

DM11-BA

DM11-BA MODEM CONTRL
CZKMGAO

AH-S892A-MC
FICHE 1 OF 1

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MADE IN USA



Grid of microfiche frames containing technical data.



.NLIST SEQ,BIN,LOC
.REM %

IDENTIFICATION

PRODUCT CODE: AC-S890A-MC
PRODUCT NAME: CZKMGAO DM11-BA MODEM CONTRL
PROGRAM DATE: SEPTEMBER 1981
MAINTAINER: CSS/NPG DIAGNOSTICS

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1.0 ABSTRACT

THIS PROGRAM IS A TEST OF THE DM11-BA MODEM CONTROL MULTIPLEXER
THE PROGRAM IS DIVIDED INTO FUNCTIONAL TEST GROUPS AS
FOLLOWS:

- GROUP 0: ALL LINE SCANNER AND LINE MULTIPLEXER FUNCTIONS ARE
TESTED USING THE 54-14700 TEST CONNECTOR
(OR H3256 TEST CONNECTORS WITH THE H317-M DISTRIBUTION PANEL)
GROUP 1: A SINGLE LINE IS TESTED USING THE H317-M PANEL WITH H3256
TEST CONNECTORS IN PLACE OF THE MODEM CABLES .
GROUP 2: CONNECT-DISCONNECT TEST FOR 103A MODEMS
GROUP 3: CONNECT-DISCONNECT TEST FOR 202C MODEMS

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11 COMPUTER WITH AT LEAST 8K OF MEMORY
ASR-33 TELETYPE OR EQUIVALENT
DM11-BA

2.1.1 FOR 8 LINE SCANNER TEST

54-14700 TEST CONNECTOR

2.1.2 FOR SINGLE LINE CABLE TEST

2 CABLES CONNECTED TO DISTRIBUTION PANEL
H3256 TEST CONNECTOR

2.2 MEMORY

THE PROGRAM RUNS IN 8K MEMORY

2.3 M8640 HARDWARE JUMPERS

HARDWARE JUMPERS W10-17 ON THE M8640 MODULE ENABLE OR
DISABLE TRANSITION DETECTION OF THE MODEM SIGNALS .
THE FOLLOWING RESTRICTIONS APPLY TO THESE JUMPERS:

TEST GROUP 0 - ASSUMES THAT ALL TRANSITION DETECTIONS WILL NOT BE
DISABLED (AT LEAST 1 MUST BE ENABLED)

TEST GROUP 1 - IS NOT EFFECTED BY THESE JUMPERS .

TEST GROUPS 2 & 3 - ASSUMES THE FOLLOWING :
(1) RING TRANSITIONS WILL NOT BE DISABLED .
(2) BOTH CLEAR TO SEND & CARRIER WILL NOT BE
DISABLED TOGETHER . (ONE DISABLE IS ALLOWED).

3.0 THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1. <CR> IF NO CHANGES ARE TO BE MADE
2. 6 DIGITS 0-7 TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3. ^U TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ^G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

4.0 LOADING AND STARTING PROCEDURE
THE STANDARD PROCEDURE FOR LOADING BINARY TAPES IS TO BE USED.
IF THE DIAGNOSTIC IS ON MAGNETIC MEDIA, FOLLOW INSTRUCTIONS FOR
THE MONITOR BEING USED. THE PROGRAM AUTOSTARTS ON LOADING.

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

4.2.1A WITH HARDWARE SWITCH REGISTER
LOAD ADDRESS 000200
IF DEFAULT ADDRESSES ARE NOT PRESENT SET SW00 = 0
(DEFAULT CSR = 764200 , VECTOR = 540)
PRESS START

4.2.1B WITHOUT HARDWARE SWITCH REGISTER
LOAD ADDRESS 200
PRESS START

4.2.1.2 PROGRAM WILL TYPE:
"CZKMGAO DM11-BA MODEM CONTROL" (ONCE ONLY)

4.2.1.3 PROGRAM WILL TYPE (WITH SW00 = 0)
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 DM11-BA 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 DM11-BA
UNDER TEST, A HALT WILL OCCUR AT THAT ADDRESS+2, WHEN
THE DM11-BA 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
DM11-BA 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
"TEST-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

4.2.1.8 TYPE AN 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 54-14700 TEST CONNECTOR. FIRST TEST=0
TEST GROUP 1:
OFF LINE TESTS USING H3256 TEST CONNECTOR AND H317-M DISTRIBUTION PANEL.
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 WITH HARDWARE SWITCH REGISTER

4.2.2.1 WITH SW00=0

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.3 TO 4.2.1.9.

4.2.2.2 WITH SW00=1

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

PROGRAM WILL PERFORM AS DESCRIBED IN 4.2.1.7 TO 4.2.1.9

4.2.3 PROGRAM RESTART WITHOUT HARDWARE SWITCH REGISTER

LOAD ADDRESS 200
PRESS START

5.0 OPERATING PROCEDURE

5.1 TEST GROUP 0 8 LINE SCANNER TEST

5.1.1 TEST INITIALIZATION

NONE REQUIRED, PROGRAM TYPES '8 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 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 DM11-BA CABLE AND H317-M PANEL 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 1 DIGIT OCTAL NUMBER BETWEEN 0 AND 7, 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 (0-7 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
(0-7 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 DM11-BA.

5.3.2.7 IF THE CONNECTION HAS BEEN PROPERLY ESTABLISHED, THE PROGRAM TYPES 'STRIKE ANY TTY KEY TO DISCONNECT'.

WHEN A TTY KEY IS STRUCK, THE PROGRAM WILL BEGIN THE DISCONNECT SEQUENCE.

5.3.2.8 WHEN THE DISCONNECT SEQUENCE HAS BEEN COMPLETED THE PROGRAM WILL TYPE '103A TEST COMPLETE', AND WILL REQUEST THE OPERATOR TO SELECT NEW LINES.

5.3.3 PROGRAM ACTION IN CASE OF ERROR

5.3.3.1 RING ON INCORRECT LINE

IF THE PROGRAM DETECTS A RING SIGNAL ON AN INCORRECT LINE, OR IF ANY OTHER TRANSITION BESIDES RING IS DETECTED BEFORE RING, THE PROGRAM WILL TYPE A FATAL ERROR MESSAGE AND REQUEST THE OPERATOR TO RESELECT LINES AND REDIAL.

5.3.3.2 OTHER ERRORS

IF ANY ERRORS OCCUR AFTER THE FIRST RING HAS BEEN DETECTED, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND CONTINUE TESTING TO COMPLETION.

THE ONLY EXCEPTION TO THIS IS IF AN INTERRUPT OCCURS ON A LINE NOT SELECTED, IN WHICH CASE A FATAL ERROR WILL BE REPORTED, AND THE PROGRAM WILL PROCEED AS DESCRIBED IN 5.3.3.1

5.3.4 OPERATION SWITCH SETTINGS

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

5.3.5 DATA SET MODE SWITCHING

AFTER THE PROGRAM HAS TYPED THE MESSAGE DESCRIBED
IN 5.3.2.7, BUT BEFORE 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 <CONROL 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

5.6 ADDRESS CHANGE

TO CHANGE THE VECTOR AND REGISTER ADDRESS OF THE DM11-BA 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 'DM11-BA DIAGNOSTIC' WILL NOT BE TYPED.

5.7 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).

5.8 ERROR IN ENTERING DATA

TO ALLOW RE-ENTERING DATA TYPE ^U <CNTL U> BEFORE DEPRESSING <CR> WHEN ENTERING DATA. THIS WILL RESULT IN THE QUESTION BEING RE-ASKED.

5.9 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
AAAAAA BBB

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

6.1.1.4 CONTROL STATUS ERROR

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

FORMAT FOR CONTROL STATUS ERROR IS

XXXXXX STATUS ERROR
EXP REC
AAAAAA BBBB

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

6.1.1.5 LINE STATUS ERROR

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

FORMAT FOR LINE STATUS ERROR IS

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

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

6.1.2 REPEATED ERRORS

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

6.2 SCOPE LOOPS

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

6.2.1 AFTER ERROR HALT

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

PRESS CONTINUE
THE PROGRAM WILL LOOP ON THE SAME TEST.

6.2.2 FROM PROGRAM START

6.2.2.1 PROCEED AS DESCRIBED IN 4.2.1.1 TO 4.2.1.4

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

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

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

6.2.3 AFTER <CONTROL-C>
SAME AS 6.2.2.2 TO 6.2.2.4

7.0 RESTRICTIONS

7.1 STARTING

FOR 8 LINE SCANNER TEST OR SINGLE LINE TEST

THE 54-14700 TEST CONNECTORS MUST BE INSTALLED ON THE M8640
MODULE OR WHEN CONNECTED TO THE H317-M DISTRIBUTION
PANEL H3256 TEST CONNECTORS SHOULD BE INSTALLED
IN PLACE OF THE MODEM CABLES.

7.2 OPERATING

NONE.

7.3 WHEN ON ACT-11 OR 'XOR'
PROGRAM WILL DEFAULT TO 8 LINE SCANNER TEST
54-14700 TEST CONNECTOR MUST BE INSTALLED
(OR H317-M WITH H3256 TEST CONNECTORS).

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

VECTORS

DMBVEC: 540 (AUTOMATICALLY GENERATED
DMBLVL: 542 BY PROGRAM WHEN UNDER ACT-11 OR 'XOR')
ADDRESSES

DMBCSR: 164200
DMBLSR: 164202

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 SW01=1 TO DISCONNECT".

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

8.4 202C MODEM CONNECT-DISCONNECT TEST

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

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

9.0 PROGRAM DESCRIPTION

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

WHEN INITIALLY LOADED AND STARTED ...SW00 MUST BE SET =0, 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.

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.

10.0 LISTING
%

```
710 .LIST SEQ,BIN,LOC
711 .TITLE CZKMGAO DM11-BA MODEM CONTRL
712 .ENABLE ABS,AMA
713 :DM11-BA DIAGNOSTIC
714 :THIS PROGRAM CONTAINS TEST OF THE DM11-BA IN
715 :THE OFF LINE MODE OF OPERATION ONLY
716
717 :SWITCH REGISTER OPTIONS
718
719
720 :SW15=1, HALT ON ERROR
721 :SW14=1, LOOP ON CURRENT TEST
722 :SW13=1, SUPPRESS ERROR TYPEOUT
723 :SW11=1, SUPPRESS ITERATIONS
724 :SW10=1, ESCAPE TO NEXT TEST ON ERROR
725 :SW09=1, FREEZE DATA
726 :SW01=1, START DISCONNECT SEQUENCE
727 :SW00=0, RESELECT VECTOR AND CONTROL REGISTER ADDRESS
728 :AFTER PROGRAM RESTART
729
730 :STARTING ADDRESS FOR ALL TESTS IS 000200
731 :RESTART ADDRESS=000200
732
733 :TESTS AVAILABLE
734
735 :TEST GROUP 0-
736 :OFF LINE TESTS USING H861 TEST CONNECTOR-FIRST TEST=0
737 :TEST GROUP 1-
738 :OFF LINE TESTS USING DC11 TEST CONNECTOR AND MODEM CABLE-FIRST TEST=100
739 :TEST GROUP 2-
740 :CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST=200
741 :TEST GROUP 3-
742 :CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FIRST TEST=300
743
744 :SYMBOL DEFINITIONS
745
746 100000 SW15=100000
747 040000 SW14=40000
748 020000 SW13=20000
749 010000 SW12=10000
750 004000 SW11=4000
751 002000 SW10=2000
752 001000 SW09=1000
753 000400 SW08=400
754 000100 SW06=100
755
756 .NLIST MC,MD,CND
757 .LIST ME
758
759
760
761
762 :REGISTER DEFINITIONS
763
764 000000 R0=%0 ;GENERAL REGISTER
765 000001 R1=%1 ;GENERAL REGISTER
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766      000002      R2=%2          ;GENERAL REGISTER
767      000003      R3=%3          ;GENERAL REGISTER
768      000004      R4=%4          ;GENERAL REGISTER
769      000005      R5=%5          ;GENERAL REGISTER
770      000006      SP=%6         ;PROCESSOR STACK POINTER
771      000007      PC=%7         ;PROGRAM COUNTER
772
773      ;LOCATION EQUIVALENCIES
774
775      177776      PS=177776
776      .EQUIV PS,PSW
777      014660      RADIX=DIVIS    ;CONVERSION FACTOR FOR DECIMAL OUTPUT
778      014654      BINWRD=DIVIDL  ;WORD TO BE CONVERTED TO OCTAL ASCII
779      014656      DIGIT=DIVIDH   ;ASCII OCTAL DIGIT
780
781      ;CONTROL STATUS REGISTER BIT FUNCTIONS
782
783      000020      BUSY=20        ;LINE SCANNER RUNNING
784      000040      SCNENA=40      ;LINE SCANNER ENABLE
785      000100      INTENA=100     ;INTERRUPT ENABLE
786      000200      DONE=200       ;SCANNER DONE
787      000400      STEP=400       ;CAUSES LINE COUNTER TO BE INCREMENTED BY 1 COUNT
788      001000      MAINT=1000     ;FORCES 1S TO INPUT OF SCRATCH PAD MEMORY
789      002000      CLRMUX=2000    ;CLEAR MULTIPLEXER FUNCTION FLIPFLOPS
790      004000      CLRSCN=4000    ;CLEARS SCANNER SCRATCHPAD MEMORY
791      010000      SECRXF=10000   ;SECONDARY RECEIVE TRANSITION WAS DETECTED BY SCANNER
792      020000      CSF=20000     ;CLEAR TO SEND TRANSITION WAS DETECTED BY SCANNER
793      040000      COF=40000     ;CARRIER TRANSITION WAS DETECTED BY SCANNER
794      100000      RINGF=100000   ;RING SIGNAL WAS DETECTED BY SCANNER
795
796      ;LINE REGISTER BIT FUNCTIONS
797
798      000001      LINENA=1        ;=1, RECOGNIZE TRANSITIONS ON THIS LINE
799      000002      TRMRDY=2       ;=1, SEND TERMINAL READY TO MODEM
800      000004      RS=4          ;=1, SEND REQUEST TO SEND TO MODEM
801      000010      SECTX=10      ;=1, SEND SECONDARY TRANSMIT TO MODEM
802      000020      SECRX=20      ;=1, SECONDARY RECEIVE TURNED ON BY MODEM
803      000040      CS=40         ;=1, CLEAR TO SEND TURNED ON BY MODEM
804      000100      CO=100        ;=1, CARRIER TURNED ON BY MODEM
805      000200      RING=200      ;=1, RING TURNED ON BY MODEM
806
807      ;SOFTWARE TRANSITION FLAGS
808
809      000004      XCO=4          ;CARRIER TRANSITION WAS DETECTED
810      000002      XCS=2        ;CLEAR TO SEND TRANSITION WAS DETECTED
811      000001      XSCRX=1      ;SECONDARY RECEIVE TRANSITION WAS DETECTED
812
813      ;INSTRUCTION DEFINITIONS
814
815      005746      PUSH1SP=5746   ;DECREMENT PROCESSOR STACK 1 WORD
816      005726      POP1SP=5726   ;INCREMENT PROCESSOR STACK 1 WORD
817      010046      PUSHRO=10046  ;SAVE R0 ON STACK
818      012600      POPRO=12600   ;RESTORE R0 FROM STACK
819      024646      PUSH2SP=24646 ;DECREMENT STACK TWICE
820      022626      POP2SP=22626  ;INCREMENT STACK TWICE
821

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:EMT DEFINITION TABLE

ERRORC=EMT+X ;CONTROL STATUS ERROR SERVICE
ERRORL=EMT+X ;LINE STATUS ERROR SERVICE
SCOPE=EMT+X ;SCOPE LOOP AND ITERATION SERVICE
SCOPEF=EMT+X ;DATA FREEZE SERVICE
TYPE=EMT+X ;TELETYPE OUTPUT
SAV05P=EMT+X ;SAVE R0-R5, PC+2 OF CALL
OCTASC=EMT+X ;CONVERT DATA TO ASCII AND TYPE
RES05=EMT+X ;RESTORE R0-R5
CONVERT=EMT+X ;ASCII CONVERSION ROUTINE
EXTRACT=EMT+X ;DIGIT EXTRACTION ROUTINE
ERROR=EMT+X ;TYPE PC OF FAILING TESTS ONLY
INSTRG=EMT+X ;INPUT OCTAL DATA STRING
ERRORT=EMT+X ;TRANSITION ERROR
ERRORS=EMT+X ;ON LINE STATUS ERROR
ERRORN=EMT+X ;FATAL TRANSITION
GETLNS=EMT+X ;INPUT LINE NUMBERS
SETUP=EMT+X ;SET UP FOR ON LINE TEST
CKRING=EMT+X ;CHECK FOR RING ON CORRERT LINE
WAITRN=EMT+X ;WAIT FOR TRANSITIONS
CKTRAN=EMT+X ;CHECK TRANSITIONS
WAITS=EMT+X ;DELAY FOR TRANSIENTS
CNTLUU=EMT+X ;CHANGE SWREG ROUTINE
CKINTT=EMT+X ;CHECK FOR INTERRUPTS-FLAG STYLE
KBDIN=EMT+X ;FAKE INTERRUPT ENTRY POINT

:TRAPCATCAER FOR ILLEGAL INTERRUPTS

```
850
851 ;STANDARD INTERRUPT VECTORS
852
853 . =24
854 000024 015346 PFAIL ;POWER FAIL HANDLER
855 000026 000340 340 ;SERVICE AT LEVEL 7
856 000030 013350 EMTSRV ;EMT DISPATCH SERVICE
857 000032 000340 340 ;SERVICE AT LEVEL 7
858
859 . =60
860 000060 001732 KBDINT ;KEYBOARD MONITOR
861 000062 000340 340 ;SERVICE AT LEVEL 7
862
863 . =174
864 000174 000174 DISPREG:0
865 000174 000000 SWREG: 0
866 000176 000000
867
868 . =200
869 000200 000137 001100 JMP START ;GO TO START OF PROGRAM
870
871
872
873
874
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875
876      001100      001100      . =1100
877      001100      012737      015346      000024      STACK:
878      001100      012737      015346      000024      START:  MOV    #PFAIL,24      ;SET UP POWER FAIL
879                                          ;INTERRUPT SERVICE VECTOR
880      001106      005037      001730      CLR    TIPFLG      ;CLEAR TEST IN PROGRESS FLAG
881      001112      005077      014642      CLR    @TKCSR
882      001116      012706      001100      MOV    #STACK,SP   ;SET UP STACK POINTER
883      001122      013746      000006      SUSWR:  MOV    @#6,-(SP) ;SAVE VECTORS
884      001126      013746      000004      MOV    @#4,-(SP)
885      001132      012737      001152      000004      MOV    #1$,@#4     ;SET UP FOR TIMEOUT
886      001140      022777      177777      014622      CMP    #-1,@SWR   ;REFERENCE HARDWARE SWITCH REGISTER
887      001146      001402      BEQ    2$
888      001150      000407      BR     3$
889      001152      022626      1$:    CMP    (SP)+,(SP)+ ;ADJUST STACK
890      001154      012737      000176      015770      2$:    MOV    #SWREG,SWR ;POINT TO SOFTWARE SWITCH REG
891      001162      012737      000174      015772      MOV    #DISPREG,DISPLAY ;POINT TO SOFT DISPLAY REG
892      001170      012637      000004      3$:    MOV    (SP)+,@#4   ;RESTORE VECTORS
893      001174      012637      000006      MOV    (SP)+,@#6
894      001200      005037      001242      CLR    XFLAG      ;XOR = NO
895      001204      013746      000004      MOV    4,-(SP)    ;SAVE 4
896      001210      012737      001246      000004      MOV    #XORSVC,4  ;SET UP SVC ROUTINE
897      001216      005737      177060      TST    177060     ;GOT AN XOR TESTER OUT THERE ?
898      001222      012637      000004      MOV    (SP)+,4   ;YES
899      001226      005137      001242      COM    XFLAG      ;XOR = YES
900      001232      004737      015470      JSR    PC,XOR     ;AUTO VECTOR
901      001236      000137      001254      JMP    START0     ;RESTORE TRAPCATCHER
902                                          ;XOR FLAG
903      001244      000000      XFLAG:  0
904      001246      022626      FST:    0
905      001250      012637      000004      XORSVC: POP2SP
906      001254      005737      016060      START0: MOV    (SP)+,4 ;RESTORE 4
907      001260      001005      TST    TIFLG     ;TYPED TITLE?
908      001262      104004      BNE    .+14      ;YES
909      001264      016645      TYPE   'DM11-BA DIAGNOSTIC'
910      001266      012737      000001      016060      MOV    #1,TIFLG  ;SET TITLE TYPED FLAG
911      001274      005737      001242      TST    XFLAG     ;X OR ?
912      001300      100417      BMI    VECSTR    ;RESTORE TRAPCATCHER
913      001302      005737      000042      TST    42        ;ACT 11?
914      001306      001403      BEQ    START1   ;NO
915      001310      004737      015470      JSR    PC,XOR   ;YES AUTO VECTOR
916      001314      000411      BR     VECSTR   ;GET VECTOR AND REGISTER ADDRESS
917      001316      022737      000176      015770      START1: CMP    #SWREG,SWR
918      001324      001001      BNE    1$
919      001326      104025      CNTRLUU
920      001330      032777      000001      014432      1$:    BIT    #1,@SWR
921      001336      001103      BNE    STARTN
922      001340      012706      001100      VECSTR: MOV    #STACK,SP ;SET UP PROCESSOR STACK POINTER
923      001344      012737      000300      013274      MOV    #300,DATA1 ;ADDRESS OF FIRST FLOATING VECTOR
924      001352      012737      000302      013276      MOV    #302,DATA2 ;ADDRESS OF STATUS WORD
925      001360      013777      013276      011706      VECSTA: MOV    DATA2,@DATA1 ;MOVE ADDRESS OF STATUS WORD TO VECTOR
926      001366      005077      011704      CLR    @DATA2    ;CLEAR STATUS WORD
927                                          ;(FOR HALT ON ILLEGAL INTERRUPT)
928      001372      062737      000004      013274      ADD    #4,DATA1  ;NEXT VECTOR
929      001400      062737      000004      013276      ADD    #4,DATA2  ;NEXT STATUS WORD
930      001406      023727      013274      001000      CMP    DATA1,#1000 ;IS TABLE CLEARED

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931	001414	001361				BNE	VECSTA				:IF NOT, CONTINUE
932	001416	005737	001242			TST	XFLAG			:XOR ?	
933	001422	100516				BMI	TSTGO			:YES	
934	001424	005737	000042			TST	42			:ACT 11 ?	
935	001430	001113				BNE	TSTGO			:YES	
936	001432	104013				INSTRG					:GET VECTOR ADDRESS
937	001434	017422				MVECTOR					:MESSAGE 'VECTOR ADDRESS-'
938	001436	000100				100					:LOWER LIMIT FOR ADDRESS
939	001440	000774				774					:UPPER LIMIT FOR ADDRESS
940	001442	015750				DMBVEC					:STORAGE FOR ADDRESS
941	001444	032737	000003	015750	1\$:	BIT	#3,DMBVEC				:TEST 2 LSB OF ADDRESS
942	001452	001404				BEQ	VECST1				:IF 0, CONTINUE
943	001454	012716	001444			MOV	#1\$, (SP)				
944	001460	000137	015176			JMP	INSTER				:INCORRECT ADDRESS, TRY AGAIN
945	001464	013737	015750	015752	VECST1:	MOV	DMBVEC,DMBLVL				:GENERATE ADDRESS OF
946	001472	062737	000002	015752		ADD	#2,DMBLVL				:INTERRUPT STATUS WORD
947	001500	104013				INSTRG					:GET ADDRESS OF CONTROL REGISTER
948	001502	017444				MREGAD					:MESSAGE 'REGISTER ADDRESS-'
949	001504	160000				160000					:LOWER LIMIT FOR ADDRESS
950	001506	176000				176000					:UPPER LIMIT FOR ADDRESS
951	001510	015754				DMBCSR					:STORAGE FOR ADDRESS
952	001512	032737	000007	015754	1\$:	BIT	#7,DMBCSR				:IF 3 LSB ARE NOT 0
953	001520	001404				BEQ	REGST1				
954	001522	012716	001512			MOV	#1\$, (SP)				
955	001526	000137	015176			JMP	INSTER				:INCORRECT ADDRESS, TRY AGAIN
956	001532	013737	015754	015756	REGST1:	MOV	DMBCSR,DMBLSR				:SET UP ADDRESS OF LINE STATUS REGISTER
957	001540	062737	000002	015756		ADD	#2,DMBLSR				

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958
959 001546 012706 001100      STARTN: MOV      #STACK,SP      ;SET UP PROCESSOR STACK
960 001552 104013              INSTRG      ;GET TEST NUMBER
961 001554 017500              MTEST      ;MESSAGE 'TEST-'
962 001556 000000              0          ;LOWER LIMIT FOR TEST NUMBER
963 001560 000777              777       ;UPPER LIMIT FOR TEST NUMBER
964 001562 016002              TSTNO      ;STORAGE FOR TEST NUMBER
965 001564 013705 016002      X1A:  MOV      TSTNO,R5      ;GET TEST NUMBER
966 001570 042705 177077      BIC      #177077,R5      ;EXTRACT TEST GROUP NUMBER
967 001574 006205              ASR      R5
968 001576 006205              ASR      R5
969 001600 006205              ASR      R5
970 001602 006205              ASR      R5
971 001604 006205              ASR      R5
972 001606 016537 020236 016036  MOV      GRO(R5),TSTMAX    ;GET HIGHEST TEST IN GROUP
973 001614 016537 020216 016034  MOV      TSTLST(R5),TSTPNT ;GET POINTER TO TEST TABLE
974 001622 005737 016034              TST      TSTPNT          ;IF 0, INVALID TEST GROUP
975 001626 001004              BNE      STRTOA
976 001630 012716 001564      X1B:  MOV      #X1A,(SP)
977 001634 000137 015176      JMP      INSTR
978 001640 042737 177700 016002  STRTOA: BIC      #177700,TSTNO ;TRY AGAIN
979                                     ;GET NUMBER OF FIRST TEST
980 001646 023737 016002 016036  CMP      TSTNO,TSTMAX     ;TO BE EXECUTED IN SELECTED GROUP
981 001654 003401              BLE      TSTGO           ;IS NUMBER TOO LARGE
982 001656 000764              BR      X1B
983 001660 012746 000340      TSTGO: MOV      #340,-(SP) ;SET UP PRIORITY LEVEL
984 001664 005746              PUSH1SP
985 001666 000005              RESET
986 001670 012737 002146 002150  MOV      #DMYRTI,KRET     ;SET UP DUMMY KEYBOARD RETURN
987 001676 005037 016040              CLR      LINFLG          ;CLEAR LINE SELECTED FLAG
988 001702 005037 015776              CLR      TRACON          ;CLEAR TRACE TRAP FLAG
989 001706 005037 016000              CLR      PASCNT          ;CLEAR PASS COUNT
990 001712 104004              TYPE
991 001714 017514              MCRLF
992 001716 012737 000001 001730  1$:  MOV      #1,TIPFLG     ;SET TEST IN PROGRESS FLAG
993 001724 000137 013564      JMP      TSTENT          ;START TESTING
994 001730 000000      TIPFLG: 0

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995
996                                     ;TELETYPE KEYBOARD INTERRUPT SERVICE ROUTINE
997
998 001732 005037 001730          KBDINT: CLR      TIPFLG          ;CLEAR TEST IN PROGRESS FLAG
999 001736 005037 014504          CLR      TMP1
1000 001742 005037 002152          CLR      SINTFL          ;CLEAR SOFTWARE INTERRUPT FLAG
1001 001746 117737 014010 014504  MOVB     @TKDBR,TMP1
1002 001754 142737 000200 014504  BICB     #200,TMP1
1003 001762 122737 000003 014504  CMPB     #3,TMP1          ;IF <CONTROL C> WAS TYPED
1004 001770 001011                BNE     KBDIN1          ;TYPE "'C'" AND
1005 001772 104004                TYPE
1006 001774 017744                MCONTC
1007 001776 022626                POP2SP
1008 002000 005077 013750          CLR      @DMBCSR
1009 002004 005077 013750          CLR      @TKCSR
1010 002010 000137 001546          JMP      STARTN
1011 002014 122737 000026 014504  KBDIN1: CMPB     #26,TMP1          ;IF <CONTROL V> WAS TYPED
1012 002022 001011                BNE     KBDIN2          ;TYPE "'V'" AND GET NEW
1013 002024 104004                TYPE
1014 002026 017747                MCONTV
1015 002030 022626                POP2SP
1016 002032 005077 013716          CLR      @DMBCSR
1017 002036 005077 013716          CLR      @TKCSR
1018 002042 000137 001340          JMP      VECSTR
1019 002046 122737 000014 014504  KBDIN2: CMPB     #14,TMP1          ;IF <CONTROL L> WAS TYPED
1020 002054 001015                BNE     KBDIN3          ;TYPE "'L'" AND GET NEW
1021 002056 104004                TYPE
1022 002060 017752                MCONTL
1023 002062 022737 002146 002150  CMP      #DMYRTI,KRET
1024 002070 001426                BEQ     DMYRTI
1025 002072 022626                POP2SP
1026 002074 005077 013654          CLR      @DMBCSR
1027 002100 005077 013654          CLR      @TKCSR
1028 002104 000177 000040          JMP      @KRET
1029 002110 022737 000176 015770  KBDIN3: CMP      #SWREG,SWR
1030 002116 001005                BNE     1$
1031 002120 122737 000007 014504  CMPB     #7,TMP1
1032 002126 001001                BNE     1$
1033 002130 104025                CNTLUU
1034 002132 012737 000001 002152  1$:     MOV      #1,SINTFL          ;SET SOFTWARE INTERRUPT FLAG
1035 002140 012737 000001 001730  MOV      #1,TIPFLG          ;SET TEST IN PROGRESS FLAG
1036 002146 000002
1037                                     DMYRTI: RTI
1038                                     .EVEN
1038                                     KRET: 0
1039                                     SINTFL: 0

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1040 ;INITIALIZATION CHECK - PERFORMED ONLY AT PROGRAM START
1041 ;VERIFY THAT CONTROL STATUS REGISTER AND LINE STATUS
1042 ;REGISTER WERE CLEARED BY INITIALIZE
1043
1044 002154 TO: ;REFERENCE DESIGNATION
1045 002154 104004 ;TYPE '8 LINE SCANNER TEST'
1046 002156 016613
1047 002160 005777 013570 INIT1: M16 ;TEST CONTROL STATUS REGISTER
1048 002164 001401 BEQ .+4 ;CONTROL STATUS NOT CLEARED, ERROR
1049 002166 104012 ERROR ;TEST LINE STATUS REGISTER
1050 002170 005777 013562 TST @DMBLSR ;LINE STATUS NOT CLEARED, ERROR
1051 002174 001401 BEQ .+4 ;CHECK FOR LOOP
1052 002176 104012 ERROR
1053 002200 104002 SCOPE
1054
1055 ;VERIFY THAT "INTERRUPT ENABLE" CAN BE
1056 ;SET AND CLEARED.
1057
1058 002202 T1: ;REFERENCE DESIGNATION
1059 002202 012777 000100 013544 CSTR1: MOV #INTENA,@DMBCSR ;SET INTERRUPT ENABLE
1060 002210 032777 000100 013536 BIT #INTENA,@DMBCSR ;WAS INTERRUPT ENABLE SET
1061 002216 001001 BNE .+4
1062 002220 104012 ERROR ;NO, ERROR
1063 002222 042777 000100 013524 BIC #INTENA,@DMBCSR ;CLEAR INTERRUPT ENABLE
1064 002230 032777 000100 013516 BIT #INTENA,@DMBCSR ;WAS INTERRUPT ENABLE CLEARED
1065 002236 001401 BEQ .+4
1066 002240 104012 ERROR ;NO, ERROR
1067 002242 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1068
1069 ;VERIFY THAT "DONE" CAN BE SET AND CLEARED
1070
1071 002244 T2: ;REFERENCE DESIGNATION
1072 002244 012777 000200 013502 CSTR2: MOV #DONE,@DMBCSR ;SET DONE
1073 002252 032777 000200 013474 BIT #DONE,@DMBCSR ;WAS DONE SET
1074 002260 001001 BNE .+4
1075 002262 104012 ERROR ;NO, ERROR
1076 002264 042777 000200 013462 BIC #DONE,@DMBCSR ;CLEAR DONE
1077 002272 032777 000200 013454 BIT #DONE,@DMBCSR ;WAS DONE CLEARED
1078 002300 001401 BEQ .+4
1079 002302 104012 ERROR ;NO, ERROR
1080 002304 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1081
1082 ;VERIFY "MAINTENANCE MODE" CAN BE SET AND CLEARED
1083
1084 002306 T3: ;REFERENCE DESIGNATION
1085 002306 012777 001000 013440 CSTR3: MOV #MAINT,@DMBCSR ;SET MAINTENANCE MODE
1086 002314 032777 001000 013432 BIT #MAINT,@DMBCSR ;WAS MAINTENANCE MODE SET
1087 002322 001001 BNE .+4
1088 002324 104012 ERROR ;NO, ERROR
1089 002326 042777 001000 013420 BIC #MAINT,@DMBCSR ;CLEAR MAINTENANCE MODE
1090 002334 032777 001000 013412 BIT #MAINT,@DMBCSR ;WAS MAINTENANCE MODE CLEARED
1091 002342 001401 BEQ .+4
1092 002344 104012 ERROR ;NO, ERROR
1093 002346 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1094
1095 ;VERIFY THAT "SCAN ENABLE" CAN BE SET AND CLEARED.

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1096
1097 002350
1098 002350 012777 000040 013376 T4:
1099 002356 032777 000040 013370 CSTR4: MOV #SCNENA,@DMBCSR ;REFERENCE DESIGNATION
1100 002364 001001 BNE #SCNENA,@DMBCSR ;SET SCAN ENABLE
1101 ;WAS SCAN ENABLE SET
1102 002366 104012 ERROR ;NO, ERROR
1103 002370 042777 000040 013356 BIC #SCNENA,@DMBCSR ;CLEAR SCAN ENABLE
1104 002376 032777 000040 013350 BIT #SCNENA,@DMBCSR ;WAS SCAN ENABLE CLEARED
1105 002404 001401 BEQ .+4
1106
1107 002406 104012 ERROR ;NO, ERROR
1108 002410 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1109
1110 ;VERIFY THAT 'BUSY' IS SET WHEN 'SCAN ENABLE' IS SET
1111 ;VERIFY THAT 'BUSY' IS CLEARED WHEN 'SCAN ENABLE' IS CLEARED
1112
1113 002412
1114 002412 012777 000040 013334 T5:
1115 002420 032777 000020 013326 CSTR5: MOV #SCNENA,@DMBCSR ;REFERENCE DESIGNATION
1116 002426 001001 BNE #BUSY,@DMBCSR ;SET SCAN ENABLE
1117 002430 104012 ERROR ;IS BUSY BIT SET
1118 002432 042777 000040 013314 BIC #SCNENA,@DMBCSR ;BUSY NOT SET, ERROR
1119 002440 032777 000020 013306 BIT #BUSY,@DMBCSR ;CLEAR SCAN ENABLE
1120 002446 001401 BEQ .+4 ;IS BUSY BIT CLEARED
1121 002450 104012 ERROR ;BUSY NOT CLEARED, ERROR
1122 002452 104002 SCOPE ;CHECK FOR LOOP, ITERATIONS
1123
1124 ;VERIFY THAT SETTING 'DONE' DOES NOT CCAUSE AN
1125 ;INTERRUPT IF 'INTERRUPT ENABLE' IS CLEARED.
1126
1127 002454
1128 002454 052737 000340 177776 T6:
1129 002462 005077 013266 INT1: BIS #340,PS ;REFERENCE DESIGNATION
1130 002466 012777 002522 013254 CLR @DMBCSR ;LOCK OUT INTERRUPTS
1131 002474 013777 177776 013250 MOV #INT1A,@DMBVEC ;CLEAR CONTROL REGISTER
1132 002502 052777 000200 013244 MOV PS,@MIBLVL ;SET UP INTERRUPT SERVICE ADDRESS
1133 002510 042737 000340 177776 BIS #DONE,@DMBCSR ;SET UP INTERRUPT PRIORITY
1134 002516 000240 NOP #340,PS ;SET DONE
1135 002520 000402 BR INT1B ;ALLOW INTERRUPTS
1136 002522 022626 INT1A: POP2SP ;DELAY FOR INTERRUPT
1137 002524 104012 INT1B: ERROR ;NO INTERRUPT, CONTINUE
1138 002526 104002 INT1B: SCOPE ;RESTORE STACK, INTERRUPT
1139 ;OCCURED, ERROR
1140 ;CHECK FOR LOOP, ITERATIONS
1141
1142 ;VERIFY THAT NO INTERRUPT OCCURS WITH 'INTERRUPT ENABLE'
1143 ;SET AND 'DONE' CLEARED.
1144
1145 002530
1146 002530 052737 000340 177776 T7:
1147 002536 005077 013212 INT2: BIS #340,PS ;REFERENCE DESIGNATION
1148 002542 012777 002576 013200 CLR @DMBCSR ;LOCK OUT INTERRUPTS
1149 002550 013777 177776 013174 MOV #INT2A,@DMBVEC ;CLEAR CONTROL REGISTER
1150 002556 052777 000100 013170 MOV PS,@MIBLVL ;SET UP INTERRUPT SERVICE ADDRESS
1151 002572 000240 BIS #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE LEVEL
1152 002574 000402 BIC #340,PS ;SET INTERRUPT ENABLE
;ALLOW INTERRUPTS
;DELAY FOR INTERRUPTS
;NO INTERRUPT, CONTINUE

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1152 002576 022626          INT2A: POP2SP          ;RESTORE STACK
1153 002600 104012          ERROR                ;INTERRUPT OCCURED, ERROR
1154 002602 104002          INT2B: SCOPE          ;CHECK FOR ITERATIONS, LOOP
1155
1156                          ;VERIFY THAT SETTING 'DONE' CAUSES AN INTERRUPT
1157                          ;WITH 'INTERRUPT ENABLE' SET
1158
1159 002604          T10:          ;REFERENCE DESIGNATION
1160 002604 052737 000340 177776 INT3:  BIS      #340,PS      ;LOCK OUT INTERRUPTS
1161 002612 005077 013136          CLR      @DMBCSR      ;CLEAR CONTROL REGISTER
1162 002616 012777 002670 013124          MOV      #INT3A,@DMBVEC ;SET UP INTERRUPT SERVICE ADDRESS
1163 002624 012777 000100 013122          MOV      #INTENA,@DMBCSR ;SET 'INTERRUPT ENABLE'
1164 002632 013777 177776 013112          MOV      PS,@DMLVL     ;SET 'INTERRUPT LEVEL'
1165 002640 042737 000340 177776          BIC      #340,PS      ;ALLOW INTERRUPTS
1166 002646 052777 000200 013100          BIS      #DONE,@DMBCSR ;SET 'DONE'
1167 002654 000240          NOP                ;DELAY FOR INTERRUPT
1168 002656 000240          NOP
1169 002660 005077 013070          CLR      @DMBCSR
1170 002664 104012          ERROR                ;INTERRUPT OCCURED, ERROR
1171 002666 000401          BR       INT3B        ;CONTINUE
1172 002670 022626          INT3A: POP2SP        ;INTERRUPT OCCURED, RESTOR STACK
1173 002672 104002          INT3B: SCOPE         ;CHECK FOR ITERATION, LOOP
1174
1175
1176                          ;VERIFY THAT NO INTERRUPT OCCURS WITH
1177                          ;'INTERRUPT ENABLE' SET AND 'DONE' SET AT PRIORITY 7.
1178 002674          T11:          ;REFERENCE DESIGNATION
1179 002674 005077 013054          INT4:  CLR      @DMBCSR ;CLEAR CONTROL REGISTER
1180 002700 042737 000340 177776          BIC      #340,PS      ;SET PROCESSOR PRIORITY
1181 002706 052737 000340 177776          BIS      #340,PS      ;TO LEVEL 7.
1182 002714 012777 002756 013026          MOV      #INT4A,@DMBVEC ;SET UP INTERRUPT SERVICE ADDRESS
1183 002722 013777 177776 013022          MOV      PS,@DMLVL     ;SET UP INTERRUPT SERVICE LEVEL
1184 002730 012777 000100 013016          MOV      #INTENA,@DMBCSR ;SET INTERRUPT ENABLE
1185 002736 052777 000200 013010          BIS      #DONE,@DMBCSR ;GENERATE INTERRUPT
1186 002744 000240          NOP                ;DELAY FOR INTERRUPT
1187 002746 000240          NOP
1188 002750 005077 013000          CLR      @DMBCSR
1189 002754 000402          BR       INT4B        ;NO INTERRUPT, CONTINUE
1190 002756 022626          INT4A: POP2SP        ;RESTORE STACK
1191 002760 104012          ERROR                ;INTERRUPT OCCURED, ERROR
1192 002762 104002          INT4B: SCOPE         ;CHECK FOR ITERATION, LOOP
  
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1196 002764
1197 002764 005077 012764
1198 002770 042737 000340 177776
1199 002776 052737 000300 177776
1200 003004 012777 003046 012736
1201 003012 013777 177776 012732
1202 003020 012777 000100 012726
1203 003026 052777 000200 012720
1204 003034 000240
1205 003036 000240
1206 003040 005077 012710
1207 003044 000402
1208 003046 022626
1209 003050 104012
1210 003052 104002
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1214 003054
1215 003054 005077 012674
1216 003060 042737 000340 177776
1217 003066 052737 000240 177776
1218 003074 012777 003136 012646
1219 003102 013777 177776 012642
1220 003110 012777 000100 012636
1221 003116 052777 000200 012630
1222 003124 000240
1223 003126 000240
1224 003130 005077 012620
1225 003134 000402
1226 003136 022626
1227 003140 104012
1228 003142 104002
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1232 003144
1233 003144 005077 012604
1234 003150 042737 000340 177776
1235 003156 052737 000200 177776
1236 003164 012777 003226 012556
1237 003172 013777 177776 012552
1238 003200 012777 000100 012546
1239 003206 052777 000200 012540
1240 003214 000240
1241 003216 000240
1242 003220 005077 012530
1243 003224 000402
1244 003226 022626
1245 003230 104012
1246 003232 104002

;VERIFY THAT NO INTERRUPT OCCURS WITH
; "INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 6.
T12:
INT5: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #300,PS ;SET PROCESSOR PRIORITY
      MOV #INT5A,@DMBVEC ;TO LEVEL 6.
      MOV PS,@DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      MOV #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      CLR @DMBCSR
      BR INT5B ;NO INTERRUPT, CONTINUE
INT5A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT5B: SCOPE ;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
; "INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 5.
T13:
INT6: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #240,PS ;SET PROCESSOR PRIORITY
      MOV #INT6A,@DMBVEC ;TO LEVEL 5.
      MOV PS,@DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      MOV #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      CLR @DMBCSR
      BR INT6B ;NO INTERRUPT, CONTINUE
INT6A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT6B: SCOPE ;CHECK FOR ITERATION, LOOP

;VERIFY THAT NO INTERRUPT OCCURS WITH
; "INTERRUPT ENABLE" SET AND "DONE" SET AT PRIORITY 4.
T14:
INT7: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      BIS #200,PS ;SET PROCESSOR PRIORITY
      MOV #INT7A,@DMBVEC ;TO LEVEL 4.
      MOV PS,@DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      MOV #INTENA,@DMBCSR ;SET UP INTERRUPT SERVICE LEVEL
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;DELAY FOR INTERRUPT
      CLR @DMBCSR
      BR INT7B ;NO INTERRUPT, CONTINUE
INT7A: POP2SP ;RESTORE STACK
      ERROR ;INTERRUPT OCCURED, ERROR
INT7B: SCOPE ;CHECK FOR ITERATION, LOOP

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1251 003234
1252 003234 005077 012514
1253 003240 042737 000340 177776
1254 003246 012777 003316 012474
1255 003254 005077 012472
1256 003260 052737 000000 177776
1257 003266 012777 000100 012460
1258 003274 052777 000200 012452
1259 003302 000240
1260 003304 000240
1261 003306 005077 012442
1262 003312 104012
1263 003314 000401
1264 003316 022626
1265 003320 104002
1266
1267
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1269 003322
1270 003322 005077 012426
1271 003326 042737 000340 177776
1272 003334 012777 003404 012406
1273 003342 005077 012404
1274 003346 052737 000040 177776
1275 003354 012777 000100 012372
1276 003362 052777 000200 012364
1277 003370 000240
1278 003372 000240
1279 003374 005077 012354
1280 003400 104012
1281 003402 000401
1282 003404 022626
1283 003406 104002
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1287 003410
1288 003410 005077 012340
1289 003414 042737 000340 177776
1290 003422 012777 003472 012320
1291 003430 005077 012316
1292 003434 052737 000100 177776
1293 003442 012777 000100 012304
1294 003450 052777 000200 012276
1295 003456 000240
1296 003460 000240
1297 003462 005077 012266
1298 003466 104012
1299 003470 000401
1300 003472 022626
1301 003474 104002

;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
;ENABLE" SET AND "DONE" SET AT PRIORITY 0.
T15:
INT10: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #INT10A,@DMBVEC ;ALLOW INTERRUPTS
      CLR @DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      BIS #0,PS ;SET UP INTERRUPT SERVICE PRIORITY
      MOV #INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 0.
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;WAIT FOR INTERRUPT
      CLR @DMBCSR
      ERROR ;NO INTERRUPT, ERROR
      BR INT10B ;CONTINUE
INT10A: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
INT10B: SCOPE ;CHECK FOR INTERATIONS, LOOP.

;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
;ENABLE" SET AND "DONE" SET AT PRIORITY 1.
T16:
INT11: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #INT11A,@DMBVEC ;ALLOW INTERRUPTS
      CLR @DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      BIS #40,PS ;SET UP INTERRUPT SERVICE PRIORITY
      MOV #INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 1.
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;WAIT FOR INTERRUPT
      CLR @DMBCSR
      ERROR ;NO INTERRUPT, ERROR
      BR INT11B ;CONTINUE
INT11A: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
INT11B: SCOPE ;CHECK FOR INTERATIONS, LOOP.

;VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
;ENABLE" SET AND "DONE" SET AT PRIORITY 2.
T17:
INT12: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #INT12A,@DMBVEC ;ALLOW INTERRUPTS
      CLR @DMBLVL ;SET UP INTERRUPT SERVICE ADDRESS
      BIS #100,PS ;SET UP INTERRUPT SERVICE PRIORITY
      MOV #INTENA,@DMBCSR ;SET PROCESSOR PRIORITY TO LEVEL 2.
      BIS #DONE,@DMBCSR ;SET INTERRUPT ENABLE
      NOP ;GENERATE INTERRUPT
      NOP ;WAIT FOR INTERRUPT
      CLR @DMBCSR
      ERROR ;NO INTERRUPT, ERROR
      BR INT12B ;CONTINUE
INT12A: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
INT12B: SCOPE ;CHECK FOR INTERATIONS, LOOP.

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1302
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1304      :VERIFY THAT AN INTERRUPT OCCURS WITH "INTERRUPT
          :ENABLE" SET AND "DONE" SET AT PRIORITY 3.
1305 003476      T20:
1306 003476 005077 012252      INT13: CLR @DMBCSR      :REFERENCE DESIGNATION
1307 003502 042737 000340 177776      BIC #340,PS      :CLEAR CONTROL REGISTER
1308 003510 012777 003560 012232      MOV #INT13A,@DMBVEC :ALLOW INTERRUPTS
1309 003516 005077 012230      CLR @DMBLVL      :SET UP INTERRUPT SERVICE ADDRESS
1310 003522 052737 000140 177776      BIS #140,PS      :SET UP INTERRUPT SERVICE PRIORITY
1311 003530 012777 000100 012216      MOV #INTENA,@DMBCSR :SET PROCESSOR PRIORITY TO LEVEL 3.
1312 003536 052777 000200 012210      BIS #DONE,@DMBCSR  :SET INTERRUPT ENABLE
1313 003544 000240      NOP      :GENERATE INTERRUPT
1314 003546 000240      NOP      :WAIT FOR INTERRUPT
1315 003550 005077 012200      CLR @DMBCSR
1316 003554 104012      ERROR      :NO INTERRUPT, ERROR
1317 003556 000401      BR INT13B      :CONTINUE
1318 003560 022626      INT13A: POP2SP      :INTERRUPT OCCURED, RESTORE STACK
1319 003562 104002      INT13B: SCOPE      :CHECK FOR INTERATIONS, LOOP.
1320
1321      :VERIFY THAT ALL LINE NUMBERS CAN BE WRITTEN INTO AND
1322      :READ BACK FROM LINE COUNTER
1323
1324 003564      T21:
1325 003564 005077 012164      LINT1: CLR @DMBCSR      :REFERENCE DESIGNATION
1326 003570 042737 000340 177776      BIC #340,PS      :CLEAR CONTROL STATUS REGISTER
1327 003576 005005      CLR R5      :ENABLE INTERRUPTS
1328 003600 012700 000010      MOV #8,R0      :CLEAR EXPECTED LINE NUMBER
1329 003604 010577 012144      LINT1A: MOV R5,@DMBCSR :SET UP TO TEST 8 LINE NUMBERS
1330 003610 017704 012140      MOV @DMBCSR,R4 :SET LINE NUMBER
1331 003614 020504      CMP R5,R4      :READ BACK LINE NUMBER
1332 003616 001401      BEQ LINT1B      :ARE EXPECTED AND RECEIVED
1333 003620 104000      ERRORC      :LINE NUMBERS THE SAME
1334 003622 104003      LINT1B: SCOPEF      :LINE NUMBERS DIFFERENT, ERROR
1335 003624 003604      LINT1A      :CHECK FOR DATA FREEZE
1336 003626 005205      INC R5      :RETURN FOR DATA FREEZE
1337 003630 005300      DEC R0      :UPDATE LINE COUNT
1338 003632 001364      BNE LINT1A      :UPDATE LINE NUMBER
1339 003634 104002      SCOPE      :CONTINUE
1340      :CHECK FOR ITERATION, LOOP
1341
1342      :USING "STEP" MODE, VERIFY THAT THE
1343      :LINE COUNTER CAN BE STEPPED THRU ALL STATES.
1344 003636      T22:
1345 003636 042737 000340 177776      LINT2: BIC #340,PS      :REFERENCE DESIGNATION
1346 003644 005077 012104      CLR @DMBCSR      :ENABLE INTERRUPTS
1347 003650 005005      CLR R5      :CLEAR CONTROL STATUS REGISTER
1348 003652 012700 000010      MOV #8,R0      :CLEAR EXPECTED LINE COUNT
1349 003656 012777 000007 012070      MOV #7,@DMBCSR :SET UP TO TEST 8 VALUES
1350 003664 052777 000400 012062      LINT2A: BIS #STEP,@DMBCSR :FIRST VALUE =0
1351 003672 017704 012056      MOV @DMBCSR,R4 :STEP LINE COUNTER
1352 003676 020504      CMP R5,R4      :READ LINE COUNTER
1353 003700 001401      BEQ LINT2B      :COMPARE EXPECTED AND
1354 003702 104000      ERRORC      :RECEIVED LINE NUMBERS
1355 003704 104003      LINT2B: SCOPEF      :LINE COUNTER ERROR
1356 003706 003636      LINT2      :CHECK FOR DATA FREEZE
1357 003710 005205      INC R5      :UPDATE EXPECTED LINE NUMBER

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1414 004134 012702 000007          MOV      #7,R2          ;FIRST ADDRESS TO BE TESTED=0
1415 004140 012777 004000 011606 MEMT2A: MOV      #CLRSCN,@DMBCSR ;CLEAR ACANNER MEMORY
1416 004146 032777 000020 011600      BIT      #BUSY,@DMBCSR ;WAIT FOR CLEAR CYCLE
1417 004154 001374          BNE      -6
1418 004156 012777 001000 011570      MOV      #MAINT,@DMBCSR ;SET 'MAINTENANCE MODE'
1419 004164 050277 011564          BIS      R2,@DMBCSR ;SET LINE COUNTER TO TEST ADDRESS-1
1420 004170 052777 000400 011556      BIS      #STEP,@DMBCSR ;WRITE 1'S INTO TEST ADDRESS
1421 004176 042777 001000 011550      BIC      #MAINT,@DMBCSR ;CLEAR 'MAINTENANCE MODE'
1422 004204 012703 000010          MOV      #8.,R3 ;SET UP TO TEST ALL 8
1423 004210 012777 000007 011536      MOV      #7,@DMBCSR ;SCANNER MEMORY LOCATIONS
1424 004216 005202          INC      R2
1425 004220 005001          CLR      R1
1426 004222 052777 000400 011524 MEMT2B: BIS      #STEP,@DMBCSR ;ACCESS SCANNER MEMORY
1427 004230 117704 011520      MOVB     @DMBCSR,R4 ;READ CONPENTS OF MEMORY
1428 004234 010105          MOV      R1,R5 ;SET UP EXPECTED CONTENTS
1429 004236 120402          CMPB     R4,R2 ;OF SCANNER MEMORY
1430 004240 001002          BNE      MEMT2C
1431 004242 052705 070000      BIS      #70000,R5
1432 004246 020405          MEMT2C: CMP      R4,R5 ;COMPARE EXPECTED AND RECEIVED
1433 004250 001403          BEQ      MEMT2D ;VALUES
1434 004252 104000          ERRORC ;SCANNER MEMORY ERROR
1435 004254 104003          SCOPEF ;CHECK FOR DATA FREEZE
1436 004256 004140          MEMT2A
1437 004260 005201          MEMT2D: INC      R1
1438 004262 005303          DEC      R3 ;TEST NEXT SCANNEB LOCATION
1439 004264 001356          BNE      MEMT2B
1440 004266 005300          DEC      R0 ;UPDATE LINE COUNT
1441 004270 001323          BNE      MEMT2A
1442 004272 104002          SCOPE ;CHECK FOR ITERATION, LOOP
1443
1444 ;WITH ALL ACANNER MEMORY LOCATIONS SET TO 1'S,
1445 ;WRITE 0'S INTO SELECTED LOCATION
1446 ;VERIFY THAT ONLY SELECTED LOCATION WAS CLEARED.
1447
1448 004274          T25:
1449 004274 005077 011454          MEMT3: CLR      @DMBCSR ;REFERENCE DESIGNATION
1450 004300 042737 000340 177776      BIC      #340,PS ;CLEAR CONTROL STATUS REGISTER
1451 004306 012700 000010          MOV      #8.,R0 ;ENABLE INTERRUPTS
1452 004312 012702 000007          MOV      #7,R2 ;SET UP TO TEST 8 ADDRESSES
1453 004316 012703 000010          MEMT3A: MOV      #8.,R3 ;FIRST ADDRESS TO BE TESTED=0
1454 004322 012777 001007 011424      MOV      #MAINT+7,@DMBCSR ;WRITE 1'S INTO ALL SCANNER
1455 004330 052777 000400 011416 MEMT3B: BIS      #STEP,@DMBCSR ;MEMORY LOCATIONS
1456 004336 005303          DEC      R3
1457 004340 001373          BNE      MEMT3B
1458 004342 010277 011406          MOV      R2,@DMBCSR ;SET LINE COUNTER TO TEST ADDRESS-1
1459 004346 052777 000400 011400      BIS      #STEP,@DMBCSR ;WRITE 0'S INTO TEST ADDRESS
1460 004354 012703 000010          MOV      #8.,R3 ;SET UP TO TEST ALL 8
1461 004360 012777 000007 011366      MOV      #7,@DMBCSR ;SCANNER MEMORY LOCATIONS
1462 004366 005202          INC      R2
1463 004370 005001          CLR      R1
1464 004372 052777 000400 011354 MEMT3C: BIS      #STEP,@DMBCSR ;ACESS SCANNER MEMORY
1465 004400 117704 011350      MOVB     @DMBCSR,R4 ;READ CONTENTS OF MEMORY
1466 004404 010105          MOV      R1,R5 ;SET UP EXPECTED CONTENTS
1467 004406 120402          CMPB     R4,R2 ;OF SCANNER MEIORY
1468 004410 001002          BNE      MEMT3D
1469 004412 052705 070000      BIS      #70000,R5

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1470	004416	020405			MEMT3D:	CMP	R4,R5		;COMPARE EXPECTED AND
1471	004420	001403				BEQ	MEMT3E		;RECEIVED VALUES
1472	004422	104000				ERRORC			;SCANNER MEMORY ERROR
1473	004424	104003				SCOPEF			;CHECK FOR DATA FREEZE
1474	004426	004316				MEMT3A			
1475	004430	005201			MEMT3E:	INC	R1		
1476	004432	005303				DEC	R3		;TEST NEXT SCANNER LOCATION
1477	004434	001356				BNE	MEMT3C		
1478	004436	005300				DEC	R0		;UPDATE ADDRESS COUNT
1479	004440	001326				BNE	MEMT3A		
1480	004442	104002				SCOPE			;CHECK FOR ITERATION, LOOP
1481						;VERIFY			;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
1482						;BE SET			;BE SET AND CLEARED FOR SELECTED LINE
1483									
1484	004444				T26:				;REFERENCE DESIGNATION
1485	004444	005077	011304		MUX1:	CLR	@DMBCSR		;CLEAR CONTROL STATUS REGISTER
1486	004450	042737	000340	177776		BIC	#340,PS		;ENABLE INTERRUPTS
1487	004456	012700	000010			MOV	#8.,R0		;SET UP TO TEST 8 FUNCTION FLIP-FLOP
1488	004462	005001				CLR	R1		;START AT LINE 0
1489	004464	012777	002000	011262	MUX1A:	MOV	#CLRMUX,@DMBCSR		
1490	004472	012702	000010			MOV	#8.,R2		
1491	004476	010177	011252			MOV	R1,@DMBCSR		;SELECT LINE TO BE TESTED
1492	004502	012777	000001	011246		MOV	#LINENA,@DMBLSR		;SET LINE ENABLE FUNCTION FLIP-FLOP
1493	004510	005077	011240			CLR	@DMBCSR		
1494	004514	005005			MUX1B:	CLR	R5		
1495	004516	017704	011234			MOV	@DMBLSR,R4		;READ LINE STATUS REGISTER
1496	004522	117703	011226			MOVB	@DMBCSR,R3		;READ CONTROL STATUS REGISTER
1497	004526	042703	177760			BIC	#177760,R3		;CLEAR UNWANTED BITS
1498	004532	020103				CMP	R1,R3		;IF LINE NUMBER=SELECTED LINE NUMBER,
1499	004534	001002				BNE	MUX1C		;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
1500	004536	012705	000001			MOV	#LINENA,R5		
1501									;TO BE SET
1502	004542	020504			MUX1C:	CMP	R5,R4		;COMPARE EXPECTED AND RECEIVED
1503	004544	001403				BEQ	MUX1D		;RESULTS
1504	004546	104001				ERRORL			;LINE STATUS ERROR
1505	004550	104003				SCOPEF			
1506	004552	004554				MUX1D			
1507	004554	052777	000400	011172	MUX1D:	BIS	#STEP,@DMBCSR		;EXAMINE NEXT LINE
1508	004562	005302				DEC	R2		
1509	004564	001353				BNE	MUX1B		
1510	004566	005005				CLR	R5		
1511	004570	010177	011160		MUX1E:	MOV	R1,@DMBCSR		
1512	004574	010103				MOV	R1,R3		;SET LINE COUNTER TO SELECTED LINE
1513	004576	005077	011154			CLR	@DMBLSR		;CLEAR LINE ENABLE FLIP FLOP
1514	004602	105227	000000			INCB	#0		;DELAY FOR CABLE
1515	004606	001375				BNE	.-4		;DITTO
1516	004610	017704	011142			MOV	@DMBLSR,R4		;READ LINE STATUS REGISTER
1517	004614	005704				TST	R4		;WAS LINE ENABLE FUNCTION FLIP FLOP
1518	004616	001401				BEQ	MUX1F		;CLEARED
1519	004620	104001				ERRORL			;NO, LINE STATUS ERROR
1520	004622	104003			MUX1F:	SCOPEF			;CHECK FOR LOOP ON SAME DATA
1521	004624	004464				MUX1A			
1522	004626	005201				INC	R1		;SELECT NEXT LINE
1523	004630	005300				DEC	R0		;DECREMENT LINE COUNT
1524	004632	001314				BNE	MUX1A		;CONTINU IF NOT DONE
1525	004634	104002				SCOPE			;CHECK FOR ITERATIONS, LOOP


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1665 005414
1666 005414 005077 010334
1667 005420 042737 000340 177776
1668 005426 012700 000010
1669 005432 005001
1670 005434 012702 000010
1671 005440 010177 010310
1672 005444 012777 000003 010304
1673 005452 005077 010276
1674 005456 005005
1675 005460 017704 010272
1676 005464 117703 010264
1677 005470 042703 177760
1678 005474 020103
1679 005476 001002
1680 005500 012705 000143
1681
1682 005504 020405
1683 005506 001403
1684 005510 104001
1685 005512 104003
1686 005514 005516
1687 005516 052777 000400 010230
1688 005524 005302
1689 005526 001353
1690 005530 012705 000001
1691 005534 010103
1692 005536 010177 010212
1693 005542 042777 000002 010206
1694 005550 105227 000000
1695 005554 001375
1696 005556 017704 010174
1697 005562 020504
1698 005564 001401
1699 005566 104001
1700 005570 104003
1701 005572 005434
1702 005574 005201
1703 005576 005077 010154
1704 005602 005300
1705 005604 001313
1706 005606 104002

T32:
MUX5: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #8.,R0 ;ENABLE INTERRUPTS
      CLR R1 ;SET UP TO TEST 8 LINES
      MUX5A: MOV #8.,R2 ;8 LINES ;START AT LINE 0
      MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+TRMRDY,@DMBLSR ;SET LINE ENABLE +TRMRDY
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
      MUX5B: CLR R5 ;CLEAR EXPECTED RESULT
      MOV @DMBLSR,R4 ;READ LINE STATUS
      MOV @DMBCSR,R3 ;READ LINE NUMBER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMO R1,R3 ;IF RECEIVED LINE=SELECTED LINE
      BNE MUX5C ;EXPECT LINE ENABLE AND
      MOV #LINENA+TRMRDY+CO+CS,R5 ;CLEAR TO SEND AND CARRIER ARE SET

MUX5C: CMP R4,R5 ;COMPARE EXPECTED AND
      BEQ MUX5D ;RECEIVED RESULTS
      ERRORL SCOPEF ;LINE STATUS ERROR
      MUX5D

MUX5D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX5B ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
      MUX5E: MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #TRMRDY,@DMBLSR ;CLEAR TERMINAL
      INCB #0 ;DELAY FOR CABLE
      BNE .-4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX5F ;SET ON THIS LINE
      ERRORL SCOPEF ;LINE STATUS ERROR
      MUX5F: SCOPEF ;CHECK FOR LOOP ON SAME DATA
      MUX5A
      INC R1 ;UPDATE LINE NUMBER
      CLR @DMBLSR ;CLEAR LINE STATUS REGISTER
      DEC R0 ;CONTINUE IF ALL LINES NOT
      BNE MUX5A ;TESTED
      SCOPE ;CHECK FOR ITERATIONS, LOOP

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1707
1708
1709
1710
1711 005610
1712 005610 005077 010140
1713 005614 042737 000340 177776
1714 005622 012700 000010
1715 005626 005001
1716 005630 012702 000010
1717 005634 010177 010114
1718 005640 012777 000005 010110
1719 005646 005077 010102
1720 005652 005005
1721 005654 017704 010076
1722 005660 117703 010070
1723 005664 042703 177760
1724 005670 020103
1725 005672 001002
1726 005674 012705 000205
1727
1728 005700 020405
1729 005702 001403
1730 005704 104001
1731 005706 104003
1732 005710 005712
1733 005712 052777 000400 010034
1734 005720 005302
1735 005722 001353
1736 005724 012705 000001
1737 005730 010103
1738 005732 010177 010016
1739 005736 042777 000004 010012
1740 005744 105227 000000
1741 005750 001375
1742 005752 017704 010000
1743 005756 020504
1744 005760 001401
1745 005762 104001
1746 005764 104003
1747 005766 005630
1748 005770 005201
1749 005772 005077 007760
1750 005776 005300
1751 006000 001313
1752 006002 104002

T33:
MUX6: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #8.,R0 ;ENABLE INTERRUPTS
      CLR R1 ;SET UP TO TEST 8 LINES
      MUX6A: MOV #8.,R2 ;8 LINES ;START AT LINE 0
      MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+RS,@DMBLSR ;SET LINE ENABLE +RS
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
      MUX6B: CLR R5 ;CLEAR EXPECTED RESULT
      MOV @DMBLSR,R4 ;READ LINE STATUS
      MOV @DMBCSR,R3 ;READ LINE NUMBER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
      BNE MUX6C ;EXPECT LINE ENABLE AND
      MOV #LINENA+RS+RING,R5 ;RING IS SET

MUX6C: CMP R4,R5 ;COMPARE EXPECTED AND
      BEQ MUX6D ;RECEIVED RESULTS
      ERRORL ;LINE STATUS ERROR
      SCOPEF
      MUX6D

MUX6D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX6B ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
      MUX6E: MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #RS,@DMBLSR ;CLEAR REQUEST TO SEND
      INCB #0 ;DELAY FOR CABLE
      BNE .-4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX6F ;SET ON THIS LINE
      ERRORL ;LINE STATUS ERROR
      SCOPEF ;CHECK FOR LOOP ON SAME DATA
      MUX6A
      MUX6F: INC R1 ;UPDATE LINE NUMBER
      CLR @DMBLSR ;CLEAR LINE STATUS REGISTER
      DEC R0 ;CONTINUE IF ALL LINES NOT
      BNE MUX6A ;TESTED
      SCOPE ;CHECK FOR ITERATIONS, LOOP

```

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1753
1754
1755
1756
1757 006004
1758 006004 005077 007744
1759 006010 042737 000340 177776
1760 006016 012700 000010
1761 006022 005001
1762 006024 012702 000010
1763 006030 010177 007720
1764 006034 012777 000011 007714
1765 006042 005077 007706
1766 006046 005005
1767 006050 017704 007702
1768 006054 117703 007674
1769 006060 042703 177760
1770 006064 020103
1771 006066 001002
1772 006070 012705 000031
1773
1774 006074 020405
1775 006076 001403
1776 006100 104001
1777 006102 104003
1778 006104 006106
1779 006106 052777 000400 007640
1780 006114 005302
1781 006116 001353
1782 006120 012705 000001
1783 006124 010103
1784 006126 010177 007622
1785 006132 042777 000010 007616
1786 006140 105227 000000
1787 006144 001375
1788 006146 017704 007604
1789 006152 020504
1790 006154 001401
1791 006156 104001
1792 006160 104003
1793 006162 006024
1794 006164 005201
1795 006166 005077 007564
1796 006172 005300
1797 006174 001313
1798 006176 104002

```

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

```

T34:
MUX7: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #8.,R0 ;ENABLE INTERRUPTS
      CLR R1 ;SET UP TO TEST 8 LINES
      MOV #8.,R2 ;8 LINES ;START AT LINE 0
MUX7A: MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+SECTX,@DMBLSR ;SET LINE ENABLE +SECTX
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
MUX7B: CLR R5 ;CLEAR EXPECTED RESULT
      MOV @DMBLSR,R4 ;READ LINE STATUS
      MOVB @DMBCSR,R3 ;READ LINE NUMBER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
      BNE MUX7C ;EXPECT LINE ENABLE AND
      MOV #LINENA+SECTX+SECRX,R5
MUX7C: CMP R4,R5 ;SECONDARY RECEIVE IS SET
      BEQ MUX7D ;COMPARE EXPECTED AND
      ERRORL SCOPEF ;RECEIVED RESULTS
      MUX7D ;LINE STATUS ERROR
MUX7D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX7B ;ARE NOT DONE FOR THIS LINE
MUX7E: MOV #LINENA,R5 ;EXPECT LINE ENABLE
      MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #SECTX,@DMBLSR ;CLEAR SECONDARY TRANSMIT
      INCB #0 ;DELAY FOR CABLE
      BNE -4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX7F ;SET ON THIS LINE
      ERRORL SCOPEF ;LINE STATUS ERROR
      MUX7A ;CHECK FOR LOOP ON SAME DATA
      INC R1 ;UPDATE LINE NUMBER
      CLR @DMBLSR ;CLEAR LINE STATUS REGISTER
      DEC R0 ;CONTINUE IF ALL LINES NOT
      BNE MUX7A ;TESTED
      SCOPE ;CHECK FOR ITERATIONS, LOOP

```



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1799
1800
1801
1802
1803 006200
1804 006200 005077 007550
1805 006204 042737 000340 177776
1806 006212 012700 000010
1807 006216 012777 000017 007532
1808 006224 052777 000400 007522
1809 006232 005300
1810 006234 001370
1811 006236 005003
1812 006240 012700 000010
1813 006244 012777 002000 007502
1814 006252 010377 007476
1815 006256 017704 007474
1816 006262 005005
1817 006264 005704
1818 006266 001403
1819 006270 104001
1820 006272 104003
1821 006274 006244
1822 006276 005205
1823 006300 052777 000001 007450
1824 006306 017704 007444
1825 006312 020504
1826 006314 001403
1827 006316 104001
1828 006320 104003
1829 006322 006244
1830 006324 005203
1831 006326 005077 007424
1832 006332 005300
1833 006334 001346
1834 006336 104002
1835
1836
1837
1838
1839
1840
1841 006340
1842 006340 012777 002000 007406
1843 006346 005077 007402
1844 006352 042737 000340 177776
1845 006360 012700 000010
1846 006364 012777 001007 007362
1847 006372 052777 000400 007354
1848 006400 012777 000001 007350
1849 006406 005300
1850 006410 001370
1851 006412 012705 070340
1852 006416 012777 006516 007324
1853 006424 013777 177776 007320
1854 006432 012700 000010

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

T35:
MUX8: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #8.,R0 ;ENABLE INTERRUPTS
      MOV #17,@DMBLSR ;SET UP TO TEST 8 LINES
MUX8A: BIS #STEP,@DMBCSR ;WRITE 1S INTO ALL MULTIPLEXER
      DEC R0 ;FUNCTION FLIPFLOPS
      BNE MUX8A
      CLR R3 ;SET UP FOR 8 LINES
MUX8B: MOV #8.,R0
MUX8C: MOV #CLRMUX,@DMBCSR ;CLEAR MULTIPLEXER
      MOV R3,@DMBCSR ;SELECT LINE
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CLR R5 ;EXPECT OS
      TST R4 ;WAS LINE STATUS REGISTER CLEARED
      BEQ MUX8D
      ERRORL ;LINE STATUS ERROR
      SCOPEF ;CHECK FOR LOOP ON SAME DATA
      MUX8B
MUX8D: INC R5 ;EXPECT LINE ENABLE
      BIS #LINENA,@DMBLSR ;SET LINE ENABLE ON SELECTED LINE
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;IS ANYTHING BUT LINE ENABLE SET
      BEQ MUX8E
      ERRORL ;LINE STATUS ERROR
      SCOPEF ;CHECK FOR LOOP ON SAME DATA
      MUX8B
MUX8E: INC R3 ;UPDATE LINE NUMBER
      CLR @DMBLSR ;CLEAR CURRENT LINE
      DEC R0 ;CONTINUE IF ALL LINES NOT
      BNE MUX8C ;TESTED
      SCOPE ;CHECK FOR ITERATIONS, LOOP

;WRITE 1'S INTO ALL SCANNER MEMORY LOCATIONS
;SET "LINE ENABLE" FOR ALL LINES
;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE

T36:
SCNT1: MOV #CLRMUX,@DMBCSR ;REFERENCE DESIGNATION
      CLR @DMBCSR ;CLEAR ALL MULTIPLEXER FLIPFLOPS
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV #8.,R0 ;ENABLE INTERRUPTS
      MOV #MAINT+7,@DMBCSR ;SET UP TO WRITE 1'S INTO
      BIS #STEP,@DMBCSR ;ALL SCANNER MEMORY LOCATION
      MOV #LINENA,@DMBLSR ;WRITE A LOCATION
      DEC R0 ;LET "LINE ENABLE"
      BNE SCNT1A
      MOV #70340,R5 ;EXPECT "DONE"+"SCNENA"+"COF"+"CSF"+"SECRXF"
      MOV #SCNT1C,@DMBVEC ;SET UP LOCAL INTERRUPT SERVICE
      MOV PS,@DMBLVL ;SERVICE AT LEVEL 7
      MOV #8.,R0

```

```

1855 006436 012777 000107 007310      MOV      #INTENA+7,@DMBCSR      ;SET INTERRUPT ENABLE
1856 006444 052737 000340 177776      SCNT1B: BIS      #340,PS          ;LOCK OUT INTERRUPTS
1857 006452 052777 000040 007274      BIS      #SCNENA,@DMBCSR      ;START SCANNER
1858 006460 042737 000340 177776      BIC      #340,PS          ;ENABLE INTERRUPTS
1859 006466 105777 007262      TSTB    @DMBCSR            ;WAIT FOR DONE
1860 006472 100375      BPL      .-4              ;PROGRAM WILL HANG HERE
1861                                     ;IF DONE NEVER SETS
1862 006474 052737 000340 177776      BIS      #340,PS          ;INTERRUPT DID NOT OCCUR
1863 006502 017704 007246      MOV      @DMBCSR,R4        ;ERROR
1864 006506 104000      ERRORC                      ;CONTROL STATUS ERROR
1865 006510 104003      SCOPEF                      ;CHECK FOR LOOP ON SAME DATA
1866 006512 006340      SCNT1
1867 006514 000410      BR      SCNT1D
1868 006516 022626      SCNT1C: POP2SP            ;INTERRUPT OCCURED, REPOSITION STACK
1869 006520 017704 007230      MOV      @DMBCSR,R4        ;READ CONTROL STATUS
1870 006524 020504      CMP      R5,R4            ;ARE EXPECTED AND RECEIVED
1871 006526 001403      BEQ      SCNT1D           ;REGISTERS THE SAME
1872 006530 104000      ERRORC                      ;NO, LINE STATUS ERROR
1873 006532 104003      SCOPEF                      ;CHECK FOR LOOP WITH CURRENT DATA
1874 006534 006340      SCNT1
1875 006536 042777 000240 007210      SCNT1D: BIC      #SCNENA+DONE,@DMBCSR ;CLEAR SCAN ENABLE AND DONE
1876 006544 005205      INC      R5              ;UPDATE EXPECTED RESULT
1877 006546 005300      DEC      R0              ;CONTINUE IF NOT DONE
1878 006550 001335      BNE      SCNT1B
1879 006552 104002      SCOPE                      ;CHECK FOR ITERATIONS, LOOP
1880
1881                                     ;WRITE 1'S INTO ALL MULTIPLEXER FUNCTION FLIP-FLOPS
1882                                     ;CLEAR SCANNER MEMORY
1883                                     ;VERIFY THAT AN INTERRUPT OCCURS FOR EACH LINE
1884
1885 006554      T37:
1886 006554 012700 000010      SCNT2: MOV      #8,R0      ;REFERENCE DESIGNATION
1887 006560 012777 002000 007166      MOV      #CLRMUX,@DMBCSR    ;WRITE 1S INTO ALL
1888 006566 005077 007162      CLR      @DMBCSR          ;CLEAR MULTIPLEXER
1889 006572 042737 000340 177776      BIC      #340,PS          ;MULTIPLEXER FUNCTION
1890 006600 012777 000017 007150      SCNT2A: MOV      #17,@DMBLSR ;ENABLE TELETYPE INTERRUPTS
1891 006606 052777 000400 007140      BIS      #STEP,@DMBCSR     ;FLIPFLOPS
1892 006614 005300      DEC      R0
1893 006616 001370      BNE      SCNT2A
1894 006620 012777 004000 007126      MOV      #CLRSCN,@DMBCSR   ;CLEAR SCANNER MEMORY
1895 006626 032777 000020 007120      BIT      #BUSY,@DMBCSR    ;WAIT FOR CLEAR CYCLE TO COMPLETE
1896 006634 001374      BNE      .-6
1897 006636 012700 000010      MOV      #8,R0            ;SET UP TO TEST 8 LINES
1898 006642 012705 170340      MOV      #170340,R5       ;FIRST EXPECTED RESULT
1899 006646 012777 006742 007074      MOV      #SCNT2C,@DMBVEC   ;SET UP LOCAL INTERRUPT RETURN
1900 006654 013777 177776 007070      MOV      PS,@DMBLVL
1901 006662 012777 000107 007064      MOV      #INTENA+7,@DMBCSR ;SET INTERRUPT ENABLE
1902 006670 052737 000340 177776      SCNT2B: BIS      #340,PS          ;LOCK OUT INTERRUPTS
1903 006676 052777 000040 007050      BIS      #SCNENA,@DMBCSR   ;START SCANNER
1904 006704 042737 000340 177776      BIC      #340,PS          ;ENABLE INTERRUPTS
1905 006712 105777 007036      TSTB    @DMBCSR            ;WAIT FOR DONE
1906 006716 100375      BPL      .-4              ;PROGRAM WILL HANG HERE
1907                                     ;IF DONE NEVER SETS
1908 006720 052737 000340 177776      BIS      #340,PS          ;LOCK OUT INTERRUPTS
1909 006726 017704 007022      MOV      @DMBCSR,R4        ;READ CONTROL STATUS
1910 006732 104000      ERRORC                      ;INTERRUPT DID NOT OCCUR
    
```

```

1911 006734 104003 SCOPEF ;CHECK FOR LOOP ON CURRENT DATA
1912 006736 006554 SCNT2
1913 006740 000410 BR SCNT2D ;CONTINUE
1914 006742 022626 SCNT2C: POP2SP ;INTERRUPT OCCURED, RESTORE STACK
1915 006744 017704 007004 MOV @DMBCSR,R4 ;READ CONTROL STATUS REGISTER
1916 006750 020504 CMP R5,R4 ;COMPARE TO EXPECTED RESULT
1917 006752 001403 BEQ SCNT2D
1918 006754 104000 ERRORC ;CONTROL STATUS ERROR
1919 006756 104003 SCOPEF ;CHECK FOR LOOP ON CURRENT DATA
1920 006760 006554 SCNT2
1921 006762 042777 000240 006764 SCNT2D: BIC #SCNENA+DONE,@DMBCSR ;CLEAR SCAN ENABLE AND DONE
1922 006770 005205 INC R5 ;UPDATE EXPECTED RESULT
1923 006772 005300 DEC R0 ;CONTINUE IF ALL
1924 006774 001335 BNE SCNT2B ;LINES NOT TESTED
1925 006776 104002 SCOPE ;CHECK FOR ITERATIONS, LOOP
1926
1927
1928 ;SINGLE LINE CABLE TEST
1929 ;FOR USE WITH THE H317-M DISTRIBUTION PANEL
1930 ;H3256 TEST CONNECTORS REPLACE MODEM CABLES
1931
1932
1933
1934 007000 T100: ;REFERENCE DESIGNATION
1935 007000 012737 007020 002150 STRLIN: MOV #STRLNA,KRET ;SET UP FOR NEW LINE SELECTION
1936 007006 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
1937 007014 104004 TYPE ;TYPE "SINGLE LINE CABLE TEST"
1938 007016 017517 MLINE
1939 007020 104013 STRLNA: INSTRG ;GET LINE NUMBER
1940 007022 017552 MLINEI
1941 007024 000000 0
1942 007026 000007 7
1943 007030 016042 LINE
1944 007032 104004 TYPE
1945 007034 017514 MCRLF
1946
1947 ;VERIFY THAT LINE ENABLE FUNCTION FLIP-FLOP CAN
1948 ;BE SET AND CLEARED FOR SELECTED LINE
1949
1950 007036 T101: ;REFERENCE DESIGNATION
1951 007036 005077 006712 MUX11: CLR @DMBCSR ;CLEAR CONTROL STATUS REGISTER
1952 007042 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
1953 007050 013701 016042 MOV LINE,R1
1954 007054 012777 002000 006672 MUX11A: MOV #CLRMUX,@DMBCSR
1955 007062 012702 000010 MOV #8.,R2
1956 007066 010177 006662 MOV R1,@DMBCSR ;SELECT LINE TO BE TESTED
1957 007072 012777 000001 006656 MOV #LINENA,@DMBLSR ;SET LINE ENABLE FUNCTION FLIP-FLOP
1958 007100 005077 006650 CLR @DMBCSR
1959 007104 005005 MUX11B: CLR R5
1960 007106 017704 006644 MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
1961 007112 117703 006636 MOV @DMBCSR,R3 ;READ CONTROL STATUS REGISTER
1962 007116 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
1963 007122 020103 CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER,
1964 007124 001002 BNE MUX11C ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
1965 007126 012705 000001 MOV #LINENA,R5
1966 ;TO BE SET

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1967	007132	020504			MUX11C:	CMP	R5,R4		:COMPARE EXPECTED AND RECEIVED
1968	007134	001403				BEQ	MUX11D		:RESULTS
1969	007136	104001				ERRORL			:LINE STATUS ERROR
1970	007140	104003				SCOPEF			
1971	007142	007144				MUX11D			
1972	007144	052777	000400	006602	MUX11D:	BIS	#STEP,@DMBCSR		:EXAMINE NEXT LINE
1973	007152	005302				DEC	R2		
1974	007154	001353				BNE	MUX11B		
1975	007156	005005				CLR	R5		
1976	007160	010177	006570		MUX11E:	MOV	R1,@DMBCSR		
1977	007164	010103				MOV	R1,R3		:SET LINE COUNTER TO SELECTED LINE
1978	007166	005077	006564			CLR	@DMBLSR		:CLEAR LINE ENABLE FLIP FLOP
1979	007172	105227	000000			INCB	#0		:DELAY FOR CABLE
1980	007176	001375				BNE	.-4		:DITTO
1981	007200	017704	006552			MOV	@DMBLSR,R4		:READ LINE STATUS REGISTER
1982	007204	005704				TST	R4		:WAS LINE ENABLE FUNCTION FLIP FLOP
1983	007206	001401				BEQ	MUX11F		:CLEARED
1984	007210	104001				ERRORL			:NO, LINE STATUS ERROR
1985	007212	104002			MUX11F:	SCOPE			:CHECK FOR ITERATIONS, LOOP

```

1986
1987
1988
1989 007214
1990 007214 005077 006534
1991 007220 042737 000340 177776
1992 007226 013701 016042
1993 007232 012777 002000 006514
1994 007240 012702 000010
1995 007244 010177 006504
1996 007250 012777 000002 006500
1997 007256 005077 006472
1998 007262 005005
1999 007264 017704 006466
2000 007270 117703 006460
2001 007274 042703 177760
2002 007300 020103
2003 007302 001002
2004 007304 012705 000002
2005
2006 007310 020504
2007 007312 001403
2008 007314 104001
2009 007316 104003
2010 007320 007322
2011 007322 052777 000400 006424
2012 007330 005302
2013 007332 001353
2014 007334 005005
2015 007336 010177 006412
2016 007342 010103
2017 007344 005077 006406
2018 007350 105227 000000
2019 007354 001375
2020 007356 017704 006374
2021 007362 005704
2022 007364 001401
2023 007366 104001
2024 007370 104002

:VERIFY THAT TERMINAL READY FUNCTION FLIP-FLOP CAN
:BE SET AND CLEARED FOR SELECTED LINE

T102:
MUX12: CLR @DMBCSR ;REFERENCE DESIGNATION
BIC #340,PS ;CLEAR CONTROL STATUS REGISTER
MOV LINE,R1 ;ENABLE INTERRUPTS
MUX12A: MOV #CLRMUX,@DMBCSR
MOV #8,R2
MOV R1,@DMBCSR ;SELECT LINE TO BE TESTED
MOV #TRMRDY,@DMBLSR ;SET TERMINAL READY FUNCTION FLIP-FLOP
CLR @DMBCSR
MUX12B: CLR R5
MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
MOVB @DMBCSR,R3 ;READ CONTROL STATUS REGISTER
BIC #177760,R3 ;CLEAR UNWANTED BITS
CMP R1,R3 ;IF LINE NUMBER=SELECTED LINE NUMBER,
BNE MUX12C ;EXCEPT TERMINAL READY FUNCTION FLIP FLOP
MOV #TRMRDY,R5
MUX12C: CMP R5,R4 ;TO BE SET
BEQ MUX12D ;COMPARE EXPECTED AND RECEIVED
ERRORL ;RESULTS
SCOPEF ;LINE STATUS ERROR
MUX12D: BIS #STEP,@DMBCSR ;EXAMINE NEXT LINE
DEC R2
BNE MUX12B
CLR R5
MUX12E: MOV R1,@DMBCSR
MOV R1,R3 ;SET LINE COUNTER TO SELECTED LINE
CLR @DMBLSR ;CLEAR TERMINAL READY FLIP FLOP
INCB #0 ;DELAY FOR CABLE
BNE -4 ;DITTO
MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
TST R4 ;WAS TERMINAL READY FUNCTION FLIP FLOP
BEQ MUX12F ;CLEARED
ERRORL ;NO, LINE STATUS ERROR
MUX12F: SCOPE ;CHECK FOR ITERATIONS, LOOP

```

```

2025                                     :VERIFY THAT REQUEST TO SEND FUNCTION FLIP-FLOP CAN
2026                                     :BE SET AND CLEARED FOR SELECTED LINE
2027
2028 007372                               T103:                                     :REFERENCE DESIGNATION
2029 007372 005077 006356                MUX13: CLR @DMBCSR                       :CLEAR CONTROL STATUS REGISTER
2030 007376 042737 000340 177776        BIC #340,PS                             :ENABLE INTERRUPTS
2031 007404 013701 016042                MOV LINE,R1
2032 007410 012777 002000 006336        MUX13A: MOV #CLRMUX,@DMBCSR
2033 007416 012702 000010                MOV #8.,R2
2034 007422 010177 006326                MOV R1,@DMBCSR
2035 007426 012777 000004 006322        MOV #RS,@DMBLSR
2036 007434 005077 006314                CLR @DMBCSR
2037 007440 005005                        MUX13B: CLR R5
2038 007442 017704 006310                MOV @DMBLSR,R4
2039 007446 117703 006302                MOVB @DMBCSR,R3
2040 007452 042703 177760                BIC #177760,R3
2041 007456 020103                        CMP R1,R3
2042 007460 001002                        BNE MUX13C
2043 007462 012705 000004                MOV #RS,R5
2044
2045 007466 020504                        MUX13C: CMP R5,R4
2046 007470 001403                        BEQ MUX13D
2047 007472 104001                        ERRORL
2048 007474 104003                        SCOPEF
2049 007476 007500                        MUX13D
2050 007500 052777 000400 006246        MUX13D: BIS #STEP,@DMBCSR
2051 007506 005302                        DEC R2
2052 007510 001353                        BNE MUX13B
2053 007512 005005                        CLR R5
2054 007514 010177 006234                MUX13E: MOV R1,@DMBCSR
2055 007520 010103                        MOV R1,R3
2056 007522 005077 006230                CLR @DMBLSR
2057 007526 105227 000000                INCB #0
2058 007532 001375                        BNE .-4
2059 007534 017704 006216                MOV @DMBLSR,R4
2060 007540 005704                        TST R4
2061 007542 001401                        BEQ MUX13F
2062 007544 104001                        ERRORL
2063 007546 104002                        MUX13F: SCOPE

```

```

:SELECT LINE TO BE TESTED
:SET REQUEST TO SEND FUNCTION FLIP-FLOP
:READ LINE STATUS REGISTER
:READ CONTROL STATUS REGISTER
:CLEAR UNWANTED BITS
:IF LINE NUMBER=SELECTED LINE NUMBER,
:EXCEPT REQUEST TO SEND FUNCTION FLIP FLOP
:TO BE SET
:COMPARE EXPECTED AND RECEIVED
:RESULTS
:LINE STATUS ERROR
:EXAMINE NEXT LINE
:SET LINE COUNTER TO SELECTED LINE
:CLEAR REQUEST TO SEND FLIP FLOP
:DELAY FOR CABLE
:DITTO
:READ LINE STATUS REGISTER
:WAS REQUEST TO SEND FUNCTION FLIP FLOP
:CLEARED
:NO, LINE STATUS ERROR
:CHECK FOR ITERATIONS, LOOP

```



```

2103
2104 ;VERIFY THAT CLEAR TO SEND AND CARRIER ARE SET IF "LINE ENABLE"
2105 ;AND TERMINAL ARE SET FOR SELECTED LINE.
2106
2107 007726 T105: ;REFERENCE DESIGNATION
2108 007726 005077 006022 MUX15: CLR @DMBCSR ;CLEAR CONTROL REGISTER
2109 007732 042737 000340 177776 BIC #340,PS ;ENABLE INTERRUPTS
2110 007740 013701 016042 MOV LINE,R1
2111 007744 012702 000010 MUX15A: MOV #8.,R2 ;8 LINES
2112 007750 010177 006000 MOV R1,@DMBCSR ;SELECT A LINE
2113 007754 012777 000003 005774 MOV #LINENA+TRMRDY,@DMBLSR ;SET LINE ENABLE +TRMRDY
2114 007762 005077 005766 CLR @DMBCSR ;CLEAR CONTROL REGISTER
2115 007766 005005 MUX15B: CLR R5 ;CLEAR EXPECTED RESULT
2116 007770 017704 005762 MOV @DMBLSR,R4 ;READ LINE STATUS
2117 007774 117703 005754 MOVB @DMBCSR,R3 ;READ LINE NUMBER
2118 010000 042703 177760 BIC #177760,R3 ;CLEAR UNWANTED BITS
2119 010004 020103 CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
2120 010006 001002 BNE MUX15C ;EXPECT LINE ENABLE AND
2121 010010 012705 000143 MOV #LINENA+TRMRDY+CO+CS,R5
2122
2123 010014 020405 MUX15C: CMP R4,R5 ;CLEAR TO SEND AND CARRIER ARE SET
2124 010016 001403 BEQ MUX15D ;COMPARE EXPECTED AND
2125 010020 104001 ERRORL ;RECEIVED RESULTS
2126 010022 104003 SCOPEF ;LINE STATUS ERROR
2127 010024 010026 MUX15D
2128 010026 052777 000400 005720 MUX15D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
2129 010034 005302 DEC R2 ;CONTINUE IF ALL CHECKS
2130 010036 001353 BNE MUX15B ;ARE NOT DONE FOR THIS LINE
2131 010040 012705 000001 MOV #LINENA,R5 ;EXPECT LINE ENABLE
2132 010044 010103 MUX15E: MOV R1,R3 ;ON SELECTED LINE
2133 010046 010177 005702 MOV R1,@DMBCSR ;SELECT LINE
2134 010052 042777 000002 005676 BIC #TRMRDY,@DMBLSR ;CLEAR TERMINAL
2135 010060 105227 000000 INCB #0 ;DELAY FOR CABLE
2136 010064 001375 BNE .-4 ;DITTO
2137 010066 017704 005664 MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
2138 010072 020504 CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
2139 010074 001401 BEQ MUX15F ;SET ON THIS LINE
2140 010076 104001 ERRORL ;LINE STATUS ERROR
2141 010100 104002 MUX15F: SCOPE ;CHECK FOR ITERATIONS, LOOP

```



```

2142
2143
2144
2145
2146 010102
2147 010102 005077 005646
2148 010106 042737 000340 177776
2149 010114 013701 016042
2150 010120 012702 000010
2151 010124 010177 005624
2152 010130 012777 000005 005620
2153 010136 005077 005612
2154 010142 005005
2155 010144 017704 005606
2156 010150 117703 005600
2157 010154 042703 177760
2158 010160 020103
2159 010162 001002
2160 010164 012705 000205
2161
2162 010170 020405
2163 010172 001403
2164 010174 104001
2165 010176 104003
2166 010200 010202
2167 010202 052777 000400 005544
2168 010210 005302
2169 010212 001353
2170 010214 012705 000001
2171 010220 010103
2172 010222 010177 005526
2173 010226 042777 000004 005522
2174 010234 105227 000000
2175 010240 001375
2176 010242 017704 005510
2177 010246 020504
2178 010250 001401
2179 010252 104001
2180 010254 104002

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

T106:
MUX16: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV LINE,R1 ;ENABLE INTERRUPTS
MUX16A: MOV #8.,R2 ;8 LINES
      MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+RS,@DMBLSR ;SET LINE ENABLE +RS
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
MUX16B: CLR R5 ;CLEAR EXPECTED RESULT
      MOV @DMBLSR,R4 ;READ LINE STATUS
      MOVB @DMBCSR,R3 ;READ LINE NUMBER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
      BNE MUX16C ;EXPECT LINE ENABLE AND
      MOV #LINENA+RS+RING,R5
MUX16C: CMP R4,R5 ;RING IS SET
      BEQ MUX16D ;COMPARE EXPECTED AND
      ERRORL MUX16D ;RECEIVED RESULTS
      SCOPEF ;LINE STATUS ERROR
MUX16D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX16B ;ARE NOT DONE FOR THIS LINE
MUX16E: MOV #LINENA,R5 ;EXPECT LINE ENABLE
      MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #RS,@DMBLSR ;CLEAR REQUEST TO SEND
      INCB #0 ;DELAY FOR CABLE
      BNE .-4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX16F ;SET ON THIS LINE
      ERRORL ;LINE STATUS ERROR
MUX16F: SCOPE ;CHECK FOR ITERATIONS, LOOP
  
```

```

2181
2182
2183
2184
2185 010256
2186 010256 005077 005472
2187 010262 042737 000340 177776
2188 010270 013701 016042
2189 010274 012702 000010
2190 010300 010177 005450
2191 010304 012777 000011 005444
2192 010312 005077 005436
2193 010316 005005
2194 010320 017704 005432
2195 010324 117703 005424
2196 010330 042703 177760
2197 010334 020103
2198 010336 001002
2199 010340 012705 000031
2200
2201 010344 020405
2202 010346 001403
2203 010350 104001
2204 010352 104003
2205 010354 010356
2206 010356 052777 000400 005370
2207 010364 005302
2208 010366 001353
2209 010370 012705 000001
2210 010374 010103
2211 010376 010177 005352
2212 010402 042777 000010 005346
2213 010410 105227 000000
2214 010414 001375
2215 010416 017704 005334
2216 010422 020504
2217 010424 001401
2218 010426 104001
2219 010430 104002
2220
2221
2222
2223
2224
2225
2226
2227
2228 010432
2229 010432 000005
2230 010434 012737 000340 177776
2231 010442 104004
2232 010444 016300
2233 010446 022737 000176 015770
2234 010454 001001
2235 010456 104025
2236 010460 012737 010476 012266 1$:

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

T107:
MUX17: CLR @DMBCSR ;REFERENCE DESIGNATION
      BIC #340,PS ;CLEAR CONTROL REGISTER
      MOV LINE,R1 ;ENABLE INTERRUPTS
MUX17A: MOV #8,R2 ;8 LINES
      MOV R1,@DMBCSR ;SELECT A LINE
      MOV #LINENA+SECTX,@DMBLSR ;SET LINE ENABLE +SECTX
      CLR @DMBCSR ;CLEAR CONTROL REGISTER
MUX17B: CLR R5 ;CLEAR EXPECTED RESULT
      MOV @DMBLSR,R4 ;READ LINE STATUS
      MOVB @DMBCSR,R3 ;READ LINE NUMBER
      BIC #177760,R3 ;CLEAR UNWANTED BITS
      CMP R1,R3 ;IF RECEIVED LINE=SELECTED LINE
      BNE MUX17C ;EXPECT LINE ENABLE AND
      MOV #LINENA+SECTX+SECTX,R5
MUX17C: CMP R4,R5 ;SECONDARY RECEIVE IS SET
      BEQ MUX17D ;COMPARE EXPECTED AND
      ERRORL SCOPEF ;RECEIVED RESULTS
      MUX17D ;LINE STATUS ERROR
MUX17D: BIS #STEP,@DMBCSR ;UPDATE LINE COUNTER
      DEC R2 ;CONTINUE IF ALL CHECKS
      BNE MUX17B ;ARE NOT DONE FOR THIS LINE
      MOV #LINENA,R5 ;EXPECT LINE ENABLE
MUX17E: MOV R1,R3 ;ON SELECTED LINE
      MOV R1,@DMBCSR ;SELECT LINE
      BIC #SECTX,@DMBLSR ;CLEAR SECONDARY TRANSMIT
      INCB #0 ;DELAY FOR CABLE
      BNE -4 ;DITTO
      MOV @DMBLSR,R4 ;READ LINE STATUS REGISTER
      CMP R5,R4 ;ONLY LINE ENABLE SHOULD BE
      BEQ MUX17F ;SET ON THIS LINE
      ERRORL SCOPE ;LINE STATUS ERROR
MUX17F: SCOPE ;CHECK FOR ITERATIONS, LOOP

;DM11-BA 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 DM11-BA TO CONTROL 103A TYPE MODEMS

T200:
ST103A: RESET ;REFERENCE DESIGNATION
      MOV #340,PS ;INITIALIZE INTERFACE
      TYPE ;DISABLE ALL INTERRUPTS
      MT103T ;TYPE "103A MODEM CONNECT-
      CMP #SWREG,SWR ;DISCONNECT TEST"
      BNE 1$
      CNTLUU
      MOV #T103A,FATRET ;SET UP FOR FATAL ERROR
  
```



```

2405 011060 104012      T202A1: ERROR      ;NO RING WITHIN 5 MINUTES
2406 011062 000772      BR          ST202B  ;SELECT NEW LINES AND REDIAL
2407
2408                    ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2409                    ;IF AN INCORRECT TRANSITION OCCURS, THE PROGRAM
2410                    ;WILL TYPE AN ERROR MESSAGE, AND THE OPERATOR
2411                    ;WILL BE REQUESTED TO RESELECT LINES AND REDIAL
2412
2413 011064 104021      T202B: CKRING      ;CHECK FOR RING INTERRUPT
2414                    ;ONLY ON ANSWER LINE
2415                    ;AND NO TRANSITIONS ON
2416                    ;ORIGINATE LINE
2417 011066 011104      T202C            ;GO HERE IF TRANSITIONS
2418                    ;ARE CORRECT
2419 011070 011074      T202B1          ;GO HERE IF INCORRECT
2420                    ;TRANSITION ON ANSWER LINE
2421 011072 011100      T202B2          ;GO HERE IF INCORRECT
2422                    ;TRANSITION ON ORIGINATE LINE
2423 011074 104014      T202B1: ERROR      ;ANSWER LINE TRANSITION ERROR
2424 011076 000207      RTS          PC   ;CONTINUE CHECKING
2425 011100 104014      T202B2: ERROR      ;ORIGINATE LINE TRANSITION ERROR
2426 011102 000762      BR          ST202B ;RESELECT LINES AND REDIAL
2427
2428                    ;SET TERMINAL READY ON SELECTED ANSWER LINE
2429                    ;SET REQUEST TO SEND ON SELECTED ORIGINATE LINE
2430                    ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2431
2432 011104 013777 016046 004642 T202C: MOV      LINANS,@DMBCSR ;SET LINE COUNTER TO ANSWER LINE
2433 011112 052777 000002 004636 BIS      #TRMRDY,@DMBLSR ;SET TERMINAL READY ON ANSWER LINE
2434 011120 013777 016044 004626 T202D: MOV      LINORG,@DMBCSR ;SET LINE COUNTER TO ORIGINATE LINE
2435 011126 052777 000004 004622 BIS      #RS,@DMBLSR ;SET REQUEST TO SEND ON ORIGINATE LINE
2436 011134 104026      CKINTT
2437 011136 104022      WAITRN          ;WAIT FOR TRANSITIONS TO OCCUR
2438
2439                    ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2440                    ;SELECTED ORIGINATE AND ANSWER LINES
2441
2442 011140 104023      CKTRAN          ;CHECK TRANSITIONS AND STATUS
2443                    ;ON SELECTED ANSWER AND
2444                    ;ORIGINATE LINES
2445 011142 000103      CO+LINENA+TRMRDY ;EXPECT CARRIER, LINE ENABLE
2446                    ;AND TERMINAL READY STATUS
2447                    ;BITS SET ON ANSWER LINE
2448 011144 000147      RS+CO+CS+LINENA+TRMRDY ;EXPECT REQUEST TO SEND, CLEAR
2449                    ;TO SEND, CARRIER, LINE ENABLE
2450                    ;AND TERMINAL READY STATUS BITS
2451                    ;SET ON ORIGINATE LINE
2452 011146 100004      RINGF+XCO       ;EXPECT CARRIER AND POSSIBLE
2453                    ;RING TRANSITIONS ON
2454                    ;ANSWER LINE
2455 011150 000006      XCO+XCS         ;EXPECT CARRIER AND CLEAR
2456                    ;TO SEND TRANSITIONS ON
2457                    ;ORIGINATE LINE
2458 011152 011164      T202D1          ;GO HERE ON ANSWER LINE STATUS ERROR
2459 011154 011170      T202D2          ;GO HERE ON ORIGINATE LINE STATUS ERROR
2460 011156 011174      T202D3          ;GO HERE ON ANSWER LINE STATUS ERROR
  
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2461 011160 011200 T202D4 :GO HERE ON ORIGINATE LINE TRANSITION ERROR
2462 011162 011204 T202E :GO TO NEXT TEST IF NO ERRORS
2463 011164 104015 T202D1: ERRORS :ANSWER LINE SATAUS ERROR
2464 011166 000207 RTS PC :CONTINUE CHECKING
2465 011170 104015 T202D2: ERRORS :ORIGINATE LINE STATUS ERROR
2466 011172 000207 RTS PC :CONTINUE CHECKING
2467 011174 104014 T202D3: ERRORT :ANSWER LINE TRANSITION ERROR
2468 011176 000207 RTS PC :CONTINUE CHECKING
2469 011200 104014 T202D4: ERRORT :ORIGINATE LINE TRANSITION ERROR
2470 011202 000207 RTS PC :CONTINUE CHECKING
2471
2472 :SET SECONDARY TRANSMIT ON ANSWER LINE
2473 :WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2474
2475 011204 013777 016046 004542 T202E: MOV LINANS,@DMBCSR :SET LINE COUNTER TO ANSWER LINE
2476 011212 052777 000010 004536 BIS #SECTX,@DMBLSR :SET SECONDARY RECEIVE ON ANSWER LINE
2477 011220 104026 CKINTT
2478 011222 104022 WAITRN :WAIT FOR TRANSITIONS TO OCCUR
2479
2480 :CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2481 :SELECTED ORIGINATE AND ANSWER LINES
2482
2483 011224 104023 CKTRAN :CHECK TRANSITIONS AND STATUS
2484 :ON SELECTED ANSWER AND
2485 :ORIGINATE LINES
2486 011226 000133 SECTX+CO+LINENA+TRMRDY+SECRX :EXPECT SECONDARY TRANSMIT
2487 :SECONDARY RECEIVE, CARRIER
2488 :LINE ENABLE AND TERMINAL READY
2489 :STATUS BITS SET ON ANSWER LINE
2490 011230 000167 SECRX+RS+CO+CS+LINENA+TRMRDY :EXPECT SECONDARY RECEIVE,
2491 :REQUEST TO SEND, CLEAR TO SEND
2492 :CARRIER, LINE ENABLE AND
2493 :TERMINAL READY STATUS BITS
2494 :SET ON ORIGINATE LINE
2495 011232 000001 XSCRX :EXPECT SECONDARY RECEIVE
2496 :TRANSITION ON ANSWER LINE
2497 011234 000001 XSCRX :EXPECT SECONDARY RECEIVE
2498 :TRANSITION ON ORIGINATE LINE
2499 011236 011250 T202E1 :GO HERE ON ANSWER LINE STATUS ERROR
2500 011240 011254 T202E2 :GO HERE ON ORIGINATE LINE STATUS ERROR
2501 011242 011260 T202E3 :GO HERE ON ANSWER LINE TRANSITION ERROR
2502 011244 011264 T202E4 :GO HERE ON ORIGINATE LINE TRANSITION ERROR
2503 011246 011270 T202F :GO TO NEXT TEST IF NO ERRORS
2504 011250 104015 T202E1: ERRORS :ANSWER LINE STATUS ERROR
2505 011252 000207 RTS PC :CONTINUE CHECKING
2506 011254 104015 T202E2: ERRORS :ORIGINATE LINE STATUS ERROR
2507 011256 000207 RTS PC :CONTINUE CHECKING
2508 011260 104014 T202E3: ERRORT :ANSWER LINE TRANSITION ERROR
2509 011262 000207 RTS PC :CONTINUE CHECKING
2510 011264 104014 T202E4: ERRORT :ORIGINATE LINE TRANSITION ERROR
2511 011266 000207 RTS PC :CONTINUE CHECKING
2512
2513 :DROP REQUEST TO SEND ON ORIGINATE LINE
2514 :DROP SECONDARY TRANSMIT ON ANSWER LINE
2515 :WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2516
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2517 011270 013777 016044 004456 T202F: MOV LINORG,@DMBCSR ;SET LINE COUNTER TO ORIGINATE LINE
2518 011276 042777 000004 004452 BIC #RS,@DMBLSR ;DROP REQUEST TO SEND
2519 011304 013777 016046 004442 MOV LINANS,@DMBCSR ;SET LINE COUNTER TO ANSWER LINE
2520 011312 042777 000010 004436 BIC #SECTX,@DMBLSR ;DROP SECONDARY RECEIVE
2521 011320 104026 CKINTT
2522 011322 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
2523
2524 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2525 ;SELECTED ORIGINATE AND ANSWER LINES
2526
2527 011324 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
2528 ;ON SELECTED ANSWER AND
2529 ;ORIGINATE LINES
2530 011326 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
2531 ;TERMINAL READY STATUS BITS
2532 ;SET ON ANSWER LINE
2533 011330 000003 LINENA+TRMRDY ;EXPECT LINE ENABLE AND
2534 ;TERMINAL READY STATUS BITS
2535 ;SET ON ORIGINATE LINE
2536 011332 000005 XCO+XSCRX ;EXPECT CARRIER AND SECONDARY
2537 ;RECEIVE TRANSITIONS ON
2538 ;ANSWER LINE
2539 011334 000007 XCO+XCS+XSCRX ;EXPECT CARRIER, CLEAR TO SEND
2540 ;AND SECONDARY RECEIVE
2541 ;TRANSITIONS ON ORIGINATE LINE
2542 011336 011350 T202F2 ;GO HERE ON ANSWER LINE STAATUS ERROR
2543 011340 011354 T202F3 ;GO HERE ON ORIGINATE LINE STATUS ERROR
2544 011342 011360 T202F4 ;GO HERE ON ANSWER LINE TRANSITION ERROR
2545 011344 011364 T202F5 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2546 011346 011370 T202G ;GO TO NEXT TEST IF NO ERRORS
2547 011350 104015 T202F2: ERRORS ;ANSWER LINE STATUS ERROR
2548 011352 000207 RTS PC ;CONTINUE CHECKING
2549 011354 104015 T202F3: ERRORS ;ORIGINATE LINE STATUS ERROR
2550 011356 000207 RTS PC ;CONTINUE CHECKING
2551 011360 104014 T202F4: ERRORT ;ANSWER LINE TRANSITION ERROR
2552 011362 000207 RTS PC ;CONTINTUE CHECKING
2553 011364 104014 T202F5: ERRORT ;ORIGINATE LINE TRANSITION ERROR
2554 011366 000207 RTS PC ;CONTINUE CHECKING
2555
2556
2557 ;SET REQUEST TO SEND ON ANSWER LINE
2558 ;WAIT FOR TRANSITIONS ON SELECTED LINES
2559
2560 011370 013777 016046 004356 T202G: MOV LINANS,@DMBCSR ;SET LINE COUNTER TO ANSWER LINE
2561 011376 052777 000004 004352 BIS #RS,@DMBLSR ;SET REQUEST TO SEND
2562 011404 104026 CKINTT
2563 011406 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
2564
2565 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2566 ;SELECTED ORIGINATE AND ANSWER LINES
2567
2568 011410 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
2569 ;ON SELECTED ANSWER AND
2570 ;ORIGINATE LINES
2571 011412 000147 RS+CO+CS+LINENA+TRMRDY ;EXPECT LINE ENABLE, TERMINAL
2572 ;READY, REQUEST TO SEND, CLEAR

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2573
2574
2575 011414 000103 CO+LINENA+TRMRDY
2576
2577
2578 011416 000006 XCO+XCS
2579
2580
2581 011420 000004 XCO
2582
2583 011422 011434 T202G1
2584 011424 011440 T202G2
2585 011426 011444 T202G3
2586 011430 011450 T202G4
2587 011432 011454 T202H
2588 011434 104015 T202G1: ERRORS
2589 011436 000207 RTS PC
2590 011440 104015 T202G2: ERRORS
2591 011442 000207 RTS PC
2592 011444 104014 T202G3: ERRORT
2593 011446 000207 RTS PC
2594 011450 104014 T202G4: ERRORT
2595 011452 000207 RTS PC
2596
2597 ;SET SECONDARY TRANSMIT ON ORIGINATE LINE
2598 ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2599
2600 011454 013777 016044 004272 T202H: MOV LINORG,@DMBCSR ;SET LINE COUNTER TO ORIGINATE LINE
2601 011462 052777 000010 004266 BIS #SECTX,@DMBLSR ;SET SECONDARY TRANSMIT
2602 011470 104026 CKINTT
2603 011472 104022 WAITRN ;WAIT FOR TRANSITIONS TO OCCUR
2604
2605 ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2606 ;SELECTED ORIGINATE AND ANSWER LINES
2607
2608 011474 104023 CKTRAN ;CHECK TRANSITIONS AND STATUS
2609 ;ON SELECTED ANSWER AND
2610 ;ORIGINATE LINES
2611 011476 000167 RS+CS+CO+LINENA+TRMRDY+SECRX ;EXPECT LINE ENABLE, TERMINAL
2612 ;READY, REQUEST TO SEND, CLEAR
2613 ;TO SEND, CARRIER AND SECONDARY
2614 ;RECEIVE STATUS BITS SET
2615 ;ON ANSWER LINE
2616 011500 000133 SECTX+CO+LINENA+TRMRDY+SECRX ;EXPECT LINE ENABLE, TERMINAL
2617 ;READY, CARRIER, SECONDARY
2618 ;TRANSMIT AND SECONDARY
2619 ;RECEIVE STATUS BITS SET
2620 ;ON ORIGINATE LINE
2621 011502 000001 XSCRX ;EXPECT SECONDARY RECEIVE
2622 ;TRANSITION ON ANSWER LINE
2623 011504 000001 XSCRX ;EXPECT SECONDARY RECEIVE
2624 ;TRANSITION ON ORIGINATE LINE
2625 011506 011520 T202H2 ;GO HERE ON ANSWER LINE STATUS ERROR
2626 011510 011524 T202H3 ;GO HERE ON ORIGINATE LINE STATUS ERROR
2627 011512 011530 T202H4 ;GO HERE ON ANSWER LINE TRANSITION ERROR
2628 011514 011534 T202H5 ;GO HERE ON ORIGINATE LINE TRANSITION ERROR

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2629 011516 011540          T202I          ;GO TO NEXT TEST IF NO ERRORS
2630 011520 104015          T202H2: ERRORS          ;ANSWER LIN STATUS ERROR
2631 011522 000207          RTS          PC          ;CONTINUE CHECKING
2632 011524 104015          T202H3: ERRORS          ;ORIGINATE LINE STATUS ERROR
2633 011526 000207          RTS          PC          ;CONTINUE CHECKING
2634 011530 104014          T202H4: ERRORT         ;ANSWER LINE TRANSITION ERROR
2635 011532 000207          RTS          PC          ;CONTINUE CHECKING
2636 011534 104014          T202H5: ERRORT         ;ORIGINATE LINE TRANSITION ERROR
2637 011536 000207          RTS          PC          ;CONTINUE CHECKING
2638
2639                          ;DROP REQUEST TO SEND ON ANSWER LINE
2640                          ;WAIT FOR TRANSITIONS TO OCCUR ON SELECTED LINES
2641
2642 011540 013777 016046 004206 T202I: MOV      LINANS,@DMBCSR ;SET LINE COUNTER TO ANSWER LINE
2643 011546 042777 000004 004202 BIC      #RS,@DMBLSR      ;CLEAR REQUEST TO SEND
2644 011554 013777 016044 004172 MOV      LINORG,@DMBCSR   ;SET LINE COUNTER TO ORIGINATE LINE
2645 011562 042777 000010 004166 BIC      #SECTX,@DMBLSR  ;CLEAR SECONDARY TRANSMIT
2646 011570 104026          CKINTT
2647 011572 104022          WAITRN          ;WAIT FRO TRANSITIONS TO OCCUR
2648
2649                          ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2650                          ;SELECTED ORIGINATE AND ANSWER LINES
2651
2652 011574 104023          CKTRAN          ;CHECK TRANSITION S AND STATUS
2653                          ;ON SELECTED ANSWE AND
2654                          ;ORIGINATE LINES
2655 011576 000003          LINENA+TRMRDY  ;EXPECT LINE ENABLE AND
2656                          ;TERMINAL READY STATUS BITS SET
2657                          ;ON ANSWER LINE
2658 011600 000003          LINENA+TRMRDY  ;EXPECT LINE ENABLE AND
2659                          ;TERMINAL READY STATUS BITS
2660                          ;SET ON ORIGINATE LINE
2661 011602 000007          XCO+XCS+XSCRX  ;EXPECT CARRIER, CLEAR TO SEND
2662                          ;AND SECONDARY RECEIVE TRANSITIONS
2663                          ;ON ANSWER LINE
2664 011604 000005          XCO+XSCRX      ;EXPECT CARRIER AND SECONDARY
2665                          ;RECEIVE TRANSITIONS ON
2666                          ;ORIGINATE LINE
2667 011606 011620          T202I2         ;GO HERE ON ANSWER LINE STATUS ERROR
2668 011610 011624          T202I3         ;GO HERE ON ORIGINATE LINE STATUS ERROR
2669 011612 011630          T202I4         ;GO HERE ON ANSWER LINE TRANSITIN ERROR
2670 011614 011634          T202I5         ;GO HERE ON ORIGINATE LINE TRANSITION ERROR
2671 011616 011640          T202J          ;GO TO NEXT TEST IF NO ERRORS
2672 011620 104015          T202I2: ERRORS          ;ANSWER LINE STATUS ERROR
2673 011622 000207          RTS          PC          ;CONTINUE CHECKING
2674 011624 104015          T202I3: ERRORS          ;ORIGINATE LINE STATUS ERROR
2675 011626 000207          RTS          PC          ;CONTINUE CHECKING
2676 011630 104014          T202I4: ERRORT         ;ANSWE LINE TRANSITION ERROR
2677 011632 000207          RTS          PC          ;CONTINUE CHECKING
2678 011634 104014          T202I5: ERRORT         ;ORIGINATE LINE TRANSITION ERROR
2679 011636 000207          RTS          PC          ;CONTINUE CHECKING
2680
2681                          ;SET UP TO TEST DISCONNECT SEQUENCE
2682                          ;THE PROGRAM WILL REQUEST THE OPERATOR TO SET SW01=1
2683                          ;TO INITIATE THE DISCONNECT SEQUENCE
2684                          ;THE OPERATOR MAY MANUALLY SWITCH THE DATA SETS FROM

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2685                                     ;DATA TO TALK MODE AS MANY TIMES AS DESIRED
2686                                     ;BEFORE THE SWITCH SEETIN IS MADE
2687                                     ;ANY TRANSITIONS DETECTED DURING THIS TIME WILL BE
2688                                     ;REPORTED BY TYPEOUT
2689
2690 011640 104004          T202J: TYPE          ;TYPE "SET SW01=1 TO
2691 011642 016543          MDISC          ;TEST DISCONNECT"
2692 011644 012737 000340 177776      MOV #340,PS      ;LOCK OUT INTERRUPTS
2693 011652 012777 012310 004070      MOV #TRNTYP,@DMBVEC ;SET UP TO DETECT TRANSITIONS
2694 011660 012737 011700 016062      MOV #T202JS,RNGRET ;SET UP DUMMY RETURN FOR RING
2695                                     ;FROM RING INTERRUPT
2696 011666 012777 000140 004060      MOV #SCNENA+INTENA,@DMBCSR ;ENABLE LINE SCANNER
2697                                     ;START SCANNER
2698 011674 005037 177776          CLR PS          ;ENABLE INTERRUPTS
2699 011700 005077 004056          T202JS: CLR @TKDBR
2700 011704 105777 004050          1$: TSTB @TKCSR
2701 011710 100375          BPL 1$
2702 011712 005777 004044          TST @TKDBR
2703
2704                                     ;DISCONNECT SEQUENCE REQUESTED
2705
2706 011716 012737 000340 177776      MOV #340,PS      ;LOCK OUT INTERRUPTS
2707 011724 005077 004024          CLR @DMBCSR      ;STOP SCANNER
2708 011730 013777 016044 004016      MOV LINORG,@DMBCSR ;SET LINE COUNTER TO SELECTED ORIGINATE LINE
2709 011736 042777 000002 004012      BIC #TRMRDY,@DMBLSR ;SET TERMINAL READY ON SELECTED LINE
2710 011744 104024          WAITS          ;DELAY
2711 011746 104026          CKINTT
2712 011750 104022          WAITRN          ;WAIT FOR TRANSITIONS TO OCCUR
2713
2714                                     ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON SELECTED
2715                                     ;ORIGINATE AND ANSWER LINES
2716
2717 011752 104023          CKTRAN          ;CHECK TRANSITIONS AND STATUS
2718                                     ;ON SELECTED ASNWER AND
2719                                     ;ORIGINATE LINES
2720 011754 000003          LINENA+TRMRDY ;EXPECT LINE ENABLE AND
2721                                     ;TERMINAL READY STATUS BITS
2722                                     ;SET ON ANSWER LINE
2723 011756 000001          LINENA          ;EXPECT LINE ENABLE STATUS
2724                                     ;BIT SET ON ORIGINATE LINE
2725 011760 000000          0              ;EXPECT NO TRANSITIONS ON
2726                                     ;ANSWER LINE
2727 011762 000000          0              ;EXPECT NO TRANSITIONS ON
2728                                     ;ORIGINATE LINE
2729 011764 011776          T202J1          ;GO HERE IF ANSWER LINE STATUS ERROR
2730 011766 012002          T202J2          ;GO HERE IF ORIGINATE LINE STATUS ERROR
2731 011770 012006          T202J3          ;GO HERE IF ANSWER LINE TRANSITION ERROR
2732 011772 012012          T202J4          ;GO HERE IF ORIGINATE LINE TRANSITIONS ERROR
2733 011774 012016          T202JN          ;GO TO END OF TEST IF NO ERRORS
2734 011776 104015          T202J1: ERRORS ;ANSWER LINE STATUS ERROR
2735 012000 000207          RTS PC          ;CONTINUE CHECKING
2736 012002 104015          T202J2: ERRORS ;ORIGINATE LINE STATUS ERROR
2737 012004 000207          RTS PC          ;CONTINUE CHECKING
2738 012006 104014          T202J3: ERRORT ;ANSWER LINE TRANSITION ERROR
2739 012010 000207          RTS PC          ;CONTINUE CHECKING
2740 012012 104014          T202J4: ERRORT ;ORIGINATE LINE TRANSITION ERROR

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2741 012014 000207          RTS      PC          ;CONTINUE CHECKING
2742
2743 012016 104004          T202JN: TYPE          ;TYPE '202C TEST COMPLETE'
2744 012020 016514          MT202A
2745 012022 104026          CKINTT
2746 012024 000137 011050  JMP      ST202B       ;GET NEW LINE NUMBERS
2747                                     ;RESTART TEST
2748
2749                                     ;DETECT AND RECORD TRANSITIONS ON SELECTED
2750                                     ;ORIGINATE AND ANSWER LINES
2751
2752                                     ;TRANSITION DATA IS STORED IN LOCATIONS ANSFLG AND ORGFLG
2753                                     ;FOR ANSWER AND ORIGINATE LINES RESPECTIVELY
2754                                     ;FORMAT OF DATA IS (FOR BOTH LINES)
2755
2756                                     ;BIT0=1,SECONDARY RECEIVE CAUSED INTERRUPT
2757                                     ;BIT1=1, CLEAR TO SEND CAUSED INTERRUPT
2758                                     ;BIT2=1, CARRIER CAUSED INTERRUPT
2759                                     ;BIT3=1, RING CAUSED INTERRUPT
2760
2761 012030 017704 003720          TRANS:  MOV      @DMBCSR,R4          ;GET LINE NUMBER AND
2762                                     ;INTERRUPT FLAGS
2763 012034 010405          MOV      R4,R5
2764 012036 042705 177760          BIC      #177760,R5          ;EXTRACT LINE NUMBER
2765 012042 023705 016044          CMP      LINORG,R5          ;DID ORIGINATE LINE INTERRUPT
2766 012046 001411          BEQ      ORGTR              ;IF YES, SERVICE
2767 012050 023705 016046          CMP      LINANS,R5          ;DID ANSWER LINE INTERRUPT
2768 012054 001443          BEQ      ANSTR              ;IF YES, SERVICE
2769 012056 010577 003672          MOV      R5,@DMBCSR
2770 012062 017703 003670          MOV      @DMBLSR,R3
2771 012066 104016          ERRORN
2772 012070 000471          BR       FATEX              ;INTERRUPT ON INCORRECT LINE
2773
2774                                     ;RECORD TRANSITIONS FOR ORIGINATE LINE
2775
2776 012072 032704 100000          ORGTR:  BIT      #RINGF,R4          ;IF RING CAUSED INTERRUPT,
2777 012076 001403          BEQ      ORGTR1              ;SET RING TRANSITION BIT
2778 012100 052737 000010 016052          BIS      #10,ORGFLG
2779 012106 032704 040000          ORGTR1: BIT      #COF,R4          ;IF CARRIER CAUSED INTERRUPT
2780 012112 001403          BEQ      ORGTR2              ;SET CARRIER TRANSITION BIT
2781 012114 052737 000004 016052          BIS      #4,ORGFLG
2782 012122 032704 020000          ORGTR2: BIT      #CSF,R4          ;IF CLEAR TO SEND
2783                                     ;CAUSED INTERRUPT
2784 012126 001403          BEQ      ORGTR3              ;SET CLEAR TO SEND
2785                                     ;TRANSITION BIT
2786 012130 052737 000002 016052          BIS      #2,ORGFLG
2787 012136 032704 010000          ORGTR3: BIT      #SECRXF,R4          ;IF SECONDARY RECEIVE
2788                                     ;CAUSED INTERRUPT
2789 012142 001403          BEQ      ORGTR4              ;SET SECONDARY RECEIVE
2790 012144 052737 000001 016052          BIS      #1,ORGFLG          ;TRANSITION BIT
2791 012152 032704 170000          ORGTR4: BIT      #RINGF+COF+CSF+SECRXF,R4
2792                                     ;IF NO INTERRUPT FLAGS SET
2793 012156 001044          ORGTRR: BNE      TRANEX          ;EXIT TRANSITION DETECTION
2794 012160 104016          ERRORN
2795 012162 000434          BR       FATEX
2796

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2797 ;RECORD TRANSITIONS FOR ANSWER LINE
2798
2799 012164 032704 100000 ANSTR: BIT #RINGF,R4 ;IF RING CAUSED INTERRUPT,
2800 012170 001403 BEQ ANSTR1 ;SET RING TRANSITION BIT
2801 012172 052737 000010 016050 BIS #10,ANSFLG
2802 012200 032704 040000 ANSTR1: BIT #COF,R4 ;IF CARRIER CAUSED INTERRUPT
2803 012204 001403 BEQ ANSTR2 ;SET CARRIER TRANSITION BIT
2804 012206 052737 000004 016050 BIS #4,ANSFLG
2805 012214 032704 020000 ANSTR2: BIT #CSF,R4 ;IF CLEAR TO SEND
2806 ;CAUSED INTERRUPT
2807 012220 001403 BEQ ANSTR3 ;SET CLEAR TO SEND
2808 ;TRANSITION BIT
2809 012222 052737 000002 016050 BIS #2,ANSFLG
2810 012230 032704 010000 ANSTR3: BIT #SECRXF,R4 ;IF SECONDARY RECEIVE
2811 ;CAUSED INTERRUPT
2812 012234 001403 BEQ ANSTR4 ;SET SECONDARY RECEIVE
2813 012236 052737 000001 016050 BIS #1,ANSFLG ;TRANSITION BIT
2814 012244 032704 170000 ANSTR4: BIT #RINGF+COF+CSF+SECRXF,R4
2815 ;IF NO INTERRUPT FLAGS SET
2816 012250 001007 BNE TRANEX ;EXIT TRANSITION DETECTION
2817 012252 104016 ANSTRR: ERRORN
2818 012254 005037 016002 FATEX: CLR TSTNO
2819 012260 022626 POP2SP
2820 012262 000177 000000 JMP @FATRET
2821 012266 060000 FATRET: 0
2822
2823 ;EXIT TRANSITION DETECTION
2824
2825 012270 005704 TRANEX: TST R4 ;IF RING FLAG WAS SET
2826 012272 100002 BPL .+6 ;SET UP SPECIAL RETURN
2827 012274 013716 016062 MOV RNGRET,(SP)
2828 012300 012777 000140 003446 TRANX1: MOV #SCNENA+INTENA,@DMBCSR ;RESTART SCANNER
2829 012306 000002 RTI
2830
2831 ;TYPE TRANSITION DATA AND RETURN
2832
2833 012310 017737 003440 013274 TRNTYP: MOV @DMBCSR,DATA1
2834 012316 017737 003434 013276 MOV @DMBLSR,DATA2
2835 012324 104004 TYPE
2836 012326 017623 MTRNDET
2837 012330 104006 OCTASC
2838 012332 012336 TRNTAB
2839 012334 000761 BR TRANX1
2840 012336 000002 TRNTAB: 2
2841 012340 000006 6
2842 012342 013274 DATA1
2843 012344 000003 3
2844 012346 013276 DATA2
2845
2846 ;INPUT ORIGINATE AND ANSWER LINES FROM TELETYPE KEYBOARD
2847
2848 012350 000005 GETLIN: RESET
2849 012352 104013 INSTRG ;TYPE 'ORIGINATE LINE-'
2850 012354 016422 MSELOR ;AND GET LINE NUMBER
2851 012356 000000 0
2852 012360 000007 7
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2853 012362 016044          LINORG
2854 012364 104013          INSTRG
2855 012366 016446          MSELANS
2856 012370 000000          0
2857 012372 000007          7
2858 012374 016046          LINANS
2859 012376 104004          TYPE
2860 012400 017514          MCRLF
2861 012402 000002          RTI
2862
2863
2864
2865 012404 000005          SETUPS: RESET
2866 012406 012737 000340 177776  MOV #340,PS
2867 012414 011605          MOV (SP),R5
2868 012416 012537 013304          MOV (R5)+,NXTTS
2869 012422 012537 013264          MOV (R5)+,ERR1
2870 012426 010516          MOV R5,(SP)
2871 012430 012777 006000 003316  MOV #CLRSCN+CLRMUX,@DMBCSR
2872 012436 032777 000020 003310  SETUP1: BIT #BUSY,@DMBCSR
2873 012444 001374          BNE SETUP1
2874 012446 005037 015774          CLR ERRFLG
2875
2876
2877
2878
2879 012452 013777 016044 003274  SETUP2: MOV LINORG,@DMBCSR
2880
2881 012460 012777 000003 003270  MOV #LINENA+TRMRDY,@DMBLSR
2882
2883 012466 013777 016046 003260  MOV LINANS,@DMBCSR
2884 012474 012777 000001 003254  MOV #LINENA,@DMBLSR
2885
2886
2887
2888
2889
2890 012502 012777 012030 003240  MOV #TRANS,@DMBVEC
2891
2892 012510 012777 000340 003234  MOV #340,@DMBLVL
2893 012516 012777 000140 003230  MOV #SCNENA+INTENA,@DMBCSR
2894 012524 005037 016050          CLR ANSFLG
2895 012530 005037 016052          CLR ORGFLG
2896 012534 012737 012564 016062  MOV #SETUP4,RNGRET
2897
2898 012542 104004          TYPE
2899 012544 016242          DIALM
2900 012546 005037 177776          CLR PS
2901 012552 005037 016054          CLR TIME1
2902 012556 012737 001000 016056  MOV #1000,TIME2
2903 012564 005737 016050          SETUP4: TST ANSFLG
2904 012570 001014          BNE SETUPB
2905 012572 005737 016052          TST ORGFLG
2906 012576 001011          BNE SETUPB
2907 012600 005237 016054          INC TIME1
2908 012604 001367          BNE SETUP4

```

:TYPE 'ANSWER LINE-'
:AND GET LINE NUMBER

:RETURN TO CALLING ROUTINE

:INITIALIZE INTERFACE

:LOCK OUT ALL INTERRUPTS

:CLEAR LINE SCANNER AND MULTIPLEXER
:WAIT FOR SCANNER TO CLEAR

:ENABLE SELECTED LINES
:SET TERMINAL READY ON SELECTED ORIGINATE LINE

:SET UP TO ENABLE ORIGINATE LINE
:ORIGINATE LINE NUMBER
:SET LINE ENABLE AND
:TERMINAL READY ON ORIGINATE LINE
:SET LINE COUNTER TO ANSWER LINE
:SET LINE ENABLE ON ANSWER LINE

:REQUEST OPERATOR TO DIAL SELECTED ANSWER TERMINAL
:SET UP TO RECEIVE INTERRUPTS
:START LINE SCANNER

:SET UP INTERRUPT VECTOR
:FOR TRANSITION DETECTION
:SET UP INTERRUPT SERVICE LEVEL
:START SCANNER, ENABLE INTERRUPTS
:CLEAR TRANSITION DETECTED FLAGS

:SET UP RETURN FROM
:DETECTION OF RING INTERRUPT
:REQUEST OPERATOR TO DIAL

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

:ALLOW OPERATOR 5 MINUTES TO DIAL

```
2909 012606 005337 016056          DEC    TIME2
2910 012612 001364          BNE    SETUP4
2911 012614 022626          POP2SP
2912 012616 000177 000442          JMP    @ERR1
2913 012622 022626          SETUPB: POP2SP
2914 012624 000177 000454          JMP    @NXTTS
2915 012630 012766 000340 000002  MOV    #340,+2(SP)
2916 012636 000002          RTI
2917
2918          ;CHECK FOR RING INTERRUPT ON SELECTED ANSWER LINE
2919
2920 012640 011605          CKRNG: MOV    (SP),R5
2921 012642 012537 013304          MOV    (R5)+,NXTTS
2922 012646 012537 013264          MOV    (R5)+,ERR1
2923 012652 012537 013266          MOV    (R5)+,ERR2
2924 012656 010516          MOV    R5,(SP)
2925 012660 012705 000010          MOV    #10,R5          ;EXPECT RING ONLY ON ANSWER LINE
2926 012664 013704 016050          MOV    ANSFLG,R4      ;GET ACTUAL TRANSITION DATA
2927 012670 013703 016046          MOV    LINANS,R3     ;SET UP LINE NUMBER
2928 012674 020504          CMP    R5,R4          ;DID RING CAUSE INTERRUPT
2929 012676 001402          BEQ    CKRNG1        ;ON ANSWER LINE
2930 012700 004777 000360          JSR    PC,@ERR1
2931 012704 005005          CKRNG1: CLR    R5
2932 012706 013704 016052          MOV    ORGFLG,R4
2933 012712 013703 016044          MOV    LINORG,R3
2934 012716 005704          TST    R4          ;IF TRANSITION OCCURED
2935 012720 001403          BEQ    CKRNG2        ;ON ORIGINATE LINE, ERROR
2936 012722 022626          POP2SP
2937 012724 000177 000336          JMP    @ERR2
2938 012730 022626          CKRNG2: POP2SP
2939 012732 000177 000346          JMP    @NXTTS
2940
2941 012736 005037 016050          WAITR: CLR    ANSFLG
2942 012742 005037 016052          CLR    ORGFLG
2943 012746 012777 012030 002774  MOV    #TRANS,@DMBVEC
2944 012754 012737 012774 016062  MOV    #WAITRR,RNGRET          ;SET UP FOR RETURN
2945          ;FROM RING DETECTION
2946 012762 012777 000140 002764  MOV    #SCNENA+INTENA,@DMBCSR          ;START SCANNER
2947 012770 005037 177776          CLR    PS
2948 012774 005037 016054          WAITRR: CLR    TIME1
2949 013000 012737 000025 016056  MOV    #25,TIME2
2950 013006 005237 016054          WAITR1: INC    TIME1          ;WAIT FOR TRANSITIONS OF
2951 013012 001375          BNE    WAITR1        ;CARRIER AND CLEAR TO SEND
2952 013014 005337 016056          DEC    TIME2
2953 013020 001372          BNE    WAITR1
2954 013022 000002          RTI
2955
2956          ;CHECK FOR CORRECT STATUS AND TRANSITIONS ON
2957          ;SELECTED ORIGINATE AND ANSWER LINES
2958
2959 013024 012737 000340 177776  CKTRN: MOV    #340,PS          ;LOCK OUT FURTHER INTERRUPTS
2960 013032 005077 002716          CLR    @DMBCSR        ;STOP LINE SCANNER
2961 013036 011605          MOV    (SP),R5
2962 013040 012537 013274          MOV    (R5)+,DATA1
2963 013044 012537 013276          MOV    (R5)+,DATA2
2964 013050 012537 013300          MOV    (R5)+,DATA3
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3021 013306
3022 013306 005237 016000
3023 013312 012737 000001 016002
3024 013320 104004
3025 013322 020102
3026 013324 013701 000042
3027 013330 001515
3028 013332 000005
3029 013334 004711
3030 013336 000240
3031 013340 000240
3032 013342 000240
3033 013344 000137 013564
3034
3035
3036
3037
3038
3039
3040 013350 011646
3041 013352 162716 000002
3042 013356 017616 000000
3043 013362 006316
3044 013364 042716 177001
3045 013370 062716 020134
3046 013374 017616 000000
3047 013400 000136
3048
3049
3050 013402 105777 002352
3051 013406 100001
3052 013410 104027
3053 013412 000002
3054
3055
3056
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3059
3060
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3062
3063 013414 005737 001242
3064 013420 100022
3065 013422 013746 000004
3066 013426 012737 013446 000004
3067 013434 005737 177060
3068 013440 012637 000004
3069 013444 000404
3070 013446 022626
3071 013450 012637 000004
3072 013454 000402
3073 013456 000137 013560
3074 013462 000137 013564
3075 013466
3076 013466 005037 177776

EOP:
INC PASCNT ;UPDATE PASS COUNT
MOV #1,TSTNO ;START AT FIRST TEST OF GROUP
TYPE ; RING BELL
MEPASS
MOV 42,R1
BEQ TSTENT ;NO ;ARE YOU ON ACT11?
RESET
LOGICAL: JSR PC,(R1)
NOP
NOP
NOP
JMP TSTENT ;GET ADDRESS OF FIRST TEST

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

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

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

;END OF SUBTEST SERVICE
;CHECK FOR LOOP ON CURRENT TEST
;CHECK FOR ESCAPE TO NEXT TEST ON ERROR
;UPDATE ITERATION COUNT AND EXIT TO NEXT TEST IF 0

;TEST XOR FLAG (XFLAG) FOR EXISTANCE OF XOR TESTER.

LOOP: TST XFLAG ;IS THERE AN XOR TESTER OUT THERE ?
BPL 4$ ;NO
MOV 4,-(SP) ;SAVE 4
MOV #1$,4 ;SET UP SVC ROUTINE
TST 177060 ;GOT SOMETHING LIKE SLAVE SYNC
MOV (SP)+,4 ;YOU BETCHUM
BR 2$
1$: POP2SP ;RESTORE STACK
MOV (SP)+,4 ;RESTORE 4
BR 3$
2$: JMP LOOPX ;GO TO NEXT TEST
3$: JMP TSTENT ;GO
4$: CLR PSW

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3077 013472 012777 000100 002260      MOV      #INTENA,@TKCSR
3078 013500 005737 015774      5$:     TST      ERRFLG           ;IF ERROR OCCURED FLAG=1,
3079 013504 001404                BEQ      LOOPS           ;CHECK FOR ESCAPE TO NEXT TEST
3080 013506 032777 002000 002254      BIT      #SW10,@SWR     ;IF SW10=1,
3081 013514 001021                BNE     LOOPX           ;ESCAPE TO NEXT TEST
3082 013516 032777 040000 002244  LOOPS:  BIT      #SW14,@SWR     ;IF SW14=1,
3083 013524 001041                BNE     LOOPL           ;LOOP ON CURRENT TEST
3084 013526 032777 004000 002234      BIT      #SW11,@SWR     ;IF SW11=1,
3085 013534 001011                BNE     LOOPX           ;INHIBIT ITERATIONS
3086 013536 005337 016006      DEC      ICOUNT         ;UPDATE ITERATION COUNT
3087 013542 001406                BEQ     LOOPX           ;IF ICOUNT=0, GO TO NEXT TEST
3088 013544 013716 016004      LOOPER: MOV     RETURN,(SP) ;SET UP FOR RETURN TO CURRENT TEST
3089 013550 042777 000100 002202      BIC     #INTENA,@TKCSR
3090 013556 000002                RTI
3091 013560 005237 016002      LOOPX: INC     TSTNO
3092 013564 013705 016002      TSTENT: MOV    TSTNO,R5   ;UPDATE TEST NUMBER
3093 013570 006305                ASL     R5              ;GET TEST NUMBER
3094 013572 006305                ASL     R5              ;MULTIPLY TEST NUMBER BY 4
3095 013574 063705 016034      ADD     TSTPNT,R5       ;GET POINTER FOR TEST ENTRY
3096 013600 011537 016004      MOV     (R5),RETURN     ;GET STARTING ADDRESS OF NEXT TEST
3097 013604 001640                BEQ     EOP             ;IF ADDRESS=0, GO TO END OF PASS
3098 013606 012516                MOV     (R5)+,(SP)     ;PUT STARTING ADDRSS ON STACK
3099 013610 011537 016006      MOV     (R5),ICOUNT     ;GET ITERATION COUNT FOR TEST
3100 013614 005037 015774      CLR     ERRFLG         ;CLEAR ERROR OCCURED FLAG
3101 013620 042777 000100 002132      BIC     #INTENA,@TKCSR
3102 013626 000002                RTI
3103 013630 012737 000001 016006  LOOPL:  MOV     #1,ICOUNT   ;GO TO TEST
3104 013636 000742                BR      LOOPER         ;SET UP TO EXIT TEST AFTER LOOP
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3111 013640 005737 015774      FREEZE: TST     ERRFLG   ;IF ERROR FLAG=0,
3112 013644 001413                BEQ     FREEZX          ;DO NOT TEST FOR ESCAPE
3113 013646 032777 002000 002114      BIT     #SW10,@SWR     ;IF SW10=1,
3114 013654 001341                BNE     LOOPX           ;ESCAPE TO NEXT TEST
3115 013656 032777 001000 002104      BIT     #SW09,@SWR     ;IF SW09=1,
3116 013664 001403                BEQ     FREEZX          ;FREEZE CURRENT DATA
3117 013666 017616 000000      MOV     @ (SP), (SP)   ;GET LOOPING ADDRESS
3118 013672 000002                RTI
3119 013674 062716 000002      FREEZX: ADD    #2,(SP)  ;LOOP
3120 013700 000002                RTI                    ;CONTINUE IN CURRENT TEST
3121
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3123 013702 005037 015774      ERR:    CLR     ERRFLG   ;GENERAL ERROR SERVICE
3124
3125 013706 005037 014122      ;ONLY PC OF FAILING TEST IS OUTPUT TO TELEPRINTER
3126 013712 005037 014134      ;ALWAYS TYPE PC+2
3127 013716 000451                CLR     ERRMSG         ;OF TEST THAT FAILED
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3133 ;XXXXXX TRANSITION ERROR
3134 ;EXP REC LINE
3135 ;AA BB CC
3136
3137 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3138 ; AA=EXPECTED INTERRUPT FLAGS (CORRESPONDS TO 4 MSB OF CONTROL REGISTER
3139 ; BB=RECEIVED INTERRUPT FLAGS (AS ABOVE)
3140 ; CC=LINE ON WHICH ERROR OCCURED
3141 013720 005037 015774 014122 ERRRT: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3142 013724 012737 016203 014122 MOV #MTRANE,ERRMSG ;TYPE 'TRANSITION ERROR'
3143 013732 012737 014210 014134 MOV #ERTAB1,ERTAB ;TABLE OF DATA
3144 013740 000440 BR ERRGEN ;OUTPUT ERROR MESSAGE
3145
3146 ;ON-LINE STATUS ERROR SERVICE
3147
3148 ;FORMAT FOR LINE STATUS ERROR IS
3149
3150 ;XXXX LINE ERROR
3151 ;EXP REC LINE
3152 ;AAA BBB CC
3153
3154 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3155 ; AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3156 ; BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3157 ; CC=LINE ON WHICH ERROR OCCURED
3158
3159 013742 005037 015774 014122 ERRS: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3160 013746 012737 016152 014122 MOV #MLINE1,ERRMSG ;TYPE 'LINE ERROR'
3161 ;EXP REC LINE''
3162 013754 012737 014226 014134 MOV #ERTAB2,ERTAB ;TABLE OF DATA
3163 013762 000427 BR ERRGEN ;OUTPUT ERROR MESSAGE
3164
3165 ;FATAL TRANSITION ERROR
3166 ;FORMAT FOR FATAL ERROR TYPEOUT IS
3167
3168 ;XXXXXX FATAL ERROR
3169 ;CSTAT LSTAT
3170 ;AAAAAA BBB
3171
3172 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3173 ; AAAAAA=RECEIVED CONTROL STATUS ON LINE THAT INTERRUPTED
3174 ; BBB=RECEIVED LINE STATUS ON LINE THAT INTERRUPTED
3175
3176 013764 005037 015774 014122 ERRN: CLR ERRFLG ;ALWAYS OUTPUT ALL DATA
3177 013770 012737 017571 014122 MOV #MFATAL,ERRMSG ;TYPE 'FATAL ERROR'
3178 ;CSTAT LSTAT''
3179 013776 012737 014244 014134 MOV #ERTAB3,ERTAB ;TABLE OF DATA
3180 014004 000416 BR ERRGEN ;OUTPUT ERROR MESSAGE
3181
3182 ;'CONTROL STATUS' ERROR SERVICE
3183 ;FORMAT FOR CONTROL STATUS ERROR IS
3184
3185 ;XXXXXX STATUS ERROR
3186 ;EXP REC
3187 ;AAAAAA BBBB
3188
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3189
3190 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3191 ; AAAAAA=EXPECTED CONTROL STATUS AT TIME OF ERROR
3192 ; BBBBBB=RECEIVED(ACTUAL) CONTROL STATUS AT TIME OF ERROR
3193
3194
3195 014006 012737 016064 014122 ERRCS: MOV #MSTATE,ERRMSG ;TYPE "STATUS ERROR
3196 ; "EXP REC"
3197 014014 012737 014256 014134 MOV #ERTAB4,ERTAB ;TABLE OF DATA
3198 014022 000407 BR ERRGEN ;OUTPUT DATA
3199
3200 ;LINE STATUS ERROR SERVICE
3201
3202 ;FORMAT FOR LINE STATUS ERROR IS
3203
3204 ;XXXX LINE ERROR
3205 ;EXP REC LINE SEL
3206 ;AAA DDD CC DD
3207
3208 ;WHERE XXXXXX=PC+2 OF CALL TO ERROR ROUTINE
3209 ; AAA=EXPECTED LINE STATUS AT TIME OF ERROR
3210 ; BBB=RECEIVED LINE STATUS AT TIME OF ERROR
3211 ; CC=LINE ON WHICH ERROR OCCURED
3212 ; DD=THE LINE ON WHICH THE PROGRAM WAS OPERATING
3213
3214
3215 014024 012737 016115 014122 ERRLS: MOV #MLINER,ERRMSG
3216 014032 012737 014270 014134 MOV #ERTAB5,ERTAB
3217 014040 000400 BR ERRGEN
3218
3219 ;GENERAL ERROR HANDLER
3220 ;TYPE PC+2 OF TEST THAT FAILED
3221 ;TYPE ERROR MESSAGE (IF ANY)
3222 ;TYPE DATA RELATING TO FAILURE (IF ANY)
3223
3224 014042 005037 177776 ERRGEN: CLR PSW
3225 014046 012777 000100 001704 MOV #INTENA,@TKCSR
3226 014054 032777 020000 001706 BIT #SW13,@SWR ;IF SW13=1, DO NOT
3227 014062 001026 BNE .3 ;TYPE ERROR MESSAGE
3228 014064 021637 016026 CMP (SP),SAVPC ;SAME ERROR AGAIN
3229 014070 001402 BEQ .+6
3230 014072 005037 015774 CLR ERRFLG
3231 014076 104005 SAV05P
3232 014100 005737 015774 TST ERRFLG ;IF ERROR OCCURED FLAG=1,
3233 014104 001007 BNE .1 ;TYPE DATA ONLY
3234 014106 104006 OCTASC ;TYPE PC+2 OF CALL TO ERROR ROUTINE
3235 014110 014202 ERTAB0
3236 014112 005737 014122 TST ERRMSG
3237 014116 001407 BEQ .2
3238 014120 104004 TYPE ;TYPE ERROR MESSAGE
3239 014122 000000 ERRMSG: 0
3240 014124 005737 014134 .1: TST ERTAB
3241 014130 001402 BEQ .2
3242 014132 104006 OCTASC ;TYPE DATA
3243 014134 000000 ERTAB: 0
3244 014136 104007 .2: RES05 ;RESTORE R0-R5

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3246                ;ERROR HALT SERVICE
3247
3248 014140 032777 100000 001622 .3:  BIT    #SW15,@SWR          ;IF SW15=0, DO NOT
3249 014146 001406                BEQ    .4                ;HALT ON ERROR
3250 014150 000000                HALT                    ;HALT AND DISPLAY ADDRESS OF FAILING TEST
3251 014152 022737 000176 015770    CMP    #SWREG,SWR
3252 014160 001001                BNE    .4
3253 014162 104025                CNTLUU
3254 014164 012737 000001 015774 .4:  MOV    #1,ERRFLG          ;SET ERROR OCCURED FLAG
3255 014172 042777 000100 001560    BIC    #INTENA,@TKCSR
3256 014200 000002                RTI                    ;RETURN TO TEST
3257
3258
3259
3260                ;TABLE S OF DATA FOR ERROR TYPEOUT
3261
3262                ;TABLE FOR TRANSITION STATUS ERROR
3263
3264 014202 000001                ERTAB0: 1
3265 014204 000006                6
3266 014206 016026                SAVPC
3267 014210 000003                ERTAB1: 3
3268 014212 000002                2
3269 014214 016022                SAVR5          ;CONTAINS EXPECTED TRANSITION STATUS
3270 014216 000002                2
3271 014220 016020                SAVR4          ;CONTAINS RECEIVED TRANSITION STATUS
3272 014222 000002                2
3273 014224 016016                SAVR3          ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3274 014226 000003                ERTAB2: 3
3275 014230 000003                3
3276 014232 016022                SAVR5          ;CONTAINS EXPECTED LINE STATUS
3277 014234 000003                3
3278 014236 016020                SAVR4          ;CONTAINS RECEIVED LINE STATUS
3279 014240 000002                2
3280 014242 016016                SAVR3          ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3281 014244 000002                ERTAB3: 2
3282 014246 000006                6
3283 014250 016020                SAVR4
3284 014252 000003                3
3285 014254 016016                SAVR3
3286 014256 000002                ERTAB4: 2
3287 014260 000006                6
3288 014262 016022                SAVR5          ;CONTAINS EXPECTED CONTROL STATUS
3289 014264 000006                6
3290 014266 016020                SAVR4          ;CONTAINS RECEIVED CONTROL STATUS
3291 014270 000004                ERTAB5: 4
3292 014272 000003                3
3293 014274 016022                SAVR5          ;CONTAINS EXPECTED LINE STATUS
3294 014276 000003                3
3295 014300 016020                SAVR4          ;CONTAINS RECEIVED LINE STATUS
3296 014302 000002                2
3297 014304 016016                SAVR3          ;CONTAINS NUMBER OF LINE WHERE ERROR OCCURED
3298 014306 000002                2
3299 014310 016012                SAVR1          ;CONTAINS NUMBER OF LINE UNDER TEST
3300

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3301 014312 000001          SWRTB: 1
3302 014314 000006          6
3303 014316 000176          SWREG
3304
3305          ;CONVERT OCTAL TO ASCII AND OUTPUT ON TTY
3306 014320 017605 000000  OCTASN: MOV @ (SP),R5          ;GET POINTER TO TABLE OF DATA
3307 014324 062716 000002  ADD #2,(SP)
3308 014330 012737 000010 014660  MOV #10,RADIX
3309 014336 012704 020001  MOV #MBCD+2,R4          ;SET UP POINTER FOR CONVERTED DATA
3310 014342 012537 016030  MOV (R5)+,WRDCNT        ;GET NUMBER OF WORDS TO BE CONVERTED
3311 014346 012537 016032  OCTAS1: MOV (R5)+,CHRCNT ;GET NUMBER OF DIGITS IN WORD
3312 014352 013537 014654  MOV @ (R5)+,BINWRD     ;GET DATA TO BE CONVERTED
3313 014356 104010  CONVERT ;CONVERT TO ASCII
3314 014360 005337 016030  DEC WRDCNT              ;IF ALL DATA IS NOT CONVERTED
3315 014364 001370  BNE OCTAS1              ;CONTINUE
3316 014366 112714 000100  MOVB #100,(R4)         ;PUT TERMINATOR AT END OF MESSAGE
3317 014372 005737 014510  TST SMLN
3318 014376 001002  BNE 1$
3319 014400 104004  TYPE ;OUTPUT CONVERTED DATA
3320 014402 017777  MBCD ;TO TELETYPE
3321 014404 000002  1$: RTI ;RETURN TO CALLING ROUTINE
3322
3323
3324 014406 005037 014504  CNTLU: CLR TMP1
3325 014412 012737 000001 014506  MOV #1,TMP2
3326 014420 104004  TYPE
3327 014422 017755  $$SWREQ
3328 014424 052737 000001 014510  BIS #1,SMLN
3329 014432 104006  OCTASC
3330 014434 014312  SWRTB
3331 014436 104004  TYPE
3332 014440 020001  MBCD+2
3333 014442 104013  INSTRG
3334 014444 017765  $NEWIS
3335 014446 000000  0
3336 014450 177777  177777
3337 014452 014504  TMP1
3338 014454 123727 015324 000015  CMPB INBUF,#15
3339 014462 001403  BEQ 1$
3340 014464 013777 014504 001276  MOV TMP1,@SWR
3341 014472 005037 014506  1$: CLR TMP2
3342 014476 005037 014510  CLR SMLN
3343 014502 000002  RTI
3344 014504 000000  TMP1: 0
3345 014506 000000  TMP2: 0
3346 014510 000000  SMLN: 0
3347
3348          ;INTEGER BINARY TO ASCII CONVERSION COMMON ROUTINE
3349
3350 014512 013700 016032  BINASC: MOV CHRCNT,R0          ;SET UP COUNT FOR DIGITS TO BE CONVERTED
3351 014516 012701 020120  MOV #TEMTAB,R1        ;SET UP POINTER FOR TEMPORARY STORAGE
3352 014522 104011  BINASA: EXTRACT ;EXTRACT ONE DIGIT
3353 014524 062737 000060 014656  ADD #60,DIGIT ;CONVERT FROM BCD TO ASCII
3354 014532 113721 014656  MOVB DIGIT,(R1)+ ;STORE DIGIT
3355 014536 005300  DEC R0 ;IF ALL DIGITS NOT DONE,
3356 014540 001370  BNE BINASA ;CONTINUE

```

```

3357 014542 114124          BINASB: MOVB    -(R1),(R4)+      ;REVERSE ORDER OF DIGITS
3358 014544 005337 016032    DEC      CHRCNT      ;IF ALL CHARACTERS ARE NOT
3359 014550 001374          BNE      BINASB      ;IN ORDER, CONTINUE
3360 014552 112724 000040    MOVB    #40,(R4)+    ;INSERT SPACE AFTER LAST DIGIT
3361 014556 000002          RTI                    ;RETURN TO CALLING ROUTINE
3362
3363                          ;SINGLE PRECISION UNSIGNED DIVIDE LOOP
3364
3365 014560 005037 014656    DIVI:   CLR      DIVIDH
3366 014564 023737 014656 014660 DIVIU:  CMP      DIVIDH,DIVIS
3367 014572 103027          BHIS    DIVIB
3368 014574 012737 000021 014634    MOV     #17.,DIVCNT
3369 014602 000407          BR     DIVIC
3370 014604 023737 014656 014660 DIVIA:  CMP      DIVIDH,DIVIS
3371 014612 103403          BLO    DIVIC
3372 014614 163737 014660 014656    SUB     DIVIS,DIVIDH
3373 014622 006137 014654    DIVIC:  ROL     DIVIDL
3374 014626 006137 014656    ROL     DIVIDH
3375 014632 005327          DEC     (PC)+
3376 014634 000000          DIVCNT: 0
3377 014636 001362          BNE    DIVIA
3378 014640 006037 014656    ROR     DIVIDH
3379 014644 005137 014654    COM     DIVIDL
3380 014650 000002          RTI
3381 014652 000000          DIVIB:  HALT
3382 014654 000000          DIVIDL: 0
3383 014656 000000          DIVIDH: 0
3384 014660 000000          DIVIS:  0
3385
3386                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
3387
3388 014662 016637 000004 016026 SV05P:  MOV     4(SP),SAVPC
3389
3390                          ;SAVE R0-R5
3391
3392 014670 010537 016022    SV05:  MOV     R5,SAVR5
3393 014674 010437 016020    MOV     R4,SAVR4
3394 014700 010337 016016    MOV     R3,SAVR3
3395 014704 010237 016014    MOV     R2,SAVR2
3396 014710 010137 016012    MOV     R1,SAVR1
3397 014714 010037 016010    MOV     R0,SAVR0
3398 014720 000002          RTI
3399
3400                          ;RESTORE R0-R5
3401
3402 014722 013700 016010    RS05:  MOV     SAVR0,R0
3403 014726 013701 016012    MOV     SAVR1,R1
3404 014732 013702 016014    MOV     SAVR2,R2
3405 014736 013703 016016    MOV     SAVR3,R3
3406 014742 013704 016020    MOV     SAVR4,R4
3407 014746 013705 016022    MOV     SAVR5,R5
3408 014752 000002          RTI
3409
3410                          ;TELETYPE OUTPUT ROUTINE
3411
3412 014754 017605 000000    TYPER: MOV     @ (SP),R5      ;GET POINTER TO MESSAGE (ON STACK)

```

3413 014760 062716 000002
 3414 014764 105777 000774
 3415 014770 100375
 3416 014772 122715 000100
 3417 014776 001001
 3418 015000 000002
 3419 015002 122715 000042
 3420 015006 001406
 3421 015010 122715 000045
 3422 015014 001403
 3423 015016 112577 000744
 3424 015022 000760
 3425 015024 142715 000040
 3426 015030 152715 000010
 3427 015034 000770
 3428
 3429
 3430
 3431
 3432
 3433
 3434
 3435
 3436 015036
 3437 015036 011605
 3438 015040 012537 015064
 3439 015044 012537 015316
 3440 015050 012537 015320
 3441 015054 012537 015322
 3442 015060 010516
 3443 015062 104004
 3444 015064 000000
 3445 015066 012704 015324
 3446 015072 012703 000007
 3447 015076 105777 000656
 3448 015102 100375
 3449 015104 005037 002152
 3450 015110 117737 000646 014504
 3451 015116 142737 000200 014504
 3452 015124 113714 014504
 3453 015130 121427 000007
 3454 015134 001420
 3455 015136 121427 000015
 3456 015142 001420
 3457 015144 121427 000025
 3458 015150 001003
 3459 015152 005037 014504
 3460 015156 000741
 3461 015160 112477 000602
 3462 015164 105777 000574
 3463 015170 100375
 3464 015172 005303
 3465 015174 001340
 3466 015176 104004
 3467 015200 017510
 3468 015202 000727

```

ADD #2,(SP) ;CORRECT STACK FOR RETURN
TYPERA: TSTB @TPCSR ;WAIT FOR TELEPRINTER READY
        BPL TYPERA
        CMPB #100,(R5) ;IF CHARACTER IS NOT TERMINATOR, TYPE IT
        BNE TYPER1
        RTI ;CHARACTER IS TERMINATOR, EXIT
TYPER1: CMPB #42,(R5) ;IF CHARACTER=42,
        BEQ TYPECL ;TYPE LINE FEED
        CMPB #45,(R5) ;IF CHARACTER=45,
        BEQ TYPECL ;TYPE CARRIAGE RETURN
TYPER2: MOVB (R5)+,@TPDDBR ;GET CHARACTER
        BR TYPERA ;TYPE IT
TYPECL: BICB #40,(R5) ;CONVERT CODE OF 42 OR 45
        BISB #10,(R5) ;TO 12 OR 15
        BR TYPER2 ;TYPE IT

;INPUT OCTAL CHARACTER STRING
;TERMINATOR IS CARRIAGE RETURN
;IF MORE THAN SEVEN (7) CHARACTERS INCLUDING
;CARRIAGE RETURN ARE TYPED, THE IN PUT WILL
;BE RE-REQUESTED

INSTR: MOV (SP),R5 ;GET POINTER TO ARGUMENTS
        MOV (R5)+,MSG ;GET MESSAGE TO BE TYPED
        MOV (R5)+,LOLIM ;GET LOWER LIMIT
        MOV (R5)+,HILIM ;GET UPPER LIMIT
        MOV (R5)+,STORE ;GET DATA STORAGE LOCATION
        MOV R5,(SP) ;RESTORE STACK
INSTR1: TYPE ;TYPE MESSAGE
MSG: 0
        MOV #INBUF,R4 ;SET UP CHARACTER INPUT BUFFER
        MOV #7,R3 ;SET UP INPUT COUNT
INSTRB: TSTB @TKCSR ;WAIT FOR CHARACTER
        BPL INSTRB
INSTRBB: CLR SINTFL
        MOVB @TKDDBR,TMP1
        BICB #200,TMP1
        MOVB TMP1,(R4)
        CMPB (R4),#7
        BEQ INSTRER
        CMPB (R4),#15 ;IS CHARACTER TERMINATOR
        BEQ INSTR2 ;IF IT IS, CONVERT INPUT STRING
        CMPB (R4),#25
        BNE 1$
        CLR TMP1
        BR INSTR1
1$: MOVB (R4)+,@TPDDBR ;TYPE CHARACTER IF NOT TERMINATOR
INSTRC: TSTB @TPCSR ;WAIT TO FINISH TYPING
        BPL INSTRC
        DEC R3 ;UPDATE RECEIVED COUNT
        BNE INSTRB ;AND CONTINUE
INSTRER: TYPE ;TYPE '?' AND RE-REQUEST INPUT
        MQM
        BR INSTR1
    
```



```

3469
3470
3471
3472 015204 104004
3473 015206 017514
3474 015210 012704 015324
3475 015214 005003
3476 015216 122714 000015
3477
3478 015222 001431
3479 015224 121427 000060
3480 015230 002762
3481 015232 121427 000067
3482 015236 003357
3483 015240 142714 000060
3484 015244 152403
3485 015246 121427 000015
3486 015252 001404
3487 015254 006303
3488 015256 006303
3489 015260 006303
3490 015262 000760
3491
3492
3493
3494 015264 020337 015320
3495 015270 101342
3496 015272 020337 015316
3497 015276 103737
3498 015300 010377 000016
3499 015304 000002
3500 015306 005737 014506
3501 015312 001731
3502 015314 000002
3503 015316 000000
3504 015320 000000
3505 015322 000000
3506 015324 000000
3507 015346
3508
3509
3510
3511 015346 010046
3512 015350 010146
3513 015352 010246
3514 015354 010346
3515 015356 010446
3516 015360 010546
3517 015362 013746 000024
3518 015366 010637 016024
3519 015372 012737 015404 000024
3520 015400 000000
3521 015402 000776
3522
3523
3524

```

```

;CONVERT ASCII STRING TO OCTAL
INSTR2: TYPE
MCR LF
MOV #INBUF,R4 ;GET POINTER TO ASCII STRING
CLR R3
CMPB #15,(R4) ;IS TERMINATOR FIRST
;CHARACTER IN STRING
INSTRD: BEQ CHCK
CMPB (R4),#60 ;IS CHARACTER OCTAL DIGIT
BLT INSTER ;IF 67>=CHAR>=60
CMPB (R4),#67 ;CHARACTER IS OCTAL DIGIT
BGT INSTER
BICB #60,(R4) ;STRIP ASCII
BISB (R4)+,R3 ;GENERATE OCTAL NUMBER
CMPB (R4),#15 ;IF END OF STRING, CHECK LIMITS
BEQ INSTER3
ASL R3 ;MULTIPLY DIGIT BY 10 (OCTAL)
ASL R3
ASL R3
BR INSTERD ;GET NEXT DIGIT
;TEST NUMBER TO SEE IF IT IS WITHIN LIMITS
INSTR3: CMP R3,HILIM ;TEST HI LIMIT
BHI INSTER ;IF R3>HILIM, ERROR
CMP R3,LOLIM ;TEST LOW LIMIT
BLO INSTER ;IF R3<LOLIM, ERROR
MOV R3,@STORE ;STORE NUMBER
RTI ;EXIT
CHCK: TST TMP2
BEQ INSTER
RTI
LOLIM: 0
HILIM: 0
STORE: 0
INBUF: 0
.=.+20 ;ENTER HERE ON POWER FAILURE
PFAIL: MOV R0,-(SP) ;SAVE R0-R5 ON PROCESSOR STACK
MOV R1,-(SP)
MOV R2,-(SP)
MOV R3,-(SP)
MOV R4,-(SP)
MOV R5,-(SP)
MOV 24,-(SP)
MOV SP,SAVSP ;SAVE STACK POINTER
MOV #RESTART,24 ;SET UP FOR POWER UP TRAP
HALT ;HALT ON POWER DOWN NORMAL
BR .-2
;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED

```

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3525 015404 013706 016024 RESTAR: MOV SAVSP,SP ;RESTORE STACK POINTER
3526 015410 012605 MOV (SP)+,R5 ;RESTORE R0-R5
3527 015412 012604 MOV (SP)+,R4
3528 015414 012603 MOV (SP)+,R3
3529 015416 012602 MOV (SP)+,R2
3530 015420 012601 MOV (SP)+,R1
3531 015422 012600 MOV (SP)+,R0
3532 015424 012737 015346 000024 MOV #PFAIL,24 ;SET UP FOR POWER FAILURE
3533 015432 005726 POP1SP
3534 015434 104004 TYPE
3535 015436 017667 MPFAIL
3536 015440 005737 001730 TST TIPFLG
3537 015444 001002 BNE RESTA1
3538 015446 000137 001254 JMP START0
3539 015452 104004 RESTA1: TYPE
3540 015454 017707 MPF1
3541 015456 012716 000340 MOV #340,(SP)
3542 015462 005746 PUSH1SP
3543 015464 000137 013564 JMP TSTENT
3544
3545
3546 ;THE FOLLOWING AUTO VECTORS USING THE FIRST BASE ADDRESS
3547 015470 013746 000020 XOR: MOV 20,-(SP) ;SAVE 20
3548 015474 013746 000022 MOV 22,-(SP) ;SAVE 22
3549 015500 012737 015672 000020 MOV #2$,20 ;IOT INTR VECTOR
3550 015506 012737 000340 000022 MOV #340,22 ;IOT INTR LVL
3551 015514 012737 000300 013274 MOV #300,DATA1
3552 015522 012737 000302 013276 MOV #302,DATA2
3553 015530 013777 013276 175536 1$: MOV DATA2,@DATA1
3554 015536 012777 000004 175532 MOV #IOT,@DATA2 ;IOT TRAP
3555 015544 062737 000004 013274 ADD #4,DATA1
3556 015552 062737 000004 013276 ADD #4,DATA2
3557 015560 023727 013274 001000 CMP DATA1,#1000
3558 015566 001360 BNE 1$
3559 015570 012737 000000 016002 MOV #0,TSTNO ;SET UP DEFAULT
3560 015576 012737 020246 016034 MOV #TSTTBO,TSTPNT
3561 015604 052737 000340 177776 BIS #340,PS ;PREVENT INTERRUPTS
3562 015612 005077 000136 CLR @DMBCSR
3563 015616 012777 000100 000130 MOV #INTENA,@DMBCSR ;SET INTERRUPT ENABLE
3564 015624 042737 000340 177776 BIC #340,PS ;ALLOW INTERRUPTS
3565 015632 052777 000200 000114 BIS #DONE,@DMBCSR ;SET DONE..AND INTERRUPT
3566 015640 000240 NOP
3567 015642 012637 000022 MOV (SP)+,22 ;YOU DIDN'T INTERRUPT ?
3568 015646 012637 000020 MOV (SP)+,20 ;RESTORE 20 & 22
3569 015652 005077 000076 CLR @DMBCSR ;STOP ALL INTERRUPT
3570 015656 052737 000340 177776 BIS #340,PS
3571 015664 104012 ERROR
3572 015666 000000 HALT ;YOU SHOULD HAVE INTERRUPTED
3573 015670 000426 BR 3$
3574 015672 011637 015750 2$: MOV (SP),DMBVEC ;EXTRACT VECTOR +4
3575 015676 162737 000002 015750 SUB #2,DMBVEC ;CREATE LVL
3576 015704 013737 015750 015752 MOV DMBVEC,DMBLVL ;SAVE
3577 015712 162737 000002 015750 SUB #2,DMBVEC ;CREATE AND SAVE VEC
3578 015720 012737 000340 177776 MOV #340,PS ;PREVENT INTERRUPTS
3579 015726 005077 000022 CLR @DMBCSR
3580 015732 022626 POP2SP

```

```
3581 015734 022626
3582 015736 012637 000022
3583 015742 012637 000020
3584 015746 000207 3$:
3585
3586
3587
3588
3589 015750 000540
3590 015752 000542
3591 015754 164200
3592 015756 164202
3593 015760 177560
3594 015762 177562
3595 015764 177564
3596 015766 177566
3597 015770 177570
3598 015772 177570
3599
3600
3601
3602 015774 000000
3603 015776 000000
3604 016000 000000
3605 016002 000000
3606 016004 000000
3607 016006 000000
3608 016010 000000
3609 016012 000000
3610 016014 000000
3611 016016 000000
3612 016020 000000
3613 016022 000000
3614 016024 000000
3615 016026 000000
3616 016030 000000
3617 016032 000000
3618 016034 020246
3619 016036 000000
3620 016040 000000
3621 016042 000000
3622 016044 000000
3623 016046 000000
3624 016050 000000
3625 016052 000000
3626 016054 000000
3627 016056 000000
3628 016060 000000
3629 016062 000000
3630
3631 016064 052123 052101 051525
3632 016072 042440 051122 051117
3633 016100 021045 054105 020120
3634 016106 020040 051040 041505
3635 016114 100
3636 016115 114 047111 020105
```

POP2SP
MOV (SP)+,22 ;RESTORE 22
MOV (SP)+,20 ;RESTORE 20
RTS PC

;INDIRECT POINTERS
DMBVEC: 540 ;DM11-BA INTERRUPT VECTOR
DMBLVL: 542 ;DM11-BA ONTERRUPT PRIORITY
DMBCSR: 164200 ;DM11-BA CONTROL STATUS REGISTER
DMBLSR: 164202 ;DM11-BA CONTROL STATUS REGISTER
TKCSR: 177560
TKDBR: 177562
TPCSR: 177564
TPDBR: 177566
SWR: 177570
DISPLAY:177570

;PROGRAM VARIABLES
ERRFLG: 0
TRACON: 0
PASCNT: 0
TSTNO: 0
RETURN: 0
ICOUNT: 0
SAVR0: 0
SAVR1: 0
SAVR2: 0
SAVR3: 0
SAVR4: 0
SAVR5: 0
SAVSP: 0
SAVPC: 0
WRDCNT: 0
CHRCNT: 0
TSTPNT: TSTTBO
TSTMAX: 0
LINFLG: 0
LINE: 0
LINORG: 0
LINANS: 0
ANSFLG: 0
ORGFLG: 0
TIME1: 0
TIME2: 0
TIFLG: 0
RNGRET: 0
MSTATE: .ASCII ;STATUS ERROR%'EXP REC@;
MLINER: .ASCII ;LINE ERROR%'EXP REC LINE SEL@;

3637	016122	051105	047522	022522	
3638	016130	042442	050130	051040	
3639	016136	041505	046040	047111	
3640	016144	020105	042523	040114	
3641	016152	044514	042516	042440	MLINE1: .ASCII ;LINE ERROR%'EXP REC LINE@;
3642	016160	051122	051117	021045	
3643	016166	054105	020120	042522	
3644	016174	020103	044514	042516	
3645	016202	100			
3646	016203	124	040522	051516	MTRANE: .ASCII ;TRANSITION ERROR%'EXP REC LINE@;
3647	016210	052111	047511	020116	
3648	016216	051105	047522	022522	
3649	016224	042442	050130	051040	
3650	016232	041505	046040	047111	
3651	016240	040105			
3652	016242	021045	021045	044504	DIALM: .ASCII ;%'%'DIAL ANSWERING DATA SET%'@;
3653	016250	046101	040440	051516	
3654	016256	042527	044522	043516	
3655	016264	042040	052101	020101	
3656	016272	042523	022524	040042	
3657	016300	021045	021045	030061	MT103T: .ASCII ;%'%'103A MODEM CONNECT-DISCONNECT TEST%'@;
3658	016306	040463	046440	042117	
3659	016314	046505	041440	047117	
3660	016322	042516	052103	042055	
3661	016330	051511	047503	047116	
3662	016336	041505	020124	042524	
3663	016344	052123	021045	100	
3664	016351	045	022442	031042	MT202T: .ASCII ;%'%'202C MODEM CONNECT-DISCONNECT TEST%'@;
3665	016356	031060	020103	047515	
3666	016364	042504	020115	047503	
3667	016372	047116	041505	026524	
3668	016400	044504	041523	047117	
3669	016406	042516	052103	052040	
3670	016414	051505	022524	040042	
3671	016422	021045	021045	051117	MSELOR: .ASCII ;%'%'ORIGINATE LINE-@;
3672	016430	043511	047111	052101	
3673	016436	020105	044514	042516	
3674	016444	040055			
3675	016446	021045	047101	053523	MSELAN: .ASCII ;%'ANSWER LINE-@;
3676	016454	051105	046040	047111	
3677	016462	026505	100		
3678	016465	045	030442	031460	MT103A: .ASCII ;%'103A TEST COMPLETE%'@;
3679	016472	020101	042524	052123	
3680	016500	041440	046517	046120	
3681	016506	052105	022505	040042	
3682	016514	021045	030062	041462	MT202A: .ASCII ;%'202C TEST COMPLETE%'@;
3683	016522	052040	051505	020124	
3684	016530	047503	050115	042514	
3685	016536	042524	021045	100	
3686	016543	045	051442	051124	MDISC: .ASCII ;%'STRIKE ANY TTY KEY TO TEST DISCONNECT@;
3687	016550	045511	020105	047101	
3688	016556	020131	052124	020131	
3689	016564	042513	020131	047524	
3690	016572	052040	051505	020124	
3691	016600	044504	041523	047117	
3692	016606	042516	052103	100	

3693 016613 045 022442 034042
3694 016620 046040 047111 020105
3695 016626 041523 047101 042516
3696 016634 020122 042524 052123
3697 016642 021045 100
3698 016645 045 022442 041442
3699 016652 045532 043515 030101
3700 016660 042040 030515 026461
3701 016666 040502 046440 042117
3702 016674 046505 041440 047117
3703 016702 051124 022514 042
3704 016707 045 042
3705 016711 124 051505 020124
3706 016716 051107 052517 020120
3707 016724 035060 021045
3708 016730 043117 020106 044514
3709 016736 042516 052040 051505
3710 016744 051524 052440 042523
3711 016752 047111 020107 032065
3712 016760 030455 033464 030060
3713 016766 052040 051505 020124
3714 016774 047503 047116 041505
3715 017002 047524 051522 020056
3716 017010 044506 051522 020124
3717 017016 042524 052123 020075
3718 017024 022460 042
3719 017027 124 051505 020124
3720 017034 051107 052517 020120
3721 017042 035061 021045
3722 017046 043117 020106 044514
3723 017054 042516 052040 051505
3724 017062 051524 052440 042523
3725 017070 047111 020107 031510
3726 017076 032462 020066 042524
3727 017104 052123 041440 047117
3728 017112 042516 052103 051117
3729 017120 020123 047101 020104
3730 017126 031510 033461 046455
3731 017134 050040 047101 046105
3732 017142 022456 042
3733 017145 106 044522 052123
3734 017152 052040 051505 036524
3735 017160 030440 030060 021045
3736 017166 042524 052123 043440
3737 017174 047522 050125 031040
3738 017202 022472 042
3739 017205 103 047117 042516
3740 017212 052103 042057 051511
3741 017220 047503 047116 041505
3742 017226 020124 042524 052123
3743 017234 043040 051117 041040
3744 017242 046105 020114 030061
3745 017250 040463 046440 042117
3746 017256 046505 026523 044506
3747 017264 051522 020124 042524
3748 017272 052123 020075 030062

M16: .ASCII ;%'%'8 LINE SCANNER TEST%'':

MTITLE: .ASCII ;%'%'CZKMGAO DM11-BA MODEM CONTRL%'':

.ASCII ;%'':
.ASCII ;TEST GROUP 0:'%':

.ASCII ;OFF LINE TESTS USEING 54-14700 TEST CONNECTORS. FIRST TEST= 0%'':

.ASCII ;TEST GROUP 1:'%':

.ASCII ;OFF LINE TESTS USEING H3256 TEST CONNECTORS AND H317-M PANEL.'%':

.ASCII ;FRIST TEST= 100%'':

.ASCII ;TEST GROUP 2:'%':

.ASCII ;CONNECT/DISCONNECT TEST FOR BELL 103A MODEMS-FIRST TEST= 200:'%':

3749	017300	035060	021045		
3750	017304	042524	052123	043440	.ASCII ;TEST GROUP 3:%'';
3751	017312	047522	050125	031440	
3752	017320	022472	042		
3753	017323	103	047117	042516	.ASCII ;CONNECT/DISCONNECT TEST FOR BELL 202C MODEMS-FRIST TEST= 300%'a;
3754	017330	052103	042057	051511	
3755	017336	047503	047116	041505	
3756	017344	020124	042524	052123	
3757	017352	043040	051117	041040	
3758	017360	046105	020114	030062	
3759	017366	041462	046440	042117	
3760	017374	046505	026523	051106	
3761	017402	051511	020124	042524	
3762	017410	052123	020075	030063	
3763	017416	022460	040042		
3764	017422	021045	042526	052103	MVECTOR: .ASCII ;%'VECTOR ADDRESS-a;
3765	017430	051117	040440	042104	
3766	017436	042522	051523	040055	
3767	017444	021045	047503	052116	MREGAD: .ASCII ;%'CONTROL REGISTER ADDRESS-a;
3768	017452	047522	020114	042522	
3769	017460	044507	052123	051105	
3770	017466	040440	042104	042522	
3771	017474	051523	040055		
3772	017500	021045	042524	052123	MTEST: .ASCII ;%'TEST-a;
3773	017506	040055			
3774	017510	020040	040077		MQM: .ASCII ; ?a;
3775	017514	021045	100		MCRLF: .ASCII ;%'a;
3776	017517	045	051442	047111	MLINE: .ASCII ;%'SINGLE LINE CABLE TEST%'a;
3777	017524	046107	020105	044514	
3778	017532	042516	041440	041101	
3779	017540	042514	052040	051505	
3780	017546	022524	040042		
3781	017552	021045	044514	042516	MLINEI: .ASCII ;%'LINE NUMBER-a;
3782	017560	047040	046525	042502	
3783	017566	026522	100		
3784	017571	106	052101	046101	MFATAL: .ASCII ;FATAL ERROR%'CSTAT LSTATa;
3785	017576	042440	051122	051117	
3786	017604	021045	051503	040524	
3787	017612	020124	046040	052123	
3788	017620	052101	100		
3789	017623	045	052042	040522	MTRNDE: .ASCII ;%'TRANSITION DETECTED%'CSTAT LSTATa;
3790	017630	051516	052111	047511	
3791	017636	020116	042504	042524	
3792	017644	052103	042105	021045	
3793	017652	051503	040524	020124	
3794	017660	046040	052123	052101	
3795	017666	100			
3796	017667	045	050042	053517	MPFAIL: .ASCII ;%'POWER FAILUREa;
3797	017674	051105	043040	044501	
3798	017702	052514	042522	100	
3799	017707	055	052503	051122	MPF1: .ASCII ;-CURRENT TEST WILL RESTART%'a;
3800	017714	047105	020124	042524	
3801	017722	052123	053440	046111	
3802	017730	020114	042522	052123	
3803	017736	051101	022524	040042	
3804	017744	041536	100		MCONTC: .ASCII ;^Ca;

3805	017747	136	040126		MCONTV: .ASCII ;^V@;
3806	017752	046136	100		MCONTL: .ASCII ;^L@;
3807	017755	045	051442	051127	\$SWREQ: .ASCII ;%'SWR= @;
3808	017762	020075	100		
3809	017765	040	020040	047040	\$NEWS: .ASCII ; NEW= @;
3810	017772	053505	020075	100	
3811	017777	045	042		MBCD: .ASCII ;%'';
3812		020101			.=.+100
3813		020102			.EVEN
3814	020102	021045	047105	020104	MEPASS: .ASCII ;%'END PASS @;
3815	020110	040520	051523	020040	
3816	020116	040040			
3817	020120	000000			TEMTAB: 0
3818		020132			.=.+10
3819					
3820	020132	000000			0
3821					
3822					;EMT DISPATCH TABLE
3823					
3824	020134	014006			EMTTAB: ERRCS
3825	020136	014024			ERRLS
3826	020140	013414			LOOP
3827	020142	013640			FREEZE
3828	020144	014754			TYPFR
3829	020146	014662			SV05P
3830	020150	014320			OCTASN
3831	020152	014722			RS05
3832	020154	014512			BINASC
3833	020156	014560			DIVI
3834	020160	013702			ERR
3835	020162	015036			INSTR
3836	020164	013720			ERRT
3837	020166	013742			ERRS
3838	020170	013764			ERRN
3839	020172	012350			GETLIN
3840	020174	012404			SETUPS
3841	020176	012640			CKRNG
3842	020200	012736			WAITR
3843	020202	013024			CKTRN
3844	020204	012774			WAITRR
3845	020206	014406			CNTLU
3846	020210	013402			CKINT
3847	020212	001732			KBDINT
3848	020214	000000			EMTLIM: 0
3849	020216	020246			TSTLST: TSTTB0
3850	020220	020450			TSTTB1
3851	020222	020512			TSTTB2
3852	020224	020520			TSTTB3
3853	020226	000000			0
3854	020230	000000			0
3855	020232	000000			0
3856	020234	000000			0
3857	020236	000037			GRO: N0-1
3858	020240	000007			N1-100-1
3859	020242	000001			N2-200-1
3860	020244	000000			N3-300-1

: CALLED BY EMT CNTLUU
: CALLED BY EMT CKINTT
: CALLED BY EMT KBDIN

3861	020246	002154	TSTTB0: T0
3862	020250	000001	1
3863	020252	002202	T1
3864	020254	004000	TIMES
3865	020256	002244	T2
3866	020260	004000	TIMES
3867	020262	002306	T3
3868	020264	004000	TIMES
3869	020266	002350	T4
3870	020270	004000	TIMES
3871	020272	002412	T5
3872	020274	004000	TIMES
3873	020276	002454	T6
3874	020300	004000	TIMES
3875	020302	002530	T7
3876	020304	004000	TIMES
3877	020306	002604	T10
3878	020310	004000	TIMES
3879	020312	002674	T11
3880	020314	004000	TIMES
3881	020316	002764	T12
3882	020320	004000	TIMES
3883	020322	003054	T13
3884	020324	004000	TIMES
3885	020326	003144	T14
3886	020330	004000	TIMES
3887	020332	003234	T15
3888	020334	004000	TIMES
3889	020336	003322	T16
3890	020340	004000	TIMES
3891	020342	003410	T17
3892	020344	004000	TIMES
3893	020346	003476	T20
3894	020350	004000	TIMES
3895	020352	003564	T21
3896	020354	004000	TIMES
3897	020356	003636	T22
3898	020360	000400	TIMES
3899	020362	003720	T23
3900	020364	000400	TIMES
3901	020366	004116	T24
3902	020370	000400	TIMES
3903	020372	004274	T25
3904	020374	000200	TIMES
3905	020376	004444	T26
3906	020400	000200	TIMES
3907	020402	004636	T27
3908	020404	000200	TIMES
3909	020406	005030	T30
3910	020410	000200	TIMES
3911	020412	005222	T31
3912	020414	000200	TIMES
3913	020416	005414	T32
3914	020420	000200	TIMES
3915	020422	005610	T33
3916	020424	000200	TIMES

3917	020426	006004	T34
3918	020430	000200	TIMES
3919	020432	006200	T35
3920	020434	004000	TIMES
3921	020436	006340	T36
3922	020440	004000	TIMES
3923	020442	006554	T37
3924	020444	004000	TIMES
3925	020446	000000	0
3926	020450	007000	TSTTB1: T100
3927	020452	000001	1
3928	020454	007036	T101
3929	020456	004000	TIMES
3930	020460	007214	T102
3931	020462	004000	TIMES
3932	020464	007372	T103
3933	020466	004000	TIMES
3934	020470	007550	T104
3935	020472	004000	TIMES
3936	020474	007726	T105
3937	020476	004000	TIMES
3938	020500	010102	T106
3939	020502	004000	TIMES
3940	020504	010256	T107
3941	020506	004000	TIMES
3942	020510	000000	0
3943	020512	010432	TSTTB2: T200
3944	020514	000001	1
3945	020516	000000	0
3946	020520	011006	TSTTB3: T300
3947	020522	000001	1
3948		000001	.END

MDISC	016543	2322	2691	3686#
MEMT1	003720	1369#	1385	
MEMT1A	003746	1373#	1375	
MEMT1B	003776	1379#	1388	
MEMT1C	004022	1382	1386#	
MEMT1D	004030	1389#	1401	
MEMT1E	004062	1395#	1404	
MEMT1F	004106	1398	1402#	
MEMT2	004116	1411#		
MEMT2A	004140	1415#	1436	1441
MEMT2B	004222	1426#	1439	
MEMT2C	004246	1430	1432#	
MEMT2D	004260	1433	1437#	
MEMT3	004274	1449#		
MEMT3A	004316	1453#	1474	1479
MEMT3B	004330	1455#	1457	
MEMT3C	004372	1464#	1477	
MEMT3D	004416	1468	1470#	
MEMT3E	004430	1471	1475#	
MEPASS	020102	3025	3814#	
MFATAL	017571	3178	3784#	
MLINE	017517	1938	3776#	
MLINEI	017552	1940	3781#	
MLINER	016115	3215	3636#	
MLINE1	016152	3161	3641#	
MPFAIL	017667	3535	3796#	
MPF1	017707	3540	3799#	
MQM	017510	3467	3774#	
MREGAD	017444	948	3767#	
MSELAN	016446	2855	3675#	
MSELOR	016422	2850	3671#	
MSG	015064	3438*	3444#	
MSTATE	016064	3195	3631#	
MTEST	017500	961	3772#	
MTITLE	016645	909	3698#	
MTRANE	016203	3142	3646#	
MTRNDE	017623	2836	3789#	
MT103A	016465	2375	3678#	
MT103T	016300	2232	3657#	
MT202A	016514	2744	3682#	
MT202T	016351	2393	3664#	
MUX1	004444	1485#		
MUX1A	004464	1489#	1521	1524
MUX1B	004514	1494#	1509	
MUX1C	004542	1499	1502#	
MUX1D	004554	1503	1506	1507#
MUX1E	004570	1511#		
MUX1F	004622	1518	1520#	
MUX11	007036	1951#		
MUX11A	007054	1954#		
MUX11B	007104	1959#	1974	
MUX11C	007132	1964	1967#	
MUX11D	007144	1968	1971	1972#
MUX11E	007160	1976#		
MUX11F	007212	1983	1985#	
MUX12	007214	1990#		

CZKMGAO DM11-BA MODEM CONTRL
CZKMG.A.P11 20-OCT-81 17:09

MACY11 30A(1052) 21-OCT-81 05:36 PAGE 87
CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0086

MUX12A	007232	1993#		
MUX12B	007262	1998#	2013	
MUX12C	007310	2003	2006#	
MUX12D	007322	2007	2010	2011#
MUX12E	007336	2015#		
MUX12F	007370	2022	2024#	
MUX13	007372	2029#		
MUX13A	007410	2032#		
MUX13B	007440	2037#	2052	
MUX13C	007466	2042	2045#	
MUX13D	007500	2046	2049	2050#
MUX13E	007514	2054#		
MUX13F	007546	2061	2063#	
MUX14	007550	2068#		
MUX14A	007566	2071#		
MUX14B	007616	2076#	2091	
MUX14C	007644	2081	2084#	
MUX14D	007656	2085	2088	2089#
MUX14E	007672	2093#		
MUX14F	007724	2100	2102#	
MUX15	007726	2108#		
MUX15A	007744	2111#		
MUX15B	007766	2115#	2130	
MUX15C	010014	2120	2123#	
MUX15D	010026	2124	2127	2128#
MUX15E	010044	2132#		
MUX15F	010100	2139	2141#	
MUX16	010102	2147#		
MUX16A	010120	2150#		
MUX16B	010142	2154#	2169	
MUX16C	010170	2159	2162#	
MUX16D	010202	2163	2166	2167#
MUX16E	010220	2171#		
MUX16F	010254	2178	2180#	
MUX17	010256	2186#		
MUX17A	010274	2189#		
MUX17B	010316	2193#	2208	
MUX17C	010344	2198	2201#	
MUX17D	010356	2202	2205	2206#
MUX17E	010374	2210#		
MUX17F	010430	2217	2219#	
MUX2	004636	1530#		
MUX2A	004656	1534#	1566	1569
MUX2B	004706	1539#	1554	
MUX2C	004734	1544	1547#	
MUX2D	004746	1548	1551	1552#
MUX2E	004762	1556#		
MUX2F	005014	1563	1565#	
MUX3	005030	1575#		
MUX3A	005050	1579#	1611	1614
MUX3B	005100	1584#	1599	
MUX3C	005126	1589	1592#	
MUX3D	005140	1593	1596	1597#
MUX3E	005154	1601#		
MUX3F	005206	1608	1610#	
MUX4	005222	1620#		

T103E	010530	2256	2270#
T103D1	010574	2297	2303#
T103D2	010600	2299	2305#
T103D3	010604	2300	2307#
T103D4	010610	2301	2309#
T103E	010614	2302	2321#
T103EN	010770	2363	2374#
T103ES	010654	2326	2330#
T103E1	010750	2358	2364#
T103E2	010754	2360	2366#
T103E3	010760	2361	2368#
T103E4	010764	2362	2370#
T104	007550	2067#	3934
T105	007726	2107#	3936
T106	010102	2146#	3938
T107	010256	2185#	3940
T11	002674	1178#	3879
T12	002764	1196#	3881
T13	003054	1214#	3883
T14	003144	1232#	3885
T15	003234	1251#	3887
T16	003322	1269#	3889
T17	003410	1287#	3891
T2	002244	1071#	3865
T20	003476	1305#	3893
T200	010432	2228#	3943
T201	010770	2373#	
T202A	011052	2397	2401#
T202A1	011060	2404	2405#
T202B	011064	2403	2413#
T202B1	011074	2419	2423#
T202B2	011100	2421	2425#
T202C	011104	2417	2432#
T202D	011120	2434#	
T202D1	011164	2458	2463#
T202D2	011170	2459	2465#
T202D3	011174	2460	2467#
T202D4	011200	2461	2469#
T202E	011204	2462	2475#
T202E1	011250	2499	2504#
T202E2	011254	2500	2506#
T202E3	011260	2501	2508#
T202E4	011264	2502	2510#
T202F	011270	2503	2517#
T202F2	011350	2542	2547#
T202F3	011354	2543	2549#
T202F4	011360	2544	2551#
T202F5	011364	2545	2553#
T202G	011370	2546	2560#
T202G1	011434	2583	2588#
T202G2	011440	2584	2590#
T202G3	011444	2585	2592#
T202G4	011450	2586	2594#
T202H	011454	2587	2600#
T202H2	011520	2625	2630#
T202H3	011524	2626	2632#

CZKMGAO DM11-BA MODEM CONTRL
CZKMGA.P11 20-OCT-81 17:09

MACY11 30A(1052) 21-OCT-81 05:36 PAGE 96
CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0094

COMMEN	760#	874#	1044#	1175#	1248#	1927#	1934#	2228#	2389#	3863#	3928#				
EMTDEF	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838
	839	840	841	842	843	844	845	846	847	874#					
INTS	1040#	1248	1266	1284	1302										
MUXS1	1040#	1481	1526	1571	1616	1947	1986	2025	2064						
MUXS2	1040#	1661	1707	1753	2103	2142	2181								
NOINT	1040#	1175	1193	1211	1229										
TM	875#	3863	3865	3867	3869	3871	3873	3875	3877	3879	3881	3883	3885	3887	3889
	3891	3893	3895	3897	3899	3901	3903	3905	3907	3909	3911	3913	3915	3917	3919
	3921	3923	3928	3930	3932	3934	3936	3938	3940						
TS	873#	1044	1058	1071	1084	1097	1113	1127	1143	1159	1178	1196	1214	1232	1251
	1269	1287	1305	1324	1344	1368	1410	1448	1484	1529	1574	1619	1665	1711	1757
	1803	1841	1885	1934	1950	1989	2028	2067	2107	2146	2185	2228	2373	2389	
TSS	873#														

. ABS. 020524 000

ERRORS DETECTED: 0

CZKMGA,CZKMGA/CRF/SOL/NL:TOC=CZKMGA
RUN-TIME: 29 55 8 SECONDS
RUN-TIME RATIO: 467/93=4.9
CORE USED: 11K (21 PAGES)