.REM

IDENTIFICATION

PRODUCT CODE: AC-8484F-MC

PRODUCT NAME: CZDHKFO DH11 MODEM CONTROL MULTIPLEXER DIAGNOSTIC

DATE : 18-JUN-1985

MAINTAINER: NAC SOFTWARE ENGINEERING

AUTHOR: G. BAISLEY

```
                        1.0     ABSTRACT
                        2
                                THIS PROGRAM IS A TEST OF THE  MODEM CONTROL MULTIPLEXER USED WITH THE
                                DH11 OPTION
                        5
                                THE PROGRAM IS DIVIDED INTO FUNCTIONAL TEST GROUPS AS
                                FOLLOWS:
                        8
                        GROUP 0:  ALL LINE SCANNER AND LINE MULTIPLEXER FUNCTIONS ARE
                                  TESTED. NO TEST CONNECTOR IS NEEDED...
                        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
                        15
                        16      2.0     REQUIREMENTS
                        17
                        18      2.1     EQUIPMENT
                        19
                                PDP-11 COMPUTER WITH AT LEAST 8K OF MEMORY
                                WITH OR WITHOUT HARDWARE SWITCH REGISTER
                                ASR-33 TELETYPE OR EQUIVALENT
                                MODEM CONTROL MODULES
                        24
                        25      2.1.1   FOR 16 LINE SCANNER TEST
                        26
                                NO ADDITIONAL HARDWARE IS NEEDED. PROGRAM HAS BEEN MODIFIED
                                TO RUN WITHOUT H861 TEST CONNECTOR.
                        29
                        30      2.1.2   FOR SINGLE LINE CABLE TEST
                        31
                                4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
                                H315 TEST CONNECTOR
                        34
                        35      2.1.3   FOR ON LINE TESTS
                        36
                                4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
                                2 BELL 103A MODEMS (FOR 103A TEST)
                                2 BELL 202C MODEMS (FOR 202C TEST)
                        40
                        41      3.0     LOADING PROCEDURE
                        42
                                THE STANDARD PROCEDURE FOR LOADING BINARY TAPES IS TO BE USED.
                        44
                        45      4.0     STARTING PROCEDURE
                        46
                        47      4.1     STARTING ADDRESS
                        48
                                THE STARTING ADDRESS FOR ALL TESTS IS 000200.
                        50
                                RESTART ADDRESS FOR ALL TESTS IS 000200
```

```
                4.2     OPERATOR AND/OR PROGRAM ACTION

                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 -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

                5.2.1   TEST INITIALIZATION

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

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

                5.2.2   OPERATIONAL SWITCH SETTINGS

                        SAME AS 5.1.2

                5.2.3   PROGRAM AND/OR OPERATOR ACTION

                        SAME AS 5.1.3

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

                5.3.1   TEST INITIALIZATION

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

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

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

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

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

                5.3.2   OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

                5.3.2.1 PLACE ANSWERING DATA SET IN "AUTO ANSWER" MODE
```

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
```

```
                                6.1.1.6 TIME OUT ERROR


                                        THIS ERROR WILL OCCUR IF THE LINE UNDER TEST DOES
                                        NOT INTERRUPT WITHIN A GIVEN TIME FRAME.


                                        FORMAT FOR THIS ERROR IS

                                        XXXXXX TIME OUT WAITING FOR INTERRUPT
                                        LN  CSR    LSR
                                        AAA BBBBBB CCCCCC

                                        WHERE   XXXXXX=PC+2 OF ERROR CALL
                                                AAA=FAILING LINE NUMBER
                                                BBBBBB=CONTROL STATUS REGISTER
                                                CCCCCC=LINE STATUS REGISTER


                                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

                                NO TEST CONNECTOR IS NEEDED TO RUN THIS TEST....

                        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

                        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

                        11. MODIFICATION HISTORY:
                                10-JULY-84      KEN RAUHALA
                                ADDED DELAY FOR PDP-11/44 WITH CACHE ON.
                                THE "MUXS2" MACRO WAS MODIFIED.
                                ;
```

```
                                .TITLE  CZDHK-F
000000                          .ENABLE ABS,AMA
                                        ;MODEM CONTROL DIAGNOSTIC
                                        ;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.
                                        ;MODIFIED APRIL 77 TO RUN SCANNER TEST W/O H861 CONNETTOR
                                        ;
                                        ;MODIFIED BY S. SKONETSKI     MAY 1985
                                        ;REMOVE .EQUIV WHICH IS NOT RECOGNISED BY PDP11 MACRO, AND TO
                                        ;DYNAMICALLY SET VECTOR SPACE WHICH IS CLOBBERED BY THE NEW XXDP

                                        ;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 NO 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
```

```
     60
     61                                 .MACRO  COMMENT
     62
     63                                 .NLIST
     64                                 ;CODITIONAL ASSEMBLY PARAMETERS
     65
     66                                 SINGLE=0        ;IF 0, ASSEMBLE FOR MULTIPLE LINES
     67                                                 ;IF 1, ASSEMBLE FOR SINGLE LINE
     68                                 .LIST
     69                                 .ENDM
     70 000000                                  COMMENT

                                        ;CODITIONAL ASSEMBLY PARAMETERS

                000000                  SINGLE=0        ;IF 0, ASSEMBLE FOR MULTIPLE LINES
                                                        ;IF 1, ASSEMBLE FOR SINGLE LINE
```

```
                                ;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
177776                          PSW=177776      ;PROCESSOR STATUS WORD

                                .MACRO  PS
                                PSW
                                .ENDM   PS

014436                          RADIX=DIVIS     ;CONVERSION FACTOR FOR DECIMAL OUTPUT
014432                          BINWRD=DIVIDL   ;WORD TO BE CONVERTED TO OCTAL ASCII
014434                          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 1S 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

000000                                  EMTDEF  ERRORC,†/CONTROL STATUS ERROR SERVICE/
104000                                  ERRORC=EMT+X            ;CONTROL STATUS ERROR SERVICE
000001                                  X=X+1
000000                                  EMTDEF  ERRORL,†/LINE STATUS ERROR SERVICE/
104001                                  ERRORL=EMT+X            ;LINE STATUS ERROR SERVICE
000002                                  X=X+1
000000                                  EMTDEF  SCOPE,†/SCOPE LOOP AND ITERATION SERVICE/
104002                                  SCOPE=EMT+X             ;SCOPE LOOP AND ITERATION SERVICE
000003                                  X=X+1
000000                                  EMTDEF  SCOPEF,†/DATA FREEZE SERVICE/
104003                                  SCOPEF=EMT+X            ;DATA FREEZE SERVICE
000004                                  X=X+1
000000                                  EMTDEF  TYPE,†/TELETYPE OUTPUT/
104004                                  TYPE=EMT+X              ;TELETYPE OUTPUT
000005                                  X=X+1
000000                                  EMTDEF  SAVO5P,†/SAVE R0-R5, PC+2 OF CALL/
104005                                  SAVO5P=EMT+X            ;SAVE R0-R5, PC+2 OF CALL
000006                                  X=X+1
000000                                  EMTDEF  OCTASC,†/CONVERT DATA TO ASCII AND TYPE/
104006                                  OCTASC=EMT+X            ;CONVERT DATA TO ASCII AND TYPE
000007                                  X=X+1
000000                                  EMTDEF  RES05,†/RESTORE R0-R5/
104007                                  RES05=EMT+X             ;RESTORE R0-R5
000010                                  X=X+1
000000                                  EMTDEF  CONVERT,†/ASCII CONVERSION ROUTINE/
104010                                  CONVERT=EMT+X           ;ASCII CONVERSION ROUTINE
000011                                  X=X+1
000000                                  EMTDEF  EXTRACT,†/DIGIT EXTRACTION ROUTINE/
104011                                  EXTRACT=EMT+X           ;DIGIT EXTRACTION ROUTINE
000012                                  X=X+1
000000                                  EMTDEF  ERROR,†/TYPE PC OF FAILING TESTS ONLY/
104012                                  ERROR=EMT+X             ;TYPE PC OF FAILING TESTS ONLY
000013                                  X=X+1
000000                                  EMTDEF  INSTRG,†/INPUT OCTAL DATA STRING/
104013                                  INSTRG=EMT+X            ;INPUT OCTAL DATA STRING
000014                                  X=X+1
000000                                  EMTDEF  ERRORT,†/TRANSITION ERROR/
104014                                  ERRORT=EMT+X            ;TRANSITION ERROR
000015                                  X=X+1
000000                                  EMTDEF  ERRORS,†/ON LINE STATUS ERROR/
104015                                  ERRORS=EMT+X            ;ON LINE STATUS ERROR
000016                                  X=X+1
000000                                  EMTDEF  ERRORN,†/FATAL TRANSITION/
104016                                  ERRORN=EMT+X            ;FATAL TRANSITION
000017                                  X=X+1
```

```
 28 000000                      EMTDEF  GETLNS,†/INPUT LINE NUMBERS/
            104017              GETLNS=EMT+X            ;INPUT LINE NUMBERS
            000020              X=X+1
 29 000000                      EMTDEF  SETUP,†/SET UP FOR ON LINE TEST/
            104020              SETUP=EMT+X             ;SET UP FOR ON LINE TEST
            000021              X=X+1
 30 000000                      EMTDEF  CKRING,†/CHECK FOR RING ON CORRERT LINE/
            104021              CKRING=EMT+X            ;CHECK FOR RING ON CORRERT LINE
            000022              X=X+1
 31 000000                      EMTDEF  WAITRN,†/WAIT FOR TRANSITIONS/
            104022              WAITRN=EMT+X            ;WAIT FOR TRANSITIONS
            000023              X=X+1
 32 000000                      EMTDEF  CKTRAN,†/CHECK TRANSITIONS/
            104023              CKTRAN=EMT+X            ;CHECK TRANSITIONS
            000024              X=X+1
 33 000000                      EMTDEF  WAITS,†/DELAY FOR TRANSIENTS/
            104024              WAITS=EMT+X             ;DELAY FOR TRANSIENTS
            000025              X=X+1
 34 000000                      EMTDEF  CNTLUU,†/CHANGE SWREG ROUTINE/
            104025              CNTLUU=EMT+X            ;CHANGE SWREG ROUTINE
            000026              X=X+1
 35 000000                      EMTDEF  CKINTT,†/CHECK FOR INTERRUPTS-FLAG STYLE/
            104026              CKINTT=EMT+X            ;CHECK FOR INTERRUPTS-FLAG STYLE
            000027              X=X+1
 36 000000                      EMTDEF  KBDIN,†/FAKE INTERRUPT ENTRY POINT/
            104027              KBDIN=EMT+X             ;FAKE INTERRUPT ENTRY POINT
            000030              X=X+1
 37 000000                      EMTDEF  ERRINT,†/TIME OUT ERROR FOR INTERRUPTS/
            104030              ERRINT=EMT+X            ;TIME OUT ERROR FOR INTERRUPTS
            000031              X=X+1
```

```
                                        ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
                                .LIST MC,MD
                                .NLIST  ME
                        000000  .=0
                        000200  .REPT 200
                                        .+2
                                        HALT
                                .ENDR
000000  000002                          .+2
000002  000000                          HALT
000004  000006                          .+2
000006  000000                          HALT
000010  000012                          .+2
000012  000000                          HALT
000014  000016                          .+2
000016  000000                          HALT
000020  000022                          .+2
000022  000000                          HALT
000024  000026                          .+2
000026  000000                          HALT
000030  000032                          .+2
000032  000000                          HALT
000034  000036                          .+2
000036  000000                          HALT
000040  000042                          .+2
000042  000000                          HALT
000044  000046                          .+2
000046  000000                          HALT
000050  000052                          .+2
000052  000000                          HALT
000054  000056                          .+2
000056  000000                          HALT
000060  000062                          .+2
000062  000000                          HALT
000064  000066                          .+2
000066  000000                          HALT
000070  000072                          .+2
000072  000000                          HALT
000074  000076                          .+2
000076  000000                          HALT
000100  000102                          .+2
000102  000000                          HALT
000104  000106                          .+2
000106  000000                          HALT
000110  000112                          .+2
000112  000000                          HALT
000114  000116                          .+2
000116  000000                          HALT
000120  000122                          .+2
000122  000000                          HALT
000124  000126                          .+2
000126  000000                          HALT
000130  000132                          .+2
000132  000000                          HALT
000134  000136                          .+2
000136  000000                          HALT
```

```
000140  000142                  .+2
000142  000000                  HALT
000144  000146                  .+2
000146  000000                  HALT
000150  000152                  .+2
000152  000000                  HALT
000154  000156                  .+2
000156  000000                  HALT
000160  000162                  .+2
000162  000000                  HALT
000164  000166                  .+2
000166  000000                  HALT
000170  000172                  .+2
000172  000000                  HALT
000174  000176                  .+2
000176  000000                  HALT
000200  000202                  .+2
000202  000000                  HALT
000204  000206                  .+2
000206  000000                  HALT
000210  000212                  .+2
000212  000000                  HALT
000214  000216                  .+2
000216  000000                  HALT
000220  000222                  .+2
000222  000000                  HALT
000224  000226                  .+2
000226  000000                  HALT
000230  000232                  .+2
000232  000000                  HALT
000234  000236                  .+2
000236  000000                  HALT
000240  000242                  .+2
000242  000000                  HALT
000244  000246                  .+2
000246  000000                  HALT
000250  000252                  .+2
000252  000000                  HALT
000254  000256                  .+2
000256  000000                  HALT
000260  000262                  .+2
000262  000000                  HALT
000264  000266                  .+2
000266  000000                  HALT
000270  000272                  .+2
000272  000000                  HALT
000274  000276                  .+2
000276  000000                  HALT
000300  000302                  .+2
000302  000000                  HALT
000304  000306                  .+2
000306  000000                  HALT
000310  000312                  .+2
000312  000000                  HALT
000314  000316                  .+2
000316  000000                  HALT
000320  000322                  .+2
```

```
000322  000000                  HALT
000324  000326                  .+2
000326  000000                  HALT
000330  000332                  .+2
000332  000000                  HALT
000334  000336                  .+2
000336  000000                  HALT
000340  000342                  .+2
000342  000000                  HALT
000344  000346                  .+2
000346  000000                  HALT
000350  000352                  .+2
000352  000000                  HALT
000354  000356                  .+2
000356  000000                  HALT
000360  000362                  .+2
000362  000000                  HALT
000364  000366                  .+2
000366  000000                  HALT
000370  000372                  .+2
000372  000000                  HALT
000374  000376                  .+2
000376  000000                  HALT
000400  000402                  .+2
000402  000000                  HALT
000404  000406                  .+2
000406  000000                  HALT
000410  000412                  .+2
000412  000000                  HALT
000414  000416                  .+2
000416  000000                  HALT
000420  000422                  .+2
000422  000000                  HALT
000424  000426                  .+2
000426  000000                  HALT
000430  000432                  .+2
000432  000000                  HALT
000434  000436                  .+2
000436  000000                  HALT
000440  000442                  .+2
000442  000000                  HALT
000444  000446                  .+2
000446  000000                  HALT
000450  000452                  .+2
000452  000000                  HALT
000454  000456                  .+2
000456  000000                  HALT
000460  000462                  .+2
000462  000000                  HALT
000464  000466                  .+2
000466  000000                  HALT
000470  000472                  .+2
000472  000000                  HALT
000474  000476                  .+2
000476  000000                  HALT
000500  000502                  .+2
000502  000000                  HALT
```

```
000504  000506                  .+2
000506  000000                  HALT
000510  000512                  .+2
000512  000000                  HALT
000514  000516                  .+2
000516  000000                  HALT
000520  000522                  .+2
000522  000000                  HALT
000524  000526                  .+2
000526  000000                  HALT
000530  000532                  .+2
000532  000000                  HALT
000534  000536                  .+2
000536  000000                  HALT
000540  000542                  .+2
000542  000000                  HALT
000544  000546                  .+2
000546  000000                  HALT
000550  000552                  .+2
000552  000000                  HALT
000554  000556                  .+2
000556  000000                  HALT
000560  000562                  .+2
000562  000000                  HALT
000564  000566                  .+2
000566  000000                  HALT
000570  000572                  .+2
000572  000000                  HALT
000574  000576                  .+2
000576  000000                  HALT
000600  000602                  .+2
000602  000000                  HALT
000604  000606                  .+2
000606  000000                  HALT
000610  000612                  .+2
000612  000000                  HALT
000614  000616                  .+2
000616  000000                  HALT
000620  000622                  .+2
000622  000000                  HALT
000624  000626                  .+2
000626  000000                  HALT
000630  000632                  .+2
000632  000000                  HALT
000634  000636                  .+2
000636  000000                  HALT
000640  000642                  .+2
000642  000000                  HALT
000644  000646                  .+2
000646  000000                  HALT
000650  000652                  .+2
000652  000000                  HALT
000654  000656                  .+2
000656  000000                  HALT
000660  000662                  .+2
000662  000000                  HALT
000664  000666                  .+2
```

```
000666  000000                          HALT
000670  000672                          .+2
000672  000000                          HALT
000674  000676                          .+2
000676  000000                          HALT
000700  000702                          .+2
000702  000000                          HALT
000704  000706                          .+2
000706  000000                          HALT
000710  000712                          .+2
000712  000000                          HALT
000714  000716                          .+2
000716  000000                          HALT
000720  000722                          .+2
000722  000000                          HALT
000724  000726                          .+2
000726  000000                          HALT
000730  000732                          .+2
000732  000000                          HALT
000734  000736                          .+2
000736  000000                          HALT
000740  000742                          .+2
000742  000000                          HALT
000744  000746                          .+2
000746  000000                          HALT
000750  000752                          .+2
000752  000000                          HALT
000754  000756                          .+2
000756  000000                          HALT
000760  000762                          .+2
000762  000000                          HALT
000764  000766                          .+2
000766  000000                          HALT
000770  000772                          .+2
000772  000000                          HALT
000774  000776                          .+2
000776  000000                          HALT
    13                          .LIST ME
    14                          .NLIST MC,MD,CND
```

```
                                          ;STANDARD INTERRUPT VECTORS

        000024                   .=24
 000024 015204                            PFAIL                    ;POWER FAIL HANDLER
 000026 000340                            340                      ;SERVICE AT LEVEL 7
 000030 013044                            EMTSRV                   ;EMT DISPATCH SERVICE
 000032 000340                            340                      ;SERVICE AT LEVEL 7

        000046                   .=46
 000046 013026                            LOGICAL                  ;ACT11?

        000060                   .=60
 000060 002020                            KBDINT                   ;KEYBOARD MONITOR
 000062 000340                            340                      ;SERVICE AT LEVEL 7
        000174                   .=174
 000174 000000                            DISPREG:        0
 000176 000000                            SWREG:  0

        000200                   .=200
 000200 000167  000674                    JMP     START            ;GO TO START OF PROGRAM


                                 .MACRO   TS      XN,X
                                 .NLIST
                                          ;REFERANCE NUMBER DEFINITION
                                 .LIST
                                 T'XN':                                      ;REFERENCE DESIGNATION
                                 .NLIST
                                 N'X'=N'X'+1
                                 .LIST
                                 .ENDM
                                 .MACRO   TSS     XNN
                                 T'XNN':
                                 .NLIST
                                 NN=NN+1
                                 .LIST
                                 .ENDM

                                 .MACRO   COMMENT
                                 .NLIST
                                          ;EMT GENERATOR
                                          X=0
                                 .LIST
                                 .ENDM
 000204                                   COMMENT
                                          ;EMT GENERATOR
        000000                            X=0
                                 .MACRO   EMTDEF  FNCT,COMMNT
                                          FNCT=EMT+X               ;'COMMNT'
                                 .NLIST
                                          X=X+1
                                 .LIST
                                 .ENDM
                                 .MACRO   COMMENT
                                 .NLIST
                                          ;TEST TABLE GENERATOR
```

```
                                .LIST
                                .ENDM
000204                                  COMMENT
                                        ;TEST TABLE GENERATOR

                                .MACRO  TM      XM,Y
                                .NLIST
                                TIMES=4000
                                .IIF GT M0-21,TIMES=400
                                .IIF GT M0-24,TIMES=200
                                .IIF GT M0-34,TIMES=4000
                                .LIST
                                        T'XM'
                                        TIMES
                                .NLIST
                                        M'Y'=M'Y'+1
                                .LIST
                                .ENDM
```

```
 1
 2          001100                  .=1100
 3  001100                          STACK:
 4  001100  012702  000024          START:  MOV     #24, R2                 ; SET UP VECTOR AREA
 5  001104  012722  015204                  MOV     #PFAIL, (R2)+           ;POWER FAIL HANDLER
 6  001110  012722  000340                  MOV     #340,(R2)+              ;SERVICE AT LEVEL 7
 7  001114  012722  013044                  MOV     #EMTSRV, (R2)+          ;EMT DISPATCH SERVICE
 8  001120  012722  000340                  MOV     #340, (R2)+             ;SERVICE AT LEVEL 7
 9  001124  012737  013026  000046          MOV     #LOGICAL,@#46
10  001132  012737  002020  000060          MOV     #KBDINT, @#60
11  001140  012737  000340  000062          MOV     #340, @#62              ;SERVICE AT LEVEL 7
12  001146  005067  000644                  CLR     TIPFLG                  ;CLEAR TEST IN PROGRESS FLAG
13  001152  005077  014440                  CLR     @TKCSR
14  001156  012706  001100                  MOV     #STACK,SP               ;SET UP STACK POINTER
15
16  001162  013746  000006          SUSWR:  MOV     @#6,-(SP)               ;SAVE VECTORS
17  001166  013746  000004                  MOV     @#4,-(SP)
18  001172  012737  001212  000004          MOV     #64$,@#4                ;SET UP FOR TIMEOUT
19  001200  022777  177777  014420          CMP     #-1,@SWR                ;REFERENCE HARDWARE SWITCH REGISTER
20  001206  001402                          BEQ     65$
21  001210  000407                          BR      66$
22  001212  022626                  64$:    CMP     (SP)+,(SP)+             ;ADJUST STACK
23  001214  012767  000176  014404  65$:    MOV     #SWREG,SWR              ;POINT TO SOFTWARE SWITCH REG
24  001222  012767  000174  014400          MOV     #DISPREG,DISPLAY        ;POINT TO SOFT DISPLAY REG
25  001230  012637  000004          66$:    MOV     (SP)+,@#4               ;RESTORE VECTORS
26  001234  012637  000006                  MOV     (SP)+,@#6
27  001240  012777  000100  014350          MOV     #INTENA,@TKCSR          ;ENABLE TELETYPE INTERRUPTS
28  001246  005067  000040                  CLR     XFLAG   ;XOR = NO
29                                  ;*****************************************************************
30                                  ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
31                                  ;*****************************************************************
32  001252  000423                          BR      STARTO                  ;SKIP XOR STUFF
33  001254  016746  176524                  MOV     4,-(SP) ;SAVE 4
34  001260  012767  001314  176516          MOV     #XORSVC,4       ;SET UP SVC ROUTINE
35  001266  005767  175566                  TST     177060  ;GOT AN XOR TESTER OUT THERE ?
36  001272  012667  176506                  MOV     (SP)+,4 ;YES
37  001276  005167  000010                  COM     XFLAG   ;XOR = YES
38  001302  004767  014020                  JSR     PC,XOR          ;AUTO VECTOR
39  001306  000167  000010                  JMP     STARTO          ;RESTORE TRAPCATCHER
40  001312  000000                  XFLAG:  0                       ;XOR FLAG
41  001314  022626                  XORSVC: POP2SP
42  001316  012667  176462                  MOV     (SP)+,4 ;RESTORE 4
43  001322  005767  014370          STARTO: TST     TIFLG                   ;TYPED TITLE?
44  001326  001005                          BNE     .+14                    ;YES
45  001330  104004                          TYPE                            ;TYPE "MODEM CONTROL DIAGNOSTIC"
46  001332  016575                          MTITLE
47  001334  012767  000001  014354          MOV     #1,TIFLG                ;SET TITLE TYPED FLAG
48  001342  005767  177744                  TST     XFLAG                   ;X OR ?
49  001346  100422                          BMI     VECSTR                  ;RESTORE TRAPCATCHER
50  001350  005767  176466                  TST     42              ;ACT 11?
51  001354  001403                          BEQ     START1          ;NO
52  001356  004767  013744                  JSR     PC,XOR          ;YES  AUTO VECTOR
53  001362  000414                          BR      VECSTR                  ;GET VECTOR AND REGISTER ADDRESS
54  001364  005737  000042          START1: TST     @#42                    ;UNDER MONITOR?
55  001370  001005                          BNE     1$
56  001372  022767  000176  014226          CMP     #SWREG,SWR              ;USING SWREG?
57  001400  001001                          BNE     1$
```

```
 58 001402  104025                          CNTLUU
 59 001404  032777  000001  014214  1$:     BIT     #1,@SWR                 ;IF SW BIT 0=1, ON PROGRAM RESTART
 60 001412  001510                          BEQ     STARTN                  ;INPUT VECTOR AND REGISTER ADDRESSES
 61 001414  012706  001100          VECSTR: MOV     #STACK,SP               ;SET UP PROCESSOR STACK POINTER
 62 001420  012767  000300  011324          MOV     #300,DATA1              ;ADDRESS OF FIRST FLOATING VECTOR
 63 001426  012767  000302  011320          MOV     #302,DATA2              ;ADDRESS OF STATUS WORD
 64 001434  016777  011314  011310  VECSTA: MOV     DATA2,@DATA1            ;MOVE ADDRESS OF STATUS WORD TO VECTOR
 65 001442  005077  011306                  CLR     @DATA2                  ;CLEAR STATUS WORD
 66                                                                         ;(FOR HALT ON ILLEGAL INTERRUPT)
 67 001446  062767  000004  011276          ADD     #4,DATA1                ;NEXT VECTOR
 68 001454  062767  000004  011272          ADD     #4,DATA2                ;NEXT STATUS WORD
 69 001462  026727  011264  001000          CMP     DATA1,#1000             ;IS TABLE CLEARED
 70 001470  001361                          BNE     VECSTA                  ;IF NOT, CONTINUE
 71 001472  005767  177614                  TST     XFLAG           ;XOR ?
 72 001476  100523                          BMI     TSTGO           ;YES
 73 001500  005767  176336                  TST     42              ;ACT 11 ?
 74 001504  001120                          BNE     TSTGO           ;YES
 75 001506  104013                          INSTRG                          ;GET VECTOR ADDRESS
 76 001510  016661                          MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
 77 001512  000300                          300                             ;LOWER LIMIT FOR ADDRESS
 78 001514  000774                          774                             ;UPPER LIMIT FOR ADDRESS
 79 001516  015606                          DHMVEC                          ;STORAGE FOR ADDRESS
 80 001520  032767  000003  014060  1$:     BIT     #3,DHMVEC               ;TEST 2 LSB OF ADDRESS
 81 001526  001404                          BEQ     VECST1                  ;IF 0, CONTINUE
 82 001530  012716  001520                  MOV     #1$,(SP)
 83 001534  000167  013274                  JMP     INSTER                  ;INCORRECT ADDRESS, TRY AGAIN
 84 001540  016767  014042  014042  VECST1: MOV     DHMVEC,DHMLVL           ;GENERATE ADDRESS OF
 85 001546  062767  000002  014034          ADD     #2,DHMLVL               ;INTERRUPT STATUS WORD
 86 001554  104013                          INSTRG                          ;GET ADDRESS OF CONTROL REGISTER
 87 001556  016703                          MREGAD                          ;MESSAGE "REGISTER ADDRESS-"
 88 001560  170500                          170500                          ;LOWER LIMIT FOR ADDRESS
 89 001562  177777                          177777                          ;UPPER LIMIT FOR ADDRESS
 90 001564  015612                          DHMCSR                          ;STORAGE FOR ADDRESS
 91 001566  032767  000007  014016  1$:     BIT     #7,DHMCSR               ;IF 3 LSB ARE NOT 0
 92 001574  001404                          BEQ     REGST1
 93 001576  012716  001566                  MOV     #1$,(SP)
 94 001602  000167  013226                  JMP     INSTER                  ;INCORRECT ADDRESS, TRY AGAIN
 95 001606  016767  014000  014000  REGST1: MOV     DHMCSR,DHMLSR           ;SET UP ADDRESS OF LINE STATUS REGISTER
 96 001614  062767  000002  013772          ADD     #2,DHMLSR
 97 001622  104013                          INSTRG                          ;GET LINE SELECT PARAMETER
 98 001624  016737                          MLINSL
 99 001626  000000                          0
100 001630  177777                          177777
101 001632  015720                          LINSEL
```

```

001634  012706  001100          STARTN: MOV     #STACK,SP               ;SET UP PROCESSOR STACK
001640  104013                          INSTRG                          ;GET TEST NUMBER
001642  016771                          MTEST                           ;MESSAGE "TEST-"
001644  000000                          0                               ;LOWER LIMIT FOR TEST NUMBER
001646  000777                          777                             ;UPPER LIMIT FOR TEST NUMBER
001650  015640                          TSTNO                           ;STORAGE FOR TEST NUMBER
001652  016705  013762          X1A:    MOV     TSTNO,R5                ;GET TEST NUMBER
001656  042705  177077                  BIC     #177077,R5              ;EXTRACT TEST GROUP NUMBER
        000005                  .REPT   5
                                        ASR     R5
                                .ENDR
001662  006205                          ASR     R5
001664  006205                          ASR     R5
001666  006205                          ASR     R5
001670  006205                          ASR     R5
001672  006205                          ASR     R5
001674  016567  017532  013772          MOV     GRO(R5),TSTMAX          ;GET HIGHEST TEST IN GROUP
001702  016567  017512  013762          MOV     TSTLST(R5),TSTPNT       ;GET POINTER TO TEST TABLE
001710  005767  013756                  TST     TSTPNT                  ;IF 0, INVALID TEST GROUP
001714  001004                          BNE     STRTOA
001716  012716  001652          X1B:    MOV     #X1A,(SP)
001722  000167  013106                  JMP     INSTER                  ;TRY AGAIN
001726  042767  177700  013704  STRTOA: BIC     #177700,TSTNO           ;GET NUMBER OF FIRST TEST
                                                                        ;TO BE EXECUTED IN SELECTED GROUP
001734  026767  013700  013732          CMP     TSTNO,TSTMAX            ;IS NUMBER TOO LARGE
001742  003401                          BLE     TSTGO
001744  000764                          BR      X1B
001746  012746  000340          TSTGO:  MOV     #340,-(SP)              ;SET UP PRIORITY LEVEL
001752  005746                          PUSH1SP
001754  000005                          RESET
001756  012767  002242  000260          MOV     #DMYRTI,KRET            ;SET UP DUMMY KEYBOARD RETURN
001764  005067  013706                  CLR     LINFLG                  ;CLEAR LINE SELECTED FLAG
001770  005067  013640                  CLR     TRACON                  ;CLEAR TRACE TRAP FLAG
001774  005067  013636                  CLR     PASCNT                  ;CLEAR PASS COUNT
002000  104004                          TYPE
002002  017005                          MCRLF
002004  012767  000001  000004  1$:     MOV     #1,TIPFLG               ;SET TEST IN PROGRESS FLAG
002012  000167  011250                  JMP     TSTENT                  ;START TESTING
002016  000000                  TIPFLG: 0




                                        ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE

002020  005067  177772          KBDINT: CLR     TIPFLG                  ;CLEAR TEST IN PROGRESS FLAG
002024  005067  012232                  CLR     TMP1
002030  005067  000212                  CLR     SINTFL                  ;CLEAR SOFTWARE INTERRUPT FLAG
002034  117767  013560  012220          MOVB    @TKDBR,TMP1
002042  142767  000200  012212          BICB    #200,TMP1
002050  122767  000003  012204          CMPB    #3,TMP1                 ;IF <CNTROL C> WAS TYPED
002056  001011                          BNE     KBDIN1                  ;TYPE "↑C" AND
002060  104004                          TYPE                            ;SELECT NEW TEST
002062  017235                          MCONTC
002064  022626                          POP2SP
002066  005077  013520                  CLR     @DHMCSR
```

```
 53 002072  005077  013520                 CLR     @TKCSR
 54 002076  000167  177532                 JMP     STARTN
 55 002102  122767  000026  012152 KBDIN1: CMPB    #26,TMP1            ;IF <CONTROL V> WAS TYPED
 56 002110  001011                         BNE     KBDIN2              ;TYPE "^V" AND GET NEW
 57 002112  104004                         TYPE                        ;VECTOR AND REGISTER ADDRESS
 58 002114  017240                         MCONTV
 59 002116  022626                         POP2SP
 60 002120  005077  013466                 CLR     @DHMCSR
 61 002124  005077  013466                 CLR     @TKCSR
 62 002130  000167  177260                 JMP     VECSTR
 63 002134  122767  000014  012120 KBDIN2: CMPB    #14,TMP1            ;IF <CONTROL L> WAS TYPED
 64 002142  001015                         BNE     KBDIN3              ;TYPE "^L" AND GET NEW
 65 002144  104004                         TYPE                        ;LINE NUMBERS, UNLESS
 66 002146  017243                         MCONTL                      ;TEST GROUP 0 WAS IN PROGRESS
 67 002150  022767  002242  000066         CMP     #DMYRTI,KRET        ;IF <CONTROL L> WAS TYPED IN TEST
 68 002156  001431                         BEQ     DMYRTI              ;GROUP 0, IGNORE
 69 002160  022626                         POP2SP
 70 002162  005077  013424                 CLR     @DHMCSR
 71 002166  005077  013424                 CLR     @TKCSR
 72 002172  000177  000046                 JMP     @KRET
 73 002176  005737  000042 KBDIN3: TST     @#42
 74 002202  001011                         BNE     1$
 75 002204  022767  000176  013414         CMP     #SWREG,SWR
 76 002212  001005                         BNE     1$
 77 002214  122767  000007  012040         CMPB    #7,TMP1             ;IS IT <^G>
 78 002222  001001                         BNE     1$
 79 002224  104025                         CNTLUU
 80 002226  012767  000001  000012 1$:     MOV     #1,SINTFL           ;SET SOFTWARE INTERRUPT FLAG
 81 002234  012767  000001  177554         MOV     #1,TIPFLG           ;SET TEST IN PROGRESS FLAG
 82 002242  000002                 DMYRTI: RTI
 83                                 .EVEN
 84 002244  000000                 KRET:   0
 85 002246  000000                 SINTFL: 0
 86
109
131
132
213
214
288
289                                        ;INITIALIZATION CHECK - PERFORMED ONLY AT PROGRAM START
290                                        ;VERIFY THAT CONTROL STATUS REGISTER AND LINE STATUS
291                                        ;REGISTER WERE CLEARED BY INITIALIZE
292
293                                .MACRO  COMMENT
294                                .NLIST
295                                NO 0
296                                N=NO
297                                XN=NO
298                                .LIST
299                                .ENDM
300 002250                                 COMMENT
            000000                 NO=0
            000000                 N=NO
            000000                 XN=NO
301 002250                         TS \NO,0
                                           ;REFERANCE NUMBER DEFINITION
```

```
    002250                          T0:                                     ;REFERENCE DESIGNATION
            000001                  NO=NO+1
    002250  104004                          TYPE                            ;TYPE "16 LINE SCANNER TEST"
    002252  016542                          M16
    002254  005777  013332          INIT1:  TST     @DHMCSR                 ;TEST CONTROL STATUS REGISTER
    002260  001401                          BEQ     .+4
    002262  104012                          ERROR                           ;CONTROL STATUS NOT CLEARED, ERROR
    002264  005777  013324                  TST     @DHMLSR                 ;TEST LINE STATUS REGISTER
    002270  001401                          BEQ     .+4
    002272  104012                          ERROR                           ;LINE STATUS NOT CLEARED, ERROR
    002274  104002                          SCOPE                           ;CHECK FOR LOOP

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

    002276                          TS \NO,0
                                            ;REFERANCE NUMBER DEFINITION
    002276                          T1:                                     ;REFERENCE DESIGNATION
            000002                  NO=NO+1
    002276  012777  000100  013306  CSTR1:  MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
    002304  032777  000100  013300          BIT     #INTENA,@DHMCSR         ;WAS INTERRUPT ENABLE SET
    002312  001001                          BNE     .+4
    002314  104012                          ERROR                           ;NO, ERROR
    002316  042777  000100  013266          BIC     #INTENA,@DHMCSR         ;CLEAR INTERRUPT ENABLE
    002324  032777  000100  013260          BIT     #INTENA,@DHMCSR         ;WAS INTERRUPT ENABLE CLEARED
    002332  001401                          BEQ     .+4
    002334  104012                          ERROR                           ;NO, ERROR
    002336  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP

                                            ;VERIFY THAT "DONE" CAN BE SET AND CLEARED

    002340                          TS \NO,0
                                            ;REFERANCE NUMBER DEFINITION
    002340                          T2:                                     ;REFERENCE DESIGNATION
            000003                  NO=NO+1
    002340  012777  000200  013244  CSTR2:  MOV     #DONE,@DHMCSR           ;SET DONE
    002346  032777  000200  013236          BIT     #DONE,@DHMCSR           ;WAS DONE SET
    002354  001001                          BNE     .+4
    002356  104012                          ERROR                           ;NO, ERROR
    002360  042777  000200  013224          BIC     #DONE,@DHMCSR           ;CLEAR DONE
    002366  032777  000200  013216          BIT     #DONE,@DHMCSR           ;WAS DONE CLEARED
    002374  001401                          BEQ     .+4
    002376  104012                          ERROR                           ;NO, ERROR
    002400  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;VERIFY "MAINTENANCE MODE" CAN BE SET AND CLEARED

002402                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002402                          T3:                                     ;REFERENCE DESIGNATION
        000004                  NO=NO+1
002402  012777  001000  013202  CSTR3:  MOV     #MAINT,@DHMCSR          ;SET MAINTENANCE MODE
002410  032777  001000  013174          BIT     #MAINT,@DHMCSR          ;WAS MAINTENANCE MODE SET
002416  001001                          BNE     .+4
002420  104012                          ERROR                           ;NO, ERROR
002422  042777  001000  013162          BIC     #MAINT,@DHMCSR          ;CLEAR MAINTENANCE MODE
002430  032777  001000  013154          BIT     #MAINT,@DHMCSR          ;WAS MAINTENANCE MODE CLEARED
002436  001401                          BEQ     .+4
002440  104012                          ERROR                           ;NO, ERROR
002442  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

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

002444                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002444                          T4:                                     ;REFERENCE DESIGNATION
        000005                  NO=NO+1
002444  012777  000040  013140  CSTR4:  MOV     @SCNENA,@DHMCSR         ;SET SCAN ENABLE
002452  032777  000040  013132          BIT     @SCNENA,@DHMCSR         ;WAS SCAN ENABLE SET
002460  001001                          BNE     .+4

002462  104012                          ERROR                           ;NO, ERROR
002464  042777  000040  013120          BIC     @SCNENA,@DHMCSR         ;CLEAR SCAN ENABLE
002472  032777  000040  013112          BIT     @SCNENA,@DHMCSR         ;WAS SCAN ENABLE CLEARED
002500  001401                          BEQ     .+4

002502  104012                          ERROR                           ;NO, ERROR
002504  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

002506                          TS      \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002506                          T5:                                     ;REFERENCE DESIGNATION
        000006                  NO=NO+1
002506  012777  000040  013076  CSTR5:  MOV     @SCNENA,@DHMCSR         ;SET SCAN ENABLE
002514  032777  000020  013070          BIT     @BUSY,@DHMCSR           ;IS BUSY BIT SET
002522  001001                          BNE     .+4
002524  104012                          ERROR                           ;BUSY NOT SET, ERROR
002526  042777  000040  013056          BIC     @SCNENA,@DHMCSR         ;CLEAR SCAN ENABLE
002534  032777  000020  013050          BIT     @BUSY,@DHMCSR           ;IS BUSY BIT CLEARED
002542  001401                          BEQ     .+4
002544  104012                          ERROR                           ;BUSY NOT CLEARED, ERROR
002546  104002                          SCOPE                           ;CHECK FOR LOOP, ITERATIONS

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

002550                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002550                          T6:                                     ;REFERENCE DESIGNATION
        000007                  NO=NO+1
002550  052767  000340  175220  INT1:   BIS     @340,PS                 ;LOCK OUT INTERRUPTS
002556  005077  013030                  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002562  012777  002616  013016          MOV     @INT1A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
002570  016777  175202  013012          MOV     PS,@DHMLVL              ;SET UP INTERRUPT PRIORITY
002576  052777  000200  013006          BIS     @DONE,@DHMCSR           ;SET DONE
002604  042767  000340  175164          BIC     @340,PS                 ;ALLOW INTERRUPTS
002612  000240                          NOP                             ;DELAY FOR INTERRUPT
002614  000402                          BR      INT1B                   ;NO INTERRUPT, CONTINUE
002616  022626                  INT1A:  POP2SP                          ;RESTORE STACK, INTERRUPT
002620  104012                          ERROR                           ;OCCURED, ERROR
002622  104002                  INT1B:  SCOPE                           ;CHECK FOR LOOP, ITERATIONS
```

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

002624                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002624                          T7:                                     ;REFERENCE DESIGNATION
        000010                  NO=NO+1
002624  052767  000340  175144  INT2:   BIS     #340,PS                 ;LOCK OUT INTERRUPTS
002632  005077  012754          CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002636  012777  002672  012742  MOV     #INT2A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
002644  016777  175126  012736  MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
002652  052777  000100  012732  BIS     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
002660  042767  000340  175110  BIC     #340,PS                 ;ALLOW INTERRUPTS
002666  000240                  NOP                             ;DELAY FOR INTERRUPTS
002670  000402                  BR      INT2B                   ;NO INTERRUPT, CONTINUE
002672  022626          INT2A:  POP2SP                          ;RESTORE STACK
002674  104012                  ERROR                           ;INTERRUPT OCCURED, ERROR
002676  104002          INT2B:  SCOPE                           ;CHECK FOR ITERATIONS, LOOP

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

002700                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002700                          T10:                                    ;REFERENCE DESIGNATION
        000011                  NO=NO+1
002700  052767  000340  175070  INT3:   BIS     #340,PS                 ;LOCK OUT INTERRUPTS
002706  005077  012700          CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002712  012777  002764  012666  MOV     #INT3A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
002720  012777  000100  012664  MOV     #INTENA,@DHMCSR         ;SET "INTERRUPT ENABLE"
002726  016777  175044  012654  MOV     PS,@DHMLVL              ;SET "INTERRUPT LEVEL"
002734  042767  000340  175034  BIC     #340,PS                 ;ALLOW INTERRUPTS
002742  052777  000200  012642  BIS     #DONE,@DHMCSR           ;SET "DONE"
002750  000240                  NOP                             ;DELAY FOR INTERRUPT
002752  000240                  NOP
002754  005077  012632          CLR     @DHMCSR
002760  104012                  ERROR                           ;INTERRUPT OCCURED, ERROR
002762  000401                  BR      INT3B                   ;CONTINUE
002764  022626          INT3A:  POP2SP                          ;INTERRUPT OCCURED, RESTOR STACK
002766  104002          INT3B:  SCOPE                           ;CHECK FOR ITERATION, LOOP

                        .MACRO  COMMENT
                        .NLIST
                                ST=340
                                LVL=7
                                T=4
                        .LIST
                        .ENDM
002770                          COMMENT
        000340                  ST=340
        000007                  LVL=7
        000004                  T=4
        000004          .REPT   4
                                NOINT   \ST,\LVL,\T
                        .NLIST
                                ST=ST-40
```

```
                                        LVL=LVL-1
                                        T=T+1
                                .LIST
                                .IIF EQ NO-12,.PAGE
                                .IIF EQ NO-15,.PAGE
                                .ENDR
002770                                  NOINT   \ST,\LVL,\T

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

002770                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
002770                          T11:                                    ;REFERENCE DESIGNATION
        000012                  NO=NO+1
002770  005077  012616          INT4:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
002774  042767  000340  174774        BIC     #340,PS                 ;SET PROCESSOR PRIORITY
003002  052767  000340  174766        BIS     #340,PS                 ;TO LEVEL 7.
003010  012777  003052  012570        MOV     #INT4A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
003016  016777  174754  012564        MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
003024  012777  000100  012560        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003032  052777  000200  012552        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003040  000240                        NOP                             ;DELAY FOR INTERRUPT
003042  000240                        NOP
003044  005077  012542                CLR     @DHMCSR
003050  000402                        BR      INT4B                   ;NO INTERRUPT, CONTINUE
003052  022626                INT4A:  POP2SP                          ;RESTORE STACK
003054  104012                        ERROR                           ;INTERRUPT OCCURED, ERROR
003056  104002                INT4B:  SCOPE                           ;CHECK FOR ITERATION, LOOP
        000300                        ST=ST-40
        000006                        LVL=LVL-1
        000005                        T=T+1
```

```
0                                       .IIF EQ NO 15,.PAGE
 003060                                         NOINT   \ST,\LVL,\T

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

 003060                                 TS \NO,0
                                                ;REFERANCE NUMBER DEFINITION
 003060                                 T12:                                    ;REFERENCE DESIGNATION
         000013                         NO=NO+1
 003060  005077  012526                 INT5:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 003064  042767  000340  174704                 BIC     #340,PS                 ;SET PROCESSOR PRIORITY
 003072  052767  000300  174676                 BIS     #300,PS                 ;TO LEVEL 6.
 003100  012777  003142  012500                 MOV     #INT5A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
 003106  016777  174664  012474                 MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
 003114  012777  000100  012470                 MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
 003122  052777  000200  012462                 BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
 003130  000240                                 NOP                             ;DELAY FOR INTERRUPT
 003132  000240                                 NOP
 003134  005077  012452                         CLR     @DHMCSR
 003140  000402                                 BR      INT5B                   ;NO INTERRUPT, CONTINUE
 003142  022626                 INT5A:  POP2SP                                  ;RESTORE STACK
 003144  104012                         ERROR                                   ;INTERRUPT OCCURED, ERROR
 003146  104002                 INT5B:  SCOPE                                   ;CHECK FOR ITERATION, LOOP
         000240                         ST=ST-40
         000005                         LVL=LVL-1
         000006                         T=T+1
                                        .IIF EQ NO 12,.PAGE
                                        .IIF EQ NO-15,.PAGE
 003150                                         NOINT   \ST,\LVL,\T

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

 003150                                 TS \NO,0
                                                ;REFERANCE NUMBER DEFINITION
 003150                                 T13:                                    ;REFERENCE DESIGNATION
         000014                         NO=NO+1
 003150  005077  012436                 INT6:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 003154  042767  000340  174614                 BIC     #340,PS                 ;SET PROCESSOR PRIORITY
 003162  052767  000240  174606                 BIS     #240,PS                 ;TO LEVEL 5.
 003170  012777  003232  012410                 MOV     #INT6A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
 003176  016777  174574  012404                 MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
 003204  012777  000100  012400                 MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
 003212  052777  000200  012372                 BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
 003220  000240                                 NOP                             ;DELAY FOR INTERRUPT
 003222  000240                                 NOP
 003224  005077  012362                         CLR     @DHMCSR
 003230  000402                                 BR      INT6B                   ;NO INTERRUPT, CONTINUE
 003232  022626                 INT6A:  POP2SP                                  ;RESTORE STACK
 003234  104012                         ERROR                                   ;INTERRUPT OCCURED, ERROR
 003236  104002                 INT6B:  SCOPE                                   ;CHECK FOR ITERATION, LOOP
         000200                         ST=ST-40
         000004                         LVL=LVL-1
         000007                         T=T+1
                                        .IIF EQ NO-12,.PAGE
                                        .IIF EQ NO-15,.PAGE
```

```
003240                                  NOINT   \ST,\LVL,\T

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

003240                                  TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
003240                                  T14:                                    ;REFERENCE DESIGNATION
        000015                          N0=N0+1
003240  005077  012346                  INT7:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003244  042767  000340  174524                BIC     #340,PS                 ;SET PROCESSOR PRIORITY
003252  052767  000200  174516                BIS     #200,PS                 ;TO LEVEL 4.
003260  012777  003322  012320                MOV     #INT7A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
003266  016777  174504  012314                MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
003274  012777  000100  012310                MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003302  052777  000200  012302                BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003310  000240                                NOP                             ;DELAY FOR INTERRUPT
003312  000240                                NOP
003314  005077  012272                        CLR     @DHMCSR
003320  000402                                BR      INT7B                   ;NO INTERRUPT, CONTINUE
003322  022626                  INT7A:  POP2SP                                  ;RESTORE STACK
003324  104012                          ERROR                                   ;INTERRUPT OCCURED, ERROR
003326  104002                  INT7B:  SCOPE                                   ;CHECK FOR ITERATION, LOOP
        000140                          ST=ST-40
        000003                          LVL=LVL 1
        000010                          T=T+1
                                .IIF EQ N0-12,.PAGE
```

```
                                .MACRO  COMMENT
                                .NLIST
                                        ST=0
                                        LVL=0
                                        T=10
                                .LIST
                                .ENDM
003330                                  COMMENT
                000000                  ST=0
                000000                  LVL=0
                000010                  T=10
                000004          .REPT   4
                                        INTS    \ST,\LVL,\T
                                .NLIST
                                        ST=ST+40
                                        LVL=LVL+1
                                        T=T+1
                                .LIST
                                .IIF EQ NO-20,.PAGE
                                .ENDR
003330                                  INTS    \ST,\LVL,\T

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

003330                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
003330                          T15:                                    ;REFERENCE DESIGNATION
                000016                  NO=NO+1
003330  005077  012256          INT10:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003334  042767  000340  174434          BIC     #340,PS                 ;ALLOW INTERRUPTS
003342  012777  003412  012236          MOV     #INT10A,@DHMVEC         ;SET UP INTERRUPT SERVICE ADDRESS
003350  005077  012234                  CLR     @DHMLVL                 ;SET UP INTERRUPT SERVICE PRIORITY
003354  052767  000000  174414          BIS     #0,PS                   ;SET PROCESSOR PRIORITY TO LEVEL 0.
003362  012777  000100  012222          MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003370  052777  000200  012214          BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003376  000240                          NOP                             ;WAIT FOR INTERRUPT
003400  000240                          NOP
003402  005077  012204                  CLR     @DHMCSR
003406  104012                          ERROR                           ;NO INTERRUPT, ERROR
003410  000401                          BR      INT10B                  ;CONTINUE
003412  022626                  INT10A: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
003414  104002                  INT10B: SCOPE                           ;CHECK FOR INTERATIONS, LOOP.
                000040                  ST=ST+40
                000001                  LVL=LVL+1
                000011                  T=T+1
                                .IIF EQ NO-20,.PAGE
003416                                  INTS    \ST,\LVL,\T

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

003416                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
003416                          T16:                                    ;REFERENCE DESIGNATION
                00001/                  NO=NO+1
```

```
003416  005077  012170          INT11:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003422  042767  000340  174346          BIC     #340,PS                 ;ALLOW INTERRUPTS
003430  012777  003500  012150          MOV     #INT11A,@DHMVEC         ;SET UP INTERRUPT SERVICE ADDRESS
003436  005077  012146                  CLR     @DHMLVL                 ;SET UP INTERRUPT SERVICE PRIORITY
003442  052767  000040  174326          BIS     #40,PS                  ;SET PROCESSOR PRIORITY TO LEVEL 1.
003450  012777  000100  012134          MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003456  052777  000200  012126          BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003464  000240                          NOP                             ;WAIT FOR INTERRUPT
003466  000240                          NOP
003470  005077  012116                  CLR     @DHMCSR
003474  104012                          ERROR                           ;NO INTERRUPT, ERROR
003476  000401                          BR      INT11B                  ;CONTINUE
003500  022626                  INT11A: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
003502  104002                  INT11B: SCOPE                           ;CHECK FOR INTERATIONS, LOOP.
        000100                          ST=ST+40
        000002                          LVL=LVL+1
        000012                          T=T+1
                                .IIF EQ NO-20,.PAGE
003504                                  INTS    \ST,\LVL,\T

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

0C3504                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
003504                          T17:                                    ;REFERENCE DESIGNATION
        000020                  NO=NO+1
003504  005077  012102          INT12:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
003510  042767  000340  174260          BIC     #340,PS                 ;ALLOW INTERRUPTS
003516  012777  003566  012062          MOV     #INT12A,@DHMVEC         ;SET UP INTERRUPT SERVICE ADDRESS
003524  005077  012060                  CLR     @DHMLVL                 ;SET UP INTERRUPT SERVICE PRIORITY
003530  052767  000100  174240          BIS     #100,PS                 ;SET PROCESSOR PRIORITY TO LEVEL 2.
003536  012777  000100  012046          MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
003544  052777  000200  012040          BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
003552  000240                          NOP                             ;WAIT FOR INTERRUPT
003554  000240                          NOP
003556  005077  012030                  CLR     @DHMCSR
003562  104012                          ERROR                           ;NO INTERRUPT, ERROR
003564  000401                          BR      INT12B                  ;CONTINUE
003566  022626                  INT12A: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
003570  104002                  INT12B: SCOPE                           ;CHECK FOR INTERATIONS, LOOP.
        000140                          ST=ST+40
        000003                          LVL=LVL+1
        000013                          T=T+1
```

```
0 003572                                INTS    \ST,\LVL,\T

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

  003572                        TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
  003572                        T20:                                    ;REFERENCE DESIGNATION
          000021                N0=N0+1
  003572  005077  012014        INT13:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
  003576  042767  000340  174172        BIC     #340,PS                 ;ALLOW INTERRUPTS
  003604  012777  003654  011774        MOV     #INT13A,@DHMVEC         ;SET UP INTERRUPT SERVICE ADDRESS
  003612  005077  011772                CLR     @DHMLVL                 ;SET UP INTERRUPT SERVICE PRIORITY
  003616  052767  000140  174152        BIS     #140,PS                 ;SET PROCESSOR PRIORITY TO LEVEL 3.
  003624  012777  000100  011760        MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
  003632  052777  000200  011752        BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
  003640  000240                        NOP                             ;WAIT FOR INTERRUPT
  003642  000240                        NOP
  003644  005077  011742                CLR     @DHMCSR
  003650  104012                        ERROR                           ;NO INTERRUPT, ERROR
  003652  000401                        BR      INT13B                  ;CONTINUE
  003654  022626                INT13A: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
  003656  104002                INT13B: SCOPE                           ;CHECK FOR INTERATIONS, LOOP.
          000200                        ST=ST+40
          000004                        LVL=LVL+1
          000014                        T=T+1
                                .IIF EQ N0-20,.PAGE
```

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

003660                          TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
003660                          T21:                                    ;REFERENCE DESIGNATION
        000022                  N0=N0+1
003660  005077  011726          LINT1:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
003664  042767  000340  174104        BIC     #340,PS                 ;ENABLE INTERRUPTS
003672  012767  000001  012022        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
003700  005005                        CLR     R5                      ;CLEAR EXPECTED LINE NUMBER
003702  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 LINE NUMBERS
003706  036767  012010  012004  LINT1A: BIT     SELMSK,LINSEL           ;THIS LINE SELECTED ??
003714  001407                        BEQ     LINT1B                  ;BR IF NOT
003716  010577  011670                MOV     R5,@DHMCSR              ;SET LINE NUMBER
003722  017704  011664                MOV     @DHMCSR,R4              ;READ BACK LINE NUMBER
003726  020504                        CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED
003730  001401                        BEQ     LINT1B                  ;LINE NUBMERS THE SAME
003732  104000                        ERRORC                          ;LINE NUMBERS DIFFERENT, ERROR
003734  104003                LINT1B: SCOPEF                          ;CHECK FOR DATA FREEZE
003736  003706                        LINT1A                          ;RETURN FOR DATA FREEZE
003740  005205                        INC     R5                      ;UPDATE LINE COUNT
0C3742  006367  011754                ASL     SELMSK                  ;SELECT NEXT LINE TO TEST
003746  005300                        DEC     R0                      ;UPDATE LINE NUMBER
003750  001356                        BNE     LINT1A                  ;CONTINUE
003752  104002                        SCOPE                           ;CHECK FOR ITERATION, LOOP

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

003754                          TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
003754                          T22:                                    ;REFERENCE DESIGNATION
        000023                  N0=N0+1
003754  042767  000340  174014  LINT2:  BIC     #340,PS                 ;ENABLE INTERRUPTS
003762  005077  011624                CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
003766  005005                        CLR     R5                      ;CLEAR EXPECTED LINE COUNT
003770  012767  000001  011724        MOV     #1,SELMSK               ;SET UP SELECT MASK
003776  012701  177777                MOV     #-1,R1                  ;INIT LINE COUNTER
004002  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 VALUES
004006  012777  000017  011576        MOV     #17,@DHMCSR             ;FIRST VALUE =0
004014  036767  011702  011676  LINT2A: BIT     SELMSK,LINSEL           ;THIS LINE SELECTED ??
004022  001407                        BEQ     LINT2B                  ;BR IF NOT
004024  004767  007354                CALL    STEPER                  ;STEP LINE COUNTER
004030  017704  011556                MOV     @DHMCSR,R4              ;READ LINE COUNTER
004034  020504                        CMP     R5,R4                   ;COMPARE EXPECTED AND
004036  001401                        BEQ     LINT2B                  ;RECEIVED LINE NUMBERS
004040  104000                        ERRORC                          ;LINE COUNTER ERROR
```

```
 44 004042  104003                 LINT2B: SCOPEF                          ;CHECK FOR DATA FREEZE
 45 004044  003754                         LINT2
 46 004046  005205                         INC     R5                      ;UPDATE EXPECTED LINE NUMBER
 47 004050  006367  011646                 ASL     SELMSK                  ;SHIFT SELECT MASK
 48 004054  005201                         INC     R1                      ;GEN NEW LINE NO.
 49 004056  010177  011530                 MOV     R1,@DHMCSR              ;SET NEW LINE NO. IN CSR
 50 004062  005300                         DEC     R0
 51 004064  001353                         BNE     LINT2A
 52 004066  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.

 8 004070                               TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
   004070                               T23:                                    ;REFERENCE DESIGNATION
          000024                        NO=NO+1
 9 004070  012777  002000  011514       MEMT1:  MOV     #CLRMUX,@DHMCSR         ;CLEAR CONTROL STATUS REGISTER
10 004076  042767  000340  173672               BIC     #340,PS                 ;ENABLE INTERRUPTS
11 004104  012700  000020                       MOV     #16.,R0                 ;SET UP TO TEST 16 LOCATIONS
12 004110  052777  001017  011474               BIS     #MAINT+17,@DHMCSR       ;SET MAINTEANCE MODE
13 004116  004767  007262               MEMT1A: CALL    STEPER                  ;SET LINE COUNTER THRU ALL
14 004122  005300                               DEC     R0                      ;STATES, WRITING 1'S INTO
15 004124  001374                               BNE     MEMT1A                  ;ALL MEMORY WORDS
16 004126  012700  000020                       MOV     #16.,R0                 ;SET UP TO TEST 16 WORDS
17 004132  012705  070000                       MOV     #70000,R5               ;SET UP EXPECTED STATUS REGISTER
18 004136  012777  000017  011446               MOV     #17,@DHMCSR             ;START WITH LINE 0
19 004144  004767  007234               MEMT1B: CALL    STEPER                  ;ACCESS SCANNER MEMORY
20 004150  017704  011436                       MOV     @DHMCSR,R4              ;READ DATA
21 004154  020504                               CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
22 004156  001403                               BEQ     MEMT1C                  ;DATA
23 004160  104000                               ERRORC                          ;CONTROL STATUS OR MEMORY ERROR
24 004162  104003                               SCOPEF                          ;CHECK FOR DATA FREEZE
25 004164  004070                               MEMT1
26 004166  005205               MEMT1C: INC     R5                      ;UPDATE EEXPECTED STATUS
27 004170  005300                               DEC     R0                      ;UPDATE LINE COUNT
28 004172  001364                               BNE     MEMT1B                  ;CONTINUE
29 004174  012777  004000  011410  MEMT1D: MOV     #CLRSCN,@DHMCSR         ;SET "CLEAR SCAN"
30 004202  032777  000020  011402               BIT     #BUSY,@DHMCSR           ;WAIT FOR "CLEAR CYCLES"
31 004210  001374                               BNE     .-6
32 004212  012700  000020                       MOV     #16.,R0                 ;SET UP TO TEST 16 MEMORY
33 004216  005005                               CLR     R5                      ;LOCATIONS
34 004220  012777  000017  011364               MOV     #17,@DHMCSR             ;FIRST TO BE TESTED=0
35 004226  004767  007152               MEMT1E: CALL    STEPER                  ;ACCESS SEANNER MEMORY
36 004232  017704  011354                       MOV     @DHMCSR,R4              ;READ DATA
37 004236  020504                               CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
38 004240  001403                               BEQ     MEMT1F                  ;DATA
39 004242  104000                               ERRORC                          ;CONTROL  STATUS OF MEMORY ERROR
40 004244  104003                               SCOPEFF                         ;CHECK FOR DATA FREEZE
41 004246  004174                               MEMT1D
42 004250  005205               MEMT1F: INC     R5                      ;UPDATE EXPECTED DATA
43 004252  005300                               DEC     R0                      ;UPDATE LINE COUNT
44 004254  001364                               BNE     MEMT1E                  ;CONTTINUE
45 004256  104002                               SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

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

004260                          TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
004260                          T24:                                    ;REFERENCE DESIGNATION
        000025                  N0=N0+1
004260  005077  011326          MEMT2:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
004264  042767  000340  173504        BIC     #340,PS                 ;ENABLE INTERRUPTS
004272  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 ADDRESSES
004276  012702  000017                MOV     #17,R2                  ;FIRST ADDRESS TO BE TESTED=0
004302  012777  004000  011302  MEMT2A: MOV     #CLRSCN,@DHMCSR         ;CLEAR ACANNER MEMORY
004310  032777  000020  011274        BIT     #BUSY,@DHMCSR           ;WAIT FOR CLEAR CYCLE
004316  001374                      BNE     . 6
004320  012777  001000  011264        MOV     #MAINT,@DHMCSR          ;SET "MAINTENANCE MODE"
004326  050277  011260                BIS     R2,@DHMCSR              ;SET LINE COUNTER TO TEST ADDRESS-1
004332  004767  007046                CALL    STEPER                  ;WRITE 1'S INTO TEST ADDRESS
004336  042777  001000  011246        BIC     #MAINT,@DHMCSR          ;CLEAR "MAINTENANCE MODE"
004344  012703  000020                MOV     #16.,R3                 ;SET UP TO TEST ALL 16
004350  012777  000017  011234        MOV     #17,@DHMCSR             ;SCANNER MEMORY LOCATIONS
004356  005202                      INC     R2
004360  005001                      CLR     R1
0C4362  004767  007016  MEMT2B: CALL    STEPER                  ;ACCESS SCANNER MEMORY
004366  117704  011220                MOVB    @DHMCSR,R4              ;READ CONPENTS OF MEMORY
004372  010105                      MOV     R1,R5                   ;SET UP EXPECTED CONTENTS
004374  120402                      CMPB    R4,R2                   ;OF SCANNER MEMORY
004376  001002                      BNE     MEMT2C
004400  052705  070000                BIS     #70000,R5
004404  020405  MEMT2C: CMP     R4,R5                   ;COMPARE EXPECTED AND RECEIVED
004406  001403                      BEQ     MEMT2D                  ;VALUES
004410  104000                      ERRORC                          ;SCANNER MEMORY ERROR
004412  104003                      SCOPEF                          ;CHECK FOR DATA FREEZE
004414  004302                      MEMT2A
004416  005201  MEMT2D: INC     R1
004420  005303                      DEC     R3                      ;TEST NEXT SCANNEB LOCATION
004422  001357                      BNE     MEMT2B
004424  005300                      DEC     R0                      ;UPDATE LINE COUNT
004426  001325                      BNE     MEMT2A
004430  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.

 004432                         TS \N0 0
                                        ;REFERANCE NUMBER DEFINITION
 004432                         T25:                                    ;REFERENCE DESIGNATION
        000026                  N0=N0+1
 004432 005077  011154          MEMT3:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
 004436 042767  000340  173332          BIC     #340,PS                 ;ENABLE INTERRUPTS
 004444 012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 ADDRESSES
 004450 012702  000017                  MOV     #17,R2                  ;FIRST ADDRESS TO BE TESTED=0
 004454 012703  000020          MEMT3A: MOV     #16.,R3                 ;WRITE 1'S INTO ALL SCANNER
 004460 012777  001017  011124          MOV     #MAINT+17,@DHMCSR       ;MEMORY LOCATIONS
 004466 004767  006712          MEMT3B: CALL    STEPER                  ;ACCESS SCANNER MEM
 004472 005303                          DEC     R3
 004474 001374                          BNE     MEMT3B
 004476 010277  011110                  MOV     R2,@DHMCSR              ;SET LINE COUNTER TO TEST ADDRESS-1
 004502 004767  006676                  CALL    STEPER                  ;WRITE 0'S INTO TEST ADDRESS
 004506 012703  000020                  MOV     #16.,R3                 ;SET UP TO TEST ALL 16
 004512 012777  000017  011072          MOV     #17,@DHMCSR             ;SCANNER MEMORY LOCATIONS
 004520 005202                          INC     R2
 004522 005001                          CLR     R1
 004524 004767  006654          MEMT3C: CALL    STEPER                  ;ACESS SCANNER MEMORY
 004530 117704  011056                  MOVB    @DHMCSR,R4              ;READ CONTENTS OF MEMORY
 004534 010105                          MOV     R1,R5                   ;SET UP EXPECTED CONTENTS
 004536 120402                          CMPB    R4,R2                   ;OF SCANNER MEIORY
 004540 001002                          BNE     MEMT3D
 004542 052705  070000                  BIS     #70000,R5
 004546 020405                  MEMT3D: CMP     R4,R5                   ;COMPARE EXPECTED AND
 004550 001403                          BEQ     MEMT3E                  ;RECEIVED VALUES
 004552 104000                          ERRORC                          ;SCANNER MEMORY ERROR
 004554 104003                          SCOPEF                          ;CHECK FOR DATA FREEZE
 004556 004454                          MEMT3A
 004560 005201                  MEMT3E: INC     R1
 004562 005303                          DEC     R3                      ;TEST NEXT SCANNER LOCATION
 004564 001357                          BNE     MEMT3C
 004566 005300                          DEC     R0                      ;UPDATE ADDRESS COUNT
 004570 001331                          BNE     MEMT3A
 004572 104002                          SCOPE                           ;CHECK FOR ITERATION, LOOP
```

```
1 004574                        MUXS1           1,LINENA,↑/LINE ENABLE/
                                        ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

                                .IFEQ   SINGLE
  004574                        TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
  004574                        T26:                                    ;REFERENCE DESIGNATION
         000027                 N0=N0+1
                                .IFF
                                TS      \N1,1
                                .IFTF
  004574  005077  011012        MUX1:   CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
  004600  042767  000340  173170        BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
  004606  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
  004612  012767  000001  011102        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
  004620  005001                        CLR     R1                      ;START AT LINE 0
                                .IFF
                                        MOV     LINE,R1
                                .IFTF
  004622  012777  002000  010762  MUX1A:  MOV     #CLRMUX,@DHMCSR
  004630  012702  000020                MOV     #16.,R2
                                .IFT
  004634  036767  011062  011056        BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
  004642  001464                        BEQ     MUX1F                   ;BR IF NOT
                                .IFTF
  004644  010177  010742                MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
  004650  012777  000001  010736        MOV     #LINENA,@DHMLSR         ;SET LINE ENABLE FUNCTION FLIP-FLOP
                                .IFT
  004656  012767  000001  011040        MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                .IFTF
  004664  005077  010722                CLR     @DHMCSR
  004670  005005                MUX1B:  CLR     R5
                                .IFT
  004672  036767  011026  011020        BIT     SLMSK,LINSEL            ;SELECTED ??
  004700  001421                        BEQ     MUX1D                   ;BR IF NOT
                                .IFTF
  004702  017704  010706                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
  004706  117703  010700                MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
  004712  042703  177760                BIC     #177760,R3              ;CLEAR UNWANTED BITS
  004716  020103                        CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
  004720  001002                        BNE     MUX1C                   ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
  004722  012705  000001                MOV     #LINENA,R5
                                                                        ;TO BE SET
  004726                        MUX1C:
                                .IF IDN <LINENA>,<LINENA>
  004726  042704  000360                BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                        ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                .ENDC
  004732  020504                        CMP     R5,R4                   ;CMP EXPECTED AND RECVD
  004734  001403                        BEQ     MUX1D                   ;RESULTS
  004736  104001                        ERRORL                          ;LINE STATUS ERROR
  004740  104003                        SCOPEF
  004742  004744                        MUX1D
  004744  004767  006434        MUX1D:  CALL    STEPER                  ;EXAMINE NEXT LINE
                                .IFT
```

```
004750  006367  010750                ASL     SLMSK           ;SHIFT MASK
                                .IFTF
004754  005302                         DEC     R2
004756  001344                         BNE     MUX1B
004760  005005                         CLR     R5
004762  010177  010624        MUX1E:  MOV     R1,@DHMCSR
004766  010103                         MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
004770  005077  010620                 CLR     @DHMLSR         ;CLEAR LINE ENABLE FLIP FLOP
004774  105227  000000                 INCB    #0              ;DELAY FOR CABLE
005000  001375                         BNE     .-4             ;DITTO
005002  017704  010606                 MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
005006  005704                         TST     R4              ;WAS LINE ENABLE FUNCTION FLIP FLOP
005010  001401                         BEQ     MUX1F           ;CLEARED
005012  104001                         ERRORL                  ;NO, LINE STATUS ERROR
                                .IFT
005014  104003        MUX1F:  SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
005016  004622                         MUX1A
005020  006367  010676                 ASL     SELMSK          ;SHIFT SELECT MASK
005024  005201                         INC     R1              ;SELECT NEXT LINE
005026  005300                         DEC     R0              ;DECREMENT LINE COUNT
005030  001274                         BNE     MUX1A           ;CONTINU IF NOT DONE
005032  104002                         SCOPE                   ;CHECK FOR ITERATIONS, LOOP
                                .IFF
                                MUX1F:  SCOPE                   ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
005034                          MUXS1           2,TRMRDY,↑/TERMINAL READY/
                                        ;VERIFY THAT TERMINAL READY FUNCTION FLIP FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

                                .IFEQ   SINGLE
005034                          TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
005034                          T27:                                    ;REFERENCE DESIGNATION
        000030                  N0=N0+1
                                .IFF
                                TS      \N1,1
                                .IFTF
005034  005077  010552          MUX2:   CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
005040  042767  000340  172730          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
005046  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
005052  012767  000001  010642          MOV     #1,SELMSK               ;INIT LINE SELECT MASK
005060  005001                          CLR     R1                      ;START AT LINE 0
                                .IFF
                                        MOV     LINE,R1
                                .IFTF
005062  012777  002000  010522  MUX2A:  MOV     #CLRMUX,@DHMCSR
005070  012702  000020                  MOV     #16.,R2
                                .IFT
005074  036767  010622  010616          BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
005102  001462                          BEQ     MUX2F                   ;BR IF NOT
                                .IFTF
005104  010177  010502                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
005110  012777  000002  010476          MOV     #TRMRDY,@DHMLSR         ;SET TERMINAL READY FUNCTION FLIP-FLOP
                                .IFT
005116  012767  000001  010600          MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                .IFTF
005124  005077  010462                  CLR     @DHMCSR
005130  005005                  MUX2B:  CLR     R5
                                .IFT
005132  036767  010566  010560          BIT     SLMSK,LINSEL            ;SELECTED ??
005140  001417                          BEQ     MUX2D                   ;BR IF NOT
                                .IFTF
005142  017704  010446                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
005146  117703  010440                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
005152  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
005156  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
005160  001002                          BNE     MUX2C                   ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
005162  012705  000002                  MOV     #TRMRDY,R5
                                                                        ;TO BE SET
005166                          MUX2C:
                                .IF IDN <TRMRDY>,<LINENA>
                                        BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                        ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                .ENDC
005166  020504                          CMP     R5,R4                   ;CMP EXPECTED AND RECVD
005170  001403                          BEQ     MUX2D                   ;RESULTS
005172  104001                          ERROR1                          ;LINE STATUS ERROR
005174  104003                          SCOPEF
005176  005200                          MUX2D
005200  004767  006200          MUX2D:  CALL    STEPER                  ;EXAMINE NEXT LINE
                                .IFT
```

```
 005204  006367  010514                 ASL     SLMSK                   ;SHIFT MASK
                                .IFTF
 005210  005302                         DEC     R2
 005212  001346                         BNE     MUX2B
 005214  005005                         CLR     R5
 005216  010177  010370         MUX2E:  MOV     R1,@DHMCSR
 005222  010103                         MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
 005224  005077  010364                 CLR     @DHMLSR                 ;CLEAR TERMINAL READY FLIP FLOP
 005230  105227  000000                 INCB    #0                      ;DELAY FOR CABLE
 005234  001375                         BNE     .-4                     ;DITTO
 005236  017704  010352                 MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
 005242  005704                         TST     R4                      ;WAS TERMINAL READY FUNCTION FLIP FLOP
 005244  001401                         BEQ     MUX2F                   ;CLEARED
 005246  104001                         ERRORL                          ;NO, LINE STATUS ERROR
                                .IFT
 005250  104003         MUX2F:  SCOPEF                                  ;CHECK FOR LOOP ON SAME DATA
 005252  005062                 MUX2A
 005254  006367  010442                 ASL     SELMSK                  ;SHIFT SELECT MASK
 005260  005201                         INC     R1                      ;SELECT NEXT LINE
 005262  005300                         DEC     R0                      ;DECREMENT LINE COUNT
 005264  001276                         BNE     MUX2A                   ;CONTINU IF NOT DONE
 005266  104002                         SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .IFF
                         MUX2F:  SCOPE                                  ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
005270                          MUXS1           3,RS,+/REQUEST TO SEND/
                                        ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

                                .IFEQ   SINGLE
005270                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
005270                          T30:                                    ;REFERENCE DESIGNATION
        000031                  NO=NO+1
                                .IFF
                                TS      \N1,1
                                .IFTF
005270  005077  010316          MUX3:   CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
005274  042767  000340  172474        BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
005302  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
005306  012767  000001  010406        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
005314  005001                        CLR     R1                      ;START AT LINE 0
                                .IFF
                                        MOV     LINE,R1
                                .IFTF
005316  012777  002000  010266  MUX3A: MOV     #CLRMUX,@DHMCSR
005324  012702  000020                MOV     #16.,R2
                                .IFT
005330  036767  010366  010362        BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
005336  001462                        BEQ     MUX3F                   ;BR IF NOT
                                .IFTF
005340  010177  010246                MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
005344  012777  000004  010242        MOV     #RS,@DHMLSR             ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
                                .IFT
005352  012767  000001  010344        MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                .IFTF
005360  005077  010226                CLR     @DHMCSR
005364  005005                MUX3B:  CLR     R5
                                .IFT
005366  036767  010332  010324        BIT     SLMSK,LINSEL            ;SELECTED ??
005374  001417                        BEQ     MUX3D                   ;BR IF NOT
                                .IFTF
005376  017704  010212                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
005402  117703  010204                MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
005406  042703  177760                BIC     #177760,R3              ;CLEAR UNWANTED BITS
005412  020103                        CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
005414  001002                        BNE     MUX3C                   ;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
005416  012705  000004                MOV     #RS,R5
                                                                        ;TO BE SET
005422                          MUX3C:
                                .IF IDN <RS>,<LINENA>
                                        BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                        ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                .ENDC
005422  020504                        CMP     R5,R4                   ;CMP EXPECTED AND RECVD
005424  001403                        BEQ     MUX3D                   ;RESULTS
005426  104001                        ERRDRL                          ;LINE STATUS ERROR
005430  104003                        SCOPEF
005432  005434                        MUX3D
005434  004767  005744        MUX3D:  CALL    STEPER                  ;EXAMINE NEXT LINE
                                .IFT
```

```
005440  006367  010260                  ASL     SLMSK                   ;SHIFT MASK
                                .IFTF
005444  005302                          DEC     R2
005446  001346                          BNE     MUX3B
005450  005005                          CLR     R5
005452  010177  010134          MUX3E:  MOV     R1,@DHMCSR
005456  010103                          MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
005460  005077  010130                  CLR     @DHMLSR                 ;CLEAR REQUEST TO SEND FLIP FLOP
005464  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
005470  001375                          BNE     .-4                     ;DITTO
005472  017704  010116                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
005476  005704                          TST     R4                      ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
005500  001401                          BEQ     MUX3F                   ;CLEARED
005502  104001                          ERRORL                          ;NO, LINE STATUS ERROR
                                .IFT
005504  104003          MUX3F:  SCOPEF                                  ;CHECK FOR LOOP ON SAME DATA
005506  005316                  MUX3A
005510  006367  010206                  ASL     SELMSK                  ;SHIFT SELECT MASK
005514  005201                          INC     R1                      ;SELECT NEXT LINE
005516  005300                          DEC     R0                      ;DECREMENT LINE COUNT
005520  001276                          BNE     MUX3A                   ;CONTINU IF NOT DONE
005522  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .IFF
                        MUX3F:  SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
005524                          MUXS1           4,SECTX,+/SECONDARY TRANSMIT/
                                        ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

                                .IFEQ   SINGLE
005524                          TS \NO,0
                                        ;REFERANCE NUMBER DEFINITION
005524                          T31:                                    ;REFERENCE DESIGNATION
        000032                  NO=NO+1
                                .IFF
                                TS      \N1,1
                                .IFTF
005524  005077  010062          MUX4:   CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
005530  042767  000340  172240          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
005536  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
005542  012767  000001  010152          MOV     #1,SELMSK               ;INIT LINE SELECT MASK
005550  005001                          CLR     R1                      ;START AT LINE 0
                                .IFF
                                        MOV     LINE,R1
                                .IFTF
005552  012777  002000  010032  MUX4A:  MOV     #CLRMUX,@DHMCSR
005560  012702  000020                  MOV     #16.,R2
                                .IFT
005564  036767  010132  010126          BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
005572  001462                          BEQ     MUX4F                   ;BR IF NOT
                                .IFTF
005574  010177  010012                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
005600  012777  000010  010006          MOV     #SECTX,@DHMLSR          ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
                                .IFT
005606  012767  000001  010110          MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                .IFTF
005614  005077  007772                  CLR     @DHMCSR
005620  005005                  MUX4B:  CLR     R5
                                .IFT
005622  036767  010076  010070          BIT     SLMSK,LINSEL            ;SELECTED ??
005630  001417                          BEQ     MUX4D                   ;BR IF NOT
                                .IFTF
005632  017704  007756                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
005636  117703  007750                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
005642  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
005646  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
005650  001002                          BNE     MUX4C                   ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
005652  012705  000010                  MOV     #SECTX,R5
                                                                        ;TO BE SET
005656                          MUX4C:
                                .IF IDN <SECTX>,<LINENA>
                                        BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                        ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                .ENDC
005656  020504                          CMP     R5,R4                   ;CMP EXPECTED AND RECVD
005660  001403                          BEQ     MUX4D                   ;RESULTS
005662  104001                          ERRORL                          ;LINE STATUS ERROR
005664  104003                          SCOPEF
005666  005670                          MUX4D
005670  004767  005510          MUX4D:  CALL    STEPER                  ;EXAMINE NEXT LINE
                                .IFT
```

```
005674  006367  010024                  ASL     SLMSK                   ;SHIFT MASK
                                .IFTF
005700  005302                          DEC     R2
005702  001346                          BNE     MUX4B
005704  005005                          CLR     R5
005706  010177  007700          MUX4E:  MOV     R1,@DHMCSR
005712  010103                          MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
005714  005077  007674                  CLR     @DHMLSR                 ;CLEAR SECONDARY TRANSMIT FLIP FLOP
005720  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
005724  001375                          BNE     .-4                     ;DITTO
005726  017704  007662                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
005732  005704                          TST     R4                      ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
005734  001401                          BEQ     MUX4F                   ;CLEARED
005736  104001                          ERRORL                          ;NO, LINE STATUS ERROR
                                .IFT
005740  104003          MUX4F:  SCOPEF                                  ;CHECK FOR LOOP ON SAME DATA
005742  005552                  MUX4A
005744  006367  007752                  ASL     SELMSK                  ;SHIFT SELECT MASK
005750  005201                          INC     R1                      ;SELECT NEXT LINE
005752  005300                          DEC     R0                      ;DECREMENT LINE COUNT
005754  001276                          BNE     MUX4A                   ;CONTINU IF NOT DONE
005756  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .IFF
                        MUX4F:  SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
                                        ;VERIFY THAT "CLEAR MULTIPLXER" CLEARS ALL MULTIP EXER
                                        ;FUNCTION FLIP-FLOPS

005760                          TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
005760                          T32:                                    ;REFERENCE DESIGNATION
        000033                  N0=N0+1
005760  005077  007626          MUX8:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
005764  042767  000340  172004        BIC     #340,PS                 ;ENABLE INTERRUPTS
005772  012700  000020                MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
005776  012777  000017  007610  MUX8A: MOV     #17,@DHMLSR             ;WRITE 1S INTO  ALL MULTIPLEXER
006004  004767  005374                CALL    STEPER                  ;FUNCTION FLIPFLOPS
006010  005300                        DEC     R0
006012  001371                        BNE     MUX8A
006014  012767  000001  007700        MOV     #1,SELMSK               ;INIT SELECT MASK
006022  005003                        CLR     R3                      ;SET UP FOR 16 LINES
006024  012700  000020                MOV     #16.,R0
006030  012777  002000  007554  MUX8B: MOV     #CLRMUX,@DHMCSR         ;CLEAR MULTIPLEXER
006036  036767  007660  007654  MUX8C: BIT     SELMSK,LINSEL           ;SELECTED ??
006044  001427                        BEQ     MUX8E                   ;BR IF NOT
006046  010377  007540                MOV     R3,@DHMCSR              ;SELECT LINE
006052  017704  007536                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
006056  005005                        CLR     R5                      ;EXPECT 0S
006060  005704                        TST     R4                      ;WAS LINE STATUS REGISTER CLEARED
006062  001403                        BEQ     MUX8D
006064  104001                        ERRORL                          ;LINE STATUS ERROR
006066  104003                        SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
006070  006030                        MUX8B
006072  005205                MUX8D:  INC     R5                      ;EXPECT LINE ENABLE
006074  052777  000001  007512        BIS     #LINENA,@DHMLSR         ;SET LINE ENABLE ON SELECTED LINE
006102  017704  007506                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
006106  042704  000360                BIC     #360,R4                 ;CLEAR RING,CO,CS SECRCV-MAY FLOAT HIGH
006112  020504                        CMP     R5,R4                   ;IS ANYTHING BUT LINE ENABLE SET
006114  001403                        BEQ     MUX8E
006116  104001                        ERRORL                          ;LINE STATUS ERROR
006120  104003                        SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
006122  006030                        MUX8B
006124  005203                MUX8E:  INC     R3                      ;UPDATE LINE NUMBER
006126  005077  007462                CLR     @DHMLSR                 ;CLEAR CURRENT LINE
006132  006367  007564                ASL     SELMSK                  ;SHIFT SELECT MASK
006136  005300                        DEC     R0                      ;CONTINUE IF ALL LINES NOT
006140  001336                        BNE     MUX8C                   ;TESTED
006142  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS
                                        ;SET "LINE ENABLE FOR ALL LINES
                                        ;VERIFY THAT AN INTERRUPP OCCURS FOR EACH LINE
                                        ;THIS TEST WILL FAIL ON ANY LINE THAT DOES
                                        ;NOT HAVE A LEVEL CONVERTER--CO,CS,RING,SECRCV WILL FLOAT
                                        ;HIGH,HENCE MAINT. MODE CANNOT TOGGLE THESE SIGNALS TO
                                        ;CAUSE A TRANSITION.A PROGRAM TIME OUT WILL OCCUR.....

006144                          TS \N0,0
                                        ;REFERANCE NUMBER DEFINITION
006144                          T33:                                    ;REFERENCE DESIGNATION
        000034                  N0=N0+1
006144  012777  002000  007440  SCNT1:  MOV     #CLRMUX,@DHMCSR         ;CLEAR ALL MULTIPLEXER FLIPFLOPS
006152  005077  007434                  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
006156  042767  000340  171612          BIC     #340,PS                 ;ENABLE INTERRUPTS
006164  012700  000020                  MOV     #16.,R0                 ;SET UP TO WRITE 1'S INTO
006170  012777  001017  007414          MOV     #MAINT+17,@DHMCSR       ;ALL SCANNER MEMORY LOCATION
006176  012767  000001  007516          MOV     #1,SELMSK               ;INIT SELECT MASK
006204  004767  005174          SCNT1A: CALL    STEPER                  ;WRITE A LOCATION
006210  012777  000001  007376          MOV     #LINENA,@DHMLSR         ;LET "LINE ENABLE"
006216  005300                  DEC     R0
006220  001371                  BNE     SCNT1A
006222  012701  177777                  MOV     #-1,R1                  ;INIT LINE NO. GEN.
006226  012705  070300                  MOV     #70300,R5               ;EXPECT "DONE"+"COF"+"CSF"+"SECRXF"
006232  012777  006404  007346          MOV     #SCNT1C,@DHMVEC         ;SET UP LOCAL INTERRUPT SERVICE
006240  012777  000340  007342          MOV     #340,@DHMLVL            ;SERVICE AT LEVEL 7
006246  012700  000020                  MOV     #16.,R0
006252  012777  000117  007332          MOV     #INTENA+17,@DHMCSR      ;SET INTERRUPT ENABLE
006260  036767  007436  007432  SCNT1B: BIT     SELMSK,LINSEL           ;SELECTED ??
006266  001456                  BEQ     SCNT1D                  ;BR IF NOT
006270  052767  000340  171500          BIS     #340,PS                 ;LOCK OUT INTERRUPTS
006276  004767  005102                  CALL    STEPER                  ;HIT THE SCANER ONCE
006302  005003                  CLR     R3                      ;CLEAR DELAY
006304  042767  000340  171464          BIC     #340,PS                 ;ENABLE INTERRUPTS
006312  005303          1$:     DEC     R3                      ;WAIT LONG ENOUGH?
006314  001404                  BEQ     2$                      ;WE HAVE AN ERROR
006316  105777  007270                  TSTB    @DHMCSR                 ;DID DONE SET
006322  100373                  BPL     1$                      ;NOT YET
006324  100416                  BMI     3$                      ;SET BUT NO INTERRUPT
006326  052767  000340  171442  2$:     BIS     #340,PS
006334  017704  007252                  MOV     @DHMCSR,R4              ;GET FAILING LINE
006340  010402                  MOV     R4,R2                   ;GET CSR
006342  017703  007246                  MOV     @DHMLSR,R3              ;GET LSR
006346  042704  177760                  BIC     #177760,R4
006352  104030                  ERRINT                          ;REPORT ERROR HAS OCCURED
006354  104003                  SCOPEF
006356  006144                  SCNT1
006360  000421                  BR      SCNT1D                  ;CONTINUE THE TEST
006362  052767  000340  171406  3$:     BIS     #340,PS                 ;INTERRUPT DID NOT OCCUR
006370  017704  007216                  MOV     @DHMCSR,R4              ;ERROR
006374  104000                  ERRORC                          ;CONTROL STATUS ERROR
006376  104003                  SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
006400  006144                  SCNT1
006402  000410                  BR      SCNT1D
006404  022626          SCNT1C: POP2SP                          ;INTERRUPT OCCURED, REPOSITION STACK
```

```
 55 006406  017704  007200                MOV     @DHMCSR,R4              ;READ CONTROL STATUS
 56 006412  020504                        CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED
 57 006414  001403                        BEQ     SCNT1D                  ;REGISTERS THE SAME
 58 006416  104000                        ERRORC                          ;NO, LINE STATUS ERROR
 59 006420  104003                        SCOPEF                          ;CHECK FOR LOOP WITH CURPENT DATA
 60 006422  006144                        SCNT1
 61 006424  042777  000217  007160  SCNT1D: BIC     #DONE+17,@DHMCSR        ;CLEAR D DONE
 62 006432  005201                        INC     R1                      ;GEN NXT LINE NO.
 63 006434  050177  007152                BIS     R1,@DHMCSR              ;SET LINE NO. BITS
 64 006440  006367  007256                ASL     SELMSK                  ;SHIFT SELECT MASK
 65 006444  005205                        INC     R5                      ;UPDATE EXPECTED RESULT
 66 006446  005300                        DEC     R0                      ;CONTINUE IF NOT DONE
 67 006450  001303                        BNE     SCNT1B
 68 006452  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                .MACRO  COMMENT
                                .NLIST
                                SINGLE=1
                                .LIST
                                .ENDM
006454                                  COMMENT
        000001                  SINGLE=1

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

                                        ;NOTE:  MODEM CONTROL MULTIPLEXER INPUTS SHOULD BE CONNECTED
                                        ;TO DISTRIBUTION PANEL WIA DM11-DC


                                .MACRO  COMMENT
                                .NLIST
                                N1=100
                                N=N1
                                XN=N1
                                .LIST
                                .ENDM
006454                                  COMMENT
        000100                  N1=100
        000100                  N=N1
        000100                  XN=N1
006454                          TS      \N1,1
                                        ;REFERANCE NUMBER DEFINITION
006454                          T100:                                   ;REFERENCE DESIGNATION
        000101                  N1=N1+1
006454  012767  006474  173562  STRLIN: MOV     #STRLNA,KRET            ;SET UP FOR NEW LINE SELECTION
006462  042767  000340  171306          BIC     #340,PS                 ;ENABLE INTERRUPTS
006470  104004                        TYPE                            ;TYPE "SINGLE LINE CABLE TEST"
006472  017010                        MLINE
006474  104013                  STRLNA: INSTRG                          ;GET LINE NUMBER
006476  017043                        MLINEI
006500  000000                        0
006502  000017                        17
006504  015700                        LINE
006506  104004                        TYPE
006510  017005                        MCRLF
```

```
1
2 006512                                MUXS1   11,LINENA,†/LINE ENABLE/
                                                ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
                                                ;BE SET AND CLEARED FOR SELECTED LINE

                                        .IFEQ   SINGLE
                                        TS \NO,0
                                        .IFF
  006512                                TS      \N1,1
                                                ;REFERANCE NUMBER DEFINITION
  006512                                T101:                                   ;REFERENCE DESIGNATION
          000102                        N1=N1+1
                                        .IFTF
  006512  005077  007074        MUX11:  CLR     @DHMCSR                         ;CLEAR CONTROL STATUS REGISTER
  006516  042767  000340  171252        BIC     #340,PS                         ;ENABLE INTERRUPTS
                                        .IFT
                                        MOV     #16.,R0                         ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
                                        MOV     #1,SELMSK                       ;INIT LINE SELECT MASK
                                        CLR     R1                              ;START AT LINE 0
                                        .IFF
  006524  016701  007150                MOV     LINE,R1
                                        .IFTF
  006530  012777  002000  007054 MUX11A: MOV     #CLRMUX,@DHMCSR
  006536  012702  000020                MOV     #16.,R2
                                        .IFT
                                        BIT     SELMSK,LINSEL                   ;IS THIS LINE SELECTED FOR TEST ?
                                        BEQ     MUX11F                          ;BR IF NOT
                                        .IFTF
  006542  010177  007044                MOV     R1,@DHMCSR                      ;SELECT LINE TO BE TESTED
  006546  012777  000001  007040        MOV     #LINENA,@DHMLSR                 ;SET LINE ENABLE FUNCTION FLIP-FLOP
                                        .IFT
                                        MOV     #1,SLMSK                        ;INIT ANOTHER SELECT MASK
                                        .IFTF
  006554  005077  007032                CLR     @DHMCSR
  006560  005005                MUX11B: CLR     R5
                                        .IFT
                                        BIT     SLMSK,LINSEL                    ;SELECTED ??
                                        BEQ     MUX11D                          ;BR IF NOT
                                        .IFTF
  006562  017704  007026                MOV     @DHMLSR,R4 ;                    ;READ LINE STATUS REGISTER
  006566  117703  007020                MOVB    @DHMCSR,R3                      ;READ CONTROL STATUS REGISTER
  006572  042703  177760                BIC     #177760,R3                      ;CLEAR UNWANTED BITS
  006576  020103                        CMP     R1,R3                           ;IF LINE NUMBER=SELECTED LINE NUMBER,
  006600  001002                        BNE     MUX11C                          ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
  006602  012705  000001                MOV     #LINENA,R5
                                                                                ;TO BE SET
  006606                        MUX11C:
                                        .IF IDN <LINENA>,<LINENA>
  006606  042704  000360                BIC     #360,R4                         ;CLEAR RING,CO,CS,SECRCV
                                                                                ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                        .ENDC
  006612  020504                        CMP     R5,R4                           ;CMP EXPECTED AND RECVD
  006614  001403                        BEQ     MUX11D                          ;RESULTS
  006616  104001                        ERRORL                                  ;LINE STATUS ERROR
  006620  104003                        SCOPEF
  006622  006624                        MUX11D
  006624  004767  004554        MUX11D: CALL    STEPER                          ;EXAMINE NEXT LINE
```

```
                                .IFT
                                        ASL     SLMSK                   ;SHIFT MASK
                                .IFTF
006630  005302                        DEC     R2
006632  001352                        BNE     MUX11B
006634  005005                        CLR     R5
006636  010177  006750        MUX11E: MOV     R1,@DHMCSR
006642  010103                        MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
006644  005077  006744                CLR     @DHMLSR                 ;CLEAR LINE ENABLE FLIP FLOP
006650  105227  000000                INCB    #0                      ;DELAY FOR CABLE
006654  001375                        BNE     .-4                     ;DITTO
006656  017704  006732                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
006662  005704                        TST     R4                      ;WAS LINE ENABLE FUNCTION FLIP FLOP
006664  001401                        BEQ     MUX11F                  ;CLEARED
006666  104001                        ERRORL                          ;NO, LINE STATUS ERROR
                                .IFT
                                MUX11F: SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
                                        MUX11A
                                        ASL     SELMSK                  ;SHIFT SELECT MASK
                                        INC     R1                      ;SELECT NEXT LINE
                                        DEC     R0                      ;DECREMENT LINE COUNT
                                        BNE     MUX11A                  ;CONTINU IF NOT DONE
                                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .IFF
006670  104002                MUX11F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
1 006672                          MUXS1   12,TRMRDY,†/TERMINAL READY/
                                          ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
                                          ;BE SET AND CLEARED FOR SELECTED LINE

                                  .IFEQ   SINGLE
                                  TS \N0,0
                                  .IFF
  006672                          TS      \N1,1
                                          ;REFERANCE NUMBER DEFINITION
  006672                          T102:                                   ;REFERENCE DESIGNATION
          000103                  N1=N1+1
                                  .IFTF
  006672  005077  006714          MUX12:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
  006676  042767  000340  171072          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                  .IFT
                                          MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
                                          MOV     #1,SELMSK               ;INIT LINE SELECT MASK
                                          CLR     R1                      ;START AT LINE 0
                                  .IFF
  006704  016701  006770                  MOV     LINE,R1
                                  .IFTF
  006710  012777  002000  006674  MUX12A: MOV     #CLRMUX,@DHMCSR
  006716  012702  000020                  MOV     #16.,R2
                                  .IFT
                                          BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
                                          BEQ     MUX12F                  ;BR IF NOT
                                  .IFTF
  006722  010177  006664                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
  006726  012777  000002  006660          MOV     #TRMRDY,@DHMLSR         ;SET TERMINAL READY FUNCTION FLIP-FLOP
                                  .IFT
                                          MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                  .IFTF
  006734  005077  006652                  CLR     @DHMCSR
  006740  005005                  MUX12B: CLR     R5
                                  .IFT
                                          BIT     SLMSK,LINSEL            ;SELECTED ??
                                          BEQ     MUX12D                  ;BR IF NOT
                                  .IFTF
  006742  017704  006646                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
  006746  117703  006640                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
  006752  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
  006756  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
  006760  001002                          BNE     MUX12C                  ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
  006762  012705  000002                  MOV     #TRMRDY,R5
                                                                          ;TO BE SET
  006766                          MUX12C:
                                  .IF IDN <TRMRDY>,<LINENA>
                                          BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                          ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                  .ENDC
  006766  020504                          CMP     R5,R4                   ;CMP EXPECTED AND RECVD
  006770  001403                          BEQ     MUX12D                  ;RESULTS
  006772  104001                          ERRORL                          ;LINE STATUS ERROR
  006774  104003                          SCOPEF
  006776  007000                          MUX12D
  007000  004767  004400          MUX12D: CALL    STEPER                  ;EXAMINE NEXT LINE
                                  .IFT
```

```
                                        ASL     SLMSK                   ;SHIFT MASK
                                .IFTF
007004  005302                          DEC     R2
007006  001354                          BNE     MUX12B
007010  005005                          CLR     R5
007012  010177  006574          MUX12E: MOV     R1,@DHMCSR
007016  010103                          MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
007020  005077  006570                  CLR     @DHMLSR                 ;CLEAR TERMINAL READY FLIP FLOP
007024  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
007030  001375                          BNE     .-4                     ;DITTO
007032  017704  006556                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
007036  005704                          TST     R4                      ;WAS TERMINAL READY FUNCTION FLIP FLOP
007040  001401                          BEQ     MUX12F                  ;CLEARED
007042  104001                          ERRORL                          ;NO, LINE STATUS ERROR
                                .IFT
                                MUX12F: SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
                                        MUX12A
                                        ASL     SELMSK                  ;SHIFT SELECT MASK
                                        INC     R1                      ;SELECT NEXT LINE
                                        DEC     R0                      ;DECREMENT LINE COUNT
                                        BNE     MUX12A                  ;CONTINU IF NOT DONE
                                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .IFF
007044  104002                  MUX12F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
007046                          MUXS1   13,RS,+/REQUEST TO SEND/
                                        ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

                                .IFEQ   SINGLE
                                TS \N0,0
                                .IFF
007046                          TS      \N1,1
                                        ;REFERANCE NUMBER DEFINITION
007046                          T103:                                   ;REFERENCE DESIGNATION
        000104                  N1=N1+1
                                .IFTF
007046  005077  006540          MUX13:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
007052  042767  000340  170716          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
                                        MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
                                        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
                                        CLR     R1                      ;START AT LINE 0
                                .IFF
007060  016701  006614                  MOV     LINE,R1
                                .IFTF
007064  012777  002000  006520  MUX13A: MOV     #CLRMUX,@DHMCSR
007072  012702  000020                  MOV     #16.,R2
                                .IFT
                                        BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
                                        BEQ     MUX13F                  ;BR IF NOT
                                .IFTF
007076  010177  006510                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
007102  012777  000004  006504          MOV     #RS,@DHMLSR             ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
                                .IFT
                                        MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                .IFTF
007110  005077  006476                  CLR     @DHMCSR
007114  005005                  MUX13B: CLR     R5
                                .IFT
                                        BIT     SLMSK,LINSEL            ;SELECTED ??
                                        BEQ     MUX13D                  ;BR IF NOT
                                .IFTF
007116  017704  006472                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
007122  117703  006464                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
007126  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
007132  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
007134  001002                          BNE     MUX13C                  ;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
007136  012705  000004                  MOV     #RS,R5
                                                                        ;TO BE SET
007142                          MUX13C:
                                .IF IDN <RS>,<LINENA>
                                        BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                        ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                .ENDC
007142  020504                          CMP     R5,R4                   ;CMP EXPECTED AND RECVD
007144  001403                          BEQ     MUX13D                  ;RESULTS
007146  104001                          ERRORL                          ;LINE STATUS ERROR
007150  104003                          SCOPEF
007152  007154                          MUX13D
007154  004767  004224          MUX13D: CALL    STEPER                  ;EXAMINE NEXT LINE
                                .IFT
```

```
                                  ASL     SLMSK              ;SHIFT MASK
                          .IFTF
007160  005302                    DEC     R2
007162  001354                    BNE     MUX13B
007164  005005                    CLR     R5
007166  010177  006420    MUX13E: MOV     R1,@DHMCSR
007172  010103                    MOV     R1,R3              ;SET LINE COUNTER TO SELECTED LINE
007174  005077  006414            CLR     @DHMLSR            ;CLEAR REQUEST TO SEND FLIP FLOP
007200  105227  000000            INCB    #0                 ;DELAY FOR CABLE
007204  001375                    BNE     .-4                ;DITTO
007206  017704  006402            MOV     @DHMLSR,R4         ;READ LINE STATUS REGISTER
007212  005704                    TST     R4                 ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
007214  001401                    BEQ     MUX13F             ;CLEARED
007216  104001                    ERRORL                     ;NO, LINE STATUS ERROR
                          .IFT
                          MUX13F: SCOPEF                     ;CHECK FOR LOOP ON SAME DATA
                                  MUX13A
                                  ASL     SELMSK             ;SHIFT SELECT MASK
                                  INC     R1                 ;SELECT NEXT LINE
                                  DEC     R0                 ;DECREMENT LINE COUNT
                                  BNE     MUX13A             ;CONTINU IF NOT DONE
                                  SCOPE                      ;CHECK FOR ITERATIONS, LOOP
                          .IFF
007220  104002            MUX13F: SCOPE                      ;CHECK FOR ITERATIONS, LOOP
                          .ENDC
```

```
007222                          MUXS1   14,SECTX,†/SECONDARY TRANSMIT/
                                        ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP FLOP CAN
                                        ;BE SET AND CLEARED FOR SELECTED LINE

                                .IFEQ   SINGLE
                                TS \N0,0
                                .IFF
007222                          TS      \N1,1
                                        ;REFERANCE NUMBER DEFINITION
007222                          T104:                                   ;REFERENCE DESIGNATION
        000105                  N1=N1+1
                                .IFTF
007222  005077  006364          MUX14:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
007226  042767  000340  170542          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
                                        MOV     #16.,R0                 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
                                        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
                                        CLR     R1                      ;START AT LINE 0
                                .IFF
007234  016701  006440                  MOV     LINE,R1
                                .IFTF
007240  012777  002000  006344  MUX14A: MOV     #CLRMUX,@DHMCSR
007246  012702  000020                  MOV     #16.,R2
                                .IFT
                                        BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED FOR TEST ?
                                        BEQ     MUX14F                  ;BR IF NOT
                                .IFTF
007252  010177  006334                  MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
007256  012777  000010  006330          MOV     #SECTX,@DHMLSR          ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
                                .IFT
                                        MOV     #1,SLMSK                ;INIT ANOTHER SELECT MASK
                                .IFTF
007264  005077  006322                  CLR     @DHMCSR
007270  005005                  MUX14B: CLR     R5
                                .IFT
                                        BIT     SLMSK,LINSEL            ;SELECTED ??
                                        BEQ     MUX14D                  ;BR IF NOT
                                .IFTF
007272  017704  006316                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
007276  117703  006310                  MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
007302  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
007306  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
007310  001002                          BNE     MUX14C                  ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
007312  012705  000010                  MOV     #SECTX,R5
                                                                        ;TO BE SET
007316                          MUX14C:
                                .IF IDN <SECTX>,<LINENA>
                                        BIC     #360,R4                 ;CLEAR RING,CO,CS,SECRCV
                                                                        ;IF NO LEVEL CONVERTER THESE BITS FLOAT
                                .ENDC
007316  020504                          CMP     R5,R4                   ;CMP EXPECTED AND RECVD
007320  001403                          BEQ     MUX14D                  ;RESULTS
007322  104001                          ERRORL                          ;LINE STATUS ERROR
007324  104003                          SCOPEF
007326  007330                          MUX14D
007330  004767  004050          MUX14D: CALL    STEPER                  ;EXAMINE NEXT LINE
                                .IFT
```

```
                                        ASL     SLMSK                   ;SHIFT MASK
                                .IFTF
007334  005302                         DEC     R2
007336  001354                         BNE     MUX14B
007340  005005                         CLR     R5
007342  010177  006244        MUX14E: MOV     R1,@DHMCSR
007346  010103                         MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
007350  005077  006240                 CLR     @DHMLSR                 ;CLEAR SECONDARY TRANSMIT FLIP FLOP
007354  105227  000000                 INCB    #0                      ;DELAY FOR CABLE
007360  001375                         BNE     . 4                     ;DITTO
007362  017704  006226                 MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
007366  005704                         TST     R4                      ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
007370  001401                         BEQ     MUX14F                  ;CLEARED
007372  104001                         ERRORL                          ;NO, LINE STATUS ERROR
                                .IFT
                                MUX14F: SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
                                        MUX14A
                                        ASL     SELMSK                  ;SHIFT SELECT MASK
                                        INC     R1                      ;SELECT NEXT LINE
                                        DEC     R0                      ;DECREMENT LINE COUNT
                                        BNE     MUX14A                  ;CONTINU IF NOT DONE
                                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .IFF
0C7374  104002                  MUX14F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
007376                          MUXS2   15,TRMRDY,CO+CS,+/CLEAR TO SEND AND CARRIER ARE/,+/TERMINAL/

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

                                .IFEQ   SINGLE
                                TS \NO,0
                                .IFF
007376                          TS      \N1,1
                                        ;REFERANCE NUMBER DEFINITION
007376                          T105:                                   ;REFERENCE DESIGNATION
        000106                  N1=N1+1
                                .IFTF
007376  005077  006210          MUX15:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
007402  042767  000340  170366          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
                                        MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
                                        CLR     R1                      ;START AT LINE 0
                                        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
                                .IFF
007410  016701  006264                  MOV     LINE,R1
                                .IFTF
007414  012702  000020          MUX15A: MOV     #16.,R2                 ;16 LINES
                                .IFT
                                        BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
                                        BEQ     MUX15F                  ;BR IF NOT
                                .IFTF
007420  010177  006166                  MOV     R1,@DHMCSR              ;SELECT A LINE
007424  012777  000003  006162          MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE +TRMRDY

                                ;THESE TWO NOP'S ADDED FOR SOME DELAY FOR PDP-11/44
                                ;WITH CACHE MEMORY TURNED ON.
007432  000240                          NOP                             ;KR 10-JULY-84 REV E
007434  000240                          NOP                             ;KR 10-JULY-84 REV E

007436  005077  006150                  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
007442  005005                  MUX15B: CLR     R5                      ;CLEAR EXPECTED RESULT
007444  017704  006144                  MOV     @DHMLSR,R4              ;READ LINE STATUS
007450  117703  006136                  MOVB    @DHMCSR,R3              ;READ LINE NUMBER
007454  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
007460  020103                          CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
007462  001002                          BNE     MUX15C                  ;EXPECT LINE ENABLE AND
007464  012705  000143                  MOV     #LINENA+TRMRDY+CO+CS,R5
                                                                        ;CLEAR TO SEND AND CARRIER ARE SET
007470  020405                  MUX15C: CMP     R4,R5                   ;COMPARE EXPECTED AND
007472  001403                          BEQ     MUX15D                  ;RECEIVED RESULTS
007474  104001                          ERRORL                          ;LINE STATUS ERROR
007476  104003                          SCOPEF
007500  007502                          MUX15D
007502  004767  003676          MUX15D: CALL    STEPER                  ;UPDATE LINE COUNTER
007506  005302                          DEC     R2                      ;CONTINUE IF ALL CHECKS
007510  001354                          BNE     MUX15B                  ;ARE NOT DONE FOR THIS LINE
007512  012705  000001                  MOV     #LINENA,R5              ;EXPECT LINE ENABLE
007516  010103                  MUX15E: MOV     R1,R3                   ;ON SELECTED LINE
007520  010177  006066                  MOV     R1,@DHMCSR              ;SELECT LINE
007524  042777  000002  006062          BIC     #TRMRDY,@DHMLSR         ;CLEAR TERMINAL
007532  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
```

```
007536  001375                          BNE     . 4                     ;DITTO
007540  017704  006050                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
007544  020504                          CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
007546  001401                          BEQ     MUX15F                  ;SET ON THIS LINE
007550  104001                          ERRORL                          ;LINE STATUS ERROR
                                .IFT
                        MUX15F: SCOPEF                                  ;CHECK FOR LOOP ON SAME DATA
                                MUX15A
                                INC     R1                              ;UPDATE LINE NUMBER
                                CLR     @DHMLSR                         ;CLEAR LINE STATUS REGISTER
                                ASL     SELMSK                          ;SHIFT MARK TO TEST NEXT LINE
                                DEC     R0                              ;CONTINUE IF ALL LINES NOT
                                BNE     MUX15A                          ;TESTED
                                SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
                                .IFF
007552  104002                  MUX15F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
007554                          MUX52   16,RS,RING,↑/RING IS/,↑/REQUEST TO SEND/

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

                                .IFEQ   SINGLE
                                TS \N0,0
                                .IFF
007554                          TS      \N1,1
                                        ;REFERANCE NUMBER DEFINITION
007554                          T106:                                   ;REFERENCE DESIGNATION
        000107                  N1=N1+1
                                .IFTF
007554  005077  006032          MUX16:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
007560  042767  000340  170210          BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
                                        MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
                                        CLR     R1                      ;START AT LINE 0
                                        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
                                .IFF
007566  016701  006106                  MOV     LINE,R1
                                .IFTF
007572  012702  000020          MUX16A: MOV     #16.,R2                 ;16 LINES
                                .IFT
                                        BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
                                        BEQ     MUX16F                  ;BR IF NOT
                                .IFTF
007576  010177  006010                  MOV     R1,@DHMCSR              ;SELECT A LINE
007602  012777  000005  006004          MOV     #LINENA+RS,@DHMLSR      ;SET LINE ENABLE +RS

                                ;THESE TWO NOP'S ADDED FOR SOME DELAY FOR PDP-11/44
                                ;WITH CACHE MEMORY TURNED ON.
007610  000240                          NOP                             ;KR 10-JULY-84 REV E
007612  000240                          NOP                             ;KR 10-JULY-84 REV E

007614  005077  005772                  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
007620  005005                  MUX16B: CLR     R5                      ;CLEAR EXPECTED RESULT
007622  017704  005766                  MOV     @DHMLSR,R4              ;READ LINE STATUS
007626  117703  005760                  MOVB    @DHMCSR,R3              ;READ LINE NUMBER
007632  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
007636  020103                          CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
007640  001002                          BNE     MUX16C                  ;EXPECT LINE ENABLE AND
007642  012705  000205                  MOV     #LINENA+RS+RING,R5
                                                                        ;RING IS SET
007646  020405                  MUX16C: CMP     R4,R5                   ;COMPARE EXPECTED AND
007650  001403                          BEQ     MUX16D                  ;RECEIVED RESULTS
007652  104001                          ERRORL                          ;LINE STATUS ERROR
007654  104003                          SCOPEF
007656  007660                          MUX16D
007660  004767  003520          MUX16D: CALL    STEPER                  ;UPDATE LINE COUNTER
007664  005302                          DEC     R2                      ;CONTINUE IF ALL CHECKS
007666  001354                          BNE     MUX16B                  ;ARE NOT DONE FOR THIS LINE
007670  012705  000001                  MOV     #LINENA,R5              ;EXPECT LINE ENABLE
007674  010103                  MUX[illegible]: MOV     R1,R3           ;ON SELECTED LINE
007676  010177  005710                  MOV     R1,@DHMCSR              ;SELECT LINE
007702  042777  000004  005704          BIC     #RS,@DHMLSR             ;CLEAR REQUEST TO SEND
007710  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
```

```
007714  001375                  BNE     .-4                     ;DITTO
007716  017704  005672          MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
007722  020504                  CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
007724  001401                  BEQ     MUX16F                  ;SET ON THIS LINE
007726  104001                  ERRORL                          ;LINE STATUS ERROR
                        .IFT
                        MUX16F: SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
                                MUX16A
                                INC     R1                      ;UPDATE LINE NUMBER
                                CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER
                                ASL     SELMSK                  ;SHIFT MARK TO TEST NEXT LINE
                                DEC     R0                      ;CONTINUE IF ALL LINES NOT
                                BNE     MUX16A                  ;TESTED
                                SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                        .IFF
007730  104002          MUX16F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                        .ENDC
```

```
007732                          MUXS2   17,SECTX,SECRX,†/SECONDARY RECEIVE IS/,†/SECONDARY TRANSMIT/

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

                                .IFEQ   SINGLE
                                TS \N0,0
                                .IFF
007732                          TS      \N1,1
                                        ;REFERANCE NUMBER DEFINITION
007732                          T107:                                   ;REFERENCE DESIGNATION
        000110                  N1=N1+1
                                .IFTF
007732  005077  005654          MUX17:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
007736  042767  000340  170032        BIC     #340,PS                 ;ENABLE INTERRUPTS
                                .IFT
                                        MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
                                        CLR     R1                      ;START AT LINE 0
                                        MOV     #1,SELMSK               ;INIT LINE SELECT MASK
                                .IFF
007744  016701  005730                  MOV     LINE,R1
                                .IFTF
007750  012702  000020          MUX17A: MOV     #16.,R2                 ;16 LINES
                                .IFT
                                        BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
                                        BEQ     MUX17F                  ;BR IF NOT
                                .IFTF
007754  010177  005632                  MOV     R1,@DHMCSR              ;SELECT A LINE
007760  012777  000011  005626          MOV     #LINENA+SECTX,@DHMLSR   ;SET LINE ENABLE +SECTX

                                ;THESE TWO NOP'S ADDED FOR SOME DELAY FOR PDP-11/44
                                ;WITH CACHE MEMORY TURNED ON.
007766  000240                          NOP                             ;KR 10-JULY-84 REV E
007770  000240                          NOP                             ;KR 10-JULY-84 REV E

007772  005077  005614                  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
007776  005005                  MUX17B: CLR     R5                      ;CLEAR EXPECTED RESULT
010000  017704  005610                  MOV     @DHMLSR,R4              ;READ LINE STATUS
010004  117703  005602                  MOVB    @DHMCSR,R3              ;READ LINE NUMBER
010010  042703  177760                  BIC     #177760,R3              ;CLEAR UNWANTED BITS
010014  020103                          CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
010016  001002                          BNE     MUX17C                  ;EXPECT LINE ENABLE AND
010020  012705  000031                  MOV     #LINENA+SECTX+SECRX,R5
                                                                        ;SECONDARY RECEIVE IS SET
010024  020405                  MUX17C: CMP     R4,R5                   ;COMPARE EXPECTED AND
010026  001403                          BEQ     MUX17D                  ;RECEIVED RESULTS
010030  104001                          ERRORL                          ;LINE STATUS ERROR
010032  104003                          SCOPEF
010034  010036                          MUX17D
010036  004767  003342          MUX17D: CALL    STEPER                  ;UPDATE LINE COUNTER
010042  005302                          DEC     R2                      ;CONTINUE IF ALL CHECKS
010044  001354                          BNE     MUX17B                  ;ARE NOT DONE FOR THIS LINE
010046  012705  000001                  MOV     #LINENA,R5              ;EXPECT LINE ENABLE
010052  010103                  MUX17E: MOV     R1,R3                   ;ON SELECTED LINE
010054  010177  005532                  MOV     R1,@DHMCSR              ;SELECT LINE
010060  042777  000010  005526          BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
010066  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
```

```
010072  001375                          BNE     . 4                     ;DITTO
010074  017704  005514                   MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
010100  020504                          CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
010102  001401                          BEQ     MUX17F                  ;SET ON THIS LINE
010104  104001                          ERRORL                          ;LINE STATUS ERROR
                                .IFT
                        MUX17F: SCOPEF                                  ;CHECK FOR LOOP ON SAME DATA
                                MUX17A
                                INC     R1                              ;UPDATE LINE NUMBER
                                CLR     @DHMLSR                         ;CLEAR LINE STATUS REGISTER
                                ASL     SELMSK                          ;SHIFT MARK TO TEST NEXT LINE
                                DEC     R0                              ;CONTINUE IF ALL LINES NOT
                                BNE     MUX17A                          ;TESTED
                                SCOPE                                   ;CHECK FOR ITERATIONS, LOOP
                                .IFF
010106  104002                 MUX17F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
                                .ENDC
```

```
                                        ;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


                                .MACRO  COMMENT
                                .NLIST
                                N2=200
                                N=N2
                                XN=N2
                                .LIST
                                .ENDM
010110                                  COMMENT
        000200                  N2=200
        000200                  N=N2
        000200                  XN=N2
010110                          TS \N2,2
                                        ;REFERANCE NUMBER DEFINITION
010110                          T200:                                   ;REFERENCE DESIGNATION
        000201                  N2=N2+1
010110  000005                  ST103A: RESET                           ;INITIALIZE INTERFACE
010112  012767  000340  167656          MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
010120  104004                          TYPE                            ;TYPE "103A MODEM CONNECT-
010122  016227                          MT103T                          ;DISCONNECT TEST"
010124  022767  000176  005474          CMP     #SWREG,SWR
010132  001001                          BNE     1$
010134  104025                          CNTLUU
010136  012767  010154  001600  1$:     MOV     #T103A,FATRET           ;SET UP FOR FATAL ERROR
010144  012767  010152  172072          MOV     #ST103B,KRET            ;SET UP FOR LINE CHANGE
010152  104017                  ST103B: GETLNS                          ;INPUT ORIGINATE AND
                                                                        ;AND ANSWER LINE NUMBERS
010154  104020                  T103A:  SETUP                           ;SET UP TO RECEIVE INTERRUPTS
                                                                        ;WAIT FOR RING
010156  010166                          T103B                           ;GO HERE IF RING OK
010160  010162                          T103A1                          ;GO HERE IF NO RING
010162  104012                  T103A1: ERROR                           ;NO RING WITHIN 5 MINUTES
010164  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

010166  104021                  T103B:  CKRING                          ;CHECK FOR RING INTERRUPT
                                                                        ;ONLY ON ANSWER LINE
                                                                        ;AND NO TRANSITIONS ON
                                                                        ;ORIGINATE LINE
010170  010206                          T103C                           ;GO HERE IF TRANSITIONS
                                                                        ;ARE CORRECT
```

```
 52 010172  010176                    T103B1                          ;GO HERE IF INCORRECT
 53                                                                    ;TRANSITION ON ANSWER LINE
 54 010174  010202                    T103B2                          ;GO HERE IF INCORRECT TRANSITION
 55                                                                    ;ON ORIGINATE LINE
 56 010176  104014          T103B1:    ERRORT                          ;TRANSITION ERROR ON ANSWER LINE
 57 010200  000207                     RTS       PC                    ;CONTINUE CHECKING
 58 010202  104014          T103B2:    ERRORT                          ;TRANSITION ERROR ON ORIGINATE LINE
 59 010204  000762                     BR        ST103B                ;RESELECT LINES AND REDIAL
```

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

010206  016777  005472  005376  T103C:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO
                                                                        ;ANSWER LINE NUMBER
010214  052777  000002  005372          BIS     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON
                                                                        ;SELECTED ANSWER LINE
010222  104026                          CKINTT
010224  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

010226  104023                          CKTRAN                          ;CHECK TRANSITIONS AND
                                                                        ;STATUS ON SELECTED
                                                                        ;ANSWER AND ORIGINATE LINES
010230  000143                          CO+CS+LINENA+TRMRDY             ;EXPECT CARRIER, CLEAR TO SEND,
                                                                        ;LINE ENABLE AND TERMINAL
                                                                        ;READY STATUS BITS SET ON
                                                                        ;ANSWER LINE
010232  000143                          CO+CS+LINENA+TRMRDY             ;EXPECT CARRIER, CLEAR TO SEND,
                                                                        ;LINE ENABLE  , AND TERMINAL
                                                                        ;READY STATUS BITS ON
                                                                        ;ORIGINATE LINE
010234  100006                          RINGF+XCO+XCS                   ;EXPECT CARRIER, CLEAR TO SEND
                                                                        ;AND POSSIBLE RING TRANSITIONS
                                                                        ;ON ANSWER LINE
010236  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ORIGINATE LINE
010240  010252                          T103D1                          ;GO HERE ON ANSWER LINE STATUS ERROR

010242  010256                          T103D2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
010244  010262                          T103D3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
010246  010266                          T103D4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
010250  010272                          T103E                           ;GO TO NEXT TEST IF NO ERRORS
010252  104015          T103D1: ERRORS                                  ;ANSWER LINE STATUS ERROR
010254  000207                  RTS     PC                              ;CONTINUE CHECKING
010256  104015          T103D2: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
010260  000207                  RTS     PC                              ;CONTINUE CHECKING
010262  104014          T103D3: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
010264  000207                  RTS     PC                              ;CONTINUE CHECKING
010266  104014          T103D4: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
010270  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

010272  104004                T103E:  TYPE                            ;TYPE 'STRIKE ANY TTY KEY
010274  016472                        MDISC                           ;TEST DISCONNECT"
010276  012767  000340  167472        MOV     #340,PS                 ;LOCK OUT INTERRUPTS
010304  012777  011766  005274        MOV     #TRNTYP,@DHMVEC ;SET UP TO DETECT TRANSITIONS
                                                                        ;BEFORE DISCONNECT SEQUENCE STARTS
010312  012767  010332  005412        MOV     #T103ES,RNGRET          ;SET UP DUMMY RETURN FOR
                                                                        ;RING INTERRUPT
010320  012777  000140  005264        MOV     #SCNENA+INTENA,@DHMCSR  ;SET SCAN ENABLE AND INTERRUPT ENABLE
010326  005067  167444                CLR     PS                      ;ALLOW INTERRUPTS
010332  005077  005262        T103ES: CLR     @TKDBR
010336  105777  005254        1$:     TSTB    @TKCSR                  ;WAIT FOR TTY TO HIT
010342  100375                        BPL     1$
010344  005777  005250                TST     @TKDBR
010350  012767  000340  167420        MOV     #340,PS                 ;START DISCONNECT SEQUENCE
010356  005077  005230                CLR     @DHMCSR                 ;CLEAR CONROL REGISTER
010362  016777  005314  005222        MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
010370  042777  000002  005216        BIC     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON SELECTED LINE
010376  104026                        CKINTT
010400  104022                        WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
```

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

010402  104023                          CKTRAN                          ;CHECK TRANSITIONS AND
                                                                        ;STATUS ON SELECTED
                                                                        ;ANSWER AND ORIGINATE LINES
010404  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ANSWER LINE
010406  000001                          LINENA                          ;EXPECT LINE ENABLE STATUS BIT
                                                                        ;SET ON ORIGINATE LINE
010410  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ANSWER LINE
010412  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ORIGINATE LINE
010414  010426                          T103E1                          ;GO HERE ON ANSWER LINE STATUS ERROR

010416  010432                          T103E2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
010420  010436                          T103E3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
010422  010442                          T103E4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
010424  010446                          T103EN                          ;GO TO NEXT TEST IF NO ERRORS
010426  104015                  T103E1: ERRORS                          ;ANSWER LINE STATUS ERROR
010430  000207                          RTS     PC                      ;CONTINUE CHECKING
010432  104015                  T103E2: ERRORS                          ;ORIGINATE LINE STATUS ERROR
010434  000207                          RTS     PC                      ;CONTINUE CHECKING
010436  104014                  T103E3: ERRORT                          ;ANSWER LINE TRANSITION ERROR
010440  000207                          RTS     PC                      ;CONTINUE CHECKING
010442  104014                  T103E4: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
010444  000207                          RTS     PC                      ;CONTINUE CHECKING

010446                          TS \N2,2
                                        ;REFERANCE NUMBER DEFINITION
010446                          T201:                                   ;REFERENCE DESIGNATION
        000202                  N2=N2+1
010446  104004                  T103EN: TYPE                            ;TYPE " 103A TEST COMPLETE'
010450  016414                          MT103A
010452  005067  005162                 CLR     TSTNO                   ;CLEAR TEST NUMBER FOR LOOPING
010456  104026                          CKINTT
010460  000167  177466                 JMP     ST103B                  ;SELECT NEW LINE NUMBERS AND
                                                                        ;RESTART TEST
```

```
 1
 2                                          ;MODEM CONTROL ON LINE TEST USING 202C TYPE MODEMS
 3                                          ;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
 4                                          ;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
 5                                          ;USING THE MODEM CONTROL TO CONTROL 202C TYPE MODEMS
 6
 7                                          ;ALSO TESTED ARE LINE TURN AROUND AND
 8                                          ;SECONDARY TRANS1IT SECONDARY RECEIVE
 9
10                                  .MACRO  COMMENT
11                                  .NLIST
12                                  N3=300
13                                  N=N3
14                                  XN=N3
15                                  .LIST
16                                  .ENDM
17 010464                                   COMMENT
           000300                   N3=300
           000300                   N=N3
           000300                   XN=N3
18 010464                           TS \N3,3
                                            ;REFERANCE NUMBER DEFINITION
   010464                           T300:                                   ;REFERENCE DESIGNATION
           000301                   N3=N3+1
19 010464  000005                  ST202A: RESET                           ;INITIALIZE INTERFACE
20 010466  012767  000340  167302          MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
21 010474  104004                          TYPE                            ;TYPE "202C MODEM CONNECT-
22 010476  016300                          MT202T                          ;DISCONNECT TEST"
23 010500  022767  000176  005120          CMP     #SWREG,SWR
24 010506  001001                          BNE     1$
25 010510  104025                          CNTLUU
26 010512  012767  010530  001224  1$:     MOV     #T202A,FATRET           ;SET UP FOR FATAL ERROR
27 010520  012767  010526  171516          MOV     #ST202B,KRET            ;SET UP FOR LINE CHANGE
28 010526  104017                  ST202B: GETLNS                          ;INPUT ORIGINATE AND
29                                                                          ;ANSWER LINE NUMBERS
30 010530  104020                  T202A:  SETUP                           ;SET UP TO RECEIVE INTERRUPTS
31                                                                          ;WAIT FOR RING
32 010532  010542                          T202B                           ;GO HERE IF RING OK
33 010534  010536                          T202A1                          ;GO HERE IF NO RING
34 010536  104012                  T202A1: ERROR                           ;NO RING WITHIN 5 MINUTES
35 010540  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

010542  104021          T202B:  CKRING                  ;CHECK FOR RING INTERRUPT
                                                        ;ONLY ON ANSWER LINE
                                                        ;AND NO TRANSITIONS ON
                                                        ;ORIGINATE LINE
010544  010562                  T202C                   ;GO HERE IF TRANSITIONS
                                                        ;ARE CORRECT
010546  010552                  T202B1                  ;GO HERE IF INCORRECT
                                                        ;TRANSITION ON ANSWER LINE
010550  010556                  T202B2                  ;GO HERE IF INCORRECT
                                                        ;TRANSITION ON ORIGINATE LINE
010552  104014          T202B1: ERRORT                  ;ANSWER LINE TRANSITION ERROR
010554  000207                  RTS     PC              ;CONTINUE CHECKING
010556  104014          T202B2: ERRORT                  ;ORIGINATE LINE TRANSITION ERROR
010560  000762                  BR      ST202B          ;RESELECT LINES AND REDIAL
```

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

010562  016777  005116  005022  T202C:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
010570  052777  000002  005016          BIS     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON ANSWER LINE
010576  016777  005100  005006  T202D:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
010604  052777  000004  005002          BIS     #RS,@DHMLSR             ;SET REQUEST TO SEND ON ORIGINATE LINE
010612  104026                          CKINTT
010614  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

010616  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
010620  000103                          CO+LINENA+TRMRDY                ;EXPECT CARRIER, LINE ENABLE
                                                                        ;AND TERMINAL READY STATUS
                                                                        ;BITS SET ON ANSWER LINE
010622  000147                          RS+CO+CS+LINENA+TRMRDY          ;EXPECT REQUEST TO SEND, CLEAR
                                                                        ;TO SEND, CARRIER, LINE ENABLE
                                                                        ;AND TERMINAL READY STATUS BITS
                                                                        ;SET ON ORIGINATE LINE
010624  100004                          RINGF+XCO                       ;EXPECT CARRIER AND POSSIBLE
                                                                        ;RING TRANSITIONS ON
                                                                        ;ANSWER LINE
010626  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ORIGINATE LINE
010630  010642                          T202D1                          ;GO HERE ON ANSWER LINE STATUS ERROR
010632  010646                          T202D2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
010634  010652                          T202D3                          ;GO HERE ON ANSWER LINE STATUS ERROR
010636  010656                          T202D4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
010640  010662                          T202E                           ;GO TO NEXT TEST IF NO ERRORS
010642  104015          T202D1: ERRORS                                  ;ANSWER LINE SATAUS ERROR
010644  000207                  RTS     PC                              ;CONTINUE CHECKING
010646  104015          T202D2: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
010650  000207                  RTS     PC                              ;CONTINUE CHECKING
010652  104014          T202D3: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
010654  000207                  RTS     PC                              :CONTINUE CHECKING
010656  104014          T202D4: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
010660  000207                  RTS     PC                              ;CONTINUE CHECKING
```

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

010662  016777  005016  004722  T202E:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
010670  052777  000010  004716          BIS     #SECTX,@DHMLSR          ;SET SECONDARY RECEIVE ON ANSWER LINE
010676  104026                          CKINTT
010700  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

010702  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
010704  000133                          SECTX+CO+LINENA+TRMRDY+SECRX    ;EXPECT SECONDARY TRANSMIT
                                                                        ;SECONDARY RECEIVE, CARRIER
                                                                        ;LINE ENABLE AND TERMINAL READY
                                                                        ;STATUS BITS SET ON ANSWER LINE
010706  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
010710  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ANSWER LINE
010712  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ORIGINATE LINE
010714  010726                          T202E1                          ;GO HERE ON ANSWER LINE STATUS ERROR
010716  010732                          T202E2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
010720  010736                          T202E3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
010722  010742                          T202E4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
010724  010746                          T202F                           ;GO TO NEXT TEST IF NO ERRORS
010726  104015          T202E1: ERRORS                                  ;ANSWER LINE STATUS ERROR
010730  000207                  RTS     PC                              ;CONTINUE CHECKING
010732  104015          T202E2: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
010734  000207                  RTS     PC                              ;CONTINUE CHECKING
010736  104014          T202E3: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
010740  000207                  RTS     PC                              ;CONTINUE CHECKING
010742  104014          T202E4: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
010744  000207                  RTS     PC                              ;CONTINUE CHECKING
```

```
                                        ;DROP REQUEST TO SEND ON ORIGINATE LINE
                                        ;DROP SECONDARY TRANSMIT ON ANSWER LINE
                                        ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES

010746  016777  004730  004636  T202F:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
010754  042777  000004  004632          BIC     #RS,@DHMLSR             ;DROP REQUEST TO SEND
010762  016777  004716  004622          MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
010770  042777  000010  004616          BIC     #SECTX,@DHMLSR          ;DROP SECONDARY RECEIVE
010776  104026                          CKINTT
011000  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

011002  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
011004  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ANSWER LINE
011006  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ORIGINATE LINE
011010  000005                          XCO+XSCRX                       ;EXPECT CARRIER AND SECONDARY
                                                                        ;RECEIVE TRANSITIONS ON
                                                                        ;ANSWER LINE
011012  000007                          XCO+XCS+XSCRX                   ;EXPECT CARRIER, CLEAR TO SEND
                                                                        ;AND SECONDARY RECEIVE
                                                                        ;TRANSITIONS ON ORIGINATE LINE
011014  011026                          T202F2                          ;GO HERE ON ANSWER LINE STAATUS ERROR
011016  011032                          T202F3                          ;GO HERE ON ORIGINATE LINE STATUS ERRORO
011020  011036                          T202F4                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
011022  011042                          T202F5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011024  011046                          T202G                           ;GO TO NEXT TEST IF NO ERRORS
011026  104015                  T202F2: ERRORS                          ;ANSWER LINE STATUS ERROR
011030  000207                          RTS     PC                      ;CONTINUE CHECKING
011032  104015                  T202F3: ERRORS                          ;ORIGINATE LINE STATUS ERROR
011034  000207                          RTS     PC                      ;CONTINUE CHECKING
011036  104014                  T202F4: ERRORT                          ;ANSWER LINE TRANSITION ERROR
011040  000207                          RTS     PC                      ;CONTINTUE CHECKING
011042  104014                  T202F5: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011044  000207                          RTS     PC                      ;CONTINUE CHECKING
```

```
                                        ;SET REQUEST TO SEND ON ANSWER LINE
                                        ;WAIT FOR TRANSITIONS ON SELECTED LINES

011046  016777  004632  004536  T202G:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
011054  052777  000004  004532          BIS     #RS,@DHMLSR             ;SET REQUEST TO SEND
011062  104026                          CKINTT
011064  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

011066  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
011070  000147                          RS+CO+CS+LINENA+TRMRDY          ;EXPECT LINE ENABLE, TERMINAL
                                                                        ;READY, REQUEST TO SEND, CLEAR
                                                                        ;TO SEND, AND CARRIER
                                                                        ;STATUS BITS SET ON  ANSWER LINE
011072  000103                          CO+LINENA+TRMRDY                ;EXPECT LINE ENABLE, TERMINAL
                                                                        ;READY AND CARRIER STATUS
                                                                        ;BITS SET ON ORIGINATE LINE
011074  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ANSWER LINE
011076  000004                          XCO                             ;EXPECT CARRIER TRANSITION
                                                                        ;ON ORIGINATE LINE
011100  011112                          T202G1                          ;GO HERE ON  ANSWER LINE STATUS ERROR
011102  011116                          T202G2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
011104  011122                          T202G3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
011106  011126                          T202G4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011110  011132                          T202H                           ;GO TO NEXT TEST IF NO ERRORS
011112  104015          T202G1: ERRORS                                  ;ANSWER LINE STATUS ERROR
011114  000207                  RTS     PC                              ;CONTINUE TESTING
011116  104015          T202G2: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
011120  000207                  RTS     PC                              ;CONTINUE TESTING
011122  104014          T202G3: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
011124  000207                  RTS     PC                              ;CONTINUE TESTING
011126  104014          T202G4: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
011130  000207                  RTS     PC                              ;CONTINUE TESTING
```

```
 1
 2                                          ;SET SECONDARY TRANSMIT ON ORIGINATE LINE
 3                                          ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
 4
 5 011132  016777  004544  004452  T202H:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
 6 011140  052777  000010  004446          BIS     #SECTX,@DHMLSR          ;SET SECONDARY TRANSMIT
 7 011146  104026                          CKINTT
 8 011150  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
 9
10                                          ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
11                                          ;SELECTED ORIGINATE AND ANSWER LINES
12
13 011152  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
14                                                                          ;ON SELECTED ANSWER AND
15                                                                          ;ORIGINATE LINES
16 011154  000167                          RS+CS+CO+LINENA+TRMRDY+SECRX    ;EXPECT LINE ENABLE, TERMINAL
17                                                                          ;READY, REQUEST TO SEND, CLEAR
18                                                                          ;TO SEND, CARRIER AND SECONDARY
19                                                                          ;RECEIVE STATUS BITS SET
20                                                                          ;ON ANSWER LINE
21 011156  000133                          SECTX+CO+LINENA+TRMRDY+SECRX    ;EXPECT LINE ENABLE, TERMINAL
22                                                                          ;READY, CARRIER, SECONDARY
23                                                                          ;TRANSMIT AND SECONDARY
24                                                                          ;RECEIVE STATUS BITS SET
25                                                                          ;ON ORIGINATE LINE
26 011160  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
27                                                                          ;TRANSITION ON ANSWER LINE
28 011162  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
29                                                                          ;TRANSITION ON ORIGINATE LINE
30 011164  011176                          T202H2                          ;GO HERE ON ANSWER LINE STATUS ERROR
31 011166  011202                          T202H3                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
32 011170  011206                          T202H4                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
33 011172  011212                          T202H5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
34 011174  011216                          T202I                           ;GO TO NEXT TEST IF NO ERRORS
35 011176  104015          T202H2: ERRORS                                  ;ANSWER LIN STATUS ERROR
36 011200  000207                  RTS     PC                              ;CONTINUE CHECKING
37 011202  104015          T202H3: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
38 011204  000207                  RTS     PC                              ;CONTINUE CHECKING
39 011206  104014          T202H4: ERRORT                                  ;ANSWER LINE TRANSITION ERROR
40 011210  000207                  RTS     PC                              ;CONTINUE CHECKING
41 011212  104014          T202H5: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
42 011214  000207                  RTS     PC                              ;CONTINUE CHECKING
```

```
                                        ;DROP REQUEST TO SEND ON ANSWER LINE
                                        ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES

011216  016777  004462  004366  T202I:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
011224  042777  000004  004362          BIC     #RS,@DHMLSR             ;CLEAR REQUEST TO SEND
011232  016777  004444  004352          MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
011240  042777  000010  004346          BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
011246  104026                          CKINTT
011250  104022                          WAITRN                          ;WAIT FRO TRANSITIONS TO OCCUR

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

011252  104023                          CKTRAN                          ;CHECK TRANSITION S AND STATUS
                                                                        ;ON SELECTED ANSWE AND
                                                                        ;ORIGINATE LINES
011254  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS SET
                                                                        ;ON ANSWER LINE
011256  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ORIGINATE LINE
011260  000007                          XCO+XCS+XSCRX                   ;EXPECT CARRIER, CLEAR TO SEND
                                                                        ;AND SECONDARY RECEIVE TRANSITIONS
                                                                        ;ON ANSWER LINE
011262  000005                          XCO+XSCRX                       ;EXPECT CARRIER AND SECONDARY
                                                                        ;RECEIVE TRANSITIONS ON
                                                                        ;ORIGINATE LINE
011264  011276                          T202I2                          ;GO HERE ON ANSWER LINE STATUS ERROR
011266  011302                          T202I3                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
011270  011306                          T202I4                          ;GO HERE ON ANSWER LINE TRANSITIN ERROR
011272  011312                          T202I5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011274  011316                          T202J                           ;GO TO NEXT TEST IF NO ERRORS
011276  104015          T202I2: ERRORS                                  ;ANSWER LINE STATUS ERROR
011300  000207                  RTS     PC                              ;CONTINUE CHECKING
011302  104015          T202I3: ERRORS                                  ;ORIGINATE LINE STATUS ERROR
011304  000207                  RTS     PC                              ;CONTINUE CHECKING
011306  104014          T202I4: ERRORT                                  ;ANSWE LINE TRANSITION ERROR
011310  000207                  RTS     PC                              ;CONTINUE CHECKING
011312  104014          T202I5: ERRORT                                  ;ORIGINATE LINE TRANSITION ERROR
011314  000207                  RTS     PC                              ;CONTINUE CHECKING
```

```
 1
 2                                          ;SET UP TO TEST DISCONNECT SEQUENCE
 3                                          ;THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
 4                                          ;TO INITIATE THE DISCONNECT SEQUENCE
 5                                          ;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
 6                                          ;DATA TO TALK MODE AS MANY TIMES AS DESIRED
 7                                          ;BEFORE THE SWITCH SEETIN IS MADE
 8                                          ;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
 9                                          ;REPORTED BY TYPEOUT
10
11 011316  104004                  T202J:  TYPE                            ;TYPE "STRIKE ANY TTY KEY
12 011320  016472                          MDISC                           ;TEST DISCONNECT"
13 011322  012767  000340  166446          MOV     #340,PS                 ;LOCK OUT INTERRUPTS
14 011330  012777  011766  004250          MOV     #TRNTYP,@DHMVEC         ;SET UP TO DETECT TRANSITIONS
15 011336  012767  011356  004366          MOV     #T202JS,RNGRET          ;SET UP DUMMY RETURN FOR RING
16                                                                          ;FROM RING INTERRUPT
17 011344  012777  000140  004240          MOV     #SCNENA+INTENA,@DHMCSR  ;ENABLE LINE SCANNER
18                                                                          ;START SCANNER
19 011352  005067  166420                  CLR     PS                      ;ENABLE INTERRUPTS
20 011356  005077  004236          T202JS: CLR     @TKDBR
21 011362  105777  004230          1$:     TSTB    @TKCSR
22 011366  100375                  BPL     1$
23 011370  005777  004224                  TST     @TKDBR
24
25                                          ;DISCONNECT SEQUENCE REQUESTED
26
27 011374  012767  000340  166374          MOV     #340,PS                 ;LOCK OUT INTERRUPTS
28 011402  005077  004204                  CLR     @DHMCSR                 ;STOP SCANNER
29 011406  016777  004270  004176          MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
30 011414  042777  000002  004172          BIC     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON SELECTED LINE
31 011422  104024                          WAITS                           ;DELAY
32 011424  104026                          CKINTT
33 011426  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
```

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

011430  104023                  CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                ;ON SELECTED ASNWER AND
                                                                ;ORIGINATE LINES
011432  000003                  LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                ;TERMINAL READY STATUS BITS
                                                                ;SET ON ANSWER LINE
011434  000001                  LINENA                          ;EXPECT LINE ENABLE STATUS
                                                                ;BIT SET ON ORIGINATE LINE
011436  000000                  0                               ;EXPECT NO TRANSITIONS ON
                                                                ;ANSWER LINE
011440  000000                  0                               ;EXPECT NO TRANSITIONS ON
                                                                ;ORIGINATE LINE
011442  011454                  T202J1                          ;GO HERE IF ANSWER LINE STATUS ERROR
011444  011460                  T202J2                          ;GO HERE IF ORIGINATE LINE STATUS ERROR
011446  011464                  T202J3                          ;GO HERE IF ANSWER LINE TRANSITION ERROR
011450  011470                  T202J4                          ;GO HERE IF ORIGINATE LINE TRANSITIONS ERROR
011452  011474                  T202JN                          ;GO TO END OF TEST IF NO ERRORS
011454  104015          T202J1: ERRORS                          ;ANSWER LINE STATUS ERRORO
011456  000207                  RTS     PC                      ;CONTINUE CHECKING
011460  104015          T202J2: ERRORS                          ;ORIGINATE LINE STATUS ERRROR
011462  000207                  RTS     PC                      ;CONTINUE CHECKING
011464  104014          T202J3: ERRORT                          ;ANSWER LINE TRANSITION ERROR
011466  000207                  RTS     PC                      ;CONTINUE CHECKING
011470  104014          T202J4: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011472  000207                  RTS     PC                      ;CONTINUE CHECKING

011474  104004          T202JN: TYPE                            ;TYPE "202C TEST COMPLETE"
011476  016443                  MT202A
011500  104026                  CKINTT
011502  000167  177020          JMP     ST202B                  ;GET NEW LINE NUMBERS
                                                                ;RESTART TEST
```

```
 1
 2                                          ;DETECT AND RECORD TRANSITIONS ON SELECTED
 3                                          ;ORIGINATE AND ANSWER LINES
 4
 5                                          ;TRANSITION DATA IS STORED IN LOCATIONS ANSFLG AND ORGFLG
 6                                          ;FOR ANSWER AND ORIGINATE LINES RESPECTIVELY
 7                                          ;FORMAT OF DATA IS (FOR BOTH LINES)
 8
 9                                          ;BIT0=1,SECONDARY RECEIVE CAUSED INTERRUPT
10                                          ;BIT1=1, CLEAR TO SEND CAUSED INTERRUPT
11                                          ;BIT2=1, CARRIER CAUSED INTERRUPT
12                                          ;BIT3=1, RING CAUSED INTERRUPT
13
14 011506  017704  004100          TRANS:  MOV     @DHMCSR,R4              ;GET LINE NUMBER AND
15                                                                          ;INTERRUPT FLAGS
16 011512  010405                          MOV     R4,R5
17 011514  042705  177760                  BIC     #177760,R5              ;EXTRACT LINE NUMBER
18 011520  026705  004156                  CMP     LINORG,R5               ;DID ORIGINATE LINE INTERRUPT
19 011524  001411                          BEQ     ORGTR                   ;IF YES, SERVICE
20 011526  026705  004152                  CMP     LINANS,R5               ;DID ANSWER LINE INTERRUPT
21 011532  001443                          BEQ     ANSTR                   ;IF YES, SERVICE
22 011534  010577  004052                  MOV     R5,@DHMCSR
23 011540  017703  004050                  MOV     @DHMLSR,R3
24 011544  104016                          ERRORN                          ;INTERRUPT ON INCORRECT LINE
25 011546  000471                          BR      FATEX
26
27                                          ;RECORD TRANSITIONS FOR ORIGINATE LINE
28
29 011550  032704  100000          ORGTR:  BIT     #RINGF,R4               ;IF RING CAUSED INTERRUPT,
30 011554  001403                          BEQ     ORGTR1                  ;SET RING TRANSITION BIT
31 011556  052767  000010  004124          BIS     #10,ORGFLG
32 011564  032704  040000          ORGTR1: BIT     #COF,R4                 ;IF CARRIER CAUSED INTERRUPT
33 011570  001403                          BEQ     ORGTR2                  ;SET CARRIER TRANSITION BIT
34 011572  052767  000004  004110          BIS     #4,ORGFLG
35 011600  032704  020000          ORGTR2: BIT     #CSF,R4                 ;IF CLEAR TO SEND
36                                                                          ;CAUSED INTERRUPT
37 011604  001403                          BEQ     ORGTR3                  ;SET CLEAR TO SEND
38                                                                          ;TRANSITION BIT
39 011606  052767  000002  004074          BIS     #2,ORGFLG
40 011614  032704  010000          ORGTR3: BIT     #SECRXF,R4              ;IF SECONDARY RECEIVE
41                                                                          ;CAUSED INTERRUPT
42 011620  001403                          BEQ     ORGTR4                  ;SET SECONDARY RECEIVE
43 011622  052767  000001  004060          BIS     #1,ORGFLG               ;TRANSITION BIT
44 011630  032704  170000          ORGTR4: BIT     #RINGF+COF+CSF+SECRXF,R4
45                                                                          ;IF NO INTERRUPT FLAGS SET
46 011634  001044                          BNE     TRANEX                  ;EXIT TRANSITION DETECTION
47 011636  104016                  ORGTRR: ERRORN
48 011640  000434                          BR      FATEX
```

```
                                        ;RECORD TRANSITIONS FOR ANSWER LINE
                                        ;
011642  032704  100000          ANSTR:  BIT     @RINGF,R4               ;IF RING CAUSED INTERRUPT,
011646  001403                          BEQ     ANSTR1                  ;SET RING TRANSITION BIT
011650  052767  000010  004030          BIS     #10,ANSFLG
011656  032704  040000          ANSTR1: BIT     @COF,R4                 ;IF CARRIER CAUSED INTERRUPT
011662  001403                          BEQ     ANSTR2                  ;SET CARRIER TRANSITION BIT
011664  052767  000004  004014          BIS     #4,ANSFLG
011672  032704  020000          ANSTR2: BIT     @CSF,R4                 ;IF CLEAR TO SEND
                                                                        ;CAUSED INTERRUPT
011676  001403                          BEQ     ANSTR3                  ;SET CLEAR TO SEND
                                                                        ;TRANSITION BIT
011700  052767  000002  004000          BIS     #2,ANSFLG
011706  032704  010000          ANSTR3: BIT     @SECRXF,R4              ;IF SECONDARY RECEIVE
                                                                        ;CAUSED INTERRUPT
011712  001403                          BEQ     ANSTR4                  ;SET SECONDARY RECEIVE
011714  052767  000001  003764          BIS     #1,ANSFLG               ;TRANSITION BIT
011722  032704  170000          ANSTR4: BIT     @RINGF+COF+CSF+SECRXF,R4
                                                                        ;IF NO INTERRUPT FLAGS SET
011726  001007                          BNE     TRANEX                  ;EXIT TRANSITION DETECTION
011730  104016                  ANSTRR: ERRORN
011732  005067  003702          FATEX:  CLR     TSTNO
011736  022626                          POP2SP
011740  000177  000000                  JMP     @FATRET
011744  000000                  FATRET: 0
                                        ;EXIT TRANSITION DETECTION
                                        ;
011746  005704                  TRANEX: TST     R4                      ;IF RING FLAG WAS SET
011750  100002                          BPL     .+6                     ;SET UP SPECIAL RETURN
011752  016716  003754                  MOV     RNGRET,(SP)
011756  012777  000140  003626  TRANX1: MOV     @SCNENA+INTENA,@DHMCSR  ;RESTART SCANNER
011764  000002                          RTI
                                        ;
                                        ;TYPE TRANSITION DATA AND RETURN
                                        ;
011766  017767  003620  000756  TRNTYP: MOV     @DHMCSR,DATA1
011774  017767  003614  000752          MOV     @DHMLSR,DATA2
012002  104004                          TYPE
012004  017114                          MTRNDET
012006  104006                          OCTASC
012010  012014                          TRNTAB
012012  000761                          BR      TRANX1
012014  000002                  TRNTAB: 2
012016  000006                          6
012020  012752                          DATA1
012022  000003                          3
012024  012754                          DATA2
```

```

                                            ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD

012026  000005                      GETLIN: RESET
012030  104013                              INSTRG                          ;TYPE "ORIGINATE LINE '
012032  016351                              MSELOR                          ;AND GET LINE NUMBER
012034  000000                              0
012036  000017                              17
012040  015702                              LINORG
012042  104013                              INSTRG                          ;TYPE 'ANSWER LINE-"
012044  016375                              MSELANS                         ;AND GET LINE NUMBER
012046  000000                              0
012050  000017                              17
012052  015704                              LINANS
012054  104004                              TYPE
012056  017005                              MCRLF
012060  000002                              RTI                             ;RETURN TO CALLING ROUTINE

                                            ;INITIALIZE INTERFACE

012062  000005                      SETUPS: RESET
012064  012767  000340  165704              MOV     #340,PS                 ;LOCK OUT ALL INTERRUPTS
012072  011605                              MOV     (SP),R5
012074  012567  000662                      MOV     (R5)+,NXTTS
012100  012567  000636                      MOV     (R5)+,ERR1
012104  010516                              MOV     R5,(SP)
012106  012777  006000  003476              MOV     #CLRSCN+CLRMUX,@DHMCSR  ;CLEAR LINE SCANNER AND MULTIPLEXER
012114  032777  000020  003470      SETUP1: BIT     #BUSY,@DHMCSR           ;WAIT FOR SCANNER TO CLEAR
012122  001374                              BNE     SETUP1
012124  005067  003502                      CLR     ERRFLG

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

012130  016777  003546  003454      SETUP2: MOV     LINORG,@DHMCSR          ;SET UP TO ENABLE ORIGINATE LINE
                                                                            ;ORIGINATE LINE NUMBER
012136  012777  000003  003450              MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE AND
                                                                            ;TERMINAL READY ON ORIGINATE LINE
012144  016777  003534  003440              MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
012152  012777  000001  003434              MOV     #LINENA,@DHMLSR         ;SET LINE ENABLE ON ANSWER LINE

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

012160  012777  011506  003420              MOV     #TRANS,@DHMVEC          ;SET UP INTERRUPT VECTOR
                                                                            ;FOR TRANSITION DETECTION
012166  012777  000340  003414              MOV     #340,@DHMLVL            ;SET UP INTERRUPT SERVICE LEVEL
012174  012777  000140  003410              MOV     #SCNENA+INTENA,@DHMCSR  ;START SCANNER, ENABLE INTERRUPTS
012202  005067  003500                      CLR     ANSFLG                  ;CLEAR TRANSITION DETECTED FLAGS
012206  005067  003476                      CLR     ORGFLG
012212  012767  012242  003512              MOV     #SETUP4,RNGRET          ;SET UP RETURN FROM
                                                                            ;DETECTION OF RING INTERRUPT
012220  104004                              TYPE                            ;REQUEST OPERATOR TO DIAL
012222  016171                              DIALM
012224  005067  165546                      CLR     PS                      ;CLEAR PROCESSOR STATUS WORD
012230  005067  003456                      CLR     TIME1                   ;CLEAR TIMER
```

```
 58 012234  012767  001000  003452          MOV     #1000,TIME2             ;SET UP FOR 5 MINUTE DELAY
 59 012242  005767  003440          SETUP4: TST     ANSFLG                  ;IF TRANSITION HAS OCCURED,
 60 012246  001014                          BNE     SETUPB                  ;EXIT WAIT LOOP
 61 012250  005767  003434                  TST     ORGFLG
 62 012254  001011                          BNE     SETUPB
 63 012256  005267  003430                  INC     TIME1                   ;ALLOW OPERATOR 5 MINUTES TO DIAL
 64 012262  001367                          BNE     SETUP4
 65 012264  005367  003424                  DEC     TIME2
 66 012270  001364                          BNE     SETUP4
 67 012272  022626                          POP2SP
 68 012274  000177  000442                  JMP     @ERR1
 69 012300  022626          SETUPB: POP2SP
 70 012302  000177  000454                  JMP     @NXTTS
 71 012306  012766  000340  000002          MOV     #340,+2(SP)
 72 012314  000002                          RTI
 73
 74                                         ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
 75
 76 012316  011605          CKRNG:  MOV     (SP),R5
 77 012320  012567  000436                  MOV     (R5)+,NXTTS
 78 012324  012567  000412                  MOV     (R5)+,ERR1
 79 012330  012567  000410                  MOV     (R5)+,ERR2
 80 012334  010516                          MOV     R5,(SP)
 81 012336  012705  000010                  MOV     #10,R5                  ;EXPECT RING ONLY ON ANSWER LINE
 82 012342  016704  003340                  MOV     ANSFLG,R4               ;GET ACTUAL TRANSITION DATA
 83 012346  016703  003332                  MOV     LINANS,R3               ;SET UP LINE NUMBER
 84 012352  020504                          CMP     R5,R4           ;DID RING CAUSE INTERRUPT
 85 012354  001402                          BEQ     CKRNG1                  ;ON ANSWER LINE
 86 012356  004777  000360                  JSR     PC,@ERR1
 87 012362  005005          CKRNG1: CLR     R5
 88 012364  016704  003320                  MOV     ORGFLG,R4
 89 012370  016703  003306                  MOV     LINORG,R3
 90 012374  005704                          TST     R4                      ;IF TRANSITION OCCURED
 91 012376  001403                          BEQ     CKRNG2                  ;ON ORIGINATE LINE, ERROR
 92 012400  022626                          POP2SP
 93 012402  000177  000336                  JMP     @ERR2
 94 012406  022626          CKRNG2: POP2SP
 95 012410  000177  000346                  JMP     @NXTTS
```

```
    1
    2 012414  005067  003266          WAITR:  CLR     ANSFLG
    3 012420  005067  003264                  CLR     ORGFLG
    4 012424  012777  011506  003154          MOV     #TRANS,@DHMVEC
    5 012432  012767  012452  003272          MOV     #WAITRR,RNGRET          ;SET UP FOR RETURN
    6                                                                          ;FROM RING DETECTION
    7 012440  012777  000140  003144          MOV     #SCNENA+INTENA,@DHMCSR  ;START SCANNER
    8 012446  005067  165324                  CLR     PS
    9 012452  005067  003234          WAITRR: CLR     TIME1
   10 012456  012767  000025  003230          MOV     #25,TIME2
   11 012464  005267  003222          WAITR1: INC     TIME1                   ;WAIT FOR TRANSITIONS OF
   12 012470  001375                          BNE     WAITR1                  ;CARRIER AND CLEAR TO SEND
   13 012472  005367  003216                  DEC     TIME2
   14 012476  001372                          BNE     WAITR1
   15 012500  000002                          RTI
   16
   17                                         ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
   18                                         ;SELECTED ORIGINATE AND ANSWER LINES
   19
   20 012502  012767  000340  165266  CKTRN:  MOV     #340,PS                 ;LOCK OUT FURTHER INTERRUPTS
   21 012510  005077  003076                  CLR     @DHMCSR                 ;STOP LINE SCANNER
   22 012514  011605                          MOV     (SP),R5
   23 012516  012567  000230                  MOV     (R5)+,DATA1
   24 012522  012567  000226                  MOV     (R5)+,DATA2
   25 012526  012567  000224                  MOV     (R5)+,DATA3
   26 012532  012567  000222                  MOV     (R5)+,DATA4
   27 012536  012567  000200                  MOV     (R5)+,ERR1
   28 012542  012567  000176                  MOV     (R5)+,ERR2
   29 012546  012567  000174                  MOV     (R5)+,ERR3
   30 012552  012567  000172                  MOV     (R5)+,ERR4
   31 012556  012567  000200                  MOV     (R5)+,NXTTS
   32 012562  010516                          MOV     R5,(SP)
   33 012564  016705  000162                  MOV     DATA1,R5
   34 012570  016777  003110  003014          MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
   35 012576  017704  003012                  MOV     @DHMLSR,R4              ;GET ACTUAL ANSWER LINE STATUS
   36 012602  016703  003076                  MOV     LINANS,R3
   37 012606  020504                          CMP     R5,R4                   ;COMPARE
   38 012610  001402                          BEQ     CKTRN1
   39 012612  004777  000124                  JSR     PC,@ERR1
   40 012616  016777  003060  002766  CKTRN1: MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
   41 012624  017704  002764                  MOV     @DHMLSR,R4              ;GET ACTUAL ORIGINATE LINE STATUS
   42 012630  016705  000120                  MOV     DATA2,R5
   43 012634  016703  003042                  MOV     LINORG,R3
   44 012640  020504                          CMP     R5,R4                   ;COMPARE
   45 012642  001402                          BEQ     CKTRN2
   46 012644  004777  000074                  JSR     PC,@ERR2
```

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

012650  105767  000103          CKTRN2: TSTB    DATA3+1
012654  100003                  BPL     .+10
012656  042767  000010  003022          BIC     #10,ANSFLG
012664  116704  003016                  MOVB    ANSFLG,R4               ;GET TRANSITION DATA FOR
012670  116705  000062                  MOVB    DATA3,R5
012674  016703  003004                  MOV     LINANS,R3
012700  020504                          CMP     R5,R4                   ;DID CORRECT TRANSITIONS OCCUR
012702  001402                          BEQ     CKTRN3
012704  004777  000036                  JSR     PC,@ERR3
012710  016704  002774          CKTRN3: MOV     ORGFLG,R4               ;GET TRANSITION DATA FOR
012714  016705  000040                  MOV     DATA4,R5
012720  016703  002756                  MOV     LINORG,R3
012724  020504                          CMP     R5,R4                   ;DID CORRECT TRANSITIONS OCCUR
012726  001402                          BEQ     CKTRN4
012730  004777  000014                  JSR     PC,@ERR4
012734  022626                  CKTRN4: POP2SP
012736  000177  000020                  JMP     @NXTTS
012742  000000                  ERR1:   0
012744  000000                  ERR2:   0
012746  000000                  ERR3:   0
012750  000000                  ERR4:   0
012752  000000                  DATA1:  0
012754  000000                  DATA2:  0
012756  000000                  DATA3:  0
012760  000000                  DATA4:  0
012762  000000                  NXTTS:  0
```

```
  1
  2                                     ;END OF PASS
  3                                     ;UPDATE PASS COUNT
  4                                     ;TYPE END OF PASS MESSAGE
  5
  6 012764                              EOP:
  7 012764  005267  002646                      INC     PASCNT                  ;UPDATE PASS COUNT
  8 012770  012767  000001  002642              MOV     #1,TSTNO                ;START AT FIRST TEST OF GROUP
  9 012776  000005                              RESET                           ;CLEAR THE WORLD
 10 013000  005067  002724                      CLR     FILLA                   ;INIT COUNTER
 11 013004  005367  002720              1$:     DEC     FILLA                   ;COUNT THE CTR
 12 013010  001375                              BNE     1$                      ;BR TIL STALL TIMES OUT
 13 013012  104004                              TYPE                            ; RING BELL
 14 013014  017271                              MEPASS
 15 013016  016701  165020                      MOV     42,R1                   ;ARE YOU ON ACT11?
 16 013022  001521                              BEQ     TSTENT          ;NO
 17 013024  000005                              RESET
 18 013026  004711                      LOGICAL:        JSR     PC,(R1)
 19 013030  000240                              NOP
 20 013032  000240                              NOP
 21 013034  000240                              NOP
 22 013036  000240                              NOP
 23 013040  000167  000222                      JMP     TSTENT                  ;GET ADDRESS OF FIRST TEST
 24
 25                                     ;EMT DISPATCH SERVICE
 26                                     ;ARGUMENT OF EMT IS EXTRACTED
 27                                     ;AND USED AS OFFSET TO OBTAIN POINTER
 28                                     ;TO SELECTED SUBROUTINE
 29
 30 013044  011646                      EMTSRV: MOV     (SP),-(SP)              ;GET PC OF RETURN
 31 013046  162716  000002                      SUB     #2,(SP)                 ;=PC OF EMT
 32 013052  017616  000000                      MOV     @(SP),(SP)              ;GET EMT
 33 013056  006316                      EMTOK:  ASL     (SP)                    ;MULTIPLY EMT ARG BY 2
 34 013060  042716  177001                      BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
 35 013064  062716  017426                      ADD     #EMTTAB,(SP)            ;POINTER TO SUBROUTINE ADDRESS
 36 013070  017616  000000                      MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
 37 013074  000136                              JMP     @(SP)+                  ;GO TO SUBROUTINE
 38
 39 013076  105777  002514              CKINT:  TSTB    @TKCSR
 40 013102  100001                              BPL     1$
 41 013104  104027                              KBDIN
 42 013106  000002                      1$:     RTI
 43
```

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

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

013110  005767  166176          LOOP:   TST     XFLAG   ;IS THERE AN XOR TESTER OUT THERE ?
013114  100022                          BPL     4$      ;NO
013116  016746  164662                  MOV     4,-(SP) ;SAVE 4
013122  012767  013142  164654          MOV     #1$,4   ;SET UP SVC ROUTINE
013130  005767  163724                  TST     177060  ;GOT SOMETHING LIKE SLAVE SYNC
013134  012667  164644                  MOV     (SP)+,4 ;YOU BETCHUM
013140  000404                          BR      2$
013142  022626                  1$:     POP2SP          ;RESTORE STACK
013144  012667  164634                  MOV     (SP)+,4 ;RESTORE 4
013150  000402                          BR      3$
013152  000167  000104          2$:     JMP     LOOPX   ;GO TO NEXT TEST
013156  000167  000104          3$:     JMP     TSTENT  ;GO
013162                          4$:
013162  005067  164610                  CLR     PS
013166  052777  000100  002422          BIS     #INTENA,@TKCSR
013174  005767  002436                  TST     PASCNT                  ;1ST PASS
013200  001430                          BEQ     LOOPX                   ;NO ITERATIONS
013202  005767  002424          5$:     TST     ERRFLG                  ;IF ERROR OCCURED FLAG=1,
013206  001404                          BEQ     LOOPS                   ;CHECK FOR ESCAPE TO NEXT TEST
013210  032777  002000  002410          BIT     #SW10,@SWR              ;IF SW10=1,
013216  001021                          BNE     LOOPX                   ;ESCAPE TO NEXT TEST
013220  032777  040000  002400  LOOPS:  BIT     #SW14,@SWR              ;IF SW14=1,
013226  001041                          BNE     LOOPL                   ;LOOP ON CURRENT TEST
013230  032777  004000  002370          BIT     #SW11,@SWR              ;IF SW11=1,
013236  001011                          BNE     LOOPX                   ;INHIBIT ITERATIONS
013240  005367  002400                  DEC     ICOUNT                  ;UPDATE ITERATION COUNT
013244  001406                          BEQ     LOOPX                   ;IF ICOUNT=0, GO TO NEXT TEST
013246  016716  002370          LOOPER: MOV     RETURN,(SP)             ;SET UP FOR RETURN TO CURRENT TEST
013252  042777  000100  002336          BIC     #INTENA,@TKCSR
013260  000002                          RTI                             ;RETURN TO CURRENT TEST
013262  005267  002352          LOOPX:  INC     TSTNO                   ;UPDATE TEST NUMBER
013266  016705  002346          TSTENT: MOV     TSTNO,R5                ;GET TEST NUMBER
013272  006305                          ASL     R5                      ;MULTIPLY TEST NUMBER BY 4
013274  006305                          ASL     R5
013276  066705  002370                  ADD     TSTPNT,R5               ;GET POINTER FOR TEST ENTRY
013302  011567  002334                  MOV     (R5),RETURN             ;GET STARTING ADDRESS OF NEXT TEST
013306  001626                          BEQ     EOP                     ;IF ADDRESS=0, GO TO END OF PASS
013310  012516                          MOV     (R5)+,(SP)              ;PUT STARTING ADDRSS ON STACK
013312  011567  002326                  MOV     (R5),ICOUNT             ;GET ITERATION COUNT FOR TEST
013316  005067  002310                  CLR     ERRFLG                  ;CLEAR ERROR OCCURED FLAG
013322  042777  000100  002266          BIC     #INTENA,@TKCSR
013330  000002                          RTI                             ;GO TO TEST
013332  012767  000001  002304  LOOPL:  MOV     #1,ICOUNT               ;SET UP TO EXIT TEST AFTER LOOP
013340  000742                          BR      LOOPER                  ;GO TO LOOP SERVICE

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

013342  005767  002264          FREEZE: TST     ERRFLG                  ;IF ERROR FLAG=0,
```

```
 58 013346  001413                          BEQ     FREEZX                  ;DO NOT TEST FOR ESCAPE
 59 013350  032777  002000  002250          BIT     #SW10,@SWR              ;IF SW10=1,
 60 013356  001341                          BNE     LOOPX                   ;ESCAPE TO NEXT TEST
 61 013360  032777  001000  002240          BIT     #SW09,@SWR              ;IF SW09=1,
 62 013366  001403                          BEQ     FREEZX                  ;FREEZE CURRENT DATA
 63 013370  017616  000000                  MOV     @(SP),(SP)              ;GET LOOPING ADDRESS
 64 013374  000002                          RTI                             ;LOOP
 65 013376  062716  000002          FREEZX: ADD     #2,(SP)                 ;CONTINUE IN CURRENT TEST
 66 013402  000002                          RTI
 67
 68
 69                                         ;ROUTINE TO STEP THRU LINES
 70 013404  052777  000400  002200  STEPER: BIS     #STEP,@DHMCSR
 71 013412  032777  000020  002172  1$:     BIT     #BUSY,@DHMCSR
 72 013420  001374                          BNE     1$
 73 013422  000207                          RETURN
 74
 75
```

```
                                        ;GENERAL ERROR SERVICE
                                        ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER

013424  005067  002202        ERR:    CLR     ERRFLG                  ;ALWAYS TYPE PC+2
                                                                ;OF TEST THAT FAILED
013430  005067  000210                CLR     ERRMSG                  ;NO MESSAGE
013434  005067  000216                CLR     ERTAB                   ;NO TABLE OF DATA
013440  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
013442  005067  002164        ERRT:   CLR     ERRFLG                  ;ALWAYS OUTPUT  ALL DATA
013446  012767  016132  000170        MOV     #MTRANE,ERRMSG          ;TYPE "TRANSITION ERROR
013454  012767  013750  000174        MOV     #ERTAB1,ERTAB           ;TABLE OF DATA
013462  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

013464  005067  002142        ERRS:   CLR     ERRFLG                  ;ALWAYS OUTPUT ALL DATA
013470  012767  016101  000146        MOV     #MLINE1,ERRMSG          ;TYPE "LINE ERROR
                                                                        ;EXP REC LINE"
013476  012767  013766  000152        MOV     #ERTAB2,ERTAB           ;TABLE OF DATA
013504  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

013506  005067  002120          ERRN:   CLR     ERRFLG                  ;ALWAYS OUTPUT ALL DATA
013512  012767  017062  000124          MOV     #MFATAL,ERRMSG          ;TYPE "FATAL ERROR
                                                                        ;CSTAT   LSTAT"
013520  012767  014004  000130          MOV     #ERTAB3,ERTAB           ;TABLE OF DATA
013526  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

013530  012767  016013  000106  ERRCS:  MOV     #MSTATE,ERRMSG          ;TYPE "STATUS ERROR
                                                                        ;"EXP REC"
013536  012767  014016  000112          MOV     #ERTAB4,ERTAB           ;TABLE OF DATA
013544  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

013546  012767  016044  000070  ERRLS:  MOV     #MLINER,ERRMSG
013554  012767  014030  000074          MOV     #ERTAB5,ERTAB
013562  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)

013564  005067  164206          ERRGEN: CLR     PS
013570  012777  000100  002020          MOV     #INTENA,@TKCSR
013576  032777  020000  002022          BIT     #SW13,@SWR              ;IF SW13=1, DO NOT
013604  001026                          BNE     .3                      ;TYPE ERROR MESSAGE
013606  021667  002052                  CMP     (SP),SAVPC              ;SAME ERROR AGAIN
013612  001402                          BEQ     .+6
013614  005067  002012                  CLR     ERRFLG
013620  104005                          SAVOSP
013622  005767  002004                  TST     ERRFLG                  ;IF ERROR OCCURED FLAG=1,
013626  001007                          BNE     .1                      ;TYPE DATA ONLY
013630  104006                          OCTASC                          ;TYPE PC+2 OF CALL TO ERROR ROUTINE
013632  013742                          ERTABO
013634  005767  000004                  TST     ERRMSG
013640  001407                          BEQ     .2
013642  104004                          TYPE                            ;TYPE ERROR MESSAGE
013644  000000                  ERRMSG: 0
013646  005767  000004          .1:     TST     ERTAB
013652  001402                          BEQ     .2
013654  104006                          OCTASC                          ;TYPE DATA
013656  000000                  ERTAB:  0
013660  104007                  .2:     RESO5                           ;RESTORE R0 R5

                                        ;ERROR HALT SERVICE

013662  032777  100000  001736  .3:     BIT     #SW15,@SWR              ;IF SW15=0, DO NOT
013670  001406                          BEQ     .4                      ;HALT ON ERROR
013672  000000                          HALT                            ;HALT AND DISPLAY ADDRESS OF FAILING TEST
013674  022767  000176  001724          CMP     #SWREG,SWR
013702  001001                          BNE     .4
013704  104025                          CNTLUU
013706  012767  000001  001716  .4:     MOV     #1,ERRFLG               ;SET ERROR OCCURED FLAG
013714  042777  000100  001674          BIC     #INTENA,@TKCSR
013722  000002                          RTI                             ;RETURN TO TEST

                                ;TIMEOUT ERROR WAITING FOR INTERRUPT ON TEST 33
013724  012767  015734  177712  ERRQ:   MOV     #MNOINT,ERRMSG
013732  012767  014060  177716          MOV     #ERTAB6,ERTAB           ;TYPE LN#,CSR,LSR+MSG
013740  000711                          BR      ERRGEN                  ;OUTPUT DATA
```

```
                                        ;TABLE S OF DATA FOR ERROR TYPEOUT
                                        ;
                                        ;TABLE FOR TRANSITION STATUS ERROR
                                        ;
013742  000001          ERTAB0: 1
013744  000006                  6
013746  015664                  SAVPC
013750  000003          ERTAB1: 3
013752  000002                  2
013754  015660                  SAVR5           ;CONTAINS EXPECTED TRANSITION STATUS
013756  000002                  2
013760  015656                  SAVR4           ;CONTAINS RECEIVED TRANSITION STATUS
013762  000002                  2
013764  015654                  SAVR3           ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
013766  000003          ERTAB2: 3
013770  000003                  3
013772  015660                  SAVR5                   ;CONTAINS EXPECTED LINE STATUS
013774  000003                  3
013776  015656                  SAVR4                   ;CONTAINS RECEIVED LINE STATUS
014000  000002                  2
014002  015654                  SAVR3                   ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
014004  000002          ERTAB3: 2
014006  000006                  6
014010  015656                  SAVR4
014012  000003                  3
014014  015654                  SAVR3
014016  000002          ERTAB4: 2
014020  000006                  6
014022  015660                  SAVR5                   ;CONTAINS EXPECTED CONTROL STATUS
014024  000006                  6
014026  015656                  SAVR4                   ;CONTAINS RECEIVED CONTROL STATUS
014030  000004          ERTAB5: 4
014032  000003                  3
014034  015660                  SAVR5                   ;CONTAINS EXPECTED LINE STATUS
014036  000003                  3
014040  015656                  SAVR4                   ;CONTAINS RECEIVED LINE STATUS
014042  000002                  2
014044  015654                  SAVR3                   ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
014046  000002                  2
014050  015650                  SAVR1                   ;CONTAINS NUMBER OF LINE UNDER TEST

014052  000001          SWRTB:  1
014054  000006                  6
014056  000176                  SWREG

014060  000003          ERTAB6: 3
014062  000003                  3
014064  015656                  SAVR4                   ;FAILING LINE #
014066  000006                  6
014070  015652                  SAVR2                   ;CSR OF DEVICE
014072  000006                  6
014074  015654                  SAVR3                   ;LSR OF DEVICE
```

```
                                        ;CONVERT OCTAL TO ASCII AND
                                        ;OUTPUT ON TELETYPE

014076  017605  000000          OCTASN: MOV     @(SP),R5                ;GET POINTER TO TABLE OF DATA
014102  062716  000002                  ADD     #2,(SP)
014106  012767  000010  000322          MOV     #10,RADIX
014114  012704  017311                  MOV     #MBCD+2,R4              ;SET UP POINTER FOR CONVERTED DATA
014120  012567  001542                  MOV     (R5)+,WRDCNT            ;GET NUMBER OF WORDS TO BE CONVERTED
014124  012567  001540          OCTAS1: MOV     (R5)+,CHRCNT            ;GET NUMBER OF DIGITS IN WORD
014130  013567  000276                  MOV     @(R5)+,BINWRD           ;GET DATA TO BE CONVERTED
014134  104010                          CONVERT                         ;CONVERT TO ASCII
014136  005367  001524                  DEC     WRDCNT                  ;IF ALL DATA IS NOT CONVERTED
014142  001370                          BNE     OCTAS1                  ;CONTINUE
014144  112714  000100                  MOVB    #100,(R4)               ;PUT TERMINATOR AT END OF MESSAGE
014150  005767  000112                  TST     SMLN
014154  001002                          BNE     1$
014156  104004                          TYPE                            ;OUTPUT CONVERTED DATA
014160  017307                          MBCD                            ;TO TELETYPE
014162  000002                  1$:     RTI                             ;RETURN TO CALLING ROUTINE


014164  005067  000072          CNTLU:  CLR     TMP1
014170  012767  000001  000066          MOV     #1,TMP2
014176  104004                          TYPE
014200  017246                          $SWREQ
014202  052767  000001  000056          BIS     #1,SMLN
014210  104006                          OCTASC
014212  014052                          SWRTB
014214  104004                          TYPE
014216  017311                          MBCD+2
014220  104013                          INSTRG
014222  017257                          $NEWIS
014224  000000                          0
014226  177777                          177777
014230  014262                          TMP1
014232  126727  000724  000015          CMPB    INBUF,#15
014240  001403                          BEQ     1$
014242  016777  000014  001356          MOV     TMP1,@SWR
014250  005067  000010          1$:     CLR     TMP2
014254  005067  000006                  CLR     SMLN
014260  000002                          RTI
014262  000000                  TMP1:   0
014264  000000                  TMP2:   0
014266  000000                  SMLN:   0
```

```
                                                  ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE

014270  016700  001374           BINASC: MOV    CHRCNT,R0           ;SET UP COUNT FOR DIGITS TO BE CONVERTED
014274  012701  017412                   MOV    #TEMTAB,R1          ;SET UP POINTER FOR TEMPORARY STORAGE
014300  104011                   BINASA: EXTRACT                    ;EXTRACT ONE DIGIT
014302  062767  000060  000124           ADD    #60,DIGIT           ;CONVERT FROM BCD TO ASCII
014310  116721  000120                   MOVB   DIGIT,(R1)+         ;STORE DIGIT
014314  005300                           DEC    R0                  ;IF ALL DIGITS NOT DONE,
014316  001370                           BNE    BINASA              ;CONTINUE
014320  114124                   BINASB: MOVB    (R1),(R4)+         ;REVERSE ORDER OF DIGITS
014322  005367  001342                   DEC    CHRCNT              ;IF ALL CHARACTERS ARE NOT
014326  001374                           BNE    BINASB              ;IN ORDER, CONTINUE
014330  112724  000040                   MOVB   #40,(R4)+           ;INSERT SPACE AFTER LAST DIGIT
014334  000002                           RTI                        ;RETURN TO CALLING ROUTINE

                                                  ;SINGLE PRECISION UNSIGNED DIVIDE LOOP

014336  005067  000072           DIVI:   CLR    DIVIDH
014342  026767  000066  000066   DIVIU:  CMP    DIVIDH,DIVIS
014350  103027                           BHIS   DIVIB
014352  012767  000021  000032           MOV    #17.,DIVCNT
014360  000407                           BR     DIVIC
014362  026767  000046  000046   DIVIA:  CMP    DIVIDH,DIVIS
014370  103403                           BLO    DIVIC
014372  166767  000040  000034           SUB    DIVIS,DIVIDH
014400  006167  000026           DIVIC:  ROL    DIVIDL
014404  006167  000024                   ROL    DIVIDH
014410  005327                           DEC    (PC)+
014412  000000                   DIVCNT: 0
014414  001362                           BNE    DIVIA
014416  006067  000012                   ROR    DIVIDH
014422  005167  000004                   COM    DIVIDL
014426  000002                           RTI
014430  000000                   DIVIB:  HALT
014432  000000                   DIVIDL: 0
014434  000000                   DIVIDH: 0
014436  000000                   DIVIS:  0

                                                  ;SAVE PC OF TEST THAT FAILED AND R0 R5

014440  016667  000004  001216   SV05P:  MOV    4(SP),SAVPC

                                                  ;SAVE R0-R5

014446  010567  001206           SV05:   MOV    R5,SAVR5
014452  010467  001200                   MOV    R4,SAVR4
014456  010367  001172                   MOV    R3,SAVR3
014462  010267  001164                   MOV    R2,SAVR2
014466  010167  001156                   MOV    R1,SAVR1
014472  010067  001150                   MOV    R0,SAVR0
014476  000002                           RTI
```

```
                                        ;RESTORE R0 R5
 014500  016700  001142        RS05:   MOV     SAVR0,R0
 014504  016701  001140                MOV     SAVR1,R1
 014510  016702  001136                MOV     SAVR2,R2
 014514  016703  001134                MOV     SAVR3,R3
 014520  016704  001132                MOV     SAVR4,R4
 014524  016705  001130                MOV     SAVR5,R5
 014530  000002                       RTI

                                        ;TELETYPE OUTPUT ROUTINE
 014532  017605  000000        TYPER:  MOV     @(SP),R5        ;GET POINTER TO MESSAGE (ON STACK)
 014536  062716  000002                ADD     #2,(SP)         ;CORRECT STACK FOR RETURN
 014542  105777  001054        TYPERA: TSTB    @TPCSR          ;WAIT FOR TELEPRINTER READY
 014546  100375                       BPL     TYPERA
 014550  122765  000012  177777       CMPB    #12,-1(R5)      ;WAS LAST ONE A L.F. ??
 014556  001405                       BEQ     1$              ;BR IF YES
 014560  122765  000015  177777       CMPB    #15,-1(R5)      ;WAS LAST ONE A C.R. ??
 014566  001401                       BEQ     1$              ;BR IF YES
 014570  000402                       BR      2$              ;CONTINUE IF NEITHER
 014572  004767  000044        1$:     JSR     PC,TYFILL       ;GO OUT PUT FILLERS
 014576  122715  000100        2$:     CMPB    #100,(R5)       ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
 014602  001001                       BNE     TYPER1
 014604  000002                       RTI                     ;CHARACTER IS TERMINATOR, EXIT
 014606  122715  000042        TYPER1: CMPB    #42,(R5)        ;IF CHARACTER=42,
 014612  001406                       BEQ     TYPECL          ;TYPE LINE FEED
 014614  122715  000045                CMPB    #45,(R5)        ;IF CHARACTER=45,
 014620  001403                       BEQ     TYPECL          ;TYPE CARRIAGE RETURN
 014622  112577  000776        TYPER2: MOVB    (R5)+,@TPDBR    ;GET CHARACTER
 014626  000745                       BR      TYPERA          ;TYPE IT
 014630  142715  000040        TYPECL: BICB    #40,(R5)        ;CONVERT CODE OF 42 OR 45
 014634  152715  000010                BISB    #10,(R5)        ;TO 12 OR 15
 014640  000770                       BR      TYPER2          ;TYPE IT


                                        ;OUTPUT FILLERS AFTER <CR> OR <LF> CHAR IS OUT PUTTED.

 014642  116767  001060  001060 TYFILL: MOVB    FILL,FILLA      ;GET FILL COUNT
 014650  116777  001053  000746 1$:     MOVB    FILL+1,@TPDBR   ;OUT PUT ONE FILLER
 014656  105777  000740        2$:     TSTB    @TPCSR          ;WAIT FOR TTY TO FINISH OUTPUT
 014662  100375                       BPL     2$              ;BR IF TTY NOT DONE
 014664  105367  001040                DECB    FILLA           ;COUNT ONE FILLER
 014670  001367                       BNE     1$              ;BR TIL ALL DONE
 014672  000207                       RTS     PC              ;RETURN TO CALLER ABOVE

                                        ;INPUT OCTAL CHARACTER STRING
                                        ;TERMINATOR IS CARRIAGE RETURN
                                        ;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
                                        ;CARRIAGE RETURN ARE TYPED, THE IN  PUT WILL
                                        ;BE RE-REQUESTED

 014674                         INSTR:
 014674  011605                       MOV     (SP),R5         ;GET POINTER TO ARGUMENTS
 014676  012567  000020                MOV     (R5)+,MSG       ;GET MESAGE TO BE TYPED
 014702  012567  000246                MOV     (R5)+,LOLIM     ;GET LOWER LIMIT
```

```
 58 014706  012567  000244                 MOV     (R5)+,HILIM             ;GET UPPER LIMIT
 59 014712  012567  000242                 MOV     (R5)+,STORE             ;GET DATA STORAGE LOCATION
 60 014716  010516                         MOV     R5,(SP)                 ;RESTORE STACK
 61 014720  104004                 INSTR1: TYPE                            ;TYPE MESSAGE
 62 014722  000000                 MSG:    0
 63 014724  012704  015162                 MOV     #INBUF,R4               ;SET UP CHARACTER INPUT BUFFER
 64 014730  012703  000007                 MOV     #7,R3                   ;SET UP INPUT COUNT
 65 014734  105777  000656         INSTRB: TSTB    @TKCSR                  ;WAIT FOR CHARACTER
 66 014740  100375                         BPL     INSTRB
 67 014742  005067  165300         INSTBB: CLR     SINTFL
 68 014746  017767  000646  177306         MOV     @TKDBR,TMP1
 69 014754  142767  000200  177300         BICB    #200,TMP1
 70 014762  116714  177274                 MOVB    TMP1,(R4)
 71 014766  121427  000007                 CMPB    (R4),#7
 72 014772  001420                         BEQ     INSTER
 73 014774  121427  000015                 CMPB    (R4),#15                ;IS CHARACTER TERMINATOR
 74 015000  001420                         BEQ     INSTR2                  ;IF IT IS, CONVERT INPUT STRING
 75 015002  121427  000025                 CMPB    (R4),#25
 76 015006  001003                         BNE     1$
 77 015010  005067  177246                 CLR     TMP1
 78 015014  000741                         BR      INSTR1
 79 015016  112477  000602         1$:     MOVB    (R4)+,@TPDBR
 80 015022  105777  000574         INSTRC: TSTB    @TPCSR                  ;WAIT TO FINISH TYPING
 81 015026  100375                         BPL     INSTRC
 82 015030  005303                         DEC     R3                      ;UPDATE RECEIVED COUNT
 83 015032  001340                         BNE     INSTRB                  ;AND CONTINUE
 84 015034  104004                 INSTER: TYPE                            ;TYPE "?" AND RE-REQUEST INPUT
 85 015036  017001                         MQM
 86 015040  000727                         BR      INSTR1
 87
 88                                        ;CONVERT ASCII STRING TO OCTAL
 89
 90 015042  104004                 INSTR2: TYPE
 91 015044  017005                         MCRLF
 92 015046  012704  015162                 MOV     #INBUF,R4               ;GET POINTER TO ASCII STRING
 93 015052  005003                         CLR     R3
 94 015054  122714  000015                 CMPB    #15,(R4)                ;IS TERMINATOR FIRST
 95                                                                         ;CHARACTER IN STRING
 96 015060  001431                         BEQ     CHCK
 97 015062  121427  000060         INSTRD: CMPB    (R4),#60                ;IS CHARACTER OCTAL DIGIT
 98 015066  002762                         BLT     INSTER                  ;IF 67>=CHAR>=60
 99 015070  121427  000067                 CMPB    (R4),#67                ;CHARACTER IS OCTAL DIGIT
100 015074  003357                         BGT     INSTER
101 015076  142714  000060                 BICB    #60,(R4)                ;STRIP ASCII
102 015102  152403                         BISB    (R4)+,R3                ;GENERATE OCTAL NUMBER
103 015104  121427  000015                 CMPB    (R4),#15                ;IF END OF STRING, CHECK LIMITS
104 015110  001404                         BEQ     INSTR3
105 015112  006303                         ASL     R3                      ;MULTIPLY DIGIT BY 10 (OCTAL
106 015114  006303                         ASL     R3
107 015116  006303                         ASL     R3
108 015120  000760                         BR      INSTRD                  ;GET NEXT DIGIT
109
110                                        ;TEST NUMBER TO SEE IF IT IS WITHIN LIMITS
111
112 015122  020367  000030         INSTR3: CMP     R3,HILIM                ;TEST HI LIMIT
113 015126  101342                         BHI     INSTER                  ;IF R3>HILIM, ERROR
114 015130  020367  000020                 CMP     R3,LOLIM                ;TEST LOW LIMIT
```

```
                                                BLO     INSTER                  ;IF R3<LOLIM, ERROR
                                                MOV     R3,@STORE               ;STORE NUMBER
                                                RTI                             ;EXIT
                                        CHCK:   TST     TMP2
                                                BEQ     INSTER
                                                RTI
                                        LOLIM:  0
                                        HILIM:  0
                                        STORE:  0
                                        INBUF:  0
                                        .=.+20
                                                ;ENTER HERE ON POWER FAILURE


                                        PFAIL:  MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
                                                MOV     R1,-(SP)
                                                MOV     R2,-(SP)
                                                MOV     R3,-(SP)
                                                MOV     R4,-(SP)
                                                MOV     R5,-(SP)
                                                MOV     24,-(SP)
                                                MOV     SP,SAVSP                ;SAVE STACK POINTER
                                                MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
                                                HALT                            ;HALT ON POWER DOWN NORMAL
                                                BR      .-2

                                                ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED

                                        RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
                                                MOV     (SP)+,R5                ;RESTORE R0-R5
                                                MOV     (SP)+,R4
                                                MOV     (SP)+,R3
                                                MOV     (SP)+,R2
                                                MOV     (SP)+,R1
                                                MOV     (SP)+,R0
                                                MOV     #PFAIL,24               ;SET UP FOR POWER FAILURE
                                                POP1SP
                                                TYPE
                                                MPFAIL
                                                TST     TIPFLG
                                                BNE     RESTA1
                                                JMP     START0
                                        RESTA1: TYPE
                                                MPF1
                                                MOV     #340,-(SP)
                                                PUSH1SP
                                                JMP     TSTENT


                                                ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
                                        XOR:    MOV     20,-(SP)        ;SAVE 20
                                                MOV     22,-(SP)        ;SAVE 22
                                                MOV     #2$,20          ;IOT INTR VECTOR
                                                MOV     #340,22         ;IOT INTR LVL
                                                MOV     #300,DATA1
                                                MOV     #302,DATA2
                                        1$:     MOV     DATA2,@DATA1
```

```
172 015374  012777  000004  175352          MOV     #IOT,@DATA2     ;IOT TRAP
173 015402  062767  000004  175342          ADD     #4,DATA1
174 015410  062767  000004  175336          ADD     #4,DATA2
175 015416  026727  175330  001000          CMP     DATA1,#1000
176 015424  001360                          BNE     1$
177 015426  012767  000000  000204          MOV     #0,TSTNO        ;SET UP DEFAULT
178 015434  012767  017542  000230          MOV     #TSTTBO,TSTPNT  ;
179 015442  052767  000340  162326          BIS     #340,PS         ;PREVENT INTERRUPTS
180 015450  005077  000136                  CLR     @DHMCSR         ;
181 015454  012777  000100  000130          MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
182 015462  042767  000340  162306          BIC     #340,PS ;ALLOW INTERRUPTS
183 015470  052777  000200  000114          BIS     #DONE,@DHMCSR   ;SET DONE..AND INTERRUPT
184 015476  000240                          NOP
185 015500  012667  162316                  MOV     (SP)+,22        ;YOU DIDN'T INTERRUPT ?
186 015504  012667  162310                  MOV     (SP)+,20        ;RESTORE 20 & 22
187 015510  005077  000076                  CLR     @DHMCSR         ;STOP ALL INTERRUPT
188 015514  052767  000340  162254          BIS     #340,PS         ;
189 015522  104012                          ERROR
190 015524  000000                          HALT                    ;YOU SHOULD HAVE INTERRUPTED
191 015526  000426                          BR      3$
192 015530  011667  000052          2$:     MOV     (SP),DHMVEC     ;EXTRACT VECTOR +4
193 015534  162767  000002  000044          SUB     #2,DHMVEC       ;CREATE LVL
194 015542  016767  000040  000040          MOV     DHMVEC,DHMLVL   ;SAVE
195 015550  162767  000002  000030          SUB     #2,DHMVEC       ;CREATE AND SAVE VEC
196 015556  012767  000340  162212          MOV     #340,PS         ;PREVENT INTERRUPTS
197 015564  005077  000022                  CLR     @DHMCSR         ;
198 015570  022626                          POP2SP
199 015572  022626                          POP2SP
200 015574  012667  162222                  MOV     (SP)+,22        ;RESTORE 22
201 015600  012667  162214                  MOV     (SP)+,20        ;RESTORE 20
202 015604  000207                  3$:     RTS     PC
203
```

```
                                        ;INDIRECT POINTERS

015606  000300                  DHMVEC: 300                     ;MODEM CONTROL INTERRUPT VECTOR
015610  000302                  DHMLVL: 302                     ;MODEM CONTROL ONTERRUPT PRIORITY
015612  170500                  DHMCSR: 170500                  ;MODEM CONTROL CONTROL STATUS REGISTER
015614  170502                  DHMLSR: 170502                  ;MODEM CONTROL CONTROL STATUS REGISTER
015616  177560                  TKCSR:  177560
015620  177562                  TKDBR:  177562
015622  177564                  TPCSR:  177564
015624  177566                  TPDBR:  177566
015626  177570                  SWR:    177570
015630  177570                  DISPLAY:177570

                                        ;PROGRAM VARIABLES

015632  000000                  ERRFLG: 0
015634  000000                  TRACON: 0
015636  000000                  PASCNT: 0
015640  000000                  TSTNO:  0
015642  000000                  RETURN: 0
015644  000000                  ICOUNT: 0
015646  000000                  SAVR0:  0
015650  000000                  SAVR1:  0
015652  000000                  SAVR2:  0
015654  000000                  SAVR3:  0
015656  000000                  SAVR4:  0
015660  000000                  SAVR5:  0
015662  000000                  SAVSP:  0
015664  000000                  SAVPC:  0
015666  000000                  WRDCNT: 0
015670  000000                  CHRCNT: 0
015672  017542                   STPNT: TSTTBO
015674  000000                  TSTMAX: 0
015676  000000                  LINFLG: 0
015700  000000                  LINE:   0
015702  000000                  LINORG: 0
015704  000000                  LINANS: 0
015706  000000                  ANSFLG: 0
015710  000000                  ORGFLG: 0
015712  000000                  TIME1:  0
015714  000000                  TIME2:  0
015716  000000                  TIFLG:  0
015720  177777                  LINSEL: 177777
015722  000000                  SELMSK: 0
015724  000000                  SLMSK:  0
015726  000002                  FILL:   2                               ;FILL CHAR/COUNT
015730  000000                  FILLA:  0                               ;TEMP STORAGE FOR FILL COUNT
015732  000000                  RNGRET: 0

                                .NLIST  BEX
015734     124     111     115  MNOINT: .ASCII  ;TIME OUT WAITING FOR INTERRUPT#";
015774     114     116     040          .ASCII  ;LN  CSR    LSR@;
016013     123     124     101  MSTATE: .ASCII  ;STATUS ERROR#"EXP    REC@;
016044     114     111     116  MLINER: .ASCII  ;LINE ERROR#"EXP REC LINE SEL@;
016101     114     111     116  MLINE1: .ASCII  ;LINE ERROR#"EXP REC LINE@;
016132     124     122     101  MTRANE: .ASCII  ;TRANSITION ERROR#"EXP REC LINE@;
```

```
 58 016171     045     042     045  DIALM:  .ASCII  ;%"%"DIAL ANSWERING DATA SET%"@;
 59 016227     045     042     045  MT103T: .ASCII  ;%"%"103A MODEM CONNECT-DISCONNECT TEST%"@;
 60 016300     045     042     045  MT202T: .ASCII  ;%"%"202C MODEM CONNECT-DISCONNECT TEST%"@;
 61 016351     045     042     045  MSELOR: .ASCII  ;%"%"ORIGINATE LINE-@;
 62 016375     045     042     101  MSELAN: .ASCII  ;%"ANSWER LINE @;
 63 016414     045     042     061  MT103A: .ASCII  ;%"103A TEST COMPLETE%"@;
 64 016443     045     042     062  MT202A: .ASCII  ;%"202C TEST COMPLETE%"@;
 65 016472     045     042     123  MDISC:  .ASCII  ;%"STRIKE ANY TTY KEY TO TEST DISCONNECT@;
 66 016542     045     042     045  M16:    .ASCII  ;%"%"16 LINE SCANNER TEST%"@;
 67 016575     045     042     045  MTITLE: .ASCII  ;%"%"CZDHK-F     -  --MODEM CONTROL DIAGNOSTIC - - %"@;
 68 016661     045     042     126  MVECTO: .ASCII  ;%"VECTOR ADDRESS-@;
 69 016703     045     042     103  MREGAD: .ASCII  ;%"CONTROL REGISTER ADDRESS-@;
 70 016737     045     042     114  MLINSL: .ASCII  ;%"LINE SELECT PARAMETER -@;
 71 016771     045     042     124  MTEST:  .ASCII  ;%"TEST @;
 72 017001     040     040     077  MQM:    .ASCII  ;  ?@;
 73 017005     045     042     100  MCRLF:  .ASCII   ;%"@;
 74 017010     045     042     123  MLINE:  .ASCII  ;%"SINGLE LINE CABLE TEST%"@;
 75 017043     045     042     114  MLINEI: .ASCII  ;%"LINE NUMBER-@;
 76 017062     106     101     124  MFATAL: .ASCII  ;FATAL ERROR%"CSTAT  LSTAT@;
 77 017114     045     042     124  MTRNDE: .ASCII  ;%"TRANSITION DETECTED%"CSTAT  LSTAT@;
 78 017160     045     042     120  MPFAIL: .ASCII  ;%"POWER FAILURE@;
 79 017200     055     103     125  MPF1:   .ASCII  ;-CURRENT TEST WILL RESTART%"@;
 80 017235     136     103     100  MCONTC: .ASCII  ;†C@;
 81 017240     136     126     100  MCONTV: .ASCII  ;†V@;
 82 017243     136     114     100  MCONTL: .ASCII  ;†L@;
 83 017246     045     042     123  $SWREQ: .ASCII  ;%"SWR=  @;
 84 017257     040     040     040  $NEWIS: .ASCII  ;   NEW=  @;
 85 017271     045     042     105  MEPASS: .ASCII  ;%"END PASS   @;
 86 017307     045     042          MBCD:   .ASCII  ;%";
 87          017411                       .=.+100
 88                                       .EVEN
 89 017412  000000                  TEMTAB: 0
 90          017424                       .=.+10
 91
 92 017424  000000                          0
 93
 94                                       ;EMT DISPATCH TABLE
 95
 96 017426  013530                  EMTTAB: ERRCS
 97 017430  013546                          ERRLS
 98 017432  013110                          LOOP
 99 017434  013342                          FREEZE
100 017436  014532                          TYPER
101 017440  014440                          SV05P
102 017442  014076                          OCTASN
103 017444  014500                          RS05
104 017446  014270                          BINASC
105 017450  014336                          DIVI
106 017452  013424                          ERR
107 017454  014674                          INSTR
108 017456  013442                          ERRT
109 017460  013464                          ERRS
110 017462  013506                          ERRN
111 017464  012026                          GETLIN
112 017466  012062                          SETUPS
113 017470  012316                          CKRNG
114 017472  012414                          WAITR
```

```
   115 017474  012502                       CKTRN
   116 017476  012452                       WAITRR
   117 017500  014164                       CNTLU                ;CALL BY EMT CNTLUU
   118 017502  013076                       CKINT                ;CALL  BY EMT CKINTT
   119 017504  002020                       KBDINT               ;CALLBY EMT  KBDIN
   120 017506  013724                       ERRQ                 ;CALLED BY EMT ERRINT
   121 017510  000000             EMTLIM:   0
   122 017512  017542             TSTLST:   TSTTB0
   123 017514  017724                       TSTTB1
   124 017516  017766                       TSTTB2
   125 017520  017774                       TSTTB3
   126 017522  000000                       0
   127 017524  000000                       0
   128 017526  000000                       0
   129 017530  000000                       0
   130 017532  000033             GRO:      N0-1
   131 017534  000007                       N1-100-1
   132 017536  000001                       N2-200-1
   133 017540  000000                       N3-300 1
   134 017542  002250             TSTTB0:   T0
   135 017544  000001                       1
   136                            .MACRO    COMMENT
   137                            .NLIST
   138                            M0=1
   139                            XM=M0
   140                            .LIST
   141                            .ENDM
   142 017546                               COMMENT
               000001             M0=1
               000001             XM=M0
   143         000033                       .REPT    N0-1
   144                                      TM       \M0,0
   145                                      .ENDR
       017546                               TM       \M0,0
               004000             TIMES=4000
       017546  002276                       T1
       017550  004000                       TIMES
               000002                       M0=M0+1
       017552                               TM       \M0,0
               004000             TIMES=4000
       017552  002340                       T2
       017554  004000                       TIMES
               000003                       M0=M0+1
       017556                               TM       \M0,0
               004000             TIMES=4000
       017556  002402                       T3
       017560  004000                       TIMES
               000004                       M0=M0+1
       017562                               TM       \M0,0
               004000             TIMES=4000
       017562  002444                       T4
       017564  004000                       TIMES
               000005                       M0=M0+1
       017566                               TM       \M0,0
               004000             TIMES=4000
       017566  002506                       T5
       017570  004000                       TIMES
```

```
                000006                          M0=M0+1
017572                                          TM      \M0,0
                004000                  TIMES=4000
017572          002550                          T6
017574          004000                          TIMES
                000007                          M0=M0+1
017576                                          TM      \M0,0
                004000                  TIMES=4000
017576          002624                          T7
017600          004000                          TIMES
                000010                          M0=M0+1
017602                                          TM      \M0,0
                004000                  TIMES=4000
017602          002700                          T10
017604          004000                          TIMES
                000011                          M0=M0+1
017606                                          TM      \M0,0
                004000                  TIMES=4000
017606          002770                          T11
017610          004000                          TIMES
                000012                          M0=M0+1
017612                                          TM      \M0,0
                004000                  TIMES=4000
017612          003060                          T12
017614          004000                          TIMES
                000013                          M0=M0+1
017616                                          TM      \M0,0
                004000                  TIMES=4000
017616          003150                          T13
017620          004000                          TIMES
                000014                          M0=M0+1
017622                                          TM      \M0,0
                004000                  TIMES=4000
017622          003240                          T14
017624          004000                          TIMES
                000015                          M0=M0+1
017626                                          TM      \M0,0
                004000                  TIMES=4000
017626          003330                          T15
017630          004000                          TIMES
                000016                          M0=M0+1
017632                                          TM      \M0,0
                004000                  TIMES=4000
017632          003416                          T16
017634          004000                          TIMES
                000017                          M0=M0+1
017636                                          TM      \M0,0
                004000                  TIMES=4000
017636          003504                          T17
017640          004000                          TIMES
                000020                          M0=M0+1
017642                                          TM      \M0,0
                004000                  TIMES=4000
017642          003572                          T20
017644          004000                          TIMES
                000021                          M0=M0+1
017646                                          TM      \M0,0
```

```
                004000                  TIMES=4000
017646          003660                          T21
017650          004000                          TIMES
                000022                          M0=M0+1
017652                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
017652          003754                          T22
017654          000400                          TIMES
                000023                          M0=M0+1
017656                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
017656          004070                          T23
017660          000400                          TIMES
                000024                          M0=M0+1
017662                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
017662          004260                          T24
017664          000400                          TIMES
                000025                          M0=M0+1
017666                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
                000200                  TIMES=200
017666          004432                          T25
017670          000200                          TIMES
                000026                          M0=M0+1
017672                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
                000200                  TIMES=200
017672          004574                          T26
017674          000200                          TIMES
                000027                          M0=M0+1
017676                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
                000200                  TIMES=200
017676          005034                          T27
017700          000200                          TIMES
                000030                          M0=M0+1
017702                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
                000200                  TIMES=200
017702          005270                          T30
017704          000200                          TIMES
                000031                          M0=M0+1
017706                                          TM      \M0,0
                004000                  TIMES=4000
                000400                  TIMES=400
                000200                  TIMES=200
017706          005524                          T31
017710          000200                          TIMES
                000032                          M0=M0+1
```

```
                017712                          TM      \M0,0
                       004000           TIMES=4000
                       000400           TIMES=400
                       000200           TIMES=200
                017712 005760                  T32
                017714 000200                  TIMES
                       000033                  M0=M0+1
                017716                         TM      \M0,0
                       004000           TIMES=4000
                       000400           TIMES=400
                       000200           TIMES=200
                017716 006144                  T33
                017720 000200                  TIMES
                       000034                  M0=M0+1
            146 017722 000000                  0
            147 017724 006454          TSTTB1: T100
            148 017726 000001                  1
            149                        .MACRO  COMMENT
            150                        .NLIST
            151                        M1=101
            152                        XM=M1
            153                        .LIST
            154                        .ENDM
            155 017730                         COMMENT
                       000101           M1=101
                       000101           XM=M1
            156        000007           .REPT   N1-101
            157                                TM      \M1,1
            158                        .ENDR
                017730                         TM      \M1,1
                       004000           TIMES=4000
                       000400           TIMES=400
                       000200           TIMES=200
                017730 006512                  T101
                017732 000200                  TIMES
                       000102                  M1=M1+1
                017734                         TM      \M1,1
                       004000           TIMES=4000
                       000400           TIMES=400
                       000200           TIMES=200
                017734 006672                  T102
                017736 000200                  TIMES
                       000103                  M1=M1+1
                017740                         TM      \M1,1
                       004000           TIMES=4000
                       000400           TIMES=400
                       000200           TIMES=200
                017740 007046                  T103
                017742 000200                  TIMES
                       000104                  M1=M1+1
                017744                         TM      \M1,1
                       004000           TIMES=4000
                       000400           TIMES=400
                       000200           TIMES=200
                017744 007222                  T104
                017746 000200                  TIMES
                       000105                  M1=M1+1
```

```
                017750                                  TM      \M1,1
                        004000                  TIMES=4000
                        000400                  TIMES=400
                        000200                  TIMES=200
                017750  007376                          T105
                017752  000200                          TIMES
                        000106                          M1=M1+1
                017754                                  TM      \M1,1
                        004000                  TIMES=4000
                        000400                  TIMES=400
                        000200                  TIMES=200
                017754  007554                          T106
                017756  000200                          TIMES
                        000107                          M1=M1+1
                017760                                  TM      \M1,1
                        004000                  TIMES=4000
                        000400                  TIMES=400
                        000200                  TIMES=200
                017760  007732                          T107
                017762  000200                          TIMES
                        000110                          M1=M1+1
            159 017764  000000                          0
            160 017766  010110                  TSTTB2: T200
            161 017770  000001                          1
            162 017772  000000                          0
            163 017774  010464                  TSTTB3: T300
            164 017776  000001                          1
            165         000001                  .END
```

CZDHK F MACRO V04.00 27-JUN-85 13:13:25 PAGE 76-7
SYMBOL TABLE

```
AND    = ******    DIGIT  = 014434    FILLA  015730    INT7B  003326    MLINER 016044
ANSFLG  015706     DISPLA  015630    FLAG   = ******    ITERAT= ******    MLINE1 016101
ANSTR   011642     DISPRE  000174    FOR    = ******    KBDIN  = 104027    MLINSL 016737
ANSTRR  011730     DIVCNT  014412    FREEZE  013342    KBDINT  002020    MNOINT 015734
ANSTR1  011656     DIVI    014336    FREEZX  013376    KBDIN1  002102    MPFAIL 017160
ANSTR2  011672     DIVIA   014362    GETLIN  012026    KBDIN2  002134    MPF1   017200
ANSTR3  011706     DIVIB   014430    GETLNS= 104017    KBDIN3  002176    MQM    017001
ANSTR4  011722     DIVIC   014400    GRO     017532    KRET    002244    MREGAD 016703
ASCII  = ******    DIVIDH  014434    HILIM   015156    LINANS  015704    MSELAN 016375
BINASA  014300     DIVIDL  014432    ICOUNT  015644    LINE    015700    MSELOR 016351
BINASB  014320     DIVIS   014436    INBUF   015162    LINENA= 000001    MSG    014722
BINASC  014270     DIVIU   014342    INIT1   002254    LINFLG  015676    MSTATE 016013
BINWRD= 014432     DMYRTI  002242    INPUT  = ******    LINORG  015702    MTEST  016771
BUSY   = 000020    DONE   = 000200    INSTBB  014742    LINSEL  015720    MTITLE 016575
CHANGE= ******     EMTDEF= ******    INSTER  015034    LINT1   003660    MTRANE 016132
CHCK    015144     EMTLIM  017510    INSTR   014674    LINT1A  003706    MTRNDE 017114
CHECK  = ******    EMTOK   013056    INSTRB  014734    LINT1B  003734    MT103A 016414
CHRCNT  015670     EMTSRV  013044    INSTRC  015022    LINT2   003754    MT103T 016227
CKINT   013076     EMTTAB  017426    INSTRD  015062    LINT2A  004014    MT202A 016443
CKINTT= 104026     ENTRY  = ******    INSTRG= 104013    LINT2B  004042    MT202T 016300
CKRING= 104021     EOP     012764    INSTR1  014720    LOGICA  013026    MUX1   004574
CKRNG   012316     ERR     013424    INSTR2  015042    LOLIM   015154    MUX1A  004622
CKRNG1  012362     ERRCS   013530    INSTR3  015122    LOOP    013110    MUX1B  004670
CKRNG2  012406     ERRFLG  015632    INTENA= 000100    LOOPER  013246    MUX1C  004726
CKTRAN= 104023     ERRGEN  013564    INTERR= ******    LOOPL   013332    MUX1D  004744
CKTRN   012502     ERRINT= 104030    INT1    002550    LOOPS   013220    MUX1E  004762
CKTRN1  012616     ERRLS   013546    INT1A   002616    LOOPX   013262    MUX1F  005014
CKTRN2  012650     ERRMSG  013644    INT1B   002622    LVL    = 000004    MUX11  006512
CKTRN3  012710     ERRN    013506    INT10   003330    MAINT  = 001000    MUX11A 006530
CKTRN4  012734     ERROR  = 104012    INT10A  003412    MBCD    017307    MUX11B 006560
CLRMUX= 002000     ERRORC= 104000    INT10B  003414    MCONTC  017235    MUX11C 006606
CLRSCN= 004000     ERRORL= 104001    INT11   003416    MCONTL  017243    MUX11D 006624
CNTLU   014164     ERRORN= 104016    INT11A  003500    MCONTV  017240    MUX11E 006636
CNTLUU= 104025     ERRORS= 104015    INT11B  003502    MCRLF   017005    MUX11F 006670
CO     = 000100    ERRORT= 104014    INT12   003504    MDISC   016472    MUX12  006672
COF    = 040000    ERRQ    013724    INT12A  003566    MEMT1   004070    MUX12A 006710
CONTRO= ******     ERRS    013464    INT12B  003570    MEMT1A  004116    MUX12B 006740
CONVER= 104010     ERRT    013442    INT13   003572    MEMT1B  004144    MUX12C 006766
CORRER= ******     ERR1    012742    INT13A  003654    MEMT1C  004166    MUX12D 007000
CS     = 000040    ERR2    012744    INT13B  003656    MEMT1D  004174    MUX12E 007012
CSF    = 020000    ERR3    012746    INT2    002624    MEMT1E  004226    MUX12F 007044
CSTR1   002276     ERR4    012750    INT2A   002672    MEMT1F  004250    MUX13  007046
CSTR2   002340     ERTAB   013656    INT2B   002676    MEMT2   004260    MUX13A 007064
CSTR3   002402     ERTAB0  013742    INT3    002700    MEMT2A  004302    MUX13B 007114
CSTR4   002444     ERTAB1  013750    INT3A   002764    MEMT2B  004362    MUX13C 007142
CSTR5   002506     ERTAB2  013766    INT3B   002766    MEMT2C  004404    MUX13D 007154
DATA   = ******    ERTAB3  014004    INT4    002770    MEMT2D  004416    MUX13E 007166
DATA1   012752     ERTAB4  014016    INT4A   003052    MEMT3   004432    MUX13F 007220
DATA2   012754     ERTAB5  014030    INT4B   003056    MEMT3A  004454    MUX14  007222
DATA3   012756     ERTAB6  014060    INT5    003060    MEMT3B  004466    MUX14A 007240
DATA4   012760     EXTRAC= 104011    INT5A   003142    MEMT3C  004524    MUX14B 007270
DELAY  = ******    FAILIN= ******    INT5B   003146    MEMT3D  004546    MUX14C 007316
DHMCSR  015612     FAKE   = ******    INT6    003150    MEMT3E  004560    MUX14D 007330
DHMLSR  015614     FATAL  = ******    INT6A   003232    MEPASS  017271    MUX14E 007342
DHMLVL  015610     FATEX   011732    INT6B   003236    MFATAL  017062    MUX14F 007374
DHMVEC  015606     FATRET  011744    INT7    003240    MLINE   017010    MUX15  007376
DIALP   016171     FILL    015726    INT7A   003322    MLINEI  017043    MUX15A 007414
```

SYMBOL TABLE

```
MUX15B  007442          OCTAL  = ******    SCOPEF= 104003    TIME   = ******    T103E1  010426
MUX15C  007470          OCTASC= 104006     SECRX  = 000020    TIMES  = 000200    T103E2  010432
MUX15D  007502          OCTASN  014076     SECRXF= 010000     TIME1   015712     T103E3  010436
MUX15E  007516          OCTAS1  014124     SECTX  = 000010    TIME2   015714     T103E4  010442
MUX15F  007552          OF     = ******    SELMSK  015722     TIPFLG  002016     T104    007222
MUX16   007554          ON     = ******    SERVIC= ******     TKCSR   015616     T105    007376
MUX16A  007572          ONLY   = ******    SET    = ******     TKDBR   015620     T106    007554
MUX16B  007620          ORGFLG  015710     SETUP  = 104020     TMP1    014262     T107    007732
MUX16C  007646          ORGTR   011550     SETUPB  012300     TMP2    014264     T11     002770
MUX16D  007660          ORGTRR  011636     SETUPS  012062     TO     = ******    T12     003060
MUX16E  007674          ORGTR1  011564     SETUP1  012114     TPCSR   015622     T13     003150
MUX16F  007730          ORGTR2  011600     SETUP2  012130     TPDBR   015624     T14     003240
MUX17   007732          ORGTR3  011614     SETUP4  012242     TRACON  015634     T15     003330
MUX17A  007750          ORGTR4  011630     SINGLE= 000001     TRANEX  011746     T16     003416
MUX17B  007776          OUT    = ******    SINTFL  002246     TRANS   011506     T17     003504
MUX17C  010024          OUTPUT= ******     SLMSK   015724     TRANSI= ******     T2      002340
MUX17D  010036          PASCNT  015636     SMLN    014266     TRANX1  011756     T20     003572
MUX17E  010052          PFAIL   015204     ST     = 000200    TRMRDY= 000002     T200    010110
MUX17F  010106          POINT  = ******    STACK   001100     TRNTAB  012014     T201    010446
MUX2    005034          POPRO  = 012600    START   001100     TRNTYP  011766     T202A   010530
MUX2A   005062          POP1SP= 005726     STARTN  001634     TSTENT  013266     T202A1  010536
MUX2B   005130          POP2SP= 022626     STARTO  001322     TSTGO   001746     T202B   010542
MUX2C   005166          PS     = 177776    START1  001364     TSTLST  017512     T202B1  010552
MUX2D   005200          PSW    = 177776    STATUS= ******     TSTMAX  015674     T202B2  010556
MUX2E   005216          PUSHRO= 010046     STEP   = 000400    TSTNO   015640     T202C   010562
MUX2F   005250          PUSH1S= 005746     STEPER  013404     TSTPNT  015672     T202D   010576
MUX3    005270          PUSH2S= 024646     STORE   015160     TSTTB0  017542     T202D1  010642
MUX3A   005316          RADIX  = 014436    STRING= ******     TSTTB1  017724     T202D2  010646
MUX3B   005364          REGST1  001606     STRLIN  006454     TSTTB2  017766     T202D3  010652
MUX3C   005422          RESTAR  015242     STRLNA  006474     TSTTB3  017774     T202D4  010656
MUX3D   005434          RESTA1  015310     STRTOA  001726     TYFILL  014642     T202E   010662
MUX3E   005452          RESTOR= ******     STYLE  = ******    TYPE   = 104004    T202E1  010726
MUX3F   005504          RES05  = 104007    ST103A  010110     TYPECL  014630     T202E2  010732
MUX4    005524          RETURN  015642     ST103B  010152     TYPER   014532     T202E3  010736
MUX4A   005552          RING   = 000200    ST202A  010464     TYPERA  014542     T202E4  010742
MUX4B   005620          RINGF  = 100000    ST202B  010526     TYPER1  014606     T202F   010746
MUX4C   005656          RNGRET  015732     SUSWR   001162     TYPER2  014622     T202F2  011026
MUX4D   005670          ROUTIN= ******     SV05    014446     T0      002250     T202F3  011032
MUX4E   005706          RS     = 000004    SV05P   014440     T1      002276     T202F4  011036
MUX4F   005740          RS05    014500     SWR     015626     T10     002700     T202F5  011042
MUX8    005760          SAVE   = ******    SWREG   000176     T100    006454     T202G   011046
MUX8A   005776          SAVPC   015664     SWRTB   014052     T101    006512     T202G1  011112
MUX8B   006030          SAVRO   015646     SW06   = 000100    T102    006672     T202G2  011116
MUX8C   006036          SAVR1   015650     SW08   = 000400    T103    007046     T202G3  011122
MUX8D   006072          SAVR2   015652     SW09   = 001000    T103A   010154     T202G4  011126
MUX8E   006124          SAVR3   015654     SW10   = 002000    T103A1  010162     T202H   011132
MVECTO  016661          SAVR4   015656     SW11   = 004000    T103B   010166     T202H2  011176
M0     = 000034         SAVR5   015660     SW12   = 010000    T103B1  010176     T202H3  011202
M1     = 000110         SAVSP   015662     SW13   = 020000    T103B2  010202     T202H4  011206
M16     016542          SAV05P= 104005     SW14   = 040000    T103C   010206     T202H5  011212
N      = 000300         SCNENA= 000040     SW15   = 100000    T103D1  010252     T202I   011216
NUMBER= ******          SCNT1   006144     T      = 000014    T103D2  010256     T202I2  011276
NXTTS   012762          SCNT1A  006204     TELETY= ******     T103D3  010262     T202I3  011302
N0     = 000034         SCNT1B  006260     TEMTAB  017412     T103D4  010266     T202I4  011306
N1     = 000110         SCNT1C  006404     TEST   = ******    T103E   010272     T202I5  011312
N2     = 000202         SCNT1D  006424     TESTS  = ******    T103EN  010446     T202J   011316
N3     = 000301         SCOPE  = 104002    TIFLG   015716     T103ES  010332     T202JN  011474
```

T202J5	011356	T26	004574	T6	002550	WAITS	= 104024	XSCRX	= 000001
T202J1	011454	T27	005034	T7	002624	WRDCNT	015666	X1A	001652
T202J2	011460	T3	.02402	UP	= ******	X	= 000000	X1B	001716
T202J3	011464	T30	005270	VECSTA	001434	XC0	= 000004	Y	= 000000
T202J4	011470	T300	010464	VECSTR	001414	XCS	= 000002	$NEWIS	017257
T21	003660	T31	005524	VECST1	001540	XFLAG	001312	$SWREQ	017246
T22	003754	T32	005760	WAITR	012414	XM	= 000101	.1	013646
T23	004070	T33	006144	WAITRN	= 104022	XN	= 000300	.2	013660
T24	004260	T4	002444	WAITRR	012452	XOR	015326	.3	013662
T25	004432	T5	002506	WAITR1	012464	XORSVC	001314	.4	013706

```
. ABS.  020000      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  19456 WORDS  ( 76 PAGES)
DYNAMIC MEMORY AVAILABLE FOR  71 PAGES
CZDHKF.BIN,CZDHKF.SEQ=DHMACA.MAC,CZDHKF.P11
```