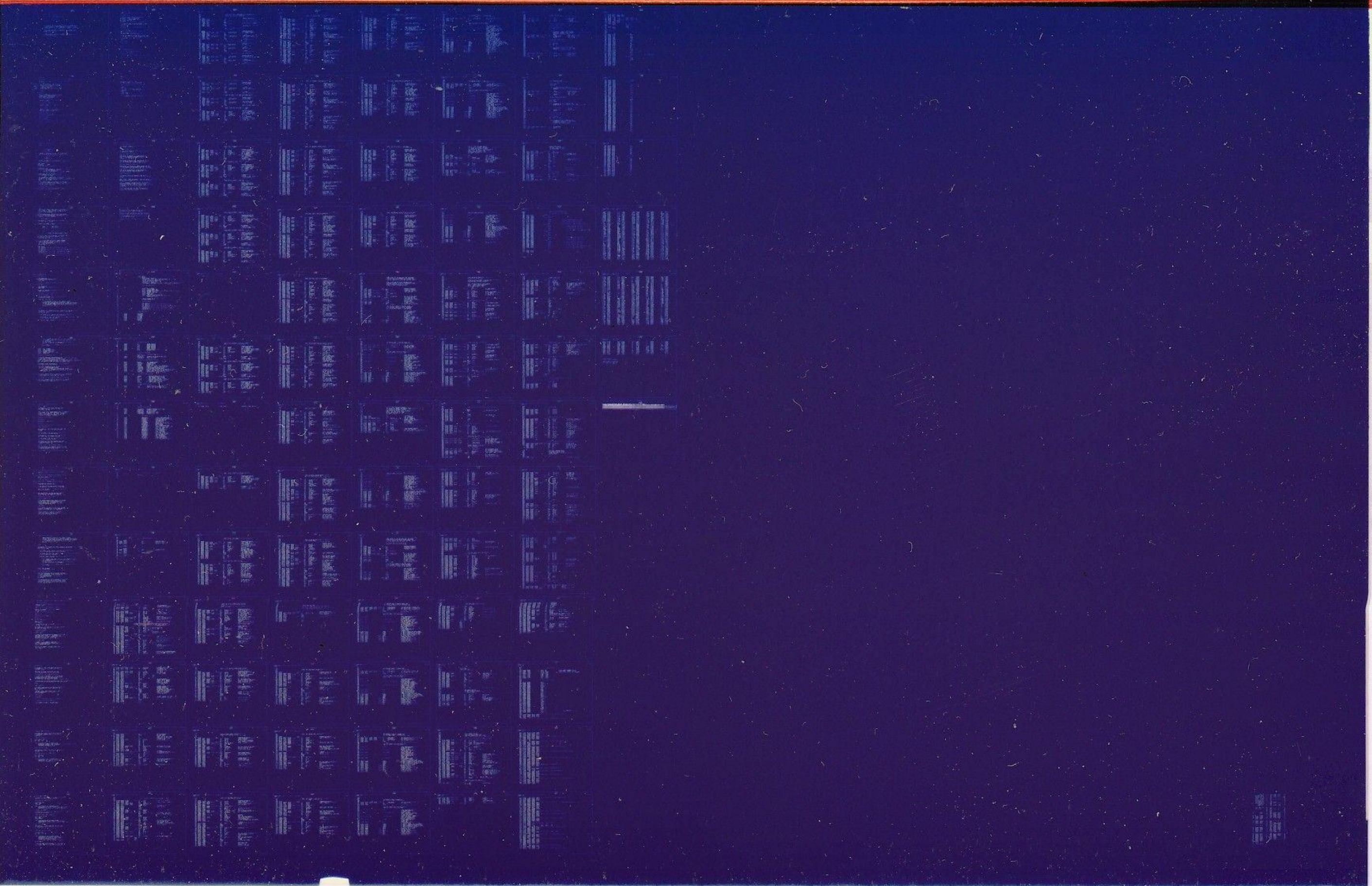


DH11

MULTIPLEXER DIAGNOSTIC
MD-11-DZDHK-C

EP-DZDHK-C-DL-A
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MADE IN U.S.A.



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDHK-C-D
PRODUCT NAME: MODEM CONTROL
MULTIPLEXER DIAGNOSTIC
DATE : 21 AUG 1976
MAINTAINER: DIAGNOSTIC GROUP

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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 H961 TEST CONNECTOR
- GROUP 1: A SINGLE LINE IS TESTED USING THE MODEM CABLE AND
A H315 TEST CONNECTOR
- GROUP 2: CONNECT-DISCONNECT TEST FOR 103A MODEMS
- GROUP 3: CONNECT-DISCONNECT TEST FOR 202C MODEMS

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11 COMPUTER WITH AT LEAST 8K OF MEMORY
WITH OR WITHOUT HARDWARE SWITCH REGISTER
ASR-33 TELETYPE OR EQUIVALENT
MODEM CONTROL MODULES M7807 & M7808

2.1.1 FOR 16 LINE SCANNER TEST

4 CABLES TO CONNECT TO TEST CONNECTOR
H961 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)

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.

NOTE

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

4.2.1.1 LOAD ADDRESS 000200

SET SW00 = 1
PRESS START

***SOFTWARE SWITCH REGISTER IS LOC. 176

4.2.1.2 PROGRAM WILL TYPE

"DH11-MODEM CONTROL DIAGNOSTIC "(ONCE ONLY)

***NOTE: IF USING SOFTWARE SWITCH REGISTER THE FOLLOWING
WILL BE TYPED BEFORE TITLE:

SWR=XXXXXX NEW= (REFER TO SECTION 5.1.2 FOR OPTIONS)

4.2.1.3 PROGRAM WILL TYPE (WITH SW00 = 1)

VECTOR ADDRESS-" AND WILL WAIT FOR AN INPUT
FROM THE TELETYPE KEYBOARD.

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

BIT00 = 1	TEST LINE 00
BIT01 = 1	TEST LINE 01
BIT02 = 0	DO NOT TEST LINE 2

BIT15 = 1 TEST LINE 15

EG: TYPING 377(8) SELECTS LINES 00 THRU 07
TYPING 17777(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

4.2.1.11 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART

4.2.2.1 WITH SW00=1

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.

4.2.2.2 WITH SW00=0

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10
OPERATING PROCEDURE

5.0

5.1 TEST GROUP 0 16 LINE SCANNER TEST

5.1.1 TEST INITIALIZATION

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

5.1.2 OPERATIONAL SWITCH SETTINGS

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

CONTROL:

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

- 1) TYPE CONTROL G (<↑G>); THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.
- 2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)
- 3) AFTER THE "NEW=" HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE OF THE FOLLOWING AT THE TTY:

GO1

SEQ 0006

- A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED) IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.
- B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

SW15=1, HALT ON ERROR
SW14=1, LOOP ON CURRENT TEST
SW13=1, SUPPRESS ERROR TYPEOUT
SW11=1, SUPPRESS ITERATIONS
SW10=1, ESCAPE TO NEXT TEST ON ERROR
SW09=1, FREEZE DATA

5.1.3 PROGRAM AND/OR OPERATOR ACTION

5.1.3.1 WITH ALL SWITCHES DOWN, THE PROGRAM WILL RUN ALL TESTS IN THE SELECTED GROUP, SEQUENTIALLY. EACH TEST IS REPEATED A FIXED NUMBER OF TIMES (SEE LISTING FOR DETAILS), EXCEPT FOR TO WHICH IS EXECUTED ONCE ONLY AFTER START OF TEST. WHEN ALL TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL ISSUE A "RESET", RING THE TELETYPE BELL, AND RESTART AT THE FIRST TEST OF THE SELECTED GROUP.

IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING.

5.1.3.2 WITH SW15=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT A HALT WILL OCCUR AFTER ERROR TYPEOUT.

NOTE: IF USING THE SOFTWARE SWITCH REGISTER AND AN ERROR HALT OCCURS, THE SOFTWARE SWITCH REGISTER CAN BE CHANGED BY PRESSING CONTINUE THE PROGRAM WILL RESPOND WITH THE FOLLOWING:
SWR=XXXXXX NEW=

5.1.3.3 WITH SW13=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT NO ERROR TYPEOUT WILL OCCUR. THE PC OF THE TEST THAT FAILED WILL BE DISPLAYED IN THE COMPUTER DATA LIGHTS.

5.1.3.4 THIS PROGRAM WILL NO LONGER TRACE TRAP WITH THIS RELEASE

5.1.3.5 WITH SW10=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT AFTER AN ERROR HAS OCCURED, THE PROGRAM WILL IMMEDIATELY START THE NEXT TEST IN SEQUENCE.

5.2 TEST GROUP 1 SINGLE LINE CABLE TEST

5.2.1 TEST INITIALIZATION

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

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

5.2.2 OPERATIONAL SWITCH SETTINGS

SAME AS 5.1.2

5.2.3 PROGRAM AND/OR OPERATOR ACTION

SAME AS 5.1.3

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

5.3.1 TEST INITIALIZATION

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

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

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

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

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

5.3.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.3.2.1 PLACE ANSWERING DATA SET IN "AUTO ANSWER" MODE

- 5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE
- 5.3.2.3 DIAL DIAL ANSWERING DATA SET FROM ORIGINATING DATA SET
- 5.3.2.4 LISTEN FOR TONE IN HANDSET OF ORIGINATING DATA SET.
WHEN TONE IS HEARD, PRESS "DATA" BUTTON ON ORIGINATING DATA SET.
"DATA" LIGHT SHOULD ILLUMINATE
- 5.3.2.5 "DATA" LIGHT ON ANSWERING DATA SET SHOULD BE LIT.
- 5.3.2.6 THE PROGRAM WILL NOW WAIT FOR INTERRUPTS FROM THE MODEM CONTROL.
- 5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED, THE PROGRAM WILL TYPE "TYPE TTY KEY TO DISCONNECT".
WHEN TTY KEY IS STRUCK, THE PROGRAM WILL BEGIN THE DISCONNECT SEQUENCE.
- 5.3.2.8 WHEN THE DISCONNECT SEQUENCE HAS BEEN COMPLETED THE PROGRAM WILL TYPE "103A TEST COMPLETE", AND WILL REQUEST THE OPERATOR TO SELECT NEW LINES.
- 5.3.3 PROGRAM ACTION IN CASE OF ERROR
- 5.3.3.1 RING ON INCORRECT LINE
IF THE PROGRAM DETECTS A RING SIGNAL ON AN INCORRECT LINE, OR IF ANY OTHER TRANSITION BESIDES RING IS DETECTED BEFORE RING, THE PROGRAM WILL TYPE A FATAL ERROR MESSAGE AND REQUEST THE OPERATOR TO RESELECT LINES AND REDIAL.
- 5.3.3.2 OTHER ERRORS
IF ANY ERRORS OCCUR AFTER THE FIRST RING HAS BEEN DETECTED, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING TO COMPLETION.
THE ONLY EXCEPTION TO THIS IS IF AN INTERRUPT OCCURS ON A LINE NOT SELECTED, IN WHICH CASE A FATAL ERROR WILL BE REPORTED, AND THE PROGRAM WILL PROCEED AS DESCRIBED IN 5.3.3.1

5.3.4 OPERATION SWITCH SETTINGS

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

CONTROL:

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

- 1) TYPE CONTROL G (<G>); THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.
- 2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)
- 3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE OF THE FOLLOWING AT THE TTY:
 - A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED AND ONLY 6 NUMBERS WILL BE ALLOWED)
IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.
 - B) IF A CONTROL U (<U>) IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

SW15=1, HALT ON ERROR
SW13=1, SUPPRESS ERROR TYPEOUT

5.3.5 DATA SET MODE SWITCHING

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

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

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

5.4.1 TEST INITIALIZATION

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

5.4.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.4.3 PROGRAM ACTION IN CASE OF ERRORS

SAME AS 5.3.3

5.4.4 OPERATIONAL SWITCH SETTINGS

SAME AS 5.3.4

5.4.5 DATA SET MODE SWITCHING

SAME AS 5.3.5

5.5 TEST RESELECTION

TO ESCAPE FROM THE TEST IN PROGRESS, AND SELECT A NEW TEST, TYPE <CONTROL C>.

THE PROGRAM WILL STOP EXECUTION OF THE TEST IN PROGRESS AND THEN TYPE "TEST-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

PROCEED AS DESCRIBED IN 4.2.1.8

5.5 ADDRESS CHANGE

TO CHANGE THE VECTOR AND REGISTER ADDRESS OF THE 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 RESUME TEST EXECUTION.

NOTE: IF A TEST IS NOT IN PROGRESS, I.E., IF THE PROGRAM IS WAITING FOR AN INPUT FROM THE TELETYPE KEYBOARD, THE ERROR MESSAGE WILL BE "POWER FAILURE". THE PROGRAM WILL THEN REQUEST THE OPERATOR TO SELECT A TEST.

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

6.0 ERRORS

6.1 NORMAL OPERATION

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

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

6.1.1 ERROR MESSAGES

6.1.1.1 UNIQUE ERROR

ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER

AN EXAMPLE OF THIS TYPE OF ERROR IS:

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

6.1.1.2 TRANSITION DETECTION ERROR

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

FORMAT FOR ERROR TYPEOUT IS

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

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

6.1.1.3 SINGLE LINE STATUS ERROR

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

FORMAT FOR SINGLE LINE STATUS ERROR IS

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

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

6.1.1.4 FATAL TRANSITION ERROR

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

FORMAT FOR FATAL ERROR TYPEOUT IS

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

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

6.1.1.4 CONTROL STATUS ERROR

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

FORMAT FOR CONTROL STATUS ERROR IS

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

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

6.1.1.5 LINE STATUS ERROR

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

FORMAT FOR LINE STATUS ERROR IS

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

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

6.1.2 REPEATED ERRORS

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

6.2 SCOPE LOOPS

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

6.2.1 AFTER ERROR HALT

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

***IF USING SOFTWARE SWITCH REGISTER AND YOU WANT TO CHANGE
THE SWITCH SETTING TYPE A (↑G) BEFORE CONTINUING,
PRESS CONTINUE

THE PROGRAM WILL LOOP ON THE SAME TEST.

6.2.2 FROM PROGRAM START

6.2.2.1 PROCEED AS DESCRIBED IN 4.2.1.1 TO 4.2.1.4

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

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

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

6.2.3 AFTER (CONTROL)

SAME AS 6.2.2.2 TO 6.2.2.4

7.0 RESTRICTIONS

7.1 STARTING

7.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR MUST BE INSTALLED.

7.1.2 FOR SINGLE LINE CABLE TEST

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

7.1.3 FOR ON LINE TESTS

NONE

7.2 OPERATING
NONE.

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

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

VECTORS

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

ADDRESSES

DHMCSR: 170500
DHMLSR: 170502

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

8.0 EXECUTION TIME

8.1 16 LINE SCANNER TEST

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

8.2 SINGLE LINE CABLE TEST

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

8.3 103A MODEM CONNECT-DISCONNECT TEST

APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET FIRST DETECTS A RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SWD1=1 TO DISCONNECT".

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

8.4 202C MODEM CONNECT-DISCONNECT TEST

APPROXIMATELY 1.5 MINUTES WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET DETECTS THE FIRST RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SWD1=1 TO DISCONNECT".

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

9. PROGRAM DESCRIPTION

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

WHEN INITIALLY LOADED AND STARTED ... SWD0 MUST BE SET =1. THE PROGRAM WILL BEGIN A DIALOG WITH THE OPERATOR TO INPUT THE PARAMETERS REQUIRED BY THE PROGRAM.

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

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

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

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 0

;REGISTER DEFINITIONS

```

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

;LOCATION EQUIVALENCIES

```

177776      PS=177776     ;PROCESSOR STATUS WORD
              .EQUIV PS,PSW
015430      RADIX=DIVIS   ;CONVERSION FACTOR FOR DECIMAL OUTPUT
015424      BINWRD=DIVIDL ;WORD TO BE CONVERTED TO OCTAL ASCII
015426      DIGIT=DIVIDH  ;ASCII OCTAL DIGIT
  
```

;CONTROL STATUS REGISTER BIT FUNCTIONS

```

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

;LINE REGISTER BIT FUNCTIONS

```

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

;SOFTWARE TRANSITION FLAGS

```

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

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141

; INSTRUCTION DEFINITIONS

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

; EMT DEFINITION TABLE

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


```

149
150 ;STANDARD INTERRUPT VECTORS
151
152 . =24
153 000024 000024 PFAIL ;POWER FAIL HANDLER
154 000026 016176 340 ;SERVICE AT LEVEL 7
155 000030 014120 EMTSRV ;EMT DISPATCH SERVICE
156 000032 000340 340 ;SERVICE AT LEVEL 7
157
158 . =46
159 000046 014102 LOGICAL ;ACT11?
160
161 . =60
162 000060 001760 KBDINT ;KEYBOARD MONITOR
163 000062 000340 340 ;SERVICE AT LEVEL 7
164
165 . =174
166 000174 000000 DISPREG: 0
167 000176 000000 SWREG: 0
168
169 . =200
170 000200 000137 001100 JMP START ;GO TO START OF PROGRAM
171
172
173

```

```

174
175      001100      001100      .=1100
176      001100      012737      016176      000024      STACK:
177      001100      012737      016176      000024      START:  MOV      #PFAIL,24      ;SET UP POWER FAIL
178                                          ;INTERRUPT SERVICE VECTOR
179      001106      005037      001756      CLR      TIPFLG      ;CLEAR TEST IN PROGRESS FLAG
180      001112      005077      015472      CLR      @TKCSR
181      001116      012706      001100      MOV      #STACK,SP      ;SET UP STACK POINTER
182
183      001122      013746      000006      SUSWR:  MOV      @#6,-(SP)      ;SAVE VECTORS
184      001126      013746      000004      MOV      @#4,-(SP)
185      001132      012737      001152      000004      MOV      #64$,@#4      ;SET UP FOR TIMEOUT
186      001140      022777      177777      015452      CMP      #-1,@SWR      ;REFERENCE HARDWARE SWITCH REGISTER
187      001146      001402      BEQ      65$
188      001150      000407      BR       66$
189      001152      022626      64$:    CMP      (SP)+,(SP)+      ;ADJUST STACK
190      001154      012737      000176      016620      65$:    MOV      #SWREG,SWR      ;POINT TO SOFTWARE SWITCH REG
191      001162      012737      000174      016622      MOV      #DISPREG,DISPLAY      ;POINT TO SOFT DISPLAY REG
192      001170      012637      000004      66$:    MOV      (SP)+,@#4      ;RESTORE VECTORS
193      001174      012637      000006      MOV      (SP)+,@#6
194      001200      012777      000100      015402      MOV      #INTENA,@TKCSR      ;ENABLE TELETYPE INTERRUPTS
195      001206      005037      001252      CLR      XFLAG      ;XOR = NO
196
197      ;*****
198      ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
199      ;*****
200      001212      000423      BR       STARTO      ;SKIP XOR STUFF
201      001214      013746      000004      MOV      4,-(SP)      ;SAVE 4
202      001220      012737      001254      000004      MOV      #XORSVC,4      ;SET UP SVC ROUTINE
203      001226      005737      177060      TST      177060      ;GOT AN XOR TESTER OUT THERE ?
204      001232      012637      000004      MOV      (SP)+,4      ;YES
205      001236      005137      001252      COM      XFLAG      ;XOR = YES
206      001242      004737      016320      JSR      PC,XOR      ;AUTO VECTOR
207      001246      000137      001262      JMP      STARTO      ;RESTORE TRAPCATCHER
208      001252      000000      XFLAG:  0      ;XOR FLAG
209      001254      022626      XORSVC: POP2SP
210      001256      012637      000004      MOV      (SP)+,4      ;RESTORE 4
211      001262      005737      016710      STARTO: TST      TIFLG      ;TYPED TITLE?
212      001266      001005      BNE      .+14      ;YES
213      001270      104004      TYPE     ;TYPE "MODEM CONTROL DIAGNOSTIC"
214      001272      017510      MTITLE
215      001274      012737      000001      016710      MOV      #1,TIFLG      ;SET TITLE TYPED FLAG
216      001302      005737      001252      TST      XFLAG      ;X OR ?
217      001306      100422      BMI      VECSTR      ;RESTORE TRAPCATCHER
218      001310      005737      000042      TST      42      ;ACT 11?
219      001314      001403      BEQ      START1      ;NO
220      001316      004737      016320      JSR      PC,XOR      ;YES AUTO VECTOR
221      001322      000414      BR       VECSTR      ;GET VECTOR AND REGISTER ADDRESS
222      001324      005737      000042      START1: TST      @#42      ;UNDER MONITOR?
223      001330      001005      BNE      1$
224      001332      022737      000176      016620      CMP      #SWREG,SWR      ;USING SWREG?
225      001340      001001      BNE      1$
226      001342      104025      CNTLUU
227      001344      032777      000001      015246      1$:    BIT      #1,@SWR      ;IF SW BIT 0=1, ON PROGRAM RESTART
228      001352      001510      BEQ      STARTN      ;INPUT VECTOR AND REGISTER ADDRESSES
229      001354      012706      001100      VECSTR: MOV      #STACK,SP      ;SET UP PROCESSOR STACK POINTER
230      001360      012737      000300      014026      MOV      #300,DATA1      ;ADDRESS OF FIRST FLOATING VECTOR

```

230	001366	012737	000302	014030		MOV	#302, DATA2		: ADDRESS OF STATUS WORD
231	001374	013777	014030	012424	VECSTA:	MOV	DATA2, @DATA1		: MOVE ADDRESS OF STATUS WORD TO VECTOR
232	001402	005077	012422			CLR	@DATA2		: CLEAR STATUS WORD
233									: (FOR HALT ON ILLEGAL INTERRUPT)
234	001406	062737	000004	014026		ADD	#4, DATA1		: NEXT VECTOR
235	001414	062737	000004	014030		ADD	#4, DATA2		: NEXT STATUS WORD
236	001422	023727	014026	001000		CMP	DATA1, #1000		: IS TABLE CLEARED
237	001430	001361				BNE	VECSTA		: IF NOT, CONTINUE
238	001432	005737	001252			TST	XFLAG	: XOR ?	
239	001436	100523				BMI	TSTGO	: YES	
240	001440	005737	000042			TST	42	: ACT 11 ?	
241	001444	001120				BNE	TSTGO	: YES	
242	001446	104013				INSTRG			: GET VECTOR ADDRESS
243	001450	017574				MVECTOR			: MESSAGE "VECTOR ADDRESS--"
244	001452	000303				300			: LOWER LIMIT FOR ADDRESS
245	001454	000774				774			: UPPER LIMIT FOR ADDRESS
246	001456	016600				DHMVEC			: STORAGE FOR ADDRESS
247	001460	032737	000003	016600	1\$:	BIT	#3, DHMVEC		: TEST 2 LSB OF ADDRESS
248	001466	001404				BEQ	VECST1		: IF 0, CONTINUE
249	001470	012716	001460			MOV	#1\$, (SP)		
250	001474	000137	016026			JMP	INSTR		: INCORRECT ADDRESS, TRY AGAIN
251	001500	013737	016600	016602	VECST1:	MOV	DHMVEC, DHMLVL		: GENERATE ADDRESS OF
252	001506	062737	000002	016602		ADD	#2, DHMLVL		: INTERRUPT STATUS WORD
253	001514	104013				INSTRG			: GET ADDRESS OF CONTROL REGISTER
254	001516	017616				MREGAD			: MESSAGE "REGISTER ADDRESS--"
255	001520	170500				170500			: LOWER LIMIT FOR ADDRESS
256	001522	170670				170670			: UPPER LIMIT FOR ADDRESS
257	001524	016604				DHMCSR			: STORAGE FOR ADDRESS
258	001526	032737	000007	016604	1\$:	BIT	#7, DHMCSR		: IF 3 LSB ARE NOT 0
259	001534	001404				BEQ	REGST1		
260	001536	012716	001526			MOV	#1\$, (SP)		
261	001542	000137	016026			JMP	INSTR		: INCORRECT ADDRESS, TRY AGAIN
262	001546	013737	016604	016606	REGST1:	MOV	DHMCSR, DHMLSR		: SET UP ADDRESS OF LINE STATUS REGISTER
263	001554	062737	000002	016606		ADD	#2, DHMLSR		
264	001562	104013				INSTRG			: GET LINE SELECT PARAMETER
265	001564	017652				MLINSL			
266	001566	000000				0			
267	001570	177777				177777			
268	001572	016712				LINSEL			

```

269
270 001574 012706 001100      STARTN: MOV      #STACK, SP      ;SET UP PROCESSOR STACK
271 001600 104013              INSTRG                      ;GET TEST NUMBER
272 001602 017704              MTEST                      ;MESSAGE "TEST-"
273 001604 000000              0                          ;LOWER LIMIT FOR TEST NUMBER
274 001606 000777              777                        ;UPPER LIMIT FOR TEST NUMBER
275 001610 016632              TSTNO                      ;STORAGE FOR TEST NUMBER
276 001612 013705 016632      X1A:  MOV      TSTNO, R5      ;GET TEST NUMBER
277 001616 042705 177077      BIC      #177077, R5        ;EXTRACT TEST GROUP NUMBER
278 001622 006205              ASR      R5
279 001624 006205              ASR      R5
280 001626 006205              ASR      R5
281 001630 006205              ASR      R5
282 001632 006205              ASR      R5
283 001634 016537 020426 016666      MOV      GR0(R5), TSTMAX    ;GET HIGHEST TEST IN GROUP
284 001642 016537 020406 016664      MOV      TSTLST(R5), TSTPNT ;GET POINTER TO TEST TABLE
285 001650 005737 016664      TST      TSTPNT            ;IF 0, INVALID TEST GROUP
286 001654 001004              BNE      STRTOA
287 001656 012716 001612      X1B:  MOV      #X1A, (SP)
288 001662 000137 016026      JMP      INSTR
289 001666 042737 177700 016632      STRTOA: BIC      #177700, TSTNO ;TRY AGAIN
290                                     ;GET NUMBER OF FIRST TEST
291 001674 023737 016632 016666      CMP      TSTNO, TSTMAX      ;TO BE EXECUTED IN SELECTED GROUP
292 001702 003401              BLE      TSTGO              ;IS NUMBER TOO LARGE
293 001704 000764              BR       X1B
294 001706 012746 000340      TSTGO: MOV      #340, -(SP) ;SET UP PRIORITY LEVEL
295 001712 005746              PUSH1SP
296 001714 000005              RESET
297 001716 012737 002202 002204      MOV      #DMYRTI, KRET      ;SET UP DUMMY KEYBOARD RETURN
298 001724 005037 016670              CLR      LINFLG            ;CLEAR LINE SELECTED FLAG
299 001730 005037 016626              CLR      TRACON            ;CLEAR TRACE TRAP FLAG
300 001734 005037 016630              CLR      PASCNT            ;CLEAR PASS COUNT
301 001740 104004              TYPE
302 001742 017720              MCRLF
303 001744 012737 000001 001756      1$:  MOV      #1, TIPFLG     ;SET TEST IN PROGRESS FLAG
304 001752 000137 014334      JMP      TSTENT            ;START TESTING
305 001756 000000              TIPFLG: 0

```

```

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

```



```

507
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511 003020
512 003020 005077 013560
513 003024 042737 000340 177776
514 003032 052737 000300 177776
515 003040 012777 003102 013532
516 003046 013777 177776 013526
517 003054 012777 000100 013522
518 003062 052777 000200 013514
519 003070 000240
520 003072 000240
521 003074 005077 013504
522 003100 000402
523 003102 022626
524 003104 104012
525 003106 104002
526
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531 003110
532 003110 005077 013470
533 003114 042737 000340 177776
534 003122 052737 000240 177776
535 003130 012777 003172 013442
536 003136 013777 177776 013436
537 003144 012777 000100 013432
538 003152 052777 000200 013424
539 003160 000240
540 003162 000240
541 003164 005077 013414
542 003170 000402
543 003172 022626
544 003174 104012
545 003176 104002
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550 003200
551 003200 005077 013400
552 003204 042737 000340 177776
553 003212 052737 000200 177776
554 003220 012777 003262 013352
555 003226 013777 177776 013346
556 003234 012777 000100 013342
557 003242 052777 000200 013334
558 003250 000240
559 003252 000240
560 003254 005077 013324
561 003260 000402
562 003262 022626
563 003264 104012

```

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

```

T12:
INT5: CLR    3DHMCSR
      BIC    #340,PS
      BIS    #300,PS
      MOV    #INT5A,3DHMVEC
      MOV    PS,3DHMLVL
      MOV    #INTENA,3DHMCSR
      BIS    #DONE,3DHMCSR
      NOP
      NOP
      CLR    3DHMCSR
      BR     INT5B
INT5A: POP2SP
      ERROR
INT5B: SCOPE

```

:REFERENCE DESIGNATION
:CLEAR CONTROL REGISTER
:SET PROCESSOR PRIORITY
:TO LEVEL 6.
:SET UP INTERRUPT SERVICE ADDRESS
:SET UP INTERRUPT SERVICE LEVEL
:SET INTERRUPT ENABLE
:GENERATE INTERRUPT
:DELAY FOR INTERRUPT

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

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

```

T13:
INT6: CLR    3DHMCSR
      BIC    #340,PS
      BIS    #240,PS
      MOV    #INT6A,3DHMVEC
      MOV    PS,3DHMLVL
      MOV    #INTENA,3DHMCSR
      BIS    #DONE,3DHMCSR
      NOP
      NOP
      CLR    3DHMCSR
      BR     INT6B
INT6A: POP2SP
      ERROR
INT6B: SCOPE

```

:REFERENCE DESIGNATION
:CLEAR CONTROL REGISTER
:SET PROCESSOR PRIORITY
:TO LEVEL 5.
:SET UP INTERRUPT SERVICE ADDRESS
:SET UP INTERRUPT SERVICE LEVEL
:SET INTERRUPT ENABLE
:GENERATE INTERRUPT
:DELAY FOR INTERRUPT

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

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

```

T14:
INT7: CLR    3DHMCSR
      BIC    #340,PS
      BIS    #200,PS
      MOV    #INT7A,3DHMVEC
      MOV    PS,3DHMLVL
      MOV    #INTENA,3DHMCSR
      BIS    #DONE,3DHMCSR
      NOP
      NOP
      CLR    3DHMCSR
      BR     INT7B
INT7A: POP2SP
      ERROR

```

:REFERENCE DESIGNATION
:CLEAR CONTROL REGISTER
:SET PROCESSOR PRIORITY
:TO LEVEL 4.
:SET UP INTERRUPT SERVICE ADDRESS
:SET UP INTERRUPT SERVICE LEVEL
:SET INTERRUPT ENABLE
:GENERATE INTERRUPT
:DELAY FOR INTERRUPT

:NO INTERRUPT, CONTINUE
:RESTORE STACK
:INTERRUPT OCCURED, ERROR

F03

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DZDHKC.P11

SEQ 0031

563 003266 104002

INT7B: SCOPE

;CHECK FOR ITERATION, LOOP

```

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570 003270
571 003270 005077 013310
572 003274 042737 000340 177776
573 003302 012777 003352 013270
574 003310 005077 013266
575 003314 052737 000000 177776
576 003322 012777 000100 013254
577 003330 052777 000200 013246
578 003336 000240
579 003340 000240
580 003342 005077 013236
581 003346 104012
582 003350 000401
583 003352 022626
584 003354 104002
585
586
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589
590 003356
591 003356 005077 013222
592 003362 042737 000340 177776
593 003370 012777 003440 013202
594 003376 005077 013200
595 003402 052737 000040 177776
596 003410 012777 000100 013166
597 003416 052777 000200 013160
598 003424 000240
599 003426 000240
600 003430 005077 013150
601 003434 104012
602 003436 000401
603 003440 022626
604 003442 104002
605
606
607 003444
608 003444 005077 013134
609 003450 042737 000340 177776
610 003456 012777 003526 013114
611 003464 005077 013112
612 003470 052737 000100 177776
613 003476 012777 000100 013100
614 003504 052777 000200 013072
615 003512 000240
616 003514 000240
617 003516 005077 013062
618 003522 104012
619 003524 000401

```

```

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

T15:
INT10: CLR      3DHMCSR      ;REFERENCE DESIGNATION
        BIC      #340,PS    ;CLEAR CONTROL REGISTER
        MOV      #INT10A,3DHMVEC ;ALLOW INTERRUPTS
        CLR      3DHMLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #0,PS      ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      #INTENA,3DHMCSR ;SET PROCESSOR PRIORITY TO LEVEL 0.
        BIS      #DONE,3DHMCSR ;SET INTERRUPT ENABLE
        NOP      ;GENERATE INTERRUPT
        NOP      ;WAIT FOR INTERRUPT
        CLR      3DHMCSR
        ERROR
        BR       INT10B      ;NO INTERRUPT, ERROR
INT10A: POP2SP
INT10B: SCOPE                ;CONTINUE
                                ;INTERRUPT OCCURED, RESTORE STACK
                                ;CHECK FOR INTERATIONS, LOOP.

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

T16:
INT11: CLR      3DHMCSR      ;REFERENCE DESIGNATION
        BIC      #340,PS    ;CLEAR CONTROL REGISTER
        MOV      #INT11A,3DHMVEC ;ALLOW INTERRUPTS
        CLR      3DHMLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #40,PS     ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      #INTENA,3DHMCSR ;SET PROCESSOR PRIORITY TO LEVEL 1.
        BIS      #DONE,3DHMCSR ;SET INTERRUPT ENABLE
        NOP      ;GENERATE INTERRUPT
        NOP      ;WAIT FOR INTERRUPT
        CLR      3DHMCSR
        ERROR
        BR       INT11B      ;NO INTERRUPT, ERROR
INT11A: POP2SP
INT11B: SCOPE                ;CONTINUE
                                ;INTERRUPT OCCURED, RESTORE STACK
                                ;CHECK FOR INTERATIONS, LOOP.

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

T17:
INT12: CLR      3DHMCSR      ;REFERENCE DESIGNATION
        BIC      #340,PS    ;CLEAR CONTROL REGISTER
        MOV      #INT12A,3DHMVEC ;ALLOW INTERRUPTS
        CLR      3DHMLVL    ;SET UP INTERRUPT SERVICE ADDRESS
        BIS      #100,PS    ;SET UP INTERRUPT SERVICE PRIORITY
        MOV      #INTENA,3DHMCSR ;SET PROCESSOR PRIORITY TO LEVEL 2.
        BIS      #DONE,3DHMCSR ;SET INTERRUPT ENABLE
        NOP      ;GENERATE INTERRUPT
        NOP      ;WAIT FOR INTERRUPT
        CLR      3DHMCSR
        ERROR
        BR       INT12B      ;NO INTERRUPT, ERROR
                                ;CONTINUE

```

H03

DZDHK-C MACY11 27(732) 17-MAY-76 13:35 PAGE 16
DZDHKC.P11

SEQ 0033

620 003526 022626
621 003530 104002

INT12A: PUP2SF
INT12B: SCOPE

; INTERRUPT OCCURED, RESTORE STACK
; CHECK FOR INTERATIONS, LOOP.


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645 003620
646 003620 005077 012760
647 003624 042737 000340 177776
648 003632 012737 000001 016714
649 003640 005005
650 003642 012700 000020
651 003646 033737 016714 016712
652 003654 001407
653 003656 010577 012722
654 003662 017704 012716
655 003666 020504
656 003670 001401
657 003672 104000
658 003674 104003
659 003676 003646
660 003700 005205
661 003702 006337 016714
662 003706 005300
663 003710 001356
664 003712 104002
665
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669 003714
670 003714 042737 000340 177776
671 003722 005077 012656
672 003726 005005
673 003730 012737 000001 016714
674 003736 012701 177777
675 003742 012700 000020
676 003746 012777 000017 012630
677 003754 033737 016714 016712
678 003762 001410
679 003764 052777 000400 012612
680 003772 017704 012606
681 003776 020504
682 004000 001401
683 004002 104000
684 004004 104003
685 004006 003714
686 004010 005205
687 004012 006337 016714
688 004016 005201
689 004020 010177 012560
690 004024 005300
691 004026 001352
692 004030 104002

;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
        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 NUMBERS THE SAME
        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
        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
        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

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700 004032          T23:
701 004032 012777 002000 012544 MEMT1: MOV #CLRMUX, @DHMCSR ; REFERENCE DESIGNATION
702 004040 042737 000340 177776      BIC #340, PS ; CLEAR CONTROL STATUS REGISTER
703 004046 012700 000020          MOV #16., R0 ; ENABLE INTERRUPTS
704 004052 052777 001017 012524      BIS #MAINT+17, @DHMCSR ; SET UP TO TEST 16 LOCATIONS
705 004060 052777 000400 012516 MEMT1A: BIS #STEP, @DHMCSR ; SET MAINTENANCE MODE
706 004066 005300          DEC R0 ; SET LINE COUNTER THRU ALL
707 004070 001373          BNE MEMT1A ; STATES, WRITING 1'S INTO
708 004072 012700 000020          MOV #16., R0 ; ALL MEMORY WORDS
709 004076 012705 070000          MOV #70000, R5 ; SET UP TO TEST 16 WORDS
710 004102 012777 000017 012474      MOV #17, @DHMCSR ; SET UP EXPECTED STATUS REGISTER
711 004110 052777 000400 012466 MEMT1B: BIS #STEP, @DHMCSR ; START WITH LINE 0
712 004116 017704 012462          MOV @DHMCSR, R4 ; ACCESS SCANNER MEMORY
713 004122 020504          CMP R5, R4 ; READ DATA
714 004124 001403          BEQ MEMT1C ; COMPARE EXPECTED AND RECEIVED
715 004126 104000          ERRORC ; DATA
716 004130 104003          SCOPEF ; CONTROL STATUS OR MEMORY ERROR
717 004132 004032          MEMT1 ; CHECK FOR DATA FREEZE
718 004134 005205          MEMT1C: INC R5 ; UPDATE EXPECTED STATUS
719 004136 005300          DEC R0 ; UPDATE LINE COUNT
720 004140 001363          BNE MEMT1B ; CONTINUE
721 004142 012777 004000 012434 MEMT1D: MOV #CLRSCN, @DHMCSR ; SET "CLEAR SCAN"
722 004150 032777 000020 012426      BIT #BUSY, @DHMCSR ; WAIT FOR "CLEAR CYCLES"
723 004156 001374          BNE .-6
724 004160 012700 000020          MOV #16., R0 ; SET UP TO TEST 16 MEMORY
725 004164 005005          CLR R5 ; LOCATIONS
726 004166 012777 000017 012410      MOV #17, @DHMCSR ; FIRST TO BE TESTED=0
727 004174 052777 000400 012402 MEMT1E: BIS #STEP, @DHMCSR ; ACCESS SEANNER MEMORY
728 004202 017704 012376          MOV @DHMCSR, R4 ; READ DATA
729 004206 020504          CMP R5, R4 ; COMPARE EXPECTED AND RECEIVED
730 004210 001403          BEQ MEMT1F ; DATA
731 004212 104000          ERRORC ; CONTROL STATUS OF MEMORY ERROR
732 004214 104003          SCOPEFF ; CHECK FOR DATA FREEZE
733 004216 004142          MEMT1D
734 004220 005205          MEMT1F: INC R5 ; UPDATE EXPECTED DATA
735 004222 005300          DEC R0 ; UPDATE LINE COUNT
736 004224 001363          BNE MEMT1E ; CONTINUE
737 004226 104002          SCOPE ; CHECK FOR ITERATIONS, LOOP

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742 004230
743 004230 005077 012350
744 004234 042737 000340 177776
745 004242 012700 000020
746 004246 012702 000017
747 004252 012777 004000 012324
748 004260 032777 000020 012316
749 004266 001374
750 004270 012777 001000 012306
751 004276 050277 012302
752 004302 052777 000400 012274
753 004310 042777 001000 012266
754 004316 012703 000020
755 004322 012777 000017 012254
756 004330 005202
757 004332 005001
758 004334 052777 000400 012242
759 004342 117704 012236
760 004346 010105
761 004350 120402
762 004352 001002
763 004354 052705 070000
764 004360 020405
765 004362 001403
766 004364 104000
767 004366 104003
768 004370 004252
769 004372 005201
770 004374 005303
771 004376 001356
772 004400 005300
773 004402 001323
774 004404 104002

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

T24:
MEMT2: CLR @DHMCSR
      BIC #340,PS
      MOV #16,R0
      MOV #17,R2
MEMT2A: MOV #CLRSCN,@DHMCSR
      BIT #BUSY,@DHMCSR
      BNE .-6
      MOV #MAINT,@DHMCSR
      BIS R2,@DHMCSR
      BIS #STEP,@DHMCSR
      BIC #MAINT,@DHMCSR
      MOV #16,R3
      MOV #17,@DHMCSR
      INC R2
      CLR R1
MEMT2B: BIS #STEP,@DHMCSR
      MOVB @DHMCSR,R4
      MOV R1,R5
      CMPB R4,R2
      BNE MEMT2C
MEMT2C: BIS #70000,R5
      CMP R4,R5
      BEQ MEMT2D
      ERRORC
      SCOPEF
MEMT2D: INC R1
      DEC R3
      BNE MEMT2B
      DEC R0
      BNE MEMT2A
      SCOPE

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

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

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

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

;TEST NEXT SCANNED LOCATION
;UPDATE LINE COUNT
;CHECK FOR ITERATION, LOOP

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775
776                                     ;WITH ALL ACANNER MEMORY LOCATIONS SET TO 1'S,
777                                     ;WRITE 0'S INTO SELECTED LOCATION
778                                     ;VERIFY THAT ONLY SELECTED LOCATION WAS CLEARED.
779
780 004406                                T25:                                ;REFERENCE DESIGNATION
781 004406 005077 012172                 MEMT3: CLR                @DHMCSR          ;CLEAR CONTROL STATUS REGISTER
782 004412 042737 000340 177776         BIC                #340,PS             ;ENABLE INTERRUPTS
783 004420 012700 000020                 MOV                #16.,R0            ;SET UP TO TEST 16 ADDRESSES
784 004424 012702 000017                 MOV                #17.,R2            ;FIRST ADDRESS TO BE TESTED=0
785 004430 012703 000020                 MEMT3A: MOV           #16.,R3          ;WRITE 1'S INTO ALL SCANNER
786 004434 012777 001017 012142         MOV                #MAINT+17,@DHMCSR ;MEMORY LOCATIONS
787 004442 052777 000400 012134         MEMT3B: BIS                #STEP,@DHMCSR
788 004450 005303                         DEC                R3
789 004452 001373                         BNE                MEMT3B
790 004454 010277 012124                 MOV                R2,@DHMCSR          ;SET LINE COUNTER TO TEST ADDRESS-1
791 004460 052777 000400 012116         BIS                #STEP,@DHMCSR      ;WRITE 0'S INTO TEST ADDRESS
792 004466 012703 000020                 MOV                #16.,R3            ;SET UP TO TEST ALL 16
793 004472 012777 000017 012104         MOV                #17,@DHMCSR        ;SCANNER MEMORY LOCATIONS
794 004500 005202                         INC                R2
795 004502 005001                         CLR                R1
796 004504 052777 000400 012072         MEMT3C: BIS                #STEP,@DHMCSR ;ACCESS SCANNER MEMORY
797 004512 117704 012066                 MOVB               @DHMCSR,R4          ;READ CONTENTS OF MEMORY
798 004516 010105                         MOV                R1,R5              ;SET UP EXPECTED CONTENTS
799 004520 120402                         CMPB               R4,R2              ;OF SCANNER MEMORY
800 004522 001002                         BNE                MEMT3D
801 004524 052705 070000                 MEMT3D: BIS                #70000,R5
802 004530 020405                         CMP                R4,R5              ;COMPARE EXPECTED AND
803 004532 001403                         BEQ                MEMT3E             ;RECEIVED VALUES
804 004534 104000                         ERRORC
805 004536 104003                         SCOPEF
806 004540 004430                         MEMT3A
807 004542 005201                         MEMT3E: INC                R1
808 004544 005303                         DEC                R3                  ;TEST NEXT SCANNER LOCATION
809 004546 001356                         BNE                MEMT3C
810 004550 005300                         DEC                R0                  ;UPDATE ADDRESS COUNT
811 004552 001326                         BNE                MEMT3A
812 004554 104002                         SCOPE
    
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:VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
:BE SET AND CLEARED FOR SELECTED LINE

005252 005077 011326 T30:
005252 042737 000340 177776 MUX3: CLR 3DHMCSR
005256 012700 000020 MOV #340,PS
005270 012737 000001 016714 MOV #16,R0
005276 005001 CLR #1,SELMSK
005300 012777 002000 011276 MUX3A: MOV R1
005306 012702 000020 MOV #CLRMUX,3DHMCSR
005312 033737 016714 016712 BIT #16,R2
005320 001463 BEQ SELMSK,LINSEL
005322 010177 011256 MOV MUX3F
005326 012777 000004 011252 MOV R1,3DHMCSR
005334 012737 000001 016716 MOV #RS,3DHMLSR
005342 005077 011236 CLR #1,SLMSK
005346 005005 MUX3B: CLR 3DHMCSR
005350 033737 016716 016712 BIT RS
005356 001417 BEQ SLMSK,LINSEL
005360 017704 011222 MOV MUX3D
005364 117703 011214 MOVB 3DHMLSR,R4
005370 042703 177760 BIC 3DHMCSR,R3
005374 020103 CMP #177760,R3
005376 001002 BNE
005400 012705 000004 MUX3C: MOV #RS,R5

005404 020504 MUX3C: CMP R5,R4
005406 001403 BEQ MUX3D
005410 104001 ERRORL
005412 104003 SCOPEF
005414 005416 MUX3D
005416 052777 000400 011160 MUX3D: BIS #STEP,3DHMCSR
005424 006337 016716 ASL SLMSK
005430 005302 DEC R2
005432 001345 BNE MUX3B
005434 005005 CLR R5
005436 010177 011142 MUX3E: MOV R1,3DHMCSR
005440 010103 MOV R1,R3
005444 005077 011136 CLR 3DHMLSR
005450 105227 000000 INCB #0
005454 001375 BNE -4
005456 017704 011124 MOV 3DHMLSR,R4
005462 005704 TST R4
005464 001401 BEQ MUX3F
005466 104001 ERRORL
005470 104003 MUX3F: SCOPEF
005472 005300 MUX3A
005474 006337 016714 ASL SELMSK
005500 005201 INC R1
005502 005300 DEC R0
005504 001275 BNE MUX3A
005506 104002 SCOPE
:REFERENCE DESIGNATION
:CLEAR CONTROL STATUS REGISTER
:ENABLE INTERRUPTS
:SET UP TO TEST 16 FUNCTION FLIP-FLOP
:INIT LINE SELECT MASK
:START AT LINE 0
:IS THIS LINE SELECTED FOR TEST ?
:BR IF NOT
:SELECT LINE TO BE TESTED
:SET REQUEST TO SEND FUNCTION FLIP-FLOP
:INIT ANOTHER SELECT MASK
:SELECTED ??
:BR IF NOT
:READ LINE STATUS REGISTER
:READ CONTROL STATUS REGISTER
:CLEAR UNWANTED BITS
:IF LINE NUMBER=SELECTED LINE NUMBER,
:EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
:TO BE SET
:COMPARE EXPECTED AND RECEIVED
:RESULTS
:LINE STATUS ERROR
:EXAMINE NEXT LINE
:SHIFT MASK
:SET LINE COUNTER TO SELECTED LINE
:CLEAR REQUEST TO SEND FLIP FLOP
:DELAY FOR CABLE
:DITTO
:READ LINE STATUS REGISTER
:WAS REQUEST TO SEND FUNCTION FLIP FLOP
:CLEARED
:NO. LINE STATUS ERROR
:CHECK FOR LOOP ON SAME DATA
:SHIFT SELECT MASK
:SELECT NEXT LINE
:DECREMENT LINE COUNT
:CONTINU IF NOT DONE
:CHECK FOR ITERATIONS, LOOP
    
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:VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
:BE SET AND CLEARED FOR SELECTED LINE

9972 005510 005077 011070 T31:
9973 005510 042737 000340 177776 MUX4: CLR 3DHMCSR
9974 005514 012700 000020 MOV #340,PS
9975 005522 012737 000001 016714 MOV #16,R0
9976 005534 005001 CLR #1,SELMSK
9977 005536 012777 002000 011040 MUX4A: MOV #CLRMUX,3DHMCSR
9978 005544 012702 000020 MOV #16,R2
9979 005550 033737 016714 016712 BIT SELMSK,LINSEL
9980 005556 001463 SEQ MUX4F
9981 005560 010177 011020 MOV R1,3DHMCSR
9982 005564 012777 000010 011014 MOV #SECTX,3DHMLSR
9983 005572 012737 000001 016716 MOV #1,SLMSK
9984 005600 005077 011000 CLR 3DHMCSR
9985 005604 005005 MUX4B: CLR R5
9986 005606 033737 016716 016712 BIT SLMSK,LINSEL
9987 005614 001417 BEQ MUX4D
9988 005616 017704 010764 MOV 3DHMLSR,R4
9989 005622 117703 010756 MOVB 3DHMCSR,R3
9990 005626 042703 177760 BIC #177760,R3
9991 005632 020103 CMP R1,R3
9992 005634 001002 BNE MUX4C
9993 005636 012705 000010 MOV #SECTX,R5
9994 005642 020504 MUX4C: CMP R5,R4
1000 005644 001403 BEQ MUX4D
1001 005646 104001 ERRORL
1002 005650 104003 SCOPEF
1003 005652 005654 MUX4D
1004 005654 052777 000400 010722 MUX4D: BIS #STEP,3DHMCSR
1005 005662 006337 016716 ASL SLMSK
1006 005666 005302 DEC R2
1007 005670 001345 BNE MUX4B
1008 005672 005005 CLR R5
1009 005674 010177 010704 MUX4E: MOV R1,3DHMCSR
1010 005700 010103 MOV R1,R3
1011 005702 005077 010700 CLR 3DHMLSR
1012 005706 105227 000000 INCB #0
1013 005712 001375 BNE -4
1014 005714 017704 010666 MOV 3DHMLSR,R4
1015 005720 005704 TST R4
1016 005722 001401 BEQ MUX4F
1017 005724 104001 ERRORL
1018 005726 104003 MUX4F: SCOPEF
1019 005730 005536 MUX4A
1020 005732 006337 016714 ASL SELMSK
1021 005736 005201 INC R1
1022 005740 005300 DEC R0
1023 005742 001275 BNE MUX4A
1024 005744 104002 SCOPE
:REFERENCE DESIGNATION
:CLEAR CONTROL STATUS REGISTER
:ENABLE INTERRUPTS
:SET UP TO TEST 16 FUNCTION FLIP-FLOP
:INIT LINE SELECT MASK
:START AT LINE 0

:IS THIS LINE SELECTED FOR TEST ?
:BR IF NOT
:SELECT LINE TO BE TESTED
:SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
:INIT ANOTHER SELECT MASK

:SELECTED ??
:BR IF NOT
:READ LINE STATUS REGISTER
:READ CONTROL STATUS REGISTER
:CLEAR UNWANTED BITS
:IF LINE NUMBER=SELECTED LINE NUMBER,
:EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP

:TO BE SET
:COMPARE EXPECTED AND RECEIVED
:RESULTS
:LINE STATUS ERROR

:EXAMINE NEXT LINE
:SHIFT MASK

:SET LINE COUNTER TO SELECTED LINE
:CLEAR SECONDARY TRANSMIT FLIP FLOP
:DELAY FOR CABLE
:DITTO
:READ LINE STATUS REGISTER
:WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
:CLEARED
:NO, LINE STATUS ERROR
:CHECK FOR LOOP ON SAME DATA

:SHIFT SELECT MASK
:SELECT NEXT LINE
:DECREMENT LINE COUNT
:CONTINU IF NOT NONE
:CHECK FOR ITERATIONS, LOOP

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1030 005746 005077 010632
1031 005752 042737 000340 177776
1032 005760 012700 000020
1033 005764 005001
1034 005766 012737 000001 016714
1035 005774 012702 000020
1036 006000 033737 016714 016712
1037 006006 001454
1038 006010 010177 010570
1039 006014 012777 000003 010564
1040 006022 005077 010556
1041 006026 005005
1042 006030 017704 010552
1043 006034 117703 010544
1044 006040 042703 177760
1045 006044 020103
1046 006046 001002
1047 006050 012705 000143
1048
1049 006054 020405
1050 006056 001403
1051 006060 104001
1052 006062 104003
1053 006064 006066
1054 006066 052777 000400 010510
1055 006074 005302
1056 006076 001353
1057 006100 012705 000001
1058 006104 010103
1059 006106 010177 010472
1060 006112 042777 000002 010466
1061 006120 105227 000000
1062 006124 001375
1063 006126 017704 010454
1064 006132 020504
1065 006134 001401
1066 006136 104001
1067 006140 104003
1068 006142 005774
1069 006144 005201
1070 006146 005077 010434
1071 006152 006337 016714
1072 006156 005300
1073 006160 001305
1074 006162 104002

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

T32:
MUX5: CLR @DHMCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #16.,R0 ;ENABLE INTERRUPTS
      CLR R1 ;SET UP TO TEST 16 LINES
      MOV #1,SELMSK ;START AT LINE 0
      MOV #16.,R2 ;INIT LINE SELECT MASK
      BIT SELMSK,LINSEL ;16 LINES
      BEQ MUX5F ;THIS LINE SELECTED FOR TEST ?
      MOV R1,@DHMCSR ;BR IF NOT
      MOV #LINENA+TRMRDY,@DHMLSR ;SELECT A LINE
      CLR @DHMCSR ;SET LINE ENABLE +TRMRDY
      CLR R5 ;CLEAR CONTROL REGISTER
      MOV @DHMLSR,R4 ;CLEAR EXPECTED RESULT
      MOVB @DHMCSR,R3 ;READ LINE STATUS
      BIC #177760,R3 ;READ LINE NUMBER
      CMP R1,R3 ;CLEAR UNWANTED BITS
      BNE MUX5C ;IF RECEIVED LINE=SELECTED LINE
      MOV #LINENA+TRMRDY+CO+CS,R5 ;EXPECT LINE ENABLE AND

MUX5B: CLR R5 ;CLEAR TO SEND AND CARRIER ARE SET
      MOV @DHMLSR,R4 ;COMPARE EXPECTED AND
      MOVB @DHMCSR,R3 ;RECEIVED RESULTS
      BIC #177760,R3 ;LINE STATUS ERROR
      CMP R1,R3
      BEQ MUX5D

MUX5C: CMP R4,R5
      BEQ MUX5D
      ERRORL SCOPEF
      MUX5D

MUX5D: BIS #STEP,@DHMCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX5B ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
      MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DHMCSR ;SELECT LINE
      BIC #TRMRDY,@DHMLSR ;CLEAR TERMINAL
      INCB #0 ;DELAY FOR CABLE
      BNE .-4 ;DITTO
      MOV @DHMLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX5F ;SET ON THIS LINE
      ERRORL SCOPEF ;LINE STATUS ERROR
      MUX5A ;CHECK FOR LOOP ON SAME DATA
      INC R1
      CLR @DHMLSR ;UPDATE LINE NUMBER
      ASL SELMSK ;CLEAR LINE STATUS REGISTER
      DEC R0 ;SHIFT MARK TO TEST NEXT LINE
      BNE MUX5A ;CONTINUE IF ALL LINES NOT
      SCOPE ;TESTED
           ;CHECK FOR ITERATIONS. LOOP

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1079 006164 T33:
1080 006164 005077 010414 MUX6: CLR 3DHMCSR ;REFERENCE DESIGNATION
1081 006170 042737 000340 177776 BIC #340,PS ;CLEAR CONTROL REGISTER
1082 006176 012700 000020 MOV #16.,R0 ;ENABLE INTERRUPTS
1083 006202 005001 CLR R1 ;SET UP TO TEST 16 LINES
1084 006204 012737 000001 016714 MUX6A: MOV #1,SELSK ;START AT LINE 0
1085 006212 012702 000020 MOV #16.,R2 ;INIT LINE SELECT MASK
1086 006216 033737 016714 016712 BIT SELMSK,LINSEL ;16 LINES
1087 006224 001454 BEQ MUX6F ;THIS LINE SELECTED FOR TEST ?
1088 006226 010177 010352 MOV R1,3DHMCSR ;BR IF NOT
1089 006232 012777 000005 010346 MUX6B: MOV #LINA+RS,3DHMLSR ;SELECT A LINE
1090 006240 005077 010340 CLR 3DHMCSR ;SET LINE ENABLE +RS
1091 006244 005005 MUX6B: CLR R5 ;CLEAR CONTROL REGISTER
1092 006246 017704 010334 MOV 3DHMLSR,R4 ;CLEAR EXPECTED RESULT
1093 006252 117703 010326 MOVB 3DHMCSR,R3 ;READ LINE STATUS
1094 006256 042703 177760 BIC #177760,R3 ;READ LINE NUMBER
1095 006262 020103 CMP R1,R3 ;CLEAR UNWANTED BITS
1096 006264 001002 BNE MUX6C ;IF RECEIVED LINE=SELECTED LINE
1097 006266 012705 000205 MOV #LINA+RS+RING,R5 ;EXPECT LINE ENABLE AND
1098
1099 MUX6C: CMP R4,R5 ;RING IS SET
1100 006274 001403 BEQ MUX6D ;COMPARE EXPECTED AND
1101 006276 104001 ERRORL ;RECEIVED RESULTS
1102 006300 104003 SCOPEF ;LINE STATUS ERROR
1103 006302 006304 MUX6D
1104 006304 052777 000400 010272 MUX6D: BIS #STEP,3DHMCSR. ;UPDATE LINE COUNTER
1105 006312 005302 DEC R2 ;CONTINUE IF ALL CHECKS
1106 006314 001353 BNE MUX6B ;ARE NOT DONE FOR THIS LINE
1107 006316 012705 000001 MOV #LINA,R5 ;EXPECT LINE ENABLE
1108 006322 010103 MUX6E: MOV R1,R3 ;ON SELECTED LINE
1109 006324 010177 010254 MOV R1,3DHMCSR ;SELECT LINE
1110 006330 042777 000004 010250 BIC #RS,3DHMLSR ;CLEAR REQUEST TO SEND
1111 006336 105227 000000 INCB #0 ;DELAY FOR CABLE
1112 006342 001375 BNE -4 ;DITTO
1113 006344 017704 010236 MOV 3DHMLSR,R4 ;READ LINE STATUS REGISTER
1114 006350 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
1115 006352 001401 BEQ MUX6F ;SET ON THIS LINE
1116 006354 104001 ERRORL ;LINE STATUS ERROR
1117 006356 104003 MUX6F: SCOPEF ;CHECK FOR LOOP ON SAME DATA.
1118 006360 006212 MUX6A
1119 006362 005201 INC R1 ;UPDATE LINE NUMBER
1120 006364 005077 010216 CLR 3DHMLSR ;CLEAR LINE STATUS REGISTER
1121 006370 006337 016714 ASL SELMSK ;SHIFT MARK TO TEST NEXT LINE
1122 006374 005300 DEC R0 ;CONTINUE IF ALL LINES NOT
1123 006376 001305 BNE MUX6A ;TESTED
1124 006400 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
    
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1125
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1130 006402 005077 010176 T34:
1131 006406 042737 000340 177776 MUX7: CLR 3DHMCSR ;REFERENCE DESIGNATION
1132 006414 012700 000020 MOV #340,PS ;CLEAR CONTROL REGISTER
1133 006420 005001 CLR R1 ;ENABLE INTERRUPTS
1134 006422 012737 000001 016714 MOV #16.,R0 ;SET UP TO TEST 16 LINES
1135 006430 012702 000020 MUX7A: CLR R1 ;START AT LINE 0
1136 006434 033737 016714 016712 MOV #1,SELMSK ;INIT LINE SELECT MASK
1137 006442 001454 BEQ MUX7F ;16 LINES
1138 006444 010177 010134 MOV R1,3DHMCSR ;THIS LINE SELECTED FOR TEST ?
1139 006450 012777 000011 010130 MOV #LINENA+SECTX,3DHMLSR ;BR IF NOT
1140 006456 005077 010122 CLR 3DHMCSR ;SELECT A LINE
1141 006462 005005 MUX7B: CLR R5 ;SET LINE ENABLE +SECTX
1142 006464 017704 010116 MOV 3DHMLSR,R4 ;CLEAR CONTROL REGISTER
1143 006470 117703 010110 MOVB 3DHMCSR,R3 ;CLEAR EXPECTED RESULT
1144 006474 042703 177760 BIC #177760,R3 ;READ LINE STATUS
1145 006500 020103 CMP R1,R3 ;READ LINE NUMBER
1146 006502 001002 BNE MUX7C ;CLEAR UNWANTED BITS
1147 006504 012705 000031 MOV #LINENA+SECTX+SECRX,R5 ;IF RECEIVED LINE=SELECTED LINE
1148 ;EXPECT LINE ENABLE AND
1149 006510 020405 MUX7C: CMP R4,R5 ;SECONDARY RECEIVE IS SET
1150 006512 001403 BEQ MUX7D ;COMPARE EXPECTED AND
1151 006514 104001 ERRORL ;RECEIVED RESULTS
1152 006516 104003 SCOPEF ;LINE STATUS ERROR
1153 006520 006522 MUX7D:
1154 006522 052777 000400 010054 MUX7D: BIS #STEP,3DHMCSR ;UPDATE LINE COUNTER
1155 006530 005302 DEC R2 ;CONTINUE IF ALL CHECKS
1156 006532 001353 BNE MUX7B ;ARE NOT DONE FOR THIS LINE
1157 006534 012705 000001 MOV #LINENA,R5 ;EXPECT LINE ENABLE
1158 006540 010103 MUX7E: MOV R1,R3 ;ON SELECTED LINE
1159 006542 010177 010036 MOV R1,3DHMCSR ;SELECT LINE
1160 006546 042777 000010 010032 BIC #SECTX,3DHMLSR ;CLEAR SECONDARY TRANSMIT
1161 006554 105227 000000 INCB #0 ;DELAY FOR CABLE
1162 006560 001375 BNE -4 ;DITTO
1163 006562 017704 010020 MOV 3DHMLSR,R4 ;READ LINE STATUS REGISTER
1164 006566 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
1165 006570 001401 BEQ MUX7F ;SET ON THIS LINE
1166 006572 104001 ERRORL ;LINE STATUS ERROR
1167 006574 104003 MUX7F: SCOPEF ;CHECK FOR LOOP ON SAME DATA
1168 006576 006430 MUX7A:
1169 006600 005201 INC R1 ;UPDATE LINE NUMBER
1170 006602 005077 010000 CLR 3DHMLSR ;CLEAR LINE STATUS REGISTER
1171 006606 006337 016714 ASL SELMSK ;SHIFT MARK TO TEST NEXT LINE
1172 006612 005300 DEC R0 ;CONTINUE IF ALL LINES NOT
1173 006614 001305 BNE MUX7A ;TESTED
1174 006616 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP

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1177
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1180 006620 005077 007760
1181 006624 042737 000340 177776
1182 006632 012700 000020
1183 006636 012777 000017 007742
1184 006644 052777 000400 007732
1185 006652 005300
1186 006654 001370
1187 006656 012737 000001 016714
1188 006664 005003
1189 006666 012700 000020
1190 006672 012777 002000 007704
1191 006700 033737 016714 016712
1192 006706 001425
1193 006710 010377 007670
1194 006714 017704 007666
1195 006720 005005
1196 006722 005704
1197 006724 001403
1198 006726 104001
1199 006730 104003
1200 006732 006672
1201 006734 005205
1202 006736 052777 000001 007642
1203 006744 017704 007636
1204 006750 020504
1205 006752 001403
1206 006754 104001
1207 006756 104003
1208 006760 006672
1209 006762 005203
1210 006764 005077 007616
1211 006770 006337 016714
1212 006774 005300
1213 006776 001340
1214 007000 104002

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

T35:
MUX8: CLR JDHMCSR
      BIC #340,PS
      MOV #16,R0
MUX8A: MOV #17,JDHMLSR
      BIS #STEP,JDHMCSR
      DEC R0
      BNE MUX8A
      MOV #1,SELMSK
      CLR R3
      MOV #16,R0
MUX8B: MOV #CLRMUX,JDHMCSR
MUX8C: BIT SELMSK,LINSEL
      BEQ MUX8E
      MOV R3,JDHMCSR
      MOV JDHMLSR,R4
      CLR R5
      TST R4
      BEQ MUX8D
      ERRORL
      SCOPEF
      MUX8B
MUX8D: INC R5
      BIS #LINENA,JDHMLSR
      MOV JDHMLSR,R4
      CMP R5,R4
      BEQ MUX8E
      ERRORL
      SCOPEF
      MUX8B
MUX8E: INC R3
      CLR JDHMLSR
      ASL SELMSK
      DEC R0
      BNE MUX8C
      SCOPE

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

;INIT SELECT MASK
;SET UP FOR 16 LINES

;CLEAR MULTIPLEXER
;SELECTED ??
;BR IF NOT
;SELECT LINE
;READ LINE STATUS REGISTER
;EXPECT OS
;WAS LINE STATUS REGISTER CLEARED

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

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

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

;UPDATE LINE NUMBER
;CLEAR CURRENT LINE
;SHIFT SELECT MASK
;CONTINUE IF ALL LINES NOT
;TESTED
;CHECK FOR ITERATIONS, LOOP

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

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1272 007252          T37:
1273 007252 012700 000020          SCNT2: MOV #16.,R0
1274 007256 012777 002000 007320          MOV #CLRMUX,ADHMCSR
1275 007264 005077 007314          CLR ADHMCSR
1276 007270 042737 000340 177776          BIC #340,PS
1277 007276 012737 000001 016714          MOV #1,SELMSK
1278 007304 012777 000017 007274          SCNT2A: MOV #17,ADHMLSR
1279 007312 052777 000400 007264          BIS #STEP,ADHMCSR
1280 007320 005300          DEC R0
1281 007322 001370          BNE SCNT2A
1282 007324 012777 004000 007252          MOV #CLRSCN,ADHMCSR
1283 007332 032777 000020 007244          BIT #BUSY,ADHMCSR
1284 007340 001374          BNE -.6
1285 007342 012700 000020          MOV #16.,R0
1286 007346 012701 177777          MOV #-1,R1
1287 007352 012705 170340          MOV #170340,R5
1288 007356 012777 007402 007214          MOV #SCNT2C,ADHMVEC
1289 007364 013777 177776 007210          MOV PS,ADHMLVL
1290 007372 012777 000117 007204          MOV #INTENA+17,ADHMCSR
1291 007400 033737 016714 016712          SCNT2B: BIT SELMSK,LINSEL
1292 007406 001435          BEQ SCNT2D
1293 007410 052737 000340 177776          BIS #340,PS
1294 007416 052777 000040 007160          BIS #SCNENA,ADHMCSR
1295 007424 042737 000340 177776          BIC #340,PS
1296 007432 105777 007146          TSTB ADHMCSR
1297 007436 100375          BPL -.4
1298
1299 007440 052737 000340 177776          BIS #340,PS
1300 007446 017704 007132          MOV ADHMCSR,R4
1301 007452 104000          ERRORC
1302 007454 104003          SCOPEF
1303 007456 007252          SCNT2
1304 007460 000410          BR SCNT2D
1305 007462 022626          SCNT2C: POP2SP
1306 007464 017704 007114          MOV ADHMCSR,R4
1307 007470 020504          CMP R5,R4
1308 007472 001403          BEQ SCNT2D
1309 007474 104000          ERRORC
1310 007476 104003          SCOPEF
1311 007500 007252          SCNT2
1312 007502 042777 000257 007074          SCNT2D: BIC #SCNENA+DONE+17,ADHMCSR
1313 007510 006337 016714          ASL SELMSK
1314 007514 005201          INC R1
1315 007516 150177 007062          BISB R1,ADHMCSR
1316 007522 005205          INC R5
1317 007524 005300          DEC R0
1318 007526 001324          BNE SCNT2B
1319 007530 104002          SCOPE

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

;REFERENCE DESIGNATION
;WRITE 1S INTO ALL
;CLEAR MULTIPLEXER
;MULTIPLEXER FUNCTION
;ENABLE TELETYPE INTERRUPTS
;INIT LINE SELECT MASK
;FLIPFLOPS

;CLEAR SCANNER MEMORY
;WAIT FOR CLEAR CYCLE TO COMPLETE

;SET UP TO TEST 16 LINES
;INIT LINE NO. GENERATOR
;FIRST EXPECTED RESULT
;SET UP LOCAL INTERRUPT RETURN

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

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

;CONTROL STATUS ERROR
;CHECK FOR LOOP ON CURRENT DATA

;CLEAR SCAN ENABLE AND DONE AND LINE NO.
;SHIFT SELECT BIT
;GEN NEW LINE NO.
;SET IT IN CSR
;UPDATE EXPECTED RESULT
;CONTINUE IF ALL
;LINES NOT TESTED
;CHECK FOR ITERATIONS, LOOP

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007532
007532 012737 007552 002204
007540 042737 000340 177776
007546 104004
007550 017723
007552 104013
007554 017756
007556 007000
007560 000017
007562 016672
007564 104004
007566 017720

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

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

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

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

;GET LINE NUMBER

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

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

15000 010460 005077 006120 T105:
15001 010460 042737 000340 MUX15: CLR 3DHMCSR :REFERENCE DESIGNATION
15002 010464 013701 016672 177776 BIC #340,FS :CLEAR CONTROL REGISTER
15003 010476 012702 000020 MUX15A: MOV LINE,R1 :ENABLE INTERRUPTS
15004 010502 010177 006076 MOV #16,R2 :16 LINES
15005 010506 012777 000003 006072 MOV R1,3DHMCSR :SELECT A LINE
15006 010514 005077 006064 CLR #LINENA+TRMRDY,3DHMLSR :SET LINE ENABLE +TRMRDY
15007 010520 005005 MUX15B: CLR 3DHMCSR :CLEAR CONTROL REGISTER
15008 010522 017704 006060 MOV 3DHMLSR,R4 :CLEAR EXPECTED RESULT
15009 010525 117703 006052 MOVB 3DHMCSR,R3 :READ LINE STATUS
15010 010532 042703 177760 BIC #177760,R3 :READ LINE NUMBER
15011 010536 020103 CMP R1,R3 :CLEAR UNWANTED BITS
15012 010540 001002 BNE MUX15C :IF RECEIVED LINE=SELECTED LINE
15013 010542 012705 000143 MOV #LINENA+TRMRDY+00+05,R5 :EXPECT LINE ENABLE AND
15014 010546 020405 MUX15C: CMP R4,R5 :CLEAR TO SEND AND CARRIER ARE SET
15015 010550 001403 BEQ MUX15D :COMPARE EXPECTED AND
15016 010552 104001 ERRORL :RECEIVED RESULTS
15017 010554 104003 SCOPEF :LINE STATUS ERROR
15018 010556 010550 MUX15D: MUX15D
15019 010560 052777 000400 006016 MUX15D: BIS #STEP,3DHMCSR :UPDATE LINE COUNTER
15020 010566 005302 DEC R2 :CONTINUE IF ALL CHECKS
15021 010570 001353 BNE MUX15E :ARE NOT DONE FOR THIS LINE
15022 010572 012705 000001 MOV #LINENA,R5 :EXPECT LINE ENABLE
15023 010576 010103 MUX15E: MOV R1,R3 :ON SELECTED LINE
15024 010600 010177 006000 MOV R1,3DHMCSR :SELECT LINE
15025 010604 042777 000002 005774 BIC #TRMRDY,3DHMLSR :CLEAR TERMINAL
15026 010612 105227 000000 INCB #0 :DELAY FOR CABLE
15027 010616 001375 BNE -4 :DITTO
15028 010620 017704 005762 MOV 3DHMLSR,R4 :READ LINE STATUS REGISTER
15029 010624 020504 CMP R5,R4 :ONLY LINE ENABLE SHOULD BE
15030 010626 001401 BEQ MUX15F :SET ON THIS LINE
15031 010630 104001 ERRORL :LINE STATUS ERROR
15032 010632 104002 MUX15F: SCOPE :CHECK FOR ITERATIONS, LOOP
    
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15641 010634
15642 010634 005077 005744
15643 010640 042737 000340 177776
15644 010646 013701 016672
15645 010652 012702 000020
15646 010656 010177 005722
15647 010662 012777 000005 005716
15648 010670 005077 005710
15649 010674 005005
15650 010676 017704 005704
15651 010702 117703 005676
15652 010706 042703 177760
15653 010712 020103
15654 010714 001002
15655 010716 012705 000205
15656 010722 020405
15657 010724 001403
15658 010726 104001
15659 010730 104003
15660 010732 010734
15661 010734 052777 000400 005642
15662 010742 005302
15663 010744 001352
15664 010746 012705 000001
15665 010752 010103
15666 010754 010177 005624
15667 010760 042777 000004 005620
15668 010766 105227 000000
15669 010772 001375
15670 010774 017704 005606
15671 011000 020504
15672 011002 001401
15673 011004 104001
15674 011006 104002
15675

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

T106:
MUX16: CLR @DHMCSR
BIC #340,PS
MOV LINE,R1
MUX16A: MOV #16,R2
MOV R1,@DHMCSR
MOV #LINENA+RS,@DHMLSR
CLR @DHMCSR
MUX16B: CLR R5
MOV @DHMLSR,R4
MOVB @DHMCSR,R3
BIC #177760,R3
CMP R1,R3
BNE MUX16C
MOV #LINENA+RS+RING,R5
MUX16C: CMP R4,R5
BEQ MUX16D
ERRORL SCOPEF
MUX16D: BIS #STEP,@DHMCSR
DEC R2
BNE MUX16B
MUX16E: MOV #LINENA,R5
MOV R1,R3
MOV R1,@DHMCSR
BIC #RS,@DHMLSR
INCB #0
BNE .-4
MOV @DHMLSR,R4
CMP R5,R4
BEQ MUX16F
ERRORL SCOPE
MUX16F:

:REFERENCE DESIGNATION
:CLEAR CONTROL REGISTER
:ENABLE INTERRUPTS
:16 LINES
:SELECT A LINE
:SET LINE ENABLE +RS
:CLEAR CONTROL REGISTER
:CLEAR EXPECTED RESULT
:READ LINE STATUS
:READ LINE NUMBER
:CLEAR UNWANTED BITS
:IF RECEIVED LINE=SELECTED LINE
:EXPECT LINE ENABLE AND
:RING IS SET
:COMPARE EXPECTED AND
:RECEIVED RESULTS
:LINE STATUS ERROR
:UPDATE LINE COUNTER
:CONTINUE IF ALL CHECKS
:ARE NOT DONE FOR THIS LINE
:EXPECT LINE ENABLE
:ON SELECTED LINE
:SELECT LINE
:CLEAR REQUEST TO SEND
:DELAY FOR CABLE
:DITTO
:READ LINE STATUS REGISTER
:ONLY LINE ENABLE SHOULD BE
:SET ON THIS LINE
:LINE STATUS ERROR
:CHECK FOR ITERATIONS. LOOP
    
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1576
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1580 011010 T107: ;REFERENCE DESIGNATION
1581 011010 005077 005570 MUX17: CLR @DHCSR ;CLEAR CONTROL REGISTER
1582 011014 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
1583 011022 013701 016672 MOV LINE,R1
1584 011026 012702 000020 MUX17A: MOV #16,R2 ;16 LINES
1585 011032 010177 005546 MOV R1,@DHCSR ;SELECT A LINE
1586 011036 012777 000011 005542 MOV #LINENA+SECTX,@DHMLSR ;SET LINE ENABLE +SECTX
1587 011044 005077 005534 CLR @DHCSR ;CLEAR CONTROL REGISTER
1588 011050 005005 MUX17B: CLR R5 ;CLEAR EXPECTED RESULT
1589 011052 017704 005530 MOV @DHMLSR,R4 ;READ LINE STATUS
1590 011056 117703 005522 MOVB @DHCSR,R3 ;READ LINE NUMBER
1591 011062 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
1592 011066 020103 CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
1593 011070 001002 BNE MUX17C ;EXPECT LINE ENABLE AND
1594 011072 012705 000031 MOV #LINENA+SECTX+SECRX,R5 ;SECONDARY RECEIVE IS SET
1595
1596 011076 020405 MUX17C: CMP R4,R5 ;COMPARE EXPECTED AND
1597 011100 001403 BEQ MUX17D ;RECEIVED RESULTS
1598 011102 104001 ERRORL ;LINE STATUS ERROR
1599 011104 104003 SCOPEF
1600 011106 011110 MUX17D
1601 011110 052777 000400 005466 MUX17D: BIS #STEP,@DHCSR ;UPDATE LINE COUNTER
1602 011116 005302 DEC R2 ;CONTINUE IF ALL CHECKS
1603 011120 001353 BNE MUX17B ;ARE NOT DONE FOR THIS LINE
1604 011122 012705 000001 MOV #LINENA,R5 ;EXPECT LINE ENABLE
1605 011126 010103 MUX17E: MOV R1,R3 ;ON SELECTED LINE
1606 011130 010177 005450 MOV R1,@DHCSR ;SELECT LINE
1607 011134 042777 000010 005444 BIC #SECTX,@DHMLSR ;CLEAR SECONDARY TRANSMIT
1608 011142 105227 000000 INCB #0 ;DELAY FOR CABLE
1609 011146 001375 BNE -4 ;DITTO
1610 011150 017704 005432 MOV @DHMLSR,R4 ;READ LINE STATUS REGISTER
1611 011154 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
1612 011156 001401 BEQ MUX17F ;SET ON THIS LINE
1613 011160 104001 ERRORL ;LINE STATUS ERROR
1614 011162 104002 MUX17F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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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

;REFERENCE DESIGNATION
;INITIALIZE INTERFACE
;DISABLE ALL INTERRUPTS
;TYPE "103A MODEM CONNECT-
;DISCONNECT TEST"

;SET UP FOR FATAL ERROR
;SET UP FOR LINE CHANGE
;INPUT ORIGINATE AND
;AND ANSWER LINE NUMBERS
;SET UP TO RECEIVE INTERRUPTS
;WAIT FOR RING
;GO HERE IF RING OK
;GO HERE IF NO RING
;NO RING WITHIN 5 MINUTES
;SELECT NEW LINES AND REDIAL

;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
;WILL BE REQUESTED TO RESELECT LINES AND REDIAL

;CHECK FOR RING INTERRUPT
;ONLY ON ANSWER LINE
;AND NO TRANSITIONS ON
;ORIGINATE LINE
;GO HERE IF TRANSITIONS
;ARE CORRECT
;GO HERE IF INCORRECT
;TRANSITION ON ANSWER LINE
;GO HERE IF INCORRECT TRANSITION
;ON ORIGINATE LINE
;TRANSITION ERROR ON ANSWER LINE
;CONTINUE CHECKING
;TRANSITION ERROR ON ORIGINATE LINE
;RESELECT LINES AND REDIAL

011164	000005			T200:			
011164	012737	000340	177776	ST103A:	RESET		
011166	104004				MOV	#340,PS	
011174	017142				TYPE		
011200	022737	000176	016620		MT103T		
011206	001001				CMP	#SWREG,SWR	
011210	104025				BNE	1\$	
011212	012737	011230	013020	1\$:	CNTLUU		
011220	012737	011226	002204		MOV	#T103A,FATRET	
011226	104017			ST103B:	MOV	#ST103B,KRET	
011230	104020				GETLNS		
011232	011242			T103A:	SETUP		
011234	011236				T103B		
011236	104012			T103A1:	T103A1		
011240	000772				ERROR		
					BR	ST103B	
011242	104021			T103B:	CKRING		
011244	011262				T103C		
011246	011252				T103B1		
011250	011256				T103B2		
011252	104014			T103B1:	ERRORT		
011254	000207				RTS	PC	
011256	104014			T103B2:	ERRORT		
011260	000762				BR	ST103B	

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

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1721 011346 104004          T103E: TYPE          ;TYPE "STRIKE ANY TTY KEY
1722 011350 017405          MDISC              ;TEST DISCONNECT"
1723 011352 012737 000340 177776  MOV #340,PS        ;LOCK OUT INTERRUPTS
1724 011360 012777 013042 005212  MOV #TRNTYP,@DHMVEC ;SET UP TO DETECT TRANSITIONS
1725
1726 011366 012737 011406 016724  MOV #T103ES,RNGRET ;BEFORE DISCONNECT SEQUENCE STARTS
1727
1728 011374 012777 000140 005202  MOV #SCNENA+INTENA,@DHMCSR ;SET UP DUMMY RETURN FOR
1729 011402 005037 177776          CLR PS             ;RING INTERRUPT
1730 011406 005077 005200          T103ES: CLR @TKDBR ;SET SCAN ENABLE AND INTERRUPT ENABLE
1731 011412 105777 005172          IS:  TSTB @TKCSR  ;ALLOW INTERRUPTS
1732 011416 100375          BPL 15
1733 011420 005777 005166          TST @TKDBR
1734 011424 012737 000340 177776  MOV #340,PS        ;START DISCONNECT SEQUENCE
1735 011432 005077 005146          CLR @DHMCSR      ;CLEAR CONTROL REGISTER
1736 011436 013777 016674 005140  MOV LINORG,@DHMCSR ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
1737 011444 042777 000002 005134  BIC #TRMRDY,@DHMLSR ;SET TERMINAL READY ON SELECTED LINE
1738 011452 104026
1739 011454 104022          CKINTT
          WAITRN      ;WAIT FOR TRANSITIONS TO OCCUR

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1789 011540
1790 011540 000005
1791 011542 012737 000340 177776
1792 011550 104004
1793 011552 017213
1794 011554 022737 000176 016620
1795 011562 001001
1796 011564 104025
1797 011566 012737 011604 013020
1798 011574 012737 011602 002204
1799 011602 104017
1800
1801 011604 104020
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1803 011606 011616
1804 011610 011612
1805 011612 104012
1806 011614 000772
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1813 011616 104021
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1817 011620 011636
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1819 011622 011626
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1821 011624 011632
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1823 011626 104014
1824 011630 000207
1825 011632 104014
1826 011634 000762

;MODEM CONTROL ON LINE TEST USING 202C TYPE MODEMS
;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
;USING THE MODEM CONTROL TO CONTROL 202C TYPE MODEMS

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

T300:
ST202A: RESET ;REFERENCE DESIGNATION
MOV #340,PS ;INITIALIZE INTERFACE
TYPE ;DISABLE ALL INTERRUPTS
MT202T ;TYPE "202C MODEM CONNECT-
CMP #SWREG,SWR ;DISCONNECT TEST"
BNE 1$
CNTRLUU
1$: MOV #T202A,FATRET ;SET UP FOR FATAL ERROR
MOV #ST202B,KRET ;SET UP FOR LINE CHANGE
ST202B: GETLNS ;INPUT ORIGINATE AND
;ANSWER LINE NUMBERS
T202A: SETUP ;SET UP TO RECEIVE INTERRUPTS
;WAIT FOR RING
T202B ;GO HERE IF RING OK
T202A1 ;GO HERE IF NO RING
ERROR ;NO RING WITHIN 5 MINUTES
BR ST202B ;SELECT NEW LINES AND REDIAL

;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
;WILL BE REQUESTED TO RESELECT LINES AND REDIAL

T202B: CKRING ;CHECK FOR RING INTERRUPT
;ONLY ON ANSWER LINE
;AND NO TRANSITIONS ON
;ORIGINATE LINE
T202C ;GO HERE IF TRANSITIONS
;ARE CORRECT
T202B1 ;GO HERE IF INCORRECT
;TRANSITION ON ANSWER LINE
T202B2 ;GO HERE IF INCORRECT
;TRANSITION ON ORIGINATE LINE
T202B1: ERRORT ;ANSWER LINE TRANSITION ERROR
RTS PC ;CONTINUE CHECKING
T202B2: ERRORT ;ORIGINATE LINE TRANSITION ERROR
BR ST202B ;RESELECT LINES AND REDIAL

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1832 011636 013777 016676 004740 T2020: MOV LINANS, @DHMCSR ;SET LINE COUNTER TO ANSWER LINE
1833 011644 052777 000002 004734 BIS #TRMRDY, @DHMLSR ;SET TERMINAL READY ON ANSWER LINE
1834 011652 013777 016674 004724 T2020: MOV LINORG, @DHMCSR ;SET LINE COUNTER TO ORIGINATE LINE
1835 011660 052777 000004 004720 BIS #RS, @DHMLSR ;SET REQUEST TO SEND ON ORIGINATE LINE
1836 011666 104026 CKINTT
1837 011670 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
1838
1839 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1840 ;SELECTED ORIGINATE AND ANSWER LINES
1841
1842 011672 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
1843 ;ON SELECTED ANSWER AND
1844 ;ORIGINATE LINES
1845 011674 000103 CO+LINENA+TRMRDY ;EXPECT CARRIER, LINE ENABLE
1846 ;AND TERMINAL READY STATUS
1847 ;BITS SET ON ANSWER LINE
1848 011676 000147 RS+CO+CS+LINENA+TRMRDY ;EXPECT REQUEST TO SEND, CLEAR
1849 ;TO SEND, CARRIER, LINE ENABLE
1850 ;AND TERMINAL READY STATUS BITS
1851 ;SET ON ORIGINATE LINE
1852 011700 100004 RINGF+XCO ;EXPECT CARRIER AND POSSIBLE
1853 ;RING TRANSITIONS ON
1854 ;ANSWER LINE
1855 011702 000006 XCO+XCS ;EXPECT CARRIER AND CLEAR
1856 ;TO SEND TRANSITIONS ON
1857 ;ORIGINATE LINE
1858 011704 011716 T202D1 ;GO HERE ON ANSWER LINE STATUS ERROR
1859 011706 011722 T202D2 ;GO HERE ON ORIGINATE LINE STATUS ERROR
1860 011710 011726 T202D3 ;GO HERE ON ANSWER LINE STATUS ERROR
1861 011712 011732 T202D4 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1862 011714 011736 T202E ;GO TO NEXT TEST IF NO ERRORS
1863 011716 104015 T202D1: ERRORS ;ANSWER LINE SATUS ERROR
1864 011720 000207 RTS PC ;CONTINUE CHECKING
1865 011722 104015 T202D2: ERRORS ;ORIGINATE LINE STATUS ERROR
1866 011724 000207 RTS PC ;CONTINUE CHECKING
1867 011726 104014 T202D3: ERRORT ;ANSWER LINE TRANSITION ERROR
1868 011730 000207 RTS PC ;CONTINUE CHECKING
1869 011732 104014 T202D4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
1870 011734 000207 RTS PC ;CONTINUE CHECKING

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1871
1872
1873           ;SET SECONDARY TRANSMIT ON ANSWER LINE
1874           ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1875 011736 013777 016676 004640 T202E: MOV LINANS,JDHMCSR           ;SET LINE COUNTER TO ANSWER LINE
1876 011744 052777 000010 004634 BIS #SECTX,JDHMLSR           ;SET SECONDARY RECEIVE ON ANSWER LINE
1877 011752 104026 CKINTT
1878 011754 104022 WAITRN           ;WAIT FOR TRANSITIONS TO OCCUR
1879
1880           ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1881           ;SELECTED ORIGINATE AND ANSWER LINES
1882
1883 011756 104023 CKTRAN           ;CHECK TRANSITIONS AND STATUS
1884           ;ON SELECTED ANSWER AND
1885           ;ORIGINATE LINES
1886 011760 000133 SECTX+CO+LINENA+TRMRDY+SECRX           ;EXPECT SECONDARY TRANSMIT
1887           ;SECONDARY RECEIVE, CARRIER
1888           ;LINE ENABLE AND TERMINAL READY
1889           ;STATUS BITS SET ON ANSWER LINE
1890 011762 000167 SECRX+RS+CO+CS+LINENA+TRMRDY           ;EXPECT SECONDARY RECEIVE,
1891           ;REQUEST TO SEND, CLEAR TO SEND
1892           ;CARRIER, LINE ENABLE AND
1893           ;TERMINAL READY STATUS BITS
1894           ;SET ON ORIGINATE LINE
1895 011764 000001 XSCRX           ;EXPECT SECONDARY RECEIVE
1896           ;TRANSITION ON ANSWER LINE
1897 011766 000001 XSCRX           ;EXPECT SECONDARY RECEIVE
1898           ;TRANSITION ON ORIGINATE LINE
1899 011770 012002 T202E1           ;GO HERE ON ANSWER LINE STATUS ERROR
1900 011772 012006 T202E2           ;GO HERE ON ORIGINATE LINE STATUS ERROR
1901 011774 012012 T202E3           ;GO HERE ON ANSWER LINE TRANSITION ERROR
1902 011776 012016 T202E4           ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1903 012000 012022 T202F           ;GO TO NEXT TEST IF NO ERRORS
1904 012002 104015 T202E1: ERRORS           ;ANSWER LINE STATUS ERROR
1905 012004 000207 RTS PC           ;CONTINUE CHECKING
1906 012006 104015 T202E2: ERRORS           ;ORIGINATE LINE STATUS ERROR
1907 012010 000207 RTS PC           ;CONTINUE CHECKING
1908 012012 104014 T202E3: ERRORT           ;ANSWER LINE TRANSITION ERROR
1909 012014 000207 RTS PC           ;CONTINUE CHECKING
1910 012016 104014 T202E4: ERRORT           ;ORIGINATE LINE TRANSITION ERROR
1911 012020 000207 RTS PC           ;CONTINUE CHECKING
  
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1913 ;DROP REQUEST TO SEND ON ORIGINATE LINE
1914 ;DROP SECONDARY TRANSMIT ON ANSWER LINE
1915 ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1916
1917 012022 013777 016674 004554 T202F: MOV LINORG,JDHMCSR ;SET LINE COUNTER TO ORIGINATE LINE
1918 012030 042777 000004 004550 BIC #RS,JDHMLSR ;DROP REQUEST TO SEND
1919 012036 013777 016676 004540 MOV LINANS,JDHMCSR ;SET LINE COUNTER TO ANSWER LINE
1920 012044 042777 000010 004534 BIC #SECTX,JDHMLSR ;DROP SECONDARY RECEIVE
1921 012052 104026 CKINTT
1922 012054 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
1923
1924 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1925 ;SELECTED ORIGINATE AND ANSWER LINES
1926
1927 012056 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
1928 ;ON SELECTED ANSWER AND
1929 ;ORIGINATE LINES
1930 012060 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
1931 ;TERMINAL READY STATUS BITS
1932 ;SET ON ANSWER LINE
1933 012062 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
1934 ;TERMINAL READY STATUS BITS
1935 ;SET ON ORIGINATE LINE
1936 012064 000005 XCO+XSCRX ;EXPECT CARRIER AND SECONDARY
1937 ;RECEIVE TRANSITIONS ON
1938 ;ANSWER LINE
1939 012066 000007 XCO+XCS+XSCRX ;EXPECT CARRIER, CLEAR TO SEND
1940 ;AND SECONDARY RECEIVE
1941 ;TRANSITIONS ON ORIGINATE LINE
1942 012070 012102 T202F2 ;GO HERE ON ANSWER LINE STATUS ERROR
1943 012072 012106 T202F3 ;GO HERE ON CRIGINATE LINE STATUS ERROR
1944 012074 012112 T202F4 ;GO HERE ON ANSWER LINE TRANSITION ERROR
1945 012076 012116 T202F5 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1946 012100 012122 T202G ;GO TO NEXT TEST IF NO ERRORS
1947 012102 104015 T202F2: ERRORS ;ANSWER LINE STATUS ERROR
1948 012104 000207 RTS PC ;CONTINUE CHECKING
1949 012106 104015 T202F3: ERRORS ;ORIGINATE LINE STATUS ERROR
1950 012110 000207 RTS PC ;CONTINUE CHECKING
1951 012112 104014 T202F4: ERRORT ;ANSWER LINE TRANSITION ERROR
1952 012114 000207 RTS PC ;CONTINUE CHECKING
1953 012116 104014 T202F5: ERRORT ;ORIGINATE LINE TRANSITION ERROR
1954 012120 000207 RTS PC ;CONTINUE CHECKING

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

```

:SET SECONDARY TRANSMIT ON ORIGINATE LINE
:WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES

012206 013777 016674 004370 T202H: MOV LINORG,JDHMCSR :SET LINE COUNTER TO ORIGINATE LINE
013777 052777 000010 004364 BIS #SECTX,JDHMLSR :SET SECONDARY TRANSMIT
013777 104026 CKINTT :WAIT FOR TRANSITIONS TO OCCUR
012206 104022 WAITRN

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

012226 104023 CKTRAN :CHECK TRANSITIONS AND STATUS
:ON SELECTED ANSWER AND
:ORIGINATE LINES
012230 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
012232 000133 SECTX+CO+LINENA+TRMRDY+SECRX :EXPECT LINE ENABLE, TERMINAL
:READY, CARRIER, SECONDARY
:TRANSMIT AND SECONDARY
:RECEIVE STATUS BITS SET
:ON ORIGINATE LINE
012234 000001 XSCRX :EXPECT SECONDARY RECEIVE
:TRANSITION ON ANSWER LINE
012236 000001 XSCRX :EXPECT SECONDARY RECEIVE
:TRANSITION ON ORIGINATE LINE
012240 012252 T202H2 :GO HERE ON ANSWER LINE STATUS ERROR
012241 012253 T202H3 :GO HERE ON ORIGINATE LINE STATUS ERROR
012242 012254 T202H4 :GO HERE ON ANSWER LINE TRANSITION ERROR
012243 012255 T202H5 :GO HERE ON ORIGINATE LINE TRANSITION ERROR
012244 012256 T202I :GO TO NEXT TEST IF NO ERRORS
012245 104010 T202H2: ERRORS :ANSWER LIN STATUS ERROR
012246 000207 RTS PC :CONTINUE CHECKING
012247 104011 T202H3: ERRORS :ORIGINATE LINE STATUS ERROR
012248 000207 RTS PC :CONTINUE CHECKING
012249 104012 T202H4: ERRORT :ANSWER LINE TRANSITION ERROR
012250 000207 RTS PC :CONTINUE CHECKING
012251 104013 T202H5: ERRORT :ORIGINATE LINE TRANSITION ERROR
012252 000207 RTS PC :CONTINUE CHECKING

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

012272 013777 016676 004304 T2021: MOV LINANS,JDHMCSR :SET LINE COUNTER TO ANSWER LINE
012273 042777 000004 004300 BIC #RS,JDHMLSR :CLEAR REQUEST TO SEND
012274 013777 016674 004270 MOV LINORG,JDHMCSR :SET LINE COUNTER TO ORIGINATE LINE
012275 042777 000010 004264 BIC #SECTX,JDHMLSR :CLEAR SECONDARY TRANSMIT
012276 104026 CKINTT
012277 104022 WAITRN :WAIT FRO TRANSITIONS TO OCCUR

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

012326 104023 CKTRAN :CHECK TRANSITION S AND STATUS
:ON SELECTED ANSWE AND
:ORIGINATE LINES
012330 000003 LINENA+TRMRDY :EXPECT LINE ENABLE AND
:TERMINAL READY STATUS BITS SET
:ON ANSWER LINE
012332 000003 LINENA+TRMRDY :EXPECT LINE ENABLE AND
:TERMINAL READY STATUS BITS
:SET ON ORIGINATE LINE
012334 000007 XCO+XCS+XSCRX :EXPECT CARRIER, CLEAR TO SEND
:AND SECONDARY RECEIVE TRANSITIONS
:ON ANSWER LINE
012336 000005 XCO+XSCRX :EXPECT CARRIER AND SECONDARY
:RECEIVE TRANSITIONS ON
:ORIGINATE LINE
:GO HERE ON ANSWER LINE STATUS ERROR
012340 012352 T20212 :GO HERE ON ORIGINATE LINE STATUS ERROR
012342 012356 T20213 :GO HERE ON ANSWER LINE TRANSITIN ERROR
012344 012362 T20214 :GO HERE ON ORIGINATE LINE TRANSITION ERROR
012346 012366 T20215 :GO TO NEXT TEST IF NO ERRORS
012350 012372 T202J :ANSWER LINE STATUS ERROR
012352 104015 T202I2: ERRORS :CONTINUE CHECKING
012354 000207 RTS PC :ORIGINATE LINE STATUS ERROR
012356 104015 T202I3: ERRORS :CONTINUE CHECKING
012360 000207 RTS PC :ANSWE LINE TRANSITION ERROR
012362 104014 T202I4: ERRORT :CONTINUE CHECKING
012364 000207 RTS PC :ORIGINATE LINE TRANSITION ERROR
012366 104014 T202I5: ERRORT :CONTINUE CHECKING
012370 000207 RTS PC

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

012372 104004
012374 017405
012376 012737 000340 177776
012404 012777 013042 004166
012412 012737 012432 016724

012420 012777 000140 004156

012426 005037 177776
012432 005077 004154
012436 105777 004146
012442 100375
012444 005777 004142

012450 012737 000340 177776
012456 005077 004122
012462 013777 016674 004114
012470 042777 000002 004110
012476 104024
012500 104026
012502 104022

T202J: TYPE
MDISC
MOV #340,PS
MOV #TRNTYP,JDHMVEC
MOV #T202JS,RNGRET

MOV #SCNENA+INTENA,JDHMCSR

CLR PS
T202JS: CLR JTKDBR
18: TSTB JTKCSR
BPL 18
TST JTKDBR

:TYPE "STRIKE ANY TTY KEY
:TEST DISCONNECT"
:LOCK OUT INTERRUPTS
:SET UP TO DETECT TRANSITIONS
:SET UP DUMMY RETURN FOR RING
:FROM RING INTERRUPT
:ENABLE LINE SCANNER
:START SCANNER
:ENABLE INTERRUPTS

:DISCONNECT SEQUENCE REQUESTED

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

:WAIT FOR TRANSITIONS TO OCCUR

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1113
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1117 012504 104023 CKTRAN
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1120 012506 000003 LINENA+TRMRDY
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1122
1123 012510 000001 LINENA
1124
1125 012512 000000 0
1126
1127 012514 000000 0
1128
1129 012516 012530 T202J1
1130 012520 012534 T202J2
1131 012522 012540 T202J3
1132 012524 012544 T202J4
1133 012526 012550 T202JN
1134 012530 104015 T202J1: ERRORS
1135 012532 000207 RTS PC
1136 012534 104015 T202J2: ERRORS
1137 012536 000207 RTS PC
1138 012540 104014 T202J3: ERROR
1139 012542 000207 RTS PC
1140 012544 104014 T202J4: ERROR
1141 012546 000207 RTS PC
1142
1143 012550 104004 T202JN: TYPE
1144 012552 017356 MT202A
1145 012554 104026 CKINTT
1146 012556 000137 011602 JMP ST202B
1147

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

```

:CHECK TRANSITIONS AND STATUS
:ON SELECTED ANSWER AND
:ORIGINATE LINES
:EXPECT LINE ENABLE AND
:TERMINAL READY STATUS BITS
:SET ON ANSWER LINE
:EXPECT LINE ENABLE STATUS
:BIT SET ON ORIGINATE LINE
:EXPECT NO TRANSITIONS ON
:ANSWER LINE
:EXPECT NO TRANSITIONS ON
:ORIGINATE LINE
:GO HERE IF ANSWER LINE STATUS ERROR
:GO HERE IF ORIGINATE LINE STATUS ERROR
:GO HERE IF ANSWER LINE TRANSITION ERROR
:GO HERE IF ORIGINATE LINE TRANSITIONS ERROR
:GO TO END OF TEST IF NO ERRORS
:ANSWER LINE STATUS ERROR
:CONTINUE CHECKING
:ORIGINATE LINE STATUS ERROR
:CONTINUE CHECKING
:ANSWER LINE TRANSITION ERROR
:CONTINUE CHECKING
:ORIGINATE LINE TRANSITION ERROR
:CONTINUE CHECKING

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:TYPE "2020 TEST COMPLETE"

:GET NEW LINE NUMBERS
:RESTART TEST

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2148
2149
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2160
2161 012562 017704 004016 TRANS: MOV 3DHMCSR,R4 ;GET LINE NUMBER AND
2162 ;INTERRUPT FLAGS
2163 012566 010405 MOV R4,R5
2164 012570 042705 177760 BIC #177760,R5 ;EXTRACT LINE NUMBER
2165 012574 023705 016674 CMP LINORG,R5 ;DID ORIGINATE LINE INTERRUPT
2166 012600 001411 BEQ ORGTR ;IF YES, SERVICE
2167 012602 023705 016676 CMP LINANS,R5 ;DID ANSWER LINE INTERRUPT
2168 012606 001443 BEQ ANSTR ;IF YES, SERVICE
2169 012610 010577 003770 MOV R5,3DHMCSR
2170 012614 017703 003766 MOV 3DHMLSR,R3
2171 012620 104016 ERRORN ;INTERRUPT ON INCORRECT LINE
2172 012622 000471 BR FATEX
2173
2174 ;RECORD TRANSITIONS FOR ORIGINATE LINE
2175
2176 012624 032704 100000 ORGTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT.
2177 012630 001403 BEQ ORGTR1 ;SET RING TRANSITION BIT
2178 012632 052737 000010 016702 ORGTR1: BIS #10,ORGFLG
2179 012640 032704 040000 ORGTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
2180 012644 001403 BEQ ORGTR2 ;SET CARRIER TRANSITION BIT
2181 012646 052737 000004 016702 ORGTR2: BIS #4,ORGFLG
2182 012654 032704 020000 ORGTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
2183 ;CAUSED INTERRUPT
2184 012660 001403 BEQ ORGTR3 ;SET CLEAR TO SEND
2185 ;TRANSITION BIT
2186 012662 052737 000002 016702 ORGTR3: BIS #2,ORGFLG
2187 012670 032704 010000 ORGTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
2188 ;CAUSED INTERRUPT
2189 012674 001403 BEQ ORGTR4 ;SET SECONDARY RECEIVE
2190 012676 052737 000001 016702 ORGTR4: BIS #1,ORGFLG ;TRANSITION BIT
2191 012704 032704 170000 ORGTR4: BIT #RINGF+COF+CSF+SECRXF,R4
2192 ;IF NO INTERRUPT FLAGS SET
2193 012710 001044 ORGTRR: BNE TRANEX ;EXIT TRANSITION DETECTION
2194 012712 104016 ERRORN
2195 012714 000434 BR FATEX

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

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2245
2246 ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2247
2248 013102 000005 GETLIN: RESET
2249 013104 104013 INSTRG ;TYPE "ORIGINATE LINE-"
2250 013106 017264 MSELOR ;AND GET LINE NUMBER
2251 013110 000000 0
2252 013112 000017 17
2253 013114 016674 LINORG
2254 013116 104013 INSTRG ;TYPE "ANSWER LINE-"
2255 013120 017310 MSELANS ;AND GET LINE NUMBER
2256 013122 000000 0
2257 013124 000017 17
2258 013126 016676 LINANS
2259 013130 104004 TYPE
2260 013132 017720 MCRLF
2261 013134 000002 RTI ;RETURN TO CALLING ROUTINE
2262
2263 ;INITIALIZE INTERFACE
2264
2265 013136 000005 SETUPS: RESET
2266 013140 012737 000340 177776 MOV #340,PS ;LOCK OUT ALL INTERRUPTS
2267 013146 011605 MOV (SP),RS
2268 013150 012537 014036 MOV (RS)+,NXTTS
2269 013154 012537 014016 MOV (RS)+,ERR1
2270 013160 010516 MOV RS,(SP)
2271 013162 012777 006000 003414 MOV #CLRSCN+CLRMUX,JDHMCSR ;CLEAR LINE SCANNER AND MULTIPLEXER
2272 013170 032777 000020 003406 SETUP1: BIT #BUSY,JDHMCSR ;WAIT FOR SCANNER TO CLEAR
2273 013176 001374 BNE SETUP1
2274 013200 005037 016624 CLR ERRFLG
2275
2276 ;ENABLE SELECTED LINES
2277 ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
2278
2279 013204 013777 016674 003372 SETUP2: MOV LINORG,JDHMCSR ;SET UP TO ENABLE ORIGINATE LINE
2280 ;ORIGINATE LINE NUMBER
2281 013212 012777 000003 003366 MOV #LINENA+TRMRDY,JDHMLSR ;SET LINE ENABLE AND
2282 ;TERMINAL READY ON ORIGINATE LINE
2283 013220 013777 016676 003356 MOV LINANS,JDHMCSR ;SET LINE COUNTER TO ANSWER LINE
2284 013226 012777 000001 003352 MOV #LINENA,JDHMLSR ;SET LINE ENABLE ON ANSWER LINE
2285
2286 ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
2287 ;SET UP TO RECEIVE INTERRUPTS
2288 ;START LINE SCANNER
2289
2290 013234 012777 012562 003336 MOV #TRANS,JDHMVEC ;SET UP INTERRUPT VECTOR
2291 ;FOR TRANSITION DETECTION
2292 013242 012777 000340 003332 MOV #340,JDHMLVL ;SET UP INTERRUPT SERVICE LEVEL
2293 013250 012777 000140 003326 MOV #SCNENA+INTENA,JDHMCSR ;START SCANNER, ENABLE INTERRUPTS
2294 013256 005037 016700 CLR ANSFLG ;CLEAR TRANSITION DETECTED FLAGS
2295 013262 005037 016702 CLR ORGFLG
2296 013266 012737 013316 016724 MOV #SETUP4,RNGRET ;SET UP RETURN FROM
2297 ;DETECTION OF RING INTERRUPT
2298 013274 104004 TYPE ;REQUEST OPERATOR TO DIAL
2299 013276 017104 DIALM
2300 013300 005037 177776 CLR PS ;CLEAR PROCESSOR STATUS WORD

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2301 013304 005037 016704          CLR      TIME1          ;CLEAR TIMER
2302 013310 012737 001000 016706    MOV      #1000, TIME2  ;SET UP FOR 5 MINUTE DELAY
2303 013316 005737 016700          SETUP4: TST      ANSFLG  ;IF TRANSITION HAS OCCURED,
2304 013322 001014                      BNE      SETUPB       ;EXIT WAIT LOOP
2305 013324 005737 016702          TST      ORGFLG
2306 013330 001011                      BNE      SETUPB
2307 013332 005237 016704          INC      TIME1        ;ALLOW OPERATOR 5 MINUTES TO DIAL
2308 013336 001367                      BNE      SETUP4
2309 013340 005337 016706          DEC      TIME2
2310 013344 001364                      BNE      SETUF4
2311 013346 022626                      POP2SP
2312 013350 000177 000442          JMP      @ERR1
2313 013354 022626          SETUPB: POP2SP
2314 013356 000177 000454          JMP      @NXTTS
2315 013362 012766 000340 000002    MOV      #340, +2(SP)
2316 013370 000002                      RTI
2317
2318                                ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2319
2320 013372 011605          CKRNG: MOV      (SP), R5
2321 013374 012537 014036          MOV      (R5)+, NXTTS
2322 013400 012537 014016          MOV      (R5)+, ERR1
2323 013404 012537 014020          MOV      (R5)+, ERR2
2324 013410 010516          MOV      R5, (SP)
2325 013412 012705 000010          MOV      #10, R5      ;EXPECT RING ONLY ON ANSWER LINE
2326 013416 013704 016700          MOV      ANSFLG, R4   ;GET ACTUAL TRANSITION DATA
2327 013422 013703 016676          MOV      LINANS, R3  ;SET UP LINE NUMBER
2328 013426 020504          CMP      R5, R4      ;DID RING CAUSE INTERRUPT
2329 013430 001402          BEQ      CKRNG1     ;ON ANSWER LINE
2330 013432 004777 000360          JSR      PC, @ERR1
2331 013436 005005          CKRNG1: CLR      R5
2332 013440 013704 016702          MOV      ORGFLG, R4
2333 013444 013703 016674          MOV      LINORG, R3
2334 013450 005704          TST      R4
2335 013452 001403          BEQ      CKRNG2     ;IF TRANSITION OCCURED
2336 013454 022626          POP2SP             ;ON ORIGINATE LINE, ERROR
2337 013456 000177 000336          JMP      @ERR2
2338 013462 022626          CKRNG2: POP2SP
2339 013464 000177 000346          JMP      @NXTTS

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

```

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

```

2416
2417
2418
2419
2420
2421 014040
2422 014040 005237 016630
2423 014044 012737 000001 016632
2424 014052 000005
2425 014054 005037 016722
2426 014060 005337 016722
2427 014064 001375
2428 014066 104004
2429 014070 020306
2430 014072 013701 000042
2431 014076 001516
2432 014100 000005
2433 014102 004711
2434 014104 000240
2435 014106 000240
2436 014110 000240
2437 014112 000240
2438 014114 000137 014334
2439
2440
2441
2442
2443
2444
2445 014120 011646
2446 014122 162716 000002
2447 014126 017616 000000
2448 014132 006316
2449 014134 042716 177001
2450 014140 062716 020324
2451 014144 017616 000000
2452 014150 000136
2453
2454 014152 105777 002432
2455 014156 100001
2456 014160 104027
2457 014162 000002
2458

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

EOP:
    INC      PASCNT
    MOV      #1, TSTNO
    RESET
    CLR      FILLA
    DEC      FILLA
    BNE      1$
    TYPE
    MEPASS
    MOV      42, R1
    BEQ      TSTENT
    RESET
LOGICAL:
    JSR      PC, (R1)
    NOP
    NOP
    NOP
    NOP
    JMP      TSTENT

;UPDATE PASS COUNT
;START AT FIRST TEST OF GROUP
;CLEAR THE WORLD
;INIT COUNTER
;COUNT THE CTR
;BR TIL STALL TIMES OUT
;RING BELL

;ARE YOU ON ACT11?

;GET ADDRESS OF FIRST TEST

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

ENTSRV: MOV      (SP), -(SP)
        SUB      #2, (SP)
        MOV      @ (SP), (SP)
EMTOK:  ASL      (SP)
        BIC      #177001, (SP)
        ADD      #EMTTAB, (SP)
        MOV      @ (SP), (SP)
        JMP      @ (SP)+

CKINT:  TSTB    @TKCSR
        BPL      1$
        KBDIN
1$:     RTI

;GET PC OF RETURN
;=PC OF EMT
;GET EMT
;MULTIPLY EMT ARG BY 2
;CLEAR UNWANTED BITS
;POINTER TO SUBROUTINE ADDRESS
;SUBROUTINE ADDRESS
;GO TO SUBROUTINE
    
```

```

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

```

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

014452 005037 016624
014456 005037 014672
014458 005037 014704
014459 000451
014470 005037 016624
014474 012737 017045 014672
014502 012737 014760 014704
014510 000440
014512 005037 016624
014516 012737 017014 014672
014524 012737 014776 014704
014528 000427

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

ERR: CLR ERRFLG ; ALWAYS TYPE PC+2
; OF TEST THAT FAILED
CLR ERRMSG ; NO MESSAGE
CLR ERTAB ; NO TABLE OF DATA
BR ERRGEN ; OUTPUT ERROR MESSAGE

:TRANSITION DETECTION ERROR SERVICE
:FORMAT FOR ERROR TYPEOUT IS

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

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

ERRT: CLR ERRFLG ; ALWAYS OUTPUT ALL DATA
MOV #MTRANE,ERRMSG ; TYPE "TRANSITION ERROR"
MOV #ERTAB1,ERTAB ; TABLE OF DATA
BR ERRGEN ; OUTPUT ERROR MESSAGE

:ON-LINE STATUS ERROR SERVICE
:FORMAT FOR LINE STATUS ERROR IS

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

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

ERRS: CLR ERRFLG ; ALWAYS OUTPUT ALL DATA
MOV #MLINE1,ERRMSG ; TYPE "LINE ERROR"
; EXP REC LINE"
MOV #ERTAB2,ERTAB ; TABLE OF DATA
BR ERRGEN ; OUTPUT ERROR MESSAGE

014524 005037 016624 014672
014540 012737 017775 014672
014546 012737 015014 014704
014554 000416
014556 012737 016726 014672
014564 012737 015026 014704
014572 000407
014574 012737 016757 014672
014602 012737 015040 014704
014610 000400

:FATAL TRANSITION ERROR
:FORMAT FOR FATAL ERROR TYPEOUT IS

:XXXXXX FATAL ERROR
:CSTAT LSTAT
:AAAAA BBB

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

ERRN: CLR ERRFLG : ALWAYS OUTPUT ALL DATA
MOV #MFATAL,ERRMSG : TYPE "FATAL ERROR"
:CSTAT LSTAT
MOV #ERTAB3,ERTAB : TABLE OF DATA
BR ERGEN : OUTPUT ERROR MESSAGE

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

:XXXXXX STATUS ERROR
:EXP REC
:AAAAA BBBBBB

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

ERRCS: MOV #MSTATE,ERRMSG : TYPE "STATUS ERROR"
: "EXP REC"
MOV #ERTAB4,ERTAB : TABLE OF DATA
BR ERGEN : 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

ERRLS: MOV #MLINER,ERRMSG
MOV #ERTAB5,ERTAB
BR ERGEN

; TABLE S OF DATA FOR ERROR TYPEOUT

; TABLE FOR TRANSITION STATUS ERROR

2661	014752	000001
2662	014754	000006
2663	014756	016656
2664	014760	000003
2665	014762	000002
2666	014764	016652
2667	014766	000002
2668	014770	016650
2669	014772	000002
2670	014774	016646
2671	014776	000003
2672	015000	000003
2673	015002	016652
2674	015004	000003
2675	015006	016650
2676	015010	000002
2677	015012	016646
2678	015014	000002
2679	015016	000006
2680	015020	016650
2681	015022	000003
2682	015024	016646
2683	015026	000002
2684	015030	000006
2685	015032	016652
2686	015034	000006
2687	015036	016650
2688	015040	000004
2689	015042	000003
2690	015044	016652
2691	015046	000003
2692	015050	016650
2693	015052	000002
2694	015054	016646
2695	015056	000002
2696	015060	016642
2700		
2701		
2702		
2703	015062	000001
2704	015064	000006
2705	015066	000176

ERTAB0: 1
 SAVPC
 ERTAB1: 3
 SAVR5
 SAVR4
 SAVR3
 ERTAB2: 3
 SAVR5
 SAVR4
 SAVR3
 ERTAB3: 3
 SAVR4
 SAVR3
 ERTAB4: 3
 SAVR5
 SAVR4
 ERTAB5: 4
 SAVR5
 SAVR4
 SAVR3
 SAVR1
 SWRTB: 1
 SWREG

; CONTAINS EXPECTED TRANSITION STATUS
 ; CONTAINS RECEIVED TRANSITION STATUS
 ; CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
 ; CONTAINS EXPECTED LINE STATUS
 ; CONTAINS RECEIVED LINE STATUS
 ; CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
 ; CONTAINS EXPECTED CONTROL STATUS
 ; CONTAINS RECEIVED CONTROL STATUS
 ; CONTAINS EXPECTED LINE STATUS
 ; CONTAINS RECEIVED LINE STATUS
 ; CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
 ; CONTAINS NUMBER OF LINE UNDER TEST

```

: CONVERT OCTAL TO ASCII AND
: OUTPUT ON TELETYPE
: GET POINTER TO TABLE OF DATA
: SET UP POINTER FOR CONVERTED DATA
: GET NUMBER OF WORDS TO BE CONVERTED
: GET NUMBER OF DIGITS IN WORD
: GET DATA TO BE CONVERTED
: CONVERT TO ASCII
: IF ALL DATA IS NOT CONVERTED
: CONTINUE
: PUT TERMINATOR AT END OF MESSAGE
: OUTPUT CONVERTED DATA
: TO TELETYPE
: RETURN TO CALLING ROUTINE

015070 017605 000000 OCTASN: MOV 3(SP),R5
015074 062716 000002 ADD #2,(SP)
015100 012737 000010 MOV #10,RADIX
015106 012704 020206 MOV #MBCD+2,R4
015112 012537 016660 MOV (R5)+,WRDCNT
015116 012537 016662 OCTAS1: MOV (R5)+,CHRCNT
015122 013537 015424 MOV 3(R5)+,BINWRD
015126 104010 CONVERT
015130 005337 016660 DEC WRDCNT
015134 001370 BNE OCTAS1
015136 112714 000100 MOVB #100,(R4)
015142 005737 015260 TST SMLN
015146 001002 BNE 1$
015150 104004 TYPE
015152 020204 MBCD
015154 000002 1$: RTI

015156 005037 015254 CNTLU: CLR TMP1
015162 012737 000001 MOV #1,TMP2
015170 104004 TYPE
015172 020161 $SWREQ
015174 052737 000001 BIS #1,SMLN
015202 104006 OCTASC
015204 015062 SWRTB
015206 104004 TYPE
015210 020206 MBCD+2
015212 104013 INSTRG
015214 020172 $NEWIS
015216 000000 0
015220 177777 177777
015222 015254 TMP1
015224 123727 016154 000015 CMPB INBUF,#15
015232 001403 BEQ 1$
015234 013777 015254 001356 MOV TMP1,3SWR
015242 005037 015256 1$: CLR TMP2
015246 005037 015260 CLR SMLN
015252 000002 RTI
015254 000000 TMP1: 0
015256 000000 TMP2: 0
015260 000000 SMLN: 0

```

```

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

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

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

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2918 016120 101342          BHI     INSTER          ;IF R3>HILIM, ERROR
2919 016122 020337 016146    CMP     R3,LOLIM        ;TEST LOW LIMIT
2920 016126 103737          BLO    INSTER          ;IF R3<LOLIM, ERROR
2921 016130 010377 000016    MOV     R3,STORE       ;STORE NUMBER
2922 016134 000002          RTI                    ;EXIT
2923 016136 005737 015256    CHCK:  TST     TMP2
2924 016142 001731          BEQ    INSTER
2925 016144 000002          RTI
2926 016146 000000          LOLIM: 0
2927 016150 000000          HILIM: 0
2928 016152 000000          STORE: 0
2929 016154 000000          INBUF: 0
2930          .=.+20
2931          ;ENTER HERE ON POWER FAILURE
2932
2933
2934 016176 010046          PFAIL: MOV     R0,-(SP)      ;SAVE R0-R5 ON PROCESSOR STACK
2935 016200 010146          MOV     R1,-(SP)
2936 016202 010246          MOV     R2,-(SP)
2937 016204 010346          MOV     R3,-(SP)
2938 016206 010446          MOV     R4,-(SP)
2939 016210 010546          MOV     R5,-(SP)
2940 016212 013746 000024    MOV     24,-(SP)
2941 016216 010637 016654    MOV     SP,SAVSP       ;SAVE STACK POINTER
2942 016222 012737 016234 000024    MOV     #RESTART,24   ;SET UP FOR POWER UP TRAP
2943 016230 000000          HALT
2944 016232 000776          BR     .-2            ;HALT ON POWER DOWN NORMAL
2945
2946          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
2947
2948 016234 013706 016654          RESTAR: MOV     SAVSP,SP   ;RESTORE STACK POINTER
2949 016240 012605          MOV     (SP)+,R5       ;RESTORE R0-R5
2950 016242 012604          MOV     (SP)+,R4
2951 016244 012603          MOV     (SP)+,R3
2952 016246 012602          MOV     (SP)+,R2
2953 016250 012601          MOV     (SP)+,R1
2954 016252 012600          MOV     (SP)+,R0
2955 016254 012737 016176 000024    MOV     #PFAIL,24     ;SET UP FOR POWER FAILURE
2956 016262 005726          POP1SP
2957 016264 104004          TYPE
2958 016266 020073          MPFAIL
2959 016270 005737 001756    TST     TIPFLG
2960 016274 001002          BNE    RESTA1
2961 016276 000137 001262    JMP     START0
2962 016302 104004          RESTA1: TYPE
2963 016304 020113          MPF1
2964 016306 012746 000340    MOV     #340,-(SP)
2965 016312 005746          PUSH1SP
2966 016314 000137 014334    JMP     TSTENT
2967
2968
2969          ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
2970 016320 013746 000020    XOR:  MOV     20,-(SP)   ;SAVE 20
2971 016324 013746 000022    MOV     22,-(SP)       ;SAVE 22
2972 016330 012737 016522 000020    MOV     #2$,20         ;IOT INTR VECTOR
2973 016336 012737 000340 000022    MOV     #340,22        ;IOT INTR LVL
  
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2974 016344 012737 000300 014026      MOV      #300,DATA1
2975 016352 012737 000302 014030      MOV      #302,DATA2
2976 016360 013777 014030 175440      1$:     MOV      DATA2,DATA1
2977 016366 012777 000004 175434      MOV      #IOT,DATA2      ; IOT TRAP
2978 016374 062737 000004 014026      ADD      #4,DATA1
2979 016402 062737 000004 014030      ADD      #4,DATA2
2980 016410 023727 014026 001000      CMP      DATA1,#1000
2981 016416 001360      BNE      1$
2982 016420 012737 000000 016632      MOV      #0,TSTNO      ; SET UP DEFAULT
2983 016426 012737 020436 016664      MOV      #TSTBO,TSTPNT
2984 016434 052737 000340 177776      BIS      #340,PS      ; PREVENT INTERRUPTS
2985 016442 005077 000136      CLR      ADHMCSR
2986 016446 012777 000100 000130      MOV      #INTENA,ADHMCSR ; SET INTERRUPT ENABLE
2987 016454 042737 000340 177776      BIC      #340,PS      ; ALLOW INTERRUPTS
2988 016462 052777 000200 000114      BIS      #DONE,ADHMCSR ; SET DONE..AND INTERRUPT
2989 016470 000240      NOP
2990 016472 012637 000022      MOV      (SP)+,22      ; YOU DIDN'T INTERRUPT ?
2991 016476 012637 000020      MOV      (SP)+,20      ; RESTORE 20 & 22
2992 016502 005077 000076      CLR      ADHMCSR      ; STOP ALL INTERRUPT
2993 016506 052737 000340 177776      BIS      #340,PS
2994 016514 104012      ERROR
2995 016516 000000      HALT
2996 016520 000426      BR      3$      ; YOU SHOULD HAVE INTERRUPTED
2997 016522 011637 016600      2$:     MOV      (SP),DHMVEC      ; EXTRACT VECTOR +4
2998 016526 162737 000002 016600      SUB      #2,DHMVEC      ; CREATE LVL
2999 016534 013737 016600 016602      MOV      DHMVEC,DHMLVL ; SAVE
3000 016542 162737 000002 016600      SUB      #2,DHMVEC      ; CREATE AND SAVE VEC
3001 016550 012737 000340 177776      MOV      #340,PS      ; PREVENT INTERRUPTS
3002 016556 005077 000022      CLR      ADHMCSR
3003 016562 022626      POP2SP
3004 016564 022626      POP2SP
3005 016566 012637 000022      MOV      (SP)+,22      ; RESTORE 22
3006 016572 012637 000020      MOV      (SP)+,20      ; RESTORE 20
3007 016576 000207      3$:     RTS      PC
3008

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3009
3010 ;INDIRECT POINTERS
3011
3012 016600 000300 DHMVEC: 300 ;MODEM CONTROL INTERRUPT VECTOR
3013 016602 000302 DHMLVL: 302 ;MODEM CONTROL ONTERRUPT PRIORITY
3014 016604 170500 DHMCSR: 170500 ;MODEM CONTROL CONTROL STATUS REGISTER
3015 016606 170502 DHMLSR: 170502 ;MODEM CONTROL CONTROL STATUS REGISTER
3016 016610 177560 TKCSR: 177560
3017 016612 177562 TKDBR: 177562
3018 016614 177564 TPCSR: 177564
3019 016616 177566 TPDBR: 177566
3020 016620 177570 SWR: 177570
3021 016622 177570 DISPLAY:177570
3022
3023 ;PROGRAM VARIABLES
3024
3025 016624 000000 ERRFLG: 0
3026 016626 000000 TRACON: 0
3027 016630 000000 PASCNT: 0
3028 016632 000000 TSTNO: 0
3029 016634 000000 RETURN: 0
3030 016636 000000 ICOUNT: 0
3031 016640 000000 SAVRO: 0
3032 016642 000000 SAVR1: 0
3033 016644 000000 SAVR2: 0
3034 016646 000000 SAVR3: 0
3035 016650 000000 SAVR4: 0
3036 016652 000000 SAVR5: 0
3037 016654 000000 SAVSP: 0
3038 016656 000000 SAVPC: 0
3039 016660 000000 WRDCNT: 0
3040 016662 000000 CHRCNT: 0
3041 016664 020436 TSTPNT: TSTTBO
3042 016666 000000 TSTMAX: 0
3043 016670 000000 LINFLG: 0
3044 016672 000000 LINE: 0
3045 016674 000000 LINORG: 0
3046 016676 000000 LINANS: 0
3047 016700 000000 ANSFLG: 0
3048 016702 000000 ORGFLG: 0
3049 016704 000000 TIME1: 0
3050 016706 000000 TIME2: 0
3051 016710 000000 TIFLG: 0
3052 016712 177777 LINSEL: 177777
3053 016714 000000 SELMSK: 0
3054 016716 000000 SLMSK: 0
3055 016720 000002 FILL: 2 ;FILL CHAR/COUNT
3056 016722 000000 FILLA: 0 ;TEMP STORAGE FOR FILL COUNT
3057 016724 000000 RNGRET: 0
3058
3059 016726 052123 052101 051525 MSTATE: .ASCII ;STATUS ERROR%"EXP REC;
3060 016734 042440 051122 051117
3061 016742 021045 054105 020120
3062 016750 020040 051040 041505
3063 016756 100
3064 016757 114 047111 020105 MLINER: .ASCII ;LINE ERROR%"EXP REC LINE SEL;
  
```

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

3121	017455	045	022442	030442	M16: .ASCII ;%"16 LINE SCANNER TEST%";
3122	017462	020066	044514	042516	
3123	017470	051440	040503	047116	
3124	017476	051105	052040	051505	
3125	017504	022524	040042		
3126	017510	021045	021045	055104	MTITLE: .ASCII ;%"DZDHC-C -----MODEM CONTROL DIAGNOSTIC-----%";
3127	017516	044104	026513	020103	
3128	017524	020040	026440	026455	
3129	017532	026455	047515	042504	
3130	017540	020115	047503	052116	
3131	017546	047522	020114	044504	
3132	017554	043501	047516	052123	
3133	017562	041511	026455	026455	
3134	017570	022455	040042		
3135	017574	021045	042526	052103	MVECTOR: .ASCII ;%"VECTOR ADDRESS-";
3136	017602	051117	040440	042104	
3137	017610	042522	051523	040055	
3138	017616	021045	047503	052116	MREGAD: .ASCII ;%"CONTROL REGISTER ADDRESS-";
3139	017624	047522	020114	042522	
3140	017632	044507	052123	051105	
3141	017640	040440	042104	042522	
3142	017646	051523	040055		
3143	017652	021045	044514	042516	MLINSL: .ASCII ;%"LINE SELECT PARAMETER -";
3144	017660	051440	046105	041505	
3145	017666	020124	040520	040522	
3146	017674	042515	042524	020122	
3147	017702	040055			
3148	017704	021045	042524	052123	MTEST: .ASCII ;%"TEST-";
3149	017712	040055			
3150	017714	020040	040077		MQM: .ASCII ; ?";
3151	017720	021045	100		MCRLF: .ASCII ; %";
3152	017723	045	051442	047111	MLINE: .ASCII ;%"SINGLE LINE CABLE TEST%";
3153	017730	046107	020105	044514	
3154	017736	042516	041440	041101	
3155	017744	042514	052040	051505	
3156	017752	022524	040042		
3157	017756	021045	044514	042516	MLINEI: .ASCII ;%"LINE NUMBER-";
3158	017764	047040	046525	042502	
3159	017772	026522	100		
3160	017775	106	052101	046101	MFATAL: .ASCII ;FATAL ERROR% "CSTAT LSTAT";
3161	020002	042440	051122	051117	
3162	020010	021045	051503	040524	
3163	020016	020124	046040	052123	
3164	020024	052101	100		
3165	020027	045	052042	040522	MTRNDE: .ASCII ;%"TRANSITION DETECTED% "CSTAT LSTAT";
3166	020034	051516	052111	047511	
3167	020042	020116	042504	042524	
3168	020050	052103	042105	021045	
3169	020056	051503	040524	020124	
3170	020064	046040	052123	052101	
3171	020072	100			
3172	020073	045	050042	053517	MPFAIL: .ASCII ;%"POWER FAILURE";
3173	020100	051105	043040	044501	
3174	020106	052514	042522	100	
3175	020113	055	052503	051122	MPF1: .ASCII ;-CURRENT TEST WILL RESTART%";
3176	020120	047105	020124	042524	

DD FORM 1300-10
DD FORM 1300-10

020612	006164
020614	000200
020616	006400
020620	006200
020624	006200
020626	004000
020630	007000
020634	004000
020636	004000
020640	000000
020644	007500
020646	000001
020648	007500
020650	004000
020654	007746
020656	004000
020660	010124
020664	004000
020666	010300
020670	004000
020672	010450
020674	004000
020676	010634
020700	004000
020702	011010
020704	004000
020706	000000
020710	000000
020712	011540
	000001
	000001

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
.
END

ANSFLG	016700	DIV1	015330	ICOUNT	016636	LINANS	016676	MPF1	020113
ANSTR	012716	DIV1A	015354	INSBUF	016154	LINE	016672	MQM	017714
ANSTRR	013004	DIV1B	015422	INIT1	002214	LINENA=	000001	MREGAD	017616
ANSTR1	012732	DIV1C	015372	INSTBB	015734	LINFLG	016670	MSELAN	017310
ANSTR2	012746	DIVIDH	015426	INSTER	016026	LINORG	016674	MSELOR	017264
ANSTR3	012762	DIVIDL	015424	INSTR	015666	LINSEL	016712	MSG	015714
ANSTR4	012776	DIVIS	015420	INSTRB	015726	LINT1	003620	MSTATE	016726
WINASB	015272	DIVIU	015334	INSTRC	016014	LINT1A	003646	MTEST	017704
WINASB	015312	DMYRTI	002202	INSTRD	016054	LINT1B	003674	MTITLE	017510
WINASB	015262	DONE	000200	INSTRG=	104013	LINT2	003714	MTRANE	017045
WINASB	015424	EMTDEF=	***** U	INSTR1	015712	LINT2A	003754	MTRNDE	020027
WUSY =	000020	EMTLIM	020404	INSTR2	016034	LINT2B	004004	MT103A	017327
CHCK	016136	EMTOK	014132	INSTR3	016114	LOGICA	014102	MT103T	017142
CHRCNT	016662	EMTSRV	014120	INTENA=	000100	LOLIM	016146	MT202A	017356
CKINT	014152	EMTTAB	020324	INT1	002510	LOOP	014164	MT202T	017213
CKINTT=	104026	EOP	014040	INT1A	002556	LOOPER	014314	MUX1	004556
CKRING=	104021	ERR	014452	INT1B	002562	LOOPL	014400	MUX1A	004604
CKRNG	013372	ERRCS	014556	INT10	003270	LOOPS	014266	MUX1B	004652
CKRNG1	013436	ERRFLG	016624	INT10A	003352	LOOPX	014330	MUX1C	004710
CKRNG2	013462	ERRGEN	014612	INT10B	003354	LVL =	000004	MUX1D	004722
CKTRAN=	104023	ERRLS	014574	INT11	003356	MAINT =	001000	MUX1E	004742
CKTRN	013556	ERRMSG	014672	INT11A	003440	MBCD	020204	MUX1F	004774
CKTRN1	013672	ERRN	014534	INT11B	003442	MCONTC	020150	MUX11	007570
CKTRN2	013724	ERROR =	104012	INT12	003444	MCONTL	020156	MUX11A	007606
CKTRN3	013764	ERRORC =	104000	INT12A	003526	MCONTV	020153	MUX11B	007636
CKTRN4	014010	ERRORL =	104001	INT12B	003530	MCRLF	017720	MUX11C	007664
CLRMUX=	002000	ERRORN =	104016	INT13	003532	MDISC	017405	MUX11D	007676
CLRSCN=	004000	ERRORS =	104015	INT13A	003614	MEMT1	004032	MUX11E	007712
CNTLU	015156	ERRORT =	104014	INT13B	003616	MEMT1A	004060	MUX11F	007744
CNTLUU=	104025	ERRS	014512	INT2	002564	MEMT1B	004110	MUX12	007746
CO =	000100	ERRT	014470	INT2A	002632	MEMT1C	004134	MUX12A	007764
COF =	040000	ERR1	014016	INT2B	002636	MEMT1D	004142	MUX12B	010014
CONVER=	104010	ERR2	014020	INT3	002640	MEMT1E	004174	MUX12C	010042
CS =	000040	ERR3	014022	INT3A	002724	MEMT1F	004220	MUX12D	010054
CSF =	020000	ERR4	014024	INT3B	002726	MEMT2	004230	MUX12E	010070
CSTR1	002236	ERTAB	014704	INT4	002730	MEMT2A	004252	MUX12F	010122
CSTR2	002300	ERTAB0	014752	INT4A	003012	MEMT2B	004334	MUX13	010124
CSTR3	002342	ERTAB1	014760	INT4B	003016	MEMT2C	004360	MUX13A	010142
CSTR4	002404	ERTAB2	014776	INT5	003020	MEMT2D	004372	MUX13B	010172
CSTR5	002446	ERTAB3	015014	INT5A	003102	MEMT3	004406	MUX13C	010220
DATA1	014026	ERTAB4	015026	INT5B	003106	MEMT3A	004430	MUX13D	010232
DATA2	014030	ERTAB5	015040	INT6	003110	MEMT3B	004442	MUX13E	010246
DATA3	014032	EXTRAC=	104011	INT6A	003172	MEMT3C	004504	MUX13F	010300
DATA4	014034	FATEX	013006	INT6B	003176	MEMT3D	004530	MUX14	010302
DHMCSR	016604	FATRET	013020	INT7	003200	MEMT3E	004542	MUX14A	010320
DHMLSR	016606	FILL	016720	INT7A	003262	MEPASS	020306	MUX14B	010350
DHMLVL	016602	FILLA	016722	INT7B	003266	MFATAL	017775	MUX14C	010376
DHMVEC	016600	FREEZE	014410	KBDIN =	104027	MLINE	017723	MUX14D	010410
DIALM	017104	FREEZX	014444	KBDINT	001760	MLINEI	017756	MUX14E	010424
DIGIT =	015426	GETLIN	013102	KBDIN1	002042	MLINER	016757	MUX14F	010456
DISPLA	016622	GETLNS=	104017	KBDIN2	002074	MLINSL	017014	MUX15	010460
DISPRT	000174	GRO	020426	KBDIN3	002136	MPFAIL	020073	MUX15A	010476
DIVCNT	015404	HILIM	016150	KRET	002204			MUX15B	010520

MUX15C	010546	MUX7	006402	RS	= 000004	STRLIN	007532	TYPE	= 104004
MUX15D	010560	MUX7A	006430	RS05	015472	STRLNA	007552	TYPECL	015622
MUX15E	010576	MUX7B	006462	RO	=%000000	STRTOA	001666	TYPER	015524
MUX15F	010632	MUX7C	006510	R1	=%000001	ST103A	011164	TYPERA	015534
MUX16	010634	MUX7D	006522	R2	=%000002	ST103B	011226	TYPER1	015600
MUX16A	010652	MUX7E	006540	R3	=%000003	ST202A	011540	TYPER2	015614
MUX16B	010674	MUX7F	006574	R4	=%000004	ST202B	011602	T0	002210
MUX16C	010722	MUX8	006620	R5	=%000005	SUSWR	001122	T1	002236
MUX16D	010734	MUX8A	006636	SAVPC	016656	SV05	015440	T10	002640
MUX16E	010752	MUX8B	006672	SAVR0	016640	SV05P	015432	T100	007532
MUX16F	011006	MUX8C	006700	SAVR1	016642	SWR	016620	T101	007570
MUX17	011010	MUX8D	006734	SAVR2	016644	SWREG	000176	T102	007746
MUX17A	011026	MUX8E	006762	SAVR3	016646	SWRTB	015062	T103	010124
MUX17B	011050	MVECTO	017574	SAVR4	016650	SW06	= 000100	T103A	011230
MUX17C	011076	MO	= 000040	SAVR5	016652	SW08	= 000400	T103A1	011236
MUX17D	011110	M1	= 000110	SAVSP	016654	SW09	= 001000	T103B	011242
MUX17E	011126	M16	= 017455	SAV05P=	104005	SW10	= 002000	T103B1	011252
MUX17F	011162	N	= 000300	SCNENA=	000040	SW11	= 004000	T103B2	011256
MUX2	005014	NXTTS	014036	SCNT1	007002	SW12	= 010000	T103C	011262
MUX2A	005042	NO	= 000040	SCNT1A	007042	SW13	= 020000	T103D1	011326
MUX2B	005110	N1	= 000110	SCNT1B	007120	SW14	= 040000	T103D2	011332
MUX2C	005146	N2	= 000202	SCNT1C	007202	SW15	= 100000	T103D3	011336
MUX2D	005160	N3	= 000301	SCNT1D	007222	T	= 000014	T103D4	011342
MUX2E	005200	OCTASC	= 104006	SCNT2	007252	TEMTAB	020310	T103E	011346
MUX2F	005232	OCTASN	015070	SCNT2A	007304	TIFLG	016710	T103EN	011522
MUX3	005252	OCTAS1	015116	SCNT2B	007400	TIMES	= 004000	T103ES	011406
MUX3A	005300	ORGFLG	016702	SCNT2C	007462	TIME1	016704	T103E1	011502
MUX3B	005346	ORGTR	012624	SCNT2D	007502	TIME2	016706	T103E2	011506
MUX3C	005404	ORGTRR	012712	SCOPE	= 104002	TIPFLG	001756	T103E3	011512
MUX3D	005416	ORGTR1	012640	SCOPEF	= 104003	TKCSR	016610	T103E4	011516
MUX3E	005436	ORGTR2	012654	SECRX	= 000020	TKDBR	016612	T104	010302
MUX3F	005470	ORGTR3	012670	SECRXF	= 010000	TMP1	015254	T105	010460
MUX4	005510	ORGTR4	012704	SECTX	= 000010	TMP2	015256	T106	010634
MUX4A	005536	PASCNT	016630	SELSK	016714	TPCSR	016614	T107	011010
MUX4B	005604	PC	=%000007	SETUP	= 104020	TPDBR	016616	T11	002730
MUX4C	005642	PFAIL	016176	SETUPB	013354	TRACON	016626	T12	003020
MUX4D	005654	POPPO	= 012600	SETUPS	013136	TRANEX	013022	T13	003110
MUX4E	005674	POP1SP=	005726	SETUP1	013170	TRANS	012562	T14	003200
MUX4F	005726	POP2SP=	022626	SETUP2	013204	TRANX1	013032	T15	003270
MUX5	005746	PS	= 177776	SETUP4	013316	TRMRDY=	000002	T16	003356
MUX5A	005774	PSW	= 177776	SINGLE=	000001	TRNTAB	013070	T17	003444
MUX5B	006026	PUSHRO=	010046	SINTFL	002206	TRNTYP	013042	T2	002300
MUX5C	006054	PUSH1S=	005746	SLMSK	016716	TSTENT	014334	T20	003532
MUX5D	006066	PUSH2S=	024646	SMLN	015260	TSTGO	001706	T200	011164
MUX5E	006104	RADIX	= 015430	SP	=%000006	TSTLST	020406	T201	011522
MUX5F	006140	REGST1	001546	ST	= 000200	TSTMAX	016666	T202A	011604
MUX6	006164	RESTAR	016234	STACK	001100	TSTNO	016632	T202A1	011612
MUX6A	006212	RESTA1	016302	START	001100	TSTPNT	016664	T202B	011616
MUX6B	006244	RES05	= 104007	STARTN	001574	TSTTB0	020436	T202B1	011626
MUX6C	006272	RETURN	016634	STARTO	001262	TSTTB1	020640	T202B2	011632
MUX6D	006304	RING	= 000200	START1	001324	TSTTB2	020702	T202C	011636
MUX6E	006322	RINGF	= 100000	STEP	= 000400	TSTTB3	020710	T202D	011652
MUX6F	006356	RNGRET	016724	STORE	016152	TYFILL	015634	T202D1	011716

T202D2	011722	T202G4	012202	T202J4	012544	T37	007252	XFLAG	001252
T202D3	011726	T202H	012206	T21	003620	T4	002404	XM	= 000101
T202D4	011732	T202H2	012252	T22	003714	T5	002446	XN	= 000300
T202F1	011736	T202H3	012256	T23	004032	T6	002510	XOR	016320
T202F2	012002	T202H4	012262	T24	004230	T7	002564	XORSVC	001254
T202F3	012006	T202H5	012266	T25	004406	VECSTA	001374	XSCRX	= 000001
T202F4	012012	T202I	012272	T26	004556	VECSTR	001354	XIA	001612
T202F5	012016	T202I2	012352	T27	005014	VECST1	001500	XIB	001656
T202F6	012022	T202I3	012356	T3	002342	WAITR	013470	\$NEWS	020172
T202F7	012102	T202I4	012362	T30	005252	WAITRN=	104022	\$SWREQ	020161
T202F8	012106	T202I5	012366	T300	011540	WAITR1	013526	.1	014674
T202F9	012112	T202J	012372	T31	005510	WAITR2	013540	.2	014706
T202G1	012116	T202JN	012550	T32	005746	WAITS =	104024	.3	014710
T202G2	012122	T202JS	012432	T33	006164	WRDCNT	016660	.4	014734
T202G3	012166	T202J1	012530	T34	006402	X	= 000000	.	= 020714

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

*DZDHKC.DZDHKC/SOL+DZDHKC.P11
RUN-TIME: 14 26 2 SECONDS
RUN-TIME RATIO: 79.43=1.9
CORE USED: 8K (15 PAGES)

