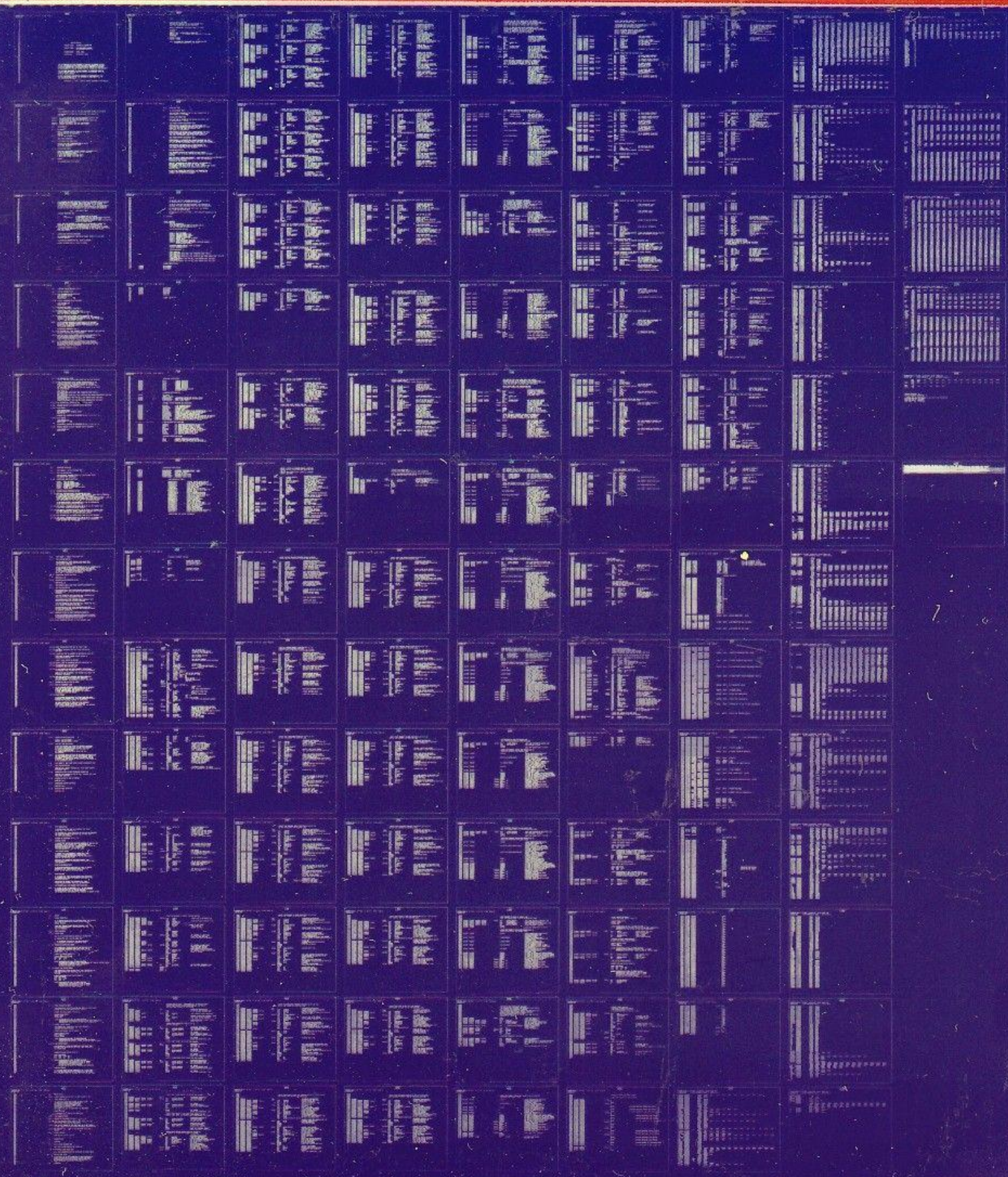


DM11BB

MODEM CONTROL DIAG
MD-11-DZDMD-B

EP-DZDMD-B-DL-A
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MADE IN USA



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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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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 (CNTRL 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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DZDMD8.SRC

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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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100000
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
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15
14
13
12
11
10
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

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

776
777
778
779      000020      BUSY=20      ;LINE SCANNER RUNNING
780      000040      SCNA=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

791
792
793
794      000001      LINENA=1      ;=1, RECOGNIZE TRANSITIONS ON THIS LINE
795      000002      TRMDY=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

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

;REGISTER DEFINITIONS
;LOCATION EQUIVALENCIES
;CONTROL STATUS REGISTER BIT FUNCTIONS
;LINE REGISTER BIT FUNCTIONS
;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-R5, PC+2 OF CALL
826      104006      OCTASC=EMT+X  ;CONVERT DATA TO ASCII AND TYPE
827      104007      RESOS=EMT+X   ;RESTORE RO-R5
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

```

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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
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870

```

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	1\$:	BIT	#3,DMBVEC		;TEST 2 LSB OF ADDRESS
938	001452	001404				BEQ	VECST1		;IF 0, CONTINUE
939	001454	012716	001444			MOV	#1\$, (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	1\$:	BIT	#7,DMBCSR		;IF 3 LSB ARE NOT 0
949	001520	001404				BEQ	REGST1		
950	001522	012716	001512			MOV	#1\$, (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		

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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      INSTR
974 001640 042737 177700 016002  STRTOA: BIC      #177700,TSTNO ;TRY AGAIN
975                                          ;GET NUMBER OF FIRST TEST
976 001646 023737 016002 016036  CMP      TSTNO,TSTMAX      ;TO BE EXECUTED IN SELECTED GROUP
977 001654 003401              BLE      TSTGO            ;IS NUMBER TOO LARGE
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     IS
1027 002120 122737 000007 014504  CMPB    #7,TMP1
1028 002126 001001                BNE     IS
1029 002130 104025                CNTLUU
1030 002132 012737 000001 002152  IS:    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
;SET SCAN ENABLE
BIT #SCNENA, @DMBCSR ;WAS SCAN ENABLE SET
BNE .+4

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
;SET SCAN ENABLE
BIT #BUSY, @DMBCSR ;IS BUSY BIT SET
BNE .+4
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 CCAUSE 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
1170
1171
1172
1173
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
      CLR @DMBCSR
      MOV #INT2A,@DMBVEC
      MOV PS,@DMBLVL
      BIS #INTENA,@DMBCSR
      BIC #340,PS
      NOP
      BR INT2B
INT2A: POP2SP
      ERROR
INT2B: SCOPE

;REFERENCE DESIGNATION
;LOCK OUT INTERRUPTS
;CLEAR CONTROL REGISTER
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;ALLOW INTERRUPTS
;DELAY FOR INTERRUPTS
;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATIONS, LOOP

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

T10:
INT3: BIS #340,PS
      CLR @DMBCSR
      MOV #INT3A,@DMBVEC
      MOV #INTENA,@DMBCSR
      MOV PS,@DMBLVL
      BIC #340,PS
      BIS #DONE,@DMBCSR
      NOP
      NOP
      CLR @DMBCSR
      ERROR
      BR INT3B
INT3A: POP2SP
INT3B: SCOPE

;REFERENCE DESIGNATION
;LOCK OUT INTERRUPTS
;CLEAR CONTROL REGISTER
;SET UP INTERRUPT SERVICE ADDRESS
;SET "INTERRUPT ENABLE"
;SET "INTERRUPT LEVEL"
;ALLOW INTERRUPTS
;SET "DONE"
;DELAY FOR INTERRUPT

;INTERRUPT OCCURED, ERROR
;CONTINUE
;INTERRUPT OCCURED, RESTOR STACK
;CHECK FOR ITERATION, LOOP

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

T11:
INT4: CLR @DMBCSR
      BIC #340,PS
      BIS #340,PS
      MOV #INT4A,@DMBVEC
      MOV PS,@DMBLVL
      MOV #INTENA,@DMBCSR
      BIS #DONE,@DMBCSR
      NOP
      NOP
      CLR @DMBCSR
      BR INT4B
INT4A: POP2SP
      ERROR
INT4B: SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 7.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT

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

```

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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
1207
1208
1209
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.
T12:
INT5: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #300,PS ;SET PROCESSOR PRIORITY
      MOV #INT5A,@DMBVEC ;TO LEVEL 6.
      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 INT5B ;NO INTERRUPT, CONTINUE
INT5A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT5B: SCOPE ;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 5.
T13:
INT6: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #240,PS ;SET PROCESSOR PRIORITY
      MOV #INT6A,@DMBVEC ;TO LEVEL 5.
      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 INT6B ;NO INTERRUPT, CONTINUE
INT6A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT6B: SCOPE ;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 4.
T14:
INT7: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #200,PS ;SET PROCESSOR PRIORITY
      MOV #INT7A,@DMBVEC ;TO LEVEL 4.
      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 INT7B ;NO INTERRUPT, CONTINUE
INT7A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT7B: SCOPE ;CHECK FOR ITERATION, LOOP

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1243
1244
1245
1246
1247 003234
1248 003234 005077 012514
1249 003240 042737 000340 177776
1250 003246 012777 003316 012474
1251 003254 005077 012472
1252 003260 052737 000000 177776
1253 003266 012777 000100 012460
1254 003274 052777 000200 012452
1255 003302 000240
1256 003304 000240
1257 003306 005077 012442
1258 003312 104012
1259 003314 000401
1260 003316 022626
1261 003320 104002
1262
1263
1264
1265 003322
1266 003322 005077 012426
1267 003326 042737 000340 177776
1268 003334 012777 003404 012406
1269 003342 005077 012404
1270 003346 052737 000040 177776
1271 003354 012777 000100 012372
1272 003362 052777 000200 012364
1273 003370 000240
1274 003372 000240
1275 003374 005077 012354
1276 003400 104012
1277 003402 000401
1278 003404 022626
1279 003406 104002
1280
1281
1282
1283 003410
1284 003410 005077 012340
1285 003414 042737 000340 177776
1286 003422 012777 003472 012320
1287 003430 005077 012316
1288 003434 052737 000100 177776
1289 003442 012777 000100 012304
1290 003450 052777 000200 012276
1291 003456 000240
1292 003460 000240
1293 003462 005077 012266
1294 003466 104012
1295 003470 000401
1296 003472 022626
1297 003474 104002
  
```

```

;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
;ENABLE" SET AND "DONE" SET AT PRIORITY 0.
T15:
INT10: CLR      @DMBCSR      ;REFERENCE DESIGNATION
        BIC      @340,PS    ;CLEAR CONTROL REGISTER
        MOV      @INT10A,@DMBVEC ;ALLOW INTERRUPTS
        CLR      @DMBLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      @0,PS      ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      @INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 0.
        BIS      @DONE,@DMBCSR ;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      @DMBCSR      ;REFERENCE DESIGNATION
        BIC      @340,PS    ;CLEAR CONTROL REGISTER
        MOV      @INT11A,@DMBVEC ;ALLOW INTERRUPTS
        CLR      @DMBLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      @40,PS     ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      @INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 1.
        BIS      @DONE,@DMBCSR ;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      @DMBCSR      ;REFERENCE DESIGNATION
        BIC      @340,PS    ;CLEAR CONTROL REGISTER
        MOV      @INT12A,@DMBVEC ;ALLOW INTERRUPTS
        CLR      @DMBLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      @100,PS    ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      @INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 2.
        BIS      @DONE,@DMBCSR ;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
          BIC      #340,PS
          MOV      #INT13A,@DMBVEC
          CLR      @DMBLVL
          BIS      #140,PS
          MOV      #INTENA,@DMBCSR
          BIS      #DONE,@DMBCSR
          NOP
          NOP
          CLR      @DMBCSR
          ERROR
          BR       INT13B
INT13A: POP2SP
INT13B: SCOPE

:VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
:ENABLE" SET AND "DONE" SET AT PRIORITY 3.
:REFERENCE DESIGNATION
:CLEAR CONTROL REGISTER
:ALLOW INTERRUPTS
:SET UP INTERRUPT SERVICE ADDRESS
:SET UP INTERRUPT SERVICE PRIORITY
:SET PROCESSOR PRIORITY TO LEVEL 3.
:SET INTERRUPT ENABLE
:GENERATE INTERRUPT
:WAIT FOR INTERRUPT

:NO INTERRUPT, ERROR
:CONTINUE
:INTERRUPT OCCURED, RESTORE STACK
:CHECK FOR INTERACTIONS, LOOP.

```

```

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

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1357
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1365
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1371
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1373
1374
1375
1376
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1380
1381
1382
1383
1384
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1389
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1392
1393
1394
1395
1396
1397
1398
1399
1400
1401

003720
003720 012777 002000 012026
003726 042737 000340 177776
003734 012700 000020
003740 052777 001017 012006
003746 052777 000400 012000
003754 005300
003756 001373
003760 012700 000020
003764 012705 070000
003770 012777 000017 011756
003776 052777 000400 011750
004004 017704 011744
004010 020504
004012 001403
004014 104000
004016 104003
004020 003720
004022 005205
004024 005300
004026 001363
004030 012777 004000 011716
004036 032777 000020 011710
004044 001374
004046 012700 000020
004052 005005
004054 012777 000017 011672
004062 052777 000400 011664
004070 017704 011660
004074 020504
004076 001403
004100 104000
004102 104003
004104 004030
004106 005205
004110 005300
004112 001363
004114 104002

T23:
MEMT1: MOV #CLRMUX, @DMBCSR
BIC #340, PS
MOV #16, R0
MEMT1A: BIS #MAINT+17, @DMBCSR
BIS #STEP, @DMBCSR
DEC R0
BNE MEMT1A
MOV #16, R0
MOV #70000, R5
MEMT1B: MOV #17, @DMBCSR
BIS #STEP, @DMBCSR
MOV @DMBCSR, R4
CMP R5, R4
BEQ MEMT1C
ERRORC
SCOPEF
MEMT1
MEMT1C: INC R5
DEC R0
BNE MEMT1B
MEMT1D: MOV #CLRSCN, @DMBCSR
BIT #BUSY, @DMBCSR
BNE .-6
MOV #16, R0
CLR R5
MEMT1E: MOV #17, @DMBCSR
BIS #STEP, @DMBCSR
MOV @DMBCSR, R4
CMP R5, R4
BEQ MEMT1F
ERRORC
SCOPEFF
MEMT1D
MEMT1F: INC R5
DEC R0
BNE MEMT1E
SCOPE

;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.

;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LOCATIONS
;SET MAINTENANCE MODE
;SET LINE COUNTER THRU ALL
;STATES, WRITING 1'S INTO
;ALL MEMORY WORDS
;SET UP TO TEST 16 WORDS
;SET UP EXPECTED STATUS REGISTER
;START WITH LINE 0
;ACCESS SCANNER MEMORY
;READ DATA
;COMPARE EXPECTED AND RECEIVED
;DATA
;CONTROL STATUS OR MEMORY ERROR
;CHECK FOR DATA FREEZE
;UPDATE EXPECTED STATUS
;UPDATE LINE COUNT
;CONTINUE
;SET "CLEAR SCAN"
;WAIT FOR "CLEAR CYCLES"
;SET UP TO TEST 16 MEMORY
;LOCATIONS
;FIRST TO BE TESTED=0
;ACCESS SCANNER MEMORY
;READ DATA
;COMPARE EXPECTED AND RECEIVED
;DATA
;CONTROL STATUS OF MEMORY ERROR
;CHECK FOR DATA FREEZE
;UPDATE EXPECTED DATA
;UPDATE LINE COUNT
;CONTINUE
;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      QDMBCSR      ;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,QDMBCSR ;FIRST ADDRESS TO BE TESTED=0
        BIT      #BUSY,QDMBCSR ;CLEAR ACANNER MEMORY
        BNE      .-6        ;WAIT FOR CLEAR CYCLE
        MOV      #MAINT,QDMBCSR ;SET "MAINTENANCE MODE"
        BIS      R2,QDMBCSR  ;SET LINE COUNTER TO TEST ADDRESS-1
        BIS      #STEP,QDMBCSR ;WRITE 1'S INTO TEST ADDRESS
        BIC      #MAINT,QDMBCSR ;CLEAR "MAINTENANCE MODE"
        MOV      #16,R3     ;SET UP TO TEST ALL 16
        MOV      #17,QDMBCSR ;SCANNER MEMORY LOCATIONS
        INC      R2
        CLR      R1
MEMT2B: BIS      #STEP,QDMBCSR  ;ACCESS SCANNER MEMORY
        MOVB     QDMBCSR,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
        BNE     MEMT2B    ;TEST NEXT SCANNER LOCATION
        DEC     R0
        BNE     MEMT2A    ;UPDATE LINE COUNT
        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
  
```

```

1477                                     ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
1478                                     ;BE SET AND CLEARED FOR SELECTED LINE
1479
1480 004444 T26:                                     ;REFERENCE DESIGNATION
1481 004444 005077 011304 MUX1: CLR @DMBCSR ;CLEAR CONTROL STATUS REGISTER
1482 004450 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
1483 004456 012700 000020 MOV #16.,R0 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
1484 004462 005001 CLR R1 ;START AT LINE 0
1485 004464 012777 002000 011262 MUX1A: MOV #CLRMUX,@DMBCSR
1486 004472 012702 000020 MOV #16.,R2
1487 004476 010177 011252 MOV R1,@DMBCSR ;SELECT LINE TO BE TESTED
1488 004502 012777 000001 011246 MUX1A: MOV #LINENA,@DMBLSR ;SET LINE ENABLE FUNCTION FLIP-FLOP
1489 004510 005077 011240 CLR @DMBCSR
1490 004514 005005 MUX1B: CLR R5
1491 004516 017704 011234 MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
1492 004522 117703 011226 MOV @DMBCSR,R3 ;READ CONTROL STATUS REGISTER
1493 004526 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
1494 004532 020103 CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER,
1495 004534 001002 BNE MUX1C ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
1496 004536 012705 000001 MOV #LINENA,R5
1497
1498 MUX1C: CMP R5,R4 ;TO BE SET
1499 004544 001403 BEQ MUX1D ;COMPARE EXPECTED AND RECEIVED
1500 004546 104001 ERRORL ;RESULTS
1501 004550 104003 SCOPEF ;LINE STATUS ERROR
1502 004552 004554 MUX1D
1503 004554 052777 000400 011172 MUX1D: BIS #STEP,@DMBCSR ;EXAMINE NEXT LINE
1504 004562 005302 DEC R2
1505 004564 001353 BNE MUX1B
1506 004566 005005 CLR R5
1507 004570 010177 011160 MUX1E: MOV R1,@DMBCSR
1508 004574 010103 MOV R1,R3 ;SET LINE COUNTER TO SELECTED LINE
1509 004576 005077 011154 CLR @DMBLSR ;CLEAR LINE ENABLE FLIP FLOP
1510 004602 105227 000000 INCB #0 ;DELAY FOR CABLE
1511 004606 001375 BNE .-4 ;DITTO
1512 004610 017704 011142 MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
1513 004614 005704 TST R4 ;WAS LINE ENABLE FUNCTION FLIP FLOP
1514 004616 001401 BEQ MUX1F ;CLEARED
1515 004620 104001 ERRORL ;NO LINE STATUS ERROR
1516 004622 104003 SCOPEF ;CHECK FOR LOOP ON SAME DATA
1517 004624 004464 MUX1A
1518 004626 005201 INC R1 ;SELECT NEXT LINE
1519 004630 005300 DEC R0 ;DECREMENT LINE COUNT
1520 004632 001314 BNE MUX1A ;CONTINU IF NOT DONE
1521 004634 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
    
```


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
  
```

```

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

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
      MOVB @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
MUX6F: MUX6A
      INC R1
      CLR @DMBLSR
      DEC R0
      BNE MUX6A
      SCOPE

;VERIFY THAT RING IS SET IF "LINE ENABLE"
;AND REQUEST TO SEND 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 +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

```

1749										
1750										:VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
1751										:AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
1752										
1753	006004									:REFERENCE DESIGNATION
1754	006004	005077	007744							:CLEAR CONTROL REGISTER
1755	006010	042737	000340	177776						:ENABLE INTERRUPTS
1756	006016	012700	000020							:SET UP TO TEST 16 LINES
1757	006022	005001								:START AT LINE 0
1758	006024	012702	000020							:16 LINES
1759	006030	010177	007720							:SELECT A LINE
1760	006034	012777	000011	007714						:SET LINE ENABLE +SECTX
1761	006042	005077	007706							:CLEAR CONTROL REGISTER
1762	006046	005005								:CLEAR EXPECTED RESULT
1763	006050	017704	007702							:READ LINE STATUS
1764	006054	117703	007674							:READ LINE NUMBER
1765	006060	042703	177760							:CLEAR UNWANTED BITS
1766	006064	020103								:IF RECEIVED LINE=SELECTED LINE
1767	006066	001002								:EXPECT LINE ENABLE AND
1768	006070	012705	000031							
1769										:SECONDARY RECEIVE IS SET
1770	006074	020405								:COMPARE EXPECTED AND
1771	006076	001403								:RECEIVED RESULTS
1772	006100	104001								:LINE STATUS ERROR
1773	006102	104003								
1774	006104	006106								
1775	006106	052777	000400	007640						:UPDATE LINE COUNTER
1776	006114	005302								:CONTINUE IF ALL CHECKS
1777	006116	001353								:ARE NOT DONE FOR THIS LINE
1778	006120	012705	000001							:EXPECT LINE ENABLE
1779	006124	010103								:ON SELECTED LINE
1780	006126	010177	007622							:SELECT LINE
1781	006132	042777	000010	007616						:CLEAR SECONDARY TRANSMIT
1782	006140	105227	000000							:DELAY FOR CABLE
1783	006144	001575								:DITTO
1784	006146	017704	007604							:READ LINE STATUS REGISTER
1785	006152	020504								:ONLY LINE ENABLE SHOULD BE
1786	006154	001401								:SET ON THIS LINE
1787	006156	104001								:LINE STATUS ERROR
1788	006160	104003								:CHECK FOR LOOP ON SAME DATA
1789	006162	006024								
1790	006164	005201								:UPDATE LINE NUMBER
1791	006166	005077	007564							:CLEAR LINE STATUS REGISTER
1792	006172	005300								:CONTINUE IF ALL LINES NOT
1793	006174	001313								:TESTED
1794	006176	104002								:CHECK FOR ITERATIONS, LOOP

```

1795
1796
1797
1798
1799 006200
1800 006200 005077 007550
1801 006204 042737 000340 177776
1802 006212 012700 000020
1803 006216 012777 000017 007532
1804 006224 052777 000400 007522
1805 006232 005300
1806 006234 001370
1807 006236 005003
1808 006240 012700 000020
1809 006244 012777 002000 007502
1810 006252 010377 007476
1811 006256 017704 007474
1812 006262 005005
1813 006264 005704
1814 006266 001403
1815 006270 104001
1816 006272 104003
1817 006274 006244
1818 006276 005205
1819 006300 052777 000001 007450
1820 006306 017704 007444
1821 006312 020504
1822 006314 001403
1823 006316 104001
1824 006320 104003
1825 006322 006244
1826 006324 005203
1827 006326 005077 007424
1828 006332 005300
1829 006334 001346
1830 006336 104002

;VERIFY THAT "CLEAR MULTIPLXER" CLEARS ALL MULTIPLEXER
;FUNCTION FLIP-FLOPS

T35:
MUXB: CLR @DMBCSR
      BIC #340,PS
      MOV #16,R0
MUXBA: MOV #17,@DMBLSR
      BIS #STEP,@DMBCSR
      DEC R0
      BNE MUXBA
      CLR R3
      MOV #16,R0
MUXBB: MOV #CLRMUX,@DMBCSR
MUXBC: MOV R3,@DMBCSR
      MOV @DMBLSR,R4
      CLR R5
      TST R4
      BEQ MUXBD
      ERRORL SCOPEF
      MUXBB
MUXBD: INC R5
      BIS #LINENA,@DMBLSR
      MOV @DMBLSR,R4
      CMP R5,R4
      BEQ MUXBE
      ERRORL SCOPEF
      MUXBB
MUXBE: INC R3
      CLR @DMBLSR
      DEC R0
      BNE MUXBC
      SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LINES
;WRITE 15 INTO ALL MULTIPLEXER
;FUNCTION FLIPFLOPS

;SET UP FOR 16 LINES

;CLEAR MULTIPLEXER
;SELECT LINE
;READ LINE STATUS REGISTER
;EXPECT 05
;WAS LINE STATUS REGISTER CLEARED

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

;EXPECT LINE ENABLE
;SET LINE ENABLE ON SELECTED LINE
;READ LINE STATUS REGISTER
;IS ANYTHING BUT LINE ENABLE SET

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

;UPDATE LINE NUMBER
;CLEAR CURRENT LINE
;CONTINUE IF ALL LINES NOT
;TESTED
;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
        BIS #STEP, @DMBCSR ;ALL SCANNER MEMORY LOCATION
        MOV #LINEA, @DMBLSR ;WRITE A LOCATION
        DEC RO ;LET "LINE ENABLE"
        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
        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

SCNT1A:
SCNT1B:
SCNT1C: 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
1878
1879
1880
1881 006554
1882 006554 012700 000020
1883 006560 012777 002000 007166
1884 006566 005077 007162
1885 006572 042737 000340 177776
1886 006600 012777 000017 007150
1887 006606 052777 000400 007140
1888 006614 005300
1889 006616 001370
1890 006620 012777 004000 007126
1891 006626 032777 000020 007120
1892 006634 001374
1893 006636 012700 000020
1894 006642 012705 170340
1895 006646 012777 006742 007074
1896 006654 0.3777 177776 007070
1897 006662 012777 000117 007064
1898 006670 052737 000340 177776
1899 006676 052777 000040 007050
1900 006704 042737 000340 177776
1901 006712 105777 007036
1902 006716 100375
1903
1904 006720 052737 000340 177776
1905 006726 017704 007022
1906 006732 104000
1907 006734 104003
1908 006736 006554
1909 006740 000410
1910 006742 022076
1911 006744 017704 007004
1912 006750 020504
1913 006752 001403
1914 006754 104000
1915 006756 104003
1916 006760 006554
1917 006762 042777 000240 006764
1918 006770 005205
1919 006772 005300
1920 006774 001335
1921 006776 104002

;WRITE 1'S INTO ALL MULTIPLEXER FUNCTION FLIP-FLOPS
;CLEAR SCANNER MEMORY
;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE

T37:
SCNT2: MOV #16,R0
MOV #CLRMUX,DMBCSR
CLR DMBCSR
BIC #340,PS
SCNT2A: MOV #17,DMBLSR
BIS #STEP,DMBCSR
DEC R0
BNE SCNT2A
MOV #CLRSCN,DMBCSR
BIT #BUSY,DMBCSR
BNE -.6
MOV #16,R0
MOV #170340,R5
MOV #SCNT2C,DMBVEC
MOV PS,DMBLVL
SCNT2B: MOV #INTENA+17,DMBCSR
BIS #340,PS
BIS #SCNENA,DMBCSR
BIC #340,PS
TSTB DMBCSR
BPL .-4
BIS #340,PS
MOV DMBCSR,R4
ERRORC
SCOPEF
SCNT2
BR SCNT2D
SCNT2C: POP2SP
MOV DMBCSR,R4
CMP R5,R4
BEQ SCNT2D
ERRORC
SCOPEF
SCNT2
SCNT2D: BIC #SCNENA+DONE,DMBCSR
INC R5
DEC R0
BNE SCNT2B
SCOPE

;REFERENCE DESIGNATION
;WRITE 1S INTO ALL
;CLEAR MULTIPLEXER
;MULTIPLEXER FUNCTION
;ENABLE TELETYPE INTERRUPTS
;FLIPFLOPS

;CLEAR SCANNER MEMORY
;WAIT FOR CLEAR CYCLE TO COMPLETE

;SET UP TO TEST 16 LINES
;FIRST EXPECTED RESULT
;SET UP LOCAL INTERRUPT RETURN

;SET INTERRUPT ENABLE
;LOCK OUT INTERRUPTS
;START SCANNER
;ENABLE INTERRUPTS
;WAIT FOR DONE
;PROGRAM WILL HANG HERE
;IF DONE NEVER SETS
;LOCK OUT INTERRUPTS
;READ CONTROL STATUS
;INTERRUPT DID NOT OCCUR
;CHECK FOR LOOP ON CURRENT DATA

;CONTINUE
;INTERRUPT OCCURED, RESTORE STACK
;READ CONTROL STATUS REGISTER
;COMPARE TO EXPECTED RESULT

;CONTROL STATUS ERROR
;CHECK FOR LOOP ON CURRENT DATA

;CLEAR SCAN ENABLE AND DONE
;UPDATE EXPECTED RESULT
;CONTINUE IF ALL
;LINES NOT TESTED
;CHECK FOR ITERATIONS, LOOP

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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
  
```

H04

DZDMD-B MACY11 27(732) 11-OCT-76 10:59 PAGE 47
 DZDMD8.SRC

1943						
1944						;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
1945						;BE SET AND CLEARED FOR SELECTED LINE
1946						
1947	007036				T101:	;REFERENCE DESIGNATION
1948	007036	005077	006712		MUX11:	CLR @DMBCSR
1949	007042	042737	000340	177776		;CLEAR CONTROL STATUS REGISTER
1950	007050	013701	016042			;ENABLE INTERRUPTS
1951	007054	012777	002000	006672	MUX11A:	MOV #CLRMUX,@DMBCSR
1952	007062	012702	000020			
1953	007066	010177	006662			;SELECT LINE TO BE TESTED
1954	007072	012777	000001	006656		;SET LINE ENABLE FUNCTION FLIP-FLOP
1955	007100	005077	006650			
1956	007104	005005			MUX11B:	CLR R5
1957	007106	017704	006644			;READ LINE STATUS REGISTER
1958	007112	117703	006636			;READ CONTROL STATUS REGISTER
1959	007116	042703	177760			;CLEAR UNWANTED BITS
1960	007122	020103				;IF LINE NUMBER=SELECTED LINE NUMBER,
1961	007124	001002				;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
1962	007126	012705	000001			
1963						;TO BE SET
1964	007132	020504			MUX11C:	COMPAR
1965	007134	001403				EXPECTED AND RECEIVED
1966	007136	104001				RESULTS
1967	007140	104003				;LINE STATUS ERROR
1968	007142	007144				
1969	007144	052777	000400	006602	MUX11D:	BIS #STEP,@DMBCSR
1970	007152	005302				;EXAMINE NEXT LINE
1971	007154	001353				
1972	007156	005005				
1973	007160	010177	006570		MUX11E:	MOV R1,@DMBCSR
1974	007164	010103				;SET LINE COUNTER TO SELECTED LINE
1975	007166	005077	006564			;CLEAR LINE ENABLE FLIP FLOP
1976	007172	105227	000000			;DELAY FOR CABLE
1977	007176	001375				;DITTO
1978	007200	017704	006552			;READ LINE STATUS REGISTER
1979	007204	005704				;WAS LINE ENABLE FUNCTION FLIP FLOP
1980	007206	001401				;CLEARED
1981	007210	104001				;NO, LINE STATUS ERROR
1982	007212	104002			MUX11F:	SCOPE
						;CHECK FOR ITERATIONS, LOOP


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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
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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 MUX15E ;ARE NOT DONE FOR THIS LINE
MUX15E: 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 MUX15F ;SET ON THIS LINE
      ERRORL ;LINE STATUS ERROR
MUX15F: SCOPE ;CHECK FOR ITERATIONS, LOOP
  
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2139
2140 ;VERIFY THAT RING IS SET IF "LINE ENABLE"
2141 ;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.
2142
2143 T106: ;REFERENCE DESIGNATION
2144 MUX16: CLR @DMBCSR ;CLEAR CONTROL REGISTER
2145 010102 005077 005646 177776 BIC #340,PS ;ENABLE INTERRUPTS
2146 010106 042737 000340 MOV LINE,R1
2147 010114 013701 016042 MUX16A: MOV #16,R2 ;16 LINES
2148 010120 012702 000020 MOV R1,@DMBCSR ;SELECT A LINE
2149 010124 010177 005624 MOV #LINENA+RS,@DMBLSR ;SET LINE ENABLE +RS
2150 010130 012777 000005 005620 CLR @DMBCSR ;CLEAR CONTROL REGISTER
2151 010136 005077 005612 MUX16B: CLR R5 ;CLEAR EXPECTED RESULT
2152 010142 005005 MOV @DMBLSR,R4 ;READ LINE STATUS
2153 010144 017704 005606 MOV @DMBCSR,R3 ;READ LINE NUMBER
2154 010150 117703 005600 BIC #177760,R3 ;CLEAR UNWANTED BITS
2155 010154 042703 177760 CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
2156 010160 020103 BNE MUX16C ;EXPECT LINE ENABLE AND
2157 010162 001002 MOV #LINENA+RS+RING,R5
2158 010164 012705 000205 MUX16C: CMP R4,R5 ;RING IS SET
2159 010170 020405 BEQ MUX16D ;COMPARE EXPECTED AND
2160 010172 001403 ERRORL ;RECEIVED RESULTS
2161 010174 104071 SCOPEF ;LINE STATUS ERROR
2162 010176 104003 MUX16D
2163 010200 010202 MUX16D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
2164 010202 052777 000400 005544 DEC R2 ;CONTINUE IF ALL CHECKS
2165 010210 005302 BNE MUX16B ;ARE NOT DONE FOR THIS LINE
2166 010212 001353 MOV #LINENA,R5 ;EXPECT LINE ENABLE
2167 010214 012705 000001 MUX16E: MOV R1,R3 ;ON SELECTED LINE
2168 010220 010103 MOV R1,@DMBCSR ;SELECT LINE
2169 010222 010177 005526 BIC #RS,@DMBLSR ;CLEAR REQUEST TO SEND
2170 010226 042777 000004 005522 INCB #0 ;DELAY FOR CABLE
2171 010234 105227 000000 BNE .-4 ;DITTO
2172 010240 001375 MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
2173 010242 017704 005510 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
2174 010246 020504 BEQ MUX16F ;SET ON THIS LINE
2175 010250 001401 ERRORL ;LINE STATUS ERROR
2176 010252 104001 MUX16F: SCOPE ;CHECK FOR ITERATIONS, LOOP
2177 010254 104002

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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 CLR @DMBCSR ;CLEAR CONTROL REGISTER
2190 010316 005005 MUX17B: 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

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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		;SET LINE COUNTER TO
2273									;ANSWER LINE NUMBER
2274	010536	052777	000002	005212		BIS	#TRMRDY,DMBLSR		;SET TERMINAL READY ON
2275									;SELECTED ANSWER LINE
2276	010544	104026				CKINTT			
2277	010546	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2278									
2279									
2280									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2281									;SELECTED ORIGINATE AND ANSWER LINES
2282	010550	104023				CKTRAN			;CHECK TRANSITIONS AND
2283									STATUS ON SELECTED
2284									ANSWER AND ORIGINATE LINES
2285	010552	000143				CO+CS+LINENA+TRMPDY			EXPECT CARRIER, CLEAR TO SEND,
2286									LINE ENABLE AND TERMINAL
2287									READY STATUS BITS SET ON
2288									ANSWER LINE
2289	010554	000143				CO+CS+LINENA+TRMRDY			EXPECT CARRIER, CLEAR TO SEND,
2290									LINE ENABLE AND TERMINAL
2291									READY STATUS BITS ON
2292									ORIGINATE LINE
2293	010556	100006				RINGF+XCO+XCS			EXPECT CARRIER, CLEAR TO SEND
2294									AND POSSIBLE RING TRANSITIONS
2295									ON ANSWER LINE
2296	010560	000006				XCO+XCS			EXPECT CARRIER AND CLEAR
2297									TO SEND TRANSITIONS ON
2298									ORIGINATE LINE
2299	010562	010574				T10301			GO HERE ON ANSWER LINE STATUS ERROR
2300									
2301	010564	010600				T10302			GO HERE ON ORIGINATE LINE STATUS ERROR
2302	010566	010604				T10303			GO HERE ON ANSWER LINE TRANSITION ERROR
2303	010570	010610				T10304			GO HERE ON ORIGINATE LINE TRANSITION ER
2304	010572	010614				T103E			GO TO NEXT TEST IF NO ERRORS
2305	010574	104015				T10301: ERRORS			ANSWER LINE STATUS ERROR
2306	010576	000207				RTS	PC		CONTINUE CHECKING
2307	010600	104015				T10302: ERRORS			ORIGINATE LINE STATUS ERROR
2308	010602	000207				RTS	PC		CONTINUE CHECKING
2309	010604	104014				T10303: ERROR			ANSWER LINE TRANSITION ERROR
2310	010606	000207				RTS	PC		CONTINUE CHECKING
2311	010610	104014				T10304: ERROR			ORIGINATE LINE TRANSITION ERROR
2312	010612	000207				RTS	PC		CONTINUE CHECKING

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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 SWO1=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 SWO1=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

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2346 010724 104023 CKTRAN ;CHECK TRANSITIONS AND
2347 ;STATUS ON SELECTED
2348 010726 000003 LINENA+TRMRDY ;ANSWER AND ORIGINATE LINES
2349 ;EXPECT LINE ENABLE AND
2350 ;TERMINAL READY STATUS BITS
2351 010730 000001 LINENA ;SET ON ANSWER LINE
2352 ;EXPECT LINE ENABLE STATUS BIT
2353 010732 000006 XCO+XCS ;SET ON ORIGINATE LINE
2354 ;EXPECT CARRIER AND CLEAR
2355 ;TO SEND TRANSITIONS ON
2356 010734 000006 XCO+XCS ;ANSWER LINE
2357 ;EXPECT CARRIER AND CLEAR
2358 ;TO SEND TRANSITIONS ON
2359 010736 010750 T103E1 ;ORIGINATE LINE
2360 ;GO HERE ON ANSWER LINE STATUS ERROR
2361
2362 010740 010754 T103E2 ;GO HERE ON ORIGINATE LINE STATUS ERROR
2363 010742 010760 T103E3 ;GO HERE ON ANSWER LINE TRANSITION ERROR
2364 010744 010764 T103E4 ;GO HERE ON ORIGINATE LINE TRANSITION ER
2365 010746 010770 T103EN ;GO TO NEXT TEST IF NO ERRORS
2366 010750 104015 T103E1: ERRORS ;ANSWER LINE STATUS ERROR
2367 010752 000207 RTS PC ;CONTINUE CHECKING
2368 010754 104015 T103E2: ERRORS ;ORIGINATE LINE STATUS ERROR
2369 010756 000207 RTS PC ;CONTINUE CHECKING
2370 010760 104014 T103E3: ERRORT ;ANSWER LINE TRANSITION ERROR
2371 010762 000207 RTS PC ;CONTINUE CHECKING
2372 010764 104014 T103E4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2373 010766 000207 RTS PC ;CONTINUE CHECKING
2374
2375 010770 T201: ;REFERENCE DESIGNATION
2376 010770 104004 T103EN: TYPE ;TYPE " 103A TEST COMPLETE"
2377 010772 016465 MT103A
2378 010774 005037 016002 CLR TSTNO ;CLEAR TEST NUMBER FOR LOOPING
2379 011000 104026 010474 CKINTT
2380 011002 000137 JMP ST103B ;SELECT NEW LINE NUMBERS AND
2381 ;RESTART TEST

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 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

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011104 013777 016046 004642
011112 052777 000002 004636
011120 013777 016044 004626
011126 052777 000004 004622
011134 104026
011136 104022

011140 104023

011142 000103

011144 000147

011146 100004

011150 000006

011152 011164
011154 011170
011156 011174
011160 011200
011162 011204
011164 104015
011166 000207
011170 104015
011172 000207
011174 104014
011176 000207
011200 104014
011202 000207

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

T2020: MOV LINANS, @DMBCSR ;SET LINE COUNTER TO ANSWER LINE
        BIS #TRMRDY, @DMBLSR ;SET TERMINAL READY ON ANSWER LINE
T2020: MOV LINORG, @DMBCSR ;SET LINE COUNTER TO ORIGINATE LINE
        BIS #RS, @DMBLSR ;SET REQUEST TO SEND ON ORIGINATE LINE
        CKINTT
        WAITRN ;WAIT FOR TRANSITIONS TO OCCUR

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

CKTRAN ;CHECK TRANSITIONS AND STATUS
        ;ON SELECTED ANSWER AND
        ;ORIGINATE LINES
        CO+LINENA+TRMRDY ;EXPECT CARRIER, LINE ENABLE
        ;AND TERMINAL READY STATUS
        ;BITS SET ON ANSWER LINE
        RS+CO+CS+LINENA+TRMRDY ;EXPECT REQUEST TO SEND, CLEAR
        ;TO SEND, CARRIER, LINE ENABLE
        ;AND TERMINAL READY STATUS BITS
        ;SET ON ORIGINATE LINE
        RINGF+XCO ;EXPECT CARRIER AND POSSIBLE
        ;RING TRANSITIONS ON
        ;ANSWER LINE
        XCO+XCS ;EXPECT CARRIER AND CLEAR
        ;TO SEND TRANSITIONS ON
        ;ORIGINATE LINE
        T20201 ;GO HERE ON ANSWER LINE STATUS ERROR
        T20202 ;GO HERE ON ORIGINATE LINE STATUS ERROR
        T20203 ;GO HERE ON ANSWER LINE STATUS ERROR
        T20204 ;GO HERE ON ORIGINATE LINE TRANSITION ER
        T202E ;GO TO NEXT TEST IF NO ERRORS
T20201: ERRORS ;ANSWER LINE STATUS ERROR
        RTS PC ;CONTINUE CHECKING
T20202: ERRORS ;ORIGINATE LINE STATUS ERROR
        RTS PC ;CONTINUE CHECKING
T20203: ERRORT ;ANSWER LINE TRANSITION ERROR
        RTS PC ;CONTINUE CHECKING
T20204: ERRORT ;ORIGINATE LINE TRANSITION ERROR
        RTS PC ;CONTINUE CHECKING

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H05

2473					;SET SECONDARY TRANSMIT ON ANSWER LINE ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES	
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 ;SELECTED ORIGINATE AND ANSWER LINES
2483						
2484	011224	104023				CKTRAN ;CHECK TRANSITIONS AND STATUS ;ON SELECTED ANSWER AND ;ORIGINATE LINES
2485						;EXPECT SECONDARY TRANSMIT ;SECONDARY RECEIVE, CARRIER ;LINE ENABLE AND TERMINAL READY ;STATUS BITS SET ON ANSWER LINE
2486						;EXPECT SECONDARY RECEIVE ;REQUEST TO SEND, CLEAR TO SEND ;CARRIER, LINE ENABLE AND ;TERMINAL READY STATUS BITS
2487						;SET ON ORIGINATE LINE ;EXPECT SECONDARY RECEIVE ;TRANSITION ON ANSWER LINE
2488	011226	000133				SECTX+CO+LINENA+TRMRDY+SECRX
2489						;EXPECT SECONDARY RECEIVE ;TRANSITION ON ORIGINATE LINE
2490						;GO HERE ON ANSWER LINE STATUS ERROR ;GO HERE ON ORIGINATE LINE STATUS ERROR
2491						;GO HERE ON ANSWER LINE TRANSITION ERROR ;GO HERE ON ORIGINATE LINE TRANSITION ER
2492	011230	000167				SECRX+RS+CO+CS+LINENA+TRMRDY
2493						;GO TO NEXT TEST IF NO ERRORS ;ANSWER LINE STATUS ERROR
2494						;CONTINUE CHECKING
2495						;ORIGINATE LINE STATUS ERROR ;CONTINUE CHECKING
2496						;ANSWER LINE TRANSITION ERROR ;CONTINUE CHECKING
2497	011232	000001				XSCRX
2498						;ORIGINATE LINE TRANSITION ERROR ;CONTINUE CHECKING
2499	011234	000001				XSCRX
2500						;CONTINUE CHECKING
2501	011236	011250				T202E1
2502	011240	011254				T202E2
2503	011242	011260				T202E3
2504	011244	011264				T202E4
2505	011246	011270				T202F
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:	ERROR		;ORIGINATE LINE TRANSITION ERROR
2513	011266	000207		RTS	PC	;CONTINUE CHECKING

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								;SET REQUEST TO SEND ON ANSWER LINE
2560								;WAIT FOR TRANSITIONS ON SELECTED LINES
2561								
2562	011370	013777	016046	004356	T202G:	MOV	LINANS, @DMBCSR	;SET LINE COUNTER TO ANSWER LINE
2563	011376	052777	000004	004352		BIS	*RS, @DMBLSR	;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
2699
2700 011674 005037 177776
2701 011700 005077 004056
2702 011704 105777 004050
2703 011710 100375
2704 011712 005777 004044
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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

;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

T202JS: CLR PS
1$: CLR @TKDDBR
TSTB @TKCSR
BPL 1$
TST @TKDDBR

;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
2718
2719 011752 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
2720 ;ON SELECTED ASNWER AND
2721 ;ORIGINATE LINES
2722 011754 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
2723 ;TERMINAL READY STATUS BITS
2724 ;SET ON ANSWER LINE
2725 011756 000001 LINENA ;EXPECT LINE ENABLE STATUS
2726 ;BIT SET ON ORIGINATE LINE
2727 011760 000000 0 ;EXPECT NO TRANSITIONS ON
2728 ;ANSWER LINE
2729 011762 000000 0 ;EXPECT NO TRANSITIONS ON
2730 ;ORIGINATE LINE
2731 011764 011776 T202J1 ;GO HERE IF ANSWER LINE STATUS ERROR
2732 011766 012002 T202J2 ;GO HERE IF ORIGINATE LINE STATUS ERROR
2733 011770 012006 T202J3 ;GO HERE IF ANSWER LINE TRANSITION ERROR
2734 011772 012012 T202J4 ;GO HERE IF ORIGINATE LINE TRANSITIONS E
2735 011774 012016 T202JN ;GO TO END OF TEST IF NO ERRORS
2736 011776 104015 T202J1: ERRORS ;ANSWER LINE STATUS ERROR0
2737 012000 000207 RTS PC ;CONTINUE CHECKING
2738 012002 104015 T202J2: ERRORS ;ORIGINATE LINE STATUS ERROR
2739 012004 000207 RTS PC ;CONTINUE CHECKING
2740 012006 104014 T202J3: ERRORT ;ANSWER LINE TRANSITION ERROR
2741 012010 000207 RTS PC ;CONTINUE CHECKING
2742 012012 104014 T202J4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2743 012014 000207 RTS PC ;CONTINUE CHECKING
2744
2745 012016 104004 T202JN: TYPE ;TYPE "202C TEST COMPLETE"
2746 012020 016514 MT202A
2747 012022 104026 CKINTT
2748 012024 000137 011050 JMP ST202B ;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

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; 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    2MBLSR,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
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 BEQ ANSTR3 ;CAUSED INTERRUPT
2809 012220 001403 ;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 ANSTR: BNE TRANEX
2819 012252 104016 ANSTR: ERRORN
2820 012254 005037 016002 FATEX: CLR TSTNO
2821 012260 022626 POP2SP
2822 012262 000177 JMP JFATRET
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 DMBCSR,DATA2
2837 012324 104004 TYPE
2838 012326 017125 MTRNDT
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
2849
2850 012350 000005          GETLIN: RESET
2851 012352 104013          INSTRG          ;TYPE "ORIGINATE LINE-"
2852 012354 016422          MSELOR         ;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	016046		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, @DMBVEC
2946	012754	012737	012774	016062		MOV	#WAITRR, RNGRET
2947							;SET UP FOR RETURN
2948	012762	012777	000140	002764		MOV	#SCNENA+INTENA, @DMBCSR
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	@DMBCSR
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, @DMBCSR
2976	013120	017704	002632			MOV	@DMBLSR, 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, @ERR1
2981	013140	013777	016044	002606	CKTRN1:	MOV	LINORG, @DMBCSR
2982	013146	017704	002604			MOV	@DMBLSR, 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, @ERR2

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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   @TKCSR
        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
   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
   RTI ;RETURN TO CURRENT TEST
LOOPX: INC TSTNO ;UPDATE TEST NUMBER
TSTENT: MOV TSTNO,R5 ;GET TEST NUMBER
        ASL R5 ;MULTIPLY TEST NUMBER BY 4
        ASL R5
        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
        RTI ;GO TO TEST
LOOPL: 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 ;AAAAA BBB
3174
3175 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3176 ; AAAAA=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 ERGEN ;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 ;AAAAA BBBB
3191
3192 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3193 ; AAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
3194 ; BBBB=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 ERGEN ;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 ERGEN
  
```

```

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 CNTRLUU
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
  
```

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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 014660 MOV #10,RADIX
3311 014336 012704 017303 MOV #MBCD+2,R4 ;SET UP POINTER FOR CONVERTED DATA
3312 014342 012537 016030 MOV (R5)+,WADCNT ;GET NUMBER OF WORDS TO BE CONVERTED
3313 014346 012537 016032 OCTASI: MOV (R5)+,CHRCNT ;GET NUMBER OF DIGITS IN WORD
3314 014352 013537 014654 MOV #2(R5)+,BINWRD ;GET DATA TO BE CONVERTED
3315 014356 104010 CONVERT ;CONVERT TO ASCII
3316 014360 005337 016030 DEC WADCNT ;IF ALL DATA IS NOT CONVERTED
3317 014364 001370 BNE OCTASI ;CONTINUE
3318 014366 112714 000100 MOVB #100,(R4) ;PUT TERMINATOR AT END OF MESSAGE
3319 014372 005737 014510 TST SMLN
3320 014376 001002 BNE IS
3321 014400 104004 TYPE ;OUTPUT CONVERTED DATA
3322 014402 017301 MBCD ;TO TELETYPE
3323 014404 000002 IS: RTI ;RETURN TO CALLING ROUTINE
3324
3325
3326 014406 005037 014504 CNTLU: CLR TMP1
3327 014412 012737 000001 014506 MOV #1,TMP2
3328 014420 104004 TYPE
3329 014422 017257 $SWREQ
3330 014424 052737 000001 014510 BIS #1,SMLN
3331 014432 104006 OCTASC
3332 014434 014312 SWRTB
3333 014436 104004 TYPE
3334 014440 017303 MBCD+2
3335 014442 104013 INSTPG
3336 014444 017267 $NEWS
3337 014446 000000 0
3338 014450 177777 177777
3339 014452 014504 TMP1
3340 014454 123727 015324 000015 CMPB INBUF,#15
3341 014462 001403 BEQ IS
3342 014464 013777 014504 001276 MOV TMP1,2SWR
3343 014472 005037 014506 IS: CLR TMP2
3344 014476 005037 014510 CLR SMLN
3345 014502 000002 RTI
3346 014504 000000 TMP1: 0
3347 014506 000000 TMP2: 0
3348 014510 000000 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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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
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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 TYPER1
      RTI ;CHARACTER IS TERMINATOR, EXIT
TYPER1: CMPB #42,(R5) ;IF CHARACTER=42,
      BEQ TYPECL ;TYPE LINE FEED
      CMPB #45,(R5) ;IF CHARACTER=45,
      BEQ TYPECL ;TYPE CARRIAGE RETURN
TYPER2: 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 TYPER2 ;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)+,DTPDR  ;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 #TSTTBO,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							

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3600

015750 000300
015752 000302
015754 170500
015756 170502
015760 177560
015762 177562
015764 177564
015766 177566
015770 177570
015772 177570

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

3601
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015774 000000
015776 000000
016000 000000
016002 000000
016004 000000
016006 000000
016010 000000
016012 000000
016014 000000
016016 000000
016020 000000
016022 000000
016024 000000
016026 000000
016030 000000
016032 000000
016034 017534
016036 000000
016040 000000
016042 000000
016044 000000
016046 000000
016050 000000
016052 000000
016054 000000
016056 000000
016060 000000
016062 000000

;PROGRAM VARIABLES
ERRFLG: 0
TRACON: 0
PASCNT: 0
TSTNO: 0
RETURN: 0
ICOUNT: 0
SAVR0: 0
SAVR1: 0
SAVR2: 0
SAVR3: 0
SAVR4: 0
SAVR5: 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

3633
3634
3635
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3640
3641
3642
3643

016064 052123 052101 051525
016072 042440 051122 051117
016100 021045 054105 020120
016106 020040 051040 041505
016114 100
016115 114 047111 020105
016122 051105 047522 022522
016130 042442 050130 051040
016136 041505 046040 047111
016144 020105 042523 040114
016152 044514 042516 042440

MSTATE: .ASCII ;STATUS ERROR%*EXP REC0;
MLINER: .ASCII ;LINE ERROR%*EXP REC LINE SEL0;
MLINE1: .ASCII ;LINE ERROR%*EXP REC LINE0;

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	

MTITLE: .ASCII ;%*"DZDMD-B -----DM11-BB DIAGNOSTIC-----%"@;

MVECTOR: .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 ;tC@;

MCONTV: .ASCII ;tV@;

MCONTL: .ASCII ;tL@;

\$SWREQ: .ASCII ;%*"SWR= @;

\$NEWS: .ASCII ; NEW= @;

MBCD: .ASCII ;%*";

3756 017403
 3757 017404
 3758 017404 040007
 3759 017406 000000
 3760 017420
 3761 000000
 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
 TYPFR
 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

```


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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#	
MPM	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#		

		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		
		3463	3476*	3478	3481	3483	3485*	3465	3487	3517	3529*					
RS	=%000005	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							

DZDMD-B MACY11 27(732) 11-OCT-76 10:58 PAGE 104
 DZDMD.B.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

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#	
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T202D4	011200	2463	2471#
T202E	011204	2464	2477#
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T202E2	011254	2502	2508#
T202E3	011260	2503	2510#
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T202F	011270	2505	2519#
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T202G2	011440	2586	2592#
T202G3	011444	2587	2594#
T202G4	011450	2588	2596#
T202H	011454	2589	2602#
T202H2	011520	2627	2632#
T202H3	011524	2628	2634#

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CROSS REFERENCE TABLE - - - - -

COMMENT	756	870	1040	1171	1244	1923	1931	2230	2391	3805	3870				
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CONF	835	836	837	838	839	840	841	842	843	870					
CONF	1025	1194	1180	1280	1298										
CONF	1026	1195	1181	1281	1299	1944	1983	2022	2061						
CONF	1027	1196	1182	1282	1300	2139	2178								
CONF	1028	1197	1183	1283	1301										
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CONF	1030	1199	1185	1285	1303	3814	3816	3818	3820	3822	3824	3826	3828	3830	3832
CONF	1031	1200	1186	1286	1304	3815	3817	3819	3821	3823	3825	3827	3829	3831	3833
CONF	1032	1201	1187	1287	1305	3816	3818	3820	3822	3824	3826	3828	3830	3832	3834
CONF	1033	1202	1188	1288	1306	3817	3819	3821	3823	3825	3827	3829	3831	3833	3835
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CONF	1036	1205	1191	1291	1309	3820	3822	3824	3826	3828	3830	3832	3834	3836	3838
CONF	1037	1206	1192	1292	1310	3821	3823	3825	3827	3829	3831	3833	3835	3837	3839
CONF	1038	1207	1193	1293	1311	3822	3824	3826	3828	3830	3832	3834	3836	3838	3840
CONF	1039	1208	1194	1294	1312	3823	3825	3827	3829	3831	3833	3835	3837	3839	3841
CONF	1040	1209	1195	1295	1313	3824	3826	3828	3830	3832	3834	3836	3838	3840	3842
CONF	1041	1210	1196	1296	1314	3825	3827	3829	3831	3833	3835	3837	3839	3841	3843
CONF	1042	1211	1197	1297	1315	3826	3828	3830	3832	3834	3836	3838	3840	3842	3844
CONF	1043	1212	1198	1298	1316	3827	3829	3831	3833	3835	3837	3839	3841	3843	3845
CONF	1044	1213	1199	1299	1317	3828	3830	3832	3834	3836	3838	3840	3842	3844	3846
CONF	1045	1214	1200	1300	1318	3829	3831	3833	3835	3837	3839	3841	3843	3845	3847
CONF	1046	1215	1201	1301	1319	3830	3832	3834	3836	3838	3840	3842	3844	3846	3848
CONF	1047	1216	1202	1302	1320	3831	3833	3835	3837	3839	3841	3843	3845	3847	3849
CONF	1048	1217	1203	1303	1321	3832	3834	3836	3838	3840	3842	3844	3846	3848	3850
CONF	1049	1218	1204	1304	1322	3833	3835	3837	3839	3841	3843	3845	3847	3849	3851
CONF	1050	1219	1205	1305	1323	3834	3836	3838	3840	3842	3844	3846	3848	3850	3852
CONF	1051	1220	1206	1306	1324	3835	3837	3839	3841	3843	3845	3847	3849	3851	3853
CONF	1052	1221	1207	1307	1325	3836	3838	3840	3842	3844	3846	3848	3850	3852	3854
CONF	1053	1222	1208	1308	1326	3837	3839	3841	3843	3845	3847	3849	3851	3853	3855
CONF	1054	1223	1209	1309	1327	3838	3840	3842	3844	3846	3848	3850	3852	3854	3856
CONF	1055	1224	1210	1310	1328	3839	3841	3843	3845	3847	3849	3851	3853	3855	3857
CONF	1056	1225	1211	1311	1329	3840	3842	3844	3846	3848	3850	3852	3854	3856	3858
CONF	1057	1226	1212	1312	1330	3841	3843	3845	3847	3849	3851	3853	3855	3857	3859
CONF	1058	1227	1213	1313	1331	3842	3844	3846	3848	3850	3852	3854	3856	3858	3860
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CONF	1060	1229	1215	1315	1333	3844	3846	3848	3850	3852	3854	3856	3858	3860	3862
CONF	1061	1230	1216	1316	1334	3845	3847	3849	3851	3853	3855	3857	3859	3861	3863
CONF	1062	1231	1217	1317	1335	3846	3848	3850	3852	3854	3856	3858	3860	3862	3864
CONF	1063	1232	1218	1318	1336	3847	3849	3851	3853	3855	3857	3859	3861	3863	3865
CONF	1064	1233	1219	1319	1337	3848	3850	3852	3854	3856	3858	3860	3862	3864	3866
CONF	1065	1234	1220	1320	1338	3849	3851	3853	3855	3857	3859	3861	3863	3865	3867
CONF	1066	1235	1221	1321	1339	3850	3852	3854	3856	3858	3860	3862	3864	3866	3868
CONF	1067	1236	1222	1322	1340	3851	3853	3855	3857	3859	3861	3863	3865	3867	3869
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CONF	1069	1238	1224	1324	1342	3853	3855	3857	3859	3861	3863	3865	3867	3869	3871
CONF	1070	1239	1225	1325	1343	3854	3856	3858	3860	3862	3864	3866	3868	3870	3872
CONF	1071	1240	1226	1326	1344	3855	3857	3859	3861	3863	3865	3867	3869	3871	3873
CONF	1072	1241	1227	1327	1345	3856	3858	3860	3862	3864	3866	3868	3870	3872	3874
CONF	1073	1242	1228	1328	1346	3857	3859	3861	3863	3865	3867	3869	3871	3873	3875
CONF	1074	1243	1229	1329	1347	3858	3860	3862	3864	3866	3868	3870	3872	3874	3876
CONF	1075	1244	1230	1330	1348	3859	3861	3863	3865	3867	3869	3871	3873	3875	3877
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CONF	1077	1246	1232	1332	1350	3861	3863	3865	3867	3869	3871	3873	3875	3877	3879
CONF	1078	1247	1233	1333	1351	3862	3864	3866	3868	3870	3872	3874	3876	3878	3880
CONF	1079	1248	1234	1334	1352	3863	3865	3867	3869	3871	3873	3875	3877	3879	3881
CONF	1080	1249	1235	1335	1353	3864	3866	3868	3870	3872	3874	3876	3878	3880	3882
CONF	1081	1250	1236	1336	1354	3865	3867	3869	3871	3873	3875	3877	3879	3881	3883
CONF	1082	1251	1237	1337	1355	3866	3868	3870	3872	3874	3876	3878	3880	3882	3884
CONF	1083	1252	1238	1338	1356	3867	3869	3871	3873	3875	3877	3879	3881	3883	3885
CONF	1084	1253	1239	1339	1357	3868	3870	3872	3874	3876	3878	3880	3882	3884	3886
CONF	1085	1254	1240	1340	1358	3869	3871	3873	3875	3877	3879	3881	3883	3885	3887
CONF	1086	1255	1241	1341	1359	3870	3872	3874	3876	3878	3880	3882	3884	3886	3888
CONF	1087	1256	1242	1342	1360	3871	3873	3875	3877	3879	3881	3883	3885	3887	3889
CONF	1088	1257	1243	1343	1361	3872	3874	3876	3878	3880	3882	3884	3886	3888	3890
CONF	1089	1258	1244	1344	1362	3873	3875	3877	3879	3881	3883	3885	3887	3889	3891
CONF	1090	1259	1245	1345	1363	3874	3876	3878	3880	3882	3884	3886	3888	3890	3892
CONF	1091	1260	1246	1346	1364	3875	3877	3879	3881	3883	3885	3887	3889	3891	3893
CONF	1092	1261	1247	1347	1365	3876	3878	3880	3882	3884	3886	3888	3890	3892	3894
CONF	1093	1262	1248	1348	1366	3877	3879	3881	3883	3885	3887	3889	3891	3893	3895
CONF	1094	1263	1249	1349	1367	3878	3880	3882	3884	3886	3888	3890	3892	3894	3896
CONF	1095	1264	1250	1350	1368	3879	3881	3883	3885	3887	3889	3891	3893	3895	3897
CONF	1096	1265	1251	1351	1369	3880	3882	3884	3886	3888	3890	3892	3894	3896	3898
CONF	1097	1266	1252	1352	1370	3881	3883	3885	3887	3889	3891	3893	3895	3897	3899
CONF	1098														

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ASL	3045	3095	3096	3489	3490	3491											
ASR	963	964	965	966	967												
BFG	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															
	923	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		
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	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	2105	2111	2112	2144	2151		
	2903	2933	2943	2944	2949	2950	2962	3078	3102	2709	2820	2876	2896	2897	2902		
	3226	3232	3326	3343	3344	3367	3451	3461	3477	3564	3571	3581	3143	3162	3179		

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													
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	1509	1639	1654	1684	1700	1730	1746	1776	1792	1805	1828	1845	1873	1888	1919
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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	
LOT	2556														
MP	865	877	940	951	973	989	1006	1014	1024	2380	2748	2822	2914	2916	2939
	2941	3008	3035	3043	3075	3076	3540	3545							
JSR	896	911	2932	2980	2987	3000	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	1289	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
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ROR	3380														
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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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 RUN-TIME RATIO: 145/68=2.1
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