

IDENTIFICATION

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

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1.0 ABSTRACT

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

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

2.0 REQUIREMENTS

2.1 EQUIPMENT

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

2.1.1 FOR 16 LINE SCANNER TEST

4 CABLES TO CONNECT TO TEST CONNECTOR
H861 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
H315 TEST CONNECTOR

2.1.3 FOR 0/1 LINE TESTS

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

3.0 LOADING PROCEDURE

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

4.0 STARTING PROCEDURE

4.1 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200.

RESTART ADDRESS FOR ALL TESTS IS 000200

4.2 OPERATOR AND/OR PROGRAM ACTION

4.2.1 INITIAL PROGRAM START

NOTE

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

NOTE

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

4.2.1.1 LOAD ADDRESS 000200

SET SW00 = 1
PRESS START
***SOFTWARE SWITCH REGISTER IS LOC. 176

4.2.1.2 PROGRAM WILL TYPE

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

4.2.1.3 PROGRAM WILL TYPE (WITH SW00 = 1)

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

BIT15 = 1 TEST LINE 15

EG: TYPING 377(8) SELECTS LINES 00 THRU 07
TYPING 17777(8) SELECTS ALL 16 LINES

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

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

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

TEST GROUP 0:
OFF LINE TESTS USING HB61 TEST CONNECTOR-FIRST TEST=0
TEST GROUP 1:
OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100
TEST GROUP 2:
CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200
TEST GROUP 3:
CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300

4.2.1.11 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART

4.2.2.1 WITH SW00=1

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.

4.2.2.2 WITH SW00=0

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10
 OPERATING PROCEDURE

5.0

5.1 TEST GROUP 0 16 LINE SCANNER TEST

5.1.1 TEST INITIALIZATION

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

5.1.2 OPERATIONAL SWITCH SETTINGS

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

CONTROL:

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

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

GO1

SEG 0006

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

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

5.1.3 PROGRAM AND/OR OPERATOR ACTION

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

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

5.1.3.2 WITH SW15=1, PROGRAM ACTION WILL BE AS IN 5.1.3.1 EXCEPT THAT A HALT WILL OCCUR AFTER ERROR TYPEOUT.
NOTE: IF USING THE SOFTWARE SWITCH REGISTER AND AN ERROR HALT OCCURS, THE SOFTWARE SWITCH REGISTER CAN BE CHANGED BY PRESSING CONTINUE THE PROGRAM WILL RESPOND WITH THE FOLLOWING:
SWR=XXXXXX NEW=

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

5.1.3.4 THIS PROGRAM WILL NO LONGER TRACE TRAP WITH THIS RELEASE

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

5.2 TEST GROUP 1 SINGLE LINE CABLE TEST

5.2.1 TEST INITIALIZATION

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

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

5.2.2 OPERATIONAL SWITCH SETTINGS

SAME AS 5.1.2

5.2.3 PROGRAM AND/OR OPERATOR ACTION

SAME AS 5.1.3

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

5.3.1 TEST INITIALIZATION

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

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

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

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

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

5.3.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.3.2.1 PLACE ANSWERING DATA SET IN "AUTO ANSWER" MODE

- 5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE
- 5.3.2.3 DIAL DIAL ANSWERING DATA SET FROM ORIGINATING DATA SET
- 5.3.2.4 LISTEN FOR TONE IN HANDSET OF ORIGINATING DATA SET.
WHEN TONE IS HEARD, PRESS "DATA" BUTTON ON ORIGINATING DATA SET.
"DATA" LIGHT SHOULD ILLUMINATE
- 5.3.2.5 "DATA" LIGHT ON ANSWERING DATA SET SHOULD BE LIT.
- 5.3.2.6 THE PROGRAM WILL NOW WAIT FOR INTERRUPTS FROM THE MODEM CONTROL.
- 5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED, THE PROGRAM WILL TYPE "TYPE TTY KEY TO DISCONNECT".
WHEN TTY KEY IS STRUCK, THE PROGRAM WILL BEGIN THE DISCONNECT SEQUENCE.
- 5.3.2.8 WHEN THE DISCONNECT SEQUENCE HAS BEEN COMPLETED THE PROGRAM WILL TYPE "IO3A TEST COMPLETE", AND WILL REQUEST THE OPERATOR TO SELECT NEW LINES.
- 5.3.3 PROGRAM ACTION IN CASE OF ERROR
- 5.3.3.1 RING ON INCORRECT LINE
IF THE PROGRAM DETECTS A RING SIGNAL ON AN INCORRECT LINE, OR IF ANY OTHER TRANSITION BESIDES RING IS DETECTED BEFORE RING, THE PROGRAM WILL TYPE A FATAL ERROR MESSAGE AND REQUEST THE OPERATOR TO RESELECT LINES AND REDIAL.
- 5.3.3.2 OTHER ERRORS
IF ANY ERRORS OCCUR AFTER THE FIRST RING HAS BEEN DETECTED, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING TO COMPLETION.
THE ONLY EXCEPTION TO THIS IS IF AN INTERRUPT OCCURS ON A LINE NOT SELECTED, IN WHICH CASE A FATAL ERROR WILL BE REPORTED, AND THE PROGRAM WILL PROCEED AS DESCRIBED IN 5.3.3.1

5.3.4 OPERATION SWITCH SETTINGS

SEQ 0009

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:
 - 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 (<IU>) IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

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

5.3.5 DATA SET MODE SWITCHING

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

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

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

5.4.1 TEST INITIALIZATION

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

5.4.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.4.3 PROGRAM ACTION IN CASE OF ERRORS

SAME AS 5.3.3

5.4.4 OPERATIONAL SWITCH SETTINGS

SAME AS 5.3.4

5.4.5 DATA SET MODE SWITCHING

SAME AS 5.3.5
5.5 TEST RESELECTION

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

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

PROCEED AS DESCRIBED IN 4.2.1.8

5.5 ADDRESS CHANGE

TO CHANGE THE VECTOR AND REGISTER ADDRESS OF THE MODEM CONTROL UNDER TEST, TYPE <CONTROL V>. THE PROGRAM WILL STOP EXECUTION OF THE TEST IN PROGRESS AND PROCEED AS DESCRIBED IN SECTION 4.2.1, EXCEPT THAT "MODEM CONTROL DIAGNOSTIC" WILL NOT BE TYPED.

5.6 LINE NUMBER CHANGE

TO CHANGE THE LINE NUMBER(S) UNDER TEST, TYPE <CONTROL L>. THE PROGRAM WILL SUSPEND THE TEST IN PROGRESS AND RETURN TO THE INITIALIZATION STAGE OF THE SELECTED TEST.

WHEN THE LINE NUMBER(S) HAS BEEN CHANGED, THE PROGRAM WILL RESTART THE SELECTED TEST USING THE NEW LINE NUMBER(S).

5.7 POWER FAILURE

IF A POWER FAIL TRAP OCCURS DURING TEST EXECUTION THE PROGRAM WILL SAVE THE GENERAL REGISTERS OF THE PROCESSOR AND HALT.

WHEN POWER UP OCCURS, THE PROGRAM WILL TYPE "POWER FAILURE-CURRENT TEST WILL BE RESTARTED".

THE PROGRAM WILL THEN RESUME TEST EXECUTION.

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

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

6.0 ERRORS

6.1 NORMAL OPERATION

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

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

6.1.1 ERROR MESSAGES

6.1.1.1 UNIQUE ERROR

ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER

AN EXAMPLE OF THIS TYPE OF ERROR IS:

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

6.1.1.2 TRANSITION DETECTION ERROR

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

FORMAT FOR ERROR TYPEOUT IS

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

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

6.1.1.4 FATAL TRANSITION ERROR

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

FORMAT FOR FATAL ERROR TYPEOUT IS

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

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

6.1.1.4 CONTROL STATUS ERROR

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

FORMAT FOR CONTROL STATUS ERROR IS

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

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

6.1.1.5 LINE STATUS ERROR

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

FORMAT FOR LINE STATUS ERROR IS

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

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

6.1.2 REPEATED ERRORS

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

6.2 SCOPE LOOPS

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

6.2.1 AFTER ERROR HALT

TO LOOP ON A GIVEN TEST AFTER AN ERROR HALT,
SET SW15=0 TO RUN WITHOUT STOPPING
SET SW14=1 TO LOOP ON CURRENT TEST
SET SW13=1 TO SUPPRESS ERROR TIMEOUT
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 LOOPE
ON (SEE LISTING FOR TEST NUMBER REFERENCE DESIGNATIONS)

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

6.2.3 AFTER (CONTROL)

SAME AS 6.2.2.2 TO 6.2.2.4

7.0 RESTRICTIONS

7.1 STARTING

7.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR MUST BE INSTALLED.

7.1.2 FOR SINGLE LINE CABLE TEST

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

7.1.3 FOR ON LINE TESTS

NONE

7.2 OPERATING

NONE.

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

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

VECTORS

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

DHMC SR: 170500
DHML SR: 170502

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

8.0 EXECUTION TIME

8.1 16 LINE SCANNER TEST

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

8.2 SINGLE LINE CABLE TEST

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

8.3 103A MODEM CONNECT-DISCONNECT TEST

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

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

8.4 202C MODEM CONNECT-DISCONNECT TEST

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

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

9. PROGRAM DESCRIPTION

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

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

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

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

9. CONT'D

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

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

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

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

10. LISTING

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

```
; SWITCH REGISTER OPTIONS
```

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

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

```
; TESTS AVAILABLE
```

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

```
; SYMBOL DEFINITIONS
```

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

```
.NLIST MC,MD,CND
.LIST ME
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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 CORRECT LINE
104022	WAITRN=EMT+X	; WAIT FOR TRANSITIONS
104023	CKTRAN=EMT+X	; CHECK TRANSITIONS
104024	WAITS=EMT+X	; DELAY FOR TRANSIENTS
104025	CNTLUU=EMT+X	; CHANGE SWREG ROUTINE
104026	CKINTT=EMT+X	; CHECK FOR INTERRUPTS-FLAG STYLE
104027	KBDIN=EMT+X	; FAKE INTERRUPT ENTRY POINT


```

149
150                ;STANDARD INTERRUPT VECTORS
151
152                . =24
153 000024 016176   PFAIL                ;POWER FAIL HANDLER
154 000026 000340   340                ;SERVICE AT LEVEL 7
155 000030 014120   EMTSRV             ;EMT DISPATCH SERVICE
156 000032 000340   340                ;SERVICE AT LEVEL 7
157
158                . =46
159 000046 014102   LOGICAL            ;ACT11?
160
161                . =60
162 000050 001760   KBDINT             ;KEYBOARD MONITOR
163 000062 000340   340                ;SERVICE AT LEVEL 7
164
165                . =174
166 000174 000000   DISPREG:          0
167 000176 000000   SWREG: 0
168
169 000200 000137 001100 . =200   JMP      START    ;GO TO START OF PROGRAM
170
171
172
173

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174
175      001100      001100      . = 1100
176      001100      012737      016176      000024      STACK:
177      001100      012737      016176      000024      START:  MOV    #PFail,24      ;SET UP POWER FAIL
178                                          ;INTERRUPT SERVICE VECTOR
179      001106      005037      001756      CLR     TIPFLG      ;CLEAR TEST IN PROGRESS FLAG
180      001112      005077      015472      CLR     @TKCSR
181      001116      012706      001100      MOV     #STACK,SP   ;SET UP STACK POINTER
182
183      001122      013746      000006      SUSWR:  MOV     @#6,-(SP)   ;SAVE VECTORS
184      001126      013746      000004      MOV     @#4,-(SP)
185      001132      012737      001152      000004      MOV     @#4$,@#4     ;SET UP FOR TIMEOUT
186      001140      022777      177777      015452      CMP     @-1,@SWR    ;REFERENCE HARDWARE SWITCH REGISTER
187      001146      001402      BEQ     65$
188      001150      000407      BR     66$
189      001152      022626      64$:    CMP     (SP)+,(SP)+   ;ADJUST STACK
190      001154      012737      000176      016620      65$:    MOV     #SWREG,SWR   ;POINT TO SOFTWARE SWITCH REG
191      001162      012737      000174      016622      MOV     #DISPREG,DISPLAY ;POINT TO SOFT DISPLAY REG
192      001170      012637      000004      66$:    MOV     (SP)+,@#4     ;RESTORE VECTORS
193      001174      012637      000006      MOV     (SP)+,@#6
194      001200      012777      000100      015402      MOV     #INTENA,@TKCSR ;ENABLE TELETYPE INTERRUPTS
195      001206      005037      001252      CLR     XFLAG      ;XOR = NO
196
197      ;*****
198      ;REPLACE THE FOLLOWING BRANCH WITH A "NOP" (240) TO ACTIVATE "XOR" CODE
199      ;*****
200      001212      000423      BR     STARTO      ;SKIP XOR STUFF
201      001214      013746      000004      MOV     4,-(SP)    ;SAVE 4
202      001220      012737      001254      000004      MOV     #XORSVC,4  ;SET UP SVC ROUTINE
203      001226      005737      177060      TST    177060     ;GOT AN XOR TESTER OUT THERE ?
204      001232      012637      000004      MOV     (SP)+,4   ;YES
205      001236      005137      001252      COM    XFLAG      ;XOR = YES
206      001242      004737      016320      JSR    PC,XOR     ;AUTO VECTOR
207      001246      000137      001262      JMP    STARTO     ;RESTORE TRAPCATCHER
208      001252      000000      XFLAG:  0           ;XOR FLAG
209      001254      022626      XORSVC: POP2SP
210      001256      012637      000004      MOV     (SP)+,4  ;RESTORE 4
211      001262      005737      016710      STARTO: TST     TIPFLG   ;TYPED TITLE?
212      001266      001005      BNE    .+14       ;YES
213      001270      104004      TYPE    .+14      ;TYPE "MODEM CONTROL DIAGNOSTIC"
214      001272      017510      MTITLE
215      001274      012737      000001      016710      MOV     #1,TIFLG   ;SET TITLE TYPED FLAG
216      001302      005737      001252      TST    XFLAG     ;X OR ?
217      001306      100422      BMI    VECSTR     ;RESTORE TRAPCATCHER
218      001310      005737      000042      TST    42        ;ACT 11?
219      001314      001403      BEQ    START1     ;NO
220      001316      004737      016320      JSR    PC,XOR     ;YES AUTO VECTOR
221      001322      000414      BR     VECSTR     ;GET VECTOR AND REGISTER ADDRESS
222      001324      005737      000042      START1: TST     @#42   ;UNDER MONITOR?
223      001330      001005      BNE    1$
224      001332      022737      000176      016620      CMP     #SWREG,SWR ;USING SWREG?
225      001340      001001      BNE    1$
226      001342      104025      CNTLUU
227      001344      032777      000001      015246      1$:    BIT     #1,@SWR    ;IF SW BIT 0=1, ON PROGRAM RESTART
228      001352      001510      BEQ    STARTN     ;INPUT VECTOR AND REGISTER ADDRESSES
229      001354      012706      001100      VECSTR: MOV     #STACK,SP ;SET UP PROCESSOR STACK POINTER
230      001360      012737      000300      014026      MOV     #300,DAT1  ;ADDRESS OF FIRST FLOATING VECTOR

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230	001366	012737	000302	014030		MOV	#302, DATA2		; ADDRESS OF STATUS WORD
231	001374	013777	014030	012424	VECSTA:	MOV	DATA2, %DATA1		; MOVE ADDRESS OF STATUS WORD TO VECTOR
232	001402	005077	012422			CLR	%DATA2		; CLEAR STATUS WORD
233									; (FOR HALT ON ILLEGAL INTERRUPT)
234	001406	062737	000004	014026		ADD	#4, DATA1		; NEXT VECTOR
235	001414	062737	000004	014030		ADD	#4, DATA2		; NEXT STATUS WORD
236	001422	023727	014026	001000		CMP	DATA1, #1000		; IS TABLE CLEARED
237	001430	001361				BNE	VECSTA		; IF NOT, CONTINUE
239	001432	005737	001252			TST	XFLAG	; XOR ?	
239	001436	100523				BMI	TSTGO	; YES	
240	001440	005737	000042			TST	42	; ACT 11 ?	
241	001444	001120				BNE	TSTGO	; YES	
242	001446	104013				INSTRG			; GET VECTOR ADDRESS
243	001450	017574				MVECTOR			; MESSAGE "VECTOR ADDRESS--"
244	001452	000300				300			; LOWER LIMIT FOR ADDRESS
245	001454	000774				774			; UPPER LIMIT FOR ADDRESS
246	001456	016600				DHMVEC			; STORAGE FOR ADDRESS
247	001460	032737	000003	016600	15:	BIT	#3, DHMVEC		; TEST 2 LSB OF ADDRESS
248	001466	001404				BEQ	VECST1		; IF 0, CONTINUE
249	001470	012716	001460			MOV	#15, (SP)		
250	001474	000137	016026			JMP	INSTR		; INCORRECT ADDRESS, TRY AGAIN
251	001500	013737	016600	016602	VECST1:	MOV	DHMVEC, DHMLVL		; GENERATE ADDRESS OF
252	001506	062737	000002	016602		ADD	#2, DHMLVL		; INTERRUPT STATUS WORD
253	001514	104013				INSTRG			; GET ADDRESS OF CONTROL REGISTER
254	001516	017616				MREGAD			; MESSAGE "REGISTER ADDRESS--"
255	001520	170500				170500			; LOWER LIMIT FOR ADDRESS
256	001522	170670				170670			; UPPER LIMIT FOR ADDRESS
257	001524	016604				DHMCSR			; STORAGE FOR ADDRESS
258	001526	032737	000007	016604	15:	BIT	#7, DHMCSR		; IF 3 LSB ARE NOT 0
259	001534	001404				BEQ	REGST1		
260	001536	012716	001526			MOV	#15, (SP)		
261	001542	000137	016026			JMP	INSTR		; INCORRECT ADDRESS, TRY AGAIN
262	001546	013737	016604	016606	REGST1:	MOV	DHMCSR, DHMLSR		; SET UP ADDRESS OF LINE STATUS REGISTER
263	001554	062737	000002	016606		ADD	#2, DHMLSR		
264	001562	104013				INSTRG			; GET LINE SELECT PARAMETER
265	001564	017652				MLINSL			
266	001566	000000				0			
267	001570	177777				177777			
268	001572	016712				LINSEL			

M02

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 DZDHC.P11

SEQ 0025

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269
270 001574 012706 001100      STARTN: MOV      #STACK, SP      ;SET UP PROCESSOR STACK
271 001600 104013              INSTRG                      ;GET TEST NUMBER
272 001602 017704              MTEST                       ;MESSAGE "TEST-"
273 001604 000000              0                            ;LOWER LIMIT FOR TEST NUMBER
274 001606 000777              777                          ;UPPER LIMIT FOR TEST NUMBER
275 001610 016632              TSTNO                       ;STORAGE FOR TEST NUMBER
276 001612 013705 016632      X1A:  MOV      TSTNO, R5      ;GET TEST NUMBER
277 001616 042705 177077      BIC      #177077, R5        ;EXTRACT TEST GROUP NUMBER
278 001622 006205              ASR      R5
279 001624 006205              ASR      R5
280 001626 006205              ASR      R5
281 001630 006205              ASR      R5
282 001632 006205              ASR      R5
283 001634 016537 020426 016666      MOV      GRO(R5), TSTMAX    ;GET HIGHEST TEST IN GROUP
284 001642 016537 020406 016664      MOV      TSTLST(R5), TSTPNT ;GET POINTER TO TEST TABLE
285 001650 005737 016664              TST      TSTPNT            ;IF 0, INVALID TEST GROUP
286 001654 0016J4              BNE      STRTGA
287 001656 012716 001612      X1B:  MOV      #X1A, (SP)
288 001662 000137 016026              JMP      INSTR
289 001666 042737 177700 016632      STRTGA: BIC      #177700, TSTNO ;TRY AGAIN
290                                          ;GET NUMBER OF FIRST TEST
291 001674 023737 016632 016666      CMP      TSTNO, TSTMAX     ;TO BE EXECUTED IN SELECTED GROUP
292 001702 003401              BLE      TSTGO             ;IS NUMBER TOO LARGE
293 001704 000764              BR       X1B
294 001706 012746 000340      TSTGO: MOV      #340, -(SP) ;SET UP PRIORITY LEVEL
295 001712 005746              PUSH1SP
296 001714 000005              RESET
297 001716 012737 002202 002204      MOV      #DMYRTI, KRET    ;SET UP DUMMY KEYBOARD RETURN
298 001724 005037 016670              CLR      LINFLG           ;CLEAR LINE SELECTED FLAG
299 001730 005037 016626              CLR      TRACON          ;CLEAR TRACE TRAP FLAG
300 001734 005037 016630              CLR      PASCNT          ;CLEAR PASS COUNT
301 001740 104004              TYPE
302 001742 017720              MCRLF
303 001744 012737 000001 001756      IS:  MOV      #1, TIPFLG   ;SET TEST IN PROGRESS FLAG
304 001752 000137 014334              JMP      TSTENT           ;START TESTING
305 001756 000000              TIPFLG: 0

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306
307
308 ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
309 001760 005037 001756 KBDINT: CLR TIPFLG ;CLEAR TEST IN PROGRESS FLAG
310 001764 005037 015254 CLR TMP1
311 001770 005037 002206 CLR SINTFL ;CLEAR SOFTWARE INTERRUPT FLAG
312 001774 117737 014612 015254 MOV B @TKDBR, TMP1
313 002002 142737 000200 015254 BIC B #200, TMP1
314 002010 122737 000003 015254 CMP B #3, TMP1 ;IF <CONTROL C> WAS TYPED
315 002016 001011 BNE KBDIN1 ;TYPE "IC" AND
316 002020 104004 TYPE ;SELECT NEW TEST
317 002022 020150 MCONT C
318 002024 022626 POP 2SP
319 002026 005077 014552 CLR @DMCSR
320 002032 005077 014552 CLR @TKCSR
321 002036 000137 001574 JMP STARTN
322 002042 122737 000026 015254 KBDIN1: CMP B #26, TMP1 ;IF <CONTROL V> WAS TYPED
323 002050 001011 BNE KBDIN2 ;TYPE "IV" AND GET NEW
324 002052 104004 TYPE ;VECTOR AND REGISTER ADDRESS
325 002054 020153 MCONT V
326 002056 022626 POP 2SP
327 002060 005077 014520 CLR @DMCSR
328 002064 005077 014520 CLR @TKCSR
329 002070 000137 001354 JMP VECSTR
330 002074 122737 000014 015254 KBDIN2: CMP B #14, TMP1 ;IF <CONTROL L> WAS TYPED
331 002102 001015 BNE KBDIN3 ;TYPE "IL" AND GET NEW
332 002104 104004 TYPE ;LINE NUMBERS, UNLESS
333 002106 020156 MCONT L ;TEST GROUP 0 WAS IN PROGRESS
334 002110 022737 002202 002204 CMP #DMYRTI, KRET ;IF <CONTROL L> WAS TYPED IN TEST
335 002116 001431 BEQ DMYRTI ;GROUP 0, IGNORE
336 002120 022626 POP 2SP
337 002122 005077 014456 CLR @DMCSR
338 002126 005077 014456 CLR @TKCSR
339 002132 000177 000046 JMP @KRET
340 002136 005737 000042 KBDIN3: TST @#42
341 002142 001011 BNE 1'
342 002144 022737 000176 016620 CMP -@REG, SWR
343 002152 001005 BNE 1'
344 002154 122737 000007 015254 CMP #7, TMP1 ;IS IT <IG>
345 002162 001001 BNE 1'
346 002164 104025 CINTLW
347 002166 012737 000001 002206 IS: MOV #1, SINTFL ;SET SOFTWARE INTERRUPT FLAG
348 002174 012737 000001 001756 MOV #1, TIPFLG ;SET TEST IN PROGRESS FLAG
349 002202 000002 DMYRTI: RTI
350 .EVEN
351 002204 000000 KRET: 0
352 002206 000000 SINTFL: 0

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407
408
409
410 002404
411 002404 012777 000040 014172 T4:
412 002412 032777 000040 014164 CSTR4:
413 002420 001001
414
415 002422 104012
416 002424 042777 033040 014152
417 002432 032777 000040 014144
418 002440 001401
419
420 002442 104012
421 002444 104002
422
423
424
425
426 002446
427 002446 012777 000040 014130 T5:
428 002454 032777 000020 014122 CSTR5:
429 002462 001001
430 002464 104012
431 002466 042777 000040 014110
432 002474 032777 000020 014102
433 002502 001401
434 002504 104012
435 002506 104002
436
437
438
439
440 002510
441 002510 052737 000340 177776 T6:
442 002516 005077 014062 INT1:
443 002522 012777 002556 014050
444 002530 013777 177776 014044
445 002536 052777 000200 014040
446 002544 042737 000340 177776
447 002552 000240
448 002554 000402
449 002556 022626 INT1A:
450 002560 104012
451 002562 104002 INT1B:

```

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

;REFERENCE DESIGNATION
 ;SET SCAN ENABLE
 ;WAS SCAN ENABLE SET

;NO ERROR
 ;CLEAR SCAN ENABLE
 ;WAS SCAN ENABLE CLEARED

;NO ERROR
 ;CHECK FOR ITERATIONS, LOOP

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

;REFERENCE DESIGNATION
 ;SET SCAN ENABLE
 ;IS BUSY BIT SET

;BUSY NOT SET, ERROR
 ;CLEAR SCAN ENABLE
 ;IS BUSY BIT CLEARED

;BUSY NOT CLEARED, ERROR
 ;CHECK FOR LOOP, ITERATIONS

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

;REFERENCE DESIGNATION
 ;LOCK OUT INTERRUPTS
 ;CLEAR CONTROL REGISTER
 ;SET UP INTERRUPT SERVICE ADDRESS
 ;SET UP INTERRUPT PRIORITY
 ;SET DONE

;ALLOW INTERRUPTS
 ;DELAY FOR INTERRUPT
 ;NO INTERRUPT, CONTINUE
 ;RESTORE STACK, INTERRUPT
 ;OCCURED, ERROR
 ;CHECK FOR LOOP, ITERATIONS

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452
453                                     ;VERIFY THAT NO INTERRUPT OCCURS WITH "INTERRUPT ENABLE"
454                                     ;SET AND "DONE" CLEARED.
455
456 002564                                T7:                                ;REFERENCE DESIGNATION
457 002564 052737 000340 177776 INT2:  BIS      #340,PS                ;LOCK OUT INTERRUPTS
458 002572 005077 014006                                CLR      @DHMCSR                ;CLEAR CONTROL REGISTER
459 002576 012777 002632 013774                                MOV      @INT2A,@DHMVEC        ;SET UP INTERRUPT SERVICE ADDRESS
460 002604 013777 177776 013770                                MOV      PS,@DHMLVL           ;SET UP INTERRUPT SERVICE LEVEL
461 002612 052777 000100 013764                                BIS      @INTENA,@DHMCSR      ;SET INTERRUPT ENABLE
462 002620 042737 000340 177776                                BIC      #340,PS              ;ALLOW INTERRUPTS
463 002626 000240                                NOP                               ;DELAY FOR INTERRUPTS
464 002630 000402                                BR       INT2B                 ;NO INTERRUPT, CONTINUE
465 002632 022626                                INT2A: POP2SP                  ;RESTORE STACK
466 002634 104012                                ERROR                                     ;INTERRUPT OCCURED, ERROR
467 002636 104002                                INT2B: SCOPE                   ;CHECK FOR ITERATIONS, LOOP
468
469                                     ;VERIFY THAT SETTING "DONE" CAUSES AN INTERRUPT
470                                     ;WITH "INTERRUPT ENABLE" SET
471
472 002640                                T10:                               ;REFERENCE DESIGNATION
473 002640 052737 000340 177776 INT3:  BIS      #340,PS                ;LOCK OUT INTERRUPTS
474 002646 005077 013732                                CLR      @DHMCSR                ;CLEAR CONTROL REGISTER
475 002652 012777 002724 013720                                MOV      @INT3A,@DHMVEC        ;SET UP INTERRUPT SERVICE ADDRESS
476 002650 012777 000100 013716                                MOV      @INTENA,@DHMCSR      ;SET "INTERRUPT ENABLE"
477 002666 013777 177776 013706                                MOV      PS,@DHMLVL           ;SET "INTERRUPT LEVEL"
478 002674 042737 000340 177776                                BIC      #340,PS              ;ALLOW INTERRUPTS
479 002702 052777 000200 013674                                BIS      @DONE,@DHMCSR        ;SET "DONE"
480 002710 000240                                NOP                               ;DELAY FOR INTERRUPT
481 002712 000240                                NOP                               ;
482 002714 005077 013664                                CLR      @DHMCSR                ;
483 002720 104012                                ERROR                                     ;INTERRUPT OCCURED, ERROR
484 002722 000401                                ER       INT3B                 ;CONTINUE
485 002724 022626                                INT3A: POP2SP                  ;INTERRUPT OCCURED, RESTOR STACK
486 002726 104002                                INT3B: SCOPE                   ;CHECK FOR ITERATION, LOOP
487
488
489                                     ;VERIFY THAT NO INTERRUPT OCCURS WITH
490                                     ;"INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 7.
491
492 002730                                T11:                               ;REFERENCE DESIGNATION
493 002730 005077 013650                                INT4:  CLR      @DHMCSR        ;CLEAR CONTROL REGISTER
494 002734 042737 000340 177776                                BIC      #340,PS                ;SET PROCESSOR PRIORITY
495 002742 052737 000340 177776                                BIS      #340,PS                ;TO LEVEL 7.
496 002750 012777 003012 013522                                MOV      @INT4A,@DHMVEC        ;SET UP INTERRUPT SERVICE ADDRESS
497 002756 013777 177776 013616                                MOV      PS,@DHMLVL           ;SET UP INTERRUPT SERVICE LEVEL
498 002764 012777 000100 013612                                MOV      @INTENA,@DHMCSR      ;SET INTERRUPT ENABLE
499 002772 052777 000200 013604                                BIS      @DONE,@DHMCSR        ;GENERATE INTERRUPT
500 003000 000240                                NOP                               ;DELAY FOR INTERRUPT
501 003002 000240                                NOP                               ;
502 003004 005077 013574                                CLR      @DHMCSR                ;
503 003010 000402                                BR       INT4B                 ;NO INTERRUPT, CONTINUE
504 003012 022626                                INT4A: POP2SP                  ;RESTORE STACK
505 003014 104012                                ERROR                                     ;INTERRUPT OCCURED, ERROR
506 003016 104002                                INT4B: SCOPE                   ;CHECK FOR ITERATION, LOOP

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E03

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507
508
509
510
511 003020
512 003020 005077 013560
513 003024 042737 000340 177776
514 003032 052737 000300 177776
515 003040 012777 003102 013532
516 003046 013777 177776 013526
517 003054 012777 000100 013522
518 003062 052777 000200 013514
519 003070 000240
520 003072 000240
521 003074 005077 013504
522 003100 000402
523 003102 022626
524 003104 104012
525 003106 104002
526
527
528
529
530 003110
531 003110 005077 013470
532 003114 042737 000340 177776
533 003122 052737 000240 177776
534 003130 012777 003172 013442
535 003136 013777 177776 013436
536 003144 012777 000100 013432
537 003152 052777 000200 013424
538 003160 000240
539 003162 000240
540 003164 005077 013414
541 003170 000402
542 003172 022626
543 003174 104012
544 003176 104002
545
546
547
548
549
550 003200
551 003200 005077 013400
552 003204 042737 000340 177776
553 003212 052737 000200 177776
554 003220 012777 003262 013352
555 003226 013777 177776 013346
556 003234 012777 000100 013342
557 003242 052777 000200 013334
558 003250 000240
559 003252 000240
560 003254 005077 013324
561 003260 000402
562 003262 022626
    003264 104012

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

T12:
INT5: CLR @DHMCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #300,PS ;SET PROCESSOR PRIORITY
      ;TO LEVEL 6.
      MOV #INT5A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
      MOV PS,@DHMLVL ;SET UP INTERRUPT SERVICE LEVEL
      MOV #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
      BIS #DONE,@DHMCSR ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      NOP
      CLR @DHMCSR
      BR INT5B ;NO INTERRUPT, CONTINUE
INT5A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT5B: SCOPE ;CHECK FOR ITERATION, LOOP

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

T13:
INT6: CLR @DHMCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #240,PS ;SET PROCESSOR PRIORITY
      ;TO LEVEL 5.
      MOV #INT6A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
      MOV PS,@DHMLVL ;SET UP INTERRUPT SERVICE LEVEL
      MOV #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
      BIS #DONE,@DHMCSR ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      NOP
      CLR @DHMCSR
      BR INT6B ;NO INTERRUPT, CONTINUE
INT6A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT6B: SCOPE ;CHECK FOR ITERATION, LOOP

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

T14:
INT7: CLR @DHMCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #200,PS ;SET PROCESSOR PRIORITY
      ;TO LEVEL 4.
      MOV #INT7A,@DHMVEC ;SET UP INTERRUPT SERVICE ADDRESS
      MOV PS,@DHMLVL ;SET UP INTERRUPT SERVICE LEVEL
      MOV #INTENA,@DHMCSR ;SET INTERRUPT ENABLE
      BIS #DONE,@DHMCSR ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      NOP
      CLR @DHMCSR
      BR INT7B ;NO INTERRUPT, CONTINUE
INT7A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR

```

F03

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SEQ 0031

563 003266 1UM002

INT7B: SCOPE

;CHECK FOR ITERATION, LOOP

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564
565
566 ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
567 ;ENABLE" SET AND "DONE" SET AT PRIORITY 0.
568
569 003270 T15: ;REFERENCE DESIGNATION
570 003270 005077 013310 INT10: CLR 20HMCSR ;CLEAR CONTROL REGISTER
571 003274 042737 000340 177776 BIC #340,PS ;ALLOW INTERRUPTS
572 003302 012777 003352 013270 MOV #INT10A,20HMVEC ;SET UP INTERRUPT SERVICE ADDRESS
573 003310 005077 013266 CLR 20HMLVL ;SET UP INTERRUPT SERVICE PRIORITY
574 003314 052737 000000 177776 BIS #0,PS ;SET PROCESSOR PRIORITY TO LEVEL 0.
575 003322 012777 000100 013254 MOV #INTENA,20HMCSR ;SET INTERRUPT ENABLE
576 003330 052777 000200 013246 BIS #DONE,20HMCSR ;GENERATE INTERRUPT
577 003336 000240 NOP ;WAIT FOR INTERRUPT
578 003340 000240 NOP
579 003342 005077 013236 CLR 20HMCSR
580 003346 104012 ERROR ;NO INTERRUPT, ERROR
581 003350 000401 BR INT10B ;CONTINUE
582 003352 022626 INT10A: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
583 003354 104002 INT10B: SCOPE ;CHECK FOR INTERATIONS, LOOP.
584
585 ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
586 ;ENABLE" SET AND "DONE" SET AT PRIORITY 1.
587
588
589 003356 T16: ;REFERENCE DESIGNATION
590 003356 005077 013222 INT11: CLR 20HMCSR ;CLEAR CONTROL REGISTER
591 003362 042737 000340 177776 BIC #340,PS ;ALLOW INTERRUPTS
592 003370 012777 003440 013202 MOV #INT11A,20HMVEC ;SET UP INTERRUPT SERVICE ADDRESS
593 003376 005077 013200 CLR 20HMLVL ;SET UP INTERRUPT SERVICE PRIORITY
594 003402 052737 000340 177776 BIS #40,PS ;SET PROCESSOR PRIORITY TO LEVEL 1.
595 003410 012777 000100 013166 MOV #INTENA,20HMCSR ;SET INTERRUPT ENABLE
596 003416 052777 000200 013160 BIS #DONE,20HMCSR ;GENERATE INTERRUPT
597 003424 000240 NOP ;WAIT FOR INTERRUPT
598 003426 000240 NOP
599 003430 005077 013150 CLR 20HMCSR
600 003434 104012 ERROR ;NO INTERRUPT, ERROR
601 003436 000401 BR INT11B ;CONTINUE
602 003440 022626 INT11A: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
603 003442 104002 INT11B: SCOPE ;CHECK FOR INTERATIONS, LOOP.
604
605 ;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
606 ;ENABLE" SET AND "DONE" SET AT PRIORITY 2.
607
608
609 003444 T17: ;REFERENCE DESIGNATION
610 003444 005077 013134 INT12: CLR 20HMCSR ;CLEAR CONTROL REGISTER
611 003450 042737 000340 177776 BIC #340,PS ;ALLOW INTERRUPTS
612 003456 012777 003526 013114 MOV #INT12A,20HMVEC ;SET UP INTERRUPT SERVICE ADDRESS
613 003464 005077 013112 CLR 20HMLVL ;SET UP INTERRUPT SERVICE PRIORITY
614 003470 052737 000100 177776 BIS #100,PS ;SET PROCESSOR PRIORITY TO LEVEL 2.
615 003476 012777 000100 013100 MOV #INTENA,20HMCSR ;SET INTERRUPT ENABLE
616 003504 052777 000200 013072 BIS #DONE,20HMCSR ;GENERATE INTERRUPT
617 003512 000240 NOP ;WAIT FOR INTERRUPT
618 003514 000240 NOP
619 003516 005077 013062 CLR 20HMCSR
620 003522 104012 ERROR ;NO INTERRUPT, ERROR
621 003524 000401 BR INT12B ;CONTINUE

```

H03

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DZDHC.P11

SEQ 0033

620 003526 022626
621 003530 104002

INT12A: POP2SP
INT12B: SCOPE

: INTERRUPT OCCURED, RESTORE STACK
; CHECK FOR INTERACTIONS, LOOP.

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622
623
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625
626 003532
627 003532 005077 013046
628 003536 042737 000340 177776
629 003544 012777 003614 013026
630 003552 005077 013024
631 003556 052737 000140 177776
632 003564 012777 000100 013012
633 003572 052777 000200 013004
634 003600 000240
635 003602 000240
636 003604 005077 012774
637 003610 104012
638 003612 000401
639 003614 022626
640 003616 104002

T20:
INT13: CLR 20HMCSR
        BIC #340,PS
        MOV #INT13A,20HMVEC
        CLR 20HMLVL
        BIS #140,PS
        MOV #INTENA,20HMCSR
        BIS #DONE,20HMCSR
        NOP
        NOP
        CLR 20HMCSR
        ERROR
        BR INT13B
INT13A: POP2SP
INT13B: SCOPE

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

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ALLOW INTERRUPTS
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE PRIORITY
;SET PROCESSOR PRIORITY TO LEVEL 3.
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;WAIT FOR INTERRUPT

;NO INTERRUPT, ERROR
;CONTINUE
;INTERRUPT OCCURED, RESTORE STACK
;CHECK FOR INTERATIONS, LOOP.
    
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641
642
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645 003620
646 003620 005077 012760
647 003624 042737 000340 177776
648 003632 012737 000001 016714
649 003640 005005
650 003642 012700 000020
651 003646 033737 016714 016712
652 003654 001407
653 003656 010577 012722
654 003662 017704 012716
655 003666 020504
656 003670 001401
657 003672 104000
658 003674 104003
659 003676 003646
660 003700 005205
661 003702 006337 016714
662 003706 005300
663 003710 001356
664 003712 104002
665
666
667
668
669 003714
670 003714 042737 000340 177776
671 003722 005077 012656
672 003726 005005
673 003730 012737 000001 016714
674 003736 012701 177777
675 003742 012700 000020
676 003746 012777 000017 012630
677 003754 033737 016714 016712
678 003762 001410
679 003764 052777 000400 012612
680 003772 017704 012606
681 003776 020504
682 004000 001401
683 004002 104000
684 004004 104003
685 004006 003714
686 004010 005205
687 004012 006337 016714
688 004016 005201
689 004020 010177 012560
690 004024 005300
691 004026 001352
692 004030 104002

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

T21:
LINT1: CLR 20HMCSR
        BIC #340,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 #340,PS
        CLR 20HMCSR
        CLR R5
        MOV #1,SELMSK
        MOV #-1,R1
        MOV #16,R0
        MOV #17,20HMCSR
LINT2A: BIT SELMSK,LINSEL
        BEQ LINT2B
        BIS #STEP,20HMCSR
        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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693
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699
700 004032          T23:
701 004032 012777 002000 012544 MENT1: MOV #CLRMUX,20HMSCR ;REFERENCE DESIGNATION
702 004040 042737 000340 177776 BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
703 004046 012700 000020 MOV #16.,R0 ;ENABLE INTERRUPTS
704 004052 052777 001017 012524 BIS #MAINT+17,20HMSCR ;SET UP TO TEST 16 LOCATIONS
705 004060 052777 000400 012516 MENT1A: BIS #STEP,20HMSCR ;SET MAINTENANCE MODE
706 004066 005300 DEC R0 ;SET LINE COUNTER THRU ALL
707 004070 001373 BNE MENT1A ;STATES, WRITING 1'S INTO
708 004072 012700 000020 MOV #16.,R0 ;ALL MEMORY WORDS
709 004076 012705 070000 MOV #70000,R5 ;SET UP TO TEST 16 WORDS
710 004102 012777 000017 012474 MOV #17,20HMSCR ;SET UP EXPECTED STATUS REGISTER
711 004110 052777 000400 012466 MENT1B: BIS #STEP,20HMSCR ;START WITH LINE 0
712 004116 017704 012462 MOV 20HMSCR,R4 ;ACCESS SCANNER MEMORY
713 004122 020504 CMP R5,R4 ;READ DATA
714 004124 001403 BEQ MENT1C ;COMPARE EXPECTED AND RECEIVED
715 004126 104000 ERRORC ;DATA
716 004130 104003 SCOPEFF ;CONTROL STATUS OR MEMORY ERROR
717 004132 004032 MENT1 ;CHECK FOR DATA FREEZE
718 004134 005205 MENT1C: INC R5 ;UPDATE EXPECTED STATUS
719 004136 005300 DEC R0 ;UPDATE LINE COUNT
720 004140 001363 BNE MENT1B ;CONTINUE
721 004142 012777 004000 012434 MENT1D: MOV #CLRSCN,20HMSCR ;SET "CLEAR SCAN"
722 004150 032777 000020 012426 BIT #BUSY,20HMSCR ;WAIT FOR "CLEAR CYCLES"
723 004156 001374 BNE .-6
724 004160 012700 000020 MOV #16.,R0 ;SET UP TO TEST 16 MEMORY
725 004164 005005 CLR R5 ;LOCATIONS
726 004166 012777 000017 012410 MOV #17,20HMSCR ;FIRST TO BE TESTED=0
727 004174 052777 000400 012402 MENT1E: BIS #STEP,20HMSCR ;ACCESS SCANNER MEMORY
728 004202 017704 012376 MOV 20HMSCR,R4 ;READ DATA
729 004206 020504 CMP R5,R4 ;COMPARE EXPECTED AND RECEIVED
730 004210 001403 BEQ MENT1F ;DATA
731 004212 104000 ERRORC ;CONTROL STATUS OF MEMORY ERROR
732 004214 104003 SCOPEFF ;CHECK FOR DATA FREEZE
733 004216 004142 MENT1D
734 004220 005205 MENT1F: INC R5 ;UPDATE EXPECTED DATA
735 004222 005300 DEC R0 ;UPDATE LINE COUNT
736 004224 001363 BNE MENT1E ;CONTINUE
737 004226 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP

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738										
739										;WRITE 1'S INTO SELECTED SCANNER MEMORY LOCATION.
740										;VERIFY THAT ONLY SELECTED LOCATION WAS WRITTEN INTO.
741										
742	004230					T24:				;REFERENCE DESIGNATION
743	004230	005077	012350			MENT2:	CLR	2DHCSR		;CLEAR CONTROL STATUS REGISTER
744	004234	042737	000340	177776			BIC	#340,PS		;ENABLE INTERRUPTS
745	004242	012700	000020				MOV	#16,R0		;SET UP TO TEST 16 ADDRESSES
746	004246	012702	000017				MOV	#17,R2		;FIRST ADDRESS TO BE TESTED=0
747	004252	012777	004000	012324		MENT2A:	MOV	#CLASCN,2DHCSR		;CLEAR SCANNER MEMORY
748	004260	032777	000020	012316			BIT	#BUSY,2DHCSR		;WAIT FOR CLEAR CYCLE
749	004266	001374					BNE	.-6		
750	004270	012777	001000	012306			MOV	#MAINT,2DHCSR		;SET "MAINTENANCE MODE"
751	004276	050277	012302				BIS	R2,2DHCSR		;SET LINE COUNTER TO TEST ADDRESS-1
752	004302	052777	000400	012274			BIS	#STEP,2DHCSR		;WRITE 1'S INTO TEST ADDRESS
753	004310	042777	001000	012266			BIC	#MAINT,2DHCSR		;CLEAR "MAINTENANCE MODE"
754	004316	012703	000020				MOV	#16,R3		;SET UP TO TEST ALL 16
755	004322	012777	000017	012254			MOV	#17,2DHCSR		;SCANNER MEMORY LOCATIONS
756	004330	005202					INC	R2		
757	004332	005001					CLR	R1		
758	004334	052777	000400	012242		MENT2B:	BIS	#STEP,2DHCSR		;ACCESS SCANNER MEMORY
759	004342	117704	012236				MOVB	2DHCSR,R4		;READ CONTENTS OF MEMORY
760	004346	010105					MOV	R1,R5		;SET UP EXPECTED CONTENTS
761	004350	120402					CMPB	R4,R2		;OF SCANNER MEMORY
762	004352	001002					BNE	MENT2C		
763	004354	052705	070000				BIS	#70000,R5		
764	004360	020405				MENT2C:	CMP	R4,R5		;COMPARE EXPECTED AND RECEIVED
765	004362	001403					BEQ	MENT2D		;VALUES
766	004364	104000					ERRORC			;SCANNER MEMORY ERROR
767	004366	104003					SCOPEF			;CHECK FOR DATA FREEZE
768	004370	004252					MENT2A			
769	004372	005201				MENT2D:	INC	R1		
770	004374	005303					DEC	R3		;TEST NEXT SCANNED LOCATION
771	004376	001356					BNE	MENT2B		
772	004400	005300					DEC	R0		;UPDATE LINE COUNT
773	004402	001323					BNE	MENT2A		
774	004404	104002					SCOPE			;CHECK FOR ITERATION, LOOP

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

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;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 ADDRESSES
;FIRST ADDRESS TO BE TESTED=0
;WRITE 1'S INTO ALL SCANNER
;MEMORY LOCATIONS

;SET LINE COUNTER TO TEST ADDRESS-1
;WRITE 0'S INTO TEST ADDRESS
;SET UP TO TEST ALL 16
;SCANNER MEMORY LOCATIONS

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

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

;TEST NEXT SCANNER LOCATION

;UPDATE ADDRESS COUNT

;CHECK FOR ITERATION, LOOP

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813                                     ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
814                                     ;BE SET AND CLEARED FOR SELECTED LINE
815
816 004556 T26: REFERENCE DESIGNATION
817 004556 005077 012022 MUX1: CLR @DHMCSR ;CLEAR CONTROL STATUS REGISTER
818 004562 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
819 004570 012700 000020 MOV #16,R0 ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
820 004574 012737 000001 016714 MOV #1,SELMSK ;INIT LINE SELECT MASK
821 004602 005001 CLR R1 ;START AT LINE 0
822 004604 012777 002000 011772 MUX1A: MOV @CLRMUX,@DHMCSR
823 004612 012702 000020 MOV #16,R2
824 004616 033737 016714 016712 BIT SELMSK,LINSEL ;IS THIS LINE SELECTED FOR TEST ?
825 004624 001463 BEQ MUX1F ;BR IF NOT
826 004626 010177 011752 MOV R1,@DHMCSR ;SELECT LINE TO BE TESTED
827 004632 012777 000001 011746 MOV @LINENA,@DHMLSR ;SET LINE ENABLE FUNCTION FLIP-FLOP
828 004640 012737 000001 016716 MOV #1,SLMSK ;INIT ANOTHER SELECT MASK
829 004646 005077 011732 CLR @DHMCSR
830 004652 005005 MUX1B: CLR R5
831 004654 033737 016716 016712 BIT SLMSK,LINSEL ;SELECTED ??
832 004662 001417 BEQ MUX1D ;BR IF NOT
833 004664 017704 011716 MOV @DHMLSR,R4 ;READ LINE STATUS REGISTER
834 004670 117703 011710 MOV @DHMCSR,R3 ;READ CONTROL STATUS REGISTER
835 004674 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
836 004700 020103 CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER,
837 004702 001002 BNE MUX1C ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
838 004704 012705 000001 MOV @LINENA,R5
839
840 MUX1C: CMP R5,R4 ;TO BE SET
841 004712 001403 BEQ MUX1D ;COMPARE EXPECTED AND RECEIVED
842 004714 104001 ERRORL ;RESULTS
843 004716 104003 SCOPEF ;LINE STATUS ERROR
844 004720 004722 MUX1D
845 004722 052777 000400 011654 MUX1D: BIS #STEP,@DHMCSR ;EXAMINE NEXT LINE
846 004730 006337 016716 ASL SLMSK ;SHIFT MASK
847 004734 005302 DEC R2
848 004735 001345 BNE MUX1B
849 004740 005005 CLR R5
850 004742 010177 011636 MUX1E: MOV R1,@DHMCSR
851 004746 010103 MOV R1,R3 ;SET LINE COUNTER TO SELECTED LINE
852 004750 005077 011632 CLR @DHMLSR ;CLEAR LINE ENABLE FLIP FLOP
853 004754 105227 000000 INCB #0 ;DELAY FOR CABLE
854 004760 001375 BNE -4 ;DITTO
855 004762 017704 011620 MOV @DHMLSR,R4 ;READ LINE STATUS REGISTER
856 004766 005704 TST R4 ;WAS LINE ENABLE FUNCTION FLIP FLOP
857 004770 001401 BEQ MUX1F ;CLEARED
858 004772 104001 ERRORL ;NO, LINE STATUS ERROR
859 004774 104003 SCOPEF ;CHECK FOR LOOP ON SAME DATA
860 004776 004604 MUX1A
861 005000 006337 016714 ASL SELMSK ;SHIFT SELECT MASK
862 005004 005201 INC R1 ;SELECT NEXT LINE
863 005006 005300 DEC R0 ;DECREMENT LINE COUNT
864 005010 001275 BNE MUX1A ;CONTINU IF NOT DONE
865 005012 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
    
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866                                     ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
867                                     ;BE SET AND CLEARED FOR SELECTED LINE
868
869 005014                                T27:                                ;REFERENCE DESIGNATION
870 005014 005077 011564                MUX2:  CLR                @OHMCSR                ;CLEAR CONTROL STATUS REGISTER
871 005020 042737 000340 177776        BIC                @340,PS                ;ENABLE INTERRUPTS
872 005026 012700 000020                MOV                @16,R0                ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
873 005032 012737 000001 016714        MOV                @1,SELMSK            ;INIT LINE SELECT MASK
874 005040 005001                        CLR                R1                    ;START AT LINE 0
875 005042 012777 002000 011534        MUX2A: MOV                @CLAMUX,@OHMCSR
876 005050 012702 000020                MOV                @16,R2
877 005054 033737 016714 016712        BIT                SELMSK,LINSEL
878 005062 001463                        BEQ                MUX2F
879 005064 010177 011514                MOV                R1,@OHMCSR
880 005070 012777 000002 011510        MOV                @TRMRY,@OHMLSR
881 005076 012737 000001 016716        MOV                @1,SLMSK
882 005104 005077 011474                CLR                @OHMCSR
883 005110 005005                        MUX2B: CLR                R5
884 005112 033737 016716 016712        BIT                SLMSK,LINSEL
885 005120 001417                        BEQ                MUX2D
886 005122 017704 011460                MOV                @OHMLSR,R4
887 005126 117703 011452                MOVB               @OHMCSR,R3
888 005132 042703 177760                BIC                @177760,R3
889 005136 020103                        CMP                R1,R3
890 005140 001002                        BNE                MUX2C
891 005142 012705 000002                MOV                @TRMRY,R5
892
893 005146 020504                                MUX2C: CMP                R5,R4
894 005150 001403                        BEQ                MUX2D
895 005152 104001                        ERRORL
896 005154 104003                        SCOPEF
897 005156 005160                        MUX2D
898 005160 052777 000400 011416        MUX2D: BIS                @STEP,@OHMCSR
899 005166 006337 016716                ASL                SLMSK
900 005172 005302                        DEC                R2
901 005174 001345                        BNE                MUX2B
902 005176 005005                        CLR                R5
903 005200 010177 011400                MUX2E: MOV                R1,@OHMCSR
904 005204 010103                        MOV                R1,R3
905 005206 005077 011374                CLR                @OHMLSR
906 005212 105227 000000                INCB                @0
907 005216 001375                        BNE                -4
908 005220 017704 011362                MOV                @OHMLSR,R4
909 005224 005704                        TST                R4
910 005226 001401                        BEQ                MUX2F
911 005230 104001                        ERRORL
912 005232 104003                        MUX2F: SCOPEF
913 005234 005042                        MUX2A
914 005236 006337 016714                ASL                SELMSK
915 005242 005201                        INC                R1
916 005244 005300                        DEC                R0
917 005246 001275                        BNE                MUX2A
918 005250 104002                        SCOPE
    
```

DZDMKC.P11

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919 ;VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
920 ;BE SET AND CLEARED FOR SELECTED LINE
921
922 005252 005077 011326 T30:
923 005252 042737 000340 177776 MUX3: CLR 20HMCSR
924 005256 012700 000020 MOV 8340,PS
925 005270 012737 000001 016714 MOV 816,R0
926 005276 005001 CLR 81,SELMSK
927 005300 012777 002000 011276 MUX3A: CLR R1
928 005306 012702 000020 MOV 8CLRMUX,20HMCSR
929 005312 033737 016714 016712 MOV 816,R2
930 005320 001463 BIT SELMSK,LINSEL
931 005322 010177 011256 BEQ MUX3F
932 005326 012777 000004 011252 MOV R1,20HMCSR
933 005334 012737 000001 016716 MOV 8RS,20HMLSR
934 005342 005077 011236 MOV 81,SLMSK
935 005346 005005 CLR 20HMCSR
936 005350 033737 016716 016712 MUX3B: CLR R5
937 005356 001417 BIT SLMSK,LINSEL
938 005360 017704 011222 BEQ MUX3D
939 005364 117703 011224 MOV 20HMLSR,R4
940 005370 042703 177760 MOV 20HMCSR,R3
941 005374 020103 BIC 8177760,R3
942 005376 001002 CMP R1,R3
943 005400 012705 000004 BNE MUX3C
944
945 MUX3C: MOV 8RS,R5
946
947 005404 020504 MUX3C: CMP R5,R4
948 005406 001403 BEQ MUX3D
949 005410 104001 ERRORL
950 005412 104003 SCOPEF
951 005414 005416 MUX3D
952 005416 052777 000400 011160 MUX3D: BIS 8STEP,20HMCSR
953 005424 006337 016716 ASL SLMSK
954 005430 005302 DEC R2
955 005432 001345 BNE MUX3B
956 005434 005005 CLR R5
957 005436 010177 011142 MUX3E: MOV R1,20HMCSR
958 005442 010103 MOV R1,R3
959 005444 005077 011136 CLR 20HMLSR
960 005450 105227 000000 INCB 80
961 005454 001375 BNE 8-4
962 005456 017704 011124 MOV 20HMLSR,R4
963 005462 005704 TST R4
964 005464 001401 BEQ MUX3F
965 005466 104001 ERRORL
966 005470 104003 SCOPEF
967 005472 005300 MUX3F: MUX3A
968 005474 006337 016714 ASL SELMSK
969 005500 005201 INC R1
970 005502 005300 DEC R0
971 005506 104002 BNE MUX3A
SCOPE
;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;SET JP TO TEST 16 FUNCTION FLIP-FLOP
;INIT LINE SELECT MASK
;START AT LINE 0
;IS THIS LINE SELECTED FOR TEST ?
;BR IF NOT
;SELECT LINE TO BE TESTED
;SET REQUEST TO SEND FUNCTION FLIP-FLOP
;INIT ANOTHER SELECT MASK
;SELECTED ??
;BR IF NOT
;READ LINE STATUS REGISTER
;READ CONTROL STATUS REGISTER
;CLEAR UNWANTED BITS
;IF LINE NUMBER=SELECTED LINE NUMBER
;EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
;TO BE SET
;COMPARE EXPECTED AND RECEIVED
;RESULTS
;LINE STATUS ERROR
;EXAMINE NEXT LINE
;SHIFT MASK
;SET LINE COUNTER TO SELECTED LINE
;CLEAR REQUEST TO SEND FLIP FLOP
;DELAY FOR CABLE
;DITTO
;READ LINE STATUS REGISTER
;WAS REQUEST TO SEND FUNCTION FLIP FLOP
;CLEARED
;NO LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA
;SHIFT SELECT MASK
;SELECT NEXT LINE
;DECREMENT LINE COUNT
;CONTINU IF NOT DONE
;CHECK FOR ITERATIONS, LOOP

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972                                     ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
973                                     ;BE SET AND CLEARED FOR SELECTED LINE
974
975                                     T31:
976 005510 005077 011070 MUX4: CLR 20HMCSR ;REFERENCE DESIGNATION
977 005514 042737 000340 177776 MUX4: BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
978 005522 012700 000020 MUX4: MOV #16,R0 ;ENABLE INTERRUPTS
979 005526 012737 000001 016714 MUX4: MOV #1,SELMSK ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
980 005534 005001 MUX4: CLR R1 ;INIT LINE SELECT MASK
981 005536 012777 002000 011040 MUX4A: MOV #CLRMUX,20HMCSR ;START AT LINE 0
982 005544 012702 000020 MUX4A: MOV #16,R2
983 005550 033737 016714 016712 MUX4A: BIT SELMSK,LINSEL ;IS THIS LINE SELECTED FOR TEST ?
984 005556 001463 MUX4A: BEQ MUX4F ;BR IF NOT
985 005560 010177 011020 MUX4A: MOV R1,20HMCSR ;SELECT LINE TO BE TESTED
986 005564 012777 000010 011014 MUX4A: MOV #SECTX,20HMLSR ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
987 005572 012737 000001 016716 MUX4A: MOV #1,SLMSK ;INIT ANOTHER SELECT MASK
988 005600 005077 011000 MUX4A: CLR 20HMCSR
989 005604 005005 MUX4B: CLR R5
990 005606 033737 016716 016712 MUX4B: BIT SLMSK,LINSEL ;SELECTED ??
991 005614 001417 MUX4B: BEQ MUX4D ;BR IF NOT
992 005616 017704 010764 MUX4B: MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
993 005622 117703 010756 MUX4B: MOVB 20HMCSR,R3 ;READ CONTROL STATUS REGISTER
994 005626 042703 177760 MUX4B: BIC #177760,R3 ;CLEAR UNWANTED BITS
995 005632 020103 MUX4B: CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER
996 005634 001002 MUX4B: BNE MUX4C ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
997 005636 012705 000010 MUX4B: MOV #SECTX,R5
998
999 MUX4C: CMP R5,R4 ;TO BE SET
1000 005642 020504 MUX4C: BEQ MUX4D ;COMPARE EXPECTED AND RECEIVED
1001 005646 104001 MUX4C: ERRORL ;RESULTS
1002 005650 104003 MUX4C: SCOPEF ;LINE STATUS ERROR
1003 005652 005654 MUX4C: MUX4D
1004 005654 052777 000400 010722 MUX4D: BIS #STEP,20HMCSR ;EXAMINE NEXT LINE
1005 005662 005337 016716 MUX4D: ASL SLMSK ;SHIFT MASK
1006 005666 005302 MUX4D: DEC R2
1007 005670 001345 MUX4D: BNE MUX4B
1008 005672 005005 MUX4D: CLR R5
1009 005674 010177 010704 MUX4E: MOV R1,20HMCSR
1010 005700 010103 MUX4E: MOV R1,R3 ;SET LINE COUNTER TO SELECTED LINE
1011 005702 005077 010700 MUX4E: CLR 20HMLSR ;CLEAR SECONDARY TRANSMIT FLIP FLOP
1012 005706 105227 000000 MUX4E: INCB #0 ;DELAY FOR CABLE
1013 005712 001375 MUX4E: BNE -4 ;DITTO
1014 005714 017704 010666 MUX4E: MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
1015 005720 005704 MUX4E: TST R4 ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
1016 005722 001401 MUX4E: BEQ MUX4F ;CLEARED
1017 005724 104001 MUX4E: ERRORL ;NO LINE STATUS ERROR
1018 005726 104003 MUX4F: SCOPEF ;CHECK FOR LOOP ON SAME DATA
1019 005730 005536 MUX4F: MUX4A
1020 005732 006337 016714 MUX4F: ASL SELMSK ;SHIFT SELECT MASK
1021 005736 005201 MUX4F: INC R1 ;SELECT NEXT LINE
1022 005740 005300 MUX4F: DEC R0 ;DECREMENT LINE COUNT
1023 005742 001275 MUX4F: BNE MUX4A ;CONTINUE IF NOT DONE
1024 005744 104002 MUX4F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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1029 005746
1030 005746 005077 010632
1031 005752 042737 000340 177776
1032 005760 012700 000020
1033 005764 005001
1034 005766 012737 000001 016714
1035 005774 012702 000020
1036 006000 333737 016714 016712
1037 006006 001454
1038 006010 010177 010570
1039 006014 012777 000003 010564
1040 006022 005077 010556
1041 006026 005005
1042 006030 017704 010552
1043 006034 117703 010544
1044 006040 042703 177760
1045 006044 020103
1046 006046 001002
1047 006050 012705 000143
1048
1049 005054 020405
1050 006056 001403
1051 006060 104001
1052 006062 104003
1053 006064 006066
1054 006066 052777 000400 010510
1055 006074 005302
1056 006076 001353
1057 006100 012705 000001
1058 006104 010103
1059 006106 010177 010472
1060 006112 042777 000002 010466
1061 006120 105227 000000
1062 006124 001375
1063 006126 017704 010454
1064 006132 020504
1065 006134 001401
1066 006136 104001
1067 006140 104003
1068 006142 005774
1069 006144 005201
1070 006145 005077 010434
1071 006152 006337 016714
1072 006156 005300
1073 006160 001305
1074 006162 104002

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

T32:
MUXS: CLR 20HMSCR
      BIC #340,PS
      MOV #16.,R0
      CLR R1
      MOV #1,SELMSK
MUXSA: MOV #16.,R2
      BIT SELMSK,LINSEL
      BEQ MUXSF
      MOV R1,20HMSCR
      MOV #LINENA+TRMRDY,20HMLSR
      CLR 20HMSCR
MUXSB: CLR R5
      MOV 20HMLSR,R4
      MOVB 20HMSCR,R3
      BIC #177760,R3
      CMP R1,R3
      BNE MUXSC
      MOV #LINENA+TRMRDY+CO+CS,R5
MUXSC: CMP R4,R5
      BEQ MUXSD
      ERRORL SCOPEF
      MUXSD
MUXSD: BIS #STEP,20HMSCR
      DEC R2
      BNE MUXSB
      MOV #LINENA,R5
MUXSE: MOV R1,R3
      MOV R1,20HMSCR
      BIC #TRMRDY,20HMLSR
      INCB #0
      BNE .-4
      MOV 20HMLSR,R4
      CMP R5,R4
      BEQ MUXSF
      ERRORL SCOPEF
      MUXSA
      INC R1
      CLR 20HMLSR
      ASL SELMSK
      DEC R0
      BNE MUXSA
      SCOPE

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LINES
;START AT LINE 0
;INIT LINE SELECT MASK
;16 LINES
;THIS LINE SELECTED FOR TEST ?
;BR IF NOT
;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 LOOP ON SAME DATA
;UPDATE LINE NUMBER
;CLEAR LINE STATUS REGISTER
;SHIFT MARK TO TEST NEXT LINE
;CONTINUE IF ALL LINES NOT
;TESTED
;CHECK FOR ITERATIONS, LOOP

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1079 006164 005077 010414 T33:
1080 006164 042737 000340 177776 MUX6: CLR 20HCSR ;REFERENCE DESIGNATION
1081 006170 012700 000020 BIC #340,PS ;CLEAR CONTROL REGISTER
1082 006176 005001 012700 016714 MOV #16.,R0 ;ENABLE INTERRUPTS
1083 006202 012737 000001 016714 CLR R1 ;SET UP TO TEST 16 LINES
1084 006204 012702 000020 016712 MUX6A: MOV #1,SELMSK ;START AT LINE 0
1085 006212 033737 016714 016712 BIT SELMSK,LINSEL ;INIT LINE SELECT MASK
1086 006224 001454 BEQ MUX6F ;16 LINES
1087 006226 010177 010352 MOV R1,20HCSR ;THIS LINE SELECTED FOR TEST ?
1088 006232 012777 000005 010346 MUX6A: MOV #LINENA+RS,20HLSR ;OR IF NOT
1089 006240 005077 010340 CLR 20HCSR ;SELECT A LINE
1090 006244 005005 MUX6B: CLR R5 ;SET LINE ENABLE +RS
1091 006246 017704 010334 MOV 20HLSR,R4 ;CLEAR CONTROL REGISTER
1092 006252 117703 010326 MOVB 20HCSR,R3 ;CLEAR EXPECTED RESULT
1093 006256 042703 177760 BIC #177760,R3 ;READ LINE STATUS
1094 006262 020103 CMP R1,R3 ;READ LINE NUMBER
1095 006264 001002 BNE MUX6C ;CLEAR UNWANTED BITS
1096 006266 012705 000205 MOV #LINENA+RS+RING,R5 ;IF RECEIVED LINE=SELECTED LINE
1097 ;EXPECT LINE ENABLE AND
1098 MUX6C: CMP R4,R5 ;RING IS SET
1099 BEQ MUX6C ;COMPARE EXPECTED AND
1100 ERRORL ;RECEIVED RESULTS
1101 SCOPEF ;LINE STATUS ERROR
1102 MUX6D:
1103 BIS #STEP,20HCSR ;UPDATE LINE COUNTER
1104 DEC R2 ;CONTINUE IF ALL CHECKS
1105 BNE MUX6B ;ARE NOT DONE FOR THIS LINE
1106 MOV #LINENA,R5 ;EXPECT LINE ENABLE
1107 MUX6E: MOV R1,R3 ;ON SELECTED LINE
1108 MOV R1,20HCSR ;SELECT LINE
1109 BIC #RS,20HLSR ;CLEAR REQUEST TO SEND
1110 INCB #0 ;DELAY FOR CABLE
1111 BNE -4 ;DITTO
1112 MOV 20HLSR,R4 ;READ LINE STATUS REGISTER
1113 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
1114 BEQ MUX6F ;SET ON THIS LINE
1115 ERRORL ;LINE STATUS ERROR
1116 SCOPEF ;CHECK FOR LOOP ON SAME DATA
1117 MUX6F:
1118 MUX6A: INC R1 ;UPDATE LINE NUMBER
1119 CLR 20HLSR ;CLEAR LINE STATUS REGISTER
1120 RSL SELMSK ;SHIFT MARK TO TEST NEXT LINE
1121 DEC R0 ;CONTINUE IF ALL LINES NOT
1122 BNE MUX6A ;TESTED
1123 SCOPE ;CHECK FOR ITERATIONS, LOOP
1124

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1125
1126
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1129
1130 006402 005077 010176
1131 006406 042737 000340 177776
1132 006414 012700 000020
1133 006420 005001
1134 006422 012737 000001 016714
1135 006430 012702 000020
1136 006434 033737 016714 015712
1137 006442 001454
1138 006444 010177 010134
1139 006450 012777 000011 010130
1140 006456 005077 010122
1141 006462 005005
1142 006464 017704 010116
1143 006470 117703 010110
1144 006474 042703 177760
1145 006500 020103
1146 006502 001002
1147 006504 012705 000031
1148
1149 006510 020405
1150 006512 001403
1151 006514 104001
1152 006516 104003
1153 006520 006522
1154 006522 052777 000400 010054
1155 006522 005302
1156 006522 001353
1157 006534 012705 000001
1158 006540 010103
1159 006542 010177 010036
1160 006546 042777 000010 010032
1161 006554 105227 000000
1162 006560 001375
1163 006562 017704 010020
1164 006566 020504
1165 006570 001401
1166 006572 104001
1167 006574 104003
1168 006576 006430
1169 006600 005201
1170 006602 005077 010000
1171 006606 006337 016714
1172 006612 005300
1173 006614 001305
1174 006616 104002

```

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

```

T34:
MUX7: CLR 20HMCSR
      BIC #340,PS
      MOV #16.,R0
      CLR R1
      MOV #1,SELSK
      MOV #16.,R2
MUX7A: BIT SELSK,LINSEL
      BEQ MUX7F
      MOV R1,20HMCSR
      MOV #LINENA+SECTX,20HMLSR
      CLR 20HMCSR
MUX7B: CLR R5
      MOV 20HMLSR,R4
      MOVB 20HMCSR,R3
      BIC #177760,R3
      CMP R1,R3
      BNE MUX7C
      MOV #LINENA+SECTX+SECRX,R5
MUX7C: CMP R4,R5
      BEQ MUX7D
      ERROR SCOPEF
      MUX7D
MUX7D: BIS #STEP,20HMCSR
      DEC R2
      BNE MUX7B
      MOV #LINENA,R5
MUX7E: MOV R1,R3
      MOV R1,20HMCSR
      BIC #SECTX,20HMLSR
      INCB #0
      BNE .-4
      MOV 20HMLSR,R4
      CMP R5,R4
      BEQ MUX7F
      ERROR SCOPEF
      MUX7A
      INC R1
      CLR 20HMLSR
      ASL SELSK
      DEC R0
      BNE MUX7A
      SCOPE

```

```

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 LINES
;START AT LINE 0
;INIT LINE SELECT MASK
;16 LINES
;THIS LINE SELECTED FOR TEST ?
;BR IF NOT
;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 LOOP ON SAME DATA
;UPDATE LINE NUMBER
;CLEAR LINE STATUS REGISTER
;SHIFT MARK TO TEST NEXT LINE
;CONTINUE IF ALL LINES NOT
;TESTED
;CHECK FOR ITERATIONS, LOOP

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1175
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1177
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1179 006620          T35:
1180 006620 005077 007760 MUX8: CLR 20HCSR ;REFERENCE DESIGNATION
1181 006624 042737 000340 177776 BIC #340,PS ;CLEAR CONTROL REGISTER
1182 006632 012700 000020 MOV #16,R0 ;ENABLE INTERRUPTS
1183 006636 012777 000017 037742 MUX8A: MOV #17,20HMLSR ;SET UP TO TEST 16 LINES
1184 006644 052777 000400 007732 BIS #STEP,20HCSR ;WRITE 15 INTO ALL MULTIPLEXER
1185 006652 005300 DEC R0 ;FUNCTION FLIPFLOPS
1186 006654 001370 BNE MUX8A
1187 006656 012737 000001 016714 MOV #1,SELMSK ;INIT SELECT MASK
1188 006664 005003 CLR R3 ;SET UP FOR 16 LINES
1189 006666 012700 000020 MOV #16,R0
1190 006672 012777 002000 007704 MUX8B: MOV #CLRMUX,20HCSR ;CLEAR MULTIPLEXER
1191 006700 033737 016714 016712 MUX8C: BIT SELMSK,LINSEL ;SELECTED ??
1192 006706 001425 BEQ MUX8E ;BR IF NOT
1193 006710 010377 007670 MOV R3,20HCSR ;SELECT LINE
1194 006714 017704 007666 MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
1195 006720 005005 CLR R5 ;EXPECT 05
1196 006722 005704 TST R4 ;HAS LINE STATUS REGISTER CLEARED
1197 006724 001403 BEQ MUX8D
1198 006726 104001 ERRORL ;LINE STATUS ERROR
1199 006730 104003 SCOPEF ;CHECK FOR LOOP ON SAME DATA
1200 006732 006672 MUX8B
1201 006734 005205 MUX8D: INC R5 ;EXPECT LINE ENABLE
1202 006736 052777 000001 007642 BIS #LINENA,20HMLSR ;SET LINE ENABLE ON SELECTED LINE
1203 006744 017704 007636 MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
1204 006750 020504 CMP R5,R4 ;IS ANYTHING BUT LINE ENABLE SET
1205 006752 001403 BEQ MUX8E
1206 006754 104001 ERRORL ;LINE STATUS ERROR
1207 006756 104003 SCOPEF ;CHECK FOR LOOP ON SAME DATA
1208 006760 006672 MUX8B
1209 006762 005203 MUX8E: INC R3 ;UPDATE LINE NUMBER
1210 006764 005077 007616 CLR 20HMLSR ;CLEAR CURRENT LINE
1211 006770 006337 016714 ASL SELMSK ;SHIFT SELECT MASK
1212 006774 005300 DEC R0 ;CONTINUE IF ALL LINES NOT
1213 006776 001340 BNE MUX8C ;TESTED
1214 007000 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
    
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1215
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1220
1221 007002          T36:
1222 007002 012777 002000 007574 SCNT1: MOV    #CLRMUX, @DHMCSR      ; REFERENCE DESIGNATION
1223 007010 005077 007570          CLR    @DHMCSR          ; CLEAR ALL MULTIPLEXER FLIPFLOPS
1224 007014 042737 000340 177776 BIC    #340, PS         ; CLEAR CONTROL REGISTER
1225 007022 012700 000020          MOV    #16, R0         ; ENABLE INTERRUPTS
1226 007026 012777 001017 007550 MOV    #MAINT+17, @DHMCSR ; SET UP TO WRITE 1'S INTO
1227 007034 012737 000001 016714 MOV    #1, SELMSK      ; ALL SCANNER MEMORY LOCATION
1228 007042 052777 000400 007534 SCNT1A: BIS    #STEP, @DHMCSR ; INIT SELECT MASK
1229 007050 012777 000001 007530 MOV    #LINEA, @DHMLSR ; WRITE A LOCATION
1230 007056 005300          DEC    R0              ; LET "LINE ENABLE"
1231 007060 001370          BNE    SCNT1A
1232 007062 012701 177777          MOV    #-1, R1
1233 007066 012705 070340          MOV    #70340, R5     ; INIT LINE NO. GEN.
1234 007072 012777 007202 007500 MOV    #SCNT1C, @DHMVEC ; EXPECT "DONE"+"SCNENA"+"COF"+"CSF"+"SECRXF"
1235 007100 013777 177776 007474 MOV    PS, @DHMLVL    ; SET UP LOCAL INTERRUPT SERVICE
1236 007106 012700 000020          MOV    #16, R0
1237 007112 012777 000117 007464 MOV    #INTENA+17, @DHMCSR ; SET INTERRUPT ENABLE
1238 007120 033737 016714 016712 SCNT1B: BIT    SELMSK, LINSSEL ; SELECTED ??
1239 007126 001435          BEQ    SCNT1D         ; BR IF NOT
1240 007130 052737 000340 177776 BIS    #340, PS       ; LOCK OUT INTERRUPTS
1241 007136 052777 000040 007440 BIS    #SCNENA, @DHMCSR ; START SCANNER
1242 007144 042737 000340 177776 BIC    #340, PS       ; ENABLE INTERRUPTS
1243 007152 105777 007426          TSTB  @DHMCSR        ; WAIT FOR DONE
1244 007156 100375          BPL    -.4            ; PROGRAM WILL HANG HERE
1245
1246 007160 052737 000340 177776 BIS    #340, PS       ; IF DONE NEVER SETS
1247 007166 017704 007412          MOV    @DHMCSR, R4    ; INTERRUPT DID NOT OCCUR
1248 007172 104000          ERRORC              ; ERROR
1249 007174 104003          SCOPEF             ; CONTROL STATUS ERROR
1250 007176 007002          SCNT1              ; CHECK FOR LOOP ON SAME DATA
1251 007200 000410          BR     SCNT1D
1252 007202 023626          SCNT1C: POP2SP
1253 007204 017704 007374          MOV    @DHMCSR, R4
1254 007210 020504          CMP    R5, R4
1255 007212 001403          BEQ    SCNT1D
1256 007214 104000          ERRORC
1257 007216 104003          SCOPEF
1258 007220 007002          SCNT1
1259 007222 042777 000257 007354 SCNT1D: BIC    #SCNENA+DONE+17, @DHMCSR ; CLEAR SCAN ENABLE AND DONE
1260 007230 005201          INC    R1            ; GEN NXT LINE NO.
1261 007232 150177 007346          BISB  R1, @DHMCSR    ; SET LINE NO. BITS
1262 007236 006337 016714          ASL   SELMSK        ; SHIFT SELECT MASK
1263 007242 005205          INC   R5            ; UPDATE EXPECTED RESULT
1264 007244 005300          DEC   R0            ; CONTINUE IF NOT DONE
1265 007246 001324          BNE   SCNT1B
1266 007250 104002          SCOPE              ; CHECK FOR ITERATIONS, LOOP

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1272 007252
1273 007252 012700 000020
1274 007256 012777 002000 007320
1275 007264 005077 007314
1276 007270 042737 000340 177776
1277 007276 012737 000001 016714
1278 007304 012777 000017 007274
1279 007312 052777 000400 007264
1280 007320 005300
1281 007322 001370
1282 007324 012777 004000 007252
1283 007332 032777 000020 007244
1284 007340 001374
1285 007342 012700 000020
1286 007346 012701 177777
1287 007352 012705 170340
1288 007356 012777 007462 007214
1289 007364 013777 177776 007210
1290 007372 012777 000117 007204
1291 007400 033737 016714 016712
1292 007406 001435
1293 007410 052737 000340 177776
1294 007416 052777 000040 007160
1295 007424 042737 000340 177776
1296 007432 105777 007146
1297 007436 100375
1298
1299 007440 052737 000340 177776
1300 007446 017704 007132
1301 007452 104000
1302 007454 104003
1303 007456 007252
1304 007460 000410
1305 007462 022626
1306 007464 017704 007114
1307 007470 020504
1308 007472 001403
1309 007474 104000
1310 007476 104003
1311 007500 007252
1312 007502 042777 000257 007074
1313 007510 006337 016714
1314 007514 005201
1315 007516 150177 007062
1316 007522 005205
1317 007524 005300
1318 007526 001324
1319 007530 104002

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

T37:
SCNT2: MOV #16, R0
MOV #CLRMUX, @DHMCSR
CLR @DHMCSR
BIC #340, PS
MOV #1, SELMSK
SCNT2A: MOV #17, @DHMLSR
BIS #STEP, @DHMCSR
RO
DEC RO
BNE SCNT2A
MOV #CLRSCN, @DHMCSR
BIT #BUSY, @DHMCSR
BNE .-6
MOV #16, R0
MOV #-1, R1
MOV #170340, R5
MOV #SCNT2C, @DHMVEC
MOV PS, @DHMLVL
SCNT2B: BIT #INTENA+17, @DHMCSR
SELMSK, LINSEL
BEQ SCNT2D
BIS #340, PS
BIS #SCNENA, @DHMCSR
BIC #340, PS
TSTB @DHMCSR
BPL .-4
BIS #340, PS
MOV @DHMCSR, R4
ERRORC
SCOPEF
SCNT2
BR SCNT2D
SCNT2C: POP2SP
MOV @DHMCSR, R4
CMP R5, R4
BEQ SCNT2D
ERRORC
SCOPEF
SCNT2
SCNT2D: BIC #SCNENA+DONE+17, @DHMCSR
ASL SELMSK
INC R1
BISB R1, @DHMCSR
INC R5
DEC RO
BNE SCNT2B
SCOPE

;REFERENCE DESIGNATION
;WRITE 15 INTO ALL
;CLEAR MULTIPLEXER
;MULTIPLEXER FUNCTION
;ENABLE TELETYPE INTERRUPTS
;INIT LINE SELECT MASK
;FLIPFLOPS

;CLEAR SCANNER MEMORY
;WAIT FOR CLEAR CYCLE TO COMPLETE

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

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

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

;CONTROL STATUS ERROR
;CHECK FOR LOOP ON CURRENT DATA

;CLEAR SCAN ENABLE AND DONE AND LINE NO.
;SHIFT SELECT BIT
;GEN NEW LINE NO.
;SET IT IN CSR
;UPDATE EXPECTED RESULT
;CONTINUE IF ALL
;LINES NOT TESTED
;CHECK FOR ITERATIONS, LOOP
    
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007532
007532 012737 007552 002204
007540 042737 000340 177776
007546 104004
007550 017723
007552 104013
007554 017756
007556 000000
007560 000017
007562 016672
007564 104004
007566 017720

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

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

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

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

;GET LINE NUMBER

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1341
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1345 007570
1346 007570 005077 007010
1347 007574 042737 000340 177776
1348 007602 013701 016672
1349 007606 012777 002000 006770
1350 007614 012702 000020
1351 007620 010177 006760
1352 007624 012777 000001 006754
1353 007632 005077 006746
1354 007636 005005
1355 007640 017704 006742
1356 007644 117703 006734
1357 007650 042703 177760
1358 007654 020103
1359 007656 001002
1360 007660 012705 000001
1361
1362 007664 020504
1363 007666 001403
1364 007670 104001
1365 007672 104003
1366 007674 007676
1367 007676 052777 000400 006700
1368 007704 005302
1369 007706 001353
1370 007710 005005
1371 007712 010177 006666
1372 007716 010103
1373 007720 005077 006652
1374 007724 105227 000000
1375 007730 001375
1376 007732 017704 006650
1377 007736 005704
1378 007740 001401
1379 007742 104001
1380 007744 104002

T101:
MUX11: CLR @DHMCSR
      BIC #340,PS
      MOV LINE,R1
MUX11A: MOV #CLRMUX,@DHMCSR
      MOV #16,R2
      MOV R1,@DHMCSR
      MOV #LINENA,@DHMLSR
MUX11B: CLR @DHMCSR
      CLR R5
      MOV @DHMLSR,R4
      MOVB @DHMCSR,R3
      BIC #177760,R3
      CMP R1,R3
      BNE MUX11C
      MOV #LINENA,R5
MUX11C: CMP R5,R4
      BEQ MUX11D
      ERRORL SCOPEF
      MUX11D
MUX11D: BIS #STEP,@DHMCSR
      DEC R2
      BNE MUX11B
      CLR R5
MUX11E: MOV R1,@DHMCSR
      MOV R1,R3
      CLR @DHMLSR
      INCB #0
      BNE #-4
      MOV @DHMLSR,R4
      TST R4
      BEQ MUX11F
      ERRORL SCOPE
MUX11F: SCOPE

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

```

```

;REFERENCE DESIGNATION

```

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;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS

```

```

;SELECT LINE TO BE TESTED
;SET LINE ENABLE FUNCTION FLIP-FLOP

```

```

;READ LINE STATUS REGISTER
;READ CONTROL STATUS REGISTER
;CLEAR UNWANTED BITS
;IF LINE NUMBER=SELECTED LINE NUMBER,
;EXCEPT LINE ENABLE FUNCTION FLIP FLOP

```

```

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

```

```

;EXAMINE NEXT LINE

```

```

;SET LINE COUNTER TO SELECTED LINE
;CLEAR LINE ENABLE FLIP FLOP
;DELAY FOR CABLE
;DITTO
;READ LINE STATUS REGISTER
;WAS LINE ENABLE FUNCTION FLIP FLOP
;CLEARED
;NO. LINE STATUS ERROR
;CHECK FOR ITERATIONS, LOOP

```

M04

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 DZDHC.P11

SEQ 0051

```

1381                                     ;VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
1382                                     ;BE SET AND CLEARED FOR SELECTED LINE
1383
1384 007746                                T102:                                ;REFERENCE DESIGNATION
1385 007746 005077 006632                MUX12: CLR @DHMCSR                ;CLEAR CONTROL STATUS REGISTER
1386 007752 042737 000340 177776        BIC #340,PS                       ;ENABLE INTERRUPTS
1387 007760 013701 016672                MOV LINE,R1
1388 007764 012777 002000 006612        MUX12A: MOV @CLRMUX,@DHMCSR
1389 007772 012702 000020                MOV #16,R2
1390 007776 010177 006602                MOV R1,@DHMCSR
1391 010002 012777 000002 006576        MOV @TRMROY,@DHMLSR
1392 010010 005077 006570                CLR @DHMCSR
1393 010014 005005                MUX12B: CLR R5
1394 010016 017704 006564                MOV @DHMLSR,R4
1395 010022 117703 006556                MOVB @DHMCSR,R3
1396 010026 042703 177760                BIC #177760,R3
1397 010032 020103                CMP R1,R3
1398 010034 001002                BNE MUX12C
1399 010036 012705 000002                MOV @TRMROY,R5
1400
1401 010042 020504                MUX12C: CMP R5,R4
1402 010044 001403                BEQ MUX12D
1403 010046 104001                ERRORL
1404 010050 104003                SCOPEF
1405 010052 010054                MUX12D
1406 010054 052777 000400 006522        MUX12D: BIS #STEP,@DHMCSR
1407 010062 005302                DEC R2
1408 010064 001353                BNE MUX12B
1409 010066 005005                CLR R5
1410 010070 010177 006510                MUX12E: MOV R1,@DHMCSR
1411 010074 010103                MOV R1,R3
1412 010076 005077 006504                CLR @DHMLSR
1413 010102 105227 000000                INCB #0
1414 010106 001375                BNE .-4
1415 010110 017704 006472                MOV @DHMLSR,R4
1416 010114 005704                TST R4
1417 010116 001401                BEQ MUX12F
1418 010120 104001                ERRORL
1419 010122 104002                MUX12F: SCOPE

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

;EXAMINE NEXT LINE

;SET LINE COUNTER TO SELECTED LINE
;CLEAR TERMINAL READY FLIP FLOP
;DELAY FOR CABLE
;DITTO
;READ LINE STATUS REGISTER
;WAS TERMINAL READY FUNCTION FLIP FLOP
;CLEARED
;NO LINE STATUS ERROR
;CHECK FOR ITERATIONS, LOOP

```



```

1459                                     ;VERIFY THAT SECONDARY TRANSMIT FUNCTION FLIP-FLOP CAN
1460                                     ;BE SET AND CLEARED FOR SELECTED LINE
1461
1462 010302 T104:                                     ;REFERENCE DESIGNATION
1463 010302 005077 006276 MUX14: CLR 20HMCSR ;CLEAR CONTROL STATUS REGISTER
1464 010306 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
1465 010314 013701 016672 MOV LINE,R1
1466 010320 012777 002000 006256 MUX14A: MOV #CLRMUX,20HMCSR
1467 010326 012702 000020 MOV #16,R2
1468 010332 010177 006246 MOV R1,20HMCSR ;SELECT LINE TO BE TESTED
1469 010336 012777 000010 006242 MOV #SECTX,20HMLSR ;SET SECONDARY TRANSMIT FUNCTION FLIP-FLOP
1470 010344 005077 006234 CLR 20HMCSR
1471 010350 005005 MUX14B: CLR R5
1472 010352 017704 006230 MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
1473 010356 117703 006222 MOVB 20HMCSR,R3 ;READ CONTROL STATUS REGISTER
1474 010362 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
1475 010366 020103 CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER
1476 010370 001002 BNE MUX14C ;EXCEPT SECONDARY TRANSMIT FUNCTION FLIP FLOP
1477 010372 012705 000010 MOV #SECTX,R5
1478
1479 010376 020504 MUX14C: CMP R5,R4 ;TO BE SET
1480 010400 001403 BEQ MUX14D ;COMPARE EXPECTED AND RECEIVED
1481 010402 104001 ERRORL ;RESULTS
1482 010404 104003 SCOPEF ;LINE STATUS ERROR
1483 010406 010410 MUX14D
1484 010410 052777 000400 006166 MUX14D: BIS #STEP,20HMCSR ;EXAMINE NEXT LINE
1485 010416 005302 DEC R2
1486 010420 001353 BNE MUX14B
1487 010422 005005 CLR R5
1488 010424 010177 006154 MUX14E: MOV R1,20HMCSR
1489 010430 010103 MOV R1,R3 ;SET LINE COUNTER TO SELECTED LINE
1490 010432 005077 006150 CLR 20HMLSR ;CLEAR SECONDARY TRANSMIT FLIP FLOP
1491 010436 105227 000000 INCB #0 ;DELAY FOR CABLE
1492 010442 001375 BNE .-4 ;DITTO
1493 010444 017704 006136 MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
1494 010450 005704 TST R4 ;WAS SECONDARY TRANSMIT FUNCTION FLIP FLOP
1495 010452 001401 BEQ MUX14F ;CLEARED
1496 010454 104001 ERRORL ;NO, LINE STATUS ERROR
1497 010456 104002 MUX14F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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1498
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1502 010460 T105: ;REFERENCE DESIGNATION
1503 010460 005077 006120 MUX15: CLR @DHMCSR ;CLEAR CONTROL REGISTER
1504 010464 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
1505 010472 013701 016672 MOV LINE,R1
1506 010476 012702 000020 MUX15A: MOV #16,R2 ;16 LINES
1507 010502 010177 006076 MOV R1,@DHMCSR ;SELECT A LINE
1508 010506 012777 000003 006072 MOV @LINENA+TRMROY,@DHMLSR ;SET LINE ENABLE +TRMROY
1509 010514 005077 006064 CLR @DHMCSR ;CLEAR CONTROL REGISTER
1510 010520 005005 MUX15B: CLR R5 ;CLEAR EXPECTED RESULT
1511 010522 017704 006060 MOV @DHMLSR,R4 ;READ LINE STATUS
1512 010526 117703 006052 MOV @DHMCSR,R3 ;READ LINE NUMBER
1513 010532 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
1514 010536 020103 CMP R1,R3 ;IF RECEIVED LI =SELECTED LINE
1515 010540 001002 BNE MUX15C ;EXPECT LINE ENABLE AND
1516 010542 012705 000143 MOV @LINENA+TRMROY+CO+CS,R5 ;CLEAR TO SEND AND CARRIER ARE SET
1517
1518 010546 020405 MUX15C: CMP R4,R5 ;COMPARE EXPECTED AND
1519 010550 001403 BEQ MUX15D ;RECEIVED RESULTS
1520 010552 104001 ERRORL ;LINE STATUS ERROR
1521 010554 104003 SCOPEF
1522 010556 010560 MUX15D
1523 010560 052777 000400 006016 MUX15D: BIS #STEP,@DHMCSR ;UPDATE LINE COUNTER
1524 010566 005302 DEC R2 ;CONTINUE IF ALL CHECKS
1525 010570 001353 BNE MUX15B ;ARE NOT DONE FOR THIS LINE
1526 010572 012705 000001 MOV @LINENA,R5 ;EXPECT LINE ENABLE
1527 010576 010103 MUX15E: MOV R1,R3 ;ON SELECTED LINE
1528 010600 010177 006000 MOV R1,@DHMCSR ;SELECT LINE
1529 010604 042777 000002 005774 BIC #TRMROY,@DHMLSR ;CLEAR TERMINAL
1530 010612 105227 000000 INCB #0 ;DELAY FOR CABLE
1531 010616 001375 BNE .-4 ;DITTO
1532 010620 017704 005762 MOV @DHMLSR,R4 ;READ LINE STATUS REGISTER
1533 010624 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
1534 010626 001401 BEQ MUX15F ;SET ON THIS LINE
1535 010630 104001 ERRORL ;LINE STATUS ERROR
1536 010632 104002 MUX15F: SCOPE ;CHECK FOR ITERATIONS, LOOP
    
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1541 010634 T106:
1542 010634 005077 005744 MUX16: CLR 20HCSR
1543 010640 042737 000340 177776 BIC 8340,PS
1544 010646 013701 016672 MOV LINE,R1
1545 010652 012702 000020 MUX16A: MOV 16,R2
1546 010656 010177 005722 MOV R1,20HCSR
1547 010662 012777 030005 005716 MOV #LINEA+RS,20HLSR
1548 010670 005077 005710 CLR 20HCSR
1549 010674 005005 MUX16B: CLR RS
1550 010676 017704 005704 MOV 20HLSR,R4
1551 010732 117703 005676 MOVB 20HCSR,R3
1552 010706 042703 177760 BIC #177760,R3
1553 010712 020103 CMP R1,R3
1554 010714 001002 BNE MUX16C
1555 010716 012705 000205 MOV #LINEA+RS+RING,RS
1556
1557 010722 020405 MUX16C: CMP R4,RS
1558 010724 001403 BEQ MUX16D
1559 010726 104001 ERRORL
1560 010730 104003 SCOPEF
1561 010732 010734 MUX16D
1562 010734 052777 000400 005642 MUX16D: BIS #STEP,20HCSR
1563 010742 005302 DEC R2
1564 010744 001353 BNE MUX16E
1565 010746 012705 000001 MOV #LINEA,RS
1566 010752 010103 MUX16E: MOV R1,R3
1567 010754 010177 005624 MOV R1,20HCSR
1568 010760 042777 003004 005620 BIC #RS,20HLSR
1569 010766 105227 000000 INCB #0
1570 010772 001375 BNE -4
1571 010774 017704 005606 MOV 20HLSR,R4
1572 011000 020504 CMP R5,R4
1573 011002 001401 BEQ MUX16F
1574 011004 104001 ERRORL
1575 011006 104002 MUX16F: SCOPE

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

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;ENABLE INTERRUPTS

;16 LINES
;SELECT A LINE
;SET LINE ENABLE +RS
;CLEAR CONTROL REGISTER
;CLEAR EXPECTED RESULT
;READ LINE STATUS
;READ LINE NUMBER
;CLEAR UNWANTED BITS
;IF RECEIVED LINE=SELECTED LINE
;EXPECT LINE ENABLE AND

;RING IS SET
;COMPARE EXPECTED AND
;RECEIVED RESULTS
;LINE STATUS ERROR

;UPDATE LINE COUNTER
;CONTINUE IF ALL CHECKS
;ARE NOT DONE FOR THIS LINE
;EXPECT LINE ENABLE
;ON SELECTED LINE
;SELECT LINE
;CLEAR REQUEST TO SEND
;DELAY FOR CABLE
;DITTO
;READ LINE STATUS REGISTER
;ONLY LINE ENABLE SHOULD BE
;SET ON THIS LINE
;LINE STATUS ERROR
;CHECK FOR ITERATIONS, LOOP

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1576
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1580 011010 T107: ;REFERENCE DESIGNATION
1581 011010 005077 005570 MUX17: CLR 20HMCSR ;CLEAR CONTROL REGISTER
1582 011014 042737 000340 177776 BIC 8340,PS ;ENABLE INTERRUPTS
1583 011022 013701 016672 MOV LINE,R1
1584 011026 012702 000020 MUX17A: MOV 816,R2 ;16 LINES
1585 011032 010177 005546 MOV R1,20HMCSR ;SELECT A LINE
1586 011036 012777 000011 005542 MOV #LINENA+SECTX,20HMLSR ;SET LINE ENABLE +SECTX
1587 011044 005077 005534 CLR 20HMCSR ;CLEAR CONTROL REGISTER
1588 011050 005005 MUX17B: CLR R5 ;CLEAR EXPECTED RESULT
1589 011052 017704 005530 MOV 20HMLSR,R4 ;READ LINE STATUS
1590 011056 117703 005522 MOVB 20HMCSR,R3 ;READ LINE NUMBER
1591 011062 042703 177760 BIC 8177760,R3 ;CLEAR UNWANTED BITS
1592 011066 020103 CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
1593 011070 001002 BNE MUX17C ;EXPECT LINE ENABLE AND
1594 011072 012705 000031 MOV #LINENA+SECTX+SECRX,R5
1595
1596 011076 020405 MUX17C: CMP R4,R5 ;SECONDARY RECEIVE IS SET
1597 011100 001403 BEQ MUX17D ;COMPARE EXPECTED AND
1598 011102 104001 ERRORL ;RECEIVED RESULTS
1599 011104 104003 SCOPEF ;LINE STATUS ERROR
1600 011106 011110 MUX17D
1601 011110 052777 000400 005466 MUX17D: BIS #STEP,20HMCSR ;UPDATE LINE COUNTER
1602 011116 005302 DEC R2 ;CONTINUE IF ALL CHECKS
1603 011120 001353 BNE MUX17B ;ARE NOT DONE FOR THIS LINE
1604 011122 012705 000001 MOV #LINENA,R5 ;EXPECT LINE ENABLE
1605 011126 010103 MUX17E: MOV R1,R3 ;ON SELECTED LINE
1606 011130 010177 005450 MOV R1,20HMCSR ;SELECT LINE
1607 011134 042777 000010 005444 BIC #SECTX,20HMLSR ;CLEAR SECONDARY TRANSMIT
1608 011142 105227 000000 INCB #0 ;DELAY FOR CABLE
1609 011146 001375 BNE .-4 ;DITTO
1610 011150 017704 005432 MOV 20HMLSR,R4 ;READ LINE STATUS REGISTER
1611 011154 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
1612 011156 001401 BEQ MUX17F ;SET ON THIS LINE
1613 011160 104001 ERRORL ;LINE STATUS ERROR
1614 011162 104002 MUX17F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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1665
    011164
    011164 000075
    011166 012737 000340 177776
    011174 104004
    011176 017142
    011200 022737 000176 016620
    011206 001001
    011210 104025
    011212 012737 011230 013020
    011220 012737 011226 002204
    011226 104017
    011230 104020
    011232 011242
    011234 011236
    011236 104012
    011240 000772
    011242 104021
    011244 011262
    011246 011252
    011250 011256
    011252 104014
    011254 000207
    011256 104014
    011260 000762

T200:
ST103A:
T103A:
T103A1:
T1038:
T1038:
T1038:
T10381:
T10382:
T10381:
T10382:

RESET
MOV #340,PS
TYPE
MT103T
CMP #SWREG,SWR
BNE IS
CNTLUU
IS:
MOV #T103A,FATRET
MOV #ST1038,KRET
GETLNS
SETUP
T1038
T103A1
ERROR
BR ST1038

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

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

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

;CHECK FOR RING INTERRUPT
;ONLY ON ANSWER LINE
;AND NO TRANSITIONS ON
;ORIGINATE LINE
;GO HERE IF TRANSITIONS
;ARE CORRECT
;GO HERE IF INCORRECT
;TRANSITION ON ANSWER LINE
;GO HERE IF INCORRECT TRANSITION
;ON ORIGINATE LINE
;TRANSITION ERROR ON ANSWER LINE
;CONTINUE CHECKING
;TRANSITION ERROR ON ORIGINATE LINE
;RESELECT LINES AND REDIAL
    
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SEG 0058

1666								
1667							:SET TERMINAL READY ON SELECTED ANSWER LINE	
1668							:WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES	
1669								
1670	011262	013777	016676	005314	T103C:	MOV	LINANS,JDHMC SR	:SET LINE COUNTER TO
1671								:ANSWER LINE NUMBER
1672	011270	052777	000002	005310		BIS	#TRMRDY,JDHMLSR	:SET TERMINAL READY ON
1673								:SELECTED ANSWER LINE
1674	011276	104026				CKINTT		
1675	011300	104022				WAITRN		:WAIT FOR TRANSITIONS TO OCCUR
1676								
1677							:CHECK FOR CORRECT STATUS AND TRANSITIONS ON	
1678							:SELECTED ORIGINATE AND ANSWER LINES	
1679								
1680	011302	104023				CKTRAN		:CHECK TRANSITIONS AND
1681								:STATUS ON SELECTED
1682								:ANSWER AND ORIGINATE LINES
1683	011304	000143				CO+CS+LINENA+TRMRDY		:EXPECT CARRIER, CLEAR TO SEND,
1684								:LINE ENABLE AND TERMINAL
1685								:READY STATUS BITS SET ON
1686								:ANSWER LINE
1687	011306	000143				CO+CS+LINENA+TRMRDY		:EXPECT CARRIER, CLEAR TO SEND,
1688								:LINE ENABLE AND TERMINAL
1689								:READY STATUS BITS ON
1690								:ORIGINATE LINE
1691	011310	100006				RINGF+XCO+XCS		:EXPECT CARRIER, CLEAR TO SEND
1692								:AND POSSIBLE RING TRANSITIONS
1693								:ON ANSWER LINE
1694	011312	000006				XCO+XCS		:EXPECT CARRIER AND CLEAR
1695								:TO SEND TRANSITIONS ON
1696								:ORIGINATE LINE
1697	011314	011326				T10301		:GO HERE ON ANSWER LINE STATUS ERROR
1698								
1699	011316	011332				T10302		:GO HERE ON ORIGINATE LINE STATUS ERROR
1700	011320	011336				T10303		:GO HERE ON ANSWER LINE TRANSITION ERROR
1701	011322	011342				T10304		:GO HERE ON ORIGINATE LINE TRANSITION ERROR
1702	011324	011346				T103E		:GO TO NEXT TEST IF NO ERRORS
1703	011326	104015	T10301:	ERRORS				:ANSWER LINE STATUS ERROR
1704	011330	000207		RTS	PC			:CONTINUE CHECKING
1705	011332	104015	T10302:	ERRORS				:ORIGINATE LINE STATUS ERROR
1706	011334	000207		RTS	PC			:CONTINUE CHECKING
1707	011336	104014	T10303:	ERRORT				:ANSWER LINE TRANSITION ERROR
1708	011340	000207		RTS	PC			:CONTINUE CHECKING
1709	011342	104014	T10304:	ERRORT				:ORIGINATE LINE TRANSITION ERROR
1710	011344	000207		RTS	PC			:CONTINUE CHECKING

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1711
1712 ;SET UP TO TEST DISCONNECT SEQUENCE
1713 ;THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
1714 ;TO INITIATE THE DISCONNECT SEQUENCE
1715 ;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
1716 ;DATA TO TALK MODE AS MANY TIMES AS DESIRED
1717 ;BEFORE THE SWITCH SEETIN IS MADE
1718 ;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
1719 ;REPORTED BY TYPEOUT
1720
1721 011346 104004          T103E: TYPE          ;TYPE "STRIKE ANY TTY KEY
1722 011350 017405          MDISC          ;TEST DISCONNECT"
1723 011352 012737 000340 177776      MOV          #340,PS      ;LOCK OUT INTERRUPTS
1724 011360 012777 013042 005212      MOV          #TRNTYP,20HMVEC ;SET UP TO DETECT TRANSITIONS
1725 ;BEFORE DISCONNECT SEQUENCE STARTS
1726 011366 012737 011406 016724      MOV          #T103ES,RNGRET ;SET UP DUMMY RETURN FOR
1727 ;RING INTERRUPT
1728 011374 012777 000140 005202      MOV          #SCNENA+INTENA,20HMCSR ;SET SCAN ENABLE AND INTERRUPT ENABLE
1729 011402 005037 177776          CLR          PS          ;ALLOW INTERRUPTS
1730 011406 005077 005200          CLR          2TKDBR
1731 011412 105777 005172          T103ES: CLR          2TKCSR      ;WAIT FOR TTY TO HIT
1732 011416 100375          IS:      TSTB
1733 011420 005777 005166          BPL          IS
1734 011424 012737 000340 177776      TST          2TKDBR
1735 011432 005077 005146          MOV          #340,PS      ;START DISCONNECT SEQUENCE
1736 011436 013777 016674 005140      CLR          20HMCSR      ;CLEAR CONTROL REGISTER
1737 011444 042777 000002 005134      MOV          LINORG,20HMCSR ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
1738 011452 104026          BIC          #TRMROY,20HMLSR ;SET TERMINAL READY ON SELECTED LINE
1739 011454 104022          CKINTT
          WAITRN          ;WAIT FOR TRANSITIONS TO OCCUR
  
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1780
1781 ;MODEM CONTROL ON LINE TEST USING 202C TYPE MODEMS
1782 ;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
1783 ;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
1784 ;USING THE MODEM CONTROL TO CONTROL 202C TYPE MODEMS
1785
1786 ;ALSO TESTED ARE LINE TURN-AROUND AND
1787 ;SECONDARY TRANSMIT-SECONDARY RECEIVE
1788
1789 011540 T300: ;REFERENCE DESIGNATION
1790 011540 000005 ST202A: RESET ;INITIALIZE INTERFACE
1791 011542 012737 000340 177776 MOV #340,PS ;DISABLE ALL INTERRUPTS
1792 011550 104004 TYPE ;TYPE "202C MODEM CONNECT-
1793 011552 017213 MT202T ;DISCONNECT TEST"
1794 011554 022737 000176 016620 CMP #SWREG,SWR
1795 011562 001001 BNE IS
1796 011564 104025 CNTLW
1797 011566 012737 011604 013020 IS: MOV #T202A,FATRET ;SET UP FOR FATAL ERROR
1798 011574 012737 011602 002204 MOV #ST202B,KRET ;SET UP FOR LINE CHANGE
1799 011602 104017 ST202B: GETLMS ;INPUT ORIGINATE AND
1800 ;ANSWER LINE NUMBERS
1801 011604 104020 T202A: SETUP ;SET UP TO RECEIVE INTERRUPTS
1802 ;WAIT FOR RING
1803 011606 011616 T202B ;GO HERE IF RING OK
1804 011610 011612 T202A1 ;GO HERE IF NO RING
1805 011612 104012 T202A1: ERROR ;NO RING WITHIN 5 MINUTES
1806 011614 000772 BR ST202B ;SELECT NEW LINES AND REDIAL
1807
1808 ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
1809 ;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
1810 ;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
1811 ;WILL BE REQUESTED TO RESELECT LINES AND REDIAL
1812
1813 011616 104021 T202B: CKRING ;CHECK FOR RING INTERRUPT
1814 ;ONLY ON ANSWER LINE
1815 ;AND NO TRANSITIONS ON
1816 ;ORIGINATE LINE
1817 011620 011636 T202C ;GO HERE IF TRANSITIONS
1818 ;ARE CORRECT
1819 011622 011626 T202B1 ;GO HERE IF INCORRECT
1820 ;TRANSITION ON ANSWER LINE
1821 011624 011632 T202B2 ;GO HERE IF INCORRECT
1822 ;TRANSITION ON ORIGINATE LINE
1823 011626 104014 T202B1: ERRORT ;ANSWER LINE TRANSITION ERROR
1824 011630 000207 RTS PC ;CONTINUE CHECKING
1825 011632 104014 T202B2: ERRORT ;ORIGINATE LINE TRANSITION ERROR
1826 011634 000762 BR ST202B ;RESELECT LINES AND REDIAL

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

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1871									
1872									;SET SECONDARY TRANSMIT ON ANSWER LINE
1873									;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1874									
1875	011736	013777	016676	004640	T202E:	MOV	LINANS,20HMC5R		;SET LINE COUNTER TO ANSWER LINE
1876	011744	052777	000010	004634		BIS	#SECTX,20HML5R		;SET SECONDARY RECEIVE ON ANSWER LINE
1877	011752	104026				CKINTT			
1878	011754	104022				WAITRN			;WAIT FOR TRANSITIONS TO OCCUR
1879									
1880									;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1881									;SELECTED ORIGINATE AND ANSWER LINES
1882									
1883	011756	104023				CKTRAN			;CHECK TRANSITIONS AND STATUS
1884									;ON SELECTED ANSWER AND
1885									;ORIGINATE LINES
1886	011760	000133				SECTX+CO+LINENA+TRMRDY+SECRX			;EXPECT SECONDARY TRANSMIT
1887									;SECONDARY RECEIVE, CARRIER
1888									;LINE ENABLE AND TERMINAL READY
1889									;STATUS BITS SET ON ANSWER LINE
1890	011762	000167				SECRX+RS+CO+CS+LINENA+TRMRDY			;EXPECT SECONDARY RECEIVE
1891									;REQUEST TO SEND, CLEAR TO SEND
1892									;CARRIER, LINE ENABLE AND
1893									;TERMINAL READY STATUS BITS
1894									;SET ON ORIGINATE LINE
1895	011764	000001				XSCRX			;EXPECT SECONDARY RECEIVE
1896									;TRANSITION ON ANSWER LINE
1897	011766	000001				XSCRX			;EXPECT SECONDARY RECEIVE
1898									;TRANSITION ON ORIGINATE LINE
1899	011770	012002				T202E1			;GO HERE ON ANSWER LINE STATUS ERROR
1900	011772	012006				T202E2			;GO HERE ON ORIGINATE LINE STATUS ERROR
1901	011774	012012				T202E3			;GO HERE ON ANSWER LINE TRANSITION ERROR
1902	011776	012016				T202E4			;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1903	012000	012022				T202F			;GO TO NEXT TEST IF NO ERRORS
1904	012002	104015			T202E1:	ERRORS			;ANSWER LINE STATUS ERROR
1905	012004	000207				RTS	PC		;CONTINUE CHECKING
1906	012006	104015			T202E2:	ERRORS			;ORIGINATE LINE STATUS ERROR
1907	012010	000207				RTS	PC		;CONTINUE CHECKING
1908	012012	104014			T202E3:	ERRORT			;ANSWER LINE TRANSITION ERROR
1909	012014	000207				RTS	PC		;CONTINUE CHECKING
1910	012016	104014			T202E4:	ERRORT			;ORIGINATE LINE TRANSITION ERROR
1911	012020	000207				RTS	PC		;CONTINUE CHECKING

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

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

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

2038									
2039									
2040									: DROP REQUEST TO SEND ON ANSWER LINE
2041									: WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2042	012272	013777	016676	004304	T2021:	MOV	LINANS, ZDHMCSR		: SET LINE COUNTER TO ANSWER LINE
2043	012300	042777	000004	004300		BIC	MS, ZDHMLSR		: CLEAR REQUEST TO SEND
2044	012306	013777	016674	004270		MOV	LINORG, ZDHMCSR		: SET LINE COUNTER TO ORIGINATE LINE
2045	012314	042777	000010	004264		BIC	SECTX, ZDHMLSR		: CLEAR SECONDARY TRANSMIT
2046	012322	104026				CKINTT			
2047	012324	104022				WAITRN			: WAIT FOR TRANSITIONS TO OCCUR
2048									
2049									
2050									: CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2051									: SELECTED ORIGINATE AND ANSWER LINES
2052	012326	104023				CKTRAN			: CHECK TRANSITION S AND STATUS
2053									: ON SELECTED ANSWER AND
2054									: ORIGINATE LINES
2055	012330	000003				LINENA+TRMRDY			: EXPECT LINE ENABLE AND
2056									: TERMINAL READY STATUS BITS SET
2057									: ON ANSWER LINE
2058	012332	000003				LINENA+TRMRDY			: EXPECT LINE ENABLE AND
2059									: TERMINAL READY STATUS BITS
2060									: SET ON ORIGINATE LINE
2061	012334	000007				XCO+XCS+XSCRX			: EXPECT CARRIER, CLEAR TO SEND
2062									: AND SECONDARY RECEIVE TRANSITIONS
2063									: ON ANSWER LINE
2064	012336	000005				XCO+XSCRX			: EXPECT CARRIER AND SECONDARY
2065									: RECEIVE TRANSITIONS ON
2066									: ORIGINATE LINE
2067	012340	012352				T20212			: GO HERE ON ANSWER LINE STATUS ERROR
2068	012342	012356				T20213			: GO HERE ON ORIGINATE LINE STATUS ERROR
2069	012344	012362				T20214			: GO HERE ON ANSWER LINE TRANSITION ERROR
2070	012346	012366				T20215			: GO HERE ON ORIGINATE LINE TRANSITION ERROR
2071	012350	012372				T202J			: GO TO NEXT TEST IF NO ERRORS
2072	012352	104015				T202I2: ERRORS			: ANSWER LINE STATUS ERROR
2073	012354	000207				RTS	PC		: CONTINUE CHECKING
2074	012356	104015				T202I3: ERRORS			: ORIGINATE LINE STATUS ERROR
2075	012360	000207				RTS	PC		: CONTINUE CHECKING
2076	012362	104014				T202I4: ERROR			: ANSWER LINE TRANSITION ERROR
2077	012364	000207				RTS	PC		: CONTINUE CHECKING
2078	012366	104014				T202I5: ERROR			: ORIGINATE LINE TRANSITION ERROR
2079	012370	000207				RTS	PC		: CONTINUE CHECKING

```

2080
2081 :SET UP TO TEST DISCONNECT SEQUENCE
2082 :THE PROGRAM WILL REQUEST THE OPERATOR TO TYPE A CHARACTER
2083 :TO INITIATE THE DISCONNECT SEQUENCE
2084 :THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
2085 :DATA TO TALK MODE AS MANY TIMES AS DESIRED
2086 :BEFORE THE SWITCH SEETIN IS MADE
2087 :ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
2088 :REPORTED BY TYPEOUT
2089
2090 012372 104004          T202J: TYPE          :TYPE "STRIKE ANY TTY KEY
2091 012374 017405          MDISC          :TEST DISCONNECT"
2092 012376 012737 000340 177776  MOV      #340,PS      :LOCK OUT INTERRUPTS
2093 012404 012777 013042 004166  MOV      #RNTYP,@DMVEC :SET UP TO DETECT TRANSITIONS
2094 012412 012737 012432 016724  MOV      #T202JS,RNGRET :SET UP DUMMY RETURN FOR RING
2095                                     :FROM RING INTERRUPT
2096 012420 012777 000140 004156  MOV      #SCNENA+INTENA,@DMCSR :ENABLE LINE SCANNER
2097                                     :START SCANNER
2098 012426 005037 177776          CLR      PS           :ENABLE INTERRUPTS
2099 012432 005077 004154          T202JS: CLR      @TKDBR
2100 012436 105777 004146          IS:    TSTB   @TKCSR
2101 012442 100375          BPL     IS
2102 012444 005777 004142          TST     @TKDBR
2103
2104                                     ;DISCONNECT SEQUENCE REQUESTED
2105
2106 012450 012737 000340 177776  MOV      #340,PS      :LOCK OUT INTERRUPTS
2107 012456 005077 004122          CLR      @DMCSR      :STOP SCANNER
2108 012462 013777 016674 004114  MOV      LINORG,@DMCSR :SET LINE COUNTER TO SELECTED ORIGINATE LINE
2109 012470 042777 000002 004110  BIC     #TRMRDY,@DMPLSR :SET TERMINAL READY ON SELECTED LINE
2110 012476 104024          WAITS          :DELAY
2111 012500 104026          CKINTT
2112 012502 104022          WAITRN          ;WAIT FOR TRANSITIONS TO OCCUR

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2113
2114
2115
2116
2117 012504 104023 CKTRAN
2118
2119
2120 012506 000003 LINENA+TRMRY
2121
2122
2123 012510 000001 LINENA
2124
2125 012512 000000 0
2126
2127 012514 000000 0
2128
2129 012516 012530 T202J1
2130 012520 012534 T202J2
2131 012522 012540 T202J3
2132 012524 012544 T202J4
2133 012526 012550 T202JN
2134 012530 104015 T202J1: ERRORS
2135 012532 000207 RTS PC
2136 012534 104015 T202J2: ERRORS
2137 012536 000207 RTS PC
2138 012540 104014 T202J3: ERROR
2139 012542 000207 RTS PC
2140 012544 104014 T202J4: ERROR
2141 012546 000207 RTS PC
2142
2143 012550 104004 T202JN: TYPE
2144 012552 017356 MT202A
2145 012554 104026 CKINTT
2146 012556 000137 011602 JMP ST202B
2147

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

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

```

;TYPE "202C TEST COMPLETE"

;GET NEW LINE NUMBERS
;RESTART TEST

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2160
2161 012562 017704 004016      TRANS:  MOV      2DHMCSR,R4          ;GET LINE NUMBER AND
2162                                     ;INTERRUPT FLAGS
2163 012566 010405      MOV      R4,R5
2164 012570 042705 177760      BIC      #177760,R5          ;EXTRACT LINE NUMBER
2165 012574 023705 016674      CMP      LINORG,R5          ;DID ORIGINATE LINE INTERRUPT
2166 012600 001411      BEQ      ORGTR              ;IF YES, SERVICE
2167 012602 023705 016676      CMP      LINANS,R5          ;DID ANSWER LINE INTERRUPT
2168 012606 001443      BEQ      ANSTR              ;IF YES, SERVICE
2169 012610 010577 003770      MOV      R5,2DHMCSR
2170 012614 017703 003766      MOV      2DHMLSR,R3
2171 012620 104016      ERRORN
2172 012622 000471      BR       FATEX              ;INTERRUPT ON INCORRECT LINE
2173
2174                                     ;RECORD TRANSITIONS FOR ORIGINATE LINE
2175
2176 012624 032704 100000      ORGTR:  BIT      #RINGF,R4          ;IF RING CAUSED INTERRUPT,
2177 012630 001403      BEQ      ORGTR1             ;SET RING TRANSITION BIT
2178 012632 052737 000010 016702      BIS      #10,ORGFLG
2179 012640 032704 040000      ORGTR1: BIT      #COF,R4          ;IF CARRIER CAUSED INTERRUPT
2180 012644 001403      BEQ      ORGTR2             ;SET CARRIER TRANSITION BIT
2181 012646 052737 000004 016702      BIS      #4,ORGFLG
2182 012654 032704 020000      ORGTR2: BIT      #CSF,R4          ;IF CLEAR TO SEND
2183                                     ;CAUSED INTERRUPT
2184 012660 001403      BEQ      ORGTR3             ;SET CLEAR TO SEND
2185                                     ;TRANSITION BIT
2186 012662 052737 000002 016702      BIS      #2,ORGFLG
2187 012670 032704 010000      ORGTR3: BIT      #SECRXF,R4       ;IF SECONDARY RECEIVE
2188                                     ;CAUSED INTERRUPT
2189 012674 001403      BEQ      ORGTR4             ;SET SECONDARY RECEIVE
2190 012676 052737 000001 016702      BIS      #1,ORGFLG          ;TRANSITION BIT
2191 012704 032704 170000      ORGTR4: BIT      #RINGF+COF+CSF+SECRXF,R4
2192                                     ;IF NO INTERRUPT FLAGS SET
2193 012710 001044      BNE      TRANEX            ;EXIT TRANSITION DETECTION
2194 012712 104016      ORGTRR: ERRORN
2195 012714 000434      BR       FATEX
    
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2196
2197
2198
2199 012716 032704 100000 ANSTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT,
2200 012722 001403 BEQ ANSTR1 ;SET RING TRANSITION BIT
2201 012724 052737 000010 016700 BIS #10,ANSFLG
2202 012732 032704 040000 ANSTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
2203 012736 001403 BEQ ANSTR2 ;SET CARRIER TRANSITION BIT
2204 012740 052737 000004 016700 BIS #4,ANSFLG
2205 012746 032704 020000 ANSTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
2206 ;CAUSED INTERRUPT
2207 012752 001403 BEQ ANSTR3 ;SET CLEAR TO SEND
2208 ;TRANSITION BIT
2209 012754 052737 000002 016700 BIS #2,ANSFLG
2210 012762 032704 010000 ANSTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
2211 ;CAUSED INTERRUPT
2212 012766 001403 BEQ ANSTR4 ;SET SECONDARY RECEIVE
2213 012770 052737 000001 016700 BIS #1,ANSFLG ;TRANSITION BIT
2214 012776 032704 170000 ANSTR4: BIT #RINGF+COF+CSF+SECRXF,R4
2215 ;IF NO INTERRUPT FLAGS SET
2216 013002 001007 BNE TRANEX ;EXIT TRANSITION DETECTION
2217 013004 104016 ANSTR: ERRORN
2218 013006 005037 016632 FATEX: CLR TSTNO
2219 013012 022626 POP2SP
2220 013014 000177 000000 JMP @FATRET
2221 013020 000000 FATRET: 0
2222
2223 ;EXIT TRANSITION DETECTION
2224
2225 013022 005704 TRANEX: TST R4 ;IF RING FLAG WAS SET
2226 013024 100002 BPL +6 ;SET UP SPECIAL RETURN
2227 013026 013716 016724 MOV RINGRET,(SP)
2228 013032 012777 000140 003544 TRANX1: MOV #SCNENA+INTENA,@OHMCSR ;RESTART SCANNER
2229 013040 000002 RTI
2230
2231 ;TYPE TRANSITION DATA AND RETURN
2232
2233 013042 017737 003536 014026 TRNTYP: MOV @OHMCSR,DATA1
2234 013050 017737 003532 014030 MOV @OHMLSR,DATA2
2235 013056 104004 TYPE
2236 013060 020027 MTRANDET
2237 013062 104006 OCTASC
2238 013064 013070 TRNTAB
2239 013066 000761 BR TRANX1
2240 013070 000002 TRNTAB: 2
2241 013072 000006 6
2242 013074 014026 DATA1
2243 013076 000003 3
2244 013100 014030 DATA2
    
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2245
2246 ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2247
2248 013102 000005 GETLIN: RESET
2249 013104 104013 INSTRG ;TYPE "ORIGINATE LINE-"
2250 013106 017264 MSELOR ;AND GET LINE NUMBER
2251 013110 000000 0
2252 013112 000017 17
2253 013114 016674 LINORG
2254 013116 104013 INSTRG ;TYPE "ANSWER LINE-"
2255 013120 017310 MSELANS ;AND GET LINE NUMBER
2256 013122 000000 0
2257 013124 000017 17
2258 013126 016676 LINANS
2259 013130 104004 TYPE
2260 013132 017720 MCRLF
2261 013134 000002 RTI ;RETURN TO CALLING ROUTINE
2262
2263 ;INITIALIZE INTERFACE
2264
2265 013136 000005 SETUPS: RESET
2266 013140 012737 000340 177776 MOV #340,PS ;LOCK OUT ALL INTERRUPTS
2267 013146 011605 MOV (SP),RS
2268 013150 012537 014036 MOV (RS)+,NXTTS
2269 013154 012537 014016 MOV (RS)+,ERR1
2270 013160 010516 MOV RS,(SP)
2271 013162 012777 006000 003414 MOV #CLRSCN+CLRMUX,JDHMCSR ;CLEAR LINE SCANNER AND MULTIPLEXER
2272 013170 032777 000020 003406 SETUP1: BIT #BUSY,JDHMCSR ;WAIT FOR SCANNER TO CLEAR
2273 013176 001374 BNE SETUP1
2274 013200 005037 016624 CLR ERRFLG
2275
2276 ;ENABLE SELECTED LINES
2277 ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
2278
2279 013204 013777 016674 003372 SETUP2: MOV LINORG,JDHMCSR ;SET UP TO ENABLE ORIGINATE LINE
2280 ;ORIGINATE LINE NUMBER
2281 013212 012777 000003 003366 MOV #LINENA+TRMRY,JDHMLSR ;SET LINE ENABLE AND
2282 ;TERMINAL READY ON ORIGINATE LINE
2283 013220 013777 016676 003356 MOV LINANS,JDHMCSR ;SET LINE COUNTER TO ANSWER LINE
2284 013226 012777 000001 003352 MOV #LINENA,JDHMLSR ;SET LINE ENABLE ON ANSWER LINE
2285
2286 ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
2287 ;SET UP TO RECEIVE INTERRUPTS
2288 ;START LINE SCANNER
2289
2290 013234 012777 012562 003336 MOV #TRANS,JDHMVEC ;SET UP INTERRUPT VECTOR
2291 ;FOR TRANSITION DETECTION
2292 013242 012777 000340 003332 MOV #340,JDHMLVL ;SET UP INTERRUPT SERVICE LEVEL
2293 013250 012777 000140 003326 MOV #SCNENA+INTENA,JDHMCSR ;START SCANNER, ENABLE INTERRUPTS
2294 013256 005037 016700 CLR ANSFLG ;CLEAR TRANSITION DETECTED FLAGS
2295 013262 005037 016702 CLR ORGFLG
2296 013266 012737 013316 016724 MOV #SETUP4,RNGRET ;SET UP RETURN FROM
2297 ;DETECTION OF RING INTERRUPT
2298 013274 104004 TYPE ;REQUEST OPERATOR TO DIAL
2299 013276 017104 DIALM
2300 013300 005037 177776 CLR PS ;CLEAR PROCESSOR STATUS WORD

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2301 013304 005037 016704          CLR      TIME1          ;CLEAR TIMER
2302 013310 012737 001000 016706    MOV      #1000,TIME2    ;SET UP FOR 5 MINUTE DELAY
2303 013316 005737 016700          TST      ANSFLG         ;IF TRANSITION HAS OCCURED,
2304 013322 001014          BNE     SETUPB         ;EXIT WAIT LOOP
2305 013324 005737 016702          TST      ORGFLG
2306 013330 001011          BNE     SETUPB
2307 013332 005237 016704          INC      TIME1          ;ALLOW OPERATOR 5 MINUTES TO DIAL
2308 013336 001367          BNE     SETUP4
2309 013340 005337 016706          DEC      TIME2
2310 013344 001364          BNE     SETUP4
2311 013346 022626          POP2SP
2312 013350 000177 000442          JMP      @ERR1
2313 013354 022626          SETUPB: POP2SP
2314 013356 000177 000454          JMP      @NXTTS
2315 013362 012766 000340 000002    MOV      #340,+2(SP)
2316 013370 000002          RTI
2317
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013372 011605          CKRNG:  MOV      (SP),R5
013374 012537 014036    MOV      (R5)+,NXTTS
013400 012537 014016    MOV      (R5)+,ERR1
013404 012537 014020    MOV      (R5)+,ERR2
013410 010516          MOV      RS,(SP)
013412 012705 000010    MOV      #10,R5        ;EXPECT RING ONLY ON ANSWER LINE
013416 013704 016700    MOV      ANSFLG,R4     ;GET ACTUAL TRANSITION DATA
013422 013703 016676    MOV      LINANS,R3     ;SET UP LINE NUMBER
013426 020504          CMP      R5,R4        ;DID RING CAUSE INTERRUPT
013430 001402          BEQ     CKRNG1        ;ON ANSWER LINE
013432 004777 000360    JSR      PC,@ERR1
013436 005005          CKRNG1: CLR      R5
013440 013704 016702    MOV      ORGFLG,R4
013444 013703 016674    MOV      LINORG,R3
013450 005704          TST      R4
013452 001403          BEQ     CKRNG2        ;IF TRANSITION OCCURED
013454 022626          POP2SP                ;ON ORIGINATE LINE, ERROR
013456 000177 000336    JMP      @ERR2
013462 022626          CKRNG2: POP2SP
013464 000177 000346    JMP      @NXTTS
    
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2340
2341 013470 005037 016700      WAITR: CLR      ANSFLG
2342 013474 005037 016702      CLR      ORGFLG
2343 013500 012777 012562 003072  MOV      #TRANS, @OHMVEC
2344 013506 012737 013526 016724  MOV      #WAITR, RRGRET      ;SET UP FOR RETURN
2345                                     ;FROM RING DETECTION
2346 013514 012777 000140 003062  MOV      #SCNENA+INTENA, @OHMCSR ;START SCANNER
2347 013522 005037 177776      CLR      PS
2348 013526 005037 016704      WAITRR: CLR     TIME1
2349 013532 012737 000025 016706  MOV      #25, TIME2
2350 013540 005237 016704      WAITR1: INC     TIME1      ;WAIT FOR TRANSITIONS OF
2351 013544 001375                                     BNE     WAITR1      ;CARRIER AND CLEAR TO SEND
2352 013546 005337 016706      DEC     TIME2
2353 013552 001372                                     BNE     WAITR1
2354 013554 000002      RTI
2355
2356                                     ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2357                                     ;SELECTED ORIGINATE AND ANSWER LINES
2358
2359 013556 012737 000340 177776  CKTRN: MOV      #340, PS      ;LOCK OUT FURTHER INTERRUPTS
2360 013564 005077 003014      CLR      @OHMCSR      ;STOP LINE SCANNER
2361 013570 011605      MOV      (SP), R5
2362 013572 012537 014026      MOV      (R5)+, DATA1
2363 013576 012537 014030      MOV      (R5)+, DATA2
2364 013602 012537 014032      MOV      (R5)+, DATA3
2365 013606 012537 014034      MOV      (R5)+, DATA4
2366 013612 012537 014016      MOV      (R5)+, ERR1
2367 013616 012537 014020      MOV      (R5)+, ERR2
2368 013622 012537 014022      MOV      (R5)+, ERR3
2369 013626 012537 014024      MOV      (R5)+, ERR4
2370 013632 012537 014036      MOV      (R5)+, NXTTS
2371 013636 010516      MOV      R5, (SP)
2372 013640 013705 014026      MOV      DATA1, R5
2373 013644 013777 016676 002732  MOV      LINANS, @OHMCSR      ;SET LINE COUNTER TO ANSWER LINE
2374 013652 017704 002730      MOV      @OHMLSR, R4      ;GET ACTUAL ANSWER LINE STATUS
2375 013656 013703 016676      MOV      LINANS, R3
2376 013662 020504      CMP      R5, R4      ;COMPARE
2377 013664 001402      BEQ     CKTRN1
2378 013666 004777 000124      JSR     PC, @ERR1
2379 013672 013777 016674 002704  CKTRN1: MOV      LINORG, @OHMCSR      ;SET LINE COUNTER TO ORIGINATE LINE
2380 013700 017704 002702      MOV      @OHMLSR, R4      ;GET ACTUAL ORIGINATE LINE STATUS
2381 013704 013705 014030      MOV      DATA2, R5
2382 013710 013703 016674      MOV      LINORG, R3
2383 013714 020504      CMP      R5, R4      ;COMPARE
2384 013716 001402      BEQ     CKTRN2
2385 013720 004777 000074      JSR     PC, @ERR2
  
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013724 105737 014033
013730 100003
013732 042737 000010 016700
013740 113704 016700
013744 113705 014032
013750 013703 016676
013754 020504
013756 001402
013760 004777 000036
013764 013704 016702
013770 013705 014034
013774 013703 016674
014000 020504
014002 001402
014004 004777 000014
014010 022626
014012 000177 000020
014016 000000
014020 000000
014022 000000
014024 000000
014026 000000
014030 000000
014032 000000
014034 000000
014036 000000

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

CKTRN2: TSTB DATA3+1
BPL .+10
BIC #10,ANSFLG
MOVB ANSFLG,R4 ;GET TRANSITION DATA FOR
MOVB DATA3,R5
MOV LINANS,R3
CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
BEQ CKTRN3
JSR PC,@ERR3
CKTRN3: MOV ORGFLG,R4 ;GET TRANSITION DATA FOR
MOV DATA4,R5
MOV LINORG,R3
CMP R5,R4 ;DID CORRECT TRANSITIONS OCCUR
BEQ CKTRN4
JSR PC,@ERR4
CKTRN4: POP2SP
JMP @NXTTS

ERR1: 0
ERR2: 0
ERR3: 0
ERR4: 0
DATA1: 0
DATA2: 0
DATA3: 0
DATA4: 0
NXTTS: 0

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014040
014040 005237 016630
014044 012737 000001 016632
014052 000005
014054 005037 016722
014060 005337 016722
014064 001375
014066 104004
014070 020306
014072 013701 000042
014076 001516
014100 000005
014102 004711
014104 000240
014106 000240
014110 000240
014112 000240
014114 000137 014334

014120 011646
014122 162716 000002
014126 017616 000000
014132 006316
014134 042716 177001
014140 062716 020324
014144 017616 000000
014150 000136

014152 105777 002432
014156 100001
014160 104027
014162 000002

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

EOP: INC PASCNT ;UPDATE PASS COUNT
MOV #1, TSTNO ;START AT FIRST TEST OF GROUP
RESET ;CLEAR THE WORLD
CLR FILLA ;INIT COUNTER
IS: DEC FILLA ;COUNT THE CTR
BNE IS ;BR TIL STALL TIMES OUT
TYPE ; RING BELL
MEPASS
MOV 42, R1 ;ARE YOU ON ACT11?
BEQ TSTENT ;NO
RESET
LOGICAL: JSR PC, (R1)
NOP
NOP
NOP
NOP
JMP TSTENT ;GET ADDRESS OF FIRST TEST

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

EMTSRV: MOV (SP), -(SP) ;GET PC OF RETURN
SUB #2, (SP) ;=PC OF EMT
MOV @2(SP), (SP) ;GET EMT
EMTOK: ASL (SP) ;MULTIPLY EMT ARG BY 2
BIC #177001, (SP) ;CLEAR UNWANTED BITS
ADD #EMTTAB, (SP) ;POINTER TO SUBROUTINE ADDRESS
MOV @2(SP), (SP) ;SUBROUTINE ADDRESS
JMP @2(SP)+ ;GO TO SUBROUTINE

CKINT: TSTB @TKCSR
BPL IS
KBDIN
IS: RTI

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

```

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

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; GENERAL ERROR SERVICE
; ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
014452 005037 016624 ERR: CLR ERRFLG ; ALWAYS TYPE PC+2
; OF TEST THAT FAILED
014456 005037 014672 CLR ERRMSG ; NO MESSAGE
014462 005037 014704 CLR ERTAB ; NO TABLE OF DATA
014466 000451 BR ERRGEN ; OUTPUT ERROR MESSAGE

```

; TRANSITION DETECTION ERROR SERVICE
; FORMAT FOR ERROR TYPEOUT IS

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

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

```

014470 005037 016624 ERRRT: CLR ERRFLG ; ALWAYS OUTPUT ALL DATA
014474 012737 017045 014672 MOV @MTRANE,ERRMSG ; TYPE "TRANSITION ERPOR"
014502 012737 014760 014704 MOV @ERTAB1,ERTAB ; TABLE OF DATA
014510 000440 BR ERRGEN ; OUTPUT ERROR MESSAGE

```

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

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

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

```

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

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; FATAL TRANSITION ERROR
; FORMAT FOR FATAL ERROR TYPEOUT IS

; XXXXXX FATAL ERROR
; CSTAT LSTAT
; AAAAAA BBB

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

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

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

; XXXXXX STATUS ERROR
; EXP REC
; AAAAAA BBBBBB

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

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

; LINE STATUS ERROR SERVICE
; FORMAT FOR LINE STATUS ERROR IS

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

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

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

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2628 014612 005037 177776
2629 014616 012777 000100 001764
2630 014624 032777 020000 001766
2631 014632 001026
2632 014634 021637 016656
2633 014640 001402
2634 014642 005037 016624
2635 014646 104005
2636 014650 005737 016624
2637 014654 001007
2638 014656 104006
2639 014660 014752
2640 014662 005737 014672
2641 014666 001407
2642 014670 104004
2643 014672 000000
2644 014674 005737 014704
2645 014700 001402
2646 014702 104006
2647 014704 000000
2648 014706 104007
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2652 014710 032777 100000 001702
2653 014716 001406
2654 014720 000000
2655 014722 022737 000176 016620
2656 014730 001001
2657 014732 104025
2658 014734 012737 000001 016624
2659 014742 042777 000100 001640
2660 014750 000002

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

ERRGEN: CLR      PSH
        MOV      #INTENA,@TKCSR
        BIT      #SW13,@SWR
        BNE     .3
        CMP      (SP),SAVPC
        BEQ     .+6
        CLR      ERRFLG
        SAVDSP
        TST     ERRFLG
        BNE     .1
        OCTASC  ERTAB0
        TST     ERRMSG
        BEQ     .2
        TYPE
ERRMSG: .1: TST     ERTAB
        BEQ     .2
        OCTASC
ERTAB:  .2: RES05
        ;ERROR HALT SERVICE
        .3: BIT      #SW15,@SWR
        BEQ     .4
        HALT
        CMP      #SWREG,SWR
        BNE     .4
        CNTRU
        .4: MOV      #1,ERRFLG
        BIC      #INTENA,@TKCSR
        RTI

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; IF SW13=1, DO NOT
; TYPE ERROR MESSAGE
; SAME ERROR AGAIN

; IF ERROR OCCURED FLAG=1,
; TYPE DATA ONLY
; TYPE PC+2 OF CALL TO ERROR ROUTINE

; TYPE ERROR MESSAGE

; TYPE DATA
; RESTORE R0-R5

; IF SW15=0, DO NOT
; HALT ON ERROR
; HALT AND DISPLAY ADDRESS OF FAILING TEST

; SET ERROR OCCURED FLAG
; RETURN TO TEST

```

E07

```
2661 ;TABLE S OF DATA FOR ERROR TYPEOUT
2662
2663 ;TABLE FOR TRANSITION STATUS ERROR
2664
2665 014752 000001 ERTAB0: 1
2666 014754 000006 6
2667 014756 016656 SAVPC
2668 014760 000003 ERTAB1: 3
2669 014762 000002 SAVRS ;CONTAINS EXPECTED TRANSITION STATUS
2670 014764 016652 SAVR4 ;CONTAINS RECEIVED TRANSITION STATUS
2671 014766 000002 SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2672 014770 016650 SAVR4 ;CONTAINS EXPECTED LINE STATUS
2673 014772 000002 SAVR4 ;CONTAINS RECEIVED LINE STATUS
2674 014774 016646 SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2675 014776 000003 ERTAB2: 3
2676 015000 000003 SAVRS ;CONTAINS EXPECTED LINE STATUS
2677 015002 016652 SAVR4 ;CONTAINS RECEIVED LINE STATUS
2678 015004 000003 SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2679 015006 016650 SAVR4 ;CONTAINS EXPECTED LINE STATUS
2680 015010 000002 SAVR4 ;CONTAINS RECEIVED LINE STATUS
2681 015012 016646 SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2682 015014 000002 ERTAB3: 2
2683 015016 000006 SAVR3 ;CONTAINS EXPECTED CONTROL STATUS
2684 015020 016650 SAVR4 ;CONTAINS RECEIVED CONTROL STATUS
2685 015022 000003 SAVR4 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2686 015024 016646 SAVR3 ;CONTAINS EXPECTED LINE STATUS
2687 015026 000002 ERTAB4: 2
2688 015030 000006 SAVR4 ;CONTAINS RECEIVED LINE STATUS
2689 015032 016652 SAVRS ;CONTAINS EXPECTED CONTROL STATUS
2690 015034 000006 SAVR4 ;CONTAINS RECEIVED CONTROL STATUS
2691 015036 016650 SAVR4 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2692 015040 000004 ERTAB5: 4
2693 015042 000003 SAVRS ;CONTAINS EXPECTED LINE STATUS
2694 015044 016652 SAVR4 ;CONTAINS RECEIVED LINE STATUS
2695 015046 000003 SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2696 015050 016650 SAVR1 ;CONTAINS NUMBER OF LINE UNDER TEST
2697 015052 000002 SAVR4 ;CONTAINS EXPECTED LINE STATUS
2698 015054 016646 SAVR3 ;CONTAINS RECEIVED LINE STATUS
2699 015056 000002 SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
2700 015060 016642 SAVR1 ;CONTAINS NUMBER OF LINE UNDER TEST
2701
2702
2703 015062 000001 SWRTB: 1
2704 015064 000006 6
2705 015066 000176 SWREG
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2706
2707 ; CONVERT OCTAL TO ASCII AND
2708 ; OUTPUT ON TELETYPE
2709
2710 015070 017605 000000 OCTASN: MOV 2(SP),R5 ; GET POINTER TO TABLE OF DATA
2711 015074 062716 000002 ADD #2,(SP)
2712 015100 012737 000010 MOV #10,RADIX
2713 015106 012704 020206 MOV #MBCD+2,R4 ; SET UP POINTER FOR CONVERTED DATA
2714 015112 012537 016660 MOV (R5)+,WRDCNT ; GET NUMBER OF WORDS TO BE CONVERTED
2715 015116 012537 016662 OCTAS1: MOV (R5)+,CHRCNT ; GET NUMBER OF DIGITS IN WORD
2716 015122 013537 015424 MOV 2(R5)+,BINWRD ; GET DATA TO BE CONVERTED
2717 015126 104010 CONVERT ; CONVERT TO ASCII
2718 015130 005337 016660 DEC WRDCNT ; IF ALL DATA IS NOT CONVERTED
2719 015134 001370 BNE OCTAS1 ; CONTINUE
2720 015136 112714 000100 MOV#B #100,(R4) ; PUT TERMINATOR AT END OF MESSAGE
2721 015142 005737 015260 TST SMLN
2722 015146 001002 BNE IS
2723 015150 104004 TYPE ; OUTPUT CONVERTED DATA
2724 015152 020204 MBCD ; TO TELETYPE
2725 015154 000002 IS: RTI ; RETURN TO CALLING ROUTINE
2726
2727
2728
2729 015156 005037 015254 CNTLU: CLR TMP1
2730 015162 012737 000001 015256 MOV #1,TMP2
2731 015170 104004 TYPE
2732 015172 020161 $$SWREQ
2733 015174 052737 000001 015260 BIS #1,SMLN
2734 015202 104006 OCTASC
2735 015204 015062 SWRTB
2736 015206 104004 TYPE
2737 015210 020206 MBCD+2
2738 015212 104013 INSTRG
2739 015214 020172 $NEWS
2740 015216 000000 0
2741 015220 177777 177777
2742 015222 015254 TMP1
2743 015224 123727 016154 000015 CMP# INBUF,#15
2744 015232 001403 BEQ IS
2745 015234 013777 015254 001356 MOV TMP1,@SWR
2746 015242 005037 015256 IS: CLR TMP2
2747 015246 005037 015260 CLR SMLN
2748 015252 000002 RTI
2749 015254 000000 TMP1: 0
2750 015256 000000 TMP2: 0
2751 015260 000000 SMLN: 0
2752
2753

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

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

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

```

2918 016120 101342          BMT      INSTER          ; IF R3>HILIM, ERROR
2919 016122 020337 016146   CMP      R3,LOLIM      ; TEST LOW LIMIT
2920 016126 103737          BLO     INSTER          ; IF R3<LOLIM, ERROR
2921 016130 010377 000016   MOV     R3,STORE      ; STORE NUMBER
2922 016134 000002          RTI                    ; EXIT
2923 016136 005737 015256   CHCK:  TST     TMP2
2924 016142 001731          BEQ     INSTER
2925 016144 000002          RTI
2926 016146 000000          LOLIM:  0
2927 016150 000000          HILIM:  0
2928 016152 000000          STORE:  0
2929 016154 000000          INBUF:  0
2930          016176          .=.+20
2931          ;ENTER HERE ON POWER FAILURE
2932
2933
2934 016176 010045          PFAIL:  MOV     R0,-(SP)      ;SAVE R0-R5 ON PROCESSOR STACK
2935 016200 010146          MOV     R1,-(SP)
2936 016202 010246          MOV     R2,-(SP)
2937 016204 010346          MOV     R3,-(SP)
2938 016206 010446          MOV     R4,-(SP)
2939 016210 010546          MOV     R5,-(SP)
2940 016212 013746 000024   MOV     R4,-(SP)
2941 016216 010637 016654   MOV     SP,SAVSP
2942 016222 012737 016234 000024   MOV     #RESTART,24      ;SAVE STACK POINTER
2943 016230 000000          HALT
2944 016232 000776          BR     .-2              ;SET UP FOR POWER UP TRAP
2945          ;HALT ON POWER DOWN NORMAL
2946          ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
2947
2948 016234 013706 016654          RESTAR: MOV     SAVSP,SP      ;RESTORE STACK POINTER
2949 016240 012605          MOV     (SP)+,R5        ;RESTORE R0-R5
2950 016242 012604          MOV     (SP)+,R4
2951 016244 012603          MOV     (SP)+,R3
2952 016246 012602          MOV     (SP)+,R2
2953 016250 012601          MOV     (SP)+,R1
2954 016252 012600          MOV     (SP)+,R0
2955 016254 012737 016176 000024   MOV     #PFAIL,24      ;SET UP FOR POWER FAILURE
2956 016262 005726          POP1SP
2957 016264 104004          TYPE
2958 016266 020073          #PFAIL
2959 016270 005737 001756   TST     TIPFLG
2960 016274 001002          BNE     RESTA1
2961 016276 000137 001262   JMP     START0
2962 016302 104004          RESTA1: TYPE
2963 016304 020113          #PFI
2964 016306 012746 000340   MOV     #340,-(SP)
2965 016312 005746          PUSH1SP
2966 016314 000137 014334   JMP     TSTENT
2967
2968
2969          ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
2970 016320 013746 000020   XOR:   MOV     20,-(SP)      ;SAVE 20
2971 016324 013746 000022   MOV     22,-(SP)          ;SAVE 22
2972 016330 012737 016522 000020   MOV     #20,20           ;IOT INTR VECTOR
2973 016336 012737 000340 000022   MOV     #340,22         ;IOT INTR LVL
    
```

2974	016344	012737	000300	014026		MOV	#300, DATA1	
2975	016352	012737	000302	014030		MOV	#302, DATA2	
2976	016360	013777	014030	175440	15:	MOV	DATA2, DATA1	
2977	016366	012777	000004	175434		MOV	#IOT, DATA2	; IOT TRAP
2978	016374	062737	000004	014026		ADD	#4, DATA1	
2979	016402	062737	000004	014030		ADD	#4, DATA2	
2980	016410	023727	014026	001000		CMP	DATA1, #1000	
2981	016416	001360				BNE	15	
2982	016420	012737	000000	016632		MOV	#0, TSTNO	; SET UP DEFAULT
2983	016426	012737	020436	016664		MOV	#TSTTBO, TSTPNT	
2984	016434	052737	000340	177776		BIS	#340, PS	; PREVENT INTERRUPTS
2985	016442	005077	000136			CLR	DATA1	
2986	016448	012777	000100	000130		MOV	#INTENA, DATA1	; SET INTERRUPT ENABLE
2987	016454	042737	000340	177776		BIC	#340, PS	; ALLOW INTERRUPTS
2988	016462	052777	000200	000114		BIS	#DONE, DATA1	; SET DONE..AND INTERRUPT
2989	016470	000240				NOP		
2990	016472	012637	000022			MOV	(SP)+, 22	; YOU DIDN'T INTERRUPT ?
2991	016476	012637	000020			MOV	(SP)+, 20	; RESTORE 20 & 22
2992	016502	005077	000076			CLR	DATA1	; STOP ALL INTERRUPT
2993	016506	052737	000340	177776		BIS	#340, PS	
2994	016514	104012				ERROR		
2995	016516	000000				HALT		; YOU SHOULD HAVE INTERRUPTED
2996	016520	000426				BR	35	
2997	016522	011637	016600		25:	MOV	(SP), DATA1	; EXTRACT VECTOR +4
2998	016526	162737	000002	016600		SUB	#2, DATA1	; CREATE LVL
2999	016534	013737	016600	016602		MOV	DATA1, DATA2	; SAVE
3000	016542	162737	000002	016600		SUB	#2, DATA1	; CREATE AND SAVE VEC
3001	016550	012737	000340	177776		MOV	#340, PS	; PREVENT INTERRUPTS
3002	016556	005077	000022			CLR	DATA1	
3003	016562	022626				POP2SP		
3004	016564	022626				POP2SP		
3005	016566	012637	000022			MOV	(SP)+, 22	; RESTORE 22
3006	016572	012637	000020			MOV	(SP)+, 20	; RESTORE 20
3007	016576	000207			35:	RTS	PC	
3008								

```

3009
3010
3011
3012 016600 000300
3013 016602 000302
3014 016604 170500
3015 016606 170502
3016 016610 177560
3017 016612 177562
3018 016614 177564
3019 016616 177566
3020 016620 177570
3021 016622 177570
3022
3023
3024
3025 016624 000000
3026 016626 000000
3027 016630 000000
3028 016632 000000
3029 016634 000000
3030 016636 000000
3031 016640 000000
3032 016642 000000
3033 016644 000000
3034 016646 000000
3035 016650 000000
3036 016652 000000
3037 016654 000000
3038 016656 000000
3039 016660 000000
3040 016662 000000
3041 016664 020436
3042 016666 000000
3043 016670 000000
3044 016672 000000
3045 016674 000000
3046 016676 000000
3047 016700 000000
3048 016702 000000
3049 016704 000000
3050 016706 000000
3051 016710 000000
3052 016712 177777
3053 016714 000000
3054 016716 000000
3055 016720 000002
3056 016722 000000
3057 016724 000000
3058
3059 016726 052123 052101 051525 MSTATE: .ASCII ;STATUS ERROR%*EXP RECA;
3060 016734 042440 051122 051117
3061 016742 021045 054105 020120
3062 016750 020040 051040 041505
3063 016756 100
3064 016757 114 047111 020105 MLINER: .ASCII ;LINE ERROR%*EXP REC LINE SELA;

```

;INDIRECT POINTERS

```

DHMVEC: 300 ;MODEM CONTROL INTERRUPT VECTOR
DHMLVL: 302 ;MODEM CONTROL ONTERRUPT PRIORITY
DHMCSR: 170500 ;MODEM CONTROL CONTROL STATUS REGISTER
DHMLSR: 170502 ;MODEM CONTROL CONTROL STATUS REGISTER
TKCSR: 177560
TKDBR: 177562
TPCSR: 177564
TPDBR: 177566
SWR: 177570
DISPLAY: 177570

```

;PROGRAM VARIABLES

```

ERRFLG: 0
TRACON: 0
PASCNT: 0
TSTNO: 0
RETURN: 0
ICOUNT: 0
SAVR0: 0
SAVR1: 0
SAVR2: 0
SAVR3: 0
SAVR4: 0
SAVR5: 0
SAVSP: 0
SAVPC: 0
WROCNT: 0
CHRCNT: 0
TSTPNT: TSTTBO
TSTMAX: 0
LINF LG: 0
LINE: 0
LINORG: 0
LINANS: 0
ANSFLG: 0
ORGFLG: 0
TIME1: 0
TIME2: 0
IFLG: 0
LINSEL: 177777
SELSK: 0
SLMSK: 0
FILL: 2 ;FILL CHAR/COUNT
FILLA: 0 ;TEMP STORAGE FOR FILL COUNT
RNGRET: 0

```

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

3121	017455	045	022442	030442	M16:	.ASCII	;%%"16 LINE SCANNER TEST%"
3122	017462	020066	044514	042516			
3123	017470	051440	040503	047116			
3124	017476	051105	052040	051505			
3125	017504	022524	040042				
3126	017510	021045	021045	055104	MTITLE:	.ASCII	;%%"DZDHC-C -----MODEM CONTROL DIAGNOSTIC-----%"
3127	017516	044104	026513	020103			
3128	017524	020040	026440	026455			
3129	017532	026455	047515	042504			
3130	017540	020115	047503	052116			
3131	017546	047522	020114	044504			
3132	017554	043501	047516	052123			
3133	017562	041511	026455	026455			
3134	017570	022455	040042				
3135	017574	021045	042526	052103	MVECTOR:	.ASCII	;%"VECTOR ADDRESS-";
3136	017602	051117	040440	042104			
3137	017610	042522	051523	040055			
3138	017616	021045	047503	052116	MREGAD:	.ASCII	;%"CONTROL REGISTER ADDRESS-";
3139	017624	047522	020114	042522			
3140	017632	044507	052123	051105			
3141	017640	040440	042104	042522			
3142	017646	051523	040055				
3143	017652	021045	044514	042516	MLINSL:	.ASCII	;%"LINE SELECT PARAMETER -";
3144	017660	051440	046105	041505			
3145	017666	020124	040520	040522			
3146	017674	042515	042524	020122			
3147	017702	040055					
3148	017704	021045	042524	052123	MTEST:	.ASCII	;%"TEST-";
3149	017712	040055					
3150	017714	020040	040077		MGM:	.ASCII	; ?;
3151	017720	021045	100		MCRLF:	.ASCII	; x-;
3152	017723	045	051442	047111	MLINE:	.ASCII	;%"SINGLE LINE CABLE TEST%"
3153	017730	046107	020105	044514			
3154	017736	042516	041440	041101			
3155	017744	042514	052040	051505			
3156	017752	022524	040042				
3157	017756	021045	044514	042516	MLINEI:	.ASCII	;%"LINE NUMBER-";
3158	017764	047040	046525	042502			
3159	017772	026522	100				
3160	017775	106	052101	046101	MFATAL:	.ASCII	;FATAL ERROR%"CSTAT LSTAT";
3161	020002	042440	051122	051117			
3162	020010	021045	051503	040524			
3163	020016	020124	046040	052123			
3164	020024	052101	100				
3165	02027	045	052042	040522	MTRNDE:	.ASCII	;%"TRANSITION DETECTED%"CSTAT LSTAT";
3166	02034	051516	052111	047511			
3167	020042	020116	042504	042524			
3168	020050	052103	042105	021045			
3169	020054	051503	040524	020124			
3170	020064	046040	052123	052101			
3171	020072	100					
3172	020073	045	050042	053517	MPFAIL:	.ASCII	;%"POWER FAILURE";
3173	020100	051105	043040	044501			
3174	020106	052514	042522	100			
3175	020113	055	052503	051122	MPF1:	.ASCII	;-CURRENT TEST WILL RESTART%"
3176	020120	047105	020124	042524			

3177	020126	052123	053440	046111	
3178	020134	020114	042522	052123	
3179	020142	051101	042524	040042	
3180	020150	041536	100		
3181	020158	136	040128		
3182	020198	046136	100		
3183	020161	045	051442	051127	
3184	020166	020075	040040		
3185	020172	020040	047040	053505	
3186	020200	020075	040040		
3187	020204	021045			
3188		020306			
3189					
3190	020306	040007			
3191	020310	000000			
3192		020322			
3193					
3194	020322	000000			
3195					
3196					
3197					
3198	020324	014556			
3199	020326	014574			
3200	020330	014164			
3201	020332	014410			
3202	020334	015524			
3203	020336	015432			
3204	020340	015070			
3205	020342	015472			
3206	020344	015262			
3207	020346	015330			
3208	020350	014452			
3209	020352	015666			
3210	020354	014470			
3211	020356	014512			
3212	020360	014534			
3213	020362	013102			
3214	020364	013136			
3215	020366	013372			
3216	020370	013470			
3217	020372	013556			
3218	020374	013526			
3219	020376	015156			
3220	020400	014152			
3221	020402	001760			
3222	020404	000000			
3223	020406	020436			
3224	020410	020440			
3225	020412	020702			
3226	020414	020710			
3227	020416	000000			
3228	020420	000000			
3229	020422	000000			
3230	020424	000000			
3231	020426	000037			
3232	020430	000007			

```

MCONTC: .ASCII ;+CQ;
MCONTV: .ASCII ;+VQ;
MCONTL: .ASCII ;+LQ;
SSWREB: .ASCII ;%SWR= a;
SNEWIS: .ASCII ; NEW= a;
MBCD: .ASCII ;%";
.=.+100
.EVEN
MEPASS: 40007
TEMTAB: 0
.=.+10

```

;EMT DISPATCH TABLE

```

EMTTAB: ERRCS
        ERRLS
        LOOP
        FREEZE
        TYPFR
        SVOSP
        OCTASN
        RSOS
        BINASC
        DIVI
        ERR
        INSTR
        ERRT
        ERRS
        ERRN
        GETLIN
        SETUPS
        CKRNG
        MAITR
        CKTRN
        MAITRR
        CNTLU
        CKINT
        KBDINT

```

```

;CALL BY EMT CNTLUU
;CALL BY EMT CKINTT
;CALLBY EMT KBDIN

```

```

EMTLIM: 0
TSTLST: TSTTB0
        TSTTB1
        TSTTB2
        TSTTB3
        0
        0
        0
        0
        0
        GRO: NO-1
        NI-100-1

```

3233	020432	000001	N2-200-1
3234	020434	000000	N3-300-1
3235	020436	002210	TSTTBO: T0
3236	020440	000001	↓
3237	020442	002236	T1
3238	020444	004000	TIMES
3239	020446	002300	T2
3240	020450	004000	TIMES
3241	020452	002342	T3
3242	020454	004000	TIMES
3243	020456	002404	T4
3244	020460	004000	TIMES
3245	020462	002446	T5
3246	020464	004000	TIMES
3247	020466	002510	T6
3248	020470	004000	TIMES
3249	020472	002564	T7
3250	020474	004000	TIMES
3251	020476	002640	T10
3252	020500	004000	TIMES
3253	020502	002730	T11
3254	020504	004000	TIMES
3255	020506	003720	T12
3256	020510	004000	TIMES
3257	020512	003110	T13
3258	020514	004000	TIMES
3259	020516	003200	T14
3260	020520	004000	TIMES
3261	020522	003270	T15
3262	020524	004000	TIMES
3263	020526	003356	T16
3264	020530	004000	TIMES
3265	020532	003444	T17
3266	020534	004000	TIMES
3267	020536	003532	T20
3268	020540	004000	TIMES
3269	020542	003620	T21
3270	020544	004000	TIMES
3271	020546	003714	T22
3272	020550	000460	TIMES
3273	020552	004032	T23
3274	020554	000400	TIMES
3275	020556	004230	T24
3276	020560	000400	TIMES
3277	020562	004406	T25
3278	020564	000200	TIMES
3279	020566	004556	T26
3280	020570	000200	TIMES
3281	020572	005014	T27
3282	020574	000200	TIMES
3283	020576	005252	T30
3284	020600	000200	TIMES
3285	020602	005510	T31
3286	020604	000200	TIMES
3287	020606	005746	T32
3288	020610	000200	TIMES

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

ANSFLG	016700	DIVI	015330	ICOUNT	016636	LINANS	016676	MPF1	020113
ANSTR	012716	DIVIA	015354	INBUF	016154	LINE	016672	MQM	017714
ANSTRR	013004	DIVIB	015422	INIT1	002214	LINENA=	000001	MREGAO	017616
ANSTR1	012732	DIVIC	015372	INSTB8	015734	LINFLG	016670	MSELAN	017310
ANSTR2	012746	DIVIDH	015426	INSTER	016026	LINORG	016674	MSELOR	017264
ANSTR3	012762	DIVIDL	015424	INSTR	015666	LINSEL	016712	MSG	015714
ANSTR4	012776	DIVIS	015430	INSTRB	015726	LINT1	003620	MSTATE	016726
BINASA	015272	DIVIU	015334	INSTRC	016014	LINT1A	003646	MTEST	017704
BINASB	015312	DMYRTI	002202	INSTRD	016054	LINT1B	003674	MTITLE	017510
BINASC	015262	DONE =	000200	INSTRG=	104013	LINT2	003714	MTRANE	017045
BINARD=	015424	EMTDEF =	***** U	INSTR1	015712	LINT2A	003754	MTRNDI	020027
BUSY =	000020	EMTLIM	020404	INSTR2	016024	LINT2B	004004	MT103A	017327
CHCK	016136	EMTOK	014132	INSTR3	016114	LOGICA	014102	MT103T	017142
CHRCNT	016662	EMTSRV	014120	INTENA=	000100	LOLIM	016146	MT202A	017356
CKINT	014152	EMTTAB	020324	INT1	002510	LOOP	014164	MT202T	017213
CKINTT=	104026	EOP	014040	INT1A	002556	LOOPER	014314	MUX1	004556
CKPING=	104021	ERR	014452	INT1B	002562	LOOPL	014400	MUX1A	004604
CKRNG	013372	ERRCS	014556	INT10	003270	LOOPS	014266	MUX1B	004652
CKRNG1	013436	ERRFLG	016624	INT10A	003352	LOOPX	014330	MUX1C	004710
CKRNG2	013462	ERRGEN	014612	INT10B	003354	LVL =	000004	MUX1D	004722
CKTRAN=	104023	ERRLS	014574	INT11	003356	MAINT =	001000	MUX1E	004742
CKTRN	013556	ERRMSG	014672	INT11A	003440	MBCD	020204	MUX1F	004774
CKTRN1	013672	ERRN	014534	INT11B	003442	MCONTC	020150	MUX11	007570
CKTRN2	013724	ERROR =	104012	INT12	003444	MCONTL	020156	MUX11A	007606
CKTRN3	013764	ERRARC =	104000	INT12A	003526	MCONTV	020153	MUX11B	007636
CKTRN4	014010	ERRARL =	104001	INT12B	003530	MCRLF	017720	MUX11C	007664
CLRMUX=	002000	ERRARN =	104016	INT13	003532	MDISC	017405	MUX11D	007676
CLRSCH=	004000	ERRORS =	104015	INT13A	003614	MENT1	004032	MUX11E	007712
CNTLU	015156	ERRORT =	104014	INT13B	003616	MENT1A	004060	MUX11F	007744
CNTLUU=	104025	ERFS	014512	INT2	002564	MENT1B	004110	MUX12	007746
CO =	000100	ERFT	014470	INT2A	002632	MENT1C	004134	MUX12A	007764
COF =	040000	ERR1	014016	INT2B	002636	MENT1D	004142	MUX12B	010014
CONVER=	104010	ERR2	014020	INT3	002640	MENT1E	004174	MUX12C	010042
CS =	000040	ERR3	014022	INT3A	002724	MENT1F	004220	MUX12D	010054
CSF =	020000	ERR4	014024	INT3B	002726	MENT2	004230	MUX12E	010070
CSTR1	002236	ERTAB	014704	INT4	002730	MENT2A	004252	MUX12F	010122
CSTR2	002300	ERTAB0	014752	INT4A	003012	MENT2B	004334	MUX13	010124
CSTR3	002342	ERTAB1	014760	INT4B	003016	MENT2C	004360	MUX13A	010142
CSTR4	002404	ERTAB2	014776	INT5	003020	MENT2D	004372	MUX13C	010172
CSTR5	002446	ERTAB3	015014	INT5A	003102	MENT3	004406	MUX13C	010220
DATA1	014026	ERTAB4	015026	INT5B	003106	MENT3A	004430	MUX13D	010232
DATA2	014030	ERTAB5	015040	INT6	003110	MENT3B	004442	MUX13E	010246
DATA3	014032	EXTRAC=	104011	INT6A	003172	MENT3C	004504	MUX13F	010300
DATA4	014034	FATEX	013006	INT6B	003176	MENT3D	004530	MUX14	010302
DHMCSR	016604	FATRET	013020	INT7	003200	MENT3E	004542	MUX14A	010320
DHMLSR	016606	FILL	016720	INT7A	003262	MEPASS	020306	MUX14B	010350
DHMLVL	016602	FILLA	016722	INT7B	003266	MFATAL	017775	MUX14C	010376
DHMEC	016600	FFTEZE	014410	KBDIN =	104027	MLINE	017723	MUX14D	010410
DIALM	017104	FREZX	014444	KBDINT	001760	MLINEI	017756	MUX14E	010424
DIGIT =	015426	GETLIN	013102	KBDIN1	002042	MLINER	016757	MUX14F	010456
DISPLA	016622	GETLNS=	104017	KBDIN2	002074	MLINEI	017014	MUX15	010460
DISPPE	000174	GRO	020426	KBDIN3	002136	MLINSL	017652	MUX15A	010476
DIVCNT	015404	HILIM	016150	KRET	002204	MPFAIL	020073	MUX15B	010520

MUX15C	010546	MUX7	006402	RS	= 000004	STRLIN	007532	TYPE	= 104004
MUX15D	010560	MUX7A	006430	RS05	015472	STRMVA	007552	TYPECL	015622
MUX15E	010576	MUX7B	006462	RG	=%000000	STRTOA	001666	TYPERR	015524
MUX15F	010632	MUX7C	006510	R1	=%000001	ST103A	011164	TYPERA	015534
MUX16	010634	MUX7D	006522	R2	=%000002	ST103B	011226	TYPERR1	015600
MUX16A	010652	MUX7E	006540	R3	=%000003	ST202A	011540	TYPERR2	015614
MUX16B	010674	MUX7F	006574	R4	=%000004	ST202B	011602	T0	002210
MUX16C	010722	MUX8	006620	R5	=%000005	SUSWR	001122	T1	002236
MUX16D	010734	MUX8A	006636	SAVPC	016656	SVOS	015440	T10	002640
MUX16E	010752	MUX8B	006672	SAVRO	016640	SVOSP	015432	T100	007532
MUX16F	011006	MUX8C	006700	SAVR1	016642	SWR	016620	T101	007570
MUX17	011010	MUX8D	006734	SAVR2	016644	SWREG	000176	T102	007746
MUX17A	011026	MUX8E	006762	SAVR3	016646	SWRTB	015062	T103	010124
MUX17B	011050	MVECTO	017574	SAVR4	016650	SW06	= 000100	T103A	011230
MUX17C	011076	M0	= 000040	SAVRS	016652	SW08	= 000400	T103A1	011236
MUX17D	011110	M1	= 000110	SAVSP	016654	SW09	= 001000	T103B	011242
MUX17E	011126	M16	017455	SAVOSP=	104005	SW10	= 002000	T103B1	011252
MUX17F	011162	N	= 000300	SCNENA=	000040	SW11	= 004000	T103B2	011256
MUX2	005014	NXTTS	014036	SCNT1	007002	SW12	= 010000	T103C	011262
MUX2A	005042	N0	= 000040	SCNT1A	007042	SW13	= 020000	T103D1	011326
MUX2B	005110	N1	= 000110	SCNT1B	007120	SW14	= 040000	T103D2	011332
MUX2C	005146	N2	= 000202	SCNT1C	007202	SW15	= 100000	T103D3	011336
MUX2D	005160	N3	= 000301	SCNT1D	007222	T	= 000014	T103D4	011342
MUX2E	005200	OCTASC	= 104006	SCNT2	007252	TEMTAB	020310	T103E	011346
MUX2F	005232	OCTASN	015070	SCNT2A	007304	TIFLG	016710	T103EN	011522
MUX3	005252	OCTAS1	015116	SCNT2B	007400	TIMES	= 004000	T103ES	011406
MUX3A	005300	ORGFLG	016702	SCNT2C	007462	TIME1	016704	T103E1	011502
MUX3B	005346	ORGTR	012624	SCNT2D	007502	TIME2	016706	T103E2	011506
MUX3C	005404	ORGTRR	012712	SCOPE	= 104002	TIPFLG	001756	T103E3	011512
MUX3D	005416	ORGTR1	012640	SCOPEF	= 104003	TKCSR	016610	T103E4	011516
MUX3E	005436	ORGTR2	012654	SECRX	= 000020	TKDBR	016612	T104	010302
MUX3F	005470	ORGTR3	012670	SECRXF	= 010000	TMP1	015254	T105	010460
MUX4	005510	ORGTR4	012704	SECTX	= 000010	TMP2	015256	T106	010634
MUX4A	005536	PASCNT	016630	SELMSK	016714	TPCSR	016614	T107	011010
MUX4B	005604	PC	=%000007	SETUP	= 104020	TPDBR	016616	T11	002730
MUX4C	005642	PFAIL	016176	SETUPB	013354	TRACON	016626	T12	003020
MUX4D	005654	POPPO	= 012600	SETUPS	013136	TRANEX	013022	T13	003110
MUX4E	005674	POP:SP=	005726	SETUP1	013170	TRANS	012562	T14	003200
MUX4F	005726	POP2SP=	023526	SETUP2	013204	TRANX1	013032	T.5	003270
MUX5	005746	PS	= 177776	SETUP4	013316	TRMROY=	000002	T16	003356
MUX5A	005774	PSM	= 177776	SINGLE=	000001	TRNTAB	013070	T17	003444
MUX5B	006026	PUSHRO=	010046	SINTFL	002206	TRNTYP	013042	T2	002300
MUX5C	006054	PUSH1S=	005746	SLMSK	016716	TSTENT	014334	T20	003532
MUX5D	006066	PUSH2S=	024646	SMLN	015260	TSTGO	001706	T200	011164
MUX5E	006104	RADIX	= 015430	SP	=%000006	TSTLST	020406	T201	011522
MUX5F	006140	REGST1	001546	ST	= 000200	TSTMAX	016666	T202A	011604
MUX6	006164	RESTAR	016234	STACK	001100	TSTNO	016632	T202A1	011612
MUX6A	006212	RESTA1	016302	START	001100	TSTPNT	016664	T202B	011616
MUX6B	006244	RESOS	= 104007	STARTN	001574	TSTTBO	020436	T202B1	011626
MUX6C	006272	RETURN	016634	STARTO	001262	TSTTB1	020640	T202B2	011632
MUX6D	006304	RING	= 000200	START1	001324	TSTTB2	020702	T202C	011636
MUX6E	006322	RINGF	= 100000	STEP	= 000400	TSTTB3	020710	T202D	011652
MUX6F	006356	RINGRET	016724	STORE	016152	TYFILL	015634	T202D1	011716

T20202	011722	T202G4	012202	T202J4	012544	T37	007252	XFLAG	001252
T20203	011726	T202H	012206	T21	003620	T4	002404	XM	= 000101
T20204	011732	T202H2	012252	T22	003714	T5	002446	XN	= 000300
T202E	011736	T202H3	012256	T23	004032	T6	002510	XOR	016320
T202E1	012002	T202H4	012262	T24	004230	T7	002564	XOR SVC	001254
T202E2	012006	T202H5	012266	T25	004406	VECSTA	001374	XSCRX	= 000001
T202E3	012012	T202I	012272	T26	004556	VECSTR	001354	X1A	001612
T202E4	012016	T202I2	012352	T27	005014	VECST1	001500	X1B	001656
T202F	012022	T202I3	012356	T3	002342	WAITR	013470	\$NEWS	020172
T202F2	012102	T202I4	012362	T30	005252	WAITRN	= 104022	\$SWREQ	020161
T202F3	012106	T202I5	012366	T300	011540	WAITRR	013526	.1	014674
T202F4	012112	T202J	012372	T31	005510	WAITR1	013540	.2	014706
T202F5	012116	T202JN	012550	T32	005746	WAITS	= 104024	.3	014710
T202G	012122	T202JS	012432	T33	006164	WADCNT	016660	.4	014734
T202G1	012166	T202J1	012530	T34	006402	X	= 000000	.	= 020714

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

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

