

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDHK-B-D
PRODUCT NAME: MODEM CONTROL
MULTIPLEXER DIAGNOSTIC
DATE : 21 FEBRUARY 1976
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: G. BAISLEY
E. CROWLEY (MODIFIED PROGRAM TO ALLOW
LINE SELECTION FOR TEST GROUP 0)

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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 4K OF MEMORY
ASR-33 TELETYPE OR EQUIVALENT
MODEM CONTROL MODULES M7807 & M7808

2.1.1 FOR 16 LINE SCANNER TEST

4 CABLES TO CONNECT TO TEST CONNECTOR
H861 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

4 CABLES TO CONNECT TO THE DISTRIBUTION PANEL
H315 TEST CONNECTOR

2.1.3 FOR ON LINE TESTS

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

2.2 MEMORY

THE PROGRAM UTILIZES LOCATIONS 0000-17500

3.0 LOADING PROCEDURE

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

4.0 STARTING PROCEDURE**4.1 STARTING ADDRESS**

THE STARTING ADDRESS FOR ALL TESTS IS 000200.

RESTART ADDRESS FOR ALL TESTS IS 000200

4.2 OPERATOR AND/OR PROGRAM ACTION

4.2.1 INITIAL PROGRAM START

NOTE

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

4.2.1.1 LOAD ADDRESS 000200
SET SW00 = 1
PRESS START

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

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

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

TO RECOVER, PERFORM 4.2.2.1.

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

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

BIT00 = 1 TEST LINE 00

F01

SEG 0004

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

"
BIT15 = 1 TEST LINE 15

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

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

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

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

TEST GROUP 0:

OFF LINE TESTS USING 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

4.2.1.9 THE PROGRAM WILL ENTER THE SELECTED TEST GROUP.

4.2.2 PROGRAM RESTART

4.2.2.1 WITH SW00=1

LOAD ADDRESS 200

SET SW00=1 BEFORE PRESSING START.

PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.10.

4.2.2.2 WITH SW00=0

LOAD ADDRESS 200

PRESS START

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.10

5.0 OPERATING PROCEDURE**5.1 TEST GROUP 0 16 LINE SCANNER TEST****5.1.1 TEST INITIALIZATION**

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

5.1.2 OPERATIONAL SWITCH SETTINGS

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

5.1.3 PROGRAM AND/OR OPERATOR ACTION

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

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

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

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

5.1.3.4 THIS PROGRAM WILL NO LONGER TRACE TRAP WITH THIS RELEASE

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

5.2 TEST GROUP 1 SINGLE LINE CABLE TEST**5.2.1 TEST INITIALIZATION**

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

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

5.2.2 OPERATIONAL SWITCH SETTINGS

SAME AS 5.1.2

5.2.3 PROGRAM AND/OR OPERATOR ACTION

SAME AS 5.1.3

5.3 TEST GROUP 2 BELL 103A MODEM CONNECT-DISCONNECT TEST**5.3.1 TEST INITIALIZATION**

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

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

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

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

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

5.3.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.3.2.1 PLACE ANSWERING DATA SET IN "AUTO ANSWER" MODE

- 5.3.2.2 PLACE ORIGINATING DATA SET IN "TALK" MODE
- 5.3.2.3 DIAL DIAL ANSWERING DATA SET FROM ORIGINATING DATA SET
- 5.3.2.4 LISTEN FOR TONE IN HANDSET OF ORIGINATING DATA SET.
WHEN TONE IS HEARD, PRESS "DATA" BUTTON ON ORIGINATING DATA SET.
"DATA" LIGHT SHOULD ILLUMINATE
- 5.3.2.5 "DATA" LIGHT ON ANSWERING DATA SET SHOULD BE LIT.
- 5.3.2.6 THE PROGRAM WILL NOW WAIT FOR INTERRUPTS FROM THE MODEM CONTROL.
- 5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED, THE PROGRAM WILL TYPE "SET SMO1=1 TO DISCONNECT".
WHEN SMO1 IS SET TO 1, THE PROGRAM WILL BEGIN THE DISCONNECT SEQUENCE.
- 5.3.2.8 WHEN THE DISCONNECT SEQUENCE HAS BEEN COMPLETED THE PROGRAM WILL TYPE "103A TEST COMPLETE" AND WILL REQUEST THE OPERATOR TO SELECT NEW LINES.
- 5.3.3 PROGRAM ACTION IN CASE OF ERROR
- 5.3.3.1 RING ON INCORRECT LINE
IF THE PROGRAM DETECTS A RING SIGNAL ON AN INCORRECT LINE, OR IF ANY OTHER TRANSITION BESIDES RING IS DETECTED BEFORE RING, THE PROGRAM WILL TYPE A FATAL ERROR MESSAGE AND REQUEST THE OPERATOR TO RESELECT LINES AND REDIAL.
- 5.3.3.2 OTHER ERRORS
IF ANY ERRORS OCCUR AFTER THE FIRST RING HAS BEEN DETECTED, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING TO COMPLETION.
THE ONLY EXCEPTION TO THIS IS IF AN INTERRUPT OCCURS ON A LINE NOT SELECTED, IN WHICH CASE A FATAL ERROR WILL BE REPORTED, AND THE PROGRAM WILL PROCEED AS DESCRIBED IN 5.3.3.1

5.3.4 OPERATION SWITCH SETTINGS

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

5.3.5 DATA SET MODE SWITCHING

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

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

5.4 TEST GROUP 3 BELL 202C MODEM CONNECT-DISCONNECT TEST**5.4.1 TEST INITIALIZATION**

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

5.4.2 OPERATOR ACTION TO MAKE TELEPHONE CONNECTION

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

5.4.3 PROGRAM ACTION IN CASE OF ERRORS

SAME AS 5.3.3

5.4.4 OPERATIONAL SWITCH SETTINGS

SAME AS 5.3.4

5.4.5 DATA SET MODE SWITCHING

SAME AS 5.3.5

5.5 TEST RESELECTION

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

6.0 ERRORS

6.1 NORMAL OPERATION

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

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

6.1.1 ERROR MESSAGES

6.1.1.1 UNIQUE ERROR

ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER

AN EXAMPLE OF THIS TYPE OF ERROR IS:

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

6.1.1.2 TRANSITION DETECTION ERROR

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

FORMAT FOR ERROR TYPEOUT IS

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

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

6.1.1.3 SINGLE LINE STATUS ERROR

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

FORMAT FOR SINGLE LINE STATUS ERROR IS

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

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

6.1.1.4 FATAL TRANSITION ERROR

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

FORMAT FOR FATAL ERROR TYPEOUT IS

```
XXXXXX FATAL ERROR
CSTAT LSTAT
AAAAA BBB
```

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

6.1.1.4 CONTROL STATUS ERROR

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

FORMAT FOR CONTROL STATUS ERROR IS

```
XXXXXX STATUS ERROR
EXP REC
AAAAA BBBB
```

WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
AAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
BBBBB=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)

PRESS CONTINUE

THE PROGRAM WILL LOOP ON THE SAME TEST.

6.2.2 FROM PROGRAM START

6.2.2.1 PROCEED AS DESCRIBED IN 4.2.1.1 TO 4.2.1.4

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

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

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

6.2.3 AFTER <CONTROL>

SAME AS 6.2.2.2 TO 6.2.2.4

7.0 RESTRICTIONS

7.1 STARTING

7.1.1 FOR 16 LINE SCANNER TEST

H861 TEST CONNECTOR MUST BE INSTALLED.

7.1.2 FOR SINGLE LINE CABLE TEST

H315 TEST CONNECTOR MUST BE INSTALLED ON MODEM CABLE

7.1.3 FOR ON LINE TESTS

NONE

7.2 OPERATING

NONE.

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

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

VECTORS

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

ADDRESSES

DHMC SR: 170500
DHMLSR: 170502

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

8.0 EXECUTION TIME**8.1 16 LINE SCANNER TEST**

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

8.2 SINGLE LINE CABLE TEST

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

8.3 103A MODEM CONNECT-DISCONNECT TEST

APPROXIMATELY 30 SECONDS WILL ELAPSE BETWEEN THE TIME THAT THE ANSWERING DATA SET FIRST DETECTS A RING SIGNAL TO THE TIME THAT THE PROGRAM TYPES "SET SMD1=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 SMD1=1 TO DISCONNECT".

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

9. PROGRAM DESCRIPTION

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

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

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

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

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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;REGISTER DEFINITIONS

000000	R0=X0	: GENERAL REGISTER
000001	R1=X1	: GENERAL REGISTER
000002	R2=X2	: GENERAL REGISTER
000003	R3=X3	: GENERAL REGISTER
000004	R4=X4	: GENERAL REGISTER
000005	R5=X5	: GENERAL REGISTER
000006	SP=X6	: PROCESSOR STACK POINTER
000007	PC=X7	: PROGRAM COUNTER

;LOCATION EQUIVALENCIES

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

;CONTROL STATUS REGISTER BIT FUNCTIONS

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

;LINE REGISTER BIT FUNCTIONS

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

;SOFTWARE TRANSITION FLAGS

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

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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 CORRERT LINE
104022	WAITRN=EMT+X	: WAIT FOR TRANSITIONS
104023	CKTRAN=EMT+X	: CHECK TRANSITIONS
104024	WAITS=EMT+X	: DELAY FOR TRANSIENTS

(1)	000146	000000	HAL T
(1)	000150	000152	+ n T
(1)	000154	000000	HAL T
(1)	000156	000156	+ n T
(1)	000158	000000	HAL T
(1)	000160	000162	+ n T
(1)	000162	000000	HAL T
(1)	000164	000166	+ n T
(1)	000166	000000	HAL T
(1)	000170	000172	+ n T
(1)	000172	000000	HAL T
(1)	000174	000176	+ n T
(1)	000176	000000	HAL T
(1)	000200	000202	+ n T
(1)	000202	000000	HAL T
(1)	000204	000206	+ n T
(1)	000206	000000	HAL T
(1)	000210	000212	+ n T
(1)	000212	000000	HAL T
(1)	000214	000216	+ n T
(1)	000216	000000	HAL T
(1)	000220	000222	+ n T
(1)	000222	000000	HAL T
(1)	000224	000226	+ n T
(1)	000226	000000	HAL T
(1)	000230	000232	+ n T
(1)	000232	000000	HAL T
(1)	000234	000236	+ n T
(1)	000236	000000	HAL T
(1)	000240	000242	+ n T
(1)	000242	000000	HAL T
(1)	000244	000246	+ n T
(1)	000246	000000	HAL T
(1)	000250	000252	+ n T
(1)	000252	000000	HAL T
(1)	000254	000256	+ n T
(1)	000256	000000	HAL T
(1)	000260	000262	+ n T
(1)	000262	000000	HAL T
(1)	000264	000266	+ n T
(1)	000266	000000	HAL T
(1)	000270	000272	+ n T
(1)	000272	000000	HAL T
(1)	000274	000276	+ n T
(1)	000276	000000	HAL T
(1)	000300	000302	+ n T
(1)	000302	000000	HAL T
(1)	000304	000306	+ n T
(1)	000306	000000	HAL T
(1)	000310	000312	+ n T
(1)	000312	000000	HAL T
(1)	000314	000316	+ n T
(1)	000316	000000	HAL T
(1)	000320	000322	+ n T

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

```

157
158
159
160
161 000024 000024
162 000026 015542
163 000030 013720
164 000032 000340
165
166 000046 000046
167 000046 013702
168
169 000060 000060
170 000060 001562
171 000062 000340
172 000200 000200
173 000200 000137 001000
174
175
191
211
    
```

; STANDARD INTERRUPT VECTORS

```

    . = 24
    PFAIL          ; POWER FAIL HANDLER
    340            ; SERVICE AT LEVEL 7
    EMTSRV        ; EMT DISPATCH SERVICE
    340            ; SERVICE AT LEVEL 7

    . = 46
    LOGICAL        ; ACT11?

    . = 60
    KBDINT        ; KEYBOARD MONITOR
    340            ; SERVICE AT LEVEL 7

    . = 200
    JMP START     ; GO TO START OF PROGRAM
    
```


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

333	001366	012706	020422		STARTN:	MOV	#STACK, SP		:SET UP PROCESSOR STACK
334	001372	104013				INSTRG			:GET TEST NUMBER
335	001374	017249				MTEST			:MESSAGE "TEST"
336	001376	000000				0			:LOWER LIMIT FOR TEST NUMBER
337	001400	000777				777			:UPPER LIMIT FOR TEST NUMBER
338	001402	016200				TSTNO			:STORAGE FOR TEST NUMBER
339	001404	013705	016200			MOV	TSTNO, RS		:GET TEST NUMBER
340	001410	042705	177077			BIC	#177077, RS		:EXTRACT TEST GROUP NUMBER
341	001414	006205				ASR	RS		
342	001416	006205				ASR	RS		
343	001420	006205				ASR	RS		
344	001422	006205				ASR	RS		
345	001424	006205				ASR	RS		
346	001426	016537	017734	016234		MOV	GRO(RS), TSTMAX		:GET HIGHEST TEST IN GROUP
347	001434	016537	017714	016232		MOV	TSTLST(RS), TSTPNT		:GET POINTER TO TEST TABLE
348	001442	005737	016232			TST	TSTPNT		:IF 0, INVALID TEST GROUP
349	001446	001003				BNE	STRTOA		
350	001450	024646				PUSH2SP			
351	001452	000137	015406			JMP	INSTER		:TRY AGAIN
352	001456	042737	177700	016200	STRTOA:	BIC	#177700, TSTNO		:GET NUMBER OF FIRST TEST TO BE EXECUTED IN SELECTED GROUP
353	001464	023737	016200	016234		CMP	TSTNO, TSTMAX		:IS NUMBER TOO LARGE
354	001472	003403				BLE	TSTGO		
355	001474	024646				PUSH2SP			
356	001476	000137	015406			JMP	INSTER		:TRY AGAIN
357	001502	012716	000340		TSTGO:	MOV	#340, (SP)		:SET UP PRIORITY LEVEL
358	001506	005746				PUSH1SP			
359	001510	000005				RESET			
360	001512	052777	000100	014442		BIS	#INTENA, #TKCSR		:ENABLE TELETYPE INTERRUPTS
361	001520	012737	001720	001722		MOV	#DMYRTI, KRET		:SET UP DUMMY KEYBOARD RETURN
362	001526	005037	016236			CLR	LINFLG		:CLEAR LINE SELECTED FLAG
363	001532	005037	016174			CLR	TRACON		:CLEAR TRACE TRAP FLAG
364	001536	005037	016176			CLR	PASCNT		:CLEAR PASS COUNT
365	001542	104004				TYPE			
366	001544	017256				MCRLF			
367	001546	012737	000001	001560		MOV	#1, TIPFLG		:SET TEST IN PROGRESS FLAG
368	001554	000137	014102		TIPFLG:	JMP	TSTENT		:START TESTING
369	001560	000000				0			

```

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

```

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553 ;INITIALIZATION CHECK - PERFORMED ONLY AT PROGRAM START
554 ;VERIFY THAT CONTROL STATUS REGISTER AND LINE STATUS
555 ;REGISTER WERE CLEARED BY INITIALIZE
556
557 TO: ;REFERENCE DESIGNATION
558 ;TYPE "16 LINE SCANNER TEST"
559
560 001726 104004
561 001726 017013
562 001730 017013
563 001732 005777 014220
564 001736 001401
565 001740 104012
566 001742 005777 014212
567 001746 001401
568 001750 104012
569 001752 104002
570
571
572
573
574
575
576 ;VERIFY THAT "INTERRUPT ENABLE" CAN BE
577 ;SET AND CLEARED.
578
579 T1: ;REFERENCE DESIGNATION
580 001754 012777 000100 014174 CSTR1: MOV #INTENA,3DHMCSR ;SET INTERRUPT ENABLE
581 001762 032777 000100 014166 BIT #INTENA,3DHMCSR ;WAS INTERRUPT ENABLE SET
582 001770 001001 BNE .+4
583 001772 104012 ERROR ;NO, ERROR
584 001774 042777 000100 014154 BIC #INTENA,3DHMCSR ;CLEAR INTERRUPT ENABLE
585 002002 032777 000100 014146 BIT #INTENA,3DHMCSR ;WAS INTERRUPT ENABLE CLEARED
586 002010 001401 BEQ .+4
587 002012 104012 ERROR ;NO, ERROR
588 002014 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
589
590 ;VERIFY THAT "DONE" CAN BE SET AND CLEARED
591
592 T2: ;REFERENCE DESIGNATION
593 002016 012777 000200 014132 CSTR2: MOV #DONE,3DHMCSR ;SET DONE
594 002024 032777 000200 014124 BIT #DONE,3DHMCSR ;WAS DONE SET
595 002032 001001 BNE .+4
596 002034 104012 ERROR ;NO, ERROR
597 002036 042777 000200 014112 BIC #DONE,3DHMCSR ;CLEAR DONE
598 002044 032777 000200 014104 BIT #DONE,3DHMCSR ;WAS DONE CLEARED
599 002052 001401 BEQ .+4
600 002054 104012 ERROR ;NO, ERROR
601 002056 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
602
603 ;VERIFY "MAINTENANCE MODE" CAN BE SET AND CLEARED
604
605 T3: ;REFERENCE DESIGNATION
606 002060 012777 001000 014070 CSTR3: MOV #MAINT,3DHMCSR ;SET MAINTENANCE MODE
607 002066 032777 001000 014062 BIT #MAINT,3DHMCSR ;WAS MAINTENANCE MODE SET
608 002074 001001 BNE .+4
609 002076 104012 ERROR ;NO, ERROR
610 002100 042777 001000 014050 BIC #MAINT,3DHMCSR ;CLEAR MAINTENANCE MODE
611 002106 032777 001000 014042 BIT #MAINT,3DHMCSR ;WAS MAINTENANCE MODE CLEARED
612 002114 001401 BEQ .+4
613 002116 104012 ERROR ;NO, ERROR
614 002120 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP

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616
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620 002122 012777 000040 014026 T4:
621 002130 032777 000040 014020 CSTR4: MOV #SCNENA,20HMCSR ;REFERENCE DESIGNATION
622 002136 001001 BNE .+4 ;SET SCAN ENABLE
623
624 002140 104012 ERROR ;NO, ERROR
625 002142 042777 000040 014006 BIC #SCNENA,20HMCSR ;CLEAR SCAN ENABLE
626 002150 032777 000040 014000 BIT #SCNENA,20HMCSR ;WAS SCAN ENABLE CLEARED
627 002156 001401 BEQ .+4
628
629 002160 104012 ERROR ;NO, ERROR
630 002162 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
631
632
633
634
635
636
637 002164 012777 000040 013764 T5:
638 002172 032777 000020 013756 CSTR5: MOV #SCNENA,20HMCSR ;REFERENCE DESIGNATION
639 002200 001001 BNE .+4 ;SET SCAN ENABLE
640 002202 104012 ERROR ;BUSY NOT SET, ERROR
641 002204 042777 000040 013744 BIC #SCNENA,20HMCSR ;CLEAR SCAN ENABLE
642 002212 032777 000020 013736 BIT #BUSY,20HMCSR ;IS BUSY BIT CLEARED
643 002220 001401 BEQ .+4
644 002222 104012 ERROR ;BUSY NOT CLEARED, ERROR
645 002224 104002 SCOPE ;CHECK FOR LOOP, ITERATIONS
646
647
648
649
650 002226 052737 000340 177776 T6:
651 002234 005077 013716 INT1: BIS #340,PS ;REFERENCE DESIGNATION
652 002240 012777 002274 013704 MOV #INT1A,20HMVEC ;LOCK OUT INTERRUPTS
653 002246 013777 177776 013700 MOV PS,20HMLVL ;CLEAR CONTROL REGISTER
654 002254 052777 000200 013674 BIS #DONE,20HMCSR ;SET UP INTERRUPT SERVICE ADDRESS
655 002262 042737 000340 177776 BIC #340,PS ;SET UP INTERRUPT PRIORITY
656 002270 000240 NOP ;SET DONE
657 002272 000402 BR INT1B ;ALLOW INTERRUPTS
658 002274 022626 INT1A: POP2SP ;DELAY FOR INTERRUPT
659 002276 104012 INT1B: ERROR ;NO INTERRUPT, CONTINUE
660 002300 104002 INT1B: SCOPE ;RESTORE STACK, INTERRUPT
;OCCURED, ERROR
;CHECK FOR LOOP, ITERATIONS

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662
663
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666 002302
667 002302 052737 000340 177776 T7:
668 002310 005077 013642 INT2: BIS #340,PS
669 002314 012777 002350 013630 CLR #340,PS
670 002322 013777 177776 013624 MOV #INT2A,#340,PS
671 002330 052777 000100 013620 MOV PS,#340,PS
672 002336 042737 000340 177776 BIS #INTENA,#340,PS
673 002344 000240 NOP
674 002346 000402 BR INT2B
675 002350 022626 INT2A: POP2SP
676 002352 104012 ERROR
677 002354 104002 INT2B: SCOPE
678
679
680
681
682 002356
683 002356 052737 000340 177776 T10:
684 002364 005077 013566 INT3: BIS #340,PS
685 002370 012777 002434 013554 CLR #340,PS
686 002376 012777 000100 013552 MOV #INT3A,#340,PS
687 002404 013777 177776 013542 MOV #INTENA,#340,PS
688 002412 042737 000340 177776 MOV PS,#340,PS
689 002420 052777 000200 013530 BIS #DONE,#340,PS
690 002426 000240 NOP
691 002430 104012 ERROR
692 002432 000401 BR INT3B
693 002434 022626 INT3A: POP2SP
694 002436 104002 INT3B: SCOPE
695
713
(2)
(2)
(2)
(3) 002440
(2) 002440 005077 013512 T11:
(2) 002444 042737 000340 177776 INT4: CLR #340,PS
(2) 002452 052737 000340 177776 BIC #340,PS
(2) 002460 012777 002514 013464 BIS #340,PS
(2) 002466 013777 177776 013460 MOV #INT4A,#340,PS
(2) 002474 012777 000100 013454 MOV PS,#340,PS
(2) 002502 052777 000200 013446 MOV #INTENA,#340,PS
(2) 002510 000240 BIS #DONE,#340,PS
(2) 002512 000402 NOP
(2) 002514 022626 BR INT4B
(2) 002516 104012 INT4A: POP2SP
(2) 002520 104002 INT4B: SCOPE

```

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

;REFERENCE DESIGNATION
;LOCK OUT INTERRUPTS
;CLEAR CONTROL REGISTER
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;ALLOW INTERRUPTS
;DELAY FOR INTERRUPTS
;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATIONS, LOOP

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

;REFERENCE DESIGNATION
;LOCK OUT INTERRUPTS
;CLEAR CONTROL REGISTER
;SET UP INTERRUPT SERVICE ADDRESS
;SET "INTERRUPT ENABLE"
;SET "INTERRUPT LEVEL"
;ALLOW INTERRUPTS
;SET "DONE"
;DELAY FOR INTERRUPT
;INTERRUPT OCCURED, ERROR
;CONTINUE
;INTERRUPT OCCURED, RESTOR STACK
;CHECK FOR ITERATION, LOOP

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

;REFERENCE DESIGNATION
;CLEAR CONTROL REGISTER
;SET PROCESSOR PRIORITY
;TO LEVEL 7.
;SET UP INTERRUPT SERVICE ADDRESS
;SET UP INTERRUPT SERVICE LEVEL
;SET INTERRUPT ENABLE
;GENERATE INTERRUPT
;DELAY FOR INTERRUPT
;NO INTERRUPT, CONTINUE
;RESTORE STACK
;INTERRUPT OCCURED, ERROR
;CHECK FOR ITERATION, LOOP


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733
734
735
736
737 003250
738 003250 005077 012702
739 003254 042737 000340 177776
740 003262 012737 000001 016262
741 003270 005005
742 003272 012700 000020
743 003276 033737 016262 016260
744 003304 001407
745 003306 010577 012644
746 003312 017704 012640
747 003316 020504
748 003320 001401
749 003322 104000
750 003324 104003
751 003326 003276
752 003330 005205
753 003332 006337 016262
754 003336 005300
755 003340 001356
756 003342 104002
757
758
759
760
761 003344
762 003344 042737 000340 177776
763 003352 005077 012600
764 003356 005005
765 003360 012737 000001 016262
766 003366 012701 177777
767 003372 012700 000020
768 003376 012777 000017 012552
769 003404 033737 016262 016260
770 003412 001410
771 003414 052777 000400 012534
772 003422 017704 012530
773 003426 020504
774 003430 001401
775 003432 104000
776 003434 104003
777 003436 003344
778 003440 005205
779 003442 006337 016262
780 003446 005201
781 003450 010177 012502
782 003454 005300
783 003456 001352
784 003460 104002

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

T21:
LINT1: CLR 2DHMCSR
      BIC #340,PS
      MOV #1,SELMSK
      CLR R5
      MOV #16,R0
LINT1A: BIT SELMSK,LINSEL
      BEQ LINT1B
      MOV R5,2DHMCSR
      MOV 2DHMCSR,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 2DHMCSR
      CLR R5
      MOV #1,SELMSK
      MOV #-1,R1
      MOV #16,R0
      MOV #17,2DHMCSR
LINT2A: BIT SELMSK,LINSEL
      BEQ LINT2B
      BIS #STEP,2DHMCSR
      MOV 2DHMCSR,R4
      CMP R5,R4
      BEQ LINT2B
      ERRORC
LINT2B: SCOPEF
      LINT2
      INC R5
      ASL SELMSK
      INC R1
      MOV R1,2DHMCSR
      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

```

```

786
787
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790
791
792
793 003462          T23:
794 003462 012777 002000 012466 MENT1:  MOV    #CLRMUX,JDHMCSR
795 003470 042737 000340 177776      BIC    #340,PS
796 003476 012700 000020          MOV    #16.,R0
797 003502 052777 001017 012446      BIS    #MAINT+17,JDHMCSR
798 003510 052777 000400 012440 MENT1A: BIS    #STEP,JDHMCSR
799 003516 005300          DEC    R0
800 003520 001373          BNE    MENT1A
801 003522 012700 000020          MOV    #16.,R0
802 003526 012705 070000          MOV    #70000,R5
803 003532 012777 000017 012416      MOV    #17,JDHMCSR
804 003540 052777 000400 012410 MENT1B: BIS    #STEP,JDHMCSR
805 003546 017704 012404          MOV    JDHMCSR,R4
806 003552 020504          CMP    R5,R4
807 003554 001403          BEQ    MENT1C
808 003556 104000          ERRORC
809 003560 104003          SCOPEF
810 003562 003462          MENT1
811 003564 005205          MENT1C: INC    R5
812 003566 005300          DEC    R0
813 003570 001363          BNE    MENT1B
814 003572 012777 004000 012356 MENT1D: MOV    #CLRSCN,JDHMCSR
815 003600 032777 000020 012350      BIT    #BUSY,JDHMCSR
816 003606 001374          BNE    #-6
817 003610 012700 000020          MOV    #16.,R0
818 003614 005005          CLR    R5
819 003616 012777 000017 012332      MOV    #17,JDHMCSR
820 003624 052777 000400 012324 MENT1E: BIS    #STEP,JDHMCSR
821 003632 017704 012320          MOV    JDHMCSR,R4
822 003636 020504          CMP    R5,R4
823 003640 001403          BEQ    MENT1F
824 003642 104000          ERRORC
825 003644 104003          SCOPEFF
826 003646 003572          MENT1D
827 003650 005205          MENT1F: INC    R5
828 003652 005300          DEC    R0
829 003654 001363          BNE    MENT1E
830 003656 104002          SCOPE

```

```

:WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS.
:VERIFY THAT ALL LOCATIONS HAVE BEEN WRITTEN
:TO 1'S.
:VERIFY THAT "CLEAR SCAN" CLEARS ALL SCANNER
:MEMORY LOCATIONS.

```

```

:REFERENCE DESIGNATION
:CLEAR CONTROL STATUS REGISTER
:ENABLE INTERRUPTS
:SET UP TO TEST 16 LOCATIONS
:SET MAINTENANCE MODE
:SET LINE COUNTER THRU ALL
:STATES, WRITING 1'S INTO
:ALL MEMORY WORDS
:SET UP TO TEST 16 WORDS
:SET UP EXPECTED STATUS REGISTER
:START WITH LINE 0
:ACCESS SCANNER MEMORY
:READ DATA
:COMPARE EXPECTED AND RECEIVED
:DATA
:CONTROL STATUS OR MEMORY ERROR
:CHECK FOR DATA FREEZE

:UPDATE EXPECTED STATUS
:UPDATE LINE COUNT
:CONTINUE
:SET "CLEAR SCAN"
:WAIT FOR "CLEAR CYCLES"

:SET UP TO TEST 16 MEMORY
:LOCATIONS
:FIRST TO BE TESTED=0
:ACCESS SCANNER MEMORY
:READ DATA
:COMPARE EXPECTED AND RECEIVED
:DATA
:CONTROL STATUS OF MEMORY ERROR
:CHECK FOR DATA FREEZE

:UPDATE EXPECTED DATA
:UPDATE LINE COUNT
:CONTINUE
:CHECK FOR ITERATIONS, LOOP

```

```

832
833
834
835
836 003660
837 003660 005077 012272
838 003664 042737 000340 177776
839 003672 012700 000020
840 003676 012702 000017
841 003702 012777 004000 012246
842 003710 032777 000020 012240
843 003716 001374
844 003720 012777 001000 012230
845 003726 050277 012224
846 003732 052777 000400 012216
847 003740 042777 001000 012210
848 003746 012703 000020
849 003752 012777 000017 012176
850 003760 005202
851 003762 005001
852 003764 052777 000400 012164
853 003772 117704 012160
854 003776 010105
855 004000 120402
856 004002 001002
857 004004 052705 070000
858 004010 020405
859 004012 001403
860 004014 104000
861 004016 104003
862 004020 003702
863 004022 005201
864 004024 005303
865 004026 001356
866 004030 005300
867 004032 001323
868 004034 104002

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

T24:
MENT2: CLR @DHMCSR
      BIC @340,PS
      MOV @16,R0
      MOV @17,R2
MENT2A: MOV @CLASCN,@DHMCSR
      BIT @BUSY,@DHMCSR
      BNE -.6
      MOV @MAINT,@DHMCSR
      BIS R2,@DHMCSR
      BIS @STEP,@DHMCSR
      BIC @MAINT,@DHMCSR
      MOV @16,R3
      MOV @17,@DHMCSR
      INC R2
      CLR R1
MENT2B: BIS @STEP,@DHMCSR
      MOV @DHMCSR,R4
      MOV R1,R5
      CMPB R4,R2
      BNE MENT2C
      BIS @70000,R5
MENT2C: CMP R4,R5
      BEQ MENT2D
      ERRORC
      SCOPEF
MENT2D: INC R1
      DEC R3
      BNE MENT2B
      DEC R0
      BNE MENT2A
      SCOPE

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

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

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

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

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

```

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870
871
872
873
874
875 004036
876 004036 005077 012114
877 004042 042737 000340 177776
878 004050 012700 000020
879 004054 012702 000017
880 004060 012703 000020
881 004064 012777 001017 012064
882 004072 052777 000400 012056
883 004100 005303
884 004102 001373
885 004104 010277 012046
886 004110 052777 000400 012040
887 004116 012703 000020
888 004122 012777 000017 012026
889 004130 005202
890 004132 005001
891 004134 052777 000400 012014
892 004142 117704 012010
893 004146 010105
894 004150 120402
895 004152 001002
896 004154 052705 070000
897 004160 020405
898 004162 001403
899 004164 104000
900 004166 104003
901 004170 004060
902 004172 005201
903 004174 005303
904 004176 001356
905 004200 005300
906 004202 001326
907 004204 104002

;WITH ALL SCANNER MEMORY LOCATIONS SET TO 1'S,
;WRITE 0'S INTO SELECTED LOCATION
;VERIFY THAT ONLY SELECTED LOCATION WAS CLEARED.

T25:
MENT3: CLR 3DHCSR
      BIC #340,PS
      MOV #16,R0
      MOV #17,R2
MENT3A: MOV #16,R3
      MOV #MAINT+17,3DHCSR
MENT3B: BIS #STEP,3DHCSR
      DEC R3
      BNE MENT3B
      MOV R2,3DHCSR
      BIS #STEP,3DHCSR
      MOV #16,R3
      MOV #17,3DHCSR
      INC R2
      CLR R1
MENT3C: BIS #STEP,3DHCSR
      MOVB 3DHCSR,R4
      MOV R1,R5
      CMPB R4,R2
      BNE MENT3D
      BIS #70000,R5
MENT3D: CMP R4,R5
      BEQ MENT3E
      ERRORC
      SCOPEF
MENT3A: MENT3A
MENT3E: INC R1
      DEC R3
      BNE MENT3C
      DEC R0
      BNE MENT3A
      SCOPE

;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
    
```

```

909          ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
(1)          ;BE SET AND CLEARED FOR SELECTED LINE
(1)
(2) 004206          T26:          ;REFERENCE DESIGNATION
(1) 004206 005077 011744          MUX1:  CLR  20HMCSR          ;CLEAR CONTROL STATUS REGISTER
(1) 004212 042737 000340 177776  BIC  8340,PS          ;ENABLE INTERRUPTS
(1) 004220 012700 000020          MOV  816,R0          ;SET UP TO TEST 16 FUNCTION FLIP-FLOP
(1) 004224 012737 000001 016262  MOV  81,SELMSK          ;INIT LINE SELECT MASK
(1) 004230 005001          CLR  R1          ;START AT LINE 0
(1) 004234 012777 002000 011714  MUX1A: MOV  8CLRMUX,20HMCSR
(1) 004240 012702 000020          MOV  816,R2
(1) 004246 033737 016262 016260  BIT  SELMSK,LINSEL          ;IS THIS LINE SELECTED FOR TEST ?
(1) 004254 001463          BEQ  MUX1F          ;BR IF NOT
(1) 004256 010177 011674          MOV  R1,20HMCSR          ;SELECT LINE TO BE TESTED
(1) 004262 012777 000001 011670  MOV  8LINENA,20HMLSR          ;SET LINE ENABLE FUNCTION FLIP-FLOP
(1) 004270 012737 000001 016264  MOV  81,SLMSK          ;INIT ANOTHER SELECT MASK
(1) 004276 005077 011654          CLR  20HMCSR
(1) 004302 005005          MUX1B: CLR  R5
(1) 004304 033737 016264 016260  BIT  SLMSK,LINSEL          ;SELECTED ??
(1) 004312 001417          BEQ  MUX1D          ;BR IF NOT
(1) 004314 017704 011640          MOV  20HMLSR,R4          ;READ LINE STATUS REGISTER
(1) 004320 117703 011632          MOV  20HMCSR,R3          ;READ CONTROL STATUS REGISTER
(1) 004324 042703 177760          BIC  8177760,R3          ;CLEAR UNWANTED BITS
(1) 004330 020103          CMP  R1,R3          ;IF LINE NUMBER=SELECTED LINE NUMBER,
(1) 004332 001002          BNE  MUX1C          ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
(1) 004334 012705 000001          MOV  8LINENA,R5
(1)
(1) 004340 020504          MUX1C: CMP  R5,R4          ;TO BE SET
(1) 004342 001403          BEQ  MUX1D          ;COMPARE EXPECTED AND RECEIVED
(1) 004344 104001          ERRORL          ;RESULTS
(1) 004346 104003          SCOPEF          ;LINE STATUS ERROR
(1) 004350 004352          MUX1D
(1) 004352 052777 000400 011576  MUX1D: BIS  #STEP,20HMCSR          ;EXAMINE NEXT LINE
(1) 004360 006337 016264          ASL  SLMSK          ;SHIFT MASK
(1) 004364 005302          DEC  R2
(1) 004366 001345          BNE  MUX1B
(1) 004370 005005          CLR  R5
(1) 004372 010177 011560          MUX1E: MOV  R1,20HMCSR
(1) 004376 010103          MOV  R1,R3
(1) 004400 005077 011554          CLR  20HMLSR          ;SET LINE COUNTER TO SELECTED LINE
(1) 004404 105227 000000          INCB  #0          ;CLEAR LINE ENABLE FLIP FLOP
(1) 004410 001375          BNE  -4          ;DELAY FOR CABLE
(1) 004412 017704 011542          MOV  20HMLSR,R4          ;DITTO
(1) 004416 005704          TST  R4          ;READ LINE STATUS REGISTER
(1) 004420 001401          BEQ  MUX1F          ;WAS LINE ENABLE FUNCTION FLIP FLOP
(1) 004422 104001          ERRORL          ;CLEARED
(1) 004424 104003          SCOPEF          ;NO, LINE STATUS ERROR
(1) 004426 004234          MUX1F: MUX1A          ;CHECK FOR LOOP ON SAME DATA
(1) 004430 006337 016262          ASL  SELMSK          ;SHIFT SELECT MASK
(1) 004434 005201          INC  R1          ;SELECT NEXT LINE
(1) 004436 005300          DEC  R0          ;DECREMENT LINE COUNT
(1) 004440 001275          BNE  MUX1A          ;CONTINU IF NOT DONE
(1) 004442 104002          SCOPE          ;CHECK FOR ITERATIONS, LOOP

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915
(1)
(1)
(2) 005140
(1) 005140 005077 011012
(1) 005144 042737 000340 177776
(1) 005152 012700 000020
(1) 005156 012737 000001 016262
(1) 005164 005001
(1) 005166 012777 002000 010762 MUX4A:
(1) 005174 012702 000020
(1) 005200 033737 016262 016260
(1) 005206 001463
(1) 005210 010177 010742
(1) 005214 012777 000010 010736
(1) 005222 012737 000001 016264
(1) 005230 005077 010722
(1) 005234 005005 MUX4B:
(1) 005236 033737 016264 016260
(1) 005244 001417
(1) 005246 017704 010706
(1) 005252 117703 010700
(1) 005256 042703 177760
(1) 005262 020103
(1) 005264 001002
(1) 005266 012705 000010
(1)
(1) 005272 020504 MUX4C:
(1) 005274 001403
(1) 005276 104001
(1) 005300 104003
(1) 005302 005304
(1) 005304 052777 000400 010644 MUX4D:
(1) 005312 006337 016264
(1) 005316 005302
(1) 005320 001345
(1) 005322 005005
(1) 005324 010177 010626 MUX4E:
(1) 005330 010103
(1) 005332 005077 010622
(1) 005336 105227 000000
(1) 005342 001375
(1) 005344 017704 010610
(1) 005350 005704
(1) 005352 001401
(1) 005354 104001
(1) 005356 104003 MUX4F:
(1) 005360 005166
(1) 005362 006337 016262
(1) 005366 005201
(1) 005370 005300
(1) 005372 001275
(1) 005374 104002

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

;REFERENCE DESIGNATION
;CLEAR CONTROL STATUS REGISTER
;ENABLE INTERRUPTS
;SET UP TO TEST 16 FUNCTION FLIP-FLOP
;INIT LINE SELECT MASK
;START AT LINE 0

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

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

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

;EXAMINE NEXT LINE
;SHIFT MASK

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

;SHIFT SELECT MASK
;SELECT NEXT LINE
;DECREMENT LINE COUNT
;CONTINU IF NOT DONE
;CHECK FOR ITERATIONS, LOOP
    
```

```

917
(1)                                     ;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
(1)                                     ;AND TERMINAL ARE SET FOR SELECTED LINE.
(1)
(2) 005376                               T32:
(1) 005376 005077 010554                 MUXS: CLR      2DHMCSR
(1) 005402 042737 000340 177776        BIC      #340,PS
(1) 005410 012700 000020                 MOV      #16.,R0
(1) 005414 005001                         CLR      R1
(1) 005416 012737 000001 016262        MOV      #1,SELMSK
(1) 005424 012702 000020                 MUXSA: MOV      #16.,R2
(1) 005430 033737 016262 016260        BIT      SELMSK,LINSEL
(1) 005436 001454                         BEQ      MUXSF
(1) 005440 010177 010512                 MOV      R1,2DHMCSR
(1) 005444 012777 000003 010506        MOV      #LINENA+TRMRDY,2DHMLSR
(1) 005452 005077 010500                 CLR      2DHMCSR
(1) 005456 005005                         MUXSB: CLR      R5
(1) 005460 017704 010474                 MOV      2DHMLSR,R4
(1) 005464 117703 010466                 MOV      2DHMCSR,R3
(1) 005470 042703 177760                 BIC      #177760,R3
(1) 005474 020103                         CMP      R1,R3
(1) 005476 001002                         BNE      MUXSC
(1) 005500 012705 000143                 MOV      #LINENA+TRMRDY+CO+CS,R5
(1)
(1) 005504 020405                         MUXSC: CMP      R4,R5
(1) 005506 001403                         BEQ      MUXSD
(1) 005510 104001                         ERRORI
(1) 005512 104003                         SCOPEF
(1) 005514 005516                         MUXSD
(1) 005516 052777 000400 010432        MUXSD: BIS      #STEP,2DHMCSR
(1) 005524 005302                         DEC      R2
(1) 005526 001353                         BNE      MUXSB
(1) 005530 012705 000001                 MUXSE: MOV      #LINENA,R5
(1) 005534 010103                         MOV      R1,R3
(1) 005536 010177 010414                 MOV      R1,2DHMCSR
(1) 005542 042777 000002 010410        BIC      #TRMRDY,2DHMLSR
(1) 005550 105227 000000                 INCB    #0
(1) 005554 001375                         BNE     #-4
(1) 005556 017704 010376                 MOV      2DHMLSR,R4
(1) 005562 020504                         CMP      R5,R4
(1) 005564 001401                         BEQ      MUXSF
(1) 005566 104001                         ERRORI
(1) 005570 104003                         SCOPEF
(1) 005572 005424                         MUXSA
(1) 005574 005201                         INC      R1
(1) 005576 005077 010356                 CLR      2DHMLSR
(1) 005602 006337 016262                 ASL      SELMSK
(1) 005606 005300                         DEC      R0
(1) 005610 001305                         BNE      MUXSA
(1) 005612 104002                         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

```

```

919
(1)
(1)
(1)
(2) 005614 005077 010336 T33:
(1) 005614 005077 010336 MUX6: CLR 3DHMCSR
(1) 005620 042737 000340 177776 BIC #340,PS
(1) 005626 012700 000020 MOV #16.,R0
(1) 005632 005001 CLR R1
(1) 005634 012737 000001 016262 MUX6A: MOV #1,SELMSK
(1) 005642 012702 000020 MOV #16.,R2
(1) 005646 033737 016262 016260 BIT SELMSK,LINSEL
(1) 005654 001454 BEQ MUX6F
(1) 005656 010177 010274 MOV R1,3DHMCSR
(1) 005662 012777 000005 010270 MOV #LINENA+RS,3DHMLSR
(1) 005670 005077 010262 CLR 3DHMCSR
(1) 005674 005005 MUX6B: CLR R5
(1) 005676 017704 010256 MOV 3DHMLSR,R4
(1) 005702 117703 010250 MOVB 3DHMCSR,R3
(1) 005706 042703 177760 BIC #177760,R3
(1) 005712 020103 CMP R1,R3
(1) 005714 001002 BNE MUX6C
(1) 005716 012705 000205 MOV #LINENA+RS+RING,R5
(1)
(1) 005722 020405 MUX6C: CMP R4,R5
(1) 005724 001403 BEQ MUX6D
(1) 005726 104001 ERRORL
(1) 005730 104003 SCOPEF
(1) 005732 005734 MUX6D:
(1) 005734 052777 000400 010214 MUX6D: BIS #STEP,3DHMCSR
(1) 005742 005302 DEC R2
(1) 005744 001353 BNE MUX6B
(1) 005746 012705 000001 MUX6E: MOV #LINENA,R5
(1) 005752 010103 MOV R1,R3
(1) 005754 010177 010176 010172 MUX6E: MOV R1,3DHMCSR
(1) 005760 042777 000004 BIC #RS,3DHMLSR
(1) 005766 105227 000000 INCB #0
(1) 005772 001375 BNE -4
(1) 005774 017704 010160 MOV 3DHMLSR,R4
(1) 006000 020504 CMP R5,R4
(1) 006002 001401 BEQ MUX6F
(1) 006004 104001 ERRORL
(1) 006006 104003 MUX6F: SCOPEF
(1) 006010 005642 MUX6A
(1) 006012 005201 INC R1
(1) 006014 005077 010140 CLR 3DHMLSR
(1) 006020 006337 016262 ASL SELMSK
(1) 006024 005300 DEC R0
(1) 006026 001305 BNE MUX6A
(1) 006030 104002 SCOPE

```

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

: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 +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 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

```

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

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923
924
925
926
927 006250
928 006250 005077 007702
929 006254 042737 000340 177776
930 006262 012700 000020
931 006266 012777 000017 007664
932 006274 052777 000400 007654
933 006302 005300
934 006304 001370
935 006306 012737 000001 016262
936 006314 005003
937 006316 012700 000020
938 006322 012777 002000 007626
939 006330 033737 016262 016260
940 006336 001425
941 006340 010377 007612
942 006344 017704 007610
943 006350 005005
944 006352 005704
945 006354 001403
946 006356 104001
947 006360 104003
948 006362 006322
949 006364 005205
950 006366 052777 000001 007564
951 006374 017704 007560
952 006400 020504
953 006402 001403
954 006404 104001
955 006406 104003
956 006410 006322
957 006412 005203
958 006414 005077 007540
959 006420 006337 016262
960 006424 005300
961 006426 001340
962 006430 104002

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

T35:
MUXB: CLR 2DHCSR
      BIC 2340,PS
      MOV 216.,R0
MUXBA: MOV 217.,2DHMLSR
      BIS 2STEP,2DHCSR
      DEC R0
      BNE MUXBA
      MOV 21.,SELMSK
      CLR R3
      MOV 216.,R0
MUXBB: MOV 2CLRMLX,2DHCSR
MUXBC: BIT SELMSK,LINSEL
      BEQ MUXBE
      MOV R3,2DHCSR
      MOV 2DHMLSR,R4
      CLR R5
      TST R4
      BEQ MUXBD
      ERRORL
      SCOPEF
MUXBD: INC R5
      BIS 2LINENA,2DHMLSR
      MOV 2DHMLSR,R4
      CMP R5,R4
      BEQ MUXBE
      ERRORL
      SCOPEF
MUXBE: INC R3
      CLR 2DHMLSR
      ASL SELMSK
      DEC R0
      BNE MUXBC
      SCOPE

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

;INIT SELECT MASK
;SET UP FOR 16 LINES

;CLEAR MULTIPLEXER
;SELECTED ??
;BR IF NOT
;SELECT LINE
;READ LINE STATUS REGISTER
;EXPECT 05
;WAS LINE STATUS REGISTER CLEARED

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

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

;LINE STATUS ERROR
;CHECK FOR LOOP ON SAME DATA

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

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964
965
966                                     ;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS
967                                     ;SET "LINE ENABLE FOR ALL LINES
968                                     ;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE
969
970 006432                                T36:
971 006432 012777 002000 007516 SCNT1: MOV    #CLRMUX,2DHMCSR      ;REFERENCE DESIGNATION
972 006440 005077 007512                                CLR    2DHMCSR          ;CLEAR ALL MULTIPLEXER FLIPFLOPS
973 006444 042737 000340 177776                                BIC    #340,PS        ;CLEAR CONTROL REGISTER
974 006452 012700 000020                                MOV    #16,R0        ;ENABLE INTERRUPTS
975 006456 012777 001017 007472                                MOV    #MAINT+17,2DHMCSR ;SET UP TO WRITE 1'S INTO
976 006464 012737 000001 016262                                MOV    #1,SELSK      ;ALL SCANNER MEMORY LOCATION
977 006472 052777 000400 007456 SCNT1A: BIS    #STEP,2DHMCSR      ;INIT SELECT MASK
978 006500 012777 000001 007452                                MOV    #LINEA,2DHMSR  ;WRITE A LOCATION
979 006506 005300                                DEC    R0             ;LET "LINE ENABLE"
980 006510 001370                                BNE    SCNT1A
981 006512 012701 177777                                MOV    #-1,R1        ;INIT LINE NO. GEN.
982 006516 012705 070340                                MOV    #70340,R5     ;EXPECT "DONE"+"SCNENA"+"COF"+"CSF"+"SECRXF"
983 006522 012777 006632 007422                                MOV    #SCNT1C,2DHMVEC ;SET UP LOCAL INTERRUPT SERVICE
984 006530 013777 177776 007416                                MOV    PS,2DHMLVL    ;SERVICE AT LEVEL 7
985 006536 012700 000020                                MOV    #16,R0
986 006542 012777 000117 007406                                MOV    #INTENA+17,2DHMCSR ;SET INTERRUPT ENABLE
987 006550 033737 016262 016260 SCNT1B: BIT    SELSK,LINSEL  ;SELECTED ??
988 006556 001435                                BEQ    SCNT1D        ;BR IF NOT
989 006560 052737 000340 177776                                BIS    #340,PS       ;LOCK OUT INTERRUPTS
990 006566 052777 000040 007362                                BIS    #SCNENA,2DHMCSR ;START SCANNER
991 006574 042737 000340 177776                                BIC    #340,PS       ;ENABLE INTERRUPTS
992 006602 105777 007350                                TSTB  2DHMCSR        ;WAIT FOR DONE
993 006606 100375                                BPL    .-4           ;PROGRAM WILL HANG HERE
994
995 006610 052737 000340 177776                                BIS    #340,PS       ;IF DONE NEVER SETS
996 006616 017704 007334                                MOV    2DHMCSR,R4    ;INTERRUPT DID NOT OCCUR
997 006622 104000                                ERRORC                ;ERROR
998 006624 104003                                SCOPEF                ;CONTROL STATUS ERROR
999 006626 006432                                SCNT1                 ;CHECK FOR LOOP ON SAME DATA
1000 006630 000410                                BR     SCNT1D
1001 006632 022626                                SCNT1C: POP2SP        ;INTERRUPT OCCURED, REPOSITION STACK
1002 006634 017704 007316                                MOV    2DHMCSR,R4    ;READ CONTROL STATUS
1003 006640 020504                                CMP    R5,R4         ;ARE EXPECTED AND RECEIVED
1004 006642 001403                                BEQ    SCNT1D        ;REGISTERS THE SAME
1005 006644 104000                                ERRORC                ;NO. LINE STATUS ERROR
1006 006646 104003                                SCOPEF                ;CHECK FOR LOOP WITH CURRENT DATA
1007 006650 006432                                SCNT1
1008 006652 042777 000257 007276 SCNT1D: BIC    #SCNENA+DONE+17,2DHMCSR ;CLEAR SCAN ENABLE AND DONE
1009 006660 005201                                INC    R1            ;GEN NXT LINE NO.
1010 006662 150177 007270                                BISB  R1,2DHMCSR     ;SET LINE NO. BITS
1011 006666 006337 016262                                ASL   SELSK         ;SHIFT SELECT MASK
1012 006672 005205                                INC    R5            ;UPDATE EXPECTED RESULT
1013 006674 005300                                DEC    R0            ;CONTINUE IF NOT DONE
1014 006676 001324                                BNE   SCNT1B
1015 006700 104002                                SCOPE                 ;CHECK FOR ITERATIONS, LOOP

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1017
1018
1019
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1021
1022 006702
1023 006702 012700 000020
1024 006706 012777 002000 007242
1025 006714 005077 007236
1026 006720 042737 000340 177776
1027 006726 012737 000001 016262
1028 006734 012777 000017 007216
1029 006742 052777 000400 007206
1030 006750 005300
1031 006752 001370
1032 006754 012777 004000 007174
1033 006762 032777 000020 007166
1034 006770 001374
1035 006772 012700 000020
1036 006776 012701 177777
1037 007002 012705 170340
1038 007006 012777 007112 007136
1039 007014 013777 177776 007132
1040 007022 012777 000117 007126
1041 007030 033737 016262 016260
1042 007036 001435
1043 007040 052737 000340 177776
1044 007046 052777 000040 007102
1045 007054 042737 000340 177776
1046 007062 105777 007070
1047 007066 100375
1048
1049 007070 052737 000340 177776
1050 007076 017704 007054
1051 007102 104000
1052 007104 104003
1053 007106 006702
1054 007110 000410
1055 007112 022626
1056 007114 017704 007036
1057 007120 020504
1058 007122 001403
1059 007124 104000
1060 007126 104003
1061 007130 006702
1062 007132 042777 000257 007016
1063 007140 006337 016262
1064 007144 005201
1065 007146 150177 007004
1066 007152 005205
1067 007154 005300
1068 007156 001324
1069 007160 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,JDHMCSR
CLR JDHMCSR
BIC #340,PS
MOV #1,SELMSK
SCNT2A: MOV #17,JDHMLSR
BIS #STEP,JDHMCSR
RO
DEC
BNE SCNT2A
MOV #CLRSCN,JDHMCSR
BIT #BUSY,JDHMCSR
BNE
MOV #16,R0
MOV #1,R1
MOV #170340,R5
MOV #SCNT2C,JDHMVEC
MOV PS,JDHMLVL
SCNT2B: MOV #INTENA+17,JDHMCSR
BIT SELMSK,LINSEL
BEQ SCNT2D
BIS #340,PS
BIS #SCNENA,JDHMCSR
BIC #340,PS
TSTB JDHMCSR
BPL
BIS #340,PS
MOV JDHMCSR,R4
ERRORC
SCOPEF
SCNT2
BR SCNT2D
SCNT2C: POP2SP
MOV JDHMCSR,R4
CMP R5,R4
BEQ SCNT2D
ERRORC
SCOPEF
SCNT2
SCNT2D: BIC #SCNENA+DONE+17,JDHMCSR
ASL SELMSK
INC R1
BISB R1,JDHMCSR
INC R5
DEC R0
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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1071
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1080
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1099
1100
1101
1102
1103
1104
1105

007163
007163 012737 007202 001722
007170 042737 000340 177776
007176 104004
007200 017261
007202 104013
007204 017314
007206 000000
007210 000017
007212 016240
007214 104004
007216 017256

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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1107
1108
(1)
(1)
(2) 007220 005077 006732 T101:
(1) 007220 042737 000340 MUX11: CLR 3DHMCSR ;REFERENCE DESIGNATION
(1) 007224 013701 016240 177776 BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
(1) 007232 012777 002000 MUX11A: MOV LINE,R1 ;ENABLE INTERRUPTS
(1) 007236 012702 000020 MOV #CLRMUX,3DHMCSR
(1) 007244 033737 016262 016260 BIT SELMSK,LINSEL ;IS THIS LINE SELECTED FOR TEST ?
(1) 007250 001463 BEQ MUX11F ;BR IF NOT
(1) 007260 010177 006672 MOV R1,3DHMCSR ;SELECT LINE TO BE TESTED
(1) 007264 012777 000001 006666 MOV #LINENA,3DHMLSR ;SET LINE ENABLE FUNCTION FLIP-FLOP
(1) 007272 012737 000001 016264 MOV #1,SLMSK ;INIT ANOTHER SELECT MASK
(1) 007300 005077 006652 CLR 3DHMCSR
(1) 007304 005005 MUX11B: CLR R5
(1) 007306 033737 016264 016260 BIT SLMSK,LINSEL ;SELECTED ??
(1) 007314 001417 BEQ MUX11D ;BR IF NOT
(1) 007316 017704 006636 MOV 3DHMLSR,R4 ;READ LINE STATUS REGISTER
(1) 007322 117703 006630 MOVB 3DHMCSR,R3 ;READ CONTROL STATUS REGISTER
(1) 007326 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
(1) 007332 020103 CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER,
(1) 007334 001002 BNE MUX11C ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
(1) 007336 012705 000001 MOV #LINENA,R5 ;TO BE SET
(1) 007342 020504 MUX11C: CMP R5,R4 ;COMPARE EXPECTED AND RECEIVED
(1) 007344 001403 BEQ MUX11D ;RESULTS
(1) 007346 104001 ERRORL ;LINE STATUS ERROR
(1) 007350 104003 SCOPEF
(1) 007352 007354 MUX11D: MUX11D
(1) 007354 052777 000400 006574 MUX11D: BIS #STEP,3DHMCSR ;EXAMINE NEXT LINE
(1) 007362 006337 016264 ASL SLMSK ;SHIFT MASK
(1) 007366 005302 DEC R2
(1) 007370 001345 BNE MUX11B
(1) 007372 005005 CLR R5
(1) 007374 010177 006556 MUX11E: MOV R1,3DHMCSR ;SET LINE COUNTER TO SELECTED LINE
(1) 007400 010103 MOV R1,R3 ;CLEAR LINE ENABLE FLIP FLOP
(1) 007402 005077 006552 CLR 3DHMLSR ;DELAY FOR CABLE
(1) 007406 105227 000000 INCB #0 ;DITTO
(1) 007412 001375 BNE .-4
(1) 007414 017704 006540 MOV 3DHMLSR,R4 ;READ LINE STATUS REGISTER
(1) 007420 005704 TST R4 ;WAS LINE ENABLE FUNCTION FLIP FLOP
(1) 007422 001401 BEQ MUX11F ;CLEARED
(1) 007424 104001 ERRORL ;NO, LINE STATUS ERROR
(1) 007426 104002 MUX11F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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1114
(1)
(1)
(2) 010050
(1) 010050 005077 006102
(1) 010054 042737 000340 177776
(1) 010062 013701 016240
(1) 010066 012777 002000 006062
(1) 010074 012702 000020
(1) 010100 033737 016262 016260
(1) 010106 001463
(1) 010110 010177 006042
(1) 010114 012777 000010 006036
(1) 010122 012737 000001 016264
(1) 010130 005077 006022
(1) 010134 005005
(1) 010136 033737 016264 016260
(1) 010144 001417
(1) 010146 017704 006006
(1) 010152 117703 006000
(1) 010156 042703 177760
(1) 010162 020103
(1) 010164 001002
(1) 010166 012705 000010
(1)
(1) 010172 020504
(1) 010174 001403
(1) 010176 104001
(1) 010200 104003
(1) 010202 010204
(1) 010204 052777 000400 005744
(1) 010212 006337 016264
(1) 010216 005302
(1) 010220 001345
(1) 010222 005005
(1) 010224 010177 005726
(1) 010230 010103
(1) 010232 005077 005722
(1) 010236 105227 000000
(1) 010242 001375
(1) 010244 017704 005710
(1) 010250 005704
(1) 010252 001401
(1) 010254 104001
(1) 010256 104002

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

T104:
MUX14: CLR 2DHCSR
      BIC 8340,PS
      MOV LINE,R1
MUX14A: MOV 8CLRMUX,2DHCSR
      MOV 816,R2
      BIT SELMSK,LINSEL
      BEQ MUX14F
      MOV R1,2DHCSR
      MOV 8SECTX,2DHMSLR
      MOV 81,SLMSK
      CLR 2DHCSR
MUX14B: CLR R5
      BIT SLMSK,LINSEL
      BEQ MUX14D
      MOV 2DHMSLR,R4
      MOVB 2DHCSR,R3
      BIC 8177760,R3
      CMP R1,R3
      BNE MUX14C
      MOV 8SECTX,R5

      ;REFERENCE DESIGNATION
      ;CLEAR CONTROL STATUS REGISTER
      ;ENABLE INTERRUPTS

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

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

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

MUX14C: CMP R5,R4
      BEQ MUX14D
      ERRORL SCOPEF
      MUX14D

MUX14D: BIS 8STEP,2DHCSR
      ASL SLMSK
      DEC R2
      BNE MUX14B
      CLR R5
MUX14E: MOV R1,2DHCSR
      MOV R1,R3
      CLR 2DHMSLR
      INCB 80
      BNE .-4
      MOV 2DHMSLR,R4
      TST R4
      BEQ MUX14F
      ERRORL SCOPE

MUX14F: SCOPE

      ;EXAMINE NEXT LINE
      ;SHIFT MASK

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

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1116

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(1)                                     ;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
(1)                                     ;AND TERMINAL ARE SET FOR SELECTED LINE.
(1)
(2) 010260                               T105:                               ;REFERENCE DESIGNATION
(1) 010260 005077 005672                 MUX15: CLR 2DHMCSR                 ;CLEAR CONTROL REGISTER
(1) 010264 042737 000340 177776         BIC 2340,PS                       ;ENABLE INTERRUPTS
(1) 010272 013701 016240                 MOV LINE,R1
(1) 010276 012702 000020                 MUX15A: MOV 216,R2                ;16 LINES
(1) 010302 033737 016262 016260         BIT SELMSK,LINSEL                 ;THIS LINE SELECTED FOR TEST ?
(1) 010310 001454                         BEQ MUX15F                         ;OR IF NOT
(1) 010312 010177 005640                 MOV R1,2DHMCSR                    ;SELECT A LINE
(1) 010316 012777 000003 005634         MOV 2LINENA+TRMRDY,2DHMLSR        ;SET LINE ENABLE +TRMRDY
(1) 010324 005077 005626                 CLR 2DHMCSR                       ;CLEAR CONTROL REGISTER
(1) 010330 005005                 MUX15B: CLR R5                    ;CLEAR EXPECTED RESULT
(1) 010332 017704 005622                 MOV 2DHMLSR,R4                    ;READ LINE STATUS
(1) 010336 117703 005614                 MOVB 2DHMCSR,R3                   ;READ LINE NUMBER
(1) 010342 042703 177760                 BIC 2177760,R3                    ;CLEAR UNWANTED BITS
(1) 010346 020103                         CMP R1,R3                          ;IF RECEIVED LINE=SELECTED LINE
(1) 010350 001002                         BNE MUX15C                         ;EXPECT LINE ENABLE AND
(1) 010352 012705 000143                 MOV 2LINENA+TRMRDY+CO+CS,R5        ;CLEAR TO SEND AND CARRIER ARE SET
(1)                                     MUX15C: CMP R4,R5                 ;COMPARE EXPECTED AND
(1) 010356 020405                         BEQ MUX15D                         ;RECEIVED RESULTS
(1) 010360 001403                         ERRORL                               ;LINE STATUS ERROR
(1) 010362 104001                         SCOPEF
(1) 010364 104003                         MUX15D
(1) 010366 010370
(1) 010370 052777 000400 005560         MUX15D: BIS 2STEP,2DHMCSR          ;UPDATE LINE COUNTER
(1) 010376 005302                         DEC R2                              ;CONTINUE IF ALL CHECKS
(1) 010400 001353                         BNE MUX15B                          ;ARE NOT DONE FOR THIS LINE
(1) 010402 012705 000001                 MOV 2LINENA,R5                     ;EXPECT LINE ENABLE
(1) 010406 010103                 MUX15E: MOV R1,R3                  ;ON SELECTED LINE
(1) 010410 010177 005542                 MOV R1,2DHMCSR                    ;SELECT LINE
(1) 010414 042777 000002 005536         BIC 2TRMRDY,2DHMLSR               ;CLEAR TERMINAL
(1) 010422 105227 000000                 INCB 20                             ;DELAY FOR CABLE
(1) 010426 001375                         BNE -4                              ;DITTO
(1) 010430 017704 005524                 MOV 2DHMLSR,R4                    ;READ LINE STATUS REGISTER
(1) 010434 020504                         CMP R5,R4                          ;ONLY LINE ENABLE SHOULD BE
(1) 010436 001401                         BEQ MUX15F                         ;SET ON THIS LINE
(1) 010440 104001                         ERRORL                               ;LINE STATUS ERROR
(1) 010442 104002                 MUX15F: SCOPE                      ;CHECK FOR ITERATIONS, LOOP

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F05

1118

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(1)                                     ;VERIFY THAT RING IS SET IF "LINE ENABLE"
(1)                                     ;AND REQUEST TO SEND ARE SET FOR SELECTED LINE.
(1)
(1)
(2) 010444                               T106:                               ;REFERENCE DESIGNATION
(1) 010444 005077 005506                MUX16: CLR 2DHMCSR                ;CLEAR CONTROL REGISTER
(1) 010450 042737 000340 177776        BIC 8340,PS                       ;ENABLE INTERRUPTS
(1) 010456 013701 016240                MOV LINE,R1
(1) 010462 012702 000020                MUX16A: MOV 816,R2                ;16 LINES
(1) 010466 033737 016262 016260        BIT SELMSK,LINSEL                 ;THIS LINE SELECTED FOR TEST ?
(1) 010474 001454                        BEQ MUX16F                         ;BR IF NOT
(1) 010476 010177 005454                MOV R1,2DHMCSR                    ;SELECT A LINE
(1) 010502 012777 000005 005450        MOV 8LINENA+RS,2DHMLSR           ;SET LINE ENABLE +RS
(1) 010510 005077 005442                CLR 2DHMCSR                       ;CLEAR CONTROL REGISTER
(1) 010514 005005                MUX16B: CLR R5                    ;CLEAR EXPECTED RESULT
(1) 010516 017704 005436                MOV 2DHMLSR,R4                    ;READ LINE STATUS
(1) 010522 117703 005430                MOVB 2DHMCSR,R3                   ;READ LINE NUMBER
(1) 010526 042703 177760                BIC 8177760,R3                    ;CLEAR UNWANTED BITS
(1) 010532 020103                CMP R1,R3                          ;IF RECEIVED LINE=SELECTED LINE
(1) 010534 001002                BNE MUX16C                         ;EXPECT LINE ENABLE AND
(1) 010536 012705 000205                MOV 8LINENA+RS+RING,R5
(1)
(1) 010542 020405                MUX16C: CMP R4,R5                 ;RING IS SET
(1) 010544 001403                BEQ MUX16D                         ;COMPARE EXPECTED AND
(1) 010546 104001                ERRORL                               ;RECEIVED RESULTS
(1) 010550 104003                SCOPEF                               ;LINE STATUS ERROR
(1) 010552 010554                MUX16D
(1) 010554 052777 000400 005374        MUX16D: BIS 8STEP,2DHMCSR         ;UPDATE LINE COUNTER
(1) 010562 005302                DEC R2                              ;CONTINUE IF ALL CHECKS
(1) 010564 001353                BNE MUX16B                          ;ARE NOT DONE FOR THIS LINE
(1) 010566 012705 000001                MOV 8LINENA,R5                     ;EXPECT LINE ENABLE
(1) 010572 010103                MUX16E: MOV R1,R3                  ;ON SELECTED LINE
(1) 010574 010177 005356                MOV R1,2DHMCSR                     ;SELECT LINE
(1) 010600 042777 000004 005352        BIC 8RS,2DHMLSR                    ;CLEAR REQUEST TO SEND
(1) 010606 105227 000000                INCB 80                             ;DELAY FOR CABLE
(1) 010612 001375                BNE -4                               ;DITTO
(1) 010614 017704 005340                MOV 2DHMLSR,R4                      ;READ LINE STATUS REGISTER
(1) 010620 020504                CMP R5,R4                          ;ONLY LINE ENABLE SHOULD BE
(1) 010622 001401                BEQ MUX16F                          ;SET ON THIS LINE
(1) 010624 104001                ERRORL                               ;LINE STATUS ERROR
(1) 010626 104002                MUX16F: SCOPE                       ;CHECK FOR ITERATIONS, LOOP

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1120

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(1) ;VERIFY THAT SECONDARY RECEIVE IS SET IF "LINE ENABLE"
(1) ;AND SECONDARY TRANSMIT ARE SET FOR SELECTED LINE.
(1)
(2) 010630 T107: ;REFERENCE DESIGNATION
(1) 010630 005077 005322 MUX17: CLR 3DHCSR ;CLEAR CONTROL REGISTER
(1) 010634 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
(1) 010642 013701 016240 MOV LINE,R1
(1) 010646 012702 000020 MUX17A: MOV #16,R2 ;16 LINES
(1) 010652 033737 016262 016260 BIT SELMSK,LINSEL ;THIS LINE SELECTED FOR TEST ?
(1) 010660 001454 BEQ MUX17F ;BR IF NOT
(1) 010662 010177 005270 MOV R1,3DHCSR ;SELECT A LINE
(1) 010666 012777 000011 005264 MOV #LINENA+SECTX,3DHMSR ;SET LINE ENABLE +SECTX
(1) 010674 005077 005256 CLR 3DHCSR ;CLEAR CONTROL REGISTER
(1) 010700 005005 MUX17B: CLR R5 ;CLEAR EXPECTED RESULT
(1) 010702 017704 005252 MOV 3DHMSR,R4 ;READ LINE STATUS
(1) 010706 117703 005244 MOVB 3DHCSR,R3 ;READ LINE NUMBER
(1) 010712 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
(1) 010716 020103 CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
(1) 010720 001002 BNE MUX17C ;EXPECT LINE ENABLE AND
(1) 010722 012705 000031 MOV #LINENA+SECTX+SECRX,R5 ;SECONDARY RECEIVE IS SET
(1) 010726 020405 MUX17C: CMP R4,R5 ;COMPARE EXPECTED AND
(1) 010730 001403 BEQ MUX17D ;RECEIVED RESULTS
(1) 010732 104001 ERRORL ;LINE STATUS ERROR
(1) 010734 104003 SCOPEF
(1) 010736 010740 MUX17D:
(1) 010740 052777 000400 005210 MUX17D: BIS #STEP,3DHCSR ;UPDATE LINE COUNTER
(1) 010746 005302 DEC R2 ;CONTINUE IF ALL CHECKS
(1) 010750 001353 BNE MUX17B ;ARE NOT DONE FOR THIS LINE
(1) 010752 012705 000001 MOV #LINENA,R5 ;EXPECT LINE ENABLE
(1) 010756 010103 MUX17E: MOV R1,R3 ;ON SELECTED LINE
(1) 010760 010177 005172 MOV R1,3DHCSR ;SELECT LINE
(1) 010764 042777 000010 005166 BIC #SECTX,3DHMSR ;CLEAR SECONDARY TRANSMIT
(1) 010772 105227 000000 INCB #0 ;DELAY FOR CABLE
(1) 010776 001375 BNE -4 ;DITTO
(1) 011000 017704 005154 MOV 3DHMSR,R4 ;READ LINE STATUS REGISTER
(1) 011004 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
(1) 011006 001401 BEQ MUX17F ;SET ON THIS LINE
(1) 011010 104001 ERRORL ;LINE STATUS ERROR
(1) 011012 104002 MUX17F: SCOPE ;CHECK FOR ITERATIONS, LOOP

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1144 011014 000005
1145 011016 012777 000100 005136
1146 011024 012737 000340 177776
1147 011032 104004
1148 011034 016510
1149 011036 012737 011054 012576
1150 011044 012737 011052 001722
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1178 011104 000762

;MODEM CONTROL ON LINE TEST USING 103A TYPE MODEMS
;ANSWER STATION TO BE OPERATED IN AUTO-ANSWER MODE
;THIS TEST VERIFIES THE CONNECT AND DISCONNECT SEQUENCES
;USING THE MODEM CONTROL TO CONTROL 103A TYPE MODEMS

;NOTE: IF THE DM11-AA IS NOT CONNECTED TO THE
;DISTRIBUTION PANEL, AN M974 DM11 MAINTENANCE JUMPER
;SHOULD BE INSTALLED IN SLOT B1 OR B3 OF THE DISTRIBUTION
;PANEL TO PREVENT A POSSIBLE LONG SPACE
;DISCONNECT FROM HANGING UP THE MODEM

T200:
ST103A: RESET ;REFERENCE DESIGNATION
MOV #INTENA, @TKCSR ;INITIALIZE INTERFACE
MOV #340, PS
TYPE ;DISABLE ALL INTERRUPTS
MT103T ;TYPE "103A MODEM CONNECT-
;DISCONNECT TEST"
MOV #T103A, FATRET ;SET UP FOR FATAL ERROR
MOV #ST103B, KRET ;SET UP FOR LINE CHANGE
ST103B: GETLNS ;INPUT ORIGINATE AND
;AND ANSWER LINE NUMBERS
T103A: SETUP ;SET UP TO RECEIVE INTERRUPTS
;WAIT FOR RING
T103B ;GO HERE IF RING OK
T103A1 ;GO HERE IF NO RING
ERROR ;NO RING WITHIN 5 MINUTES
BR ST103B ;SELECT NEW LINES AND REDIAL

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

T103B: CKRING ;CHECK FOR RING INTERRUPT
;ONLY ON ANSWER LINE
;AND NO TRANSITIONS ON
;ORIGINATE LINE
T103C ;GO HERE IF TRANSITIONS
;ARE CORRECT
T103B1 ;GO HERE IF INCORRECT
;TRANSITION ON ANSWER LINE
T103B2 ;GO HERE IF INCORRECT TRANSITION
;ON ORIGINATE LINE
T103B1: ERRORT ;TRANSITION ERROR ON ANSWER LINE
RTS PC ;CONTINUE CHECKING
T103B2: ERRORT ;TRANSITION ERROR ON ORIGINATE LINE
BR ST103B ;RESELECT LINES AND REDIAL

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

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:SET UP TO TEST DISCONNECT SEQUENCE
 :THE PROGRAM WILL REQUEST THE OPERATOR TO SET SWD1=1
 :TO INITIATE THE DISCONNECT SEQUENCE
 :THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
 :DATA TO TALK MODE AS MANY TIMES AS DESIRED
 :BEFORE THE SWITCH SEETIN IS MADE
 :ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
 :REPORTED BY TYPEOUT

011170	104004			T103E:	TYPE		:TYPE "SET SWD1=1 TO
011172	016753				MDISC		:TEST DISCONNECT"
011174	012737	000340	177776		MOV	#340,PS	:LOCK OUT INTERRUPTS
011202	012777	012620	004742		MOV	#TRNTYP,@DHMVEC ;SET UP	:TO DETECT TRANSITIONS
							:BEFORE DISCONNECT SEQUENCE STARTS
011210	012737	011230	016272		MOV	#T103ES,RNGRET	:SET UP DUMMY RETURN FOR
							:RING INTERRUPT
011216	012777	000140	004732		MOV	#SCNENA+INTENA,@DHMCSR	:SET SCAN ENABLE AND INTERRUPT ENABLE
011224	005037	177776			CLR	PS	:ALLOW INTERRUPTS
011230	032737	000002	177570	T103ES:	BIT	#2,SWR	:WAIT FOR SWD0=1, BEFORE
							:STARTING DISCONNECT SEQUENCE
011236	001774				BEG	T103ES	
011240	012737	000340	177776		MOV	#340,PS	:START DISCONNECT SEQUENCE
011246	005077	004704			CLR	@DHMCSR	:CLEAR CONROL REGISTER
011252	013777	016242	004676		MOV	LINORG,@DHMCSR	:SET LINE COUNTER TO SELECTED ORIGINATE LINE
011260	042777	000002	004672		BIC	#TRMADY,@DHMLSR	:SET TERMINAL READY ON SELECTED LINE
011266	104022				WAITRN		:WAIT FOR TRANSITIONS TO OCCUR


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1311 011350 000005
1312 011352 012777 000100 004602
1313 011360 012737 000340 177776
1314 011366 104004
1315 011370 016561
1316 011372 012737 011410 012576
1317 011400 012737 011406 001722
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1342 011432 104014
1343 011434 000207
1344 011436 104014
1345 011440 000762

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

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

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

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

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

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1352 011442 013777 016244 004506 T202C: MOV LINANS,JDHMSCR ;SET LINE COUNTER TO ANSWER LINE
1353 011450 052777 000002 004502 BIS #TRMRDY,JDHMLSR ;SET TERMINAL READY ON ANSWER LINE
1354 011456 013777 016242 004472 T202D: MOV LINORG,JDHMSCR ;SET LINE COUNTER TO ORIGINATE LINE
1355 011464 052777 000004 004466 BIS #RS,JDHMLSR ;SET REQUEST TO SEND ON ORIGINATE LINE
1356 011472 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
1357
1358 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1359 ;SELECTED ORIGINATE AND ANSWER LINES
1360
1361 011474 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
1362 ;ON SELECTED ANSWER AND
1363 ;ORIGINATE LINES
1364 011476 000103 CO+LINENA+TRMRDY ;EXPECT CARRIER, LINE ENABLE
1365 ;AND TERMINAL READY STATUS
1366 ;BITS SET ON ANSWER LINE
1367 011500 000147 RS+CO+CS+LINENA+TRMRDY ;EXPECT REQUEST TO SEND, CLEAR
1368 ;TO SEND, CARRIER, LINE ENABLE
1369 ;AND TERMINAL READY STATUS BITS
1370 ;SET ON ORIGINATE LINE
1371 011502 100004 RINGF+XCO ;EXPECT CARRIER AND POSSIBLE
1372 ;RING TRANSITIONS ON
1373 ;ANSWER LINE
1374 011504 000006 XCO+XCS ;EXPECT CARRIER AND CLEAR
1375 ;TO SEND TRANSITIONS ON
1376 ;ORIGINATE LINE
1377 011506 011520 T202D1 ;GO HERE ON ANSWER LINE STATUS ERROR
1378 011510 011524 T202D2 ;GO HERE ON ORIGINATE LINE STATUS ERROR
1379 011512 011530 T202D3 ;GO HERE ON ANSWER LINE STATUS ERROR
1380 011514 011534 T202D4 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1381 011516 011540 T202E ;GO TO NEXT TEST IF NO ERRORS
1382 011520 104015 T202D1: ERRORS ;ANSWER LINE STATUS ERROR
1383 011522 000207 RTS PC ;CONTINUE CHECKING
1384 011524 104015 T202D2: ERRORS ;ORIGINATE LINE STATUS ERROR
1385 011526 000207 RTS PC ;CONTINUE CHECKING
1386 011530 104014 T202D3: ERRORT ;ANSWER LINE TRANSITION ERROR
1387 011532 000207 RTS PC ;CONTINUE CHECKING
1388 011534 104014 T202D4: ERRORT ;ORIGINATE LINE TRANSITION ERROR
1389 011536 000207 RTS PC ;CONTINUE CHECKING

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1395	011540	013777	016244	004410	T202E:	MOV	LINANS,JDHMCSR		:SET LINE COUNTER TO ANSWER LINE
1396	011546	052777	000010	004404		BIS	#SECTX,JDHMLSR		:SET SECONDARY RECEIVE ON ANSWER LINE
1397	011554	104022				WAITRN			:WAIT FOR TRANSITIONS TO OCCUR
1398									
1399									
1400									:CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1401									:SELECTED ORIGINATE AND ANSWER LINES
1402	011556	104023				CKTRAN			:CHECK TRANSITIONS AND STATUS
1403									:ON SELECTED ANSWER AND
1404									:ORIGINATE LINES
1405	011560	000133				SECTX+CO+LINENA+TRMRDY+SECRX			:EXPECT SECONDARY TRANSMIT
1406									:SECONDARY RECEIVE, CARRIER
1407									:LINE ENABLE AND TERMINAL READY
1408									:STATUS BITS SET ON ANSWER LINE
1409	011562	000167				SECRX+RS+CO+CS+LINENA+TRMRDY			:EXPECT SECONDARY RECEIVE
1410									:REQUEST TO SEND, CLEAR TO SEND
1411									:CARRIER, LINE ENABLE AND
1412									:TERMINAL READY STATUS BITS
1413									:SET ON ORIGINATE LINE
1414	011564	000001				XSCRX			:EXPECT SECONDARY RECEIVE
1415									:TRANSITION ON ANSWER LINE
1416	011566	000001				XSCRX			:EXPECT SECONDARY RECEIVE
1417									:TRANSITION ON ORIGINATE LINE
1418	011570	011602				T202E1			:GO HERE ON ANSWER LINE STATUS ERROR
1419	011572	011606				T202E2			:GO HERE ON ORIGINATE LINE STATUS ERROR
1420	011574	011612				T202E3			:GO HERE ON ANSWER LINE TRANSITION ERROR
1421	011576	011616				T202E4			:GO HERE ON ORIGINATE LINE TRANSITION ERROR
1422	011600	011622				T202F			:GO TO NEXT TEST IF NO ERRORS
1423	011602	104015			T202E1:	ERRORS			:ANSWER LINE STATUS ERROR
1424	011604	000207				RTS	PC		:CONTINUE CHECKING
1425	011606	104015			T202E2:	ERRORS			:ORIGINATE LINE STATUS ERROR
1426	011610	000207				RTS	PC		:CONTINUE CHECKING
1427	011612	104014			T202E3:	ERRORT			:ANSWER LINE TRANSITION ERROR
1428	011614	000207				RTS	PC		:CONTINUE CHECKING
1429	011616	104014			T202E4:	ERRORT			:ORIGINATE LINE TRANSITION ERROR
1430	011620	000207				RTS	PC		:CONTINUE CHECKING

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					: DROP REQUEST TO SEND ON ORIGINATE LINE
					: DROP SECONDARY TRANSMIT ON ANSWER LINE
					: WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
011622	013777	016242	004326	T202F:	MOV LINORG, 20HCSR : SET LINE COUNTER TO ORIGINATE LINE
011630	042777	000004	004322		BIC 8RS, 20HLSR : DROP REQUEST TO SEND
011636	013777	016244	004312		MOV LINANS, 20HCSR : SET LINE COUNTER TO ANSWER LINE
011644	042777	000010	004306		BIC 8SECTX, 20HLSR : DROP SECONDARY RECEIVE
011652	104022				WAITRN : WAIT FOR TRANSITIONS TO OCCUR
					: CHECK FOR CORRECT STATUS AND TRANSITIONS ON
					: SELECTED ORIGINATE AND ANSWER LINES
011654	104023			CKTRAN	: CHECK TRANSITIONS AND STATUS
					: ON SELECTED ANSWER AND
					: ORIGINATE LINES
011656	000003			LINENA+TRMRDY	: EXPECT LINE ENABLE AND
					: TERMINAL READY STATUS BITS
					: SET ON ANSWER LINE
011660	000003			LINENA+TRMRDY	: EXPECT LINE ENABLE AND
					: TERMINAL READY STATUS BITS
					: SET ON ORIGINATE LINE
011662	000005			XCO+XSCRX	: EXPECT CARRIER AND SECONDARY
					: RECEIVE TRANSITIONS ON
					: ANSWER LINE
011664	000007			XCO+XCS+XSCRX	: EXPECT CARRIER, CLEAR TO SEND
					: AND SECONDARY RECEIVE
					: TRANSITIONS ON ORIGINATE LINE
011666	011700			T202F2	: GO HERE ON ANSWER LINE STATUS ERROR
011670	011704			T202F3	: GO HERE ON ORIGINATE LINE STATUS ERROR
011672	011710			T202F4	: GO HERE ON ANSWER LINE TRANSITION ERROR
011674	011714			T202F5	: GO HERE ON ORIGINATE LINE TRANSITION ERROR
011676	011720			T202G	: GO TO NEXT TEST IF NO ERRORS
011700	104015			T202F2: ERRORS	: ANSWER LINE STATUS ERROR
011702	000207			RTS	: CONTINUE CHECKING
011704	104015			T202F3: ERRORS	: ORIGINATE LINE STATUS ERROR
011706	000207			RTS	: CONTINUE CHECKING
011710	104014			T202F4: ERROR	: ANSWER LINE TRANSITION ERROR
011712	000207			RTS	: CONTINUE CHECKING
011714	104014			T202F5: ERROR	: ORIGINATE LINE TRANSITION ERROR
011716	000207			RTS	: CONTINUE CHECKING

1475									
1476									
1477									
1478									
1479									
1480	011720	013777	016244	004230	T202G:	MOV	LINANS,JDHMCSR		:SET LINE COUNTER TO ANSWER LINE
1481	011726	052777	000004	004224		BIS	ORS,JDHMLSR		:SET REQUEST TO SEND
1482	011734	104022				WAITRN			:WAIT FOR TRANSITIONS TO OCCUR
1483									
1484									
1485									
1486									
1487	011736	104023				CKTRAN			:CHECK TRANSITIONS AND STATUS
1488									:ON SELECTED ANSWER AND
1489									:ORIGINATE LINES
1490	011740	000147				RS+CO+CS+LINENA+TRMRDY			:EXPECT LINE ENABLE, TERMINAL
1491									:READY, REQUEST TO SEND, CLEAR
1492									:TO SEND, AND CARRIER
1493									:STATUS BITS SET ON ANSWER LINE
1494	011742	000103				CO+LINENA+TRMRDY			:EXPECT LINE ENABLE, TERMINAL
1495									:READY AND CARRIER STATUS
1496									:BITS SET ON ORIGINATE LINE
1497	011744	000006				XCO+XCS			:EXPECT CARRIER AND CLEAR
1498									:TO SEND TRANSITIONS ON
1499									:ANSWER LINE
1500	011746	000004				XCO			:EXPECT CARRIER TRANSITION
1501									:ON ORIGINATE LINE
1502	011750	011762				T202G1			:GO HERE ON ANSWER LINE STATUS ERROR
1503	011752	011766				T202G2			:GO HERE ON ORIGINATE LINE STATUS ERROR
1504	011754	011772				T202G3			:GO HERE ON ANSWER LINE TRANSITION ERROR
1505	011756	011776				T202G4			:GO HERE ON ORIGINATE LINE TRANSITION ERROR
1506	011760	012002				T202H			:GO TO NEXT TEST IF NO ERRORS
1507	011762	104015				T202G1: ERRORS			:ANSWER LINE STATUS ERROR
1508	011764	000207				RTS	PC		:CONTINUE TESTING
1509	011766	104015				T202G2: ERRORS			:ORIGINATE LINE STATUS ERROR
1510	011770	000207				RTS	PC		:CONTINUE TESTING
1511	011772	104014				T202G3: ERROR			:ANSWER LINE TRANSITION ERROR
1512	011774	000207				RTS	PC		:CONTINUE TESTING
1513	011776	104014				T202G4: ERROR			:ORIGINATE LINE TRANSITION ERROR
1514	012000	000207				RTS	PC		:CONTINUE TESTING

1516									
1517									:SET SECONDARY TRANSMIT ON ORIGINATE LINE
1518									:WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
1519									
1520	012002	013777	016242	004146	T202H:	MOV	LINORG,2DHMCSR		:SET LINE COUNTER TO ORIGINATE LINE
1521	012010	052777	000010	004142		BIS	#SECTX,2DHMLSR		:SET SECONDARY TRANSMIT
1522	012016	104022				WAITRN			:WAIT FOR TRANSITIONS TO OCCUR
1523									
1524									:CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1525									:SELECTED ORIGINATE AND ANSWER LINES
1526									
1527	012020	104023				CKTRAN			:CHECK TRANSITIONS AND STATUS
1528									:ON SELECTED ANSWER AND
1529									:ORIGINATE LINES
1530	012022	000167				RS+CS+CO+LINENA+TRMRDY+SECRX			:EXPECT LINE ENABLE, TERMINAL
1531									:READY, REQUEST TO SEND, CLEAR
1532									:TO SEND, CARRIER AND SECONDARY
1533									:RECEIVE STATUS BITS SET
1534									:ON ANSWER LINE
1535	012024	000133				SECTX+CO+LINENA+TRMRDY+SECRX			:EXPECT LINE ENABLE, TERMINAL
1536									:READY, CARRIER, SECONDARY
1537									:TRANSMIT AND SECONDARY
1538									:RECEIVE STATUS BITS SET
1539									:ON ORIGINATE LINE
1540	012026	000001				XSCRX			:EXPECT SECONDARY RECEIVE
1541									:TRANSITION ON ANSWER LINE
1542	012030	000001				XSCRX			:EXPECT SECONDARY RECEIVE
1543									:TRANSITION ON ORIGINATE LINE
1544	012032	012044				T202H2			:GO HERE ON ANSWER LINE STATUS ERROR
1545	012034	012050				T202H3			:GO HERE ON ORIGINATE LINE STATUS ERROR
1546	012036	012054				T202H4			:GO HERE ON ANSWER LINE TRANSITION ERROR
1547	012040	012060				T202H5			:GO HERE ON ORIGINATE LINE TRANSITION ERROR
1548	012042	012064				T202I			:GO TO NEXT TEST IF NO ERRORS
1549	012044	104015			T202H2:	ERRORS			:ANSWER LIN STATUS ERROR
1550	012046	000207				RTS	PC		:CONTINUE CHECKING
1551	012050	104015			T202H3:	ERRORS			:ORIGINATE LINE STATUS ERROR
1552	012052	000207				RTS	PC		:CONTINUE CHECKING
1553	012054	104014			T202H4:	ERRORT			:ANSWER LINE TRANSITION ERROR
1554	012056	000207				RTS	PC		:CONTINUE CHECKING
1555	012060	104014			T202H5:	ERRORT			:ORIGINATE LINE TRANSITION ERROR
1556	012062	000207				RTS	PC		:CONTINUE CHECKING

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1558
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1562 012064 013777 016244 004064 T202I: MOV LINANS,20HCSR ;SET LINE COUNTER TO ANSWER LINE
1563 012072 042777 000004 004060 BIC #RS,20HLSR ;CLEAR REQUEST TO SEND
1564 012100 013777 016242 004050 MOV LINORG,20HCSR ;SET LINE COUNTER TO ORIGINATE LINE
1565 012106 042777 000010 004044 BIC #SECTX,20HLSR ;CLEAR SECONDARY TRANSMIT
1566 012114 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
1567
1568 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
1569 ;SELECTED ORIGINATE AND ANSWER LINES
1570
1571 012116 104023 CKTRAN ;CHECK TRANSITION S AND STATUS
1572 ;ON SELECTED ANSWER AND
1573 ;ORIGINATE LINES
1574 012120 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
1575 ;TERMINAL READY STATUS BITS SET
1576 ;ON ANSWER LINE
1577 012122 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
1578 ;TERMINAL READY STATUS BITS
1579 ;SET ON ORIGINATE LINE
1580 012124 000007 XCO+XCS+XSCRX ;EXPECT CARRIER, CLEAR TO SEND
1581 ;AND SECONDARY RECEIVE TRANSITIONS
1582 ;ON ANSWER LINE
1583 012126 000005 XCO+XSCRX ;EXPECT CARRIER AND SECONDARY
1584 ;RECEIVE TRANSITIONS ON
1585 ;ORIGINATE LINE
1586 012130 012142 T202I2 ;GO HERE ON ANSWER LINE STATUS ERROR
1587 012132 012146 T202I3 ;GO HERE ON ORIGINATE LINE STATUS ERROR
1588 012134 012152 T202I4 ;GO HERE ON ANSWER LINE TRANSITION ERROR
1589 012136 012156 T202I5 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
1590 012140 012162 T202J ;GO TO NEXT TEST IF NO ERRORS
1591 012142 104015 T202I2: ERRORS ;ANSWER LINE STATUS ERROR
1592 012144 000207 RTS PC ;CONTINUE CHECKING
1593 012146 104015 T202I3: ERRORS ;ORIGINATE LINE STATUS ERROR
1594 012150 000207 RTS PC ;CONTINUE CHECKING
1595 012152 104014 T202I4: ERRORT ;ANSWER LINE TRANSITION ERROR
1596 012154 000207 RTS PC ;CONTINUE CHECKING
1597 012156 104014 T202I5: ERRORT ;ORIGINATE LINE TRANSITION ERROR
1598 012160 000207 RTS PC ;CONTINUE CHECKING

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1610 012162 104004          T202J: TYPE
1611 012164 016753          MDISC
1612 012166 012737 000340 177776  MOV #340,PS
1613 012174 012777 012620 003750  MOV #TRNTYP,JDHMVEC
1614 012202 012737 012222 016272  MOV #T202JS,RNGRET
1615
1616 012210 012777 000140 003740  MOV #SCNENA+INTENA,JDHMCSR
1617
1618 012216 005037 177776          CLR PS
1619 012222 032737 000002 177570 T202JS: BIT #2,SWR
1620 012230 001774          BEQ T202JS
1621
1622
1623
1624 012232 012737 000340 177776  MOV #340,PS
1625 012240 005077 003712          CLR JDHMCSR
1626 012244 013777 016242 003704  MOV LINORG,JDHMCSR
1627 012252 042777 000002 003700  BIC #TRMRDY,JDHMLSR
1628 012260 104024          WAITS
1629 012262 104022          WAITRN

```

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;SET UP TO TEST DISCONNECT SEQUENCE
;THE PROGRAM WILL REQUEST THE OPERATOR TO SET SWD1=1
;TO INITIATE THE DISCONNECT SEQUENCE
;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM
;DATA TO TALK MODE AS MANY TIMES AS DESIRED
;BEFORE THE SWITCH SEETIN IS MADE
;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
;REPORTED BY TYPEOUT

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;TYPE "SET SWD1=1 TO
;TEST DISCONNECT"
;LOCK OUT INTERRUPTS
;SET UP TO DETECT TRANSITIONS
;SET UP DUMMY RETURN FOR RING
;FROM RING INTERRUPT
;ENABLE LINE SCANNER
;START SCANNER
;ENABLE INTERRUPTS
;MONITOR SWD1 FOR DISCONNECT

```

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;DISCONNECT SEQUENCE REQUESTED

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```

;LOCK OUT INTERRUPTS
;STOP SCANNER
;SET LINE COUNTER TO SELECTED ORIGINATE LINE
;SET TERMINAL READY ON SELECTED LINE
;DELAY
;WAIT FOR TRANSITIONS TO OCCUR

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1666
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1678
1679 012340 017704 003612      TRANS:  MOV      3DHMCSR,R4      ;GET LINE NUMBER AND
1680                                     ;INTERRUPT FLAGS
1681 012344 010405      MOV      R4,R5
1682 012346 042705 177760      BIC      #177760,R5      ;EXTRACT LINE NUMBER
1683 012352 023705 016242      CMP      LINORG,R5      ;DID ORIGINATE LINE INTERRUPT
1684 012356 001411      BEQ      ORGTR          ;IF YES, SERVICE
1685 012360 023705 016244      CMP      LINANS,R5      ;DID ANSWER LINE INTERRUPT
1686 012364 001443      BEQ      ANSTR          ;IF YES, SERVICE
1687 012366 010577 003564      MOV      R5,3DHMCSR
1688 012372 017703 003562      MOV      3DHMLSR,R3
1689 012376 104016      ERRORN
1690 012400 000471      BR       FATEX          ;INTERRUPT ON INCORRECT LINE
1691
1692                                     ;RECORD TRANSITIONS FOR ORIGINATE LINE
1693
1694 012402 032704 100000      ORGTR:  BIT      #RINGF,R4      ;IF RING CAUSED INTERRUPT,
1695 012406 001403      BEQ      ORGTR1          ;SET RING TRANSITION BIT
1696 012410 052737 000010 016250      BIS      #10,ORGFLG
1697 012416 032704 040000      ORGTR1: BIT      #COF,R4      ;IF CARRIER CAUSED INTERRUPT
1698 012422 001403      BEQ      ORGTR2          ;SET CARRIER TRANSITION BIT
1699 012424 052737 000004 016250      BIS      #4,ORGFLG
1700 012432 032704 020000      ORGTR2: BIT      #CSF,R4      ;IF CLEAR TO SEND
1701                                     ;CAUSED INTERRUPT
1702 012436 001403      BEQ      ORGTR3          ;SET CLEAR TO SEND
1703                                     ;TRANSITION BIT
1704 012440 052737 000002 016250      BIS      #2,ORGFLG
1705 012446 032704 010000      ORGTR3: BIT      #SECRXF,R4      ;IF SECONDARY RECEIVE
1706                                     ;CAUSED INTERRUPT
1707 012452 001403      BEQ      ORGTR4          ;SET SECONDARY RECEIVE
1708 012454 052737 000001 016250      BIS      #1,ORGFLG      ;TRANSITION BIT
1709 012462 032704 170000      ORGTR4: BIT      #RINGF+COF+CSF+SECRXF,R4
1710                                     ;IF NO INTERRUPT FLAGS SET
1711 012466 001044      BNE      TRANEX          ;EXIT TRANSITION DETECTION
1712 012470 104016      ORGTRR: ERRORN
1713 012472 000434      BR       FATEX

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1715
1716
1717 ;RECORD TRANSITIONS FOR ANSWER LINE
1718 012474 032704 100000 ANSTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT,
1719 012500 001403 BEQ ANSTR1 ;SET RING TRANSITION BIT
1720 012502 052737 000010 016246 BIS #10,ANSFLG
1721 012510 032704 040000 ANSTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
1722 012514 001403 BEQ ANSTR2 ;SET CARRIER TRANSITION BIT
1723 012516 052737 000004 016246 BIS #4,ANSFLG
1724 012524 032704 020000 ANSTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
1725 ;CAUSED INTERRUPT
1726 012530 001403 BEQ ANSTR3 ;SET CLEAR TO SEND
1727 ;TRANSITION BIT
1728 012532 052737 000002 016246 BIS #2,ANSFLG
1729 012540 032704 010000 ANSTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
1730 ;CAUSED INTERRUPT
1731 012544 001403 BEQ ANSTR4 ;SET SECONDARY RECEIVE
1732 012546 052737 000001 016246 BIS #1,ANSFLG ;TRANSITION BIT
1733 012554 032704 170000 ANSTR4: BIT #RINGF+COF+CSF+SECRXF,R4
1734 ;IF NO INTERRUPT FLAGS SET
1735 012560 001007 BNE TRANEX ;EXIT TRANSITION DETECTION
1736 012562 104016 ANSTR: ERRORN
1737 012564 005037 016200 FATEX: CLR TSTNO
1738 012570 022626 POP2SP
1739 012572 000177 000000 FATRET: JMP #FATRET
1740 012576 000000
1741
1742 ;EXIT TRANSITION DETECTION
1743
1744 012600 005704 TRANEX: TST R4 ;IF RING FLAG WAS SET
1745 012602 100002 BPL .+6 ;SET UP SPECIAL RETURN
1746 012604 013716 016272 MOV RINGRET,(SP)
1747 012610 012777 000140 003340 TRANX1: MOV #SCNENA+INTENA,@DHMCSR ;RESTART SCANNER
1748 012616 000002 RTI
1749
1750 ;TYPE TRANSITION DATA AND RETURN
1751
1752 012620 017737 003332 013620 TRNTYP: MOV @DHMCSR,DATA1
1753 012626 017737 003326 013622 MOV @DHMLSR,DATA2
1754 012634 104004 TYPE
1755 012636 017365 MTRNOET
1756 012640 104006 OCTASC
1757 012642 012646 TRNTAB
1758 012644 000761 BR TRANX1
1759 012646 000002 TRNTAB: 2
1760 012650 000006 6
1761 012652 013620 DATA1
1762 012654 000003 3
1763 012656 013622 DATA2
    
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1765
1766
1767 ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
1768 012660 000005 GETLIN: RESET
1769 012662 012777 000100 003272 MOV #INTENA,JKCSR
1770 012670 104013 INSTRG ;TYPE "ORIGINATE LINE-"
1771 012672 016632 MSELOR ;AND GET LINE NUMBER
1772 012674 000000 0
1773 012676 000017 17
1774 012700 016242 LINORG
1775 012702 104013 INSTRG ;TYPE "ANSWER LINE-"
1776 012704 016656 MSELANS ;AND GET LINE NUMBER
1777 012706 000000 0
1778 012710 000017 17
1779 012712 016244 LINANS
1780 012714 104004 TYPE
1781 012716 017256 MCRLF
1782 012720 000002 RTI ;RETURN TO CALLING ROUTINE
1783
1784 ;INITIALIZE INTERFACE
1785
1786 012722 000005 SETUPS: RESET
1787 012724 012777 000100 003230 MOV #INTENA,JKCSR
1788 012732 012737 000340 177776 MOV #340,PS ;LOCK OUT ALL INTERRUPTS
1789 012740 011605 MOV (SP),RS
1790 012742 012537 013630 MOV (RS)+,NXTTS
1791 012746 012537 013610 MOV (RS)+,ERR1
1792 012752 010516 MOV RS,(SP)
1793 012754 012777 006000 003174 MOV #CLRSCN+CLRMUX,JDHMCSR ;CLEAR LINE SCANNER AND MULTIPLEXER
1794 012762 032777 000020 003166 SETUP1: BIT #BUSY,JDHMCSR ;WAIT FOR SCANNER TO CLEAR
1795 012770 001374 BNE SETUP1
1796 012772 005037 016172 CLR ERRFLG
1797
1798 ;ENABLE SELECTED LINES
1799 ;SET TERMINAL READY ON SELECTED ORIGINATE LINE
1800
1801 012776 013777 016242 003152 SETUP2: MOV LINORG,JDHMCSR ;SET UP TO ENABLE ORIGINATE LINE
1802 ;ORIGINATE LINE NUMBER
1803 013004 012777 000003 003146 MOV #LINENA+TRMRDY,JDHMLSR ;SET LINE ENABLE AND
1804 ;TERMINAL READY ON ORIGINATE LINE
1805 013012 013777 016244 003136 MOV LINANS,JDHMCSR ;SET LINE COUNTER TO ANSWER LINE
1806 013020 012777 000001 003132 MOV #LINENA,JDHMLSR ;SET LINE ENABLE ON ANSWER LINE
1807
1808 ;REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
1809 ;SET UP TO RECEIVE INTERRUPTS
1810 ;START LINE SCANNER
1811
1812 013026 012777 012340 003116 MOV #TRANS,JDHMVEC ;SET UP INTERRUPT VECTOR
1813 ;FOR TRANSITION DETECTION
1814 013034 012777 000340 003112 MOV #340,JDHMLVL ;SET UP INTERRUPT SERVICE LEVEL
1815 013042 012777 000140 003106 MOV #SCNENA+INTENA,JDHMCSR ;START SCANNER, ENABLE INTERRUPTS
1816 013050 005037 016246 CLR ANSFLG ;CLEAR TRANSITION DETECTED FLAGS
1817 013054 005037 016250 CLR ORGFLG
1818 013060 012737 013110 016272 MOV #SETUP4,RNGRET ;SET UP RETURN FROM

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

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;DETECTION OF RING INTERRUPT
;REQUEST OPERATOR TO DIAL

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;CLEAR PROCESSOR STATUS WORD
;CLEAR TIMER
;SET UP FOR 5 MINUTE DELAY
;IF TRANSITION HAS OCCURED,
;EXIT WAIT LOOP

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;ALLOW OPERATOR 5 MINUTES TO DIAL

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;EXPECT RING ONLY ON ANSWER LINE
;GET ACTUAL TRANSITION DATA
;SET UP LINE NUMBER
;DID RING CAUSE INTERRUPT
;ON ANSWER LINE

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;IF TRANSITION OCCURED
;ON ORIGINATE LINE, ERROR

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

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1914 013516 105737 013625
1915 013522 100003
1916 013524 042737 000010 016246
1917 013532 113704 016246
1918 013536 113705 013624
1919 013542 013703 016244
1920 013546 020504
1921 013550 001402
1922 013552 004777 000036
1923 013556 013704 016250
1924 013562 013705 013626
1925 013566 013703 016242
1926 013572 020504
1927 013574 001402
1928 013576 004777 000014
1929 013602 022626
1930 013604 000177 000020
1931 013610 000000
1932 013612 000000
1933 013614 000000
1934 013616 000000
1935 013620 000000
1936 013622 000000
1937 013624 000000
1938 013626 000000
1939 013630 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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1941
1942
1943      ;END OF PASS
1944      ;UPDATE PASS COUNT
1945      ;TYPE END OF PASS MESSAGE
1946      EOP:
1947 013632 012777 000100 002322      MOV      #100,PTKCSR
1948 013640 005237 016176              INC      PASCNT      ;UPDATE PASS COUNT
1949 013644 012737 000001 016200      MOV      #1,TSTNO    ;START AT FIRST TEST OF GROUP
1950 013652 000005              RESET     ;CLEAR THE WORLD
1951 013654 005037 016270      CLR      FILLA      ;INIT COUNTER
1952 013660 005337 016270      IS:      DEC      FILLA  ;COUNT THE CTR
1953 013664 001375              BNE      IS         ;BR TIL STALL TIMES OUT
1954 013666 104004              TYPE     ;RING BELL
1955 013670 017622      MEPASS
1956 013672 013701 000042      MOV      42,R1      ;ARE YOU ON ACT11?
1957 013676 001501              BEQ      TSTENT     ;NO
1958 013700 000005              RESET
1959 013702 004711      LOGICAL: JSR      PC,(R1)
1960 013704 000240              NOP
1961 013706 000240              NOP
1962 013710 000240              NOP
1963 013712 000240              NOP
1964 013714 000137 014102      JMP      TSTENT     ;GET ADDRESS OF FIRST TEST
1965
1966      ;EMT DISPATCH SERVICE
1967      ;ARGUMENT OF EMT IS EXTRACTED
1968      ;AND USED AS OFFSET TO OBTAIN POINTER
1969      ;TO SELECTED SUBROUTINE
1970
1971 013720 011646      EMTSRV: MOV      (SP),-(SP)      ;GET PC OF RETURN
1972 013722 162716 000002      SUB      #2,(SP)      ;=PC OF EMT
1973 013726 017616 000000      MOV      2(SP),(SP)   ;GET EMT
1974 013732 006316      EMTOK: ASL      (SP)      ;MULTIPLY EMT ARG BY 2
1975 013734 042716 177001      BIC      #177001,(SP) ;CLEAR UNWANTED BITS
1976 013740 062716 017640      ADD      #EMTTAB,(SP) ;POINTER TO SUBROUTINE ADDRESS
1977 013744 017616 000000      MOV      2(SP),(SP)   ;SUBROUTINE ADDRESS
1978 013750 000136      JMP      2(SP)+      ;GO TO SUBROUTINE

```

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1988 013752 005737 001070 LOOP: TST XFLAG ;IS THERE AN XOR TESTER OUT THERE ?
1989 013756 100022 BPL 45 ;NO
1990 013760 013746 000004 MOV 4, -(SP) ;SAVE 4
1991 013764 012737 014004 000004 MOV #16, 4 ;SET UP SVC ROUTINE
1992 013772 005737 177060 TST 177060 ;GOT SOMETHING LIKE SLAVE SYNC
1993 013776 012637 000004 MOV (SP)+, 4 ;YOU BETCHUM
1994 014002 000404 BR 25
1995 014004 022626 15: POP2SP ;RESTORE STACK
1996 014006 012637 000004 MOV (SP)+, 4 ;RESTORE 4
1997 014012 000402 BR 35
1998 014014 000137 014076 25: JMP LOOPX ;GO TO NEXT TEST
1999 014020 000137 014102 35: JMP TSTENT ;GO
2000 014024 45:
2001 014024 005737 016172 TST ERRFLG ;IF ERROR OCCURED FLAG=1
2002 014030 001404 BEQ LOOPS ;CHECK FOR ESCAPE TO NEXT TEST
2003 014032 032737 002000 177570 BIT #SW10, SWR ;IF SW10=1,
2004 014040 001016 BNE LOOPX ;ESCAPE TO NEXT TEST
2005 014042 032737 040000 177570 LOOPS: BIT #SW14, SWR ;IF SW14=1,
2006 014050 001033 BNE LOOPL ;LOOP ON CURRENT TEST
2007 014052 032737 004000 177570 BIT #SW11, SWR ;IF SW11=1,
2008 014060 001006 BNE LOOPX ;INHIBIT ITERATIONS
2009 014062 005337 016204 DEC ICOUNT ;UPDATE ITERATION COUNT
2010 014066 001403 BEQ LOOPX ;IF ICOUNT=0, GO TO NEXT TEST
2011 014070 013716 016202 LOOPER: MOV RETURN, (SP) ;SET UP FOR RETURN TO CURRENT TEST
2012 014074 000002 RTI ;RETURN TO CURRENT TEST
2013 014076 005237 016200 LOOPX: INC TSTNO ;UPDATE TEST NUMBER
2014 014102 013705 016200 TSTENT: MOV TSTNO, RS ;GET TEST NUMBER
2015 014106 006305 ASL RS ;MULTIPLY TEST NUMBER BY 4
2016 014110 006305 ASL RS
2017 014112 063705 016232 ADD TSTPNT, RS ;GET POINTER FOR TEST ENTRY
2018 014116 011537 016202 MOV (RS), RETURN ;GET STARTING ADDRESS OF NEXT TEST
2019 014122 001643 BEQ EOP ;IF ADDRESS=0, GO TO END OF PASS
2020 014124 012516 MOV (RS)+, (SP) ;PUT STARTING ADDRESS ON STACK
2021 014126 011537 016204 MOV (RS), ICOUNT ;GET ITERATION COUNT FOR TEST
2022 014132 005037 016172 CLR ERRFLG ;CLEAR ERROR OCCURED FLAG
2023 014136 000002 RTI ;GO TO TEST
2024 014140 012737 000001 016204 LOOPL: MOV #1, ICOUNT ;SET UP TO EXIT TEST AFTER LOOP
2025 014146 000750 BR LOOPER ;GO TO LOOP SERVICE

;CHECK FOR LOOPING WITH SAME DATA
;CHECK FOR ESCAPE TO NEXT TEST ON ERROR
2030 014150 005737 016172 FREEZE: TST ERRFLG ;IF ERROR FLAG=0,
2031 014154 001413 BEQ FREEZX ;DO NOT TEST FOR ESCAPE
2032 014156 032737 002000 177570 BIT #SW10, SWR ;IF SW10=1,
2033 014164 001344 BNE LOOPX ;ESCAPE TO NEXT TEST

```

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

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;GENERAL ERROR SERVICE
;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
014212 005037 016172 ERR: CLR ERRFLG ;ALWAYS TYPE PC+2
;OF TEST THAT FAILED
014216 005037 014420 CLR ERRMSG ;NO MESSAGE
014222 005037 014432 CLR ERTAB ;NO TABLE OF DATA
014226 000451 BR ERGEN ;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

```

```

014230 005037 016172 ERR: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
014234 012737 016413 014420 MOV @MTRANE,ERRMSG ;TYPE "TRANSITION ERROR"
014242 012737 014476 014432 MOV @ERTAB1,ERTAB ;TABLE OF DATA
014250 000440 BR ERGEN ;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

```

```

014252 005037 016172 ERRS: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
014256 012737 016362 014420 MOV @MLINE1,ERRMSG ;TYPE "LINE ERROR"
014264 012737 014514 014432 MOV @ERTAB2,ERTAB ;EXP REC LINE"
014272 000427 BR ERGEN ;TABLE OF DATA
;OUTPUT ERROR MESSAGE

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```

;FATAL TRANSITION ERROR
;FORMAT FOR FATAL ERROR TYPEOUT IS

;XXXXXX FATAL ERROR
;CSTAT LSTAT
;AAAAA BBB

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

014274 005037 016172 014420 ERRN: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
014300 012737 017333 014420 MOV #MFATAL,ERRMSG ;TYPE "FATAL ERROR"
;CSTAT LSTAT
014306 012737 014532 014432 MOV #ERTAB3,ERTAB ;TABLE OF DATA
014314 000416 BR ERGEN ;OUTPUT ERROR MESSAGE

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

;XXXXXX STATUS ERROR
;EXP REC
;AAAAA BBBBBB

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

014316 012737 016274 014420 ERRCS: MOV #MSTATE,ERRMSG ;TYPE "STATUS ERROR"
;EXP REC
014324 012737 014544 014432 MOV #ERTAB4,ERTAB ;TABLE OF DATA
014332 000407 BR ERGEN ;OUTPUT DATA

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

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

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

014334 012737 016325 014420 ERRLS: MOV #MLINER,ERRMSG
014342 012737 014556 014432 MOV #ERTAB5,ERTAB
014350 000400 BR ERGEN

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2177
; GENERAL ERROR HANDLER
; TYPE PC+2 OF TEST THAT FAILED
; TYPE ERROR MESSAGE (IF ANY)
; TYPE DATA RELATING TO FAILURE (IF ANY)

014352 032737 020000 177570 ERGEN: BIT #SW13,SWR ; IF SW13=1, DO NOT
014360 001026 BNE .3 ; TYPE ERROR MESSAGE
014362 021637 016224 CMP (SP),SAVPC ; SAME ERROR AGAIN
014366 001402 BEQ +6
014370 005037 016172 CLR ERRFLG
014374 104005 SAVOSP
014376 005737 016172 TST ERRFLG ; IF ERROR OCCURED FLAG=1,
014402 001007 BNE .1 ; TYPE DATA ONLY
014404 104006 OCTASC ; TYPE PC+2 OF CALL TO ERROR ROUTINE
014406 014470 ERTAB0
014410 005737 014420 TST ERRMSG
014414 001407 BEQ .2
014416 104004 TYPE ; TYPE ERROR MESSAGE
014420 000000 ERMSG: 0
014422 005737 014432 .1: TST ERTAB
014426 001402 BEQ .2
014430 104006 OCTASC ; TYPE DATA
014432 000000 ERTAB: 0
014434 104007 .2: RESOS ; RESTORE RO-R5

; ERROR HALT SERVICE

014436 032737 100000 177570 .3: BIT #SW15,SWR ; IF SW15=0, DO NOT
014444 001405 BEQ .4 ; HALT ON ERROR
014446 010046 PUSHRO ; SAVE RO ON STACK
014450 013700 016224 MOV SAVPC,RO ; GET PC+2 OF CALL TO ERROR
014454 000000 HALT ; HALT AND DISPLAY ADDRESS OF FAILING TEST
014456 012600 POPRO ; RESTORE RO
014460 012737 000001 016172 .4: MOV #1,ERRFLG ; SET ERROR OCCURED FLAG
014466 000002 RTI ; RETURN TO TEST
    
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014470 000001
014472 000006
014474 016224
014476 000003
014500 000002
014502 016220
014504 000002
014506 016216
014510 000002
014512 016214
014514 000003
014516 000003
014520 016220
014522 000003
014524 016216
014526 000002
014530 016214
014532 000002
014534 000006
014536 016216
014540 000003
014542 016214
014544 000002
014546 000006
014550 016220
014552 000006
014554 016216
014556 000004
014560 000003
014562 016220
014564 000003
014566 016216
014570 000002
014572 016214
014574 000002
014576 016210

;TABLE S OF DATA FOR ERROR TYPEOUT
;TABLE FOR TRANSITION STATUS ERROR
ERTAB0: 1
SAVPC
ERTAB1: SAVR5 ;CONTAINS EXPECTED TRANSITION STATUS
SAVR4 ;CONTAINS RECEIVED TRANSITION STATUS
SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
SAVR5 ;CONTAINS EXPECTED LINE STATUS
SAVR4 ;CONTAINS RECEIVED LINE STATUS
SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
ERTAB2: SAVR3
SAVR4
SAVR3
ERTAB3: SAVR4
SAVR3
SAVR5 ;CONTAINS EXPECTED CONTROL STATUS
SAVR4 ;CONTAINS RECEIVED CONTROL STATUS
ERTAB4: SAVR4
SAVR5
SAVR4
ERTAB5: SAVR5 ;CONTAINS EXPECTED LINE STATUS
SAVR4 ;CONTAINS RECEIVED LINE STATUS
SAVR3 ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
SAVR1 ;CONTAINS NUMBER OF LINE UNDER TEST

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014600 017605 000000
014604 062716 000002
014610 012737 000010 015026
014616 012704 017521
014622 012537 016226
014626 012537 016230
014632 013537 015022
014636 104010
014640 005337 016226
014644 001370
014646 112714 000100
014652 104004
014654 017517
014656 000002

015026

```

; CONVERT OCTAL TO ASCII AND
; OUTPUT ON TELETYPE
OCTASN: MOV    2(SP), R5
        ADD    #2, (SP)
        MOV    #10, RADIX
        MOV    #MBCD+2, R4
        MOV    (R5)+, WRCNT
OCTAS1: MOV    (R5)+, CHRCNT
        MOV    2(R5)+, BINWRD
        CONVERT
        DEC    WRCNT
        BNE    OCTAS1
        MOVB  #100, (R4)
        TYPE
        MBCD
        RTI

```

; GET POINTER TO TABLE OF DATA

```

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

```

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

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;RESTORE R0-R5
RSOS:  MOV SAVR0,R0
      MOV SAVR1,R1
      MOV SAVR2,R2
      MOV SAVR3,R3
      MOV SAVR4,R4
      MOV SAVR5,R5
      RTI

;TELETYPE OUTPUT ROUTINE
TYPERS: MOV @ (SP),R5 ;GET POINTER TO MESSAGE (ON STACK)
        ADD #2,(SP) ;CORRECT STACK FOR RETURN
TYPERA: TSTB @TPCSR ;WAIT FOR TELEPRINTER READY
        BPL TYPERA
        CMPB #12,-1(R5) ;WAS LAST ONE A L.F. ??
        BEQ IS ;BR IF YES
        CMPB #15,-1(R5) ;WAS LAST ONE A C.R. ??
        BEQ IS ;BR IF YES
        BR 2S ;CONTINUE IF NEITHER
        JSR PC,TYFILL ;GO OUT PUT FILLERS
        CMPB #100,(R5) ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
        BNE TYPERS1
        RTI ;CHARACTER IS TERMINATOR, EXIT
TYPERS1: CMPB #42,(R5) ;IF CHARACTER=42,
        BEQ TYPECL ;TYPE LINE FEED
        CMPB #45,(R5) ;IF CHARACTER=45,
        BEQ TYPECL ;TYPE CARRIAGE RETURN
TYPERS2: MOVB (R5)+,@TPD8R ;GET CHARACTER
        BR TYPERA ;TYPE IT
TYPECL: BICB #40,(R5) ;CONVERT CODE OF 42 OR 45
        BISB #10,(R5) ;TO 12 OR 15
        BR TYPERS2 ;TYPE IT

;OUTPUT FILLERS AFTER <CR> OR <LF> CHAR IS OUT PUTTED.
TYFILL: MOVB FILL,FILLA ;GET FILL COUNT
        IS: MOVB FILL+1,@TPD8R ;OUT PUT ONE FILLER
        2S: TSTB @TPCSR ;WAIT FOR TTY TO FINISH OUTPUT
        BPL 2S ;BR IF TTY NOT DONE
        DECB FILLA ;COUNT ONE FILLER
        BNE IS ;BR TIL ALL DONE
        RTS PC ;RETURN TO CALLER ABOVE

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

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

```

400 015504 010377 000006      MOV      R3, @STORE      ;STORE NUMBER
401 015510 000002      RTI                    ;EXIT
402 015512 000000      LCLIM: 0
403 015514 000000      HILIM: 0
404 015516 000000      STORE: 0
405 015520 000000      INBUF: 0
406 015542 015542      .=. +20
407                                     ;ENTER HERE ON POWER FAILURE

408 015542 010046      PFAIL: MOV      R0, -(SP)      ;SAVE R0-R5 ON PROCESSOR STACK
409 015544 010146      MOV      R1, -(SP)
410 015546 010246      MOV      R2, -(SP)
411 015550 010346      MOV      R3, -(SP)
412 015552 010446      MOV      R4, -(SP)
413 015554 010546      MOV      R5, -(SP)
414 015556 013746 000024      MOV      @24, -(SP)
415 015562 010637 016222      MOV      SP, SAVSP      ;SAVE STACK POINTER
416 015566 012737 015600 000024      MOV      @RESTART, 24    ;SET UP FOR POWER UP TRAP
417 015574 000000      HALT
418 015576 000776      BR      .-2            ;HALT ON POWER DOWN NORMAL

419                                     ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED

420 015600 013706 016222      RESTAR: MOV      SAVSP, SP    ;RESTORE STACK POINTER
421 015604 012605      MOV      (SP)+, R5        ;RESTORE R0-R5
422 015606 012604      MOV      (SP)+, R4
423 015610 012603      MOV      (SP)+, R3
424 015612 012602      MOV      (SP)+, R2
425 015614 012601      MOV      (SP)+, R1
426 015616 012600      MOV      (SP)+, R0
427 015620 012737 015542 000024      MOV      @PFAIL, 24      ;SET UP FOR POWER FAILURE
428 015626 005726      POP1SP
429 015630 104004      TYPE
430 015632 017431      MPFAIL
431 015634 012777 000100 000320      MOV      @100, @TKCSR
432 015642 005737 001560      TST      TIPFLG
433 015646 001002      BNE      RESTA1
434 015650 000137 001100      JMP      START0
435 015654 104004      RESTA1: TYPE
436 015656 017451      MPF1
437 015660 012716 000340      MOV      @340, (SP)
438 015664 005746      PUSH1SP
439 015666 000137 014102      JMP      TSTENT

440                                     ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
441 XOR: 015672 013746 000020      MOV      20, -(SP)      ;SAVE 20
442 015676 013746 000022      MOV      22, -(SP)      ;SAVE 22
443 015702 012737 016074 000020      MOV      @24, 20        ;IOT INTR VECTOR
444 015710 012737 000340 000022      MOV      @340, 22        ;IOT INTR LVL
445 015716 012737 000300 013620      MOV      @300, DATA1
446 015724 012737 000302 013622      MOV      @302, DATA2
447 015732 013777 013622 175660      IS:  MOV      DATA2, @DATA1
    
```

2454	015740	012777	000004	175654		MOV	#IOT, DATA2	; IOT TRAP
2455	015746	062737	000004	013620		ADD	#4, DATA1	
2456	015754	062737	000004	013622		ADD	#4, DATA2	
2457	015762	023727	013620	001000		CMP	DATA1, #1000	
2458	015770	001360				BNE	15	
2459	015772	012737	000000	016200		MOV	#0, TSTNO	; SET UP DEFAULT
2460	016000	012737	017744	016232		MOV	#TSTTBO, TSTPNT	
2461	016006	052737	000340	177776		BIS	#340, PS	; PREVENT INTERRUPTS
2462	016014	005077	000136			CLR	ADHMCSR	
2463	016020	012777	000100	000130		MOV	#INTENA, ADHMCSR	; SET INTERRUPT ENABLE
2464	016026	042737	000340	177776		BIC	#340, PS	; ALLOW INTERRUPTS
2465	016034	052777	000200	000114		BIS	#DONE, ADHMCSR	; SET DONE..AND INTERRUPT
2466	016042	000240				NOP		
2467	016044	012637	000022			MOV	(SP)+, 22	; YOU DIDN'T INTERRUPT ?
2468	016050	012637	000020			MOV	(SP)+, 20	; RESTORE 20 & 22
2469	016054	005077	000076			CLR	ADHMCSR	; STOP ALL INTERRUPT
2470	016060	052737	000340	177776		BIS	#340, PS	
2471	016066	104012				ERROR		
2472	016070	000000				HALT		; YOU SHOULD HAVE INTERRUPTED
2473	016072	000426				BR	35	
2474	016074	011637	016152		25:	MOV	(SP), DHMVEC	; EXTRACT VECTOR +4
2475	016100	162737	000002	016152		SUB	#2, DHMVEC	; CREATE LVL
2476	016106	013737	016152	016154		MOV	DHMVEC, DHMLVL	; SAVE
2477	016114	162737	000002	016152		SUB	#2, DHMVEC	; CREATE AND SAVE VEC
2478	016122	012737	000340	177776		MOV	#340, PS	; PREVENT INTERRUPTS
2479	016130	005077	000022			CLR	ADHMCSR	
2480	016134	022626				POP2SP		
2481	016136	022626				POP2SP		
2482	016140	012637	000022			MOV	(SP)+, 22	; RESTORE 22
2483	016144	012637	000020			MOV	(SP)+, 20	; RESTORE 20
2484	016150	000207			35:	RTS	PC	
2485								

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016152 000300
016154 000302
016156 170500
016160 170502
016162 177560
016164 177562
016166 177564
016170 177566

;INDIRECT POINTERS

DHMVEC: 300
DHMLVL: 302
DHMCSR: 170500
DHMLSR: 170502
TKCSR: 177560
TKDBR: 177562
TPCSR: 177564
TPDBR: 177566

;MODEM CONTROL INTERRUPT VECTOR
;MODEM CONTROL ONTERRUPT PRIORITY
;MODEM CONTROL CONTROL STATUS REGISTER
;MODEM CONTROL CONTROL STATUS REGISTER

;PROGRAM VARIABLES

016172 000000
016174 000000
016176 000000
016200 000000
016202 000000
016204 000000
016206 000000
016210 000000
016212 000000
016214 000000
016216 000000
016220 000000
016222 000000
016224 000000
016226 000000
016230 000000
016232 017744
016234 000000
016236 000000
016240 000000
016242 000000
016244 000000
016246 000000
016250 000000
016252 000000
016254 000000
016256 000000
016260 177777
016262 000000
016264 000000
016266 000002
016270 000000
016272 000000

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
WRDCNT: 0
CHRCNT: 0
TSTPNT: TSTTBO
TSTMAX: 0
LINFLG: 0
LINE: 0
LINORG: 0
LINANS: 0
ANSFLG: 0
ORGLG: 0
TIME1: 0
TIME2: 0
TIFLG: 0
LINSEL: 177777
SELSK: 0
SLMSK: 0
FILL: 0
FILLA: 0
RNGRET: 0

;FILL CHAR/COUNT
;TEMP STORAGE FOR FILL COUNT

016274 052123 052101 051525
016302 042440 051122 051117
016310 021045 054105 020120
016316 020040 051040 041505
016324 100
2536 016325 114 047111 020105

MSTATE: .ASCII ;STATUS ERRORX"EXP REC;
MLINER: .ASCII ;LINE ERRORX"EXP REC LINE SEL;

	016332	051105	047522	022522	
	016340	042440	050130	051040	
	016346	041504	046040	047111	
	016354	020101	042523	040114	
2537	016362	044514	042516	042440	MLINE1: .ASCII ;LINE ERROR:"EXP REC LINE";
	016370	051117	051117	021045	
	016376	020120	020120	042522	
	016404	020103	044514	042516	
	016412	100			
2538	016413	100	040522	051516	MTRANE: .ASCII ;TRANSITION ERROR:"EXP REC LINE";
	016420	052111	047511	020116	
	016426	051105	047522	022523	
	016434	042440	050130	051040	
	016442	041504	046040	047111	
2539	016450	021045			DIALM: .ASCII ;X"X"DIAL ANSWERING DATA SETX"Q;
	016460	046101	040440	051516	
	016466	042522	044522	043516	
	016474	042040	052101	020101	
2540	016502	042523	022524	040042	MT103T: .ASCII ;X"X"103A MODEM CONNECT-DISCONNECT TESTX"Q;
	016510	021045	021045	030061	
	016516	040463	046440	042117	
	016524	046505	041440	047117	
	016532	042516	052103	042055	
	016540	051511	047503	047116	
	016546	041505	020124	042524	
2541	016554	052123	021045	100	MT202T: .ASCII ;X"X"202C MODEM CONNECT-DISCONNECT TESTX"Q;
	016561	04	022442	031042	
	016566	031060	020103	047515	
	016574	042504	020115	047503	
	016602	047116	041505	026524	
	016610	044504	041523	047117	
	016616	042516	052103	052040	
2542	016624	051505	022524	040042	MSELOR: .ASCII ;X"X"ORIGINATE LINE-Q;
	016632	021045	021045	051117	
	016640	043511	047111	052101	
	016646	020105	044514	042516	
2543	016654	040055			MSELAN: .ASCII ;X"ANSWER LINE-Q;
	016656	021045	047101	053523	
	016664	051105	046040	047111	
2544	016672	026505	100		MT103A: .ASCII ;X"103A TEST COMPLETEX"Q;
	016675	045	030442	031460	
	016702	020101	042524	052123	
	016710	041440	046517	046120	
2545	016716	052105	022505	040042	MT202A: .ASCII ;X"202C TEST COMPLETEX"Q;
	016724	021045	030062	041462	
	016732	052040	051505	020124	
	016740	047503	050115	042514	
2546	016746	042524	021045	100	MDISC: .ASCII ;X"SET SMD1=1 TO TEST DISCONNECTQ;
	016753	045	051442	052105	
	016760	051440	030127	036461	
	016766	020061	047524	052040	
	016774	051505	020124	044504	
	017002	041523	047117	042516	

2547	017010	052103	100	030442	M16: .ASCII ;X"X"16 LINE SCANNER TESTX"Q;
	017013	045	022442	042516	
	017020	020066	044514	047116	
	017026	051440	040503	051505	
	017034	051105	052040		
	017042	022524	040042		
2548	017046	021045	021045	055104	MTITLE: .ASCII ;X"X"DZDMK-B -----MODEM CONTROL DIAGNOSTIC-----X"Q;
	017054	044104	026513	020102	
	017062	020040	026440	026455	
	017070	026455	047515	042504	
	017076	020115	047503	052116	
	017104	047522	020114	044504	
	017112	043501	047516	052123	
	017120	041511	026455	026455	
	017126	022455	040042		
2549	017132	021045	042526	052103	MVECTOR: .ASCII ;X"VECTOR ADDRESS-Q;
	017140	051117	040440	042104	
	017146	042522	051523	040055	
2550	017154	021045	047503	052116	MREGAD: .ASCII ;X"CONTROL REGISTER ADDRESS-Q;
	017162	047522	020114	042523	
	017170	044507	052123	051105	
	017176	040440	042104	042522	
	017204	051523	040055		
2551	017210	021045	044514	042516	MLINSL: .ASCII ;X"LINE SELECT PARAMETER -Q;
	017216	051440	046105	041505	
	017224	020124	040520	040522	
	017232	042515	042524	020122	
	017240	040055			
2552	017242	021045	042524	052123	MTEST: .ASCII ;X"TEST-Q;
	017250	040055			
2553	017252	020040	040077		MGM: .ASCII ; ?Q;
2554	017256	021045	100		MCRLF: .ASCII ;X"Q;
2555	017261	045	051442	047111	MLINE: .ASCII ;X"SINGLE LINE CABLE TESTX"Q;
	017266	046107	020105	044514	
	017274	042516	041440	041101	
	017302	042514	052040	051505	
	017310	022524	040042		
2556	017314	021045	044514	042516	MLINEI: .ASCII ;X"LINE NUMBER-Q;
	017322	047040	046525	042502	
	017330	026522	100		
2557	017333	106	052101	046101	MFATAL: .ASCII ;FATAL ERRORX"CSTAT LSTATQ;
	017340	042440	051122	051117	
	017346	021045	051503	040524	
	017354	020124	046040	052123	
	017362	052101	100		
2558	017365	045	052042	040522	MTRNDE: .ASCII ;X"TRANSITION DETECTEDX"CSTAT LSTATQ;
	017372	051516	052111	047511	
	017400	020116	042504	042524	
	017406	052103	042105	021045	
	017414	051503	040524	020124	
	017422	046040	052123	052101	
	017430	100			
2559	017431	045	050042	053517	MPFAIL: .ASCII ;X"POWER FAILUREQ;
	017436	051105	043040	044501	

2560	017444	052514	042523	051100
	017451	052514	052503	042523
	017456	047109	020124	042523
	017464	052123	053440	046111
	017472	020114	042523	052123
	017500	051101	022523	040042
	017506	041536	100	
	017511	136	040126	
	017514	046136	100	
	017517	045	042	
		017621		
		017622		
	017622	040007		
	017624	000000		
		017636		
	017636	000000		
	017640	014316		
	017642	014334		
	017644	013752		
	017646	014150		
	017650	015122		
	017652	015030		
	017654	014600		
	017656	015070		
	017660	014660		
	017662	014726		
	017664	014212		
	017666	015264		
	017670	014230		
	017672	014252		
	017674	014274		
	017676	012660		
	017700	012722		
	017702	013164		
	017704	013262		
	017706	013350		
	017710	013320		
	017712	000000		
	017714	017744		
	017716	020146		
	017720	020210		
	017722	020216		
	017724	000000		
	017726	000000		
	017730	000000		
	017732	000000		
	017734	000037		
	017736	000007		
	017740	000001		
2608	017742	000000		

MPF1: .ASCII ; -CURRENT TEST WILL RESTARTX"0;

MCONTC: .ASCII ;+C0;
MCONTV: .ASCII ;+V0;
MCONTL: .ASCII ;+L0;
MBCD: .ASCII ;+X0;
.=.+100
.EVEN
MEPASS: 40007
TENTAB: 0
.=.+10

;EMT DISPATCH TABLE

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

ENTLIN: 0
TSTLST: TSTTB0
TSTTB1
TSTTB2
TSTTB3

GRO: NO-1
N1-100-1
N2-200-1
N3-300-1

2609	017744	001726
2610	017746	000001
(2)	017750	001754
(2)	017752	004000
(2)	017754	002016
(2)	017756	004000
(2)	017760	002060
(2)	017762	004000
(2)	017764	002122
(2)	017766	004000
(2)	017770	002164
(2)	017772	004000
(2)	017774	002226
(2)	017776	004000
(2)	020000	002302
(2)	020002	004000
(2)	020004	002356
(2)	020006	004000
(2)	020010	002440
(2)	020012	004000
(2)	020014	002522
(2)	020016	004000
(2)	020020	002604
(2)	020022	004000
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H09

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BEQ	314														
BEG	256	260	281	292	365	569	572	586	599	612	627	642	744	748	770
BEG	774	807	823	859	898	909	911	913	915	917	919	921	940	945	953
BEG	988	1004	1042	1058	1108	1110	1112	1114	1116	1118	1120	1246	1620	1684	1686
BEG	1695	1698	1702	1707	1719	1722	1726	1731	1851	1857	1900	1907	1921	1927	1957
BEG	2002	2010	2019	2031	2035	2151	2159	2163	2171	2310	2312	2319	2321	2359	2364
BEG	2380	2388													
BEG	2384														
BEG	2397														
BEG	2259														
BEG	311	321	584	597	610	625	640	655	672	688	713	731	739	762	795
BEG	838	847	877	909	911	913	915	917	919	921	929	973	991	1008	1026
BEG	1045	1062	1096	1108	1110	1112	1114	1116	1118	1120	1250	1438	1440	1563	1565
BEG	1627	1682	1916	1975	2464										
BEG	2324	2362	2385												
BEG	330	650	654	667	671	683	689	713	731	771	797	798	804	820	845
BEG	846	852	857	882	886	891	896	909	911	913	915	917	919	921	932
BEG	950	977	989	990	995	1029	1043	1044	1049	1108	1110	1112	1114	1116	1118
BEG	1120	1186	1353	1355	1396	1481	1521	1696	1699	1704	1708	1720	1723	1728	1732
BEG	2461	2465	2470												
BEG	1010	1065	2325	2386											
BEG	259	280	291	581	585	594	598	607	611	621	626	637	641	743	769
BEG	815	842	909	911	913	915	917	919	921	939	987	1033	1041	1108	1110
BEG	1112	1114	1116	1118	1120	1244	1619	1694	1697	1700	1705	1709	1718	1721	1724
BEG	1729	1733	1794	2003	2005	2007	2032	2034	2148	2170					
BEG	324														
BEG	2263	2399													
BEG	2382														
BEG	254	272	2357												
BEG	249	270	274	318	347	354	361	582	595	608	622	638	755	783	800
BEG	813	816	829	843	856	865	867	884	895	904	906	909	911	913	915
BEG	917	919	921	934	951	980	1014	1031	1034	1068	1108	1110	1112	1114	1116
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BEG	237	258	657	674	692	713	731	1000	1054	1158	1178	1325	1345	1690	1713
BEG	1758	1994	1997	2025	2049	2066	2086	2104	2121	2140	2261	2313	2323	2326	2372
BEG	2392	2420	2473												
BEG	230	233	265	332	333	334	344	345	351	358	367	651	668	684	713
BEG	731	738	741	763	764	818	837	851	876	890	909	911	913	915	917
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BEG	1871	1883	1951	2022	2045	2047	2048	2063	2082	2100	2152	2257	2345	2360	2377
BEG	2462	2469	2479												
BEG	269	323	346	353	360	364	747	773	806	822	858	897	909	911	913
BEG	915	917	919	921	952	1003	1057	1108	1110	1112	1114	1116	1118	1120	1683
BEG	1685	1850	1899	1906	1920	1926	2150	2258	2262	2396	2398	2457			
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BEG	242	2271													
BEG	754	782	799	812	828	864	866	883	903	905	909	911	913	915	917
BEG	919	921	933	960	979	1013	1030	1067	1108	1110	1112	1114	1116	1118	1120

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DECB	2335														
ENT	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141
	142	143	144	145	146	147									
HALT	155	2174	2273	2419	2472										
INC	752	778	780	811	827	850	863	889	902	909	911	913	915	917	919
	921	949	957	1009	1012	1064	1066	1829	1873	1948	2013				
INCB	909	911	913	915	917	919	921	1108	1110	1112	1114	1116	1118	1120	
LOT	2454														
JMP	173	244	283	294	320	326	338	352	359	368	1290	1663	1739	1834	1836
	1859	1861	1930	1964	1978	1998	1999	2438	2443						
JSR	243	257	1852	1901	1908	1922	1928	1959	2314						
MOV	228	231	232	238	239	241	247	252	261	262	263	264	284	295	304
	310	315	316	327	331	337	369	370	580	593	606	620	636	652	653
	669	670	685	686	687	713	731	740	742	745	746	765	766	767	768
	772	781	794	796	801	802	803	805	814	817	819	821	839	840	841
	844	848	849	854	878	879	880	881	885	887	888	893	909	911	913
	915	917	919	921	930	931	935	937	938	941	942	951	971	974	975
	976	978	981	982	983	984	985	986	996	1002	1023	1024	1027	1028	1032
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	1120	1917	1918	2234	2246	2249	2252	2322	2331	2332	2361	2365			
NOP	656	673	690	713	731	1960	1961	1962	1963	2466					
RESET	329	1144	1311	1768	1786	1950	1958								
ROL	2265	2266													
ROR	2270														
RTI	371	1748	1782	1838	1877	2012	2023	2037	2039	2177	2237	2253	2272	2290	2301
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TST	240	248	253	255	271	273	317	568	571	909	911	913	915	944	1108
	1110	1112	1114	1744	1825	1827	1856	1988	1992	2001	2030	2154	2158	2162	2358
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.IFT	909	911	913	915	917	919	921	1108	1110	1112	1114	1116	1118	1120		
.IFTF	909	911	913	915	917	919	921	1108	1110	1112	1114	1116	1118	1120		
.IIF	713	731	2620	2633												
.LIST	49	60	127	129	129	130	131	132	133	134	135	136	137	138	139	
	140	141	142	144	144	145	146	147	198	210	551	564	565	579	592	
	605	619	635	649	666	682	703	713	722	731	737	761	793	836	875	
	909	911	913	915	917	919	921	927	970	1022	1077	1093	1094	1108	1110	
.MACRO	1112	1114	1116	1118	1120	1142	1143	1286	1309	1310	2617	2620	2630	2633	1110	
	51	176	185	199	199	205	212	377	397	418	487	557	696	715	1072	
.NLIST	1086	1135	1303	2611	2624											
	48	60	127	129	129	130	131	132	133	134	135	136	137	138	139	
	140	141	142	144	144	145	146	147	198	210	376	564	565	579	592	
	605	619	635	649	666	682	703	713	722	731	737	761	793	836	875	
	909	911	913	915	917	919	921	927	970	1022	1077	1093	1094	1108	1110	
.PAGE	1112	1114	1116	1118	1120	1142	1143	1286	1309	1310	2617	2620	2630	2633	1110	
.REPT	713	731	910	912	914	916	918	920	922	1109	1111	1113	1115	1117	1119	
.TITLE	152	312	704	723	2618	2631										
	1															

ERRORS DETECTED: 0

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

