PDP11

MULTIPLEXER DIAGNOSTIC

MD-11-DZDHK-C

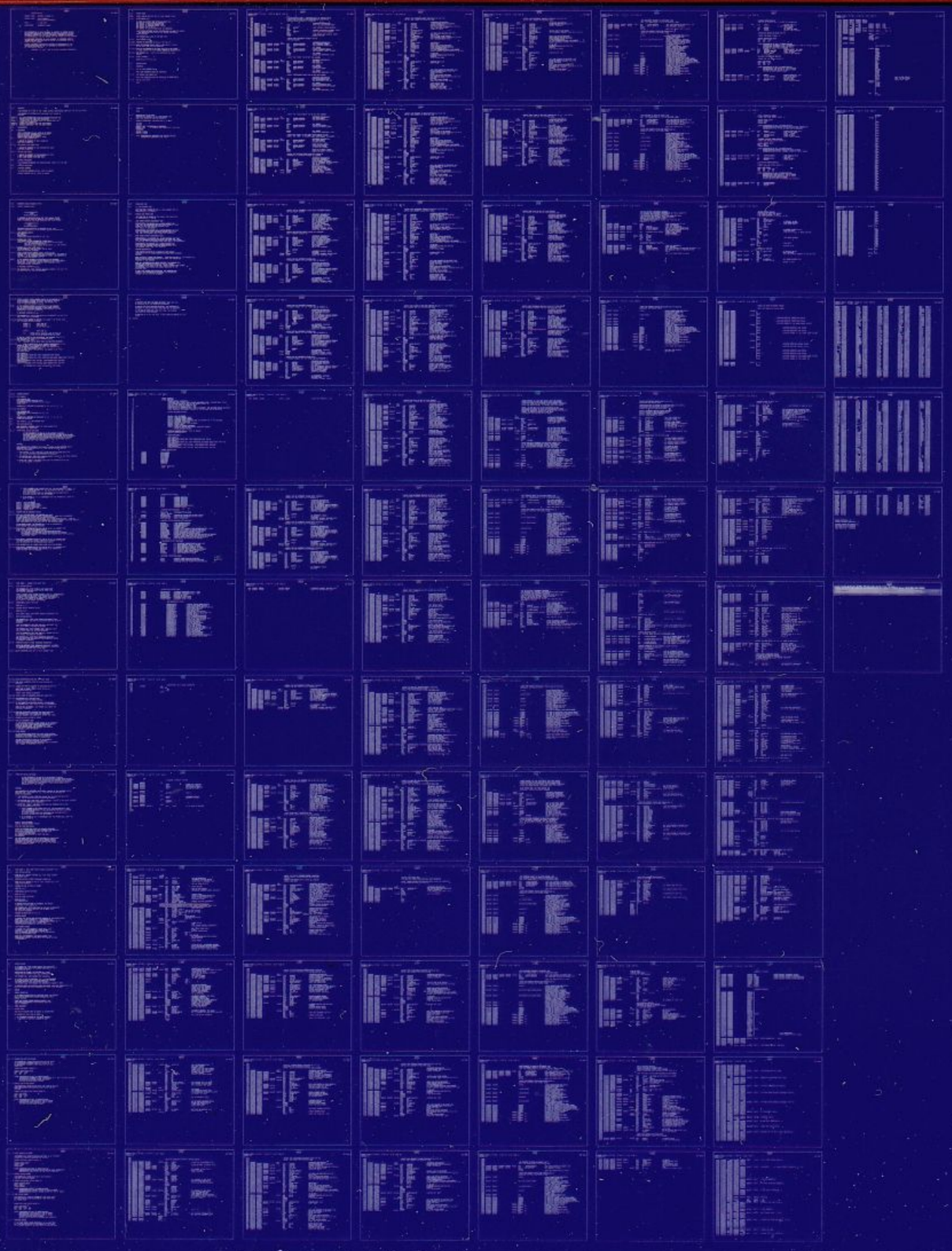
EP-DZDHK-C-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN U.S.A



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDHK-C-D

PRODUCT NAME: MODEM CONTROL
MULTIPLEXER DIAGNOSTIC

DATE : 21 AUG 1976

MAINTAINER: DIAGNOSTIC GROUP

1.0 ABSTRACT

THIS PROGRAM IS A TEST OF THE MODEM CONTROL MULTIPLEXER USED WITH THE DH11-AD OPTION

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 H315 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
WITH OR WITHOUT HARDWARE SWITCH REGISTER
ASR-33 TELETYPE OR EQUIVALENT
MODEM CONTROL MODULES M7807 & M7808

2.1.1 FOR 16 LINE SCANNER TEST

4 CABLES TO CONNECT TO TEST CONNECTOR
H861 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
H315 TEST CONNECTOR

2.1.3 FOR 0% LINE TESTS

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
2 BELL 103A MODEMS (FOR 103A TEST)
2 BELL 202C MODEMS (FOR 202C TEST)

3.0 LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING BINARY TAPES IS TO BE USED.

4.0 STARTING PROCEDURE

4.1 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200.

RESTART ADDRESS FOR ALL TESTS IS 000200

4.2 OPERATOR AND/OR PROGRAM ACTION SEQ 0003

4.2.1 INITIAL PROGRAM START

****
NOTE
****

IF PROGRAM IS BEING RUN WITH THE "XOR" MODULE TESTER
LOCATION 1030(8) MUST BE MODIFIED TO CONTAIN A 240(8)
"NOP" TO ACTIVATE THAT CODE AFFECTING THE "XOR" TESTER.

****
NOTE
****

SOFTWARE SWITCH REGISTER IS DEFINED AS LOC. 176
(REFER TO SECTION 5.1.2 FOR DYNAMIC LOADING INSTRUCTIONS)

4.2.1.1 LOAD ADDRESS 000200
SET SW00 = 1
PRESS START
***SOFTWARE SWITCH REGISTER IS LOC. 176

4.2.1.2 PROGRAM WILL TYPE
"DH11-MODEM CONTROL DIAGNOSTIC "(ONCE ONLY)
***NOTE: IF USING SOFTWARE SWITCH REGISTER THE FOLLOWING
WILL BE TYPED BEFORE TITLE:
SWR=XXXXXX NEW= (REFER TO SECTION 5.1.2 FOR OPTIONS)

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 MODEM CONTROL 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 MODEM CONTROL
UNDER TEST, A HALT WILL OCCUR AT THAT ADDRESS+2, WHEN
THE MODEM CONTROL 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 MODEM CONTROL'S 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.

4.2.1.7 THE PROGRAM WILL TYPE "LINE SELECTION PARAMETER-" AND WAIT FOR INPUT FROM THE TTY KEYBOARD.

4.2.1.8 TYPE AN OCTAL NUMBER TO SPECIFY THE LINES TO BE TESTED USING THE FOLLOWING ENCODING SCHEME:

```
BIT00 = 1       TEST LINE 00
BIT01 = 1       TEST LINE 01
BIT02 = 0       DO NOT TEST LINE 2
   .
   .
BIT15 = 1       TEST LINE 15

EG:     TYPING 377(8) SELECTS LINES 00 THRU 07
        TYPING 177777(8) SELECTS ALL 16 LINES
```

IF THE NO. TYPED IS NOT ACCEPTABLE, THE PROGRAM TYPES A "?" AND ASKS FOR THE LINE SELECT PARAMETER AGAIN.

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

4.2.1.10 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 M861 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
```

4.2.1.11 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART

4.2.2.1 WITH SW00=1

LOAD ADDRESS 200
SET SW00=1 BEFORE PRESSING START.
SOFTWARE SWITCH REGISTER IS LOC 176
PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.

4.2.2.2 WITH SW00=0

LOAD ADDRESS 200
***SOFTWARE SWITCH REGISTER IS LOC. 176
PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10

5.0 OPERATING PROCEDURE

5.1 TEST GROUP 0 16 LINE SCANNER TEST

5.1.1 TEST INITIALIZATION

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

5.1.2 OPERATIONAL SWITCH SETTINGS

IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH
REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS
THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER.
IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES
AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH
REGISTER (LOC. 176) IS USED.

CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH
REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY
DOING THE FOLLOWING:

1) TYPE CONTROL G (↑G); THIS WILL ALLOW THE TTY TO ENTER DATA INTO
   LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.

2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS
   OF THE SOFTWARE SWITCH REGISTER.)

3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE
   OF THE FOLLOWING AT THE TTY:

A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>.
(ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS
WILL BE ALLOWED)
IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH
REGISTER CONTENTS WILL NOT BE CHANGED.

B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU
BACK TO STEP 2.

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 ALL
TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL ISSUE A "RESET", 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.
NOTE: IF USING THE SOFTWARE SWITCH REGISTER AND AN EROR
HALT OCCURS. THE SOFTWARE SWITCH REGISTER CAN BE CHANGED
BY PRESSING CONTINUE THE PROGRAM WILL RESPOND WITH THE FOLLOWING:
SWR=XXXXXX NEW=

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.

5.2 TEST GROUP 1 SINGLE LINE CABLE TEST SEQ 0007

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 YHAT 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

5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE

5.3.2.3 DIAL DIAL ANSWERING DATA SET FROM ORIGINATING DATA SET

5.3.2.4 LISTEN FOR TONE IN HANDSET OF ORIGINATING DATA SET.

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

"DATA" LIGHT SHOULD ILLUMINATE

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

5.3.2.6 THE PROGRAM WILL NOW WAIT FOR INTERRUPTS FROM THE MODEM CONTROL.

5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED, THE PROGRAM WILL TYPE "TYPE TTY KEY TO DISCONNECT".

WHEN 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

5.3.4 OPERATION SWITCH SETTINGS

IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER. IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH REGISTER (LOC. 176) IS USED.

CONTROL:

THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY DOING THE FOLLOWING:

1) TYPE CONTROL G (↑G); THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.

2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)

3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE OF THE FOLLOWING AT THE TTY:

   A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A (CR). (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED)
   IF A (CR) IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.

   B) IF A CONTROL U (↑U) IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

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 TTY KEY IS STRUCK, 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

5.5 TEST RESELECTION

TO ESCAPE FROM THE TEST IN PROGRESS, AND SELECT A NEW TEST, TYPE <CONTOL 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 MODEM CONTROL 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 "MODEM CONTROL 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 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 RUSUME 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.

NOTE: IF MACHINE HAS A SOLID-STATE SWITCH REGISTER, THEN THE CONTENTS WILL BE
LOST ON A POWER FAIL AND THEREFORE WILL HAVE TO BE RELOADED.

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 REGISTER
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

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=RECEVICED 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 BBBBBB
```

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

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)

###IF USING SOFTWARE SWITCH REGISTER AND YOU WANT TO CHANGE
THE SWITCH SETTING TYPE A <↑G> BEFORE CONTINUING.
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

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

7.1.3 FOR ON LINE TESTS

NONE

7.2 OPERATING

NONE.

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

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

ADDRESSES

DHMCSR: 170500
DHMLSR: 170502

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

8.0 EXECUTION TIME

8.1 16 LINE SCANNER TEST

THE TIME FOR 2 PASSES OF THE 16 LINE SCANNER TEST IS APPROXIMATELY 1.5 MINUTES.

8.2 SINGLE LINE CABLE TEST

THE TIME FOR 12 PASSES OF THE SINGLE LINE CABLE TEST IS APPROXIMATELY 1 MINUTE.

8.3 103A MODEM CONNECT-DISCONNECT TEST

APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET FIRST DETECTS A RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SW01=1 TO DISCONNECT".

APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE PROGRAM TYPES THE ABOVE MESSAGE UNTIL THE TIME THAT THE PROGRAM TYPES "103A TEST COMPLETE".

8.4 202C MODEM CONNECT-DISCONNECT TEST

APPROXIMATELY 1.5 MINUTES WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET DETECTS THE FIRST RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SW01=1 TO DISCONNECT".

APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE PROGRAM TYPES THE ABOVE MESSAGE UNTIL THE PROGRAM TYPES "202C TEST COMPLETE".

9. PROGRAM DESCRIPTION

THIS PROGRAM CONSISTS OF A SERIES OF TEST GROUPS LINKED BY A SET OF COMMON SERVICE ROUTINES AND A KEYBOARD MONITOR.

WHEN INITIALLY LOADED AND STARTED ...SW00 MUST BE SET =1, THE PROGRAM WILL BEGIN A DIALOG WITH THE OPERATOR TO INPUT THE PARAMETERS REQUIRED BY THE PROGRAM.

WHEN ALL INFORMATION HAS BEEN INPUTTED, THE PROGRAM WILL REQUEST THE OPERATOR TO SELECT A TEST BY TYPING THE NUMBER OF THE TEST TO BE RUN. WHEN A CORRECT TEST NUMBER IS RECEIVED, THE PROGRAM WILL BEGIN EXECUTION OF THE SELECTED TEST.

AT ANY TIME DURING TEST EXECUTION, THE OPERATOR MAY CHANGE A TEST PARAMETER BY ENTERING THE APPROPRIATE COMMAND VIA THE TELETYPE KEYBOARD.

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  DZDHK-C
                        .ENABLE ABS,AMA
                                ;MODEM CONTROL DIAGNOSTIC
                                ;COPYRIGHT 1971, 1972, 1976, DIGITAL EQUIPMENT CORP., MAYNARD,MASS. 01754
                                ;THIS PROGRAM CONTAINS TEST OF THE MODEM CONTROL IN
                                ;THE OFF LINE MODE OF OPERATION ONLY
                                ;MODIFIED BY ED CROWLEY APRIL, 1976
                                ;MODIFIED BY S. CARPENTER JULY, 1976 TO SUPPORT  THE SOFTWARE SWITCH REGISTER.
                                ;ALSO, SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH REGISTER.

                                ;SWITCH REGISTER OPTIONS


                                ;SW15=1, HALT ON ERROR
                                ;SW14=1, LOOP ON CURRENT TEST
                                ;SW13=1, SUPPRESS ERROR TYPEOUT
                                ;SW12=1, SUPPRESS TRACE TRAPPING(THIS IS INOPERATIVE IN THIS RELEASE)
                                ;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

100000                  SW15=100000
040000                  SW14=40000
020000                  SW13=20000
010000                  SW12=10000
004000                  SW11=4000
002000                  SW10=2000
001000                  SW09=1000
000400                  SW08=400
000100                  SW06=100

                        .NLIST  MC,MD,CND
                        .LIST   ME
```

```
                        ;REGISTER DEFINITIONS
                        
000000                  R0=%0           ;GENERAL REGISTER
000001                  R1=%1           ;GENERAL REGISTER
000002                  R2=%2           ;GENERAL REGISTER
000003                  R3=%3           ;GENERAL REGISTER
000004                  R4=%4           ;GENERAL REGISTER
000005                  R5=%5           ;GENERAL REGISTER
000006                  SP=%6           ;PROCESSOR STACK POINTER
000007                  PC=%7           ;PROGRAM COUNTER
                        
                        ;LOCATION EQUIVALENCIES
                        
177776                  PS=177776       ;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
015430                  RADIX=DIVIS     ;CONVERSION FACTOR FOR DECIMAL OUTPUT
015424                  BINWRD=DIVIDL   ;WORD TO BE CONVERTED TO OCTAL ASCII
015426                  DIGIT=DIVIDH    ;ASCII OCTAL DIGIT
                        
                        ;CONTROL STATUS REGISTER BIT FUNCTIONS
                        
000020                  BUSY=20         ;LINE SCANNER RUNNING
000040                  SCNENA=40       ;LINE SCANNER ENABLE
000100                  INTENA=100      ;INTERRUPT ENABLE
000200                  DONE=200        ;SCANNER DONE
000400                  STEP=400        ;CAUSES LINE COUNTER TO BE INCREMENTED BY 1 COUNT
001000                  MAINT=1000      ;FORCES IS TO INPUT OF SCRATCH PAD MEMORY
002000                  CLRMUX=2000     ;CLEAR MULTIPLEXER FUNCTION FLIPFLOPS
004000                  CLRSCN=4000     ;CLEARS SCANNER SCRATCHPAD MEMORY
010000                  SECRXF=10000    ;SECONDARY RECEIVE TRANSITION WAS DETECTED BY SCANNER
020000                  CSF=20000       ;CLEAR TO SEND TRANSITION WAS DETECTED BY SCANNER
040000                  COF=40000       ;CARRIER TRANSITION WAS DETECTED BY SCANNER
100000                  RINGF=100000    ;RING SIGNAL WAS DETECTED BY SCANNER
                        
                        ;LINE REGISTER BIT FUNCTIONS
                        
000001                  LINENA=1        ;=1, RECOGNIZE TRANSITIONS ON THIS LINE
000002                  TRMRDY=2        ;=1, SEND TERMINAL READY TO MODEM
000004                  RS=4            ;=1, SEND REQUEST TO SEND TO MODEM
000010                  SECTX=10        ;=1, SEND SECONDARY TRANSMIT TO MODEM
000020                  SECRX=20        ;=1, SECONDARY RECEIVE TURNED ON BY MODEM
000040                  CS=40           ;=1, CLEAR TO SEND TURNED ON BY MODEM
000100                  CO=100          ;=1, CARRIER TURNED ON BY MODEM
000200                  RING=200        ;=1, RING TURNED ON BY MODEM
                        
                        ;SOFTWARE TRANSITION FLAGS
                        
000004                  XCO=4           ;CARRIER TRANSITION WAS DETECTED
000002                  XCS=2           ;CLEAR TO SEND TRANSITION WAS DETECTED
000001                  XSCRX=1         ;SECONDARY RECEIVE TRANSITION WAS DETECTED
```

```
                        ;INSTRUCTION DEFINITIONS

005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
010046                  PUSHR0=10046    ;SAVE R0 ON STACK
012600                  POPR0=12600     ;RESTORE R0 FROM STACK
024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE
022626                  POP2SP=22626    ;INCREMENT STACK TWICE

                                ;EMT DEFINITION TABLE

104000                          ERRORC=EMT+X            ;CONTROL STATUS ERROR SERVICE
104001                          ERRORL=EMT+X            ;LINE STATUS ERROR SERVICE
104002                          SCOPE=EMT+X             ;SCOPE LOOP AND ITERATION SERVICE
104003                          SCOPEF=EMT+X            ;DATA FREEZE SERVICE
104004                          TYPE=EMT+X              ;TELETYPE OUTPUT
104005                          SAVOSP=EMT+X            ;SAVE R0-R5, PC+2 OF CALL
104006                          OCTASC=EMT+X            ;CONVERT DATA TO ASCII AND TYPE
104007                          RESO5=EMT+X             ;RESTORE R0-R5
104010                          CONVERT=EMT+X           ;ASCII CONVERSION ROUTINE
104011                          EXTRACT=EMT+X           ;DIGIT EXTRACTION ROUTINE
104012                          ERROR=EMT+X             ;TYPE PC OF FAILING TESTS ONLY
104013                          INSTRG=EMT+X            ;INPUT OCTAL DATA STRING
104014                          ERRORT=EMT+X            ;TRANSITION ERROR
104015                          ERRORS=EMT+X            ;ON LINE STATUS ERROR
104016                          ERRORN=EMT+X            ;FATAL TRANSITION
104017                          GETLNS=EMT+X            ;INPUT LINE NUMBERS
104020                          SETUP=EMT+X             ;SET UP FOR ON LINE TEST
104021                          CKRING=EMT+X            ;CHECK FOR RING ON CORRERT LINE
104022                          WAITRN=EMT+X            ;WAIT FOR TRANSITIONS
104023                          CKTRAN=EMT+X            ;CHECK TRANSITIONS
104024                          WAITS=EMT+X             ;DELAY FOR TRANSIENTS
104025                          CNTLUU=EMT+X            ;CHANGE SWREG ROUTINE
104026                          CKINTT=EMT+X            ;CHECK FOR INTERRUPTS-FLAG STYLE
104027                  KBDIN=EMT+X                     ;FAKE INTERRUPT ENTRY POINT
```

```
                                        ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
000000                          .=0
                                .REPT 200
                                        .+2
                                        HALT
                                .ENDR
```

```
                                        ;STANDARD INTERRUPT VECTORS

                000024          .=24
000024  016176                 PFAIL                   ;POWER FAIL HANDLER
000026  000340                 340                     ;SERVICE AT LEVEL 7
000030  014120                 EMTSRV                  ;EMT DISPATCH SERVICE
000032  000340                 340                     ;SERVICE AT LEVEL 7

                000046          .=46
000046  014102                 LOGICAL                 ;ACT11?

                000060          .=60
000060  001760                 KBDINT                  ;KEYBOARD MONITOR
000062  000340                 340                     ;SERVICE AT LEVEL 7
                000174          .=174
000174  000000                 DISPREG:        0
000176  000000                 SWREG:  0

                000200          .=200
000200  000137  001100         JMP     START           ;GO TO START OF PROGRAM
```

K02


```
                        001100                  .=1100
001100                                          STACK:
001100  012737  016176  000024  START:  MOV     #PFAIL,24               ;SET UP POWER FAIL
                                                                        ;INTERRUPT SERVICE VECTOR
001106  005037  001756          CLR     TIPFLG                          ;CLEAR TEST IN PROGRESS FLAG
001112  005077  015472          CLR     @TKCSR
001116  012706  001100          MOV     #STACK,SP                       ;SET UP STACK POINTER

001122  013746  000006  SUSWR:  MOV     @#6,-(SP)                       ;SAVE VECTORS
001126  013746  000004          MOV     @#4,-(SP)
001132  012737  001152  000004  MOV     #64$,@#4                        ;SET UP FOR TIMEOUT
001140  022777  177777  015452  CMP     #-1,@SWR                        ;REFERENCE HARDWARE SWITCH REGISTER
001146  001402                  BEQ     65$
001150  000407                  BR      66$
001152  022626          64$:    CMP     (SP)+,(SP)+                     ;ADJUST STACK
001154  012737  000176  016620  65$:    MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
001162  012737  000174  016622          MOV     #DISPREG,DISPLAY        ;POINT TO SOFT DISPLAY REG
001170  012637  000004  66$:    MOV     (SP)+,@#4                       ;RESTORE VECTORS
001174  012637  000006          MOV     (SP)+,@#6
001200  012777  000100  015402  MOV     #INTENA,@TKCSR                  ;ENABLE TELETYPE INTERRUPTS
001206  005037  001252          CLR     XFLAG   ;XOR = NO
                        ;*****************************************************************
                        ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
                        ;*****************************************************************
001212  000423                  BR      STARTO                          ;SKIP XOR STUFF
001214  013746  000004          MOV     4,-(SP) ;SAVE 4
001220  012737  001254  000004  MOV     #XORSVC,4               ;SET UP SVC ROUTINE
001226  005737  177060          TST     177060  ;GOT AN XOR TESTER OUT THERE ?
001232  012637  000004          MOV     (SP)+,4 ;YES
001236  005137  001252          COM     XFLAG   ;XOR = YES
001242  004737  016320          JSR     PC,XOR          ;AUTO VECTOR
001246  000137  001262          JMP     STARTO          ;RESTORE TRAPCATCHER
001252  000000          XFLAG:  0               ;XOR FLAG
001254  022626          XORSVC: POP2SP
001256  012637  000004          MOV     (SP)+,4 ;RESTORE 4
001262  005737  016710  STARTO: TST     TIFLG                           ;TYPED TITLE?
001266  001005                  BNE     .+14                            ;YES
001270  104004                  TYPE                                    ;TYPE "MODEM CONTROL DIAGNOSTIC"
001272  017510                  MTITLE
001274  012737  000001  016710  MOV     #1,TIFLG                        ;SET TITLE TYPED FLAG
001302  005737  001252          TST     XFLAG                           ;X OR ?
001306  100422                  BMI     VECSTR                          ;RESTORE TRAPCATCHER
001310  005737  000042          TST     42              ;ACT 11?
001314  001403                  BEQ     START1          ;NO
001316  004737  016320          JSR     PC,XOR          ;YES  AUTO VECTOR
001322  000414                  BR      VECSTR                          ;GET VECTOR AND REGISTER ADDRESS
001324  005737  000042  START1: TST     @#42                            ;UNDER MONITOR?
001330  001005                  BNE     1$
001332  022737  000176  016620  CMP     #SWREG,SWR                      ;USING SWREG?
001340  001001                  BNE     1$
001342  104025                  CNTLUU
001344  032777  000001  015246  1$:     BIT     #1,@SWR                 ;IF SW BIT 0=1, ON PROGRAM RESTART
001352  001510                  BEQ     STARTN                          ;INPUT VECTOR AND REGISTER ADDRESSES
001354  012706  001100  VECSTR: MOV     #STACK,SP                       ;SET UP PROCESSOR STACK POINTER
001360  012737  000300  014026  MOV     #300,DATA1                      ;ADDRESS OF FIRST FLOATING VECTOR
```

```
001366 012737 000302 014030            MOV     #302,DATA2              ;ADDRESS OF STATUS WORD
001374 013777 014030 012424  VECSTA:   MOV     DATA2,@DATA1            ;MOVE ADDRESS OF STATUS WORD TO VECTOR
001402 005077 012422                   CLR     @DATA2                  ;CLEAR STATUS WORD
                                                                       ;(FOR HALT ON ILLEGAL INTERRUPT)
001406 062737 000004 014026            ADD     #4,DATA1                ;NEXT VECTOR
001414 062737 000004 014030            ADD     #4,DATA2                ;NEXT STATUS WORD
001422 023727 014026 001000            CMP     DATA1,#1000             ;IS TABLE CLEARED
001430 001361                          BNE     VECSTA                  ;IF NOT, CONTINUE
001432 005737 001252                   TST     XFLAG           ;XOR ?
001436 100523                          BMI     TSTGO           ;YES
001440 005737 000042                   TST     42              ;ACT 11 ?
001444 001120                          BNE     TSTGO           ;YES
001446 104013                          INSTRG                          ;GET VECTOR ADDRESS
001450 017574                          MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
001452 000300                          300                             ;LOWER LIMIT FOR ADDRESS
001454 000774                          774                             ;UPPER LIMIT FOR ADDRESS
001456 016600                          DHMVEC                          ;STORAGE FOR ADDRESS
001460 032737 000003 016600  1$:       BIT     #3,DHMVEC               ;TEST 2 LSB OF ADDRESS
001466 001404                          BEQ     VECST1                  ;IF 0, CONTINUE
001470 012716 001460                   MOV     #1$,(SP)
001474 000137 016026                   JMP     INSTER                  ;INCORRECT ADDRESS, TRY AGAIN
001500 013737 016600 016602  VECST1:   MOV     DHMVEC,DHMLVL           ;GENERATE ADDRESS OF
001506 062737 000002 016602            ADD     #2,DHMLVL               ;INTERRUPT STATUS WORD
001514 104013                          INSTRG                          ;GET ADDRESS OF CONTROL REGISTER
001516 017616                          MREGAD                          ;MESSAGE "REGISTER ADDRESS-"
001520 170500                          170500                          ;LOWER LIMIT FOR ADDRESS
001522 170670                          170670                          ;UPPER LIMIT FOR ADDRESS
001524 016604                          DHMCSR                          ;STORAGE FOR ADDRESS
001526 032737 000007 016604  1$:       BIT     #7,DHMCSR               ;IF 3 LSB ARE NOT 0
001534 001404                          BEQ     REGST1
001536 012716 001526                   MOV     #1$,(SP)
001542 000137 016026                   JMP     INSTER                  ;INCORRECT ADDRESS, TRY AGAIN
001546 013737 016604 016606  REGST1:   MOV     DHMCSR,DHMLSR           ;SET UP ADDRESS OF LINE STATUS REGISTER
001554 062737 000002 016606            ADD     #2,DHMLSR
001562 104013                          INSTRG                          ;GET LINE SELECT PARAMETER
001564 017652                          MLINSL
001566 000000                          0
001570 177777                          177777
001572 016712                          LINSEL
```

```
001574 012706 001100        STARTN: MOV     #STACK,SP           ;SET UP PROCESSOR STACK
001600 104013                       INSTRG                      ;GET TEST NUMBER
001602 017704                       MTEST                       ;MESSAGE "TEST-"
001604 000000                       0                           ;LOWER LIMIT FOR TEST NUMBER
001606 000777                       777                         ;UPPER LIMIT FOR TEST NUMBER
001610 016632                       TSTNO                       ;STORAGE FOR TEST NUMBER
001612 013705 016632        X1A:    MOV     TSTNO,R5            ;GET TEST NUMBER
001616 042705 177077                BIC     #177077,R5          ;EXTRACT TEST GROUP NUMBER
001622 006205                       ASR     R5
001624 006205                       ASR     R5
001626 006205                       ASR     R5
001630 006205                       ASR     R5
001632 006205                       ASR     R5
001634 016537 020426 016666         MOV     GRD(R5),TSTMAX      ;GET HIGHEST TEST IN GROUP
001642 016537 020406 016664         MOV     TSTLST(R5),TSTPNT   ;GET POINTER TO TEST TABLE
001650 005737 016664                TST     TSTPNT              ;IF 0, INVALID TEST GROUP
001654 001004                       BNE     STRT0A
001656 012716 001612        X1B:    MOV     #X1A,(SP)
001662 000137 016026                JMP     INSTER              ;TRY AGAIN
001666 042737 177700 016632 STRT0A: BIC     #177700,TSTNO       ;GET NUMBER OF FIRST TEST
                                                                ;TO BE EXECUTED IN SELECTED GROUP
001674 023737 016632 016666         CMP     TSTNO,TSTMAX        ;IS NUMBER TOO LARGE
001702 003401                       BLE     TSTGO
001704 000764                       BR      X1B
001706 012746 000340        TSTGO:  MOV     #340,-(SP)          ;SET UP PRIORITY LEVEL
001712 005746                       PUSH1SP
001714 000005                       RESET
001716 012737 002202 002204         MOV     #DMYRTI,KRET        ;SET UP DUMMY KEYBOARD RETURN
001724 005037 016670                CLR     LINFLG              ;CLEAR LINE SELECTED FLAG
001730 005037 016626                CLR     TRACON              ;CLEAR TRACE TRAP FLAG
001734 005037 016630                CLR     PASCNT              ;CLEAR PASS COUNT
001740 104004                       TYPE
001742 017720                       MCRLF
001744 012737 000001 001756 1$:     MOV     #1,TIPFLG           ;SET TEST IN PROGRESS FLAG
001752 000137 014334                JMP     TSTENT              ;START TESTING
001756 000000               TIPFLG: 0
```

```
306
307                                         ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
308
309  001760  005037  001756          KBDINT: CLR     TIPFLG                  ;CLEAR TEST IN PROGRESS FLAG
310  001764  005037  015254                  CLR     TMP1
311  001770  005037  002206                  CLR     SINTFL                  ;CLEAR SOFTWARE INTERRUPT FLAG
312  001774  117737  014612  015254          MOVB    @TKDBR,TMP1
313  002002  142737  000200  015254          BICB    #200,TMP1
314  002010  122737  000003  015254          CMPB    #3,TMP1                 ;IF <CNTROL C> WAS TYPED
315  002016  001011                          BNE     KBDIN1                  ;TYPE "↑C" AND
316  002020  104004                          TYPE                            ;SELECT NEW TEST
317  002022  020150                          MCONTC
318  002024  022626                          POP2SP
319  002026  005077  014552                  CLR     @DHMCSR
320  002032  005077  014552                  CLR     @TKCSR
321  002036  000137  001574                  JMP     STARTN
322  002042  122737  000026  015254  KBDIN1: CMPB    #26,TMP1                ;IF <CONTROL V> WAS TYPED
323  002050  001011                          BNE     KBDIN2                  ;TYPE "↑V" AND GET NEW
324  002052  104004                          TYPE                            ;VECTOR AND REGISTER ADDRESS
325  002054  020153                          MCONTV
326  002056  022626                          POP2SP
327  002060  005077  014520                  CLR     @DHMCSR
328  002064  005077  014520                  CLR     @TKCSR
329  002070  000137  001354                  JMP     VECSTR
330  002074  122737  000014  015254  KBDIN2: CMPB    #14,TMP1                ;IF <CONTROL L> WAS TYPED
331  002102  001015                          BNE     KBDIN3                  ;TYPE "↑L" AND GET NEW
332  002104  104004                          TYPE                            ;LINE NUMBERS, UNLESS
333  002106  020156                          MCONTL                          ;TEST GROUP 0 WAS IN PROGRESS
334  002110  022737  002202  002204          CMP     #DMYRTI,KRET            ;IF <CONTROL L> WAS TYPED IN TEST
335  002116  001431                          BEQ     DMYRTI                  ;GROUP 0, IGNORE
336  002120  022626                          POP2SP
337  002122  005077  014456                  CLR     @DHMCSR
338  002126  005077  014456                  CLR     @TKCSR
339  002132  000177  000046                  JMP     @KRET
340  002136  005737  000042          KBDIN3: TST     @#42
341  002142  001011                          BNE     1$
342  002144  022737  000176  016620          CMP     #SWREG,SWR
343  002152  001005                          BNE     1$
344  002154  122737  000007  015254          CMPB    #7,TMP1                 ;IS IT <↑G>
345  002162  001001                          BNE     1$
346  002164  104025                          CNTLUU
347  002166  012737  000001  002206  1$:     MOV     #1,SINTFL               ;SET SOFTWARE INTERRUPT FLAG
348  002174  012737  000001  001756          MOV     #1,TIPFLG               ;SET TEST IN PROGRESS FLAG
349  002202  000002                  DMYRTI: RTI
350                                          .EVEN
351  002204  000000                  KRET:   0
352  002206  000000                  SINTFL: 0
```

```
                                        ;INITIALIZATION CHECK - PERFORMED ONLY AT PROGRAM START
                                        ;VERIFY THAT CONTROL STATUS REGISTER AND LINE STATUS
                                        ;REGISTER WERE CLEARED BY INITIALIZE

002210                          T0:                             ;REFERENCE DESIGNATION
002210  104004                         TYPE                    ;TYPE "16 LINE SCANNER TEST"
002212  017455                         M16
002214  005777  014364          INIT1: TST     @DHMCSR          ;TEST CONTROL STATUS REGISTER
002220  001401                         BEQ     .+4
002222  104012                         ERROR                   ;CONTROL STATUS NOT CLEARED, ERROR
002224  005777  014356                 TST     @DHMLSR         ;TEST LINE STATUS REGISTER
002230  001401                         BEQ     .+4
002232  104012                         ERROR                   ;LINE STATUS NOT CLEARED, ERROR
002234  104002                         SCOPE                   ;CHECK FOR LOOP

                                        ;VERIFY THAT "INTERRUPT ENABLE" CAN BE
                                        ;SET AND CLEARED.

002236                          T1:                             ;REFERENCE DESIGNATION
002236  012777  000100  014340 CSTR1: MOV     #INTENA,@DHMCSR  ;SET INTERRUPT ENABLE
002244  032777  000100  014332         BIT     #INTENA,@DHMCSR ;WAS INTERRUPT ENABLE SET
002252  001001                         BNE     .+4
002254  104012                         ERROR                   ;NO, ERROR
002256  042777  000100  014320         BIC     #INTENA,@DHMCSR ;CLEAR INTERRUPT ENABLE
002264  032777  000100  014312         BIT     #INTENA,@DHMCSR ;WAS INTERRUPT ENABLE CLEARED
002272  001401                         BEQ     .+4
002274  104012                         ERROR                   ;NO, ERROR
002276  104002                         SCOPE                   ;CHECK FOR ITERATIONS, LOOP

                                        ;VERIFY THAT "DONE" CAN BE SET AND CLEARED

002300                          T2:                             ;REFERENCE DESIGNATION
002300  012777  000200  014276 CSTR2: MOV     #DONE,@DHMCSR    ;SET DONE
002306  032777  000200  014270         BIT     #DONE,@DHMCSR   ;WAS DONE SET
002314  001001                         BNE     .+4
002316  104012                         ERROR                   ;NO, ERROR
002320  042777  000200  014256         BIC     #DONE,@DHMCSR   ;CLEAR DONE
002326  032777  000200  014250         BIT     #DONE,@DHMCSR   ;WAS DONE CLEARED
002334  001401                         BEQ     .+4
002336  104012                         ERROR                   ;NO, ERROR
002340  104002                         SCOPE                   ;CHECK FOR ITERATIONS, LOOP

                                        ;VERIFY "MAINTENANCE MODE" CAN BE SET AND CLEARED

002342                          T3:                             ;REFERENCE DESIGNATION
002342  012777  001000  014234 CSTR3: MOV     #MAINT,@DHMCSR   ;SET MAINTENANCE MODE
002350  032777  001000  014226         BIT     #MAINT,@DHMCSR  ;WAS MAINTENANCE MODE SET
002356  001001                         BNE     .+4
002360  104012                         ERROR                   ;NO, ERROR
002362  042777  001000  014214         BIC     #MAINT,@DHMCSR  ;CLEAR MAINTENANCE MODE
002370  032777  001000  014206         BIT     #MAINT,@DHMCSR  ;WAS MAINTENANCE MODE CLEARED
002376  001401                         BEQ     .+4
002400  104012                         ERROR                   ;NO, ERROR
002402  104002                         SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;VERIFY THAT "SCAN ENABLE" CAN BE SET AND CLEARED.

002404                          T4:                             ;REFERENCE DESIGNATION
002404  012777  000040  014172  CSTR4:  MOV     #SCNENA,@DHMCSR ;SET SCAN ENABLE
002412  032777  000040  014164          BIT     #SCNENA,@DHMCSR ;WAS SCAN ENABLE SET
002420  001001                          BNE     .+4
002422  104012                          ERROR                   ;NO, ERROR
002424  042777  000040  014152          BIC     #SCNENA,@DHMCSR ;CLEAR SCAN ENABLE
002432  032777  000040  014144          BIT     #SCNENA,@DHMCSR ;WAS SCAN ENABLE CLEARED
002440  001401                          BEQ     .+4
002442  104012                          ERROR                   ;NO, ERROR
002444  104002                          SCOPE                   ;CHECK FOR ITERATIONS, LOOP

                                        ;VERIFY THAT "BUSY" IS SET WHEN "SCAN ENABLE" IS SET
                                        ;VERIFY THAT "BUSY" IS CLEARED WHEN "SCAN ENABLE" IS CLEARED

002446                          T5:                             ;REFERENCE DESIGNATION
002446  012777  000040  014130  CSTR5:  MOV     #SCNENA,@DHMCSR ;SET SCAN ENABLE
002454  032777  000020  014122          BIT     #BUSY,@DHMCSR   ;IS BUSY BIT SET
002462  001001                          BNE     .+4
002464  104012                          ERROR                   ;BUSY NOT SET, ERROR
002466  042777  000040  014110          BIC     #SCNENA,@DHMCSR ;CLEAR SCAN ENABLE
002474  032777  000020  014102          BIT     #BUSY,@DHMCSR   ;IS BUSY BIT CLEARED
002502  001401                          BEQ     .+4
002504  104012                          ERROR                   ;BUSY NOT CLEARED, ERROR
002506  104002                          SCOPE                   ;CHECK FOR LOOP, ITERATIONS

                                        ;VERIFY THAT SETTING "DONE" DOES NOT CCAUSE AN
                                        ;INTERRUPT IF "INTERRUPT ENABLE" IS CLEARED.

002510                          T6:                             ;REFERENCE DESIGNATION
002510  052737  000340  177776  INT1:   BIS     #340,PS         ;LOCK OUT INTERRUPTS
002516  005077  014062                  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
002522  012777  002556  014050          MOV     #INT1A,@DHMVEC  ;SET UP INTERRUPT SERVICE ADDRESS
002530  013777  177776  014044          MOV     PS,@DHMLVL      ;SET UP INTERRUPT PRIORITY
002536  052777  000200  014040          BIS     #DONE,@DHMCSR   ;SET DONE
002544  042737  000340  177776          BIC     #340,PS         ;ALLOW INTERRUPTS
002552  000240                          NOP                     ;DELAY FOR INTERRUPT
002554  000402                          BR      INT1B           ;NO INTERRUPT, CONTINUE
002556  022626          INT1A:  POP2SP                          ;RESTORE STACK, INTERRUPT
002560  104012                          ERROR                   ;OCCURED, ERROR
002562  104002          INT1B:  SCOPE                           ;CHECK FOR LOOP, ITERATIONS
```

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

                                T7:                                     ;REFERENCE DESIGNATION
002564                          INT2:   BIS     #340,PS                 ;LOCK OUT INTERRUPTS
002564  052737  000340  177776        CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002572  005077  014006                MOV     #INT2A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
002576  012777  002632  013774        MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
002604  013777  177776  013770        BIS     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
002612  052777  000100  013764        BIC     #340,PS                 ;ALLOW INTERRUPTS
002620  042737  000340  177776        NOP                             ;DELAY FOR INTERRUPTS
002626  000240                        BR      INT2B                   ;NO INTERRUPT, CONTINUE
002630  000402                INT2A:  POP2SP                          ;RESTORE STACK
002632  022626                        ERROR                           ;INTERRUPT OCCURED, ERROR
002634  104012                INT2B:  SCOPE                           ;CHECK FOR ITERATIONS, LOOP
002636  104002

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

                                T10:                                    ;REFERENCE DESIGNATION
002640                          INT3:   BIS     #340,PS                 ;LOCK OUT INTERRUPTS
002640  052737  000340  177776        CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002646  005077  013732                MOV     #INT3A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
002652  012777  002724  013720        MOV     #INTENA,@DHMCSR         ;SET "INTERRUPT ENABLE"
002660  012777  000100  013716        MOV     PS,@DHMLVL              ;SET "INTERRUPT LEVEL"
002666  013777  177776  013706        BIC     #340,PS                 ;ALLOW INTERRUPTS
002674  042737  000340  177776        BIS     #DONE,@DHMCSR           ;SET "DONE"
002702  052777  000200  013674        NOP                             ;DELAY FOR INTERRUPT
002710  000240                        NOP
002712  000240
002714  005077  013664                CLR     @DHMCSR
002720  104012                        ERROR                           ;INTERRUPT OCCURED, ERROR
002722  000401                        BR      INT3B                   ;CONTINUE
002724  022626                INT3A:  POP2SP                          ;INTERRUPT OCCURED, RESTOR STACK
002726  104002                INT3B:  SCOPE                           ;CHECK FOR ITERATION, LOOP


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

                                T11:                                    ;REFERENCE DESIGNATION
002730                          INT4:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002730  005077  013650                BIC     #340,PS                 ;SET PROCESSOR PRIORITY
002734  042737  000340  177776        BIS     #340,PS                 ;TO LEVEL 7.
002742  052737  000340  177776        MOV     #INT4A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
002750  012777  003012  013622        MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
002756  013777  177776  013616        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
002764  012777  000100  013612        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
002772  052777  000200  013604        NOP                             ;DELAY FOR INTERRUPT
003000  000240                        NOP
003002  000240
003004  005077  013574                CLR     @DHMCSR
003010  000402                        BR      INT4B                   ;NO INTERRUPT, CONTINUE
003012  022626                INT4A:  POP2SP                          ;RESTORE STACK
003014  104012                        ERROR                           ;INTERRUPT OCCURED, ERROR
003016  104002                INT4B:  SCOPE                           ;CHECK FOR ITERATION, LOOP
```

```
                                        ;VERIFY THAT NO INTERRUPT OCCURS WITH
                                        ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 6.

003020                          T12:                                    ;REFERENCE DESIGNATION
003020  005077  013560         INT5:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003024  042737  000340  177776        BIC     #340,PS                 ;SET PROCESSOR PRIORITY
003032  052737  000300  177776        BIS     #300,PS                 ;TO LEVEL 6.
003040  012777  003102  013532        MOV     #INT5A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
003046  013777  177776  013526        MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
003054  012777  000100  013522        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003062  052777  000200  013514        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003070  000240                        NOP                             ;DELAY FOR INTERRUPT
003072  000240                        NOP
003074  005077  013504                CLR     @DHMCSR
003100  000402                        BR      INT5B                   ;NO INTERRUPT, CONTINUE
003102  022626                 INT5A:  POP2SP                          ;RESTORE STACK
003104  104012                        ERROR                           ;INTERRUPT OCCURED, ERROR
003106  104002                 INT5B:  SCOPE                           ;CHECK FOR ITERATION, LOOP

                                        ;VERIFY THAT NO INTERRUPT OCCURS WITH
                                        ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 5.

003110                          T13:                                    ;REFERENCE DESIGNATION
003110  005077  013470         INT6:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003114  042737  000340  177776        BIC     #340,PS                 ;SET PROCESSOR PRIORITY
003122  052737  000240  177776        BIS     #240,PS                 ;TO LEVEL 5.
003130  012777  003172  013442        MOV     #INT6A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
003136  013777  177776  013436        MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
003144  012777  000100  013432        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003152  052777  000200  013424        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003160  000240                        NOP                             ;DELAY FOR INTERRUPT
003162  000240                        NOP
003164  005077  013414                CLR     @DHMCSR
003170  000402                        BR      INT6B                   ;NO INTERRUPT, CONTINUE
003172  022626                 INT6A:  POP2SP                          ;RESTORE STACK
003174  104012                        ERROR                           ;INTERRUPT OCCURED, ERROR
003176  104002                 INT6B:  SCOPE                           ;CHECK FOR ITERATION, LOOP

                                        ;VERIFY THAT NO INTERRUPT OCCURS WITH
                                        ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 4.

003200                          T14:                                    ;REFERENCE DESIGNATION
003200  005077  013400         INT7:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003204  042737  000340  177776        BIC     #340,PS                 ;SET PROCESSOR PRIORITY
003212  052737  000200  177776        BIS     #200,PS                 ;TO LEVEL 4.
003220  012777  003262  013352        MOV     #INT7A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
003226  013777  177776  013346        MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
003234  012777  000100  013342        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003242  052777  000200  013334        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003250  000240                        NOP                             ;DELAY FOR INTERRUPT
003252  000240                        NOP
003254  005077  013324                CLR     @DHMCSR
003260  000402                        BR      INT7B                   ;NO INTERRUPT, CONTINUE
003262  022626                 INT7A:  POP2SP                          ;RESTORE STACK
003264  104012                        ERROR                           ;INTERRUPT OCCURED, ERROR
```

```
   563  003266  104002                  INT7B:  SCOPE                   ;CHECK FOR ITERATION, LOOP
```

```
                                        ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
                                        ;ENABLE" SET AND "DONE" SET AT PRIORITY 0.

003270                          T15:                            ;REFERENCE DESIGNATION
003270  005077  013310         INT10:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
003274  042737  000340  177776        BIC     #340,PS         ;ALLOW INTERRUPTS
003302  012777  003352  013270        MOV     #INT10A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
003310  005077  013266                CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
003314  052737  000000  177776        BIS     #0,PS           ;SET PROCESSOR PRIORITY TO LEVEL 0.
003322  012777  000100  013254        MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
003330  052777  000200  013246        BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
003336  000240                        NOP                     ;WAIT FOR INTERRUPT
003340  000240                        NOP
003342  005077  013236                CLR     @DHMCSR
003346  104012                        ERROR                   ;NO INTERRUPT, ERROR
003350  000401                        BR      INT10B          ;CONTINUE
003352  022626                INT10A: POP2SP                  ;INTERRUPT OCCURED, RESTORE STACK
003354  104002                INT10B: SCOPE                   ;CHECK FOR INTERATIONS, LOOP.

                                        ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
                                        ;ENABLE" SET AND "DONE" SET AT PRIORITY 1.

003356                          T16:                            ;REFERENCE DESIGNATION
003356  005077  013222         INT11:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
003362  042737  000340  177776        BIC     #340,PS         ;ALLOW INTERRUPTS
003370  012777  003440  013202        MOV     #INT11A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
003376  005077  013200                CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
003402  052737  000040  177776        BIS     #40,PS          ;SET PROCESSOR PRIORITY TO LEVEL 1.
003410  012777  000100  013166        MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
003416  052777  000200  013160        BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
003424  000240                        NOP                     ;WAIT FOR INTERRUPT
003426  000240                        NOP
003430  005077  013150                CLR     @DHMCSR
003434  104012                        ERROR                   ;NO INTERRUPT, ERROR
003436  000401                        BR      INT11B          ;CONTINUE
003440  022626                INT11A: POP2SP                  ;INTERRUPT OCCURED, RESTORE STACK
003442  104002                INT11B: SCOPE                   ;CHECK FOR INTERATIONS, LOOP.

                                        ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
                                        ;ENABLE" SET AND "DONE" SET AT PRIORITY 2.

003444                          T17:                            ;REFERENCE DESIGNATION
003444  005077  013134         INT12:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
003450  042737  000340  177776        BIC     #340,PS         ;ALLOW INTERRUPTS
003456  012777  003526  013114        MOV     #INT12A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
003464  005077  013112                CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
003470  052737  000100  177776        BIS     #100,PS         ;SET PROCESSOR PRIORITY TO LEVEL 2.
003476  012777  000100  013100        MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
003504  052777  000200  013072        BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
003512  000240                        NOP                     ;WAIT FOR INTERRUPT
003514  000240                        NOP
003516  005077  013062                CLR     @DHMCSR
003522  104012                        ERROR                   ;NO INTERRUPT, ERROR
003524  000401                        BR      INT12B          ;CONTINUE
```

```
  620  003526  022626                INT12A: POP2SP                  ;INTERRUPT OCCURED, RESTORE STACK
  621  003530  104002                INT12B: SCOPE                   ;CHECK FOR INTERATIONS, LOOP.
```

```
                                        ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
                                        ;ENABLE" SET AND "DONE" SET AT PRIORITY 3.

003532                          T20:                                    ;REFERENCE DESIGNATION
003532  005077  013046        INT13:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003536  042737  000340  177776        BIC     #340,PS                 ;ALLOW INTERRUPTS
003544  012777  003614  013026        MOV     #INT13A,@DHMVEC         ;SET UP INTERRUPT SERVICE ADDRESS
003552  005077  013024                CLR     @DHMLVL                 ;SET UP INTERRUPT SERVICE PRIORITY
003556  052737  000140  177776        BIS     #140,PS                 ;SET PROCESSOR PRIORITY TO LEVEL 3.
003564  012777  000100  013012        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003572  052777  000200  013004        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003600  000240                        NOP                             ;WAIT FOR INTERRUPT
003602  000240                        NOP
003604  005077  012774                CLR     @DHMCSR
003610  104012                        ERROR                           ;NO INTERRUPT, ERROR
003612  000401                        BR      INT13B                  ;CONTINUE
003614  022626                INT13A: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
003616  104002                INT13B: SCOPE                           ;CHECK FOR INTERATIONS, LOOP.
```

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

003620                          T21:                                    ;REFERENCE DESIGNATION
003620  005077  012760          LINT1:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
003624  042737  000340  177776        BIC     #340,PS                 ;ENABLE INTERRUPTS
003632  012737  000001  016714        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
003640  005005                        CLR     R5                      ;CLEAR EXPECTED LINE NUMBER
003642  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 LINE NUMBERS
003646  033737  016714  016712  LINT1A: BIT     SELMSK,LINSEL           ;THIS LINE SELECTED ??
003654  001407                        BEQ     LINT1B                  ;BR IF NOT
003656  010577  012722                MOV     R5,@DHMCSR              ;SET LINE NUMBER
003662  017704  012716                MOV     @DHMCSR,R4              ;READ BACK LINE NUMBER
003666  020504                        CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED
003670  001401                        BEQ     LINT1B                  ;LINE NUMBERS THE SAME
003672  104000                        ERRORC                          ;LINE NUMBERS DIFFERENT, ERROR
003674  104003          LINT1B: SCOPEF                                  ;CHECK FOR DATA FREEZE
003676  003646                        LINT1A                          ;RETURN FOR DATA FREEZE
003700  005205                        INC     R5                      ;UPDATE LINE COUNT
003702  006337  016714                ASL     SELMSK                  ;SELECT NEXT LINE TO TEST
003706  005300                        DEC     R0                      ;UPDATE LINE NUMBER
003710  001356                        BNE     LINT1A                  ;CONTINUE
003712  104002                        SCOPE                           ;CHECK FOR ITERATION, LOOP

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

003714                          T22:                                    ;REFERENCE DESIGNATION
003714  042737  000340  177776  LINT2:  BIC     #340,PS                 ;ENABLE INTERRUPTS
003722  005077  012656                CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
003726  005005                        CLR     R5                      ;CLEAR EXPECTED LINE COUNT
003730  012737  000001  016714        MOV     #1,SELMSK               ;SET UP SELECT MASK
003736  012701  177777                MOV     #-1,R1                  ;INIT LINE COUNTER
003742  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 VALUES
003746  012777  000017  012630        MOV     #17,@DHMCSR             ;FIRST VALUE =0
003754  033737  016714  016712  LINT2A: BIT     SELMSK,LINSEL           ;THIS LINE SELECTED ??
003762  001410                        BEQ     LINT2B                  ;BR IF NOT
003764  052777  000400  012612        BIS     #STEP,@DHMCSR           ;STEP LINE COUNTER
003772  017704  012606                MOV     @DHMCSR,R4              ;READ LINE COUNTER
003776  020504                        CMP     R5,R4                   ;COMPARE EXPECTED AND
004000  001401                        BEQ     LINT2B                  ;RECEIVED LINE NUMBERS
004002  104000                        ERRORC                          ;LINE COUNTER ERROR
004004  104003          LINT2B: SCOPEF                                  ;CHECK FOR DATA FREEZE
004006  003714                        LINT2
004010  005205                        INC     R5                      ;UPDATE EXPECTED LINE NUMBER
004012  006337  016714                ASL     SELMSK                  ;SHIFT SELECT MASK
004016  005201                        INC     R1                      ;GEN NEW LINE NO.
004020  010177  012560                MOV     R1,@DHMCSR              ;SET NEW LINE NO. IN CSR
004024  005300                        DEC     R0
004026  001352                        BNE     LINT2A
004030  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                                ;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.

004032                                  T23:                                    ;REFERENCE DESIGNATION
004032  012777  002000  012544    MEMT1:  MOV     #CLRMUX,@DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
004040  042737  000340  177776            BIC     #340,PS                         ;ENABLE INTERRUPTS
004046  012700  000020                    MOV     #16.,R0                         ;SET UP TO TEST 16 LOCATIONS
004052  052777  001017  012524            BIS     #MAINT+17,@DHMCSR               ;SET MAINTEANCE MODE
004060  052777  000400  012516    MEMT1A: BIS     #STEP,@DHMCSR                   ;SET LINE COUNTER THRU ALL
004066  005300                            DEC     R0                              ;STATES, WRITING 1'S INTO
004070  001373                            BNE     MEMT1A                          ;ALL MEMORY WORDS
004072  012700  000020                    MOV     #16.,R0                         ;SET UP TO TEST 16 WORDS
004076  012705  070000                    MOV     #70000,R5                       ;SET UP EXPECTED STATUS REGISTER
004102  012777  000017  012474            MOV     #17,@DHMCSR                     ;START WITH LINE 0
004110  052777  000400  012466    MEMT1B: BIS     #STEP,@DHMCSR                   ;ACCESS SCANNER MEMORY
004116  017704  012462                    MOV     @DHMCSR,R4                      ;READ DATA
004122  020504                            CMP     R5,R4                           ;COMPARE EXPECTED AND RECEIVED
004124  001403                            BEQ     MEMT1C                          ;DATA
004126  104000                            ERRORC                                  ;CONTROL STATUS OR MEMORY ERROR
004130  104003                            SCOPEF                                  ;CHECK FOR DATA FREEZE
004132  004032                            MEMT1
004134  005205                  MEMT1C: INC     R5                              ;UPDATE EEXPECTED STATUS
004136  005300                          DEC     R0                              ;UPDATE LINE COUNT
004140  001363                          BNE     MEMT1B                          ;CONTINUE
004142  012777  004000  012434  MEMT1D: MOV     #CLRSCN,@DHMCSR                 ;SET "CLEAR SCAN"
004150  032777  000020  012426          BIT     #BUSY,@DHMCSR                   ;WAIT FOR "CLEAR CYCLES"
004156  001374                          BNE     .-6
004160  012700  000020                  MOV     #16.,R0                         ;SET UP TO TEST 16 MEMORY
004164  005005                          CLR     R5                              ;LOCATIONS
004166  012777  000017  012410          MOV     #17,@DHMCSR                     ;FIRST TO BE TESTED=0
004174  052777  000400  012402  MEMT1E: BIS     #STEP,@DHMCSR                   ;ACCESS SEANNER MEMORY
004202  017704  012376                  MOV     @DHMCSR,R4                      ;READ DATA
004206  020504                          CMP     R5,R4                           ;COMPARE EXPECTED AND RECEIVED
004210  001403                          BEQ     MEMT1F                          ;DATA
004212  104000                          ERRORC                                  ;CONTROL  STATUS OF MEMORY ERROR
004214  104003                          SCOPEFF                                 ;CHECK FOR DATA FREEZE
004216  004142                          MEMT1D
004220  005205                  MEMT1F: INC     R5                              ;UPDATE EXPECTED DATA
004222  005300                          DEC     R0                              ;UPDATE LINE COUNT
004224  001363                          BNE     MEMT1E                          ;CONTTINUE
004226  104002                          SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
```

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

004230                          T24:                            ;REFERENCE DESIGNATION
004230  005077  012350          MEMT2:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
004234  042737  000340  177776        BIC     #340,PS         ;ENABLE INTERRUPTS
004242  012700  000020                MOV     #16.,R0         ;SET UP TO TEST 16 ADDRESSES
004246  012702  000017                MOV     #17,R2          ;FIRST ADDRESS TO BE TESTED=0
004252  012777  004000  012324  MEMT2A: MOV     #CLRSCN,@DHMCSR ;CLEAR ACANNER MEMORY
004260  032777  000020  012316        BIT     #BUSY,@DHMCSR   ;WAIT FOR CLEAR CYCLE
004266  001374                      BNE     .-6
004270  012777  001000  012306        MOV     #MAINT,@DHMCSR  ;SET "MAINTENANCE MODE"
004276  050277  012302                BIS     R2,@DHMCSR      ;SET LINE COUNTER TO TEST ADDRESS-1
004302  052777  000400  012274        BIS     #STEP,@DHMCSR   ;WRITE 1'S INTO TEST ADDRESS
004310  042777  001000  012266        BIC     #MAINT,@DHMCSR  ;CLEAR "MAINTENANCE MODE"
004316  012703  000020                MOV     #16.,R3         ;SET UP TO TEST ALL 16
004322  012777  000017  012254        MOV     #17,@DHMCSR     ;SCANNER MEMORY LOCATIONS
004330  005202                      INC     R2
004332  005001                      CLR     R1
004334  052777  000400  012242  MEMT2B: BIS     #STEP,@DHMCSR   ;ACCESS SCANNER MEMORY
004342  117704  012236                MOVB    @DHMCSR,R4      ;READ CONPENTS OF MEMORY
004346  010105                      MOV     R1,R5           ;SET UP EXPECTED CONTENTS
004350  120402                      CMPB    R4,R2           ;OF SCANNER MEMORY
004352  001002                      BNE     MEMT2C
004354  052705  070000                BIS     #70000,R5
004360  020405                MEMT2C: CMP     R4,R5           ;COMPARE EXPECTED AND RECEIVED
004362  001403                      BEQ     MEMT2D          ;VALUES
004364  104000                      ERRORC                  ;SCANNER MEMORY ERROR
004366  104003                      SCOPEF                  ;CHECK FOR DATA FREEZE
004370  004252                      MEMT2A
004372  005201                MEMT2D: INC     R1
004374  005303                      DEC     R3              ;TEST NEXT SCANNEB LOCATION
004376  001356                      BNE     MEMT2B
004400  005300                      DEC     R0              ;UPDATE LINE COUNT
004402  001323                      BNE     MEMT2A
004404  104002                      SCOPE                   ;CHECK FOR ITERATION, LOOP
```

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

004406                          T25:                            ;REFERENCE DESIGNATION
004406  005077  012172          MEMT3:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
004412  042737  000340  177776        BIC     #340,PS         ;ENABLE INTERRUPTS
004420  012700  000020                MOV     #16.,R0         ;SET UP TO TEST 16 ADDRESSES
004424  012702  000017                MOV     #17,R2          ;FIRST ADDRESS TO BE TESTED=0
004430  012703  000020          MEMT3A: MOV     #16.,R3         ;WRITE 1'S INTO ALL SCANNER
004434  012777  001017  012142        MOV     #MAINT+17,@DHMCSR ;MEMORY LOCATIONS
004442  052777  000400  012134  MEMT3B: BIS     #STEP,@DHMCSR
004450  005303                        DEC     R3
004452  001373                        BNE     MEMT3B
004454  010277  012124                MOV     R2,@DHMCSR      ;SET LINE COUNTER TO TEST ADDRESS-1
004460  052777  000400  012116        BIS     #STEP,@DHMCSR   ;WRITE 0'S INTO TEST ADDRESS
004466  012703  000020                MOV     #16.,R3         ;SET UP TO TEST ALL 16
004472  012777  000017  012104        MOV     #17,@DHMCSR     ;SCANNER MEMORY LOCATIONS
004500  005202                        INC     R2
004502  005001                        CLR     R1
004504  052777  000400  012072  MEMT3C: BIS     #STEP,@DHMCSR   ;ACESS SCANNER MEMORY
004512  117704  012066                MOVB    @DHMCSR,R4      ;READ CONTENTS OF MEMORY
004516  010105                        MOV     R1,R5           ;SET UP EXPECTED CONTENTS
004520  120402                        CMPB    R4,R2           ;OF SCANNER MEIORY
004522  001002                        BNE     MEMT3D
004524  052705  070000                BIS     #70000,R5
004530  020405          MEMT3D: CMP     R4,R5           ;COMPARE EXPECTED AND
004532  001403                  BEQ     MEMT3E          ;RECEIVED VALUES
004534  104000                  ERRORC                  ;SCANNER MEMORY ERROR
004536  104003                  SCOPEF                  ;CHECK FOR DATA FREEZE
004540  004430                  MEMT3A
004542  005201          MEMT3E: INC     R1
004544  005303                  DEC     R3              ;TEST NEXT SCANNER LOCATION
004546  001356                  BNE     MEMT3C
004550  005300                  DEC     R0              ;UPDATE ADDRESS COUNT
004552  001326                  BNE     MEMT3A
004554  104002                  SCOPE                   ;CHECK FOR ITERATION, LOOP
```

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

004556                                  T26:                                    ;REFERENCE DESIGNATION
004556  005077  012022                  MUX1:   CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
004562  042737  000340  177776                BIC     #340,PS                 ;ENABLE INTERRUPTS
004570  012700  000020                        MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
004574  012737  000001  016714                MOV     #1,SELMSK               ;INIT LINE SELECT MASK
004602  005001                                CLR     R1                      ;START AT LINE 0
004604  012777  002000  011772          MUX1A:  MOV     #CLRMUX,@DHMCSR
004612  012702  000020                        MOV     #16.,R2
004616  033737  016714  016712                BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
004624  001463                                BEQ     MUX1F                   ;BR IF NOT
004626  010177  011752                        MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
004632  012777  000001  011746                MOV     #LINENA,@DHMLSR         ;SET LINE ENABLE FUNCTION FLIP-FLOP
004640  012737  000001  016716                MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
004646  005077  011732                        CLR     @DHMCSR
004652  005005                          MUX1B:  CLR     R5
004654  033737  016716  016712                BIT     SLMSK,LINSEL            ;SELECTED ??
004662  001417                                BEQ     MUX1D                   ;BR IF NOT
004664  017704  011716                        MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
004670  117703  011710                        MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
004674  042703  177760                        BIC     #177760,R3              ;CLEAR UNWANTED BITS
004700  020103                                CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
004702  001002                                BNE     MUX1C                   ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
004704  012705  000001                        MOV     #LINENA,R5
                                                                                ;TO BE SET
004710  020504                          MUX1C:  CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
004712  001403                                BEQ     MUX1D                   ;RESULTS
004714  104001                                ERRORL                          ;LINE STATUS ERROR
004716  104003                                SCOPEF
004720  004722                                MUX1D
004722  052777  000400  011654          MUX1D:  BIS     #STEP,@DHMCSR           ;EXAMINE NEXT LINE
004730  006337  016716                        ASL     SLMSK                   ;SHIFT MASK
004734  005302                                DEC     R2
004736  001345                                BNE     MUX1B
004740  005005                                CLR     R5
004742  010177  011636                  MUX1E:  MOV     R1,@DHMCSR
004746  010103                                MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
004750  005077  011632                        CLR     @DHMLSR                 ;CLEAR LINE ENABLE FLIP FLOP
004754  105227  000000                        INCB    #0                      ;DELAY FOR CABLE
004760  001375                                BNE     .-4                     ;DITTO
004762  017704  011620                        MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
004766  005704                                TST     R4                      ;WAS LINE ENABLE FUNCTION FLIP FLOP
004770  001401                                BEQ     MUX1F                   ;CLEARED
004772  104001                                ERRORL                          ;NO, LINE STATUS ERROR
004774  104003                          MUX1F:  SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
004776  004604                                MUX1A
005000  006337  016714                        ASL     SELMSK                  ;SHIFT SELECT MASK
005004  005201                                INC     R1                      ;SELECT NEXT LINE
005006  005300                                DEC     R0                      ;DECREMENT LINE COUNT
005010  001275                                BNE     MUX1A                   ;CONTINU IF NOT DONE
005012  104002                                SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                                ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
                                                ;BE SET AND CLEARED FOR SELECTED LINE
                                
005014                                  T27:                            ;REFERENCE DESIGNATION
005014  005077  011564                 MUX2:   CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
005020  042737  000340  177776                BIC     #340,PS         ;ENABLE INTERRUPTS
005026  012700  000020                        MOV     #16.,R0         ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
005032  012737  000001  016714                MOV     #1,SELMSK       ;INIT LINE SELECT MASK
005040  005001                                CLR     R1              ;START AT LINE 0
005042  012777  002000  011534         MUX2A: MOV     #CLRMUX,@DHMCSR
005050  012702  000020                        MOV     #16.,R2
005054  033737  016714  016712                BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
005062  001463                                BEQ     MUX2F           ;BR IF NOT
005064  010177  011514                        MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
005070  012777  000002  011510                MOV     #TRMRDY,@DHMLSR ;SET TERMINAL READY FUNCTION FLIP-FLOP
005076  012737  000001  016716                MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
005104  005077  011474                        CLR     @DHMCSR
005110  005005                         MUX2B: CLR     R5
005112  033737  016716  016712                BIT     SLMSK,LINSEL    ;SELECTED ??
005120  001417                                BEQ     MUX2D           ;BR IF NOT
005122  017704  011460                        MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005126  117703  011452                        MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
005132  042703  177760                        BIC     #177760,R3      ;CLEAR UNWANTED BITS
005136  020103                                CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
005140  001002                                BNE     MUX2C           ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
005142  012705  000002                        MOV     #TRMRDY,R5
                                                                        ;TO BE SET
005146  020504                         MUX2C: CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
005150  001403                                BEQ     MUX2D           ;RESULTS
005152  104001                                ERRORL                  ;LINE STATUS ERROR
005154  104003                                SCOPEF
005156  005160                                MUX2D
005160  052777  000400  011416  MUX2D: BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
005166  006337  016716                        ASL     SLMSK           ;SHIFT MASK
005172  005302                                DEC     R2
005174  001345                                BNE     MUX2B
005176  005005                                CLR     R5
005200  010177  011400                 MUX2E: MOV     R1,@DHMCSR
005204  010103                                MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
005206  005077  011374                        CLR     @DHMLSR         ;CLEAR TERMINAL READY FLIP FLOP
005212  105227  000000                        INCB    #0              ;DELAY FOR CABLE
005216  001375                                BNE     .-4             ;DITTO
005220  017704  011362                        MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005224  005704                                TST     R4              ;WAS TERMINAL READY FUNCTION FLIP FLOP
005226  001401                                BEQ     MUX2F           ;CLEARED
005230  104001                                ERRORL                  ;NO, LINE STATUS ERROR
005232  104003                         MUX2F: SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
005234  005042                                MUX2A
005236  006337  016714                        ASL     SELMSK          ;SHIFT SELECT MASK
005242  005201                                INC     R1              ;SELECT NEXT LINE
005244  005300                                DEC     R0              ;DECREMENT LINE COUNT
005246  001275                                BNE     MUX2A           ;CONTINU IF NOT DONE
005250  104002                                SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE
                                
005252                          T30:                    ;REFERENCE DESIGNATION
005252  005077  011326          MUX3:   CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
005256  042737  000340  177776        BIC     #340,PS         ;ENABLE INTERRUPTS
005264  012700  000020                MOV     #16.,R0         ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
005270  012737  000001  016714        MOV     #1,SELMSK       ;INIT LINE SELECT MASK
005276  005001                        CLR     R1              ;START AT LINE 0
005300  012777  002000  011276  MUX3A: MOV     #CLRMUX,@DHMCSR
005306  012702  000020                MOV     #16.,R2
005312  033737  016714  016712        BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
005320  001463                        BEQ     MUX3F           ;BR IF NOT
005322  010177  011256                MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
005326  012777  000004  011252        MOV     #RS,@DHMLSR     ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
005334  012737  000001  016716        MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
005342  005077  011236                CLR     @DHMCSR
005346  005005                MUX3B:  CLR     R5
005350  033737  016716  016712        BIT     SLMSK,LINSEL    ;SELECTED ??
005356  001417                        BEQ     MUX3D           ;BR IF NOT
005360  017704  011222                MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005364  117703  011214                MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
005370  042703  177760                BIC     #177760,R3      ;CLEAR UNWANTED BITS
005374  020103                        CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
005376  001002                        BNE     MUX3C           ;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
005400  012705  000004                MOV     #RS,R5
                                                            ;TO BE SET
005404  020504                MUX3C:  CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
005406  001403                        BEQ     MUX3D           ;RESULTS
005410  104001                        ERRORL                  ;LINE STATUS ERROR
005412  104003                        SCOPEF
005414  005416                        MUX3D
005416  052777  000400  011160  MUX3D: BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
005424  006337  016716                ASL     SLMSK           ;SHIFT MASK
005430  005302                        DEC     R2
005432  001345                        BNE     MUX3B
005434  005005                        CLR     R5
005436  010177  011142          MUX3E: MOV     R1,@DHMCSR
005442  010103                        MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
005444  005077  011136                CLR     @DHMLSR         ;CLEAR REQUEST TO SEND FLIP FLOP
005450  105227  000000                INCB    #0              ;DELAY FOR CABLE
005454  001375                        BNE     .-4             ;DITTO
005456  017704  011124                MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005462  005704                        TST     R4              ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
005464  001401                        BEQ     MUX3F           ;CLEARED
005466  104001                        ERRORL                  ;NO, LINE STATUS ERROR
005470  104003                MUX3F:  SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
005472  005300                        MUX3A
005474  006337  016714                ASL     SELMSK          ;SHIFT SELECT MASK
005500  005201                        INC     R1              ;SELECT NEXT LINE
005502  005300                        DEC     R0              ;DECREMENT LINE COUNT
005504  001275                        BNE     MUX3A           ;CONTINU IF NOT DONE
005506  104002                        SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

005510                          T31:                    ;REFERENCE DESIGNATION
005510  005077  011070        MUX4:   CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
005514  042737  000340  177776        BIC     #340,PS         ;ENABLE INTERRUPTS
005522  012700  000020                MOV     #16.,R0         ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
005526  012737  000001  016714        MOV     #1,SELMSK       ;INIT LINE SELECT MASK
005534  005001                        CLR     R1              ;START AT LINE 0
005536  012777  002000  011040  MUX4A: MOV     #CLRMUX,@DHMCSR
005544  012702  000020                MOV     #16.,R2
005550  033737  016714  016712        BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
005556  001463                        BEQ     MUX4F           ;BR IF NOT
005560  010177  011020                MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
005564  012777  000010  011014        MOV     #SECTX,@DHMLSR  ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
005572  012737  000001  016716        MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
005600  005077  011000                CLR     @DHMCSR
005604  005005                MUX4B:  CLR     R5
005606  033737  016716  016712        BIT     SLMSK,LINSEL    ;SELECTED ??
005614  001417                        BEQ     MUX4D           ;BR IF NOT
005616  017704  010764                MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005622  117703  010756                MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
005626  042703  177760                BIC     #177760,R3      ;CLEAR UNWANTED BITS
005632  020103                        CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
005634  001002                        BNE     MUX4C           ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
005636  012705  000010                MOV     #SECTX,R5
                                                            ;TO BE SET
005642  020504                MUX4C:  CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
005644  001403                        BEQ     MUX4D           ;RESULTS
005646  104001                        ERRORL                  ;LINE STATUS ERROR
005650  104003                        SCOPEF
005652  005654                        MUX4D
005654  052777  000400  010722  MUX4D: BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
005662  006337  016716                ASL     SLMSK           ;SHIFT MASK
005666  005302                        DEC     R2
005670  001345                        BNE     MUX4B
005672  005005                        CLR     R5
005674  010177  010704        MUX4E:  MOV     R1,@DHMCSR
005700  010103                        MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
005702  005077  010700                CLR     @DHMLSR         ;CLEAR SECONDARY TRANSMIT FLIP FLOP
005706  105227  000000                INCB    #0              ;DELAY FOR CABLE
005712  001375                        BNE     .-4             ;DITTO
005714  017704  010666                MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005720  005704                        TST     R4              ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
005722  001401                        BEQ     MUX4F           ;CLEARED
005724  104001                        ERRORL                  ;NO, LINE STATUS ERROR
005726  104003                MUX4F:  SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
005730  005536                        MUX4A
005732  006337  016714                ASL     SELMSK          ;SHIFT SELECT MASK
005736  005201                        INC     R1              ;SELECT NEXT LINE
005740  005300                        DEC     R0              ;DECREMENT LINE COUNT
005742  001275                        BNE     MUX4A           ;CONTINU IF NOT DONE
005744  104002                        SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

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

005746                          T32:                                    ;REFERENCE DESIGNATION
005746  005077  010632          MUX5:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
005752  042737  000340  177776        BIC     #340,PS                 ;ENABLE INTERRUPTS
005760  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
005764  005001                        CLR     R1                      ;START AT LINE 0
005766  012737  000001  016714        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
005774  012702  000020          MUX5A:  MOV     #16.,R2                 ;16 LINES
006000  033737  016714  016712        BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
006006  001454                        BEQ     MUX5F                   ;BR IF NOT
006010  010177  010570                MOV     R1,@DHMCSR              ;SELECT A LINE
006014  012777  000003  010564        MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE +TRMRDY
006022  005077  010556                CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
006026  005005          MUX5B:  CLR     R5                      ;CLEAR EXPECTED RESULT
006030  017704  010552                MOV     @DHMLSR,R4              ;READ LINE STATUS
006034  117703  010544                MOVB    @DHMCSR,R3              ;READ LINE NUMBER
006040  042703  177760                BIC     #177760,R3              ;CLEAR UNWANTED BITS
006044  020103                        CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
006046  001002                        BNE     MUX5C                   ;EXPECT LINE ENABLE AND
006050  012705  000143                MOV     #LINENA+TRMRDY+CO+CS,R5
                                                                        ;CLEAR TO SEND AND CARRIER ARE SET
006054  020405          MUX5C:  CMP     R4,R5                   ;COMPARE EXPECTED AND
006056  001403                        BEQ     MUX5D                   ;RECEIVED RESULTS
006060  104001                        ERRORL                          ;LINE STATUS ERROR
006062  104003                        SCOPEF
006064  006066                        MUX5D
006066  052777  000400  010510  MUX5D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
006074  005302                        DEC     R2                      ;CONTINUE IF ALL CHECKS
006076  001353                        BNE     MUX5B                   ;ARE NOT DONE FOR THIS LINE
006100  012705  000001                MOV     #LINENA,R5              ;EXPECT LINE ENABLE
006104  010103          MUX5E:  MOV     R1,R3                   ;ON SELECTED LINE
006106  010177  010472                MOV     R1,@DHMCSR              ;SELECT LINE
006112  042777  000002  010466        BIC     #TRMRDY,@DHMLSR         ;CLEAR TERMINAL
006120  105227  000000                INCB    #0                      ;DELAY FOR CABLE
006124  001375                        BNE     .-4                     ;DITTO
006126  017704  010454                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
006132  020504                        CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
006134  001401                        BEQ     MUX5F                   ;SET ON THIS LINE
006136  104001                        ERRORL                          ;LINE STATUS ERROR
006140  104003          MUX5F:  SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
006142  005774                        MUX5A
006144  005201                        INC     R1                      ;UPDATE LINE NUMBER
006146  005077  010434                CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER
006152  006337  016714                ASL     SELMSK                  ;SHIFT MARK TO TEST NEXT LINE
006156  005300                        DEC     R0                      ;CONTINUE IF ALL LINES NOT
006160  001305                        BNE     MUX5A                   ;TESTED
006162  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
1075
1076                                        ;VERIFY THAT RING IS SET IF "LINE ENABLE"
1077                                        ;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.
1078
1079  006164                        T33:                                ;REFERENCE DESIGNATION
1080  006164  005077  010414       MUX6:  CLR     @DHMCSR               ;CLEAR CONTROL REGISTER
1081  006170  042737  000340  177776      BIC     #340,PS               ;ENABLE INTERRUPTS
1082  006176  012700  000020              MOV     #16.,R0               ;SET UP TO TEST 16 LINES
1083  006202  005001                      CLR     R1                    ;START AT LINE 0
1084  006204  012737  000001  016714      MOV     #1,SELMSK             ;INIT LINE SELECT MASK
1085  006212  012702  000020       MUX6A: MOV     #16.,R2               ;16 LINES
1086  006216  033737  016714  016712      BIT     SELMSK,LINSEL         ;THIS LINE SELECTED FOR TEST ?
1087  006224  001454                      BEQ     MUX6F                 ;BR IF NOT
1088  006226  010177  010352              MOV     R1,@DHMCSR            ;SELECT A LINE
1089  006232  012777  000005  010346      MOV     #LINENA+RS,@DHMLSR    ;SET LINE ENABLE +RS
1090  006240  005077  010340              CLR     @DHMCSR               ;CLEAR CONTROL REGISTER
1091  006244  005005                MUX6B: CLR     R5                    ;CLEAR EXPECTED RESULT
1092  006246  017704  010334              MOV     @DHMLSR,R4            ;READ LINE STATUS
1093  006252  117703  010326              MOVB    @DHMCSR,R3            ;READ LINE NUMBER
1094  006256  042703  177760              BIC     #177760,R3            ;CLEAR UNWANTED BITS
1095  006262  020103                      CMP     R1,R3                 ;IF RECEIVED LINE=SELECTED LINE
1096  006264  001002                      BNE     MUX6C                 ;EXPECT LINE ENABLE AND
1097  006266  012705  000205              MOV     #LINENA+RS+RING,R5
1098                                                                    ;RING IS SET
1099  006272  020405                MUX6C: CMP     R4,R5                 ;COMPARE EXPECTED AND
1100  006274  001403                      BEQ     MUX6D                 ;RECEIVED RESULTS
1101  006276  104001                      ERRORL                        ;LINE STATUS ERROR
1102  006300  104003                      SCOPEF
1103  006302  006304                      MUX6D
1104  006304  052777  000400  010272 MUX6D: BIS     #STEP,@DHMCSR         ;UPDATE LINE COUNTER
1105  006312  005302                      DEC     R2                    ;CONTINUE IF ALL CHECKS
1106  006314  001353                      BNE     MUX6B                 ;ARE NOT DONE FOR THIS LINE
1107  006316  012705  000001              MOV     #LINENA,R5            ;EXPECT LINE ENABLE
1108  006322  010103                MUX6E: MOV     R1,R3                 ;ON SELECTED LINE
1109  006324  010177  010254              MOV     R1,@DHMCSR            ;SELECT LINE
1110  006330  042777  000004  010250      BIC     #RS,@DHMLSR           ;CLEAR REQUEST TO SEND
1111  006336  105227  000000              INCB    #0                    ;DELAY FOR CABLE
1112  006342  001375                      BNE     .-4                   ;DITTO
1113  006344  017704  010236              MOV     @DHMLSR,R4            ;READ LINE STATUS REGISTER
1114  006350  020504                      CMP     R5,R4                 ;ONLY LINE ENABLE SHOULD BE
1115  006352  001401                      BEQ     MUX6F                 ;SET ON THIS LINE
1116  006354  104001                      ERRORL                        ;LINE STATUS ERROR
1117  006356  104003                MUX6F: SCOPEF                        ;CHECK FOR LOOP ON SAME DATA
1118  006360  006212                      MUX6A
1119  006362  005201                      INC     R1                    ;UPDATE LINE NUMBER
1120  006364  005077  010216              CLR     @DHMLSR               ;CLEAR LINE STATUS REGISTER
1121  006370  006337  016714              ASL     SELMSK                ;SHIFT MARK TO TEST NEXT LINE
1122  006374  005300                      DEC     R0                    ;CONTINUE IF ALL LINES NOT
1123  006376  001305                      BNE     MUX6A                 ;TESTED
1124  006400  104002                      SCOPE                         ;CHECK FOR ITERATIONS, LOOP
```

```
1125
1126                                        ;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
1127                                        ;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
1128
1129  006402                        T34:                                ;REFERENCE DESIGNATION
1130  006402  005077  010176        MUX7:   CLR     @DHMCSR             ;CLEAR CONTROL REGISTER
1131  006406  042737  000340  177776        BIC     #340,PS             ;ENABLE INTERRUPTS
1132  006414  012700  000020              MOV     #16.,R0             ;SET UP TO TEST 16 LINES
1133  006420  005001                       CLR     R1                  ;START AT LINE 0
1134  006422  012737  000001  016714        MOV     #1,SELMSK           ;INIT LINE SELECT MASK
1135  006430  012702  000020        MUX7A:  MOV     #16.,R2             ;16 LINES
1136  006434  033737  016714  016712        BIT     SELMSK,LINSEL       ;THIS LINE SELECTED FOR TEST ?
1137  006442  001454                       BEQ     MUX7F               ;BR IF NOT
1138  006444  010177  010134              MOV     R1,@DHMCSR          ;SELECT A LINE
1139  006450  012777  000011  010130        MOV     #LINENA+SECTX,@DHMLSR ;SET LINE ENABLE +SECTX
1140  006456  005077  010122              CLR     @DHMCSR             ;CLEAR CONTROL REGISTER
1141  006462  005005                MUX7B:  CLR     R5                  ;CLEAR EXPECTED RESULT
1142  006464  017704  010116              MOV     @DHMLSR,R4          ;READ LINE STATUS
1143  006470  117703  010110              MOVB    @DHMCSR,R3          ;READ LINE NUMBER
1144  006474  042703  177760              BIC     #177760,R3          ;CLEAR UNWANTED BITS
1145  006500  020103                       CMP     R1,R3               ;IF RECEIVED LINE=SELECTED LINE
1146  006502  001002                       BNE     MUX7C               ;EXPECT LINE ENABLE AND
1147  006504  012705  000031              MOV     #LINENA+SECTX+SECRX,R5
1148                                                                    ;SECONDARY RECEIVE IS SET
1149  006510  020405                MUX7C:  CMP     R4,R5               ;COMPARE EXPECTED AND
1150  006512  001403                       BEQ     MUX7D               ;RECEIVED RESULTS
1151  006514  104001                       ERRORL                      ;LINE STATUS ERROR
1152  006516  104003                       SCOPEF
1153  006520  006522                       MUX7D
1154  006522  052777  000400  010054  MUX7D:  BIS     #STEP,@DHMCSR       ;UPDATE LINE COUNTER
1155  006526  005302                       DEC     R2                  ;CONTINUE IF ALL CHECKS
1156  006530  001353                       BNE     MUX7B               ;ARE NOT DONE FOR THIS LINE
1157  006534  012705  000001              MOV     #LINENA,R5          ;EXPECT LINE ENABLE
1158  006540  010103                MUX7E:  MOV     R1,R3               ;ON SELECTED LINE
1159  006542  010177  010036              MOV     R1,@DHMCSR          ;SELECT LINE
1160  006546  042777  000010  010032        BIC     #SECTX,@DHMLSR      ;CLEAR SECONDARY TRANSMIT
1161  006554  105227  000000              INCB    #0                  ;DELAY FOR CABLE
1162  006560  001375                       BNE     .-4                 ;DITTO
1163  006562  017704  010020              MOV     @DHMLSR,R4          ;READ LINE STATUS REGISTER
1164  006566  020504                       CMP     R5,R4               ;ONLY LINE ENABLE SHOULD BE
1165  006570  001401                       BEQ     MUX7F               ;SET ON THIS LINE
1166  006572  104001                       ERRORL                      ;LINE STATUS ERROR
1167  006574  104003                MUX7F:  SCOPEF                      ;CHECK FOR LOOP ON SAME DATA
1168  006576  006430                       MUX7A
1169  006600  005201                       INC     R1                  ;UPDATE LINE NUMBER
1170  006602  005077  010000              CLR     @DHMLSR             ;CLEAR LINE STATUS REGISTER
1171  006606  006337  016714              ASL     SELMSK              ;SHIFT MARK TO TEST NEXT LINE
1172  006612  005300                       DEC     R0                  ;CONTINUE IF ALL LINES NOT
1173  006614  001305                       BNE     MUX7A               ;TESTED
1174  006616  104002                       SCOPE                       ;CHECK FOR ITERATIONS, LOOP
```

```
1175
1176                                        ;VERIFY THAT "CLEAR MULTIPLXER" CLEARS ALL MULTIPLEXER
1177                                        ;FUNCTION FLIP-FLOPS
1178
1179  006620                        T35:                              ;REFERENCE DESIGNATION
1180  006620  005077  007760        MUX8:   CLR     @DHMCSR           ;CLEAR CONTROL REGISTER
1181  006624  042737  000340  177776        BIC     #340,PS           ;ENABLE INTERRUPTS
1182  006632  012700  000020              MOV     #16.,R0           ;SET UP TO TEST 16 LINES
1183  006636  012777  000017  007742  MUX8A:  MOV     #17,@DHMLSR       ;WRITE 1S INTO  ALL MULTIPLEXER
1184  006644  052777  000400  007732        BIS     #STEP,@DHMCSR     ;FUNCTION FLIPFLOPS
1185  006652  005300                        DEC     R0
1186  006654  001370                        BNE     MUX8A
1187  006656  012737  000001  016714        MOV     #1,SELMSK         ;INIT SELECT MASK
1188  006664  005003                        CLR     R3                ;SET UP FOR 16 LINES
1189  006666  012700  000020              MOV     #16.,R0
1190  006672  012777  002000  007704  MUX8B:  MOV     #CLRMUX,@DHMCSR   ;CLEAR MULTIPLEXER
1191  006700  033737  016714  016712  MUX8C:  BIT     SELMSK,LINSEL     ;SELECTED ??
1192  006706  001425                        BEQ     MUX8E             ;BR IF NOT
1193  006710  010377  007670              MOV     R3,@DHMCSR        ;SELECT LINE
1194  006714  017704  007666              MOV     @DHMLSR,R4        ;READ LINE STATUS REGISTER
1195  006720  005005                        CLR     R5                ;EXPECT 0S
1196  006722  005704                        TST     R4                ;WAS LINE STATUS REGISTER CLEARED
1197  006724  001403                        BEQ     MUX8D
1198  006726  104001                        ERRORL                    ;LINE STATUS ERROR
1199  006730  104003                        SCOPEF                    ;CHECK FOR LOOP ON SAME DATA
1200  006732  006672                        MUX8B
1201  006734  005205              MUX8D:  INC     R5                ;EXPECT LINE ENABLE
1202  006736  052777  000001  007642        BIS     #LINENA,@DHMLSR   ;SET LINE ENABLE ON SELECTED LINE
1203  006744  017704  007636              MOV     @DHMLSR,R4        ;READ LINE STATUS REGISTER
1204  006750  020504                        CMP     R5,R4             ;IS ANYTHING BUT LINE ENABLE SET
1205  006752  001403                        BEQ     MUX8E
1206  006754  104001                        ERRORL                    ;LINE STATUS ERROR
1207  006756  104003                        SCOPEF                    ;CHECK FOR LOOP ON SAME DATA
1208  006760  006672                        MUX8B
1209  006762  005203              MUX8E:  INC     R3                ;UPDATE LINE NUMBER
1210  006764  005077  007616              CLR     @DHMLSR           ;CLEAR CURRENT LINE
1211  006770  006337  016714              ASL     SELMSK            ;SHIFT SELECT MASK
1212  006774  005300                        DEC     R0                ;CONTINUE IF ALL LINES NOT
1213  006776  001340                        BNE     MUX8C             ;TESTED
1214  007000  104002                        SCOPE                     ;CHECK FOR ITERATIONS, LOOP
```

```
1215
1216
1217                                        ;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS
1218                                        ;SET "LINE ENABLE FOR ALL LINES
1219                                        ;VERIFY THAT AN INTERRUPP OCCURS FOR EACH LINE
1220
1221  007002                          T36:                                ;REFERENCE DESIGNATION
1222  007002  012777  002000  007574 SCNT1: MOV   #CLRMUX,@DHMCSR         ;CLEAR ALL MULTIPLEXER FLIPFLOPS
1223  007010  005077  007570          CLR   @DHMCSR                       ;CLEAR CONTROL REGISTER
1224  007014  042737  000340  177776 BIC   #340,PS                       ;ENABLE INTERRUPTS
1225  007022  012700  000020          MOV   #16.,R0                       ;SET UP TO WRITE 1'S INTO
1226  007026  012777  001017  007550 MOV   #MAINT+17,@DHMCSR             ;ALL SCANNER MEMORY LOCATION
1227  007034  012737  000001  016714 MOV   #1,SELMSK                     ;INIT SELECT MASK
1228  007042  052777  000400  007534 SCNT1A: BIS #STEP,@DHMCSR           ;WRITE A LOCATION
1229  007050  012777  000001  007530 MOV   #LINENA,@DHMLSR               ;LET "LINE ENABLE"
1230  007056  005300          DEC   R0
1231  007060  001370          BNE   SCNT1A
1232  007062  012701  177777          MOV   #-1,R1                        ;INIT LINE NO. GEN.
1233  007066  012705  070340          MOV   #70340,R5                     ;EXPECT "DONE"+"SCNENA"+"COF"+"CSF"+"SECRXF"
1234  007072  012777  007202  007500 MOV   #SCNT1C,@DHMVEC               ;SET UP LOCAL INTERRUPT SERVICE
1235  007100  013777  177776  007474 MOV   PS,@DHMLVL                     ;SERVICE AT LEVEL 7
1236  007106  012700  000020          MOV   #16.,R0
1237  007112  012777  000117  007464 MOV   #INTENA+17,@DHMCSR            ;SET INTERRUPT ENABLE
1238  007120  033737  016714  016712 SCNT1B: BIT  SELMSK,LINSEL           ;SELECTED ??
1239  007126  001435          BEQ   SCNT1D                        ;BR IF NOT
1240  007130  052737  000340  177776          BIS   #340,PS               ;LOCK OUT INTERRUPTS
1241  007136  052777  000040  007440          BIS   #SCNENA,@DHMCSR       ;START SCANNER
1242  007144  042737  000340  177776          BIC   #340,PS               ;ENABLE INTERRUPTS
1243  007152  105777  007426          TSTB  @DHMCSR                       ;WAIT FOR DONE
1244  007156  100375          BPL   .-4                           ;PROGRAM WILL HANG HERE
1245                                                              ;IF DONE NEVER SETS
1246  007160  052737  000340  177776          BIS   #340,PS               ;INTERRUPT DID NOT OCCUR
1247  007166  017704  007412          MOV   @DHMCSR,R4                    ;ERROR
1248  007172  104000          ERRORC                              ;CONTROL STATUS ERROR
1249  007174  104003          SCOPEF                              ;CHECK FOR LOOP ON SAME DATA
1250  007176  007002          SCNT1
1251  007200  000410          BR    SCNT1D
1252  007202  022626                SCNT1C: POP2SP                      ;INTERRUPT OCCURED, REPOSITION STACK
1253  007204  017704  007374          MOV   @DHMCSR,R4                    ;READ CONTROL STATUS
1254  007210  020504          CMP   R5,R4                         ;ARE EXPECTED AND RECEIVED
1255  007212  001403          BEQ   SCNT1D                        ;REGISTERS THE SAME
1256  007214  104000          ERRORC                              ;NO, LINE STATUS ERROR
1257  007216  104003          SCOPEF                              ;CHECK FOR LOOP WITH CURRENT DATA
1258  007220  007002          SCNT1
1259  007222  042777  000257  007354 SCNT1D: BIC  #SCNENA+DONE+17,@DHMCSR ;CLEAR SCAN ENABLE AND DONE
1260  007230  005201          INC   R1                            ;GEN NXT LINE NO.
1261  007232  150177  007346          BISB  R1,@DHMCSR                    ;SET LINE NO. BITS
1262  007236  006337  016714          ASL   SELMSK                        ;SHIFT SELECT MASK
1263  007242  005205          INC   R5                            ;UPDATE EXPECTED RESULT
1264  007244  005300          DEC   R0                            ;CONTINUE IF NOT DONE
1265  007246  001324          BNE   SCNT1B
1266  007250  104002          SCOPE                               ;CHECK FOR ITERATIONS, LOOP
```

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

007252                          T37:                                    ;REFERENCE DESIGNATION
007252  012700  000020          SCNT2:  MOV     #16.,R0                 ;WRITE 1S INTO ALL
007256  012777  002000  007320          MOV     #CLRMUX,@DHMCSR         ;CLEAR MULTIPLEXER
007264  005077  007314                  CLR     @DHMCSR                 ;MULTIPLEXER FUNCTION
007270  042737  000340  177776          BIC     #340,PS                 ;ENABLE TELETYPE INTERRUPTS
007276  012737  000001  016714          MOV     #1,SELMSK               ;INIT LINE SELECT MASK
007304  012777  000017  007274  SCNT2A: MOV     #17,@DHMLSR             ;FLIPFLOPS
007312  052777  000400  007264          BIS     #STEP,@DHMCSR
007320  005300                          DEC     R0
007322  001370                          BNE     SCNT2A
007324  012777  004000  007252          MOV     #CLRSCN,@DHMCSR         ;CLEAR SCANNER MEMORY
007332  032777  000020  007244          BIT     #BUSY,@DHMCSR           ;WAIT FOR CLEAR CYCLE TO COMPLETE
007340  001374                          BNE     .-6
007342  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
007346  012701  177777                  MOV     #-1,R1                  ;INIT LINE NO. GENERATOR
007352  012705  170340                  MOV     #170340,R5              ;FIRST EXPECTED RESULT
007356  012777  007462  007214          MOV     #SCNT2C,@DHMVEC         ;SET UP LOCAL INTERRUPT RETURN
007364  013777  177776  007210          MOV     PS,@DHMLVL
007372  012777  000117  007204          MOV     #INTENA+17,@DHMCSR      ;SET INTERRUPT ENABLE
007400  033737  016714  016712  SCNT2B: BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED ??
007406  001435                          BEQ     SCNT2D                  ;BR IF NOT
007410  052737  000340  177776          BIS     #340,PS                 ;LOCK OUT INTERRUPTS
007416  052777  000040  007160          BIS     #SCNENA,@DHMCSR         ;START SCANNER
007424  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
007432  105777  007146                  TSTB    @DHMCSR                 ;WAIT FOR DONE
007436  100375                          BPL     .-4                     ;PROGRAM WILL HANG HERE
                                                                        ;IF DONE NEVER SETS
007440  052737  000340  177776          BIS     #340,PS                 ;LOCK OUT INTERRUPTS
007446  017704  007132                  MOV     @DHMCSR,R4              ;READ CONTROL STATUS
007452  104000                          ERRORC                          ;INTERRUPT DID NOT OCCUR
007454  104003                          SCOPEF                          ;CHECK FOR LOOP ON CURRENT DATA
007456  007252                          SCNT2
007460  000410                          BR      SCNT2D                  ;CONTINUE
007462  022626                  SCNT2C: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
007464  017704  007114                  MOV     @DHMCSR,R4              ;READ CONTROL STATUS REGISTER
007470  020504                          CMP     R5,R4                   ;COMPARE TO EXPECTED RESULT
007472  001403                          BEQ     SCNT2D
007474  104000                          ERRORC                          ;CONTROL STATUS ERROR
007476  104003                          SCOPEF                          ;CHECK FOR LOOP ON CURRENT DATA
007500  007252                          SCNT2
007502  042777  000257  007074  SCNT2D: BIC     #SCNENA+DONE+17,@DHMCSR ;CLEAR SCAN ENABLE AND DONE AND LINE NO.
007510  006337  016714                  ASL     SELMSK                  ;SHIFT SELECT BIT
007514  005201                          INC     R1                      ;GEN NEW LINE NO.
007516  150177  007062                  BISB    R1,@DHMCSR              ;SET IT IN CSR
007522  005205                          INC     R5                      ;UPDATE EXPECTED RESULT
007524  005300                          DEC     R0                      ;CONTINUE IF ALL
007526  001324                          BNE     SCNT2B                  ;LINES NOT TESTED
007530  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
 1320
 1321
 1322                                   ;SINGLE LINE CABLE TEST
 1323                                   ;FOR USE WITH MODEM CABLE AND DC11 TEST CONNECTOR
 1324
 1325                                   ;NOTE:  MODEM CONTROL MULTIPLEXER INPUTS SHOULD BE CONNECTED
 1326                                   ;TO DISTRIBUTION PANEL WIA DM11-DC
 1327
 1328
 1329  007532                    T100:                                   ;REFERENCE DESIGNATION
 1330  007532  012737  007552  002204 STRLIN: MOV     #STRLNA,KRET       ;SET UP FOR NEW LINE SELECTION
 1331  007540  042737  000340  177776        BIC     #340,PS            ;ENABLE INTERRUPTS
 1332  007546  104004                        TYPE                       ;TYPE "SINGLE LINE CABLE TEST"
 1333  007550  017723                        MLINE
 1334  007552  104013                STRLNA: INSTRG                     ;GET LINE NUMBER
 1335  007554  017756                        MLINEI
 1336  007556  000000                        0
 1337  007560  000017                        17
 1338  007562  016672                        LINE
 1339  007564  104004                        TYPE
 1340  007566  017720                        MCRLF
```

```
1341
1342                                        ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
1343                                        ;BE SET AND CLEARED FOR SELECTED LINE
1344
1345  007570                        T101:                                 ;REFERENCE DESIGNATION
1346  007570  005077  007010       MUX11:  CLR     @DHMCSR               ;CLEAR CONTROL STATUS REGISTER
1347  007574  042737  000340 177776       BIC     #340,PS               ;ENABLE INTERRUPTS
1348  007602  013701  016672             MOV     LINE,R1
1349  007606  012777  002000 006770 MUX11A: MOV     #CLRMUX,@DHMCSR
1350  007614  012702  000020             MOV     #16.,R2
1351  007620  010177  006760             MOV     R1,@DHMCSR            ;SELECT LINE TO BE TESTED
1352  007624  012777  000001 006754       MOV     #LINENA,@DHMLSR       ;SET LINE ENABLE FUNCTION FLIP-FLOP
1353  007632  005077  006746             CLR     @DHMCSR
1354  007636  005005                MUX11B: CLR     R5
1355  007640  017704  006742             MOV     @DHMLSR,R4            ;READ LINE STATUS REGISTER
1356  007644  117703  006734             MOVB    @DHMCSR,R3            ;READ CONTROL STATUS REGISTER
1357  007650  042703  177760             BIC     #177760,R3            ;CLEAR UNWANTED BITS
1358  007654  020103                      CMP     R1,R3                 ;IF LINE NUMBER=SELECTED LINE NUMBER,
1359  007656  001002                      BNE     MUX11C                ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
1360  007660  012705  000001             MOV     #LINENA,R5
1361                                                                    ;TO BE SET
1362  007664  020504                MUX11C: CMP     R5,R4                 ;COMPARE EXPECTED AND RECEIVED
1363  007666  001403                      BEQ     MUX11D                ;RESULTS
1364  007670  104001                      ERRORL                        ;LINE STATUS ERROR
1365  007672  104003                      SCOPEF
1366  007674  007676                      MUX11D
1367  007676  052777  000400 006700 MUX11D: BIS     #STEP,@DHMCSR         ;EXAMINE NEXT LINE
1368  007704  005302                      DEC     R2
1369  007706  001353                      BNE     MUX11B
1370  007710  005005                      CLR     R5
1371  007712  010177  006666       MUX11E: MOV     R1,@DHMCSR
1372  007716  010103                      MOV     R1,R3                 ;SET LINE COUNTER TO SELECTED LINE
1373  007720  005077  006662             CLR     @DHMLSR               ;CLEAR LINE ENABLE FLIP FLOP
1374  007724  105227  000000             INCB    #0                    ;DELAY FOR CABLE
1375  007730  001375                      BNE     .-4                   ;DITTO
1376  007732  017704  006650             MOV     @DHMLSR,R4            ;READ LINE STATUS REGISTER
1377  007736  005704                      TST     R4                    ;WAS LINE ENABLE FUNCTION FLIP FLOP
1378  007740  001401                      BEQ     MUX11F                ;CLEARED
1379  007742  104001                      ERRORL                        ;NO, LINE STATUS ERROR
1380  007744  104002                MUX11F: SCOPE                         ;CHECK FOR ITERATIONS, LOOP
```

```
                                                ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
                                                ;BE SET AND CLEARED FOR SELECTED LINE

007746                          T102:                                   ;REFERENCE DESIGNATION
007746  005077  006632          MUX12:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
007752  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
007760  013701  016672                  MOV     LINE,R1
007764  012777  002000  006612  MUX12A: MOV     #CLRMUX,@DHMCSR
007772  012702  000020                  MOV     #16.,R2
007776  010177  006602                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
010002  012777  000002  006576          MOV     #TRMRDY,@DHMLSR         ;SET TERMINAL READY FUNCTION FLIP-FLOP
010010  005077  006570                  CLR     @DHMCSR
010014  005005                  MUX12B: CLR     R5
010016  017704  006564                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
010022  117703  006556                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
010026  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
010032  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
010034  001002                          BNE     MUX12C                  ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
010036  012705  000002                  MOV     #TRMRDY,R5
                                                                        ;TO BE SET
010042  020504                  MUX12C: CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
010044  001403                          BEQ     MUX12D                  ;RESULTS
010046  104001                          ERRORL                          ;LINE STATUS ERROR
010050  104003                          SCOPEF
010052  010054                          MUX12D
010054  052777  000400  006522  MUX12D: BIS     #STEP,@DHMCSR           ;EXAMINE NEXT LINE
010062  005302                          DEC     R2
010064  001353                          BNE     MUX12B
010066  005005                          CLR     R5
010070  010177  006510          MUX12E: MOV     R1,@DHMCSR
010074  010103                          MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
010076  005077  006504                  CLR     @DHMLSR                 ;CLEAR TERMINAL READY FLIP FLOP
010102  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
010106  001375                          BNE     .-4                     ;DITTO
010110  017704  006472                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
010114  005704                          TST     R4                      ;WAS TERMINAL READY FUNCTION FLIP FLOP
010116  001401                          BEQ     MUX12F                  ;CLEARED
010120  104001                          ERRORL                          ;NO, LINE STATUS ERROR
010122  104002                  MUX12F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
1420                                            ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
1421                                            ;BE SET AND CLEARED FOR SELECTED LINE
1422
1423  010124                            T103:                                   ;REFERENCE DESIGNATION
1424  010124  005077  006454           MUX13:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
1425  010130  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
1426  010136  013701  016672                  MOV     LINE,R1
1427  010142  012777  002000  006434  MUX13A: MOV     #CLRMUX,@DHMCSR
1428  010150  012702  000020                  MOV     #16.,R2
1429  010154  010177  006424                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
1430  010160  012777  000004  006420          MOV     #RS,@DHMLSR             ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
1431  010166  005077  006412                  CLR     @DHMCSR
1432  010172  005005                  MUX13B: CLR     R5
1433  010174  017704  006406                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
1434  010200  117703  006400                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
1435  010204  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
1436  010210  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
1437  010212  001002                          BNE     MUX13C                  ;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
1438  010214  012705  000004                  MOV     #RS,R5
1439                                                                          ;TO BE SET
1440  010220  020504                  MUX13C: CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
1441  010222  001403                          BEQ     MUX13D                  ;RESULTS
1442  010224  104001                          ERRORL                          ;LINE STATUS ERROR
1443  010226  104003                          SCOPEF
1444  010230  010232                          MUX13D
1445  010232  052777  000400  006344  MUX13D: BIS     #STEP,@DHMCSR           ;EXAMINE NEXT LINE
1446  010240  005302                          DEC     R2
1447  010242  001353                          BNE     MUX13B
1448  010244  005005                          CLR     R5
1449  010246  010177  006332          MUX13E: MOV     R1,@DHMCSR
1450  010252  010103                          MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
1451  010254  005077  006326                  CLR     @DHMLSR                 ;CLEAR REQUEST TO SEND FLIP FLOP
1452  010260  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
1453  010264  001375                          BNE     .-4                     ;DITTO
1454  010266  017704  006314                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
1455  010272  005704                          TST     R4                      ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
1456  010274  001401                          BEQ     MUX13F                  ;CLEARED
1457  010276  104001                          ERRORL                          ;NO, LINE STATUS ERROR
1458  010300  104002          MUX13F: SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
```

```
1459                                            ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
1460                                            ;BE SET AND CLEARED FOR SELECTED LINE
1461
1462  010302                            T104:                                   ;REFERENCE DESIGNATION
1463  010302  005077  006276           MUX14:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
1464  010306  042737  000340  177776           BIC     #340,PS                 ;ENABLE INTERRUPTS
1465  010314  013701  016672                   MOV     LINE,R1
1466  010320  012777  002000  006256  MUX14A:  MOV     #CLRMUX,@DHMCSR
1467  010326  012702  000020                   MOV     #16.,R2
1468  010332  010177  006246                   MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
1469  010336  012777  000010  006242           MOV     #SECTX,@DHMLSR          ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
1470  010344  005077  006234                   CLR     @DHMCSR
1471  010350  005005                  MUX14B:  CLR     R5
1472  010352  017704  006230                   MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
1473  010356  117703  006222                   MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
1474  010362  042703  177760                   BIC     #177760,R3              ;CLEAR UNWANTED BITS
1475  010366  020103                           CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
1476  010370  001002                           BNE     MUX14C                  ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
1477  010372  012705  000010                   MOV     #SECTX,R5               ;TO BE SET
1478
1479  010376  020504                  MUX14C:  CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
1480  010400  001403                           BEQ     MUX14D                  ;RESULTS
1481  010402  104001                           ERRORL                          ;LINE STATUS ERROR
1482  010404  104003                           SCOPEF
1483  010406  010410                           MUX14D
1484  010410  052777  000400  006166  MUX14D:  BIS     #STEP,@DHMCSR           ;EXAMINE NEXT LINE
1485  010416  005302                           DEC     R2
1486  010420  001353                           BNE     MUX14B
1487  010422  005005                           CLR     R5
1488  010424  010177  006154          MUX14E:  MOV     R1,@DHMCSR              ;SET LINE COUNTER TO SELECTED LINE
1489  010430  010103                           MOV     R1,R3                   ;CLEAR SECONDARY TRANSMIT FLIP FLOP
1490  010432  005077  006150                   CLR     @DHMLSR                 ;DELAY FOR CABLE
1491  010436  105227  000000                   INCB    #0                      ;DITTO
1492  010442  001375                           BNE     .-4                     ;READ LINE STATUS REGISTER
1493  010444  017704  006136                   MOV     @DHMLSR,R4              ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
1494  010450  005704                           TST     R4                      ;CLEARED
1495  010452  001401                           BEQ     MUX14F                  ;NO, LINE STATUS ERROR
1496  010454  104001                           ERRORL                          ;CHECK FOR ITERATIONS, LOOP
1497  010456  104002                  MUX14F:  SCOPE
```

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

010460                          T105:                                   ;REFERENCE DESIGNATION
010460  005077  006120        MUX15:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
010464  042737  000340  177776        BIC     #340,PS                 ;ENABLE INTERRUPTS
010472  013701  016672                MOV     LINE,R1
010476  012702  000020        MUX15A: MOV     #16.,R2                 ;16 LINES
010502  010177  006076                MOV     R1,@DHMCSR              ;SELECT A LINE
010506  012777  000003  006072        MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE +TRMRDY
010514  005077  006064                CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
010520  005005                MUX15B: CLR     R5                      ;CLEAR EXPECTED RESULT
010522  017704  006060                MOV     @DHMLSR,R4              ;READ LINE STATUS
010526  117703  006052                MOVB    @DHMCSR,R3              ;READ LINE NUMBER
010532  042703  177760                BIC     #177760,R3              ;CLEAR UNWANTED BITS
010536  020103                        CMP     R1,R3                   ;IF RECEIVED LINE =SELECTED LINE
010540  001002                        BNE     MUX15C                  ;EXPECT LINE ENABLE AND
010542  012705  000143                MOV     #LINENA+TRMRDY+CO+CS,R5
                                                                        ;CLEAR TO SEND AND CARRIER ARE SET
010546  020405                MUX15C: CMP     R4,R5                   ;COMPARE EXPECTED AND
010550  001403                        BEQ     MUX15D                  ;RECEIVED RESULTS
010552  104001                        ERRORL                          ;LINE STATUS ERROR
010554  104003                        SCOPEF
010556  010560                        MUX15D
010560  052777  000400  006016 MUX15D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
010566  005302                        DEC     R2                      ;CONTINUE IF ALL CHECKS
010570  001353                        BNE     MUX15B                  ;ARE NOT DONE FOR THIS LINE
010572  012705  000001                MOV     #LINENA,R5              ;EXPECT LINE ENABLE
010576  010103                MUX15E: MOV     R1,R3                   ;ON SELECTED LINE
010600  010177  006000                MOV     R1,@DHMCSR              ;SELECT LINE
010604  042777  000002  005774        BIC     #TRMRDY,@DHMLSR         ;CLEAR TERMINAL
010612  105227  000000                INCB    #0                      ;DELAY FOR CABLE
010616  001375                        BNE     .-4                     ;DITTO
010620  017704  005762                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
010624  020504                        CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
010626  001401                        BEQ     MUX15F                  ;SET ON THIS LINE
010630  104001                        ERRORL                          ;LINE STATUS ERROR
010632  104002                MUX15F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
1537
1538                                        ;VERIFY THAT RING IS SET IF "LINE ENABLE"
1539                                        ;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.
1540
1541  010634                        T106:                               ;REFERENCE DESIGNATION
1542  010634  005077  005744       MUX16:  CLR     @DHMCSR             ;CLEAR CONTROL REGISTER
1543  010640  042737  000340 177776       BIC     #340,PS             ;ENABLE INTERRUPTS
1544  010646  013701  016672             MOV     LINE,R1
1545  010652  012702  000020       MUX16A: MOV     #16.,R2             ;16 LINES
1546  010656  010177  005722             MOV     R1,@DHMCSR          ;SELECT A LINE
1547  010662  012777  000005 005716      MOV     #LINENA+RS,@DHMLSR  ;SET LINE ENABLE +RS
1548  010670  005077  005710             CLR     @DHMCSR             ;CLEAR CONTROL REGISTER
1549  010674  005005             MUX16B: CLR     R5                  ;CLEAR EXPECTED RESULT
1550  010676  017704  005704             MOV     @DHMLSR,R4          ;READ LINE STATUS
1551  010702  117703  005676             MOVB    @DHMCSR,R3          ;READ LINE NUMBER
1552  010706  042703  177760             BIC     #177760,R3          ;CLEAR UNWANTED BITS
1553  010712  020103                     CMP     R1,R3               ;IF RECEIVED LINE=SELECTED LINE
1554  010714  001002                     BNE     MUX16C              ;EXPECT LINE ENABLE AND
1555  010716  012705  000205             MOV     #LINENA+RS+RING,R5
1556                                                                  ;RING IS SET
1557  010722  020405             MUX16C: CMP     R4,R5               ;COMPARE EXPECTED AND
1558  010724  001403                     BEQ     MUX16D              ;RECEIVED RESULTS
1559  010726  104001                     ERRORL                      ;LINE STATUS ERROR
1560  010730  104003                     SCOPEF
1561  010732  010734                     MUX16D
1562  010734  052777  000400 005642 MUX16D: BIS     #STEP,@DHMCSR       ;UPDATE LINE COUNTER
1563  010742  005302                     DEC     R2                  ;CONTINUE IF ALL CHECKS
1564  010744  001353                     BNE     MUX16B              ;ARE NOT DONE FOR THIS LINE
1565  010746  012705  000001             MOV     #LINENA,R5          ;EXPECT LINE ENABLE
1566  010752  010103             MUX16E: MOV     R1,R3               ;ON SELECTED LINE
1567  010754  010177  005624             MOV     R1,@DHMCSR          ;SELECT LINE
1568  010760  042777  000004 005620      BIC     #RS,@DHMLSR         ;CLEAR REQUEST TO SEND
1569  010766  105227  000000             INCB    #0                  ;DELAY FOR CABLE
1570  010772  001375                     BNE     .-4                 ;DITTO
1571  010774  017704  005606             MOV     @DHMLSR,R4          ;READ LINE STATUS REGISTER
1572  011000  020504                     CMP     R5,R4               ;ONLY LINE ENABLE SHOULD BE
1573  011002  001401                     BEQ     MUX16F              ;SET ON THIS LINE
1574  011004  104001                     ERRORL                      ;LINE STATUS ERROR
1575  011006  104002             MUX16F: SCOPE                       ;CHECK FOR ITERATIONS, LOOP
```

```
1576
1577                                            ;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
1578                                            ;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
1579
1580  011010                            T107:                                   ;REFERENCE DESIGNATION
1581  011010  005077  005570           MUX17:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
1582  011014  042737  000340  177776         BIC     #340,PS                 ;ENABLE INTERRUPTS
1583  011022  013701  016672                 MOV     LINE,R1
1584  011026  012702  000020           MUX17A: MOV     #16.,R2                 ;16 LINES
1585  011032  010177  005546                 MOV     R1,@DHMCSR              ;SELECT A LINE
1586  011036  012777  000011  005542         MOV     #LINENA+SECTX,@DHMLSR   ;SET LINE ENABLE +SECTX
1587  011044  005077  005534                 CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
1588  011050  005005                  MUX17B: CLR     R5                      ;CLEAR EXPECTED RESULT
1589  011052  017704  005530                 MOV     @DHMLSR,R4              ;READ LINE STATUS
1590  011056  117703  005522                 MOVB    @DHMCSR,R3              ;READ LINE NUMBER
1591  011062  042703  177760                 BIC     #177760,R3              ;CLEAR UNWANTED BITS
1592  011066  020103                          CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
1593  011070  001002                          BNE     MUX17C                  ;EXPECT LINE ENABLE AND
1594  011072  012705  000031                 MOV     #LINENA+SECTX+SECRX,R5
1595                                                                          ;SECONDARY RECEIVE IS SET
1596  011076  020405                  MUX17C: CMP     R4,R5                   ;COMPARE EXPECTED AND
1597  011100  001403                          BEQ     MUX17D                  ;RECEIVED RESULTS
1598  011102  104001                          ERRORL                          ;LINE STATUS ERROR
1599  011104  104003                          SCOPEF
1600  011106  011110                          MUX17D
1601  011110  052777  000400  005466  MUX17D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
1602  011116  005302                          DEC     R2                      ;CONTINUE IF ALL CHECKS
1603  011120  001353                          BNE     MUX17B                  ;ARE NOT DONE FOR THIS LINE
1604  011122  012705  000201                 MOV     #LINENA,R5              ;EXPECT LINE ENABLE
1605  011126  010103                  MUX17E: MOV     R1,R3                   ;ON SELECTED LINE
1606  011130  010177  005450                 MOV     R1,@DHMCSR              ;SELECT LINE
1607  011134  042777  000010  005444         BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
1608  011142  105227  000000                 INCB    #0                      ;DELAY FOR CABLE
1609  011146  001375                          BNE     .-4                     ;DITTO
1610  011150  017704  005432                 MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
1611  011154  020504                          CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
1612  011156  001401                          BEQ     MUX17F                  ;SET ON THIS LINE
1613  011160  104001                          ERRORL                          ;LINE STATUS ERROR
1614  011162  104002                  MUX17F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;MODEM CONTROL 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 MODEM CONTROL 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

011164                          T200:                                   ;REFERENCE DESIGNATION
011164  000005                 ST103A: RESET                           ;INITIALIZE INTERFACE
011166  012737  000340  177776        MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011174  104004                      TYPE                            ;TYPE "103A MODEM CONNECT-
011176  017142                      MT103T                          ;DISCONNECT TEST"
011200  022737  000176  016620      CMP     #SWREG,SWR
011206  001001                      BNE     1$
011210  104025                      CNTLUU
011212  012737  011230  013020  1$: MOV     #T103A,FATRET           ;SET UP FOR FATAL ERROR
011220  012737  011226  002204      MOV     #ST103B,KRET            ;SET UP FOR LINE CHANGE
011226  104017                  ST103B: GETLNS                      ;INPUT ORIGINATE AND
                                                                    ;AND ANSWER LINE NUMBERS
011230  104020                  T103A:  SETUP                       ;SET UP TO RECEIVE INTERRUPTS
                                                                    ;WAIT FOR RING
011232  011242                      T103B                           ;GO HERE IF RING OK
011234  011236                      T103A1                          ;GO HERE IF NO RING
011236  104012                  T103A1: ERROR                       ;NO RING WITHIN 5 MINUTES
011240  000772                      BR      ST103B                  ;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

011242  104021                  T103B:  CKRING                      ;CHECK FOR RING INTERRUPT
                                                                    ;ONLY ON ANSWER LINE
                                                                    ;AND NO TRANSITIONS ON
                                                                    ;ORIGINATE LINE
011244  011262                      T103C                           ;GO HERE IF TRANSITIONS
                                                                    ;ARE CORRECT
011246  011252                      T103B1                          ;GO HERE IF INCORRECT
                                                                    ;TRANSITION ON ANSWER LINE
011250  011256                      T103B2                          ;GO HERE IF INCORRECT TRANSITION
                                                                    ;ON ORIGINATE LINE
011252  104014                  T103B1: ERRORT                      ;TRANSITION ERROR ON ANSWER LINE
011254  000207                      RTS     PC                      ;CONTINUE CHECKING
011256  104014                  T103B2: ERRORT                      ;TRANSITION ERROR ON ORIGINATE LINE
011260  000762                      BR      ST103B                  ;RESELECT LINES AND REDIAL
```

```
1666
1667                                        ;SET TERMINAL READY ON SELECTED ANSWER LINE
1668                                        ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1669
1670  011262  013777  016676  005314  T103C:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO
1671                                                                            ;ANSWER LINE NUMBER
1672  011270  052777  000002  005310           BIS     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON
1673                                                                            ;SELECTED ANSWER LINE
1674  011276  104026                           CKINTT
1675  011300  104022                           WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
1676
1677                                        ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1678                                        ;SELECTED ORIGINATE AND ANSWER LINES
1679
1680  011302  104023                           CKTRAN                          ;CHECK TRANSITIONS AND
1681                                                                            ;STATUS ON SELECTED
1682                                                                            ;ANSWER AND ORIGINATE LINES
1683  011304  000143                           CO+CS+LINENA+TRMRDY              ;EXPECT CARRIER, CLEAR TO SEND,
1684                                                                            ;LINE ENABLE AND TERMINAL
1685                                                                            ;READY STATUS BITS SET ON
1686                                                                            ;ANSWER LINE
1687  011306  000143                           CO+CS+LINENA+TRMRDY              ;EXPECT CARRIER, CLEAR TO SEND,
1688                                                                            ;LINE ENABLE   , AND TERMINAL
1689                                                                            ;READY STATUS BITS ON
1690                                                                            ;ORIGINATE LINE
1691  011310  100006                           RINGF+XCO+XCS                   ;EXPECT CARRIER, CLEAR TO SEND
1692                                                                            ;AND POSSIBLE RING TRANSITIONS
1693                                                                            ;ON ANSWER LINE
1694  011312  000006                           XCO+XCS                         ;EXPECT CARRIER AND CLEAR
1695                                                                            ;TO SEND TRANSITIONS ON
1696                                                                            ;ORIGINATE LINE
1697  011314  011326                           T103D1                          ;GO HERE ON ANSWER LINE STATUS ERROR
1698
1699  011316  011332                           T103D2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
1700  011320  011336                           T103D3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
1701  011322  011342                           T103D4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1702  011324  011346                           T103E                           ;GO TO NEXT TEST IF NO ERRORS
1703  011326  104015           T103D1:  ERRORS                                  ;ANSWER LINE STATUS ERROR
1704  011330  000207                    RTS     PC                             ;CONTINUE CHECKING
1705  011332  104015           T103D2:  ERRORS                                  ;ORIGINATE LINE STATUS ERROR
1706  011334  000207                    RTS     PC                             ;CONTINUE CHECKING
1707  011336  104014           T103D3:  ERRORT                                  ;ANSWER LINE TRANSITION ERROR
1708  011340  000207                    RTS     PC                             ;CONTINUE CHECKING
1709  011342  104014           T103D4:  ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
1710  011344  000207                    RTS     PC                             ;CONTINUE CHECKING
```

```
 1711
 1712                                           ;SET UP TO TEST DISCONNECT SEQUENCE
 1713                                           ;THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
 1714                                           ;TO INITIATE THE DISCONNECT SEQUENCE
 1715                                           ;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
 1716                                           ;DATA TO TALK MODE AS MANY TIMES AS DESIRED
 1717                                           ;BEFORE THE SWITCH SEETIN IS MADE
 1718                                           ;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
 1719                                           ;REPORTED BY TYPEOUT
 1720
 1721  011346  104004                 T103E:    TYPE                                ;TYPE "STRIKE ANY TTY KEY
 1722  011350  017405                           MDISC                               ;TEST DISCONNECT"
 1723  011352  012737  000340  177776           MOV     #340,PS                     ;LOCK OUT INTERRUPTS
 1724  011360  012777  013042  005212           MOV     #TRNTYP,@DHMVEC ;SET UP TO DETECT TRANSITIONS
 1725                                                                               ;BEFORE DISCONNECT SEQUENCE STARTS
 1726  011366  012737  011406  016724           MOV     #T103ES,RNGRET              ;SET UP DUMMY RETURN FOR
 1727                                                                               ;RING INTERRUPT
 1728  011374  012777  000140  005202           MOV     #SCNENA+INTENA,@DHMCSR      ;SET SCAN ENABLE AND INTERRUPT ENABLE
 1729  011402  005037  177776                   CLR     PS                          ;ALLOW INTERRUPTS
 1730  011406  005077  005200          T103ES:  CLR     @TKDBR
 1731  011412  105777  005172          1$:      TSTB    @TKCSR                      ;WAIT FOR TTY TO HIT
 1732  011416  100375                           BPL     1$
 1733  011420  005777  005166                   TST     @TKDBR
 1734  011424  012737  000340  177776           MOV     #340,PS                     ;START DISCONNECT SEQUENCE
 1735  011432  005077  005146                   CLR     @DHMCSR                     ;CLEAR CONROL REGISTER
 1736  011436  013777  016674  005140           MOV     LINORG,@DHMCSR              ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
 1737  011444  042777  000002  005134           BIC     #TRMRDY,@DHMLSR             ;SET TERMINAL READY ON SELECTED LINE
 1738  011452  104026                           CKINTT
 1739  011454  104022                           WAITRN                              ;WAIT FOR TRANSITIONS TO OCCUR
```

```
1740
1741                                    ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON SELECTED
1742                                    ;ORIGINATE AND ANSWER LINES
1743
1744  011456  104023                    CKTRAN                  ;CHECK TRANSITIONS AND
1745                                                            ;STATUS ON SELECTED
1746                                                            ;ANSWER AND ORIGINATE LINES
1747  011460  000003                    LINENA+TRMRDY           ;EXPECT LINE ENABLE AND
1748                                                            ;TERMINAL READY STATUS BITS
1749                                                            ;SET ON ANSWER LINE
1750  011462  000001                    LINENA                  ;EXPECT LINE ENABLE STATUS BIT
1751                                                            ;SET ON ORIGINATE LINE
1752  011464  000006                    XCO+XCS                 ;EXPECT CARRIER AND CLEAR
1753                                                            ;TO SEND TRANSITIONS ON
1754                                                            ;ANSWER LINE
1755  011466  000006                    XCO+XCS                 ;EXPECT CARRIER AND CLEAR
1756                                                            ;TO SEND TRANSITIONS ON
1757                                                            ;ORIGINATE LINE
1758  011470  011502                    T103E1                  ;GO HERE ON ANSWER LINE STATUS ERROR
1759
1760  011472  011506                    T103E2                  ;GO HERE ON ORIGINATE LINE STATUS ERROR
1761  011474  011512                    T103E3                  ;GO HERE ON ANSWER LINE TRANSITION ERROR
1762  011476  011516                    T103E4                  ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1763  011500  011522                    T103EN                  ;GO TO NEXT TEST IF NO ERRORS
1764  011502  104015          T103E1:   ERRORS                  ;ANSWER LINE STATUS ERROR
1765  011504  000207                    RTS     PC              ;CONTINUE CHECKING
1766  011506  104015          T103E2:   ERRORS                  ;ORIGINATE LINE STATUS ERROR
1767  011510  000207                    RTS     PC              ;CONTINUE CHECKING
1768  011512  104014          T103E3:   ERRORT                  ;ANSWER LINE TRANSITION ERROR
1769  011514  000207                    RTS     PC              ;CONTINUE CHECKING
1770  011516  104014          T103E4:   ERRORT                  ;ORIGINATE LINE TRANSITION ERROR
1771  011520  000207                    RTS     PC              ;CONTINUE CHECKING
1772
1773  011522                   T201:
1774  011522  104004           T103EN:  TYPE                    ;REFERENCE DESIGNATION
1775  011524  017327                    MT103A                  ;TYPE " 103A TEST COMPLETE"
1776  011526  005037  016632            CLR     TSTNO           ;CLEAR TEST NUMBER FOR LOOPING
1777  011532  104026                    CKINTT
1778  011534  000137  011226            JMP     ST103B          ;SELECT NEW LINE NUMBERS AND
1779                                                            ;RESTART TEST
```

```
                                        ;MODEM CONTROL 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 MODEM CONTROL TO CONTROL 202C TYPE MODEMS

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

011540                          T300:                                   ;REFERENCE DESIGNATION
011540  000005                  ST202A: RESET                           ;INITIALIZE INTERFACE
011542  012737  000340  177776          MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011550  104004                          TYPE                            ;TYPE "202C MODEM CONNECT-
011552  017213                          MT202T                          ;DISCONNECT TEST"
011554  022737  000176  016620          CMP     #SWREG,SWR
011562  001001                          BNE     1$
011564  104025                          CNTLUU
011566  012737  011604  013020  1$:     MOV     #T202A,FATRET           ;SET UP FOR FATAL ERROR
011574  012737  011602  002204          MOV     #ST202B,KRET            ;SET UP FOR LINE CHANGE
011602  104017                  ST202B: GETLNS                          ;INPUT ORIGINATE AND
                                                                        ;ANSWER LINE NUMBERS
011604  104020                  T202A:  SETUP                           ;SET UP TO RECEIVE INTERRUPTS
                                                                        ;WAIT FOR RING
011606  011616                          T202B                           ;GO HERE IF RING OK
011610  011612                          T202A1                          ;GO HERE IF NO RING
011612  104012                  T202A1: ERROR                           ;NO RING WITHIN 5 MINUTES
011614  000772                          BR      ST202B                  ;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

011616  104021                  T202B:  CKRING                          ;CHECK FOR RING INTERRUPT
                                                                        ;ONLY ON ANSWER LINE
                                                                        ;AND NO TRANSITIONS ON
                                                                        ;ORIGINATE LINE
011620  011636                          T202C                           ;GO HERE IF TRANSITIONS
                                                                        ;ARE CORRECT
011622  011626                          T202B1                          ;GO HERE IF INCORRECT
                                                                        ;TRANSITION ON ANSWER LINE
011624  011632                          T202B2                          ;GO HERE IF INCORRECT
                                                                        ;TRANSITION ON ORIGINATE LINE
011626  104014                  T202B1: ERRORT                          ;ANSWER LINE TRANSITION ERROR
011630  000207                          RTS     PC                      ;CONTINUE CHECKING
011632  104014                  T202B2: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011634  000762                          BR      ST202B                  ;RESELECT LINES AND REDIAL
```

```
 1827
 1828                                           ;SET TERMINAL READY ON SELECTED ANSWER LINE
 1829                                           ;SET REQUEST TO SEND ON SELECTED ORIGINATE LINE
 1830                                           ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
 1831
 1832  011636  013777  016676  004740  T202C:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
 1833  011644  052777  000002  004734          BIS     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON ANSWER LINE
 1834  011652  013777  016674  004724  T202D:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
 1835  011660  052777  000004  004720          BIS     #RS,@DHMLSR             ;SET REQUEST TO SEND ON ORIGINATE LINE
 1836  011666  104026                          CKINTT
 1837  011670  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
 1838
 1839                                           ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
 1840                                           ;SELECTED ORIGINATE AND ANSWER LINES
 1841
 1842  011672  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
 1843                                                                           ;ON SELECTED ANSWER AND
 1844                                                                           ;ORIGINATE LINES
 1845  011674  000103                          CO+LINENA+TRMRDY                ;EXPECT CARRIER, LINE ENABLE
 1846                                                                           ;AND TERMINAL READY STATUS
 1847                                                                           ;BITS SET ON ANSWER LINE
 1848  011676  000147                          RS+CO+CS+LINENA+TRMRDY          ;EXPECT REQUEST TO SEND, CLEAR
 1849                                                                           ;TO SEND, CARRIER, LINE ENABLE
 1850                                                                           ;AND TERMINAL READY STATUS BITS
 1851                                                                           ;SET ON ORIGINATE LINE
 1852  011700  100004                          RINGF+XCO                       ;EXPECT CARRIER AND POSSIBLE
 1853                                                                           ;RING TRANSITIONS ON
 1854                                                                           ;ANSWER LINE
 1855  011702  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
 1856                                                                           ;TO SEND TRANSITIONS ON
 1857                                                                           ;ORIGINATE LINE
 1858  011704  011716                          T202D1                          ;GO HERE ON ANSWER LINE STATUS ERROR
 1859  011706  011722                          T202D2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
 1860  011710  011726                          T202D3                          ;GO HERE ON ANSWER LINE STATUS ERROR
 1861  011712  011732                          T202D4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
 1862  011714  011736                          T202E                           ;GO TO NEXT TEST IF NO ERRORS
 1863  011716  104015          T202D1:  ERRORS                                 ;ANSWER LINE SATAUS ERROR
 1864  011720  000207                   RTS     PC                              ;CONTINUE CHECKING
 1865  011722  104015          T202D2:  ERRORS                                 ;ORIGINATE LINE STATUS ERROR
 1866  011724  000207                   RTS     PC                              ;CONTINUE CHECKING
 1867  011726  104014          T202D3:  ERRORT                                 ;ANSWER LINE TRANSITION ERROR
 1868  011730  000207                   RTS     PC                              ;CONTINUE CHECKING
 1869  011732  104014          T202D4:  ERRORT                                 ;ORIGINATE LINE TRANSITION ERROR
 1870  011734  000207                   RTS     PC                              ;CONTINUE CHECKING
```

```
                                        ;SET SECONDARY TRANSMIT ON ANSWER LINE
                                        ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES

011736  013777  016676  004640  T202E:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
011744  052777  000010  004634          BIS     #SECTX,@DHMLSR          ;SET SECONDARY RECEIVE ON ANSWER LINE
011752  104026                          CKINTT
011754  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

011756  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
011760  000133                          SECTX+CO+LINENA+TRMRDY+SECRX    ;EXPECT SECONDARY TRANSMIT
                                                                        ;SECONDARY RECEIVE, CARRIER
                                                                        ;LINE ENABLE AND TERMINAL READY
                                                                        ;STATUS BITS SET ON ANSWER LINE
011762  000167                          SECRX+RS+CO+CS+LINENA+TRMRDY    ;EXPECT SECONDARY RECEIVE,
                                                                        ;REQUEST TO SEND, CLEAR TO SEND
                                                                        ;CARRIER, LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ORIGINATE LINE
011764  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ANSWER LINE
011766  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ORIGINATE LINE
011770  012002                          T202E1                          ;GO HERE ON ANSWER LINE STATUS ERROR
011772  012006                          T202E2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
011774  012012                          T202E3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
011776  012016                          T202E4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
012000  012022                          T202F                           ;GO TO NEXT TEST IF NO ERRORS
012002  104015          T202E1:         ERRORS                          ;ANSWER LINE STATUS ERROR
012004  000207                          RTS     PC                      ;CONTINUE CHECKING
012006  104015          T202E2:         ERRORS                          ;ORIGINATE LINE STATUS ERROR
012010  000207                          RTS     PC                      ;CONTINUE CHECKING
012012  104014          T202E3:         ERRORT                          ;ANSWER LINE TRANSITION ERROR
012014  000207                          RTS     PC                      ;CONTINUE CHECKING
012016  104014          T202E4:         ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
012020  000207                          RTS     PC                      ;CONTINUE CHECKING
```

```
1912
1913                                    ;DROP REQUEST TO SEND ON ORIGINATE LINE
1914                                    ;DROP SECONDARY TRANSMIT ON ANSWER LINE
1915                                    ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1916
1917  012022  013777  016674  004554  T202F:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
1918  012030  042777  000004  004550          BIC     #RS,@DHMLSR             ;DROP REQUEST TO SEND
1919  012036  013777  016676  004540          MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
1920  012044  042777  000010  004534          BIC     #SECTX,@DHMLSR          ;DROP SECONDARY RECEIVE
1921  012052  104026                          CKINTT
1922  012054  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
1923
1924                                    ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1925                                    ;SELECTED ORIGINATE AND ANSWER LINES
1926
1927  012056  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
1928                                                                          ;ON SELECTED ANSWER AND
1929                                                                          ;ORIGINATE LINES
1930  012060  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
1931                                                                          ;TERMINAL READY STATUS BITS
1932                                                                          ;SET ON ANSWER LINE
1933  012062  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
1934                                                                          ;TERMINAL READY STATUS BITS
1935                                                                          ;SET ON ORIGINATE LINE
1936  012064  000005                          XCO+XSCRX                       ;EXPECT CARRIER AND SECONDARY
1937                                                                          ;RECEIVE TRANSITIONS ON
1938                                                                          ;ANSWER LINE
1939  012066  000007                          XCO+XCS+XSCRX                   ;EXPECT CARRIER, CLEAR TO SEND
1940                                                                          ;AND SECONDARY RECEIVE
1941                                                                          ;TRANSITIONS ON ORIGINATE LINE
1942  012070  012102                          T202F2                          ;GO HERE ON ANSWER LINE STAATUS ERROR
1943  012072  012106                          T202F3                          ;GO HERE ON ORIGINATE LINE STATUS ERRORO
1944  012074  012112                          T202F4                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
1945  012076  012116                          T202F5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1946  012100  012122                          T202G                           ;GO TO NEXT TEST IF NO ERRORS
1947  012102  104015          T202F2:         ERRORS                          ;ANSWER LINE STATUS ERROR
1948  012104  000207                          RTS     PC                      ;CONTINUE CHECKING
1949  012106  104015          T202F3:         ERRORS                          ;ORIGINATE LINE STATUS ERROR
1950  012110  000207                          RTS     PC                      ;CONTINUE CHECKING
1951  012112  104014          T202F4:         ERRORT                          ;ANSWER LINE TRANSITION ERROR
1952  012114  000207                          RTS     PC                      ;CONTINTUE CHECKING
1953  012116  104014          T202F5:         ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
1954  012120  000207                          RTS     PC                      ;CONTINUE CHECKING
```

```
 1955
 1956
 1957                                   ;SET REQUEST TO SEND ON ANSWER LINE
 1958                                   ;WAIT FOR TRANSITIONS ON SELECTED LINES
 1959
 1960  012122  013777  016676  004454  T202G:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
 1961  012130  052777  000004  004450          BIS     #RS,@DHMLSR             ;SET REQUEST TO SEND
 1962  012136  104026                          CKINTT
 1963  012140  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
 1964
 1965                                   ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
 1966                                   ;SELECTED ORIGINATE AND ANSWER LINES
 1967
 1968  012142  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
 1969                                                                          ;ON SELECTED ANSWER AND
 1970                                                                          ;ORIGINATE LINES
 1971  012144  000147                          RS+CO+CS+LINENA+TRMRDY          ;EXPECT LINE ENABLE, TERMINAL
 1972                                                                          ;READY, REQUEST TO SEND, CLEAR
 1973                                                                          ;TO SEND, AND CARRIER
 1974                                                                          ;STATUS BITS SET ON  ANSWER LINE
 1975  012146  000103                          CO+LINENA+TRMRDY                ;EXPECT LINE ENABLE, TERMINAL
 1976                                                                          ;READY AND CARRIER STATUS
 1977                                                                          ;BITS SET ON ORIGINATE LINE
 1978  012150  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
 1979                                                                          ;TO SEND TRANSITIONS ON
 1980                                                                          ;ANSWER LINE
 1981  012152  000004                          XCO                             ;EXPECT CARRIER TRANSITION
 1982                                                                          ;ON ORIGINATE LINE
 1983  012154  012166                          T202G1                          ;GO HERE ON  ANSWER LINE STATUS ERROR
 1984  012156  012172                          T202G2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
 1985  012160  012176                          T202G3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
 1986  012162  012202                          T202G4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
 1987  012164  012206                          T202H                           ;GO TO NEXT TEST IF NO ERRORS
 1988  012166  104015          T202G1: ERRORS                                  ;ANSWER LINE STATUS ERROR
 1989  012170  000207                  RTS     PC                              ;CONTINUE TESTING
 1990  012172  104015          T202G2: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
 1991  012174  000207                  RTS     PC                              ;CONTINUE TESTING
 1992  012176  104014          T202G3: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
 1993  012200  000207                  RTS     PC                              ;CONTINUE TESTING
 1994  012202  104014          T202G4: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
 1995  012204  000207                  RTS     PC                              ;CONTINUE TESTING
```

```
 1996
 1997                                           ;SET SECONDARY TRANSMIT ON ORIGINATE LINE
 1998                                           ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
 1999
 2000  012206  013777  016674  004370  T202H:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
 2001  012214  052777  000010  004364          BIS     #SECTX,@DHMLSR          ;SET SECONDARY TRANSMIT
 2002  012222  104026                          CKINTT
 2003  012224  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
 2004
 2005                                           ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
 2006                                           ;SELECTED ORIGINATE AND ANSWER LINES
 2007
 2008  012226  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
 2009                                                                          ;ON SELECTED ANSWER AND
 2010                                                                          ;ORIGINATE LINES
 2011  012230  000167                          RS+CS+CO+LINENA+TRMRDY+SECRX     ;EXPECT LINE ENABLE, TERMINAL
 2012                                                                          ;READY, REQUEST TO SEND, CLEAR
 2013                                                                          ;TO SEND, CARRIER AND SECONDARY
 2014                                                                          ;RECEIVE STATUS BITS SET
 2015                                                                          ;ON ANSWER LINE
 2016  012232  000133                          SECTX+CO+LINENA+TRMRDY+SECRX     ;EXPECT LINE ENABLE, TERMINAL
 2017                                                                          ;READY, CARRIER, SECONDARY
 2018                                                                          ;TRANSMIT AND SECONDARY
 2019                                                                          ;RECEIVE STATUS BITS SET
 2020                                                                          ;ON ORIGINATE LINE
 2021  012234  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
 2022                                                                          ;TRANSITION ON ANSWER LINE
 2023  012236  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
 2024                                                                          ;TRANSITION ON ORIGINATE LINE
 2025  012240  012252                          T202H2                          ;GO HERE ON ANSWER LINE STATUS ERROR
 2026  012242  012256                          T202H3                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
 2027  012244  012262                          T202H4                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
 2028  012246  012266                          T202H5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
 2029  012250  012272                          T202I                           ;GO TO NEXT TEST IF NO ERRORS
 2030  012252  104015          T202H2: ERRORS                                  ;ANSWER LIN STATUS ERROR
 2031  012254  000207                  RTS     PC                              ;CONTINUE CHECKING
 2032  012256  104015          T202H3: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
 2033  012260  000207                  RTS     PC                              ;CONTINUE CHECKING
 2034  012262  104014          T202H4: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
 2035  012264  000207                  RTS     PC                              ;CONTINUE CHECKING
 2036  012266  104014          T202H5: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
 2037  012270  000207                  RTS     PC                              ;CONTINUE CHECKING
```

```
 2038
 2039                                           ;DROP REQUEST TO SEND ON ANSWER LINE
 2040                                           ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
 2041
 2042  012272  013777  016676  004304  T202I:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
 2043  012300  042777  000004  004300          BIC     #RS,@DHMLSR             ;CLEAR REQUEST TO SEND
 2044  012306  013777  016674  004270          MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
 2045  012314  042777  000010  004264          BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
 2046  012322  104026                          CKINTT
 2047  012324  104022                          WAITRN                          ;WAIT FRO TRANSITIONS TO OCCUR
 2048
 2049                                           ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
 2050                                           ;SELECTED ORIGINATE AND ANSWER LINES
 2051
 2052  012326  104023                          CKTRAN                          ;CHECK TRANSITION S AND STATUS
 2053                                                                          ;ON SELECTED ANSWE AND
 2054                                                                          ;ORIGINATE LINES
 2055  012330  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
 2056                                                                          ;TERMINAL READY STATUS BITS SET
 2057                                                                          ;ON ANSWER LINE
 2058  012332  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
 2059                                                                          ;TERMINAL READY STATUS BITS
 2060                                                                          ;SET ON ORIGINATE LINE
 2061  012334  000007                          XCO+XCS+XSCRX                   ;EXPECT CARRIER, CLEAR TO SEND
 2062                                                                          ;AND SECONDARY RECEIVE TRANSITIONS
 2063                                                                          ;ON ANSWER LINE
 2064  012336  000005                          XCO+XSCRX                       ;EXPECT CARRIER AND SECONDARY
 2065                                                                          ;RECEIVE TRANSITIONS ON
 2066                                                                          ;ORIGINATE LINE
 2067  012340  012352                          T202I2                          ;GO HERE ON ANSWER LINE STATUS ERROR
 2068  012342  012356                          T202I3                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
 2069  012344  012362                          T202I4                          ;GO HERE ON ANSWER LINE TRANSITIN ERROR
 2070  012346  012366                          T202I5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
 2071  012350  012372                          T202J                           ;GO TO NEXT TEST IF NO ERRORS
 2072  012352  104015          T202I2: ERRORS                                  ;ANSWER LINE STATUS ERROR
 2073  012354  000207                  RTS     PC                              ;CONTINUE CHECKING
 2074  012356  104015          T202I3: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
 2075  012360  000207                  RTS     PC                              ;CONTINUE CHECKING
 2076  012362  104014          T202I4: ERRORT                                  ;ANSWE LINE TRANSITION ERROR
 2077  012364  000207                  RTS     PC                              ;CONTINUE CHECKING
 2078  012366  104014          T202I5: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
 2079  012370  000207                  RTS     PC                              ;CONTINUE CHECKING
```

```
                                        ;SET UP TO TEST DISCONNECT SEQUENCE
                                        ;THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
                                        ;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
012372  104004          T202J:  TYPE                            ;TYPE "STRIKE ANY TTY KEY
012374  017405                  MDISC                           ;TEST DISCONNECT"
012376  012737  000340  177776          MOV     #340,PS         ;LOCK OUT INTERRUPTS
012404  012777  013042  004166          MOV     #TRNTYP,@DHMVEC ;SET UP TO DETECT TRANSITIONS
012412  012737  012432  016724          MOV     #T202JS,RNGRET  ;SET UP DUMMY RETURN FOR RING
                                                                ;FROM RING INTERRUPT
012420  012777  000140  004156          MOV     #SCNENA+INTENA,@DHMCSR  ;ENABLE LINE SCANNER
                                                                ;START SCANNER
012426  005037  177776                  CLR     PS              ;ENABLE INTERRUPTS
012432  005077  004154  T202JS: CLR     @TKDBR
012436  105777  004146  1$:     TSTB    @TKCSR
012442  100375                  BPL     1$
012444  005777  004142          TST     @TKDBR

                                        ;DISCONNECT SEQUENCE REQUESTED

012450  012737  000340  177776          MOV     #340,PS         ;LOCK OUT INTERRUPTS
012456  005077  004122          CLR     @DHMCSR         ;STOP SCANNER
012462  013777  016674  004114          MOV     LINORG,@DHMCSR  ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
012470  042777  000002  004110          BIC     #TRMRDY,@DHMLSR ;SET TERMINAL READY ON SELECTED LINE
012476  104024                  WAITS                           ;DELAY
012500  104026                  CKINTT
012502  104022                  WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
```

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

012504  104023                          CKTRAN                  ;CHECK TRANSITIONS AND STATUS
                                                                ;ON SELECTED ASNWER AND
                                                                ;ORIGINATE LINES
012506  000003                          LINENA+TRMRDY           ;EXPECT LINE ENABLE AND
                                                                ;TERMINAL READY STATUS BITS
                                                                ;SET ON ANSWER LINE
012510  000001                          LINENA                  ;EXPECT LINE ENABLE STATUS
                                                                ;BIT SET ON ORIGINATE LINE
012512  000000                          0                       ;EXPECT NO TRANSITIONS ON
                                                                ;ANSWER LINE
012514  000000                          0                       ;EXPECT NO TRANSITIONS ON
                                                                ;ORIGINATE LINE
012516  012530                          T202J1                  ;GO HERE IF ANSWER LINE STATUS ERROR
012520  012534                          T202J2                  ;GO HERE IF ORIGINATE LINE STATUS ERROR
012522  012540                          T202J3                  ;GO HERE IF ANSWER LINE TRANSITION ERROR
012524  012544                          T202J4                  ;GO HERE IF ORIGINATE LINE TRANSITIONS ERROR
012526  012550                          T202JN                  ;GO TO END OF TEST IF NO ERRORS
012530  104015          T202J1: ERRORS                          ;ANSWER LINE STATUS ERRORO
012532  000207                  RTS     PC                      ;CONTINUE CHECKING
012534  104015          T202J2: ERRORS                          ;ORIGINATE LINE STATUS ERRROR
012536  000207                  RTS     PC                      ;CONTINUE CHECKING
012540  104014          T202J3: ERRORT                          ;ANSWER LINE TRANSITION ERROR
012542  000207                  RTS     PC                      ;CONTINUE CHECKING
012544  104014          T202J4: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
012546  000207                  RTS     PC                      ;CONTINUE CHECKING

012550  104004          T202JN: TYPE                            ;TYPE "202C TEST COMPLETE"
012552  017356                  MT202A
012554  104026                  CKINTT
012556  000137  011602          JMP     ST202B                  ;GET NEW LINE NUMBERS
                                                                ;RESTART TEST
```

```
                                        ;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

012562 017704 004016          TRANS:    MOV     @DHMCSR,R4          ;GET LINE NUMBER AND
                                                                    ;INTERRUPT FLAGS
012566 010405                           MOV     R4,R5
012570 042705 177760                    BIC     #177760,R5          ;EXTRACT LINE NUMBER
012574 023705 016674                    CMP     LINORG,R5           ;DID ORIGINATE LINE INTERRUPT
012600 001411                           BEQ     ORGTR               ;IF YES, SERVICE
012602 023705 016676                    CMP     LINANS,R5           ;DID ANSWER LINE INTERRUPT
012606 001443                           BEQ     ANSTR               ;IF YES, SERVICE
012610 010577 003770                    MOV     R5,@DHMCSR
012614 017703 003766                    MOV     @DHMLSR,R3
012620 104016                           ERRORN                      ;INTERRUPT ON INCORRECT LINE
012622 000471                           BR      FATEX

                                        ;RECORD TRANSITIONS FOR ORIGINATE LINE

012624 032704 100000          ORGTR:    BIT     #RINGF,R4           ;IF RING CAUSED INTERRUPT,
012630 001403                           BEQ     ORGTR1              ;SET RING TRANSITION BIT
012632 052737 000010 016702             BIS     #10,ORGFLG
012640 032704 040000          ORGTR1:   BIT     #COF,R4             ;IF CARRIER CAUSED INTERRUPT
012644 001403                           BEQ     ORGTR2              ;SET CARRIER TRANSITION BIT
012646 052737 000004 016702             BIS     #4,ORGFLG
012654 032704 020000          ORGTR2:   BIT     #CSF,R4             ;IF CLEAR TO SEND
                                                                    ;CAUSED INTERRUPT
012660 001403                           BEQ     ORGTR3              ;SET CLEAR TO SEND
                                                                    ;TRANSITION BIT
012662 052737 000002 016702             BIS     #2,ORGFLG
012670 032704 010000          ORGTR3:   BIT     #SECRXF,R4          ;IF SECONDARY RECEIVE
                                                                    ;CAUSED INTERRUPT
012674 001403                           BEQ     ORGTR4              ;SET SECONDARY RECEIVE
012676 052737 000001 016702             BIS     #1,ORGFLG           ;TRANSITION BIT
012704 032704 170000          ORGTR4:   BIT     #RINGF+COF+CSF+SECRXF,R4
                                                                    ;IF NO INTERRUPT FLAGS SET
012710 001044                           BNE     TRANEX              ;EXIT TRANSITION DETECTION
012712 104016                 ORGTRR:   ERRORN
012714 000434                           BR      FATEX
```

```
2196
2197                                            ;RECORD TRANSITIONS FOR ANSWER LINE
2198
2199  012716  032704  100000          ANSTR:  BIT     #RINGF,R4               ;IF RING CAUSED INTERRUPT,
2200  012722  001403                          BEQ     ANSTR1                  ;SET RING TRANSITION BIT
2201  012724  052737  000010  016700          BIS     #10,ANSFLG
2202  012732  032704  040000          ANSTR1: BIT     #COF,R4                 ;IF CARRIER CAUSED INTERRUPT
2203  012736  001403                          BEQ     ANSTR2                  ;SET CARRIER TRANSITION BIT
2204  012740  052737  000004  016700          BIS     #4,ANSFLG
2205  012746  032704  020000          ANSTR2: BIT     #CSF,R4                 ;IF CLEAR TO SEND
2206                                                                          ;CAUSED INTERRUPT
2207  012752  001403                          BEQ     ANSTR3                  ;SET CLEAR TO SEND
2208                                                                          ;TRANSITION BIT
2209  012754  052737  000002  016700          BIS     #2,ANSFLG
2210  012762  032704  010000          ANSTR3: BIT     #SECRXF,R4              ;IF SECONDARY RECEIVE
2211                                                                          ;CAUSED INTERRUPT
2212  012766  001403                          BEQ     ANSTR4                  ;SET SECONDARY RECEIVE
2213  012770  052737  000001  016700          BIS     #1,ANSFLG               ;TRANSITION BIT
2214  012776  032704  170000          ANSTR4: BIT     #RINGF+COF+CSF+SECRXF,R4
2215                                                                          ;IF NO INTERRUPT FLAGS SET
2216  013002  001007                          BNE     TRANEX                  ;EXIT TRANSITION DETECTION
2217  013004  104016                  ANSTRR: ERROR#
2218  013006  005037  016632          FATEX:  CLR     TSTNO
2219  013012  022626                          POP2SP
2220  013014  000177  000000                  JMP     @FATRET
2221  013020  000000                  FATRET: 0
2222
2223                                            ;EXIT TRANSITION DETECTION
2224
2225  013022  005704                  TRANEX: TST     R4                      ;IF RING FLAG WAS SET
2226  013024  100002                          BPL     .+6                     ;SET UP SPECIAL RETURN
2227  013026  013716  016724                  MOV     RINGRET,(SP)
2228  013032  012777  000140  003544  TRANX1: MOV     #SCNENA+INTENA,@DHMCSR  ;RESTART SCANNER
2229  013040  000002                          RTI
2230
2231                                            ;TYPE TRANSITION DATA AND RETURN
2232
2233  013042  017737  003536  014026  TRNTYP: MOV     @DHMCSR,DATA1
2234  013050  017737  003532  014030          MOV     @DHMLSR,DATA2
2235  013056  104004                          TYPE
2236  013060  020027                          MTRNDET
2237  013062  104006                          OCTASC
2238  013064  013070                          TRNTAB
2239  013066  000761                          BR      TRANX1
2240  013070  000002                  TRNTAB: 2
2241  013072  000006                          6
2242  013074  014026                          DATA1
2243  013076  000003                          3
2244  013100  014030                          DATA2
```

```
                                        ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD

013102  000005                GETLIN: RESET
013104  104013                        INSTRG                          ;TYPE "ORIGINATE LINE-"
013106  017264                        MSELOR                          ;AND GET LINE NUMBER
013110  000000                        0
013112  000017                        17
013114  016674                        LINORG
013116  104013                        INSTRG                          ;TYPE "ANSWER LINE-"
013120  017310                        MSELANS                         ;AND GET LINE NUMBER
013122  000000                        0
013124  000017                        17
013126  016676                        LINANS
013130  104004                        TYPE
013132  017720                        MCRLF
013134  000002                        RTI                             ;RETURN TO CALLING ROUTINE

                                        ;INITIALIZE INTERFACE

013136  000005                SETUPS: RESET
013140  012737  000340  177776        MOV     #340,PS                 ;LOCK OUT ALL INTERRUPTS
013146  011605                        MOV     (SP),R5
013150  012537  014036                MOV     (R5)+,NXTTS
013154  012537  014016                MOV     (R5)+,ERR1
013160  010516                        MOV     R5,(SP)
013162  012777  006000  003414        MOV     #CLRSCN+CLRMUX,@DHMCSR  ;CLEAR LINE SCANNER AND MULTIPLEXER
013170  032777  000020  003406 SETUP1: BIT     #BUSY,@DHMCSR           ;WAIT FOR SCANNER TO CLEAR
013176  001374                        BNE     SETUP1
013200  005037  016624                CLR     ERRFLG

                                        ;ENABLE SELECTED LINES
                                        ;SET TERMINAL READY ON SELECTED ORIGINATE LINE

013204  013777  016674  003372 SETUP2: MOV     LINORG,@DHMCSR          ;SET UP TO ENABLE ORIGINATE LINE
                                                                        ;ORIGINATE LINE NUMBER
013212  012777  000003  003366        MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE AND
                                                                        ;TERMINAL READY ON ORIGINATE LINE
013220  013777  016676  003356        MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
013226  012777  000001  003352        MOV     #LINENA,@DHMLSR         ;SET LINE ENABLE ON ANSWER LINE

                                        ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
                                        ;SET UP TO RECEIVE INTERRUPTS
                                        ;START LINE SCANNER

013234  012777  012562  003336        MOV     #TRANS,@DHMVEC          ;SET UP INTERRUPT VECTOR
                                                                        ;FOR TRANSITION DETECTION
013242  012777  000340  003332        MOV     #340,@DHMLVL            ;SET UP INTERRUPT SERVICE LEVEL
013250  012777  000140  003326        MOV     #SCNENA+INTENA,@DHMCSR  ;START SCANNER, ENABLE INTERRUPTS
013256  005037  016700                CLR     ANSFLG                  ;CLEAR TRANSITION DETECTED FLAGS
013262  005037  016702                CLR     ORGFLG
013266  012737  013316  016724        MOV     #SETUP4,RNGRET          ;SET UP RETURN FROM
                                                                        ;DETECTION OF RING INTERRUPT
013274  104004                        TYPE                            ;REQUEST OPERATOR TO DIAL
013276  017104                        DIALM
013300  005037  177776                CLR     PS                      ;CLEAR PROCESSOR STATUS WORD
```

```
2301  013304  005037  016704                    CLR     TIME1                   ;CLEAR TIMER
2302  013310  012737  001000  016706            MOV     #1000,TIME2             ;SET UP FOR 5 MINUTE DELAY
2303  013316  005737  016700          SETUP4:   TST     ANSFLG                  ;IF TRANSITION HAS OCCURED,
2304  013322  001014                            BNE     SETUPB                  ;EXIT WAIT LOOP
2305  013324  005737  016702                    TST     ORGFLG
2306  013330  001011                            BNE     SETUPB
2307  013332  005237  016704                    INC     TIME1                   ;ALLOW OPERATOR 5 MINUTES TO DIAL
2308  013336  001367                            BNE     SETUP4
2309  013340  005337  016706                    DEC     TIME2
2310  013344  001364                            BNE     SETUP4
2311  013346  022626                            POP2SP
2312  013350  000177  000442                    JMP     @ERR1
2313  013354  022626          SETUPB:   POP2SP
2314  013356  000177  000454                    JMP     @NXTTS
2315  013362  012766  000340  000002            MOV     #340,+2(SP)
2316  013370  000002                            RTI
2317
2318                                    ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2319
2320  013372  011605          CKRNG:    MOV     (SP),R5
2321  013374  012537  014036                    MOV     (R5)+,NXTTS
2322  013400  012537  014016                    MOV     (R5)+,ERR1
2323  013404  012537  014020                    MOV     (R5)+,ERR2
2324  013410  010516                            MOV     R5,(SP)
2325  013412  012705  000010                    MOV     #10,R5                  ;EXPECT RING ONLY ON ANSWER LINE
2326  013416  013704  016700                    MOV     ANSFLG,R4               ;GET ACTUAL TRANSITION DATA
2327  013422  013703  016676                    MOV     LINANS,R3               ;SET UP LINE NUMBER
2328  013426  020504                            CMP     R5,R4           ;DID RING CAUSE INTERRUPT
2329  013430  001402                            BEQ     CKRNG1                  ;ON ANSWER LINE
2330  013432  004777  000360                    JSR     PC,@ERR1
2331  013436  005005          CKRNG1:   CLR     R5
2332  013440  013704  016702                    MOV     ORGFLG,R4
2333  013444  013703  016674                    MOV     LINORG,R3
2334  013450  005704                            TST     R4                      ;IF TRANSITION OCCURED
2335  013452  001403                            BEQ     CKRNG2                  ;ON ORIGINATE LINE, ERROR
2336  013454  022626                            POP2SP
2337  013456  000177  000336                    JMP     @ERR2
2338  013462  022626          CKRNG2:   POP2SP
2339  013464  000177  000346                    JMP     @NXTTS
```

```
2340
2341  013470  005037  016700          WAITR:  CLR     ANSFLG
2342  013474  005037  016702                  CLR     ORGFLG
2343  013500  012777  012562  003072          MOV     #TRANS,@DHMVEC
2344  013506  012737  013526  016724          MOV     #WAITRR,RNGRET          ;SET UP FOR RETURN
2345                                                                          ;FROM RING DETECTION
2346  013514  012777  000140  003062          MOV     #SCNENA+INTENA,@DHMCSR  ;START SCANNER
2347  013522  005037  177776                  CLR     PS
2348  013526  005037  016704          WAITRR: CLR     TIME1
2349  013532  012737  000025  016706          MOV     #25.,TIME2
2350  013540  005237  016704          WAITR1: INC     TIME1                   ;WAIT FOR TRANSITIONS OF
2351  013544  001375                          BNE     WAITR1                  ;CARRIER AND CLEAR TO SEND
2352  013546  005337  016706                  DEC     TIME2
2353  013552  001372                          BNE     WAITR1
2354  013554  000002                          RTI
2355
2356                                          ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2357                                          ;SELECTED ORIGINATE AND ANSWER LINES
2358
2359  013556  012737  000340  177776  CKTRN:  MOV     #340,PS                 ;LOCK OUT FURTHER INTERRUPTS
2360  013564  005077  003014                  CLR     @DHMCSR                 ;STOP LINE SCANNER
2361  013570  011605                          MOV     (SP),R5
2362  013572  012537  014026                  MOV     (R5)+,DATA1
2363  013576  012537  014030                  MOV     (R5)+,DATA2
2364  013602  012537  014032                  MOV     (R5)+,DATA3
2365  013606  012537  014034                  MOV     (R5)+,DATA4
2366  013612  012537  014016                  MOV     (R5)+,ERR1
2367  013616  012537  014020                  MOV     (R5)+,ERR2
2368  013622  012537  014022                  MOV     (R5)+,ERR3
2369  013626  012537  014024                  MOV     (R5)+,ERR4
2370  013632  012537  014036                  MOV     (R5)+,NXTTS
2371  013636  010516                          MOV     R5,(SP)
2372  013640  013705  014026                  MOV     DATA1,R5
2373  013644  013777  016676  002732          MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
2374  013652  017704  002730                  MOV     @DHMLSR,R4              ;GET ACTUAL ANSWER LINE STATUS
2375  013656  013703  016676                  MOV     LINANS,R3
2376  013662  020504                          CMP     R5,R4                   ;COMPARE
2377  013664  001402                          BEQ     CKTRN1
2378  013666  004777  000124                  JSR     PC,@ERR1
2379  013672  013777  016674  002704  CKTRN1: MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
2380  013700  017704  002702                  MOV     @DHMLSR,R4              ;GET ACTUAL ORIGINATE LINE STATUS
2381  013704  013705  014030                  MOV     DATA2,R5
2382  013710  013703  016674                  MOV     LINORG,R3
2383  013714  020504                          CMP     R5,R4                   ;COMPARE
2384  013716  001402                          BEQ     CKTRN2
2385  013720  004777  000074                  JSR     PC,@ERR2
```

```
2386
2387                                            ;CHECK FOR CORRECT TRANSITIONS ON
2388                                            ;SELECTED ORIGINATE AND ANSWER LINES
2389
2390  013724  105737  014033        CKTRN2: TSTB    DATA3+1
2391  013730  100003                        BPL     .+10
2392  013732  042737  000010  016700        BIC     #10,ANSFLG
2393  013740  113704  016700                MOVB    ANSFLG,R4               ;GET TRANSITION DATA FOR
2394  013744  113705  014032                MOVB    DATA3,R5
2395  013750  013703  016676                MOV     LINANS,R3
2396  013754  020504                        CMP     R5,R4                   ;DID CORRECT TRANSITIONS OCCUR
2397  013756  001402                        BEQ     CKTRN3
2398  013760  004777  000036                JSR     PC,@ERR3
2399  013764  013704  016702        CKTRN3: MOV     ORGFLG,R4               ;GET TRANSITION DATA FOR
2400  013770  013705  014034                MOV     DATA4,R5
2401  013774  013703  016674                MOV     LINORG,R3
2402  014000  020504                        CMP     R5,R4                   ;DID CORRECT TRANSITIONS OCCUR
2403  014002  001402                        BEQ     CKTRN4
2404  014004  004777  000014                JSR     PC,@ERR4
2405  014010  022626                CKTRN4: POP2SP
2406  014012  000177  000020                JMP     @NXTTS
2407  014016  000000                ERR1:   0
2408  014020  000000                ERR2:   0
2409  014022  000000                ERR3:   0
2410  014024  000000                ERR4:   0
2411  014026  000000                DATA1:  0
2412  014030  000000                DATA2:  0
2413  014032  000000                DATA3:  0
2414  014034  000000                DATA4:  0
2415  014036  000000                NXTTS:  0
```

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

014040                          EOP:
014040  005237  016630                INC     PASCNT                  ;UPDATE PASS COUNT
014044  012737  000001  016632        MOV     #1,TSTNO                ;START AT FIRST TEST OF GROUP
014052  000005                       RESET                           ;CLEAR THE WORLD
014054  005037  016722                CLR     FILLA                   ;INIT COUNTER
014060  005337  016722        1$:     DEC     FILLA                   ;COUNT THE CTR
014064  001375                       BNE     1$                      ;BR TIL STALL TIMES OUT
014066  104004                       TYPE                            ; RING BELL
014070  020306                       MEPASS
014072  013701  000042               MOV     42,R1                   ;ARE YOU ON ACT11?
014076  001516                       BEQ     TSTENT          ;NO
014100  000005                       RESET
014102  004711                LOGICAL:        JSR     PC,(R1)
014104  000240                       NOP
014106  000240                       NOP
014110  000240                       NOP
014112  000240                       NOP
014114  000137  014334               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

014120  011646                EMTSRV: MOV     (SP),-(SP)              ;GET PC OF RETURN
014122  162716  000002                SUB     #2,(SP)                 ;=PC OF EMT
014126  017616  000000                MOV     @(SP),(SP)              ;GET EMT
014132  006316                EMTOK:  ASL     (SP)                    ;MULTIPLY EMT ARG BY 2
014134  042716  177001                BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
014140  062716  020324                ADD     #EMTTAB,(SP)            ;POINTER TO SUBROUTINE ADDRESS
014144  017616  000000                MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
014150  000136                       JMP     @(SP)+                  ;GO TO SUBROUTINE

014152  105777  002432        CKINT:  TSTB    @TKCSR
014156  100001                       BPL     1$
014160  104027                       KBDIN
014162  000002                1$:     RTI
```

```
2459
2460                                        ;END OF SUBTEST SERVICE
2461                                        ;CHECK FOR LOOP ON CURRENT TEST
2462                                        ;CHECK FOR ESCAPE TO NEXT TEST ON ERROR
2463                                        ;UPDATE ITERATION COUNT AND EXIT TO NEXT TEST IF 0
2464
2465                                        ;TEST XOR FLAG (XFLAG) FOR EXISTANCE OF XOR TESTER.
2466
2467  014164  005737  001252          LOOP: TST     XFLAG   ;IS THERE AN XOR TESTER OUT THERE ?
2468  014170  100022                        BPL     4$      ;NO
2469  014172  013746  000004                MOV     4,-(SP) ;SAVE 4
2470  014176  012737  014216  000004        MOV     #1$,4   ;SET UP SVC ROUTINE
2471  014204  005737  177060                TST     177060  ;GOT SOMETHING LIKE SLAVE SYNC
2472  014210  012637  000004                MOV     (SP)+,4 ;YOU BETCHUM
2473  014214  000404                        BR      2$
2474  014216  022626                  1$:   POP2SP          ;RESTORE STACK
2475  014220  012637  000004                MOV     (SP)+,4 ;RESTORE 4
2476  014224  000402                        BR      3$
2477  014226  000137  014330          2$:   JMP     LOOPX   ;GO TO NEXT TEST
2478  014232  000137  014334          3$:   JMP     TSTENT  ;GO
2479  014236                          4$:
2480  014236  005037  177776                CLR     PSW
2481  014242  042777  000100  002340        BIC     #INTENA,@TKCSR
2482  014250  005737  016624          5$:   TST     ERRFLG                  ;IF ERROR OCCURED FLAG=1,
2483  014254  001404                        BEQ     LOOPS                   ;CHECK FOR ESCAPE TO NEXT TEST
2484  014256  032777  002000  002334        BIT     #SW10,@SWR              ;IF SW10=1,
2485  014264  001021                        BNE     LOOPX                   ;ESCAPE TO NEXT TEST
2486  014266  032777  040000  002324  LOOPS: BIT     #SW14,@SWR              ;IF SW14=1,
2487  014274  001041                        BNE     LOOPL                   ;LOOP ON CURRENT TEST
2488  014276  032777  004000  002314        BIT     #SW11,@SWR              ;IF SW11=1,
2489  014304  001011                        BNE     LOOPX                   ;INHIBIT ITERATIONS
2490  014306  005337  016636                DEC     ICOUNT                  ;UPDATE ITERATION COUNT
2491  014312  001406                        BEQ     LOOPX                   ;IF ICOUNT=0, GO TO NEXT TEST
2492  014314  013716  016634          LOOPER: MOV     RETURN,(SP)             ;SET UP FOR RETURN TO CURRENT TEST
2493  014320  042777  000100  002262        BIC     #INTENA,@TKCSR
2494  014326  000002                        RTI                             ;RETURN TO CURRENT TEST
2495  014330  005237  016632          LOOPX: INC     TSTNO                   ;UPDATE TEST NUMBER
2496  014334  013705  016632          TSTENT: MOV    TSTNO,R5                ;GET TEST NUMBER
2497  014340  006305                        ASL     R5                      ;MULTIPLY TEST NUMBER BY 4
2498  014342  006305                        ASL     R5
2499  014344  063705  016664                ADD     TSTPNT,R5               ;GET POINTER FOR TEST ENTRY
2500  014350  011537  016634                MOV     (R5),RETURN             ;GET STARTING ADDRESS OF NEXT TEST
2501  014354  001631                        BEQ     EOP                     ;IF ADDRESS=0, GO TO END OF PASS
2502  014356  012516                        MOV     (R5)+,(SP)              ;PUT STARTING ADDRSS ON STACK
2503  014360  011537  016636                MOV     (R5),ICOUNT             ;GET ITERATION COUNT FOR TEST
2504  014364  005037  016624                CLR     ERRFLG                  ;CLEAR ERROR OCCURED FLAG
2505  014370  042777  000100  002212        BIC     #INTENA,@TKCSR
2506  014376  000002                        RTI                             ;GO TO TEST
2507  014400  012737  000001  016636  LOOPL: MOV     #1,ICOUNT               ;SET UP TO EXIT TEST AFTER LOOP
2508  014406  000742                        BR      LOOPER                  ;GO TO LOOP SERVICE
2509
2510                                        ;CHECK FOR LOOPING WITH SAME DATA
2511                                        ;CHECK FOR ESCAPE TO NEXT TEST ON ERROR
2512
2513  014410  005737  016624          FREEZE: TST    ERRFLG                  ;IF ERROR FLAG=0,
2514  014414  001413                        BEQ     FREEZX                  ;DO NOT TEST FOR ESCAPE
```

```
2515  014416  032777  002000  002174          BIT     #SW10,@SWR              ;IF SW10=1,
2516  014424  001341                          BNE     LOOPX                   ;ESCAPE TO NEXT TEST
2517  014426  032777  001000  002164          BIT     #SW09,@SWR              ;IF SW09=1,
2518  014434  001403                          BEQ     FREEZX                  ;FREEZE CURRENT DATA
2519  014436  017616  000000                  MOV     @(SP),(SP)              ;GET LOOPING ADDRESS
2520  014442  000002                          RTI                             ;LOOP
2521  014444  062716  000002          FREEZX: ADD     #2,(SP)                 ;CONTINUE IN CURRENT TEST
2522  014450  000002                          RTI
```

```
                                        ;GENERAL ERROR SERVICE
                                        ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
                                        
014452  005037  016624          ERR:    CLR     ERRFLG                  ;ALWAYS TYPE PC+2
                                                                        ;OF TEST THAT FAILED
014456  005037  014672                  CLR     ERRMSG                  ;NO MESSAGE
014462  005037  014704                  CLR     ERTAB                   ;NO TABLE OF DATA
014466  000451                          BR      ERRGEN                  ;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 REGISTER
                                        ;       BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
                                        ;       CC=LINE ON WHICH ERROR OCCURED
014470  005037  016624          ERRT:   CLR     ERRFLG                  ;ALWAYS OUTPUT  ALL DATA
014474  012737  017045  014672          MOV     #MTRANE,ERRMSG          ;TYPE "TRANSITION ERROR
014502  012737  014760  014704          MOV     #ERTAB1,ERTAB           ;TABLE OF DATA
014510  000440                          BR      ERRGEN                  ;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

014512  005037  016624          ERRS:   CLR     ERRFLG                  ;ALWAYS OUTPUT ALL DATA
014516  012737  017014  014672          MOV     #MLINE1,ERRMSG          ;TYPE "LINE ERROR
                                                                        ;EXP REC LINE"
014524  012737  014776  014704          MOV     #ERTAB2,ERTAB           ;TABLE OF DATA
014532  000427                          BR      ERRGEN                  ;OUTPUT ERROR MESSAGE
```

```
                                        ;FATAL TRANSITION ERROR
                                        ;FORMAT FOR FATAL ERROR TYPEOUT IS

                                        ;XXXXXX FATAL ERROR
                                        ;CSTAT  LSTAT
                                        ;AAAAAA BBB

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

014534  005037  016624          ERRN:   CLR     ERRFLG                  ;ALWAYS OUTPUT ALL DATA
014540  012737  017775  014672          MOV     #MFATAL,ERRMSG          ;TYPE "FATAL ERROR
                                                                        ;CSTAT   LSTAT"
014546  012737  015014  014704          MOV     #ERTAB3,ERTAB           ;TABLE OF DATA
014554  000416                          BR      ERRGEN                  ;OUTPUT ERROR MESSAGE

                                        ;"CONTROL STATUS" ERROR SERVICE
                                        ;FORMAT FOR CONTROL STATUS ERROR IS

                                        ;XXXXXX STATUS ERROR
                                        ;EXP    REC
                                        ;AAAAAA BBBBBB

                                        ;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


014556  012737  016726  014672  ERRCS:  MOV     #MSTATE,ERRMSG          ;TYPE "STATUS ERROR
                                                                        ;"EXP REC"
014564  012737  015026  014704          MOV     #ERTAB4,ERTAB           ;TABLE OF DATA
014572  000407                          BR      ERRGEN                  ;OUTPUT DATA

                                        ;LINE STATUS ERROR SERVICE

                                        ;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

014574  012737  016757  014672  ERRLS:  MOV     #MLINER,ERRMSG
014602  012737  015040  014704          MOV     #ERTAB5,ERTAB
014610  000400                          BR      ERRGEN
```

```
                                        ;GENERAL ERROR HANDLER
                                        ;TYPE PC+2 OF TEST THAT FAILED
                                        ;TYPE ERROR MESSAGE (IF ANY)
                                        ;TYPE DATA RELATING TO FAILURE (IF ANY)

014612  005037  177776          ERRGEN: CLR     PSW
014616  012777  000100  001764          MOV     #INTENA,@TKCSR
014624  032777  020000  001766          BIT     #SW13,@SWR              ;IF SW13=1, DO NOT
014632  001026                          BNE     .3                      ;TYPE ERROR MESSAGE
014634  021637  016656                  CMP     (SP),SAVPC              ;SAME ERROR AGAIN
014640  001402                          BEQ     .+6
014642  005037  016624                  CLR     ERRFLG
014646  104005                          SAVOSP
014650  005737  016624                  TST     ERRFLG                  ;IF ERROR OCCURED FLAG=1,
014654  001007                          BNE     .1                      ;TYPE DATA ONLY
014656  104006                          OCTASC                          ;TYPE PC+2 OF CALL TO ERROR ROUTINE
014660  014752                          ERTABO
014662  005737  014672                  TST     ERRMSG
014666  001407                          BEQ     .2
014670  104004                          TYPE                            ;TYPE ERROR MESSAGE
014672  000000          ERRMSG: 0
014674  005737  014704          .1:     TST     ERTAB
014700  001402                          BEQ     .2
014702  104006                          OCTASC                          ;TYPE DATA
014704  000000          ERTAB:  0
014706  104007          .2:     RESOS                                   ;RESTORE R0-R5

                                        ;ERROR HALT SERVICE

014710  032777  100000  001702  .3:     BIT     #SW15,@SWR              ;IF SW15=0, DO NOT
014716  001406                          BEQ     .4                      ;HALT ON ERROR
014720  000000                          HALT                            ;HALT AND DISPLAY ADDRESS OF FAILING TEST
014722  022737  000176  016620          CMP     #SWREG,SWR
014730  001001                          BNE     .4
014732  104025                          CNTLUU
014734  012737  000001  016624  .4:     MOV     #1,ERRFLG               ;SET ERROR OCCURED FLAG
014742  042777  000100  001640          BIC     #INTENA,@TKCSR
014750  000002                          RTI                             ;RETURN TO TEST
```

```
                                        ;TABLE S OF DATA FOR ERROR TYPEOUT
                                        ;TABLE FOR TRANSITION STATUS ERROR
                                ERTAB0: 1
                                        6
                                        $AVPC
                                ERTAB1: 3
                                        $AVR5           ;CONTAINS EXPECTED TRANSITION STATUS
                                        $AVR4           ;CONTAINS RECEIVED TRANSITION STATUS
                                        $AVR3           ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
                                ERTAB2: 3
                                        $AVR5                   ;CONTAINS EXPECTED LINE STATUS
                                        $AVR4                   ;CONTAINS RECEIVED LINE STATUS
                                        $AVR3                   ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
                                ERTAB3: 3
                                        $AVR4
                                        $AVR3
                                ERTAB4: 6
                                        $AVR5                   ;CONTAINS EXPECTED CONTROL STATUS
                                        6
                                        $AVR4                   ;CONTAINS RECEIVED CONTROL STATUS
                                ERTAB5: 4
                                        3
                                        $AVR5           ;CONTAINS EXPECTED LINE STATUS
                                        3
                                        $AVR4           ;CONTAINS RECEIVED LINE STATUS
                                        2
                                        $AVR3           ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
                                        2
                                        $AVR1           ;CONTAINS NUMBER OF LINE UNDER TEST


                                SWRTB:  1
                                        6
                                        $WREG
```

```
2706
2707                                        ;CONVERT OCTAL TO ASCII AND
2708                                        ;OUTPUT ON TELETYPE
2709
2710  015070  017605  000000          OCTASN: MOV     @(SP),R5                ;GET POINTER TO TABLE OF DATA
2711  015074  062716  000002                  ADD     #2,(SP)
2712  015100  012737  000010  015430          MOV     #10,RADIX
2713  015106  012704  020206                  MOV     #MBCD+2,R4              ;SET UP POINTER FOR CONVERTED DATA
2714  015112  012537  016660                  MOV     (R5)+,WRDCNT            ;GET NUMBER OF WORDS TO BE CONVERTED
2715  015116  012537  016662          OCTAS1: MOV     (R5)+,CHRCNT            ;GET NUMBER OF DIGITS IN WORD
2716  015122  013537  015424                  MOV     @(R5)+,BINWRD           ;GET DATA TO BE CONVERTED
2717  015126  104010                          CONVERT                         ;CONVERT TO ASCII
2718  015130  005337  016660                  DEC     WRDCNT                  ;IF ALL DATA IS NOT CONVERTED
2719  015134  001370                          BNE     OCTAS1                  ;CONTINUE
2720  015136  112714  000100                  MOVB    #100,(R4)               ;PUT TERMINATOR AT END OF MESSAGE
2721  015142  005737  015260                  TST     SMLN
2722  015146  001002                          BNE     1$
2723  015150  104004                          TYPE                            ;OUTPUT CONVERTED DATA
2724  015152  020204                          MBCD                            ;TO TELETYPE
2725  015154  000002          1$:     RTI                                     ;RETURN TO CALLING ROUTINE
2726
2727
2728
2729  015156  005037  015254          CNTLU:  CLR     TMP1
2730  015162  012737  000001  015256          MOV     #1,TMP2
2731  015170  104004                          TYPE
2732  015172  020161                          $SWREQ
2733  015174  052737  000001  015260          BIS     #1,SMLN
2734  015202  104006                          OCTASC
2735  015204  015062                          SWRTB
2736  015206  104004                          TYPE
2737  015210  020206                          MBCD+2
2738  015212  104013                          INSTRG
2739  015214  020172                          $NEWIS
2740  015216  000000                          0
2741  015220  177777                          177777
2742  015222  015254                          TMP1
2743  015224  123727  016154  000015          CMPB    INBUF,#15
2744  015232  001403                          BEQ     1$
2745  015234  013777  015254  001356          MOV     TMP1,@SWR
2746  015242  005037  015256          1$:     CLR     TMP2
2747  015246  005037  015260                  CLR     SMLN
2748  015252  000002                          RTI
2749  015254  000000          TMP1:   0
2750  015256  000000          TMP2:   0
2751  015260  000000          SMLN:   0
2752
2753
```

```
2754
2755                                        ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE
2756
2757  015262  013700  016662        BINASC: MOV     CHRCNT,R0           ;SET UP COUNT FOR DIGITS TO BE CONVERTED
2758  015266  012701  020310                MOV     #TEMTAB,R1          ;SET UP POINTER FOR TEMPORARY STORAGE
2759  015272  104011                BINASA: EXTRACT                     ;EXTRACT ONE DIGIT
2760  015274  062737  000060  015426        ADD     #60,DIGIT           ;CONVERT FROM BCD TO ASCII
2761  015302  113721  015426                MOVB    DIGIT,(R1)+         ;STORE DIGIT
2762  015306  005300                DEC     R0                  ;IF ALL DIGITS NOT DONE,
2763  015310  001370                BNE     BINASA              ;CONTINUE
2764  015312  114124                BINASB: MOVB    -(R1),(R4)+         ;REVERSE ORDER OF DIGITS
2765  015314  005337  016662                DEC     CHRCNT              ;IF ALL CHARACTERS ARE NOT
2766  015320  001374                BNE     BINASB              ;IN ORDER, CONTINUE
2767  015322  112724  000040                MOVB    #40,(R4)+           ;INSERT SPACE AFTER LAST DIGIT
2768  015326  000002                RTI                         ;RETURN TO CALLING ROUTINE
2769
2770                                        ;SINGLE PRECISION UNSIGNED DIVIDE LOOP
2771
2772  015330  005037  015426        DIVI:   CLR     DIVIDH
2773  015334  023737  015426  015430DIVIU:  CMP     DIVIDH,DIVIS
2774  015342  103027                BHIS    DIVIB
2775  015344  012737  000021  015404        MOV     #17.,DIVCNT
2776  015352  000407                BR      DIVIC
2777  015354  023737  015426  015430DIVIA:  CMP     DIVIDH,DIVIS
2778  015362  103403                BLO     DIVIC
2779  015364  163737  015430  015426        SUB     DIVIS,DIVIDH
2780  015372  006137  015424        DIVIC:  ROL     DIVIDL
2781  015376  006137  015426                ROL     DIVIDH
2782  015402  005327                DEC     (PC)+
2783  015404  000000                DIVCNT: 0
2784  015406  001362                BNE     DIVIA
2785  015410  006037  015426                ROR     DIVIDH
2786  015414  005137  015424                COM     DIVIDL
2787  015420  000002                RTI
2788  015422  000000                DIVIB:  HALT
2789  015424  000000                DIVIDL: 0
2790  015426  000000                DIVIDH: 0
2791  015430  000000                DIVIS:  0
2792
2793                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5
2794
2795  015432  016637  000004  016656SVOSP:  MOV     4(SP),SAVPC
2796
2797                                        ;SAVE R0-R5
2798
2799  015440  010537  016652        SVOS:   MOV     R5,SAVR5
2800  015444  010437  016650                MOV     R4,SAVR4
2801  015450  010337  016646                MOV     R3,SAVR3
2802  015454  010237  016644                MOV     R2,SAVR2
2803  015460  010137  016642                MOV     R1,SAVR1
2804  015464  010037  016640                MOV     R0,SAVR0
2805  015470  000002                RTI
```

```
 2806
 2807                                           ;RESTORE R0-R5
 2808
 2809  015472  013700  016640          RS05:   MOV     SAVR0,R0
 2810  015476  013701  016642                  MOV     SAVR1,R1
 2811  015502  013702  016644                  MOV     SAVR2,R2
 2812  015506  013703  016646                  MOV     SAVR3,R3
 2813  015512  013704  016650                  MOV     SAVR4,R4
 2814  015516  013705  016652                  MOV     SAVR5,R5
 2815  015522  000002                          RTI
 2816
 2817                                           ;TELETYPE OUTPUT ROUTINE
 2818
 2819  015524  017605  000000          TYPER:  MOV     @(SP),R5        ;GET POINTER TO MESSAGE (ON STACK)
 2820  015530  062716  000002                  ADD     #2,(SP)         ;CORRECT STACK FOR RETURN
 2821  015534  105777  001054          TYPERA: TSTB    @TPCSR          ;WAIT FOR TELEPRINTER READY
 2822  015540  100375                          BPL     TYPERA
 2823  015542  122765  000012  177777        CMPB    #12,-1(R5)      ;WAS LAST ONE A L.F. ??
 2824  015550  001405                          BEQ     1$              ;BR IF YES
 2825  015552  122765  000015  177777        CMPB    #15,-1(R5)      ;WAS LAST ONE A C.R. ??
 2826  015560  001401                          BEQ     1$              ;BR IF YES
 2827  015562  000402                          BR      2$              ;CONTINUE IF NEITHER
 2828  015564  004737  015634          1$:     JSR     PC,TYFILL       ;GO OUT PUT FILLERS
 2829  015570  122715  000100          2$:     CMPB    #100,(R5)       ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
 2830  015574  001001                          BNE     TYPER1
 2831  015576  000002                          RTI                     ;CHARACTER IS TERMINATOR, EXIT
 2832  015600  122715  000042          TYPER1: CMPB    #42,(R5)        ;IF CHARACTER=42,
 2833  015604  001406                          BEQ     TYPECL          ;TYPE LINE FEED
 2834  015606  122715  000045                  CMPB    #45,(R5)        ;IF CHARACTER=45,
 2835  015612  001403                          BEQ     TYPECL          ;TYPE CARRIAGE RETURN
 2836  015614  112577  000776          TYPER2: MOVB    (R5)+,@TPDBR    ;GET CHARACTER
 2837  015620  000745                          BR      TYPERA          ;TYPE IT
 2838  015622  142715  000040          TYPECL: BICB    #40,(R5)        ;CONVERT CODE OF 42 OR 45
 2839  015626  152715  000010                  BISB    #10,(R5)        ;TO 12 OR 15
 2840  015632  000770                          BR      TYPER2          ;TYPE IT
 2841
 2842
 2843                                           ;OUTPUT FILLERS AFTER <CR> OR <LF> CHAR IS OUT PUTTED.
 2844
 2845  015634  113737  016720  016722  TYFILL: MOVB    FILL,FILLA              ;GET FILL COUNT
 2846  015642  113777  016721  000746  1$:     MOVB    FILL+1,@TPDBR           ;OUT PUT ONE FILLER
 2847  015650  105777  000740          2$:     TSTB    @TPCSR                  ;WAIT FOR TTY TO FINISH OUTPUT
 2848  015654  100375                          BPL     2$                      ;BR IF TTY NOT DONE
 2849  015656  105337  016722                  DECB    FILLA                   ;COUNT ONE FILLER
 2850  015662  001367                          BNE     1$                      ;BR TIL ALL DONE
 2851  015664  000207                          RTS     PC                      ;RETURN TO CALLER ABOVE
 2852
 2853                                           ;INPUT OCTAL CHARACTER STRING
 2854                                           ;TERMINATOR IS CARRIAGE RETURN
 2855                                           ;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
 2856                                           ;CARRIAGE RETURN ARE TYPED, THE IN  PUT WILL
 2857                                           ;BE RE-REQUESTED
 2858
 2859  015666                          INSTR:
 2860  015666  011605                          MOV     (SP),R5                 ;GET POINTER TO ARGUMENTS
 2861  015670  012537  015714                  MOV     (R5)+,MSG               ;GET MESAGE TO BE TYPED
```

```
2862  015674  012537  016146                  MOV     (R5)+,LOLIM             ;GET LOWER LIMIT
2863  015700  012537  016150                  MOV     (R5)+,HILIM             ;GET UPPER LIMIT
2864  015704  012537  016152                  MOV     (R5)+,STORE             ;GET DATA STORAGE LOCATION
2865  015710  010516                          MOV     R5,(SP)                 ;RESTORE STACK
2866  015712  104004                INSTR1:   TYPE                            ;TYPE MESSAGE
2867  015714  000000                MSG:      0
2868  015716  012704  016154                  MOV     #INBUF,R4               ;SET UP CHARACTER INPUT BUFFER
2869  015722  012703  000007                  MOV     #7,R3                   ;SET UP INPUT COUNT
2870  015726  105777  000656        INSTRB:   TSTB    @TKCSR                  ;WAIT FOR CHARACTER
2871  015732  100375                          BPL     INSTRB
2872  015734  005037  002206        INSTBB:   CLR     $INTFL
2873  015740  017737  000646 015254          MOV     @TKDBR,TMP1
2874  015746  142737  000200 015254          BICB    #200,TMP1
2875  015754  113714  015254                  MOVB    TMP1,(R4)
2876  015760  121427  000007                  CMPB    (R4),#7
2877  015764  001420                          BEQ     INSTER
2878  015766  121427  000015                  CMPB    (R4),#15                ;IS CHARACTER TERMINATOR
2879  015772  001420                          BEQ     INSTR2                  ;IF IT IS, CONVERT INPUT STRING
2880  015774  121427  000025                  CMPB    (R4),#25
2881  016000  001003                          BNE     1$
2882  016002  005037  015254                  CLR     TMP1
2883  016006  000741                          BR      INSTR1
2884  016010  112477  000602        1$:       MOVB    (R4)+,@TPDBR
2885  016014  105777  000574        INSTRC:   TSTB    @TPCSR                  ;WAIT TO FINISH TYPING
2886  016020  100375                          BPL     INSTRC
2887  016022  005303                          DEC     R3                      ;UPDATE RECEIVED COUNT
2888  016024  001340                          BNE     INSTRB                  ;AND CONTINUE
2889  016026  104004                INSTER:   TYPE                            ;TYPE "?" AND RE-REQUEST INPUT
2890  016030  017714                          MQM
2891  016032  000727                          BR      INSTR1
2892
2893                                          ;CONVERT ASCII STRING TO OCTAL
2894
2895  016034  104004                INSTR2:   TYPE
2896  016036  017720                          MCRLF
2897  016040  012704  016154                  MOV     #INBUF,R4               ;GET POINTER TO ASCII STRING
2898  016044  005003                          CLR     R3
2899  016046  122714  000015                  CMPB    #15,(R4)                ;IS TERMINATOR FIRST
2900                                                                          ;CHARACTER IN STRING
2901  016052  001431                          BEQ     CHCK
2902  016054  121427  000060        INSTRD:   CMPB    (R4),#60                ;IS CHARACTER OCTAL DIGIT
2903  016060  002762                          BLT     INSTER                  ;IF 67)=CHAR)=60
2904  016062  121427  000067                  CMPB    (R4),#67                ;CHARACTER IS OCTAL DIGIT
2905  016066  003357                          BGT     INSTER
2906  016070  142714  000060                  BICB    #60,(R4)                ;STRIP ASCII
2907  016074  152403                          BISB    (R4)+,R3                ;GENERATE OCTAL NUMBER
2908  016076  121427  000015                  CMPB    (R4),#15                ;IF END OF STRING, CHECK LIMITS
2909  016102  001404                          BEQ     INSTR3
2910  016104  006303                          ASL     R3                      ;MULTIPLY DIGIT BY 10 (OCTAL
2911  016106  006303                          ASL     R3
2912  016110  006303                          ASL     R3
2913  016112  000760                          BR      INSTRD                  ;GET NEXT DIGIT
2914
2915                                          ;TEST NUMBER TO SEE IF IT IS WITHIN LIMITS
2916
2917  016114  020337  016150        INSTR3:   CMP     R3,HILIM                ;TEST HI LIMIT
```

```
2918  016120  101342                        BHI     INSTER                  ;IF R3>HILIM, ERROR
2919  016122  020337  016146                CMP     R3,LOLIM                ;TEST LOW LIMIT
2920  016126  103737                        BLO     INSTER                  ;IF R3<LOLIM, ERROR
2921  016130  010377  000016                MOV     R3,@STORE               ;STORE NUMBER
2922  016134  000002                        RTI                             ;EXIT
2923  016136  005737  015256        CHCK:   TST     TMP2
2924  016142  001731                        BEQ     INSTER
2925  016144  000002                        RTI
2926  016146  000000                LOLIM:  0
2927  016150  000000                HILIM:  0
2928  016152  000000                STORE:  0
2929  016154  000000                INBUF:  0
2930           016176                .=.+20
2931                                  ;ENTER HERE ON POWER FAILURE
2932
2933
2934  016176  010046                PFAIL:  MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
2935  016200  010146                        MOV     R1,-(SP)
2936  016202  010246                        MOV     R2,-(SP)
2937  016204  010346                        MOV     R3,-(SP)
2938  016206  010446                        MOV     R4,-(SP)
2939  016210  010546                        MOV     R5,-(SP)
2940  016212  013746  000024                MOV     24,-(SP)
2941  016216  010637  016654                MOV     SP,SAVSP                ;SAVE STACK POINTER
2942  016222  012737  016234  000024        MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
2943  016230  000000                        HALT                            ;HALT ON POWER DOWN NORMAL
2944  016232  000776                        BR      .-2
2945
2946                                  ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
2947
2948  016234  013706  016654        RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
2949  016240  012605                        MOV     (SP)+,R5                ;RESTORE R0-R5
2950  016242  012604                        MOV     (SP)+,R4
2951  016244  012603                        MOV     (SP)+,R3
2952  016246  012602                        MOV     (SP)+,R2
2953  016250  012601                        MOV     (SP)+,R1
2954  016252  012600                        MOV     (SP)+,R0
2955  016254  012737  016176  000024        MOV     #PFAIL,24               ;SET UP FOR POWER FAILURE
2956  016262  005726                        POP1SP
2957  016264  104004                        TYPE
2958  016266  020073                        MPFAIL
2959  016270  005737  001756                TST     TIPFLG
2960  016274  001002                        BNE     RESTA1
2961  016276  000137  001262                JMP     START0
2962  016302  104004                RESTA1: TYPE
2963  016304  020113                        MPFI
2964  016306  012746  000340                MOV     #340,-(SP)
2965  016312  005746                        PUSH1SP
2966  016314  000137  014334                JMP     TSTENT
2967
2968
2969                                  ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
2970  016320  013746  000020        XOR:    MOV     20,-(SP)                ;SAVE 20
2971  016324  013746  000022                MOV     22,-(SP)                ;SAVE 22
2972  016330  012737  016522  000020        MOV     #2$,20                  ;IOT INTR VECTOR
2973  016336  012737  000340  000022        MOV     #340,22                 ;IOT INTR LVL
```

```
 2974  016344  012737  000300  014026          MOV     #300,DATA1
 2975  016352  012737  000302  014030          MOV     #302,DATA2
 2976  016360  013777  014030  175440  1$:     MOV     DATA2,@DATA1
 2977  016366  012777  000004  175434          MOV     #IOT,@DATA2     ;IOT TRAP
 2978  016374  062737  000004  014026          ADD     #4,DATA1
 2979  016402  062737  000004  014030          ADD     #4,DATA2
 2980  016410  023727  014026  001000          CMP     DATA1,#1000
 2981  016416  001360                          BNE     1$
 2982  016420  012737  000000  016632          MOV     #0,TSTNO        ;SET UP DEFAULT
 2983  016426  012737  020436  016664          MOV     #TSTTBO,TSTPNT  ;
 2984  016434  052737  000340  177776          BIS     #340,PS         ;PREVENT INTERRUPTS
 2985  016442  005077  000136                  CLR     @DHMCSR         ;
 2986  016446  012777  000100  000130          MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
 2987  016454  042737  000340  177776          BIC     #340,PS ;ALLOW INTERRUPTS
 2988  016462  052777  000200  000114          BIS     #DONE,@DHMCSR   ;SET DONE..AND INTERRUPT
 2989  016470  000240                          NOP
 2990  016472  012637  000022                  MOV     (SP)+,22        ;YOU DIDN'T INTERRUPT ?
 2991  016476  012637  000020                  MOV     (SP)+,20        ;RESTORE 20 & 22
 2992  016502  005077  000076                  CLR     @DHMCSR         ;STOP ALL INTERRUPT
 2993  016506  052737  000340  177776          BIS     #340,PS         ;
 2994  016514  104012                          ERROR
 2995  016516  000000                          HALT                    ;YOU SHOULD HAVE INTERRUPTED
 2996  016520  000426                          BR      3$
 2997  016522  011637  016600          2$:     MOV     (SP),DHMVEC     ;EXTRACT VECTOR +4
 2998  016526  162737  000002  016600          SUB     #2,DHMVEC       ;CREATE LVL
 2999  016534  013737  016600  016602          MOV     DHMVEC,DHMLVL   ;SAVE
 3000  016542  162737  000002  016600          SUB     #2,DHMVEC       ;CREATE AND SAVE VEC
 3001  016550  012737  000340  177776          MOV     #340,PS         ;PREVENT INTERRUPTS
 3002  016556  005077  000022                  CLR     @DHMCSR         ;
 3003  016562  022626                          POP2SP
 3004  016564  022626                          POP2SP
 3005  016566  012637  000022                  MOV     (SP)+,22        ;RESTORE 22
 3006  016572  012637  000020                  MOV     (SP)+,20        ;RESTORE 20
 3007  016576  000207          3$:     RTS     PC
 3008
```

```
                                        ;INDIRECT POINTERS
                                
016600  000300                  DHMVEC: 300                     ;MODEM CONTROL INTERRUPT VECTOR
016602  000302                  DHMLVL: 302                     ;MODEM CONTROL ONTERRUPT PRIORITY
016604  170500                  DHMCSR: 170500                  ;MODEM CONTROL CONTROL STATUS REGISTER
016606  170502                  DHMLSR: 170502                  ;MODEM CONTROL CONTROL STATUS REGISTER
016610  177560                  TKCSR:  177560
016612  177562                  TKDBR:  177562
016614  177564                  TPCSR:  177564
016616  177566                  TPDBR:  177566
016620  177570                  SWR:    177570
016622  177570                  DISPLAY:177570
                                
                                        ;PROGRAM VARIABLES
                                
016624  000000                  ERRFLG: 0
016626  000000                  TRACON: 0
016630  000000                  PASCNT: 0
016632  000000                  TSTNO:  0
016634  000000                  RETURN: 0
016636  000000                  ICOUNT: 0
016640  000000                  SAVR0:  0
016642  000000                  SAVR1:  0
016644  000000                  SAVR2:  0
016646  000000                  SAVR3:  0
016650  000000                  SAVR4:  0
016652  000000                  SAVR5:  0
016654  000000                  SAVSP:  0
016656  000000                  SAVPC:  0
016660  000000                  WRDCNT: 0
016662  000000                  CHRCNT: 0
016664  020436                  TSTPNT: TSTTBO
016666  000000                  TSTMAX: 0
016670  000000                  LINFLG: 0
016672  000000                  LINE:   0
016674  000000                  LINORG: 0
016676  000000                  LINANS: 0
016700  000000                  ANSFLG: 0
016702  000000                  ORGFLG: 0
016704  000000                  TIME1:  0
016706  000000                  TIME2:  0
016710  000000                  TIFLG:  0
016712  177777                  LINSEL: 177777
016714  000000                  SELMSK: 0
016716  000000                  SLMSK:  0
016720  000002                  FILL:   2                       ;FILL CHAR/COUNT
016722  000000                  FILLA:  0                       ;TEMP STORAGE FOR FILL COUNT
016724  000000                  RNGRET: 0
                                
016726  052123  052101  051525  MSTATE: .ASCII  ;STATUS ERROR%"EXP    REC@;
016734  042440  051122  051117
016742  021045  054105  020120
016750  020040  051040  041505
016756     100
016757     114  047111  020105  MLINER: .ASCII  ;LINE ERROR%"EXP REC LINE SEL@;
```

```
3065  016764  051105  047522  022522
3066  016772  042442  050130  051040
3067  017000  041505  046040  047111
3068  017006  020105  042523  040114
3069  017014  044514  042516  042440  MLINE1: .ASCII  ;LINE ERROR%"EXP REC LINE@;
3070  017022  051122  051117  021045
3071  017030  054105  020120  042522
3072  017036  020103  044514  042516
3073  017044     100
3074  017045     124  040522  051516  MTRANE: .ASCII  ;TRANSITION ERROR%"EXP REC LINE@;
3075  017052  052111  047511  020116
3076  017060  051105  047522  022522
3077  017066  042442  050130  051040
3078  017074  041505  046040  047111
3079  017102  040105
3080  017104  021045  021045  044504  DIALM:  .ASCII  ;%"%"DIAL ANSWERING DATA SET%"@;
3081  017112  046101  040440  051516
3082  017120  042527  044522  043516
3083  017126  042040  052101  020101
3084  017134  042523  022524  040042
3085  017142  021045  021045  030061  MT103T: .ASCII  ;%"%"103A MODEM CONNECT-DISCONNECT TEST%"@;
3086  017150  040463  046440  042117
3087  017156  046505  041440  047117
3088  017164  042516  052103  042055
3089  017172  051511  047503  047116
3090  017200  041505  020124  042524
3091  017206  052123  021045     100
3092  017213     045  022442  031042  MT202T: .ASCII  ;%"%"202C MODEM CONNECT-DISCONNECT TEST%"@;
3093  017220  031060  020103  047515
3094  017226  042504  020115  047503
3095  017234  047116  041505  026524
3096  017242  044504  041523  047117
3097  017250  042516  052103  052040
3098  017256  051505  022524  040042
3099  017264  021045  021045  051117  MSELOR: .ASCII  ;%"%"ORIGINATE LINE-@;
3100  017272  043511  047111  052101
3101  017300  020105  044514  042516
3102  017306  040055
3103  017310  021045  047101  053523  MSELAN: .ASCII  ;%"ANSWER LINE-@;
3104  017316  051105  046040  047111
3105  017324  026505     100
3106  017327     045  030442  031460  MT103A: .ASCII  ;%"103A TEST COMPLETE%"@;
3107  017334  020101  042524  052123
3108  017342  041440  046517  046120
3109  017350  052105  022505  040042
3110  017356  021045  030062  041462  MT202A: .ASCII  ;%"202C TEST COMPLETE%"@;
3111  017364  052040  051505  020124
3112  017372  047503  050115  042514
3113  017400  042524  021045     100
3114  017405     045  051442  051124  MDISC:  .ASCII  ;%"STRIKE ANY TTY KEY TO TEST DISCONNECT@;
3115  017412  045511  020105  047101
3116  017420  020131  052124  020131
3117  017426  042513  020131  047524
3118  017434  052040  051505  020124
3119  017442  044504  041523  047117
3120  017450  042516  052103     100
```

```
 3121  017455     045  022442  030442  M16:    .ASCII  ;%"%"16 LINE SCANNER TEST%"@;
 3122  017462  020066  044514  042516
 3123  017470  051440  040503  047116
 3124  017476  051105  052040  051505
 3125  017504  022524  040042
 3126  017510  021045  021045  055104  MTITLE: .ASCII  ;%"%"DZDHK-C    -----MODEM CONTROL DIAGNOSTIC-----%"@;
 3127  017516  044104  026513  020103
 3128  017524  020040  026440  026455
 3129  017532  026455  047515  042504
 3130  017540  020115  047503  052116
 3131  017546  047522  020114  044504
 3132  017554  043501  047516  052123
 3133  017562  041511  026455  026455
 3134  017570  022455  040042
 3135  017574  021045  042526  052103  MVECTO: .ASCII  ;%"VECTOR ADDRESS-@;
 3136  017602  051117  040440  042104
 3137  017610  042522  051523  040055
 3138  017616  021045  047503  052116  MREGAD: .ASCII  ;%"CONTROL REGISTER ADDRESS-@;
 3139  017624  047522  020114  042522
 3140  017632  044507  052123  051105
 3141  017640  040440  042104  042522
 3142  017646  051523  040055
 3143  017652  021045  044514  042516  MLINSL: .ASCII  ;%"LINE SELECT PARAMETER -@;
 3144  017660  051440  046105  041505
 3145  017666  020124  040520  040522
 3146  017674  042515  042524  020122
 3147  017702  040055
 3148  017704  021045  042524  052123  MTEST:  .ASCII  ;%"TEST-@;
 3149  017712  040055
 3150  017714  020040  040077          MQM:    .ASCII  ;  ?@;
 3151  017720  021045     100          MCRLF:  .ASCII  ;%"@;
 3152  017723     045  051442  047111  MLINE:  .ASCII  ;%"SINGLE LINE CABLE TEST%"@;
 3153  017730  046107  020105  044514
 3154  017736  042516  041440  041101
 3155  017744  042514  052040  051505
 3156  017752  022524  040042
 3157  017756  021045  044514  042516  MLINEI: .ASCII  ;%"LINE NUMBER-@;
 3158  017764  047040  046525  042502
 3159  017772  026522     100
 3160  017775     106  052101  046101  MFATAL: .ASCII  ;FATAL ERROR%"CSTAT  LSTAT@;
 3161  020002  042440  051122  051117
 3162  020010  021045  051503  040524
 3163  020016  020124  046040  052123
 3164  020024  052101     100
 3165  020027     045  052042  040522  MTRNDE: .ASCII  ;%"TRANSITION DETECTED%"CSTAT  LSTAT@;
 3166  020034  051516  052111  047511
 3167  020042  020116  042504  042524
 3168  020050  052103  042105  021045
 3169  020055  051503  040524  020124
 3170  020064  046040  052123  052101
 3171  020072     100
 3172  020073     045  050042  053517  MPFAIL: .ASCII  ;%"POWER FAILURE@;
 3173  020100  051105  043040  044501
 3174  020106  052514  042522     100
 3175  020113     055  052503  051122  MPF1:   .ASCII  ;-CURRENT TEST WILL RESTART%"@;
 3176  020120  047105  020124  042524
```

```
3177  020126  052123  053440  046111
3178  020134  020114  042522  052123
3179  020142  051101  022524  040042
3180  020150  041536     100          MCONTC: .ASCII  ;↑C@;
3181  020153     136  040126          MCONTV: .ASCII  ;↑V@;
3182  020156  046136     100          MCONTL: .ASCII  ;↑L@;
3183  020161     045  051442  051127  $SWREQ: .ASCII  ;%"SWR=  @;
3184  020166  020075  040040
3185  020172  020040  047040  053505  $NEWIS: .ASCII  ;   NEW=  @;
3186  020200  020075  040040
3187  020204  021045                  MBCD:   .ASCII  ;%";
3188          020306                  .=.+100
3189                                  .EVEN
3190  020306  040007                  MEPASS: 40007
3191  020310  000000                  TEMTAB: 0
3192          020322                  .=.+10
3193
3194  020322  000000                          0
3195
3196                                          ;EMT DISPATCH TABLE
3197
3198  020324  014556                  EMTTAB: ERRCS
3199  020326  014574                          ERRLS
3200  020330  014164                          LOOP
3201  020332  014410                          FREEZE
3202  020334  015524                          TYPER
3203  020336  015432                          SVOSP
3204  020340  015070                          OCTASN
3205  020342  015472                          RSOS
3206  020344  015262                          BINASC
3207  020346  015330                          DIVI
3208  020350  014452                          ERR
3209  020352  015666                          INSTR
3210  020354  014470                          ERRT
3211  020356  014512                          ERRS
3212  020360  014534                          ERRN
3213  020362  013102                          GETLIN
3214  020364  013136                          SETUPS
3215  020366  013372                          CKRNG
3216  020370  013470                          WAITR
3217  020372  013556                          CKTRN
3218  020374  013526                          WAITRR
3219  020376  015156                          CNTLU           ;CALL BY EMT CNTLUU
3220  020400  014152                          CKINT           ;CALL  BY EMT CKINTT
3221  020402  001760                          KBDINT          ;CALLBY EMT  KBDIN
3222  020404  000000          EMTLIM: 0
3223  020406  020436          TSTLST: TSTTBO
3224  020410  020640                  TSTTBI
3225  020412  020702                  TSTTB2
3226  020414  020710                  TSTTB3
3227  020416  000000                  0
3228  020420  000000                  0
3229  020422  000000                  0
3230  020424  000000                  0
3231  020426  000037          GRO:    NO-1
3232  020430  000007                  N1-100-1
```

```
3233  020432  000001                    N2-200-1
3234  020434  000000                    N3-300-1
3235  020436  002210          TSTTBO:   T0
3236  020440  000001                    1
3237  020442  002236                    T1
3238  020444  004000                    TIMES
3239  020446  002300                    T2
3240  020450  004000                    TIMES
3241  020452  002342                    T3
3242  020454  004000                    TIMES
3243  020456  002404                    T4
3244  020460  004000                    TIMES
3245  020462  002446                    T5
3246  020464  004000                    TIMES
3247  020466  002510                    T6
3248  020470  004000                    TIMES
3249  020472  002564                    T7
3250  020474  004000                    TIMES
3251  020476  002640                    T10
3252  020500  004000                    TIMES
3253  020502  002730                    T11
3254  020504  004000                    TIMES
3255  020506  003020                    T12
3256  020510  004000                    TIMES
3257  020512  003110                    T13
3258  020514  004000                    TIMES
3259  020516  003200                    T14
3260  020520  004000                    TIMES
3261  020522  003270                    T15
3262  020524  004000                    TIMES
3263  020526  003356                    T16
3264  020530  004000                    TIMES
3265  020532  003444                    T17
3266  020534  004000                    TIMES
3267  020536  003532                    T20
3268  020540  004000                    TIMES
3269  020542  003620                    T21
3270  020544  004000                    TIMES
3271  020546  003714                    T22
3272  020550  000400                    TIMES
3273  020552  004032                    T23
3274  020554  000400                    TIMES
3275  020556  004230                    T24
3276  020560  000400                    TIMES
3277  020562  004406                    T25
3278  020564  000200                    TIMES
3279  020566  004556                    T26
3280  020570  000200                    TIMES
3281  020572  005014                    T27
3282  020574  000200                    TIMES
3283  020576  005252                    T30
3284  020600  000200                    TIMES
3285  020602  005510                    T31
3286  020604  000200                    TIMES
3287  020606  005746                    T32
3288  020610  000200                    TIMES
```

```
3289  020612  006164                          T33
3290  020614  000200                          TIMES
3291  020616  006402                          T34
3292  020620  000200                          TIMES
3293  020622  006620                          T35
3294  020624  004000                          TIMES
3295  020626  007002                          T36
3296  020630  004000                          TIMES
3297  020632  007252                          T37
3298  020634  004000                          TIMES
3299  020636  000000                          0
3300  020640  007532                TSTTB1:   T100
3301  020642  000001                          1
3302  020644  007570                          T101
3303  020646  004000                          TIMES
3304  020650  007746                          T102
3305  020652  004000                          TIMES
3306  020654  010124                          T103
3307  020656  004000                          TIMES
3308  020660  010302                          T104
3309  020662  004000                          TIMES
3310  020664  010460                          T105
3311  020666  004000                          TIMES
3312  020670  010634                          T106
3313  020672  004000                          TIMES
3314  020674  011010                          T107
3315  020676  004000                          TIMES
3316  020700  000000                          0
3317  020702  011164                TSTTB2:   T200
3318  020704  000001                          1
3319  020706  000000                          0
3320  020710  011540                TSTTB3:   T300
3321  020712  000001                          1
3322          000001                .END
```

```
ANSFLG  016700
ANSTR   012716
ANSTRR  013004
ANSTR1  012732
ANSTR2  012746
ANSTR3  012762
ANSTR4  012776
BINASA  015272
BINASB  015312
BINASC  015262
BINWRD= 015424
BUSY  = 000020
CHCK    016136
CHRCNT  016662
CKINT   014152
CKINTT= 104026
CKRING= 104021
CKRNG   013372
CKRNG1  013436
CKRNG2  013462
CKTRAN= 104023
CKTRN   013556
CKTRN1  013672
CKTRN2  013724
CKTRN3  013764
CKTRN4  014010
CLRMUX= 002000
CLRSCN= 004000
CNTLU   015156
CNTLUU= 104025
CO    = 000100
COF   = 040000
CONVER= 104010
CS    = 000040
CSF   = 020000
CSTR1   002236
CSTR2   002300
CSTR3   002342
CSTR4   002404
CSTR5   002446
DATA1   014026
DATA2   014030
DATA3   014032
DATA4   014034
DHMCSR  016604
DHMLSR  016606
DHMLVL  016602
DHMVEC  016600
DIALM   017104
DIGIT = 015426
DISPLA  016622
DISPRE  000174
DIVCNT  015404
DIVI    015330
DIVIA   015354
DIVIB   015422
DIVIC   015372
DIVIDH  015426
DIVIDL  015424
DIVIS   015430
DIVIU   015334
DMYRTI  002202
DONE  = 000200
EMTDEF= ****** U
EMTLIM  020404
EMTOK   014132
EMTSRV  014120
EMTTAB  020324
EOP     014040
ERR     014452
ERRCS   014556
ERRFLG  016624
ERRGEN  014612
ERRLS   014574
ERRMSG  014672
ERRN    014534
ERROR = 104012
ERRORC= 104000
ERRORL= 104001
ERRORN= 104016
ERRORS= 104015
ERRORT= 104014
ERRS    014512
ERRT    014470
ERR1    014016
ERR2    014020
ERR3    014022
ERR4    014024
ERTAB   014704
ERTAB0  014752
ERTAB1  014760
ERTAB2  014776
ERTAB3  015014
ERTAB4  015026
ERTAB5  015040
EXTRAC= 104011
FATEX   013006
FATRET  013020
FILL    016720
FILLA   016722
FREEZE  014410
FREEZX  014444
GETLIN  013102
GETLNS= 104017
GRD     020426
HILIM   016150
ICOUNT  016636
INBUF   016154
INIT1   002214
INSTBB  015734
INSTER  016026
INSTR   015666
INSTR8  015726
INSTRC  016014
INSTRD  016054
INSTRG= 104013
INSTR1  015712
INSTR2  016034
INSTR3  016114
INTENA= 000100
INT1    002510
INT1A   002556
INT1B   002562
INT10   003270
INT10A  003352
INT10B  003354
INT11   003356
INT11A  003440
INT11B  003442
INT12   003444
INT12A  003526
INT12B  003530
INT13   003532
INT13A  003614
INT13B  003616
INT2    002564
INT2A   002632
INT2B   002636
INT3    002640
INT3A   002724
INT3B   002726
INT4    002730
INT4A   003012
INT4B   003016
INT5    003020
INT5A   003102
INT5B   003106
INT6    003110
INT6A   003172
INT6B   003176
INT7    003200
INT7A   003262
INT7B   003266
KBDIN = 104027
KBDINT  001760
KBDIN1  002042
KBDIN2  002074
KBDIN3  002136
KRET    002204
LINANS  016676
LINE    016672
LINENA= 060001
LINFLG  016670
LINORG  016674
LINSEL  016712
LINT1   003620
LINT1A  003646
LINT1B  003674
LINT2   003714
LINT2A  003754
LINT2B  004004
LOGICA  014102
LOLIM   016146
LOOP    014164
LOOPER  014314
LOOPL   014400
LOOPS   014266
LOOPX   014330
LVL   = 000004
MAINT = 001000
MBCD    020204
MCONTC  020150
MCONTL  020156
MCONTV  020153
MCRLF   017720
MDISC   017405
MEMT1   004032
MEMT1A  004060
MEMT1B  004110
MEMT1C  004134
MEMT1D  004142
MEMT1E  004174
MEMT1F  004220
MEMT2   004230
MEMT2A  004252
MEMT2B  004334
MEMT2C  004360
MEMT2D  004372
MEMT3   004406
MEMT3A  004430
MEMT3B  004442
MEMT3C  004504
MEMT3D  004530
MEMT3E  004542
MEPASS  020306
MFATAL  017775
MLINE   017723
MLINEI  017756
MLINER  016757
MLINE1  017014
MLINSL  017652
MPFAIL  020073
MPF1    020113
MQM     017714
MREGAD  017616
MSELAN  017310
MSELOR  017264
MSG     015714
MSTATE  016726
MTEST   017704
MTITLE  017510
MTRANE  017045
MTRNDE  020027
MT103A  017327
MT103T  017142
MT202A  017356
MT202T  017213
MUX1    004556
MUX1A   004604
MUX1B   004652
MUX1C   004710
MUX1D   004722
MUX1E   004742
MUX1F   004774
MUX11   007570
MUX11A  007606
MUX11B  007636
MUX11C  007664
MUX11D  007676
MUX11E  007712
MUX11F  007744
MUX12   007746
MUX12A  007764
MUX12B  010014
MUX12C  010042
MUX12D  010054
MUX12E  010070
MUX12F  010122
MUX13   010124
MUX13A  010142
MUX13B  010172
MUX13C  010220
MUX13D  010232
MUX13E  010246
MUX13F  010300
MUX14   010302
MUX14A  010320
MUX14B  010350
MUX14C  010376
MUX14D  010410
MUX14E  010424
MUX14F  010456
MUX15   010460
MUX15A  010476
MUX15B  010520
```

DZDHKC.P11 SYMBOL TABLE

```
MUX15C  010546
MUX15D  010560
MUX15E  010576
MUX15F  010632
MUX16   010634
MUX16A  010652
MUX16B  010674
MUX16C  010722
MUX16D  010734
MUX16E  010752
MUX16F  011006
MUX17   011010
MUX17A  011026
MUX17B  011050
MUX17C  011076
MUX17D  011110
MUX17E  011126
MUX17F  011142
MUX2    005014
MUX2A   005042
MUX2B   005110
MUX2C   005146
MUX2D   005160
MUX2E   005200
MUX2F   005232
MUX3    005252
MUX3A   005300
MUX3B   005346
MUX3C   005404
MUX3D   005416
MUX3E   005436
MUX3F   005470
MUX4    005510
MUX4A   005536
MUX4B   005604
MUX4C   005642
MUX4D   005654
MUX4E   005674
MUX4F   005726
MUX5    005746
MUX5A   005774
MUX5B   006026
MUX5C   006054
MUX5D   006066
MUX5E   006104
MUX5F   006140
MUX6    006164
MUX6A   006212
MUX6B   006244
MUX6C   006272
MUX6D   006304
MUX6E   006322
MUX6F   006356
MUX7    006402
MUX7A   006430
MUX7B   006462
MUX7C   006510
MUX7D   006522
MUX7E   006540
MUX7F   006574
MUX8    006620
MUX8A   006636
MUX8B   006672
MUX8C   006700
MUX8D   006734
MUX8E   006762
MVECTO  017574
M0      =  000040
M1      =  000110
M16     =  017455
N       =  000300
NXTTS   014036
N0      =  000040
N1      =  000110
N2      =  000202
N3      =  000301
OCTASC= 104006
OCTASN  015070
OCTAS1  015116
ORGFLG  016702
ORGTR   012624
ORGTRR  012712
ORGTR1  012640
ORGTR2  012654
ORGTR3  012670
ORGTR4  012704
PASCNT  016630
PC      =%000007
PFAIL   016176
POPRO   =  012600
POP1SP= 005726
POP2SP= 022626
PS      =  177776
PSW     =  177776
PUSHRO= 010046
PUSH1S= 005746
PUSH2S= 024646
RADIX   =  015430
REGST1  001546
RESTAR  016234
RESTA1  016302
RESOS   =  104007
RETURN  016634
RING    =  000200
RINGF   =  100000
RNGRET  016724
RS      =  000004
RSOS    015472
R0      =%000000
R1      =%000001
R2      =%000002
R3      =%000003
R4      =%000004
R5      =%000005
SAVPC   016656
SAVR0   016640
SAVR1   016642
SAVR2   016644
SAVR3   016646
SAVR4   016650
SAVR5   016652
SAVSP   016654
SAVOSP= 104005
SCNENA= 000040
SCNT1   007002
SCNT1A  007042
SCNT1B  007120
SCNT1C  007202
SCNT1D  007222
SCNT2   007252
SCNT2A  007304
SCNT2B  007400
SCNT2C  007462
SCNT2D  007502
SCOPE   =  104002
SCOPEF= 104003
SECRX   =  000020
SECRXF= 010000
SECTX   =  000010
SELMSK  016714
SETUP   =  104020
SETUPB  013354
SETUPS  013136
SETUP1  013170
SETUP2  013204
SETUP4  013316
SINGLE= 000001
SINTFL  002206
SLMSK   016716
SMLN    015260
SP      =%000006
ST      =  000200
STACK   001100
START   001100
STARTN  001574
STARTO  001262
START1  001324
STEP    =  000400
STORE   016152
STRLIN  007532
STRLNA  007552
STRTOA  001666
ST103A  011164
ST103B  011226
ST202A  011540
ST202B  011602
SUSWR   001122
SVOS    015440
SVOSP   015432
SWR     016620
SWREG   000176
SWRTB   015062
SW06    =  000100
SW08    =  000400
SW09    =  001000
SW10    =  002000
SW11    =  004000
SW12    =  010000
SW13    =  020000
SW14    =  040000
SW15    =  100000
T       =  000014
TEMTAB  020310
TIFLG   016710
TIMES   =  004000
TIME1   016704
TIME2   016706
TIPFLG  001756
TKCSR   016610
TKDBR   016612
TMP1    015254
TMP2    015256
TPCSR   016614
TPDBR   016616
TRACON  016626
TRANEX  013022
TRANS   012562
TRANX1  013032
TRMRDY= 000002
TRNTAB  013070
TRNTYP  013042
TSTENT  014334
TSTGO   001706
TSTLST  020406
TSTMAX  016666
TSTNO   016632
TSTPNT  016664
TSTTB0  020436
TSTTB1  020640
TSTTB2  020702
TSTTB3  020710
TYFILL  015634
TYPE    =  104004
TYPECL  015622
TYPER   015524
TYPERA  015534
TYPER1  015600
TYPER2  015614
T0      002210
T1      002236
T10     002640
T100    007532
T101    007570
T102    007746
T103    010124
T103A   011230
T103A1  011236
T103B   011242
T10381  011252
T10382  011256
T103C   011262
T10301  011326
T10302  011332
T10303  011336
T10304  011342
T103E   011346
T103EN  011522
T103ES  011406
T103E1  011502
T103E2  011506
T103E3  011512
T103E4  011516
T104    010302
T105    010460
T106    010634
T107    011010
T11     002730
T12     003020
T13     003110
T14     003200
T15     003270
T16     003356
T17     003444
T2      002300
T20     003532
T200    011164
T201    011522
T202A   011604
T202A1  011612
T202B   011616
T202B1  011626
T202B2  011632
T202C   011636
T202D   011652
T202D1  011716
```

DZDHKC.P11 SYMBOL TABLE

```
T202D2  011722          T202G4  012202          T202J4  012544          T37     007252          XFLAG   001252
T202D3  011726          T202H   012206          T21     003620          T4      002404          XM    = 000101
T202D4  011732          T202H2  012252          T22     003714          T5      002446          XN    = 000300
T202E   011736          T202H3  012256          T23     004032          T6      002510          XOR     016320
T202E1  012002          T202H4  012262          T24     004230          T7      002564          XORSVC  001254
T202E2  012006          T202H5  012266          T25     004406          VECSTA  001374          XSCRX = 000001
T202E3  012012          T202I   012272          T26     004556          VECSTR  001354          X1A     001612
T202E4  012016          T202I2  012352          T27     005014          VECST1  001500          X1B     001656
T202F   012022          T202I3  012356          T3      002342          WAITR   013470          $NEWIS  020172
T202F2  012102          T202I4  012362          T30     005252          WAITRN= 104022          $SWREQ  020161
T202F3  012106          T202I5  012366          T300    011540          WAITRR  013526          .1      014674
T202F4  012112          T202J   012372          T31     005510          WAITR1  013540          .2      014706
T202F5  012116          T202JN  012550          T32     005746          WAITS = 104024          .3      014710
T202G   012122          T202JS  012432          T33     006164          WRDCNT  016660          .4      014734
T202G1  012166          T202J1  012530          T34     006402          X     = 000000          .     = 020714
```

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

```
#DZDHKC,DZDHKC/SOL=DZDHKC.P11
RUN-TIME: 14 26 2 SECONDS
RUN-TIME RATIO: 79/43=1.8
CORE USED:  8K  (15 PAGES)
```

Spooler runtime 12 Seconds, 55 KCS, 349 disk reads, 3 disk writes, 97 pages