006022 005001
1758 006024 012702 000020
1759 006030 010177 007720
1760 006034 012777 000011 007714
1761 006042 005077 007706
1762 006046 005005
1763 006050 017704 007702
1764 006054 117703 007674
1765 006060 042703 177760
1766 006064 020103
1767 006066 001002
1768 006070 012705 000031
1769
1770 006074 020405
1771 006076 001403
1772 006100 104001
1773 006102 104003
1774 006104 006106
1775 006106 052777 000400 007640
1776 006114 005302
1777 006116 001353
1778 006120 012705 000001
1779 006124 010103
1780 006126 010177 007622
1781 006132 042777 000010 007616
1782 006140 105227 000000
1783 006144 001375
1784 006146 017704 007604
1785 006152 020504
1786 006154 001401
1787 006156 104001
1788 006160 104003
1789 006162 006024
1790 006164 005201
1791 006166 005077 007564
1792 006172 005300
1793 006174 001313
1794 006176 104002

T34:
MUX7: CLR @DMBCSR
      BIC #340,PS
      MOV #16.,R0
      CLR R1
MUX7A: MOV #16.,R2
      MOV R1,@DMBCSR
      MOV #LINENA+SECTX,@DMBLSR
      CLR @DMBCSR
MUX7B: CLR R5
      MOV @DMBLSR,R4
      MOVB @DMBCSR,R3
      BIC #177760,R3
      CMP R1,R3
      BNE MUX7C
      MOV #LINENA+SECTX+SECRX,R5
MUX7C: CMP R4,R5
      BEQ MUX7D
      ERRORL SCOPEF
      MUX7D
MUX7D: BIS #STEP,@DMBCSR
      DEC R2
      BNE MUX7B
      MOV #LINENA,R5
MUX7E: MOV R1,R3
      MOV R1,@DMBCSR
      BIC #SECTX,@DMBLSR
      INCB #0
      BNE #-4
      MOV @DMBLSR,R4
      CMP R5,R4
      BEQ MUX7F
      ERRORL SCOPEF
MUX7F: MUX7A
      INC R1
      CLR @DMBLSR
      DEC R0
      BNE MUX7A
      SCOPE

;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LINES
;START AT LINE 0
;16 LINES
;SELECT A LINE
;SET LINE ENABLE +SECTX
;CLEAR CONTROL REGISTER
;CLEAR EXPECTED RESULT
;READ LINE STATUS
;READ LINE NUMBER
;CLEAR UNWANTED BITS
;IF RECEIVED LINE=SELECTED LINE
;EXPECT LINE ENABLE AND

;SECONDARY RECEIVE IS SET
;COMPARE EXPECTED AND
;RECEIVED RESULTS
;LINE STATUS ERROR

;UPDATE LINE COUNTER
;CONTINUE IF ALL CHECKS
;ARE NOT DONE FOR THIS LINE
;EXPECT LINE ENABLE
;ON SELECTED LINE
;SELECT LINE
;CLEAR SECONDARY TRANSMIT
;DELAY FOR CABLE
;DITTO
;READ LINE STATUS REGISTER
;ONLY LINE ENABLE SHOULD BE
;SET ON THIS LINE
;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

;UPDATE LINE NUMBER
;CLEAR LINE STATUS REGISTER
;CONTINUE IF ALL LINES NOT
;TESTED
;CHECK FOR ITERATIONS, LOOP

```

1795										
1796										:VERIFY THAT "CLEAR MULTIPLXER" CLEARS ALL MULTIPLEXER
1797										:FUNCTION FLIP-FLOPS
1798										
1799	006200									:REFERENCE DESIGNATION
1800	006200	005077	007550			T35:	CLR	ADMBCSR		:CLEAR CONTROL REGISTER
1801	006204	042737	000340	177776		MUXB:	BIC	#340,PS		:ENABLE INTERRUPTS
1802	006212	012700	000020				MOV	#16,R0		:SET UP TO TEST 16 LINES
1803	006216	012777	000017	007532		MUXBA:	MOV	#17,ADMBSR		:WRITE 15 INTO ALL MULTIPLEXER
1804	006224	052777	000400	007522			BIS	#STEP,ADMBCSR		:FUNCTION FLIPFLOPS
1805	006232	005300					DEC	R0		
1806	006234	001370					BNE	MUXBA		
1807	006236	005003					CLR	R3		:SET UP FOR 16 LINES
1808	006240	012700	000020				MOV	#16,R0		
1809	006244	012777	002000	007502		MUXB9:	MOV	#CLRMUX,ADMBCSR		:CLEAR MULTIPLEXER
1810	006252	010377	007476			MUXBC:	MOV	R3,ADMBCSR		:SELECT LINE
1811	006256	017704	007474				MOV	ADMBSR,R4		:READ LINE STATUS REGISTER
1812	006262	005005					CLR	R5		:EXPECT 05
1813	006264	005704					TST	R4		:WAS LINE STATUS REGISTER CLEARED
1814	006266	001403					BEQ	MUXBD		
1815	006270	104001					ERRORL			:LINE STATUS ERROR
1816	006272	104003					SCOPEF			:CHECK FOR LOOP ON SAME DATA
1817	006274	006244					MUXBB			
1818	006276	005205				MUXBD:	INC	R5		:EXPECT LINE ENABLE
1819	006300	052777	000001	007450			BIS	#LINENA,ADMBSR		:SET LINE ENABLE ON SELECTED LINE
1820	006306	017704	007444				MOV	ADMBSR,R4		:READ LINE STATUS REGISTER
1821	006312	020504					CMP	R5,R4		:IS ANYTHING BUT LINE ENABLE SET
1822	006314	001403					BEQ	MUXBE		
1823	006316	104001					ERRORL			:LINE STATUS ERROR
1824	006320	104003					SCOPEF			:CHECK FOR LOOP ON SAME DATA
1825	006322	006244					MUXBB			
1826	006324	005203				MUXBE:	INC	R3		:UPDATE LINE NUMBER
1827	006326	005077	007424				CLR	ADMBSR		:CLEAR CURRENT LINE
1828	006332	005300					DEC	R0		:CONTINUE IF ALL LINES NOT
1829	006334	001346					BNE	MUXBC		:TESTED
1830	006336	104002					SCOPE			:CHECK FOR ITERATIONS, LOOP

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1831
1832
1833
1834
1835
1836
1837 006340
1838 006340 012777 002000 007406
1839 006346 005077 007402
1840 006352 042737 000340 177776
1841 006360 012700 000020
1842 006364 012777 001017 007362
1843 006372 052777 000400 007354
1844 006400 012777 000001 007350
1845 006406 005300
1846 006410 001370
1847 006412 012705 070340
1848 006416 012777 006516 007324
1849 006424 013777 177776 007320
1850 006432 012700 000020
1851 006436 012777 000117 007310
1852 006444 052737 000340 177776
1853 006452 052777 000040 007274
1854 006460 042737 000340 177776
1855 006466 105777 007262
1856 006472 100375
1857
1858 006474 052737 000340 177776
1859 006502 017704 007246
1860 006506 104000
1861 006510 104003
1862 006512 006340
1863 006514 000410
1864 006516 022626
1865 006520 017704 007230
1866 006524 020504
1867 006526 001403
1868 006530 104000
1869 006532 104003
1870 006534 006340
1871 006536 042777 000240 007210
1872 006544 005205
1873 006546 005300
1874 006550 001335
1875 006552 104002

;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS
;SET "LINE ENABLE FOR ALL LINES
;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE

T36:
SCNT1: MOV #CLRMUX, @DMBCSR ;REFERENCE DESIGNATION
        CLR @DMBCSR ;CLEAR ALL MULTIPLEXER FLIPFLOPS
        BIC #340, PS ;CLEAR CONTROL REGISTER
        MOV #16, RO ;ENABLE INTERRUPTS
        MOV #MAINT+17, @DMBCSR ;SET UP TO WRITE 1'S INTO
        ;ALL SCANNER MEMORY LOCATION
SCNT1A: BIS #STEP, @DMBCSR ;WRITE A LOCATION
        MOV #LINEA, @DMBLSR ;LET "LINE ENABLE"
        DEC RO
        BNE SCNT1A
        MOV #70340, R5 ;EXPECT "DONE"+"SCNENA"+"COF"+"CSF"+"SEC
        MOV #SCNT1C, @DMBVEC ;SET UP LOCAL INTERRUPT SERVICE
        MOV PS, @DMBLVL ;SERVICE AT LEVEL 7
        MOV #16, RO
        MOV #INTENA+17, @DMBCSR ;SET INTERRUPT ENABLE
SCNT1B: BIS #340, PS ;LOCK OUT INTERRUPTS
        BIS #SCNENA, @DMBCSR ;START SCANNER
        BIC #340, PS ;ENABLE INTERRUPTS
        TSTB @DMBCSR ;WAIT FOR DONE
        BPL .-4 ;PROGRAM WILL HANG HERE
        ;IF DONE NEVER SETS
        ;INTERRUPT DID NOT OCCUR
        ;ERROR
        ;CONTROL STATUS ERROR
        ;CHECK FOR LOOP ON SAME DATA

SCNT1C: BR SCNT1D
        POP2SP ;INTERRUPT OCCURED, REPOSITION STACK
        MOV @DMBCSR, R4 ;READ CONTROL STATUS
        CMP R5, R4 ;ARE EXPECTED AND RECEIVED
        BEQ SCNT1D ;REGISTERS THE SAME
        ERRORC ;NO, LINE STATUS ERROR
        SCOPEF ;CHECK FOR LOOP WITH CURRENT DATA
        SCNT1

SCNT1D: BIC #SCNENA+DONE, @DMBCSR ;CLEAR SCAN ENABLE AND DONE
        INC R5 ;UPDATE EXPECTED RESULT
        DEC RO ;CONTINUE IF NOT DONE
        BNE SCNT1B
        SCOPE ;CHECK FOR ITERATIONS, LOOP

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1876										
1877										;WRITE 1'S INTO ALL MULTIPLEXER FUNCTION FLIP-FLOPS
1878										;CLEAR SCANNER MEMORY
1879										;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE
1880										
1881	006554								T37:	;REFERENCE DESIGNATION
1882	006554	012700	000020						SCNT2: MOV #16,R0	;WRITE 1S INTO ALL
1883	006560	012777	002000	007166					MOV #CLRMUX,DMBCSR	;CLEAR MULTIPLEXER
1884	006566	005077	007162						CLR DMBCSR	;MULTIPLEXER FUNCTION
1885	006572	042737	000340	177776					BIC #340,PS	;ENABLE TELETYPE INTERRUPTS
1886	006600	012777	000017	007150					SCNT2A: MOV #17,DMBLR	;FLIPFLOPS
1887	006606	052777	000400	007140					BIS #STEP,DMBCSR	
1888	006614	005300							DEC R0	
1889	006616	001370							BNE SCNT2A	
1890	006620	012777	004000	007126					MOV #CLRSCN,DMBCSR	;CLEAR SCANNER MEMORY
1891	006626	032777	000020	007120					BIT #BUSY,DMBCSR	;WAIT FOR CLEAR CYCLE TO COMPLETE
1892	006634	001374							BNE .-6	
1893	006636	012700	000020						MOV #16,R0	;SET UP TO TEST 16 LINES
1894	006642	012705	170340						MOV #170340,R5	;FIRST EXPECTED RESULT
1895	006646	012777	006742	007074					MOV #SCNT2C,DMBVEC	;SET UP LOCAL INTERRUPT RETURN
1896	006654	0.3777	177776	007070					MOV PS,DMBLVL	
1897	006662	012777	000117	007064					MOV #INTENA+17,DMBCSR	;SET INTERRUPT ENABLE
1898	006670	052737	000340	177776					SCNT2B: BIS #340,PS	;LOCK OUT INTERRUPTS
1899	006676	052777	000040	007050					BIS #SCNENA,DMBCSR	;START SCANNER
1900	006704	042737	000340	177776					BIC #340,PS	;ENABLE INTERRUPTS
1901	006712	105777	007036						TSTB DMBCSR	;WAIT FOR DONE
1902	006716	100375							BPL .-4	;PROGRAM WILL HANG HERE
1903										;IF DONE NEVER SETS
1904	006720	052737	000340	177776					BIS #340,PS	;LOCK OUT INTERRUPTS
1905	006726	017704	007022						MOV DMBCSR,R4	;READ CONTROL STATUS
1906	006732	104000							ERRORC	;INTERRUPT DID NOT OCCUR
1907	006734	104003							SCOPEF	;CHECK FOR LOOP ON CURRENT DATA
1908	006736	006554							SCNT2	
1909	006740	000410							BR SCNT2D	;CONTINUE
1910	006742	022076							SCNT2C: POP2SP	;INTERRUPT OCCURED, RESTORE STACK
1911	006744	017704	007004						MOV DMBCSR,R4	;READ CONTROL STATUS REGISTER
1912	006750	020504							CMP R5,R4	;COMPARE TO EXPECTED RESULT
1913	006752	001403							BEQ SCNT2D	
1914	006754	104000							ERRORC	;CONTROL STATUS ERROR
1915	006756	104003							SCOPEF	;CHECK FOR LOOP ON CURRENT DATA
1916	006760	006554							SCNT2	
1917	006762	042777	000240	006764					SCNT2D: BIC #SCNENA+DONE,DMBCSR	;CLEAR SCAN ENABLE AND DONE
1918	006770	005205							INC R5	;UPDATE EXPECTED RESULT
1919	006772	005300							DEC R0	;CONTINUE IF ALL
1920	006774	001335							BNE SCNT2B	;LINES NOT TESTED
1921	006776	104002							SCOPE	;CHECK FOR ITERATIONS, LOOP

1922
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 1937
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 1939
 1940
 1941
 1942

007000	012737	007020	002150
007000	042737	000340	177776
007014	104004		
007016	017021		
007020	104013		
007022	017054		
007024	000000		
007026	000017		
007030	016042		
007032	104004		
007034	017016		

```

T100:
STRLIN: MOV      #STRLNA,KRET
        BIC      #340,PS
        TYPE
        MLINE
STRLNA: INSTRG
        MLINEI
        0
        17
        LINE
        TYPE
        MCRLF
  
```

```

;SINGLE LINE CABLE TEST
;FOR USE WITH MODEM CABLE AND DC11 TEST CONNECTOR

;NOTE: DM11-BB MULTIPLEXER INPUTS SHOULD BE CONNECTED
;TO DISTRIBUTION PANEL VIA DM11-DC
  
```

```

;REFERENCE DESIGNATION
;SET UP FOR NEW LINE SELECTION
;ENABLE INTERRUPTS
;TYPE "SINGLE LINE CABLE TEST"

;GET LINE NUMBER
  
```

1943											
1944											
1945											
1946											
1947	007036										
1948	007036	005077	006712								
1949	007042	042737	000340	177776							
1950	007050	013701	016042								
1951	007054	012777	002000	006672							
1952	007062	012702	000020								
1953	007066	010177	006662								
1954	007072	012777	000001	006656							
1955	007100	005077	006650								
1956	007104	005005									
1957	007106	017704	006644								
1958	007112	117703	006636								
1959	007116	042703	177760								
1960	007122	020103									
1961	007124	001002									
1962	007126	012705	000001								
1963											
1964	007132	020504									
1965	007134	001403									
1966	007136	104001									
1967	007140	104003									
1968	007142	007144									
1969	007144	052777	000400	006602							
1970	007152	005302									
1971	007154	001353									
1972	007156	005005									
1973	007160	010177	006570								
1974	007164	010103									
1975	007166	005077	006564								
1976	007172	105227	000000								
1977	007176	001375									
1978	007200	017704	006552								
1979	007204	005704									
1980	007206	001401									
1981	007210	104001									
1982	007212	104002									

;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
 ;BE SET AND CLEARED FOR SELECTED LINE

;REFERENCE DESIGNATION
 ;CLEAR CONTROL STATUS REGISTER
 ;ENABLE INTERRUPTS

;SELECT LINE TO BE TESTED
 ;SET LINE ENABLE FUNCTION FLIP-FLOP

;READ LINE STATUS REGISTER
 ;READ CONTROL STATUS REGISTER
 ;CLEAR UNWANTED BITS
 ;IF LINE NUMBER=SELECTED LINE NUMBER,
 ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP

;TO BE SET
 ;COMPARE EXPECTED AND RECEIVED
 ;RESULTS
 ;LINE STATUS ERROR

;EXAMINE NEXT LINE

;SET LINE COUNTER TO SELECTED LINE
 ;CLEAR LINE ENABLE FLIP FLOP
 ;DELAY FOR CABLE
 ;DITTO
 ;READ LINE STATUS REGISTER
 ;WAS LINE ENABLE FUNCTION FLIP FLOP
 ;CLEARED
 ;NO, LINE STATUS ERROR
 ;CHECK FOR ITERATIONS, LOOP


```

2100
2101
2102
2103
2104 007726
2105 007726 005077 006022
2106 007732 042737 000340 177776
2107 007740 013701 016042
2108 007744 012702 000020
2109 007750 010177 006000
2110 007754 012777 000003 005774
2111 007762 005077 005766
2112 007766 005005
2113 007770 017704 005762
2114 007774 117703 005754
2115 010000 042703 177760
2116 010004 020103
2117 010006 001002
2118 010010 012705 000143
2119
2120 010014 020405
2121 010016 001403
2122 010020 104001
2123 010022 104003
2124 010024 010026
2125 010026 052777 000400 005720
2126 010034 005302
2127 010036 001353
2128 010040 012705 000001
2129 010044 010103
2130 010046 010177 005702
2131 010052 042777 000002 005676
2132 010060 105227 000000
2133 010064 001375
2134 010066 017704 005664
2135 010072 020504
2136 010074 001401
2137 010076 104001
2138 010100 104002

;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
;AND TERMINAL ARE SET FOR SELECTED LINE.

T105:
MUX15: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV LINE,R1 ;ENABLE INTERRUPTS
MUX15A: MOV #16,R2 ;16 LINES
      MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+TRMRDY,@DMBLSR ;SET LINE ENABLE +TRMRDY
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
MUX15B: CLR R5 ;CLEAR EXPECTED RESULT
      MOV @DMBLSR,R4 ;READ LINE STATUS
      MOVB @DMBCSR,R3 ;READ LINE NUMBER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
      BNE MUX15C ;EXPECT LINE ENABLE AND
      MOV #LINENA+TRMRDY+CO+CS,R5 ;CLEAR TO SEND AND CARRIER ARE SET
MUX15C: CMP R4,R5 ;COMPARE EXPECTED AND
      BEQ MUX15D ;RECEIVED RESULTS
      ERRORL ;LINE STATUS ERROR
      SCOPEF
MUX15D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX15B ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
MUX15E: MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #TRMRDY,@DMBLSR ;CLEAR TERMINAL
      INCB #0 ;DELAY FOR CABLE
      BNE -4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX15F ;SET ON THIS LINE
      ERRORL ;LINE STATUS ERROR
MUX15F: SCOPE ;CHECK FOR ITERATIONS, LOOP
  
```



```

2178
2179
2180 ;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
2181 ;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
2182 010256 T107: ;REFERENCE DESIGNATION
2183 010256 005077 005472 MUX17: CLR @DMBCSR ;CLEAR CONTROL REGISTER
2184 010262 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
2185 010270 013701 016042 MOV LINE,R1
2186 010274 012702 00J020 MUX17A: MOV #16,R2 ;16 LINES
2187 010300 010177 005450 MOV R1,@DMBCSR ;SELECT A LINE
2188 010304 012777 000011 005444 MOV #LINENA+SECTX,@DMBLSR ;SET LINE ENABLE +SECTX
2189 010312 005077 005436 MUX17B: CLR @DMBCSR ;CLEAR CONTROL REGISTER
2190 010316 005005 CLR R5 ;CLEAR EXPECTED RESULT
2191 010320 017704 005432 MOV @DMBLSR,R4 ;READ LINE STATUS
2192 010324 117703 005424 MOVB @DMBCSR,R3 ;READ LINE NUMBER
2193 010330 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
2194 010334 020103 CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
2195 010336 001002 BNE MUX17C ;EXPECT LINE ENABLE AND
2196 010340 012705 000031 MOV #LINENA+SECTX+SECRX,R5
2197
2198 010344 020405 MUX17C: CMP R4,R5 ;SECONDARY RECEIVE IS SET
2199 010346 001403 BEQ MUX17D ;COMPARE EXPECTED AND
2200 010350 104001 ERRORL ;RECEIVED RESULTS
2201 010352 104003 SCOPEF ;LINE STATUS ERROR
2202 010354 010356 MUX17D
2203 010356 052777 000400 005370 MUX17D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
2204 010364 005302 DEC R2 ;CONTINUE IF ALL CHECKS
2205 010366 001353 BNE MUX17B ;ARE NOT DONE FOR THIS LINE
2206 010370 012705 000001 MOV #LINENA,R5 ;EXPECT LINE ENABLE
2207 010374 010103 MUX17E: MOV R1,R3 ;ON SELECTED LINE
2208 010376 010177 005352 MOV R1,@DMBCSR ;SELECT LINE
2209 010402 042777 000010 005346 BIC #SECTX,@DMBLSR ;CLEAR SECONDARY TRANSMIT
2210 010410 105227 000000 INCB #0 ;DELAY FOR CABLE
2211 010414 001375 BNE -4 ;DITTO
2212 010416 017704 005334 MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
2213 010422 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
2214 010424 001401 BEQ MUX17F ;SET ON THIS LINE
2215 010426 104001 ERRORL ;LINE STATUS ERROR
2216 010430 104002 MUX17F: SCOPE ;CHECK FOR ITERATIONS, LCOP
  
```

2217
2218
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2222
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2241
2242
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2244
2245
2246
2247
2248
2249
2250
2251
2252
2253
2254
2255
2256
2257
2258
2259
2260
2261
2262
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2264
2265
2266
2267

010432
010432 000005
010434 012737 000340 177776
010442 104004
010444 016300
010446 022737 000176 015770
010454 001001
010456 104025
010460 012737 010476 012266
010466 012737 010474 002150
104017
010476 104020
010500 010510
010502 010504
010504 104012
010506 000772
010510 104021
010512 010530
010514 010520
010516 010524
010520 104014
010522 000207
010524 104014
010526 000762

T200:
ST103A: RESET
MOV #340,PS
TYPE
MT103T
CMP #SWREG,SWR
BNE IS
CNTLUJ
IS: MOV #T103A,FATRET
MOV #ST103B,KRET
ST103B: GETLNS
T103A: SETUP
T103B
T103A1
T103A1: ERROR
BR ST103B
T103B: CKRING
T103C
T103B1
T103B2
T103B1: ERROR
RTS PC
T103B2: ERROR
BR ST103B

:DM11-BB ON LINE TEST USING 103A TYPE MODEMS
:ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
:THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
:USING THE DM11-BB TO CONTROL 103A TYPE MODEMS

:NOTE: IF THE DM11-AA IS NOT CONNECTED TO THE
:DISTRIBUTION PANEL, AN M974 DM11 MAINTENANCE JUMPER
:SHOULD BE INSTALLED IN SLOT B1 OR B3 OF THE DISTRIBUTION
:PANNEL TO PREVENT A POSSIBLE LONG SPACE
:DISCONNECT FROM HANGING UP THE MODEM

:REFERENCE DESIGNATION
:INITIALIZE INTERFACE
:DISABLE ALL INTERRUPTS
:TYPE "103A MODEM CONNECT-
:DISCONNECT TEST"

:SET UP FOR FATAL ERROR
:SET UP FOR LINE CHANGE
:INPUT ORIGINATE AND
:AND ANSWER LINE NUMBERS
:SET UP TO RECEIVE INTERRUPTS
:WAIT FOR RING
:GO HERE IF RING OK
:GO HERE IF NO RING
:NO RING WITHIN 5 MINUTES
:SELECT NEW LINES AND REDIAL

:CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
:IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
:WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
:WILL BE REQUESTED TO RESELECT LINES AND REDIAL

:CHECK FOR RING INTERRUPT
:ONLY ON ANSWER LINE
:AND NO TRANSITIONS ON
:ORIGINATE LINE
:GO HERE IF TRANSITIONS
:ARE CORRECT
:GO HERE IF INCORRECT
:TRANSITION ON ANSWER LINE
:GO HERE IF INCORRECT TRANSITION
:ON ORIGINATE LINE
:TRANSITION ERROR ON ANSWER LINE
:CONTINUE CHECKING
:TRANSITION ERROR ON ORIGINATE LINE
:RESELECT LINES AND REDIAL

2268										
2269										
2270										
2271										
2272	010530	013777	016046	005216	T1030:	MOV	LINANS,DMBCSR			
2273										
2274	010536	052777	000002	005212		BIS	#TRMRDY,DMBLSR			
2275										
2276	010544	104026				CKINTT				
2277	010546	104022				WAITRN				
2278										
2279										
2280										
2281										
2282	010550	104023				CKTRAN				
2283										
2284										
2285	010552	000143				CO+CS+LINENA+TRMPDY				
2286										
2287										
2288										
2289	010554	000143				CO+CS+LINENA+TRMRDY				
2290										
2291										
2292										
2293	010556	100006				RINGF+XCO+XCS				
2294										
2295										
2296	010560	000006				XCO+XCS				
2297										
2298										
2299	010562	010574				T10301				
2300										
2301	010564	010600				T10302				
2302	010566	010604				T10303				
2303	010570	010610				T10304				
2304	010572	010614				T103E				
2305	010574	104015				T10301: ERRORS				
2306	010576	000207				RTS	PC			
2307	010600	104015				T10302: ERRORS				
2308	010602	000207				RTS	PC			
2309	010604	104014				T10303: ERROR				
2310	010606	000207				RTS	PC			
2311	010610	104014				T10304: ERROR				
2312	010612	000207				RTS	PC			

```

;SET TERMINAL READY ON SELECTED ANSWER LINE
;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES

```

```

;SET LINE COUNTER TO
;ANSWER LINE NUMBER
;SET TERMINAL READY ON
;SELECTED ANSWER LINE

```

```

;WAIT FOR TRANSITIONS TO OCCUR

```

```

;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
;SELECTED ORIGINATE AND ANSWER LINES

```

```

;CHECK TRANSITIONS AND
;STATUS ON SELECTED
;ANSWER AND ORIGINATE LINES
;EXPECT CARRIER, CLEAR TO SEND,
;LINE ENABLE AND TERMINAL
;READY STATUS BITS SET ON
;ANSWER LINE

```

```

;EXPECT CARRIER, CLEAR TO SEND,
;LINE ENABLE AND TERMINAL
;READY STATUS BITS ON

```

```

;ORIGINATE LINE
;EXPECT CARRIER, CLEAR TO SEND
;AND POSSIBLE RING TRANSITIONS
;ON ANSWER LINE

```

```

;EXPECT CARRIER AND CLEAR
;TO SEND TRANSITIONS ON
;ORIGINATE LINE

```

```

;GO HERE ON ANSWER LINE STATUS ERROR

```

```

;GO HERE ON ORIGINATE LINE STATUS ERROR
;GO HERE ON ANSWER LINE TRANSITION ERROR
;GO HERE ON ORIGINATE LINE TRANSITION ER

```

```

;GO TO NEXT TEST IF NO ERRORS
;ANSWER LINE STATUS ERROR

```

```

;CONTINUE CHECKING
;ORIGINATE LINE STATUS ERROR

```

```

;CONTINUE CHECKING
;ANSWER LINE TRANSITION ERROR

```

```

;CONTINUE CHECKING
;ORIGINATE LINE TRANSITION ERROR

```

```

;CONTINUE CHECKING

```

2313
2314
2315
2316
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2319
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2321
2322
2323
2324
2325
2326
2327
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2329
2330
2331
2332
2333
2334
2335
2336
2337
2338
2339
2340
2341

010614 104004
010616 016543
010620 012737 000340 177776
010626 012777 012310 005114
010634 012737 010654 016062
010642 012777 000140 005104
010650 005037 177776
010654 005077 005102
010660 105777 005074
010664 100375
010666 005777 005070
010672 012737 000340 177776
010700 005077 005050
010704 013777 016044 005042
010712 042777 000002 005036
010720 104026
010722 104022

T103E: TYPE
MDISC
MOV #340,PS
MOV #TRNTYP,@DMBVEC ;SET UP
MOV #T103ES,RNGRET
MOV #SCNENA+INTENA,@DMBCSR
CLR PS
T103ES: CLR @TKOBR
IS: TSTB @TKCSR
BPL IS
TST @TKOBR
MOV #340,PS
CLR @DMBCSR
MOV LINORG,@DMBCSR
BIC #TRMRDY,@DMBLSR
CKINTT
WAITRN

;SET UP TO TEST DISCONNECT SEQUENCE
;THE PROGRAM WILL REQUEST THE OPERATOR TO SET SW01=1
;TO INITIATE THE DISCONNECT SEQUENCE
;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
;DATA TO TALK MODE AS MANY TIMES AS DESIRED
;BEFORE THE SWITCH SEETIN IS MADE
;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
;REPORTED BY TYPEOUT
;TYPE "SET SW01=1 TO
;TEST DISCONNECT"
;LOCK OUT INTERRUPTS
;TO DETECT TRANSITIONS
;BEFORE DISCONNECT SEQUENCE STARTS
;SET UP DUMMY RETURN FOR
;RING INTERRUPT
;SET SCAN ENABLE AND INTERRUPT ENABLE
;ALLOW INTERRUPTS
;START DISCONNECT SEQUENCE
;CLEAR CONROL REGISTER
;SET LINE COUNTER TO SELECTED ORIGINATE
;SET TERMINAL READY ON SELECTED LINE
;WAIT FOR TRANSITIONS TO OCCUR

2382
 2383
 2384
 2385
 2386
 2387
 2388
 2389
 2390
 2391
 2392
 2393
 2394
 2395
 2396
 2397
 2398
 2399
 2400
 2401
 2402
 2403
 2404
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 2409
 2410
 2411
 2412
 2413
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 2415
 2416
 2417
 2418
 2419
 2420
 2421
 2422
 2423
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011006
 011006 - 800005
 011010 012737 000340 177776
 011016 104004
 011020 016351
 011022 022737 000176 015770
 011030 001001
 011032 104025
 011034 012737 011052 012266
 011042 012737 011050 002150
 011050 104017
 011052 104020
 011054 011064
 011056 011060
 011060 104012
 011062 000772
 011064 104021
 011066 011104
 011070 011074
 011072 011100
 011074 104014
 011076 000207
 011100 104014
 011102 000762

T300:
 ST202A: RESET
 MOV #340,PS
 TYPE
 MT202T
 CMP #SWREG,SWR
 BNE IS
 CNTLUU
 IS: MOV #T202A,FATRET
 MOV #ST202B,KRET
 ST202B: GETLNS
 T202A: SETUP
 T202B
 T202A1
 T202A1: ERROR
 BR ST202B
 T202B: CKRING
 T202C
 T202B1
 T202B2
 T202B1: ERROR
 RTS PC
 T202B2: ERROR
 BR ST202B

;DM11-BB ON LINE TEST USING 202C TYPE MODEMS
 ;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
 ;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
 ;USING THE DM11-BB TO CONTROL 202C TYPE MODEMS

 ;ALSO TESTED ARE LINE TURN-AROUND AND
 ;SECONDARY TRANSMIT-SECONDARY RECEIVE

 ;REFERENCE DESIGNATION
 ;INITIALIZE INTERFACE
 ;DISABLE ALL INTERRUPTS
 ;TYPE "202C MODEM CONNECT-
 ;DISCONNECT TEST"

 ;SET UP FOR FATAL ERROR
 ;SET UP FOR LINE CHANGE
 ;INPUT ORIGINATE AND
 ;ANSWER LINE NUMBERS
 ;SET UP TO RECEIVE INTERRUPTS
 ;WAIT FOR RING
 ;GO HERE IF RING OK
 ;GO HERE IF NO RING
 ;NO RING WITHIN 5 MINUTES
 ;SELECT NEW LINES AND REDIAL

 ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
 ;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
 ;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
 ;WILL BE REQUESTED TO RESELECT LINES AND REDIAL

 ;CHECK FOR RING INTERRUPT
 ;ONLY ON ANSWER LINE
 ;AND NO TRANSITIONS ON
 ;ORIGINATE LINE
 ;GO HERE IF TRANSITIONS
 ;ARE CORRECT
 ;GO HERE IF INCORRECT
 ;TRANSITION ON ANSWER LINE
 ;GO HERE IF INCORRECT
 ;TRANSITION ON ORIGINATE LINE
 ;ANSWER LINE TRANSITION ERROR
 ;CONTINUE CHECKING
 ;ORIGINATE LINE TRANSITION ERROR
 ;RESELECT LINES AND REDIAL

2429									
2430									
2431									
2432									
2433									
2434									
2435	011104	013777	016046	004642	T2020:	MOV	LINANS, QDMBCSR		;SET LINE COUNTER TO ANSWER LINE
2436	011112	052777	000002	004636		BIS	#TRMRDY, QDMBLSR		;SET TERMINAL READY ON ANSWER LINE
2437	011120	013777	016044	004626	T2020:	MOV	LINORG, QDMBCSR		;SET LINE COUNTER TO ORIGINATE LINE
2438	011126	052777	000004	004622		BIS	#RS, QDMBLSR		;SET REQUEST TO SEND ON ORIGINATE LINE
2439	011134	104026				CKINTT			
2440	011136	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2441									
2442									
2443									
2444	011140	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2445									;ON SELECTED ANSWER AND
2446									;ORIGINATE LINES
2447	011142	000103				CO+LINENA+TRMRDY			;EXPECT CARRIER, LINE ENABLE
2448									;AND TERMINAL READY STATUS
2449									;BITS SET ON ANSWER LINE
2450	011144	000147				RS+CO+CS+LINENA+TRMRDY			;EXPECT REQUEST TO SEND, CLEAR
2451									;TO SEND, CARRIER, LINE ENABLE
2452									;AND TERMINAL READY STATUS BITS
2453									;SET ON ORIGINATE LINE
2454	011146	100004				RINGF+XCO			;EXPECT CARRIER AND POSSIBLE
2455									;RING TRANSITIONS ON
2456									;ANSWER LINE
2457	011150	000006				XCO+XCS			;EXPECT CARRIER AND CLEAR
2458									;TO SEND TRANSITIONS ON
2459									;ORIGINATE LINE
2460	011152	011164				T20201			;GO HERE ON ANSWER LINE STATUS ERROR
2461	011154	011170				T20202			;GO HERE ON ORIGINATE LINE STATUS ERROR
2462	011156	011174				T20203			;GO HERE ON ANSWER LINE STATUS ERROR
2463	011160	011200				T20204			;GO HERE ON ORIGINATE LINE TRANSITION ER
2464	011162	011204				T202E			;GO TO NEXT TEST IF NO ERRORS
2465	011164	104015			T20201:	ERRORS			;ANSWER LINE STATUS ERROR
2466	011166	000207				RTS	PC		;CONTINUE CHECKING
2467	011170	104015			T20202:	ERRORS			;ORIGINATE LINE STATUS ERROR
2468	011172	000207				RTS	PC		;CONTINUE CHECKING
2469	011174	104014			T20203:	ERRORS			;ANSWER LINE TRANSITION ERROR
2470	011176	000207				RTS	PC		;CONTINUE CHECKING
2471	011200	104014			T20204:	ERRORS			;ORIGINATE LINE TRANSITION ERROR
2472	011202	000207				RTS	PC		;CONTINUE CHECKING

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2473
2474
2475
2476
2477 011204 013777 016046 004542 T202E: MOV LINANS, @DMBCSR ;SET LINE COUNTER TO ANSWER LINE
2478 011212 052777 000010 004536 BIS #SECTX, @DMBLSR ;SET SECONDARY RECEIVE ON ANSWER LINE
2479 011220 104026 CKINTT
2480 011222 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
2481
2482 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2483 ;SELECTED ORIGINATE AND ANSWER LINES
2484
2485 011224 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
2486 ;ON SELECTED ANSWER AND
2487 ;ORIGINATE LINES
2488 011226 000133 SECTX+CO+LINENA+TRMRDY+SECRX ;EXPECT SECONDARY TRANSMIT
2489 ;SECONDARY RECEIVE, CARRIER
2490 ;LINE ENABLE AND TERMINAL READY
2491 ;STATUS BITS SET ON ANSWER LINE
2492 011230 000167 SECRX+RS+CO+CS+LINENA+TRMRDY ;EXPECT SECONDARY RECEIVE
2493 ;REQUEST TO SEND, CLEAR TO SEND
2494 ;CARRIER, LINE ENABLE AND
2495 ;TERMINAL READY STATUS BITS
2496 ;SET ON ORIGINATE LINE
2497 011232 000001 XSCRX ;EXPECT SECONDARY RECEIVE
2498 ;TRANSITION ON ANSWER LINE
2499 011234 000001 XSCRX ;EXPECT SECONDARY RECEIVE
2500 ;TRANSITION ON ORIGINATE LINE
2501 011236 011250 T202E1 ;GO HERE ON ANSWER LINE STATUS ERROR
2502 011240 011254 T202E2 ;GO HERE ON ORIGINATE LINE STATUS ERROR
2503 011242 011260 T202E3 ;GO HERE ON ANSWER LINE TRANSITION ERROR
2504 011244 011264 T202E4 ;GO HERE ON ORIGINATE LINE TRANSITION ER
2505 011246 011270 T202F ;GO TO NEXT TEST IF NO ERRORS
2506 011250 104015 T202E1: ERRORS ;ANSWER LINE STATUS ERROR
2507 011252 000207 RTS PC ;CONTINUE CHECKING
2508 011254 104015 T202E2: ERRORS ;ORIGINATE LINE STATUS ERROR
2509 011256 000207 RTS PC ;CONTINUE CHECKING
2510 011260 104014 T202E3: ERROR: ;ANSWER LINE TRANSITION ERROR
2511 011262 000207 RTS PC ;CONTINUE CHECKING
2512 011264 104014 T202E4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2513 011266 000207 RTS PC ;CONTINUE CHECKING

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2514									
2515									;DROP REQUEST TO SEND ON ORIGINATE LINE
2516									;DROP SECONDARY TRANSMIT ON ANSWER LINE
2517									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2518									
2519	011270	013777	016044	004456	T202F:	MOV	LINORG,ADMBCSR		;SET LINE COUNTER TO ORIGINATE LINE
2520	011276	042777	000004	004452		BIC	#RS,ADMBSR		;DROP REQUEST TO SEND
2521	011304	013777	016046	004442		MOV	LINANS,ADMBCSR		;SET LINE COUNTER TO ANSWER LINE
2522	011312	042777	000010	004436		BIC	#SECTX,ADMBSR		;DROP SECONDARY RECEIVE
2523	011320	104026				CKINTT			
2524	011322	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2525									
2526									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2527									;SELECTED ORIGINATE AND ANSWER LINES
2528									
2529	011324	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2530									;ON SELECTED ANSWER AND
2531									;ORIGINATE LINES
2532	011326	000003				LINENA+TRMRDY			;EXPECT LINE ENABLE AND
2533									;TERMINAL READY STATUS BITS
2534									;SET ON ANSWER LINE
2535	011330	000003				LINENA+TRMRDY			;EXPECT LINE ENABLE AND
2536									;TERMINAL READY STATUS BITS
2537									;SET ON ORIGINATE LINE
2538	011332	000005				XCO+XSCRX			;EXPECT CARRIER AND SECONDARY
2539									;RECEIVE TRANSITIONS ON
2540									;ANSWER LINE
2541	011334	000007				XCO+XCS+XSCRX			;EXPECT CARRIER, CLEAR TO SEND
2542									;AND SECONDARY RECEIVE
2543									;TRANSITIONS ON ORIGINATE LINE
2544	011336	011350				T202F2			;GO HERE ON ANSWER LINE STATUS ERROR
2545	011340	011354				T202F3			;GO HERE ON ORIGINATE LINE STATUS ERROR
2546	011342	011360				T202F4			;GO HERE ON ANSWER LINE TRANSITION ERROR
2547	011344	011364				T202F5			;GO HERE ON ORIGINATE LINE TRANSITION ER
2548	011346	011370				T202G			;GO TO NEXT TEST IF NO ERRORS
2549	011350	104015			T202F2:	ERRORS			;ANSWER LINE STATUS ERROR
2550	011352	000207				RTS	PC		;CONTINUE CHECKING
2551	011354	104015			T202F3:	ERRORS			;ORIGINATE LINE STATUS ERROR
2552	011356	000207				RTS	PC		;CONTINUE CHECKING
2553	011360	104014			T202F4:	ERRORT			;ANSWER LINE TRANSITION ERROR
2554	011362	000207				RTS	PC		;CONTINUE CHECKING
2555	011364	104014			T202F5:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2556	011366	000207				RTS	PC		;CONTINUE CHECKING

2557									
2558									
2559									
2560									;SET REQUEST TO SEND ON ANSWER LINE
2561									;WAIT FOR TRANSITIONS ON SELECTED LINES
2562	011370	013777	016046	004356	T202G:	MOV	LINANS,ADMBCSR		;SET LINE COUNTER TO ANSWER LINE
2563	011376	052777	000004	004352		BIS	*RS,ADMBSR		;SET REQUEST TO SEND
2564	011404	104026				CKINTT			
2565	011406	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2566									
2567									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2568									;SELECTED ORIGINATE AND ANSWER LINES
2569									
2570	011410	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2571									;ON SELECTED ANSWER AND
2572									;ORIGINATE LINES
2573	011412	000147				RS+CO+CS+LINENA+TRMRDY			;EXPECT LINE ENABLE, TERMINAL
2574									;READY, REQUEST TO SEND, CLEAR
2575									;TO SEND, AND CARRIER
2576									;STATUS BITS SET ON ANSWER LINE
2577	011414	000103				CO+LINENA+TRMRDY			;EXPECT LINE ENABLE, TERMINAL
2578									;READY AND CARRIER STATUS
2579									;BITS SET ON ORIGINATE LINES
2580	011416	000006				XCO+XCS			;EXPECT CARRIER AND CLEAR
2581									;TO SEND TRANSITIONS ON
2582									;ANSWER LINE
2583	011420	000004				XCO			;EXPECT CARRIER TRANSITION
2584									;ON ORIGINATE LINE
2585	011422	011434				T202G1			;GO HERE ON ANSWER LINE STATUS ERROR
2586	011424	011440				T202G2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2587	011426	011444				T202G3			;GO HERE ON ANSWER LINE TRANSITION ERROR
2588	011430	011450				T202G4			;GO HERE ON ORIGINATE LINE TRANSITION ER
2589	011432	011454				T202H			;GO TO NEXT TEST IF NO ERRORS
2590	011434	104015			T202G1:	ERRORS			;ANSWER LINE STATUS ERROR
2591	011436	000207				RTS	PC		;CONTINUE TESTING
2592	011440	104015			T202G2:	ERRORS			;ORIGINATE LINE STATUS ERROR
2593	011442	000207				RTS	PC		;CONTINUE TESTING
2594	011444	104014			T202G3:	ERRORT			;ANSWER LINE TRANSITION ERROR
2595	011446	000207				RTS	PC		;CONTINUE TESTING
2596	011450	104014			T202G4:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2597	011452	000207				RTS	PC		;CONTINUE TESTING

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2598									
2599									
2600									;SET SECONDARY TRANSMIT ON ORIGINATE LINE
2601									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2602	011454	013777	016044	004272	T202H:	MOV	LINORG,ADMBCSR		;SET LINE COUNTER TO ORIGINATE LINE
2603	011462	052777	000010	004266		BIS	#SECTX,ADMBSLR		;SET SECONDARY TRANSMIT
2604	011470	104026				CKINTT			
2605	011472	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2606									
2607									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2608									;SELECTED ORIGINATE AND ANSWER LINES
2609									
2610	011474	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2611									;ON SELECTED ANSWER AND
2612									;ORIGINATE LINES
2613	011476	000167				RS+CS+CO+LINENA+TRMRDY+SECRX			;EXPECT LINE ENABLE, TERMINAL
2614									;READY, REQUEST TO SEND, CLEAR
2615									;TO SEND, CARRIER AND SECONDARY
2616									;RECEIVE STATUS BITS SET
2617									;ON ANSWER LINE
2618	011500	000133				SECTX+CO+LINENA+TRMRDY+SECRX			;EXPECT LINE ENABLE, TERMINAL
2619									;READY, CARRIER, SECONDARY
2620									;TRANSMIT AND SECONDARY
2621									;RECEIVE STATUS BITS SET
2622									;ON ORIGINATE LINE
2623	011502	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2624									;TRANSITION ON ANSWER LINE
2625	011504	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2626									;TRANSITION ON ORIGINATE LINE
2627	011506	011520				T202H2			;GO HERE ON ANSWER LINE STATUS ERROR
2628	011510	011524				T202H3			;GO HERE ON ORIGINATE LINE STATUS ERROR
2629	011512	011530				T202H4			;GO HERE ON ANSWER LINE TRANSITION ERROR
2630	011514	011534				T202H5			;GO HERE ON ORIGINATE LINE TRANSITION ER
2631	011516	011540				T202I			;GO TO NEXT TEST IF NO ERRORS
2632	011520	104015			T202H2:	ERRORS			;ANSWER LIN STATUS ERROR
2633	011522	000207				RTS	PC		;CONTINUE CHECKING
2634	011524	104015			T202H3:	ERRORS			;ORIGINATE LINE STATUS ERROR
2635	011526	000207				RTS	PC		;CONTINUE CHECKING
2636	011530	104014			T202H4:	ERRORT			;ANSWER LINE TRANSITION ERROR
2637	011532	000207				RTS	PC		;CONTINUE CHECKING
2638	011534	104014			T202H5:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2639	011536	000207				RTS	PC		;CONTINUE CHECKING

2640									
2641									; DROP REQUEST TO SEND ON ANSWER LINE
2642									; WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2643									
2644	011540	013777	016046	004206	T202I:	MOV	LINANS, @DMBCSR		; SET LINE COUNTER TO ANSWER LINE
2645	011546	042777	000004	004202		BIC	#RS, @DMBLSR		; CLEAR REQUEST TO SEND
2646	011554	013777	016044	004172		MOV	LINORG, @DMBCSR		; SET LINE COUNTER TO ORIGINATE LINE
2647	011562	042777	000010	004166		BIC	#SECTX, @DMBLSR		; CLEAR SECONDARY TRANSMIT
2648	011570	104026				CKIN T			
2649	011572	104022				WAITRN			; WAIT FRO TRANSITIONS TO OCCUR
2650									
2651									; CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2652									; SELECTED ORIGINATE AND ANSWER LINES
2653									
2654	011574	104023				CKTRAN			; CHECK TRANSITION S AND STATUS
2655									; ON SELECTED ANSWE AND
2656									; ORIGINATE LINES
2657	011576	000003				LINENA+TRMRDY			; EXPECT LINE ENABLE AND
2658									; TERMINAL READY STATUS BITS SET
2659									; ON ANSWER LINE
2660	011600	000003				LINENA+TRMRDY			; EXPECT LINE ENABLE AND
2661									; TERMINAL READY STATUS BITS
2662									; SET ON ORIGINATE LINE
2663	011602	000007				XCO+XCS+XSCRX			; EXPECT CARRIER, CLEAR TO SEND
2664									; AND SECONDARY RECEIVE TRANSITIONS
2665									; ON ANSWER LINE
2666	011604	000005				XCO+XSCRX			; EXPECT CARRIER AND SECONDARY
2667									; RECEIVE TRANSITIONS ON
2668									; ORIGINATE LINE
2669	011606	011620				T202I2			; GO HERE ON ANSWER LINE STATUS ERROR
2670	011610	011624				T202I3			; GO HERE ON ORIGINATE LINE STATUS ERROR
2671	011612	011630				T202I4			; GO HERE ON ANSWER LINE TRANSITIN ERROR
2672	011614	011634				T202I5			; GO HERE ON ORIGINATE LINE TRANSITION ER
2673	011616	011640				T202J			; GO TO NEXT TEST IF NO ERRORS
2674	011620	104015			T202I2:	ERRORS			; ANSWER LINE STATUS ERROR
2675	011622	000207				RTS	PC		; CONTINUE CHECKING
2676	011624	104015			T202I3:	ERRORS			; ORIGINATE LINE STATUS ERROR
2677	011626	000207				RTS	PC		; CONTINUE CHECKING
2678	011630	104014			T202I4:	ERRORT			; ANSWE LINE TRANSITION ERROR
2679	011632	000207				RTS	PC		; CONTINUE CHECKING
2680	011634	104014			T202I5:	ERRORT			; ORIGINATE LINE TRANSITION ERROR
2681	011636	000207				RTS	PC		; CONTINUE CHECKING

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2692 011640 104004
2693 011642 016543
2694 011644 012737 000340 177776
2695 011652 012777 012310 004070
2696 011660 012737 011700 016062
2697
2698 011666 012777 000140 004060
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2700 011674 005037 177776
2701 011700 005077 004056
2702 011704 105777 004050
2703 011710 100375
2704 011712 005777 004044
2705
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2708 011716 012737 000340 177776
2709 011724 005077 004024
2710 011730 013777 016044 004016
2711 011736 042777 000002 004012
2712 011744 104024
2713 011746 104026
2714 011750 104022

;SET UP TO TEST DISCONNECT SEQUENCE
;THE PROGRAM WILL REQUEST THE OPERATOR TO SET SW01=1
;TO INITIATE THE DISCONNECT SEQUENCE
;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
;DATA TO TALK MODE AS MANY TIMES AS DESIRED
;BEFORE THE SWITCH SEETIN IS MADE
;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
;REPORTED BY TYPEOUT

T202J: TYPE
MDISC
MOV #340,PS
MOV #TRNTYP,@DMBVEC
MOV #T202JS,RNGRET
MOV #SCNENA+INTENA,@DMBCSR

T202JS: CLR PS
CLR @TKDDBR
I$: TSTB @TKCSR
BPL I$
TST @TKDDBR

;TYPE "SET SW01=1 TO
;TEST DISCONNECT"
;LOCK OUT INTERRUPTS
;SET UP TO DETECT TRANSITIONS
;SET UP DUMMY RETURN FOR RING
;FROM RING INTERRUPT
;ENABLE LINE SCANNER
;START SCANNER
;ENABLE INTERRUPTS

;DISCONNECT SEQUENCE REQUESTED

MOV #340,PS
CLR @DMBCSR
MOV LINORG,@DMBCSR
BIC #TRMRDY,@DMBLSR
WAITS
CKINTT
WAITRN

;LOCK OUT INTERRUPTS
;STOP SCANNER
;SET LINE COUNTER TO SELECTED ORIGINATE
;SET TERMINAL READY ON SELECTED LINE
;DELAY

;WAIT FOR TRANSITIONS TO OCCUR

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2715						
2716						;CHECK FOR CORRECT STATUS AND TRANSITIONS ON SELECTED
2717						;ORIGINATE AND ANSWER LINES
2719	011752	104023				
2720						;CHECK TRANSITIONS AND STATUS
2721						;ON SELECTED ASNWER AND
2722	011754	000003				;ORIGINATE LINES
2723						;EXPECT LINE ENABLE AND
2724						;TERMINAL READY STATUS BITS
2725	011756	000001				;SET ON ANSWER LINE
2726						;EXPECT LINE ENABLE STATUS
2727	011760	000000				;BIT SET ON ORIGINATE LINE
2728						;EXPECT NO TRANSITIONS ON
2729	011762	000000				;ANSWER LINE
2730						;EXPECT NO TRANSITIONS ON
2731	011764	011776				;ORIGINATE LINE
2732	011766	012002				;GO HERE IF ANSWER LINE STATUS ERROR
2733	011770	012006				;GO HERE IF ORIGINATE LINE STATUS ERROR
2734	011772	012012				;GO HERE IF ANSWER LINE TRANSITION ERROR
2735	011774	012016				;GO HERE IF ORIGINATE LINE TRANSITIONS E
2736	011776	104015				;GO TO END OF TEST IF NO ERRORS
2737	012000	000207				;ANSWER LINE STATUS ERROR
2738	012002	104015				;CONTINUE CHECKING
2739	012004	000207				;ORIGINATE LINE STATUS ERROR
2740	012006	104014				;CONTINUE CHECKING
2741	012010	000207				;ANSWER LINE TRANSITION ERROR
2742	012012	104014				;CONTINUE CHECKING
2743	012014	000207				;ORIGINATE LINE TRANSITION ERROR
2744						;CONTINUE CHECKING
2745	012016	104004				
2746	012020	016514				;TYPE "202C TEST COMPLETE"
2747	012022	104026				
2748	012024	000137	011050			;GET NEW LINE NUMBERS
2749						;RESTART TEST

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012030 017704 003720
012034 010405
012036 042705 177760
012042 023705 016044
012046 001411
012050 023705 016046
012054 001443
012056 010577 003672
012062 017703 003670
012066 104016
012070 000471

012072 032704 100000
012076 001403
012100 052737 000010 016052
012106 032704 040000
012112 001403
012114 052737 000004 016052
012122 032704 020000

012126 001403

012130 052737 000002 016052
012136 032704 010000

012142 001403
012144 052737 000001 016052
012152 032704 170000

012156 001044
012160 104016
012162 000434

```
; DETECT AND RECORD TRANSITIONS ON SELECTED  
; ORIGINATE AND ANSWER LINES  
  
; TRANSITION DATA IS STORED IN LOCATIONS ANSFLG AND ORGFLG  
; FOR ANSWER AND ORIGINATE LINES RESPECTIVELY  
; FORMAT OF DATA IS (FOR BOTH LINES)  
  
; BIT0=1, SECONDARY RECEIVE CAUSED INTERRUPT  
; BIT1=1, CLEAR TO SEND CAUSED INTERRUPT  
; BIT2=1, CARRIER CAUSED INTERRUPT  
; BIT3=1, RING CAUSED INTERRUPT  
  
TRANS: MOV    2DMBCSR,R4      ; GET LINE NUMBER AND  
                                ; INTERRUPT FLAGS  
        MOV    R4,R5  
        BIC    #177760,R5  
        CMP    LINORG,R5    ; EXTRACT LINE NUMBER  
        BEQ    ORGTR        ; DID ORIGINATE LINE INTERRUPT  
        CMP    LINANS,R5    ; IF YES, SERVICE  
        BEQ    ANSTR        ; DID ANSWER LINE INTERRUPT  
        MOV    R5,2DMBCSR   ; IF YES, SERVICE  
        MOV    2DMBSR,R3  
        ERRORN  
        BR     FATEX        ; INTERRUPT ON INCORRECT LINE  
  
; RECORD TRANSITIONS FOR ORIGINATE LINE  
  
ORGTR:  BIT    #RINGF,R4    ; IF RING CAUSED INTERRUPT,  
        BEQ    ORGTR1       ; SET RING TRANSITION BIT  
        BIS    #10,ORGFLG  
ORGTR1: BIT    #COF,R4      ; IF CARRIER CAUSED INTERRUPT  
        BEQ    ORGTR2       ; SET CARRIER TRANSITION BIT  
        BIS    #4,ORGFLG  
ORGTR2: BIT    #CSF,R4     ; IF CLEAR TO SEND  
                                ; CAUSED INTERRUPT  
        BEQ    ORGTR3       ; SET CLEAR TO SEND  
                                ; TRANSITION BIT  
        BIS    #2,ORGFLG  
ORGTR3: BIT    #SECRXF,R4   ; IF SECONDARY RECEIVE  
                                ; CAUSED INTERRUPT  
        BEQ    ORGTR4       ; SET SECONDARY RECEIVE  
        BIS    #1,ORGFLG    ; TRANSITION BIT  
ORGTR4: BIT    #RINGF+COF+CSF+SECRXF,R4  
  
ORGTRR: BNE    TRANEX      ; IF NO INTERRUPT FLAGS SET  
        ERRORN             ; EXIT TRANSITION DETECTION  
        BR     FATEX
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2798
2799
2800 ;RECORD TRANSITIONS FOR ANSWER LINE
2801 012164 032704 100000 ANSTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT,
2802 012170 001403 BEQ ANSTR1 ;SET RING TRANSITION BIT
2803 012172 052737 000010 016050 BIS #10,ANSFLG
2804 012200 032704 040000 ANSTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
2805 012204 001403 BEQ ANSTR2 ;SET CARRIER TRANSITION BIT
2806 012206 052737 000004 016050 BIS #4,ANSFLG
2807 012214 032704 020000 ANSTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
2808 ;CAUSED INTERRUPT
2809 012220 001403 BEQ ANSTR3 ;SET CLEAR TO SEND
2810 ;TRANSITION BIT
2811 012222 052737 000002 016050 BIS #2,ANSFLG
2812 012230 032704 010000 ANSTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
2813 ;CAUSED INTERRUPT
2814 012234 001403 BEQ ANSTR4 ;SET SECONDARY RECEIVE
2815 012236 052737 000001 016050 BIS #1,ANSFLG ;TRANSITION BIT
2816 012244 032704 170000 ANSTR4: BIT #RINGF+COF+CSF+SECRXF,R4 ;IF NO INTERRUPT FLAGS SET
2817 ;EXIT TRANSITION DETECTION
2818 012250 001007 BNE TRANEX
2819 012252 104016 ANSTR: ERRORN
2820 012254 005037 016002 FATEX: CLR TSTNO
2821 012260 022626 POP2SP
2822 012262 000177 000000 JMP #FATRET
2823 012266 000000 FATRET: 0
2824
2825 ;EXIT TRANSITION DETECTION
2826
2827 012270 005704 TRANEX: TST R4 ;IF RING FLAG WAS SET
2828 012272 100002 BPL .+6 ;SET UP SPECIAL RETURN
2829 012274 013716 016052 MOV RINGRET,(SP)
2830 012300 012777 000140 003446 TRANX1: MOV #SCNENA+INTENA,@DMBCSR ;RESTART SCANNER
2831 012306 000002 RTI
2832
2833 ;TYPE TRANSITION DATA AND RETURN
2834
2835 012310 017737 003440 013274 TRNTYP: MOV @DMBCSR,DATA1
2836 012316 017737 003434 013276 MOV @DMBLSR,DATA2
2837 012324 104004 TYPE
2838 012326 017125 MTRNDET
2839 012330 104006 OCTASC
2840 012332 012336 TRNTAB
2841 012334 000761 BR TRANX1
2842 012336 000002 TRNTAB: 2
2843 012340 000006 6
2844 012342 013274 DATA1
2845 012344 000003 3
2846 012346 013276 DATA2

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```

2847
2848 ; INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2849
2850 012350 000005 GETLIN: RESET
2851 012352 104013 ;TYPE "ORIGINATE LINE-"
2852 012354 016422 ;AND GET LINE NUMBER
2853 012356 000000
2854 012360 000017
2855 012362 016044 LINORG
2856 012364 104013 INSTRG ;TYPE "ANSWER LINE-"
2857 012366 016446 MSELANS ;AND GET LINE NUMBER
2858 012370 000000
2859 012372 000017
2860 012374 016046 LINANS
2861 012376 104004 TYPE
2862 012400 017016 MCRLF
2863 012402 000002 RTI ;RETURN TO CALLING ROUTINE
2864
2865 ; INITIALIZE INTERFACE
2866
2867 012404 000005 SETUPS: RESET
2868 012406 012737 000340 177776 MOV #340,PS ;LOCK OUT ALL INTERRUPTS
2869 012414 011605 MOV (SP),R5
2870 012416 012537 013304 MOV (R5)+,NXTTS
2871 012422 012537 013264 MOV (R5)+,ERR1
2872 012426 010516 MOV R5,(SP)
2873 012430 012777 006000 003316 MOV #CLRSCN+CLRMUX,@DMBCSR ;CLEAR LINE SCANNER AND MULTIPLEXER
2874 012436 032777 000020 003310 SETUP1: BIT #BUSY,@DMBCSR ;WAIT FOR SCANNER TO CLEAR
2875 012444 001374 BNE SETUP1
2876 012446 005037 015774 CLR ERRFLG
2877
2878 ;ENABLE SELECTED LINES
2879 ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
2880
2881 012452 013777 016044 003274 SETUP2: MOV LINORG,@DMBCSR ;SET UP TO ENABLE ORIGINATE LINE
2882 ;ORIGINATE LINE NUMBER
2883 012460 012777 000003 003270 MOV #LINENA+TRMRDY,@DMBLSR ;SET LINE ENABLE AND
2884 ;TERMINAL READY ON ORIGINATE LINE
2885 012466 013777 016046 003260 MOV LINANS,@DMBCSR ;SET LINE COUNTER TO ANSWER LINE
2886 012474 012777 000001 003254 MOV #LINENA,@DMBLSR ;SET LINE ENABLE ON ANSWER LINE
2887
2888 ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
2889 ;SET UP TO RECEIVE INTERRUPTS
2890 ;START LINE SCANNER
2891
2892 012502 012777 012030 003240 MOV #TRANS,@DMBVEC ;SET UP INTERRUPT VECTOR
2893 ;FOR TRANSITION DETECTION
2894 012510 012777 000340 003234 MOV #340,@DMBLVL ;SET UP INTERRUPT SERVICE LEVEL
2895 012516 012777 000140 003230 MOV #SCNENA+INTENA,@DMBCSR ;START SCANNER, ENABLE INTERRUPTS
2896 012524 005037 016050 CLR ANSFLG ;CLEAR TRANSITION DETECTED FLAGS
2897 012530 005037 016052 CLR ORGFLG
2898 012534 012737 012564 016062 MOV #SETUP4,RNGRET ;SET UP RETURN FROM
2899 ;DETECTION OF RING INTERRUPT
2900 012542 104004 TYPE ;REQUEST OPERATOR TO DIAL
2901 012544 016242 DIALM
2902 012546 005037 177776 CLR PS ;CLEAR PROCESSOR STATUS WORD

```

```

2903 012552 005037 016054          CLR      TIME1          ;CLEAR TIMER
2904 012556 012737 001000 016056    MOV      #1000, TIME2   ;SET UP FOR 5 MINUTE DELAY
2905 012564 005737 016050          SETUP4: TST     ANSFLG   ;IF TRANSITION HAS OCCURED,
2906 012570 001014                    BNE     SETUPB         ;EXIT WAIT LOOP
2907 012572 005737 016052          TST     ORGFLG
2908 012576 001011                    BNE     SETUPB
2909 012600 005237 016054          INC     TIME1          ;ALLOW OPERATOR 5 MINUTES TO DIAL
2910 012604 001367                    BNE     SETUP4
2911 012606 005337 016056          DEC     TIME2
2912 012612 001364                    BNE     SETUP4
2913 012614 022626                    POP2SP
2914 012616 000177 000442          JMP     @ERR1
2915 012622 022626          SETUPB: POP2SP
2916 012624 000177 000454          JMP     @NXTTS
2917 012630 012766 C30340 000002    MOV     #340, +2(SP)
2918 012636 000002                    RTI
2919
2920                                ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2921
2922 012640 011605          CKRNG: MOV     (SP), R5
2923 012642 012537 013304          MOV     (R5)+, NXTTS
2924 012646 012537 013264          MOV     (R5)+, ERR1
2925 012652 012537 013266          MOV     (R5)+, ERR2
2926 012656 010516          MOV     R5, (SP)
2927 012660 012705 000010          MOV     #10, R5        ;EXPECT RING ONLY ON ANSWER LINE
2928 012664 013704 016050          MOV     ANSFLG, R4     ;GET ACTUAL TRANSITION DATA
2929 012670 013703 016045          MOV     LINANS, R3    ;SET UP LINE NUMBER
2930 012674 020504          CMP     R5, R4        ;DID RING CAUSE INTERRUPT
2931 012676 001402                    BEQ     CKRNG1        ;ON ANSWER LINE
2932 012700 004777 000360          JSR     PC, @ERR1
2933 012704 005005          CKRNG1: CLR     R5
2934 012706 013704 016052          MOV     ORGFLG, R4
2935 012712 013703 016044          MOV     LINORG, R3
2936 012716 005704          TST     R4            ;IF TRANSITION OCCURED
2937 012720 001403                    BEQ     CKRNG2        ;ON ORIGINATE LINE, ERROR
2938 012722 022626                    POP2SP
2939 012724 000177 000336          JMP     @ERR2
2940 012730 022626          CKRNG2: POP2SP
2941 012732 000177 000346          JMP     @NXTTS

```

2942							
2943	012736	005037	016050		WAITR:	CLR	ANSFLG
2944	012742	005037	016052			CLR	ORGFLG
2945	012746	012777	012030	002774		MOV	#TRANS, QDMBVEC
2946	012754	012737	012774	016062		MOV	#WAITRR, RNGRET
2947							; SET UP FOR RETURN
2948	012762	012777	000140	002764		MOV	#SCNENA+INTENA, QDMBCSR
2949	012770	005037	177776			CLR	PS
2950	012774	005037	016054		WAITRR:	CLR	TIME1
2951	013000	012737	000025	016056		MOV	#25, TIME2
2952	013006	005237	016054		WAITR1:	INC	TIME1
2953	013012	001375				BNE	WAITR1
2954	013014	005337	016056			DEC	TIME2
2955	013020	001372				BNE	WAITR1
2956	013022	000002				RTI	
2957							
2958							; CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2959							; SELECTED ORIGINATE AND ANSWER LINES
2960							
2961	013024	012737	000340	177776	CKTRN:	MOV	#340, PS
2962	013032	005077	002716			CLR	QDMBCSR
2963	013036	011605				MOV	(SP), R5
2964	013040	012537	013274			MOV	(R5)+, DATA1
2965	013044	012537	013276			MOV	(R5)+, DATA2
2966	013050	012537	013300			MOV	(R5)+, DATA3
2967	013054	012537	013302			MOV	(R5)+, DATA4
2968	013060	012537	013264			MOV	(R5)+, ERR1
2969	013064	012537	013266			MOV	(R5)+, ERR2
2970	013070	012537	013270			MOV	(R5)+, ERR3
2971	013074	012537	013272			MOV	(R5)+, ERR4
2972	013100	012537	013304			MOV	(R5)+, NXTTS
2973	013104	010516				MOV	R5, (SP)
2974	013106	013705	013274			MOV	DATA1, R5
2975	013112	013777	016046	002634		MOV	LINANS, QDMBCSR
2976	013120	017704	002632			MOV	QDMBSR, R4
2977	013124	013703	016046			MOV	LINANS, R3
2978	013130	020504				CMP	R5, R4
2979	013132	001402				BEQ	CKTRN1
2980	013134	004777	000124			JSR	PC, QERR1
2981	013140	013777	016044	002606	CKTRN1:	MOV	LINORG, QDMBCSR
2982	013146	017704	002604			MOV	QDMBSR, R4
2983	013152	013705	013276			MOV	DATA2, R5
2984	013156	013703	016044			MOV	LINORG, R3
2985	013162	020504				CMP	R5, R4
2986	013164	001402				BEQ	CKTRN2
2987	013166	004777	000074			JSR	PC, QERR2

```

2988
2989
2990 ;CHECK FOR CORRECT TRANSITIONS ON
2991 ;SELECTED ORIGINATE AND ANSWER LINES
2992 013172 105737 013301 CKTRN2: TSTB DATA3+1
2993 013176 100003 BPL .+10
2994 013200 042737 000010 016050 BIC #10,ANSFLG ;GET TRANSITION DATA FOR
2995 013206 113704 016050 MOVB ANSFLG,R4
2996 013212 113705 013300 MOVB DATA3,R5
2997 013216 013703 016046 MOV LINANS,R3
2998 013222 020504 CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
2999 013224 001402 BEQ CKTRN3
3000 013226 004777 000036 JSR PC,@ERR3
3001 013232 013704 016052 CKTRN3: MOV ORGFLG,R4 ;GET TRANSITION DATA FOR
3002 013236 013705 013302 MOV DATA4,R5
3003 013242 013703 016044 MOV LINORG,R3
3004 013246 020504 CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
3005 013250 001402 BEQ CKTRN4
3006 013252 004777 000014 JSR PC,@ERR4
3007 013256 022626 CKTRN4: POP2SP
3008 013260 000177 000020 JMP @NXTTS
3009 013264 000000 ERR1: 0
3010 013266 000000 ERR2: 0
3011 013270 000000 ERR3: 0
3012 013272 000000 ERR4: 0
3013 013274 000000 DATA1: 0
3014 013276 000000 DATA2: 0
3015 013300 000000 DATA3: 0
3016 013302 000000 DATA4: 0
3017 013304 000000 NXTTS: 0

```

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3018
3019
3020
3021
3022
3023 013306
3024 013306 005237 016000
3025 013312 012737 000001 016002
3026 013320 104004
3027 013322 017404
3028 013324 013701 000042
3029 013330 001515
3030 013332 000005
3031 013334 004711
3032 013336 000240
3033 013340 000240
3034 013342 000240
3035 013344 000137 013564
3036
3037
3038
3039
3040
3041
3042 013350 011646
3043 013352 162716 000002
3044 013356 017616 000000
3045 013362 006316
3046 013364 042716 177001
3047 013370 062716 017422
3048 013374 017616 000000
3049 013400 000136
3050
3051
3052 013402 105777 002352
3053 013406 100001
3054 013410 104027
3055 013412 000002
3056

```

```

;END OF PASS
;UPDATE PASS COUNT
;TYPE END OF PASS MESSAGE

EOP:
  INC      PASCNT      ;UPDATE PASS COUNT
  MOV     #1,TSTNO    ;START AT FIRST TEST OF GROUP
  TYPE    MEPASS      ;RING BELL
  MOV     42,R1       ;ARE YOU ON ACT11?
  BEQ    TSTENT      ;NO
  RESET

LOGICAL:
  JSR    PC,(R1)
  NOP
  NOP
  NOP
  JMP    TSTENT      ;GET ADDRESS OF FIRST TEST

;EMT DISPATCH SERVICE
;ARGUMENT OF EMT IS EXTRACTED
;AND USED AS OFFSET TO OBTAIN POINTER
;TO SELECTED SUBROUTINE

EMTSRV: MOV    (SP),-(SP) ;GET PC OF RETURN
        SUB    #2,(SP)  ;=PC OF EMT
        MOV    2(SP),(SP) ;GET EMT
EMTOK:  ASL    (SP)      ;MULTIPLY EMT ARG BY 2
        BIC   #177001,(SP) ;CLEAR UNWANTED BITS
        ADD   #EMTTAB,(SP) ;POINTER TO SUBROUTINE ADDRESS
        MOV   2(SP),(SP) ;SUBROUTINE ADDRESS
        JMP   2(SP)+    ;GO TO SUBROUTINE

CKINT:  TSTB   2TKCSR
        BPL   IS
        KBDIN
IS:     RTI

```



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3057
3058
3059
3060
3061
3062
3063
3064
3065 013414 005737 001242
3066 013420 100022
3067 013422 013746 000004
3068 013426 012737 013446 000004
3069 013434 005737 177060
3070 013440 012637 000004
3071 013444 000404
3072 013446 022626
3073 013450 012637 000004
3074 013454 000402
3075 013456 000137 013560
3076 013462 000137 013564
3077 013466
3078 013466 005037 177776
3079 013472 012777 000100 002260
3080 013500 005737 015774
3081 013504 001404
3082 013506 032777 002000 002254
3083 013514 001021
3084 013516 032777 040000 002244
3085 013524 001041
3086 013526 032777 004000 002234
3087 013534 001011
3088 013536 005337 016006
3089 013542 001406
3090 013544 013716 016004
3091 013550 042777 000100 002202
3092 013556 000002
3093 013560 005237 016002
3094 013564 013705 016002
3095 013570 006305
3096 013572 006305
3097 013574 063705 016034
3098 013600 011537 016004
3099 013604 001640
3100 013606 012516
3101 013610 011537 016006
3102 013614 005037 015774
3103 013620 042777 000100 002132
3104 013626 000002
3105 013630 012737 000001 016006
3106 013636 000742
3107
3108
3109
3110
3111 013640 005737 015774
3112 013644 001413

;END OF SUBTEST SERVICE
;CHECK FOR LOOP ON CURRENT TEST
;CHECK FOR ESCAPE TO NEXT TEST ON ERROR
;UPDATE ITERATION COUNT AND EXIT TO NEXT TEST IF 0

;TEST XOR FLAG (XFLAG) FOR EXISTANCE OF XOR TESTER.

LOOP: TST XFLAG ;IS THERE AN XOR TESTER OUT THERE ?
      BPL 4$ ;NO
      MOV 4-(SP) ;SAVE 4
      MOV #1$,4 ;SET UP SVC ROUTINE
      TST 177060 ;GOT SOMETHING LIKE SLAVE SYNC
      MOV (SP)+,4 ;YOU BETCHUM
      BR 2$

1$: POP2SP ;RESTORE STACK
   MOV (SP)+,4 ;RESTORE 4
   BR 3$

2$: JMP LOOPX ;GO TO NEXT TEST
3$: JMP TSTENT ;GO
4$:

5$: CLR PSW
   MOV #INTENA,@TKCSR

6$: TST ERRFLG ;IF ERROR OCCURED FLAG=1
   BEQ LOOPS ;CHECK FOR ESCAPE TO NEXT TEST
   BIT #SW10,@SWR ;IF SW10=1,
   BNE LOOPX ;ESCAPE TO NEXT TEST
   BIT #SW14,@SWR ;IF SW14=1,
   BNE LOOPL ;LOOP ON CURRENT TEST
   BIT #SW11,@SWR ;IF SW11=1,
   BNE LOOPX ;INHIBIT ITERATIONS
   DEC ICOUNT ;UPDATE ITERATION COUNT
   BEQ LOOPX ;IF ICOUNT=0, GO TO NEXT TEST
   MOV RETURN,(SP) ;SET UP FOR RETURN TO CURRENT TEST
   BIC #INTENA,@TKCSR

7$: RTI ;RETURN TO CURRENT TEST
8$: INC TSTNO ;UPDATE TEST NUMBER
9$: MOV TSTNO,R5 ;GET TEST NUMBER
   ASL R5 ;MULTIPLY TEST NUMBER BY 4
   ASL R5

10$: ADD TSTPNT,R5 ;GET POINTER FOR TEST ENTRY
   MOV (R5),RETURN ;GET STARTING ADDRESS OF NEXT TEST
   BEQ EOP ;IF ADDRESS=0, GO TO END OF PASS
   MOV (R5)+,(SP) ;PUT STARTING ADDRESS ON STACK
   MOV (R5),ICOUNT ;GET ITERATION COUNT FOR TEST
   CLR ERRFLG ;CLEAR EPROR OCCURED FLAG
   BIC #INTENA,@TKCSR

11$: RTI ;GO TO TEST
12$: MOV #1,ICOUNT ;SET UP TO EXIT TEST AFTER LOOP
   BR LOOPER ;GO TO LOOP SERVICE

;CHECK FOR LOOPING WITH SAME DATA
;CHECK FOR ESCAPE TO NEXT TEST ON ERROR

FREEZE: TST ERRFLG ;IF ERROR FLAG=0,
        BEQ FREEZX ;DO NOT TEST FOR ESCAPE

```

3113	013646	032777	002000	002114		BIT	#SW10,@SWR	:IF SW10=1,
3114	013654	001341				BNE	LOOPX	:ESCAPE TO NEXT TEST
3115	013656	032777	001000	002104		BIT	#SW09,@SWR	:IF SW09=1,
3116	013664	001403				BEQ	FREEZX	:FREEZE CURRENT DATA
3117	013666	017616	000000			MOV	@(SP),(SP)	:GET LOOPING ADDRESS
3118	013672	000002				RTI		:LOOP
3119	013674	062716	000002		FREEZX:	ADD	#2,(SP)	:CONTINUE IN CURRENT TEST
3120	013700	000002				RTI		

```

3121
3122 ;GENERAL ERROR SERVICE
3123 ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
3124
3125 013702 005037 015774 ERR: CLR ERRFLG ;ALWAYS TYPE PC+2
3126 ;OF TEST THAT FAILED
3127 013706 005037 014122 CLR ERRMSG ;NO MESSAGE
3128 013712 005037 014134 CLR ERTAB ;NO TABLE OF DATA
3129 013716 000451 BR ERGEN ;OUTPUT ERROR MESSAGE
3130
3131 ;TRANSITION DETECTION ERROR SERVICE
3132
3133 ;FORMAT FOR ERROR TYPEOUT IS
3134
3135 ;XXXXXX TRANSITION ERROR
3136 ;EXP REC LINE
3137 ;AA BB CC
3138
3139 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3140 ; AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGI
3141 ; BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
3142 ; CC=LINE ON WHICH ERROR OCCURED
3143 013720 005037 015774 ERR: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3144 013724 012737 016203 014122 MOV #MTRANE,ERRMSG ;TYPE "TRANSITION ERROR"
3145 013732 012737 014210 014134 MOV #ERTAB1,ERTAB ;TABLE OF DATA
3146 013740 000440 BR ERGEN ;OUTPUT ERROR MESSAGE
3147
3148 ;ON-LINE STATUS ERROR SERVICE
3149
3150 ;FORMAT FOR LINE STATUS ERROR IS
3151
3152 ;XXXX LINE ERROR
3153 ;EXP REC LINE
3154 ;AAA BBB CC
3155
3156 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3157 ; AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3158 ; BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3159 ; CC=LINE ON WHICH ERROR OCCURED
3160
3161
3162 013742 005037 015774 ERRS: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3163 013746 012737 016152 014122 MOV #MLINE1,ERRMSG ;TYPE "LINE ERROR"
3164 ;EXP REC LINE"
3165 013754 012737 014226 014134 MOV #ERTAB2,ERTAB ;TABLE OF DATA
3166 013762 000427 BR ERGEN ;OUTPUT ERROR MESSAGE
  
```

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3167
3168 ;FATAL TRANSITION ERROR
3169 ;FORMAT FOR FATAL ERROR TYPEOUT IS
3170
3171 ;XXXXXX FATAL ERROR
3172 ;CSTAT LSTAT
3173 ;AAAAAA BBB
3174
3175 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3176 ;      AAAAAA=RECEIVED CONTROL STATUS ON LINE THAT INTERRUPTED
3177 ;      BBB=RECEIVED LINE STATUS ON LINE THAT INTERRUPTED
3178
3179 013764 005037 015774          ERRN: CLR      ERRFLG          ;ALWAYS OUTPUT ALL DATA
3180 013770 012737 017073 014122      MOV      #MFATAL,ERRMSG      ;TYPE "FATAL ERROR"
3181                                     ;CSTAT LSTAT"
3182 013776 012737 014244 014134      MOV      #ERTAB3,ERTAB      ;TABLE OF DATA
3183 014004 000416                  BR       ERRGEN            ;OUTPUT ERROR MESSAGE
3184
3185 ;"CONTROL STATUS" ERROR SERVICE
3186 ;FORMAT FOR CONTROL STATUS ERROR IS
3187
3188 ;XXXXXX STATUS ERROR
3189 ;EXP REC
3190 ;AAAAAA BBBBBB
3191
3192 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3193 ;      AAAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
3194 ;      BBBBBB=RECEIVED(ACTUAL) CONTROL STATUS AT TIME OF ERROR
3195
3196
3197 014006 012737 016064 014122      ERRCS: MOV      #MSTATE,ERRMSG ;TYPE "STATUS ERROR"
3198                                     ;"EXP REC"
3199 014014 012737 014256 014134      MOV      #ERTAB4,ERTAB      ;TABLE OF DATA
3200 014022 000407                  BR       ERRGEN            ;OUTPUT DATA
3201
3202 ;LINE STATUS ERROR SERVICE
3203 ;FORMAT FOR LINE STATUS ERROR IS
3204
3205 ;XXXX LINE ERROR
3206 ;EXP REC LINE SEL
3207 ;AAA DDD CC DD
3208
3209 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3210 ;      AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3211 ;      BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3212 ;      CC=LINE ON WHICH ERROR OCCURED
3213 ;      DD=THE LINE ON WHICH THE PROGRAM WAS OPERATING
3214
3215
3216
3217 014024 012737 016115 014122      ERRLS: MOV      #MLINER,ERRMSG
3218 014032 012737 014270 014134      MOV      #ERTAB5,ERTAB
3219 014040 000400                  BR       ERRGEN

```

```

3220
3221 ; GENERAL ERROR HANDLER
3222 ; TYPE PC+2 OF TEST THAT FAILED
3223 ; TYPE ERROR MESSAGE (IF ANY)
3224 ; TYPE DATA RELATING TO FAILURE (IF ANY)
3225
3226 014042 005037 177776 ERRGEN: CLR PSW
3227 014046 012777 000100 001704 MOV #INTENA,@TKCSR
3228 014054 032777 020000 001706 BIT #SW13,@SWR ; IF SW13=1, DO NOT
3229 014062 001026 BNE .3 ; TYPE ERROR MESSAGE
3230 014064 021637 016026 CMP (SP),SAVPC ; SAME ERROR AGAIN
3231 014070 001402 BEQ .+6
3232 014072 005037 015774 CLR ERRFLG
3233 014076 104005 SAVD5P
3234 014100 005737 015774 TST ERRFLG ; IF ERROR OCCURED FLAG=1,
3235 014104 001007 BNE .1 ; TYPE DATA ONLY
3236 014106 104006 OCTASC ; TYPE PC+2 OF CALL TO ERROR ROUTINE
3237 014110 014202 ERTAB0
3238 014112 005737 014122 TST ERRMSG
3239 014116 001407 BEQ .2
3240 014120 104004 TYPE ; TYPE ERROR MESSAGE
3241 014122 000000 ERRMSG: 0
3242 014124 005737 014134 .1: TST ERTAB
3243 014130 001402 BEQ .2
3244 014132 104006 OCTASC ; TYPE DATA
3245 014134 000000 ERTAB: 0
3246 014136 104007 .2: RES05 ; RESTORE R0-R5
3247
3248 ; ERROR HALT SERVICE
3249
3250 014140 032777 100000 001622 .3: BIT #SW15,@SWR ; IF SW15=0, DO NOT
3251 014146 001406 BEQ .4 ; HALT ON ERROR
3252 014150 000000 HALT ; HALT AND DISPLAY ADDRESS OF FAILING TES
3253 014152 022737 000176 015770 CMP #SWREG,SWR
3254 014160 001001 BNE .4
3255 014162 104025 CNTLUU
3256 014164 012737 000001 015774 .4: MOV #1,ERRFLG ; SET ERROR OCCURED FLAG
3257 014172 042777 000100 001560 BIC #INTENA,@TKCSR
3258 014200 000002 RTI ; RETURN TO TEST
3259
3260
3261

```

```

3262                                     ;TABLE S OF DATA FOR ERROR TYPEOUT
3263
3264                                     ;TABLE FOR TRANSITION STATUS ERROR
3265
3266 014202 000001      ERTAB0: 1
3267 014204 000006      6
3268 014206 016026      SAVPC
3269 014210 000003      ERTAB1: 3
3270 014212 000002      2
3271 014214 016022      SAVR5      ;CONTAINS EXPECTED TRANSITION STATUS
3272 014216 000002      2
3273 014220 016020      SAVR4      ;CONTAINS RECEIVED TRANSITION STATUS
3274 014222 000002      2
3275 014224 016016      SAVR3      ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3276 014226 000003      ERTAB2: 3
3277 014230 000003      3
3278 014232 016022      SAVR5      ;CONTAINS EXPECTED LINE STATUS
3279 014234 000003      3
3280 014236 016020      SAVR4      ;CONTAINS RECEIVED LINE STATUS
3281 014240 000002      2
3282 014242 016016      SAVR3      ;CONTAINS NUMBER OF LINE WHERE ERROR OCC
3283 014244 000002      ERTAB3: 2
3284 014246 000006      6
3285 014250 016020      SAVR4
3286 014252 000003      3
3287 014254 016016      SAVR3
3288 014256 000002      ERTAB4: 2
3289 014260 000006      6
3290 014262 016022      SAVR5      ;CONTAINS EXPECTED CONTROL STATUS
3291 014264 000006      6
3292 014266 016020      SAVR4      ;CONTAINS RECEIVED CONTROL STATUS
3293 014270 000004      ERTAB5: 4
3294 014272 000003      3
3295 014274 016022      SAVR5      ;CONTAINS EXPECTED LINE STATUS
3296 014276 000003      3
3297 014300 016020      SAVR4      ;CONTAINS RECEIVED LINE STATUS
3298 014302 000002      2
3299 014304 016016      SAVR3      ;CONTAINS NUMBER OF LINE WHERE ERROR OCC
3300 014306 000002      2
3301 014310 016012      SAVR1      ;CONTAINS NUMBER OF LINE UNDER TEST
3302
3303 014312 000001      SWRTB: 1
3304 014314 000006      6
3305 014316 000176      SWREG
3306

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3307          : CONVERT OCTAL TO ASCII AND OUTPUT ON TTY
3308 014320 017605 000000 OCTASN: MOV      2(SP), R5          ; GET POINTER TO TABLE OF DATA
3309 014324 062716 000002      ADD      #2, (SP)
3310 014330 012737 000010      MOV      #10, RADIIX
3311 014336 012704 017303      MOV      #MBCD+2, R4
3312 014342 012537 016030      MOV      (R5)+, WADCNT          ; SET UP POINTER FOR CONVERTED DATA
3313 014346 012537 016032      MOV      (R5)+, CHRCNT         ; GET NUMBER OF WORDS TO BE CONVERTED
3314 014352 013537 014654      MOV      2(R5)+, BINWRD       ; GET NUMBER OF DIGITS IN WORD
3315 014356 104010      MOV      2(R5)+, BINWRD       ; GET DATA TO BE CONVERTED
3316 014360 005337 016030      CONVERT
3317 014364 001370      DEC      WADCNT              ; CONVERT TO ASCII
3318 014366 112714 000100      BNE     OCTASI              ; IF ALL DATA IS NOT CONVERTED
3319 014372 005737 014510      MOV     #100, (R4)         ; CONTINUE
3320 014376 001002      TST     SMLN              ; PUT TERMINATOR AT END OF MESSAGE
3321 014400 104004      BNE     1$
3322 014402 017301      TYPE
3323 014404 000002      MBCD
3324          RTI              ; OUTPUT CONVERTED DATA
3325          ; TO TELETYPE
3326          ; RETURN TO CALLING ROUTINE
3327 014406 005037 014504      CNTLU: CLR      TMP1
3328 014412 012737 000001 014506      MOV     #1, TMP2
3329 014420 104004      TYPE
3330 014424 052737 000001 014510      $SWREQ
3331 014432 104006      BIS     #1, SMLN
3332 014434 014312      OCTASC
3333 014436 104004      SWRTB
3334 014440 017303      TYPE
3335 014442 104013      MBCD+2
3336 014444 017267      INSTPG
3337 014446 000000      $NEWS
3338 014450 177777      0
3339 014452 014504      177777
3340 014454 123727 015324 000015      TMP1
3341 014462 001403      CMPB   INBUF, #15
3342 014464 013777 014504 001276      BEQ    1$
3343 014472 005037 014506      MOV     TMP1, 2SWR
3344 014476 005037 014510      1$: CLR    TMP2
3345 014502 000002      CLR    SMLN
3346 014504 000000      RTI
3347 014506 000000      TMP1: 0
3348 014510 000000      TMP2: 0
          SMLN: 0

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3349
3350                                     ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE
3351
3352 014512 013700 016032 BINASC: MOV     CHRCNT,R0                ;SET UP COUNT FOR DIGITS TO BE CONVERTED
3353 014516 012701 017406      MOV     #TEMPAB,R1            ;SET UP POINTER FOR TEMPORARY STORAGE
3354 014522 104011      BINASA: EXTRACT                ;EXTRACT ONE DIGIT
3355 014524 062737 000060 014656      ADD     #60,DIGIT          ;CONVERT FROM BCD TO ASCII
3356 014532 113721 014656      MOVB   DIGIT,(R1)+        ;STORE DIGIT
3357 014536 005300      DEC     R0                ;IF ALL DIGITS NOT DONE,
3358 014540 001370      BNE    BINASA            ;CONTINUE
3359 014542 114124      BINASB: MOVB  -(R1),(R4)+   ;REVERSE ORDER OF DIGITS
3360 014544 005337 016032      DEC     CHRCNT           ;IF ALL CHARACTERS ARE NOT
3361 014550 001374      BNE    BINASB           ;IN ORDER, CONTINUE
3362 014552 112724 000040      MOVB   #40,(R4)+        ;INSERT SPACE AFTER LAST DIGIT
3363 014556 000002      RTI                    ;RETURN TO CALLING ROUTINE
3364
3365                                     ;SINGLE PRECISION UNSIGNED DIVIDE LOOP
3366
3367 014560 005037 014656      DIVI:  CLR     DIVIDH      ;DIVIDE
3368 014564 023737 014656 014660      DIVIU: CMP     DIVIDH,DIVIS ;
3369 014572 103027      BHIS   DIVIB            ;
3370 014574 012737 000021 014634      MOV     #17,DIVCNT      ;
3371 014602 000407      BR     DIVIC            ;
3372 014604 023737 014656 014660      DIVIA: CMP     DIVIDH,DIVIS ;
3373 014612 103403      BLO    DIVIC            ;
3374 014614 163737 014660 014656      SUB     DIVIS,DIVIDH    ;
3375 014622 006137 014654      DIVIC: ROL     DIVIDL     ;
3376 014626 006137 014656      ROL     DIVIDH          ;
3377 014632 005327      DEC     (PC)+           ;
3378 014634 000000      DIVCNT: 0              ;
3379 014636 001362      BNE    DIVIA            ;
3380 014640 006037 014656      ROR     DIVIDH          ;
3381 014644 005137 014654      COM     DIVIDL          ;
3382 014650 000002      RTI                    ;
3383 014652 000000      DIVIB:  HALT           ;
3384 014654 000000      DIVIDL: 0              ;
3385 014656 000000      DIVIDH: 0              ;
3386 014660 000000      DIVIS:  0              ;
3387
3388                                     ;SAVE PC OF TEST THAT FAILED AND R0-R5
3389
3390 014662 016637 000004 016026      SV05P: MOV     4(SP),SAVPC ;
3391
3392                                     ;SAVE R0-R5
3393
3394 014670 010537 016022      SV05:  MOV     R5,SAVR5   ;
3395 014674 010437 016020      MOV     R4,SAVR4        ;
3396 014700 010337 016016      MOV     R3,SAVR3        ;
3397 014704 010237 016014      MOV     R2,SAVR2        ;
3398 014710 010137 016012      MOV     R1,SAVR1        ;
3399 014714 010037 016010      MOV     R0,SAVR0        ;
3400 014720 000002      RTI
    
```



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3401
3402
3403
3404
3405 014722 013700 016010
3406 014726 013701 016012
3407 014732 013702 016014
3408 014736 013703 016016
3409 014742 013704 016020
3410 014746 013705 016022
3411
3412
3413
3414 014754 017605 000000
3415 014760 062716 000002
3416 014764 105777 000774
3417 014770 100375
3418 014772 122715 000100
3419 014776 001001
3420 015000 000002
3421 015002 122715 000042
3422 015006 001406
3423 015010 122715 000045
3424 015014 001403
3425 015016 112577 000744
3426 015022 000760
3427 015024 142715 000040
3428 015030 152715 000010
3429 015034 000770
3430
3431
3432
3433
3434
3435
3436
3437
3438 015036
3439 015036 011605
3440 015040 012537 015064
3441 015044 012537 015316
3442 015050 012537 015320
3443 015054 012537 015322
3444 015060 010516
3445 015062 104004
3446 015064 000000
3447 015066 012704 015324
3448 015072 012703 000007
3449 015076 105777 000656
3450 015102 100375
3451 015104 005037 002152
3452 015110 117737 000646 014504
3453 015116 142737 000200 014504
3454 015124 113714 014504
3455 015130 121427 000007
3456 015134 001420

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;RESTORE R0-R5
RS05: MOV SAVR0,R0
      MOV SAVR1,R1
      MOV SAVR2,R2
      MOV SAVR3,R3
      MOV SAVR4,R4
      MOV SAVR5,R5
      RTI

;TELETYPE OUTPUT ROUTINE
TYPER: MOV @ (SP),R5 ;GET POINTER TO MESSAGE (ON STACK)
      ADD #2,(SP) ;CORRECT STACK FOR RETURN
TYPERA: TSTB @TKCSR ;WAIT FOR TELEPRINTER READY
      BPL TYPERA
      CMPB #100,(R5) ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
      BNE TYPERA1
      RTI ;CHARACTER IS TERMINATOR, EXIT
TYPERA1: CMPB #42,(R5) ;IF CHARACTER=42,
      BEQ TYPECL ;TYPE LINE FEED
      CMPB #45,(R5) ;IF CHARACTER=45,
      BEQ TYPECL ;TYPE CARRIAGE RETURN
TYPERA2: MOVB (R5)+,@TKDDBR ;GET CHARACTER
      BR TYPERA ;TYPE IT
TYPECL: BICB #40,(R5) ;CONVERT CODE OF 42 OR 45
      BISB #10,(R5) ;TO 12 OR 15
      BR TYPERA2 ;TYPE IT

;INPUT OCTAL CHARACTER STRING
;TERMINATOR IS CARRIAGE RETURN
;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
;CARRIAGE RETURN ARE TYPED, THE IN PUT WILL
;BE RE-REQUESTED
INSTR: MOV (SP),R5 ;GET POINTER TO ARGUMENTS
      MOV (R5)+,MSG ;GET MESSAGE TO BE TYPED
      MOV (R5)+,LOLIM ;GET LOWER LIMIT
      MOV (R5)+,HILIM ;GET UPPER LIMIT
      MOV (R5)+,STORE ;GET DATA STORAGE LOCATION
      MOV R5,(SP) ;RESTORE STACK
INSTR1: TYPE ;TYPE MESSAGE
MSG: 0
      MOV #INBUF,R4 ;SET UP CHARACTER INPUT BUFFER
      MOV #7,R3 ;SET UP INPUT COUNT
INSTRB: TSTB @TKCSR ;WAIT FOR CHARACTER
      BPL INSTRB
INSTRBB: CLR SINTFL
      MOVB @TKDDBR,TMP1
      BICB #200,TMP1
      MOVB TMP1,(R4)
      CMPB (R4),#7
      BEQ INSTR

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3457 015136 121427 000015      CMPB   (R4),#15      ;IS CHARACTER TERMINATOR
3458 015142 001420      BEQ    INSTR2        ;IF IT IS, CONVERT INPUT STRING
3459 015144 121427 000025      CMPB   (R4),#25
3460 015150 001003      BNE    15
3461 015152 005037 014504      CLR    TMP1
3462 015156 000741      BR     INSTR1
3463 015160 112477 000602      15:   MOVB   (R4)+,DTPD9R ;TYPE CHARACTER IF NOT TERMINATOR
3464 015164 105777 000574      INSTRC: TSTB  DTPCSR    ;WAIT TO FINISH TYPING
3465 015170 100375      BPL    INSTRC
3466 015172 005303      DEC    R3            ;UPDATE RECEIVED COUNT
3467 015174 001340      BNE    INSTRB        ;AND CONTINUE
3468 015176 104004      INSTRER: TYPE      ;TYPE "?" AND RE-REQUEST INPUT
3469 015200 017012      MQM
3470 015202 000727      BR     INSTR1
3471
3472      ;CONVERT ASCII STRING TO OCTAL
3473
3474 015204 104004      INSTR2: TYPE
3475 015206 017016      MCRLF
3476 015210 012704 015324      MOV    #INBUF,R4    ;GET POINTER TO ASCII STRING
3477 015214 005003      CLR    R3
3478 015216 122714 000015      CMPB   #15,(R4)     ;IS TERMINATOR FIRST
3479      ;CHARACTER IN STRING
3480 015222 001431      BEQ    CHCK
3481 015224 121427 000060      INSTRD: CMPB   (R4),#60  ;IS CHARACTER OCTAL DIGIT
3482 015230 002762      BLT    INSTRER      ;IF 67>=CHAR>=60
3483 015232 121427 000067      CMPB   (R4),#67    ;CHARACTER IS OCTAL DIGIT
3484 015236 003357      BGT    INSTRER
3485 015240 142714 000060      BICB   #60,(R4)    ;STRIP ASCII
3486 015244 152403      BISB   (R4)+,R3    ;GENERATE OCTAL NUMBER
3487 015246 121427 000015      CMPB   (R4),#15    ;IF END OF STRING, CHECK LIMITS
3488 015252 001404      BEQ    INSTR3
3489 015254 006303      ASL    R3            ;MULTIPLY DIGIT BY 10 (OCTAL)
3490 015256 006303      ASL    R3
3491 015260 006303      ASL    R3
3492 015262 000760      BR     INSTRD        ;GET NEXT DIGIT
3493
3494      ;TEST NUMBER TO SEE IF IT IS WITHIN LIMITS
3495
3496 015264 020337 015320      INSTR3: CMP    R3,HILIM  ;TEST HI LIMIT
3497 015270 101342      BHI    INSTRER      ;IF R3>HILIM, ERROR
3498 015272 020337 015316      CMP    R3,LOLIM    ;TEST LOW LIMIT
3499 015276 103737      BLO    INSTRER      ;IF R3<LOLIM, ERROR
3500 015300 010377 000016      MOV    R3,STORE    ;STORE NUMBER
3501 015304 000002      RTI
3502 015306 005737 014506      CHCK:  TST    TMP2
3503 015312 001731      BEQ    INSTRER
3504 015314 000002      RTI
3505 015316 000000      LOLIM: 0
3506 015320 000000      HILIM: 0
3507 015322 000000      STORE: 0
3508 015324 000000      INBUF: 0
3509      .=. +20
3510
3511      ;ENTER HERE ON POWER FAILURE
3512

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3513	015346	010046			PFAIL: MOV R0,-(SP)	;SAVE R0-R5 ON PROCESSOR STACK
3514	015350	010146			MOV R1,-(SP)	
3515	015352	010246			MOV R2,-(SP)	
3516	015354	010346			MOV R3,-(SP)	
3517	015356	010446			MOV R4,-(SP)	
3518	015360	010546			MOV R5,-(SP)	
3519	015362	013746	000024		MOV 24,-(SP)	
3520	015366	010637	016024		MOV SP,SAVSP	;SAVE STACK POINTER
3521	015372	012737	015404	000024	MOV #RESTART,24	;SET UP FOR POWER UP TRAP
3522	015400	000000			HALT	;HALT ON POWER DOWN NORMAL
3523	015402	000776			BR -2	
3524						
3525						;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
3526						
3527	015404	013706	016024		RESTAR: MOV SAVSP,SP	;RESTORE STACK POINTER
3528	015410	012605			MOV (SP)+,R5	;RESTORE R0-R5
3529	015412	012604			MOV (SP)+,R4	
3530	015414	012603			MOV (SP)+,R3	
3531	015416	012602			MOV (SP)+,R2	
3532	015420	012601			MOV (SP)+,R1	
3533	015422	012600			MOV (SP)+,R0	
3534	015424	012737	015346	000024	MOV #PFAIL,24	;SET UP FOR POWER FAILURE
3535	015432	005726			POP1SP	
3536	015434	104004			TYPE	
3537	015436	017171			MPFAIL	
3538	015440	005737	001730		TST TIPFLG	
3539	015444	001002			BNE RESTAI	
3540	015446	000137	001254		JMP STARTO	
3541	015452	104004			RESTAI: TYPE	
3542	015454	017211			MPFI	
3543	015456	012716	000340		MOV #340,(SP)	
3544	015462	005746			PUSH1SP	
3545	015464	000137	013564		JMP TSTENT	
3546						
3547						
3548						;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
3549	015470	013746	000020		XOR: MOV 20,-(SP)	;SAVE 20
3550	015474	013746	000022		MOV 22,-(SP)	;SAVE 22
3551	015500	012737	015672	000020	MOV #25,20	;IOT INTR VECTOR
3552	015506	012737	000340	000022	MOV #340,22	;IOT INTR LVL
3553	015514	012737	000300	013274	MOV #300,DATA1	
3554	015522	012737	000302	013276	MOV #302,DATA2	
3555	015530	013777	013276	175536	IS: MOV DATA2,DATA1	
3556	015536	012777	000004	175532	MOV #IOT,DATA2	;IOT TRAP
3557	015544	062737	000004	013274	ADD #4,DATA1	
3558	015552	062737	000004	013276	ADD #4,DATA2	
3559	015560	023727	013274	001000	CMP DATA1,#1000	
3560	015566	001360			BNE IS	
3561	015570	012737	000000	016002	MOV #0,TSTNO	;SET UP DEFAULT
3562	015576	012737	017534	016034	MOV #TSTBO,TSTPNT	
3563	015604	052737	000340	177776	BIS #340,PS	;PREVENT INTERRUPTS
3564	015512	005077	000136		CLR #DMBCSR	
3565	015616	012777	000100	000130	MOV #INTENA,#DMBCSR	;SET INTERRUPT ENABLE
3566	015624	042737	000340	177776	BIC #340,PS	;ALLOW INTERRUPTS
3567	015632	052777	000200	000114	BIS #DONE,#DMBCSR	;SET DONE..AND INTERRUPT
3568	015640	000240			NOP	

3569	015642	012637	000022			MOV	(SP)+,22	; YOU DIDN'T INTERRUPT ?
3570	015646	012637	000020			MOV	(SP)+,20	; RESTORE 20 & 22
3571	015652	005077	000076			CLR	DMBCSR	; STOP ALL INTERRUPT
3572	015656	052737	000340	177776		BIS	#340,PS	;
3573	015664	104012				ERROR		
3574	015666	000000				HALT		; YOU SHOULD HAVE INTERRUPTED
3575	015670	000426				BR	3\$	
3576	015672	011637	015750		2\$:	MOV	(SP),DMBVEC	; EXTRACT VECTOR +4
3577	015676	162737	000002	015750		SUB	#2,DMBVEC	; CREATE LVL
3578	015704	013737	015750	015752		MOV	DMBVEC,DMBLVL	; SAVE
3579	015712	162737	000002	015750		SUB	#2,DMBVEC	; CREATE AND SAVE VEC
3580	015720	012737	000340	177776		MOV	#340,PS	; PREVENT INTERRUPTS
3581	015726	005077	000022			CLR	DMBCSR	;
3582	015732	022626				POP2SP		
3583	015734	022626				POP2SP		
3584	015736	012637	000022			MOV	(SP)+,22	; RESTORE 22
3585	015742	012637	000020			MOV	(SP)+,20	; RESTORE 20
3586	015746	000207			3\$:	RTS	PC	
3587								

3588
 3589
 3590
 3591 015750 000300
 3592 015752 000302
 3593 015754 170500
 3594 015756 170502
 3595 015760 177560
 3596 015762 177562
 3597 015764 177564
 3598 015766 177566
 3599 015770 177570
 3600 015772 177570

;INDIRECT POINTERS

DMBVEC: 300 ;DM11-BB INTERRUPT VECTOR
 DMBLVL: 302 ;DM11-BB ONTERRUPT PRIORITY
 DMBCSR: 170500 ;DM11-BB CONTROL STATUS REGISTER
 DMBSLR: 170502 ;DM11-BB CONTROL STATUS REGISTER
 TKCSR: 177560
 TKDBR: 177562
 TPCSR: 177564
 TPDBR: 177566
 SWR: 177570
 DISPLAY: 177570

3601
 3602
 3603
 3604 015774 000000
 3605 015776 000000
 3606 016000 000000
 3607 016002 000000
 3608 016004 000000
 3609 016006 000000
 3610 016010 000000
 3611 016012 000000
 3612 016014 000000
 3613 016016 000000
 3614 016020 000000
 3615 016022 000000
 3616 016024 000000
 3617 016026 000000
 3618 016030 000000
 3619 016032 000000
 3620 016034 017534
 3621 016036 000000
 3622 016040 000000
 3623 016042 000000
 3624 016044 000000
 3625 016046 000000
 3626 016050 000000
 3627 016052 000000
 3628 016054 000000
 3629 016056 000000
 3630 016060 000000
 3631 016062 000000

;PROGRAM VARIABLES

ERRFLG: 0
 TRACON: 0
 PASCNT: 0
 TSTNO: 0
 RETURN: 0
 ICOUNT: 0
 SAVRO: 0
 SAVR1: 0
 SAVR2: 0
 SAVR3: 0
 SAVR4: 0
 SAVRS: 0
 SAVSP: 0
 SAVPC: 0
 WRDCNT: 0
 CHRCNT: 0
 TSTPNT: TSTT80
 TSTMAX: 0
 LINFLG: 0
 LINE: 0
 LINORG: 0
 LINANS: 0
 ANSFLG: 0
 ORGFLG: 0
 TIME1: 0
 TIME2: 0
 TIFLG: 0
 RNGRET: 0

3632
 3633 016064 052123 052101 051525
 3634 016072 042440 051122 051117
 3635 016100 021045 054105 020120
 3636 016106 020040 051040 041505
 3637 016114 100
 3638 016115 114 047111 020105
 3639 016122 051105 047522 022522
 3640 016130 042442 050130 051040
 3641 016136 041505 046040 047111
 3642 016144 020105 042523 040114
 3643 016152 044514 042516 042440

MSTATE: .ASCII ;STATUS ERROR%*EXP RECQ;

MLINER: .ASCII ;LINE ERROR%*EXP REC LINE SELQ;

MLINE1: .ASCII ;LINE ERROR%*EXP REC LINEQ;

3644	016160	051122	051117	021045
3645	016166	054105	020120	042522
3646	016174	020103	044514	042516
3647	016202	100		
3648	016203	124	040522	051516
3649	016210	052111	047511	020116
3650	016216	051105	047522	022522
3651	016224	042442	050130	051040
3652	016232	041505	046040	047111
3653	016240	040105		
3654	016242	021045	021045	044504
3655	016250	046101	040440	051516
3656	016256	042527	044522	043516
3657	016264	042040	052101	020101
3658	016272	042523	022524	040042
3659	016300	021045	021045	030061
3660	016306	040463	046440	042117
3661	016314	046505	041440	047117
3662	016322	042516	052103	042055
3663	016330	051511	047503	047116
3664	016336	041505	020124	042524
3665	016344	052123	021045	100
3666	016351	045	022442	031042
3667	016356	031060	020103	047515
3668	016364	042504	020115	047503
3669	016372	047116	041505	026524
3670	016400	044504	041523	047117
3671	016406	042516	052103	052040
3672	016414	051505	022524	040042
3673	016422	021045	021045	051117
3674	016430	043511	047111	052101
3675	016436	020105	044514	042516
3676	016444	040055		
3677	016446	021045	047101	053523
3678	016454	051105	046040	047111
3679	016462	026505	100	
3680	016465	045	030442	031460
3681	016472	020101	042524	052123
3682	016500	041440	046517	046120
3683	016506	052105	022505	040042
3684	016514	021045	030062	041462
3685	016522	052040	051505	020124
3686	016530	047503	050115	042514
3687	016536	042524	021045	100
3688	016543	045	051442	051124
3689	016550	045511	020105	047101
3690	016556	020131	052124	020131
3691	016564	042513	020131	047524
3692	016572	052040	051505	020124
3693	016600	044504	041523	047117
3694	016606	042516	052103	100
3695	016613	045	022442	030442
3696	016620	020066	044514	042516
3697	016626	051440	040503	047116
3698	016634	051105	052040	051505
3699	016642	022524	040042	

MTRANE: .ASCII ;TRANSITION ERROR%EXP REC LINE@;

DIALM: .ASCII ;%""DIAL ANSWERING DATA SET%""@;

MT103T: .ASCII ;%""103A MODEM CONNECT-DISCONNECT TEST%""@;

MT202T: .ASCII ;%""202C MODEM CONNECT-DISCONNECT TEST%""@;

MSELOR: .ASCII ;%""ORIGINATE LINE-@;

MSELAN: .ASCII ;%""ANSWER LINE-@;

MT103A: .ASCII ;%""103A TEST COMPLETE%""@;

MT202A: .ASCII ;%""202C TEST COMPLETE%""@;

MDISC: .ASCII ;%""STRIKE ANY TTY KEY TO TEST DISCONNECT@;

M16: .ASCII ;%""16 LINE SCANNER TEST%""@;

3700	016646	021045	021045	055104
3701	016654	046504	026504	020102
3702	016662	020040	026440	026455
3703	016670	026455	046504	030461
3704	016676	041055	020102	044504
3705	016704	043501	047516	052123
3706	016712	041511	026455	026455
3707	016720	022455	040042	
3708	016724	021045	042526	052103
3709	016732	051117	040440	042104
3710	016740	042522	051523	040055
3711	016746	021045	047503	052116
3712	016754	047522	020114	042522
3713	016762	044507	052123	051105
3714	016770	040440	042104	042522
3715	016776	051523	040055	
3716	017002	021045	042524	052123
3717	017010	040055		
3718	017012	020040	040077	
3719	017016	021045	100	
3720	017021	045	051442	047111
3721	017026	046107	020105	044514
3722	017034	042516	041440	041101
3723	017042	042514	052040	051505
3724	017050	022524	040042	
3725	017054	021045	044514	042516
3726	017062	047040	046525	042502
3727	017070	026522	100	
3728	017073	106	052101	046101
3729	017100	042440	051122	051117
3730	017106	021045	051503	040524
3731	017114	020124	046040	052123
3732	017122	052101	100	
3733	017125	045	052042	040522
3734	017132	051516	052111	047511
3735	017140	020116	042504	042524
3736	017146	052103	042105	021045
3737	017154	051503	040524	020124
3738	017162	046040	052123	052101
3739	017170	100		
3740	017171	045	050042	053517
3741	017176	051105	043040	044501
3742	017204	052514	042522	100
3743	017211	055	052503	051122
3744	017216	047105	020124	042524
3745	017224	052123	053440	046111
3746	017232	020114	042522	052123
3747	017240	051101	022524	040042
3748	017246	041536	100	
3749	017251	136	040126	
3750	017254	046136	100	
3751	017257	045	051442	051127
3752	017264	020075	100	
3753	017267	040	020040	047040
3754	017274	053505	020075	100
3755	017301	045	042	

MITLE: .ASCII ;%"DZDMD-B -----DM11-BB DIAGNOSTIC-----%"@;
 MVECTO: .ASCII ;%"VECTOR ADDRESS-@;
 MREGAD: .ASCII ;%"CONTROL REGISTER ADDRESS-@;
 MTEST: .ASCII ;%"TEST-@;
 MQM: .ASCII ; ?@;
 MCRLF: .ASCII ;%"@;
 MLINE: .ASCII ;%"SINGLE LINE CABLE TEST%"@;
 MLINEI: .ASCII ;%"LINE NUMBER-@;
 MFATAL: .ASCII ;FATAL ERROR%"CSTAT LSTAT@;
 MTRNDE: .ASCII ;%"TRANSITION DETECTED%"CSTAT LSTAT@;
 MPFAIL: .ASCII ;%"POWER FAILURE@;
 MPF1: .ASCII ;-CURRENT TEST WILL RESTART%"@;
 MCONTG: .ASCII ;t@;
 MCONTV: .ASCII ;t@;
 MCONTL: .ASCII ;t@;
 \$SWREQ: .ASCII ;%"SWR= @;
 \$NEWS: .ASCII ; NEW= @;
 MBCD: .ASCII ;%"

3756		017403
3757		017404
3758	017404	040007
3759	017406	000000
3760		017420
3761		
3762	017420	000000
3763		
3764		
3765		
3766	017422	014006
3767	017424	014024
3768	017426	013414
3769	017430	013640
3770	017432	014754
3771	017434	014662
3772	017436	014320
3773	017440	014722
3774	017442	014512
3775	017444	014560
3776	017446	013702
3777	017450	015036
3778	017452	013720
3779	017454	013742
3780	017456	013764
3781	017460	012350
3782	017462	012404
3783	017464	012640
3784	017466	012736
3785	017470	013024
3786	017472	012774
3787	01 474	014406
3788	017476	013402
3789	017500	001732
3790	017502	000000
3791	017504	017534
3792	017506	017736
3793	017510	020000
3794	017512	020006
3795	017514	000000
3796	017516	000000
3797	017520	000000
3798	017522	000000
3799	017524	000037
3800	017526	000007
3801	01 530	000001
3802	017532	000000
3803	017534	002154
3804	017536	000001
3805	017540	002202
3806	017542	004000
3807	017544	002244
3808	017546	004000
3809	017550	002306
3810	017552	004000
3811	017554	002350

```

.=.+100
.EVEN
MEPASS: 40007
TEMTAB: 0
.=.+10

0
;EMT DISPATCH TABLE

EMTTAB: ERRCS
        ERRLS
        LOOP
        FREEZE
        TYPER
        SVOSP
        OCTASN
        RSOS
        BINASC
        DIVI
        ERR
        INSTR
        ERRT
        ERRS
        ERN
        GETLIN
        SETUPS
        CKRNG
        WAITR
        CKTRN
        WAITRR
        CNTLU
        CKINT
        KBDINT

EMTLIM: 0
TSTLST: TSTTB0
        TSTTB1
        TSTTB2
        TSTTB3
        0
        0
        0
        0
GRO:    NO-1
        N1-100-1
        N2-200-1
        N3-300-1
TSTTB0: T0
        1
        T1
        TIMES
        T2
        TIMES
        T3
        TIMES
        T4

```

```

;CALLED BY EMT CNTLUU
;CALLED BY EMT CKINTT
;CALLED BY EMT KBDIN

```


3812	017556	004000	TIMES
3813	017560	002412	T5
3814	017562	004000	TIMES
3815	017564	002454	T6
3816	017566	004000	TIMES
3817	017570	002530	T7
3818	017572	004000	TIMES
3819	017574	002604	T10
3820	017576	004000	TIMES
3821	017600	002674	T11
3822	017602	004000	TIMES
3823	017604	002764	T12
3824	017606	004000	TIMES
3825	017610	003054	T13
3826	017612	004000	TIMES
3827	017614	003144	T14
3828	017616	004000	TIMES
3829	017620	003234	T15
3830	017622	004000	TIMES
3831	017624	003322	T16
3832	017626	004000	TIMES
3833	017630	003410	T17
3834	017632	004000	TIMES
3835	017634	003476	T20
3836	017636	004000	TIMES
3837	017640	003564	T21
3838	017642	004000	TIMES
3839	017644	003636	T22
3840	017646	000400	TIMES
3841	017650	003720	T23
3842	017652	000400	TIMES
3843	017654	004116	T24
3844	017656	000400	TIMES
3845	017660	004274	T25
3846	017662	000200	TIMES
3847	017664	004444	T26
3848	017666	000200	TIMES
3849	017670	004636	T27
3850	017672	000200	TIMES
3851	017674	005030	T30
3852	017676	000200	TIMES
3853	017700	005222	T31
3854	017702	000200	TIMES
3855	017704	005414	T32
3856	017706	000200	TIMES
3857	017710	005610	T33
3858	017712	000200	TIMES
3859	017714	006004	T34
3860	017716	000200	TIMES
3861	017720	006200	T35
3862	017722	004000	TIMES
3863	017724	006340	T36
3864	017726	004000	TIMES
3865	017730	006554	T37
3866	017732	004000	TIMES
3867	017734	000000	0

3868	017736	007000
3869	017740	000001
3870	017742	007036
3871	017744	004000
3872	017746	007214
3873	017750	004000
3874	017752	007372
3875	017754	004000
3876	017756	007550
3877	017760	004000
3878	017762	007726
3879	017764	004000
3880	017766	010102
3881	017770	004000
3882	017772	010256
3883	017774	004000
3884	017776	000000
3885	020000	010432
3886	020002	000001
3887	020004	000000
3888	020006	011006
3889	020010	000001
3890		000001

```

TSTT81: T100
        |
        T101
        TIMES
        T102
        TIMES
        T103
        TIMES
        T104
        TIMES
        T105
        TIMES
        T106
        TIMES
        T107
        TIMES
        0
TSTT82: T200
        |
        0
TSTT83: T300
        |
        1
.END

```


DIVIS 014660	773	3368	3372	3374	3386#									
DIVIU 014564	3368#													
DMBCSR 015754	947	948	952	1004*	1012*	1022*	1043	1055*	1056	1059*	1060	1068*	1069	
	1072*	1073	1081*	1082	1085*	1086	1094*	1095	1099*	1100	1110*	1111	1114*	
	1115	1125*	1128*	1141*	1144*	1157*	1159*	1162*	1165*	1175*	1180*	1181*	1184*	
	1193*	1199*	1199*	1202*	1211*	1216*	1217*	1220*	1229*	1234*	1235*	1238*	1248*	
	1253*	1254*	1257*	1266*	1271*	1272*	1275*	1284*	1289*	1290*	1293*	1302*	1307*	
	1308*	1311*	1321*	1325*	1326	1342*	1345*	1346*	1347	1365*	1368*	1369*	1374*	
	1375*	1376	1385*	1386	1390*	1391*	1392	1407*	1411*	1412	1414*	1415*	1416*	
	1417*	1419*	1422*	1423	1445*	1450*	1451*	1454*	1455*	1457*	1460*	1461	1481*	
	1485*	1487*	1489*	1492	1503*	1507*	1526*	1530*	1532*	1534*	1537	1548*	1552*	
	1571*	1575*	1577*	1579*	1582	1593*	1597*	1616*	1620*	1622*	1624*	1627	1638*	
	1642*	1662*	1667*	1669*	1672	1683*	1688*	1708*	1713*	1715*	1718	1729*	1734*	
	1754*	1759*	1761*	1764	1775*	1780*	1800*	1804*	1809*	1810*	1838*	1839*	1842*	
	1843*	1851*	1853*	1855	1859	1865	1871*	1883*	1884*	1897*	1890*	1891	1897*	
	1899*	1901	1905	1911	1917*	1948*	1951*	1953*	1955*	1958	1969*	1973*	1987*	
	1990*	1992*	1994*	1997	2008*	2012*	2026*	2029*	2031*	2033*	2036	2047*	2051*	
	2065*	2068*	2070*	2072*	2075	2086*	2090*	2105*	2109*	2111*	2114	2125*	2130*	
	2144*	2148*	2150*	2153	2164*	2169*	2183*	2187*	2189*	2192	2203*	2208*	2272*	
	2330*	2337*	2338*	2434*	2436*	2477*	2519*	2521*	2562*	2602*	2644*	2646*	2698*	
	2709*	2710*	2763	2771*	2830*	2835	2873*	2874	2881*	2885*	2895*	2948*	2962*	
	2975*	2981*	3564*	3565*	3567*	3571*	3581*	3593#						
DMBLSR 015756	952*	953*	1046	1488*	1491	1509*	1512	1533*	1536	1554*	1557	1578*	1581	
	1599*	1602	1623*	1626	1644*	1647	1668*	1671	1689*	1692	1699*	1714*	1717	
	1735*	1738	1745*	1760*	1763	1781*	1784	1791*	1803*	1811	1819*	1820	1827*	
	1844*	1886*	1954*	1957	1975*	1978	1993*	1996	2014*	2017	2032*	2035	2053*	
	2056	2071*	2074	2092*	2095	2110*	2113	2131*	2134	2149*	2152	2170*	2173	
	2188*	2191	2209*	2212	2274*	2339*	2435*	2437*	2478*	2520*	2522*	2563*	2603*	
	2645*	2647*	2711*	2772	2836	2883*	2886*	2976	2982	3594#				
DMBLVL 015752	941*	942*	1127*	1143*	1150*	1179*	1197*	1215*	1233*	1251*	1269*	1287*	1305*	
	1849*	1896*	2894*	3578*	3592*									
DMBEVC 015750	936	937	941	1126*	1142*	1158*	1178*	1196*	1214*	1232*	1250*	1268*	1286*	
	1304*	1848*	1895*	2326*	2695*	2892*	2945*	3576*	3577*	3578	3579*	3591#		
DMYRTI 002146	982	1019	1020	1032#										
DONE = 000200	782#	1068	1069	1072	1073	1128	1162	1181	1199	1217	1235	1254	1272	
	1290	1308	1871	1917	3567									
ENTLIM 017502	3790#													
ENTOK 013362	3045#													
ENTSRV 013350	852	3042#												
EMTTAB 017422	3047	3766#												
EOP 013306	3023#	3099												
ERR 013702	3125#	3776												
ERRCS 014006	3197#	3766												
ERRFLG 015774	2876*	3080	3102*	3111	3125*	3143*	3162*	3179*	3232*	3234	3256*	3604#		
ERRGEN 014042	3129	3146	3166	3183	3200	3219	3226#							
ERRLS 014024	3217#	3767												
ERRMSG 014122	3127*	3144*	3163*	3180*	3197*	3217*	3238	3241#						
ERRN 013764	3179#	3780												
ERROR = 104012	830#	1045	1048	1058	1062	1071	1075	1084	1088	1098	1103	1113	1117	
	1133	1149	1166	1187	1205	1223	1241	1258	1276	1294	1312	2246	2407	
	3573													
ERRORC = 104000	820#	1329	1350	1379	1395	1430	1468	1860	1868	1906	1914			
ERRORL = 104001	821#	1500	1515	1545	1560	1590	1605	1635	1650	1680	1695	1726	1741	
	1772	1787	1815	1823	1966	1981	2005	2020	2044	2059	2083	2098	2122	
	2137	2161	2176	2200	2215									
ERRORN = 104016	834#	2773	2796	2819										

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 DZDMD8.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

MDISC	016543	2324	2693	3688#
MENT1	003720	1365#	1381	
MENT1A	003746	1369#	1371	
MENT1B	003776	1375#	1384	
MENT1C	004022	1378	1382#	
MENT1D	004030	1395#	1397	
MENT1E	004062	1391#	1400	
MENT1F	004106	1394	1398#	
MENT2	004116	1407#		
MENT2A	004140	1411#	1432	1437
MENT2B	004222	1422#	1435	
MENT2C	004246	1426	1428#	
MENT2D	004260	1429	1433#	
MENT3	004274	1445#		
MENT3A	004316	1449#	1470	1475
MENT3B	004330	1451#	1453	
MENT3C	004372	1460#	1473	
MENT3D	004416	1464	1466#	
MENT3E	004430	1467	1471#	
MEPASS	017404	3027	3758#	
MFATAL	017073	3180	3728#	
MLINE	017021	1935	3720#	
MLINEI	017054	1937	3725#	
MLINER	016115	3217	3638#	
MLINE1	016152	31E3	3643#	
MPFAIL	017171	3537	3740#	
MPF1	017211	3542	3743#	
MQM	017012	3469	3718#	
MREGAD	016746	944	3711#	
MSELAN	016446	2857	3677#	
MSELOR	016422	2852	3673#	
MSG	015064	3440*	3446#	
MSTATE	016064	3197	3633#	
MTEST	017002	957	3716#	
MTITLE	016646	905	3700#	
MTRANE	016203	3144	3648#	
MTRNDE	017125	2838	3733#	
MT103A	016465	2377	3680#	
MT103T	016300	2234	3659#	
MT202A	016514	2746	3684#	
MT202T	016351	2395	3666#	
MUX1	004444	1481#		
MUX1A	004464	1485#	1517	1520
MUX1B	004514	1490#	1505	
MUX1C	004542	1495	1498#	
MUX1D	004554	1499	1502	1503#
MUX1E	004570	1507#		
MUX1F	004622	1514	1516#	
MUX11	007036	1948#		
MUX11A	007054	1951#		
MUX11B	007104	1956#	1971	
MUX11C	007132	1961	1964#	
MUX11D	007144	1965	1968	1969#
MUX11E	007160	1973#		
MUX11F	007212	1980	1982#	
MUX12	007214	1987#		

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 DZDMD8.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

MUX12A	007232	1990#		
MUX12B	007262	1995#	2010	
MUX12C	007310	2000	2003#	
MUX12D	007322	2004	2007	2008#
MUX12E	007336	2012#		
MUX12F	007370	2019	2021#	
MUX13	007372	2026#		
MUX13A	007410	2029#		
MUX13B	007440	2034#	2049	
MUX13C	007466	2039	2042#	
MUX13D	007500	2043	2046	2047#
MUX13E	007514	2051#		
MUX13F	007546	2059	2060#	
MUX14	007550	2065#		
MUX14A	007566	2068#		
MUX14B	007616	2073#	2088	
MUX14C	007644	2078	2081#	
MUX14D	007656	2082	2085	2086#
MUX14E	007672	2090#		
MUX14F	007724	2097	2099#	
MUX15	007726	2105#		
MUX15A	007744	2109#		
MUX15B	007766	2112#	2127	
MUX15C	010014	2117	2120#	
MUX15D	010026	2121	2124	2125#
MUX15E	010044	2129#		
MUX15F	010100	2136	2138#	
MUX16	010102	2144#		
MUX16A	010120	2147#		
MUX16B	010142	2151#	2166	
MUX16C	010170	2156	2159#	
MUX16D	010202	2160	2163	2164#
MUX16E	010220	2168#		
MUX16F	010254	2175	2177#	
MUX17	010256	2183#		
MUX17A	010274	2186#		
MUX17B	010316	2190#	2205	
MUX17C	010344	2195	2198#	
MUX17D	010356	2199	2202	2203#
MUX17E	010374	2207#		
MUX17F	010430	2214	2216#	
MUX2	004636	1526#		
MUX2A	004656	1530#	1562	1565
MUX2B	004706	1535#	1550	
MUX2C	004734	1540	1543#	
MUX2D	004746	1544	1547	1548#
MUX2E	004762	1552#		
MUX2F	005014	1559	1561#	
MUX3	005030	1571#		
MUX3A	005050	1575#	1607	1610
MUX3B	005100	1580#	1595	
MUX3C	005126	1585	1588#	
MUX3D	005140	1589	1592	1593#
MUX3E	005154	1597#		
MUX3F	005206	1604	1606#	
MUX4	005222	1616#		

ORGTRR	012160	2796*												
ORGTR1	012106	2779	2721*											
ORGTR2	012122	2782	2784*											
ORGTR3	012136	2786	2789*											
ORGTR4	012152	2791	2793*											
PASCNT	016000	985*	3024*	3606*										
PC	=%000007	767*	896*	911*	2265*	2306*	2308*	2310*	2312*	2367*	2369*	2371*	2373*	2426*
		2466*	2468*	2470*	2472*	2507*	2509*	2511*	2513*	2550*	2552*	2554*	2556*	2591*
		2593*	2595*	2597*	2633*	2635*	2637*	2639*	2675*	2677*	2679*	2681*	2737*	2739*
		2741*	2743*	2932*	2980*	2987*	3000*	3006*	3031*	3377*	3586*			
PFAIL	015346	850	874	3513*	3534									
POPRO	= 012600	814*												
POP1SP	= 005726	812*	3535											
POP2SP	= 022626	816*	900	1003	1011	1021	1132	1148	1168	1186	1204	1222	1240	1260
		1278	1296	1314	1864	1910	2821	2913	2915	2938	2940	3007	3072	3582
		3583												
PS	= 177776	771*	772	1124*	1127	1129*	1140*	1143	1145*	1156*	1160	1161*	1176*	1177*
		1179	1194*	1195*	1197	1212*	1213*	1215	1230*	1231*	1233	1249*	1252*	1267*
		1270*	1285*	1288*	1303*	1306*	1322*	1341*	1366*	1408*	1446*	1482*	1527*	1572*
		1617*	1663*	1709*	1755*	1801*	1840*	1849	1852*	1854*	1858*	1885*	1896	1898*
		1900*	1904*	1933*	1949*	1988*	2027*	2066*	2106*	2145*	2184*	2232*	2325*	2331*
		2336*	2393*	2694*	2700*	2708*	2868*	2902*	2949*	2961*	3563*	3566*	3572*	3580*
PSW	= 177776	772*	3078*	3226*										
PUSHRO	= 010046	813*												
PUSH1S	= 005746	811*	980	3544										
PUSH2S	= 024646	815*												
RADIX	= 014660	773*	3310*											
REGST1	001532	949	952*											
RESTAR	015404	3521	3527*											
RESTA1	015452	3539	3541*											
RESOS	= 104007	827*	3246											
RETURN	016004	3090	3098*	3608*										
RING	= 000200	801*	1722	2157										
RINGF	= 100000	790*	2293	2454	2778	2793	2801	2816						
RNGRET	016062	2328*	2696*	2829	2898*	2946*	3631*							
RS	= 000004	796*	1578	1586	1714	1722	1735	2032	2040	2149	2157	2170	2437	2450
		2492	2520	2563	2573	2613	2645							
RSOS	014722	3404*	3773											
RO	=%000000	760*	1324*	1333*	1344*	1354*	1367*	1370*	1372*	1383*	1388*	1399*	1409*	1436*
		1447*	1474*	1483*	1519*	1528*	1564*	1573*	1609*	1618*	1654*	1664*	1700*	1710*
		1746*	1756*	1792*	1802*	1805*	1808*	1828*	1841*	1845*	1850*	1873*	1882*	1888*
		1893*	1919*	3352*	3357*	3399	3404*	3513	3533*					
R1	=%000001	761*	1421*	1424	1433*	1459*	1462	1471*	1484*	1487	1494	1507	1508	1518*
		1529*	1532	1539	1552	1553	1563*	1574*	1577	1584	1597	1598	1608*	1619*
		1622	1629	1642	1643	1653*	1665*	1667	1674	1687	1688	1698*	1711*	1713
		1720	1733	1734	1744*	1757*	1759	1766	1779	1780	1790*	1950*	1953	1960
		1973	1974	1989*	1992	1999	2012	2013	2028*	2031	2038	2051	2052	2067*
		2070	2077	2090	2091	2107*	2109	2116	2129	2130	2146*	2148	2155	2168
		2169	2185*	2187	2194	2207	2208	3028*	3031	3353*	3356*	3359	3398	3405*
		3514	3532*											
R2	=%000002	762*	1410*	1415	1420*	1425	1448*	1454	1458*	1463	1486*	1504*	1531*	1549*
		1576*	1594*	1621*	1639*	1666*	1684*	1712*	1730*	1758*	1776*	1952*	1970*	1991*
		2009*	2030*	2048*	2069*	2087*	2108*	2126*	2147*	2165*	2186*	2204*	3397	3406*
		3515	3531*											
R3	=%000003	763*	1418*	1434*	1449*	1452*	1456*	1472*	1492*	1493*	1494	1508*	1537*	1538*
		1539	1553*	1582*	1583*	1584	1598*	1627*	1628*	1629	1643*	1672*	1673*	1674

		1687*	1719*	1719*	1720	1733*	1764*	1765*	1766	1779*	1807*	1810	1826*	1958*		
		1959*	1960	1974*	1997*	1998*	1999	2013*	2036*	2037*	2038	2052*	2075*	2076*		
		2077	2091*	2114*	2115*	2116	2129*	2153*	2154*	2155	2168*	2192*	2193*	2194		
		2207*	2772*	2929*	2935*	2977*	2984*	2997*	3003*	3396	3407*	3448*	3466*	3477*		
R4	=%000004	3486*	3489*	3490*	3491*	3496	3498	3500	3516	3530*						
		764*	1326*	1327	1347*	1348	1376*	1377	1392*	1393	1423*	1425	1428	1451*		
		1463	1466	1491*	1498	1512*	1513	1536*	1543	1557*	1558	1581*	1588	1602*		
		1603	1626*	1633	1647*	1648	1671*	1678	1692*	1693	1717*	1724	1738*	1739		
		1763*	1770	1784*	1785	1811*	1813	1820*	1821	1859*	1865*	1866	1905*	1911*		
		1912	1957*	1964	1978*	1979	1996*	2003	2017*	2018	2035*	2042	2056*	2057		
		2074*	2081	2095*	2096	2113*	2120	2134*	2135	2152*	2159	2173*	2174	2191*		
		2198	2212*	2213	2763*	2765	2778	2781	2784	2789	2793	2801	2804	2807		
		2812	2816	2827	2928*	2930	2934*	2936	2976*	2978	2982*	2985	2995*	2998		
		3001*	3004	3311*	3318*	3359*	3362*	3395	3408*	3447*	3454*	3455	3457	3459		
RS	=%000005	3463	3476*	3478	3481	3483	3485*	3465	3487	3517	3529*					
		765*	961*	962*	963*	964*	965*	966*	967*	968	969	1323*	1325	1327		
		1332*	1343*	1348	1353*	1373*	1377	1382*	1389*	1393	1398*	1424*	1427*	1428		
		1462*	1465*	1466	1490*	1496*	1498	1506*	1535*	1541*	1543	1551*	1580*	1586*		
		1588	1596*	1625*	1631*	1633	1641*	1670*	1676*	1678	1686*	1693	1716*	1722*		
		1724	1732*	1739	1762*	1768*	1770	1778*	1785	1812*	1818*	1821	1847*	1866		
		1872*	1894*	1912	1918*	1956*	1962*	1964	1972*	1995*	2001*	2003	2011*	2034*		
		2040*	2042	2050*	2073*	2079*	2081	2089*	2112*	2118*	2120	2128*	2135	2151*		
		2157*	2159	2167*	2174	2190*	2196*	2198	2206*	2213	2765*	2766*	2767	2769		
		2771	2869*	2870	2871	2872	2922*	2923	2924	2925	2926	2927*	2930	2933*		
		2963*	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974*	2978		
		2983*	2985	2996*	2998	3002*	3004	3094*	3095*	3096*	3097*	3098	3100	3101		
		3308*	3312	3313	3314	3394	3409*	3414*	3418	3421	3423	3425	3427*	3428*		
		3439*	3440	3441	3442	3443	3444	3518	3528*							
SAVPC	016026	3230	3268	3390*	3617*											
SAVRO	016010	3399*	3404	3610*												
SAVR1	016012	3301	3398*	3405	3611*											
SAVR2	016014	3397*	3406	3612*												
SAVR3	016016	3275	3282	3287	3299	3396*	3407	3613*								
SAVR4	016020	3273	3280	3285	3292	3297	3395*	3408	3614*							
SAVR5	016022	3271	3278	3290	3295	3394*	3409	3615*								
SAVSP	016024	3520*	3527	3616*												
SAVOSP=	104005	825*	3233													
SCNENA=	000040	780*	1094	1095	1099	1100	1110	1114	1853	1871	1899	1917	2330	2598		
		2830	2895	2948												
SCNT1	006340	1838*	1862	1870												
SCNT1A	006372	1843*	1846													
SCNT1B	006444	1852*	1874													
SCNT1C	006516	1848	1864*													
SCNT1D	006536	1863	1867	1871*												
SCNT2	006554	1882*	1908	1916												
SCNT2A	006600	1886*	1889													
SCNT2B	006670	1898*	1920													
SCNT2C	006742	1895	1910*													
SCNT2D	006762	1909	1913	1917*												
SCOPE =	104002	822*	1049	1063	1076	1089	1104	1118	1134	1150	1169	1188	1206	1224		
		1242	1261	1279	1297	1315	1335	1356	1401	1438	1476	1521	1566	1611		
		1656	1702	1748	1794	1830	1875	1921	1982	2021	2060	2099	2138	2177		
		2216														
SCOPEF=	104003	823*	1330	1351	1380	1396	1431	1469	1501	1516	1546	1561	1591	1606		
		1636	1651	1681	1696	1727	1742	1773	1788	1816	1824	1861	1869	1907		
		1915	1967	2006	2045	2084	2123	2162	2201							

T103C	010530	2258	2272#
T103D1	010574	2299	2305#
T103D2	010600	2301	2307#
T103D3	010604	2302	2309#
T103D4	010610	2303	2311#
T103E	010614	2304	2323#
T103EN	010770	2365	2376#
T103ES	010654	2328	2332#
T103E1	010753	2360	2366#
T103E2	010754	2362	2368#
T103E3	010750	2363	2370#
T103E4	010764	2364	2372#
T104	007550	2064#	3876
T105	007726	2104#	3878
T106	010102	2143#	3880
T107	010256	2182#	3882
T11	002674	1174#	3821
T12	002764	1192#	3823
T13	003054	1210#	3825
T14	003144	1228#	3827
T15	003234	1247#	3829
T16	003322	1265#	3831
T17	003410	1283#	3833
T2	002244	1067#	3807
T20	003476	1301#	3835
T200	010432	2230#	3885
T201	010770	2375#	
T202A	011052	2399	2403#
T202A1	011060	2406	2407#
T202B	011064	2405	2415#
T202B1	011074	2421	2425#
T202B2	011100	2423	2427#
T202C	011104	2419	2434#
T202D	011120	2436#	
T202D1	011164	2460	2465#
T202D2	011170	2461	2467#
T202D3	011174	2462	2469#
T202D4	011200	2463	2471#
T202E	011204	2464	2477#
T202E1	011250	2501	2506#
T202E2	011254	2502	2508#
T202E3	011260	2503	2510#
T202E4	011264	2504	2512#
T202F	011270	2505	2519#
T202F2	011350	2544	2549#
T202F3	011354	2545	2551#
T202F4	011360	2546	2553#
T202F5	011364	2547	2555#
T202G	011370	2548	2562#
T202G1	011434	2585	2590#
T202G2	011440	2586	2592#
T202G3	011444	2587	2594#
T202G4	011450	2588	2596#
T202H	011454	2589	2602#
T202H2	011520	2627	2632#
T202H3	011524	2628	2634#

ADD	924	925	942	953	3047	3097	3119	3309	3355	3415	3557	3558						
ASL	3045	3095	3096	3489	3490	3491												
ASR	963	964	965	966	967													
BFC	883	910	917	938	949	1020	1044	1047	1061	1074	1087	1101	1116	1328	1349			
	1378	1394	1429	1467	1499	1514	1544	1559	1589	1604	1634	1649	1679	1694	1725			
	1740	1771	1786	1814	1822	1867	1913	1965	1980	2004	2019	2043	2058	2082	2097			
	2121	2136	2160	2175	2199	2214	2768	2770	2779	2782	2786	2791	2802	2805	2809			
	2814	2931	2937	2979	2986	2999	3005	3029	3081	3089	3099	3112	3116	3231	3239			
	3243	3251	3341	3422	3424	3456	3458	3480	3488	3503								
	3484																	
	3497																	
	3369																	
	962	974	1059	1072	1085	1099	1114	1129	1145	1161	1176	1194	1212	1230	1249			
	1267	1285	1303	1322	1341	1366	1408	1417	1446	1482	1493	1527	1538	1572	1583			
	1617	1628	1663	1673	1689	1709	1719	1735	1755	1765	1781	1801	1840	1854	1871			
	1885	1900	1917	1933	1949	1959	1988	1998	2027	2037	2066	2076	2106	2115	2131			
	2145	2154	2170	2184	2193	2209	2339	2520	2522	2645	2647	2711	2766	2994	3046			
	3091	3103	3257	3566														
	998	3427	3453	3485														
	1124	1128	1140	1144	1156	1162	1177	1181	1195	1199	1213	1217	1231	1235	1252			
	1254	1270	1272	1288	1290	1306	1308	1346	1368	1369	1375	1391	1415	1416	1422			
	1427	1451	1455	1460	1465	1503	1548	1593	1638	1683	1729	1775	1804	1819	1843			
	1852	1853	1858	1887	1898	1899	1904	1969	2008	2047	2086	2125	2164	2203	2274			
	2435	2437	2478	2563	2603	2780	2783	2788	2792	2803	2806	2811	2815	3330	3563			
	3567	3572																
	3428	3486																
	916	937	948	1056	1060	1069	1073	1082	1086	1095	1100	1111	1115	1386	1412			
	1891	2778	2781	2784	2789	2793	2801	2804	2807	2812	2816	2874	3082	3084	3086			
	3113	3115	3228	3250														
	977																	
	3373	3499																
	3482																	
	908	929																
	903	914	927	931	971	1000	1008	1016	1026	1028	1057	1070	1083	1096	1112			
	1334	1355	1371	1384	1387	1400	1413	1426	1435	1437	1453	1464	1473	1475	1495			
	1505	1511	1520	1540	1550	1556	1565	1585	1595	1601	1610	1630	1640	1646	1655			
	1675	1685	1691	1701	1721	1731	1737	1747	1767	1777	1782	1793	1806	1829	1846			
	1874	1889	1892	1920	1961	1971	1977	2000	2010	2016	2039	2049	2055	2078	2088			
	2094	2117	2127	2133	2156	2166	2172	2195	2205	2211	2236	2397	2795	2818	2875			
	2906	2908	2910	2912	2953	2955	3083	3085	3087	3114	3229	3235	3254	3317	3320			
	3358	3361	3379	3419	3460	3467	3539	3560										
	1856	1902	2334	2703	2828	2993	3053	3066	3417	3450	3465							
	884	912	978	1131	1147	1167	1185	1203	1221	1239	1259	1277	1295	1313	1863			
	1909	2247	2267	2408	2428	2774	2797	2841	3071	3074	3106	3129	3146	3166	3183			
	3200	3219	3371	3426	3429	3462	3470	3492	3523	3575								
	876	877	890	922	983	984	985	994	995	996	1004	1005	1012	1013	1022			
	1023	1125	1141	1157	1165	1175	1184	1193	1202	1211	1220	1229	1238	1248	1251			
	1257	1266	1269	1275	1284	1287	1293	1302	1305	1311	1321	1323	1342	1343	1389			
	1407	1421	1445	1459	1481	1484	1489	1490	1506	1509	1526	1529	1534	1535	1551			
	1554	1571	1574	1579	1580	1596	1599	1616	1619	1624	1625	1641	1644	1662	1665			
	1669	1670	1699	1708	1711	1715	1716	1745	1754	1757	1761	1762	1791	1800	1807			
	1812	1827	1839	1884	1948	1955	1956	1972	1975	1987	1994	1995	2011	2014	2026			
	2033	2034	2050	2053	2065	2072	2073	2089	2092	1987	1994	1995	2011	2014	2026			
	2183	2189	2190	2331	2332	2337	2378	2700	2701	2709	2820	2876	2896	2897	2902			
	2903	2933	2943	2944	2949	2950	2962	3078	3102	3125	3127	3128	3143	3162	3179			
	3226	3232	3326	3343	3344	3367	3451	3461	3477	3564	3571	3581						

CMP	882	885	913	926	976	1019	1025	1327	1348	1377	1393	1428	1466	1494	1498
	1539	1543	1594	1588	1629	1633	1674	1678	1693	1720	1724	1739	1766	1770	1785
	1921	1866	1912	1960	1964	1999	2003	2038	2042	2077	2081	2116	2120	2135	2155
	2159	2174	2194	2198	2213	2235	2396	2767	2769	2930	2978	2985	2998	3004	3230
	3253	3368	3372	3496	3498	3559									
CMPB	999	1007	1015	1027	1425	1463	3340	3418	3421	3423	3455	3457	3459	3478	3481
	3483	3487													
COM	895	3381													
DEC	1333	1354	1370	1383	1399	1434	1436	1452	1472	1474	1504	1519	1549	1564	1594
	1509	1639	1654	1684	1700	1730	1746	1776	1792	1805	1828	1845	1873	1888	1919
	1970	2009	2048	2087	2126	2165	2204	2911	2954	3088	3316	3357	3360	3377	3466
EMT	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834
	835	836	837	838	839	840	841	842	843						
HALT	846	3252	3383	3522	3574										
INC	1332	1353	1382	1398	1420	1433	1458	1471	1518	1563	1608	1653	1698	1744	1790
	1818	1826	1872	1918	2909	2952	3024	3093							
INCB	1510	1555	1600	1645	1690	1736	1782	1976	2015	2054	2093	2132	2171	2210	
IOT	2556														
MP	865	877	940	951	973	989	1006	1014	1024	2380	2748	2822	2914	2916	2939
	2941	3008	3035	3043	3075	3076	3540	1014							
JSR	896	911	2932	2980	2987	3030	3006	3031							
MOV	874	878	879	880	881	886	887	888	889	891	892	894	901	906	918
	919	920	921	939	941	950	952	955	961	968	969	972	979	982	988
	1030	1031	1055	1068	1081	1094	1110	1126	1127	1142	1143	1158	1159	1160	1178
	1179	1180	1196	1197	1198	1214	1215	1216	1232	1233	1234	1250	1253	1268	1271
	1286	1299	1304	1307	1324	1325	1326	1344	1345	1347	1365	1367	1372	1373	1374
	1376	1385	1388	1390	1392	1409	1410	1411	1414	1418	1419	1424	1447	1448	1449
	1450	1454	1456	1457	1462	1483	1485	1486	1487	1488	1491	1496	1507	1508	1512
	1528	1530	1531	1532	1533	1536	1541	1552	1553	1557	1573	1575	1576	1577	1578
	1581	1586	1597	1598	1602	1618	1620	1621	1622	1623	1626	1631	1642	1643	1647
	1664	1666	1667	1668	1671	1676	1686	1687	1688	1692	1692	1692	1692	1692	1692
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DZDMD-B MACY11 27,732) 11-OCT-76 10:58 PAGE 113
 DZDMD.B.SRC CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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