

# DH11

CONTROL MULTIPLEXER  
MD-11-DZDHK-D

EP-DZDHK-D-DL-B

JUN 1977

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**digital**

FICHE 1 OF 1

MADE IN USA

This microfiche card contains a grid of frames, each containing technical data. The frames are arranged in approximately 12 rows and 8 columns. Each frame contains a small table or list of data points, likely related to the control multiplexer system. The data is printed in white on a dark background. The frames contain various alphanumeric strings, possibly representing test results, configuration parameters, or diagnostic information. The text is too small to read accurately but appears to be organized into columns and rows within each frame.

A small microfiche frame located in the bottom right corner of the card. It contains a small table or list of data points, similar in format to the other frames on the card. The data is printed in white on a dark background.

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDHK-D-D  
PRODUCT NAME: MODEM CONTROL  
MULTIPLEXER DIAGNOSTIC  
DATE : APRIL 1977  
MAINTAINER: DIAGNOSTIC GROUP

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1.0 ABSTRACT

THIS PROGRAM IS A TEST OF THE MODEM CONTROL MULTIPLEXER USED WITH THE DH11 OPTI  
 THE PROGRAM IS DIVIDED INTO FUNCTIONAL TEST GROUPS AS  
 FOLLOWS:

- GROUP 0: ALL LINE SCANNER AND LINE MULTIPLEXER FUNCTIONS ARE TESTED. NO TEST CONNECTOR IS NEEDED...
- GROUP 1: A SINGLE LINE IS TESTED USING THE MODEM CABLE AND A H315 TEST CONNECTOR
- GROUP 2: CONNECT-DISCONNECT TEST FOR 103A MODEMS
- GROUP 3: CONNECT-DISCONNECT TEST FOR 202C MODEMS

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

2.1.1 FOR 16 LINE SCANNER TEST

NO ADDITIONAL HARDWARE IS NEEDED. PROGRAM HAS BEEN MODIFIED TO RUN WITHOUT H861 TEST CONNECTOR.

2.1.2 FOR SINGLE LINE CABLE TEST

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL  
 H315 TEST CONNECTOR

2.1.3 FOR ON LINE TESTS

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

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

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4.2 OPERATOR AND/OR PROGRAM ACTION

4.2.1 INITIAL PROGRAM START

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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  
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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:  
SMR=XXXXXX NEM= (REFER TO SECTION 5.1.2 FOR OPTIONS)

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

BIT15 = 1 TEST LINE 15

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

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

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

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

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

4.2.1.11 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

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## 4.2.2 PROGRAM RESTART

## 4.2.2.1 WITH SW00=1

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.

## 4.2.2.2 WITH SW00=0

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10

## 5.0 OPERATING PROCEDURE

## 5.1 TEST GROUP 0 16 LINE SCANNER TEST

## 5.1.1 TEST INITIALIZATION

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

## 5.1.2 OPERATIONAL SWITCH SETTINGS

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

## CONTROL:

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

- 1) TYPE CONTROL G (<IG>): 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:

# H01

DZDHK-D MACY11 27(1006) 02-MAY-77 11:58 PAGE 6  
DZDHKD.P11 02-MAY-77 11:56

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- 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.



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## 5.2 TEST GROUP 1 SINGLE LINE CABLE TEST

## 5.2.1 TEST INITIALIZATION

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

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

## 5.2.2 OPERATIONAL SWITCH SETTINGS

SAME AS 5.1.2

## 5.2.3 PROGRAM AND/OR OPERATOR ACTION

SAME AS 5.1.3

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

## 5.3.1 TEST INITIALIZATION

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

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

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

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

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

## 5.3.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

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

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5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE

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

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## 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:

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- 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: SMR=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.

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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).

# MO1

DZDNK-D MACY11 27(1006) 02-MAY-77 11:58 PAGE 11  
DZDNKD.P11 02-MAY-77 11:56

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## 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

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## 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
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

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## 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
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

## 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

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

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

## 6.1.1.6 TIME OUT ERROR

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

FORMAT FOR THIS ERROR IS

```
XXXXXX TIME OUT WAITING FOR INTERRUPT
LN  CSR   LSR
AAA BBBBBB CCCCC
```

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

## 6.1.2 REPEATED ERRORS

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



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## 6.2 SCOPE LOOPS

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

## 6.2.1 AFTER ERROR HALT

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

\*\*\*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 &lt;CONTROL&gt;

SAME AS 6.2.2.2 TO 6.2.2.4

## 7.0 RESTRICTIONS

## 7.1 STARTING

## 7.1.1 FOR 16 LINE SCANNER TEST

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

## 7.1.2 FOR SINGLE LINE CABLE TEST

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

## 7.1.3 FOR ON LINE TESTS

NONE

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7.2 OPERATING

NONE.

7.3 WHEN ON ACT-11 OR "XOR"  
PROGRAM WILL DEFAULT TO 16 LINE SCANNER TEST

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

VECTORS

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

-----  
DHMCSR: 170500  
DHMLSR: 170502

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

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8.0 EXECUTION TIME

8.1 16 LINE SCANNER TEST  
THE TIME FOR 2 PASSES OF THE 16 LINE SCANNER TEST IS APPROXIMATELY 1.5 MINUTES.

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

8.3 103A MODEM CONNECT-DISCONNECT TEST  
APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET FIRST DETECTS A RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SMO1=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 SMO1=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 ... SMOO MUST BE SET =1, THE PROGRAM WILL BEGIN A DIALOG WITH THE OPERATOR TO INPUT THE PARAMETERS REQUIRED BY THE PROGRAM.  
WHEN ALL INFORMATION HAS BEEN INPUTTED, THE PROGRAM WILL REQUEST THE OPERATOR TO SELECT A TEST BY TYPING THE NUMBER OF THE TEST TO BE RUN. WHEN A CORRECT TEST NUMBER IS RECEIVED, THE PROGRAM WILL BEGIN EXECUTION OF THE SELECTED TEST.  
AT ANY TIME DURING TEST EXECUTION, THE OPERATOR MAY CHANGE A TEST PARAMETER BY ENTERING THE APPROPRIATE COMMAND VIA THE TELETYPE KEYBOARD.

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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  
%

H02

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```
.TITLE DZDHK-D
.ENABLE ABS,AMA
;SWITCH REGISTER OPTIONS

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

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

;TESTS AVAILABLE

;TEST GROUP 0-
;OFF LINE TESTS USING NO TEST CONNECTOR-FIRST TEST=0
;TEST GROUP 1-
;OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100
;TEST GROUP 2-
;CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200
;TEST GROUP 3-
;CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300

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

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

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835
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837
838          000000      RD=%0          ;GENERAL REGISTER
839          000001      R1=%1          ;GENERAL REGISTER
840          000002      R2=%2          ;GENERAL REGISTER
841          000003      R3=%3          ;GENERAL REGISTER
842          000004      R4=%4          ;GENERAL REGISTER
843          000005      R5=%5          ;GENERAL REGISTER
844          000006      SP=%6          ;PROCESSOR STACK POINTER
845          000007      PC=%7          ;PROGRAM COUNTER
846
847          ;LOCATION EQUIVALENCIES
848
849          177776      PS=177776      ;PROCESSOR STATUS WORD
850          .EQUIV PS,PSW
851          014362      RADIX=DIVIS     ;CONVERSION FACTOR FOR DECIMAL OUTPUT
852          014356      BINWRD=DIVIDL   ;WORD TO BE CONVERTED TO OCTAL ASCII
853          014360      DIGIT=DIVIDH    ;ASCII OCTAL DIGIT
854
855          ;CONTROL STATUS REGISTER BIT FUNCTIONS
856
857          000020      BUSY=20          ;LINE SCANNER RUNNING
858          000040      SCENA=40        ;LINE SCANNER ENABLE
859          000100      INTENA=100      ;INTERRUPT ENABLE
860          000200      DONE=200        ;SCANNER DONE
861          000400      STEP=400        ;CAUSES LINE COUNTER TO BE INCREMENTED BY 1 COUNT
862          001000      MAINT=1000      ;FORCES IS TO INPUT OF SCRATCH PAD MEMORY
863          002000      CLMUX=2000      ;CLEAR MULTIPLEXER FUNCTION FLIPFLOPS
864          004000      CLSCN=4000      ;CLEARS SCANNER SCRATCHPAD MEMORY
865          010000      SECRCF=10000    ;SECONDARY RECEIVE TRANSITION WAS DETECTED BY SCANNER
866          020000      CSF=20000      ;CLEAR TO SEND TRANSITION WAS DETECTED BY SCANNER
867          040000      COF=40000      ;CARRIER TRANSITION WAS DETECTED BY SCANNER
868          100000      RINGF=100000    ;RING SIGNAL WAS DETECTED BY SCANNER
869
870          ;LINE REGISTER BIT FUNCTIONS
871
872          000001      LINENA=1         ;=1, RECOGNIZE TRANSITIONS ON THIS LINE
873          000002      TRMRY=2         ;=1, SEND TERMINAL READY TO MODEM
874          000004      RS=4           ;=1, SEND REQUEST TO SEND TO MODEM
875          000010      SECTX=10        ;=1, SEND SECONDARY TRANSMIT TO MODEM
876          000020      SECRCX=20       ;=1, SECONDARY RECEIVE TURNED ON BY MODEM
877          000040      CS=40          ;=1, CLEAR TO SEND TURNED ON BY MODEM
878          000100      CO=100         ;=1, CARRIER TURNED ON BY MODEM
879          000200      RING=200        ;=1, RING TURNED ON BY MODEM
880
881          ;SOFTWARE TRANSITION FLAGS
882
883          000004      XCO=4           ;CARRIER TRANSITION WAS DETECTED
884          000002      XCS=2           ;CLEAR TO SEND TRANSITION WAS DETECTED
885          000001      XSCRX=1         ;SECONDARY RECEIVE TRANSITION WAS DETECTED

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; 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-RS, PC+2 OF CALL
104006	OCTASC=EMT+X	; CONVERT DATA TO ASCII AND TYPE
104007	RESOS=EMT+X	; RESTORE RO-RS
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 CORPERT 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
104030	ERRINT=EMT+X	; TIME OUT ERROR FOR INTERRUPTS

K02

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923  
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000000  
000200

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



# L02

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930
931
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933
934 000024 000024      .=24
935 000026 015130      PFAIL          ;POWER FAIL HANDLER
936 000030 000340      340           ;SERVICE AT LEVEL 7
937 000032 012770      EMTSRV        ;EMT DISPATCH SERVICE
938 000032 000340      340           ;SERVICE AT LEVEL 7
939
940 000046 000046      .=46
941 000046 012752      LOGICAL       ;ACT11?
942
943 000060 000060      .=60
944 000062 001760      KBDINT        ;KEYBOARD MONITOR
945 000062 000340      340           ;SERVICE AT LEVEL 7
946 000174 000174      .=174
947 000176 000000      DISPREG:      0
948 000176 000000      SWREG: 0
949
950 000200 000200 001100  .=200
951 JMP     START      ;GO TO START OF PROGRAM
952
953
954
  
```

M02

```

955
956      001100      001100      . = 1100
957      001100      012737      015130      000024      STACK:
958      001100      012737      015130      000024      START:  MOV    #PFail,24      ;SET UP POWER FAIL
959
960      001106      005037      001756      CLR    TIPFLG      ;INTERRUPT SERVICE VECTOR
961      001112      005077      014424      CLR    @TKCSR      ;CLEAR TEST IN PROGRESS FLAG
962      001116      012706      001100      MOV    #STACK,SP      ;SET UP STACK POINTER
963
964      001122      013746      000006      SUSWR:  MOV    @#6,-(SP)      ;SAVE VECTORS
965      001126      013746      000004      MOV    @#4,-(SP)
966      001132      012737      001152      000004      MOV    @#4@,@#4      ;SET UP FOR TIMEOUT
967      001140      022777      177777      014404      CMP    @-1,@SWR      ;REFERENCE HARDWARE SWITCH REGISTER
968      001146      001402      BEQ    @#6
969      001150      000407      BR     @#6
970      001152      022626      64$:   CMP    (SP)+,(SP)+      ;ADJUST STACK
971      001154      012737      000176      015552      65$:   MOV    @SWREG,SWR      ;POINT TO SOFTWARE SWITCH REG
972      001162      012737      000174      015554      MOV    @DISPREG,DISPLAY      ;POINT TO SOFT DISPLAY REG
973      001170      012637      000004      66$:   MOV    (SP)+,@#4      ;RESTORE VECTORS
974      001174      012637      000006      MOV    (SP)+,@#6
975      001200      012777      000100      014334      MOV    @INTENA,@TKCSR      ;ENABLE TELETYPE INTERRUPTS
976      001206      005037      001252      CLR    XFLAG      ;XOR = NO
977
978      ;*****
979      ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
980      ;*****
981      001212      000423      BR     STARTO      ;SKIP XOR STUFF
982      001214      013746      000004      MOV    4,-(SP)      ;SAVE 4
983      001220      012737      001254      000004      MOV    @XORSVC,@#4      ;SET UP SVC ROUTINE
984      001226      005737      177060      TST    177060      ;GOT AN XOR TESTER OUT THERE ?
985      001232      012637      000004      MOV    (SP)+,4      ;YES
986      001236      005137      001252      COM    XFLAG      ;XOR = YES
987      001242      004737      015252      JSR    PC,XOR      ;AUTO VECTOR
988      001246      000137      001262      JMP    STARTO      ;RESTORE TRAPCATCHER
989      001252      000000      XFLAG:  0      ;XOR FLAG
990      001254      022626      XORSVC: POP2SP
991      001256      012637      000004      MOV    (SP)+,4      ;RESTORE 4
992      001262      005737      015642      STARTO: TST    TIFLG      ;TYPED TITLE?
993      001266      001005      BNE    .+14      ;YES
994      001270      104004      TYPE    TYPE      ;TYPE "MODEM CONTROL DIAGNOSTIC"
995      001272      016521      MTITLE
996      001274      012737      000001      015642      MOV    @#1,TIFLG      ;SET TITLE TYPED FLAG
997      001302      005737      001252      TST    XFLAG      ;X OR ?
998      001306      100422      BMI    VECSTR      ;RESTORE TRAPCATCHER
999      001310      005737      000042      TST    42      ;ACT 11?
1000     001314      001403      BEQ    START1      ;NO
1001     001316      004737      015252      JSR    PC,XOR      ;YES AUTO VECTOR
1002     001322      000414      BR     VECSTR      ;GET VECTOR AND REGISTER ADDRESS
1003     001324      005737      000042      START1: TST    @#42      ;UNDER MONITOR?
1004     001330      001005      BNE    15
1005     001332      022737      000176      015552      CMP    @SWREG,SWR      ;USING SWREG?
1006     001340      001001      BNE    15
1007     001342      104025      CNTLUU
1008     001344      032777      000001      014200      15:   BIT    @#1,@SWR      ;IF SW BIT 0=1, ON PROGRAM RESTART
1009     001352      001510      BEQ    STARTN      ;INPUT VECTOR AND REGISTER ADDRESSES
1010     001354      012706      001100      VECSTR: MOV    #STACK,SP      ;SET UP PROCESSOR STACK POINTER
1011     001360      012737      000300      012676      MOV    @#300,DAT1      ;ADDRESS OF FIRST FLOATING VECTOR
    
```

N02

1011	001366	012737	000302	012700		MOV	#302, DATA2		: ADDRESS OF STATUS WORD
1012	001374	013777	012700	011274	VECSTA:	MOV	DATA2, #DATA1		: MOVE ADDRESS OF STATUS WORD TO VECTOR
1013	001402	005077	011272			CLR	#DATA2		: CLEAR STATUS WORD
1014									: (FOR HALT ON ILLEGAL INTERRUPT)
1015	001406	062737	000004	012676		ADD	#4, DATA1		: NEXT VECTOR
1016	001414	062737	000004	012700		ADD	#4, DATA2		: NEXT STATUS WORD
1017	001422	023727	012676	001000		CMP	DATA1, #1000		: IS TABLE CLEARED
1018	001430	001361				BNE	VECSTA		: IF NOT, CONTINUE
1019	001432	005737	001252			TST	XFLAG	: XOR ?	
1020	001436	100523				BMI	TSTGC	: YES	
1021	001440	005737	000042			TST	#2	: ACT 11 ?	
1022	001444	001120				BNE	TSTGC	: YES	
1023	001446	104013				INSTRG			: GET VECTOR ADDRESS
1024	001450	016605				MVECTOR			: MESSAGE "VECTOR ADDRESS--"
1025	001452	000300				300			: LOWER LIMIT FOR ADDRESS
1026	001454	000774				774			: UPPER LIMIT FOR ADDRESS
1027	001456	015532				DHIVEC			: STORAGE FOR ADDRESS
1028	001460	032737	000003	015532	1\$:	BIT	#3, DHIVEC		: TEST 2 LSB OF ADDRESS
1029	001466	001404				BEQ	VECST1		: IF 0, CONTINUE
1030	001470	012716	001460			MOV	#1\$, (SP)		
1031	001474	000137	014760			JMP	INSTR		: INCORRECT ADDRESS, TRY AGAIN
1032	001500	013737	015532	015534	VECST1:	MOV	DHIVEC, DHMLVL		: GENERATE ADDRESS OF
1033	001506	062737	000002	015534		ADD	#2, DHMLVL		: INTERRUPT STATUS WORD
1034	001514	104013				INSTRG			: GET ADDRESS OF CONTROL REGISTER
1035	001516	016627				MREGAD			: MESSAGE "REGISTER ADDRESS--"
1036	001520	170500				170500			: LOWER LIMIT FOR ADDRESS
1037	001522	177777				177777			: UPPER LIMIT FOR ADDRESS
1038	001524	015536				DHICSR			: STORAGE FOR ADDRESS
1039	001526	032737	000007	015536	1\$:	BIT	#7, DHICSR		: IF 3 LSB ARE NOT 0
1040	001534	001404				BEQ	REGST1		
1041	001536	012716	001526			MOV	#1\$, (SP)		
1042	001542	000137	014760			JMP	INSTR		: INCORRECT ADDRESS, TRY AGAIN
1043	001546	013737	015536	015540	REGST1:	MOV	DHICSR, DHMLSR		: SET UP ADDRESS OF LINE STATUS REGISTER
1044	001554	062737	000002	015540		ADD	#2, DHMLSR		
1045	001562	104013				INSTRG			: GET LINE SELECT PARAMETER
1046	001564	016663				MLINSL			
1047	001566	000000				0			
1048	001570	177777				177777			
1049	001572	015644				LINSEL			

1050											
1051	001574	012706	001100		STARTN:	MOV	#STACK, SP				;SET UP PROCESSOR STACK
1052	001600	104013				INSTRG					;GET TEST NUMBER
1053	001602	016715				MTEST					;MESSAGE "TEST-"
1054	001604	000000				0					;LOWER LIMIT FOR TEST NUMBER
1055	001606	000777				777					;UPPER LIMIT FOR TEST NUMBER
1056	001610	015564				TSTNO					;STORAGE FOR TEST NUMBER
1057	001612	013705	015564		X1A:	MOV	TSTNO, RS				;GET TEST NUMBER
1058	001616	042705	177077			BIC	#177077, RS				;EXTRACT TEST GROUP NUMBER
1059	001622	006205				ASR	RS				
1060	001624	006205				ASR	RS				
1061	001626	006205				ASR	RS				
1062	001630	006205				ASR	RS				
1063	001632	006205				ASR	RS				
1064	001634	016537	017456	015620		MOV	GRO(RS), TSTMAX				;GET HIGHEST TEST IN GROUP
1065	001642	016537	017436	015616		MOV	TSTLST(RS), TSTPNT				;GET POINTER TO TEST TABLE
1066	001650	005737	015616			TST	TSTPNT				;IF 0, INVALID TEST GROUP
1067	001654	001004				BNE	STRTOA				
1068	001656	012716	001612		X1B:	MOV	#X1A, (SP)				
1069	001662	000137	014760			JMP	INSTR				;TRY AGAIN
1070	001666	042737	177700	015564	STRTOA:	BIC	#177700, TSTNO				;GET NUMBER OF FIRST TEST
1071											;TO BE EXECUTED IN SELECTED GROUP
1072	001674	023737	015564	015620		CMP	TSTNO, TSTMAX				;IS NUMBER TOO LARGE
1073	001702	003401				BLE	TSTGO				
1074	001704	000764				BR	X1B				
1075	001706	012746	000340		TSTGO:	MOV	#340, -(SP)				;SET UP PRIORITY LEVEL
1076	001712	005746				PUSH1SP					
1077	001714	000005				RESET					
1078	001716	012737	002202	002204		MOV	#DMYRTI, KRET				;SET UP DUMMY KEYBOARD RETURN
1079	001724	005037	015622			CLR	LINFLG				;CLEAR LINE SELECTED FLAG
1080	001730	005037	015560			CLR	TRACON				;CLEAR TRACE TRAP FLAG
1081	001734	005037	015562			CLR	PASCNT				;CLEAR PASS COUNT
1082	001740	104004				TYPE					
1083	001742	016731				MCRLF					
1084	001744	012737	000001	001756	IS:	MOV	#1, TIPFLG				;SET TEST IN PROGRESS FLAG
1085	001752	000137	013212			JMP	TSTENT				;START TESTING
1086	001756	000000			TIPFLG:	0					

```

1087
1088                                     ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
1089
1090 001760 005037 001756          KBDINT: CLR      TIPFLG          ;CLEAR TEST IN PROGRESS FLAG
1091 001764 005037 014206          CLR      TMP1
1092 001770 005037 002206          CLR      SINTFL          ;CLEAR SOFTWARE INTERRUPT FLAG
1093 001774 117737 013544          MOV     #200, TMP1
1094 002002 142737 000200 014206  BIC     #200, TMP1
1095 002010 122737 000003 014206  CMP     #3, TMP1          ;IF <CONTROL C> WAS TYPED
1096 002016 001011                BNE     KBDIN1          ;TYPE "tC" AND
1097 002020 104004                TYPE
1098 002022 017161                MCONTC
1099 002024 022626                POP2SP
1100 002026 005077 013504          CLR     @DMCSR
1101 002032 005077 013504          CLR     @TKCSR
1102 002036 000137 001574          JMP     STARTN
1103 002042 122737 000026 014206  KBDIN1: CMP     #26, TMP1          ;IF <CONTROL V> WAS TYPED
1104 002050 001011                BNE     KBDIN2          ;TYPE "tV" AND GET NEW
1105 002052 104004                TYPE
1106 002054 017164                MCONTV
1107 002056 022626                POP2SP
1108 002060 005077 013452          CLR     @DMCSR
1109 002064 005077 013452          CLR     @TKCSR
1110 002070 000137 001354          JMP     VECSTR
1111 002074 122737 000014 014206  KBDIN2: CMP     #14, TMP1          ;IF <CONTROL L> WAS TYPED
1112 002102 001015                BNE     KBDIN3          ;TYPE "tL" AND GET NEW
1113 002104 104004                TYPE
1114 002106 017167                MCONTL
1115 002110 022737 002202 002204  CMP     @DMYRTI, KRET
1116 002116 001431                BEQ     DMYRTI          ;LINE NUMBERS, UNLESS
1117 002120 022626                POP2SP          ;TEST GROUP 0 WAS IN PROGRESS
1118 002122 005077 013410          CLR     @DMCSR          ;IF <CONTROL L> WAS TYPED IN TEST
1119 002126 005077 013410          CLR     @TKCSR          ;GROUP 0, IGNORE
1120 002132 000177 000046          JMP     @KRET
1121 002136 005737 000042          KBDIN3: TST     @#42
1122 002142 001011                BNE     IS
1123 002144 022737 000176 015552  CMP     @SMREG, SMR
1124 002152 001005                BNE     IS
1125 002154 122737 000007 014206  CMP     #7, TMP1          ;IS IT <tG>
1126 002162 001001                BNE     IS
1127 002164 104025                CNTLUU
1128 002166 012737 000001 002206  IS:    MOV     #1, SINTFL          ;SET SOFTWARE INTERRUPT FLAG
1129 002174 012737 000001 001756  MOV     #1, TIPFLG          ;SET TEST IN PROGRESS FLAG
1130 002202 000002          DMYRTI: RTI
1131          .EVEN
1132 002204 000000          KRET:   0
1133 002206 000000          SINTFL: 0

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# E03

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1190
1191 002404 012777 000040 013124 T4:
1192 002404 032777 000040 013116 CSTR4: MOV #SCNENA, 2DHMCSR ;REFERENCE DESIGNATION
1193 002412 032777 000040 013116 BIT #SCNENA, 2DHMCSR ;SET SCAN ENABLE
1194 002420 001001 BNE .+4 ;WAS SCAN ENABLE SET
1195
1196 002422 104012 ERROR ;NO, ERROR
1197 002424 042777 000040 013104 BIC #SCNENA, 2DHMCSR ;CLEAR SCAN ENABLE
1198 002432 032777 000040 013076 BIT #SCNENA, 2DHMCSR ;WAS SCAN ENABLE CLEARED
1199 002440 001401 BEQ .+4
1200
1201 002442 104012 ERROR ;NO, ERROR
1202 002444 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1203
1204 ;VERIFY THAT "BUSY" IS SET WHEN "SCAN ENABLE" IS SET
1205 ;VERIFY THAT "BUSY" IS CLEARED WHEN "SCAN ENABLE" IS CLEARED
1206
1207 002446 012777 000040 013062 T5:
1208 002446 032777 000020 013054 CSTR5: MOV #SCNENA, 2DHMCSR ;REFERENCE DESIGNATION
1209 002454 032777 000020 013054 BIT #BUSY, 2DHMCSR ;SET SCAN ENABLE
1210 002462 001001 BNE .+4 ;IS BUSY BIT SET
1211 002464 104012 ERROR ;BUSY NOT SET, ERROR
1212 002466 042777 000040 013042 BIC #SCNENA, 2DHMCSR ;CLEAR SCAN ENABLE
1213 002474 032777 000020 013034 BIT #BUSY, 2DHMCSR ;IS BUSY BIT CLEARED
1214 002502 001401 BEQ .+4
1215 002504 104012 ERROR ;BUSY NOT CLEARED, ERROR
1216 002506 104002 SCOPE ;CHECK FOR LOOP, ITERATIONS
1217
1218 ;VERIFY THAT SETTING "DONE" DOES NOT CAUSE AN
1219 ;INTERRUPT IF "INTERRUPT ENABLE" IS CLEARED.
1220
1221 002510 052737 000340 177776 T6:
1222 002510 005077 013014 INT1: BIS #340, PS ;REFERENCE DESIGNATION
1223 002516 012777 002556 013002 CLR 2DHMCSR ;LOCK OUT INTERRUPTS
1224 002522 013777 177776 012776 MOV #INT1A, 2DHMVEC ;CLEAR CONTROL REGISTER
1225 002530 052777 000200 012772 MOV PS, 2DHMLVL ;SET UP INTERRUPT SERVICE ADDRESS
1226 002536 042737 000340 177776 BIS #DONE, 2DHMCSR ;SET UP INTERRUPT PRIORITY
1227 002544 000240 NOP ;SET DONE
1228 002552 000402 BR INT1B ;ALLOW INTERRUPTS
1229 002554 022626 INT1A: POP2SP ;DELAY FOR INTERRUPT
1230 002556 104012 INT1B: BR INT1B ;NO INTERRUPT, CONTINUE
1231 002560 104002 ERROR ;RESTORE STACK, INTERRUPT
1232 002562 104002 SCOPE ;OCCURED, ERROR
;CHECK FOR LOOP, ITERATIONS

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1292 003020
1293 003020 005077 012512
1294 003024 042737 000340 177776
1295 003032 052737 000300 177776
1296 003040 012777 003102 012464
1297 003046 013777 177776 012460
1298 003054 012777 000100 012454
1299 003062 052777 000200 012446
1300 003070 000240
1301 003072 000240
1302 003074 005077 012436
1303 003100 000402
1304 003102 022626
1305 003104 104012
1306 003106 104002
1307
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1311 003110
1312 003110 005077 012422
1313 003114 042737 000340 177776
1314 003122 052737 000240 177776
1315 003130 012777 003172 012374
1316 003136 013777 177776 012370
1317 003144 012777 000100 012364
1318 003152 052777 000200 012356
1319 003160 000240
1320 003162 000240
1321 003164 005077 012346
1322 003170 000402
1323 003172 022626
1324 003174 104012
1325 003176 104002
1326
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1330 003200
1331 003200 005077 012332
1332 003204 042737 000340 177776
1333 003212 052737 000200 177776
1334 003220 012777 003262 012304
1335 003226 013777 177776 012300
1336 003234 012777 000100 012274
1337 003242 052777 000200 012266
1338 003250 000240
1339 003252 000240
1340 003254 005077 012256
1341 003260 000402
1342 003262 022626
1343 003264 104012

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

T12:
INT5: CLR 2DHCSR
      BIC 2340,PS
      BIS 2300,PS
      MOV 2INT5A,2DHMEC
      MOV PS,2DHMLVL
      MOV 2INT5A,2DHMCSR
      BIS 2DONE,2DHMCSR
      NOP
      NOP
      CLR 2DHMCSR
      BR INT5B
      INT5A: POP2SP
      INT5B: ERROR
           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 2DHCSR
      BIC 2340,PS
      BIS 2240,PS
      MOV 2INT6A,2DHMEC
      MOV PS,2DHMLVL
      MOV 2INT6A,2DHMCSR
      BIS 2DONE,2DHMCSR
      NOP
      NOP
      CLR 2DHCSR
      BR INT6B
      INT6A: POP2SP
      INT6B: ERROR
           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 2DHCSR
      BIC 2340,PS
      BIS 2200,PS
      MOV 2INT7A,2DHMEC
      MOV PS,2DHMLVL
      MOV 2INT7A,2DHMCSR
      BIS 2DONE,2DHMCSR
      NOP
      NOP
      CLR 2DHCSR
      BR INT7B
      INT7A: POP2SP
      INT7B: 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

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1344 003266 104002

INT7B: SCOPE

;CHECK FOR ITERATION, LOOP

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1350 003270
1351 003270 005077 012242
1352 003274 042737 000340 177776
1353 003302 012777 003352 012222
1354 003310 005077 012220
1355 003314 052737 000000 177776
1356 003322 012777 000100 012206
1357 003330 052777 000200 012200
1358 003336 000240
1359 003340 000240
1360 003342 005077 012170
1361 003346 104012
1362 003350 000401
1363 003352 022626
1364 003354 104002
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1369 003356
1370 003356 005077 012154
1371 003362 042737 000340 177776
1372 003370 012777 003440 012134
1373 003376 005077 012132
1374 003402 052737 000040 177776
1375 003410 012777 000100 012120
1376 003416 052777 000200 012112
1377 003424 000240
1378 003426 000240
1379 003430 005077 012102
1380 003434 104012
1381 003436 000401
1382 003440 022626
1383 003442 104002
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1388 003444
1389 003444 005077 012066
1390 003450 042737 000340 177776
1391 003456 012777 003526 012046
1392 003464 005077 012044
1393 003470 052737 000100 177776
1394 003476 012777 000100 012032
1395 003504 052777 000200 012024
1396 003512 000240
1397 003514 000240
1398 003516 005077 012014
1399 003522 104012
1400 003524 000401

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

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

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

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

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

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

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1401 003526 022626  
1402 003530 104002

INT12A: POP2SP  
INT12B: SCOPE

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

# K03

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1403							
1404							:VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
1405							:ENABLE" SET AND "DONE" SET AT PRIORITY 3.
1406							
1407	003532				T20:		:REFERENCE DESIGNATION
1408	003532	005077	012000		INT13:	CLR 2DHCSR	:CLEAR CONTROL REGISTER
1409	003536	042737	000340	177776		BIC #340,PS	:ALLOW INTERRUPTS
1410	003544	012777	003614	011760		MOV #INT13A,2DHVEC	:SET UP INTERRUPT SERVICE ADDRESS
1411	003552	005077	011756			CLR 2DHPLVL	:SET UP INTERRUPT SERVICE PRIORITY
1412	003556	052737	000140	177776		BIS #140,PS	:SET PROCESSOR PRIORITY TO LEVEL 3.
1413	003564	012777	000100	011744		MOV #INTENA,2DHCSR	:SET INTERRUPT ENABLE
1414	003572	052777	000200	011736		BIS #DONE,2DHCSR	:GENERATE INTERRUPT
1415	003600	000240				NOP	:WAIT FOR INTERRUPT
1416	003602	000240				NOP	
1417	003604	005077	011726			CLR 2DHCSR	
1418	003610	104012				ERROR	:NO INTERRUPT, ERROR
1419	003612	000401				BR INT13B	:CONTINUE
1420	003614	022626			INT13A:	POP2SP	:INTERRUPT OCCURED, RESTORE STACK
1421	003616	104002			INT13B:	SCOPE	:CHECK FOR INTERATIONS, LOOP.

L03

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1426 003620
1427 003620 005077 011712
1428 003624 042737 000340 177776
1429 003632 012737 000001 015646
1430 003640 005005
1431 003642 012700 000020
1432 003646 033737 015646 015644
1433 003654 001407
1434 003656 010577 011654
1435 003662 017704 011650
1436 003666 020504
1437 003670 001401
1438 003672 104000
1439 003674 104003
1440 003676 003646
1441 003700 005205
1442 003702 006337 015646
1443 003706 005300
1444 003710 001356
1445 003712 104002
1446
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1448
1449
1450 003714
1451 003714 042737 000340 177776
1452 003722 005077 011610
1453 003726 005005
1454 003730 012737 000001 015646
1455 003736 012701 177777
1456 003742 012700 000020
1457 003746 012777 000017 011562
1458 003754 033737 015646 015644
1459 003762 001407
1460 003764 004737 013330
1461 003770 017704 011542
1462 003774 020504
1463 003776 001401
1464 004000 104000
1465 004002 104003
1466 004004 003714
1467 004006 005205
1468 004010 006337 015646
1469 004014 005201
1470 004016 010177 011514
1471 004022 005300
1472 004024 001353
1473 004026 104002

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

T21:
LINT1: CLR 20HMCSR
      BIC 8340,PS
      MOV #1,SELMSK
      CLR R5
      MOV #16,R0
LINT1A: BIT SELMSK,LINSEL
      BEQ LINT1B
      MOV R5,20HMCSR
      MOV 20HMCSR,R4
      CMP R5,R4
      BEQ LINT1B
      ERRORC
LINT1B: SCOPEF
      LINT1A
      INC R5
      ASL SELMSK
      DEC R0
      BNE LINT1A
      SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;INIT LINE SELECT MASK
;CLEAR EXPECTED LINE NUMBER
;SET UP TO TEST 16 LINE NUMBERS
;THIS LINE SELECTED ??
;BR IF NOT
;SET LINE NUMBER
;READ BACK LINE NUMBER
;ARE EXPECTED AND RECEIVED
;LINE NUMBERS THE SAME
;LINE NUMBERS DIFFERENT, ERROR
;CHECK FOR DATA FREEZE
;RETURN FOR DATA FREEZE
;UPDATE LINE COUNT
;SELECT NEXT LINE TO TEST
;UPDATE LINE NUMBER
;CONTINUE
;CHECK FOR ITERATION, LOOP

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

T22:
LINT2: BIC 8340,PS
      CLR 20HMCSR
      CLR R5
      MOV #1,SELMSK
      MOV #-1,R1
      MOV #16,R0
      MOV #17,20HMCSR
LINT2A: BIT SELMSK,LINSEL
      BEQ LINT2B
      CALL STEPER
      MOV 20HMCSR,R4
      CMP R5,R4
      BEQ LINT2B
      ERRORC
LINT2B: SCOPEF
      LINT2
      INC R5
      ASL SELMSK
      INC R1
      MOV R1,20HMCSR
      DEC R0
      BNE LINT2A
      SCOPE

;REFERENCE DESIGNATION
;ENABLE INTERRUPTS
;CLEAR CONTROL STATUS REGISTER
;CLEAR EXPECTED LINE COUNT
;SET UP SELECT MASK
;INIT LINE COUNTER
;SET UP TO TEST 16 VALUES
;FIRST VALUE =0
;THIS LINE SELECTED ??
;BR IF NOT
;STEP LINE COUNTER
;READ LINE COUNTER
;COMPARE EXPECTED AND
;RECEIVED LINE NUMBERS
;LINE COUNTER ERROR
;CHECK FOR DATA FREEZE
;UPDATE EXPECTED LINE NUMBER
;SHIFT SELECT MASK
;GEN NEW LINE NO.
;SET NEW LINE NO. IN CSR

;CHECK FOR ITERATIONS, LOOP

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# M03

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1474					;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS.	
1475					;VERIFY THAT ALL LOCATIONS HAVE BEEN WRITTEN	
1476					;TO 1'S.	
1477					;VERIFY THAT "CLEAR SCAN" CLEARS ALL SCANNER	
1478					;MEMORY LOCATIONS.	
1479						
1480						
1481	004030			T23:		;REFERENCE DESIGNATION
1482	004030	012777	002000	011500	MENT1: MOV #CLRMUX,20HMCSR	;CLEAR CONTROL STATUS REGISTER
1483	004036	042737	000340	177776	BIC #340,PS	;ENABLE INTERRUPTS
1484	004044	012700	000020		MOV #16.,R0	;SET UP TO TEST 16 LOCATIONS
1485	004050	052777	001017	011460	BIS #MAINT+17,20HMCSR	;SET MAINTENANCE MODE
1486	004056	004737	013330		MENT1A: CALL STEPER	;SET LINE COUNTER THRU ALL
1487	004062	005300			DEC R0	;STATES, WRITING 1'S INTO
1488	004064	001374			BNE MENT1A	;ALL MEMORY WORDS
1489	004066	012700	000020		MOV #16.,R0	;SET UP TO TEST 16 WORDS
1490	004072	012705	070000		MOV #70000,R5	;SET UP EXPECTED STATUS REGISTER
1491	004076	012777	000017	011432	MOV #17,20HMCSR	;START WITH LINE 0
1492	004104	004737	013330		MENT1B: CALL STEPER	;ACCESS SCANNER MEMORY
1493	004110	017704	011422		MOV 20HMCSR,R4	;READ DATA
1494	004114	020504			CMP R5,R4	;COMPARE EXPECTED AND RECEIVED
1495	004116	001403			BEQ MENT1C	;DATA
1496	004120	104000			ERRORC	;CONTROL STATUS OR MEMORY ERROR
1497	004122	104003			SCOPEF	;CHECK FOR DATA FREEZE
1498	004124	004030			MENT1	
1499	004126	005205			MENT1C: INC R5	;UPDATE EXPECTED STATUS
1500	004130	005300			DEC R0	;UPDATE LINE COUNT
1501	004132	001364			BNE MENT1B	;CONTINUE
1502	004134	012777	004000	011374	MENT1D: MOV #CLRSCN,20HMCSR	;SET "CLEAR SCAN"
1503	004142	032777	000020	011366	BIT #BUSY,20HMCSR	;WAIT FOR "CLEAR CYCLES"
1504	004150	001374			BNE .-6	
1505	004152	012700	000020		MOV #16.,R0	;SET UP TO TEST 16 MEMORY
1506	004156	005005			CLR R5	;LOCATIONS
1507	004160	012777	000017	011350	MOV #17,20HMCSR	;FIRST TO BE TESTED=0
1508	004166	004737	013330		MENT1E: CALL STEPER	;ACCESS SCANNER MEMORY
1509	004172	017704	011340		MOV 20HMCSR,R4	;READ DATA
1510	004176	020504			CMP R5,R4	;COMPARE EXPECTED AND RECEIVED
1511	004200	001403			BEQ MENT1F	;DATA
1512	004202	104000			ERRORC	;CONTROL STATUS OF MEMORY ERROR
1513	004204	104003			SCOPEFF	;CHECK FOR DATA FREEZE
1514	004206	004134			MENT1D	
1515	004210	005205			MENT1F: INC R5	;UPDATE EXPECTED DATA
1516	004212	005300			DEC R0	;UPDATE LINE COUNT
1517	004214	001364			BNE MENT1E	;CONTINUE
1518	004216	104002			SCOPE	;CHECK FOR ITERATIONS, LOOP

1519										
1520										;WRITE 1'S INTO SELECTED SCANNER MEMORY LOCATION.
1521										;VERIFY THAT ONLY SELECTED LOCATION WAS WRITTEN INTO.
1522										
1523	004220					T24:				;REFERENCE DESIGNATION
1524	004220	005077	011312			MENT2:	CLR	2DHMCSR		;CLEAR CONTROL STATUS REGISTER
1525	004224	042737	000340	177776			BIC	#340,PS		;ENABLE INTERRUPTS
1526	004232	012700	000020				MOV	#16,R0		;SET UP TO TEST 16 ADDRESSES
1527	004236	012702	000017				MOV	#17,R2		;FIRST ADDRESS TO BE TESTED=0
1528	004242	012777	004000	011266		MENT2A:	MOV	#CLASCN,2DHMCSR		;CLEAR SCANNER MEMORY
1529	004250	032777	000020	011260			BIT	#BUSY,2DHMCSR		;WAIT FOR CLEAR CYCLE
1530	004256	001374					BNE	.-6		
1531	004260	012777	001000	011250			MOV	#MAINT,2DHMCSR		;SET "MAINTENANCE MODE"
1532	004266	050277	011244				BIS	R2,2DHMCSR		;SET LINE COUNTER TO TEST ADDRESS-1
1533	004272	004737	013330				CALL	STEPEP		;WRITE 1'S INTO TEST ADDRESS
1534	004276	042777	001000	011232			BIC	#MAINT,2DHMCSR		;CLEAR "MAINTENANCE MODE"
1535	004304	012703	000020				MOV	#16,R3		;SET UP TO TEST ALL 16
1536	004310	012777	000017	011220			MOV	#17,2DHMCSR		;SCANNER MEMORY LOCATIONS
1537	004316	005202					INC	R2		
1538	004320	005001					CLR	R1		
1539	004322	004737	013330			MENT2B:	CALL	STEPEP		;ACCESS SCANNER MEMORY
1540	004326	117704	011204				MOVB	2DHMCSR,R4		;READ CONTENTS OF MEMORY
1541	004332	010105					MOV	R1,R5		;SET UP EXPECTED CONTENTS
1542	004334	120402					CMPB	R4,R2		;OF SCANNER MEMORY
1543	004336	001002					BNE	MENT2C		
1544	004340	052705	070000				BIS	#70000,R5		
1545	004344	020405				MENT2C:	CMF	R4,R5		;COMPARE EXPECTED AND RECEIVED
1546	004346	001403					BEQ	MENT2D		;VALUES
1547	004350	104000					ERRORC			;SCANNER MEMORY ERROR
1548	004352	104003					SCOPEF			;CHECK FOR DATA FREEZE
1549	004354	004242					MENT2A			
1550	004356	005201				MENT2D:	INC	R1		
1551	004360	005303					DEC	R3		;TEST NEXT SCANNED LOCATION
1552	004362	001357					BNE	MENT2B		
1553	004364	005300					DEC	R0		;UPDATE LINE COUNT
1554	004366	001325					BNE	MENT2A		
1555	004370	104002					SCOPE			;CHECK FOR ITERATION, LOOP











# F04

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1758                                     ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
1759                                     ;BE SET AND CLEARED FOR SELECTED LINE
1760
1761 005464                                T31:                                ;REFERENCE DESIGNATION
1762 005464 005077 010046                MUX4: CLR 2DHCSR                    ;CLEAR CONTROL STATUS REGISTER
1763 005470 042737 000340 177776        BIC #340,PS                        ;ENABLE INTERRUPTS
1764 005476 012700 000020                MOV #16,R0                          ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
1765 005502 012737 000001 015646        MOV #1,SELMSK                       ;INIT LINE SELECT MASK
1766 005510 005001                        CLR R1                               ;START AT LINE 0
1767 005512 012777 002000 010016        MUX4A: MOV #CLRMUX,2DHCSR           ;
1768 005520 012702 000020                MOV #16,R2                          ;
1769 005524 033737 015646 015644        BIT SELMSK,LINSEL                   ;IS THIS LINE SELECTED FOR TEST ?
1770 005532 001462                        BEQ MUX4F                            ;BR IF NOT
1771 005534 010177 007776                MOV R1,2DHCSR                        ;SELECT LINE TO BE TESTED
1772 005540 012777 000010 007772        MOV #SECTX,2DHMSR                   ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
1773 005546 012737 000001 015650        MOV #1,SLMSK                         ;INIT ANOTHER SELECT MASK
1774 005554 005077 007756                CLR 2DHCSR
1775 005560 005005                        MUX4B: CLR R5
1776 005562 033737 015650 015644        BIT SLMSK,LINSEL                     ;SELECTED ??
1777 005570 001417                        BEQ MUX4D                            ;BR IF NOT
1778 005572 017704 007742                MOV 2DHMSR,R4                        ;READ LINE STATUS REGISTER
1779 005576 117703 007734                MOVB 2DHCSR,R3                       ;READ CONTROL STATUS REGISTER
1780 005602 042703 177760                BIC #177760,R3                       ;CLEAR UNWANTED BITS
1781 005606 020103                        CMP R1,R3                            ;IF LINE NUMBER=SELECTED LINE NUMBER,
1782 005610 001002                        BNE MUX4C                            ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
1783 005612 012705 000010                MOV #SECTX,R5
1784                                     ;TO BE SET
1785 005616                                MUX4C:
1786 005616 020504                        CMP R5,R4                            ;CMP EXPECTED AND RECVD
1787 005620 001403                        BEQ MUX4D                            ;RESULTS
1788 005622 104001                        ERRORL                               ;LINE STATUS ERROR
1789 005624 104003                        SCOPEF
1790 005626 005630                        MUX4D:
1791 005630 004737 013330                CALL STEPER                           ;EXAMINE NEXT LINE
1792 005634 006337 015650                ASL SLMSK                             ;SHIFT MASK
1793 005640 005302                        DEC R2
1794 005642 001346                        BNE MUX4B
1795 005644 005005                        CLR R5
1796 005646 010177 007664                MUX4E: MOV R1,2DHCSR
1797 005652 010103                        MOV R1,R3
1798 005654 005077 007660                CLR 2DHMSR
1799 005660 105227 000000                INCB #0
1800 005664 001375                        BNE .-4
1801 005666 017704 007646                MOV 2DHMSR,R4
1802 005672 005704                        TST R4
1803 005674 001401                        BEQ MUX4F
1804 005676 104001                        ERRORL
1805 005700 104003                        MUX4F: SCOPEF
1806 005702 005512                        MUX4A:
1807 005704 006337 015646                ASL SELMSK
1808 005710 005201                        INC R1
1809 005712 005300                        DEC R0
1810 005714 001276                        BNE MUX4A
1811 005716 104002                        SCOPE

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1816 005720          T32:
1817 005720 005077 007612 MUXB: CLR 2DHCSR          ;REFERENCE DESIGNATION
1818 005724 042737 000340 177776 BIC 8340,PS        ;CLEAR CONTROL REGISTER
1819 005732 012700 000020          MOV 816,R0         ;ENABLE INTERRUPTS
1820 005736 012777 000017 007574 MUXBA: MOV 817,2DHMSR    ;SET UP TO TEST 16 LINES
1821 005744 004737 013330          CALL STEPER        ;WRITE 15 INTO ALL MULTIPLEXER
1822 005750 005300          DEC R0             ;FUNCTION FLIPFLOPS
1823 005752 001371          BNE MUXBA
1824 005754 012737 000001 015646 MOV 81,SELMSK     ;INIT SELECT MASK
1825 005762 005003          CLR R3            ;SET UP FOR 16 LINES
1826 005764 012700 000020          MOV 816,R0
1827 005770 012777 002000 007540 MUXBB: MOV 8CLRMUX,2DHCSR    ;CLEAR MULTIPLEXER
1828 005776 033737 015646 015644 MUXBC: BIT SELMSK,LINSEL ;SELECTED ??
1829 006004 001427          BEQ MUXBE         ;BR IF NOT
1830 006006 010377 007524          MOV R3,2DHCSR    ;SELECT LINE
1831 006012 017704 007522          MOV 2DHMSR,R4   ;READ LINE STATUS REGISTER
1832 006016 005005          CLR R5           ;EXPECT 05
1833 006020 005704          TST R4           ;HAS LINE STATUS REGISTER CLEARED
1834 006022 001403          BEQ MUXBD
1835 006024 104001          ERRORL          ;LINE STATUS ERROR
1836 006026 104003          SCOPEF         ;CHECK FOR LOOP ON SAME DATA
1837 006030 005770          MUXBB
1838 006032 005205          MUXBD: INC R5
1839 006034 052777 000001 007476 BIS 8LINENA,2DHMSR ;EXPECT LINE ENABLE
1840 006042 017704 007472          MOV 2DHMSR,R4   ;SET LINE ENABLE ON SELECTED LINE
1841 006046 042704 000360          BIC 8360,R4     ;READ LINE STATUS REGISTER
1842 006052 020504          CMP R5,R4       ;CLEAR RING,CO,CS SECRCV-MAY FLOAT HIGH
1843 006054 001403          BEQ MUXBE       ;IS ANYTHING BUT LINE ENABLE SET
1844 006056 104001          ERRORL          ;LINE STATUS ERROR
1845 006060 104003          SCOPEF         ;CHECK FOR LOOP ON SAME DATA
1846 006062 005770          MUXBB
1847 006064 005203          MUXBE: INC R3
1848 006066 005077 007446          CLR 2DHMSR      ;UPDATE LINE NUMBER
1849 006072 006337 015646          ASL SELMSK     ;CLEAR CURRENT LINE
1850 006076 005300          DEC R0          ;SHIFT SELECT MASK
1851 006100 001336          BNE MUXBC       ;CONTINUE IF ALL LINES NOT
1852 006102 104002          SCOPE          ;TESTED
                    ;CHECK FOR ITERATIONS, LOOP

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    006104 012777 002000 007424 T33:
    006104 005077 007420 SCNT1:
    006112 042737 000340 177776
    006116 012700 000020
    006124 012777 001017 007400
    006130 012737 000001 015646
    006136 004737 013330 SCNT1A:
    006144 012777 000001 007362
    006150 005300
    006156 001371
    006160 012701 177777
    006162 012705 077300
    006166 012777 006344 007332
    006172 013777 177776 007326
    006200 012700 000020
    006206 012777 000117 007316
    006212 033737 015646 015644 SCNT1B:
    006220 001456
    006226 052737 000340 177776
    006230 004737 013330
    006236 005003
    006242 042737 000340 177776
    006244 005303
    006252 001404
    006254 105777 007254
    006256 100373
    006262 100416
    006264 052737 000340 177776
    006266 017704 007236
    006274 010402
    006300 017703 007232
    006302 042704 177760
    006306 104030
    006312 104003
    006314 006104
    006316 000421
    006320 052737 000340 177776
    006322 017704 007202
    006330 104000
    006334 104003
    006336 006104
    006340 000410
    006342 022626
    006344 017704 007164
    006346 020504
    006352

    MOV #CLRMUX, @DHMCSR
    CLR @DHMCSR
    BIC #340, PS
    MOV #16, R0
    MOV #MAINT+17, @DHMCSR
    MOV #1, SELMSK
    CALL STEPFR
    MOV #LINENA, @DHMLSR
    DEC R0
    BNE SCNT1A
    MOV #-1, R1
    MOV #70300, R5
    MOV #SCNT1C, @DHMVEC
    MOV PS, @DHMLVL
    MOV #16, R0
    MOV #INTENA+17, @DHMCSR
    BIT SELMSK, LINSEL
    BEQ SCNT1D
    BIS #340, PS
    CALL STEPFR
    CLR R3
    BIC #340, PS
    DEC R3
    BEQ 2$
    TSTB @DHMCSR
    BPL 1$
    BMI 3$
    BIS #340, PS
    MOV @DHMCSR, R4
    MOV R4, R2
    MOV @DHMLSR, R3
    BIC #177760, R4
    ERRINT
    SCOPEF
    SCNT1
    BR SCNT1D
    BIS #340, PS
    MOV @DHMCSR, R4
    ERRORC
    SCOPEF
    SCNT1
    BR SCNT1D
    SCNT1C:
    POP2SP
    MOV @DHMCSR, R4
    CMP R5, R4

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

    ;REFERENCE DESIGNATION
    ;CLEAR ALL MULTIPLEXER FLIPFLOPS
    ;CLEAR CONTROL REGISTER
    ;ENABLE INTERRUPTS
    ;SET UP TO WRITE 1'S INTO
    ;ALL SCANNER MEMORY LOCATION
    ;INIT SELECT MASK
    ;WRITE A LOCATION
    ;LET "LINE ENABLE"

    ;INIT LINE NO. GEN.
    ;EXPECT "DONE"+"COF"+"CSF"+"SECRXF"
    ;SET UP LOCAL INTERRUPT SERVICE
    ;SERVICE AT LEVEL 7

    ;SET INTERRUPT ENABLE
    ;SELECTED ??
    ;BR IF NOT
    ;LOCK OUT INTERRUPTS
    ;HIT THE SCANNER ONCE
    ;CLEAR DELAY
    ;ENABLE INTERRUPTS
    ;WAIT LONG ENOUGH?
    ;WE HAVE AN ERROR
    ;DID DONE SET
    ;NOT YET
    ;SET BUT NO INTERRUPT

    ;GET FAILING LINE
    ;GET CSR
    ;GET LSR

    ;REPORT ERROR HAS OCCURED

    ;CONTINUE THE TEST
    ;INTERRUPT DID NOT OCCUR
    ;ERROR
    ;CONTROL STATUS ERROR
    ;CHECK FOR LOOP ON SAME DATA

    ;INTERRUPT OCCURED, REPOSITION STACK
    ;READ CONTROL STATUS
    ;ARE EXPECTED AND RECEIVED
    
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1909	006354	001403				BEQ	SCNT1D		;REGISTERS THE SAME
1910	006356	104000				ERRORC			;NO. LINE STATUS ERROR
1911	006360	104003				SCOPEF			;CHECK FOR LOOP WITH CURRENT DATA
1912	006362	006104				SCNT1			
1913	006364	042777	000217	007144	SCNT1D:	BIC	#DONE+17, @DHMCSR		;CLEAR D DONE
1914	006372	005201				INC	R1		;GEN NXT LINE NO.
1915	006374	150177	007136			BISB	R1, @DHMCSR		;SET LINE NO. BITS
1916	006400	006337	015646			ASL	SELMSK		;SHIFT SELECT MASK
1917	006404	005205				INC	R5		;UPDATE EXPECTED RESULT
1918	006406	005300				DEC	R0		;CONTINUE IF NOT DONE
1919	006410	001303				BNE	SCNT1B		
1920	006412	104002				SCOPE			;CHECK FOR ITERATIONS, LOOP



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006414  
006414 012737 006434 002204  
006422 042737 000340 177776  
006430 104004  
006432 016734  
006434 104013  
006436 016767  
006440 000000  
006442 000017  
006444 015624  
006446 104004  
006450 016731

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

K04

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1942
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1946 006452
1947 006452 005077 007060
1948 006456 042737 000340 177776
1949 006464 013701 015624
1950 006470 012777 002000 007040
1951 006476 012702 000020
1952 006502 010177 007030
1953 006506 012777 000001 007024
1954 006514 005077 007016
1955 006520 005005
1956 006522 017704 007012
1957 006526 117703 007004
1958 006532 042703 177760
1959 006536 020103
1960 006540 001002
1961 006542 012705 000001
1962
1963 006546
1964 006546 042704 000360
1965
1966 006552 020504
1967 006554 001403
1968 006556 104001
1969 006560 104003
1970 006562 006564
1971 006564 004737 013330
1972 006570 005302
1973 006572 001352
1974 006574 005005
1975 006576 010177 006734
1976 006602 010103
1977 006604 005077 006730
1978 006610 105227 000000
1979 006614 001375
1980 006616 017704 006716
1981 006622 005704
1982 006624 001401
1983 006626 104001
1984 006630 104002

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

T101:
MUX11: CLR 2DHCSR
;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
BIC 8340,PS
MOV LINE,R1
MUX11A: MOV 8CLRMUX,2DHCSR
MOV 816,R2
MOV R1,2DHCSR
;SELECT LINE TO BE TESTED
MOV 8LINENA,2DHMSR
;SET LINE ENABLE FUNCTION FLIP-FLOP
CLR 2DHCSR
MUX11B: CLR R5
MOV 2DHMSR,R4
;READ LINE STATUS REGISTER
MOVB 2DHCSR,R3
;READ CONTROL STATUS REGISTER
BIC 817760,R3
;CLEAR UNWANTED BITS
CMP R1,R3
;IF LINE NUMBER=SELECTED LINE NUMBER,
;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
BNE MUX11C
MOV 8LINENA,R5
;TO BE SET

MUX11C: BIC 8360,R4
;CLEAR RING,CO,CS,SECRV
;IF NO LEVEL CONVERTER THESE BITS FLOAT
;CMP EXPECTED AND RECVD
;RESULTS
;LINE STATUS ERROR
CMP R5,R4
BEQ MUX11D
ERRORL SCOPEF
MUX11D: CALL STEPER
;EXAMINE NEXT LINE
DEC R2
BNE MUX11B
CLR R5
MUX11E: MOV R1,2DHCSR
MOV R1,R3
;SET LINE COUNTER TO SELECTED LINE
CLR 2DHMSR
;CLEAR LINE ENABLE FLIP FLOP
INCB 80
;DELAY FOR CABLE
BNE -4
;DITTO
MOV 2DHMSR,R4
;READ LINE STATUS REGISTER
TST R4
;WAS LINE ENABLE FUNCTION FLIP FLOP
;CLEARED
BEQ MUX11F
;NO LINE STATUS ERROR
ERRORL SCOPE
;CHECK FOR ITERATIONS, LOOP
MUX11F:

```





# N04

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```

2065                                     ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
2066                                     ;BE SET AND CLEARED FOR SELECTED LINE
2067
2068 007162                                T104:                                ;REFERENCE DESIGNATION
2069 007162 005077 006350                MUX14: CLR 2DHMCSR                    ;CLEAR CONTROL STATUS REGISTER
2070 007166 042737 000340 177776        BIC #340,PS                          ;ENABLE INTERRUPTS
2071 007174 013701 015624                MOV LINE,R1
2072 007200 012777 002000 006330        MUX14A: MOV #CLRMUX,2DHMCSR
2073 007206 012702 000020                MOV #16,R2
2074 007212 010177 006320                MOV R1,2DHMCSR                        ;SELECT LINE TO BE TESTED
2075 007216 012777 000010 006314        MOV #SECTX,2DHMLSR                    ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
2076 007224 005077 006306                CLR 2DHMCSR
2077 007230 005005                MUX14B: CLR R5
2078 007232 017704 006302                MOV 2DHMLSR,R4                        ;READ LINE STATUS REGISTER
2079 007236 117703 006274                MOVB 2DHMCSR,R3                       ;READ CONTROL STATUS REGISTER
2080 007242 042703 177760                BIC #177760,R3                        ;CLEAR UNWANTED BITS
2081 007246 020103                CMP R1,R3                             ;IF LINE NUMBER=SELECTED LINE NUMBER,
2082 007250 001002                BNE MUX14C                             ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
2083 007252 012705 000010                MOV #SECTX,R5
2084
2085                                     ;TO BE SET
2086 007256                MUX14C: CMP R5,R4                    ;CMP EXPECTED AND RECVD
2087 007260 001403                BEQ MUX14D                             ;RESULTS
2088 007262 104001                ERRORL                                ;LINE STATUS ERROR
2089 007264 104003                SCOPEF
2090 007266 007270                MUX14D
2091 007270 004737 013330                MUX14D: CALL STEPER                    ;EXAMINE NEXT LINE
2092 007274 005302                DEC R2
2093 007276 001354                BNE MUX14B
2094 007300 005005                CLR R5
2095 007302 010177 006230                MUX14E: MOV R1,2DHMCSR
2096 007306 010103                MOV R1,R3
2097 007310 005077 006224                CLR 2DHMLSR
2098 007314 105227 000000                INCB #0
2099 007320 001375                BNE -4
2100 007322 017704 006212                MOV 2DHMLSR,R4
2101 007326 005704                TST R4
2102 007330 001401                BEQ MUX14F
2103 007332 104001                ERRORL
2104 007334 104002                MUX14F: SCOPE
;NO. LINE STATUS ERROR
;CHECK FOR ITERATIONS, LOOP

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2105
2106
2107
2108
2109 007336
2110 007336 005077 006174
2111 007342 042737 000340 177776
2112 007350 013701 015624
2113 007354 012702 000020
2114 007360 010177 006152
2115 007364 012777 000003 006146
2116 007372 005077 006140
2117 007376 005005
2118 007400 017704 006134
2119 007404 117703 006126
2120 007410 042703 177760
2121 007414 020103
2122 007416 001002
2123 007420 012705 000143
2124
2125 007424 020405
2126 007426 001403
2127 007430 104001
2128 007432 104003
2129 007434 007436
2130 007436 004737 013330
2131 007442 005302
2132 007444 001354
2133 007446 012705 000001
2134 007452 010103
2135 007454 010177 006056
2136 007460 042777 000002 006052
2137 007466 105227 000000
2138 007472 001375
2139 007474 017704 006040
2140 007500 020504
2141 007502 001401
2142 007504 104001
2143 007506 104002

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

T105:
MUX15: CLR 20HMCSR
      BIC #340,PS
      MOV LINE,R1
MUX15A: MOV #16,R2
      MOV R1,20HMCSR
      MOV #LINENA+TRMRDY,20HMLSR
      CLR 20HMCSR
MUX15B: CLR R5
      MOV 20HMLSR,R4
      MOVB 20HMCSR,R3
      BIC #177760,R3
      CMP R1,R3
      BNE MUX15C
      MOV #LTNENA+TRMRDY+CO+CS,R5
MUX15C: CMP R4,R5
      BEQ MUX15D
      ERRORL SCOPEF
      MUX15D
MUX15D: CALL STEPER
      DEC R2
      BNE MUX15B
      MOV #LINENA,R5
MUX15E: MOV R1,R3
      MOV R1,20HMCSR
      BIC #TRMRDY,20HMLSR
      INCB #0
      BNE -4
      MOV 20HMLSR,R4
      CMP R5,R4
      BEQ MUX15F
      ERRORL SCOPE
      MUX15F: SCOPE

:REFERENCE DESIGNATION
:CLEAR CONTROL REGISTER
:ENABLE INTERRUPTS
:16 LINES
:SELECT A LINE
:SET LINE ENABLE +TRMRDY
:CLEAR CONTROL REGISTER
:CLEAR EXPECTED RESULT
:READ LINE STATUS
:READ LINE NUMBER
:CLEAR UNWANTED BITS
:IF RECEIVED LINE=SELECTED LINE
:EXPECT LINE ENABLE AND
:CLEAR TO SEND AND CARRIER ARE 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 TERMINAL
: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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2144
2145
2146
2147
2148 007510
2149 007510 005077 006022
2150 007514 042737 000340 177776
2151 007522 013701 015624
2152 007526 012702 000020
2153 007532 010177 006000
2154 007536 012777 000005 005774
2155 007544 005077 005766
2156 007550 005005
2157 007552 017704 005762
2158 007556 117703 005754
2159 007562 042703 177760
2160 007566 020103
2161 007570 001002
2162 007572 012705 000205
2163
2164 007576 020405
2165 007600 001403
2166 007602 104001
2167 007604 104003
2168 007606 007610
2169 007610 004737 013330
2170 007614 005302
2171 007616 001354
2172 007620 012705 000001
2173 007624 010103
2174 007626 010177 005704
2175 007632 042777 000004 005700
2176 007640 105227 000000
2177 007644 001375
2178 007646 017704 005666
2179 007652 020504
2180 007654 001401
2181 007656 104001
2182 007660 104002

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

T106:
MUX16: CLR 2DHCSR
BIC #340,PS
MOV LINE,R1
MUX16A: MOV #16,R2
MOV R1,2DHCSR
MOV #LINA+RS,2DHMSR
CLR 2DHCSR
MUX16B: CLR RS
MOV 2DHMSR,R4
MOVB 2DHCSR,R3
BIC #177760,R3
CMP R1,R3
BNE MUX16C
MOV #LINA+RS+RING,R5

MUX16C: CMP R4,R5
BEQ MUX16D
ERRORL SCOPEF
MUX16D
MUX16D: CALL STEPER
DEC R2
BNE MUX16B
MOV #LINA,R5
MUX16E: MOV R1,R3
MOV R1,2DHCSR
BIC #RS,2DHMSR
INCB #0
BNE -4
MOV 2DHMSR,R4
CMP RS,R4
BEQ MUX16F
ERRORL SCOPE
MUX16F: SCOPE

;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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2183
2184
2185
2186
2187 007662
2188 007662 005077 005650
2189 007666 042737 000340 177776
2190 007674 013701 015624
2191 007700 012702 000020
2192 007704 010177 005626
2193 007710 012777 000011 005622
2194 007716 005077 005614
2195 007722 005005
2196 007724 017704 005610
2197 007730 117703 005602
2198 007734 042703 177760
2199 007740 020103
2200 007742 001002
2201 007744 012705 000031
2202
2203 007750 020405
2204 007752 001403
2205 007754 104001
2206 007756 104003
2207 007760 007762
2208 007762 004737 013330
2209 007766 005302
2210 007770 001354
2211 007772 012705 000001
2212 007776 010103
2213 010000 010177 005532
2214 010004 042777 000010 005526
2215 010012 105227 000000
2216 010016 001375
2217 010020 017704 005514
2218 010024 020504
2219 010026 001401
2220 010030 104001
2221 010032 104002

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T107:
MUX17: CLR 2DHCSR
BIC #340,PS
MOV LINE,R1
MUX17A: MOV #16,R2
MOV R1,2DHCSR
MOV #LINEA+SECTX,2DHMSR
CLR 2DHCSR
MUX17B: CLR RS
MOV 2DHMSR,R4
MOVB 2DHCSR,R3
BIC #177760,R3
CMP R1,R3
BNE MUX17C
MOV #LINEA+SECTX+SECRX,R5
MUX17C: CMP R4,R5
BEQ MUX17D
ERRORL SCOPEF
MUX17D: CALL STEPER
DEC R2
BNE MUX17B
MOV #LINEA,R5
MUX17E: MOV R1,R3
MOV R1,2DHCSR
BIC #SECTX,2DHMSR
INCB #0
BNE -4
MOV 2DHMSR,R4
CMP R5,R4
BEQ MUX17F
ERRORL SCOPE
MUX17F:

:VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"  
:AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.  
:REFERENCE DESIGNATION  
:CLEAR CONTROL REGISTER  
:ENABLE INTERRUPTS  
:16 LINES  
:SELECT A LINE  
:SET LINE ENABLE +SECTX  
:CLEAR CONTROL REGISTER  
:CLEAR EXPECTED RESULT  
:READ LINE STATUS  
:READ LINE NUMBER  
:CLEAR UNWANTED BITS  
:IF RECEIVED LINE=SELECTED LINE  
:EXPECT LINE ENABLE AND  
:SECONDARY RECEIVE 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 SECONDARY TRANSMIT  
:DELAY FOR CABLE  
:DITTO  
:READ LINE STATUS REGISTER  
:ONLY LINE ENABLE SHOULD BE  
:SET ON THIS LINE  
:LINE STATUS ERROR  
:CHECK FOR ITERATIONS, LOOP



# E05

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2222
2223 ;MODEM CONTROL ON LINE TEST USING 103A TYPE MODEMS
2224 ;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
2225 ;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
2226 ;USING THE MODEM CONTROL TO CONTROL 103A TYPE MODEMS
2227
2228 ;NOTE: IF THE DM11-AA IS NOT CONNECTED TO THE
2229 ;DISTRIBUTION PANEL, AN M974 DM11 MAINTENANCE JUMPER
2230 ;SHOULD BE INSTALLED IN SLOT B1 OR B3 OF THE DISTRIBUTION
2231 ;PANEL TO PREVENT A POSSIBLE LONG SPACE
2232 ;DISCONNECT FROM HANGING UP THE MODEM
2233
2234
2235 010034 T200: ;REFERENCE DESIGNATION
2236 010034 000005 ST103A: RESET ;INITIALIZE INTERFACE
2237 010036 012737 000340 177776 MOV #340,PS ;DISABLE ALL INTERRUPTS
2238 010044 104004 TYPE ;TYPE "103A MODEM CONNECT-
2239 010046 016153 MT103T ;DISCONNECT TEST"
2240 010050 022737 000176 015552 CMP #SWREG,SWR
2241 010056 001001 BNE IS
2242 010060 104025 CNTLWU
2243 010062 012737 010100 011670 IS: MOV #T103A,FATRET ;SET UP FOR FATAL ERROR
2244 010070 012737 010076 002204 MOV #ST103B,KRET ;SET UP FOR LINE CHANGE
2245 010076 104017 ST103B: GETLNS ;INPUT ORIGINATE AND
2246 ;AND ANSWER LINE NUMBERS
2247 010100 104020 T103A: SETUP ;SET UP TO RECEIVE INTERRUPTS
2248 ;WAIT FOR RING
2249 010102 010112 T103B ;GO HERE IF RING OK
2250 010104 010106 T103A1 ;GO HERE IF NO RING
2251 010106 104012 T103A1: ERROR ;NO RING WITHIN 5 MINUTES
2252 010110 000772 BR ST103B ;SELECT NEW LINES AND REDIAL
2253
2254 ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2255 ;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
2256 ;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
2257 ;WILL BE REQUESTED TO RESELECT LINES AND REDIAL
2258
2259 010112 104021 T103B: CKRING ;CHECK FOR RING INTERRUPT
2260 ;ONLY ON ANSWER LINE
2261 ;AND NO TRANSITIONS ON
2262 ;ORIGINATE LINE
2263 010114 010132 T103C ;GO HERE IF TRANSITIONS
2264 ;ARE CORRECT
2265 010116 010122 T103B1 ;GO HERE IF INCORRECT
2266 ;TRANSITION ON ANSWER LINE
2267 010120 010126 T103B2 ;GO HERE IF INCORRECT TRANSITION
2268 ;ON ORIGINATE LINE
2269 010122 104014 T103B1: ERRORT ;TRANSITION ERROR ON ANSWER LINE
2270 010124 000207 RTS PC ;CONTINUE CHECKING
2271 010126 104014 T103B2: ERRORT ;TRANSITION ERROR ON ORIGINATE LINE
2272 010130 000762 BR ST103B ;RESELECT LINES AND REDIAL
  
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# F05

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2273									
2274									:SET TERMINAL READY ON SELECTED ANSWER LINE
2275									:WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2276									
2277	010132	013777	015630	005376	T103C:	MOV	LINANS,	JDHMCSR	:SET LINE COUNTER TO
2278									:ANSWER LINE NUMBER
2279	010140	052777	000002	005372		BIS	#TRMRDY,	JDHMLSR	:SET TERMINAL READY ON
2280									:SELECTED ANSWER LINE
2281	010146	104026				CKINTT			
2282	010150	104022				WAITRN			:WAIT FOR TRANSITIONS TO OCCUR
2283									
2284									:CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2285									:SELECTED ORIGINATE AND ANSWER LINES
2286									
2287	010152	104023				CKTRAN			:CHECK TRANSITIONS AND
2288									:STATUS ON SELECTED
2289									:ANSWER AND ORIGINATE LINES
2290	010154	000143				CO+CS+LINENA+TRMRDY			:EXPECT CARRIER, CLEAR TO SEND,
2291									:LINE ENABLE AND TERMINAL
2292									:READY STATUS BITS SET ON
2293									:ANSWER LINE
2294	010156	000143				CO+CS+LINENA+TRMRDY			:EXPECT CARRIER, CLEAR TO SEND,
2295									:LINE ENABLE AND TERMINAL
2296									:READY STATUS BITS ON
2297									:ORIGINATE LINE
2298	010160	100006				RINGF+XCO+XCS			:EXPECT CARRIER, CLEAR TO SEND
2299									:AND POSSIBLE RING TRANSITIONS
2300									:ON ANSWER LINE
2301	010162	000006				XCO+XCS			:EXPECT CARRIER AND CLEAR
2302									:TO SEND TRANSITIONS ON
2303									:ORIGINATE LINE
2304	010164	010176				T103D1			:GO HERE ON ANSWER LINE STATUS ERROR
2305									
2306	010166	010202				T103D2			:GO HERE ON ORIGINATE LINE STATUS ERROR
2307	010170	010206				T103D3			:GO HERE ON ANSWER LINE TRANSITION ERROR
2308	010172	010212				T103D4			:GO HERE ON ORIGINATE LINE TRANSITION ERROR
2309	010174	010216				T103E			:GO TO NEXT TEST IF NO ERRORS
2310	010176	104015			T103D1:	ERRORS			:ANSWER LINE STATUS ERROR
2311	010200	000207				RTS	PC		:CONTINUE CHECKING
2312	010202	104015			T103D2:	ERRORS			:ORIGINATE LINE STATUS ERROR
2313	010204	000207				RTS	PC		:CONTINUE CHECKING
2314	010206	104014			T103D3:	ERRORT			:ANSWER LINE TRANSITION ERROR
2315	010210	000207				RTS	PC		:CONTINUE CHECKING
2316	010212	104014			T103D4:	ERRORT			:ORIGINATE LINE TRANSITION ERROR
2317	010214	000207				RTS	PC		:CONTINUE CHECKING

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2328 010216 104004          T103E: TYPE
2329 010220 016416          MDISC
2330 010222 012737 000340 177776  MOV #340,PS
2331 010230 012777 011712 005274  MOV #TRNTYP,JDHMVEC ;SET UP
2332
2333 010236 012737 010256 015656  MOV #T103ES,RNGRET ;SET UP
2334
2335 010244 012777 000140 005264  MOV #SCNENA+INTENA,JDHMCSR ;SET UP
2336 010252 005037 177776          CLR PS ;DUMMY RETURN FOR
2337 010256 005077 005262          CLR #TKDBR ;RING INTERRUPT
2338 010262 105777 005254          T103ES: CLR #TKCSR ;SET SCAN ENABLE AND INTERRUPT ENABLE
2339 010266 100375          IS: TSTB #TKCSR ;ALLOW INTERRUPTS
2340 010270 005777 005250          BPL IS ;WAIT FOR TTY TO HIT
2341 010274 012737 000340 177776  TST #TKDBR
2342 010302 005077 005230          MOV #340,PS ;START DISCONNECT SEQUENCE
2343 010306 013777 015626 005222  CLR #DHMCSR ;CLEAR CONTROL REGISTER
2344 010314 042777 000002 005216  MOV LINORG,JDHMCSR ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
2345 010322 104026          BIC #TRMRDY,JDHMLSR ;SET TERMINAL READY ON SELECTED LINE
2346 010324 104022          CKINTT
          WAITRN ;WAIT FOR TRANSITIONS TO OCCUR

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# H05

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2347			;CHECK FOR CORRECT STATUS AND TRANSITIONS ON SELECTED
2348			;ORIGINATE AND ANSWER LINES
2349			
2350			
2351	010326	104023	CKTRAN ;CHECK TRANSITIONS AND
2352			;STATUS ON SELECTED
2353			;ANSWER AND ORIGINATE LINES
2354	010330	000003	LINEA+TRMRDY ;EXPECT LINE ENABLE AND
2355			;EXPECT LINE ENABLE AND
2356			;TERMINAL READY STATUS BITS
2357	010332	000001	LINEA ;SET ON ANSWER LINE
2358			;EXPECT LINE ENABLE STATUS BIT
2359	010334	000006	XCO+XCS ;SET ON ORIGINATE LINE
2360			;EXPECT CARRIER AND CLEAR
2361			;TO SEND TRANSITIONS ON
2362	010336	000006	XCO+XCS ;ANSWER LINE
2363			;EXPECT CARRIER AND CLEAR
2364			;TO SEND TRANSITIONS ON
2365	010340	010352	T103E1 ;ORIGINATE LINE
2366			;GO HERE ON ANSWER LINE STATUS ERROR
2367	010342	010356	T103E2 ;GO HERE ON ORIGINATE LINE STATUS ERROR
2368	010344	010362	T103E3 ;GO HERE ON ANSWER LINE TRANSITION ERROR
2369	010346	010366	T103E4 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2370	010350	010372	T103EN ;GO TO NEXT TEST IF NO ERRORS
2371	010352	104015	T103E1: ERRORS ;ANSWER LINE STATUS ERROR
2372	010354	000207	RTS PC ;CONTINUE CHECKING
2373	010356	104015	T103E2: ERRORS ;ORIGINATE LINE STATUS ERROR
2374	010360	000207	RTS PC ;CONTINUE CHECKING
2375	010362	104014	T103E3: ERRORT ;ANSWER LINE TRANSITION ERROR
2376	010364	000207	RTS PC ;CONTINUE CHECKING
2377	010366	104014	T103E4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2378	010370	000207	RTS PC ;CONTINUE CHECKING
2379			
2380	010372		T201: ;REFERENCE DESIGNATION
2381	010372	104004	T103EN: TYPE ;TYPE " 103A TEST COMPLETE"
2382	010374	016340	MT103A
2383	010376	005037	015564 CLR TSTNO ;CLEAR TEST NUMBER FOR LOOPING
2384	010402	104026	CKINTT
2385	010404	000137	010076 JMP ST103B ;SELECT NEW LINE NUMBERS AND
2386			;RESTART TEST

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2396 010410
2397 010410 000005
2398 010412 012737 000340 177776
2399 010420 104004
2400 010422 016224
2401 010424 022737 000176 015552
2402 010432 001001
2403 010434 104025
2404 010436 012737 010454 011670
2405 010444 012737 010452 002204
2406 010452 104017
2407
2408 010454 104020
2409
2410 010456 010466
2411 010460 010462
2412 010462 104012
2413 010464 000772
2414
2415
2416
2417
2418
2419
2420 010466 104021
2421
2422
2423
2424 010470 010506
2425
2426 010472 010476
2427
2428 010474 010502
2429
2430 010476 104014
2431 010500 000207
2432 010502 104014
2433 010504 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
MOV #340,PS
TYPE
MT202T
CMP #SWREG,SWR
BNE IS
CNTLUU
IS: MOV #T202A,FATRET
MOV #ST202B,KRET
ST202B: GETLNS
T202A: SETUP
T202B
T202A1: ERROR
BR ST202B
T202B: CKRING
T202C
T202B1
T202B2
T202B1: ERROR
RTS PC
T202B2: ERROR
BR ST202B

;REFERENCE DESIGNATION
;INITIALIZE INTERFACE
;DISABLE ALL INTERRUPTS
;TYPE "202C MODEM CONNECT-
;DISCONNECT TEST"

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

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

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

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# K05

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2478									
2479									
2480									
2481									
2482	010606	013777	015630	004722	T202E:	MOV	LINANS,JDHCSR		;SET LINE COUNTER TO ANSWER LINE
2483	010614	052777	000010	004716		BIS	#SECTX,JDHLSR		;SET SECONDARY RECEIVE ON ANSWER LINE
2484	010622	104026				CKINTT			
2485	010624	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2486									
2487									
2488									
2489									
2490	010626	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2491									;ON SELECTED ANSWER AND
2492									;ORIGINATE LINES
2493	010630	000133				SECTX+CO+LINENA+TRMRDY+SECRX			;EXPECT SECONDARY TRANSMIT
2494									;SECONDARY RECEIVE, CARRIER
2495									;LINE ENABLE AND TERMINAL READY
2496									;STATUS BITS SET ON ANSWER LINE
2497	010632	000167				SECRX+RS+CO+CS+LINENA+TRMRDY			;EXPECT SECONDARY RECEIVE
2498									;REQUEST TO SEND, CLEAR TO SEND
2499									;CARRIER, LINE ENABLE AND
2500									;TERMINAL READY STATUS BITS
2501									;SET ON ORIGINATE LINE
2502	010634	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2503									;TRANSITION ON ANSWER LINE
2504	010636	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2505									;TRANSITION ON ORIGINATE LINE
2506	010640	010652				T202E1			;GO HERE ON ANSWER LINE STATUS ERROR
2507	010642	010656				T202E2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2508	010644	010662				T202E3			;GO HERE ON ANSWER LINE TRANSITION ERROR
2509	010646	010666				T202E4			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2510	010650	010672				T202F			;GO TO NEXT TEST IF NO ERRORS
2511	010652	104015				T202E1:	ERRORS		;ANSWER LINE STATUS ERROR
2512	010654	000207					RTS	PC	;CONTINUE CHECKING
2513	010656	104015				T202E2:	ERRORS		;ORIGINATE LINE STATUS ERROR
2514	010660	000207					RTS	PC	;CONTINUE CHECKING
2515	010662	104014				T202E3:	ERRORT		;ANSWER LINE TRANSITION ERROR
2516	010664	000207					RTS	PC	;CONTINUE CHECKING
2517	010666	104014				T202E4:	ERRORT		;ORIGINATE LINE TRANSITION ERROR
2518	010670	000207					RTS	PC	;CONTINUE CHECKING





M05

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2562									
2563									
2564									;SET REQUEST TO SEND ON ANSWER LINE
2565									;WAIT FOR TRANSITIONS ON SELECTED LINES
2566									
2567	010772	013777	015630	004536	T202G:	MOV	LINANS,JDHMC SR		;SET LINE COUNTER TO ANSWER LINE
2568	011000	052777	000004	004532		BIS	#RS,JDHMLSR		;SET REQUEST TO SEND
2569	011006	104026				CKINTT			
2570	011010	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2571									
2572									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2573									;SELECTED ORIGINATE AND ANSWER LINES
2574									
2575	011012	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2576									;ON SELECTED ANSWER AND
2577									;ORIGINATE LINES
2578	011014	000147				RS+CO+CS+LINENA+TRMRDY			;EXPECT LINE ENABLE, TERMINAL
2579									;READY, REQUEST TO SEND, CLEAR
2580									;TO SEND, AND CARRIER
2581									;STATUS BITS SET ON ANSWER LINE
2582	011016	000103				CO+LINENA+TRMRDY			;EXPECT LINE ENABLE, TERMINAL
2583									;READY AND CARRIER STATUS
2584									;BITS SET ON ORIGINATE LINE
2585	011020	000006				XCO+XCS			;EXPECT CARRIER AND CLEAR
2586									;TO SEND TRANSITIONS ON
2587									;ANSWER LINE
2588	011022	000004				XCO			;EXPECT CARRIER TRANSITION
2589									;ON ORIGINATE LINE
2590	011024	011036				T202G1			;GO HERE ON ANSWER LINE STATUS ERROR
2591	011026	011042				T202G2			;GO HERE ON ORIGINATE LINE STATUS ERROR
2592	011030	011046				T202G3			;GO HERE ON ANSWER LINE TRANSITION ERROR
2593	011032	011052				T202G4			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2594	011034	011056				T202H			;GO TO NEXT TEST IF NO ERRORS
2595	011036	104015				T202G1: ERRORS			;ANSWER LINE STATUS ERROR
2596	011040	000207				RTS	PC		;CONTINUE TESTING
2597	011042	104015				T202G2: ERRORS			;ORIGINATE LINE STATUS ERROR
2598	011044	000207				RTS	PC		;CONTINUE TESTING
2599	011046	104014				T202G3: ERRORT			;ANSWER LINE TRANSITION ERROR
2600	011050	000207				RTS	PC		;CONTINUE TESTING
2601	011052	104014				T202G4: ERRORT			;ORIGINATE LINE TRANSITION ERROR
2602	011054	000207				RTS	PC		;CONTINUE TESTING

# N05

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2603									
2604									
2605									
2606									
2607	011056	013777	015626	004452	T202H:	MOV	LINORG,JDHMCSR		;SET LINE COUNTER TO ORIGINATE LINE
2608	011064	052777	000010	004446		BIS	#SECTX,JDHMLSR		;SET SECONDARY TRANSMIT
2609	011072	104026				CKINTT			
2610	011074	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
2611									
2612									
2613									
2614									
2615	011076	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
2616									;ON SELECTED ANSWER AND
2617									;ORIGINATE LINES
2618	011100	000167				RS+CS+CO+LINENA+TRMRDY+SECRX			;EXPECT LINE ENABLE, TERMINAL
2619									;READY, REQUEST TO SEND, CLEAR
2620									;TO SEND, CARRIER AND SECONDARY
2621									;RECEIVE STATUS BITS SET
2622									;ON ANSWER LINE
2623	011102	000133				SECTX+CO+LINENA+TRMRDY+SECRX			;EXPECT LINE ENABLE, TERMINAL
2624									;READY, CARRIER, SECONDARY
2625									;TRANSMIT AND SECONDARY
2626									;RECEIVE STATUS BITS SET
2627									;ON ORIGINATE LINE
2628	011104	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2629									;TRANSITION ON ANSWER LINE
2630	011106	000001				XSCRX			;EXPECT SECONDARY RECEIVE
2631									;TRANSITION ON ORIGINATE LINE
2632	011110	011122				T202H2			;GO HERE ON ANSWER LINE STATUS ERROR
2633	011112	011126				T202H3			;GO HERE ON ORIGINATE LINE STATUS ERROR
2634	011114	011132				T202H4			;GO HERE ON ANSWER LINE TRANSITION ERROR
2635	011116	011136				T202H5			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2636	011120	011142				T202I			;GO TO NEXT TEST IF NO ERRORS
2637	011122	104015				T202H2: ERRORS			;ANSWER LINE STATUS ERROR
2638	011124	000207				RTS	PC		;CONTINUE CHECKING
2639	011126	104015				T202H3: ERRORS			;ORIGINATE LINE STATUS ERROR
2640	011130	000207				RTS	PC		;CONTINUE CHECKING
2641	011132	104014				T202H4: ERROR			;ANSWER LINE TRANSITION ERROR
2642	011134	000207				RTS	PC		;CONTINUE CHECKING
2643	011136	104014				T202H5: ERROR			;ORIGINATE LINE TRANSITION ERROR
2644	011140	000207				RTS	PC		;CONTINUE CHECKING

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2645
2646
2647
2648
2649 011142 013777 015630 004366 T2021: MOV LINANS,JDHCSR ;SET LINE COUNTER TO ANSWER LINE
2650 011150 042777 000004 004362 BIC #RS,JDHLSR ;CLEAR REQUEST TO SEND
2651 011156 013777 015626 004352 MOV LINORG,JDHCSR ;SET LINE COUNTER TO ORIGINATE LINE
2652 011164 042777 000010 004346 BIC #SECTX,JDHLSR ;CLEAR SECONDARY TRANSMIT
2653 011172 104026 CKINTT
2654 011174 104022 WAITRN ;WAIT FRO TRANSITIONS TO OCCUR
2655
2656 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2657 ;SELECTED ORIGINATE AND ANSWER LINES
2658
2659 011176 104023 CKTRAN ;CHECK TRANSITION S AND STATUS
2660 ;ON SELECTED ANSME AND
2661 ;ORIGINATE LINES
2662 011200 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
2663 ;TERMINAL READY STATUS BITS SET
2664 ;ON ANSWER LINE
2665 011202 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
2666 ;TERMINAL READY STATUS BITS
2667 ;SET ON ORIGINATE LINE
2668 011204 000007 XCO+XCS+XSCRX ;EXPECT CARRIER, CLEAR TO SEND
2669 ;AND SECONDARY RECEIVE TRANSITIONS
2670 ;ON ANSWER LINE
2671 011206 000005 XCO+XSCRX ;EXPECT CARRIER AND SECONDARY
2672 ;RECEIVE TRANSITIONS ON
2673 ;ORIGINATE LINE
2674 011210 011222 T20212 ;GO HERE ON ANSWER LINE STATUS ERROR
2675 011212 011226 T20213 ;GO HERE ON ORIGINATE LINE STATUS ERROR
2676 011214 011232 T20214 ;GO HERE ON ANSWER LINE TRANSITIN ERROR
2677 011216 011236 T20215 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2678 011220 011242 T202J ;GO TO NEXT TEST IF NO ERRORS
2679 011222 104015 T20212: ERRORS ;ANSWER LINE STATUS ERROR
2680 011224 000207 RTS PC ;CONTINUE CHECKING
2681 011226 104015 T20213: ERRORS ;ORIGINATE LINE STATUS ERROR
2682 011230 000207 RTS PC ;CONTINUE CHECKING
2683 011232 104014 T20214: ERRORT ;ANSME LINE TRANSITION ERROR
2684 011234 000207 RTS PC ;CONTINUE CHECKING
2685 011236 104014 T20215: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2686 011240 000207 RTS PC ;CONTINUE CHECKING
    
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2687
2688
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2690
2691
2692
2693
2694
2695
2696
2697 011242 104004 T202J: TYPE ;TYPE "STRIKE ANY TTY KEY
2698 011244 016416 MDISC ;TEST DISCONNECT"
2699 011246 012737 000340 177776 MOV #340,PS ;LOCK OUT INTERRUPTS
2700 011254 012777 011712 004250 MOV #STRNTYP,JDHMVEC ;SET UP TO DETECT TRANSITIONS
2701 011262 012737 011302 015656 MOV #T202JS,RNGRET ;SET UP DUMMY RETURN FOR RING
2702 ;FROM RING INTERRUPT
2703 011270 012777 000140 004240 MOV #SCNENA+INTENA,JDHMCSR ;ENABLE LINE SCANNER
2704 ;START SCANNER
2705 011276 005037 177776 CLR PS ;ENABLE INTERRUPTS
2706 011302 005077 004236 T202JS: CLR #TKDBR
2707 011306 105777 004230 IS: TSTB #TKCSR
2708 011312 100375 BPL IS
2709 011314 005777 004224 TST #TKDBR
2710
2711 ;DISCONNECT SEQUENCE REQUESTED
2712
2713 011320 012737 000340 177776 MOV #340,PS ;LOCK OUT INTERRUPTS
2714 011326 005077 004204 CLR JDHMCSR ;STOP SCANNER
2715 011332 013777 015626 004176 MOV LINORG,JDHMCSR ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
2716 011340 042777 000002 004172 BIC #TRMRDY,JDHMLSR ;SET TERMINAL READY ON SELECTED LINE
2717 011346 104024 WAITS ;DELAY
2718 011350 104026 CKINTT
2719 011352 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
    
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2755
2756                                     ; DETECT AND RECORD TRANSITIONS ON SELECTED
2757                                     ; ORIGINATE AND ANSWER LINES
2758
2759                                     ; TRANSITION DATA IS STORED IN LOCATIONS ANSFLG AND ORGFLG
2760                                     ; FOR ANSWER AND ORIGINATE LINES RESPECTIVELY
2761                                     ; FORMAT OF DATA IS (FOR BOTH LINES)
2762
2763                                     ; BIT0=1, SECONDARY RECEIVE CAUSED INTERRUPT
2764                                     ; BIT1=1, CLEAR TO SEND CAUSED INTERRUPT
2765                                     ; BIT2=1, CARRIER CAUSED INTERRUPT
2766                                     ; BIT3=1, RING CAUSED INTERRUPT
2767
2768 011432 017704 004100          TRANS: MOV      3DHMCSR,R4          ; GET LINE NUMBER AND
2769                                     ; INTERRUPT FLAGS
2770
2771 011436 010405          MOV      R4,R5
2772 011440 042705 177760          BIC      #177760,R5          ; EXTRACT LINE NUMBER
2773 011444 023705 015626          CMP      LINORG,R5          ; DID ORIGINATE LINE INTERRUPT
2774 011450 001411          BEQ      ORGTR              ; IF YES, SERVICE
2775 011452 023705 015630          CMP      LINANS,R5          ; DID ANSWER LINE INTERRUPT
2776 011456 001443          BEQ      ANSTR              ; IF YES, SERVICE
2777 011460 010577 004052          MOV      R5,3DHMCSR
2778 011464 017703 004050          MOV      3DHMLSR,R3
2779 011470 104016          ERRORN
2780 011472 000471          BR       FATEX              ; INTERRUPT ON INCORRECT LINE
2781
2782                                     ; RECORD TRANSITIONS FOR ORIGINATE LINE
2783 011474 032704 100000          ORGTR:  BIT      #RINGF,R4          ; IF RING CAUSED INTERRUPT,
2784 011500 001403          BEQ      ORGTR1              ; SET RING TRANSITION BIT
2785 011502 052737 000010 015634          BIS      #10,ORGFLG
2786 011510 032704 040000          ORGTR1: BIT      #COF,R4          ; IF CARRIER CAUSED INTERRUPT
2787 011514 001403          BEQ      ORGTR2              ; SET CARRIER TRANSITION BIT
2788 011516 052737 000004 015634          BIS      #4,ORGFLG
2789 011524 032704 020000          ORGTR2: BIT      #CSF,R4          ; IF CLEAR TO SEND
2790                                     ; CAUSED INTERRUPT
2791 011530 001403          BEQ      ORGTR3              ; SET CLEAR TO SEND
2792                                     ; TRANSITION BIT
2793 011532 052737 000002 015634          BIS      #2,ORGFLG
2794 011540 032704 010000          ORGTR3: BIT      #SECRXF,R4          ; IF SECONDARY RECEIVE
2795                                     ; CAUSED INTERRUPT
2796 011544 001403          BEQ      ORGTR4              ; SET SECONDARY RECEIVE
2797 011546 052737 000001 015634          BIS      #1,ORGFLG          ; TRANSITION BIT
2798 011554 032704 170000          ORGTR4: BIT      #RINGF+COF+CSF+SECRXF,R4
2799                                     ; IF NO INTERRUPT FLAGS SET
2800 011560 001044          BNE      TRANEX              ; EXIT TRANSITION DETECTION
2801 011562 104016          ORGTRR: ERRORN
2802 011564 000434          BR       FATEX

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2803
2804                                     ;RECORD TRANSITIONS FOR ANSWER LINE
2805
2806 011566 032704 100000 ANSTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT,
2807 011572 001403 BEQ ANSTR1 ;SET RING TRANSITION BIT
2808 011574 052737 000010 015632 BIS #10,ANSFLG
2809 011602 032704 040000 ANSTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
2810 011606 001403 BEQ ANSTR2 ;SET CARRIER TRANSITION BIT
2811 011610 052737 000004 015632 BIS #4,ANSFLG
2812 011616 032704 020000 ANSTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
2813 ;CAUSED INTERRUPT
2814 011622 001403 BEQ ANSTR3 ;SET CLEAR TO SEND
2815 ;TRANSITION BIT
2816 011624 052737 000002 015632 BIS #2,ANSFLG
2817 011632 032704 010000 ANSTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
2818 ;CAUSED INTERRUPT
2819 011636 001403 BEQ ANSTR4 ;SET SECONDARY RECEIVE
2820 011640 052737 000001 015632 BIS #1,ANSFLG ;TRANSITION BIT
2821 011646 032704 170000 ANSTR4: BIT #RINGF+COF+CSF+SECRXF,R4
2822 ;IF NO INTERRUPT FLAGS SET
2823 011652 001007 BNE TRANEX ;EXIT TRANSITION DETECTION
2824 011654 104016 ANSTR: ERRORN
2825 011656 005037 015564 FATEX: CLR TSTNO
2826 011662 022626 POP2SP
2827 011664 000177 000000 JMP @FATRET
2828 011670 000000 FATRET: 0
2829
2830                                     ;EXIT TRANSITION DETECTION
2831
2832 011672 005704 TRANEX: TST R4 ;IF RING FLAG WAS SET
2833 011674 100002 BPL .+6 ;SET UP SPECIAL RETURN
2834 011676 013716 015656 MOV RINGRET,(SP)
2835 011702 012777 000140 003626 TRANX1: MOV #SCENEA+INTENA,@DHMCSR ;RESTART SCANNER
2836 011710 000002 RTI
2837
2838                                     ;TYPE TRANSITION DATA AND RETURN
2839
2840 011712 017737 003620 012676 TRNTYP: MOV @DHMCSR,DATA1
2841 011720 017737 003614 012700 MOV @DHMLSR,DATA2
2842 011726 104004 TYPE
2843 011730 017040 MTRNDT
2844 011732 104006 OCTASC
2845 011734 011740 TRNTAB
2846 011736 000761 BR TRANX1
2847 011740 000002 TRNTAB: 2
2848 011742 000006 6
2849 011744 012676 DATA1
2850 011746 000003 3
2851 011750 012700 DATA2
    
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2852
2853 ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2854
2855 011752 000005 GETLIN: RESET
2856 011754 104013 INSTRG ;TYPE "ORIGINATE LINE-"
2857 011756 016275 MSELOR ;AND GET LINE NUMBER
2858 011760 000000 0
2859 011762 000017 17
2860 011764 015626 LINORG
2861 011766 104013 INSTRG ;TYPE "ANSWER LINE-"
2862 011770 016321 MSELANS ;AND GET LINE NUMBER
2863 011772 000000 0
2864 011774 000017 17
2865 011776 015630 LINANS
2866 012000 104004 TYPE
2867 012002 016731 MCRLF
2868 012004 000002 RTI ;RETURN TO CALLING ROUTINE
2869
2870 ;INITIALIZE INTERFACE
2871
2872 012006 000005 SETUPS: RESET
2873 012010 012737 000340 177776 MOV #340,PS ;LOCK OUT ALL INTERRUPTS
2874 012016 011605 MOV (SP),RS
2875 012020 012537 012706 MOV (RS)+,NXTTS
2876 012024 012537 012666 MOV (RS)+,ERR1
2877 012030 010516 MOV RS,(SP)
2878 012032 012777 006000 003476 MOV #CLRSCN+CLRMUX,@DHMCSR ;CLEAR LINE SCANNER AND MULTIPLEXER
2879 012040 032777 000020 003470 SETUP1: BIT #BUSY,@DHMCSR ;WAIT FOR SCANNER TO CLEAR
2880 012046 001374 BNE SETUP1
2881 012050 005037 015556 CLR ERRFLG
2882
2883 ;ENABLE SELECTED LINES
2884 ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
2885
2886 012054 013777 015626 003454 SETUP2: MOV LINORG,@DHMCSR ;SET UP TO ENABLE ORIGINATE LINE
2887 ;ORIGINATE LINE NUMBER
2888 012062 012777 000003 003450 MOV #LINENA+TRMRDY,@DHMLSR ;SET LINE ENABLE AND
2889 ;TERMINAL READY ON ORIGINATE LINE
2890 012070 013777 015630 003440 MOV LINANS,@DHMCSR ;SET LINE COUNTER TO ANSWER LINE
2891 012076 012777 000001 003434 MOV #LINENA,@DHMLSR ;SET LINE ENABLE ON ANSWER LINE
2892
2893 ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
2894 ;SET UP TO RECEIVE INTERRUPTS
2895 ;START LINE SCANNER
2896
2897 012104 012777 011432 003420 MOV #TRANS,@DHMVEC ;SET UP INTERRUPT VECTOR
2898 ;FOR TRANSITION DETECTION
2899 012112 012777 000340 003414 MOV #340,@DHMLVL ;SET UP INTERRUPT SERVICE LEVEL
2900 012120 012777 000140 003410 MOV #SCNENA+INTENA,@DHMCSR ;START SCANNER, ENABLE INTERRUPTS
2901 012126 005037 015632 CLR ANSFLG ;CLEAR TRANSITION DETECTED FLAGS
2902 012132 005037 015634 CLR ORGFLG
2903 012136 012737 012166 015656 MOV #SETUP4,RNGRET ;SET UP RETURN FROM
2904 ;DETECTION OF RING INTERRUPT
2905 012144 104004 TYPE ;REQUEST OPERATOR TO DIAL
2906 012146 016115 DIALM
2907 012150 005037 177776 CLR PS ;CLEAR PROCESSOR STATUS WORD

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# H06

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2908	012154	005037	015636			CLR	TIME1	;CLEAR TIMER
2909	012160	012737	001000	015640		MOV	#1000, TIME2	;SET UP FOR 5 MINUTE DELAY
2910	012166	005737	015632		SETUP4:	TST	ANSFLG	;IF TRANSITION HAS OCCURED,
2911	012172	001014				BNE	SETUPB	;EXIT WAIT LOOP
2912	012174	005737	015634			TST	ORGFLG	
2913	012200	001011				BNE	SETUPB	
2914	012202	005237	015636			INC	TIME1	;ALLOW OPERATOR 5 MINUTES TO DIAL
2915	012206	001367				BNE	SETUP4	
2916	012210	005337	015640			DEC	TIME2	
2917	012214	001364				BNE	SETUP4	
2918	012216	022626				POP2SP		
2919	012220	000177	000442			JMP	ERR1	
2920	012224	022626			SETUPB:	POP2SP		
2921	012226	000177	000454			JMP	NXTTS	
2922	012232	012766	000340	000002		MOV	#340, +2(SP)	
2923	012240	000002				RTI		
2924								
2925								;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2926								
2927	012242	011605			CKRNG:	MOV	(SP), R5	
2928	012244	012537	012706			MOV	(R5)+, NXTTS	
2929	012250	012537	012666			MOV	(R5)+, ERR1	
2930	012254	012537	012670			MOV	(R5)+, ERR2	
2931	012260	010516				MOV	R5, (SP)	
2932	012262	012705	000010			MOV	#10, R5	;EXPECT RING ONLY ON ANSWER LINE
2933	012266	013704	015632			MOV	ANSFLG, R4	;GET ACTUAL TRANSITION DATA
2934	012272	013703	015630			MOV	LINANS, R3	;SET UP LINE NUMBER
2935	012276	020504				MOV	R5, R4	;DID RING CAUSE INTERRUPT
2936	012300	001402				BEQ	CKRNG1	;ON ANSWER LINE
2937	012302	004777	000360			JSR	PC, ERR1	
2938	012306	005005			CKRNG1:	CLR	R5	
2939	012310	013704	015634			MOV	ORGFLG, R4	
2940	012314	013703	015626			MOV	LINORG, R3	
2941	012320	005704				TST	R4	;IF TRANSITION OCCURED
2942	012322	001403				BEQ	CKRNG2	;ON ORIGINATE LINE, ERROR
2943	012324	022626				POP2SP		
2944	012326	000177	000336			JMP	ERR2	
2945	012332	022626			CKRNG2:	POP2SP		
2946	012334	000177	000346			JMP	NXTTS	

2947									
2948	012340	005037	015632		WAITR:	CLR	ANSFLG		
2949	012344	005037	015634			CLR	ORCFLG		
2950	012350	012777	011432	003154		MOV	#TRANS, @DHMVEC		
2951	012356	012737	012376	015656		MOV	#WAITR, RINGRET		;SET UP FOR RETURN
2952									;FROM RING DETECTION
2953	012364	012777	000140	003144		MOV	#SCNENA+INTENA, @DHMCSR		;START SCANNER
2954	012372	005037	177776			CLR	PS		
2955	012376	005037	015636		WAITRR:	CLR	TIME1		
2956	012402	012737	000025	015640		MOV	#25, TIME2		
2957	012410	005237	015636		WAITR1:	INC	TIME1		;WAIT FOR TRANSITIONS OF
2958	012414	001375				BNE	WAITR1		;CARRIER AND CLEAR TO SEND
2959	012416	005337	015640			DEC	TIME2		
2960	012422	001372				BNE	WAITR1		
2961	012424	000002				RTI			
2962									
2963									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2964									;SELECTED ORIGINATE AND ANSWER LINES
2965									
2966	012426	012737	000340	177776	CKTRN:	MOV	#340, PS		;LOCK OUT FURTHER INTERRUPTS
2967	012434	005077	003076			CLR	@DHMCSR		;STOP LINE SCANNER
2968	012440	011605				MOV	(SP), R5		
2969	012442	012537	012676			MOV	(R5)+, DATA1		
2970	012446	012537	012700			MOV	(R5)+, DATA2		
2971	012452	012537	012702			MOV	(R5)+, DATA3		
2972	012456	012537	012704			MOV	(R5)+, DATA4		
2973	012462	012537	012666			MOV	(R5)+, ERR1		
2974	012466	012537	012670			MOV	(R5)+, ERR2		
2975	012472	012537	012672			MOV	(R5)+, ERR3		
2976	012476	012537	012674			MOV	(R5)+, ERR4		
2977	012502	012537	012706			MOV	(R5)+, NXTTS		
2978	012506	010516				MOV	RS, (SP)		
2979	012510	013705	012676			MOV	DATA1, R5		
2980	012514	013777	015630	003014		MOV	LINANS, @DHMCSR		;SET LINE COUNTER TO ANSWER LINE
2981	012522	017704	003012			MOV	@DHMLSR, R4		;GET ACTUAL ANSWER LINE STATUS
2982	012526	013703	015630			MOV	LINANS, R3		
2983	012532	020504				CMP	RS, R4		;COMPARE
2984	012534	001402				BEQ	CKTRN1		
2985	012536	004777	000124			JSR	PC, @ERR1		
2986	012542	013777	015626	002766	CKTRN1:	MOV	LINORG, @DHMCSR		;SET LINE COUNTER TO ORIGINATE LINE
2987	012550	017704	002764			MOV	@DHMLSR, R4		;GET ACTUAL ORIGINATE LINE STATUS
2988	012554	013705	012700			MOV	DATA2, R5		
2989	012560	013703	015626			MOV	LINORG, R3		
2990	012564	020504				CMP	RS, R4		;COMPARE
2991	012566	001402				BEQ	CKTRN2		
2992	012570	004777	000074			JSR	PC, @ERR2		

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2993
2994
2995
2996
2997 012574 105737 012703 CKTRN2: TSTB DATA3+1
2998 012600 100003 BPL .+10
2999 012602 042737 000010 015632 BIC #10,ANSFLG
3000 012610 113704 015632 MOV8 ANSFLG,R4 ;GET TRANSITION DATA FOR
3001 012614 113705 012702 MOV8 DATA3,R5
3002 012620 013703 015630 MOV LINANS,R3
3003 012624 020504 CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
3004 012626 001402 BEQ CKTRN3
3005 012630 004777 000036 JSR PC,@ERR3
3006 012634 013704 015634 CKTRN3: MOV ORGFLG,R4 ;GET TRANSITION DATA FOR
3007 012640 013705 012704 MOV DATA4,R5
3008 012644 013703 015626 MOV LINORG,R3
3009 012650 020504 CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
3010 012652 001402 BEQ CKTRN4
3011 012654 004777 000014 JSR PC,@ERR4
3012 012660 022626 CKTRN4: POP2SP
3013 012662 000177 000020 JMP @NXTTS
3014 012666 000000 ERR1: 0
3015 012670 000000 ERR2: 0
3016 012672 000000 ERR3: 0
3017 012674 000000 ERR4: 0
3018 012676 000000 DATA1: 0
3019 012700 000000 DATA2: 0
3020 012702 000000 DATA3: 0
3021 012704 000000 DATA4: 0
3022 012706 000000 NXTTS: 0
  
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K06

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3023
3024
3025      ;END OF PASS
3026      ;UPDATE PASS COUNT
3027      ;TYPE END OF PASS MESSAGE
3028
3028 012710      EOP:      INC      PASCNT      ;UPDATE PASS COUNT
3029 012710 005237 015562      MOV      #1,TSTNO      ;START AT FIRST TEST OF GROUP
3030 012714 012737 000001 015564      RESET     ;CLEAR THE WORLD
3031 012722 000005      CLR      FILLA      ;INIT COUNTER
3032 012724 005037 015654      DEC      FILLA      ;COUNT THE CTR
3033 012730 005337 015654      BNE      IS          ;BR TIL STALL TIMES OUT
3034 012734 001375      TYPE     ; RING BELL
3035 012736 104004      MEPASS
3036 012740 017215      MOV      42,R1      ;ARE YOU ON ACT11?
3037 012742 013701 000042      BEQ      TSTENT      ;NO
3038 012746 001521      RESET
3039 012750 000005      LOGICAL: JSR      PC,(R1)
3040 012752 004711      NOP
3041 012754 000240      NOP
3042 012756 000240      NOP
3043 012760 000240      NOP
3044 012762 000240      NOP
3045 012764 000137 013212      JMP      TSTENT      ;GET ADDRESS OF FIRST TEST
3046
3047      ;EMT DISPATCH SERVICE
3048      ;ARGUMENT OF EMT IS EXTRACTED
3049      ;AND USED AS OFFSET TO OBTAIN POINTER
3050      ;TO SELECTED SUBROUTINE
3051
3052 012770 011646      EMTSRV: MOV      (SP),-(SP)      ;GET PC OF RETURN
3053 012772 162716 000002      SUB      #2,(SP)      ;=PC OF EMT
3054 012776 017616 000000      MOV      @2(SP),(SP)   ;GET EMT
3055 013002 006316      EMTOK: ASL      (SP)      ;MULTIPLY EMT ARG BY 2
3056 013004 042716 177001      BIC      #177001,(SP)  ;CLEAR UNWANTED BITS
3057 013010 062716 017352      ADD      #EMTTAB,(SP)  ;POINTER TO SUBROUTINE ADDRESS
3058 013014 017616 000000      MOV      @2(SP),(SP)  ;SUBROUTINE ADDRESS
3059 013020 000136      JMP      @2(SP)+      ;GO TO SUBROUTINE
3060
3061 013022 105777 002514      CKINT: TSTB   @TKCSR
3062 013026 100001      BPL      IS
3063 013030 104027      KBDIN
3064 013032 000002      IS:      RTI
3065

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3066
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3072
3073
3074 013034 005737 001252      LOOP:  TST      XFLAG      ;IS THERE AN XOR TESTER OUT THERE ?
3075 013040 100022                BPL      4S          ;NO
3076 013042 013746 000004                MOV      4, -(SP)   ;SAVE 4
3077 013046 012737 013066 000004                MOV      #1S, 4    ;SET UP SVC ROUTINE
3078 013054 005737 177060                TST      177060    ;GOT SOMETHING LIKE SLAVE SYNC
3079 013060 012637 000004                MOV      (SP)+, 4  ;YOU BETCHUM
3080 013064 000404                BR       2S
3081 013066 022626                1S:     POP2SP      ;RESTORE STACK
3082 013070 012637 000004                MOV      (SP)+, 4  ;RESTORE 4
3083 013074 000402                BR       3S
3084 013076 000137 013206                2S:     JMP      LOOPX    ;GO TO NEXT TEST
3085 013102 000137 013212                3S:     JMP      TSTENT   ;GO
3086 013106
3087 013106 005037 177776                4S:
3088 013112 052777 000100 002422                CLR      PSM
3089 013120 005737 015562                BIS      #INTENA, @TKCSR
3090 013124 001430                TST      PASCNT
3091 013126 005737 015556                5S:     BEQ      LOOPX    ;1ST PASS
3092 013132 001404                TST      ERRFLG    ;NO ITERATIONS
3093 013134 032777 002000 002410                BEQ      LOOPS     ;IF ERROR OCCURED FLAG=1,
3094 013142 001021                BIT      #SW10, @SWR ;CHECK FOR ESCAPE TO NEXT TEST
3095 013144 032777 040000 002400  LOOPS:  BNE      LOOPX    ;IF SW10=1,
3096 013152 001041                BIT      #SW14, @SWR ;ESCAPE TO NEXT TEST
3097 013154 032777 004000 002370  LOOPX:  BNE      LOOPL    ;IF SW14=1,
3098 013162 001011                BIT      #SW11, @SWR ;LOOP ON CURRENT TEST
3099 013164 005337 015570                BNE      LOOPX    ;IF SW11=1,
3100 013170 001406                DEC      ICOUNT    ;INHIBIT ITERATIONS
3101 013172 013716 015566                BEQ      LOOPX    ;UPDATE ITERATION COUNT
3102 013176 042777 000100 002336  LOOPER: MOV      RETURN, (SP) ;IF ICOUNT=0, GO TO NEXT TEST
3103 013204 000002                BIC      #INTENA, @TKCSR ;SET UP FOR RETURN TO CURRENT TEST
3104 013206 005237 015564                RTI
3105 013212 013705 015564                LOOPX: INC      TSTNO ;RETURN TO CURRENT TEST
3106 013216 006305                TSTENT: MOV     TSTNO, R5 ;UPDATE TEST NUMBER
3107 013220 006305                ASL      R5        ;GET TEST NUMBER
3108 013222 063705 015616                ASL      R5        ;MULTIPLY TEST NUMBER BY 4
3109 013226 011537 015566                ADD      TSTPNT, R5 ;GET POINTER FOR TEST ENTRY
3110 013232 001626                MOV      (R5), RETURN ;GET STARTING ADDRESS OF NEXT TEST
3111 013234 012516                BEQ      EOP       ;IF ADDRESS=0, GO TO END OF PASS
3112 013236 011537 015570                MOV      (R5)+, (SP) ;PUT STARTING ADDRESS ON STACK
3113 013242 005037 015556                MOV      (R5), ICOUNT ;GET ITERATION COUNT FOR TEST
3114 013246 042777 000100 002266                CLR      ERRFLG    ;CLEAR ERROR OCCURED FLAG
3115 013254 000002                BIC      #INTENA, @TKCSR
3116 013256 012737 000001 015570  LOOPL: MOV      #1, ICOUNT ;GO TO TEST
3117 013264 000742                BR       LOOPER    ;SET UP TO EXIT TEST AFTER LOOP
3118
3119
3120
3121
    ;CHECK FOR LOOPING WITH SAME DATA
    ;CHECK FOR ESCAPE TO NEXT TEST ON ERROR
    
```



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3141
3142 ;GENERAL ERROR SERVICE
3143 ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
3144
3145 013350 005037 015556 ERR: CLR ERRFLG ;ALWAYS TYPE PC+2
3146 ;OF TEST THAT FAILED
3147 013354 005037 013570 CLR ERRMSG ;NO MESSAGE
3148 013360 005037 013602 CLR ERTAB ;NO TABLE OF DATA
3149 013364 000451 BR ERRGEN ;OUTPUT ERROR MESSAGE
3150
3151 ;TRANSITION DETECTION ERROR SERVICE
3152
3153 ;FORMAT FOR ERROR TYPEOUT IS
3154
3155 ;XXXXXX TRANSITION ERROR
3156 ;EXP REC LINE
3157 ;AA BB CC
3158
3159 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3160 ; AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGISTER
3161 ; BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
3162 ; CC=LINE ON WHICH ERROR OCCURED
3163 013366 005037 015556 ERRRT: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3164 013372 012737 016056 013570 MOV #MTRANE,ERRMSG ;TYPE "TRANSITION ERROR"
3165 013400 012737 013674 013602 MOV #ERTAB1,ERTAB ;TABLE OF DATA
3166 013406 000440 BR ERRGEN ;OUTPUT ERROR MESSAGE
3167
3168 ;ON-LINE STATUS ERROR SERVICE
3169
3170 ;FORMAT FOR LINE STATUS ERROR IS
3171
3172 ;XXXX LINE ERROR
3173 ;EXP REC LINE
3174 ;AAA BBB CC
3175
3176 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3177 ; AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3178 ; BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3179 ; CC=LINE ON WHICH ERROR OCCURED
3180
3181
3182 013410 005037 015556 ERRS: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3183 013414 012737 016025 013570 MOV #MLINE1,ERRMSG ;TYPE "LINE ERROR"
3184 ;EXP REC LINE"
3185 013422 012737 013712 013602 MOV #ERTAB2,ERTAB ;TABLE OF DATA
3186 013430 000427 BR ERRGEN ;OUTPUT ERROR MESSAGE
    
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3187
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3198
3199 013432 005037 015556 013570 ERRN: CLR ERRFLG ; ALWAYS OUTPUT ALL DATA
3200 013436 012737 017006 013570 MOV #MFATAL,ERRMSG ; TYPE "FATAL ERROR"
3201 ; CSTAT LSTAT ;
3202 013444 012737 013730 013602 MOV #ERTAB3,ERTAB ; CSTAT LSTAT"
3203 013452 000416 BR ERGEN ; TABLE OF DATA
3204 ; OUTPUT ERROR MESSAGE
3205 ; "CONTROL STATUS" ERROR SERVICE
3206 ; FORMAT FOR CONTROL STATUS ERROR IS
3207
3208 ; XXXXXX STATUS ERROR
3209 ; EXP REC
3210 ; AAAAAA BBBBBB
3211
3212 ; WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3213 ; AAAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
3214 ; BBBBBB=RECEIVED(ACTUAL) CONTROL STATUS AT TIME OF ERROR
3215
3216
3217 013454 012737 015737 013570 ERRCS: MOV #MSTATE,ERRMSG ; TYPE "STATUS ERROR"
3218 ; "EXP REC"
3219 013462 012737 013742 013602 MOV #ERTAB4,ERTAB ; TABLE OF DATA
3220 013470 000407 BR ERGEN ; OUTPUT DATA
3221
3222 ; LINE STATUS ERROR SERVICE
3223
3224 ; FORMAT FOR LINE STATUS ERROR IS
3225
3226 ; XXXX LINE ERROR
3227 ; EXP REC LINE SEL
3228 ; AAA DDD CC DO
3229
3230 ; WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3231 ; AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3232 ; BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3233 ; CC=LINE ON WHICH ERROR OCCURED
3234 ; DO=THE LINE ON WHICH THE PROGRAM WAS OPERATING
3235
3236
3237 013472 012737 015770 013570 ERRLS: MOV #MLINER,ERRMSG
3238 013500 012737 013754 013602 MOV #ERTAB5,ERTAB
3239 013506 000400 BR ERGEN
    
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3240
3241
3242
3243
3244
3245
3246 013510 005037 177776
3247 013514 012777 000100 002020
3248 013522 032777 020000 002022
3249 013530 001026
3250 013532 021637 015610
3251 013536 001402
3252 013540 005037 015556
3253 013544 104005
3254 013546 005737 015556
3255 013552 001007
3256 013554 104006
3257 013556 013666
3258 013560 005737 013570
3259 013564 001407
3260 013566 104004
3261 013570 000000
3262 013572 005737 013600
3263 013576 001402
3264 013600 104006
3265 013602 000000
3266 013604 104007
3267
3268
3269
3270 013606 032777 100000 001736
3271 013614 001406
3272 013616 000000
3273 013620 022737 000176 015552
3274 013626 001001
3275 013630 104025
3276 013632 012737 000001 015556
3277 013640 042777 000100 001674
3278 013646 000002
3279
3280
3281 013650 012737 015660 013570
3282 013656 012737 014004 013602
3283 013664 000711
3284
3285

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

ERRGEN: CLR PSW
MOV #INTENA, @TKCSR
BIT #SW13, @SWR ; IF SW13=1, DO NOT
BNE .3 ; TYPE ERROR MESSAGE
CMP (SP), SAVPC ; SAME ERROR AGAIN
BEQ .+6
CLR ERRFLG
SAVOSP
TST ERRFLG ; IF ERROR OCCURED FLAG=1,
BNE .1 ; TYPE DATA ONLY
OCTASC ; TYPE PC+2 OF CALL TO ERROR ROUTINE
ERTAB0
TST ERRMSG
BEQ .2
TYPE ; TYPE ERROR MESSAGE

ERRMSG: 0
.1: TST ERTAB
BEQ .2
OCTASC ; TYPE DATA
ERTAB: 0
.2: RES05 ; RESTORE R0-R5

; ERROR HALT SERVICE
.3: BIT #SW15, @SWR ; IF SW15=0, DO NOT
BEQ .4 ; HALT ON ERROR
HALT ; HALT AND DISPLAY ADDRESS OF FAILING TEST
CMP #JWREG, SWR
BNE .4
CNTLUU
MOV #1, ERRFLG ; SET ERROR OCCURED FLAG
BIC #INTENA, @TKCSR ; RETURN TO TEST
RTI

; TIMEOUT ERROR WAITING FOR INTERRUPT ON TEST 33
ERRQ: MOV #MNOINT, ERRMSG
MOV #ERTAB6, ERTAB ; TYPE LN#, CSR, LSR+MSG
BR ERRGEN ; OUTPUT DATA
  
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3286                                     ;TABLE S OF DATA FOR ERROR TYPEOUT
3287
3288                                     ;TABLE FOR TRANSITION STATUS ERROR
3289
3290 013666 000001  ERTAB0: 1
3291 013670 000006                                     6
3292 013672 015610                                     SAVPC
3293 013674 000003  ERTAB1: 3
3294 013676 000002                                     SAVRS
3295 013700 015604                                     ;CONTAINS EXPECTED TRANSITION STATUS
3296 013702 000002                                     SAVR5
3297 013704 015602                                     ;CONTAINS RECEIVED TRANSITION STATUS
3298 013706 000002                                     SAVR4
3299 013710 015600                                     ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3300 013712 000003  ERTAB2: 3
3301 013714 000003                                     SAVR3
3302 013716 015604                                     ;CONTAINS EXPECTED LINE STATUS
3303 013720 000003                                     SAVRS
3304 013722 015602                                     ;CONTAINS RECEIVED LINE STATUS
3305 013724 000002                                     SAVR4
3306 013726 015600                                     ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3307 013730 000002  ERTAB3: 2
3308 013732 000006                                     6
3309 013734 015602                                     SAVR4
3310 013736 000003                                     SAVR3
3311 013740 015600  ERTAB4: 2
3312 013742 000002                                     2
3313 013744 000006                                     6
3314 013746 015604                                     ;CONTAINS EXPECTED CONTROL STATUS
3315 013750 000006                                     SAVRS
3316 013752 015602                                     ;CONTAINS RECEIVED CONTROL STATUS
3317 013754 000004  ERTAB5: 4
3318 013756 000003                                     4
3319 013760 015604                                     SAVR4
3320 013762 000003                                     ;CONTAINS EXPECTED LINE STATUS
3321 013764 015602                                     SAVR5
3322 013766 000002                                     ;CONTAINS RECEIVED LINE STATUS
3323 013770 015600                                     ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3324 013772 000002                                     SAVR3
3325 013774 015574                                     ;CONTAINS NUMBER OF LINE UNDER TEST
3326                                     SAVR1
3327
3328 013776 000001  SWRTB: 1
3329 014000 000006                                     6
3330 014002 000176                                     SWREG
3331
3332 014004 000003  ERTAB6: 3
3333 014006 000003                                     3
3334 014010 015602                                     SAVR4
3335 014012 000006                                     ;FAILING LINE #
3336 014014 015576                                     6
3337 014016 000006                                     SAVR2
3338 014020 015600                                     ;CSR OF DEVICE
3339                                     6
                                     SAVR3
                                     ;LSR OF DEVICE

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E07

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3340
3341 ;CONVERT OCTAL TO ASCII AND
3342 ;OUTPUT ON TELETYPE
3343
3344 014022 017605 000000 OCTASN: MOV @ (SP), R5 ;GET POINTER TO TABLE OF DATA
3345 014026 062716 000002 ADD #2, (SP)
3346 014032 012737 000010 014362 MOV #10, RADIX
3347 014040 012704 017235 MOV @MBCD+2, R4 ;SET UP POINTER FOR CONVERTED DATA
3348 014044 012537 015612 MOV (R5)+, WRDCNT ;GET NUMBER OF WORDS TO BE CONVERTED
3349 014050 012537 015614 OCTAS1: MOV (R5)+, CHRCNT ;GET NUMBER OF DIGITS IN WORD
3350 014054 013537 014356 MOV @ (R5)+, BINWRD ;GET DATA TO BE CONVERTED
3351 014060 104010 CONVERT ;CONVERT TO ASCII
3352 014062 005337 015612 DEC WRDCNT ;IF ALL DATA IS NOT CONVERTED
3353 014066 001370 BNE OCTAS1 ;CONTINUE
3354 014070 112714 000100 MOV#B #100, (R4) ;PUT TERMINATOR AT END OF MESSAGE
3355 014074 005737 014212 TST SMLN
3356 014100 001002 BNE IS
3357 014102 104004 TYPE ;OUTPUT CONVERTED DATA
3358 014104 017233 MBCD ;TO TELETYPE
3359 014106 000002 IS: RTI ;RETURN TO CALLING ROUTINE
3360
3361
3362
3363 014110 005037 014206 CNTLU: CLR TMP1
3364 014114 012737 000001 014210 MOV #1, TMP2
3365 014122 104004 TYPE
3366 014124 017172 $$SWREQ
3367 014126 052737 000001 014212 BIS #1, SMLN
3368 014134 104006 OCTASC
3369 014136 013776 SWRTB
3370 014140 104004 TYPE
3371 014142 017235 MBCD+2
3372 014144 104013 INSTRG
3373 014146 017203 $NEWS
3374 014150 000000 0
3375 014152 177777 177777
3376 014154 014206 TMP1
3377 014156 123727 015106 000015 CMPB INBUF, #15
3378 014164 001403 IS
3379 014166 013777 014206 001356 MOV TMP1, @SWR
3380 014174 005037 014210 IS: CLR TMP2
3381 014200 005037 014212 CLR SMLN
3382 014204 000002 RTI
3383 014206 000000 TMP1: 0
3384 014210 000000 TMP2: 0
3385 014212 000000 SMLN: 0
3386
3387

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3388
3389 ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE
3390
3391 014214 013700 015614 BINASC: MOV CHRCNT,RO ;SET UP COUNT FOR DIGITS TO BE CONVERTED
3392 014220 012701 017336 MOV #TENTAB,R1 ;SET UP POINTER FOR TEMPORARY STORAGE
3393 014224 104011 BINASA: EXTRACT ;EXTRACT ONE DIGIT
3394 014226 062737 000060 014360 ADD #60,DIGIT ;CONVERT FROM BCD TO ASCII
3395 014234 113721 014360 MOVB DIGIT,(R1)+ ;STORE DIGIT
3396 014240 005300 DEC RO ;IF ALL DIGITS NOT DONE,
3397 014242 001370 BNE BINASA ;CONTINUE
3398 014244 114124 BINASB: MOVB -(R1),(R4)+ ;REVERSE ORDER OF DIGITS
3399 014246 005337 015614 DEC CHRCNT ;IF ALL CHARACTERS ARE NOT
3400 014252 001374 BNE BINASB ;IN ORDER, CONTINUE
3401 014254 112724 000040 MOVB #40,(R4)+ ;INSERT SPACE AFTER LAST DIGIT
3402 014260 000002 RTI ;RETURN TO CALLING ROUTINE
3403
3404 ;SINGLE PRECISION UNSIGNED DIVIDE LOOP
3405
3406 014262 005037 014360 DIVI: CLR DIVIDH
3407 014266 023737 014360 014362 DIVIU: CMP DIVIDH,DIVIS
3408 014274 103027 BHIS DIVIB
3409 014276 012737 000021 014336 MOV #17.,DIVCNT
3410 014304 000407 BR DIVIC
3411 014306 023737 014360 014362 DIVIA: CMP DIVIDH,DIVIS
3412 014314 103403 BLO DIVIC
3413 014316 163737 014362 014360 SUB DIVIS,DIVIDH
3414 014324 006137 014356 DIVIC: ROL DIVIDL
3415 014330 006137 014360 ROL DIVIDH
3416 014334 005327 DEC (PC)+
3417 014336 000000 DIVCNT: 0
3418 014340 001362 BNE DIVIA
3419 014342 006037 014360 ROR DIVIDH
3420 014346 005137 014356 COM DIVIDL
3421 014352 000002 RTI
3422 014354 000000 DIVIB: HALT
3423 014356 000000 DIVIDL: 0
3424 014360 000000 DIVIDH: 0
3425 014362 000000 DIVIS: 0
3426
3427 ;SAVE PC OF TEST THAT FAILED AND RO-R5
3428
3429 014364 016637 000004 015610 SVOSP: MOV 4(SP),SAVPC
3430
3431 ;SAVE RO-R5
3432
3433 014372 010537 015604 SVOS: MOV R5,SAVR5
3434 014376 010437 015602 MOV R4,SAVR4
3435 014402 010337 015600 MOV R3,SAVR3
3436 014406 010237 015576 MOV R2,SAVR2
3437 014412 010137 015574 MOV R1,SAVR1
3438 014416 010037 015572 MOV R0,SAVR0
3439 014422 000002 RTI

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3440
3441                                ;RESTORE R0-R5
3442
3443 014424 013700 015572          RS05:  MOV     SAVR0,R0
3444 014430 013701 015574          MOV     SAVR1,R1
3445 014434 013702 015576          MOV     SAVR2,R2
3446 014440 013703 015600          MOV     SAVR3,R3
3447 014444 013704 015602          MOV     SAVR4,R4
3448 014450 013705 015604          MOV     SAVR5,R5
3449 014454 000002          RTI
3450
3451                                ;TELETYPE OUTPUT ROUTINE
3452
3453 014456 017605 000000          TYP0R:  MOV     @2(SP),R5          ;GET POINTER TO MESSAGE (ON STACK)
3454 014462 062716 000002          ADD     @2(SP)                  ;CORRECT STACK FOR RETURN
3455 014466 105777 001054          TYP0RA: TSTB   @TPCSR             ;WAIT FOR TELEPRINTER READY
3456 014472 100375                    BPL     TYP0RA
3457 014474 122765 000012 177777    CMPB   @12,-1(R5)              ;WAS LAST ONE A L.F. ??
3458 014502 001405                    BEQ     1$                      ;BR IF YES
3459 014504 122765 000015 177777    CMPB   @15,-1(R5)              ;WAS LAST ONE A C.R. ??
3460 014512 001401                    BEQ     1$                      ;BR IF YES
3461 014514 000402                    BR      2$                      ;CONTINUE IF NEITHER
3462 014516 004737 014566          1$:    JSR     PC,TYFILL           ;GO OUT PUT FILLERS
3463 014522 122715 000100          2$:    CMPB   @100,(R5)          ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
3464 014526 001001                    BNE     TYP0R1
3465 014530 000002                    RTI                               ;CHARACTER IS TERMINATOR, EXIT
3466 014532 122715 000042          TYP0R1: CMPB   @42,(R5)          ;IF CHARACTER=42,
3467 014536 001406                    BEQ     TYPECL                  ;TYPE LINE FEED
3468 014540 122715 000045          CMPB   @45,(R5)                ;IF CHARACTER=45,
3469 014544 001403                    BEQ     TYPECL                  ;TYPE CARRIAGE RETURN
3470 014546 112577 000776          TYP0R2: MOVB  (R5)+,@TPD0R       ;GET CHARACTER
3471 014552 000745                    BR      TYP0RA                  ;TYPE IT
3472 014554 142715 000040          TYPECL: BICB   @40,(R5)          ;CONVERT CODE OF 42 OR 45
3473 014560 152715 000010          BISB   @10,(R5)                ;TO 12 OR 15
3474 014564 000770                    BR      TYP0R2                  ;TYPE IT
3475
3476
3477                                ;OUTPUT FILLERS AFTER <CR> OR <LF> CHAR IS OUT PUTTED.
3478
3479 014566 113737 015652 015654    TYFILL: MOVB  FILL,FILLA          ;GET FILL COUNT
3480 014574 113777 015653 000746    1$:    MOVB  FILL+1,@TPD0R        ;OUT PUT ONE FILLER
3481 014602 105777 000740          2$:    TSTB   @TPCSR             ;WAIT FOR TTY TO FINISH OUTPUT
3482 014606 100375                    BPL     2$                      ;BR IF TTY NOT DONE
3483 014610 105337 015654          DECB   FILLA                    ;COUNT ONE FILLER
3484 014614 001367                    BNE     1$                      ;BR TIL ALL DONE
3485 014616 000207                    RTS     PC                      ;RETURN TO CALLER ABOVE
3486
3487                                ;INPUT OCTAL CHARACTER STRING
3488                                ;TERMINATOR IS CARRIAGE RETURN
3489                                ;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
3490                                ;CARRIAGE RETURN ARE TYPED, THE IN PUT WILL
3491                                ;BE RE-REQUESTED
3492
3493 014620                                INSTR:
3494 014620 011605                                MOV     (SP),R5                  ;GET POINTER TO ARGUMENTS
3495 014622 012537 014646                                MOV     (R5)+,MSG              ;GET MESSAGE TO BE TYPED

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3496	014626	012537	015100		MOV	(R5)+,LOLIM	;GET LOWER LIMIT
3497	014632	012537	015102		MOV	(R5)+,HILIM	;GET UPPER LIMIT
3498	014636	012537	015104		MOV	(R5)+,STORE	;GET DATA STORAGE LOCATION
3499	014642	010516			MOV	RS,(SP)	;RESTORE STACK
3500	014644	104004			INSTR1: TYPE		;TYPE MESSAGE
3501	014646	000000			MSG: 0		
3502	014650	012704	015106		MOV	#INBUF,R4	;SET UP CHARACTER INPUT BUFFER
3503	014654	012703	000007		MOV	#7,R3	;SET UP INPUT COUNT
3504	014660	105777	000656		INSTRB: TSTB	@TKCSR	;WAIT FOR CHARACTER
3505	014664	100375			BPL	INSTRB	
3506	014666	005037	002206		INSTRB: CLR	SINTFL	
3507	014672	017737	000646	014206	MOV	@TKDBR,TMP1	
3508	014700	142737	000200	014206	BICB	#200,TMP1	
3509	014706	113714	014206		MOVB	TMP1,(R4)	
3510	014712	121427	000007		CMPB	(R4),#7	
3511	014716	001420			BEQ	INSTR	
3512	014720	121427	000015		CMPB	(R4),#15	;IS CHARACTER TERMINATOR
3513	014724	001420			BEQ	INSTR2	;IF IT IS, CONVERT INPUT STRING
3514	014726	121427	000025		CMPB	(R4),#25	
3515	014732	001003			BNE	IS	
3516	014734	005037	014206		CLR	TMP1	
3517	014740	000741			BR	INSTR1	
3518	014742	112477	000602		IS: MOVB	(R4)+,@TPDBR	
3519	014746	105777	000574		INSTRC: TSTB	@TPCSR	;WAIT TO FINISH TYPING
3520	014752	100375			BPL	INSTRC	
3521	014754	005303			DEC	R3	;UPDATE RECEIVED COUNT
3522	014756	001340			BNE	INSTRB	;AND CONTINUE
3523	014760	104004			INSTR: TYPE		;TYPE "?" AND RE-REQUEST INPUT
3524	014762	016725			MQM		
3525	014764	000727			BR	INSTR1	
3526							
3527							
3528							
3529	014766	104004			INSTR2: TYPE		;CONVERT ASCII STRING TO OCTAL
3530	014770	016731			MCRLF		
3531	014772	012704	015106		MOV	#INBUF,R4	;GET POINTER TO ASCII STRING
3532	014776	005003			CLR	R3	
3533	015000	122714	000015		CMPB	#15,(R4)	;IS TERMINATOR FIRST
3534							;CHARACTER IN STRING
3535	015004	001431			INSTRD: BEQ	CHCK	
3536	015006	121427	000060		CMPB	(R4),#60	;IS CHARACTER OCTAL DIGIT
3537	015012	002762			BLT	INSTR	;IF 67>=CHAR>=60
3538	015014	121427	000067		CMPB	(R4),#67	;CHARACTER IS OCTAL DIGIT
3539	015020	003357			BGT	INSTR	
3540	015022	142714	000060		BICB	#60,(R4)	;STRIP ASCII
3541	015026	152403			BISB	(R4)+,R3	;GENERATE OCTAL NUMBER
3542	015030	121427	000015		CMPB	(R4),#15	;IF END OF STRING, CHECK LIMITS
3543	015034	001404			BEQ	INSTR3	
3544	015036	006303			ASL	R3	;MULTIPLY DIGIT BY 10 (OCTAL
3545	015040	006303			ASL	R3	
3546	015042	006303			ASL	R3	
3547	015044	000760			BR	INSTRD	;GET NEXT DIGIT
3548							
3549							
3550							
3551	015046	020337	015102		INSTR3: CMP	R3,HILIM	;TEST HI LIMIT

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3552 015052 101342          BHI     INSTER          ; IF R3>HILIM, ERROR
3553 015054 020337 015100    CMP     R3,LOLIM        ; TEST LOW LIMIT
3554 015060 103737          BLO     INSTER          ; IF R3<LOLIM, ERROR
3555 015062 010377 000016    MOV     R3,#STORE      ; STORE NUMBER
3556 015066 000002          RTI                    ; EXIT
3557 015070 005737 014210    CHCK:  TST     TMP2
3558 015074 001731          BEQ     INSTER
3559 015076 000002          RTI
3560 015100 000000          LOLIM: 0
3561 015102 000000          HILIM: 0
3562 015104 000000          STORE: 0
3563 015106 000000          INBUF: 0
3564          015130          .=.+20
3565          ;ENTER HERE ON POWER FAILURE
3566
3567
3568 015130 010046          PFAIL: MOV     R0,-(SP)      ;SAVE R0-R5 ON PROCESSOR STACK
3569 015132 010146          MOV     R1,-(SP)
3570 015134 010246          MOV     R2,-(SP)
3571 015136 010346          MOV     R3,-(SP)
3572 015140 010446          MOV     R4,-(SP)
3573 015142 010546          MOV     R5,-(SP)
3574 015144 013746 000024    MOV     24,-(SP)
3575 015150 010637 015606    MOV     SP,SAVSP        ;SAVE STACK POINTER
3576 015154 012737 015166 000024    MOV     #RESTART,24    ;SET UP FOR POWER UP TRAP
3577 015162 000000          HALT
3578 015164 000776          BR     .-2             ;HALT ON POWER DOWN NORMAL
3579
3580          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
3581
3582 015166 013706 015606          RESTAR: MOV     SAVSP,SP    ;RESTORE STACK POINTER
3583 015172 012605          MOV     (SP)+,R5        ;RESTORE R0-R5
3584 015174 012604          MOV     (SP)+,R4
3585 015176 012603          MOV     (SP)+,R3
3586 015200 012602          MOV     (SP)+,R2
3587 015202 012601          MOV     (SP)+,R1
3588 015204 012600          MOV     (SP)+,R0
3589 015206 012737 015130 000024    MOV     #PFAIL,24      ;SET UP FOR POWER FAILURE
3590 015214 005726          POP1SP
3591 015216 104004          TYPE
3592 015220 017104          MPFAIL
3593 015222 005737 001756          TST     TIPFLG
3594 015226 001002          BNE     RESTA1
3595 015230 000137 001262          JMP     START0
3596 015234 104004          RESTA1: TYPE
3597 015236 017124          MPFI
3598 015240 012746 000340          MOV     #340,-(SP)
3599 015244 005746          PUSH1SP
3600 015246 000137 013212          JMP     TSTENT
3601
3602
3603          ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
3604 015252 013746 000020          XOR:   MOV     20,-(SP)  ;SAVE 20
3605 015256 013746 000022          MOV     22,-(SP)  ;SAVE 22
3606 015262 012737 015454 000020          MOV     #25,20     ;IOT INTR VECTOR
3607 015270 012737 000340 000022          MOV     #340,22    ;IOT INTR LVL
    
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3608	015276	012737	000300	012676		MOV	#300, DATA1	
3609	015304	012737	000302	012700		MOV	#302, DATA2	
3610	015312	013777	012700	175356	1S:	MOV	DATA2, @DATA1	
3611	015320	012777	000004	175352		MOV	#IOT, @DATA2	; IOT TRAP
3612	015326	062737	000004	012676		ADD	#4, DATA1	
3613	015334	062737	000004	012700		ADD	#4, DATA2	
3614	015342	023727	012676	001000		CMP	DATA1, #1000	
3615	015350	001360				BNE	1S	
3616	015352	012737	000000	015564		MOV	#0, TSTNO	; SET UP DEFAULT
3617	015360	012737	017466	015616		MOV	#TSTNO, TSTPNT	
3618	015366	052737	000340	177776		BIS	#340, PS	; PREVENT INTERRUPTS
3619	015374	005077	000136			CLR	@DHMCSR	
3620	015400	012777	000100	000130		MOV	#INTENA, @DHMCSR	; SET INTERRUPT ENABLE
3621	015406	042737	000340	177776		BIC	#340, PS ; ALLOW INTERRUPTS	
3622	015414	052777	000200	000114		BIS	#DONE, @DHMCSR	; SET DONE..AND INTERRUPT
3623	015422	000240				NOP		
3624	015424	012637	000022			MOV	(SP)+, 22	; YOU DIDN'T INTERRUPT ?
3625	015430	012637	000020			MOV	(SP)+, 20	; RESTORE 20 & 22
3626	015434	005077	000076			CLR	@DHMCSR	; STOP ALL INTERRUPT
3627	015440	052737	000340	177776		BIS	#340, PS	
3628	015446	104012				ERROR		
3629	015450	000000				HALT		; YOU SHOULD HAVE INTERRUPTED
3630	015452	000426				BR	3S	
3631	015454	011637	015532		2S:	MOV	(SP), DHMVEC	; EXTRACT VECTOR +4
3632	015460	162737	000002	015532		SUB	#2, DHMVEC	; CREATE LVL
3633	015466	013737	015532	015534		MOV	DHMVEC, DHMLVL	; SAVE
3634	015474	162737	000002	015532		SUB	#2, DHMVEC	; CREATE AND SAVE VEC
3635	015502	012737	000340	177776		MOV	#340, PS	; PREVENT INTERRUPTS
3636	015510	005077	000022			CLR	@DHMCSR	
3637	015514	022626				POP2SP		
3638	015516	022626				POP2SP		
3639	015520	012637	000022			MOV	(SP)+, 22	; RESTORE 22
3640	015524	012637	000020			MOV	(SP)+, 20	; RESTORE 20
3641	015530	000207			3S:	RTS	PC	
3642								



K07

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3643
3644 ;INDIRECT POINTERS
3645
3646 015532 000300 DHMVEC: 300 ;MODEM CONTROL INTERRUPT VECTOR
3647 015534 000302 DHMLVL: 302 ;MODEM CONTROL ONTERRUPT PRIORITY
3648 015536 170500 DHMCSR: 170500 ;MODEM CONTROL CONTROL STATUS REGISTER
3649 015540 170502 DHMLSR: 170502 ;MODEM CONTROL CONTROL STATUS REGISTER
3650 015542 177560 TKCSR: 177560
3651 015544 177562 TKDBR: 177562
3652 015546 177564 TPCSR: 177564
3653 015550 177566 TPDBR: 177566
3654 015552 177570 SWR: 177570
3655 015554 177570 DISPLAY: 177570
3656
3657 ;PROGRAM VARIABLES
3658
3659 015556 000000 ERRFLG: 0
3660 015560 000000 TRACON: 0
3661 015562 000000 PRSCNT: 0
3662 015564 000000 TSTNO: 0
3663 015566 000000 RETURN: 0
3664 015570 000000 ICOUNT: 0
3665 015572 000000 SAVRO: 0
3666 015574 000000 SAVR1: 0
3667 015576 000000 SAVR2: 0
3668 015600 000000 SAVR3: 0
3669 015602 000000 SAVR4: 0
3670 015604 000000 SAVR5: 0
3671 015606 000000 SAVSP: 0
3672 015610 000000 SAVPC: 0
3673 015612 000000 WRDCNT: 0
3674 015614 000000 CHRCNT: 0
3675 015616 017466 TSTPNT: TSTT80
3676 015620 000000 TSTMAX: 0
3677 015622 000000 LINFLG: 0
3678 015624 000000 LINE: 0
3679 015626 000000 LINORG: 0
3680 015630 000000 LINANS: 0
3681 015632 000000 ANSFLG: 0
3682 015634 000000 ORGFLG: 0
3683 015636 000000 TIME1: 0
3684 015640 000000 TIME2: 0
3685 015642 000000 TIFLG: 0
3686 015644 177777 LINSEL: 177777
3687 015646 000000 SELMSK: 0
3688 015650 000000 SLMSK: 0
3689 015652 000002 FILL: 2 ;FILL CHAR/COUNT
3690 015654 000000 FILLA: 0 ;TEMP STORAGE FOR FILL COUNT
3691 015656 000000 RNGRET: 0
3692
3693 .NLIST BEX
015660 044524 042515 047440 MNOINT: .ASCII ;TIME OUT WAITING FOR INTERRUPT%;
015720 047114 020040 051503 ;LN CSR LSR;
015737 123 040524 052524 MSTATE: .ASCII ;STATUS ERROR%EXP REC;
015770 044514 042516 042440 MLINER: .ASCII ;LINE ERROR%EXP REC LINE SEL;
016025 114 047111 020105 MLINE1: .ASCII ;LINE ERROR%EXP REC LINE;

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016056	051124	047101	044523	MTRANE: .ASCII	: TRANSITION ERROR%EXP REC LINE@;
016115	045	022442	042042	DIALM: .ASCII	: %DIAL ANSWERING DATA SET%@;
016153	045	022442	030442	MT103T: .ASCII	: %103A MODEM CONNECT-DISCONNECT TEST%@;
016224	021045	021045	030062	MT202T: .ASCII	: %202C MODEM CONNECT-DISCONNECT TEST%@;
016275	045	022442	047442	MSELOR: .ASCII	: %ORIGINATE LINE-%;
016321	045	040442	051516	MSELAN: .ASCII	: %ANSWER LINE-%;
016340	021045	030061	040463	MT103A: .ASCII	: %103A TEST COMPLETE%@;
016367	045	031042	031060	MT202A: .ASCII	: %202C TEST COMPLETE%@;
016416	021045	052123	044522	MDISC: .ASCII	: %STRIKE ANY TTY KEY TO TEST DISCONNECT@;
016466	021045	021045	033061	M16: .ASCII	: %16 LINE SCANNER TEST%@;
016521	045	022442	042042	MTITLE: .ASCII	: %DZDHK-D -----MODEM CONTROL DIAGNOSTIC-----%@;
016605	045	053042	041505	MVECTO: .ASCII	: %VECTOR ADDRESS-%;
016627	045	041442	047117	MREGAD: .ASCII	: %CONTROL REGISTER ADDRESS-%;
016663	045	046042	047111	MLINSL: .ASCII	: %LINE SELECT PARAMETER -%;
016715	045	052042	051505	MTEST: .ASCII	: %TEST-%;
016725	040	037440	100	MGM: .ASCII	: %@;
016731	045	040042		MCLRF: .ASCII	: %@;
016734	021045	044523	043516	MLINE: .ASCII	: %SINGLE LINE CABLE TEST%@;
016767	045	046042	047111	MLINEI: .ASCII	: %LINE NUMBER-%;
017006	040506	040524	020114	MFATAL: .ASCII	: %FATAL ERROR%STAT LSTAT@;
017040	021045	051124	047101	MTRNDE: .ASCII	: %TRANSITION DETECTED%STAT LSTAT@;
017104	021045	047520	042527	MPFAIL: .ASCII	: %POWER FAILURE@;
017124	041455	051125	042522	MPF1: .ASCII	: %CURRENT TEST WILL RESTART%@;
017161	136	040103		MCONTC: .ASCII	: %C@;
017164	053136	100		MCONTV: .ASCII	: %V@;
017167	136	040114		MCONTL: .ASCII	: %L@;
017172	021045	053523	036522	SSWREQ: .ASCII	: %SWR= @;
017203	040	020040	042516	SNEWIS: .ASCII	: %NEW= @;
017215	045	042442	042116	MEPASS: .ASCII	: %END PASS @;
017233	045	042		MBCD: .ASCII	: %";
	017335			.=. +100	
	017336			.EVEN	
017336	000000			TEMPAB: 0	
	017350			.=. +10	
017350	000000			0	
					;EMT DISPATCH TABLE
017352	013454			EMTTAB: ERRCS	
017354	013472			ERRLS	
017356	013034			LOOP	
017360	013266			FREEZE	
017362	014456			TYPFR	
017364	014364			SVOSP	
017366	014022			OCTASN	
017370	014424			RSOS	
017372	014214			BINASC	
017374	014262			DIVI	
017376	013350			ERR	
017400	014620			INSTR	
017402	013366			ERRT	
017404	013410			ERRS	
017406	013432			ERRN	
017410	011752			GETLIN	
017412	012006			SETUPS	

M07

	017414	012242	CKRNG
	017416	012340	WAITR
	017420	012426	CKTRN
	017422	012376	WAITR
	017424	014110	CNTLU
	017426	013022	CKINT
	017430	001760	KBDINT
	017432	013650	ERRQ
	017434	000000	EMTLIM: 0
	017436	017466	TSTLST: TSTTB0
	017440	017650	TSTTB1
	017442	017712	TSTTB2
	017444	017720	TSTTB3
	017446	000000	0
	017450	000000	0
	017452	000000	0
	017454	000000	0
	017456	000033	GRO: NO-1
	017460	000007	N1-100-1
	017462	000001	N2-200-1
	017464	000000	N3-300-1
	017466	002210	TSTTB0: T0
	017470	000001	1
(2)	017472	002236	T1
(2)	017474	004000	TIMES
(2)	017476	002300	T2
(2)	017500	004000	TIMES
(2)	017502	002342	T3
(2)	017504	004000	TIMES
(2)	017506	002404	T4
(2)	017510	004000	TIMES
(2)	017512	002446	T5
(2)	017514	004000	TIMES
(2)	017516	002510	T6
(2)	017520	004000	TIMES
(2)	017522	002564	T7
(2)	017524	004000	TIMES
(2)	017526	002640	T10
(2)	017530	004000	TIMES
(2)	017532	002730	T11
(2)	017534	004000	TIMES
(2)	017536	003020	T12
(2)	017540	004000	TIMES
(2)	017542	003110	T13
(2)	017544	004000	TIMES
(2)	017546	003200	T14
(2)	017550	004000	TIMES
(2)	017552	003270	T15
(2)	017554	004000	TIMES
(2)	017556	003356	T16
(2)	017560	004000	TIMES
(2)	017562	003444	T17
(2)	017564	004000	TIMES
(2)	017566	003532	T20
(2)	017570	004000	TIMES
(2)	017572	003620	T21

:CALL BY EMT CNTLUU  
:CALL BY EMT CKINTT  
:CALLBY EMT KBDIN  
:CALLED BY EMT ERRINT

(2)	017574	004000	TIMES
(2)	017576	003714	T22
(2)	017600	000400	TIMES
(2)	017602	004030	T23
(2)	017604	000400	TIMES
(2)	017606	004220	T24
(2)	017610	000400	TIMES
(2)	017612	004372	T25
(2)	017614	000200	TIMES
(2)	017616	004534	T26
(2)	017620	000200	TIMES
(2)	017622	004774	T27
(2)	017624	000200	TIMES
(2)	017626	005230	T30
(2)	017630	000200	TIMES
(2)	017632	005464	T31
(2)	017634	000200	TIMES
(2)	017636	005720	T32
(2)	017640	000200	TIMES
(2)	017642	006104	T33
(2)	017644	000200	TIMES
	017646	000000	0
	017650	006414	TSTTB1: T100
	017652	000001	1
(2)	017654	006452	T101
(2)	017656	000200	TIMES
(2)	017660	006632	T102
(2)	017662	000200	TIMES
(2)	017664	007006	T103
(2)	017666	000200	TIMES
(2)	017670	007162	T104
(2)	017672	000200	TIMES
(2)	017674	007336	T105
(2)	017676	000200	TIMES
(2)	017700	007510	T106
(2)	017702	000200	TIMES
(2)	017704	007662	T107
(2)	017706	000200	TIMES
	017710	000000	0
	017712	010034	TSTTB2: T200
	017714	000001	1
	017716	000000	0
	017720	010410	TSTTB3: T300
	017722	000001	1
		000001	.END

ANSFLG	015632	2808*	2811*	2816*	2820*	2901*	2910	2933	2946*	2999*	3000	3681*		
ANSTR	011566	2775	2806*											
ANSTAR	011654	2824*												
ANSTR1	011602	2807	2809*											
ANSTR2	011616	2810	2812*											
ANSTR3	011632	2814	2817*											
ANSTR4	011646	2819	2821*											
BINASA	014224	3393*	3397											
BINASB	014244	3398*	3400											
BINASC	014214	3391*	3693											
BINARD=	014356	852*	3350*											
BUSY =	000020	857*	1209	1213	1503	1529	2879	3136						
CHCK	015070	3535	3557*											
CHRCNT	015614	3349*	3391	3399*	3674*									
CKINT	013022	3061*	3693											
CKINTT=	104026	920*	2281	2345	2384	2443	2484	2528	2569	2609	2653	2718	2752	
CKRING=	104021	915*	2259	2420										
CKRNG	012242	2927*	3693											
CKRNG1	012306	2936	2938*											
CKRNG2	012332	2942	2945*											
CKTRAN=	104023	917*	2287	2351	2449	2490	2534	2575	2615	2659	2724			
CKTRAN	012426	2966*	3693											
CKTRAN1	012542	2984	2986*											
CKTRAN2	012574	2991	2997*											
CKTRAN3	012634	3004	3006*											
CKTRAN4	012660	3010	3012*											
CLANUX=	002000	863*	1482	1603	1659	1713	1767	1827	1864	1950	1992	2032	2072	2878
CLRSCN=	004000	864*	1502	1528	2878									
CNTLU	014110	3363*	3693											
CNTLUU=	104025	919*	1006	1127	2242	2403	3275							
CO =	000100	878*	2123	2290	2294	2452	2455	2493	2497	2578	2582	2618	2623	
COF =	040000	867*	2786	2798	2809	2821								
CONVER=	104010	906*	3351											
CS =	000040	877*	2123	2290	2294	2455	2497	2578	2618					
CSF =	020000	866*	2789	2798	2812	2821								
CSTR1	002236	1153*												
CSTR2	002300	1166*												
CSTR3	002342	1179*												
CSTR4	002404	1192*												
CSTR5	002446	1208*												
DATA1	012676	1010*	1012*	1015*	1017	2840*	2849	2969*	2979	3018*	3608*	3610*	3612*	3614
DATA2	012700	1011*	1012	1013*	1016*	2841*	2851	2970*	2988	3019*	3609*	3610	3611*	3613*
DATA3	012702	2971*	2997	3001	3020*									
DATA4	012704	2972*	3007	3021*										
DHMCSSR	015536	1038	1039	1043	1100*	1108*	1118*	1141	1153*	1154	1157*	1158	1166*	1167
		1170*	1171	1179*	1180	1183*	1184	1192*	1193	1197*	1198	1208*	1209	1212*
		1213	1223*	1226*	1239*	1242*	1255*	1257*	1260*	1263*	1274*	1279*	1280*	1283*
		1293*	1298*	1299*	1302*	1312*	1317*	1318*	1321*	1331*	1336*	1337*	1340*	1351*
		1356*	1357*	1360*	1370*	1375*	1376*	1379*	1389*	1394*	1395*	1398*	1408*	1413*
		1414*	1417*	1427*	1434*	1435	1452*	1457*	1461	1470*	1482*	1485*	1491*	1493
		1502*	1503	1507*	1509	1524*	1528*	1529	1531*	1532*	1534*	1536*	1540	1562*
		1567*	1571*	1574*	1578	1598*	1603*	1607*	1610*	1615	1634*	1654*	1659*	1663*
		1666*	1671	1688*	1708*	1713*	1717*	1720*	1725	1742*	1762*	1767*	1771*	1774*
		1779	1796*	1817*	1827*	1830*	1864*	1865*	1868*	1879*	1888	1892	1901	1907
		1913*	1915*	1947*	1950*	1952*	1954*	1957	1975*	1989*	1992*	1994*	1996*	1999
		2015*	2029*	2032*	2034*	2036*	2039	2055*	2069*	2072*	2074*	2076*	2079	2095*









MENT1A	004056	1486#	1488		
MENT1B	004104	1492#	1501		
MENT1C	004126	1495	1499#		
MENT1D	004134	1502#	1514		
MENT1E	004166	1508#	1517		
MENT1F	004210	1511	1515#		
MENT2	004220	1524#			
MENT2A	004242	1528#	1549	1554	
MENT2B	004322	1539#	1552		
MENT2C	004344	1543	1545#		
MENT2D	004356	1546	1550#		
MENT3	004372	1562#			
MENT3A	004414	1566#	1587	1592	
MENT3B	004426	1568#	1570		
MENT3C	004464	1577#	1590		
MENT3D	004506	1581	1583#		
MENT3E	004520	1584	1588#		
MPASS	017215	3036	3693#		
MFATAL	017006	3200	3693#		
MLINE	016734	1934	3693#		
MLINEI	016767	1936	3693#		
MLINER	015770	3237	3693#		
MLINE1	016025	3183	3693#		
MLINSL	016663	1046	3693#		
MNOINT	015660	3281	3693#		
MPFAIL	017104	3592	3693#		
MPF1	017124	3597	3693#		
MPH	016725	3524	3693#		
MREGAD	016627	1035	3693#		
MSELAN	016321	2862	3693#		
MSELOR	016275	2857	3693#		
MSG	014646	3495#	3501#		
MSTATE	015737	3217	3693#		
MTEST	016715	1053	3693#		
MTITLE	016521	994	3693#		
MTRANE	016056	3164	3693#		
MTRNDE	017040	2843	3693#		
MT103A	016340	2382	3693#		
MT103T	016153	2239	3693#		
MT202A	016367	2751	3693#		
MT202T	016224	2400	3693#		
MUX1	004534	1598#			
MUX1A	004562	1603#	1644	1648	
MUX1B	004630	1611#	1632		
MUX1C	004666	1618	1621#		
MUX1D	004704	1613	1625	1628	1629#
MUX1E	004722	1634#			
MUX1F	004754	1606	1641	1643#	
MUX11	006452	1947#			
MUX11A	006470	1950#			
MUX11B	006520	1955#	1973		
MUX11C	006546	1960	1963#		
MUX11D	006564	1967	1970	1971#	
MUX11E	006576	1975#			
MUX11F	006630	1982	1984#		
MUX12	006632	1989#			

MUX12A	006650	1992#			
MUX12B	006700	1997#	2013		
MUX12C	006726	2002	2005#		
MUX12D	006740	2007	2010	2011#	
MUX12E	006752	2015#			
MUX12F	007004	2022	2024#		
MUX13	007006	2029#			
MUX13A	007024	2032#			
MUX13B	007054	2037#	2053		
MUX13C	007102	2042	2045#		
MUX13D	007114	2047	2050	2051#	
MUX13E	007126	2055#			
MUX13F	007160	2062	2064#		
MUX14	007162	2069#			
MUX14A	007200	2072#			
MUX14B	007230	2077#	2093		
MUX14C	007256	2082	2085#		
MUX14D	007270	2087	2090	2091#	
MUX14E	007302	2095#			
MUX14F	007334	2102	2104#		
MUX15	007336	2110#			
MUX15A	007354	2113#			
MUX15B	007376	2117#	2132		
MUX15C	007424	2122	2125#		
MUX15D	007436	2126	2129	2130#	
MUX15E	007452	2134#			
MUX15F	007506	2141	2143#		
MUX16	007510	2149#			
MUX16A	007526	2152#			
MUX16B	007550	2156#	2171		
MUX16C	007576	2161	2164#		
MUX16D	007610	2165	2168	2169#	
MUX16E	007624	2173#			
MUX16F	007660	2180	2182#		
MUX17	007662	2188#			
MUX17A	007700	2191#			
MUX17B	007722	2195#	2210		
MUX17C	007750	2200	2203#		
MUX17D	007762	2204	2207	2208#	
MUX17E	007776	2212#			
MUX17F	010032	2219	2221#		
MUX2	004774	1654#			
MUX2A	005022	1659#	1698	1702	
MUX2B	005070	1667#	1686		
MUX2C	005126	1674	1677#		
MUX2D	005140	1669	1679	1682	1683#
MUX2E	005156	1688#			
MUX2F	005210	1662	1695	1697#	
MUX3	005230	1708#			
MUX3A	005256	1713#	1752	1756	
MUX3B	005324	1721#	1740		
MUX3C	005362	1728	1731#		
MUX3D	005374	1723	1733	1736	1737#
MUX3E	005412	1742#			
MUX3F	005444	1716	1749	1751#	
MUX4	005464	1762#			









T20201	010566	2465	2470#
T20202	010572	2466	2472#
T20203	010576	2467	2474#
T20204	010602	2468	2476#
T202E	010606	2469	2482#
T202E1	010652	2506	2511#
T202E2	010656	2507	2513#
T202E3	010662	2508	2515#
T202E4	010666	2509	2517#
T202F	010672	2510	2524#
T202F2	010752	2549	2554#
T202F3	010756	2550	2556#
T202F4	010762	2551	2558#
T202F5	010766	2552	2560#
T202G	010772	2553	2567#
T202G1	011036	2590	2595#
T202G2	011042	2591	2597#
T202G3	011046	2592	2599#
T202G4	011052	2593	2601#
T202H	011056	2594	2607#
T202H2	011122	2632	2637#
T202H3	011126	2633	2639#
T202H4	011132	2634	2641#
T202H5	011136	2635	2643#
T202I	011142	2636	2649#
T202I2	011222	2674	2679#
T202I3	011226	2675	2681#
T202I4	011232	2676	2683#
T202I5	011236	2677	2685#
T202J	011242	2678	2697#
T202JN	011420	2740	2750#
T202JS	011302	2701	2706#
T202J1	011400	2736	2741#
T202J2	011404	2737	2743#
T202J3	011410	2738	2745#
T202J4	011414	2739	2747#
T21	003620	1426#	3693
T22	003714	1450#	3693
T23	004030	1481#	3693
T24	004220	1523#	3693
T25	004372	1561#	3693
T26	004534	1597#	3693
T27	004774	1653#	3693
T3	002342	1178#	3693
T30	005230	1707#	3693
T300	010410	2396#	3693
T31	005464	1761#	3693
T32	005720	1816#	3693
T33	006104	1863#	3693
T4	002404	1191#	3693
T5	002446	1207#	3693
T6	002510	1221#	3693
T7	002564	1237#	3693
VECSTA	001374	1012#	1018
VECSTR	001354	997	1001
VECST1	001500	1029	1032#

1009# 1110





DZDHK-D MACY11 27(1006) 02-MAY-77 11:58 PAGE 105  
 DZDHKD.P11 02-MAY-77 11:56 CROSS REFERENCE TABLE -- MACRO NAMES

COMMEN	834#	954#	1138#	1269#	1346#	1922#	1930#	2235#	2396#	3693#					
ENTDEF	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912
	913	914	915	916	917	918	919	920	921	922	954#				
INTS	1134#	1346	1365	1384	1403										
MUXS1	1134#	1594	1650	1704	1758	1943	1985	2025	2065						
MUXS2	1134#	2105	2144	2183											
NOINT	1134#	1269	1288	1307	1326										
TM	955#	3693													
TS	953#	1138	1152	1165	1178	1191	1207	1221	1237	1253	1273	1292	1311	1330	1350
	1369	1388	1407	1426	1450	1481	1523	1561	1597	1653	1707	1761	1816	1863	1930
	1946	1988	2028	2068	2109	2148	2187	2235	2380	2396					
TSS	953#														

. ABS. 017724 000

ERRORS DETECTED: 0  
 DEFAULT GLOBALS GENERATED: 0

DZDHKD.SEG/SOL/CRF/NL:TOC=DZDHKD.P11  
 RUN-TIME: 4 8 1 SECONDS  
 RUN-TIME RATIO: 44/14=3.0  
 CORE USED: 10K (19 PAGES)