DH11

DH11 MODEM

MD-11-DZDHK-B

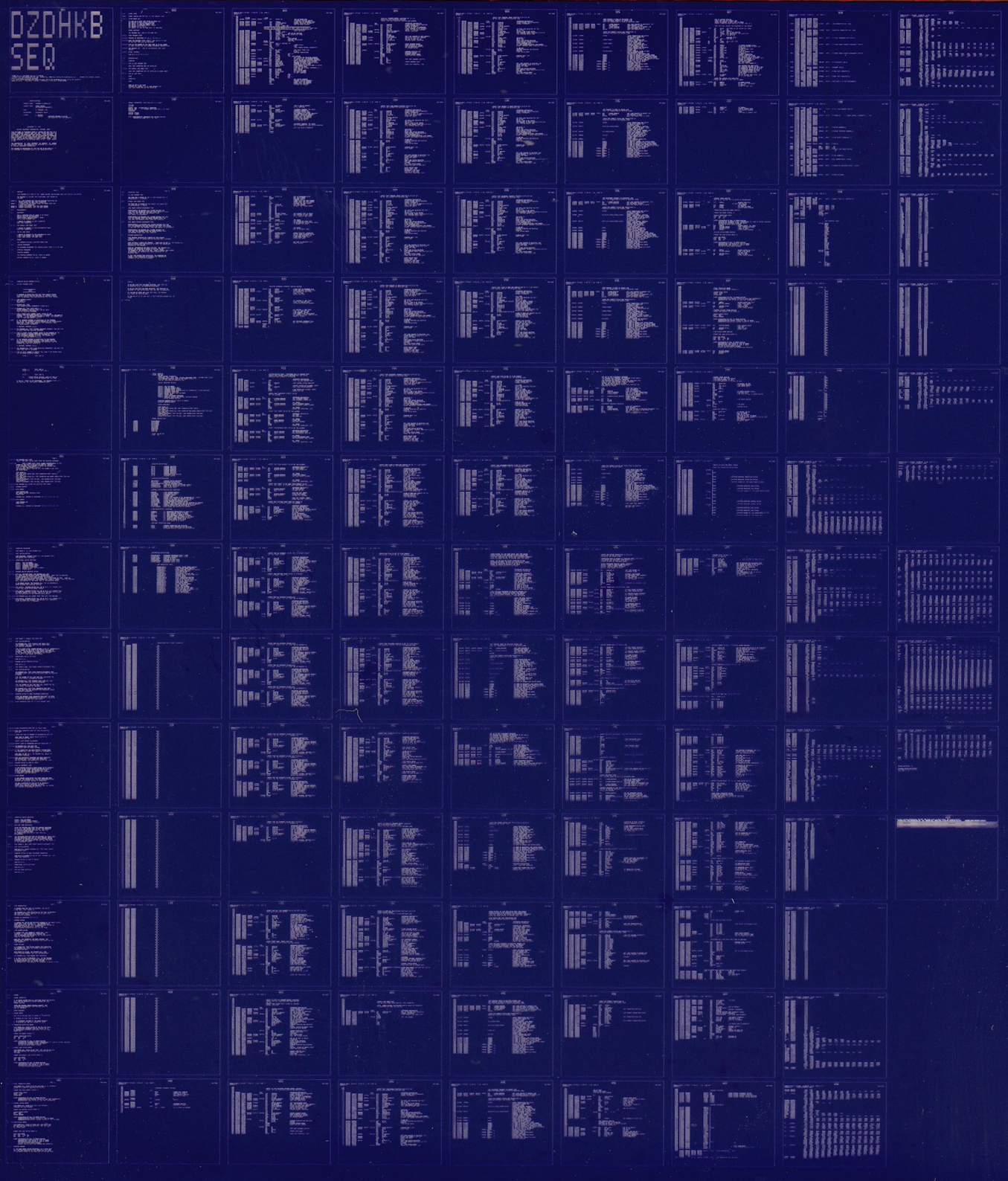
EP-DZDHK-B-DL-A

FEB 1976

FICHE 1 OF 1

digital

Made In U.S.A.



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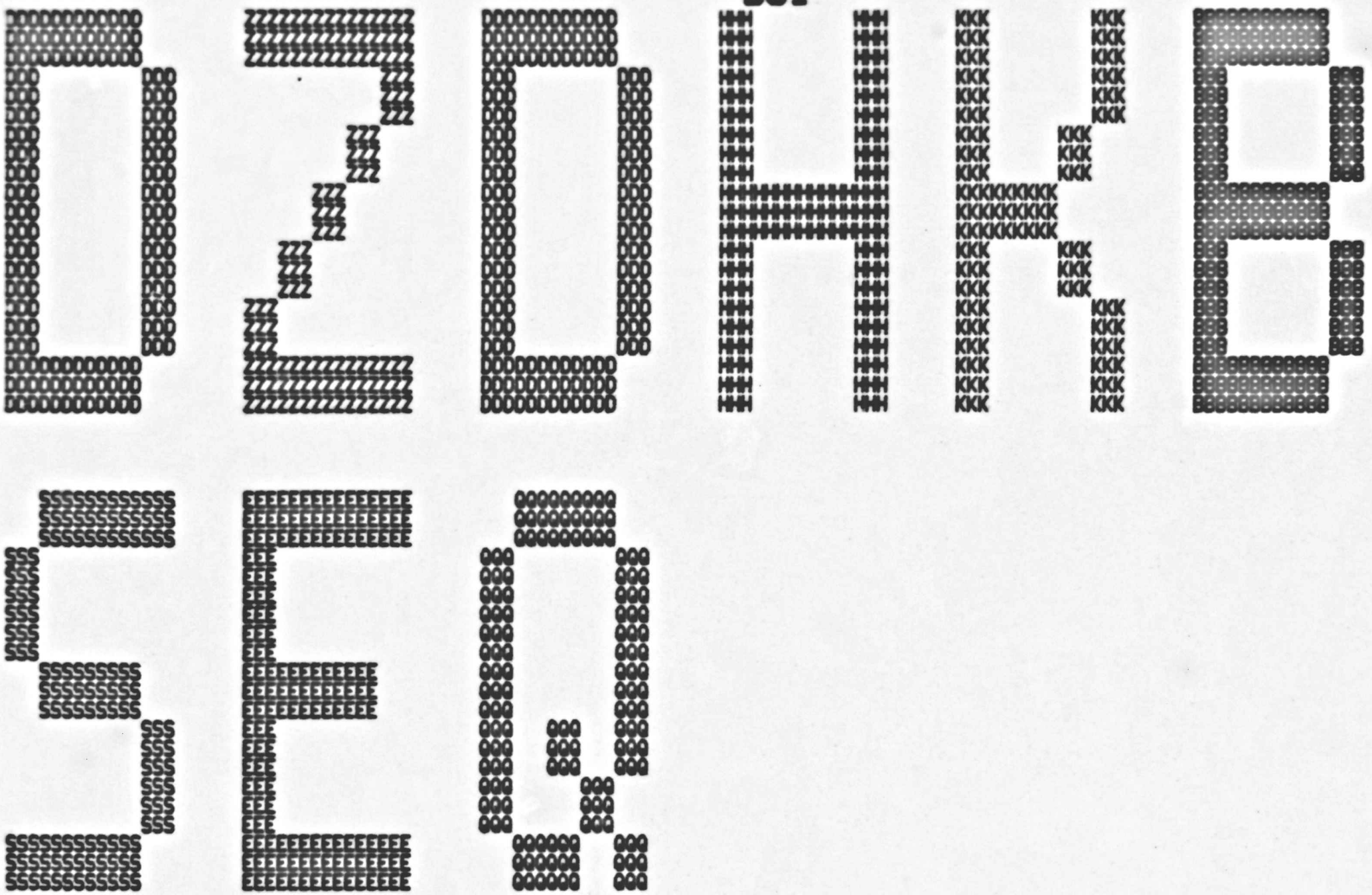

LPTSPL Version 101(2107) Running on MTA140
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Request created: 17-Jan-76 16:30:54
File: WHTG:DZDHKB.SEQ<055>[404,3722] Created: 09-Jan-76 16:08:56 Printed: 17-Jan-76 16:50:04
QUEUE Switches: /FILE:ASCII /COPIES:1 /SPACING:1 /LIMIT:214 /FORMS:NORMAL

IDENTIFICATION

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

PRODUCT NAME: MODEM CONTROL
MULTIPLEXER DIAGNOSTIC

DATE : 21 FEBRUARY 1976

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: G. BAISLEY
E. CROWLEY (MODIFIED PROGRAM TO ALLOW
LINE SELECTION FOR TEST GROUP 0)

1.0 ABSTRACT

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

THE PROGRAM IS DIVIDED INTO FUNCTIONAL TEST GROUPS AS FOLLOWS:

GROUP 0: ALL LINE SCANNER AND LINE MULTIPLEXER FUNCTIONS ARE TESTED USING THE H861 TEST CONNECTOR
GROUP 1: A SINGLE LINE IS TESTED USING THE MODEM CABLE AND A H315 TEST CONNECTOR
GROUP 2: CONNECT-DISCONNECT TEST FOR 103A MODEMS
GROUP 3: CONNECT-DISCONNECT TEST FOR 202C MODEMS

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11 COMPUTER WITH AT LEAST 4K OF MEMORY
ASR-33 TELETYPE OR EQUIVALENT
MODEM CONTROL MODULES M7807 & M7808

2.1.1 FOR 16 LINE SCANNER TEST

4 CABLES TO CONNECT TO TEST CONNECTOR
H861 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
H315 TEST CONNECTOR

2.1.3 FOR ON LINE TESTS

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

2.2 MEMORY

THE PROGRAM UTILIZES LOCATIONS 0000-17500

3.0 LOADING PROCEDURE

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

4.0 STARTING PROCEDURE

4.1 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200.

RESTART ADDRESS FOR ALL TESTS IS 000200

4.2 OPERATOR AND/OR PROGRAM ACTION

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.

4.2.1.1 LOAD ADDRESS 000200
SET SW00 = 1
PRESS START

4.2.1.2 PROGRAM WILL TYPE
"DH11-MODEM CONTROL DIAGNOSTIC "(ONCE ONLY)

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

4.2.1.4 TYPE A THREE DIGIT NUMBER (OCTAL) WHICH IS THE
ADDRESS THAT THE 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

F01


```
BIT01 = 1       TEST LINE 01
BIT02 = 0       DO NOT TEST LINE 2
  "
  "
BIT15 = 1       TEST LINE 15

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

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

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

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

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

4.2.1.9 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART

4.2.2.1 WITH SW00=1

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.

4.2.2.2 WITH SW00=0

LOAD ADDRESS 200
PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10

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

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.

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 "SET SW01=1 TO DISCONNECT".

WHEN SW01 IS SET TO 1, 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

SW15=1, HALT ON ERROR
SW13=1, SUPPRESS ERROR TYPEOUT
SW01=1, START DISCONNECT SEQUENCE

5.3.5 DATA SET MODE SWITCHING

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

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

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

5.4.1 TEST INITIALIZATION

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

5.4.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.4.3 PROGRAM ACTION IN CASE OF ERRORS

SAME AS 5.3.3

5.4.4 OPERATIONAL SWITCH SETTINGS

SAME AS 5.3.4

5.4.5 DATA SET MODE SWITCHING

SAME AS 5.3.5

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.

6.0 ERRORS

6.1 NORMAL OPERATION

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

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

6.1.1 ERROR MESSAGES

6.1.1.1 UNIQUE ERROR

ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER

AN EXAMPLE OF THIS TYPE OF ERROR IS:

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

6.1.1.2 TRANSITION DETECTION ERROR

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

FORMAT FOR ERROR TYPEOUT IS

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

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

6.1.1.3 SINGLE LINE STATUS ERROR

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

FORMAT FOR SINGLE LINE STATUS ERROR IS

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

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

6.1.1.4 FATAL TRANSITION ERROR

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

FORMAT FOR FATAL ERROR TYPEOUT IS

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

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

6.1.1.4 CONTROL STATUS ERROR

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

FORMAT FOR CONTROL STATUS ERROR IS

```
XXXXXX STATUS ERROR
EXP    REC
AAAAAA BBBBBB
```

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

6.1.1.5 LINE STATUS ERROR

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

FORMAT FOR LINE STATUS ERROR IS

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

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

6.1.2 REPEATED ERRORS

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

6.2 SCOPE LOOPS

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

6.2.1 AFTER ERROR HALT

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

PRESS CONTINUE

THE PROGRAM WILL LOOP ON THE SAME TEST.

6.2.2 FROM PROGRAM START

6.2.2.1 PROCEED AS DESCRIBED IN 4.2.1.1 TO 4.2.1.4

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

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

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

6.2.3 AFTER <CONTROL>

SAME AS 6.2.2.2 TO 6.2.2.4

7.0 RESTRICTIONS

7.1 STARTING

7.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR MUST BE INSTALLED.

7.1.2 FOR SINGLE LINE CABLE TEST

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

7.1.3 FOR ON LINE TESTS

NONE

7.2 OPERATING

NONE.

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

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

VECTORS

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

DHMCSR: 170500
DHMLSR: 170502

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

8.0 EXECUTION TIME

8.1 16 LINE SCANNER TEST

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

8.2 SINGLE LINE CABLE TEST

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

8.3 103A MODEM CONNECT-DISCONNECT TEST

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

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

8.4 202C MODEM CONNECT-DISCONNECT TEST

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

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

9. PROGRAM DESCRIPTION

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

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

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

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

9. CONT'D

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

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

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

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

10. LISTING

```
                                .TITLE  DZDHK-B
                                .ENABLE ABS,AMA
                                        ;MODEM CONTROL DIAGNOSTIC
                                        ;COPYRIGHT 1971, 1972, 1976, DIGITAL EQUIPMENT CORP., MAYNARD,MASS. 01754
                                        ;THIS PROGRAM CONTAINS TEST OF THE MODEM CONTROL IN
                                        ;THE OFF LINE MODE OF OPERATION ONLY

                                        ;SWITCH REGISTER OPTIONS


                                        ;SW15=1, HALT ON ERROR
                                        ;SW14=1, LOOP ON CURRENT TEST
                                        ;SW13=1, SUPPRESS ERROR TYPEOUT
                                        ;SW12=1, SUPPRESS TRACE TRAPPING(THIS IS INOPERATIVE IN THIS RELEASE)
                                        ;SW11=1, SUPPRESS ITERATIONS
                                        ;SW10=1, ESCAPE TO NEXT TEST ON ERROR
                                        ;SW09=1, FREEZE DATA
                                        ;SW01=1, START DISCONNECT SEQUENCE
                                        ;SW00=1, RESELECT VECTOR AND CONTROL REGISTER ADDRESS
                                                ;AFTER PROGRAM RESTART

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

                                        ;TESTS AVAILABLE

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

                                ;SYMBOL DEFINITIONS

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

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

```
                        ;REGISTER DEFINITIONS

000000                  R0=%0           ;GENERAL REGISTER
000001                  R1=%1           ;GENERAL REGISTER
000002                  R2=%2           ;GENERAL REGISTER
000003                  R3=%3           ;GENERAL REGISTER
000004                  R4=%4           ;GENERAL REGISTER
000005                  R5=%5           ;GENERAL REGISTER
000006                  SP=%6           ;PROCESSOR STACK POINTER
000007                  PC=%7           ;PROGRAM COUNTER

                        ;LOCATION EQUIVALENCIES

177570                  SWR=177570      ;CONSOLE SWITCH REGISTER
177776                  PS=177776       ;PROCESSOR STATUS WORD
020422                  STACK=ENDCOD+200;START OF PROCESSOR STACK
015026                  RADIX=DIVIS     ;CONVERSION FACTOR FOR DECIMAL OUTPUT
015022                  BINWRD=DIVIDL   ;WORD TO BE CONVERTED TO OCTAL ASCII
015024                  DIGIT=DIVIDH    ;ASCII OCTAL DIGIT

                        ;CONTROL STATUS REGISTER BIT FUNCTIONS

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

                        ;LINE REGISTER BIT FUNCTIONS

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

                        ;SOFTWARE TRANSITION FLAGS

000004                  XCO=4           ;CARRIER TRANSITION WAS DETECTED
000002                  XCS=2           ;CLEAR TO SEND TRANSITION WAS DETECTED
000001                  XSCRX=1         ;SECONDARY RECEIVE TRANSITION WAS DETECTED
```

```
                        ;INSTRUCTION DEFINITIONS

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

                                ;EMT DEFINITION TABLE

104000                          ERRORC=EMT+X            ;CONTROL STATUS ERROR SERVICE
104001                          ERRORL=EMT+X            ;LINE STATUS ERROR SERVICE
104002                          SCOPE=EMT+X             ;SCOPE LOOP AND ITERATION SERVICE
104003                          SCOPEF=EMT+X            ;DATA FREEZE SERVICE
104004                          TYPE=EMT+X              ;TELETYPE OUTPUT
104005                          SAVDSP=EMT+X            ;SAVE R0-R5, PC+2 OF CALL
104006                          OCTASC=EMT+X            ;CONVERT DATA TO ASCII AND TYPE
104007                          RESD5=EMT+X             ;RESTORE R0-R5
104010                          CONVERT=EMT+X           ;ASCII CONVERSION ROUTINE
104011                          EXTRACT=EMT+X           ;DIGIT EXTRACTION ROUTINE
104012                          ERROR=EMT+X             ;TYPE PC OF FAILING TESTS ONLY
104013                          INSTRG=EMT+X            ;INPUT OCTAL DATA STRING
104014                          ERRORT=EMT+X            ;TRANSITION ERROR
104015                          ERRORS=EMT+X            ;ON LINE STATUS ERROR
104016                          ERRORN=EMT+X            ;FATAL TRANSITION
104017                          GETLNS=EMT+X            ;INPUT LINE NUMBERS
104020                          SETUP=EMT+X             ;SET UP FOR ON LINE TEST
104021                          CKRING=EMT+X            ;CHECK FOR RING ON CORRERT LINE
104022                          WAITRN=EMT+X            ;WAIT FOR TRANSITIONS
104023                          CKTRAN=EMT+X            ;CHECK TRANSITIONS
104024                          WAITS=EMT+X             ;DELAY FOR TRANSIENTS
```

```
                                ;TRAPCATCAER FOR ILLEGAL INTERRUPTS
                        .=0
000000  000000          .+2
000002  000002          HALT
000004  000006          .+2
000006  000010          HALT
000010  000012          .+2
000012  000014          HALT
000014  000016          .+2
000016  000020          HALT
000020  000022          .+2
000022  000024          HALT
000024  000026          .+2
000026  000030          HALT
000030  000032          .+2
000032  000034          HALT
000034  000036          .+2
000036  000040          HALT
000040  000042          .+2
000042  000044          HALT
000044  000046          .+2
000046  000050          HALT
000050  000052          .+2
000052  000054          HALT
000054  000056          .+2
000056  000060          HALT
000060  000062          .+2
000062  000064          HALT
000064  000066          .+2
000066  000070          HALT
000070  000072          .+2
000072  000074          HALT
000074  000076          .+2
000076  000100          HALT
000100  000102          .+2
000102  000104          HALT
000104  000106          .+2
000106  000110          HALT
000110  000112          .+2
000112  000114          HALT
000114  000116          .+2
000116  000120          HALT
000120  000122          .+2
000122  000124          HALT
000124  000126          .+2
000126  000130          HALT
000130  000132          .+2
000132  000134          HALT
000134  000136          .+2
000136  000140          HALT
000140  000142          .+2
000142  000144          HALT
000144  000146          .+2
```

```
(1)  000146  000000          HALT
(1)  000150  000152          .+2
(1)  000152  000000          HALT
(1)  000154  000156          .+2
(1)  000156  000000          HALT
(1)  000160  000162          .+2
(1)  000162  000000          HALT
(1)  000164  000166          .+2
(1)  000166  000000          HALT
(1)  000170  000172          .+2
(1)  000172  000000          HALT
(1)  000174  000176          .+2
(1)  000176  000000          HALT
(1)  000200  000202          .+2
(1)  000202  000000          HALT
(1)  000204  000206          .+2
(1)  000206  000000          HALT
(1)  000210  000212          .+2
(1)  000212  000000          HALT
(1)  000214  000216          .+2
(1)  000216  000000          HALT
(1)  000220  000222          .+2
(1)  000222  000000          HALT
(1)  000224  000226          .+2
(1)  000226  000000          HALT
(1)  000230  000232          .+2
(1)  000232  000000          HALT
(1)  000234  000236          .+2
(1)  000236  000000          HALT
(1)  000240  000242          .+2
(1)  000242  000000          HALT
(1)  000244  000246          .+2
(1)  000246  000000          HALT
(1)  000250  000252          .+2
(1)  000252  000000          HALT
(1)  000254  000256          .+2
(1)  000256  000000          HALT
(1)  000260  000262          .+2
(1)  000262  000000          HALT
(1)  000264  000266          .+2
(1)  000266  000000          HALT
(1)  000270  000272          .+2
(1)  000272  000000          HALT
(1)  000274  000276          .+2
(1)  000276  000000          HALT
(1)  000300  000302          .+2
(1)  000302  000000          HALT
(1)  000304  000306          .+2
(1)  000306  000000          HALT
(1)  000310  000312          .+2
(1)  000312  000000          HALT
(1)  000314  000316          .+2
(1)  000316  000000          HALT
(1)  000320  000322          .+2
```

```
(1)  000322  000000                HALT
(1)  000324  000326                .+2
(1)  000326  000000                HALT
(1)  000330  000332                .+2
(1)  000332  000000                HALT
(1)  000334  000336                .+2
(1)  000336  000000                HALT
(1)  000340  000342                .+2
(1)  000342  000000                HALT
(1)  000344  000346                .+2
(1)  000346  000000                HALT
(1)  000350  000352                .+2
(1)  000352  000000                HALT
(1)  000354  000356                .+2
(1)  000356  000000                HALT
(1)  000360  000362                .+2
(1)  000362  000000                HALT
(1)  000364  000366                .+2
(1)  000366  000000                HALT
(1)  000370  000372                .+2
(1)  000372  000000                HALT
(1)  000374  000376                .+2
(1)  000376  000000                HALT
(1)  000400  000402                .+2
(1)  000402  000000                HALT
(1)  000404  000406                .+2
(1)  000406  000000                HALT
(1)  000410  000412                .+2
(1)  000412  000000                HALT
(1)  000414  000416                .+2
(1)  000416  000000                HALT
(1)  000420  000422                .+2
(1)  000422  000000                HALT
(1)  000424  000426                .+2
(1)  000426  000000                HALT
(1)  000430  000432                .+2
(1)  000432  000000                HALT
(1)  000434  000436                .+2
(1)  000436  000000                HALT
(1)  000440  000442                .+2
(1)  000442  000000                HALT
(1)  000444  000446                .+2
(1)  000446  000000                HALT
(1)  000450  000452                .+2
(1)  000452  000000                HALT
(1)  000454  000456                .+2
(1)  000456  000000                HALT
(1)  000460  000462                .+2
(1)  000462  000000                HALT
(1)  000464  000466                .+2
(1)  000466  000000                HALT
(1)  000470  000472                .+2
(1)  000472  000000                HALT
(1)  000474  000476                .+2
```

```
(1)  000476  000000                HALT
(1)  000500  000502                .+2
(1)  000502  000000                HALT
(1)  000504  000506                .+2
(1)  000506  000000                HALT
(1)  000510  000512                .+2
(1)  000512  000000                HALT
(1)  000514  000516                .+2
(1)  000516  000000                HALT
(1)  000520  000522                .+2
(1)  000522  000000                HALT
(1)  000524  000526                .+2
(1)  000526  000000                HALT
(1)  000530  000532                .+2
(1)  000532  000000                HALT
(1)  000534  000536                .+2
(1)  000536  000000                HALT
(1)  000540  000542                .+2
(1)  000542  000000                HALT
(1)  000544  000546                .+2
(1)  000546  000000                HALT
(1)  000550  000552                .+2
(1)  000552  000000                HALT
(1)  000554  000556                .+2
(1)  000556  000000                HALT
(1)  000560  000562                .+2
(1)  000562  000000                HALT
(1)  000564  000566                .+2
(1)  000566  000000                HALT
(1)  000570  000572                .+2
(1)  000572  000000                HALT
(1)  000574  000576                .+2
(1)  000576  000000                HALT
(1)  000600  000602                .+2
(1)  000602  000000                HALT
(1)  000604  000606                .+2
(1)  000606  000000                HALT
(1)  000610  000612                .+2
(1)  000612  000000                HALT
(1)  000614  000616                .+2
(1)  000616  000000                HALT
(1)  000620  000622                .+2
(1)  000622  000000                HALT
(1)  000624  000626                .+2
(1)  000626  000000                HALT
(1)  000630  000632                .+2
(1)  000632  000000                HALT
(1)  000634  000636                .+2
(1)  000636  000000                HALT
(1)  000640  000642                .+2
(1)  000642  000000                HALT
(1)  000644  000646                .+2
(1)  000646  000000                HALT
(1)  000650  000652                .+2
```

```
(1)  000652  000000                HALT
(1)  000654  000656                .+2
(1)  000656  000000                HALT
(1)  000660  000662                .+2
(1)  000662  000000                HALT
(1)  000664  000666                .+2
(1)  000666  000000                HALT
(1)  000670  000672                .+2
(1)  000672  000000                HALT
(1)  000674  000676                .+2
(1)  000676  000000                HALT
(1)  000700  000702                .+2
(1)  000702  000000                HALT
(1)  000704  000706                .+2
(1)  000706  000000                HALT
(1)  000710  000712                .+2
(1)  000712  000000                HALT
(1)  000714  000716                .+2
(1)  000716  000000                HALT
(1)  000720  000722                .+2
(1)  000722  000000                HALT
(1)  000724  000726                .+2
(1)  000726  000000                HALT
(1)  000730  000732                .+2
(1)  000732  000000                HALT
(1)  000734  000736                .+2
(1)  000736  000000                HALT
(1)  000740  000742                .+2
(1)  000742  000000                HALT
(1)  000744  000746                .+2
(1)  000746  000000                HALT
(1)  000750  000752                .+2
(1)  000752  000000                HALT
(1)  000754  000756                .+2
(1)  000756  000000                HALT
(1)  000760  000762                .+2
(1)  000762  000000                HALT
(1)  000764  000766                .+2
(1)  000766  000000                HALT
(1)  000770  000772                .+2
(1)  000772  000000                HALT
(1)  000774  000776                .+2
(1)  000776  000000                HALT
```

```
                                        ;STANDARD INTERRUPT VECTORS
                
                        000024          .=24
000024  015542                         PFAIL                   ;POWER FAIL HANDLER
000026  000340                         340                     ;SERVICE AT LEVEL 7
000030  013720                         EMTSRV                  ;EMT DISPATCH SERVICE
000032  000340                         340                     ;SERVICE AT LEVEL 7
                
                        000046          .=46
000046  013702                         LOGICAL                 ;ACT11?
                
                        000060          .=60
000060  001562                         KBDINT                  ;KEYBOARD MONITOR
000062  000340                         340                     ;SERVICE AT LEVEL 7
                        000200          .=200
000200  000137  001000                 JMP     START           ;GO TO START OF PROGRAM
```

```
                    001000                  .=1000
001000  012737  015542  000024  START:  MOV     #PFAIL,24               ;SET UP POWER FAIL
                                                                        ;INTERRUPT SERVICE VECTOR
001006  005037  001560          CLR     TIPFLG                          ;CLEAR TEST IN PROGRESS FLAG
001012  012777  000100  015142  MOV     #INTENA,@TKCSR                  ;ENABLE TELETYPE INTERRUPTS
001020  012706  020422          MOV     #STACK,SP                       ;SET UP STACK POINTER
001024  005037  001070          CLR     XFLAG   ;XOR = NO
                        ;*****************************************************************
                        ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
                        ;*****************************************************************
001030  000423                  BR      STARTO                          ;SKIP XOR STUFF
001032  013746  000004          MOV     4,-(SP) ;SAVE 4
001036  012737  001072  000004  MOV     #XORSVC,4               ;SET UP SVC ROUTINE
001044  005737  177060          TST     177060  ;GOT AN XOR TESTER OUT THERE ?
001050  012637  000004          MOV     (SP)+,4 ;YES
001054  005137  001070          COM     XFLAG   ;XOR = YES
001060  004737  015672          JSR     PC,XOR          ;AUTO VECTOR
001064  000137  001100          JMP     STARTO          ;RESTORE TRAPCATCHER
001070  000000          XFLAG:  0                       ;XOR FLAG
001072  022626          XORSVC: POP2SP
001074  012637  000004          MOV     (SP)+,4 ;RESTORE 4
001100  005737  016256  STARTO: TST     TIFLG                           ;TYPED TITLE?
001104  001005                  BNE     .+14                            ;YES
001106  104004                  TYPE                                    ;TYPE "MODEM CONTROL DIAGNOSTIC"
001110  017046                  MTITLE
001112  012737  000001  016256  MOV     #1,TIFLG                        ;SET TITLE TYPED FLAG
001120  005737  001070          TST     XFLAG                           ;X OR ?
001124  100412                  BMI     VECSTR                          ;RESTORE TRAPCATCHER
001126  005737  000042          TST     42                      ;ACT 11?
001132  001403                  BEQ     START1                  ;NO
001134  004737  015672          JSR     PC,XOR                  ;YES  AUTO VECTOR
001140  000404                  BR      VECSTR                          ;GET VECTOR AND REGISTER ADDRESS
001142  032737  000001  177570  START1: BIT     #1,SWR                  ;IF SW BIT 0=1, ON PROGRAM RESTART
001150  001506                  BEQ     STARTN                          ;INPUT VECTOR AND REGISTER ADDRESSES
001152  012706  020422  VECSTR: MOV     #STACK,SP                       ;SET UP PROCESSOR STACK POINTER
001156  012737  000300  013620  MOV     #300,DATA1                      ;ADDRESS OF FIRST FLOATING VECTOR
001164  012737  000302  013622  MOV     #302,DATA2                      ;ADDRESS OF STATUS WORD
001172  013777  013622  012420  VECSTA: MOV     DATA2,@DATA1            ;MOVE ADDRESS OF STATUS WORD TO VECTOR
001200  005077  012416          CLR     @DATA2                          ;CLEAR STATUS WORD
                                                                        ;(FOR HALT ON ILLEGAL INTERRUPT)
001204  062737  000004  013620  ADD     #4,DATA1                        ;NEXT VECTOR
001212  062737  000004  013622  ADD     #4,DATA2                        ;NEXT STATUS WORD
001220  023727  013620  001000  CMP     DATA1,#1000                     ;IS TABLE CLEARED
001226  001361                  BNE     VECSTA                          ;IF NOT, CONTINUE
001230  005737  001070          TST     XFLAG                   ;XOR ?
001234  100522                  BMI     TSTGO                   ;YES
001236  005737  000042          TST     42                      ;ACT 11 ?
001242  001117                  BNE     TSTGO                   ;YES
001244  104013                  INSTRG                                  ;GET VECTOR ADDRESS
001246  017132                  MVECTOR                                 ;MESSAGE "VECTOR ADDRESS-"
001250  000300                  300                                     ;LOWER LIMIT FOR ADDRESS
001252  000774                  774                                     ;UPPER LIMIT FOR ADDRESS
001254  016152                  DHMVEC                                  ;STORAGE FOR ADDRESS
```

```
280  001256  032737  000003  016152          BIT     #3,DHMVEC       ;TEST 2 LSB OF ADDRESS
281  001264  001403                          BEQ     VECST1          ;IF 0, CONTINUE
282  001266  024646                          PUSH2SP
283  001270  000137  015406                  JMP     INSTER          ;INCORRECT ADDRESS, TRY AGAIN
284  001274  013737  016152  016154  VECST1: MOV     DHMVEC,DHMLVL   ;GENERATE ADDRESS OF
285  001302  062737  000002  016154          ADD     #2,DHMLVL       ;INTERRUPT STATUS WORD
286  001310  104013                          INSTRG                  ;GET ADDRESS OF CONTROL REGISTER
287  001312  017154                          MREGAD                  ;MESSAGE "REGISTER ADDRESS-"
288  001314  170500                          170500                  ;LOWER LIMIT FOR ADDRESS
289  001316  170670                          170670                  ;UPPER LIMIT FOR ADDRESS
290  001320  016156                          DHMCSR                  ;STORAGE FOR ADDRESS
291  001322  032737  000007  016156          BIT     #7,DHMCSR       ;IF 3 LSB ARE NOT 0
292  001330  001403                          BEQ     REGST1
293  001332  024646                          PUSH2SP
294  001334  000137  015406                  JMP     INSTER          ;INCORRECT ADDRESS, TRY AGAIN
295  001340  013737  016156  016160  REGST1: MOV     DHMCSR,DHMLSR   ;SET UP ADDRESS OF LINE STATUS REGISTER
296  001346  062737  000002  016160          ADD     #2,DHMLSR
297  001354  104013                          INSTRG                  ;GET LINE SELECT PARAMETER
298  001356  017210                          MLINSL
299  001360  000000                          0
300  001362  177777                          177777
301  001364  016260                          LINSEL
```

```
303
304  001366  012706  020422          STARTN: MOV     #STACK,SP               ;SET UP PROCESSOR STACK
305  001372  104013                          INSTRG                          ;GET TEST NUMBER
306  001374  017242                          MTEST                           ;MESSAGE "TEST-"
307  001376  000000                          0                               ;LOWER LIMIT FOR TEST NUMBER
308  001400  000777                          777                             ;UPPER LIMIT FOR TEST NUMBER
309  001402  016200                          TSTNO                           ;STORAGE FOR TEST NUMBER
310  001404  013705  016200                  MOV     TSTNO,R5                ;GET TEST NUMBER
311  001410  042705  177077                  BIC     #177077,R5              ;EXTRACT TEST GROUP NUMBER
314  001414  006205                          ASR     R5
(1)  001416  006205                          ASR     R5
(1)  001420  006205                          ASR     R5
(1)  001422  006205                          ASR     R5
(1)  001424  006205                          ASR     R5
315  001426  016537  017734  016234          MOV     GRD(R5),TSTMAX          ;GET HIGHEST TEST IN GROUP
316  001434  016537  017714  016232          MOV     TSTLST(R5),TSTPNT       ;GET POINTER TO TEST TABLE
317  001442  005737  016232                  TST     TSTPNT                  ;IF 0, INVALID TEST GROUP
318  001446  001003                          BNE     STRT0A
319  001450  024646                          PUSH2SP
320  001452  000137  015406                  JMP     INSTER                  ;TRY AGAIN
321  001456  042737  177700  016200  STRT0A: BIC     #177700,TSTNO           ;GET NUMBER OF FIRST TEST
322                                                                          ;TO BE EXECUTED IN SELECTED GROUP
323  001464  023737  016200  016234          CMP     TSTNO,TSTMAX            ;IS NUMBER TOO LARGE
324  001472  003403                          BLE     TSTGO
325  001474  024646                          PUSH2SP
326  001476  000137  015406                  JMP     INSTER                  ;TRY AGAIN
327  001502  012716  000340          TSTGO:  MOV     #340,(SP)               ;SET UP PRIORITY LEVEL
328  001506  005746                          PUSH1SP
329  001510  000005                          RESET
330  001512  052777  000100  014442          BIS     #INTENA,@TKCSR          ;ENABLE TELETYPE INTERRUPTS
331  001520  012737  001720  001722          MOV     #DMYRTI,KRET            ;SET UP DUMMY KEYBOARD RETURN
332  001526  005037  016236                  CLR     LINFLG                  ;CLEAR LINE SELECTED FLAG
333  001532  005037  016174                  CLR     TRACON                  ;CLEAR TRACE TRAP FLAG
334  001536  005037  016176                  CLR     PASCNT                  ;CLEAR PASS COUNT
335  001542  104004                          TYPE
336  001544  017256                          MCRLF
337  001546  012737  000001  001560          MOV     #1,TIPFLG               ;SET TEST IN PROGRESS FLAG
338  001554  000137  014102                  JMP     TSTENT                  ;START TESTING
339  001560  000000                  TIPFLG: 0
```

```
                                        ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
                                        ;
001562  005037  001560          KBDINT: CLR     TIPFLG                  ;CLEAR TEST IN PROGRESS FLAG
001566  005037  001724                  CLR     SINTFL                  ;CLEAR SOFTWARE INTERRUPT FLAG
001572  022777  000203  014364          CMP     #203,@TKDBR             ;IF <CONTROL C> WAS TYPED
001600  001007                          BNE     KBDIN1                  ;TYPE "↑C" AND
001602  104004                          TYPE                            ;SELECT NEW TEST
001604  017506                          MCONTC
001606  022626                          POP2SP
001610  005077  014342                  CLR     @DHMCSR
001614  000137  001366                  JMP     STARTN
001620  022777  000226  014336  KBDIN1: CMP     #226,@TKDBR             ;IF <CONTROL V> WAS TYPED
001626  001007                          BNE     KBDIN2                  ;TYPE "↑V" AND GET NEW
001630  104004                          TYPE                            ;VECTOR AND REGISTER ADDRESS
001632  017511                          MCONTV
001634  022626                          POP2SP
001636  005077  014314                  CLR     @DHMCSR
001642  000137  001152                  JMP     VECSTR
001646  022777  000214  014310  KBDIN2: CMP     #214,@TKDBR             ;IF <CONTROL L> WAS TYPED
001654  001013                          BNE     KBDIN3                  ;TYPE "↑L" AND GET NEW
001656  104004                          TYPE                            ;LINE NUMBERS, UNLESS
001660  017514                          MCONTL                          ;TEST GROUP 0 WAS IN PROGRESS
001662  022737  001720  001722          CMP     #DMYRTI,KRET            ;IF <CONTROL L> WAS TYPED IN TEST
001670  001413                          BEQ     DMYRTI                  ;GROUP 0, IGNORE
001672  022626                          POP2SP
001674  005077  014256                  CLR     @DHMCSR
001700  000177  000016                  JMP     @KRET
001704  012737  000001  001724  KBDIN3: MOV     #1,SINTFL               ;SET SOFTWARE INTERRUPT FLAG
001712  012737  000001  001560          MOV     #1,TIPFLG               ;SET TEST IN PROGRESS FLAG
001720  000002                  DMYRTI: RTI
                                        .EVEN
001722  000000                  KRET:   0
001724  000000                  SINTFL: 0
```

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

001726                          TO:                                     ;REFERENCE DESIGNATION
001726  104004                        TYPE                            ;TYPE "16 LINE SCANNER TEST"
001730  017013                        M16
001732  005777  014220          INIT1: TST     @DHMCSR                  ;TEST CONTROL STATUS REGISTER
001736  001401                        BEQ     .+4
001740  104012                        ERROR                           ;CONTROL STATUS NOT CLEARED, ERROR
001742  005777  014212                TST     @DHMLSR                 ;TEST LINE STATUS REGISTER
001746  001401                        BEQ     .+4
001750  104012                        ERROR                           ;LINE STATUS NOT CLEARED, ERROR
001752  104002                        SCOPE                           ;CHECK FOR LOOP

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

001754                          T1:                                     ;REFERENCE DESIGNATION
001754  012777  000100  014174  CSTR1: MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
001762  032777  000100  014166        BIT     #INTENA,@DHMCSR         ;WAS INTERRUPT ENABLE SET
001770  001001                        BNE     .+4
001772  104012                        ERROR                           ;NO, ERROR
001774  042777  000100  014154        BIC     #INTENA,@DHMCSR         ;CLEAR INTERRUPT ENABLE
002002  032777  000100  014146        BIT     #INTENA,@DHMCSR         ;WAS INTERRUPT ENABLE CLEARED
002010  001401                        BEQ     .+4
002012  104012                        ERROR                           ;NO, ERROR
002014  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP

                                        ;VERIFY THAT "DONE" CAN BE SET AND CLEARED

002016                          T2:                                     ;REFERENCE DESIGNATION
002016  012777  000200  014132  CSTR2: MOV     #DONE,@DHMCSR           ;SET DONE
002024  032777  000200  014124        BIT     #DONE,@DHMCSR           ;WAS DONE SET
002032  001001                        BNE     .+4
002034  104012                        ERROR                           ;NO, ERROR
002036  042777  000200  014112        BIC     #DONE,@DHMCSR           ;CLEAR DONE
002044  032777  000200  014104        BIT     #DONE,@DHMCSR           ;WAS DONE CLEARED
002052  001401                        BEQ     .+4
002054  104012                        ERROR                           ;NO, ERROR
002056  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP

                                        ;VERIFY "MAINTENANCE MODE" CAN BE SET AND CLEARED

002060                          T3:                                     ;REFERENCE DESIGNATION
002060  012777  001000  014070  CSTR3: MOV     #MAINT,@DHMCSR          ;SET MAINTENANCE MODE
002066  032777  001000  014062        BIT     #MAINT,@DHMCSR          ;WAS MAINTENANCE MODE SET
002074  001001                        BNE     .+4
002076  104012                        ERROR                           ;NO, ERROR
002100  042777  001000  014050        BIC     #MAINT,@DHMCSR          ;CLEAR MAINTENANCE MODE
002106  032777  001000  014042        BIT     #MAINT,@DHMCSR          ;WAS MAINTENANCE MODE CLEARED
002114  001401                        BEQ     .+4
002116  104012                        ERROR                           ;NO, ERROR
002120  104002                        SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;VERIFY THAT "SCAN ENABLE" CAN BE SET AND CLEARED.
                                        ;
002122                          T4:                             ;REFERENCE DESIGNATION
002122  012777  000040  014026  CSTR4:  MOV     #SCNENA,@DHMCSR ;SET SCAN ENABLE
002130  032777  000040  014020          BIT     #SCNENA,@DHMCSR ;WAS SCAN ENABLE SET
002136  001001                          BNE     .+4
                                        ;
002140  104012                          ERROR                   ;NO, ERROR
002142  042777  000040  014006          BIC     #SCNENA,@DHMCSR ;CLEAR SCAN ENABLE
002150  032777  000040  014000          BIT     #SCNENA,@DHMCSR ;WAS SCAN ENABLE CLEARED
002156  001401                          BEQ     .+4
                                        ;
002160  104012                          ERROR                   ;NO, ERROR
002162  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
                                        ;
002164                          T5:                             ;REFERENCE DESIGNATION
002164  012777  000040  013764  CSTR5:  MOV     #SCNENA,@DHMCSR ;SET SCAN ENABLE
002172  032777  000020  013756          BIT     #BUSY,@DHMCSR   ;IS BUSY BIT SET
002200  001001                          BNE     .+4
002202  104012                          ERROR                   ;BUSY NOT SET, ERROR
002204  042777  000040  013744          BIC     #SCNENA,@DHMCSR ;CLEAR SCAN ENABLE
002212  032777  000020  013736          BIT     #BUSY,@DHMCSR   ;IS BUSY BIT CLEARED
002220  001401                          BEQ     .+4
002222  104012                          ERROR                   ;BUSY NOT CLEARED, ERROR
002224  104002                          SCOPE                   ;CHECK FOR LOOP, ITERATIONS
                                        ;
                                        ;VERIFY THAT SETTING "DONE" DOES NOT CCAUSE AN
                                        ;INTERRUPT IF "INTERRUPT ENABLE" IS CLEARED.
                                        ;
002226                          T6:                             ;REFERENCE DESIGNATION
002226  052737  000340  177776  INT1:   BIS     #340,PS         ;LOCK OUT INTERRUPTS
002234  005077  013716                  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
002240  012777  002274  013704          MOV     #INT1A,@DHMVEC  ;SET UP INTERRUPT SERVICE ADDRESS
002246  013777  177776  013700          MOV     PS,@DHMLVL      ;SET UP INTERRUPT PRIORITY
002254  052777  000200  013674          BIS     #DONE,@DHMCSR   ;SET DONE
002262  042737  000340  177776          BIC     #340,PS         ;ALLOW INTERRUPTS
002270  000240                          NOP                     ;DELAY FOR INTERRUPT
002272  000402                          BR      INT1B           ;NO INTERRUPT, CONTINUE
002274  022626                  INT1A:  POP2SP                  ;RESTORE STACK, INTERRUPT
002276  104012                          ERROR                   ;OCCURED, ERROR
002300  104002                  INT1B:  SCOPE                   ;CHECK FOR LOOP, ITERATIONS
```

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

002302                          T7:                             ;REFERENCE DESIGNATION
002302  052737  000340  177776  INT2:   BIS     #340,PS         ;LOCK OUT INTERRUPTS
002310  005077  013642                  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
002314  012777  002350  013630          MOV     #INT2A,@DHMVEC  ;SET UP INTERRUPT SERVICE ADDRESS
002322  013777  177776  013624          MOV     PS,@DHMLVL      ;SET UP INTERRUPT SERVICE LEVEL
002330  052777  000100  013620          BIS     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
002336  042737  000340  177776          BIC     #340,PS         ;ALLOW INTERRUPTS
002344  000240                          NOP                     ;DELAY FOR INTERRUPTS
002346  000402                          BR      INT2B           ;NO INTERRUPT, CONTINUE
002350  022626                  INT2A:  POP2SP                  ;RESTORE STACK
002352  104012                          ERROR                   ;INTERRUPT OCCURED, ERROR
002354  104002                  INT2B:  SCOPE                   ;CHECK FOR ITERATIONS, LOOP

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

002356                          T10:                            ;REFERENCE DESIGNATION
002356  052737  000340  177776  INT3:   BIS     #340,PS         ;LOCK OUT INTERRUPTS
002364  005077  013566                  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
002370  012777  002434  013554          MOV     #INT3A,@DHMVEC  ;SET UP INTERRUPT SERVICE ADDRESS
002376  012777  000100  013552          MOV     #INTENA,@DHMCSR ;SET "INTERRUPT ENABLE"
002404  013777  177776  013542          MOV     PS,@DHMLVL      ;SET "INTERRUPT LEVEL"
002412  042737  000340  177776          BIC     #340,PS         ;ALLOW INTERRUPTS
002420  052777  000200  013530          BIS     #DONE,@DHMCSR   ;SET "DONE"
002426  000240                          NOP                     ;DELAY FOR INTERRUPT
002430  104012                          ERROR                   ;INTERRUPT OCCURED, ERROR
002432  000401                          BR      INT3B           ;CONTINUE
002434  022626                  INT3A:  POP2SP                  ;INTERRUPT OCCURED, RESTOR STACK
002436  104002                  INT3B:  SCOPE                   ;CHECK FOR ITERATION, LOOP

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

002440                          T11:                            ;REFERENCE DESIGNATION
002440  005077  013512          INT4:   CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
002444  042737  000340  177776          BIC     #340,PS         ;SET PROCESSOR PRIORITY
002452  052737  000340  177776          BIS     #340,PS         ;TO LEVEL 7.
002460  012777  002514  013464          MOV     #INT4A,@DHMVEC  ;SET UP INTERRUPT SERVICE ADDRESS
002466  013777  177776  013460          MOV     PS,@DHMLVL      ;SET UP INTERRUPT SERVICE LEVEL
002474  012777  000100  013454          MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
002502  052777  000200  013446          BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
002510  000240                          NOP                     ;DELAY FOR INTERRUPT
002512  000402                          BR      INT4B           ;NO INTERRUPT, CONTINUE
002514  022626                  INT4A:  POP2SP                  ;RESTORE STACK
002516  104012                          ERROR                   ;INTERRUPT OCCURED, ERROR
002520  104002                  INT4B:  SCOPE                   ;CHECK FOR ITERATION, LOOP
```

```
(2)
(2)                                     ;VERIFY THAT NO INTERRUPT OCCURS WITH
(2)                                     ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 6.
(2)
(3) 002522                      T12:                                    ;REFERENCE DESIGNATION
(2) 002522  005077  013430      INT5:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
(2) 002526  042737  000340  177776      BIC     #340,PS                 ;SET PROCESSOR PRIORITY
(2) 002534  052737  000300  177776      BIS     #300,PS                 ;TO LEVEL 6.
(2) 002542  012777  002576  013402      MOV     #INT5A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
(2) 002550  013777  177776  013376      MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
(2) 002556  012777  000100  013372      MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
(2) 002564  052777  000200  013364      BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
(2) 002572  000240                      NOP                             ;DELAY FOR INTERRUPT
(2) 002574  000402                      BR      INT5B                   ;NO INTERRUPT, CONTINUE
(2) 002576  022626              INT5A:  POP2SP                          ;RESTORE STACK
(2) 002600  104012                      ERROR                           ;INTERRUPT OCCURED, ERROR
(2) 002602  104002              INT5B:  SCOPE                           ;CHECK FOR ITERATION, LOOP
(2)
(2)                                     ;VERIFY THAT NO INTERRUPT OCCURS WITH
(2)                                     ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 5.
(2)
(3) 002604                      T13:                                    ;REFERENCE DESIGNATION
(2) 002604  005077  013346      INT6:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
(2) 002610  042737  000340  177776      BIC     #340,PS                 ;SET PROCESSOR PRIORITY
(2) 002616  052737  000240  177776      BIS     #240,PS                 ;TO LEVEL 5.
(2) 002624  012777  002660  013320      MOV     #INT6A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
(2) 002632  013777  177776  013314      MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
(2) 002640  012777  000100  013310      MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
(2) 002646  052777  000200  013302      BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
(2) 002654  000240                      NOP                             ;DELAY FOR INTERRUPT
(2) 002656  000402                      BR      INT6B                   ;NO INTERRUPT, CONTINUE
(2) 002660  022626              INT6A:  POP2SP                          ;RESTORE STACK
(2) 002662  104012                      ERROR                           ;INTERRUPT OCCURED, ERROR
(2) 002664  104002              INT6B:  SCOPE                           ;CHECK FOR ITERATION, LOOP
(2)
(2)                                     ;VERIFY THAT NO INTERRUPT OCCURS WITH
(2)                                     ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 4.
(2)
(3) 002666                      T14:                                    ;REFERENCE DESIGNATION
(2) 002666  005077  013264      INT7:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
(2) 002672  042737  000340  177776      BIC     #340,PS                 ;SET PROCESSOR PRIORITY
(2) 002700  052737  000200  177776      BIS     #200,PS                 ;TO LEVEL 4.
(2) 002706  012777  002742  013236      MOV     #INT7A,@DHMVEC          ;SET UP INTERRUPT SERVICE ADDRESS
(2) 002714  013777  177776  013232      MOV     PS,@DHMLVL              ;SET UP INTERRUPT SERVICE LEVEL
(2) 002722  012777  000100  013226      MOV     #INTENA,@DHMCSR         ;SET INTERRUPT ENABLE
(2) 002730  052777  000200  013220      BIS     #DONE,@DHMCSR           ;GENERATE INTERRUPT
(2) 002736  000240                      NOP                             ;DELAY FOR INTERRUPT
(2) 002740  000402                      BR      INT7B                   ;NO INTERRUPT, CONTINUE
(2) 002742  022626              INT7A:  POP2SP                          ;RESTORE STACK
(2) 002744  104012                      ERROR                           ;INTERRUPT OCCURED, ERROR
(2) 002746  104002              INT7B:  SCOPE                           ;CHECK FOR ITERATION, LOOP
```

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

002750                          T15:                            ;REFERENCE DESIGNATION
002750  005077  013202          INT10:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
002754  042737  000340  177776        BIC     #340,PS         ;ALLOW INTERRUPTS
002762  012777  003024  013162        MOV     #INT10A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
002770  005077  013160                CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
002774  052737  000000  177776        BIS     #0,PS           ;SET PROCESSOR PRIORITY TO LEVEL 0.
003002  012777  000100  013146        MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
003010  052777  000200  013140        BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
003016  000240                        NOP                     ;WAIT FOR INTERRUPT
003020  104012                        ERROR                   ;NO INTERRUPT, ERROR
003022  000401                        BR      INT10B          ;CONTINUE
003024  022626          INT10A: POP2SP                        ;INTERRUPT OCCURED, RESTORE STACK
003026  104002          INT10B: SCOPE                         ;CHECK FOR INTERATIONS, LOOP.

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

003030                          T16:                            ;REFERENCE DESIGNATION
003030  005077  013122          INT11:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
003034  042737  000340  177776        BIC     #340,PS         ;ALLOW INTERRUPTS
003042  012777  003104  013102        MOV     #INT11A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
003050  005077  013100                CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
003054  052737  000040  177776        BIS     #40,PS          ;SET PROCESSOR PRIORITY TO LEVEL 1.
003062  012777  000100  013066        MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
003070  052777  000200  013060        BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
003076  000240                        NOP                     ;WAIT FOR INTERRUPT
003100  104012                        ERROR                   ;NO INTERRUPT, ERROR
003102  000401                        BR      INT11B          ;CONTINUE
003104  022626          INT11A: POP2SP                        ;INTERRUPT OCCURED, RESTORE STACK
003106  104002          INT11B: SCOPE                         ;CHECK FOR INTERATIONS, LOOP.

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

003110                          T17:                            ;REFERENCE DESIGNATION
003110  005077  013042          INT12:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
003114  042737  000340  177776        BIC     #340,PS         ;ALLOW INTERRUPTS
003122  012777  003164  013022        MOV     #INT12A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
003130  005077  013020                CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
003134  052737  000100  177776        BIS     #100,PS         ;SET PROCESSOR PRIORITY TO LEVEL 2.
003142  012777  000100  013006        MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
003150  052777  000200  013000        BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
003156  000240                        NOP                     ;WAIT FOR INTERRUPT
003160  104012                        ERROR                   ;NO INTERRUPT, ERROR
003162  000401                        BR      INT12B          ;CONTINUE
003164  022626          INT12A: POP2SP                        ;INTERRUPT OCCURED, RESTORE STACK
003166  104002          INT12B: SCOPE                         ;CHECK FOR INTERATIONS, LOOP.
```

```
(2)
(2)                                     ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
(2)                                     ;ENABLE" SET AND "DONE" SET AT PRIORITY 3.
(2)
(3)  003170                     T20:                            ;REFERENCE DESIGNATION
(2)  003170  005077  012762     INT13:  CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
(2)  003174  042737  000340  177776     BIC     #340,PS         ;ALLOW INTERRUPTS
(2)  003202  012777  003244  012742     MOV     #INT13A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
(2)  003210  005077  012740             CLR     @DHMLVL         ;SET UP INTERRUPT SERVICE PRIORITY
(2)  003214  052737  000140  177776     BIS     #140,PS         ;SET PROCESSOR PRIORITY TO LEVEL 3.
(2)  003222  012777  000100  012726     MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
(2)  003230  052777  000200  012720     BIS     #DONE,@DHMCSR   ;GENERATE INTERRUPT
(2)  003236  000240                     NOP                     ;WAIT FOR INTERRUPT
(2)  003240  104012                     ERROR                   ;NO INTERRUPT, ERROR
(2)  003242  000401                     BR      INT13B          ;CONTINUE
(2)  003244  022626             INT13A: POP2SP                  ;INTERRUPT OCCURED, RESTORE STACK
(2)  003246  104002             INT13B: SCOPE                   ;CHECK FOR INTERATIONS, LOOP.
```

```
                                        ;VERIFY THAT ALL LINE NUMBERS CAN BE WRITTEN INTO AND
                                        ;READ BACK FROM LINE COUNTER
                                T21:
                                LINT1:  CLR     @DHMCSR         ;REFERENCE DESIGNATION
                                        BIC     #340,PS         ;CLEAR CONTROL STATUS REGISTER
                                        MOV     #1,SELMSK       ;ENABLE INTERRUPTS
                                        CLR     R5              ;INIT LINE SELECT MASK
                                        MOV     #16.,R0         ;CLEAR EXPECTED LINE NUMBER
                                LINT1A: BIT     SELMSK,LINSEL   ;SET UP TO TEST 16 LINE NUMBERS
                                        BEQ     LINT1B          ;THIS LINE SELECTED ??
                                        MOV     R5,@DHMCSR      ;BR IF NOT
                                        MOV     @DHMCSR,R4      ;SET LINE NUMBER
                                        CMP     R5,R4           ;READ BACK LINE NUMBER
                                        BEQ     LINT1B          ;ARE EXPECTED AND RECEIVED
                                        ERRORC                  ;LINE NUBMERS THE SAME
                                LINT1B: SCOPEF                  ;LINE NUMBERS DIFFERENT, ERROR
                                        LINT1A                  ;CHECK FOR DATA FREEZE
                                        INC     R5              ;RETURN FOR DATA FREEZE
                                        ASL     SELMSK          ;UPDATE LINE COUNT
                                        DEC     R0              ;SELECT NEXT LINE TO TEST
                                        BNE     LINT1A          ;UPDATE LINE NUMBER
                                        SCOPE                   ;CONTINUE
                                                                ;CHECK FOR ITERATION, LOOP

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

                                T22:
                                LINT2:  BIC     #340,PS         ;REFERENCE DESIGNATION
                                        CLR     @DHMCSR         ;ENABLE INTERRUPTS
                                        CLR     R5              ;CLEAR CONTROL STATUS REGISTER
                                        MOV     #1,SELMSK       ;CLEAR EXPECTED LINE COUNT
                                        MOV     #-1,R1          ;SET UP SELECT MASK
                                        MOV     #16.,R0         ;INIT LINE COUNTER
                                        MOV     #17,@DHMCSR     ;SET UP TO TEST 16 VALUES
                                LINT2A: BIT     SELMSK,LINSEL   ;FIRST VALUE =0
                                        BEQ     LINT2B          ;THIS LINE SELECTED ??
                                        BIS     #STEP,@DHMCSR   ;BR IF NOT
                                        MOV     @DHMCSR,R4      ;STEP LINE COUNTER
                                        CMP     R5,R4           ;READ LINE COUNTER
                                        BEQ     LINT2B          ;COMPARE EXPECTED AND
                                        ERRORC                  ;RECEIVED LINE NUMBERS
                                LINT2B: SCOPEF                  ;LINE COUNTER ERROR
                                        LINT2                   ;CHECK FOR DATA FREEZE
                                        INC     R5              ;UPDATE EXPECTED LINE NUMBER
                                        ASL     SELMSK          ;SHIFT SELECT MASK
                                        INC     R1              ;GEN NEW LINE NO.
                                        MOV     R1,@DHMCSR      ;SET NEW LINE NO. IN CSR
                                        DEC     R0
                                        BNE     LINT2A
                                        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.

003462                          T23:                                    ;REFERENCE DESIGNATION
003462  012777  002000  012466  MEMT1:  MOV     #CLRMUX,@DHMCSR         ;CLEAR CONTROL STATUS REGISTER
003470  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
003476  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 LOCATIONS
003502  052777  001017  012446          BIS     #MAINT+17,@DHMCSR       ;SET MAINTEANCE MODE
003510  052777  000400  012440  MEMT1A: BIS     #STEP,@DHMCSR           ;SET LINE COUNTER THRU ALL
003516  005300                          DEC     R0                      ;STATES, WRITING 1'S INTO
003520  001373                          BNE     MEMT1A                  ;ALL MEMORY WORDS
003522  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 WORDS
003526  012705  070000                  MOV     #70000,R5               ;SET UP EXPECTED STATUS REGISTER
003532  012777  000017  012416          MOV     #17,@DHMCSR             ;START WITH LINE 0
003540  052777  000400  012410  MEMT1B: BIS     #STEP,@DHMCSR           ;ACCESS SCANNER MEMORY
003546  017704  012404                  MOV     @DHMCSR,R4              ;READ DATA
003552  020504                          CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
003554  001403                          BEQ     MEMT1C                  ;DATA
003556  104000                          ERRORC                          ;CONTROL STATUS OR MEMORY ERROR
003560  104003                          SCOPEF                          ;CHECK FOR DATA FREEZE
003562  003462                          MEMT1
003564  005205                  MEMT1C: INC     R5                      ;UPDATE EEXPECTED STATUS
003566  005300                          DEC     R0                      ;UPDATE LINE COUNT
003570  001363                          BNE     MEMT1B                  ;CONTINUE
003572  012777  004000  012356  MEMT1D: MOV     #CLRSCN,@DHMCSR         ;SET "CLEAR SCAN"
003600  032777  000020  012350          BIT     #BUSY,@DHMCSR           ;WAIT FOR "CLEAR CYCLES"
003606  001374                          BNE     .-6
003610  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 MEMORY
003614  005005                          CLR     R5                      ;LOCATIONS
003616  012777  000017  012332          MOV     #17,@DHMCSR             ;FIRST TO BE TESTED=0
003624  052777  000400  012324  MEMT1E: BIS     #STEP,@DHMCSR           ;ACCESS SEANNER MEMORY
003632  017704  012320                  MOV     @DHMCSR,R4              ;READ DATA
003636  020504                          CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
003640  001403                          BEQ     MEMT1F                  ;DATA
003642  104000                          ERRORC                          ;CONTROL  STATUS OF MEMORY ERROR
003644  104003                          SCOPEFF                         ;CHECK FOR DATA FREEZE
003646  003572                          MEMT1D
003650  005205                  MEMT1F: INC     R5                      ;UPDATE EXPECTED DATA
003652  005300                          DEC     R0                      ;UPDATE LINE COUNT
003654  001363                          BNE     MEMT1E                  ;CONTTINUE
003656  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

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832
833                                     ;WRITE 1'S INTO SELECTED SCANNER MEMORY LOCATION.
834                                     ;VERIFY THAT ONLY SELECTED LOCATION WAS WRITTEN INTO.
835
836 003660                      T24:                            ;REFERENCE DESIGNATION
837 003660 005077 012272        MEMT2:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
838 003664 042737 000340 177776         BIC     #340,PS         ;ENABLE INTERRUPTS
839 003672 012700 000020                MOV     #16.,R0         ;SET UP TO TEST 16 ADDRESSES
840 003676 012702 000017                MOV     #17,R2          ;FIRST ADDRESS TO BE TESTED=0
841 003702 012777 004000 012246 MEMT2A: MOV     #CLRSCN,@DHMCSR ;CLEAR ACANNER MEMORY
842 003710 032777 000020 012240         BIT     #BUSY,@DHMCSR   ;WAIT FOR CLEAR CYCLE
843 003716 001374                       BNE     .-6
844 003720 012777 001000 012230         MOV     #MAINT,@DHMCSR  ;SET "MAINTENANCE MODE"
845 003726 050277 012224                BIS     R2,@DHMCSR      ;SET LINE COUNTER TO TEST ADDRESS-1
846 003732 052777 000400 012216         BIS     #STEP,@DHMCSR   ;WRITE 1'S INTO TEST ADDRESS
847 003740 042777 001000 012210         BIC     #MAINT,@DHMCSR  ;CLEAR "MAINTENANCE MODE"
848 003746 012703 000020                MOV     #16.,R3         ;SET UP TO TEST ALL 16
849 003752 012777 000017 012176         MOV     #17,@DHMCSR     ;SCANNER MEMORY LOCATIONS
850 003760 005202                       INC     R2
851 003762 005001                       CLR     R1
852 003764 052777 000400 012164 MEMT2B: BIS     #STEP,@DHMCSR   ;ACCESS SCANNER MEMORY
853 003772 117704 012160                MOVB    @DHMCSR,R4      ;READ CONPENTS OF MEMORY
854 003776 010105                       MOV     R1,R5           ;SET UP EXPECTED CONTENTS
855 004000 120402                       CMPB    R4,R2           ;OF SCANNER MEMORY
856 004002 001002                       BNE     MEMT2C
857 004004 052705 070000                BIS     #70000,R5
858 004010 020405               MEMT2C: CMP     R4,R5           ;COMPARE EXPECTED AND RECEIVED
859 004012 001403                       BEQ     MEMT2D          ;VALUES
860 004014 104000                       ERRORC                  ;SCANNER MEMORY ERROR
861 004016 104003                       SCOPEF                  ;CHECK FOR DATA FREEZE
862 004020 003702                       MEMT2A
863 004022 005201               MEMT2D: INC     R1
864 004024 005303                       DEC     R3              ;TEST NEXT SCANNEB LOCATION
865 004026 001356                       BNE     MEMT2B
866 004030 005300                       DEC     R0              ;UPDATE LINE COUNT
867 004032 001323                       BNE     MEMT2A
868 004034 104002                       SCOPE                   ;CHECK FOR ITERATION, LOOP
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                                        ;WITH ALL ACANNER MEMORY LOCATIONS SET TO 1'S,
                                        ;WRITE 0'S INTO SELECTED LOCATION
                                        ;VERIFY THAT ONLY SELECTED LOCATION WAS CLEARED.

004036                          T25:                            ;REFERENCE DESIGNATION
004036  005077  012114          MEMT3:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
004042  042737  000340  177776        BIC     #340,PS         ;ENABLE INTERRUPTS
004050  012700  000020                MOV     #16.,R0         ;SET UP TO TEST 16 ADDRESSES
004054  012702  000017                MOV     #17,R2          ;FIRST ADDRESS TO BE TESTED=0
004060  012703  000020          MEMT3A: MOV     #16.,R3         ;WRITE 1'S INTO ALL SCANNER
004064  012777  001017  012064        MOV     #MAINT+17,@DHMCSR ;MEMORY LOCATIONS
004072  052777  000400  012056  MEMT3B: BIS     #STEP,@DHMCSR
004100  005303                        DEC     R3
004102  001373                        BNE     MEMT3B
004104  010277  012046                MOV     R2,@DHMCSR      ;SET LINE COUNTER TO TEST ADDRESS-1
004110  052777  000400  012040        BIS     #STEP,@DHMCSR   ;WRITE 0'S INTO TEST ADDRESS
004116  012703  000020                MOV     #16.,R3         ;SET UP TO TEST ALL 16
004122  012777  000017  012026        MOV     #17,@DHMCSR     ;SCANNER MEMORY LOCATIONS
004130  005202                        INC     R2
004132  005001                        CLR     R1
004134  052777  000400  012014  MEMT3C: BIS     #STEP,@DHMCSR   ;ACESS SCANNER MEMORY
004142  117704  012010                MOVB    @DHMCSR,R4      ;READ CONTENTS OF MEMORY
004146  010105                        MOV     R1,R5           ;SET UP EXPECTED CONTENTS
004150  120402                        CMPB    R4,R2           ;OF SCANNER MEIORY
004152  001002                        BNE     MEMT3D
004154  052705  070000                BIS     #70000,R5

004160  020405          MEMT3D: CMP     R4,R5           ;COMPARE EXPECTED AND
004162  001403                  BEQ     MEMT3E          ;RECEIVED VALUES
004164  104000                  ERRORC                  ;SCANNER MEMORY ERROR
004166  104003                  SCOPEF                  ;CHECK FOR DATA FREEZE
004170  004060                  MEMT3A

004172  005201          MEMT3E: INC     R1
004174  005303                  DEC     R3              ;TEST NEXT SCANNER LOCATION
004176  001356                  BNE     MEMT3C
004200  005300                  DEC     R0              ;UPDATE ADDRESS COUNT
004202  001326                  BNE     MEMT3A
004204  104002                  SCOPE                   ;CHECK FOR ITERATION, LOOP
```

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909                                             ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
(1)                                             ;BE SET AND CLEARED FOR SELECTED LINE
(1)
(2)  004206                             T26:                                    ;REFERENCE DESIGNATION
(1)  004206  005077  011744             MUX1:  CLR     @DHMCSR                  ;CLEAR CONTROL STATUS REGISTER
(1)  004212  042737  000340  177776            BIC     #340,PS                  ;ENABLE INTERRUPTS
(1)  004220  012700  000020                    MOV     #16.,R0                  ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
(1)  004224  012737  000001  016262            MOV     #1,SELMSK                ;INIT LINE SELECT MASK
(1)  004232  005001                            CLR     R1                       ;START AT LINE 0
(1)  004234  012777  002000  011714  MUX1A:    MOV     #CLRMUX,@DHMCSR
(1)  004242  012702  000020                    MOV     #16.,R2
(1)  004246  033737  016262  016260            BIT     SELMSK,LINSEL            ;IS THIS LINE SELECTED FOR TEST ?
(1)  004254  001463                            BEQ     MUX1F                    ;BR IF NOT
(1)  004256  010177  011674                    MOV     R1,@DHMCSR               ;SELECT LINE TO BE TESTED
(1)  004262  012777  000001  011670            MOV     #LINENA,@DHMLSR          ;SET LINE ENABLE FUNCTION FLIP-FLOP
(1)  004270  012737  000001  016264            MOV     #1,SLMSK                 ;INIT ANOTHER SELECT MASK
(1)  004276  005077  011654                    CLR     @DHMCSR
(1)  004302  005005                    MUX1B:  CLR     R5
(1)  004304  033737  016264  016260            BIT     SLMSK,LINSEL             ;SELECTED ??
(1)  004312  001417                            BEQ     MUX1D                    ;BR IF NOT
(1)  004314  017704  011640                    MOV     @DHMLSR,R4               ;READ LINE STATUS REGISTER
(1)  004320  117703  011632                    MOVB    @DHMCSR,R3               ;READ CONTROL STATUS REGISTER
(1)  004324  042703  177760                    BIC     #177760,R3               ;CLEAR UNWANTED BITS
(1)  004330  020103                            CMP     R1,R3                    ;IF LINE NUMBER=SELECTED LINE NUMBER,
(1)  004332  001002                            BNE     MUX1C                    ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
(1)  004334  012705  000001                    MOV     #LINENA,R5
(1)                                                                             ;TO BE SET
(1)  004340  020504                    MUX1C:  CMP     R5,R4                    ;COMPARE EXPECTED AND RECEIVED
(1)  004342  001403                            BEQ     MUX1D                    ;RESULTS
(1)  004344  104001                            ERRORL                           ;LINE STATUS ERROR
(1)  004346  104003                            SCOPEF
(1)  004350  004352                            MUX1D
(1)  004352  052777  000400  011576  MUX1D:    BIS     #STEP,@DHMCSR            ;EXAMINE NEXT LINE
(1)  004360  006337  016264                    ASL     SLMSK                    ;SHIFT MASK
(1)  004364  005302                            DEC     R2
(1)  004366  001345                            BNE     MUX1B
(1)  004370  005005                            CLR     R5
(1)  004372  010177  011560            MUX1E:  MOV     R1,@DHMCSR
(1)  004376  010103                            MOV     R1,R3                    ;SET LINE COUNTER TO SELECTED LINE
(1)  004400  005077  011554                    CLR     @DHMLSR                  ;CLEAR LINE ENABLE FLIP FLOP
(1)  004404  105227  000000                    INCB    #0                       ;DELAY FOR CABLE
(1)  004410  001375                            BNE     .-4                      ;DITTO
(1)  004412  017704  011542                    MOV     @DHMLSR,R4               ;READ LINE STATUS REGISTER
(1)  004416  005704                            TST     R4                       ;WAS LINE ENABLE FUNCTION FLIP FLOP
(1)  004420  001401                            BEQ     MUX1F                    ;CLEARED
(1)  004422  104001                            ERRORL                           ;NO, LINE STATUS ERROR
(1)  004424  104003                    MUX1F:  SCOPEF                           ;CHECK FOR LOOP ON SAME DATA
(1)  004426  004234                            MUX1A
(1)  004430  006337  016262                    ASL     SELMSK                   ;SHIFT SELECT MASK
(1)  004434  005201                            INC     R1                       ;SELECT NEXT LINE
(1)  004436  005300                            DEC     R0                       ;DECREMENT LINE COUNT
(1)  004440  001275                            BNE     MUX1A                    ;CONTINU IF NOT DONE
(1)  004442  104002                            SCOPE                            ;CHECK FOR ITERATIONS, LOOP
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911                                     ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
(1)                                     ;BE SET AND CLEARED FOR SELECTED LINE
(1)
(2)  004444                     T27:                            ;REFERENCE DESIGNATION
(1)  004444  005077  011506     MUX2:  CLR     @DHMCSR          ;CLEAR CONTROL STATUS REGISTER
(1)  004450  042737  000340  177776    BIC     #340,PS          ;ENABLE INTERRUPTS
(1)  004456  012700  000020             MOV     #16.,R0          ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
(1)  004462  012737  000001  016262     MOV     #1,SELMSK        ;INIT LINE SELECT MASK
(1)  004470  005001                     CLR     R1               ;START AT LINE 0
(1)  004472  012777  002000  011456 MUX2A: MOV    #CLRMUX,@DHMCSR
(1)  004500  012702  000020             MOV     #16.,R2
(1)  004504  033737  016262  016260     BIT     SELMSK,LINSEL    ;IS THIS LINE SELECTED FOR TEST ?
(1)  004512  001463                     BEQ     MUX2F            ;BR IF NOT
(1)  004514  010177  011436             MOV     R1,@DHMCSR       ;SELECT LINE TO BE TESTED
(1)  004520  012777  000002  011432     MOV     #TRMRDY,@DHMLSR  ;SET TERMINAL READY FUNCTION FLIP-FLOP
(1)  004526  012737  000001  016264     MOV     #1,SLMSK         ;INIT ANOTHER SELECT MASK
(1)  004534  005077  011416             CLR     @DHMCSR
(1)  004540  005005          MUX2B:     CLR     R5
(1)  004542  033737  016264  016260     BIT     SLMSK,LINSEL     ;SELECTED ??
(1)  004550  001417                     BEQ     MUX2D            ;BR IF NOT
(1)  004552  017704  011402             MOV     @DHMLSR,R4       ;READ LINE STATUS REGISTER
(1)  004556  117703  011374             MOVB    @DHMCSR,R3       ;READ CONTROL STATUS REGISTER
(1)  004562  042703  177760             BIC     #177760,R3       ;CLEAR UNWANTED BITS
(1)  004566  020103                     CMP     R1,R3            ;IF LINE NUMBER=SELECTED LINE NUMBER,
(1)  004570  001002                     BNE     MUX2C            ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
(1)  004572  012705  000002             MOV     #TRMRDY,R5
(1)                                                              ;TO BE SET
(1)  004576  020504          MUX2C:     CMP     R5,R4            ;COMPARE EXPECTED AND RECEIVED
(1)  004600  001403                     BEQ     MUX2D            ;RESULTS
(1)  004602  104001                     ERRORL                   ;LINE STATUS ERROR
(1)  004604  104003                     SCOPEF
(1)  004606  004610                     MUX2D
(1)  004610  052777  000400  011340 MUX2D: BIS    #STEP,@DHMCSR    ;EXAMINE NEXT LINE
(1)  004616  006337  016264             ASL     SLMSK            ;SHIFT MASK
(1)  004622  005302                     DEC     R2
(1)  004624  001345                     BNE     MUX2B
(1)  004626  005005                     CLR     R5
(1)  004630  010177  011322 MUX2E:     MOV     R1,@DHMCSR
(1)  004634  010103                     MOV     R1,R3            ;SET LINE COUNTER TO SELECTED LINE
(1)  004636  005077  011316             CLR     @DHMLSR          ;CLEAR TERMINAL READY FLIP FLOP
(1)  004642  105227  000000             INCB    #0               ;DELAY FOR CABLE
(1)  004646  001375                     BNE     .-4              ;DITTO
(1)  004650  017704  011304             MOV     @DHMLSR,R4       ;READ LINE STATUS REGISTER
(1)  004654  005704                     TST     R4               ;WAS TERMINAL READY FUNCTION FLIP FLOP
(1)  004656  001401                     BEQ     MUX2F            ;CLEARED
(1)  004660  104001                     ERRORL                   ;NO, LINE STATUS ERROR
(1)  004662  104003          MUX2F:     SCOPEF                   ;CHECK FOR LOOP ON SAME DATA
(1)  004664  004472                     MUX2A
(1)  004666  006337  016262             ASL     SELMSK           ;SHIFT SELECT MASK
(1)  004672  005201                     INC     R1               ;SELECT NEXT LINE
(1)  004674  005300                     DEC     R0               ;DECREMENT LINE COUNT
(1)  004676  001275                     BNE     MUX2A            ;CONTINU IF NOT DONE
(1)  004700  104002                     SCOPE                    ;CHECK FOR ITERATIONS, LOOP
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913                                             ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
(1)                                             ;BE SET AND CLEARED FOR SELECTED LINE
(1)
(2)  004702                             T30:                            ;REFERENCE DESIGNATION
(1)  004702  005077  011250             MUX3:   CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
(1)  004706  042737  000340  177776             BIC     #340,PS         ;ENABLE INTERRUPTS
(1)  004714  012700  000020                     MOV     #16.,R0         ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
(1)  004720  012737  000001  016262             MOV     #1,SELMSK       ;INIT LINE SELECT MASK
(1)  004726  005001                             CLR     R1              ;START AT LINE 0
(1)  004730  012777  002000  011220     MUX3A:  MOV     #CLRMUX,@DHMCSR
(1)  004736  012702  000020                     MOV     #16.,R2
(1)  004742  033737  016262  016260             BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
(1)  004750  001463                             BEQ     MUX3F           ;BR IF NOT
(1)  004752  010177  011200                     MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
(1)  004756  012777  000004  011174             MOV     #RS,@DHMLSR     ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
(1)  004764  012737  000001  016264             MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
(1)  004772  005077  011160                     CLR     @DHMCSR
(1)  004776  005005                     MUX3B:  CLR     R5
(1)  005000  033737  016264  016260             BIT     SLMSK,LINSEL    ;SELECTED ??
(1)  005006  001417                             BEQ     MUX3D           ;BR IF NOT
(1)  005010  017704  011144                     MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
(1)  005014  117703  011136                     MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
(1)  005020  042703  177760                     BIC     #177760,R3      ;CLEAR UNWANTED BITS
(1)  005024  020103                             CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
(1)  005026  001002                             BNE     MUX3C           ;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
(1)  005030  012705  000004                     MOV     #RS,R5
(1)                                             ;TO BE SET
(1)  005034  020504                     MUX3C:  CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
(1)  005036  001403                             BEQ     MUX3D           ;RESULTS
(1)  005040  104001                             ERRORL                  ;LINE STATUS ERROR
(1)  005042  104003                             SCOPEF
(1)  005044  005046                             MUX3D
(1)  005046  052777  000400  011102     MUX3D:  BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
(1)  005054  006337  016264                     ASL     SLMSK           ;SHIFT MASK
(1)  005060  005302                             DEC     R2
(1)  005062  001345                             BNE     MUX3B
(1)  005064  005005                             CLR     R5
(1)  005066  010177  011064             MUX3E:  MOV     R1,@DHMCSR
(1)  005072  010103                             MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
(1)  005074  005077  011060                     CLR     @DHMLSR         ;CLEAR REQUEST TO SEND FLIP FLOP
(1)  005100  105227  000000                     INCB    #0              ;DELAY FOR CABLE
(1)  005104  001375                             BNE     .-4             ;DITTO
(1)  005106  017704  011046                     MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
(1)  005112  005704                             TST     R4              ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
(1)  005114  001401                             BEQ     MUX3F           ;CLEARED
(1)  005116  104001                             ERRORL                  ;NO, LINE STATUS ERROR
(1)  005120  104003                     MUX3F:  SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
(1)  005122  004730                             MUX3A
(1)  005124  006337  016262                     ASL     SELMSK          ;SHIFT SELECT MASK
(1)  005130  005201                             INC     R1              ;SELECT NEXT LINE
(1)  005132  005300                             DEC     R0              ;DECREMENT LINE COUNT
(1)  005134  001275                             BNE     MUX3A           ;CONTINU IF NOT DONE
(1)  005136  104002                             SCOPE                   ;CHECK FOR ITERATIONS, LOOP
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915                                             ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
(1)                                             ;BE SET AND CLEARED FOR SELECTED LINE
(1)
(2)  005140                             T31:                            ;REFERENCE DESIGNATION
(1)  005140  005077  011012             MUX4:   CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
(1)  005144  042737  000340  177776             BIC     #340,PS         ;ENABLE INTERRUPTS
(1)  005152  012700  000020                     MOV     #16.,R0         ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
(1)  005156  012737  000001  016262             MOV     #1,SELMSK       ;INIT LINE SELECT MASK
(1)  005164  005001                             CLR     R1              ;START AT LINE 0
(1)  005166  012777  002000  010762     MUX4A:  MOV     #CLRMUX,@DHMCSR
(1)  005174  012702  000020                     MOV     #16.,R2
(1)  005200  033737  016262  016260             BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
(1)  005206  001463                             BEQ     MUX4F           ;BR IF NOT
(1)  005210  010177  010742                     MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
(1)  005214  012777  000010  010736             MOV     #SECTX,@DHMLSR  ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
(1)  005222  012737  000001  016264             MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
(1)  005230  005077  010722                     CLR     @DHMCSR
(1)  005234  005005                     MUX4B:  CLR     R5
(1)  005236  033737  016264  016260             BIT     SLMSK,LINSEL    ;SELECTED ??
(1)  005244  001417                             BEQ     MUX4D           ;BR IF NOT
(1)  005246  017704  010706                     MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
(1)  005252  117703  010700                     MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
(1)  005256  042703  177760                     BIC     #177760,R3      ;CLEAR UNWANTED BITS
(1)  005262  020103                             CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
(1)  005264  001002                             BNE     MUX4C           ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
(1)  005266  012705  000010                     MOV     #SECTX,R5
(1)                                                                     ;TO BE SET
(1)  005272  020504                     MUX4C:  CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
(1)  005274  001403                             BEQ     MUX4D           ;RESULTS
(1)  005276  104001                             ERRORL                  ;LINE STATUS ERROR
(1)  005300  104003                             SCOPEF
(1)  005302  005304                             MUX4D
(1)  005304  052777  000400  010644     MUX4D:  BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
(1)  005312  006337  016264                     ASL     SLMSK           ;SHIFT MASK
(1)  005316  005302                             DEC     R2
(1)  005320  001345                             BNE     MUX4B
(1)  005322  005005                             CLR     R5
(1)  005324  010177  010626             MUX4E:  MOV     R1,@DHMCSR
(1)  005330  010103                             MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
(1)  005332  005077  010622                     CLR     @DHMLSR         ;CLEAR SECONDARY TRANSMIT FLIP FLOP
(1)  005336  105227  000000                     INCB    #0              ;DELAY FOR CABLE
(1)  005342  001375                             BNE     .-4             ;DITTO
(1)  005344  017704  010610                     MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
(1)  005350  005704                             TST     R4              ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
(1)  005352  001401                             BEQ     MUX4F           ;CLEARED
(1)  005354  104001                             ERRORL                  ;NO, LINE STATUS ERROR
(1)  005356  104003                     MUX4F:  SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
(1)  005360  005166                             MUX4A
(1)  005362  006337  016262                     ASL     SELMSK          ;SHIFT SELECT MASK
(1)  005366  005201                             INC     R1              ;SELECT NEXT LINE
(1)  005370  005300                             DEC     R0              ;DECREMENT LINE COUNT
(1)  005372  001275                             BNE     MUX4A           ;CONTINU IF NOT DONE
(1)  005374  104002                             SCOPE                   ;CHECK FOR ITERATIONS, LOOP
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 917
 (1)                                    ;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
 (1)                                    ;AND TERMINAL ARE SET FOR SELECTED LINE.
 (1)
 (2) 005376                      T32:                                    ;REFERENCE DESIGNATION
 (1) 005376 005077 010554        MUX5:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 (1) 005402 042737 000340 177776         BIC     #340,PS                 ;ENABLE INTERRUPTS
 (1) 005410 012700 000020                MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
 (1) 005414 005001                       CLR     R1                      ;START AT LINE 0
 (1) 005416 012737 000001 016262         MOV     #1,SELMSK               ;INIT LINE SELECT MASK
 (1) 005424 012702 000020        MUX5A:  MOV     #16.,R2                 ;16 LINES
 (1) 005430 033737 016262 016260         BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
 (1) 005436 001454                       BEQ     MUX5F                   ;BR IF NOT
 (1) 005440 010177 010512                MOV     R1,@DHMCSR              ;SELECT A LINE
 (1) 005444 012777 000003 010506         MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE +TRMRDY
 (1) 005452 005077 010500                CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 (1) 005456 005005               MUX5B:  CLR     R5                      ;CLEAR EXPECTED RESULT
 (1) 005460 017704 010474                MOV     @DHMLSR,R4              ;READ LINE STATUS
 (1) 005464 117703 010466                MOVB    @DHMCSR,R3              ;READ LINE NUMBER
 (1) 005470 042703 177760                BIC     #177760,R3              ;CLEAR UNWANTED BITS
 (1) 005474 020103                       CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
 (1) 005476 001002                       BNE     MUX5C                   ;EXPECT LINE ENABLE AND
 (1) 005500 012705 000143                MOV     #LINENA+TRMRDY+CO+CS,R5
 (1)                                                                     ;CLEAR TO SEND AND CARRIER ARE SET
 (1) 005504 020405               MUX5C:  CMP     R4,R5                   ;COMPARE EXPECTED AND
 (1) 005506 001403                       BEQ     MUX5D                   ;RECEIVED RESULTS
 (1) 005510 104001                       ERROR%                          ;LINE STATUS ERROR
 (1) 005512 104003                       SCOPE%
 (1) 005514 005516                       MUX5D
 (1) 005516 052777 000400 010432 MUX5D:  BIS     #STEP,@DHMCSR          ;UPDATE LINE COUNTER
 (1) 005524 005302                       DEC     R2                      ;CONTINUE IF ALL CHECKS
 (1) 005526 001353                       BNE     MUX5B                   ;ARE NOT DONE FOR THIS LINE
 (1) 005530 012705 000001                MOV     #LINENA,R5              ;EXPECT LINE ENABLE
 (1) 005534 010103               MUX5E:  MOV     R1,R3                   ;ON SELECTED LINE
 (1) 005536 010177 010414                MOV     R1,@DHMCSR              ;SELECT LINE
 (1) 005542 042777 000002 010410         BIC     #TRMRDY,@DHMLSR         ;CLEAR TERMINAL
 (1) 005550 105227 000000                INCB    #0                      ;DELAY FOR CABLE
 (1) 005554 001375                       BNE     .-4                     ;DITTO
 (1) 005556 017704 010376                MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
 (1) 005562 020504                       CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
 (1) 005564 001401                       BEQ     MUX5F                   ;SET ON THIS LINE
 (1) 005566 104001                       ERROR%                          ;LINE STATUS ERROR
 (1) 005570 104003               MUX5F:  SCOPE%                          ;CHECK FOR LOOP ON SAME DATA
 (1) 005572 005424                       MUX5A
 (1) 005574 005201                       INC     R1                      ;UPDATE LINE NUMBER
 (1) 005576 005077 010356                CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER
 (1) 005602 006337 016262                ASL     SELMSK                  ;SHIFT MARK TO TEST NEXT LINE
 (1) 005606 005300                       DEC     R0                      ;CONTINUE IF ALL LINES NOT
 (1) 005610 001305                       BNE     MUX5A                   ;TESTED
 (1) 005612 104002                       SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
  919
  (1)                                   ;VERIFY THAT RING IS SET IF "LINE ENABLE"
  (1)                                   ;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.
  (1)
  (2) 005614                            T33:                            ;REFERENCE DESIGNATION
  (1) 005614 005077 010336              MUX6:   CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
  (1) 005620 042737 000340 177776       BIC     #340,PS         ;ENABLE INTERRUPTS
  (1) 005626 012700 000020              MOV     #16.,R0         ;SET UP TO TEST 16 LINES
  (1) 005632 005001                     CLR     R1              ;START AT LINE 0
  (1) 005634 012737 000001 016262       MOV     #1,SELMSK       ;INIT LINE SELECT MASK
  (1) 005642 012702 000020              MUX6A:  MOV     #16.,R2         ;16 LINES
  (1) 005646 033737 016262 016260       BIT     SELMSK,LINSEL   ;THIS LINE SELECTED FOR TEST ?
  (1) 005654 001454                     BEQ     MUX6F           ;BR IF NOT
  (1) 005656 010177 010274              MOV     R1,@DHMCSR      ;SELECT A LINE
  (1) 005662 012777 000005 010270       MOV     #LINENA+RS,@DHMLSR      ;SET LINE ENABLE +RS
  (1) 005670 005077 010262              CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
  (1) 005674 005005                     MUX6B:  CLR     R5              ;CLEAR EXPECTED RESULT
  (1) 005676 017704 010256              MOV     @DHMLSR,R4      ;READ LINE STATUS
  (1) 005702 117703 010250              MOVB    @DHMCSR,R3      ;READ LINE NUMBER
  (1) 005706 042703 177760              BIC     #177760,R3      ;CLEAR UNWANTED BITS
  (1) 005712 020103                     CMP     R1,R3           ;IF RECEIVED LINE=SELECTED LINE
  (1) 005714 001002                     BNE     MUX6C           ;EXPECT LINE ENABLE AND
  (1) 005716 012705 000205              MOV     #LINENA+RS+RING,R5
  (1)                                                           ;RING IS SET
  (1) 005722 020405                     MUX6C:  CMP     R4,R5           ;COMPARE EXPECTED AND
  (1) 005724 001403                     BEQ     MUX6D           ;RECEIVED RESULTS
  (1) 005726 104001                     ERROR1                  ;LINE STATUS ERROR
  (1) 005730 104003                     SCOPEF
  (1) 005732 005734                     MUX6D
  (1) 005734 052777 000400 010214       MUX6D:  BIS     #STEP,@DHMCSR   ;UPDATE LINE COUNTER
  (1) 005742 005302                     DEC     R2              ;CONTINUE IF ALL CHECKS
  (1) 005744 001353                     BNE     MUX6B           ;ARE NOT DONE FOR THIS LINE
  (1) 005746 012705 000001              MOV     #LINENA,R5      ;EXPECT LINE ENABLE
  (1) 005752 010103                     MUX6E:  MOV     R1,R3           ;ON SELECTED LINE
  (1) 005754 010177 010176              MOV     R1,@DHMCSR      ;SELECT LINE
  (1) 005760 042777 000004 010172       BIC     #RS,@DHMLSR     ;CLEAR REQUEST TO SEND
  (1) 005766 105227 000000              INCB    #0              ;DELAY FOR CABLE
  (1) 005772 001375                     BNE     .-4             ;DITTO
  (1) 005774 017704 010160              MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
  (1) 006000 020504                     CMP     R5,R4           ;ONLY LINE ENABLE SHOULD BE
  (1) 006002 001401                     BEQ     MUX6F           ;SET ON THIS LINE
  (1) 006004 104001                     ERROR1                  ;LINE STATUS ERROR
  (1) 006006 104003                     MUX6F:  SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
  (1) 006010 005642                     MUX6A
  (1) 006012 005201                     INC     R1              ;UPDATE LINE NUMBER
  (1) 006014 005077 010140              CLR     @DHMLSR         ;CLEAR LINE STATUS REGISTER
  (1) 006020 006337 016262              ASL     SELMSK          ;SHIFT MARK TO TEST NEXT LINE
  (1) 006024 005300                     DEC     R0              ;CONTINUE IF ALL LINES NOT
  (1) 006026 001305                     BNE     MUX6A           ;TESTED
  (1) 006030 104002                     SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

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921
(1)                                     ;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
(1)                                     ;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
(1)
(2) 006032                      T34:                                    ;REFERENCE DESIGNATION
(1) 006032  005077  010120      MUX7:   CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
(1) 006036  042737  000340  177776      BIC     #340,PS                 ;ENABLE INTERRUPTS
(1) 006044  012700  000020              MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
(1) 006050  005001                      CLR     R1                      ;START AT LINE 0
(1) 006052  012737  000001  016262      MOV     #1,SELMSK               ;INIT LINE SELECT MASK
(1) 006060  012702  000020      MUX7A:  MOV     #16.,R2                 ;16 LINES
(1) 006064  033737  016262  016260      BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
(1) 006072  001454                      BEQ     MUX7F                   ;BR IF NOT
(1) 006074  010177  010056              MOV     R1,@DHMCSR              ;SELECT A LINE
(1) 006100  012777  000011  010052      MOV     #LINENA+SECTX,@DHMLSR   ;SET LINE ENABLE +SECTX
(1) 006106  005077  010044              CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
(1) 006112  005005          MUX7B:  CLR     R5                      ;CLEAR EXPECTED RESULT
(1) 006114  017704  010040              MOV     @DHMLSR,R4              ;READ LINE STATUS
(1) 006120  117703  010032              MOVB    @DHMCSR,R3              ;READ LINE NUMBER
(1) 006124  042703  177760              BIC     #177760,R3              ;CLEAR UNWANTED BITS
(1) 006130  020103                      CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
(1) 006132  001002                      BNE     MUX7C                   ;EXPECT LINE ENABLE AND
(1) 006134  012705  000031              MOV     #LINENA+SECTX+SECRX,R5
(1)                                                                     ;SECONDARY RECEIVE IS SET
(1) 006140  020405          MUX7C:  CMP     R4,R5                   ;COMPARE EXPECTED AND
(1) 006142  001403                      BEQ     MUX7D                   ;RECEIVED RESULTS
(1) 006144  104001                      ERRORL                          ;LINE STATUS ERROR
(1) 006146  104003                      SCOPEF
(1) 006150  006152                      MUX7D
(1) 006152  052777  000400  007776  MUX7D:  BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
(1) 006160  005302                      DEC     R2                      ;CONTINUE IF ALL CHECKS
(1) 006162  001353                      BNE     MUX7B                   ;ARE NOT DONE FOR THIS LINE
(1) 006164  012705  000001              MOV     #LINENA,R5              ;EXPECT LINE ENABLE
(1) 006170  010103          MUX7E:  MOV     R1,R3                   ;ON SELECTED LINE
(1) 006172  010177  007760              MOV     R1,@DHMCSR              ;SELECT LINE
(1) 006176  042777  000010  007754      BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
(1) 006204  105227  000000              INCB    #0                      ;DELAY FOR CABLE
(1) 006210  001375                      BNE     .-4                     ;DITTO
(1) 006212  017704  007742              MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
(1) 006216  020504                      CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
(1) 006220  001401                      BEQ     MUX7F                   ;SET ON THIS LINE
(1) 006222  104001                      ERRORL                          ;LINE STATUS ERROR
(1) 006224  104003          MUX7F:  SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
(1) 006226  006060                      MUX7A
(1) 006230  005201                      INC     R1                      ;UPDATE LINE NUMBER
(1) 006232  005077  007722              CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER
(1) 006236  006337  016262              ASL     SELMSK                  ;SHIFT MARK TO TEST NEXT LINE
(1) 006242  005300                      DEC     R0                      ;CONTINUE IF ALL LINES NOT
(1) 006244  001305                      BNE     MUX7A                   ;TESTED
(1) 006246  104002                      SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

```
                                        ;VERIFY THAT "CLEAR MULTIPLXER" CLEARS ALL MULTIPLEXER
                                        ;FUNCTION FLIP-FLOPS
006250                          T35:                            ;REFERENCE DESIGNATION
006250 005077 007702            MUX8:   CLR     @DHMCSR         ;CLEAR CONTROL REGISTER
006254 042737 000340 177776             BIC     #340,PS         ;ENABLE INTERRUPTS
006262 012700 000020                    MOV     #16.,R0         ;SET UP TO TEST 16 LINES
006266 012777 000017 007664     MUXBA:  MOV     #17,@DHMLSR     ;WRITE 1S INTO  ALL MULTIPLEXER
006274 052777 000400 007654             BIS     #STEP,@DHMCSR   ;FUNCTION FLIPFLOPS
006302 005300                           DEC     R0
006304 001370                           BNE     MUXBA
006306 012737 000001 016262             MOV     #1,SELMSK       ;INIT SELECT MASK
006314 005003                           CLR     R3              ;SET UP FOR 16 LINES
006316 012700 000020                    MOV     #16.,R0
006322 012777 002000 007626     MUXBB:  MOV     #CLRMUX,@DHMCSR ;CLEAR MULTIPLEXER
006330 033737 016262 016260     MUXBC:  BIT     SELMSK,LINSEL   ;SELECTED ??
006336 001425                           BEQ     MUXBE           ;BR IF NOT
006340 010377 007612                    MOV     R3,@DHMCSR      ;SELECT LINE
006344 017704 007610                    MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
006350 005005                           CLR     R5              ;EXPECT 0S
006352 005704                           TST     R4              ;WAS LINE STATUS REGISTER CLEARED
006354 001403                           BEQ     MUXBD
006356 104001                           ERRORL                  ;LINE STATUS ERROR
006360 104003                           SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
006362 006322                           MUXBB
006364 005205                   MUXBD:  INC     R5              ;EXPECT LINE ENABLE
006366 052777 000001 007564             BIS     #LINENA,@DHMLSR ;SET LINE ENABLE ON SELECTED LINE
006374 017704 007560                    MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
006400 020504                           CMP     R5,R4           ;IS ANYTHING BUT LINE ENABLE SET
006402 001403                           BEQ     MUXBE
006404 104001                           ERRORL                  ;LINE STATUS ERROR
006406 104003                           SCOPEF                  ;CHECK FOR LOOP ON SAME DATA
006410 006322                           MUXBB
006412 005203                   MUXBE:  INC     R3              ;UPDATE LINE NUMBER
006414 005077 007540                    CLR     @DHMLSR         ;CLEAR CURRENT LINE
006420 006337 016262                    ASL     SELMSK          ;SHIFT SELECT MASK
006424 005300                           DEC     R0              ;CONTINUE IF ALL LINES NOT
006426 001340                           BNE     MUXBC           ;TESTED
006430 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

006432                          T36:                                    ;REFERENCE DESIGNATION
006432  012777  002000  007516  SCNT1:  MOV     #CLRMUX,@DHMCSR         ;CLEAR ALL MULTIPLEXER FLIPFLOPS
006440  005077  007512          CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
006444  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
006452  012700  000020          MOV     #16.,R0                 ;SET UP TO WRITE 1'S INTO
006456  012777  001017  007472          MOV     #MAINT+17,@DHMCSR       ;ALL SCANNER MEMORY LOCATION
006464  012737  000001  016262          MOV     #1,SELMSK               ;INIT SELECT MASK
006472  052777  000400  007456  SCNT1A: BIS     #STEP,@DHMCSR           ;WRITE A LOCATION
006500  012777  000001  007452          MOV     #LINENA,@DHMLSR         ;LET "LINE ENABLE"
006506  005300                  DEC     R0
006510  001370                  BNE     SCNT1A
006512  012701  177777          MOV     #-1,R1                  ;INIT LINE NO. GEN.
006516  012705  070340          MOV     #70340,R5               ;EXPECT "DONE"+"SCNENA"+"COF"+"CSF"+"SECRXF"
006522  012777  006632  007422          MOV     #SCNT1C,@DHMVEC         ;SET UP LOCAL INTERRUPT SERVICE
006530  013777  177776  007416          MOV     PS,@DHMLVL              ;SERVICE AT LEVEL 7
006536  012700  000020          MOV     #16.,R0
006542  012777  000117  007406          MOV     #INTENA+17,@DHMCSR      ;SET INTERRUPT ENABLE
006550  033737  016262  016260  SCNT1B: BIT     SELMSK,LINSEL           ;SELECTED ??
006556  001435                  BEQ     SCNT1D                  ;BR IF NOT
006560  052737  000340  177776          BIS     #340,PS                 ;LOCK OUT INTERRUPTS
006566  052777  000040  007362          BIS     #SCNENA,@DHMCSR         ;START SCANNER
006574  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
006602  105777  007350          TSTB    @DHMCSR                 ;WAIT FOR DONE
006606  100375                  BPL     .-4                     ;PROGRAM WILL HANG HERE
                                                                ;IF DONE NEVER SETS
006610  052737  000340  177776          BIS     #340,PS                 ;INTERRUPT DID NOT OCCUR
006616  017704  007334          MOV     @DHMCSR,R4              ;ERROR
006622  104000                  ERRORC                          ;CONTROL STATUS ERROR
006624  104003                  SCOPEF                          ;CHECK FOR LOOP ON SAME DATA
006626  006432                  SCNTI
006630  000410                  BR      SCNT1D
006632  022626          SCNT1C: POP2SP                          ;INTERRUPT OCCURED, REPOSITION STACK
006634  017704  007316          MOV     @DHMCSR,R4              ;READ CONTROL STATUS
006640  020504                  CMP     R5,R4                   ;ARE EXPECTED AND RECEIVED
006642  001403                  BEQ     SCNT1D                  ;REGISTERS THE SAME
006644  104000                  ERRORC                          ;NO, LINE STATUS ERROR
006646  104003                  SCOPEF                          ;CHECK FOR LOOP WITH CURRENT DATA
006650  006432                  SCNTI
006652  042777  000257  007276  SCNT1D: BIC     #SCNENA+DONE+17,@DHMCSR ;CLEAR SCAN ENABLE AND DONE
006660  005201                  INC     R1                      ;GEN NXT LINE NO.
006662  150177  007270          BISB    R1,@DHMCSR              ;SET LINE NO. BITS
006666  006337  016262          ASL     SELMSK                  ;SHIFT SELECT MASK
006672  005205                  INC     R5                      ;UPDATE EXPECTED RESULT
006674  005300                  DEC     R0                      ;CONTINUE IF NOT DONE
006676  001324                  BNE     SCNT1B
006700  104002                  SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

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

006702                          T37:                                    ;REFERENCE DESIGNATION
006702  012700  000020          SCNT2:  MOV     #16.,R0                 ;WRITE 1S INTO ALL
006706  012777  002000  007242          MOV     #CLRMUX,@DHMCSR         ;CLEAR MULTIPLEXER
006714  005077  007236                  CLR     @DHMCSR                 ;MULTIPLEXER FUNCTION
006720  042737  000340  177776          BIC     #340,PS                 ;ENABLE TELETYPE INTERRUPTS
006726  012737  000001  016262          MOV     #1,SELMSK               ;INIT LINE SELECT MASK
006734  012777  000017  007216  SCNT2A: MOV     #17,@DHMLSR             ;FLIPFLOPS
006742  052777  000400  007206          BIS     #STEP,@DHMCSR
006750  005300                          DEC     R0
006752  001370                          BNE     SCNT2A
006754  012777  004000  007174          MOV     #CLRSCN,@DHMCSR         ;CLEAR SCANNER MEMORY
006762  032777  000020  007166          BIT     #BUSY,@DHMCSR           ;WAIT FOR CLEAR CYCLE TO COMPLETE
006770  001374                          BNE     .-6
006772  012700  000020                  MOV     #16.,R0                 ;SET UP TO TEST 16 LINES
006776  012701  177777                  MOV     #-1,R1                  ;INIT LINE NO. GENERATOR
007002  012705  170340                  MOV     #170340,R5              ;FIRST EXPECTED RESULT
007006  012777  007112  007136          MOV     #SCNT2C,@DHMVEC         ;SET UP LOCAL INTERRUPT RETURN
007014  013777  177776  007132          MOV     PS,@DHMLVL
007022  012777  000117  007126          MOV     #INTENA+17,@DHMCSR      ;SET INTERRUPT ENABLE
007030  033737  016262  016260  SCNT2B: BIT     SELMSK,LINSEL           ;IS THIS LINE SELECTED ??
007036  001435                          BEQ     SCNT2D                  ;BR IF NOT
007040  052737  000340  177776          BIS     #340,PS                 ;LOCK OUT INTERRUPTS
007046  052777  000040  007102          BIS     #SCNENA,@DHMCSR         ;START SCANNER
007054  042737  000340  177776          BIC     #340,PS                 ;ENABLE INTERRUPTS
007062  105777  007070                  TSTB    @DHMCSR                 ;WAIT FOR DONE
007066  100375                          BPL     .-4                     ;PROGRAM WILL HANG HERE
                                                                        ;IF DONE NEVER SETS
007070  052737  000340  177776          BIS     #340,PS                 ;LOCK OUT INTERRUPTS
007076  017704  007054                  MOV     @DHMCSR,R4              ;READ CONTROL STATUS
007102  104000                          ERRORC                          ;INTERRUPT DID NOT OCCUR
007104  104003                          SCOPEF                          ;CHECK FOR LOOP ON CURRENT DATA
007106  006702                          SCNT2
007110  000410                          BR      SCNT2D                  ;CONTINUE
007112  022626                  SCNT2C: POP2SP                          ;INTERRUPT OCCURED, RESTORE STACK
007114  017704  007036                  MOV     @DHMCSR,R4              ;READ CONTROL STATUS REGISTER
007120  020504                          CMP     R5,R4                   ;COMPARE TO EXPECTED RESULT
007122  001403                          BEQ     SCNT2D
007124  104000                          ERRORC                          ;CONTROL STATUS ERROR
007126  104003                          SCOPEF                          ;CHECK FOR LOOP ON CURRENT DATA
007130  006702                          SCNT2
007132  042777  000257  007016  SCNT2D: BIC     #SCNENA+DONE+17,@DHMCSR ;CLEAR SCAN ENABLE AND DONE AND LINE NO.
007140  006337  016262                  ASL     SELMSK                  ;SHIFT SELECT BIT
007144  005201                          INC     R1                      ;GEN NEW LINE NO.
007146  150177  007004                  BISB    R1,@DHMCSR              ;SET IT IN CSR
007152  005205                          INC     R5                      ;UPDATE EXPECTED RESULT
007154  005300                          DEC     R0                      ;CONTINUE IF ALL
007156  001324                          BNE     SCNT2B                  ;LINES NOT TESTED
007160  104002                          SCOPE                           ;CHECK FOR ITERATIONS, LOOP
```

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1071
1078
1079                                    ;SINGLE LINE CABLE TEST
1080                                    ;FOR USE WITH MODEM CABLE AND DC11 TEST CONNECTOR
1081
1082                                    ;NOTE:  MODEM CONTROL MULTIPLEXER INPUTS SHOULD BE CONNECTED
1083                                    ;TO DISTRIBUTION PANEL WIA DM11-DC
1084
1085
1094  007162                    T100:                                   ;REFERENCE DESIGNATION
1095  007162  012737  007202  001722  STRLIN: MOV     #STRLNA,KRET     ;SET UP FOR NEW LINE SELECTION
1096  007170  042737  000340  177776          BIC     #340,PS          ;ENABLE INTERRUPTS
1097  007176  104004                          TYPE                     ;TYPE "SINGLE LINE CABLE TEST"
1098  007200  017261                          MLINE
1099  007202  104013                  STRLNA: INSTRG                   ;GET LINE NUMBER
1100  007204  017314                          MLINEI
1101  007206  000000                          0
1102  007210  000017                          17
1103  007212  016240                          LINE
1104  007214  104004                          TYPE
1105  007216  017256                          MCRLF
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```
1107
1108                                        ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
 (1)                                        ;BE SET AND CLEARED FOR SELECTED LINE
 (1)
 (2) 007220                         T101:                                ;REFERENCE DESIGNATION
 (1) 007220 005077 006732           MUX11:  CLR     @DHMCSR              ;CLEAR CONTROL STATUS REGISTER
 (1) 007224 042737 000340 177776            BIC     #340,PS              ;ENABLE INTERRUPTS
 (1) 007232 013701 016240                   MOV     LINE,R1
 (1) 007236 012777 002000 006712    MUX11A: MOV     #CLRMUX,@DHMCSR
 (1) 007244 012702 000020                   MOV     #16.,R2
 (1) 007250 033737 016262 016260            BIT     SELMSK,LINSEL        ;IS THIS LINE SELECTED FOR TEST ?
 (1) 007256 001463                          BEQ     MUX11F               ;BR IF NOT
 (1) 007260 010177 006672                   MOV     R1,@DHMCSR           ;SELECT LINE TO BE TESTED
 (1) 007264 012777 000001 006666            MOV     #LINENA,@DHMLSR      ;SET LINE ENABLE FUNCTION FLIP-FLOP
 (1) 007272 012737 000001 016264            MOV     #1,SLMSK             ;INIT ANOTHER SELECT MASK
 (1) 007300 005077 006652                   CLR     @DHMCSR
 (1) 007304 005005                  MUX11B: CLR     R5
 (1) 007306 033737 016264 016260            BIT     SLMSK,LINSEL         ;SELECTED ??
 (1) 007314 001417                          BEQ     MUX11D               ;BR IF NOT
 (1) 007316 017704 006636                   MOV     @DHMLSR,R4           ;READ LINE STATUS REGISTER
 (1) 007322 117703 006630                   MOVB    @DHMCSR,R3           ;READ CONTROL STATUS REGISTER
 (1) 007326 042703 177760                   BIC     #177760,R3           ;CLEAR UNWANTED BITS
 (1) 007332 020103                          CMP     R1,R3                ;IF LINE NUMBER=SELECTED LINE NUMBER,
 (1) 007334 001002                          BNE     MUX11C               ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
 (1) 007336 012705 000001                   MOV     #LINENA,R5
 (1)                                                                     ;TO BE SET
 (1) 007342 020504                  MUX11C: CMP     R5,R4                ;COMPARE EXPECTED AND RECEIVED
 (1) 007344 001403                          BEQ     MUX11D               ;RESULTS
 (1) 007346 104001                          ERRORL                       ;LINE STATUS ERROR
 (1) 007350 104003                          SCOPEF
 (1) 007352 007354                          MUX11D
 (1) 007354 052777 000400 006574    MUX11D: BIS     #STEP,@DHMCSR        ;EXAMINE NEXT LINE
 (1) 007362 006337 016264                   ASL     SLMSK                ;SHIFT MASK
 (1) 007366 005302                          DEC     R2
 (1) 007370 001345                          BNE     MUX11B
 (1) 007372 005005                          CLR     R5
 (1) 007374 010177 006556           MUX11E: MOV     R1,@DHMCSR
 (1) 007400 010103                          MOV     R1,R3                ;SET LINE COUNTER TO SELECTED LINE
 (1) 007402 005077 006552                   CLR     @DHMLSR              ;CLEAR LINE ENABLE FLIP FLOP
 (1) 007406 105227 000000                   INCB    #0                   ;DELAY FOR CABLE
 (1) 007412 001375                          BNE     .-4                  ;DITTO
 (1) 007414 017704 006540                   MOV     @DHMLSR,R4           ;READ LINE STATUS REGISTER
 (1) 007420 005704                          TST     R4                   ;WAS LINE ENABLE FUNCTION FLIP FLOP
 (1) 007422 001401                          BEQ     MUX11F               ;CLEARED
 (1) 007424 104001                          ERRORL                       ;NO, LINE STATUS ERROR
 (1) 007426 104002                  MUX11F: SCOPE                        ;CHECK FOR ITERATIONS, LOOP
```

```
1110                                    ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
 (1)                                    ;BE SET AND CLEARED FOR SELECTED LINE
 (1)
 (2) 007430                      T102:                           ;REFERENCE DESIGNATION
 (1) 007430 005077 006522        MUX12:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
 (1) 007434 042737 000340 177776         BIC     #340,PS         ;ENABLE INTERRUPTS
 (1) 007442 013701 016240                MOV     LINE,R1
 (1) 007446 012777 002000 006502 MUX12A: MOV     #CLRMUX,@DHMCSR
 (1) 007454 012702 000020                MOV     #16.,R2
 (1) 007460 033737 016262 016260         BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
 (1) 007466 001463                       BEQ     MUX12F          ;BR IF NOT
 (1) 007470 010177 006462                MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
 (1) 007474 012777 000002 006456         MOV     #TRMRDY,@DHMLSR ;SET TERMINAL READY FUNCTION FLIP-FLOP
 (1) 007502 012737 000001 016264         MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
 (1) 007510 005077 006442                CLR     @DHMCSR
 (1) 007514 005005                MUX12B: CLR     R5
 (1) 007516 033737 016264 016260         BIT     SLMSK,LINSEL    ;SELECTED ??
 (1) 007524 001417                       BEQ     MUX12D          ;BR IF NOT
 (1) 007526 017704 006426                MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
 (1) 007532 117703 006420                MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
 (1) 007536 042703 177760                BIC     #177760,R3      ;CLEAR UNWANTED BITS
 (1) 007542 020103                       CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
 (1) 007544 001002                       BNE     MUX12C          ;EXCEPT TERMINAL READY FUNCTION FLIP'FLOP
 (1) 007546 012705 000002                MOV     #TRMRDY,R5
 (1)                                                             ;TO BE SET
 (1) 007552 020504               MUX12C: CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
 (1) 007554 001403                       BEQ     MUX12D          ;RESULTS
 (1) 007556 104001                       ERRORL                  ;LINE STATUS ERROR
 (1) 007560 104003                       SCOPEF
 (1) 007562 007564                       MUX12D
 (1) 007564 052777 000400 006364 MUX12D: BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
 (1) 007572 006337 016264                ASL     SLMSK           ;SHIFT MASK
 (1) 007576 005302                       DEC     R2
 (1) 007600 001345                       BNE     MUX12B
 (1) 007602 005005                       CLR     R5
 (1) 007604 010177 006346        MUX12E: MOV     R1,@DHMCSR
 (1) 007610 010103                       MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
 (1) 007612 005077 006342                CLR     @DHMLSR         ;CLEAR TERMINAL READY FLIP FLOP
 (1) 007616 105227 000000                INCB    #0              ;DELAY FOR CABLE
 (1) 007622 001375                       BNE     .-4             ;DITTO
 (1) 007624 017704 006330                MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
 (1) 007630 005704                       TST     R4              ;WAS TERMINAL READY FUNCTION FLIP FLOP
 (1) 007632 001401                       BEQ     MUX12F          ;CLEARED
 (1) 007634 104001                       ERRORL                  ;NO, LINE STATUS ERROR
 (1) 007636 104002               MUX12F: SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

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1112                                            ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
 (1)                                            ;BE SET AND CLEARED FOR SELECTED LINE
 (1)
 (2) 007640                             T103:                           ;REFERENCE DESIGNATION
 (1) 007640 005077 006312               MUX13:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
 (1) 007644 042737 000340 177776                BIC     #340,PS         ;ENABLE INTERRUPTS
 (1) 007652 013701 016240                       MOV     LINE,R1
 (1) 007656 012777 002000 006272        MUX13A: MOV     #CLRMUX,@DHMCSR
 (1) 007664 012702 000020                       MOV     #16.,R2
 (1) 007670 033737 016262 016260                BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
 (1) 007676 001463                              BEQ     MUX13F          ;BR IF NOT
 (1) 007700 010177 006252                       MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
 (1) 007704 012777 000004 006246                MOV     #RS,@DHMLSR     ;SET REQUEST TO SEND FUNCTION FLIP-FLOP
 (1) 007712 012737 000001 016264                MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
 (1) 007720 005077 006232                       CLR     @DHMCSR
 (1) 007724 005005                      MUX13B: CLR     R5
 (1) 007726 033737 016264 016260                BIT     SLMSK,LINSEL    ;SELECTED ??
 (1) 007734 001417                              BEQ     MUX13D          ;BR IF NOT
 (1) 007736 017704 006216                       MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
 (1) 007742 117703 006210                       MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
 (1) 007746 042703 177760                       BIC     #177760,R3      ;CLEAR UNWANTED BITS
 (1) 007752 020103                              CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
 (1) 007754 001002                              BNE     MUX13C          ;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
 (1) 007756 012705 000004                       MOV     #RS,R5
 (1)                                            ;TO BE SET
 (1) 007762 020504                      MUX13C: CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
 (1) 007764 001403                              BEQ     MUX13D          ;RESULTS
 (1) 007766 104001                              ERRORL                  ;LINE STATUS ERROR
 (1) 007770 104003                              SCOPEF
 (1) 007772 007774                              MUX13D
 (1) 007774 052777 000400 006154        MUX13D: BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
 (1) 010002 006337 016264                       ASL     SLMSK           ;SHIFT MASK
 (1) 010006 005302                              DEC     R2
 (1) 010010 001345                              BNE     MUX13B
 (1) 010012 005005                              CLR     R5
 (1) 010014 010177 006136               MUX13E: MOV     R1,@DHMCSR
 (1) 010020 010103                              MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
 (1) 010022 005077 006132                       CLR     @DHMLSR         ;CLEAR REQUEST TO SEND FLIP FLOP
 (1) 010026 105227 000000                       INCB    #0              ;DELAY FOR CABLE
 (1) 010032 001375                              BNE     .-4             ;DITTO
 (1) 010034 017704 006120                       MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
 (1) 010040 005704                              TST     R4              ;WAS REQUEST TO SEND FUNCTION FLIP FLOP
 (1) 010042 001401                              BEQ     MUX13F          ;CLEARED
 (1) 010044 104001                              ERRORL                  ;NO, LINE STATUS ERROR
 (1) 010046 104002                      MUX13F: SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

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1114
  (1)                                           ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
  (1)                                           ;BE SET AND CLEARED FOR SELECTED LINE
  (1)
  (2)  010050                           T104:                           ;REFERENCE DESIGNATION
  (1)  010050  005077  006102           MUX14:  CLR     @DHMCSR         ;CLEAR CONTROL STATUS REGISTER
  (1)  010054  042737  000340  177776           BIC     #340,PS         ;ENABLE INTERRUPTS
  (1)  010062  013701  016240                   MOV     LINE,R1
  (1)  010066  012777  002000  006062  MUX14A:  MOV     #CLRMUX,@DHMCSR
  (1)  010074  012702  000020                   MOV     #16.,R2
  (1)  010100  033737  016262  016260           BIT     SELMSK,LINSEL   ;IS THIS LINE SELECTED FOR TEST ?
  (1)  010106  001463                           BEQ     MUX14F          ;BR IF NOT
  (1)  010110  010177  006042                   MOV     R1,@DHMCSR      ;SELECT LINE TO BE TESTED
  (1)  010114  012777  000010  006036           MOV     #SECTX,@DHMLSR  ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
  (1)  010122  012737  000001  016264           MOV     #1,SLMSK        ;INIT ANOTHER SELECT MASK
  (1)  010130  005077  006022                   CLR     @DHMCSR
  (1)  010134  005005                  MUX14B:  CLR     R5
  (1)  010136  033737  016264  016260           BIT     SLMSK,LINSEL    ;SELECTED ??
  (1)  010144  001417                           BEQ     MUX14D          ;BR IF NOT
  (1)  010146  017704  006006                   MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
  (1)  010152  117703  006000                   MOVB    @DHMCSR,R3      ;READ CONTROL STATUS REGISTER
  (1)  010156  042703  177760                   BIC     #177760,R3      ;CLEAR UNWANTED BITS
  (1)  010162  020103                           CMP     R1,R3           ;IF LINE NUMBER=SELECTED LINE NUMBER,
  (1)  010164  001002                           BNE     MUX14C          ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
  (1)  010166  012705  000010                   MOV     #SECTX,R5
  (1)                                           ;TO BE SET
  (1)  010172  020504                  MUX14C:  CMP     R5,R4           ;COMPARE EXPECTED AND RECEIVED
  (1)  010174  001403                           BEQ     MUX14D          ;RESULTS
  (1)  010176  104001                           ERRORL                  ;LINE STATUS ERROR
  (1)  010200  104003                           SCOPEF
  (1)  010202  010204                           MUX14D
  (1)  010204  052777  000400  005744  MUX14D:  BIS     #STEP,@DHMCSR   ;EXAMINE NEXT LINE
  (1)  010212  006337  016264                   ASL     SLMSK           ;SHIFT MASK
  (1)  010216  005302                           DEC     R2
  (1)  010220  001345                           BNE     MUX14B
  (1)  010222  005005                           CLR     R5
  (1)  010224  010177  005726          MUX14E:  MOV     R1,@DHMCSR
  (1)  010230  010103                           MOV     R1,R3           ;SET LINE COUNTER TO SELECTED LINE
  (1)  010232  005077  005722                   CLR     @DHMLSR         ;CLEAR SECONDARY TRANSMIT FLIP FLOP
  (1)  010236  105227  000000                   INCB    #0              ;DELAY FOR CABLE
  (1)  010242  001375                           BNE     .-4             ;DITTO
  (1)  010244  017704  005710                   MOV     @DHMLSR,R4      ;READ LINE STATUS REGISTER
  (1)  010250  005704                           TST     R4              ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
  (1)  010252  001401                           BEQ     MUX14F          ;CLEARED
  (1)  010254  104001                           ERRORL                  ;NO, LINE STATUS ERROR
  (1)  010256  104002                  MUX14F:  SCOPE                   ;CHECK FOR ITERATIONS, LOOP
```

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1116
 (1)                                    ;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
 (1)                                    ;AND TERMINAL ARE SET FOR SELECTED LINE.
 (1)
 (2) 010260                     T105:                                   ;REFERENCE DESIGNATION
 (1) 010260  005077  005672     MUX15:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 (1) 010264  042737  000340  177776     BIC     #340,PS                 ;ENABLE INTERRUPTS
 (1) 010272  013701  016240             MOV     LINE,R1
 (1) 010276  012702  000020     MUX15A: MOV     #16.,R2                 ;16 LINES
 (1) 010302  033737  016262  016260     BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
 (1) 010310  001454                     BEQ     MUX15F                  ;BR IF NOT
 (1) 010312  010177  005640             MOV     R1,@DHMCSR              ;SELECT A LINE
 (1) 010316  012777  000003  005634     MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE +TRMRDY
 (1) 010324  005077  005626             CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 (1) 010330  005005             MUX15B: CLR     R5                      ;CLEAR EXPECTED RESULT
 (1) 010332  017704  005622             MOV     @DHMLSR,R4              ;READ LINE STATUS
 (1) 010336  117703  005614             MOVB    @DHMCSR,R3              ;READ LINE NUMBER
 (1) 010342  042703  177760             BIC     #177760,R3              ;CLEAR UNWANTED BITS
 (1) 010346  020103                     CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
 (1) 010350  001002                     BNE     MUX15C                  ;EXPECT LINE ENABLE AND
 (1) 010352  012705  000143             MOV     #LINENA+TRMRDY+CO+CS,R5
 (1)                                                                    ;CLEAR TO SEND AND CARRIER ARE SET
 (1) 010356  020405             MUX15C: CMP     R4,R5                   ;COMPARE EXPECTED AND
 (1) 010360  001403                     BEQ     MUX15D                  ;RECEIVED RESULTS
 (1) 010362  104001                     ERRORL                          ;LINE STATUS ERROR
 (1) 010364  104003                     SCOPEF
 (1) 010366  010370                     MUX15D
 (1) 010370  052777  000400  005560 MUX15D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
 (1) 010376  005302                     DEC     R2                      ;CONTINUE IF ALL CHECKS
 (1) 010400  001353                     BNE     MUX15B                  ;ARE NOT DONE FOR THIS LINE
 (1) 010402  012705  000001             MOV     #LINENA,R5              ;EXPECT LINE ENABLE
 (1) 010406  010103             MUX15E: MOV     R1,R3                   ;ON SELECTED LINE
 (1) 010410  010177  005542             MOV     R1,@DHMCSR              ;SELECT LINE
 (1) 010414  042777  000002  005536     BIC     #TRMRDY,@DHMLSR         ;CLEAR TERMINAL
 (1) 010422  105227  000000             INCB    #0                      ;DELAY FOR CABLE
 (1) 010426  001375                     BNE     .-4                     ;DITTO
 (1) 010430  017704  005524             MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
 (1) 010434  020504                     CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
 (1) 010436  001401                     BEQ     MUX15F                  ;SET ON THIS LINE
 (1) 010440  104001                     ERRORL                          ;LINE STATUS ERROR
 (1) 010442  104002             MUX15F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
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1118
 (1)                                        ;VERIFY THAT RING IS SET IF "LINE ENABLE"
 (1)                                        ;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.
 (1)
 (2) 010444                          T106:                                  ;REFERENCE DESIGNATION
 (1) 010444  005077  005506          MUX16:  CLR     @DHMCSR                ;CLEAR CONTROL REGISTER
 (1) 010450  042737  000340  177776          BIC     #340,PS                ;ENABLE INTERRUPTS
 (1) 010456  013701  016240                  MOV     LINE,R1
 (1) 010462  012702  000020          MUX16A: MOV     #16.,R2                ;16 LINES
 (1) 010466  033737  016262  016260          BIT     SELMSK,LINSEL          ;THIS LINE SELECTED FOR TEST ?
 (1) 010474  001454                          BEQ     MUX16F                 ;BR IF NOT
 (1) 010476  010177  005454                  MOV     R1,@DHMCSR             ;SELECT A LINE
 (1) 010502  012777  000005  005450          MOV     #LINENA+RS,@DHMLSR     ;SET LINE ENABLE +RS
 (1) 010510  005077  005442                  CLR     @DHMCSR                ;CLEAR CONTROL REGISTER
 (1) 010514  005005                  MUX16B: CLR     R5                     ;CLEAR EXPECTED RESULT
 (1) 010516  017704  005436                  MOV     @DHMLSR,R4             ;READ LINE STATUS
 (1) 010522  117703  005430                  MOVB    @DHMCSR,R3             ;READ LINE NUMBER
 (1) 010526  042703  177760                  BIC     #177760,R3             ;CLEAR UNWANTED BITS
 (1) 010532  020103                          CMP     R1,R3                  ;IF RECEIVED LINE=SELECTED LINE
 (1) 010534  001002                          BNE     MUX16C                 ;EXPECT LINE ENABLE AND
 (1) 010536  012705  000205                  MOV     #LINENA+RS+RING,R5
 (1)                                                                        ;RING IS SET
 (1) 010542  020405                  MUX16C: CMP     R4,R5                  ;COMPARE EXPECTED AND
 (1) 010544  001403                          BEQ     MUX16D                 ;RECEIVED RESULTS
 (1) 010546  104001                          ERRORL                         ;LINE STATUS ERROR
 (1) 010550  104003                          SCOPEF
 (1) 010552  010554                          MUX16D
 (1) 010554  052777  000400  005374  MUX16D: BIS     #STEP,@DHMCSR          ;UPDATE LINE COUNTER
 (1) 010562  005302                          DEC     R2                     ;CONTINUE IF ALL CHECKS
 (1) 010564  001353                          BNE     MUX16B                 ;ARE NOT DONE FOR THIS LINE
 (1) 010566  012705  000001                  MOV     #LINENA,R5             ;EXPECT LINE ENABLE
 (1) 010572  010103                  MUX16E: MOV     R1,R3                  ;ON SELECTED LINE
 (1) 010574  010177  005356                  MOV     R1,@DHMCSR             ;SELECT LINE
 (1) 010600  042777  000004  005352          BIC     #RS,@DHMLSR            ;CLEAR REQUEST TO SEND
 (1) 010606  105227  000000                  INCB    #0                     ;DELAY FOR CABLE
 (1) 010612  001375                          BNE     .-4                    ;DITTO
 (1) 010614  017704  005340                  MOV     @DHMLSR,R4             ;READ LINE STATUS REGISTER
 (1) 010620  020504                          CMP     R5,R4                  ;ONLY LINE ENABLE SHOULD BE
 (1) 010622  001401                          BEQ     MUX16F                 ;SET ON THIS LINE
 (1) 010624  104001                          ERRORL                         ;LINE STATUS ERROR
 (1) 010626  104002                  MUX16F: SCOPE                          ;CHECK FOR ITERATIONS, LOOP
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1120
 (1)                                    ;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
 (1)                                    ;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
 (1)
 (2) 010630                     T107:                                   ;REFERENCE DESIGNATION
 (1) 010630  005077  005322     MUX17:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 (1) 010634  042737  000340  177776     BIC     #340,PS                 ;ENABLE INTERRUPTS
 (1) 010642  013701  016240             MOV     LINE,R1
 (1) 010646  012702  000020     MUX17A: MOV     #16.,R2                 ;16 LINES
 (1) 010652  033737  016262  016260     BIT     SELMSK,LINSEL           ;THIS LINE SELECTED FOR TEST ?
 (1) 010660  001454                     BEQ     MUX17F                  ;BR IF NOT
 (1) 010662  010177  005270             MOV     R1,@DHMCSR              ;SELECT A LINE
 (1) 010666  012777  000011  005264     MOV     #LINENA+SECTX,@DHMLSR   ;SET LINE ENABLE +SECTX
 (1) 010674  005077  005256             CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 (1) 010700  005005             MUX17B: CLR     R5                      ;CLEAR EXPECTED RESULT
 (1) 010702  017704  005252             MOV     @DHMLSR,R4              ;READ LINE STATUS
 (1) 010706  117703  005244             MOVB    @DHMCSR,R3              ;READ LINE NUMBER
 (1) 010712  042703  177760             BIC     #177760,R3              ;CLEAR UNWANTED BITS
 (1) 010716  020103                     CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
 (1) 010720  001002                     BNE     MUX17C                  ;EXPECT LINE ENABLE AND
 (1) 010722  012705  000031             MOV     #LINENA+SECTX+SECRX,R5
 (1)                                                                    ;SECONDARY RECEIVE IS SET
 (1) 010726  020405             MUX17C: CMP     R4,R5                   ;COMPARE EXPECTED AND
 (1) 010730  001403                     BEQ     MUX17D                  ;RECEIVED RESULTS
 (1) 010732  104001                     ERRORL                          ;LINE STATUS ERROR
 (1) 010734  104003                     SCOPEF
 (1) 010736  010740                     MUX17D
 (1) 010740  052777  000400  005210 MUX17D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
 (1) 010746  005302                     DEC     R2                      ;CONTINUE IF ALL CHECKS
 (1) 010750  001353                     BNE     MUX17B                  ;ARE NOT DONE FOR THIS LINE
 (1) 010752  012705  000001             MOV     #LINENA,R5              ;EXPECT LINE ENABLE
 (1) 010756  010103             MUX17E: MOV     R1,R3                   ;ON SELECTED LINE
 (1) 010760  010177  005172             MOV     R1,@DHMCSR              ;SELECT LINE
 (1) 010764  042777  000010  005166     BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
 (1) 010772  105227  000000             INCB    #0                      ;DELAY FOR CABLE
 (1) 010776  001375                     BNE     .-4                     ;DITTO
 (1) 011000  017704  005154             MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
 (1) 011004  020504                     CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
 (1) 011006  001401                     BEQ     MUX17F                  ;SET ON THIS LINE
 (1) 011010  104001                     ERRORL                          ;LINE STATUS ERROR
 (1) 011012  104002             MUX17F: SCOPE                           ;CHECK FOR ITERATIONS, LOOP
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                                        ;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

011014                          T200:                                   ;REFERENCE DESIGNATION
011014  000005                  ST103A: RESET                           ;INITIALIZE INTERFACE
011016  012777  000100  005136          MOV     #INTENA,@TKCSR
011024  012737  000340  177776          MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
011032  104004                          TYPE                            ;TYPE "103A MODEM CONNECT-
011034  016510                          MT103T                          ;DISCONNECT TEST"
011036  012737  011054  012576          MOV     #T103A,FATRET           ;SET UP FOR FATAL ERROR
011044  012737  011052  001722          MOV     #ST103B,KRET            ;SET UP FOR LINE CHANGE
011052  104017                  ST103B: GETLNS                          ;INPUT ORIGINATE AND
                                                                        ;AND ANSWER LINE NUMBERS
011054  104020                  T103A:  SETUP                           ;SET UP TO RECEIVE INTERRUPTS
                                                                        ;WAIT FOR RING
011056  011066                          T103B                           ;GO HERE IF RING OK
011060  011062                          T103A1                          ;GO HERE IF NO RING
011062  104012                  T103A1: ERROR                           ;NO RING WITHIN 5 MINUTES
011064  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

011066  104021                  T103B:  CKRING                          ;CHECK FOR RING INTERRUPT
                                                                        ;ONLY ON ANSWER LINE
                                                                        ;AND NO TRANSITIONS ON
                                                                        ;ORIGINATE LINE
011070  011106                          T103C                           ;GO HERE IF TRANSITIONS
                                                                        ;ARE CORRECT
011072  011076                          T103B1                          ;GO HERE IF INCORRECT
                                                                        ;TRANSITION ON ANSWER LINE
011074  011102                          T103B2                          ;GO HERE IF INCORRECT TRANSITION
                                                                        ;ON ORIGINATE LINE
011076  104014                  T103B1: ERRORT                          ;TRANSITION ERROR ON ANSWER LINE
011100  000207                          RTS     PC                      ;CONTINUE CHECKING
011102  104014                  T103B2: ERRORT                          ;TRANSITION ERROR ON ORIGINATE LINE
011104  000762                          BR      ST103B                  ;RESELECT LINES AND REDIAL
```

```
1180
1181                                    ;SET TERMINAL READY ON SELECTED ANSWER LINE
1182                                    ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1183
1184  011106  013777  016244  005042  T103C:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO
1185                                                                          ;ANSWER LINE NUMBER
1186  011114  052777  000002  005036           BIS     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON
1187                                                                          ;SELECTED ANSWER LINE
1188  011122  104022                           WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
1189
1190                                    ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1191                                    ;SELECTED ORIGINATE AND ANSWER LINES
1192
1193  011124  104023                           CKTRAN                          ;CHECK TRANSITIONS AND
1194                                                                          ;STATUS ON SELECTED
1195                                                                          ;ANSWER AND ORIGINATE LINES
1196  011126  000143                           CO+CS+LINENA+TRMRDY             ;EXPECT CARRIER, CLEAR TO SEND,
1197                                                                          ;LINE ENABLE AND TERMINAL
1198                                                                          ;READY STATUS BITS SET ON
1199                                                                          ;ANSWER LINE
1200  011130  000143                           CO+CS+LINENA+TRMRDY             ;EXPECT CARRIER, CLEAR TO SEND,
1201                                                                          ;LINE ENABLE    AND TERMINAL
1202                                                                          ;READY STATUS BITS ON
1203                                                                          ;ORIGINATE LINE
1204  011132  100006                           RINGF+XCO+XCS                   ;EXPECT CARRIER, CLEAR TO SEND
1205                                                                          ;AND POSSIBLE RING TRANSITIONS
1206                                                                          ;ON ANSWER LINE
1207  011134  000006                           XCO+XCS                         ;EXPECT CARRIER AND CLEAR
1208                                                                          ;TO SEND TRANSITIONS ON
1209                                                                          ;ORIGINATE LINE
1210  011136  011150                           T103D1                          ;GO HERE ON ANSWER LINE STATUS ERROR
1211
1212  011140  011154                           T103D2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
1213  011142  011160                           T103D3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
1214  011144  011164                           T103D4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1215  011146  011170                           T103E                           ;GO TO NEXT TEST IF NO ERRORS
1216  011150  104015  T103D1:                 ERRORS                          ;ANSWER LINE STATUS ERROR
1217  011152  000207                           RTS     PC                      ;CONTINUE CHECKING
1218  011154  104015  T103D2:                 ERRORS                          ;ORIGINATE LINE STATUS ERROR
1219  011156  000207                           RTS     PC                      ;CONTINUE CHECKING
1220  011160  104014  T103D3:                 ERRORT                          ;ANSWER LINE TRANSITION ERROR
1221  011162  000207                           RTS     PC                      ;CONTINUE CHECKING
1222  011164  104014  T103D4:                 ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
1223  011166  000207                           RTS     PC                      ;CONTINUE CHECKING
```

```
1225
1226                                        ;SET UP TO TEST DISCONNECT SEQUENCE
1227                                        ;THE PROGRAM WILL REQUEST THE OPERATOR TO SET SWD1=1
1228                                        ;TO INITIATE THE DISCONNECT SEQUENCE
1229                                        ;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
1230                                        ;DATA TO TALK MODE AS MANY TIMES AS DESIRED
1231                                        ;BEFORE THE SWITCH SEETIN IS MADE
1232                                        ;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
1233                                        ;REPORTED BY TYPEOUT
1234
1235  011170  104004            T103E:    TYPE                              ;TYPE "SET SWD1=1 TO
1236  011172  016753                      MDISC                             ;TEST DISCONNECT"
1237  011174  012737  000340  177776      MOV     #340,PS                   ;LOCK OUT INTERRUPTS
1238  011202  012777  012620  004742      MOV     #TRNTYP,@DHMVEC ;SET UP TO DETECT TRANSITIONS
1239                                                                        ;BEFORE DISCONNECT SEQUENCE STARTS
1240  011210  012737  011230  016272      MOV     #T103ES,RNGRET            ;SET UP DUMMY RETURN FOR
1241                                                                        ;RING INTERRUPT
1242  011216  012777  000140  004732      MOV     #SCNENA+INTENA,@DHMCSR    ;SET SCAN ENABLE AND INTERRUPT ENABLE
1243  011224  005037  177776              CLR     PS                        ;ALLOW INTERRUPTS
1244  011230  032737  000002  177570 T103ES: BIT   #2,SWR                   ;WAIT FOR SWDO=1, BEFORE
1245                                                                        ;STARTING DISCONNECT SEQUENCE
1246  011236  001774                      BEQ     T103ES
1247  011240  012737  000340  177776      MOV     #340,PS                   ;START DISCONNECT SEQUENCE
1248  011246  005077  004704              CLR     @DHMCSR                   ;CLEAR CONROL REGISTER
1249  011252  013777  016242  004676      MOV     LINORG,@DHMCSR            ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
1250  011260  042777  000002  004672      BIC     #TRMRDY,@DHMLSR           ;SET TERMINAL READY ON SELECTED LINE
1251  011266  104022                      WAITRN                            ;WAIT FOR TRANSITIONS TO OCCUR
```

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

011270  104023                          CKTRAN                          ;CHECK TRANSITIONS AND
                                                                        ;STATUS ON SELECTED
                                                                        ;ANSWER AND ORIGINATE LINES
011272  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ANSWER LINE
011274  000001                          LINENA                          ;EXPECT LINE ENABLE STATUS BIT
                                                                        ;SET ON ORIGINATE LINE
011276  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ANSWER LINE
011300  000006                          XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                        ;TO SEND TRANSITIONS ON
                                                                        ;ORIGINATE LINE
011302  011314                          T103E1                          ;GO HERE ON ANSWER LINE STATUS ERROR

011304  011320                          T103E2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
011306  011324                          T103E3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
011310  011330                          T103E4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011312  011334                          T103EN                          ;GO TO NEXT TEST IF NO ERRORS
011314  104015              T103E1:     ERRORS                          ;ANSWER LINE STATUS ERROR
011316  000207                          RTS     PC                      ;CONTINUE CHECKING
011320  104015              T103E2:     ERRORS                          ;ORIGINATE LINE STATUS ERROR
011322  000207                          RTS     PC                      ;CONTINUE CHECKING
011324  104014              T103E3:     ERRORT                          ;ANSWER LINE TRANSITION ERROR
011326  000207                          RTS     PC                      ;CONTINUE CHECKING
011330  104014              T103E4:     ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011332  000207                          RTS     PC                      ;CONTINUE CHECKING

011334                      T201:                                       ;REFERENCE DESIGNATION
011334  104004              T103EN:     TYPE                            ;TYPE " 103A TEST COMPLETE"
011336  016675                          MT103A
011340  005037  016200                  CLR     TSTNO                   ;CLEAR TEST NUMBER FOR LOOPING
011344  000137  011052                  JMP     ST103B                  ;SELECT NEW LINE NUMBERS AND
                                                                        ;RESTART TEST
```

```
1293
1294                                    ;MODEM CONTROL ON LINE TEST USING 202C TYPE MODEMS
1295                                    ;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
1296                                    ;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
1297                                    ;USING THE MODEM CONTROL TO CONTROL 202C TYPE MODEMS
1298
1299                                    ;ALSO TESTED ARE LINE TURN-AROUND AND
1300                                    ;SECONDARY TRANSMIT-SECONDARY RECEIVE
1301
1310  011350                    T300:                                   ;REFERENCE DESIGNATION
1311  011350  000005            ST202A: RESET                           ;INITIALIZE INTERFACE
1312  011352  012777  000100  004602  MOV     #INTENA,@TKCSR
1313  011360  012737  000340  177776  MOV     #340,PS                 ;DISABLE ALL INTERRUPTS
1314  011366  104004                  TYPE                            ;TYPE "202C MODEM CONNECT-
1315  011370  016561                  MT202T                          ;DISCONNECT TEST"
1316  011372  012737  011410  012576  MOV     #T202A,FATRET           ;SET UP FOR FATAL ERROR
1317  011400  012737  011406  001722  MOV     #ST202B,KRET            ;SET UP FOR LINE CHANGE
1318  011406  104017            ST202B: GETLNS                          ;INPUT ORIGINATE AND
1319                                                                    ;ANSWER LINE NUMBERS
1320  011410  104020            T202A:  SETUP                           ;SET UP TO RECEIVE INTERRUPTS
1321                                                                    ;WAIT FOR RING
1322  011412  011422                    T202B                           ;GO HERE IF RING OK
1323  011414  011416                    T202A1                          ;GO HERE IF NO RING
1324  011416  104012            T202A1: ERROR                           ;NO RING WITHIN 5 MINUTES
1325  011420  000772                    BR      ST202B                  ;SELECT NEW LINES AND REDIAL
1326
1327                                    ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
1328                                    ;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
1329                                    ;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
1330                                    ;WILL BE REQUESTED TO RESELECT LINES AND REDIAL
1331
1332  011422  104021            T202B:  CKRING                          ;CHECK FOR RING INTERRUPT
1333                                                                    ;ONLY ON ANSWER LINE
1334                                                                    ;AND NO TRANSITIONS ON
1335                                                                    ;ORIGINATE LINE
1336  011424  011442                    T202C                           ;GO HERE IF TRANSITIONS
1337                                                                    ;ARE CORRECT
1338  011426  011432                    T202B1                          ;GO HERE IF INCORRECT
1339                                                                    ;TRANSITION ON ANSWER LINE
1340  011430  011436                    T202B2                          ;GO HERE IF INCORRECT
1341                                                                    ;TRANSITION ON ORIGINATE LINE
1342  011432  104014            T202B1: ERRORT                          ;ANSWER LINE TRANSITION ERROR
1343  011434  000207                    RTS     PC                      ;CONTINUE CHECKING
1344  011436  104014            T202B2: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
1345  011440  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

011442  013777  016244  004506  T202C:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
011450  052777  000002  004502           BIS     #TRMRDY,@DHMLSR         ;SET TERMINAL READY ON ANSWER LINE
011456  013777  016242  004472  T202D:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
011464  052777  000004  004466           BIS     #RS,@DHMLSR             ;SET REQUEST TO SEND ON ORIGINATE LINE
011472  104022                           WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

011474  104023                           CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                         ;ON SELECTED ANSWER AND
                                                                         ;ORIGINATE LINES
011476  000103                           CO+LINENA+TRMRDY                ;EXPECT CARRIER, LINE ENABLE
                                                                         ;AND TERMINAL READY STATUS
                                                                         ;BITS SET ON ANSWER LINE
011500  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
011502  100004                           RINGF+XCO                       ;EXPECT CARRIER AND POSSIBLE
                                                                         ;RING TRANSITIONS ON
                                                                         ;ANSWER LINE
011504  000006                           XCO+XCS                         ;EXPECT CARRIER AND CLEAR
                                                                         ;TO SEND TRANSITIONS ON
                                                                         ;ORIGINATE LINE
011506  011520                           T202D1                          ;GO HERE ON ANSWER LINE STATUS ERROR
011510  011524                           T202D2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
011512  011530                           T202D3                          ;GO HERE ON ANSWER LINE STATUS ERROR
011514  011534                           T202D4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011516  011540                           T202E                           ;GO TO NEXT TEST IF NO ERRORS
011520  104015                  T202D1:  ERRORS                          ;ANSWER LINE SATAUS ERROR
011522  000207                           RTS     PC                      ;CONTINUE CHECKING
011524  104015                  T202D2:  ERRORS                          ;ORIGINATE LINE STATUS ERROR
011526  000207                           RTS     PC                      ;CONTINUE CHECKING
011530  104014                  T202D3:  ERRORT                          ;ANSWER LINE TRANSITION ERROR
011532  000207                           RTS     PC                      ;CONTINUE CHECKING
011534  104014                  T202D4:  ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011536  000207                           RTS     PC                      ;CONTINUE CHECKING
```

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

011540  013777  016244  004410  T202E:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
011546  052777  000010  004404          BIS     #SECTX,@DHMLSR          ;SET SECONDARY RECEIVE ON ANSWER LINE
011554  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

011556  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
011560  000133                          SECTX+CO+LINENA+TRMRDY+SECRX     ;EXPECT SECONDARY TRANSMIT
                                                                        ;SECONDARY RECEIVE, CARRIER
                                                                        ;LINE ENABLE AND TERMINAL READY
                                                                        ;STATUS BITS SET ON ANSWER LINE
011562  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
011564  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ANSWER LINE
011566  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ORIGINATE LINE
011570  011602                          T202E1                          ;GO HERE ON ANSWER LINE STATUS ERROR
011572  011606                          T202E2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
011574  011612                          T202E3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
011576  011616                          T202E4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011600  011622                          T202F                           ;GO TO NEXT TEST IF NO ERRORS
011602  104015          T202E1:         ERRORS                          ;ANSWER LINE STATUS ERROR
011604  000207                          RTS     PC                      ;CONTINUE CHECKING
011606  104015          T202E2:         ERRORS                          ;ORIGINATE LINE STATUS ERROR
011610  000207                          RTS     PC                      ;CONTINUE CHECKING
011612  104014          T202E3:         ERRORT                          ;ANSWER LINE TRANSITION ERROR
011614  000207                          RTS     PC                      ;CONTINUE CHECKING
011616  104014          T202E4:         ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011620  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

011622  013777  016242  004326  T202F:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
011630  042777  000004  004322          BIC     #RS,@DHMLSR             ;DROP REQUEST TO SEND
011636  013777  016244  004312          MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
011644  042777  000010  004306          BIC     #SECTX,@DHMLSR          ;DROP SECONDARY RECEIVE
011652  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR

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

011654  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
011656  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ANSWER LINE
011660  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ORIGINATE LINE
011662  000005                          XCO+XSCRX                       ;EXPECT CARRIER AND SECONDARY
                                                                        ;RECEIVE TRANSITIONS ON
                                                                        ;ANSWER LINE
011664  000007                          XCO+XCS+XSCRX                   ;EXPECT CARRIER, CLEAR TO SEND
                                                                        ;AND SECONDARY RECEIVE
                                                                        ;TRANSITIONS ON ORIGINATE LINE
011666  011700                          T202F2                          ;GO HERE ON ANSWER LINE STAATUS ERROR
011670  011704                          T202F3                          ;GO HERE ON ORIGINATE LINE STATUS ERRORO
011672  011710                          T202F4                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
011674  011714                          T202F5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
011676  011720                          T202G                           ;GO TO NEXT TEST IF NO ERRORS
011700  104015          T202F2:         ERRORS                          ;ANSWER LINE STATUS ERROR
011702  000207                          RTS     PC                      ;CONTINUE CHECKING
011704  104015          T202F3:         ERRORS                          ;ORIGINATE LINE STATUS ERROR
011706  000207                          RTS     PC                      ;CONTINUE CHECKING
011710  104014          T202F4:         ERRORT                          ;ANSWER LINE TRANSITION ERROR
011712  000207                          RTS     PC                      ;CONTINTUE CHECKING
011714  104014          T202F5:         ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
011716  000207                          RTS     PC                      ;CONTINUE CHECKING
```

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1475
1476
1477                                        ;SET REQUEST TO SEND ON ANSWER LINE
1478                                        ;WAIT FOR TRANSITIONS ON SELECTED LINES
1479
1480  011720  013777  016244  004230  T202G:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
1481  011726  052777  000004  004224          BIS     #RS,@DHMLSR             ;SET REQUEST TO SEND
1482  011734  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
1483
1484                                        ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1485                                        ;SELECTED ORIGINATE AND ANSWER LINES
1486
1487  011736  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
1488                                                                          ;ON SELECTED ANSWER AND
1489                                                                          ;ORIGINATE LINES
1490  011740  000147                          RS+CO+CS+LINENA+TRMRDY           ;EXPECT LINE ENABLE, TERMINAL
1491                                                                          ;READY, REQUEST TO SEND, CLEAR
1492                                                                          ;TO SEND, AND CARRIER
1493                                                                          ;STATUS BITS SET ON  ANSWER LINE
1494  011742  000103                          CO+LINENA+TRMRDY                 ;EXPECT LINE ENABLE, TERMINAL
1495                                                                          ;READY AND CARRIER STATUS
1496                                                                          ;BITS SET ON ORIGINATE LINE
1497  011744  000006                          XCO+XCS                          ;EXPECT CARRIER AND CLEAR
1498                                                                          ;TO SEND TRANSITIONS ON
1499                                                                          ;ANSWER LINE
1500  011746  000004                          XCO                              ;EXPECT CARRIER TRANSITION
1501                                                                          ;ON ORIGINATE LINE
1502  011750  011762                          T202G1                          ;GO HERE ON  ANSWER LINE STATUS ERROR
1503  011752  011766                          T202G2                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
1504  011754  011772                          T202G3                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
1505  011756  011776                          T202G4                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1506  011760  012002                          T202H                           ;GO TO NEXT TEST IF NO ERRORS
1507  011762  104015          T202G1:  ERRORS                                 ;ANSWER LINE STATUS ERROR
1508  011764  000207                   RTS     PC                              ;CONTINUE TESTING
1509  011766  104015          T202G2:  ERRORS                                 ;ORIGINATE LINE STATUS ERROR
1510  011770  000207                   RTS     PC                              ;CONTINUE TESTING
1511  011772  104014          T202G3:  ERRORT                                 ;ANSWER LINE TRANSITION ERROR
1512  011774  000207                   RTS     PC                              ;CONTINUE TESTING
1513  011776  104014          T202G4:  ERRORT                                 ;ORIGINATE LINE TRANSITION ERROR
1514  012000  000207                   RTS     PC                              ;CONTINUE TESTING
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                                        ;SET SECONDARY TRANSMIT ON ORIGINATE LINE
                                        ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
                                        
012002  013777  016242  004146  T202H:  MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
012010  052777  000010  004142          BIS     #SECTX,@DHMLSR          ;SET SECONDARY TRANSMIT
012016  104022                          WAITRN                          ;WAIT FOR TRANSITIONS TO OCCUR
                                        
                                        ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
                                        ;SELECTED ORIGINATE AND ANSWER LINES
                                        
012020  104023                          CKTRAN                          ;CHECK TRANSITIONS AND STATUS
                                                                        ;ON SELECTED ANSWER AND
                                                                        ;ORIGINATE LINES
012022  000167                          RS+CS+CO+LINENA+TRMRDY+SECRX     ;EXPECT LINE ENABLE, TERMINAL
                                                                        ;READY, REQUEST TO SEND, CLEAR
                                                                        ;TO SEND, CARRIER AND SECONDARY
                                                                        ;RECEIVE STATUS BITS SET
                                                                        ;ON ANSWER LINE
012024  000133                          SECTX+CO+LINENA+TRMRDY+SECRX     ;EXPECT LINE ENABLE, TERMINAL
                                                                        ;READY, CARRIER, SECONDARY
                                                                        ;TRANSMIT AND SECONDARY
                                                                        ;RECEIVE STATUS BITS SET
                                                                        ;ON ORIGINATE LINE
012026  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ANSWER LINE
012030  000001                          XSCRX                           ;EXPECT SECONDARY RECEIVE
                                                                        ;TRANSITION ON ORIGINATE LINE
012032  012044                          T202H2                          ;GO HERE ON ANSWER LINE STATUS ERROR
012034  012050                          T202H3                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
012036  012054                          T202H4                          ;GO HERE ON ANSWER LINE TRANSITION ERROR
012040  012060                          T202H5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
012042  012064                          T202I                           ;GO TO NEXT TEST IF NO ERRORS
012044  104015          T202H2:         ERRORS                          ;ANSWER LIN STATUS ERROR
012046  000207                          RTS     PC                      ;CONTINUE CHECKING
012050  104015          T202H3:         ERRORS                          ;ORIGINATE LINE STATUS ERROR
012052  000207                          RTS     PC                      ;CONTINUE CHECKING
012054  104014          T202H4:         ERRORT                          ;ANSWER LINE TRANSITION ERROR
012056  000207                          RTS     PC                      ;CONTINUE CHECKING
012060  104014          T202H5:         ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
012062  000207                          RTS     PC                      ;CONTINUE CHECKING
```

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

012064  013777  016244  004064  T202I:  MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
012072  042777  000004  004060          BIC     #RS,@DHMLSR             ;CLEAR REQUEST TO SEND
012100  013777  016242  004050          MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
012106  042777  000010  004044          BIC     #SECTX,@DHMLSR          ;CLEAR SECONDARY TRANSMIT
012114  104022                          WAITRN                          ;WAIT FRO TRANSITIONS TO OCCUR

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

012116  104023                          CKTRAN                          ;CHECK TRANSITION S AND STATUS
                                                                        ;ON SELECTED ANSWE AND
                                                                        ;ORIGINATE LINES
012120  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS SET
                                                                        ;ON ANSWER LINE
012122  000003                          LINENA+TRMRDY                   ;EXPECT LINE ENABLE AND
                                                                        ;TERMINAL READY STATUS BITS
                                                                        ;SET ON ORIGINATE LINE
012124  000007                          XCO+XCS+XSCRX                   ;EXPECT CARRIER, CLEAR TO SEND
                                                                        ;AND SECONDARY RECEIVE TRANSITIONS
                                                                        ;ON ANSWER LINE
012126  000005                          XCO+XSCRX                       ;EXPECT CARRIER AND SECONDARY
                                                                        ;RECEIVE TRANSITIONS ON
                                                                        ;ORIGINATE LINE
012130  012142                          T202I2                          ;GO HERE ON ANSWER LINE STATUS ERROR
012132  012146                          T202I3                          ;GO HERE ON ORIGINATE LINE STATUS ERROR
012134  012152                          T202I4                          ;GO HERE ON ANSWER LINE TRANSITIN ERROR
012136  012156                          T202I5                          ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
012140  012162                          T202J                           ;GO TO NEXT TEST IF NO ERRORS
012142  104015          T202I2:         ERRORS                          ;ANSWER LINE STATUS ERROR
012144  000207                          RTS     PC                      ;CONTINUE CHECKING
012146  104015          T202I3:         ERRORS                          ;ORIGINATE LINE STATUS ERROR
012150  000207                          RTS     PC                      ;CONTINUE CHECKING
012152  104014          T202I4:         ERRORT                          ;ANSWE LINE TRANSITION ERROR
012154  000207                          RTS     PC                      ;CONTINUE CHECKING
012156  104014          T202I5:         ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
012160  000207                          RTS     PC                      ;CONTINUE CHECKING
```

```
1600
1601                                        ;SET UP TO TEST DISCONNECT SEQUENCE
1602                                        ;THE PROGRAM WILL REQUEST THE OPERATOR TO SET SWD1=1
1603                                        ;TO INITIATE THE DISCONNECT SEQUENCE
1604                                        ;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
1605                                        ;DATA TO TALK MODE AS MANY TIMES AS DESIRED
1606                                        ;BEFORE THE SWITCH SEETIN IS MADE
1607                                        ;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
1608                                        ;REPORTED BY TYPEOUT
1609
1610  012162  104004            T202J:    TYPE                        ;TYPE "SET SWD1=1 TO
1611  012164  016753                      MDISC                       ;TEST DISCONNECT"
1612  012166  012737  000340  177776      MOV     #340,@#PS           ;LOCK OUT INTERRUPTS
1613  012174  012777  012620  003750      MOV     #TRNTYP,@DHMVEC     ;SET UP TO DETECT TRANSITIONS
1614  012202  012737  012222  016272      MOV     #T202JS,RNGRET      ;SET UP DUMMY RETURN FOR RING
1615                                                                  ;FROM RING INTERRUPT
1616  012210  012777  000140  003740      MOV     #SCNENA+INTENA,@DHMCSR ;ENABLE LINE SCANNER
1617                                                                  ;START SCANNER
1618  012216  005037  177776              CLR     @#PS                ;ENABLE INTERRUPTS
1619  012222  032737  000002  177570 T202JS: BIT   #2,@#SWR            ;MONITOR SWD1 FOR DISCONNECT
1620  012230  001774                      BEQ     T202JS
1621
1622                                        ;DISCONNECT SEQUENCE REQUESTED
1623
1624  012232  012737  000340  177776      MOV     #340,@#PS           ;LOCK OUT INTERRUPTS
1625  012240  005077  003712              CLR     @DHMCSR             ;STOP SCANNER
1626  012244  013777  016242  003704      MOV     LINORG,@DHMCSR      ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
1627  012252  042777  000002  003700      BIC     #TRMRDY,@DHMLSR     ;SET TERMINAL READY ON SELECTED LINE
1628  012260  104024                      WAITS                       ;DELAY
1629  012262  104022                      WAITRN                      ;WAIT FOR TRANSITIONS TO OCCUR
```

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

012264  104023                          CKTRAN                  ;CHECK TRANSITIONS AND STATUS
                                                                ;ON SELECTED ASNWER AND
                                                                ;ORIGINATE LINES
012266  000003                          LINENA+TRMRDY           ;EXPECT LINE ENABLE AND
                                                                ;TERMINAL READY STATUS BITS
                                                                ;SET ON ANSWER LINE
012270  000001                          LINENA                  ;EXPECT LINE ENABLE STATUS
                                                                ;BIT SET ON ORIGINATE LINE
012272  000000                          0                       ;EXPECT NO TRANSITIONS ON
                                                                ;ANSWER LINE
012274  000000                          0                       ;EXPECT NO TRANSITIONS ON
                                                                ;ORIGINATE LINE
012276  012310                          T202J1                  ;GO HERE IF ANSWER LINE STATUS ERROR
012300  012314                          T202J2                  ;GO HERE IF ORIGINATE LINE STATUS ERROR
012302  012320                          T202J3                  ;GO HERE IF ANSWER LINE TRANSITION ERROR
012304  012324                          T202J4                  ;GO HERE IF ORIGINATE LINE TRANSITIONS ERROR
012306  012330                          T202JN                  ;GO TO END OF TEST IF NO ERRORS
012310  104015          T202J1: ERRORS                          ;ANSWER LINE STATUS ERRORO
012312  000207                  RTS     PC                      ;CONTINUE CHECKING
012314  104015          T202J2: ERRORS                          ;ORIGINATE LINE STATUS ERRROR
012316  000207                  RTS     PC                      ;CONTINUE CHECKING
012320  104014          T202J3: ERRORT                          ;ANSWER LINE TRANSITION ERROR
012322  000207                  RTS     PC                      ;CONTINUE CHECKING
012324  104014          T202J4: ERRORT                          ;ORIGINATE LINE TRANSITION ERROR
012326  000207                  RTS     PC                      ;CONTINUE CHECKING

012330  104004          T202JN: TYPE                            ;TYPE "202C TEST COMPLETE"
012332  016724                  MT202A
012334  000137  011406          JMP     ST202B                  ;GET NEW LINE NUMBERS
                                                                ;RESTART TEST
```

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

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

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

012340 017704 003612        TRANS:  MOV     @DHMCSR,R4              ;GET LINE NUMBER AND
                                                                    ;INTERRUPT FLAGS
012344 010405                       MOV     R4,R5
012346 042705 177760                BIC     #177760,R5              ;EXTRACT LINE NUMBER
012352 023705 016242                CMP     LINORG,R5               ;DID ORIGINATE LINE INTERRUPT
012356 001411                       BEQ     ORGTR                   ;IF YES, SERVICE
012360 023705 016244                CMP     LINANS,R5               ;DID ANSWER LINE INTERRUPT
012364 001443                       BEQ     ANSTR                   ;IF YES, SERVICE
012366 010577 003564                MOV     R5,@DHMCSR
012372 017703 003562                MOV     @DHMLSR,R3
012376 104016                       ERRORN                          ;INTERRUPT ON INCORRECT LINE
012400 000471                       BR      FATEX

                                        ;RECORD TRANSITIONS FOR ORIGINATE LINE

012402 032704 100000        ORGTR:  BIT     #RINGF,R4               ;IF RING CAUSED INTERRUPT,
012406 001403                       BEQ     ORGTR1                  ;SET RING TRANSITION BIT
012410 052737 000010 016250         BIS     #10,ORGFLG
012416 032704 040000        ORGTR1: BIT     #COF,R4                 ;IF CARRIER CAUSED INTERRUPT
012422 001403                       BEQ     ORGTR2                  ;SET CARRIER TRANSITION BIT
012424 052737 000004 016250         BIS     #4,ORGFLG
012432 032704 020000        ORGTR2: BIT     #CSF,R4                 ;IF CLEAR TO SEND
                                                                    ;CAUSED INTERRUPT
012436 001403                       BEQ     ORGTR3                  ;SET CLEAR TO SEND
                                                                    ;TRANSITION BIT
012440 052737 000002 016250         BIS     #2,ORGFLG
012446 032704 010000        ORGTR3: BIT     #SECRXF,R4              ;IF SECONDARY RECEIVE
                                                                    ;CAUSED INTERRUPT
012452 001403                       BEQ     ORGTR4                  ;SET SECONDARY RECEIVE
012454 052737 000001 016250         BIS     #1,ORGFLG               ;TRANSITION BIT
012462 032704 170000        ORGTR4: BIT     #RINGF+COF+CSF+SECRXF,R4
                                                                    ;IF NO INTERRUPT FLAGS SET
012466 001044                       BNE     TRANEX                  ;EXIT TRANSITION DETECTION
012470 104016               ORGTRR: ERRORN
012472 000434                       BR      FATEX
```

```
1715
1716                                        ;RECORD TRANSITIONS FOR ANSWER LINE
1717
1718  012474  032704  100000        ANSTR:  BIT     #RINGF,R4               ;IF RING CAUSED INTERRUPT,
1719  012500  001403                BEQ     ANSTR1                  ;SET RING TRANSITION BIT
1720  012502  052737  000010  016246        BIS     #10,ANSFLG
1721  012510  032704  040000        ANSTR1: BIT     #COF,R4                 ;IF CARRIER CAUSED INTERRUPT
1722  012514  001403                BEQ     ANSTR2                  ;SET CARRIER TRANSITION BIT
1723  012516  052737  000004  016246        BIS     #4,ANSFLG
1724  012524  032704  020000        ANSTR2: BIT     #CSF,R4                 ;IF CLEAR TO SEND
1725                                                                  ;CAUSED INTERRUPT
1726  012530  001403                BEQ     ANSTR3                  ;SET CLEAR TO SEND
1727                                                                  ;TRANSITION BIT
1728  012532  052737  000002  016246        BIS     #2,ANSFLG
1729  012540  032704  010000        ANSTR3: BIT     #SECRXF,R4              ;IF SECONDARY RECEIVE
1730                                                                  ;CAUSED INTERRUPT
1731  012544  001403                BEQ     ANSTR4                  ;SET SECONDARY RECEIVE
1732  012546  052737  000001  016246        BIS     #1,ANSFLG               ;TRANSITION BIT
1733  012554  032704  170000        ANSTR4: BIT     #RINGF+COF+CSF+SECRXF,R4
1734                                                                  ;IF NO INTERRUPT FLAGS SET
1735  012560  001007                BNE     TRANEX                  ;EXIT TRANSITION DETECTION
1736  012562  104016        ANSTRR: ERRORN
1737  012564  005037  016200  FATEX: CLR     TSTNO
1738  012570  022626                POP2SP
1739  012572  000177  000000        JMP     @FATRET
1740  012576  000000        FATRET: 0
1741
1742                                        ;EXIT TRANSITION DETECTION
1743
1744  012600  005704        TRANEX: TST     R4                              ;IF RING FLAG WAS SET
1745  012602  100002                BPL     .+6                             ;SET UP SPECIAL RETURN
1746  012604  013716  016272        MOV     RNGRET,(SP)
1747  012610  012777  000140  003340 TRANX1: MOV     #SCNENA+INTENA,@DHMCSR  ;RESTART SCANNER
1748  012616  000002                RTI
1749
1750                                        ;TYPE TRANSITION DATA AND RETURN
1751
1752  012620  017737  003332  013620 TRNTYP: MOV     @DHMCSR,DATA1
1753  012626  017737  003326  013622        MOV     @DHMLSR,DATA2
1754  012634  104004                TYPE
1755  012636  017365                MTRNDET
1756  012640  104006                OCTASC
1757  012642  012646                TRNTAB
1758  012644  000761                BR      TRANX1
1759  012646  000002        TRNTAB: 2
1760  012650  000006                6
1761  012652  013620                DATA1
1762  012654  000003                3
1763  012656  013622                DATA2
```

```
1765
1766                                        ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
1767
1768  012660  000005                GETLIN: RESET
1769  012662  012777  000100  003272        MOV     #INTENA,@TKCSR
1770  012670  104013                        INSTRG                          ;TYPE "ORIGINATE LINE-"
1771  012672  016632                        MSELOR                          ;AND GET LINE NUMBER
1772  012674  000000                        0
1773  012676  000017                        17
1774  012700  016242                        LINORG
1775  012702  104013                        INSTRG                          ;TYPE "ANSWER LINE-"
1776  012704  016656                        MSELANS                         ;AND GET LINE NUMBER
1777  012706  000000                        0
1778  012710  000017                        17
1779  012712  016244                        LINANS
1780  012714  104004                        TYPE
1781  012716  017256                        MCRLF
1782  012720  000002                        RTI                             ;RETURN TO CALLING ROUTINE
1783
1784                                        ;INITIALIZE INTERFACE
1785
1786  012722  000005                SETUPS: RESET
1787  012724  012777  000100  003230        MOV     #INTENA,@TKCSR
1788  012732  012737  000340  177776        MOV     #340,PS                 ;LOCK OUT ALL INTERRUPTS
1789  012740  011605                        MOV     (SP),R5
1790  012742  012537  013630                MOV     (R5)+,NXTTS
1791  012746  012537  013610                MOV     (R5)+,ERR1
1792  012752  010516                        MOV     R5,(SP)
1793  012754  012777  006000  003174        MOV     #CLRSCN+CLRMUX,@DHMCSR  ;CLEAR LINE SCANNER AND MULTIPLEXER
1794  012762  032777  000020  003166 SETUP1: BIT     #BUSY,@DHMCSR           ;WAIT FOR SCANNER TO CLEAR
1795  012770  001374                        BNE     SETUP1
1796  012772  005037  016172                CLR     ERRFLG
1797
1798                                        ;ENABLE SELECTED LINES
1799                                        ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
1800
1801  012776  013777  016242  003152 SETUP2: MOV     LINORG,@DHMCSR          ;SET UP TO ENABLE ORIGINATE LINE
1802                                                                          ;ORIGINATE LINE NUMBER
1803  013004  012777  000003  003146        MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE AND
1804                                                                          ;TERMINAL READY ON ORIGINATE LINE
1805  013012  013777  016244  003136        MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
1806  013020  012777  000001  003132        MOV     #LINENA,@DHMLSR         ;SET LINE ENABLE ON ANSWER LINE
1807
1808                                        ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
1809                                        ;SET UP TO RECEIVE INTERRUPTS
1810                                        ;START LINE SCANNER
1811
1812  013026  012777  012340  003116        MOV     #TRANS,@DHMVEC          ;SET UP INTERRUPT VECTOR
1813                                                                          ;FOR TRANSITION DETECTION
1814  013034  012777  000340  003112        MOV     #340,@DHMLVL            ;SET UP INTERRUPT SERVICE LEVEL
1815  013042  012777  000140  003106        MOV     #SCNENA+INTENA,@DHMCSR  ;START SCANNER, ENABLE INTERRUPTS
1816  013050  005037  016246                CLR     ANSFLG                  ;CLEAR TRANSITION DETECTED FLAGS
1817  013054  005037  016250                CLR     ORGFLG
1818  013060  012737  013110  016272        MOV     #SETUP4,RNGRET          ;SET UP RETURN FROM
```

```
1819
1820  013066  104004                        TYPE                    ;DETECTION OF RING INTERRUPT
1821  013070  016452                        DIALM                   ;REQUEST OPERATOR TO DIAL
1822  013072  005037  177776                CLR     PS              ;CLEAR PROCESSOR STATUS WORD
1823  013076  005037  016252                CLR     TIME1           ;CLEAR TIMER
1824  013102  012737  001000  016254        MOV     #1000,TIME2     ;SET UP FOR 5 MINUTE DELAY
1825  013110  005737  016246        SETUP4: TST     ANSFLG          ;IF TRANSITION HAS OCCURED,
1826  013114  001014                        BNE     SETUPB          ;EXIT WAIT LOOP
1827  013116  005737  016250                TST     ORGFLG
1828  013122  001011                        BNE     SETUPB
1829  013124  005237  016252                INC     TIME1           ;ALLOW OPERATOR 5 MINUTES TO DIAL
1830  013130  001367                        BNE     SETUP4
1831  013132  005337  016254                DEC     TIME2
1832  013136  001364                        BNE     SETUP4
1833  013140  022626                        POP2SP
1834  013142  000177  000442                JMP     @ERR1
1835  013146  022626          SETUPB:       POP2SP
1836  013150  000177  000454                JMP     @NXTTS
1837  013154  012766  000340  000002        MOV     #340,+2(SP)
1838  013162  000002                        RTI
1839
1840                                        ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
1841
1842  013164  011605          CKRNG:        MOV     (SP),R5
1843  013166  012537  013630                MOV     (R5)+,NXTTS
1844  013172  012537  013610                MOV     (R5)+,ERR1
1845  013176  012537  013612                MOV     (R5)+,ERR2
1846  013202  010516                        MOV     R5,(SP)
1847  013204  012705  000010                MOV     #10,R5          ;EXPECT RING ONLY ON ANSWER LINE
1848  013210  013704  016246                MOV     ANSFLG,R4       ;GET ACTUAL TRANSITION DATA
1849  013214  013703  016244                MOV     LINANS,R3       ;SET UP LINE NUMBER
1850  013220  020504                        CMP     R5,R4           ;DID RING CAUSE INTERRUPT
1851  013222  001402                        BEQ     CKRNG1          ;ON ANSWER LINE
1852  013224  004777  000360                JSR     PC,@ERR1
1853  013230  005005          CKRNG1: CLR     R5
1854  013232  013704  016250                MOV     ORGFLG,R4
1855  013236  013703  016242                MOV     LINORG,R3
1856  013242  005704                        TST     R4              ;IF TRANSITION OCCURED
1857  013244  001403                        BEQ     CKRNG2          ;ON ORIGINATE LINE, ERROR
1858  013246  022626                        POP2SP
1859  013250  000177  000336                JMP     @ERR2
1860  013254  022626          CKRNG2:       POP2SP
1861  013256  000177  000346                JMP     @NXTTS
```

```
1863
1864  013262  005037  016246          WAITR:  CLR     ANSFLG
1865  013266  005037  016250                  CLR     ORGFLG
1866  013272  012777  012340  002652          MOV     #TRANS,@DHMVEC
1867  013300  012737  013320  016272          MOV     #WAITRR,RNGRET          ;SET UP FOR RETURN
1868                                                                          ;FROM RING DETECTION
1869  013306  012777  000140  002642          MOV     #SCNENA+INTENA,@DHMCSR  ;START SCANNER
1870  013314  005037  177776                  CLR     PS
1871  013320  005037  016252          WAITRR: CLR     TIME1
1872  013324  012737  000025  016254          MOV     #25,TIME2
1873  013332  005237  016252          WAITR1: INC     TIME1                   ;WAIT FOR TRANSITIONS OF
1874  013336  001375                  BNE     WAITR1                  ;CARRIER AND CLEAR TO SEND
1875  013340  005337  016254                  DEC     TIME2
1876  013344  001372                  BNE     WAITR1
1877  013346  000002                  RTI
1878
1879                                  ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1880                                  ;SELECTED ORIGINATE AND ANSWER LINES
1881
1882  013350  012737  000340  177776  CKTRN:  MOV     #340,PS                 ;LOCK OUT FURTHER INTERRUPTS
1883  013356  005077  002574                  CLR     @DHMCSR                 ;STOP LINE SCANNER
1884  013362  011605                  MOV     (SP),R5
1885  013364  012537  013620                  MOV     (R5)+,DATA1
1886  013370  012537  013622                  MOV     (R5)+,DATA2
1887  013374  012537  013624                  MOV     (R5)+,DATA3
1888  013400  012537  013626                  MOV     (R5)+,DATA4
1889  013404  012537  013610                  MOV     (R5)+,ERR1
1890  013410  012537  013612                  MOV     (R5)+,ERR2
1891  013414  012537  013614                  MOV     (R5)+,ERR3
1892  013420  012537  013616                  MOV     (R5)+,ERR4
1893  013424  012537  013630                  MOV     (R5)+,NXTTS
1894  013430  010516                  MOV     R5,(SP)
1895  013432  013705  013620                  MOV     DATA1,R5
1896  013436  013777  016244  002512          MOV     LINANS,@DHMCSR          ;SET LINE COUNTER TO ANSWER LINE
1897  013444  017704  002510                  MOV     @DHMLSR,R4              ;GET ACTUAL ANSWER LINE STATUS
1898  013450  013703  016244                  MOV     LINANS,R3
1899  013454  020504                  CMP     R5,R4                   ;COMPARE
1900  013456  001402                  BEQ     CKTRN1
1901  013460  004777  000124                  JSR     PC,@ERR1
1902  013464  013777  016242  002464  CKTRN1: MOV     LINORG,@DHMCSR          ;SET LINE COUNTER TO ORIGINATE LINE
1903  013472  017704  002462                  MOV     @DHMLSR,R4              ;GET ACTUAL ORIGINATE LINE STATUS
1904  013476  013705  013622                  MOV     DATA2,R5
1905  013502  013703  016242                  MOV     LINORG,R3
1906  013506  020504                  CMP     R5,R4                   ;COMPARE
1907  013510  001402                  BEQ     CKTRN2
1908  013512  004777  000074                  JSR     PC,@ERR2
```

```
1910
1911                                        ;CHECK FOR CORRECT TRANSITIONS ON
1912                                        ;SELECTED ORIGINATE AND ANSWER LINES
1913
1914  013516  105737  013625        CKTRN2: TSTB    DATA3+1
1915  013522  100003                        BPL     .+10
1916  013524  042737  000010  016246        BIC     #10,ANSFLG
1917  013532  113704  016246                MOVB    ANSFLG,R4       ;GET TRANSITION DATA FOR
1918  013536  113705  013624                MOVB    DATA3,R5
1919  013542  013703  016244                MOV     LINANS,R3
1920  013546  020504                        CMP     R5,R4           ;DID CORRECT TRANSITIONS OCCUR
1921  013550  001402                        BEQ     CKTRN3
1922  013552  004777  000036                JSR     PC,@ERR3
1923  013556  013704  016250        CKTRN3: MOV     ORGFLG,R4       ;GET TRANSITION DATA FOR
1924  013562  013705  013626                MOV     DATA4,R5
1925  013566  013703  016242                MOV     LINORG,R3
1926  013572  020504                        CMP     R5,R4           ;DID CORRECT TRANSITIONS OCCUR
1927  013574  001402                        BEQ     CKTRN4
1928  013576  004777  000014                JSR     PC,@ERR4
1929  013602  022626                CKTRN4: POP2SP
1930  013604  000177  000020                JMP     @NXTTS
1931  013610  000000                ERR1:   0
1932  013612  000000                ERR2:   0
1933  013614  000000                ERR3:   0
1934  013616  000000                ERR4:   0
1935  013620  000000                DATA1:  0
1936  013622  000000                DATA2:  0
1937  013624  000000                DATA3:  0
1938  013626  000000                DATA4:  0
1939  013630  000000                NXTTS:  0
```

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

013632                                  EOP:
013632  012777  000100  002322                MOV     #100,@TKCSR
013640  005237  016176                      INC     PASCNT                  ;UPDATE PASS COUNT
013644  012737  000001  016200                MOV     #1,TSTNO                ;START AT FIRST TEST OF GROUP
013652  000005                              RESET                           ;CLEAR THE WORLD
013654  005037  016270                      CLR     FILLA                   ;INIT COUNTER
013660  005337  016270              1$:     DEC     FILLA                   ;COUNT THE CTR
013664  001375                              BNE     1$                      ;BR TIL STALL TIMES OUT
013666  104004                              TYPE                            ; RING BELL
013670  017622                              MEPASS
013672  013701  000042                      MOV     42,R1                   ;ARE YOU ON ACT11?
013676  001501                              BEQ     TSTENT          ;NO
013700  000005                              RESET
013702  004711                  LOGICAL:    JSR     PC,(R1)
013704  000240                              NOP
013706  000240                              NOP
013710  000240                              NOP
013712  000240                              NOP
013714  000137  014102                      JMP     TSTENT                  ;GET ADDRESS OF FIRST TEST

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

013720  011646                  EMTSRV: MOV     (SP),-(SP)              ;GET PC OF RETURN
013722  162716  000002                  SUB     #2,(SP)                 ;=PC OF EMT
013726  017616  000000                  MOV     @(SP),(SP)              ;GET EMT
013732  006316                  EMTOK:  ASL     (SP)                    ;MULTIPLY EMT ARG BY 2
013734  042716  177001                  BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
013740  062716  017640                  ADD     #EMTTAB,(SP)            ;POINTER TO SUBROUTINE ADDRESS
013744  017616  000000                  MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
013750  000136                          JMP     @(SP)+                  ;GO TO SUBROUTINE
```

```
                                        ;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.

013752 005737 001070          LOOP:     TST     XFLAG   ;IS THERE AN XOR TESTER OUT THERE ?
013756 100022                           BPL     4$      ;NO
013760 013746 000004                    MOV     4,-(SP) ;SAVE 4
013764 012737 014004 000004             MOV     #1$,4   ;SET UP SVC ROUTINE
013772 005737 177060                    TST     177060  ;GOT SOMETHING LIKE SLAVE SYNC
013776 012637 000004                    MOV     (SP)+,4 ;YOU BETCHUM
014002 000404                           BR      2$
014004 022626                 1$:       POP2SP          ;RESTORE STACK
014006 012637 000004                    MOV     (SP)+,4 ;RESTORE 4
014012 000402                           BR      3$
014014 000137 014076          2$:       JMP     LOOPX   ;GO TO NEXT TEST
014020 000137 014102          3$:       JMP     TSTENT  ;GO
014024                        4$:
014024 005737 016172                    TST     ERRFLG                  ;IF ERROR OCCURED FLAG=1,
014030 001404                           BEQ     LOOPS                   ;CHECK FOR ESCAPE TO NEXT TEST
014032 032737 002000 177570             BIT     #SW10,SWR               ;IF SW10=1,
014040 001016                           BNE     LOOPX                   ;ESCAPE TO NEXT TEST
014042 032737 040000 177570   LOOPS:    BIT     #SW14,SWR               ;IF SW14=1,
014050 001033                           BNE     LOOPL                   ;LOOP ON CURRENT TEST
014052 032737 004000 177570             BIT     #SW11,SWR               ;IF SW11=1,
014060 001006                           BNE     LOOPX                   ;INHIBIT ITERATIONS
014062 005337 016204                    DEC     ICOUNT                  ;UPDATE ITERATION COUNT
014066 001403                           BEQ     LOOPX                   ;IF ICOUNT=0, GO TO NEXT TEST
014070 013716 016202          LOOPER:   MOV     RETURN,(SP)             ;SET UP FOR RETURN TO CURRENT TEST
014074 000002                           RTI                             ;RETURN TO CURRENT TEST
014076 005237 016200          LOOPX:    INC     TSTNO                   ;UPDATE TEST NUMBER
014102 013705 016200          TSTENT:   MOV     TSTNO,R5                ;GET TEST NUMBER
014106 006305                           ASL     R5                      ;MULTIPLY TEST NUMBER BY 4
014110 006305                           ASL     R5
014112 063705 016232                    ADD     TSTPNT,R5               ;GET POINTER FOR TEST ENTRY
014116 011537 016202                    MOV     (R5),RETURN             ;GET STARTING ADDRESS OF NEXT TEST
014122 001643                           BEQ     EOP                     ;IF ADDRESS=0, GO TO END OF PASS
014124 012516                           MOV     (R5)+,(SP)              ;PUT STARTING ADDRSS ON STACK
014126 011537 016204                    MOV     (R5),ICOUNT             ;GET ITERATION COUNT FOR TEST
014132 005037 016172                    CLR     ERRFLG                  ;CLEAR ERROR OCCURED FLAG
014136 000002                           RTI                             ;GO TO TEST
014140 012737 000001 016204   LOOPL:    MOV     #1,ICOUNT               ;SET UP TO EXIT TEST AFTER LOOP
014146 000750                           BR      LOOPER                  ;GO TO LOOP SERVICE

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

014150 005737 016172          FREEZE:   TST     ERRFLG                  ;IF ERROR FLAG=0,
014154 001413                           BEQ     FREEZX                  ;DO NOT TEST FOR ESCAPE
014156 032737 002000 177570             BIT     #SW10,SWR               ;IF SW10=1,
014164 001344                           BNE     LOOPX                   ;ESCAPE TO NEXT TEST
```

```
2034  014166  032737  001000  177570          BIT     #SW09,SWR       ;IF SW09=1,
2035  014174  001403                          BEQ     FREEZX          ;FREEZE CURRENT DATA
2036  014176  017616  000000                  MOV     @(SP),(SP)      ;GET LOOPING ADDRESS
2037  014202  000002                          RTI                     ;LOOP
2038  014204  062716  000002          FREEZX: ADD     #2,(SP)         ;CONTINUE IN CURRENT TEST
2039  014210  000002                          RTI
```

```
2041
2042                                    ;GENERAL ERROR SERVICE
2043                                    ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
2044
2045  014212  005037  016172    ERR:    CLR     ERRFLG                  ;ALWAYS TYPE PC+2
2046                                                                    ;OF TEST THAT FAILED
2047  014216  005037  014420            CLR     ERRMSG                  ;NO MESSAGE
2048  014222  005037  014432            CLR     ERTAB                   ;NO TABLE OF DATA
2049  014226  000451                    BR      ERRGEN                  ;OUTPUT ERROR MESSAGE
2050
2051                                    ;TRANSITION DETECTION ERROR SERVICE
2052
2053                                    ;FORMAT FOR ERROR TYPEOUT IS
2054
2055                                    ;XXXXXX TRANSITION ERROR
2056                                    ;EXP   REC   LINE
2057                                    ;AA    BB    CC
2058
2059                                    ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
2060                                    ;      AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGISTER
2061                                    ;      BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
2062                                    ;      CC=LINE ON WHICH ERROR OCCURED
2063  014230  005037  016172    ERRT:   CLR     ERRFLG                  ;ALWAYS OUTPUT  ALL DATA
2064  014234  012737  016413  014420    MOV     #MTRANE,ERRMSG          ;TYPE "TRANSITION ERROR
2065  014242  012737  014476  014432    MOV     #ERTABI,ERTAB           ;TABLE OF DATA
2066  014250  000440                    BR      ERRGEN                  ;OUTPUT ERROR MESSAGE
2067
2068                                    ;ON-LINE STATUS ERROR SERVICE
2069
2070                                    ;FORMAT FOR LINE STATUS ERROR IS
2071
2072                                    ;XXXX LINE ERROR
2073                                    ;EXP   REC   LINE
2074                                    ;AAA   BBB   CC
2075
2076                                    ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
2077                                    ;      AAA=EXPECTED LINE STATUS AT TIME OF ERROR
2078                                    ;      BBB=RECEIVED LINE STATUS AT TIME OF ERROR
2079                                    ;      CC=LINE ON WHICH ERROR OCCURED
2080
2081
2082  014252  005037  016172    ERRS:   CLR     ERRFLG                  ;ALWAYS OUTPUT ALL DATA
2083  014256  012737  016362  014420    MOV     #MLINE1,ERRMSG          ;TYPE "LINE ERROR
2084                                                                    ;EXP REC LINE"
2085  014264  012737  014514  014432    MOV     #ERTAB2,ERTAB           ;TABLE OF DATA
2086  014272  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

014274  005037  016172          ERRN:   CLR     ERRFLG                  ;ALWAYS OUTPUT ALL DATA
014300  012737  017333  014420          MOV     #MFATAL,ERRMSG          ;TYPE "FATAL ERROR
                                                                        ;CSTAT   LSTAT"
014306  012737  014532  014432          MOV     #ERTAB3,ERTAB           ;TABLE OF DATA
014314  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


014316  012737  016274  014420  ERRCS:  MOV     #MSTATE,ERRMSG          ;TYPE "STATUS ERROR
                                                                        ;"EXP REC"
014324  012737  014544  014432          MOV     #ERTAB4,ERTAB           ;TABLE OF DATA
014332  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


014334  012737  016325  014420  ERRLS:  MOV     #MLINER,ERRMSG
014342  012737  014556  014432          MOV     #ERTAB5,ERTAB
014350  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)

014352  032737  020000  177570  ERRGEN: BIT     #SW13,SWR       ;IF SW13=1, DO NOT
014360  001026                  BNE     .3              ;TYPE ERROR MESSAGE
014362  021637  016224          CMP     (SP),SAVPC      ;SAME ERROR AGAIN
014366  001402                  BEQ     .+6
014370  005037  016172          CLR     ERRFLG
014374  104005                  SAVOSP
014376  005737  016172          TST     ERRFLG          ;IF ERROR OCCURED FLAG=1,
014402  001007                  BNE     .1              ;TYPE DATA ONLY
014404  104006                  OCTASC                  ;TYPE PC+2 OF CALL TO ERROR ROUTINE
014406  014470                  ERTABO
014410  005737  014420          TST     ERRMSG
014414  001407                  BEQ     .2
014416  104004                  TYPE                    ;TYPE ERROR MESSAGE
014420  000000          ERRMSG: 0
014422  005737  014432  .1:     TST     ERTAB
014426  001402                  BEQ     .2
014430  104006                  OCTASC                  ;TYPE DATA
014432  000000          ERTAB:  0
014434  104007          .2:     RESOS                   ;RESTORE R0-R5

                                        ;ERROR HALT SERVICE

014436  032737  100000  177570  .3:     BIT     #SW15,SWR       ;IF SW15=0, DO NOT
014444  001405                  BEQ     .4              ;HALT ON ERROR
014446  010046                  PUSHRO                  ;SAVE R0 ON STACK
014450  013700  016224          MOV     SAVPC,R0        ;GET PC+2 OF CALL TO ERROR
014454  000000                  HALT                    ;HALT AND DISPLAY ADDRESS OF FAILING TEST
014456  012600                  POPRO                   ;RESTORE R0
014460  012737  000001  016172  .4:     MOV     #1,ERRFLG       ;SET ERROR OCCURED FLAG
014466  000002                  RTI                     ;RETURN TO TEST
```

```
2179                                    ;TABLE S OF DATA FOR ERROR TYPEOUT
2180                                    ;TABLE FOR TRANSITION STATUS ERROR
2181
2182
2183  014470  000001          ERTAB0: 1
2184  014472  000006                  6
2185  014474  016224                  $AVPC
2186  014476  000003          ERTAB1: 3
2187  014500  000002                  2
2188  014502  016220                  $AVR5           ;CONTAINS EXPECTED TRANSITION STATUS
2189  014504  000002                  2
2190  014506  016216                  $AVR4           ;CONTAINS RECEIVED TRANSITION STATUS
2191  014510  000002                  2
2192  014512  016214                  $AVR3           ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2193  014514  000003          ERTAB2: 3
2194  014516  000003                  3
2195  014520  016220                  $AVR5                   ;CONTAINS EXPECTED LINE STATUS
2196  014522  000003                  3
2197  014524  016216                  $AVR4                   ;CONTAINS RECEIVED LINE STATUS
2198  014526  000002                  2
2199  014530  016214                  $AVR3                   ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2200  014532  000002          ERTAB3: 2
2201  014534  000006                  6
2202  014536  016216                  $AVR4
2203  014540  000003                  3
2204  014542  016214                  $AVR3
2205  014544  000002          ERTAB4: 2
2206  014546  000006                  6
2207  014550  016220                  $AVR5                   ;CONTAINS EXPECTED CONTROL STATUS
2208  014552  000006                  6
2209  014554  016216                  $AVR4                   ;CONTAINS RECEIVED CONTROL STATUS
2210  014556  000004          ERTAB5: 4
2211  014560  000003                  3
2212  014562  016220                  $AVR5                   ;CONTAINS EXPECTED LINE STATUS
2213  014564  000003                  3
2214  014566  016216                  $AVR4                   ;CONTAINS RECEIVED LINE STATUS
2215  014570  000002                  2
2216  014572  016214                  $AVR3                   ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2217  014574  000002                  2
2218  014576  016210                  $AVR1                   ;CONTAINS NUMBER OF LINE UNDER TEST
```

```
2220
2221                                    ;CONVERT OCTAL TO ASCII AND
2222                                    ;OUTPUT ON TELETYPE
2223
2224  014600  017605  000000            OCTASN: MOV     @(SP),R5        ;GET POINTER TO TABLE OF DATA
2225  014604  062716  000002                    ADD     #2,(SP)
2226  014610  012737  000010  015026            MOV     #10.,RADIX
2227  014616  012704  017521                    MOV     #MBCD+2,R4      ;SET UP POINTER FOR CONVERTED DATA
2228  014622  012537  016226                    MOV     (R5)+,WRDCNT    ;GET NUMBER OF WORDS TO BE CONVERTED
2229  014626  012537  016230            OCTAS1: MOV     (R5)+,CHRCNT    ;GET NUMBER OF DIGITS IN WORD
2230  014632  013537  015022                    MOV     @(R5)+,BINWRD   ;GET DATA TO BE CONVERTED
2231  014636  104010                            CONVERT                 ;CONVERT TO ASCII
2232  014640  005337  016226                    DEC     WRDCNT          ;IF ALL DATA IS NOT CONVERTED
2233  014644  001370                            BNE     OCTAS1          ;CONTINUE
2234  014646  112714  000100                    MOVB    #100,(R4)       ;PUT TERMINATOR AT END OF MESSAGE
2235  014652  104004                            TYPE                    ;OUTPUT CONVERTED DATA
2236  014654  017517                            MBCD                    ;TO TELETYPE
2237  014656  000002                            RTI                     ;RETURN TO CALLING ROUTINE
```

```
2239
2240
2241                                    ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE
2242  014660  013700  016230    BINASC: MOV     CHRCNT,R0       ;SET UP COUNT FOR DIGITS TO BE CONVERTED
2243  014664  012701  017624            MOV     #TEMTAB,R1      ;SET UP POINTER FOR TEMPORARY STORAGE
2244  014670  104011            BINASA: EXTRACT                 ;EXTRACT ONE DIGIT
2245  014672  062737  000060  015024    ADD     #60,DIGIT       ;CONVERT FROM BCD TO ASCII
2246  014700  113721  015024            MOVB    DIGIT,(R1)+     ;STORE DIGIT
2247  014704  005300                    DEC     R0              ;IF ALL DIGITS NOT DONE,
2248  014706  001370                    BNE     BINASA          ;CONTINUE
2249  014710  114124            BINASB: MOVB    -(R1),(R4)+     ;REVERSE ORDER OF DIGITS
2250  014712  005337  016230            DEC     CHRCNT          ;IF ALL CHARACTERS ARE NOT
2251  014716  001374                    BNE     BINASB          ;IN ORDER, CONTINUE
2252  014720  112724  000040            MOVB    #40,(R4)+       ;INSERT SPACE AFTER LAST DIGIT
2253  014724  000002                    RTI                     ;RETURN TO CALLING ROUTINE
2254
2255                                    ;SINGLE PRECISION UNSIGNED DIVIDE LOOP
2256
2257  014726  005037  015024    DIVI:   CLR     DIVIDH
2258  014732  023737  015024  015026 DIVIU:   CMP     DIVIDH,DIVIS
2259  014740  103027                    BHIS    DIVIB
2260  014742  012737  000021  015002            MOV     #17.,DIVCNT
2261  014750  000407                    BR      DIVIC
2262  014752  023737  015024  015026 DIVIA:   CMP     DIVIDH,DIVIS
2263  014760  103403                    BLO     DIVIC
2264  014762  163737  015026  015024            SUB     DIVIS,DIVIDH
2265  014770  006137  015022    DIVIC:  ROL     DIVIDL
2266  014774  006137  015024            ROL     DIVIDH
2267  015000  005327                    DEC     (PC)+
2268  015002  000000            DIVCNT: 0
2269  015004  001362                    BNE     DIVIA
2270  015006  006037  015024            ROR     DIVIDH
2271  015012  005137  015022            COM     DIVIDL
2272  015016  000002                    RTI
2273  015020  000000            DIVIB:  HALT
2274  015022  000000            DIVIDL: 0
2275  015024  000000            DIVIDH: 0
2276  015026  000000            DIVIS:  0
2277
2278                                    ;SAVE PC OF TEST THAT FAILED AND R0-R5
2279
2280  015030  016637  000004  016224 SVOSP:  MOV     4(SP),SAVPC
2281
2282                                    ;SAVE R0-R5
2283
2284  015036  010537  016220    SVOS:   MOV     R5,SAVR5
2285  015042  010437  016216            MOV     R4,SAVR4
2286  015046  010337  016214            MOV     R3,SAVR3
2287  015052  010237  016212            MOV     R2,SAVR2
2288  015056  010137  016210            MOV     R1,SAVR1
2289  015062  010037  016206            MOV     R0,SAVR0
2290  015066  000002                    RTI
```

```
2292
2293
2294                                        ;RESTORE R0-R5
2295  015070  013700  016206        RSOS:   MOV     SAVR0,R0
2296  015074  013701  016210                MOV     SAVR1,R1
2297  015100  013702  016212                MOV     SAVR2,R2
2298  015104  013703  016214                MOV     SAVR3,R3
2299  015110  013704  016216                MOV     SAVR4,R4
2300  015114  013705  016220                MOV     SAVR5,R5
2301  015120  000002                        RTI
2302
2303                                        ;TELETYPE OUTPUT ROUTINE
2304
2305  015122  017605  000000        TYPER:  MOV     @(SP),R5        ;GET POINTER TO MESSAGE (ON STACK)
2306  015126  062716  000002                ADD     #2,(SP)         ;CORRECT STACK FOR RETURN
2307  015132  105777  001030        TYPERA: TSTB    @TPCSR          ;WAIT FOR TELEPRINTER READY
2308  015136  100375                        BPL     TYPERA
2309  015140  122765  000012  177777        CMPB    #12,-1(R5)      ;WAS LAST ONE A L.F. ??
2310  015146  001405                        BEQ     1$              ;BR IF YES
2311  015150  122765  000015  177777        CMPB    #15,-1(R5)      ;WAS LAST ONE A C.R. ??
2312  015156  001401                        BEQ     1$              ;BR IF YES
2313  015160  000402                        BR      2$              ;CONTINUE IF NEITHER
2314  015162  004737  015232        1$:     JSR     PC,TYFILL       ;GO OUT PUT FILLERS
2315  015166  122715  000100        2$:     CMPB    #100,(R5)       ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
2316  015172  001001                        BNE     TYPER1
2317  015174  000002                        RTI                     ;CHARACTER IS TERMINATOR, EXIT
2318  015176  122715  000042        TYPER1: CMPB    #42,(R5)        ;IF CHARACTER=42,
2319  015202  001406                        BEQ     TYPECL          ;TYPE LINE FEED
2320  015204  122715  000045                CMPB    #45,(R5)        ;IF CHARACTER=45,
2321  015210  001403                        BEQ     TYPECL          ;TYPE CARRIAGE RETURN
2322  015212  112577  000752        TYPER2: MOVB    (R5)+,@TPDBR    ;GET CHARACTER
2323  015216  000745                        BR      TYPERA          ;TYPE IT
2324  015220  142715  000040        TYPECL: BICB    #40,(R5)        ;CONVERT CODE OF 42 OR 45
2325  015224  152715  000010                BISB    #10,(R5)        ;TO 12 OR 15
2326  015230  000770                        BR      TYPER2          ;TYPE IT
2327
2328
2329                                        ;OUTPUT FILLERS AFTER <CR> OR <LF> CHAR IS OUT PUTTED.
2330
2331  015232  113737  016266  016270 TYFILL: MOVB    FILL,FILLA      ;GET FILL COUNT
2332  015240  113777  016267  000722 1$:     MOVB    FILL+1,@TPDBR   ;OUT PUT ONE FILLER
2333  015246  105777  000714        2$:     TSTB    @TPCSR          ;WAIT FOR TTY TO FINISH OUTPUT
2334  015252  100375                        BPL     2$              ;BR IF TTY NOT DONE
2335  015254  105337  016270                DECB    FILLA           ;COUNT ONE FILLER
2336  015260  001367                        BNE     1$              ;BR TIL ALL DONE
2337  015262  000207                        RTS     PC              ;RETURN TO CALLER ABOVE
2338
2339                                        ;INPUT OCTAL CHARACTER STRING
2340                                        ;TERMINATOR IS CARRIAGE RETURN
2341                                        ;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
2342                                        ;CARRIAGE RETURN ARE TYPED, THE IN  PUT WILL
2343                                        ;BE RE-REQUESTED
2344
2345  015264  005037  177776        INSTR:  CLR     PS
```

```
2346  015270  011605                        MOV     (SP),R5         ;GET POINTER TO ARGUMENTS
2347  015272  012537  015316                MOV     (R5)+,MSG       ;GET MESAGE TO BE TYPED
2348  015276  012537  015512                MOV     (R5)+,LOLIM     ;GET LOWER LIMIT
2349  015302  012537  015514                MOV     (R5)+,HILIM     ;GET UPPER LIMIT
2350  015306  012537  015516                MOV     (R5)+,STORE     ;GET DATA STORAGE LOCATION
2351  015312  010516                        MOV     R5,(SP)         ;RESTORE STACK
2352  015314  104004              INSTR1:   TYPE                    ;TYPE MESSAGE
2353  015316  000000              MSG:      0
2354  015320  012704  015520                MOV     #INBUF,R4       ;SET UP CHARACTER INPUT BUFFER
2355  015324  012703  000007                MOV     #7,R3           ;SET UP INPUT COUNT
2356  015330  105777  000626      INSTRB:   TSTB    @TKCSR          ;WAIT FOR CHARACTER
2357  015334  100403                        BMI     INSTBB
2358  015336  005737  001724                TST     SINTFL
2359  015342  001772                        BEQ     INSTRB
2360  015344  005037  001724      INSTBB:   CLR     SINTFL
2361  015350  117714  000610                MOVB    @TKDBR,(R4)     ;GET CHARACTER
2362  015354  142714  000200                BICB    #200,(R4)       ;CLEAR BIT 8
2363  015360  122427  000015                CMPB    (R4)+,#15       ;IS CHARACTER TERMINATOR
2364  015364  001413                        BEQ     INSTR2          ;IF IT IS, CONVERT INPUT STRING
2365  015366  117777  000572  000574       MOVB    @TKDBR,@TPDBR   ;TYPE CHARACTER IF NOT TERMINATOR
2366  015374  105777  000566      INSTRC:   TSTB    @TPCSR          ;WAIT TO FINISH TYPING
2367  015400  100375                        BPL     INSTRC
2368  015402  005303                        DEC     R3              ;UPDATE RECEIVED COUNT
2369  015404  001351                        BNE     INSTRB          ;AND CONTINUE
2370  015406  104004              INSTER:   TYPE                    ;TYPE "?" AND RE-REQUEST INPUT
2371  015410  017252                        MQM
2372  015412  000740                        BR      INSTR1
2373
2374                                        ;CONVERT ASCII STRING TO OCTAL
2375
2376  015414  012704  015520      INSTR2:   MOV     #INBUF,R4       ;GET POINTER TO ASCII STRING
2377  015420  005003                        CLR     R3
2378  015422  122714  000015                CMPB    #15,(R4)        ;IS TERMINATOR FIRST
2379                                                                ;CHARACTER IN STRING
2380  015426  001767                        BEQ     INSTER
2381  015430  121427  000060      INSTRD:   CMPB    (R4),#60        ;IS CHARACTER OCTAL DIGIT
2382  015434  002764                        BLT     INSTER          ;IF 67>=CHAR>=60
2383  015436  121427  000067                CMPB    (R4),#67        ;CHARACTER IS OCTAL DIGIT
2384  015442  003361                        BGT     INSTER
2385  015444  142714  000060                BICB    #60,(R4)        ;STRIP ASCII
2386  015450  152403                        BISB    (R4)+,R3        ;GENERATE OCTAL NUMBER
2387  015452  121427  000015                CMPB    (R4),#15        ;IF END OF STRING, CHECK LIMITS
2388  015456  001404                        BEQ     INSTR3
2389  015460  006303                        ASL     R3              ;MULTIPLY DIGIT BY 10 (OCTAL
2390  015462  006303                        ASL     R3
2391  015464  006303                        ASL     R3
2392  015466  000760                        BR      INSTRD          ;GET NEXT DIGIT
2393
2394                                        ;TEST NUMBER TO SEE IF IT IS WITHIN LIMITS
2395
2396  015470  020337  015514      INSTR3:   CMP     R3,HILIM        ;TEST HI LIMIT
2397  015474  101344                        BHI     INSTER          ;IF R3>HILIM, ERROR
2398  015476  020337  015512                CMP     R3,LOLIM        ;TEST LOW LIMIT
2399  015502  103741                        BLO     INSTER          ;IF R3<LOLIM, ERROR
```

```
2400  015504  010377  000006          MOV     R3,@STORE               ;STORE NUMBER
2401  015510  000002                  RTI                             ;EXIT
2402  015512  000000          LOLIM:  0
2403  015514  000000          HILIM:  0
2404  015516  000000          STORE:  0
2405  015520  000000          INBUF:  0
2406          015542                  .=.+20
2407                          ;ENTER HERE ON POWER FAILURE
2408
2409
2410  015542  010046          PFAIL:  MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
2411  015544  010146                  MOV     R1,-(SP)
2412  015546  010246                  MOV     R2,-(SP)
2413  015550  010346                  MOV     R3,-(SP)
2414  015552  010446                  MOV     R4,-(SP)
2415  015554  010546                  MOV     R5,-(SP)
2416  015556  013746  000024          MOV     24,-(SP)
2417  015562  010637  016222          MOV     SP,SAVSP                ;SAVE STACK POINTER
2418  015566  012737  015600  000024  MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
2419  015574  000000                  HALT                            ;HALT ON POWER DOWN NORMAL
2420  015576  000776                  BR      .-2
2421
2422                          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
2423
2424  015600  013706  016222  RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
2425  015604  012605                  MOV     (SP)+,R5                ;RESTORE R0-R5
2426  015606  012604                  MOV     (SP)+,R4
2427  015610  012603                  MOV     (SP)+,R3
2428  015612  012602                  MOV     (SP)+,R2
2429  015614  012601                  MOV     (SP)+,R1
2430  015616  012600                  MOV     (SP)+,R0
2431  015620  012737  015542  000024  MOV     #PFAIL,24               ;SET UP FOR POWER FAILURE
2432  015626  005726                  POP1SP
2433  015630  104004                  TYPE
2434  015632  017431                  MPFAIL
2435  015634  012777  000100  000320  MOV     #100,@TKCSR
2436  015642  005737  001560          TST     TIPFLG
2437  015646  001002                  BNE     RESTA1
2438  015650  000137  001100          JMP     START0
2439  015654  104004          RESTA1: TYPE
2440  015656  017451                  MPF1
2441  015660  012716  000340          MOV     #340,(SP)
2442  015664  005746                  PUSH1SP
2443  015666  000137  014102          JMP     TSTENT
2444
2445
2446                          ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
2447  015672  013746  000020  XOR:    MOV     20,-(SP)        ;SAVE 20
2448  015676  013746  000022          MOV     22,-(SP)        ;SAVE 22
2449  015702  012737  016074  000020  MOV     #2$,20          ;IOT INTR VECTOR
2450  015710  012737  000340  000022  MOV     #340,22         ;IOT INTR LVL
2451  015716  012737  000300  013620  MOV     #300,DATA1
2452  015724  012737  000302  013622  MOV     #302,DATA2
2453  015732  013777  013622  175660  1$:     MOV     DATA2,@DATA1
```

```
2454  015740  012777  000004  175654          MOV     #IOT,@DATA2     ;IOT TRAP
2455  015746  062737  000004  013620          ADD     #4,DATA1
2456  015754  062737  000004  013622          ADD     #4,DATA2
2457  015762  023727  013620  001000          CMP     DATA1,#1000
2458  015770  001360                          BNE     1$
2459  015772  012737  000000  016200          MOV     #0,TSTNO        ;SET UP DEFAULT
2460  016000  012737  017744  016232          MOV     #TSTTBO,TSTPNT  ;
2461  016006  052737  000340  177776          BIS     #340,PS         ;PREVENT INTERRUPTS
2462  016014  005077  000136                  CLR     @DHMCSR         ;
2463  016020  012777  000100  000130          MOV     #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
2464  016026  042737  000340  177776          BIC     #340,PS ;ALLOW INTERRUPTS
2465  016034  052777  000200  000114          BIS     #DONE,@DHMCSR   ;SET DONE..AND INTERRUPT
2466  016042  000240                          NOP
2467  016044  012637  000022                  MOV     (SP)+,22        ;YOU DIDN'T INTERRUPT ?
2468  016050  012637  000020                  MOV     (SP)+,20        ;RESTORE 20 & 22
2469  016054  005077  000076                  CLR     @DHMCSR         ;STOP ALL INTERRUPT
2470  016060  052737  000340  177776          BIS     #340,PS         ;
2471  016066  104012                          ERROR
2472  016070  000000                          HALT                    ;YOU SHOULD HAVE INTERRUPTED
2473  016072  000426                          BR      3$
2474  016074  011637  016152          2$:     MOV     (SP),DHMVEC     ;EXTRACT VECTOR +4
2475  016100  162737  000002  016152          SUB     #2,DHMVEC       ;CREATE LVL
2476  016106  013737  016152  016154          MOV     DHMVEC,DHMLVL   ;SAVE
2477  016114  162737  000002  016152          SUB     #2,DHMVEC       ;CREATE AND SAVE VEC
2478  016122  012737  000340  177776          MOV     #340,PS         ;PREVENT INTERRUPTS
2479  016130  005077  000022                  CLR     @DHMCSR         ;
2480  016134  022626                          POP2SP
2481  016136  022626                          POP2SP
2482  016140  012637  000022                  MOV     (SP)+,22        ;RESTORE 22
2483  016144  012637  000020                  MOV     (SP)+,20        ;RESTORE 20
2484  016150  000207          3$:     RTS     PC
2485
```

```
                                        ;INDIRECT POINTERS
                                
016152  000300          DHMVEC: 300             ;MODEM CONTROL INTERRUPT VECTOR
016154  000302          DHMLVL: 302             ;MODEM CONTROL ONTERRUPT PRIORITY
016156  170500          DHMCSR: 170500          ;MODEM CONTROL CONTROL STATUS REGISTER
016160  170502          DHMLSR: 170502          ;MODEM CONTROL CONTROL STATUS REGISTER
016162  177560          TKCSR:  177560
016164  177562          TKDBR:  177562
016166  177564          TPCSR:  177564
016170  177566          TPDBR:  177566
                                
                                        ;PROGRAM VARIABLES
                                
016172  000000          ERRFLG: 0
016174  000000          TRACON: 0
016176  000000          PASCNT: 0
016200  000000          TSTNO:  0
016202  000000          RETURN: 0
016204  000000          ICOUNT: 0
016206  000000          SAVR0:  0
016210  000000          SAVR1:  0
016212  000000          SAVR2:  0
016214  000000          SAVR3:  0
016216  000000          SAVR4:  0
016220  000000          SAVR5:  0
016222  000000          SAVSP:  0
016224  000000          SAVPC:  0
016226  000000          WRDCNT: 0
016230  000000          CHRCNT: 0
016232  017744          TSTPNT: TSTTBO
016234  000000          TSTMAX: 0
016236  000000          LINFLG: 0
016240  000000          LINE:   0
016242  000000          LINORG: 0
016244  000000          LINANS: 0
016246  000000          ANSFLG: 0
016250  000000          ORGFLG: 0
016252  000000          TIME1:  0
016254  000000          TIME2:  0
016256  000000          TIFLG:  0
016260  177777          LINSEL: 177777
016262  000000          SELMSK: 0
016264  000000          SLMSK:  0
016266  000002          FILL:   2               ;FILL CHAR/COUNT
016270  000000          FILLA:  0               ;TEMP STORAGE FOR FILL COUNT
016272  000000          RNGRET: 0
                                
016274  052123  052101  051525  MSTATE: .ASCII  ;STATUS ERROR%"EXP    REC@;
016302  042440  051122  051117
016310  021045  054105  020120
016316  020040  051040  041505
016324     100
016325     114  047111  020105  MLINER: .ASCII  ;LINE ERROR%"EXP REC LINE SEL@;
```

```
                016732  051105  047522  022522
                016740  042442  050130  051040
                016746  041505  046040  047111
                016754  020105  042523  040114
2537            016762  044514  042516  042440  MLINE1: .ASCII  ;LINE ERROR<">EXP REC LINE<200>;
                016770  051122  051117  021045
                016776  054105  020120  042522
                017004  020103  044514  042516
                017012     108
2538            017013     124  040522  051516  MTRANE: .ASCII  ;TRANSITION ERROR<">EXP REC LINE<200>;
                017020  052111  047511  020116
                017026  051105  047522  022522
                017034  042442  050130  051040
                017042  041505  046040  047111
                017050  040105
2539            017052  021045  021045  044504  DIALM:  .ASCII  ;<">DIAL ANSWERING DATA SET<">A;
                017060  046101  040440  051516
                017066  042527  044522  043516
                017074  042040  052101  020101
                017102  042523  022524  040042
2540            017110  021045  021045  030061  MT103T: .ASCII  ;<">103A MODEM CONNECT-DISCONNECT TEST<">A;
                017116  040463  046440  042117
                017124  046505  041440  047117
                017132  042516  052103  042055
                017140  051511  047503  047116
                017146  041505  020124  042524
                017154  052123  021045     100
2541            017161     045  022442  031042  MT202T: .ASCII  ;<">202C MODEM CONNECT-DISCONNECT TEST<">A;
                017166  031060  020103  047515
                017174  042504  020115  047503
                017202  047116  041505  026524
                017210  044504  041523  047117
                017216  042516  052103  052040
                017224  051505  022524  040042
2542            017232  021045  021045  051117  MSELOR: .ASCII  ;<">ORIGINATE LINE-A;
                017240  043511  047111  052101
                017246  020105  044514  042516
                017254  040055
2543            017256  021045  047101  053523  MSELAN: .ASCII  ;<">ANSWER LINE-A;
                017264  051105  046040  047111
                017272  026505     100
2544            017275     045  030442  031460  MT103A: .ASCII  ;<">103A TEST COMPLETE<">A;
                017302  020101  042524  052123
                017310  041440  046517  046120
                017316  052105  022505  040042
2545            017324  021045  030062  041462  MT202A: .ASCII  ;<">202C TEST COMPLETE<">A;
                017332  052040  051505  020124
                017340  047503  050115  042514
                017346  042524  021045     100
2546            017353     045  051442  052105  MDISC:  .ASCII  ;<">SET SW01=1 TO TEST DISCONNECTA;
                017360  051440  030127  036461
                017366  020061  047524  052040
                017374  051505  020124  044504
                017402  041523  047117  042516
```

```
                017010  052103      100
2547            017013      045  022442  030442  M16:    .ASCII  ;x"x"16 LINE SCANNER TESTx"a;
                017020  020066  044514  042516
                017026  051440  040503  047116
                017034  051105  052040  051505
                017042  022524  040042
2548            017046  021045  021045  055104  MTITLE: .ASCII  ;x"x"DZDMK-B    -----MODEM CONTROL DIAGNOSTIC-----x"a;
                017054  044104  026513  020102
                017062  020040  026440  026455
                017070  026455  047515  042504
                017076  020115  047503  052116
                017104  047522  020114  044504
                017112  043501  047516  052123
                017120  041511  026455  026455
                017126  022455  040042
2549            017132  021045  042526  052103  MVECTO: .ASCII  ;x"VECTOR ADDRESS-a;
                017140  051117  040440  042104
                017146  042522  051523  040055
2550            017154  021045  047503  052116  MREGAD: .ASCII  ;x"CONTROL REGISTER ADDRESS-a;
                017162  047522  020114  042522
                017170  044507  052123  051105
                017176  040440  042104  042522
                017204  051523  040055
2551            017210  021045  044514  042516  MLINSL: .ASCII  ;x"LINE SELECT PARAMETER -a;
                017216  051440  046105  041505
                017224  020124  040520  040522
                017232  042515  042524  020122
                017240  040055
2552            017242  021045  042524  052123  MTEST:  .ASCII  ;x"TEST-a;
                017250  040055
2553            017252  020040  040077          MQM:    .ASCII  ;  ?a;
2554            017256  021045      100          MCRLF:  .ASCII  ;x"a;
2555            017261      045  051442  047111  MLINE:  .ASCII  ;x"SINGLE LINE CABLE TESTx"a;
                017266  046107  020105  044514
                017274  042516  041440  041101
                017302  042514  052040  051505
                017310  022524  040042
2556            017314  021045  044514  042516  MLINEI: .ASCII  ;x"LINE NUMBER-a;
                017322  047040  046525  042502
                017330  026522      100
2557            017333      106  052101  046101  MFATAL: .ASCII  ;FATAL ERRORx"CSTAT  LSTATa;
                017340  042440  051122  051117
                017346  021045  051503  040524
                017354  020124  046040  052123
                017362  052101      100
2558            017365      045  052042  040522  MTRNDE: .ASCII  ;x"TRANSITION DETECTEDx"CSTAT  LSTATa;
                017372  051516  052111  047511
                017400  020116  042504  042524
                017406  052103  042105  021045
                017414  051503  040524  020124
                017422  046040  052123  052101
                017430      100
2559            017431      045  050042  053517  MPFAIL: .ASCII  ;x"POWER FAILUREa;
                017436  051105  043040  044501
```

```
                017444  052514  042522     100
 2560           017451     055  052503  051122  MPF1:   .ASCII  ;-CURRENT TEST WILL RESTART%"@;
                017456  047105  020124  042524
                017464  052123  053440  046111
                017472  020114  042522  052123
                017500  051101  022524  040042
 2561           017506  041536     100          MCONTC: .ASCII  ;↑C@;
 2562           017511     136  040126          MCONTV: .ASCII  ;↑V@;
 2563           017514  046136     100          MCONTL: .ASCII  ;↑L@;
 2564           017517     045     042          MBCD:   .ASCII  ;%";
 2565                   017621                  .=.+100
 2566                   017622                  .EVEN
 2567           017622  040007                  MEPASS: 40007
 2568           017624  000000                  TEMTAB: 0
 2569                   017636                  .=.+10
 2570
 2571           017636  000000                          0
 2572
 2573                                           ;EMT DISPATCH TABLE
 2574
 2575           017640  014316                  EMTTAB: ERRCS
 2576           017642  014334                          ERRLS
 2577           017644  013752                          LOOP
 2578           017646  014150                          FREEZE
 2579           017650  015122                          TYPER
 2580           017652  015030                          SVOSP
 2581           017654  014600                          OCTASN
 2582           017656  015070                          RSOS
 2583           017660  014660                          BINASC
 2584           017662  014726                          DIVI
 2585           017664  014212                          ERR
 2586           017666  015264                          INSTR
 2587           017670  014230                          ERRT
 2588           017672  014252                          ERRS
 2589           017674  014274                          ERRN
 2590           017676  012660                          GETLIN
 2591           017700  012722                          SETUPS
 2592           017702  013164                          CKRNG
 2593           017704  013262                          WAITR
 2594           017706  013350                          CKTRN
 2595           017710  013320                          WAITRR
 2596           017712  000000                  EMTLIM: 0
 2597           017714  017744                  TSTLST: TSTTBO
 2598           017716  020146                          TSTTB1
 2599           017720  020210                          TSTTB2
 2600           017722  020216                          TSTTB3
 2601           017724  000000                          0
 2602           017726  000000                          0
 2603           017730  000000                          0
 2604           017732  000000                          0
 2605           017734  000037                  GRO:    NO-1
 2606           017736  000007                          N1-100-1
 2607           017740  000001                          N2-200-1
 2608           017742  000000                          N3-300-1
```

```
2609  017744  001726                TSTTBO: TO
2610  017746  000001                        1
2620  017750  001754                        T1
(2)   017752  004000                        TIMES
(2)   017754  002016                        T2
(2)   017756  004000                        TIMES
(2)   017760  002060                        T3
(2)   017762  004000                        TIMES
(2)   017764  002122                        T4
(2)   017766  004000                        TIMES
(2)   017770  002164                        T5
(2)   017772  004000                        TIMES
(2)   017774  002226                        T6
(2)   017776  004000                        TIMES
(2)   020000  002302                        T7
(2)   020002  004000                        TIMES
(2)   020004  002356                        T10
(2)   020006  004000                        TIMES
(2)   020010  002440                        T11
(2)   020012  004000                        TIMES
(2)   020014  002522                        T12
(2)   020016  004000                        TIMES
(2)   020020  002604                        T13
(2)   020022  004000                        TIMES
(2)   020024  002666                        T14
(2)   020026  004000                        TIMES
(2)   020030  002750                        T15
(2)   020032  004000                        TIMES
(2)   020034  003030                        T16
(2)   020036  004000                        TIMES
(2)   020040  003110                        T17
(2)   020042  004000                        TIMES
(2)   020044  003170                        T20
(2)   020046  004000                        TIMES
(2)   020050  003250                        T21
(2)   020052  004000                        TIMES
(2)   020054  003344                        T22
(2)   020056  000400                        TIMES
(2)   020060  003462                        T23
(2)   020062  000400                        TIMES
(2)   020064  003660                        T24
(2)   020066  000400                        TIMES
(2)   020070  004036                        T25
(2)   020072  000200                        TIMES
(2)   020074  004206                        T26
(2)   020076  000200                        TIMES
(2)   020100  004444                        T27
(2)   020102  000200                        TIMES
(2)   020104  004702                        T30
(2)   020106  000200                        TIMES
(2)   020110  005140                        T31
(2)   020112  000200                        TIMES
(2)   020114  005376                        T32
(2)   020116  000200                        TIMES
```

```
                                                    T33
                                                    TIMES
                                                    T34
                                                    TIMES
                                                    T35
                                                    TIMES
                                                    T36
                                                    TIMES
                                                    T37
                                                    TIMES
                                                    0
                                        TSTTB1:     T100
                                                    1
                                                    T101
                                                    TIMES
                                                    T102
                                                    TIMES
                                                    T103
                                                    TIMES
                                                    T104
                                                    TIMES
                                                    T105
                                                    TIMES
                                                    T106
                                                    TIMES
                                                    T107
                                                    TIMES
                                                    0
                                        TSTTB2:     T200
                                                    1
                                                    0
                                        TSTTB3:     T300
                                                    1
                                        ENDCOD:     0
                                        .END
```

```
ANSFLG  016246          1720*  1723*  1728*  1732*  1816*  1825   1848   1864*  1916*  1917   2523#
ANSTR   012474          1686   1718#
ANSTRR  012562          1736#
ANSTR1  012510          1719   1721#
ANSTR2  012524          1722   1724#
ANSTR3  012540          1726   1729#
ANSTR4  012554          1731   1733#
BINASA  014670          2244#  2248
BINASB  014710          2249#  2251
BINASC  014660          2242#  2583
BINWRD= 015022            80#  2230*
BUSY  = 000020            85#   637    641    815    842   1033   1794
CHRCNT  016230          2229*  2242   2250*  2516#
CKRING= 104021           144#  1165   1332
CKRNG   013164          1842#  2592
CKRNG1  013230          1851   1853#
CKRNG2  013254          1857   1860#
CKTRAN= 104023           146#  1193   1257   1361   1402   1446   1487   1527   1571   1635
CKTRN   013350          1882#  2594
CKTRN1  013464          1900   1902#
CKTRN2  013516          1907   1914#
CKTRN3  013556          1921   1923#
CKTRN4  013602          1927   1929#
CLRMUX= 002000            91#   794    909    911    913    915    938    971   1024   1108   1110   1112   1114
                        1793
CLRSCN= 004000            92#   814    841   1032   1793
C0    = 000100           106#   917   1116   1196   1200   1364   1367   1405   1409   1490   1494   1530   1535
COF   = 040000            95#  1697   1709   1721   1733
CONVER= 104010           135#  2231
CS    = 000040           105#   917   1116   1196   1200   1367   1409   1490   1530
CSF   = 020000            94#  1700   1709   1724   1733
CSTR1   001754           580#
CSTR2   002016           593#
CSTR3   002060           606#
CSTR4   002122           620#
CSTR5   002164           636#
DATA1   013620           262*   264*   267*   269    1752*  1761   1885*  1895   1935#  2451*  2453*  2455*  2457
DATA2   013622           263*   264    265*   268*   1753*  1763   1886*  1904   1936#  2452*  2453   2454*  2456*
DATA3   013624          1887*  1914   1918   1937#
DATA4   013626          1888*  1924   1938#
DHMCSR  016156           290    291    295    351*   358*   367*   568    580*   581    584*   585    593*   594
                         597*   598    606*   607    610*   611    620*   621    625*   626    636*   637    640*
                         641    651*   654*   668*   671*   684*   686*   689*   713*   731*   738*   745*   746
                         763*   768*   771*   772    781*   794*   797*   798*   803*   804*   805    814*   815
                         819*   820*   821    837*   841*   842    844*   845*   846*   847*   849*   852*   853
                         876*   881*   882*   885*   886*   888*   891*   892    909*   911*   913*   915*   917*
                         919*   921*   928*   932*   938*   941*   971*   972*   975*   977*   986*   990*   992
                         996   1002   1008*  1010*  1024*  1025*  1029*  1032*  1033   1040*  1044*  1046   1050
                        1056   1062*  1065*  1108*  1110*  1112*  1114*  1116*  1118*  1120*  1184*  1242*  1248*
                        1249*  1352*  1354*  1395*  1437*  1439*  1480*  1520*  1562*  1564*  1616*  1625*  1626*
                        1679   1687*  1747*  1752   1793*  1794   1801*  1805*  1815*  1869*  1883*  1896*  1902*
                        2462*  2463*  2465*  2469*  2479*  2492#
DHMLSR  016160           295*   296*   571    909*   911*   913*   915*   917*   919*   921*   931*   942    950*
                         951    958*   978*  1028*  1108*  1110*  1112*  1114*  1116*  1118*  1120*  1186*  1250*
```

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                    1353*  1355*  1396*  1438*  1440*  1481*  1521*  1563*  1565*  1627*  1688   1753   1803*
                    1806*  1897   1903   2493#
DHMLVL  016154       284*   285*   653*   670*   687*   713*   731*   984*  1039*  1814*  2476*  2491#
DHMVEC  016152       279    280    284    652*   669*   685*   713*   731*   983*  1038*  1238*  1613*  1812*
                    1866*  2474*  2475*  2476   2477*  2490#
DIALM   016452      1821   2539#
DIGIT = 015024       81#   2245*  2246
DIVCNT  015002      2260*  2268#
DIVI    014726      2257#  2584
DIVIA   014752      2262#  2269
DIVIB   015020      2259   2273#
DIVIC   014770      2261   2263   2265#
DIVIDH  015024        81   2257*  2258   2262   2264*  2266*  2270*  2275#
DIVIDL  015022        80   2265*  2271*  2274#
DIVIS   015026        79   2258   2262   2264   2276#
DIVIU   014732      2258#
DMYRTI  001720       331    364    365    371#
DONE  = 000200        88#   593    594    597    598    654    689    713    731   1008   1062   2465
EMTLIM  017712      2596#
EMTOK   013732      1974#
EMTSRV  013720       163   1971#
EMTTAB  017640      1976   2575#
ENDCOD  020222        78   2640#
EOP     013632      1946#  2019
ERR     014212      2045#  2585
ERRCS   014316      2118#  2575
ERRFLG  016172      1796*  2001   2022*  2030   2045*  2063*  2082*  2100*  2152*  2154   2176*  2501#
ERRGEN  014352      2049   2066   2086   2104   2121   2140   2148#
ERRLS   014334      2138#  2576
ERRMSG  014420      2047*  2064*  2083*  2101*  2118*  2138*  2158   2161#
ERRN    014274      2100#  2589
ERROR = 104012       137#   570    573    583    587    596    600    609    613    624    629    639    643
                     659    676    691    713    731   1157   1324   2471
ERRORC= 104000       127#   749    775    808    824    860    899    997   1005   1051   1059
ERRORL= 104001       128#   909    911    913    915    917    919    921    946    954   1108   1110   1112
                    1114   1116   1118   1120
ERRORN= 104016       141#  1689   1712   1736
ERRORS= 104015       140#  1216   1218   1277   1279   1382   1384   1423   1425   1466   1468   1507   1509
                    1549   1551   1591   1593   1652   1654
ERRORT= 104014       139#  1175   1177   1220   1222   1281   1283   1342   1344   1386   1388   1427   1429
                    1470   1472   1511   1513   1553   1555   1595   1597   1656   1658
ERRS    014252      2082#  2588
ERRT    014230      2063#  2587
ERR1    013610      1791*  1834   1844*  1852   1889*  1901   1931#
ERR2    013612      1845*  1859   1890*  1908   1932#
ERR3    013614      1891*  1922   1933#
ERR4    013616      1892*  1928   1934#
ERTAB   014432      2048*  2065*  2085*  2103*  2120*  2139*  2162   2165#
ERTAB0  014470      2157   2183#
ERTAB1  014476      2065   2186#
ERTAB2  014514      2085   2193#
ERTAB3  014532      2103   2200#
ERTAB4  014544      2120   2205#
ERTAB5  014556      2139   2210#
```

DZDHKB.P11 CROSS REFERENCE TABLE

```
EXTRAC= 104011           136#  2244
FATEX   012564          1690   1713  1737#
FATRET  012576          1149*  1316* 1739  1740#
FILL    016266          2331   2332  2531#
FILLA   016270          1951*  1952* 2331* 2335# 2532#
FREEZE  014150          2030#  2578
FREEZX  014204          2031   2035  2038#
GETLIN  012660          1768#  2590
GETLNS= 104017           142#  1151  1318
GRO     017734           315   2605#
HILIM   015514          2349*  2396  2403#
ICOUNT  016204          2009*  2021* 2024* 2506#
INBUF   015520          2354   2376  2405#
INIT1   001732           568#
INSTBB  015344          2357   2360#
INSTER  015406           283    294   320   326  2370# 2380 2382 2384 2397 2399
INSTR   015264          2345#  2586
INSTRB  015330          2356#  2359  2369
INSTRC  015374          2366#  2367
INSTRD  015430          2381#  2382
INSTRG= 104013           138#   275   286   297   305  1099 1770 1775
INSTR1  015314          2352#  2372
INSTR2  015414          2364   2376#
INSTR3  015470          2388   2396#
INTENA= 000100            87#   231   330   580   581  584  585  671  686  713  731  986 1040
                         1145   1242  1312  1616  1747 1769 1787 1815 1869 2463
INT1    002226           650#
INT1A   002274           652    658#
INT1B   002300           657    660#
INT10   002750           731#
INT10A  003024           731#
INT10B  003026           731#
INT11   003030           731#
INT11A  003104           731#
INT11B  003106           731#
INT12   003110           731#
INT12A  003164           731#
INT12B  003166           731#
INT13   003170           731#
INT13A  003244           731#
INT13B  003246           731#
INT2    002302           667#
INT2A   002350           669    675#
INT2B   002354           674    677#
INT3    002356           683#
INT3A   002434           685    693#
INT3B   002436           692    694#
INT4    002440           713#
INT4A   002514           713#
INT4B   002520           713#
INT5    002522           713#
INT5A   002576           713#
INT5B   002602           713#
INT6    002604           713#
```

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DZDHKB.P11 CROSS REFERENCE TABLE

```
INT6A   002660          713#
INT6B   002664          713#
INT7    002666          713#
INT7A   002742          713#
INT7B   002746          713#
KBDINT  001562          170     344#
KBDIN1  001620          347     353#
KBDIN2  001646          354     360#
KBDIN3  001704          361     369#
KRET    001722          331*    364     368     373#    1095*   1150*   1317*
LINANS  016244          1184    1352    1395    1439    1480    1562    1685    1779    1805    1849    1896    1898    1919
                        2522#
LINE    016240          1103    1108    1110    1112    1114    1116    1118    1120    2520#
LINENA= 000001           100#    909     917     919     921     950     978    1108    1116    1118    1120    1196    1200
                        1260    1263    1364    1367    1405    1409    1449    1452    1490    1494    1530    1535    1574
                        1577    1638    1641    1803    1806
LINFLG  016236          332*    2519#
LINORG  016242          1249    1354    1437    1520    1564    1626    1683    1774    1801    1855    1902    1905    1925
                        2521#
LINSEL  016260           301     743     769     909     911     913     915     917     919     921     939     987    1041
                        1108    1110    1112    1114    1116    1118    1120    2528#
LINT1   003250          738#
LINT1A  003276          743#    751     755
LINT1B  003324          744     748     750#
LINT2   003344          762#    777
LINT2A  003404          769#    783
LINT2B  003434          770     774     776#
LOGICA  013702          167     1959#
LOLIM   015512          2348*   2398    2402#
LOOP    013752          1988#   2577
LOOPER  014070          2011#   2025
LOOPL   014140          2006    2024#
LOOPS   014042          2002    2005#
LOOPX   014076          1998    2004    2008    2010    2013#   2033
LVL     000004           703#    713#    722#    731#
MAINT = 001000            90#    606     607     610     611     797     844     847     881     975
MBCD    017517          2227    2236    2564#
MCONTC  017506           349    2561#
MCONTL  017514           363    2563#
MCONTV  017511           356    2562#
MCRLF   017256           336    1105    1781    2554#
MDISC   016753          1236    1611    2546#
MEMT1   003462           794#    810
MEMT1A  003510           798#    800
MEMT1B  003540           804#    813
MEMT1C  003564           807     811#
MEMT1D  003572           814#    826
MEMT1E  003624           820#    829
MEMT1F  003650           823     827#
MEMT2   003660           837#
MEMT2A  003702           841#    862     867
MEMT2B  003764           852#    865
MEMT2C  004010           856     858#
MEMT2D  004022           859     863#
```

DZDHKB.P11 CROSS REFERENCE TABLE

```
MEMT3   004036          876#
MEMT3A  004060          880#    901     906
MEMT3B  004072          882#    884
MEMT3C  004134          891#    904
MEMT3D  004160          895     897#
MEMT3E  004172          898     902#
MEPASS  017622         1955    2567#
MFATAL  017333         2101    2557#
MLINE   017261         1098    2555#
MLINE1  017314         1100    2556#
MLINER  016325         2138    2536#
MLINE1  016362         2083    2537#
MLINSL  017210          298    2551#
MPFAIL  017431         2434    2559#
MPF1    017451         2440    2560#
MQM     017252         2371    2553#
MREGAD  017154          287    2550#
MSELAN  016656         1776    2543#
MSELOR  016632         1771    2542#
MSG     015316         2347*   2353#
MSTATE  016274         2118    2535#
MTEST   017242          306    2552#
MTITLE  017046          251    2548#
MTRANE  016413         2064    2538#
MTRNDE  017365         1755    2558#
MT103A  016675         1288    2544#
MT103T  016510         1148    2540#
MT202A  016724         1662    2545#
MT202T  016561         1315    2541#
MUX1    004206          909#
MUX1A   004234          909#
MUX1B   004302          909#
MUX1C   004340          909#
MUX1D   004352          909#
MUX1E   004372          909#
MUX1F   004424          909#
MUX11   007220         1108#
MUX11A  007236         1108#
MUX11B  007304         1108#
MUX11C  007342         1108#
MUX11D  007354         1108#
MUX11E  007374         1138#
MUX11F  007426         1108#
MUX12   007430         1110#
MUX12A  007446         1110#
MUX12B  007514         1110#
MUX12C  007552         1110#
MUX12D  007564         1110#
MUX12E  007604         1110#
MUX12F  007636         1110#
MUX13   007640         1112#
MUX13A  007656         1112#
MUX13B  007724         1112#
MUX13C  007762         1112#
```

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MUX13D  007774          1112#
MUX13E  010014          1112#
MUX13F  010046          1112#
MUX14   010050          1114#
MUX14A  010066          1114#
MUX14B  010134          1114#
MUX14C  010172          1114#
MUX14D  010204          1114#
MUX14E  010224          1114#
MUX14F  010256          1114#
MUX15   010260          1116#
MUX15A  010276          1116#
MUX15B  010330          1116#
MUX15C  010356          1116#
MUX15D  010370          1116#
MUX15E  010406          1116#
MUX15F  010442          1116#
MUX16   010444          1118#
MUX16A  010462          1118#
MUX16B  010514          1118#
MUX16C  010542          1118#
MUX16D  010554          1118#
MUX16E  010572          1118#
MUX16F  010626          1118#
MUX17   010630          1120#
MUX17A  010646          1120#
MUX17B  010700          1120#
MUX17C  010726          1120#
MUX17D  010740          1120#
MUX17E  010756          1120#
MUX17F  011012          1120#
MUX2    004444           911#
MUX2A   004472           911#
MUX2B   004540           911#
MUX2C   004576           911#
MUX2D   004610           911#
MUX2E   004630           911#
MUX2F   004662           911#
MUX3    004702           913#
MUX3A   004730           913#
MUX3B   004776           913#
MUX3C   005034           913#
MUX3D   005046           913#
MUX3E   005066           913#
MUX3F   005120           913#
MUX4    005140           915#
MUX4A   005166           915#
MUX4B   005234           915#
MUX4C   005272           915#
MUX4D   005304           915#
MUX4E   005324           915#
MUX4F   005356           915#
MUX5    005376           917#
MUX5A   005424           917#
```

```
MUX5B   005456          917#
MUX5C   005504          917#
MUX5D   005516          917#
MUX5E   005534          917#
MUX5F   005570          917#
MUX6    005614          919#
MUX6A   005642          919#
MUX6B   005674          919#
MUX6C   005722          919#
MUX6D   005734          919#
MUX6E   005752          919#
MUX6F   006006          919#
MUX7    006032          921#
MUX7A   006060          921#
MUX7B   006112          921#
MUX7C   006140          921#
MUX7D   006152          921#
MUX7E   006170          921#
MUX7F   006224          921#
MUX8    006250          928#
MUX8A   006266          931#    934
MUX8B   006322          938#    948     956
MUX8C   006330          939#    961
MUX8D   006364          945     949#
MUX8E   006412          940     953     957#
MVECTO  017132          276     2549#
MD    = 000040         2617#   2620#   2633
MI    = 000110         2630#   2633#
MI6     017013          567     2547#
N     = 000300          564#   1093#   1142#   1309#
NXTTS   013630         1790#   1836    1843#   1861    1893#   1930    1939#
ND    = 000040          564#    565#    579#    592#    605#    619#    635#    649#    666#    682#    713#    731#    737#
                        761#    793#    836#    875#    909#    911#    913#    915#    917#    919#    921#    927#    970#
                       1022#   2605    2618
N1    = 000110         1093#   1094#   1108#   1110#   1112#   1114#   1116#   1118#   1120#   2606    2631
N2    = 000202         1142#   1143#   1286#   2607
N3    = 000301         1309#   1310#   2608
OCTASC= 104006          133#   1756    2156    2164
OCTASN  014600         2224#   2581
OCTAS1  014626         2229#   2233
ORGFLG  016250         1696#   1699#   1704#   1708#   1817#   1827    1854    1865#   1923    2524#
ORGTR   012402         1684    1694#
ORGTRR  012470         1712#
ORGTR1  012416         1695    1697#
ORGTR2  012432         1698    1700#
ORGTR3  012446         1702    1705#
ORGTR4  012462         1707    1709#
PASCNT  016176          334#   1948#   2503#
PC    =%000007          72#    243#    257#   1176#   1217#   1219#   1221#   1223#   1278#   1280#   1282#   1284#   1343#
                       1383#   1385#   1387#   1389#   1424#   1426#   1428#   1430#   1467#   1469#   1471#   1473#   1508#
                       1510#   1512#   1514#   1550#   1552#   1554#   1556#   1592#   1594#   1596#   1598#   1653#   1655#
                       1657#   1659#   1852#   1901#   1908#   1922#   1928#   1959#   2267#   2314#   2337#   2484#
PFAIL   015542          161     228    2410#   2431
POPRO = 012600          121#   2175
```

```
POP1SP= 005726#  1198  2432
POP2SP= 022626#  1238   246   350   357   366   658   675   693   713   731  1001  1055  1738
                 1833  1835  1858  1860  1929  1995  2480  2481
PS    = 177776#   778   650*  653   655*  667*  670   672*  683*  687   688*  713*  731*  739*
                  762*  795*  838*  877*  909*  911*  913*  915*  917*  919*  921*  929*  973*
                  984   989*  991*  995*  1026* 1039  1043* 1045* 1049* 1096* 1108* 1110* 1112*
                 1114* 1116* 1118* 1120* 1146* 1237* 1243* 1247* 1313* 1612* 1618* 1624* 1788*
                 1822* 1870* 1882* 2345* 2461* 2464* 2470* 2478*
PUSHRO= 010046#  1208  2172
PUSH1S= 005746#  1188   328  2442
PUSH2S= 024646#  1228   282   293   319   325
RADIX = 015026#   798  2226*
REGST1  001340#   292   295#
RESTAR  015600#  2418  2424#
RESTA1  015654#  2437  2439#
RESOS = 104007#   134#  2166
RETURN  016202#  2011  2018*  2505#
RING  = 000200#   107#   919  1118
RINGF = 100000#    96#  1204  1371  1694  1709  1718  1733
RNGRET  016272#  1240* 1614* 1746  1818* 1867* 2533#
RS    = 000004#   102#   913   919  1112  1118  1355  1367  1409  1438  1481  1490  1530  1563
RSOS    015070#  2295#  2582
R0    =%000000#    65#   742*  754*  767*  782*  796*  799*  801*  812*  817*  828*  839*  866*
                  878*  905*  909*  911*  913*  915*  917*  919*  921*  930*  933*  937*  960*
                  974*  979*  985*  1013* 1023* 1030* 1035* 1067* 2173* 2242* 2247* 2289  2295*
                 2410  2430*
R1    =%000001#    66#   766*  780*  781   851*  854   863*  890*  893   902*  909*  911*  913*
                  915*  917*  919*  921*  981*  1009* 1010  1036* 1064* 1065  1108* 1110* 1112*
                 1114* 1116* 1118* 1120* 1956* 1959  2243* 2246* 2249  2288  2296* 2411  2429*
R2    =%000002#    67#   840*  845   850*  855   879*  885   889*  894   909*  911*  913*  915*
                  917*  919*  921*  1108* 1110* 1112* 1114* 1116* 1118* 1120* 2287  2297* 2412
                 2428*
R3    =%000003#    68#   848*  864*  880*  883*  887*  903*  909*  911*  913*  915*  917*  919*
                  921*  936*  941   957*  1108* 1110* 1112* 1114* 1116* 1118* 1120* 1688* 1849*
                 1855* 1898* 1905* 1919* 1925* 2286  2298* 2355* 2368* 2377* 2386* 2389* 2390*
                 2391* 2396  2398  2400  2413  2427*
R4    =%000004#    69#   746*  747   772*  773   805*  806   821*  822   853*  855   858   892*
                  894   897   909*  911*  913*  915*  917*  919*  921*  942*  944   951*  952
                  996* 1002* 1003  1050* 1056* 1057  1108* 1110* 1112* 1114* 1116* 1118* 1120*
                 1679* 1681  1694  1697  1700  1705  1709  1718  1721  1724  1729  1733  1744
                 1848* 1850  1854* 1856  1897* 1899  1903* 1906  1917* 1920  1923* 1926  2227*
                 2234* 2249* 2252* 2285  2299* 2354* 2361* 2362* 2363  2376* 2378  2381  2383
                 2385* 2386  2387  2414  2426*
R5    =%000005#    70#   310*  311*  314*  315   316   741*  745   747   752*  764*  773   778*
                  802*  806   811*  818*  822   827*  854*  857*  858   893*  896*  897   909*
                  911*  913*  915*  917*  919*  921*  943*  949*  952   982*  1003  1012* 1037*
                 1057  1066* 1108* 1110* 1112* 1114* 1116* 1118* 1120* 1681* 1682* 1683  1685
                 1687  1789* 1790  1791  1792  1842* 1843  1844  1845  1846  1847* 1850  1853*
                 1884* 1885  1886  1887  1888  1889  1890  1891  1892  1893  1894  1895* 1899
                 1904* 1906  1918* 1920  1924* 1926  2014* 2015* 2016* 2017* 2018  2020  2021
                 2224* 2228  2229  2230  2284  2300* 2305* 2309  2311  2315  2318  2320  2322
                 2324* 2325* 2346* 2347  2348  2349  2350  2351  2415  2425*
SAVPC   016224#  2150  2173  2185  2280* 2514#
SAVR0   016206#  2289* 2295  2507#
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SAVR1   016210          2218    2288#   2296    2508#
SAVR2   016212          2287#   2297    2509#
SAVR3   016214          2192    2199    2204    2216    2286#   2298    2510#
SAVR4   016216          2190    2197    2202    2209    2214    2285#   2299    2511#
SAVR5   016220          2188    2195    2207    2212    2284#   2300    2512#
SAVSP   016222          2417#   2424    2513#
SAVOSP= 104005          1328    2153
SCNENA= 000040            86#    620     621     625     626     636     640     990    1008    1044    1062    1242    1616
                        1747    1815    1869
SCNT1   006432          971#    998#    1007
SCNT1A  006472          977#    980#
SCNT1B  006550          987#   1014
SCNT1C  006630          983    1001#
SCNT1D  006652          988    1000    1004    1008#
SCNT2   006702         1023#   1053    1061
SCNT2A  006734         1028#   1031
SCNT2B  007030         1041#   1068
SCNT2C  007112         1038    1055#
SCNT2D  007132         1042    1054    1058    1062#
SCOPE = 104002          129#    574     588     601     614     630     644     660     677     694     713     731     756
                        784     830     868     907     909     911     913     915     917     919     921     962    1015
                       1069    1108    1110    1112    1114    1116    1118    1120
SCOPEF= 104003          130#    750     776     809     825     861     900     909     911     913     915     917     919
                        921     947     955     998    1006    1052    1060    1108    1110    1112    1114    1116    1118
                       1120
SECRX = 000020          104#    921    1120    1405    1409    1530    1535
SECRDF= 010000           93#   1705    1709    1729    1733
SECTX = 000010          103#    915     921    1114    1120    1396    1405    1440    1521    1535    1565
SELMSK  016262          740#    743     753#    765#    769     779#    909#    911#    913#    915#    917#    919#    921#
                        935#    939     959#    976#    987    1011#   1027#   1041    1063#   1108    1110    1112    1114
                       1116    1118    1120    2529#
SETUP = 104020          143#   1153    1320
SETUPB  013146         1826    1828    1835#
SETUPS  012722         1786#   2591
SETUP1  012762         1794#   1795
SETUP2  012776         1801#
SETUP4  013110         1818    1825#   1830    1832
SINGLE= 000001           60#    909     911     913     915     917     919     921    1077#   1108    1110    1112    1114
                       1116    1118    1120
SINTFL  001724          345#    369#    374#   2358    2360#
SLMSK   016264          909#    911#    913#    915#   1108#   1110#   1112#   1114#   2530#
SP     =%000006          71#    232#    238#    241     247     261#    304#    327#   1746#   1789    1792#   1837#   1842
                       1846#   1884    1894#   1971#   1972#   1973#   1974#   1975#   1976#   1977#   1978    1990#   1993
                       1996    2011#   2020#   2036#   2038#   2150    2224    2225#   2280    2305    2306#   2346    2351#
                       2410#   2411#   2412#   2413#   2414#   2415#   2416#   2417    2424#   2425    2426    2427    2428
                       2429    2430    2441#   2447#   2448#   2467    2468    2474    2482    2483
ST      = 000200          703#    713#    722#    731#
STACK   = 020422           78#    232     261     304
START     001000          173     228#
STARTN    001366          260     304#    352
STARTO    001100          237     244     248#    2438
START1    001142          256     259#
STEP    = 000400           89#    771     798     804     820     846     852     882     886     891     909     911     913
                        915     917     919     921     932     977    1029    1108    1110    1112    1114    1116    1118
```

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                    1120
STORE   015516      2350*  2400*  2404#
STRLIN  007162      1095#
STRLNA  007202      1095   1099#
STRTOA  001456       318    321#
ST103A  011014      1144#
ST103B  011052      1150   1151#  1158   1178   1290
ST202A  011350      1311#
ST202B  011406      1317   1318#  1325   1345   1663
SVOS    015036      2284#
SVOSP   015030      2280#  2580
SWR   = 177570        76#   259   1244   1619   2003   2005   2007   2032   2034   2148   2170
SW06  = 000100        46#
SW08  = 000400        45#
SW09  = 001000        44#  2034
SW10  = 002000        43#  2003   2032
SW11  = 004000        42#  2007
SW12  = 010000        41#
SW13  = 020000        40#  2148
SW14  = 040000        39#  2005
SW15  = 100000        38#  2170
T     = 000014       703#   713#   722#   731#
TEMTAB  017624      2243   2568#
TIFLG   016256       248    252*  2527#
TIMES = 004000      2620#  2633#
TIME1   016252      1823*  1829*  1871*  1873*  2525#
TIME2   016254      1824*  1831*  1872*  1875*  2526#
TIPFLG  001560       230*   337*   339#   344*   370*  2436
TKCSR   016162       231*   330*  1145*  1312*  1769*  1787*  1947*  2356   2435*  2494#
TKDBR   016164       346    353    360   2361   2365   2495#
TPCSR   016166      2307   2333   2366   2496#
TPDBR   016170      2322*  2332*  2365*  2497#
TRACON  016174       333*  2502#
TRANEX  012600      1711   1735   1744#
TRANS   012340      1679#  1812   1866
TRANX1  012610      1747#  1758
TRMRDY= 000002       101#   911    917   1110   1116   1186   1196   1200   1250   1260   1353   1364   1367
                    1405   1409   1449   1452   1490   1494   1530   1535   1574   1577   1627   1638   1803
TRNTAB  012646      1757   1759#
TRNTYP  012620      1238   1613   1752#
TSTENT  014102       338   1957   1964   1999   2014#  2443
TSTGO   001502       272    274    324    327#
TSTLST  017714       316   2597#
TSTMAX  016234       315*   323   2518#
TSTNO   016200       309    310    321*   323   1289*  1737*  1949*  2013*  2014   2459*  2504#
TSTPNT  016232       316*   317   2017   2460*  2517#
TSTTB0  017744      2460   2517   2597   2609#
TSTTB1  020146      2598   2622#
TSTTB2  020210      2599   2635#
TSTTB3  020216      2600   2638#
TYFILL  015232      2314   2331#
TYPE  = 104004       131#   250    335    348    355    362    566   1097   1104   1147   1235   1287   1314
                    1610   1661   1754   1780   1820   1954   2160   2235   2352   2370   2433   2439
TYPECL  015220      2319   2321   2324#
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TYPER   015122          2305#   2579
TYPERA  015132          2307#   2308      2323
TYPERI  015176          2316    2318#
TYPER2  015212          2322#   2326
T0      001726           565#   2609
T1      001754           579#   2620
T10     002356           682#   2620
T100    007162          1094#   2622
T101    007220          1108#   2633
T102    007430          1110#   2633
T103    007640          1112#   2633
T103A   011054          1149    1153#
T103A1  011062          1156    1157#
T103B   011066          1155    1165#
T103B1  011076          1171    1175#
T103B2  011102          1173    1177#
T103C   011106          1169    1184#
T103D1  011150          1210    1216#
T103D2  011154          1212    1218#
T103D3  011160          1213    1220#
T103D4  011164          1214    1222#
T103E   011170          1215    1235#
T103EN  011334          1276    1287#
T103ES  011230          1240    1244#     1246
T103E1  011314          1271    1277#
T103E2  011320          1273    1279#
T103E3  011324          1274    1281#
T103E4  011330          1275    1283#
T104    010050          1114#   2633
T105    010260          1116#   2633
T106    010444          1118#   2633
T107    010630          1120#   2633
T11     002440           713#   2620
T12     002522           713#   2620
T13     002604           713#   2620
T14     002666           713#   2620
T15     002750           731#   2620
T16     003030           731#   2620
T17     003110           731#   2620
T2      002016           592#   2620
T20     003170           731#   2620
T200    011014          1143#   2635
T201    011334          1286#
T202A   011410          1316    1320#
T202A1  011416          1323    1324#
T202B   011422          1322    1332#
T202B1  011432          1338    1342#
T202B2  011436          1340    1344#
T202C   011442          1336    1352#
T2020   011456          1354#
T20201  011520          1377    1382#
T20202  011524          1378    1384#
T20203  011530          1379    1386#
T20204  011534          1380    1388#
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T202E	011540	1381	1395#	
T202E1	011602	1418	1423#	
T202E2	011606	1419	1425#	
T202E3	011612	1420	1427#	
T202E4	011616	1421	1429#	
T202F	011622	1422	1437#	
T202FJ	011700	1461	1466#	
T202F3	011704	1462	1468#	
T202F4	011710	1463	1470#	
T202F5	011714	1464	1472#	
T202G	011720	1465	1480#	
T202G1	011762	1502	1507#	
T202G2	011766	1503	1509#	
T202G3	011772	1504	1511#	
T202G4	011776	1505	1513#	
T202H	012002	1506	1520#	
T202H2	012044	1544	1549#	
T202H3	012050	1545	1551#	
T202H4	012054	1546	1553#	
T202H5	012060	1547	1555#	
T2021	012064	1548	1562#	
T2021J	012142	1586	1591#	
T2021J3	012146	1587	1593#	
T2021J4	012152	1588	1595#	
T2021J5	012156	1589	1597#	
T202J	012162	1590	1610#	
T202JN	012330	1651	1661#	
T202JS	012222	1614	1619#	1620
T202J1	012310	1647	1652#	
T202J2	012314	1648	1654#	
T202J3	012320	1649	1656#	
T202J4	012324	1650	1658#	
T21	003250	737#	2620	
T22	003344	761#	2620	
T23	003462	793#	2620	
T24	003660	836#	2620	
T25	004036	875#	2620	
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T27	004444	911#	2620	
T3	002060	605#	2620	
T30	004702	913#	2620	
T300	011350	1310#	2638	
T31	005140	915#	2620	
T32	005376	917#	2620	
T33	005614	919#	2620	
T34	006032	921#	2620	
T35	006250	927#	2620	
T36	006432	970#	2620	
T37	006702	1022#	2620	
T4	002122	619#	2620	
T5	002164	635#	2620	
T6	002226	649#	2620	
T7	002302	666#	2620	
VECSTA	001172	264#	270	

F09


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VECSTR  001152            254     258     261#    359
VECSTI  001274            281     284#
WAITR   013262           1864#   2593
WAITRN= 104022            145#   1188    1251    1356    1397    1441    1482    1522    1566    1629
WAITRR  013320           1867    1871#   2595
WAITRI  013332           1873#   1874    1876
WAITS = 104024            147#   1628
WRDCNT  016226           2228#   2232#   2515#
X       000000            127#    128#    129#    130#    131#    132#    133#    134#    135#    136#    137#    138#    139#
                          140#    141#    142#    143#    144#    145#    146#    147#    198#
XC0     000004            111#    1204    1207    1265    1268    1371    1374    1455    1458    1497    1500    1580    1583
XCS     000002            112#    1204    1207    1265    1268    1374    1458    1497    1580
XFLAG   001070            233#    242#    245#     253     271    1988
XM      000101           2617#   2630#
XN      000300            564#   1093#   1142#   1309#
XOR     015672            243     257    2447#
XORSVC  001072            239     246#
XSCRX = 000001            113#   1414    1416    1455    1458    1540    1542    1580    1583
.       020224            151#    155     160#    166#    169#    172#    227#    249     569     572     582     586     595
                          599     608     612     622     627     638     642     816     843     909     911     913     915
                          917     919     921     993    1034    1047    1108    1110    1112    1114    1116    1118    1120
                         1745    1915    2151    2406#   2420    2565#   2566#   2569#
.1      014422           2155    2162#
.2      014434           2159    2163    2166#
.3      014436           2149    2170#
.4      014460           2171    2176#
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G09

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ADD      267   268   285   296  1976  2017  2038  2225  2245  2306  2455  2456
ASL      753   779   909   911   913   915   917   919   921   959  1011  1063  1108  1110  1112
        1114  1974  2015  2016  2389  2390  2391
ASR      314
BEQ      256   260   281   292   365   569   572   586   599   612   627   642   744   748   770
         774   807   823   859   898   909   911   913   915   917   919   921   940   945   953
         988  1004  1042  1058  1108  1110  1112  1114  1116  1118  1120  1246  1620  1684  1686
        1695  1698  1702  1707  1719  1722  1726  1731  1851  1857  1900  1907  1921  1927  1957
        2002  2010  2019  2031  2035  2151  2159  2163  2171  2310  2312  2319  2321  2359  2364
        2380  2388
BGT     2394
BHI     2397
BHIS    2259
BIC      311   321   584   597   610   625   640   655   672   688   713   731   739   762   795
         838   847   877   909   911   913   915   917   919   921   929   973   991  1008  1026
        1045  1062  1096  1108  1110  1112  1114  1116  1118  1120  1250  1438  1440  1563  1565
        1627  1682  1916  1975  2464
BICB    2324  2362  2385
BIS      330   650   654   667   671   683   689   713   731   771   797   798   804   820   845
         846   852   857   882   886   891   896   909   911   913   915   917   919   921   932
         950   977   989   990   995  1029  1043  1044  1049  1108  1110  1112  1114  1116  1118
        1120  1186  1353  1355  1396  1481  1521  1696  1699  1704  1708  1720  1723  1728  1732
        2461  2465  2470
BISB    1010  1065  2325  2386
BIT      259   280   291   581   585   594   598   607   611   621   626   637   641   743   769
         815   842   909   911   913   915   917   919   921   939   987  1033  1041  1108  1110
        1112  1114  1116  1118  1120  1244  1619  1694  1697  1700  1705  1709  1718  1721  1724
        1726  1733  1794  2003  2005  2007  2032  2034  2148  2170
BLE      324
BLO     2263  2399
BLT     2382
BMI      254   272  2357
BNE      249   270   274   318   347   354   361   582   595   608   622   638   755   783   800
         813   816   829   843   856   865   867   884   895   904   906   909   911   913   915
         917   919   921   934   961   980  1014  1031  1034  1068  1108  1110  1112  1114  1116
        1118  1120  1711  1735  1795  1826  1828  1830  1832  1874  1876  1953  2004  2006  2008
        2033  2149  2155  2233  2248  2251  2269  2316  2336  2369  2437  2458
BPL      993  1047  1745  1915  1989  2308  2334  2367
BR       237   258   657   674   692   713   731  1000  1054  1158  1178  1325  1345  1690  1713
        1758  1994  1997  2025  2049  2066  2086  2104  2121  2140  2261  2313  2323  2326  2372
        2392  2420  2473
CLR      230   233   265   332   333   334   344   345   351   358   367   651   668   684   713
         731   738   741   763   764   818   837   851   876   890   909   911   913   915   917
         919   921   928   936   943   958   972  1025  1108  1110  1112  1114  1116  1118  1120
        1243  1248  1289  1618  1625  1737  1796  1816  1817  1822  1823  1853  1864  1865  1870
        1871  1883  1951  2022  2045  2047  2048  2063  2082  2100  2152  2257  2345  2360  2377
        2462  2469  2479
CMP      269   323   346   353   360   364   747   773   806   822   858   897   909   911   913
         915   917   919   921   952  1003  1057  1108  1110  1112  1114  1116  1118  1120  1683
        1685  1850  1899  1906  1920  1926  2150  2258  2262  2396  2398  2457
CMPB     855   894  2309  2311  2315  2318  2320  2363  2378  2381  2383  2387
COM      242  2271
DEC      754   782   799   812   828   864   866   883   903   905   909   911   913   915   917
         919   921   933   960   979  1013  1030  1067  1108  1110  1112  1114  1116  1118  1120
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          1831  1875  1952  2009  2232  2247  2250  2267  2368
DECB      2335
EMT        127   128   129   130   131   132   133   134   135   136   137   138   139   140   141
           142   143   144   145   146   147
HALT       155  2174  2273  2419  2472
INC        752   778   780   811   827   850   863   889   902   909   911   913   915   917   919
           921   949   957  1009  1012  1064  1066  1829  1873  1948  2013
INCB       908   911   913   915   917   919   921  1108  1110  1112  1114  1116  1118  1120
IOT       2454
JMP        173   244   283   294   320   326   338   352   359   368  1290  1663  1739  1834  1836
          1859  1861  1930  1964  1978  1998  1999  2438  2443
JSR        243   257  1852  1901  1908  1922  1928  1959  2314
MOV        228   231   232   238   239   241   247   252   261   262   263   264   284   295   304
           310   315   316   327   331   337   369   370   580   593   606   620   636   652   653
           669   670   685   686   687   713   731   740   742   745   746   765   766   767   768
           772   781   794   796   801   802   803   805   814   817   819   821   839   840   841
           844   848   849   854   878   879   880   881   885   887   888   893   909   911   913
           915   917   919   921   930   931   935   937   938   941   942   951   971   974   975
           976   978   981   982   983   984   985   986   996  1002  1023  1024  1027  1028  1032
          1035  1036  1037  1038  1039  1040  1050  1056  1095  1108  1110  1112  1114  1116  1118
          1120  1145  1146  1149  1150  1184  1237  1238  1240  1242  1247  1249  1312  1313  1316
          1317  1352  1354  1395  1437  1439  1480  1520  1562  1564  1612  1613  1614  1616  1624
          1626  1678  1681  1687  1688  1746  1747  1752  1753  1769  1787  1788  1789  1790  1791
          1792  1793  1801  1803  1805  1806  1812  1814  1815  1818  1824  1837  1842  1843  1844
          1845  1846  1847  1848  1849  1854  1855  1866  1867  1869  1872  1882  1884  1885  1886
          1887  1888  1889  1890  1891  1892  1893  1894  1895  1896  1897  1898  1902  1903  1904
          1905  1919  1923  1924  1925  1947  1949  1956  1971  1973  1977  1990  1991  1993  1996
          2011  2014  2018  2020  2021  2024  2036  2064  2065  2083  2085  2101  2103  2118  2120
          2138  2139  2173  2176  2224  2226  2227  2228  2229  2230  2242  2243  2260  2280  2284
          2285  2286  2287  2288  2289  2295  2296  2297  2298  2299  2300  2305  2346  2347  2348
          2349  2350  2351  2354  2355  2376  2400  2410  2411  2412  2413  2414  2415  2416  2417
          2418  2424  2425  2426  2427  2428  2429  2430  2431  2435  2441  2447  2448  2449  2450
          2451  2452  2453  2454  2459  2460  2463  2467  2468  2474  2476  2478  2482  2483
MOVB       853   892   909   911   913   915   917   919   921  1108  1110  1112  1114  1116  1118
          1120  1917  1918  2234  2246  2249  2252  2322  2331  2332  2361  2365
NOP        656   673   690   713   731  1960  1961  1962  1963  2466
RESET      329  1144  1311  1768  1786  1950  1958
ROL       2265  2266
ROR       2270
RTI        371  1748  1782  1838  1877  2012  2023  2037  2039  2177  2237  2253  2272  2290  2301
          2317  2401
RTS       1176  1217  1219  1221  1223  1278  1280  1282  1284  1343  1383  1385  1387  1389  1424
          1426  1428  1430  1467  1469  1471  1473  1508  1510  1512  1514  1550  1552  1554  1556
          1592  1594  1596  1598  1653  1655  1657  1659  2337  2484
SUB       1972  2264  2475  2477
TST        240   248   253   255   271   273   317   568   571   909   911   913   915   944  1108
          1110  1112  1114  1744  1825  1827  1856  1988  1992  2001  2030  2154  2158  2162  2358
          2436
TSTB       992  1046  1914  2307  2333  2356  2366
.ASCII    2535  2536  2537  2538  2539  2540  2541  2542  2543  2544  2545  2546  2547  2548  2549
          2550  2551  2552  2553  2554  2555  2556  2557  2558  2559  2560  2561  2562  2563  2564
.ENABL       2
.END      2641
.ENDC      909   911   913   915   917   919   921  1108  1110  1112  1114  1116  1118  1120
```

JO9

DZDHKB.P11 CROSS REFERENCE TABLE

ERRORS DETECTED: 0

#DZDHKB,DZDHKB/CRF=DZDHKB
RUN-TIME: 21 38 8 SECONDS
CORE USED: 11K

Spooler runtime 10 Seconds, 66 KCS, 391 disk reads, 1 disk writes, 114 pages printed