

DM11BB

MODEM CONTROL DIAG
MD-11-DZDMD-B

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

The left side of the page contains a grid of 100 small diagrams or tables, arranged in 10 rows and 10 columns. Each cell contains technical information, likely related to modem control. The diagrams are small and dense, with many lines of text and some graphical elements. The right side of the page is mostly blank, with a few faint markings and a small diagram in the bottom right corner.

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1.0 ABSTRACT

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

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

2.0 REQUIREMENTS

2.1 EQUIPMENT

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

2.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

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

2.1.3 FOR ON LINE TESTS

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

2.2 MEMORY

THE PROGRAM RUNS IN 8K MEMORY

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3.0

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 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 REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

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

4.0 LOADING AND STARTING PROCEDURE

4.1

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

THE STARTING ADDRESS FOR ALL TESTS IS 000200.

RESTART ADDRESS FOR ALL TESTS IS 000200

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4.2 OPERATOR AND/OR PROGRAM ACTION

4.2.1 INITIAL PROGRAM START

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

4.2.1B WITHOUT HARDWARE SWITCH REGISTER

LOAD ADDRESS 200
PRESS START

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

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

4.2.1.9 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART WITH HARDWARE SWITCH REGISTER

4.2.2.1 WITH SW00=1

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.9.

4.2.2.2 WITH SW00=0

LOAD ADDRESS 200
PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.9

4.2.3 PROGRAM RESTART WITHOUT HARDWARE SWITCH REGISTER

LOAD ADDRESS 200
PRESS START

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5.0 OPERATING PROCEDURE

5.1 TEST GROUP D 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

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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 LOOPED 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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7.3 WHEN ON ACT-11 OR "XOR"
PROGRAM WILL DEFAULT TO 16 LINE SCANNER TEST
H861 TEST CONNECTOR MUST BE INSTALLED.

7.4 DEFAULT PARAMETERS (INCLUDING ACT-11 & "XOR")

VECTORS

DMBVEC: 300 (AUTOMATICALLY GENERATED
DMBLVL: 302 BY PROGRAM WHEN UNDER ACT-11 OR "XOR")

ADDRESSES

DMBCSR: 170500
DMBLSR: 170502

NOTE: SW00(RESELECT ADDRESSES AND VECTORS BECOMES
INOPERATIVE UNDER ACT-11 OR "XOR".

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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 SWD1=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 SWD1=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 ...SWD0 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
```

746
747
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750
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753
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755
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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
761      000001
762      000002
763      000003
764      000004
765      000005
766      000006
767      000007
768
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770
771      177776
772
773      014660
774      014654
775      014656
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779      000020
780      000040
781      000100
782      000200
783      000400
784      001000
785      002000
786      004000
787      010000
788      020000
789      040000
790      100000
791
792
793
794      000001
795      000002
796      000004
797      000010
798      000020
799      000040
800      000100
801      000200
802
803
804
805      000004
806      000002
807      000001

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;REGISTER DEFINITIONS
R0=%0      ;GENERAL REGISTER
R1=%1      ;GENERAL REGISTER
R2=%2      ;GENERAL REGISTER
R3=%3      ;GENERAL REGISTER
R4=%4      ;GENERAL REGISTER
R5=%5      ;GENERAL REGISTER
SP=%6      ;PROCESSOR STACK POINTER
PC=%7      ;PROGRAM COUNTER

;LOCATION EQUIVALENCIES
PS=177776
.EQUIV PS,PSW
RADIX=DIVIS ;CONVERSION FACTOR FOR DECIMAL OUTPUT
BINWRD=DIVIDL ;WORD TO BE CONVERTED TO OCTAL ASCII
DIGIT=DIVIDH ;ASCII OCTAL DIGIT

;CONTROL STATUS REGISTER BIT FUNCTIONS
BUSY=20    ;LINE SCANNER RUNNING
SCNENA=40  ;LINE SCANNER ENABLE
INTENA=100 ;INTERRUPT ENABLE
DONE=200   ;SCANNER DONE
STEP=400   ;CAUSES LINE COUNTER TO BE INCREMENTED BY 1 COUNT
MAINT=1000 ;FORCES IS TO INPUT OF SCRATCH PAD MEMORY
CLRMUX=2000 ;CLEAR MULTIPLEXER FUNCTION FLIPFLOPS
CLRSCN=4000 ;CLEARS SCANNER SCRATCHPAD MEMORY
SECRXF=10000 ;SECONDARY RECEIVE TRANSITION WAS DETECTED BY SCANNER
CSF=20000  ;CLEAR TO SEND TRANSITION WAS DETECTED BY SCANNER
COF=40000  ;CARRIER TRANSITION WAS DETECTED BY SCANNER
RINGF=100000 ;RING SIGNAL WAS DETECTED BY SCANNER

;LINE REGISTER BIT FUNCTIONS
LINENA=1   ;=1, RECOGNIZE TRANSITIONS ON THIS LINE
TRMRDY=2  ;=1, SEND TERMINAL READY TO MODEM
RS=4       ;=1, SEND REQUEST TO SEND TO MODEM
SECTX=10  ;=1, SEND SECONDARY TRANSMIT TO MODEM
SECRX=20  ;=1, SECONDARY RECEIVE TURNED ON BY MODEM
CS=40     ;=1, CLEAR TO SEND TURNED ON BY MODEM
CO=100    ;=1, CARRIER TURNED ON BY MODEM
RING=200  ;=1, RING TURNED ON BY MODEM

;SOFTWARE TRANSITION FLAGS
XC0=4     ;CARRIER TRANSITION WAS DETECTED
XCS=2     ;CLEAR TO SEND TRANSITION WAS DETECTED
XSCRX=1   ;SECONDARY RECEIVE TRANSITION WAS DETECTED

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845005746
005726
010046
012600
024646
022626

104000
104001
104002
104003
104004
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104006
104007
104010
104011
104012
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104016
104017
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104024
104025
104026
104027

; INSTRUCTION DEFINITIONS

PUSH1SP=5746	; DECREMENT PROCESSOR STACK 1 WORD
POP1SP=5726	; INCREMENT PROCESSOR STACK 1 WORD
PUSHRO=10046	; SAVE RO ON STACK
POPPO=12600	; RESTORE RO FROM STACK
PUSH2SP=24646	; DECREMENT STACK TWICE
POP2SP=22626	; INCREMENT STACK TWICE

; EMT DEFINITION TABLE

ERRORC=EMT+X	; CONTROL STATUS ERROR SERVICE
ERRORL=EMT+X	; LINE STATUS ERROR SERVICE
SCOPE=EMT+X	; SCOPE LOOP AND ITERATION SERVICE
SCOPEF=EMT+X	; DATA FREEZE SERVICE
TYPE=EMT+X	; TELETYPE OUTPUT
SAVOSP=EMT+X	; SAVE RO-R5, PC+2 OF CALL
OCTASC=EMT+X	; CONVERT DATA TO ASCII AND TYPE
RESOS=EMT+X	; RESTORE RO-R5
CONVERT=EMT+X	; ASCII CONVERSION ROUTINE
EXTRACT=EMT+X	; DIGIT EXTRACTION ROUTINE
ERROR=EMT+X	; TYPE PC OF FAILING TESTS ONLY
INSTRG=EMT+X	; INPUT OCTAL DATA STRING
ERRORT=EMT+X	; TRANSITION ERROR
ERRORS=EMT+X	; ON LINE STATUS ERROR
ERRORN=EMT+X	; FATAL TRANSITION
GETLNS=EMT+X	; INPUT LINE NUMBERS
SETUP=EMT+X	; SET UP FOR ON LINE TEST
CKRING=EMT+X	; CHECK FOR RING ON CORRERT LINE
WAITRN=EMT+X	; WAIT FOR TRANSITIONS
CKTRAN=EMT+X	; CHECK TRANSITIONS
WAITS=EMT+X	; DELAY FOR TRANSIENTS
CNTLUU=EMT+X	; CHANGE SWREG ROUTINE
CKINTT=EMT+X	; CHECK FOR INTERRUPTS-FLAG STYLE
KBDIN=EMT+X	; FAKE INTERRUPT ENTRY POINT

; TRAPCATCAER FOR ILLEGAL INTERRUPTS

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846
847
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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
861 000174 000174      .=174
862 000174 000100      DISPREG:0
863 000176 000100      SWREG: 0
864
865 000200 000137 001100  .=200
866 000137 001100      JMP   START   ;GO TO START OF PROGRAM
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871											
872		001100									
873	001100										
874	001100	012737	015346	000024							
875											
876	001106	005037	001730								
877	001112	005077	014642								
878	001116	012706	001100								
879	001122	013746	000006								
880	001126	013746	000004								
881	001132	012737	001152	000004							
882	001140	022777	177777	014622							
883	001146	001402									
884	001150	000407									
885	001152	022626									
886	001154	012737	000176	015770							
887	001162	012737	000174	015772							
888	001170	012637	000004								
889	001174	012637	000006								
890	001200	005037	001242								
891	001204	013746	000004								
892	001210	012737	001246	000004							
893	001216	005737	177060								
894	001222	012637	000004								
895	001226	005137	001242								
896	001232	004737	015470								
897	001236	000137	001254								
898	001242	000000									
899	001244	000000									
900	001246	022626									
901	001250	012637	000004								
902	001254	005737	016060								
903	001260	001005									
904	001262	104004									
905	001264	016646									
906	001266	012737	000001	016060							
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							

```

.=1100
STACK:
START: MOV #PFAIL,24 ;SET UP POWER FAIL
;INTERRUPT SERVICE VECTOR
;CLEAR TEST IN PROGRESS FLAG
CLR TIPFLG
CLR @TKCSR
MOV #STACK,SP ;SET UP STACK POINTER
SUSWR: MOV @#6,-(SP) ;SAVE VECTORS
MOV @#4,-(SP)
MOV #1$,@#4 ;SET UP FOR TIMEOUT
CMP #-1,@SWR ;REFERENCE HARDWARE SWITCH REGISTER
BEQ 2$
BR 3$
1$: CMP (SP)+,(SP)+ ;ADJUST STACK
2$: MOV #SWREG,SWR ;POINT TO SOFTWARE SWITCH REG
MOV #DISPREG,DISPLAY ;POINT TO SOFT DISPLAY REG
3$: MOV (SP)+,@#4 ;RESTORE VECTORS
MOV (SP)+,@#6
CLR XFLAG ;XOR = NO
MOV 4,-(SP) ;SAVE 4
MOV #XORSVC,4 ;SET UP SVC ROUTINE
TST 177060 ;GOT AN XOR TESTER OUT THERE ?
MOV (SP)+,4 ;YES
COM XFLAG ;XOR = YES
JSR PC,XOR ;AUTO VECTOR
JMP STARTO ;RESTORE TRAPCATCHER
;XOR FLAG
XFLAG: 0
FST: 0
XORSVC: POP2SP
STARTO: MOV (SP)+,4 ;RESTORE 4
TST TIFLG ;TYPED TITLE?
BNE .+14 ;YES
TYPE "DM11-BB DIAGNOSTIC" ;TYPE "DM11-BB DIAGNOSTIC"
MOV #1,TIFLG ;SET TITLE TYPED FLAG
TST XFLAG ;X OR ?
BMI VECSTR ;RESTORE TRAPCATCHER
TST 42 ;ACT 11?
BEQ START1 ;NO
JSR PC,XOR ;YES AUTO VECTOR
BR VECSTR ;GET VECTOR AND REGISTER ADDRESS
START1: CMP #SWREG,SWR
BNE 1$
1$: CNTLUU
BIT #1,@SWR
BEQ STARTN
VECSTR: MOV #STACK,SP ;SET UP PROCESSOR STACK POINTER
MOV #300,DATA1 ;ADDRESS OF FIRST FLOATING VECTOR
MOV #302,DATA2 ;ADDRESS OF STATUS WORD
VECSTA: MOV DATA2,@DATA1 ;MOVE ADDRESS OF STATUS WORD TO VECTOR
CLR @DATA2 ;CLEAR STATUS WORD
; (FOR HALT ON ILLEGAL INTERRUPT)
ADD #4,DATA1 ;NEXT VECTOR
ADD #4,DATA2 ;NEXT STATUS WORD
CMP DATA1,#1000 ;IS TABLE CLEARED

```


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


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

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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

```

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;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.

```



```

1316
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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
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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
LINT2A: MOV      #17,JDMBCSR
        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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1371
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1399
1400
1401

003720	012777	002000	012026
003720	042737	000340	177776
003726	012700	000020	
003734	052777	001017	012006
003740	052777	000400	012000
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:
MENT1:  MOV    #CLRMUX, @DMBCSR
        BIC    #340, PS
        MOV    #16., R0
        BIS    #MAINT+17, @DMBCSR
MENT1A: BIS    #STEP, @DMBCSR
        DEC    R0
        BNE    MENT1A
        MOV    #16., R0
        MOV    #70000, R5
        MOV    #17, @DMBCSR
MENT1B: BIS    #STEP, @DMBCSR
        MOV    @DMBCSR, R4
        CMP    R5, R4
        BEQ    MENT1C
        ERRORC
        SCOPEF
MENT1C: INC    R5
        DEC    R0
        BNE    MENT1B
MENT1D: MOV    #CLRSCN, @DMBCSR
        BIT    #BUSY, @DMBCSR
        BNE    .-6
        MOV    #16., R0
        CLR    R5
        MOV    #17, @DMBCSR
MENT1E: BIS    #STEP, @DMBCSR
        MOV    @DMBCSR, R4
        CMP    R5, R4
        BEQ    MENT1F
        ERRORC
        SCOPEFF
MENT1F: INC    R5
        DEC    R0
        BNE    MENT1E
        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 MAINTANCE 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 EEXPECTED 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 SEANNER 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      @DMBCSR
        BIC     #340,PS
        MOV     #16,R0
        MOV     #17,R2
MEMT2A: MOV     #CLASCN,@DMBCSR
        BIT     #BUSY,@DMBCSR
        BNE     .-6
        MOV     #MAINT,@DMBCSR
        BIS     R2,@DMBCSR
        BIS     #STEP,@DMBCSR
        BIC     #MAINT,@DMBCSR
        MOV     #16,R3
        MOV     #17,@DMBCSR
        INC     R2
        CLR     R1
MEMT2B: BIS     #STEP,@DMBCSR
        MOVB    @DMBCSR,R4
        MOV     R1,R5
        CMPB   R4,R2
        BNE     MEMT2C
        BIS     #70000,R5
MEMT2C: CMP     R4,R5
        BEQ     MEMT2D
        ERRORC SCOPEF
        MEMT2A
MEMT2D: INC     R1
        DEC     R3
        BNE     MEMT2B
        DEC     R0
        BNE     MEMT2A
        SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 ADDRESSES
;FIRST ADDRESS TO BE TESTED=0
;CLEAR ACANNER MEMORY
;WAIT FOR CLEAR CYCLE

;SET "MAINTENANCE MODE"
;SET LINE COUNTER TO TEST ADDRESS-1
;WRITE 1'S INTO TEST ADDRESS
;CLEAR "MAINTENANCE MODE"
;SET UP TO TEST ALL 16
;SCANNER MEMORY LOCATIONS

;ACCESS SCANNER MEMORY
;READ CONPENTS OF MEMORY
;SET UP EXPECTED CONTENTS
;OF SCANNER MEMORY

;COMPARE EXPECTED AND RECEIVED
;VALUES
;SCANNER MEMORY ERROR
;CHECK FOR DATA FREEZE

;TEST NEXT SCANNER LOCATION
;UPDATE LINE COUNT
;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 011350
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 MEIORY
        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        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                MOVB @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                                     ;TO BE SET
1498 004542 020504                        MUX1C: CMP R5,R4                     ;COMPARE EXPECTED AND RECEIVED
1499 004544 001403                        BEQ  MUX1D                            ;RESULTS
1500 004546 104001                        ERRORL                                ;LINE STATUS ERROR
1501 004550 104003                        SCOPEF
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
1509 004576 005077 011154                CLR  @DMBLSR                          ;SET LINE COUNTER TO SELECTED LINE
1510 004602 105227 000000                INCB #0                                ;CLEAR LINE ENABLE FLIP FLOP
1511 004606 001375                        BNE  -4                                ;DELAY FOR CABLE
1512 004610 017704 011142                MOV  @DMBLSR,R4                      ;DITTO
1513 004614 005704                        TST  R4                                ;READ LINE STATUS REGISTER
1514 004616 001401                        BEQ  MUX1F                            ;WAS LINE ENABLE FUNCTION FLIP FLOP
1515 004620 104001                        ERRORL                                ;CLEARED
1516 004622 104003                        SCOPEF                                ;NO LINE STATUS ERROR
1517 004624 004464                        MUX1A                                ;CHECK FOR LOOP ON SAME DATA
1518 004626 005201                        INC  R1
1519 004630 005300                        DEC  R0
1520 004632 001314                        BNE  MUX1A
1521 004634 104002                        SCOPE
;SELECT NEXT LINE
;DECREMENT LINE COUNT
;CONTINU IF NOT DONE
;CHECK FOR ITERATIONS, LOOP

```

K03

```

1522                                     ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
1523                                     ;BE SET AND CLEARED FOR SELECTED LINE
1524
1525 004636                                T27:                                     ;REFERENCE DESIGNATION
1526 004636 005077 011112                MUX2: CLR      @DMBCSR                ;CLEAR CONTROL STATUS REGISTER
1527 004642 042737 000340 177776        BIC      #340,PS                    ;ENABLE INTERRUPTS
1528 004650 012700 000020                MOV      #16.,R0                    ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
1529 004654 005001                        CLR      R1                          ;START AT LINE 0
1530 004656 012777 002000 011070        MUX2A: MOV     #CLRMUX,@DMBCSR
1531 004664 012702 000020                MOV     #16.,R2
1532 004670 010177 011060                MOV     R1,@DMBCSR                ;SELECT LINE TO BE TESTED
1533 004674 012777 000002 011054        MOV     #TRMRDY,@DMBLSR           ;SET TERMINAL READY FUNCTION FLIP-FLOP
1534 004702 005077 011046                CLR     @DMBCSR
1535 004706 005005                        MUX2B: CLR     R5
1536 004710 017704 011042                MOV     @DMBLSR,R4                ;READ LINE STATUS REGISTER
1537 004714 117703 011034                MOV     @DMBCSR,R3                ;READ CONTROL STATUS REGISTER
1538 004720 042703 177760                BIC     #177760,R3                ;CLEAR UNWANTED BITS
1539 004724 020103                        CMP     R1,R3                      ;IF LINE NUMBER=SELECTED LINE NUMBER,
1540 004726 001002                        BNE     MUX2C                      ;EXCEPT TERMINAL READY FUNCTION FLIP FLO
1541 004730 012705 000002                MOV     #TRMRDY,R5
1542
1543                                     ;TO BE SET
1544 004734 020504                        MUX2C: CMP     R5,R4                ;COMPARE EXPECTED AND RECEIVED
1545 004736 001403                        BEQ     MUX2D                      ;RESULTS
1546 004740 104001                        ERRORL                                     ;LINE STATUS ERROR
1547 004742 104003                        SCOPEF
1548 004744 004746                        MUX2D: MUX2D
1549 004746 052777 000400 011000        BIS     #STEP,@DMBCSR                ;EXAMINE NEXT LINE
1550 004754 005302                        DEC     R2
1551 004756 001353                        BNE     MUX2B
1552 004762 010177 010766                CLR     R5
1553 004766 010103                        MUX2E: MOV     R1,@DMBCSR
1554 004770 005077 010762                MOV     R1,R3
1555 004774 105227 000000                CLR     @DMBLSR                    ;SET LINE COUNTER TO SELECTED LINE
1556 005000 001375                        INCB   #0                            ;CLEAR TERMINAL READY FLIP FLOP
1557 005002 017704 010750                BNE     -4                            ;DELAY FOR CABLE
1558 005006 005704                        MOV     @DMBLSR,R4                ;DITTO
1559 005010 001401                        TST    R4                            ;READ LINE STATUS REGISTER
1560 005012 104001                        BEQ     MUX2F                      ;WAS TERMINAL READY FUNCTION FLIP FLOP
1561 005014 104003                        ERRORL                                     ;CLEARED
1562 005016 004656                        SCOPEF                                ;NO. LINE STATUS ERROR
1563 005020 005201                        MUX2A: MUX2A                        ;CHECK FOR LOOP ON SAME DATA
1564 005022 005300                        INC     R1
1565 005024 001314                        DEC     R0
1566 005026 104002                        BNE     MUX2A
SCOPE

```



```

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

```



```

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:
MUX8: CLR @DMBCSR
      BIC #340,PS
      MOV #16,R0
MUX8A: MOV #17,@DMBLSR
      BIS #STEP,@DMBCSR
      DEC R0
      BNE MUX8A
      CLR R3
      MOV #16,R0
MUX8B: MOV #CLRMUX,@DMBCSR
MUX8C: MOV R3,@DMBCSR
      MOV @DMBLSR,R4
      CLR R5
      TST R4
      BEQ MUX8D
      ERRORL SCOPEF
      MUX8B
MUX8D: INC R5
      BIS #LINENA,@DMBLSR
      MOV @DMBLSR,R4
      CMP R5,R4
      BEQ MUX8E
      ERRORL SCOPEF
      MUX8B
MUX8E: INC R3
      CLR @DMBLSR
      DEC R0
      BNE MUX8C
      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

```

```

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

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

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

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

```

```

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 013777 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 022626
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 ;REFERENCE DESIGNATION
        MOV #CLRMUX,DMBCSR ;WRITE 1S INTO ALL
        CLR DMBCSR ;CLEAR MULTIPLEXER
        BIC #340,PS ;MULTIPLEXER FUNCTION
        MOV #17,DMBLSR ;ENABLE TELETYPE INTERRUPTS
        BIS #STEP,DMBCSR ;FLIPFLOPS
        DEC R0
        BNE SCNT2A
        MOV #CLRSCN,DMBCSR ;CLEAR SCANNER MEMORY
        BIT #BUSY,DMBCSR ;WAIT FOR CLEAR CYCLE TO COMPLETE
        BNE .-6
        MOV #16,R0 ;SET UP TO TEST 16 LINES
        MOV #170340,R5 ;FIRST EXPECTED RESULT
        MOV #SCNT2C,DMBVEC ;SET UP LOCAL INTERRUPT RETURN
        MOV PS,DMBLVL
        MOV #INTENA+17,DMBCSR ;SET INTERRUPT ENABLE
SCNT2B: 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
        BIS #340,PS ;LOCK OUT INTERRUPTS
        MOV DMBCSR,R4 ;READ CONTROL STATUS
        ERRORC ;INTERRUPT DID NOT OCCUR
        SCOPEF ;CHECK FOR LOOP ON CURRENT DATA
        SCNT2
        BR SCNT2D ;CONTINUE
SCNT2C: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
        MOV DMBCSR,R4 ;READ CONTROL STATUS REGISTER
        CMP R5,R4 ;COMPARE TO EXPECTED RESULT
        BEQ SCNT2D
        ERRORC ;CONTROL STATUS ERROR
        SCOPEF ;CHECK FOR LOOP ON CURRENT DATA
        SCNT2
SCNT2D: BIC #SCNENA+DONE,DMBCSR ;CLEAR SCAN ENABLE AND DONE
        INC R5 ;UPDATE EXPECTED RESULT
        DEC R0 ;CONTINUE IF ALL
        BNE SCNT2B ;LINES NOT TESTED
        SCOPE ;CHECK FOR ITERATIONS, LOOP
    
```

1922
 1923
 1924
 1925
 1926
 1927
 1928
 1929
 1930
 1931
 1932
 1933
 1934
 1935
 1936
 1937
 1938
 1939
 1940
 1941
 1942

007000			
007000	012737	007020	002150
007006	042737	000340	177776
007014	104004		
007016	017021		
007020	104013		
007022	017054		
007024	000000		
007026	000017		
007030	016042		
007032	104004		
007034	017016		

```

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

```

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

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

```

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

;GET LINE NUMBER
  
```

```

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

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

T101:
MUX11: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
      MOV LINE,R1 ;ENABLE INTERRUPTS
MUX11A: MOV #CLRMUX,@DMBCSR
      MOV #16,R2
      MOV R1,@DMBCSR ;SELECT LINE TO BE TESTED
      MOV #LINENA,@DMBLSR ;SET LINE ENABLE FUNCTION FLIP-FLOP
      CLR @DMBCSR
MUX11B: CLR R5
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      MOVB @DMBCSR,R3 ;READ CONTROL STATUS REGISTER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER,
      BNE MUX11C ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
      MOV #LINENA,R5
MUX11C: CMP R5,R4 ;TO BE SET
      BEQ MUX11D ;COMPARE EXPECTED AND RECEIVED
      ERRORL ;RESULTS
      SCOPEF ;LINE STATUS ERROR
      MUX11D
MUX11D: BIS #STEP,@DMBCSR ;EXAMINE NEXT LINE
      DEC R2
      BNE MUX11B
MUX11E: CLR R5
      MOV R1,@DMBCSR
      MOV R1,R3 ;SET LINE COUNTER TO SELECTED LINE
      CLR @DMBLSR ;CLEAR LINE ENABLE FLIP FLOP
      INCB #0 ;DELAY FOR CABLE
      BNE -4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      TST R4 ;WAS LINE ENABLE FUNCTION FLIP FLOP
      BEQ MUX11F ;CLEARED
      ERRORL ;NO. LINE STATUS ERROR
      SCOPE ;CHECK FOR ITERATIONS, LOOP
MUX11F:

```



```

2100
2101
2102
2103
2104 007726
2105 007726 005077 006022
2106 007732 042737 000340 177776
2107 007740 013701 016042
2108 007744 012702 000020
2109 007750 010177 006000
2110 007754 012777 000003 005774
2111 007762 005077 005766
2112 007766 005005
2113 007770 017704 005762
2114 007774 117703 005754
2115 010000 042703 177760
2116 010004 020103
2117 010006 001002
2118 010010 012705 000143
2119
2120 010014 020405
2121 010016 001403
2122 010020 104001
2123 010022 104003
2124 010024 010026
2125 010026 052777 000400 005720
2126 010034 005302
2127 010036 001353
2128 010040 012705 000001
2129 010044 010103
2130 010046 013177 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
MUX15C: CMP R4,R5 ;CLEAR TO SEND AND CARRIER ARE SET
      BEQ MUX15D ;COMPARE EXPECTED AND
      ERRORL SCOPEF ;RECEIVED RESULTS
      MUX15D ;LINE STATUS ERROR
MUX15D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX15E ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
MUX15E: MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #TRMRDY,@DMBLSR ;CLEAR TERMINAL
      INCB #0 ;DELAY FOR CABLE
      BNE -4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX15F ;SET ON THIS LINE
      ERRORL SCOPEF ;LINE STATUS ERROR
MUX15F: SCOPEF ;CHECK FOR ITERATIONS, LOOP
  
```

```

2139
2140
2141
2142
2143 010102
2144 010102 005077 005646
2145 010106 042737 000340 177776
2146 010114 013701 016042
2147 010120 012702 000020
2148 010124 010177 005624
2149 010130 012777 000005 005620
2150 010136 005077 005612
2151 010142 005005
2152 010144 017704 005606
2153 010150 117703 005600
2154 010154 042703 177760
2155 010160 020103
2156 010162 001002
2157 010164 012705 000205
2158
2159 010170 020405
2160 010172 001403
2161 010174 104001
2162 010176 104003
2163 010200 010202
2164 010202 052777 000400 005544
2165 010210 005302
2166 010212 001353
2167 010214 012705 000001
2168 010220 010103
2169 010222 010177 005526
2170 010226 042777 000004 005522
2171 010234 105227 000000
2172 010240 001375
2173 010242 017704 005510
2174 010246 020504
2175 010250 001401
2176 010252 104001
2177 010254 104002

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

T106:
MUX16: CLR @DMBCSR ;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
BIC #340,PS
MOV LINE,R1
MUX16A: MOV #16,R2 ;16 LINES
;SELECT A LINE
MOV R1,@DMBCSR ;SET LINE ENABLE +RS
MOV #LINENA+RS,@DMBLSR ;CLEAR CONTROL REGISTER
CLR @DMBCSR ;CLEAR EXPECTED RESULT
MUX16B: CLR R5 ;READ LINE STATUS
MOV @DMBLSR,R4 ;READ LINE NUMBER
MOVB @DMBCSR,R3 ;CLEAR UNWANTED BITS
BIC #177760,R3 ;IF RECEIVED LINE=SELECTED LINE
CMP R1,R3 ;EXPECT LINE ENABLE AND
BNE MUX16C
MOV #LINENA+RS+RING,R5

MUX16C: CMP R4,R5 ;RING IS SET
BEQ MUX16D ;COMPARE EXPECTED AND
;RECEIVED RESULTS
;LINE STATUS ERROR
ERRORL SCOPEF
MUX16D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
DEC R2 ;CONTINUE IF ALL CHECKS
BNE MUX16B ;ARE NOT DONE FOR THIS LINE
MOV #LINENA,R5 ;EXPECT LINE ENABLE
MUX16E: MOV R1,R3 ;ON SELECTED LINE
MOV R1,@DMBCSR ;SELECT LINE
BIC #RS,@DMBLSR ;CLEAR REQUEST TO SEND
INCB #0 ;DELAY FOR CABLE
BNE -4 ;DITTO
MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
BEQ MUX16F ;SET ON THIS LINE
ERRORL ;LINE STATUS ERROR
MUX16F: SCOPE ;CHECK FOR ITERATIONS, LOOP

```

```

2178
2179
2180
2181
2182 010256
2183 010256 005077 005472
2184 010262 042737 000340 177776
2185 010270 013701 016042
2186 010274 012702 000020
2187 010300 010177 005450
2188 010304 012777 000011 005444
2189 010312 005077 005436
2190 010316 005005
2191 010320 017704 005432
2192 010324 117703 005424
2193 010330 042703 177760
2194 010334 020103
2195 010336 001002
2196 010340 012705 000031
2197
2198 010344 020405
2199 010346 001403
2200 010350 104001
2201 010352 104003
2202 010354 010356
2203 010356 052777 000400 005370
2204 010364 005302
2205 010366 001353
2206 010370 012705 000001
2207 010374 010103
2208 010376 010177 005352
2209 010402 042777 000010 005346
2210 010410 105227 000000
2211 010414 001375
2212 010416 017704 005334
2213 010422 020504
2214 010424 001401
2215 010426 104001
2216 010430 104002

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

T107:
MUX17: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV LINE,R1 ;ENABLE INTERRUPTS
MUX17A: MOV #16,R2 ;16 LINES
      MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+SECTX,@DMBLSR ;SET LINE ENABLE +SECTX
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
MUX17B: 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 MUX17C ;EXPECT LINE ENABLE AND
      MOV #LINENA+SECTX+SECRX,R5 ;SECONDARY RECEIVE IS SET
MUX17C: CMP R4,R5 ;COMPARE EXPECTED AND
      BEQ MUX17D ;RECEIVED RESULTS
      ERRORL SCOPEF ;LINE STATUS ERROR
      MUX17D
MUX17D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX17B ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
MUX17E: MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #SECTX,@DMBLSR ;CLEAR SECONDARY TRANSMIT
      INCB #0 ;DELAY FOR CABLE
      BNE -4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX17F ;SET ON THIS LINE
      ERRORL SCOPEF ;LINE STATUS ERROR
MUX17F: SCOPEF ;CHECK FOR ITERATIONS, LCOP
  
```

2217
2218
2219
2220
2221
2222
2223
2224
2225
2226
2227
2228
2229
2230
2231
2232
2233
2234
2235
2236
2237
2238
2239
2240
2241
2242
2243
2244
2245
2246
2247
2248
2249
2250
2251
2252
2253
2254
2255
2256
2257
2258
2259
2260
2261
2262
2263
2264
2265
2266
2267

010432
010432 000005
010434 012737 000340 177776
010442 104004
010444 016300
010446 022737 000176 015770
010454 001001
010456 104025
010460 012737 010476 012266
010466 012737 010474 002150
010474 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

T103A1: T103B
T103A1
ERROR
BR ST103B

T103B: CKRING

T103C
T103B1
T103B2
T103B1: ERRORT
RTS PC
T103B2: ERRORT
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									;SET TERMINAL READY ON SELECTED ANSWER LINE
2271									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2272	010530	013777	016046	005216	T103C:	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									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2280									;SELECTED ORIGINATE AND ANSWER LINES
2281									
2282	010550	104023				CKTRAN			;CHECK TRANSITIONS AND
2283									;STATUS ON SELECTED
2284									;ANSWER AND ORIGINATE LINES
2285	010552	000143				CO+CS+LINENA+TRMRDY			;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				T103D1			;GO HERE ON ANSWER LINE STATUS ERROR
2300									
2301	010564	010600				T103D2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2302	010566	010604				T103D3			;GO HERE ON ANSWER LINE TRANSITION ERROR
2303	010570	010610				T103D4			;GO HERE ON ORIGINATE LINE TRANSITION ER
2304	010572	010614				T103E			;GO TO NEXT TEST IF NO ERRORS
2305	010574	104015			T103D1:	ERRORS			;ANSWER LINE STATUS ERROR
2306	010576	000207				RTS	PC		;CONTINUE CHECKING
2307	010600	104015			T103D2:	ERRORS			;ORIGINATE LINE STATUS ERROR
2308	010602	000207				RTS	PC		;CONTINUE CHECKING
2309	010604	104014			T103D3:	ERRORT			;ANSWER LINE TRANSITION ERROR
2310	010606	000207				RTS	PC		;CONTINUE CHECKING
2311	010610	104014			T103D4:	ERRORT			;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

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

```

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

;TYPE "SET SW01=1 TO
;TEST DISCONNECT"
;LOCK OUT INTERRUPTS
;TO DETECT TRANSITIONS
;BEFORE DISCONNECT SEQUENCE STARTS
;SET UP DUMMY RETURN FOR
;RING INTERRUPT
;SET SCAN ENABLE AND INTERRUPT ENABLE
;ALLOW INTERRUPTS

;START DISCONNECT SEQUENCE
;CLEAR CONROL REGISTER
;SET LINE COUNTER TO SELECTED ORIGINATE
;SET TERMINAL READY ON SELECTED LINE

;WAIT FOR TRANSITIONS TO OCCUR
  
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011006
011006 800005
011010 012737 000340 177776
011016 104004
011020 016351
011022 022737 000176 015770
011030 001001
011032 104025
011034 012737 011052 012266
011042 012737 011050 002150
011050 104017

011052 104020

011054 011064
011056 011060
011060 104012
011062 000772

011064 104021

011066 011104

011070 011074

011072 011100

011074 104014
011076 000207
011100 104014
011102 000762

```

;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

T300:
ST202A: RESET
MOV #340,PS
TYPE
MT202T
CMP #SWREG,SWR
BNE 1$
CNTLUU
1$: MOV #T202A,FATRET
MOV #ST202B,KRET
ST202B: GETLNS
T202A: SETUP
T202B
T202A1
T202A1: ERROR
BR ST202B

;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

T202B: CKRING
;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

T202C
T202B1
T202B2
T202B1: ERROR
RTS PC
T202B2: ERROR
BR ST202B
    
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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

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

T202C: MOV LINANS, @DMBCSR ;SET LINE COUNTER TO ANSWER LINE
      BIS #TRMRDY, @DMBLSR ;SET TERMINAL READY ON ANSWER LINE
T202D: 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
        ;EXPECT CARRIER, LINE ENABLE
        ;AND TERMINAL READY STATUS
        ;BITS SET ON ANSWER LINE
        ;EXPECT REQUEST TO SEND, CLEAR
        ;TO SEND, CARRIER, LINE ENABLE
        ;AND TERMINAL READY STATUS BITS
        ;SET ON ORIGINATE LINE
        ;EXPECT CARRIER AND POSSIBLE
        ;RING TRANSITIONS ON
        ;ANSWER LINE
        ;EXPECT CARRIER AND CLEAR
        ;TO SEND TRANSITIONS ON
        ;ORIGINATE LINE
        ;GO HERE ON ANSWER LINE STATUS ERROR
        ;GO HERE ON ORIGINATE LINE STATUS ERROR
        ;GO HERE ON ANSWER LINE STATUS ERROR
        ;GO HERE ON ORIGINATE LINE TRANSITION ER
        ;GO TO NEXT TEST IF NO ERRORS
        ;ANSWER LINE STATUS ERROR
        ;CONTINUE CHECKING
        ;ORIGINATE LINE STATUS ERROR
        ;CONTINUE CHECKING
        ;ANSWER LINE TRANSITION ERROR
        ;CONTINUE CHECKING
        ;ORIGINATE LINE TRANSITION ERROR
        ;CONTINUE CHECKING

T202D1: ERRORS
        RTS PC
T202D2: ERRORS
        RTS PC
T202D3: ERRORS
        RTS PC
T202D4: ERRORS
        RTS PC
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2473									
2474									;SET SECONDARY TRANSMIT ON ANSWER LINE
2475									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2476									
2477	011204	013777	016046	004542	T202E:	MOV	LINANS, @DMBCSR		;SET LINE COUNTER TO ANSWER LINE
2478	011212	052777	000010	004536		BIS	#SECTX, @DMBLSR		;SET SECONDARY RECEIVE ON ANSWER LINE
2479	011220	104026				CKINTT			
2480	011222	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2481									
2482									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2483									;SELECTED ORIGINATE AND ANSWER LINES
2484									
2485	011224	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2486									;ON SELECTED ANSWER AND
2487									;ORIGINATE LINES
2488	011226	000133				SECTX+CO+LINENA+TRMRDY+SECRX			;EXPECT SECONDARY TRANSMIT
2489									;SECONDARY RECEIVE, CARRIER
2490									;LINE ENABLE AND TERMINAL READY
2491									;STATUS BITS SET ON ANSWER LINE
2492	011230	000167				SECRX+RS+CO+CS+LINENA+TRMRDY			;EXPECT SECONDARY RECEIVE
2493									;REQUEST TO SEND, CLEAR TO SEND
2494									;CARRIER, LINE ENABLE AND
2495									;TERMINAL READY STATUS BITS
2496									;SET ON ORIGINATE LINE
2497	011232	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2498									;TRANSITION ON ANSWER LINE
2499	011234	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2500									;TRANSITION ON ORIGINATE LINE
2501	011236	011250				T202E1			;GO HERE ON ANSWER LINE STATUS ERROR
2502	011240	011254				T202E2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2503	011242	011260				T202E3			;GO HERE ON ANSWER LINE TRANSITION ERROR
2504	011244	011264				T202E4			;GO HERE ON ORIGINATE LINE TRANSITION ER
2505	011246	011270				T202F			;GO TO NEXT TEST IF NO ERRORS
2506	011250	104015			T202E1:	ERRORS			;ANSWER LINE STATUS ERROR
2507	011252	000207				RTS	PC		;CONTINUE CHECKING
2508	011254	104015			T202E2:	ERRORS			;ORIGINATE LINE STATUS ERROR
2509	011256	000207				RTS	PC		;CONTINUE CHECKING
2510	011260	104014			T202E3:	ERRORT			;ANSWER LINE TRANSITION ERROR
2511	011262	000207				RTS	PC		;CONTINUE CHECKING
2512	011264	104014			T202E4:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
2513	011266	000207				RTS	PC		;CONTINUE CHECKING

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: ERROR			:ANSWER LINE TRANSITION ERROR
2554	011362	000207				RTS	PC		:CONTINUE CHECKING
2555	011364	104014				T202F5: ERROR			:ORIGINATE LINE TRANSITION ERROR
2556	011366	000207				RTS	PC		:CONTINUE CHECKING

2557								
2558								
2559								
2560								;SET REQUEST TO SEND ON ANSWER LINE
2561								;WAIT FOR TRANSITIONS ON SELECTED LINES
2562	011370	013777	016046	004356	T202G:	MOV	LINANS,ADMBCSR	;SET LINE COUNTER TO ANSWER LINE
2563	011376	052777	000004	004352		BIS	#RS,ADMBSR	;SET REQUEST TO SEND
2564	011404	104026				CKINTT		
2565	011406	104022				WAITRN		;WAIT FOR TRANSITIONS TO OCCUR
2566								
2567								;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2568								;SELECTED ORIGINATE AND ANSWER LINES
2569								
2570	011410	104023				CKTRAN		;CHECK TRANSITIONS AND STATUS
2571								;ON SELECTED ANSWER AND
2572								;ORIGINATE LINES
2573	011412	000147				RS+CO+CS+LINENA+TRMRDY		;EXPECT LINE ENABLE, TERMINAL
2574								;READY, REQUEST TO SEND, CLEAR
2575								;TO SEND, AND CARRIER
2576								;STATUS BITS SET ON ANSWER LINE
2577	011414	000103				CO+LINENA+TRMRDY		;EXPECT LINE ENABLE, TERMINAL
2578								;READY AND CARRIER STATUS
2579								;BITS SET ON ORIGINATE LINE
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									;SET SECONDARY TRANSMIT ON ORIGINATE LINE	
2600									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES	
2601										
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				
2606										;WAIT FOR TRANSITIONS TO OCCUR
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				CKINTT			
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
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2698 011666 012777 000140 004060
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2700 011674 005037 177776
2701 011700 005077 004056
2702 011704 105777 004050
2703 011710 100375
2704 011712 005777 004044
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2708 011716 012737 000340 177776
2709 011724 005077 004024
2710 011730 013777 016044 004016
2711 011736 042777 000002 004012
2712 011744 104024
2713 011746 104026
2714 011750 104022

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

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

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

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

;DISCONNECT SEQUENCE REQUESTED

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

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

;WAIT FOR TRANSITIONS TO OCCUR

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2763 012030 017704 003720
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2765 012034 010405
2766 012036 042705 177760
2767 012042 023705 016044
2768 012046 001411
2769 012050 023705 016046
2770 012054 001443
2771 012056 010577 003672
2772 012062 017703 003670
2773 012066 104016
2774 012070 000471
2775
2776
2777
2778 012072 032704 100000
2779 012076 001403
2780 012100 052737 000010 016052
2781 012106 032704 040000
2782 012112 001403
2783 012114 052737 000004 016052
2784 012122 032704 020000
2785
2786 012126 001403
2787
2788 012130 052737 000002 016052
2789 012136 032704 010000
2790
2791 012142 001403
2792 012144 052737 000001 016052
2793 012152 032704 170000
2794
2795 012156 001044
2796 012160 104016
2797 012162 000434

;DETECT AND RECORD TRANSITIONS ON SELECTED
;ORIGINATE AND ANSWER LINES

;TRANSITION DATA IS STORED IN LOCATIONS ANSFLG AND ORGFLG
;FOR ANSWER AND ORIGINATE LINES RESPECTIVELY
;FORMAT OF DATA IS (FOR BOTH LINES)

;BIT0=1, SECONDARY RECEIVE CAUSED INTERRUPT
;BIT1=1, CLEAR TO SEND CAUSED INTERRUPT
;BIT2=1, CARRIER CAUSED INTERRUPT
;BIT3=1, RING CAUSED INTERRUPT

TRANS: MOV 2DMBCSR,R4 ;GET LINE NUMBER AND
;INTERRUPT FLAGS
MOV R4,R5
BIC #177760,R5 ;EXTRACT LINE NUMBER
CMP LINORG,R5 ;DID ORIGINATE LINE INTERRUPT
BEQ ORGTR ;IF YES, SERVICE
CMP LINANS,R5 ;DID ANSWER LINE INTERRUPT
BEQ ANSTR ;IF YES, SERVICE
MOV R5,2DMBCSR
MOV 2DMBSR,R3
ERRORN ;INTERRUPT ON INCORRECT LINE
BR FATEX

;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
;IF NO INTERRUPT FLAGS SET
;EXIT TRANSITION DETECTION
ORGTRR: BNE TRANEX
ERRORN
BR FATEX

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2798
2799
2800 ;RECORD TRANSITIONS FOR ANSWER LINE
2801 012164 032704 100000 ANSTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT,
2802 012170 001403 BEQ ANSTR1 ;SET RING TRANSITION BIT
2803 012172 052737 000010 016050 BIS #10,ANSFLG
2804 012200 032704 040000 ANSTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
2805 012204 001403 BEQ ANSTR2 ;SET CARRIER TRANSITION BIT
2806 012206 052737 000004 016050 BIS #4,ANSFLG
2807 012214 032704 020000 ANSTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
2808 ;CAUSED INTERRUPT
2809 012220 001403 BEQ ANSTR3 ;SET CLEAR TO SEND
2810 ;TRANSITION BIT
2811 012222 052737 000002 016050 BIS #2,ANSFLG
2812 012230 032704 010000 ANSTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
2813 ;CAUSED INTERRUPT
2814 012234 001403 BEQ ANSTR4 ;SET SECONDARY RECEIVE
2815 012236 052737 000001 016050 BIS #1,ANSFLG ;TRANSITION BIT
2816 012244 032704 170000 ANSTR4: BIT #RINGF+COF+CSF+SECRXF,R4 ;IF NO INTERRUPT FLAGS SET
2817 ;EXIT TRANSITION DETECTION
2818 012250 001007 BNE TRANEX
2819 012252 104016 ANSTRR: ERRORN
2820 012254 005037 016002 FATEX: CLR TSTNO
2821 012260 022626 POP2SP
2822 012262 000177 000000 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 016062 MOV RINGRET,(SP)
2830 012300 012777 000140 003446 TRANX1: MOV #SCNENA+INTENA,@DMBCSR ;RESTART SCANNER
2831 012306 000002 RTI
2832
2833 ;TYPE TRANSITION DATA AND RETURN
2834
2835 012310 017737 003440 013274 TRNTYP: MOV @DMBCSR,DATA1
2836 012316 017737 003434 013276 MOV @DMBLSR,DATA2
2837 012324 104004 TYPE
2838 012326 017125 MTRNDDET
2839 012330 104006 OCTASC
2840 012332 012336 TRNTAB
2841 012334 000761 BR TRANX1
2842 012336 000002 TRNTAB: 2
2843 012340 000006 6
2844 012342 013274 DATA1
2845 012344 000003 3
2846 012346 013276 DATA2

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2847
2848 ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2849
2850 012350 000005 GETLIN: RESET
2851 012352 104013 INSTRG ;TYPE "ORIGINATE LINE-"
2852 012354 016422 MSELOR ;AND GET LINE NUMBER
2853 012356 000000 0
2854 012360 000017 17
2855 012362 016044 LINORG
2856 012364 104013 INSTRG ;TYPE "ANSWER LINE-"
2857 012366 016446 MSELANS ;AND GET LINE NUMBER
2858 012370 000000 0
2859 012372 000017 17
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

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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	QERR1		
2915	012622	022626			SETUPB: POP2SP			
2916	012624	000177	000454		JMP	QNXTT5		
2917	012630	012766	000340	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, QERR1		
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	QERR2		
2940	012730	022626			CKRNG2: POP2SP			
2941	012732	000177	000346		JMP	QNXTT5		

2942						
2943	012736	005037	016050		WAITR:	CLR ANSFLG
2944	012742	005037	016052			CLR ORGFLG
2945	012746	012777	012030	002774		MOV #TRANS, QDMBVEC
2946	012754	012737	012774	016062		MOV #WAITRR, RRGRET ;SET UP FOR RETURN
2947						
2948	012762	012777	000140	002764		MOV #SCNENA+INTENA, QDMBCSR ;FROM RING DETECTION
2949	012770	005037	177776			CLR PS ;START SCANNER
2950	012774	005037	016054		WAITRR:	CLR TIME1
2951	013000	012737	000025	016056		MOV #25, TIME2
2952	013006	005237	016054		WAITR1:	INC TIME1 ;WAIT FOR TRANSITIONS OF
2953	013012	001375				BNE WAITR1 ;CARRIER AND CLEAR TO SEND
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 ;LOCK OUT FURTHER INTERRUPTS
2962	013032	005077	002716			CLR QDMBCSR ;STOP LINE SCANNER
2963	013036	011605				MOV (SP), R5
2964	013040	012537	013274			MOV (R5)+, DATA1
2965	013044	012537	013276			MOV (R5)+, DATA2
2966	013050	012537	013300			MOV (R5)+, DATA3
2967	013054	012537	013302			MOV (R5)+, DATA4
2968	013060	012537	013264			MOV (R5)+, ERR1
2969	013064	012537	013266			MOV (R5)+, ERR2
2970	013070	012537	013270			MOV (R5)+, ERR3
2971	013074	012537	013272			MOV (R5)+, ERR4
2972	013100	012537	013304			MOV (R5)+, NXTTS
2973	013104	010516				MOV R5, (SP)
2974	013106	013705	013274			MOV DATA1, R5
2975	013112	013777	016046	002634		MOV LINANS, QDMBCSR ;SET LINE COUNTER TO ANSWER LINE
2976	013120	017704	002632			MOV QDMBSR, R4 ;GET ACTUAL ANSWER LINE STATUS
2977	013124	013703	016046			MOV LINANS, R3
2978	013130	020504				CMP R5, R4 ;COMPARE
2979	013132	001402				BEQ CKTRN1
2980	013134	004777	000124			JSR PC, QERR1
2981	013140	013777	016044	002606	CKTRN1:	MOV LINORG, QDMBCSR ;SET LINE COUNTER TO ORIGINATE LINE
2982	013146	017704	002604			MOV QDMBSR, R4 ;GET ACTUAL ORIGINATE LINE STATUS
2983	013152	013705	013276			MOV DATA2, R5
2984	013156	013703	016044			MOV LINORG, R3
2985	013162	020504				CMP R5, R4 ;COMPARE
2986	013164	001402				BEQ CKTRN2
2987	013166	004777	000074			JSR PC, QERR2

2988				
2989				
2990				
2991				
2992	013172	105737	013301	
2993	013176	100003		
2994	013200	042737	000010	016050
2995	013206	113704	016050	
2996	013212	113705	013300	
2997	013216	013703	016046	
2998	013222	020504		
2999	013224	001402		
3000	013226	004777	000036	
3001	013232	013704	016052	
3002	013236	013705	013302	
3003	013242	013703	016044	
3004	013246	020504		
3005	013250	001402		
3006	013252	004777	000014	
3007	013256	022626		
3008	013260	000177	000020	
3009	013264	000000		
3010	013266	000000		
3011	013270	000000		
3012	013272	000000		
3013	013274	000000		
3014	013276	000000		
3015	013300	000000		
3016	013302	000000		
3017	013304	000000		

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

CKTRN2: TSTB DATA3+1
 BPL .+10
 BIC #10,ANSFLG
 MOVB ANSFLG,R4
 MOVB DATA3,R5
 MOV LINANS,R3
 CMP R5,R4
 BEQ CKTRN3
 JSR PC,@ERR3
 CKTRN3: MOV ORGFLG,R4
 MOV DATA4,R5
 MOV LINORG,R3
 CMP R5,R4
 BEQ CKTRN4
 JSR PC,@ERR4
 CKTRN4: POP2SP
 JMP @NXTTS

;GET TRANSITION DATA FOR

;DID CORRECT TRANSITIONS OCCUR

;GET TRANSITION DATA FOR

;DID CORRECT TRANSITIONS OCCUR

ERR1: 0
 ERR2: 0
 ERR3: 0
 ERR4: 0
 DATA1: 0
 DATA2: 0
 DATA3: 0
 DATA4: 0
 NXTTS: 0

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									


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;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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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
        ;UPDATE TEST NUMBER
        ;GET TEST NUMBER
        ;MULTIPLY TEST NUMBER BY 4
LOOPX: INC    TSTNO
        TSTENT: MOV TSTNO, R5
        ASL    R5
        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 ERROR OCCURED FLAG
        BIC    #INTENA, @TKCSR
        RTI
        ;GO TO TEST
        ;SET UP TO EXIT TEST AFTER LOOP
        ;GO TO LOOP SERVICE
LOOPL: MOV    #1, ICOUNT
        BR     LOOPER
        ;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
3114	013654	001341		
3115	013656	032777	001000	002104
3116	013664	001403		
3117	013666	017616	000000	
3118	013672	000002		
3119	013674	062716	000002	
3120	013700	000002		

FREEZX:

BIT	#SW10,@SWR
BNE	LOOPX
BIT	#SW09,@SWR
BEQ	FREEZX
MOV	@(SP),(SP)
RTI	
ADD	#2,(SP)
RTI	

```

:IF SW10=1,
:ESCAPE TO NEXT TEST
:IF SW09=1,
:FREEZE CURRENT DATA
:GET LOOPING ADDRESS
:LOOP
:CONTINUE IN CURRENT TEST

```

```

3121
3122
3123
3124
3125 013702 005037 015774
3126
3127 013706 005037 014122
3128 013712 005037 014134
3129 013716 000451
3130
3131
3132
3133
3134
3135
3136
3137
3138
3139
3140
3141
3142
3143 013720 005037 015774
3144 013724 012737 016203 014122
3145 013732 012737 014210 014134
3146 013740 000440
3147
3148
3149
3150
3151
3152
3153
3154
3155
3156
3157
3158
3159
3160
3161
3162 013742 005037 015774
3163 013746 012737 016152 014122
3164
3165 013754 012737 014226 014134
3166 013762 000427

```

;GENERAL ERROR SERVICE
;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
ERR: CLR ERRFLG ;ALWAYS TYPE PC+2
;OF TEST THAT FAILED
CLR ERRMSG ;NO MESSAGE
CLR ERTAB ;NO TABLE OF DATA
BR ERGEN ;OUTPUT ERROR MESSAGE
;TRANSITION DETECTION ERROR SERVICE
;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 REGI
; BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
; CC=LINE ON WHICH ERROR OCCURED
ERRT: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
MOV #MTRANE,ERRMSG ;TYPE "TRANSITION ERROR"
MOV #ERTAB1,ERTAB ;TABLE OF DATA
BR ERGEN ;OUTPUT ERROR MESSAGE
;ON-LINE STATUS ERROR SERVICE
;FORMAT FOR 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
ERRS: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
MOV #MLINE1,ERRMSG ;TYPE "LINE ERROR"
;EXP REC LINE"
MOV #ERTAB2,ERTAB ;TABLE OF DATA
BR ERGEN ;OUTPUT ERROR MESSAGE

```

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 ;BBBBB=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 SAVOSP
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: RESOS ; RESTORE R0-R5
3247
3248 ; ERROR HALT SERVICE
3249
3250 014140 032777 100000 001622 .3: BIT #SW15,@SWR ; IF SW15=0, DO NOT
3251 014146 001406 BEQ .4 ; HALT ON ERROR
3252 014150 000000 HALT ; HALT AND DISPLAY ADDRESS OF FAILING TES
3253 014152 022737 000176 015770 CMP #SWREG,SWR
3254 014160 001001 BNE .4
3255 014162 104025 CNTLUU
3256 014164 012737 000001 015774 .4: MOV #1,ERRFLG ; SET ERROR OCCURED FLAG
3257 014172 042777 000100 001560 BIC #INTENA,@TKCSR
3258 014200 000002 RTI ; RETURN TO TEST
3259
3260
3261

```

3262
 3263
 3264
 3265
 3266 014202 000001
 3267 014204 000006
 3268 014206 016026
 3269 014210 000003
 3270 014212 000002
 3271 014214 016022
 3272 014216 000002
 3273 014220 016020
 3274 014222 000002
 3275 014224 016016
 3276 014226 000003
 3277 014230 000003
 3278 014232 016022
 3279 014234 000003
 3280 014236 016020
 3281 014240 000002
 3282 014242 016016
 3283 014244 000002
 3284 014246 000006
 3285 014250 016020
 3286 014252 000003
 3287 014254 016016
 3288 014256 000002
 3289 014260 000006
 3290 014262 016022
 3291 014264 000006
 3292 014266 016020
 3293 014270 000004
 3294 014272 000003
 3295 014274 016022
 3296 014276 000003
 3297 014300 016020
 3298 014302 000002
 3299 014304 016016
 3300 014306 000002
 3301 014310 016012
 3302
 3303 014312 000001
 3304 014314 000006
 3305 014316 000176
 3306

```

;TABLE S OF DATA FOR ERROR TYPEOUT
;TABLE FOR TRANSITION STATUS ERROR

ERTAB0: 1
        6
        SAVPC
ERTAB1: 3
        2
        SAVR5 ;CONTAINS EXPECTED TRANSITION STATUS
        2
        SAVR4 ;CONTAINS RECEIVED TRANSITION STATUS
        2
        SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
ERTAB2: 3
        3
        SAVR5 ;CONTAINS EXPECTED LINE STATUS
        3
        SAVR4 ;CONTAINS RECEIVED LINE STATUS
        2
        SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCC
ERTAB3: 2
        6
        SAVR4
        3
        SAVR3
ERTAB4: 2
        6
        SAVR5 ;CONTAINS EXPECTED CONTROL STATUS
        6
        SAVR4 ;CONTAINS RECEIVED CONTROL STATUS
ERTAB5: 4
        3
        SAVR5 ;CONTAINS EXPECTED LINE STATUS
        3
        SAVR4 ;CONTAINS RECEIVED LINE STATUS
        2
        SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCC
        2
        SAVR1 ;CONTAINS NUMBER OF LINE UNDER TEST

SWRTB: 1
        6
        SWREG
  
```

```
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
3312 014342 012537 016030 MOV (R5)+,WADCNT ;SET UP POINTER FOR CONVERTED DATA
3313 014346 012537 016032 OCTAS1: MOV (R5)+,CHRCNT ;GET NUMBER OF WORDS TO BE CONVERTED
3314 014352 013537 014654 MOV 2(R5)+,BINWRD ;GET NUMBER OF DIGITS IN WORD
3315 014356 104010 CONVERT ;GET DATA TO BE CONVERTED
3316 014360 005337 016030 DEC WADCNT ;CONVERT TO ASCII
3317 014364 001370 BNE OCTAS1 ;IF ALL DATA IS NOT CONVERTED
3318 014366 112714 000100 MOVB #100,(R4) ;CONTINUE
3319 014372 005737 014510 TST SMLN ;PUT TERMINATOR AT END OF MESSAGE
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 INSTRG
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
```


3349									
3350									
3351									
3352	014512	013700	016032						
3353	014516	012701	017406						
3354	014522	104011							
3355	014524	062737	000060	014656					
3356	014532	113721	014656						
3357	014536	005300							
3358	014540	001370							
3359	014542	114124							
3360	014544	005337	016032						
3361	014550	001374							
3362	014552	112724	000040						
3363	014556	000002							
3364									
3365									
3366									
3367	014560	005037	014656						
3368	014564	023737	014656	014660					
3369	014572	103027							
3370	014574	012737	000021	014634					
3371	014602	000407							
3372	014604	023737	014656	014660					
3373	014612	103403							
3374	014614	163737	014660	014656					
3375	014622	006137	014654						
3376	014626	006137	014656						
3377	014632	005327							
3378	014634	000000							
3379	014636	001362							
3380	014640	006037	014656						
3381	014644	005137	014654						
3382	014650	000002							
3383	014652	000000							
3384	014654	000000							
3385	014656	000000							
3386	014660	000000							
3387									
3388									
3389									
3390	014662	016637	000004	016026					
3391									
3392									
3393									
3394	014670	010537	016022						
3395	014674	010437	016020						
3396	014700	010337	016016						
3397	014704	010237	016014						
3398	014710	010137	016012						
3399	014714	010037	016010						
3400	014720	000002							

;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE

```

BINASC: MOV   CHRCNT,RO           ;SET UP COUNT FOR DIGITS TO BE CONVERTED
        MOV   #TEMTAB,R1        ;SET UP POINTER FOR TEMPORARY STORAGE
BINASA: EXTRACT                   ;EXTRACT ONE DIGIT
        ADD   #60,DIGIT         ;CONVERT FROM BCD TO ASCII
        MOVB  DIGIT,(R1)+       ;STORE DIGIT
        DEC   RO                ;IF ALL DIGITS NOT DONE,
        BNE   BINASA           ;CONTINUE
BINASB: MOVB  -(R1),(R4)+       ;REVERSE ORDER OF DIGITS
        DEC   CHRCNT           ;IF ALL CHARACTERS ARE NOT
        BNE   BINASB          ;IN ORDER, CONTINUE
        MOVB  #40,(R4)+       ;INSERT SPACE AFTER LAST DIGIT
        RTI                    ;RETURN TO CALLING ROUTINE
  
```

;SINGLE PRECISION UNSIGNED DIVIDE LOOP

```

DIVI:   CLR   DIVIDH
DIVIU:  CMP   DIVIDH,DIVIS
        BHIS  DIVIB
        MOV  #17,DIVCNT
        BR   DIVIC
DIVIA:  CMP   DIVIDH,DIVIS
        BLO  DIVIC
        SUB  DIVIS,DIVIDH
DIVIC:  ROL  DIVIDL
        ROL  DIVIDH
        DEC  (PC)+
DIVCNT: 0
        BNE  DIVIA
        ROR  DIVIDH
        COM  DIVIDL
        RTI
DIVIB:  HALT
DIVIDL: 0
DIVIDH: 0
DIVIS:  0
  
```

;SAVE PC OF TEST THAT FAILED AND RO-R5

```

SV05P: MOV   4(SP),SAVPC
  
```

;SAVE RO-R5

```

SV05:  MOV   R5,SAVR5
        MOV   R4,SAVR4
        MOV   R3,SAVR3
        MOV   R2,SAVR2
        MOV   R1,SAVR1
        MOV   RO,SAVR0
        RTI
  
```

3401						
3402						;RESTORE R0-R5
3403						
3404	014722	013700	016010	RS05:	MOV	SAVR0,R0
3405	014726	013701	016012		MOV	SAVR1,R1
3406	014732	013702	016014		MOV	SAVR2,R2
3407	014736	013703	016016		MOV	SAVR3,R3
3408	014742	013704	016020		MOV	SAVR4,R4
3409	014746	013705	016022		MOV	SAVR5,R5
3410	014752	000002			RTI	
3411						
3412						;TELETYPE OUTPUT ROUTINE
3413						
3414	014754	017605	000000	TYP0R:	MOV	2(SP),R5 ;GET POINTER TO MESSAGE (ON STACK)
3415	014760	062716	000002		ADD	#2,(SP) ;CORRECT STACK FOR RETURN
3416	014764	105777	000774	TYP0RA:	TSTB	2TPCSR ;WAIT FOR TELEPRINTER READY
3417	014770	100375			BPL	TYP0RA
3418	014772	122715	000100		CMPB	#100,(R5) ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
3419	014776	001001			BNE	TYP0R1
3420	015000	000002			RTI	;CHARACTER IS TERMINATOR, EXIT
3421	015002	122715	000042	TYP0R1:	CMPB	#42,(R5) ;IF CHARACTER=42,
3422	015006	001406			BEQ	TYPECL ;TYPE LINE FEED
3423	015010	122715	000045		CMPB	#45,(R5) ;IF CHARACTER=45,
3424	015014	001403			BEQ	TYPECL ;TYPE CARRIAGE RETURN
3425	015016	112577	000744	TYP0R2:	MOVB	(R5)+,2TPDBR ;GET CHARACTER
3426	015022	000760			BR	TYP0RA ;TYPE IT
3427	015024	142715	000040	TYP0CL:	BICB	#40,(R5) ;CONVERT CODE OF 42 OR 45
3428	015030	152715	000010		BISB	#10,(R5) ;TO 12 OR 15
3429	015034	000770			BR	TYP0R2 ;TYPE IT
3430						
3431						
3432						;INPUT OCTAL CHARACTER STRING
3433						;TERMINATOR IS CARRIAGE RETURN
3434						;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
3435						;CARRIAGE RETURN ARE TYPED, THE IN PUT WILL
3436						;BE RE-REQUESTED
3437						
3438	015036			INSTR:		
3439	015036	011605			MOV	(SP),R5 ;GET POINTER TO ARGUMENTS
3440	015040	012537	015064		MOV	(R5)+,MSG ;GET MESSAGE TO BE TYPED
3441	015044	012537	015316		MOV	(R5)+,LOLIM ;GET LOWER LIMIT
3442	015050	012537	015320		MOV	(R5)+,HILIM ;GET UPPER LIMIT
3443	015054	012537	015322		MOV	(R5)+,STORE ;GET DATA STORAGE LOCATION
3444	015060	010516			MOV	R5,(SP) ;RESTORE STACK
3445	015062	104004		INSTR1:	TYPE	MSG ;TYPE MESSAGE
3446	015064	000000		MSG:	0	
3447	015066	012704	015324		MOV	#INBUF,R4 ;SET UP CHARACTER INPUT BUFFER
3448	015072	012703	000007		MOV	#7,R3 ;SET UP INPUT COUNT
3449	015076	105777	000656	INSTRB:	TSTB	2TKCSR ;WAIT FOR CHARACTER
3450	015102	100375			BPL	INSTRB
3451	015104	005037	002152	INSTRB:	CLR	SINTFL
3452	015110	117737	000646		MOVB	2TKDBR,TMP1
3453	015116	142737	000200		BICB	#200,TMP1
3454	015124	113714	014504		MOVB	TMP1,(R4)
3455	015130	121427	000007		CMPB	(R4),#7
3456	015134	001420			BEQ	INSTR

```

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    IS
3461 015152 005037 014504      CLR    TMP1
3462 015156 000741      BR     INSTR1
3463 015160 112477 000602      IS:   MOVB   (R4)+,DTPDBR ;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

```

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	START0		
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	015612	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		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,DM9VEC	; 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			RTS	PC	
3587							

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

;INDIRECT POINTERS

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

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

;PROGRAM VARIABLES

ERRFLG: 0
 TRACON: 0
 PASCNT: 0
 TSTNO: 0
 RETURN: 0
 ICOUNT: 0
 SAVRO: 0
 SAVR1: 0
 SAVR2: 0
 SAVR3: 0
 SAVR4: 0
 SAVR5: 0
 SAVSP: 0
 SAVPC: 0
 WRDCNT: 0
 CHRCNT: 0
 TSTPNT: TSTTBO
 TSTMAX: 0
 LINFLG: 0
 LINE: 0
 LINORG: 0
 LINANS: 0
 ANSFLG: 0
 ORGFLG: 0
 TIME1: 0
 TIME2: 0
 TIFLG: 0
 RNGRET: 0

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MVECTO: .ASCII ;%"VECTOR ADDRESS-@;

MREGAD: .ASCII ;%"CONTROL REGISTER ADDRESS-@;

MTEST: .ASCII ;%"TEST-@;

MQM: .ASCII ; ?@;
 MCRLF: .ASCII ; %"@;
 MLINE: .ASCII ; %"SINGLE LINE CABLE TEST%"@;

MLINEI: .ASCII ;%"LINE NUMBER-@;

MFATAL: .ASCII ;FATAL ERROR%"CSTAT LSTAT@;

MTRNDE: .ASCII ;%"TRANSITION DETECTED%"CSTAT LSTAT@;

MPFAIL: .ASCII ;%"POWER FAILURE@;

MPF1: .ASCII ;-CURRENT TEST WILL RESTART%"@;

MCONTC: .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		
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	017474	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	017530	000001
3802	017532	000000
3803	017534	002154
3804	017536	000001
3805	017540	002202
3806	017542	004000
3807	017544	002244
3808	017546	004000
3809	017550	002306
3810	017552	004000
3811	017554	002350

```

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

0
;EMT DISPATCH TABLE

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

EMTLIM: 0
TSTLST: TSTTB0
        TSTTB1
        TSTTB2
        TSTTB3
        0
        0
        0
        0

GRO:   NO-1
        N1-100-1
        N2-200-1
        N3-300-1

TSTTB0: T0
        1
        T1
        TIMES
        T2
        TIMES
        T3
        TIMES
        T4

```

```

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

```

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

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

```

TSTTB1: T100
         1
         T101
         TIMES
         T102
         TIMES
         T103
         TIMES
         T104
         TIMES
         T105
         TIMES
         T106
         TIMES
         T107
         TIMES
         0
TSTTB2: T200
         1
         0
TSTTB3: T300
         1
.END

```

ANSFLG	016050	2803*	2806*	2811*	2815*	2896*	2905	2928	2943*	2994*	2995	3626#
ANSTR	012164	2770	2801#									
ANSTRR	012252	2819#										
ANSTR1	012200	2802	2804#									
ANSTR2	012214	2805	2807#									
ANSTR3	012230	2809	2812#									
ANSTR4	012244	2814	2816#									
BINASA	014522	3354#	3358									
BINASB	014542	3359#	3361									
BINASC	014512	3352#	3774									
BINWRD=	014654	774#	3314*									
BUSY =	000020	779#	1111	1115	1386	1412	1891	2874				
CHCK	015306	3480	3502#									
CHRCNT	016032	3313*	3352	3360*	3619#							
CKINT	013402	3052#	3788									
CKINTT=	104026	842#	2276	2340	2379	2438	2479	2523	2564	2604	2648	2713 2747
CKRING=	104021	837#	2254	2415								
CKRNG	012640	2922#	3783									
CKRNG1	012704	2931	2933#									
CKRNG2	012730	2937	2940#									
CKTRAN=	104023	839#	2282	2346	2444	2485	2529	2570	2610	2654	2719	
CKTRN	013024	2961#	3785									
CKTRN1	013140	2979	2981#									
CKTRN2	013172	2986	2992#									
CKTRN3	013232	2999	3001#									
CKTRN4	013256	3005	3007#									
CLRMUX=	002000	785#	1365	1485	1530	1575	1620	1809	1838	1883	1951	1990 2029 2068
		2873										
CLRSCN=	004000	786#	1385	1411	1890	2873						
CNTLU	014406	3326#	3787									
CNTLUU=	104025	841#	915	1029	2237	2398	3255					
CO =	000100	800#	1676	2118	2285	2289	2447	2450	2488	2492	2573	2577 2613 2618
COF =	040000	789#	2781	2793	2804	2816						
CONVER=	104010	828#	3315									
CS =	000040	799#	1676	2118	2285	2289	2450	2492	2573	2613		
CSF =	020000	788#	2784	2793	2807	2816						
CSTR1	002202	1055#										
CSTR2	002244	1068#										
CSTR3	002306	1081#										
CSTR4	002350	1094#										
CSTR5	002412	1110#										
DATA1	013274	919#	921*	924*	926	2835*	2844	2964*	2974	3013#	3553*	3555* 3557* 3559
DATA2	013276	920#	921	922*	925*	2836*	2846	2965*	2983	3014#	3554*	3555* 3556* 3558*
DATA3	013300	2966*	2992	2996	3015#							
DATA4	013302	2967*	3002	3016#								
DIALM	016242	2901	3654#									
DIGIT =	014656	775#	3355*	3356								
DISPLA	015772	887#	3600#									
DISPRE	000174	861#	887									
DIVCNT	014634	3370*	3378#									
DIVI	014560	3367#	3775									
DIVIA	014604	3372#	3379									
DIVIB	014652	3369	3383#									
DIVIC	014622	3371	3373	3375#								
DIVIDH	014656	775	3367*	3368	3372	3374*	3376*	3380*	3385#			
DIVIDL	014654	774	3375*	3381*	3384#							

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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	1385#	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	3163	3643#	
MPFAIL	017171	3537	3740#	
MPF1	017211	3542	3743#	
MQM	017012	3469	3718#	
MREGAD	016746	944	3711#	
MSELAN	016446	2857	3677#	
MSELOR	016422	2852	3673#	
MSG	015064	3440#	3446#	
MSTATE	016064	3197	3633#	
MTTEST	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	2058	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	2108#		
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	1461*
		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
R5	=%000005	3463	3476*	3478	3481	3483	3485*	3466	3487	3517	3529*			
		765#	961*	962*	963*	964*	965*	966*	967*	968	969	1323*	1325	1327
		1332*	1343*	1348	1353*	1373*	1377	1382*	1389*	1393	1398*	1424*	1427*	1428
		1462*	1465*	1466	1490*	1496*	1498	1506*	1535*	1541*	1543	1551*	1580*	1586*
		1588	1596*	1625*	1631*	1633	1641*	1670*	1676*	1678	1686*	1693	1716*	1722*
		1724	1732*	1739	1762*	1768*	1770	1778*	1785	1812*	1818*	1821	1847*	1866
		1872*	1894*	1912	1918*	1956*	1962*	1964	1972*	1995*	2001*	2003	2011*	2034*
		2040*	2042	2050*	2073*	2079*	2081	2089*	2112*	2118*	2120	2128*	2135	2151*
		2157*	2159	2167*	2174	2190*	2196*	2198	2206*	2213	2765*	2766*	2767	2769
		2771	2869*	2870	2871	2872	2922*	2923	2924	2925	2926	2927*	2930	2933*
		2963*	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974*	2978
		2983*	2985	2996*	2998	3002*	3004	3094*	3095*	3096*	3097*	3098	3100	3101
		3308*	3312	3313	3314	3394	3409*	3414*	3418	3421	3423	3425	3427*	3428*
		3439*	3440	3441	3442	3443	3444	3518	3528*					
SAVPC	016026	3230	3268	3390*	3617#									
SAVRO	016010	3399*	3404	3610#										
SAVR1	016012	3301	3398*	3405	3611#									
SAVR2	016014	3397*	3406	3612#										
SAVR3	016016	3275	3282	3287	3299	3396*	3407	3613#						
SAVR4	016020	3273	3280	3285	3292	3297	3395*	3408	3614#					
SAVR5	016022	3271	3278	3290	3295	3394*	3409	3615#						
SAVSP	016024	3520*	3527	3616#										
SAVOSP=	104005	825#	3233											
SCNENA=	000040	780#	1094	1095	1099	1100	1110	1114	1853	1871	1899	1917	2330	2598
		2830	2895	2948										
SCNT1	006340	1838#	1862	1870										
SCNT1A	006372	1843#	1846											
SCNT1B	006444	1852#	1874											
SCNT1C	006516	1848	1864#											
SCNT1D	006536	1863	1867	1871#										
SCNT2	006554	1882#	1908	1916										
SCNT2A	006600	1886#	1889											
SCNT2B	006670	1898#	1920											
SCNT2C	006742	1895	1910#											
SCNT2D	006762	1909	1913	1917#										
SCOPE =	104002	822#	1049	1063	1076	1089	1104	1118	1134	1150	1169	1188	1206	1224
		1242	1261	1279	1297	1315	1335	1356	1401	1438	1476	1521	1566	1611
		1656	1702	1748	1794	1830	1875	1921	1982	2021	2060	2099	2138	2177
		2216												
SCOPEF=	104003	823#	1330	1351	1380	1396	1431	1469	1501	1516	1546	1561	1591	1606
		1636	1651	1681	1696	1727	1742	1773	1788	1816	1824	1861	1869	1907
		1915	1967	2006	2045	2084	2123	2162	2201					

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 DZDMD8.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	010760	2363	2370#
T103E4	010764	2364	2372#
T104	007550	2064#	3876
T105	007726	2104#	3878
T106	010102	2143#	3880
T107	010256	2182#	3882
T11	002674	1174#	3821
T12	002764	1192#	3823
T13	003054	1210#	3825
T14	003144	1228#	3827
T15	003234	1247#	3829
T16	003322	1265#	3831
T17	003410	1283#	3833
T2	002244	1067#	3807
T20	003476	1301#	3835
T200	010432	2230#	3885
T201	010770	2375#	
T202A	011052	2399	2403#
T202A1	011060	2406	2407#
T202B	011064	2405	2415#
T202B1	011074	2421	2425#
T202B2	011100	2423	2427#
T202C	011104	2419	2434#
T202D	011120	2436#	
T202D1	011164	2460	2465#
T202D2	011170	2461	2467#
T202D3	011174	2462	2469#
T202D4	011200	2463	2471#
T202E	011204	2464	2477#
T202E1	011250	2501	2506#
T202E2	011254	2502	2508#
T202E3	011260	2503	2510#
T202E4	011264	2504	2512#
T202F	011270	2505	2519#
T202F2	011350	2544	2549#
T202F3	011354	2545	2551#
T202F4	011360	2546	2553#
T202F5	011364	2547	2555#
T202G	011370	2548	2562#
T202G1	011434	2585	2590#
T202G2	011440	2586	2592#
T202G3	011444	2587	2594#
T202G4	011450	2588	2596#
T202H	011454	2589	2602#
T202H2	011520	2627	2632#
T202H3	011524	2628	2634#

COMMEN	756#	870#	1040#	1171#	1244#	1923#	1931#	2230#	2391#	3805#	3870#				
DMEND	1#														
DMFRNT	1#														
ENTDEF	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834
	825	836	837	838	839	840	841	842	843	870#					
INTS	1036#	1244	1262	1280	1298										
MUXS1	1036#	1477	1522	1567	1612	1944	1983	2022	2061						
MUXS2	1036#	1657	1703	1749	2100	2139	2178								
NOINT	1036#	1171	1189	1207	1225										
TM	871#	3805	3807	3809	3811	3813	3815	3817	3819	3821	3823	3825	3827	3829	3831
	3833	3835	3837	3839	3841	3843	3845	3847	3849	3851	3853	3855	3857	3859	3861
	3863	3865	3870	3872	3874	3876	3878	3880	3882						
TS	869#	1040	1054	1067	1080	1093	1109	1123	1139	1155	1174	1192	1210	1228	1247
	1265	1283	1301	1320	1340	1364	1406	1444	1480	1525	1570	1615	1661	1707	1753
	1799	1837	1881	1931	1947	1986	2025	2064	2104	2143	2182	2230	2375	2391	
TSS	869#														
SAUTO	1#														
SBUFE	1#														
SCOMP	1#														
SCYCLE	1#														
SEOP	1#														
SFINI	1#														
SGETPA	1#														
SHEADE	1#														
SMOCK	1#														
SMSG	1#														
SPFAIL	1#														
SQUEST	1#														
SRANCL	1#														
SRCLK	1#														
SSCOPE	1#														
SSIMBC	1#														
SSOFTC	1#														
STRPDE	1#														
STSTN	1#														
SVARIA	1#														
SXZ	1#														

ADD	924	925	942	953	3047	3097	3119	3309	3355	3415	3557	3558				
ASL	3045	3095	3096	3489	3490	3491										
ASR	963	964	965	966	967											
BEQ	893	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	1796	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						
BGT	3484															
BHT	3497															
BHTS	3369															
BIC	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	
BICB	3091	3103	3257	3566												
BIS	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														
BISB	3428	3486														
BIT	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												
BLE	977															
BLO	3373	3499														
BLT	3482															
BMI	908	929														
BNE	903	914	927	931	971	1000	1008	1016	1026	1028	1057	1070	1083	1096	1112	
	1334	1355	1371	1384	1387	1400	1413	1426	1435	1437	1453	1464	1473	1475	1495	
	1505	1511	1520	1540	1550	1556	1565	1585	1595	1601	1610	1630	1640	1646	1655	
	1675	1685	1691	1701	1721	1731	1737	1747	1767	1777	1783	1793	1806	1829	1846	
	1874	1889	1892	1920	1961	1971	1977	2000	2010	2016	2039	2049	2055	2078	2088	
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DZDMD-B MACY11 27(732) 11-OCT-76 10:58 PAGE 113
 DZDMDB.SRC CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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 DEFAULT GLOBALS GENERATED: 0

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 RUN-TIME RATIO: 145/68=2.1
 CORE USED: 20K (39 PAGES)

