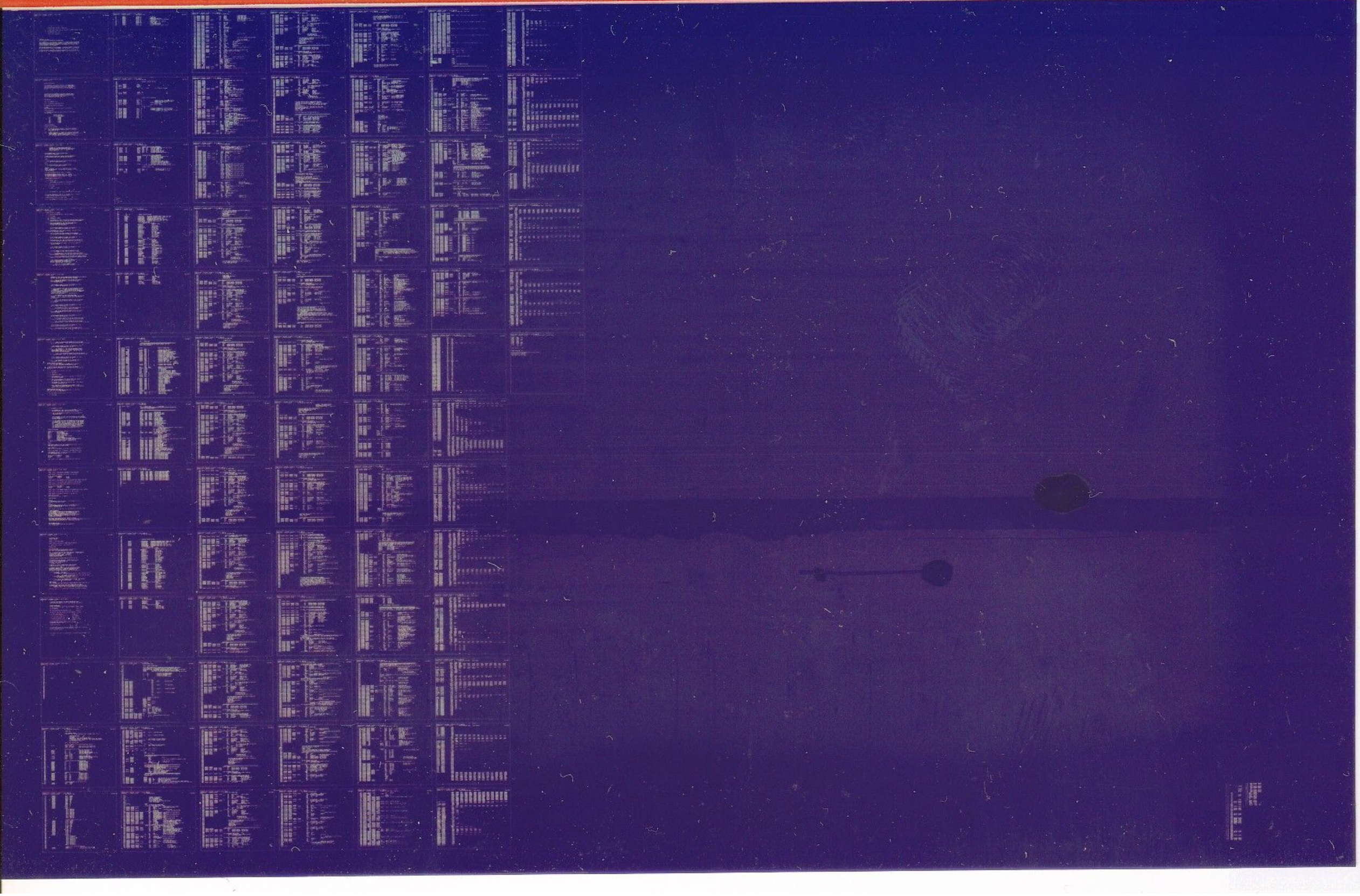
DUV-11

OFFLINE COMBINED TIMING &
MD-11-DZDUU-B
INTERRUPT TESTS

EP-DZDUU-B-DL

FICHE 1 OF 1

DEC 1977
digital
MADE IN USA



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.REM    *
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I D E N T I F I C A T I O N

PRODUCT CODE: MAINDEC-11-DZDUU-B-D

PRODUCT NAME: DUV11 OFFLINE COMBINED TIMING & INTERRUPT TESTS

RELEASE DATE: NOV. 1977

MAINTAINER : DIAGNOSTICS

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            GENERAL DESCRIPTION

            THIS DIAGNOSTIC CAN CHAIN 16 DUV11'S. THIS MEANS THAT
            16 DEVICES CAN BE SEQUENTIALLY EXERCISED.  THE DIAGNOSTIC
            MAKES ONE PASS BEFORE PROCEEDING TO THE NEXT DEVICE,
            AND CONTINUES EXERCISING ALL DEVICES IN THIS FASHION UNTIL
            HALTED.


                                                                *
                                                                        .REM    *
      1.    THE DUV11 OFFLINE COMBINED TIMING AND INTERRUPT TESTS
            VERIFY THAT THE TRANSMITTER AND RECEIVER CAN CORRECTLY
            TALK TO EACH OTHER. INTERRUPT LOGIC AND PRIORITY LEVEL
            /VECTOR ADDRESSES ARE ALSO VERIFIED
                                                                *
                                                                        .REM    *
      2.    REQUIREMENTS

            PDP-11/03 COMPUTER (LSI)

            DUV11  SYNCRONOUS/ISOCRONOUS OPTION

            ONE CONSOLE TELETYPE OR EQUIVALENT

      2.2   STORAGE
            THE PROGRAM LOADS INTO 4K OF MEMORY WITH BOOTSTRAP

      3.    LOADING PROCEDURE

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

                              STARTING ADDRESS
                              FOR ABSOLUTE LOADER
                  4K                017500
                  8K                037500
                  12K               057500
                  16K               077500
                  20K               117500
                  24K               137500
                  28K               157500

      4.    STARTING PROCEDURE

      4.1   CONTROL SWITCH SETTINGS

            NOTE:   ALL SWITCHES RESIDE INTERNAL TO THE CPU AT ADDRESS
                    176.  THESE MAY BE SET VIA THE CONSOLE TTY BY DIRECTLY
                    MODIFYING LOC. 176.

            NOTE:    RUNNING UNDER APT-11, THERE IS A USER SWITCH REGISTER
                     CALLED "$USWR".  IN ORDER TO BE FLEXIBLE ON THE AVAILIBILITY OF THE
                     H315 CONNECTOR, ONE BIT PASSES STATUS TO APT-11.
                     BIT 0 IN $USWR REFLECTS THIS STATUS, 9 0 = CONNECTOR
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PRESENT, A 1 = CONNECTOR NOT AVAILIBLE.
THE USER CHANGES THE CONTENTS OF THIS LOCATION
WHEN BUILDING THE E TABLE, BY ANSWERING THE
PROMPT "SWITCH 2".

4.1.1 AFTER PROGRAM LOAD (INITIAL PROGRAM START)
ALL CONSOLE SWITCHES DOWN

4.1.2 TO MODIFY DEVICE VECTOR AND CONTROL REGISTER ADDRESSES
AFTER PROGRAM RESTART OR TO RUN MULTIPLE DEVICES

SW00=1

4.1.3 TO START PROGRAM AT SELECTED TEST AFTER A PROGRAM RESTART
(ONLY IN SINGLE DEVICE TESTS)
SW01=1

4.1.4 TO LOCK ON SELECTED TEST AFTER A PROGRAM RESTART
(ONLY IN SINGLE DEVICE TESTS)

SW14=1
NOTE1: IN GENERAL SW01 WILL BE USED WHEN SW14=1 IS USED
NOTE2: WITHOUT SW01=1 "LOCK ON TEST" WILL DEFAULT TO TEST 1

4.2 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200

THE RETARTING ADDRESS FOR ALL TESTS IS 000200
THE STARTING ADDRESS TO ENTER A SELECTED TEST IS 000200
THE STARTING ADDRESS TO LOCK ON TEST IS 000200

4.3 PROGRAM AND/OR OPERATOR ACTION

4.3.1 INITIAL PROGRAM START

4.3.1.1 LOAD PROGRAM INTO MEMORY WITH ABSOLUTE LOADER

4.3.1.2 SET SWITCH REGISTER (LOC. 176) TO ZERO.

4.3.1.3 TYPE 200G.

4.3.1.4 PROGRAM WILL START.

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.REM *

4.3.1.5 THE PROGRAM WILL TYPE "DUV11 DZDUU-B TAPE E" (ONCE ONLY)

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.REM *

4.3.1.6 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT IS ABOUT
TO START TESTING ,AND THEN TESTING WILL BEGIN

4.3.2 PROGRAM RESTART WITH ALL SWITCHES DOWN

4.3.2.1 THE PROGRAM WILL TYPE "R" AND WILL COMMENCE TESTING

4.3.3 PROGRAM RESTART WITH SW00=1

4.3.3.1 SET SWITCH REGISTER (LOC. 176) TO A 000001.

4.3.3.2 TYPE 200G.

4.3.3.3 PROGRAM WILL START.

4.3.3.4 THE PROGRAM WILL TYPE " 1ST DEVICE: RECEIVER CONTROL REGISTER ADDRESS" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.5 TYPE IN THE ADDRESS OF THE FIRST RECEIVER CONTROL REGISTER ADDRESS OF THE DUV11 TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.4

4.3.3.6 THE PROGRAM WILL TYPE "VECTOR ADDRESS-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.7 TYPE IN THE BASE RECEIVER INTERRUPT VECTOR ADDRESS FOR THE DUV11 TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.6

4.3.3.8 THE PROGRAM WILL TYPE "ARE YOU RUNNING MULTIPLE DEVICES ?" (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.9 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ANSWER IS GIVEN, THE PROGRAM WILL TYPE "?" AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.8

IF A "NO" ANSWER IS GIVEN: JUMP TO SECTION 4.3.3.12
IF A "YES" ANSWER IS GIVEN: THE NEXT QUESTION IS ASKED

4.3.3.10 THE PROGRAM WILL TYPE "LAST DEVICE: RECEIVER CONTROL REGISTER ADDRESS-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.11 TYPE IN THE ADDRESS OF THE LAST RECEIVER CONTROL REGISTER ADDRESS OF THE DUV11 TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL THEN REPEAT THE MESSAGE OF 4.3.3.10
NOTE: ALL ADDRESSES SHALL BE CONTIGUOUS

4.3.3.11.1 IF AN "OUT OF RANGE" ADDRESS IS TYPED
IE. MORE THAN 16 (10) DEVICES AWAY (UPWARDS)..... THE

PROGRAM WILL TYPE "OUT OF RANGE: RETYPE LAST DEVICE RXCSR ADDRESS-"
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.11.2 TYPE IN THE ADDRESS OF THE LAST RECEIVER CONTROL REGISTER ADDRESS OF THE DUV11 TO BE TESTED FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT ANSWER IS TYPED, THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.11.1

IF A DEVICE ADDRESS LOWER THAN 1ST DEVICE ADDRESS IS TYPED.....
....SCHOOLS OUT.....THERE IS NO PROTECTION FOR THIS.
THE PROGRAM WILL DEFAULT TO TWO DEVICES ACTIVE (UPWARDS FROM 1ST DEVICE ADDRESS). THE SAME APPLIES TO IDENTICAL ADDRESSES TYPED FOR FIRST AND LAST DEVICE.
OBSERVE LOCATION @ ACTREG: SEE SECTION 7.2

4.3.3.12 THE PROGRAM WILL TYPE "# OF SYNC CHARS SELECTED (1 OR 2)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD. REFER TO MANUAL FOR PROPER SWITCH SETTINGS OF SWITCH E55-4.

4.3.3.13 TYPE IN THE APPROPRIATE ANSWER "1" OR "2" FOLLOWED BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED, THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.12

4.3.3.14 THE PROGRAM WILL TYPE " IS SEC XMIT SWITCH E55-2 ON? (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.15 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>. (NOTE THAT ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED, THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.14

4.3.3.16 THE PROGRAM WILL TYPE "IS SEC REC SWITCH E55-3 ON? (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.17 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED, THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.16

4.3.3.18 THE PROGRAM WILL TYPE "IS OPT CLR ENABLE SWITCH E55-1 ON? (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.19 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.18

4.3.3.20 THE PROGRAM WILL TYPE "ARE YOU RUNNING IN MAINT. MODE EXTERNAL ? AND .....DO YOU HAVE THE EXTERNAL MODEM BYPASS JUMPER CONNECTOR ON ? (Y OR N)-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.3.21 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A <CARRIAGE RETURN>. (NOTE: ALL MULTIPLE DEVICES MUST BE THE SAME)

IF AN INCORRECT ANSWER IS TYPED ,THE PROGRAM WILL TYPE "?" AND WILL REPEAT THE MESSAGE OF 4.3.3.20

4.3.3.22 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED AND WILL COMMENCE TESTING AT TEST 1

4.3.4 PROGRAM RESTART WITH SW01=1
NOTE: THIS WILL ONLY WORK WHEN A SINGLE DEVICE IS SELECTED ,,,IT WILL NOT WORK IF MULTIPLE DEVICES ARE SELECTED

IF MULTIPLE DEVICES WERE PREVIOUSLY SELECTED,LOAD 000200, AND SELECT SW00=1 AND ANSWER "NO" TO THE MULTIPLE DEVICE QUESTION SEE 4.3.3

4.3.4.1 SET SW01=1 IN SWITCH REG (LOC. 176)

4.3.4.2 TYPE 200G.

4.3.4.3 PROGRAM WILL START.

4.3.4.4 THE PROGRAM WILL TYPE "TEST PC-" AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.4.5 TYPE IN THE ADDRESS OF THE TEST AT WHICH THE PROGRAM IS TO BE STARTED FOLLOWED BY A <CARRIAGE RETURN>

4.3.4.6 THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED TESTING AT THE SELECTED TEST

NOTE: CARE MUST BE TAKEN WHEN THIS FEATURE IS USED ,SINCE THERE IS NO PROTECTION AGAINST SELECTING AN ADDRESS THAT IS IN THE MIDDLE OF A TEST

4.3.5 PROGRAM RESTART WITH SW14 =1
NOTE: THIS WILL ONLY WORK WHEN A SINGLE DEVICE IS SELECTED
SEE NOTE IN 4.3.4 FOR MORE DETAILS

4.3.5.1 SET SW14=1 IN SWITCH REG. (LOC. 176)

4.3.5.2 TYPE 200G.

4.3.5.3 PROGRAM WILL START.

4.3.5.4 THE PROGRAM WILL TYPE "LOCK ON SELECTED TEST ? (Y OR N)-"
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD

4.3.5.5 TYPE IN THE APPROPRIATE ANSWER YES OR NO FOLLOWED BY A
<CARRIAGE RETURN>

IF A NO ANSWER IS GIVEN: THIS LOCK ON TEST WILL BE IGNORED
AND THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED
TESTING AT TEST 1

4.3.5.6 IF A YES ANSWER WAS GIVEN: THE PROGRAM WILL ACT AS FOLLOWS...
THE PROGRAM WILL TYPE "R" TO INDICATE THAT IT HAS STARTED
TESTING AT TEST 1 AND WILL REMAIN IN TEST 1 UNTIL HALTED
OR IF ANY KEY IS STRUCK ON THE TELETYPE ,THE PROGRAM
WILL FREEZE ON THE NEXT TEST UNTIL A KEY IS STRUCK ON
THE TELETYPE AND SO FORTH THRU THE PROGRAM. IF SW01 =1 IT
WILL PERFORM AS IN SECTION 4.3.4 ALLOWING ONE TO FREEZE
ON A SELECTED TEST RATHER THAN DEFAULTING TO TEST 1

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS (INTERNAL TO THE CPU, ACCESSED VIA LOC. 176).
SW15 =1 HALT ON ERROR
SW14 =1 LOOP ON CURRENT TEST
SW13 =1 INHIBIT ERROR TYPEOUT
SW11 =1 INHIBIT ITERATIONS
SW10 =1 ESCAPE TO NEXT TEST ON ERROR
SW09 =1 LOOP ON ERROR
SW01 =1 RESTART PROGRAM AT SELECTED TEST
SW00 =1 RESELECT VECTOR AND CONTROL REGISTER ADRESSES
&PARAMETERS AFTER A PROGRAM RESTART
TO INHIBIT "END OF PASS" TYPEOUT - TURN TELETYPE OFF

6. ERRORS

6.1 ERROR HALTS (UNDER LSI ALL HALT ERRORS RETURN CONTROL TO O.D.T.)
THERE ARE FOUR DISTINCT ERROR TYPEOUTS

6.1.1 PC+2 = ERROR PC
WHERE PC +2 IS THE ADDRESS OF THE CALL TO THE ERROR HANDLER +2

REFER TO THE ABOVE "HLT" IN DIAGNOSTIC FOR ERROR DESCRIPTION

CHECK ADDRESS @ RXCSR: TO LOCATE THE DEVICE PRESENTLY UNDER
TEST WHEN RUNNING MULTIPLE DEVICES

6.1.2 PC +2 = REGISTER ERROR PC

REGISTER	EXPECTED	ACTUAL
16XXXX	YYYYYY	ZZZZZZ

WHERE 16XXXX IS THE ADDRESS OF THE FAILING DEVICE REGISTER

WHERE YYYYYY IS THE EXPECTED CONTENTS OF THAT REGISTER

WHERE ZZZZZZ IS THE ACTUAL CONTENTS OF THAT REGISTER

6.1.3 PC +2 = RECEIVER ERROR PC

REGISTER	EXPECTED	ACTUAL
16XXXX	YYYYYY	ZZZZZZ

WHERE 16XXXX IS THE ADDRESS OF THE FAILING RECEIVER (RXDBUF) REGISTER

WHERE YYYYYY IS THE EXPECTED DATA CONTENTS OF THAT REGISTER

WHERE ZZZZZZ IS THE ACTUAL DATA CONTENTS OF THAT REGISTER

6.1.4 PC +2 = TRANSMITTER ERROR PC

REGISTER	EXPECTED	ACTUAL
16XXXX	YYYYYY	ZZZZZZ

WHERE 16XXXX IS THE ADDRESS OF THE FAILING TRANSMITTER (TXCSR) REGISTER

WHERE YYYYYY IS THE EXPECTED CONTENTS OF THAT REGISTER

WHERE ZZZZZZ IS THE ACTUAL CONTENTS OF THAT REGISTER

6.1.5 ERROR DESCRIPTIONS
SEE LISTINGS FOR DETAILS OF ERRORS

6.2 ERROR RECOVERY

6.2.1 SW15 =0
IF THE PROGRAM IS RUN WITH SW15 =0 ,NO OPERATOR ACTION IS
REQUIRED TO CONTINUE TESTING

6.2.2 SW15 =1
IF THE PROGRAM IS RUN WITH SW15 =1 ,TO CONTINUE TESTING
AFTER THE PROGRAM HAS HALTED ,PRESS THE PROCESSOR
CONSOLE "CONTINUE SWITCH"

NOTE: THE PC + 2 OF THE "HLT" WILL BE DISPLAYED IN THE DATA LIGHTS

6.2.3 ILLEGAL INTERRUPTS
IF AN INTERRUPT OCCURS TO A VECTOR ADDRESS NOT SELECTED
DURING PROGRAM INITIALIZATION, THE PROGRAM WILL HALT IN
THE TRAPCATCHER. THE ADDRESS AT WHICH THE PROGRAM
HALTS IS 2 GREATER THAN THE ADDRESS TO WHICH THE INTERRUPT
OCCURED. THE PROGRAM MUST BE RESTARTED AT 000200 TO
RECOVER FROM THIS ERROR.

6.2.4 ADDITIONAL TROUBLESHOOTING AIDS ERRCNT: & PASCNT:
CHECK THESE TWO TAG LOCATIONS FOR TOTAL # OF ERRORS AND PASSES RESPECTIVELY.
LOADING 000200 AND RESTARTING WILL CLEAR THESE LOCATIONS.

6.3 END OF PASS ROUTINE
THIS TYPEOUT IS MENTIONED HERE FOR CONVENIENCE
IT IS IN THE FORM:

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                END OF PASS TAPE Y
                16XXXX = DEVICE

                WHERE Y IS THE TAPE LOADED

                WHERE 16XXXX IS THE DEVICE'S BASE REGISTER ADDRESS

                TO INHIBIT THIS TYPEOUT - TURN TELETYPE OFF

        7.      RESTRICTIONS

        7.1     MULTIPLE DEVICES
                UP TO 16(10) DEVICES MAY BE TESTED. HOWEVER, THEY
                MUST HAVE CONTIGUOUS ADDRESSES AND VECTORS

                NOTE: IF ALL DEVICES UNDER TEST HAVE THE SAME INTERRUPT VECTOR
                YOU CAN CHANGE  "ZERO:    ADD   #10,BASEIV      ;NEXT BLOCK
                (VECTORS)" TO "ZERO:    ADD    #0,BASEIV";
                THEREBY THE VECTOR ADDRESSES WILL NOT BE
                UPDATED AFTER EACH PASS.

        7.2     DISQUALIFYING DEVICES WHEN RUNNING MULTIPLE DEVICES

                WHEN RUNNING MULTIPLE DEVICES    AN ACTIVE BIT IS SET
                FOR EACH DEVICE RUNNING UNDER TEST  IE. BIT 0 FOR
                DEVICE 0   ,BIT 15 FOR DEVICE 15
                TO DISQUALIFY DEVICES:

        7.2.1   IF DEVICE 0 IS TO BE DISQUALIFIED ,SIMPLY RESTART
                PROGRAM WITH SW00 =1 AND OMIT THE FIRST DEVICE.

        7.2.2   IF HOWEVER, DEVICES 1 THRU 15 OR ANY COMBINATION THEREOF
                ARE TO BE DISQUALIFIED....LOAD THE LOCATION OF ACTREG:
                OBSERVE THE ACTIVE BITS (ACTIVE =1, NONACTIVE = 0)
                AND DEPOSIT 0 WHERE THOSE DEVICES ARE TO BE DISQUALIFIED

                7.2.2.1 TO RESTART...TYPE 200G...
                        THE PROGRAM WILL CONTINUE WITH THE DEVICE IT WAS IN BEFORE HALTING.

                7.2.2.2 .......OR .....SET SW00=1 IN SWITCH REG (LOC. 176) AND TYPE 200G...
                        ANSWER THE QUESTION : 1ST DEVICE : ETC.....
                         ....THE PROGRAM WILL CONTINUE WITH DEVICE 0

                7.2.2.3 IF ALL DEVICES ARE DISQUALIFIED BY MISTAKE   THE PROGRAM
                        WILL TYPEOUT   AN ERROR MESSAGE.......TYPE 200G.

        7.3     CABLE DELAYS
                NOTE: EXTERNAL LOOP BACK TESTS ONLY (MODEM CABLE WITH H315 CONNECTOR ON)

        7.3.1   TO PROVIDE SUFFICIENT DELAY FOR CLOCK SIGNAL OVER THE CABLE,
                LOCATION "HOLD: " MUST BE MODIFIED TO ACCOMODATE FOR FASTER MACHINES.
                        PRESENTLY "HOLD: " =20  IS SUFFICIENT TIME ON AN 11/03 MACHINE.

                BASICALLY DON'T TRY TO EXCEED 10K TO 12K RATE USING THE EIA DRIVERS
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7.4 TO USE THE "XOR" TESTER ,THE BRANCH AROUND THE "XOR"
CODE MUST BE PATCHED TO A "NOP". (SEE LISTINGS FOR DETAILS)

8. DEFAULT PARAMETERS:
1ST DEVICE: RECEIVER CONTROL REGISTER ADDRESS- RXCSR: 160010

VECTOR ADDRESS- DURIV: 770

ARE YOU RUNNING MULTIPLE DEVICES ?- NO MULTD: 0

LAST DEVICE: RECEIVER CONTROL REGISTER ADDRESS- LASTADD: 0

OF SYNC CHARS SELECTED - 2 SYNCNO: 377

IS SEC XMIT SWITCH E55-2 ON?- YES SEXMIT: 377

IS SEC REC SWITCH E55-3 ON?- YES SEREC: 377

IS OPT CLR ENABLE SWITCH E55-1 ON?- YES OPTCLR: 377

DO YOU HAVE THE EXTERNAL MODEM BYPASS JUMPER
CONNECTOR ON (H315)- YES JMRBY: 377

9. PROGRAM DESCRIPTION

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.REM *

9.1 THIS PROGRAM PERFORMS THE OFFLINE COMBINED (TRANSMITTER & RECEIVER)
TIMING & INTERRUPT TESTING OF THE DEVICE
SEE LISTING FOR DETAILS

*
.REM *

10. FLOW CHARTS: RECEIVER FLOW, TRANSMITTER FLOW, TRANSMITTER & RECEIVER FLOW

11. LISTINGS

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525
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527
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531
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533
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537          000001                    STN=1
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                                .ENABLE ABS

                                ;DUV11 DZDUU-B TAPE E
                                ;COPYRIGHT 1977, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754

                                        ;STARTING PROCEDURE
                                        ;TYPE 200G
                                        ;PROGRAM WILL TYPE "DUV11 DZDUU-B TAPE E "
                                        ;PROGRAM WILL TYPE "R" TO INDICATE THAT TESTING HAS STARTED
                                        ;AT THE END OF A PASS, PROGRAM WILL TYPE "END OF PASS TAPE E"
                                        ;AND THEN RESUME TESTING

                                .SBTTL  BASIC DEFINITIONS

                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                          STACK=  1100
                                .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                                .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                                ;*MISCELLANEOUS DEFINITIONS
000011                          HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                          LF=     12              ;;CODE FOR LINE FEED
000015                          CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                          CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                          PS=     177776          ;;PROCESSOR STATUS WORD
                                .EQUIV  PS,PSW
177774                          STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                          PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                          DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                          DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                                ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                          R0=     %0              ;;GENERAL REGISTER
000001                          R1=     %1              ;;GENERAL REGISTER
000002                          R2=     %2              ;;GENERAL REGISTER
000003                          R3=     %3              ;;GENERAL REGISTER
000004                          R4=     %4              ;;GENERAL REGISTER
000005                          R5=     %5              ;;GENERAL REGISTER
000006                          R6=     %6              ;;GENERAL REGISTER
000007                          R7=     %7              ;;GENERAL REGISTER
000006                          SP=     %6              ;;STACK POINTER
000007                          PC=     %7              ;;PROGRAM COUNTER

                                ;*PRIORITY LEVEL DEFINITIONS
000000                          PR0=    0               ;;PRIORITY LEVEL 0
000040                          PR1=    40              ;;PRIORITY LEVEL 1
000100                          PR2=    100             ;;PRIORITY LEVEL 2
000140                          PR3=    140             ;;PRIORITY LEVEL 3
000200                          PR4=    200             ;;PRIORITY LEVEL 4
000240                          PR5=    240             ;;PRIORITY LEVEL 5
000300                          PR6=    300             ;;PRIORITY LEVEL 6
000340                          PR7=    340             ;;PRIORITY LEVEL 7

                                ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                          SW15=   100000
040000                          SW14=   40000
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                        020000          SW13=   20000
                        010000          SW12=   10000
                        004000          SW11=   4000
                        002000          SW10=   2000
                        001000          SW09=   1000
                        000400          SW08=   400
                        000200          SW07=   200
                        000100          SW06=   100
                        000040          SW05=   40
                        000020          SW04=   20
                        000010          SW03=   10
                        000004          SW02=   4
                        000002          SW01=   2
                        000001          SW00=   1
                                        .EQUIV  SW09,SW9
                                        .EQUIV  SW08,SW8
                                        .EQUIV  SW07,SW7
                                        .EQUIV  SW06,SW6
                                        .EQUIV  SW05,SW5
                                        .EQUIV  SW04,SW4
                                        .EQUIV  SW03,SW3
                                        .EQUIV  SW02,SW2
                                        .EQUIV  SW01,SW1
                                        .EQUIV  SW00,SW0

                                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
                        100000          BIT15=  100000
                        040000          BIT14=  40000
                        020000          BIT13=  20000
                        010000          BIT12=  10000
                        004000          BIT11=  4000
                        002000          BIT10=  2000
                        001000          BIT09=  1000
                        000400          BIT08=  400
                        000200          BIT07=  200
                        000100          BIT06=  100
                        000040          BIT05=  40
                        000020          BIT04=  20
                        000010          BIT03=  10
                        000004          BIT02=  4
                        000002          BIT01=  2
                        000001          BIT00=  1
                                        .EQUIV  BIT09,BIT9
                                        .EQUIV  BIT08,BIT8
                                        .EQUIV  BIT07,BIT7
                                        .EQUIV  BIT06,BIT6
                                        .EQUIV  BIT05,BIT5
                                        .EQUIV  BIT04,BIT4
                                        .EQUIV  BIT03,BIT3
                                        .EQUIV  BIT02,BIT2
                                        .EQUIV  BIT01,BIT1
                                        .EQUIV  BIT00,BIT0

                                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
                        000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
                        000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
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                        ;TBITVEC=14             ;;"T" BIT
                        ;TRTVEC= 14             ;;TRACE TRAP
                        ;BPTVEC= 14             ;;BREAKPOINT TRAP (BPT)
                        ;IOTVEC= 20             ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
                        ;PWRVEC= 24             ;;POWER FAIL
                        ;EMTVEC= 30             ;;EMULATOR TRAP (EMT) **ERROR**
                        ;TRAPVEC=34             ;;"TRAP" TRAP
                        ;TKVEC=  60             ;;TTY KEYBOARD VECTOR
                        ;TPVEC=  64             ;;TTY PRINTER VECTOR
                        ;P!RQVEC=240            ;;PROGRAM INTERRUPT REQUEST VECTOR
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                                        ;STANDARD INTERRUPT VECTORS

                000174                  .=174
000174  000000                         DISPREG: 0
000176  000000                         SWREG: 0
                000200                  .=200
000200  000167  001746                  JMP     .START          ;GO TO START OF PROGRAM

                001100                  .=1100
001100  000000                         .WORD 0
001102  177570                         LIGHTS: 177570

                                        ;PROGRAM CONTROL PARAMETERS

001104  000000                         RETURN: 0
001106  000000                         NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
001110  000000                         LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT DATA
001112  000000                         PASCNT: 0               ;ADDRESS CONTAINING PASS COUNT
001114  000000                         ERRCNT: 0                       ;ERROR COUNT
001116  000000                         SAVSP:  0               ;STACK POINTER STORAGE

                                        ;PROGRAM VARIABLES

001120  000020                         HOLD:   20              ;TEMPORARY STORAGE=DELAY TIME FOR CABLES
001122  000000                         SHIFT:  0               ;TEMPORARY STORAGE= # OF SHIFTS PER CHAR
001124  000000                         COUNT:  0               ;TEMPORARY STORAGE= # OF TIMES A CHAR WILL BE SENT
001126  000000                         SAVPC:  0                       ;PROGRAM COUNTER STORAGE
001130  000000                         HLD0:   0
001132  000000                         HLD1:   0
001134  000000                         HLD2:   0
001136  000000                         HLD3:   0
001140  000000                         HLD4:   0
001142  000000                         HLD5:   0
001144  000000                         HLD6:   0
```

```
                                        ;PROGRAM CONVERSATIONAL PARAMETERS
001146      377         SYNCNO: .BYTE   377     ;# OF SYNC CHARS REQ'D FOR SYNC'ZATION
001147      377         SEXMIT: .BYTE   377     ;SEC XMIT JUMPER "IN"
001150      377         SEREC:  .BYTE   377     ;SEC REC JUMPER "IN"
001151      377         OPTCLR: .BYTE   377     ;OPTIONAL JUMPER CLR "IN"
001152      000         MULTD:  .BYTE   0       ;NO MULTIPLE DEVICE FLAG
001153      377         JMRBY:  .BYTE   377     ;EXTERNAL MODEM BYPASS JUMPER "IN"
                        .EVEN

                                        ;PROGRAM MULTIPLE DEVICE PARAMETERS
001154  000000          BASEADD:        0       ;PROG CONTROLLED 1ST DEVICE ADDR
001156  000000          KEEPADD:        0       ;SAVED 1ST DEVICE ADDR
001160  000000          LASTADD:        0       ;LAST DEVICE RXCSR ADDR
001162  000000          BASEIV:         0       ;PROG CONTROLLED IV
001164  000000          KEEPIV:         0       ;SAVED INTR VECTOR
001166  000000          ACTREG:         0       ;ACTIVE REGISTER ,,,MODIFY THIS
                                                ;LOCATION TO DISQUALIFY OR QUALIFY
                                                ;DEVICES (1= RUN,,,0= DON'T RUN)
001170  000000          ROTADD:         0       ;ROTATING POINTER FOR ACTREG..POINTS
                        ;TO DEVICE PRESENTLY UNDER TEST WHEN RUNNING MULTIPLE DEVICES

                        ;PROGRAM CONTROL FLAGS

001172      000         INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
001173      000         STFLG:  .BYTE   0               ;TEST START FLAG
001174      000         LOKFLG: .BYTE   0               ;LOCK ON CURRENT TEST FLAG
            001176      .EVEN
            001400      .=1400
```

```
                        ;INSTRUCTION DEFINITIONS

005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD =TST -(SP)
005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD =TST (SP)+
010046                  PUSHR0=10046    ;SAVE R0 ON STACK =MOV R0,-(SP)
012600                  POPR0=12600     ;RESTORE R0 FROM STACK =MOV (SP)+,R0
024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE =CMP -(SP),-(SP)
022626                  POP2SP=22626    ;INCREMENT STACK TWICE =CMP (SP)+,(SP)+
                        ;REGISTER DEFINITIONS
                                ;RXCSR BIT DEFINITIONS
100000                  DSC=BIT15               ;DATA SET CHANGE
040000                  RING=BIT14              ;RING
020000                  CTS=BIT13               ;CLR TO SEND
010000                  CARDET=BIT12            ;CARRIER DETECT
004000                  RECACT=BIT11            ;REC ACTIVE
002000                  SRD=BIT10               ;SEC REC DATA
001000                  DSR=BIT9                ;DATA SET RDY
000400                  STPSYN=BIT8             ;STRIP SYNC
000200                  RXDONE=BIT7             ;REC DONE
000100                  RINTEN=BIT6             ;REC INTR ENABLE
000040                  DSINTE=BIT5             ;DSC INTR ENABLE
000020                  SYNSCH=BIT4             ;SYNC SEARCH
000010                  STD=BIT3                ;SEC XMIT DATA
000004                  RTS=BIT2                ;REQ TO SEND
000002                  DTR=BIT1                ;DATA TERM RDY
000001                  VOID=BIT0
                                ;RXDBUF BIT DEFINITIONS
100000                  RXERR=BIT15             ;REC ERROR
040000                  OVRRUN=BIT14            ;OVERRUN
020000                  FRMERR=BIT13            ;FRAME ERROR
010000                  PARER=BIT12             ;PARITY ERROR
                                ;PARCSR BIT DEFINITIONS
001000                  PAREN=BIT9              ;PARITY ENABLE
000400                  EVPAR=BIT8              ;EVEN PARITY SENSE
                                ;PARCSR WRD DEFINITIONS
030000                  SYNINT=30000            ;SYNC EXTERNAL MODE
020000                  SYNEXT=20000            ;SYNC INTERNAL MODE
000000                  ISYMOD=0                ;ISOC MODE
000000                  FIVE=0                  ;WORD LENGTH 5 BITS
002000                  SIX=2000                ;WORD LENGTH 6 BITS
004000                  SEVEN=4000              ;WORD LENGTH 7 BITS
006000                  EIGHT=6000              ;WORD LENGTH 8 BITS
000000                  NOPAR=0                 ;NO PARITY
001000                  ODDPAR=1000             ;ODD PARITY
001400                  EVEPAR=1400             ;EVEN PARITY
                                ;TXCSR BIT DEFINITIONS
100000                  DNA=BIT15               ;DATA NOT AVAILABLE
040000                  MTDATA=BIT14            ;MAINT DATA
020000                  CLK=BIT13               ;CLK
002000                  BITW=BIT10              ;BIT WINDOW
000400                  MRESET=BIT8             ;MASTER RESET
000200                  TXDONE=BIT7             ;XMIT DONE
000100                  TXINTE=BIT6             ;XMIT INTR ENABLE
```

```
                000040          DNAINTE=BIT5            ;DNA INTR ENAB
                000020          SEND=BIT4               ;SEND
                000010          HDXEN=BIT3              ;HDX/FDX
                000001          BREAK=BIT0              ;BREAK
                                        ;TXCSR WRD DEFINITIONS
                000000          USER=0                  ;USER MODE
                004000          MINT=4000               ;MAINT INT MODE
                010000          MEXT=10000              ;MAINT EXT MODE
                014000          SYSTST=14000            ;SYSTEM TEST MODE
```

```
                        .SBTTL  COMMON TAGS

                        ;;**********************************************************************
                        ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                        ;*USED IN THE PROGRAM.

001400                          .=.
001400                  $CMTAG:                         ;;START OF COMMON TAGS
001400  000000                  .WORD   0
001402  000           $TSTNM:   .BYTE   0               ;;CONTAINS THE TEST NUMBER
001403  000           $ERFLG:   .BYTE   0               ;;CONTAINS ERROR FLAG
001404  000000        $ICNT:    .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001406  000000        $LPADR:   .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001410  000000        $LPERR:   .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001412  000000        $ERTTL:   .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001414  000           $ITEMB:   .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001415  001           $ERMAX:   .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001416  000000        $ERRPC:   .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001420  000000        $GDADR:   .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001422  000000        $BDADR:   .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001424  000000        $GDDAT:   .WORD   0               ;;CONTAINS 'GOOD' DATA
001426  000000        $BDDAT:   .WORD   0               ;;CONTAINS 'BAD' DATA
001430  000000                  .WORD   0               ;;RESERVED--NOT TO BE USED
001432  000000                  .WORD   0
001434  000           $AUTOB:   .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001435  000           $INTAG:   .BYTE   0               ;;INTERRUPT MODE INDICATOR
001436  000000                  .WORD   0
001440  177570        SWR:      .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001442  177570        DISPLAY:  .WORD   DDISP           ;;ADDRESS OF DISPLAY REGISTER
001444  177560        $TKS:     177560                  ;;TTY KBD STATUS
001446  177562        $TKB:     177562                  ;;TTY KBD BUFFER
001450  177564        $TPS:     177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001452  177566        $TPB:     177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001454  000           $NULL:    .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001455  002           $FILLS:   .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001456  012           $FILLC:   .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001457  000           $TPFLG:   .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001460  000000        $REGAD:   .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REGO) WAS OBTAINED
001462  000000        $REGO:    .WORD   0               ;;CONTAINS (($REGAD)+0)
001464  000000        $REG1:    .WORD   0               ;;CONTAINS (($REGAD)+2)
001466  000000        $REG2:    .WORD   0               ;;CONTAINS (($REGAD)+4)
001470  000000        $REG3:    .WORD   0               ;;CONTAINS (($REGAD)+6)
001472  000000        $REG4:    .WORD   0               ;;CONTAINS (($REGAD)+10)
001474  000000        $REG5:    .WORD   0               ;;CONTAINS (($REGAD)+12)
001476  000000        $TMP0:    .WORD   0               ;;USER DEFINED
001500  000000        $TMP1:    .WORD   0               ;;USER DEFINED
001502  000000        $TMP2:    .WORD   0               ;;USER DEFINED
001504  000000        $TMP3:    .WORD   0               ;;USER DEFINED
001506  000000        $TMP4:    .WORD   0               ;;USER DEFINED
001510  000000        $TMP5:    .WORD   0               ;;USER DEFINED
001512  000000        $TIMES:   0                       ;;MAX. NUMBER OF ITERATIONS
001514  000000        $ESCAPE:  0                       ;;ESCAPE ON ERROR ADDRESS
001516  177607  000377  $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001522  077           $QUES:    .ASCII  /?/             ;;QUESTION MARK
001523  015           $CRLF:    .ASCII  <15>            ;;CARRIAGE RETURN
```

```
   872  001524  000012                  $LF:    .ASCIZ  <12>            ;;LINE FEED
   873                                  ;;**********************************************************************
   874                                  .SBTTL  APT MAILBOX-ETABLE
   875
   876                                  ;;**********************************************************************
   877                                  .EVEN
   878  001526                          $MAIL:                          ;;APT MAILBOX
   879  001526  000000                  $MSGTY: .WORD   AMSGTY   ;;MESSAGE TYPE CODE
   880  001530  000000                  $FATAL: .WORD   AFATAL   ;;FATAL ERROR NUMBER
   881  001532  000000                  $TESTN: .WORD   ATESTN   ;;TEST NUMBER
   882  001534  000000                  $PASS:  .WORD   APASS    ;;PASS COUNT
   883  001536  000000                  $DEVCT: .WORD   ADEVCT   ;;DEVICE COUNT
   884  001540  000000                  $UNIT:  .WORD   AUNIT    ;;I/O UNIT NUMBER
   885  001542  000000                  $MSGAD: .WORD   AMSGAD   ;;MESSAGE ADDRESS
   886  001544  000000                  $MSGLG: .WORD   AMSGLG   ;;MESSAGE LENGTH
   887  001546                          $ETABLE:                        ;;APT ENVIRONMENT TABLE
   888  001546     000                  $ENV:   .BYTE   AENV     ;;ENVIRONMENT BYTE
   889  001547     000                  $ENVM:  .BYTE   AENVM    ;;ENVIRONMENT MODE BITS
   890  001550  000000                  $SWREG: .WORD   ASWREG   ;;APT SWITCH REGISTER
   891  001552  000000                  $USWR:  .WORD   AUSWR    ;;USER SWITCHES
   892  001554  000000                  $CPUOP: .WORD   ACPUOP   ;;CPU TYPE,OPTIONS
   893                                  ;*                              BITS 15-11=CPU TYPE
   894                                  ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
   895                                  ;*                                      11/70=06,PDQ=07,Q=10
   896                                  ;*                              BIT 10=REAL TIME CLOCK
   897                                  ;*                              BIT  9=FLOATING POINT PROCESSOR
   898                                  ;*                              BIT  8=MEMORY MANAGEMENT
   899  001556     000                  $MAMS1: .BYTE   AMAMS1   ;;HIGH ADDRESS,M.S.  BYTE
   900  001557     000                  $MTYP1: .BYTE   AMTYP1   ;;MEM.  TYPE,BLK#1
   901                                  ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
   902                                  ;*                                      900 NSEC CORE=001
   903                                  ;*                                      300 NSEC BIPOLAR=002
   904                                  ;*                                      500 NSEC MOS=003
   905  001560  000000                  $MADR1: .WORD   AMADR1   ;;HIGH ADDRESS,BLK#1
   906                                  ;*                                MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
   907  001562     000                  $MAMS2: .BYTE   AMAMS2   ;;HIGH ADDRESS,M.S.  BYTE
   908  001563     000                  $MTYP2: .BYTE   AMTYP2   ;;MEM.TYPE,BLK#2
   909  001564  000000                  $MADR2: .WORD   AMADR2   ;;MEM.LAST ADDRESS,BLK#2
   910  001566     000                  $MAMS3: .BYTE   AMAMS3   ;;HIGH ADDRESS,M.S.BYTE
   911  001567     000                  $MTYP3: .BYTE   AMTYP3   ;;MEM.TYPE,BLK#3
   912  001570  000000                  $MADR3: .WORD   AMADR3   ;;MEM.LAST ADDRESS,BLK#3
   913  001572     000                  $MAMS4: .BYTE   AMAMS4   ;;HIGH ADDRESS,M.S.BYTE
   914  001573     000                  $MTYP4: .BYTE   AMTYP4   ;;MEM.TYPE,BLK#4
   915  001574  000000                  $MADR4: .WORD   AMADR4   ;;MEM.LAST ADDRESS,BLK#4
   916  001576  000000                  $VECT1: .WORD   AVECT1   ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
   917  001600  000000                  $VECT2: .WORD   AVECT2   ;;INTERRUPT VECTOR#2BUS PRIORITY#2
   918  001602  000000                  $BASE:  .WORD   ABASE    ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
   919  001604  000000                  $DEVM:  .WORD   ADEVM    ;;DEVICE MAP
   920  001606  000000                  $CDW1:  .WORD   ACDW1    ;;CONTROLLER DESCRIPTION WORD#1
   921  001610  000000                  $CDW2:  .WORD   ACDW2    ;;CONTROLLER DESCRIPTION WORD#2
   922  001612  000000                  $DDW0:  .WORD   ADDW0    ;;DEVICE DESCRIPTOR WORD#0
   923  001614  000000                  $DDW1:  .WORD   ADDW1    ;;DEVICE DESCRIPTOR WORD#1
   924  001616  000000                  $DDW2:  .WORD   ADDW2    ;;DEVICE DESCRIPTOR WORD#2
   925  001620  000000                  $DDW3:  .WORD   ADDW3    ;;DEVICE DESCRIPTOR WORD#3
   926  001622  000000                  $DDW4:  .WORD   ADDW4    ;;DEVICE DESCRIPTOR WORD#4
   927  001624  000000                  $DDW5:  .WORD   ADDW5    ;;DEVICE DESCRIPTOR WORD#5
```

```
DZDUU-B MACY11 30(1046)  21-SEP-77  09:22  PAGE 23
DZDUUB.M11    31-MAY-77 09:50          APT MAILBOX-ETABLE                                                SEQ 0021

   928  001626  000000                 $DDW6:   .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
   929  001630  000000                 $DDW7:   .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
   930  001632  000000                 $DDW8:   .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
   931  001634  000000                 $DDW9:   .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
   932  001636  000000                 $DDW10:  .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
   933  001640  000000                 $DDW11:  .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
   934  001642  000000                 $DDW12:  .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
   935  001644  000000                 $DDW13:  .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
   936  001646  000000                 $DDW14:  .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
   937  001650  000000                 $DDW15:  .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
   938
   939
   940  001652                         $ETEND:
   941
   942
   943
```

```
                        ;INSTRUCTION DEFINITIONS

005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD =TST -(SP)
005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD =TST (SP)+
010046                  PUSHR0=10046    ;SAVE R0 ON STACK =MOV R0,-(SP)
012600                  POPR0=12600     ;RESTORE R0 FROM STACK =MOV (SP)+,R0
024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE =CMP -(SP),-(SP)
022626                  POP2SP=22626    ;INCREMENT STACK TWICE =CMP (SP)+,(SP)+
                        ;REGISTER DEFINITIONS
                                ;RXCSR BIT DEFINITIONS
100000                  DSC=BIT15               ;DATA SET CHANGE
040000                  RING=BIT14              ;RING
020000                  CTS=BIT13               ;CLR TO SEND
010000                  CARDET=BIT12            ;CARRIER DETECT
004000                  RECACT=BIT11            ;REC ACTIVE
002000                  SRD=BIT10               ;SEC REC DATA
001000                  DSR=BIT9                ;DATA SET RDY
000400                  STPSYN=BIT8             ;STRIP SYNC
000200                  RXDONE=BIT7             ;REC DONE
000100                  RINTEN=BIT6             ;REC INTR ENABLE
000040                  DSINTE=BIT5             ;DSC INTR ENABLE
000020                  SYNSCH=BIT4             ;SYNC SEARCH
000010                  STD=BIT3                ;SEC XMIT DATA
000004                  RTS=BIT2                ;REQ TO SEND
000002                  DTR=BIT1                ;DATA TERM RDY
000001                  VOID=BIT0
                                ;RXDBUF BIT DEFINITIONS
100000                  RXERR=BIT15             ;REC ERROR
040000                  OVRRUN=BIT14            ;OVERRUN
020000                  FRMERR=BIT13            ;FRAME ERROR
010000                  PARER=BIT12             ;PARITY ERROR
                                ;PARCSR BIT DEFINITIONS
001000                  PAREN=BIT9              ;PARITY ENABLE
000400                  EVPAR=BIT8              ;EVEN PARITY SENSE
                                ;PARCSR WRD DEFINITIONS
030000                  SYNINT=30000            ;SYNC EXTERNAL MODE
020000                  SYNEXT=20000            ;SYNC INTERNAL MODE
000000                  ISYMOD=0                ;ISOC MODE
000000                  FIVE=0                  ;WORD LENGTH 5 BITS
002000                  SIX=2000                ;WORD LENGTH 6 BITS
004000                  SEVEN=4000              ;WORD LENGTH 7 BITS
006000                  EIGHT=6000              ;WORD LENGTH 8 BITS
000000                  NOPAR=0                 ;NO PARITY
001000                  ODDPAR=1000             ;ODD PARITY
001400                  EVEPAR=1400             ;EVEN PARITY
                                ;TXCSR BIT DEFINITIONS
100000                  DNA=BIT15               ;DATA NOT AVAILABLE
040000                  MTDATA=BIT14            ;MAINT DATA
020000                  CLK=BIT13               ;CLK
002000                  BITW=BIT10              ;BIT WINDOW
000400                  MRESET=BIT8             ;MASTER RESET
000200                  TXDONE=BIT7             ;XMIT DONE
000100                  TXINTE=BIT6             ;XMIT INTR ENABLE
```

```
1000            000040                  DNAINTE=BIT5            ;DNA INTR ENAB
1001            000020                  SEND=BIT4               ;SEND
1002            000010                  HDXEN=BIT3              ;HDX/FDX
1003            000001                  BREAK=BIT0              ;BREAK
1004                                            ;TXCSR WRD DEFINITIONS
1005            000000                  USER=0                  ;USER MODE
1006            004000                  MINT=4000               ;MAINT INT MODE
1007            010000                  MEXT=10000              ;MAINT EXT MODE
1008            014000                  SYSTST=14000            ;SYSTEM TEST MODE
```

```
                        .SBTTL  ERROR POINTER TABLE

                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                        ;*LOCATION $ITEMB.  THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                        ;*      DH              ;;POINTS TO THE DATA HEADER
                        ;*      DT              ;;POINTS TO THE DATA
                        ;*      DF              ;;POINTS TO THE DATA FORMAT


001652                  $ERRTB:
                                ;ERROR TABLE
001652  001762                          EM1     ;ERROR 1        REGISTER ERROR
001654  002067                          DH1
001656  002116                          DT1
001660  002132                          DF1
001662  002022                          EM2     ;ERROR 2        RECEIVER ERROR
001664  002067                          DH1
001666  002116                          DT1
001670  002132                          DF1
001672  002043                          EM3     ;ERROR 3        TRANSMITTER ERROR
001674  002067                          DH1
001676  002116                          DT1
001700  002132                          DF1
001702  001746                          EM4     ;ERROR 4        BIT ERROR (GENERAL)
001704  000000                          0
001706  002126                          DT4
001710  002132                          DF1

                                ;DEFAULT DU ADDRESSES
001712  160010                  RXCSR:  160010
001714  160011                  HRXCSR: 160011
001716  160012                  RXDBUF: 160012
001720  160013                  HRXDBUF:        160013
001722  160012                  PARCSR: 160012
001724  160013                  HPARCSR:        160013
001726  160014                  TXCSR:  160014
001730  160015                  HTXCSR: 160015
001732  160016                  TXDBUF: 160016
001734  160017                  HTXDBUF:        160017
                                ;DEFAULT DU VECTORS
001736  000770                  DURIV:  770     ;REC INTR VECTOR
001740  000772                  DURIS:  772     ;REC INTR STATUS
001742  000774                  DUTIV:  774     ;XMIT INTR VECTOR
001744  000776                  DUTIS:  776     ;XMIT INTR STATUS
                                ;ERROR MESSAGES
001746  020040  051105  047522  EM4:    .ASCIZ  /  ERROR PC /
001754  020122  041520  000040
001762  020040  047503  050115  EM1:    .ASCIZ /  COMPARISON ERROR ON REGISTERS/
001770  051101  051511  047117
001776  042440  051122  051117
002004  047440  020116  042522
```

```
 1065  002012  044507  052123  051105
 1066  002020  000123
 1067  002022  020040  042522  042503  EM2:    .ASCIZ  /  RECEIVER ERROR/
 1068  002030  053111  051105  042440
 1069  002036  051122  051117     000
 1070  002043     040  052040  040522  EM3:    .ASCIZ  /  TRANSMITTER ERROR/
 1071  002050  051516  044515  052124
 1072  002056  051105  042440  051122
 1073  002064  051117     000
 1074                                          ;DATA HEADERS FOR ERROR MESSAGES
 1075  002067     105  051122  041520  DH1:    .ASCIZ  /ERRPC  WANTED  ACTUAL/
 1076  002074  020040  040527  052116
 1077  002102  042105  020040  041501
 1078  002110  052524  046101     000
 1079          002116                  .EVEN
 1080                                          ;DATA TABLES FOR ERROR MESSAGES
 1081  002116  001416  001130  001132  DT1:    .WORD   $ERRPC,HLD0,HLD1,0
 1082  002124  000000
 1083
 1084  002126  001416  000000          DT4:    .WORD   $ERRPC,0
 1085
 1086  002132     000     000     000  DF1:    .BYTE   0,0,0,0
 1087  002135     000
 1088                                  .EVEN
 1089                                  .SBTTL  ACT11 HOOKS
 1090
 1091                                  ;;**********************************************************************
 1092                                  ;HOOKS REQUIRED BY ACT11
 1093          002136                          $SVPC=.                 ;SAVE PC
 1094          000046                          .=46
 1095  000046  012714                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
 1096          000052                          .=52
 1097  000052  000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
 1098          002136                          .=$SVPC                 ;; RESTORE PC
 1099                                  .SBTTL  APT PARAMETER BLOCK
 1100
 1101                                  ;;**********************************************************************
 1102                                  ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
 1103                                  ;;**********************************************************************
 1104          002136                          .$X=.   ;;SAVE CURRENT LOCATION
 1105          000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
 1106  000024  000200                          200     ;;FOR APT START UP
 1107          000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
 1108  000044  002136                          $APTHDR ;;POINT TO APT HEADER BLOCK
 1109          002136                          .=.$X   ;;RESET LOCATION COUNTER
 1110                                  ;;**********************************************************************
 1111                                  ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
 1112                                  ;INTERFACE SPEC.
 1113
 1114  002136                          $APTHD:
 1115  002136  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
 1116  002140  001526                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
 1117  002142  000010                  $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
 1118  002144  000010                  $PASTM: .WORD   10      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
 1119  002146  000000                  $UNITM: .WORD           ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
 1120  002150  000052                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
1121
1122
1123                                            ;PROGRAM INITIALIZATION
1124                                            ;LOCK OUT INTERRUPTS
1125                                            ;SET UP PROCESSOR STACK
1126                                            ;SET UP POWER FAIL VECTOR
1127                                            ;CLEAR PROGRAM CONTROL FLAGS AND COUNTS
1128                                            ;TYPE TITLE MESSAGE
1129
1130  002152                                .START:
1131                                        .SBTTL  INITIALIZE THE COMMON TAGS
1132                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
1133  002152  012706  001400                        MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
1134  002156  005026                                CLR     (R6)+           ;;CLEAR MEMORY LOCATION
1135  002160  022706  001440                        CMP     #SWR,R6 ;;DONE?
1136  002164  001374                                BNE     .-6             ;;LOOP BACK IF NO
1137  002166  012706  001100                        MOV     #^#STACK,SP             ;;SETUP THE STACK POINTER
1138                                        ;;INITIALIZE A FEW VECTORS
1139  002172  012737  016340  000020                MOV     #$SCOPE,@#10TVEC ;;IOT VECTOR FOR SCOPE ROUTINE
1140  002200  012737  000340  000022                MOV     #340,@#10TVEC+2 ;;LEVEL 7
1141  002206  012737  014230  000030                MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
1142  002214  012737  000340  000032                MOV     #340,@#EMTVEC+2 ;;LEVEL 7
1143  002222  012737  016674  000034                MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
1144  002230  012737  000340  000036                MOV     #340,@#TRAPVEC+2;LEVEL 7
1145  002236  012737  015032  000024                MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
1146  002244  012737  000340  000026                MOV     #340,@#PWRVEC+2 ;;LEVEL 7
1147  002252  005067  177234                       CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
1148  002256  005067  177232                       CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
1149  002262  112767  000001  177125               MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
1150  002270  012767  002270  177110               MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
1151  002276  012767  002276  177104               MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
1152                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER.  IF NOT FOUND OR IT IS
1153                                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
1154  002304  013746  000004                       MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
1155  002310  012737  002344  000004                MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
1156  002316  012767  177570  177114               MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
1157  002324  012767  177570  177110               MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
1158  002332  022777  177777  177100               CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
1159  002340  001012                               BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
1160                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
1161  002342  000403                               BR      65$             ;;BRANCH IF NO TIMEOUT
1162  002344  012716  002352          64$:         MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
1163  002350  000002                               RTI
1164  002352  012767  000176  177060  65$:         MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
1165  002360  012767  000174  177054               MOV     #DISPREG,DISPLAY
1166  002366  012637  000004          66$:         MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
1167
1168  002372  005067  177136                       CLR     $PASS           ;;CLEAR PASS COUNT
1169  002376  132767  000200  177143               BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
1170  002404  001403                               BEQ     67$             ;;YES,USE NON-APT SWITCH
1171  002406  012767  001550  177024               MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
1172  002414                                  67$:
1173  002414  012706  001100                       MOV     #STACK,SP               ;SET STACK
1174  002420  106427  000340                       MTPS    #340                    ;LOCK INTERRUPTS
1175  002424  012737  015032  000024               MOV     #.PFAIL,@#24            ;SET UP POWER FAIL VECTOR
1176  002432  105067  176535                       CLRB    STFLG                   ;CLEAR START FLAG
```

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1177  002436  005067  176450              CLR     PASCNT                  ;CLEAR PASS COUNT
1178  002442  105067  176735              CLRB    $ERFLG                  ;CLEAR ERROR FLAG
1179  002446  005067  176740              CLR     $ERTTL                  ;CLEAR ERROR COUNT
1180  002452  005067  176740              CLR     $ERRPC                  ;CLEAR LAST ERROR POINTER
1181  002456  012767  000001  176716      MOV     #1,$TSTNM               ;SET UP FOR TEST 1
1182  002464  012767  002152  176412      MOV     #.START,RETURN          ;SET UP FOR POWER FAIL BEFORE
1183                                                                      ;TESTING STARTS
1184  002472  013746  000006              MOV     @#6,-(SP)
1185  002476  013746  000004              MOV     @#4,-(SP)
1186  002502  012737  002516  000004      MOV     #1$,@#4
1187  002510  005777  176724              TST     @SWR
1188  002514  000407                      BR      2$
1189  002516  012767  000176  176714  1$: MOV     #SWREG,SWR
1190  002524  012767  000174  176710      MOV     #DISPREG,DISPLAY
1191  002532  022626                      CMP     (SP)+,(SP)+
1192  002534  012637  000004          2$: MOV     (SP)+,@#4
1193  002540  012637  000006              MOV     (SP)+,@#6
1194  002544  022767  000176  176666      CMP     #SWREG,SWR
1195  002552  001007                      BNE     3$
1196  002554  005737  000042              TST     @#42                    ;CHECK FOR CHAIN
1197  002560  001402                      BEQ     33$
1198  002562  000167  000522              JMP     .BEGIN
1199  002566  004767  010224          33$: JSR    PC,CNTLU
1200  002572  105767  176374          3$: TSTB    INIFLG                  ;HAS INITIALIZATION BEEN PERFORMED
1201  002576  001004                      BNE     ONCE
1202  002600  104401  015172              TYPE    ,MTITLE                 ;TYPE TITLE MESSAGE
1203  002604  105167  176362              COMB    INIFLG                  ;IF NOT SET FLAG AND DO
1204  002610  105767  176732          ONCE: TSTB  $ENV            ;APT CONTROL?
1205  002614  001410                      BEQ     11$             ;BR IF NO
1206  002616  032767  000001  176726      BIT     #1,$USWR        ;EXTENAL JUMPER ON?
1207  002624  001002                      BNE     12$             ;NO
1208  002626  105067  176321              CLRB    JMRBY           ;CLEAR FLAG
1209  002632  000167  000452          12$: JMP    .BEGIN          ;GO DO IT
1210  002636  032777  000001  176574  11$: BIT    #SW00,@SWR      ;RESELECT VECTOR & CONTROL REG?
1211  002644  001002                      BNE     1$
1212  002646  000167  000436              JMP     .BEGIN
1213  002652  012700  000300          1$: MOV     #300,R0 ;RESTORE VECTOR AREA TO TRAPCATCHER
1214  002656  012701  000302              MOV     #302,R1 ;START AT LOCATION 300
1215  002662  012702  000004              MOV     #4,R2
1216  002666  010110                  2$: MOV     R1,(R0)
1217  002670  005011                      CLR     (R1)
1218  002672  060200                      ADD     R2,R0
1219  002674  060201                      ADD     R2,R1
1220  002676  022701  001000              CMP     #1000,R1        ;END AT LOCATION 776
1221  002702  002771                      BLT     2$
1222  002704  104406                      INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1223  002706  015240                      MREGAD  ;MESSAGE
1224  002710  104410                      PARAM   ;CONVERT STRING
1225  002712  160000                      160000  ;LOW LIMIT
1226  002714  167776                      167776  ;HIGH LIMIT
1227  002716  017170                      DUBASE  ;STORE AT THIS LOCATION
1228  002720     001                  .BYTE 1     ;MASK
1229  002721     001                  .BYTE 1     ;HOW MANY TIMES + 2
1230  002722  016767  014242  176226      MOV     DUBASE,KEEPADD  ;SAVE
1231  002730  004767  014102              JSR     PC,DUADDR
1232  002734  016767  176216  176212      MOV     KEEPADD,BASEADD ;RESTORE FOR ROTATION
```

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1233  002742  104406                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1234  002744  015225                          MVECTO  ;MESSAGE
1235  002746  104410                          PARAM   ;CONVERT STRING
1236  002750  000300                          300     ;LOW LIMIT
1237  002752  000776                          776     ;HIGH LIMIT
1238  002754  001736                          DURIV   ;STORE AT THIS LOCATION
1239  002756     001                  .BYTE   1       ;MASK
1240  002757     004                  .BYTE   4       ;HOW MANY TIMES + 2
1241  002760  016767  176752  176176          MOV     DURIV,KEEPIV    ;SAVE
1242  002766  016767  176744  176166          MOV     DURIV,BASEIV    ;SET UP FOR ROTATION
1243  002774  104406                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1244  002776  015270                          MMULT   ;MESSAGE
1245  003000  104414                          SETFLG  ;SET FLAG BASED UPON INPUT STRING
1246  003002  001152                          MULTD   ;THIS FLAG
1247  003004  105767  176142                  TSTB    MULTD   ;ARE THERE MULTIPLE DEVICES
1248                                                          ;ON THE SYSTEM ?
1249  003010  100406                          BMI     BBB     ;YES, ASK NEXT QUESTION
1250  003012  005067  176150                  CLR     ACTREG
1251  003016  005067  176146                  CLR     ROTADD
1252  003022  000167  000140                  JMP     OUTMUL  ;JUMP AROUND NEXT QUESTION
1253  003026                          BBB:
1254  003026  104406                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1255  003030  015317                          MLASTD  ;MESSAGE
1256  003032  104410                          PARAM   ;CONVERT STRING
1257  003034  160000                          160000  ;LOW LIMIT
1258  003036  167776                          167776  ;HIGH LIMIT
1259  003040  001160                          LASTADD ;STORE AT THIS LOCATION
1260  003042     001                  .BYTE   1       ;MASK
1261  003043     001                  .BYTE   1       ;HOW MANY TIMES + 2
1262                                  ;THE FOLLOWING ROUTINE SETS UP ACTREG FOR THE FIRST TIME
1263  003044  012767  000001  176116  1$:     MOV     #1,ROTADD       ;SET UP POINTER
1264  003052  005067  176110                  CLR     ACTREG  ;CLR ACTIVE REGISTER
1265  003056  056767  176106  176102  2$:     BIS     ROTADD,ACTREG   ;MAKE THIS DEVICE ACTIVE
1266  003064  000241                          CLC
1267  003066  006167  176076                  ROL     ROTADD  ;SET UP POINTER
1268  003072  103421                          BCS     3$      ;ARE YOU OUT OF RANGE ?
1269  003074  062767  000010  176052          ADD     #10,BASEADD     ;SET UP BASE ADDRESS
1270  003102  026767  176052  176044          CMP     LASTADD,BASEADD ;IS THIS THE LAST DEVICE ?
1271  003110  101362                          BHI     2$      ;NO DO IT AGAIN
1272  003112  056767  176052  176046          BIS     ROTADD,ACTREG   ;THIS ASSUMES THAT THERE ARE AT
1273                                                          ;LEAST TWO DEVICES WHEN YOU ANSWER YES TO
1274                                                          ;MULTIPLE DEVICE QUESTION
1275  003120  012767  000001  176042  4$:     MOV     #1,ROTADD       ;SET UP FOR LATER USE IN END OF PASS ROUTINE
1276  003126  016767  176024  176020          MOV     KEEPADD,BASEADD ;DITTO
1277  003134  000414                          BR      OUTMUL  ;CONTINUE QUESTIONS
1278  003136  016767  176014  176010  3$:     MOV     KEEPADD,BASEADD ;RESTORE
1279  003144  104406                          INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1280  003146  015413                          MRANGE  ;MESSAGE
1281  003150  104410                          PARAM   ;CONVERT STRING
1282  003152  160000                          160000  ;LOW LIMIT
1283  003154  167776                          167776  ;HIGH LIMIT
1284  003156  001160                          LASTADD ;STORE AT THIS LOCATION
1285  003160     001                  .BYTE   1       ;MASK
1286  003161     001                  .BYTE   1       ;HOW MANY TIMES + 2
1287  003162  000167  177656                  JMP     1$      ;DO IT AGAIN
1288  003166  012767  000340  013636  OUTMUL: MOV     #340,DUPRT
```

```
1289  003174  004767  013562                    JSR     PC,DULEV
1290                                            ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
1291                                            ;BUFFER TO THE CHARACTERS "1" AND "2".
1292                                            ;IF THE CHARACTER IS "1" CLEAR THE FLAG
1293                                            ;IF THE CHARACTER IS "2" SET THE FLAG
1294  003200                            AAA:
1295  003200  104406                           INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1296  003202  015631                           MSYNC   ;MESSAGE
1297  003204  122767  000061  012760  3$:      CMPB    #'1,INBUF       ;IS IT "1" ?
1298  003212  001003                           BNE     1$
1299  003214  105067  175726                  CLRB    SYNCNO  ;000
1300  003220  000412                           BR      4$
1301  003222  122767  000062  012742  1$:      CMPB    #'2,INBUF       ;IS IT "2" ?
1302  003230  001004                           BNE     2$
1303  003232  112767  177777  175706          MOVB    #-1,SYNCNO      ;377
1304  003240  000402                           BR      4$
1305  003242  104407                    2$:    INSTER  ;RETRY
1306  003244  000757                           BR      3$
1307  003246  000240                    4$:    NOP
1308  003250  104406                           INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1309  003252  015677                           MWIRE6  ;MESSAGE
1310  003254  104414                           SETFLG  ;SET FLAG BASED UPON INPUT STRING
1311  003256  001147                           SEXMIT  ;THIS FLAG
1312  003260  104406                           INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1313  003262  015750                           MWIRE5  ;MESSAGE
1314  003264  104414                           SETFLG  ;SET FLAG BASED UPON INPUT STRING
1315  003266  001150                           SEREC   ;THIS FLAG
1316  003270  104406                           INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1317  003272  016020                           MWIRE4  ;MESSAGE
1318  003274  104414                           SETFLG  ;SET FLAG BASED UPON INPUT STRING
1319  003276  001151                           OPTCLR  ;THIS FLAG
1320  003300  104406                           INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1321  003302  016077                           MEXTJ   ;MESSAGE
1322  003304  104414                           SETFLG  ;SET FLAG BASED UPON INPUT STRING
1323  003306  001153                           JMRBY   ;THIS FLAG
1324
1325                                            ;TEST START AND RESTART
1326
1327  003310  012706  001100          .BEGIN:  MOV     #STACK,SP               ;SET UP STACK
1328  003314  106427  000340                   MTPS    #340                    ;LOCK OUT INTERRUPTS
1329  003320  032777  000002  176112           BIT     #SW01,@SWR              ;IF SW01=1, GET STARTING PC
1330  003326  001413                           BEQ     3$
1331  003330  104406                           INSTR   ;OUTPUT MESSAGE & GET INPUT STRING
1332  003332  015563                           MTSTPC  ;MESSAGE
1333  003334  104410                           PARAM   ;CONVERT STRING
1334  003336  003374                           TST1    ;LOW LIMIT
1335  003340  017500                           17500   ;HIGH LIMIT
1336  003342  001402                           $TSTNM  ;STORE AT THIS LOCATION
1337  003344     001                  .BYTE    1       ;MASK
1338  003345     001                  .BYTE    1       ;HOW MANY TIMES + 2
1339  003346  016767  176030  175530           MOV     $TSTNM,RETURN
1340  003354  000403                           BR      4$
1341  003356  012767  003374  175520  3$:      MOV     #TST1,RETURN            ;START AT TEST 1
1342  003364  104401  015557          4$:      TYPE    ,MR                     ;TYPE R
1343  003370  000177  175510                   JMP     @RETURN                 ;START TESTING
1344
```

```
                                        ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
                                        ;;OF THE TRANSMITTER SECTION.
                                        ;;IT ALSO CHECKS DNA TIMING
                                        ;;MODE: ISYMOD
                                        ;;LENGTH: SEVEN PLUS PARITY
                                        ;;PARITY: EVEPAR
                                        ;;CHARACTER: 125
                                        ;;
                                    ;;**************************************************************
003374  000004                    TST1:   SCOPE
003376  052777  000400  176322            BIS     #MRESET,@TXCSR  ;MASTER RESET
003404  012777  000000  176310            MOV     #ISYMOD,@PARCSR ;SET THE MODE
003412  052777  000400  176306            BIS     #MRESET,@TXCSR  ;MASTER RESET

                                    ;SET MAINTENANCE MODE & SEND
                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
003420  012777  004020  176300            MOV     #MINT!SEND,@TXCSR

                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
003426  012777  005426  176266            MOV     #ISYMOD!SEVEN!EVEPAR!26,@PARCSR
003434  016703  176266                    MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
003440  112777  000125  176264            MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
003446  012767  001252  176024            MOV     #1252,$TMP1     ;TO BE SHIFTED CHAR
003454  012767  000012  175440            MOV     #10.,SHIFT      ;# OF SHIFTS
                                    ;POKE CLK TO GET INTO SYNCRONIZATION
003462  052777  020000  176236            BIS     #CLK,@TXCSR     ;POKE CLK UP
003470  042777  020000  176230            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
003476  005000                    1$:     CLR     R0
003500  006067  175774                    ROR     $TMP1   ;FORCE CARRY
003504  103002                            BCC     2$      ;BR IF CARRY CLR
003506  052700  002000                    BIS     #BITW,R0        ;EQUIV OF BITW
003512                            2$:
003512  052777  020000  176206            BIS     #CLK,@TXCSR     ;POKE CLK UP
003520  042777  020000  176200            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
003526  017701  176174                    MOV     @TXCSR,R1       ;ACTUAL
003532  042701  075777                    BIC     #075777,R1      ;SAVE BITW & DNA
003536  020001                            CMP     R0,R1   ;COMPARE EXP VS ACT
003540  001401                            BEQ     .+4
003542  104003                            ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
                                                        ;BIT,...ALSO CHECK DNA
003544  005367  175352                    DEC     SHIFT   ;# OF SHIFTS
003550  001352                            BNE     1$      ;DO IT AGAIN ?
                                    ;NOW POKE CLK TO SEE DNA
003552  052777  020000  176146            BIS     #CLK,@TXCSR     ;POKE CLK
003560  012700  000000                    MOV     #0,R0   ;EXPECTED
003564  017701  176136                    MOV     @TXCSR,R1       ;ACTUAL
003570  042701  077777                    BIC     #77777,R1       ;SAVE DNA ONLY
003574  020001                            CMP     R0,R1           ;COMPARE EXP VS ACT
003576  001401                            BEQ     .+4
003600  104003                            ERROR   3       ;DNA SHOULD BE SET
                                                        ;IF DNA DID NOT SET
                                                        ;CHECK WORD LENGTH SELECT LOGIC

                                        ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
                                        ;;OF THE TRANSMITTER SECTION.
                                        ;;IT ALSO CHECKS DNA TIMING
```

```
1401                                            ;;MODE: ISYMOD
1402                                            ;;LENGTH: SEVEN PLUS PARITY
1403                                            ;;PARITY: ODDPAR
1404                                            ;;CHARACTER: 125
1405                                            ;;
1406                                    ;;**********************************************************************
1407  003602  000004                    TST2:   SCOPE
1408  003604  052777  000400  176114            BIS     #MRESET,@TXCSR  ;MASTER RESET
1409  003612  012777  000000  176102            MOV     #ISYMOD,@PARCSR ;SET THE MODE
1410  003620  052777  000400  176100            BIS     #MRESET,@TXCSR  ;MASTER RESET
1411
1412                                    ;SET MAINTENANCE MODE & SEND
1413                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1414  003626  012777  004020  176072            MOV     #MINT!SEND,@TXCSR
1415
1416                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1417  003634  012777  005026  176060            MOV     #ISYMOD!SEVEN!ODDPAR!26,@PARCSR
1418  003642  016703  176060                    MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1419  003646  112777  000125  176056            MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
1420  003654  012767  001652  175616            MOV     #1652,$TMP1     ;TO BE SHIFTED CHAR
1421  003662  012767  000012  175232            MOV     #10.,SHIFT      ;# OF SHIFTS
1422                                    ;POKE CLK TO GET INTO SYNCRONIZATION
1423  003670  052777  020000  176030            BIS     #CLK,@TXCSR     ;POKE CLK UP
1424  003676  042777  020000  176022            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1425  003704  005000                    1$:     CLR     R0
1426  003706  006067  175566                    ROR     $TMP1   ;FORCE CARRY
1427  003712  103002                            BCC     2$      ;BR IF CARRY CLR
1428  003714  052700  002000                    BIS     #BITW,R0        ;EQUIV OF BITW
1429  003720                            2$:
1430  003720  052777  020000  176000            BIS     #CLK,@TXCSR     ;POKE CLK UP
1431  003726  042777  020000  175772            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1432  003734  017701  175766                    MOV     @TXCSR,R1       ;ACTUAL
1433  003740  042701  075777                    BIC     #075777,R1      ;SAVE BITW & DNA
1434  003744  020001                            CMP     R0,R1   ;COMPARE EXP VS ACT
1435  003746  001401                            BEQ     .+4
1436  003750  104003                            ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1437                                                            ;BIT,...ALSO CHECK DNA
1438  003752  005367  175144                    DEC     SHIFT   ;# OF SHIFTS
1439  003756  001352                            BNE     1$      ;DO IT AGAIN ?
1440                                    ;NOW POKE CLK TO SEE DNA
1441  003760  052777  020000  175740            BIS     #CLK,@TXCSR     ;POKE CLK
1442  003766  012700  000000                    MOV     #0,R0   ;EXPECTED
1443  003772  017701  175730                    MOV     @TXCSR,R1       ;ACTUAL
1444  003776  042701  077777                    BIC     #77777,R1       ;SAVE DNA ONLY
1445  004002  020001                            CMP     R0,R1           ;COMPARE EXP VS ACT
1446  004004  001401                            BEQ     .+4
1447  004006  104003                            ERROR   3       ;DNA SHOULD BE SET
1448                                                            ;IF DNA DID NOT SET
1449                                                            ;CHECK WORD LENGTH SELECT LOGIC
1450
1451                                            ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1452                                            ;;OF THE TRANSMITTER SECTION.
1453                                            ;;IT ALSO CHECKS DNA TIMING
1454                                            ;;MODE: SYNINT
1455                                            ;;LENGTH: EIGHT PLUS PARITY
1456                                            ;;PARITY: EVEPAR
```

```
                                        ;;CHARACTER:125
                                        ;;
                                ;;**************************************************************************
1460  004010  000004           TST3:   SCOPE
1461  004012  052777  000400  175706          BIS     #MRESET,@TXCSR  ;MASTER RESET
1462  004020  012777  030000  175674          MOV     #SYNINT,@PARCSR ;SET THE MODE
1463  004026  052777  000400  175672          BIS     #MRESET,@TXCSR  ;MASTER RESET
1464
1465                            ;SET MAINTENANCE MODE & SEND
1466                                    ;NOTE:BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1467  004034  012777  004020  175664          MOV     #MINT!SEND,@TXCSR
1468
1469                            ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1470  004042  012777  037426  175652          MOV     #SYNINT!EIGHT!EVEPAR!26,@PARCSR
1471  004050  016703  175652                 MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1472  004054  112777  000125  175650          MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
1473  004062  012767  000125  175410          MOV     #125,$TMP1      ;TO BE SHIFTED CHAR
1474  004070  012767  000011  175024          MOV     #9.,SHIFT       ;# OF SHIFTS
1475                            ;POKE CLK TO GET INTO SYNCRONIZATION
1476  004076  052777  020000  175622          BIS     #CLK,@TXCSR     ;POKE CLK UP
1477  004104  042777  020000  175614          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1478  004112  005000           1$:     CLR     R0
1479  004114  006067  175360                 ROR     $TMP1   ;FORCE CARRY
1480  004120  103002                         BCC     2$      ;BR IF CARRY CLR
1481  004122  052700  002000                 BIS     #BITW,R0        ;EQUIV OF BITW
1482  004126                  2$:
1483  004126  052777  020000  175572          BIS     #CLK,@TXCSR     ;POKE CLK UP
1484  004134  042777  020000  175564          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1485  004142  017701  175560                 MOV     @TXCSR,R1       ;ACTUAL
1486  004146  042701  075777                 BIC     #075777,R1      ;SAVE BITW & DNA
1487  004152  020001                         CMP     R0,R1   ;COMPARE EXP VS ACT
1488  004154  001401                         BEQ     .+4
1489  004156  104003                         ERROR   3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1490                                                                  ;BIT,...ALSO CHECK DNA
1491  004160  005367  174736                 DEC     SHIFT   ;# OF SHIFTS
1492  004164  001352                         BNE     1$      ;DO IT AGAIN ?
1493                            ;NOW POKE CLK TO SEE DNA
1494  004166  052777  020000  175532          BIS     #CLK,@TXCSR     ;POKE CLK
1495  004174  012700  100000                 MOV     #100000,R0      ;EXPECTED
1496  004200  017701  175522                 MOV     @TXCSR,R1       ;ACTUAL
1497  004204  042701  077777                 BIC     #77777,R1       ;SAVE DNA ONLY
1498  004210  020001                         CMP     R0,R1           ;COMPARE EXP VS ACT
1499  004212  001401                         BEQ     .+4
1500  004214  104003                         ERROR   3               ;DNA SHOULD BE SET
1501                                                                  ;IF DNA DID NOT SET
1502                                                                  ;CHECK WORD LENGTH SELECT LOGIC
1503
1504                                    ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1505                                    ;;OF THE TRANSMITTER SECTION.
1506                                    ;;IT ALSO CHECKS DNA TIMING
1507                                    ;;MODE:SYNINT
1508                                    ;;LENGTH:EIGHT PLUS PARITY
1509                                    ;;PARITY:ODDPAR
1510                                    ;;CHARACTER:125
1511                                    ;;
1512                            ;;**************************************************************************
```

```
1513  004216  000004                        TST4:   SCOPE
1514  004220  052777  000400  175500                BIS     #MRESET,@TXCSR  ;MASTER RESET
1515  004226  012777  030000  175466                MOV     #SYNINT,@PARCSR ;SET THE MODE
1516  004234  052777  000400  175464                BIS     #MRESET,@TXCSR  ;MASTER RESET
1517
1518                                        ;SET MAINTENANCE MODE & SEND
1519                                                ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1520  004242  012777  004020  175456                MOV     #MINT!SEND,@TXCSR
1521
1522                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1523  004250  012777  037026  175444                MOV     #SYNINT!EIGHT!ODDPAR!26,@PARCSR
1524  004256  016703  175444                       MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1525  004262  112777  000125  175442               MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
1526  004270  012767  000525  175202               MOV     #525,$TMP1      ;TO BE SHIFTED CHAR
1527  004276  012767  000011  174616               MOV     #9.,SHIFT       ;# OF SHIFTS
1528                                        ;POKE CLK TO GET INTO SYNCRONIZATION
1529  004304  052777  020000  175414                BIS     #CLK,@TXCSR     ;POKE CLK UP
1530  004312  042777  020000  175406                BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1531  004320  005000                        1$:     CLR     R0
1532  004322  006067  175152                       ROR     $TMP1   ;FORCE CARRY
1533  004326  103002                               BCC     2$      ;BR IF CARRY CLR
1534  004330  052700  002000                       BIS     #BITW,R0        ;EQUIV OF BITW
1535  004334                                2$:
1536  004334  052777  020000  175364                BIS     #CLK,@TXCSR     ;POKE CLK UP
1537  004342  042777  020000  175356                BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1538  004350  017701  175352                       MOV     @TXCSR,R1       ;ACTUAL
1539  004354  042701  075777                       BIC     #075777,R1      ;SAVE BITW & DNA
1540  004360  020001                               CMP     R0,R1   ;COMPARE EXP VS ACT
1541  004362  001401                               BEQ     .+4
1542  004364  104003                               ERROR   3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1543                                                                        ;BIT,...ALSO CHECK DNA
1544  004366  005367  174530                       DEC     SHIFT   ;# OF SHIFTS
1545  004372  001352                               BNE     1$      ;DO IT AGAIN ?
1546                                        ;NOW POKE CLK TO SEE DNA
1547  004374  052777  020000  175324                BIS     #CLK,@TXCSR     ;POKE CLK
1548  004402  012700  100000                       MOV     #100000,R0      ;EXPECTED
1549  004406  017701  175314                       MOV     @TXCSR,R1       ;ACTUAL
1550  004412  042701  077777                       BIC     #77777,R1       ;SAVE DNA ONLY
1551  004416  020001                               CMP     R0,R1           ;COMPARE EXP VS ACT
1552  004420  001401                               BEQ     .+4
1553  004422  104003                               ERROR   3               ;DNA SHOULD BE SET
1554                                                                        ;IF DNA DID NOT SET
1555                                                                        ;CHECK WORD LENGTH SELECT LOGIC
1556
1557                                                ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1558                                                ;;OF THE TRANSMITTER SECTION.
1559                                                ;;IT ALSO CHECKS DNA TIMING
1560                                                ;;MODE: ISYMOD
1561                                                ;;LENGTH: EIGHT PLUS PARITY
1562                                                ;;PARITY: EVEPAR
1563                                                ;;CHARACTER: 125
1564                                                ;;
1565                                        ;;**********************************************************************
1566  004424  000004                        TST5:   SCOPE
1567  004426  052777  000400  175272                BIS     #MRESET,@TXCSR  ;MASTER RESET
1568  004434  012777  000000  175260                MOV     #ISYMOD,@PARCSR ;SET THE MODE
```

```
1569  004442  052777  000400  175256          BIS     #MRESET,@TXCSR  ;MASTER RESET
1570
1571                                  ;SET MAINTENANCE MODE & SEND
1572                                      ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1573  004450  012777  004020  175250          MOV     #MINT!SEND,@TXCSR
1574
1575                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1576  004456  012777  007426  175236          MOV     #ISYMOD!EIGHT!EVEPAR!26,@PARCSR
1577  004464  016703  175236                  MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1578  004470  112777  000125  175234          MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
1579  004476  012767  002252  174774          MOV     #2252,$TMP1     ;TO BE SHIFTED CHAR
1580  004504  012767  000013  174410          MOV     #11.,SHIFT      ;# OF SHIFTS
1581                                  ;POKE CLK TO GET INTO SYNCRONIZATION
1582  004512  052777  020000  175206          BIS     #CLK,@TXCSR     ;POKE CLK UP
1583  004520  042777  020000  175200          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1584  004526  005000                  1$:     CLR     R0
1585  004530  006067  174744                  ROR     $TMP1   ;FORCE CARRY
1586  004534  103002                          BCC     2$      ;BR IF CARRY CLR
1587  004536  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BITW
1588  004542                          2$:
1589  004542  052777  020000  175156          BIS     #CLK,@TXCSR     ;POKE CLK UP
1590  004550  042777  020000  175150          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1591  004556  017701  175144                  MOV     @TXCSR,R1       ;ACTUAL
1592  004562  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
1593  004566  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1594  004570  001401                          BEQ     .+4
1595  004572  104003                          ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1596                                                          ;BIT,...ALSO CHECK DNA
1597  004574  005367  174322                  DEC     SHIFT   ;# OF SHIFTS
1598  004600  001352                          BNE     1$      ;DO IT AGAIN ?
1599                                  ;NOW POKE CLK TO SEE DNA
1600  004602  052777  020000  175116          BIS     #CLK,@TXCSR     ;POKE CLK
1601  004610  012700  000000                  MOV     #0,R0   ;EXPECTED
1602  004614  017701  175106                  MOV     @TXCSR,R1       ;ACTUAL
1603  004620  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
1604  004624  020001                          CMP     R0,R1           ;COMPARE EXP VS ACT
1605  004626  001401                          BEQ     .+4
1606  004630  104003                          ERROR   3       ;DNA SHOULD BE SET
1607                                                          ;IF DNA DID NOT SET
1608                                                          ;CHECK WORD LENGTH SELECT LOGIC
1609
1610                                      ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1611                                      ;;OF THE TRANSMITTER SECTION.
1612                                      ;;IT ALSO CHECKS DNA TIMING
1613                                      ;;MODE: ISYMOD
1614                                      ;;LENGTH: EIGHT PLUS PARITY
1615                                      ;;PARITY: ODDPAR
1616                                      ;;CHARACTER: 125
1617                                      ;;
1618                                  ;;**************************************************************************
1619  004632  000004                  TST6:   SCOPE
1620  004634  052777  000400  175064          BIS     #MRESET,@TXCSR  ;MASTER RESET
1621  004642  012777  000000  175052          MOV     #ISYMOD,@PARCSR ;SET THE MODE
1622  004650  052777  000400  175050          BIS     #MRESET,@TXCSR  ;MASTER RESET
1623
1624                                  ;SET MAINTENANCE MODE & SEND
```

```
1625                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1626  004656  012777  004020  175042            MOV     #MINT!SEND,@TXCSR
1627
1628                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1629  004664  012777  007026  175030            MOV     #ISYMOD!EIGHT!ODDPAR!26,@PARCSR
1630  004672  016703  175030                    MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1631  004676  112777  000125  175026            MOVB    #125,@TXDBUF    ;LOAD DATA CHAR
1632  004704  012767  003252  174566            MOV     #3252,$TMP1     ;TO BE SHIFTED CHAR
1633  004712  012767  000013  174202            MOV     #11.,SHIFT      ;# OF SHIFTS
1634                                    ;POKE CLK TO GET INTO SYNCRONIZATION
1635  004720  052777  020000  175000            BIS     #CLK,@TXCSR     ;POKE CLK UP
1636  004726  042777  020000  174772            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1637  004734  005000                    1$:     CLR     R0
1638  004736  006067  174536                    ROR     $TMP1   ;FORCE CARRY
1639  004742  103002                            BCC     2$      ;BR IF CARRY CLR
1640  004744  052700  002000                    BIS     #BITW,R0        ;EQUIV OF BITW
1641  004750                            2$:
1642  004750  052777  020000  174750            BIS     #CLK,@TXCSR     ;POKE CLK UP
1643  004756  042777  020000  174742            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1644  004764  017701  174736                    MOV     @TXCSR,R1       ;ACTUAL
1645  004770  042701  075777                    BIC     #075777,R1      ;SAVE BITW & DNA
1646  004774  020001                            CMP     R0,R1   ;COMPARE EXP VS ACT
1647  004776  001401                            BEQ     .+4
1648  005000  104003                            ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1649                                                            ;BIT,...ALSO CHECK DNA
1650  005002  005367  174114                    DEC     SHIFT   ;# OF SHIFTS
1651  005006  001352                            BNE     1$      ;DO IT AGAIN ?
1652                                    ;NOW POKE CLK TO SEE DNA
1653  005010  052777  020000  174710            BIS     #CLK,@TXCSR     ;POKE CLK
1654  005016  012700  000000                    MOV     #0,R0   ;EXPECTED
1655  005022  017701  174700                    MOV     @TXCSR,R1       ;ACTUAL
1656  005026  042701  077777                    BIC     #77777,R1       ;SAVE DNA ONLY
1657  005032  020001                            CMP     R0,R1           ;COMPARE EXP VS ACT
1658  005034  001401                            BEQ     .+4
1659  005036  104003                            ERROR   3       ;DNA SHOULD BE SET
1660                                                            ;IF DNA DID NOT SET
1661                                                            ;CHECK WORD LENGTH SELECT LOGIC
1662
1663
1664                                            ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1665                                            ;;OF THE TRANSMITTER SECTION.
1666                                            ;;IT ALSO CHECKS DNA TIMING
1667                                            ;;MODE: SYNINT
1668                                            ;;LENGTH: EIGHT PLUS PARITY
1669                                            ;;PARITY: EVEPAR
1670                                            ;;CHARACTER: 252
1671                                            ;;
1672                                    ;;**************************************************************************
1673  005040  000004                    TST7:   SCOPE
1674  005042  052777  000400  174656            BIS     #MRESET,@TXCSR  ;MASTER RESET
1675  005050  012777  030000  174644            MOV     #SYNINT,@PARCSR ;SET THE MODE
1676  005056  052777  000400  174642            BIS     #MRESET,@TXCSR  ;MASTER RESET
1677
1678                                    ;SET MAINTENANCE MODE & SEND
1679                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1680  005064  012777  004020  174634            MOV     #MINT!SEND,@TXCSR
```

```
1681
1682                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1683  005072  012777  037426  174622            MOV     #SYNINT!EIGHT!EVEPAR!26,@PARCSR
1684  005100  016703  174622                    MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1685  005104  112777  000252  174620            MOVB    #252,@TXDBUF    ;LOAD DATA CHAR
1686  005112  012767  000252  174360            MOV     #252,$TMP1      ;TO BE SHIFTED CHAR
1687  005120  012767  000011  173774            MOV     #9.,SHIFT       ;# OF SHIFTS
1688                                    ;POKE CLK TO GET INTO SYNCRONIZATION
1689  005126  052777  020000  174572            BIS     #CLK,@TXCSR     ;POKE CLK UP
1690  005134  042777  020000  174564            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1691  005142  005000                    1$:     CLR     R0
1692  005144  006067  174330                    ROR     $TMP1   ;FORCE CARRY
1693  005150  103002                            BCC     2$      ;BR IF CARRY CLR
1694  005152  052700  002000                    BIS     #BITW,R0        ;EQUIV OF BITW
1695  005156                            2$:
1696  005156  052777  020000  174542            BIS     #CLK,@TXCSR     ;POKE CLK UP
1697  005164  042777  020000  174534            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1698  005172  017701  174530                    MOV     @TXCSR,R1       ;ACTUAL
1699  005176  042701  075777                    BIC     #075777,R1      ;SAVE BITW & DNA
1700  005202  020001                            CMP     R0,R1   ;COMPARE EXP VS ACT
1701  005204  001401                            BEQ     .+4
1702  005206  104003                            ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1703                                                            ;BIT,...ALSO CHECK DNA
1704  005210  005367  173706                    DEC     SHIFT   ;# OF SHIFTS
1705  005214  001352                            BNE     1$      ;DO IT AGAIN ?
1706                                    ;NOW POKE CLK TO SEE DNA
1707  005216  052777  020000  174502            BIS     #CLK,@TXCSR     ;POKE CLK
1708  005224  012700  100000                    MOV     #100000,R0      ;EXPECTED
1709  005230  017701  174472                    MOV     @TXCSR,R1       ;ACTUAL
1710  005234  042701  077777                    BIC     #77777,R1       ;SAVE DNA ONLY
1711  005240  020001                            CMP     R0,R1           ;COMPARE EXP VS ACT
1712  005242  001401                            BEQ     .+4
1713  005244  104003                            ERROR   3       ;DNA SHOULD BE SET
1714                                                            ;IF DNA DID NOT SET
1715                                                            ;CHECK WORD LENGTH SELECT LOGIC
1716
1717                                            ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1718                                            ;;OF THE TRANSMITTER SECTION.
1719                                            ;;IT ALSO CHECKS DNA TIMING
1720                                            ;;MODE: SYNINT
1721                                            ;;LENGTH: EIGHT PLUS PARITY
1722                                            ;;PARITY: ODDPAR
1723                                            ;;CHARACTER: 252
1724                                            ;;
1725                                    ;;**************************************************************************
1726  005246  000004                    TST10:  SCOPE
1727  005250  052777  000400  174450            BIS     #MRESET,@TXCSR  ;MASTER RESET
1728  005256  012777  030000  174436            MOV     #SYNINT,@PARCSR ;SET THE MODE
1729  005264  052777  000400  174434            BIS     #MRESET,@TXCSR  ;MASTER RESET
1730
1731                                    ;SET MAINTENANCE MODE & SEND
1732                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1733  005272  012777  004020  174426            MOV     #MINT!SEND,@TXCSR
1734
1735                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1736  005300  012777  037026  174414            MOV     #SYNINT!EIGHT!ODDPAR!26,@PARCSR
```

```
1737  005306  016703  174414          MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1738  005312  112777  000252  174412  MOVB    #252,@TXDBUF    ;LOAD DATA CHAR
1739  005320  012767  000652  174152  MOV     #652,$TMP1      ;TO BE SHIFTED CHAR
1740  005326  012767  000011  173566  MOV     #9.,SHIFT       ;# OF SHIFTS
1741                                ;POKE CLK TO GET INTO SYNCRONIZATION
1742  005334  052777  020000  174364  BIS     #CLK,@TXCSR     ;POKE CLK UP
1743  005342  042777  020000  174356  BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1744  005350  005000                1$:     CLR     R0
1745  005352  006067  174122          ROR     $TMP1   ;FORCE CARRY
1746  005356  103002                  BCC     2$      ;BR IF CARRY CLR
1747  005360  052700  002000          BIS     #BITW,R0        ;EQUIV OF BITW
1748  005364                        2$:
1749  005364  052777  020000  174334  BIS     #CLK,@TXCSR     ;POKE CLK UP
1750  005372  042777  020000  174326  BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1751  005400  017701  174322          MOV     @TXCSR,R1       ;ACTUAL
1752  005404  042701  075777          BIC     #075777,R1      ;SAVE BITW & DNA
1753  005410  020001                  CMP     R0,R1   ;COMPARE EXP VS ACT
1754  005412  001401                  BEQ     .+4
1755  005414  104003                  ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1756                                                  ;BIT,...ALSO CHECK DNA
1757  005416  005367  173500          DEC     SHIFT   ;# OF SHIFTS
1758  005422  001352                  BNE     1$      ;DO IT AGAIN ?
1759                                ;NOW POKE CLK TO SEE DNA
1760  005424  052777  020000  174274  BIS     #CLK,@TXCSR     ;POKE CLK
1761  005432  012700  100000          MOV     #100000,R0      ;EXPECTED
1762  005436  017701  174264          MOV     @TXCSR,R1       ;ACTUAL
1763  005442  042701  077777          BIC     #77777,R1       ;SAVE DNA ONLY
1764  005446  020001                  CMP     R0,R1           ;COMPARE EXP VS ACT
1765  005450  001401                  BEQ     .+4
1766  005452  104003                  ERROR   3       ;DNA SHOULD BE SET
1767                                                  ;IF DNA DID NOT SET
1768                                                  ;CHECK WORD LENGTH SELECT LOGIC
1769
1770                                        ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1771                                        ;;OF THE TRANSMITTER SECTION.
1772                                        ;;IT ALSO CHECKS DNA TIMING
1773                                        ;;MODE: SYNINT
1774                                        ;;LENGTH: EIGHT PLUS PARITY
1775                                        ;;PARITY: EVEPAR
1776                                        ;;CHARACTER: 0
1777                                        ;;
1778                                ;;**************************************************************************
1779  005454  000004                TST11:  SCOPE
1780  005456  052777  000400  174242  BIS     #MRESET,@TXCSR  ;MASTER RESET
1781  005464  012777  030000  174230  MOV     #SYNINT,@PARCSR ;SET THE MODE
1782  005472  052777  000400  174226  BIS     #MRESET,@TXCSR  ;MASTER RESET
1783
1784                                ;SET MAINTENANCE MODE & SEND
1785                                        ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1786  005500  012777  004020  174220  MOV     #MINT!SEND,@TXCSR
1787
1788                                ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1789  005506  012777  037426  174206  MOV     #SYNINT!EIGHT!EVEPAR!26,@PARCSR
1790  005514  016703  174206          MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1791  005520  112777  000000  174204  MOVB    #0,@TXDBUF      ;LOAD DATA CHAR
1792  005526  012767  000000  173744  MOV     #0,$TMP1        ;TO BE SHIFTED CHAR
```

```
1793  005534  012767  000011  173360          MOV     #9.,SHIFT       ;# OF SHIFTS
1794                                  ;POKE CLK TO GET INTO SYNCRONIZATION
1795  005542  052777  020000  174156          BIS     #CLK,@TXCSR     ;POKE CLK UP
1796  005550  042777  020000  174150          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1797  005556  005000                  1$:     CLR     R0
1798  005560  006067  173714                  ROR     $TMP1   ;FORCE CARRY
1799  005564  103002                          BCC     2$      ;BR IF CARRY CLR
1800  005566  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BITW
1801  005572                          2$:
1802  005572  052777  020000  174126          BIS     #CLK,@TXCSR     ;POKE CLK UP
1803  005600  042777  020000  174120          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1804  005606  017701  174114                  MOV     @TXCSR,R1       ;ACTUAL
1805  005612  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
1806  005616  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1807  005620  001401                          BEQ     .+4
1808  005622  104003                          ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1809                                                          ;BIT,...ALSO CHECK DNA
1810  005624  005367  173272                  DEC     SHIFT   ;# OF SHIFTS
1811  005630  001352                          BNE     1$      ;DO IT AGAIN ?
1812                                  ;NOW POKE CLK TO SEE DNA
1813  005632  052777  020000  174066          BIS     #CLK,@TXCSR     ;POKE CLK
1814  005640  012700  100000                  MOV     #100000,R0      ;EXPECTED
1815  005644  017701  174056                  MOV     @TXCSR,R1       ;ACTUAL
1816  005650  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
1817  005654  020001                          CMP     R0,R1           ;COMPARE EXP VS ACT
1818  005656  001401                          BEQ     .+4
1819  005660  104003                          ERROR   3       ;DNA SHOULD BE SET
1820                                                          ;IF DNA DID NOT SET
1821                                                          ;CHECK WORD LENGTH SELECT LOGIC
1822
1823                                          ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1824                                          ;;OF THE TRANSMITTER SECTION.
1825                                          ;;IT ALSO CHECKS DNA TIMING
1826                                          ;;MODE: SYNINT
1827                                          ;;LENGTH: EIGHT PLUS PARITY
1828                                          ;;PARITY: ODDPAR
1829                                          ;;CHARACTER: 0
1830                                          ;;
1831                                  ;;**************************************************************************
1832  005662  000004                  TST12:  SCOPE
1833  005664  052777  000400  174034          BIS     #MRESET,@TXCSR  ;MASTER RESET
1834  005672  012777  030000  174022          MOV     #SYNINT,@PARCSR ;SET THE MODE
1835  005700  052777  000400  174020          BIS     #MRESET,@TXCSR  ;MASTER RESET
1836
1837                                  ;SET MAINTENANCE MODE & SEND
1838                                          ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1839  005706  012777  004020  174012          MOV     #MINT!SEND,@TXCSR
1840
1841                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1842  005714  012777  037026  174000          MOV     #SYNINT!EIGHT!ODDPAR!26,@PARCSR
1843  005722  016703  174000                  MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1844  005726  112777  000000  173776          MOVB    #0,@TXDBUF      ;LOAD DATA CHAR
1845  005734  012767  000400  173536          MOV     #400,$TMP1      ;TO BE SHIFTED CHAR
1846  005742  012767  000011  173152          MOV     #9.,SHIFT       ;# OF SHIFTS
1847                                  ;POKE CLK TO GET INTO SYNCRONIZATION
1848  005750  052777  020000  173750          BIS     #CLK,@TXCSR     ;POKE CLK UP
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```
1849  005756  042777  020000  173742          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1850  005764  005000                  1$:     CLR     R0
1851  005766  006067  173506                  ROR     $TMP1   ;FORCE CARRY
1852  005772  103002                          BCC     2$      ;BR IF CARRY CLR
1853  005774  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BITW
1854  006000                          2$:
1855  006000  052777  020000  173720          BIS     #CLK,@TXCSR     ;POKE CLK UP
1856  006006  042777  020000  173712          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1857  006014  017701  173706                  MOV     @TXCSR,R1       ;ACTUAL
1858  006020  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
1859  006024  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1860  006026  001401                          BEQ     .+4
1861  006030  104003                          ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1862                                                          ;BIT,...ALSO CHECK DNA
1863  006032  005367  173064                  DEC     SHIFT   ;# OF SHIFTS
1864  006036  001352                          BNE     1$      ;DO IT AGAIN ?
1865                                  ;NOW POKE CLK TO SEE DNA
1866  006040  052777  020000  173660          BIS     #CLK,@TXCSR     ;POKE CLK
1867  006046  012700  100000                  MOV     #100000,R0      ;EXPECTED
1868  006052  017701  173650                  MOV     @TXCSR,R1       ;ACTUAL
1869  006056  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
1870  006062  020001                          CMP     R0,R1           ;COMPARE EXP VS ACT
1871  006064  001401                          BEQ     .+4
1872  006066  104003                          ERROR   3       ;DNA SHOULD BE SET
1873                                                          ;IF DNA DID NOT SET
1874                                                          ;CHECK WORD LENGTH SELECT LOGIC
1875
1876                                                  ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1877                                                  ;;OF THE TRANSMITTER SECTION.
1878                                                  ;;IT ALSO CHECKS DNA TIMING
1879                                                  ;;MODE: SYNINT
1880                                                  ;;LENGTH: EIGHT PLUS PARITY
1881                                                  ;;PARITY: EVEPAR
1882                                                  ;;CHARACTER: 377
1883                                                  ;;
1884                                  ;;*****************************************************************************
1885  006070  000004                  TST13:  SCOPE
1886  006072  052777  000400  173626          BIS     #MRESET,@TXCSR  ;MASTER RESET
1887  006100  012777  030000  173614          MOV     #SYNINT,@PARCSR ;SET THE MODE
1888  006106  052777  000400  173612          BIS     #MRESET,@TXCSR  ;MASTER RESET
1889
1890                                  ;SET MAINTENANCE MODE & SEND
1891                                          ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1892  006114  012777  004020  173604          MOV     #MINT!SEND,@TXCSR
1893
1894                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1895  006122  012777  037426  173572          MOV     #SYNINT!EIGHT!EVEPAR!26,@PARCSR
1896  006130  016703  173572                  MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1897  006134  112777  000377  173570          MOVB    #377,@TXDBUF    ;LOAD DATA CHAR
1898  006142  012767  000377  173330          MOV     #377,$TMP1      ;TO BE SHIFTED CHAR
1899  006150  012767  000011  172744          MOV     #9.,SHIFT       ;# OF SHIFTS
1900                                  ;POKE CLK TO GET INTO SYNCRONIZATION
1901  006156  052777  020000  173542          BIS     #CLK,@TXCSR     ;POKE CLK UP
1902  006164  042777  020000  173534          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1903  006172  005000                  1$:     CLR     R0
1904  006174  006067  173300                  ROR     $TMP1   ;FORCE CARRY
```

```
1905  006200  103002                          BCC     2$      ;BR IF CARRY CLR
1906  006202  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BITW
1907  006206                          2$:
1908  006206  052777  020000  173512          BIS     #CLK,@TXCSR     ;POKE CLK UP
1909  006214  042777  020000  173504          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1910  006222  017701  173500                  MOV     @TXCSR,R1       ;ACTUAL
1911  006226  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
1912  006232  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1913  006234  001401                          BEQ     .+4
1914  006236  104003                          ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1915                                                          ;BIT,...ALSO CHECK DNA
1916  006240  005367  172656                  DEC     SHIFT   ;# OF SHIFTS
1917  006244  001352                          BNE     1$      ;DO IT AGAIN ?
1918                                  ;NOW POKE CLK TO SEE DNA
1919  006246  052777  020000  173452          BIS     #CLK,@TXCSR     ;POKE CLK
1920  006254  012700  100000                  MOV     #100000,R0      ;EXPECTED
1921  006260  017701  173442                  MOV     @TXCSR,R1       ;ACTUAL
1922  006264  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
1923  006270  020001                          CMP     R0,R1           ;COMPARE EXP VS ACT
1924  006272  001401                          BEQ     .+4
1925  006274  104003                          ERROR   3       ;DNA SHOULD BE SET
1926                                                          ;IF DNA DID NOT SET
1927                                                          ;CHECK WORD LENGTH SELECT LOGIC
1928
1929                                          ;;THIS TEST VERIFYS CHARACTER PLUS PARITY GENERATION
1930                                          ;;OF THE TRANSMITTER SECTION.
1931                                          ;;IT ALSO CHECKS DNA TIMING
1932                                          ;;MODE: SYNINT
1933                                          ;;LENGTH: EIGHT PLUS PARITY
1934                                          ;;PARITY: ODDPAR
1935                                          ;;CHARACTER: 377
1936                                          ;;
1937                                  ;;**************************************************************************
1938  006276  000004                  TST14:  SCOPE
1939  006300  052777  000400  173420          BIS     #MRESET,@TXCSR  ;MASTER RESET
1940  006306  012777  030000  173406          MOV     #SYNINT,@PARCSR ;SET THE MODE
1941  006314  052777  000400  173404          BIS     #MRESET,@TXCSR  ;MASTER RESET
1942
1943                                  ;SET MAINTENANCE MODE & SEND
1944                                          ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
1945  006322  012777  004020  173376          MOV     #MINT!SEND,@TXCSR
1946
1947                                  ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
1948  006330  012777  037026  173364          MOV     #SYNINT!EIGHT!ODDPAR!26,@PARCSR
1949  006336  016703  173364                  MOV     TXCSR,R3        ;SET UP FOR ERROR MSG
1950  006342  112777  000377  173362          MOVB    #377,@TXDBUF    ;LOAD DATA CHAR
1951  006350  012767  000777  173122          MOV     #777,$TMP1      ;TO BE SHIFTED CHAR
1952  006356  012767  000011  172536          MOV     #9.,SHIFT       ;# OF SHIFTS
1953                                  ;POKE CLK TO GET INTO SYNCRONIZATION
1954  006364  052777  020000  173334          BIS     #CLK,@TXCSR     ;POKE CLK UP
1955  006372  042777  020000  173326          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1956  006400  005000                  1$:     CLR     R0
1957  006402  006067  173072                  ROR     $TMP1   ;FORCE CARRY
1958  006406  103002                          BCC     2$      ;BR IF CARRY CLR
1959  006410  052700  002000                  BIS     #BITW,R0        ;EQUIV OF BITW
1960  006414                          2$:
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1961  006414  052777  020000  173304          BIS     #CLK,@TXCSR     ;POKE CLK UP
1962  006422  042777  020000  173276          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
1963  006430  017701  173272                  MOV     @TXCSR,R1       ;ACTUAL
1964  006434  042701  075777                  BIC     #075777,R1      ;SAVE BITW & DNA
1965  006440  020001                          CMP     R0,R1   ;COMPARE EXP VS ACT
1966  006442  001401                          BEQ     .+4
1967  006444  104003                          ERROR   3       ;BIT WINDOW DID NOT MATCH ACTUAL DATA
1968                                                          ;BIT,...ALSO CHECK DNA
1969  006446  005367  172450                  DEC     SHIFT   ;# OF SHIFTS
1970  006452  001352                          BNE     1$      ;DO IT AGAIN ?
1971                                  ;NOW POKE CLK TO SEE DNA
1972  006454  052777  020000  173244          BIS     #CLK,@TXCSR     ;POKE CLK
1973  006462  012700  100000                  MOV     #100000,R0      ;EXPECTED
1974  006466  017701  173234                  MOV     @TXCSR,R1       ;ACTUAL
1975  006472  042701  077777                  BIC     #77777,R1       ;SAVE DNA ONLY
1976  006476  020001                          CMP     R0,R1           ;COMPARE EXP VS ACT
1977  006500  001401                          BEQ     .+4
1978  006502  104003                          ERROR   3       ;DNA SHOULD BE SET
1979                                                          ;IF DNA DID NOT SET
1980                                                          ;CHECK WORD LENGTH SELECT LOGIC
1981
1982
1983
1984                                    ;;THIS TEST VERIFYS THAT BY SENDING ONLY ONE SYNC
1985                                    ;;CHARACTER (TWO SELECTED BY STRAPPING ) RECACT =0
1986                                    ;;THEN SEND ONE ORDINARY CHARACTER (TO BREAK UP THE SEQUENCE)
1987                                    ;;RECACT =0.............IT WILL TAKE TWO MORE SYNC CHARS
1988                                    ;;BEFORE RECACT =1
1989                                    ;;NOTE: THIS TEST WILL ONLY WORK WHEN TWO SYNC CHARS
1990                                    ;;HAS BEEN BEEN SELECTED ...OTHERWISE JUMP AROUND THIS TEST
1991                                    ;;MODE: SYNC INTERNAL (SYNINT)
1992                                    ;;PARITY: NOPAR
1993                                    ;;LENGTH: EIGHT
1994                                    ;;
1995                                    ;;THIS TEST CHECKS ONLY THE RECEIVER SECTION
1996                                    ;;
1997                                    ;;*****************************************************************
1998  006504  000004                    TST15:  SCOPE
1999  006506  105767  172434                   TSTB    SYNCNO  ;TEST FOR  # OF SYNC CHARS REQUIRED
2000  006512  100127                           BPL     2$      ;IF NOT TWO  GET OUT OF TEST
2001  006514  052777  000400  173204          BIS     #MRESET,@TXCSR  ;MASTER RESET
2002  006522  012777  030000  173172          MOV     #SYNINT,@PARCSR ;SET THE MODE
2003  006530  052777  000400  173170          BIS     #MRESET,@TXCSR  ;MASTER RESET
2004
2005                                    ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
2006  006536  012777  064001  173162          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
2007
2008                                    ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
2009  006544  012777  036026  173150          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
2010  006552  052777  000020  173132          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
2011                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
2012  006560  042777  020000  173140          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2013  006566  052777  020000  173132          BIS     #CLK,@TXCSR     ;POKE CLK UP
2014                                    ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2015  006574  042777  020000  173124          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2016  006602  052777  020000  173116          BIS     #CLK,@TXCSR     ;POKE CLK UP
```

```
2017  006610  012767  000010  172304          MOV     #8.,SHIFT       ;# OF SHIFTS
2018  006616  012767  000026  172654          MOV     #26,$TMP1       ;SYNC CHAR TO BE SHIFTED IN
2019  006624  004767  010342                  JSR     PC,RPOKE        ;SHIFT IN THIS SYNC CHAR
2020  006630  032777  004000  173054          BIT     #RECACT,@RXCSR  ;RECACT = 0 ?
2021  006636  001401                          BEQ     .+4
2022  006640  104004                          ERROR   4       ;RECACT SHOULD BE 0
2023  006642  012767  000010  172252          MOV     #8.,SHIFT       ;# OF SHIFTS
2024  006650  012767  000025  172622          MOV     #25,$TMP1       ;ANY CHARACTER
2025  006656  004767  010310                  JSR     PC,RPOKE        ;SHIFT IN THIS CHARACTER
2026                                  ;YOU HAVE JUST LOST SYNCRONIZATION.....................
2027                                  ;POKE THE CLK TWICE TO GET INTO SYNCRONIZATION
2028                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2029  006662  042777  020000  173036          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2030  006670  052777  020000  173030          BIS     #CLK,@TXCSR     ;POKE CLK UP
2031                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2032  006676  042777  020000  173022          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2033  006704  052777  020000  173014          BIS     #CLK,@TXCSR     ;POKE CLK UP
2034  006712  012767  000002  172204          MOV     #2,COUNT        ;# OF SYNC CHARS
2035  006720  032777  004000  172764  1$:     BIT     #RECACT,@RXCSR  ;RECACT = 0 ?
2036  006726  001401                          BEQ     .+4
2037  006730  104004                          ERROR   4               ;RECACT SHOULD BE  0
2038  006732  012767  000010  172162          MOV     #8.,SHIFT       ;# OF SHIFTS
2039  006740  012767  000026  172532          MOV     #26,$TMP1       ;SYNC CHAR
2040  006746  004767  010220                  JSR     PC,RPOKE        ;SHIFT IN THIS SYNC CHAR
2041  006752  005367  172146                  DEC     COUNT
2042  006756  001360                          BNE     1$      ;IS COUNT = 0 ? NO GO AGAIN
2043  006760  032777  004000  172724          BIT     #RECACT,@RXCSR  ;RECACT = 1 ?
2044  006766  001001                          BNE     .+4
2045  006770  104004                          ERROR   4       ;RECACT SHOULD BE ASSERTED
2046  006772                          2$:
2047                                  ;;THIS TEST VERIFYS MODE SELECT.....
2048                                  ;;SYNC EXTERNAL VS.  SYNC INTERNAL
2049                                  ;;
2050                                  ;BASICALLY THE TEST CHECKS THAT THE RECEIVED
2051                                  ;DATA FREEZES  IN SYNC INTERNAL
2052                                  ;IN SYNC EXTERNAL THIS DATA IS TRANSPARENT
2053                                  ;THIS TEST ONLY APPLIES TO THE RECEIVER SECTION
2054                                  ;;LENGTH:  EIGHT
2055                                  ;NOTE: SEARCH SYNC !S NOT SET
2056                                  ;;**********************************************************************
2057  006772  000004                  TST16:  SCOPE
2058  006774  052777  000400  172724          BIS     #MRESET,@TXCSR  ;MASTER RESET
2059  007002  012777  030000  172712          MOV     #SYNINT,@PARCSR ;SET THE MODE
2060  007010  052777  000400  172710          BIS     #MRESET,@TXCSR  ;MASTER RESET
2061
2062                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
2063  007016  012777  064001  172702          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
2064
2065                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
2066  007024  012777  036026  172670          MOV     #SYNINT!EIGHT!NOPAR!26,@FARCSR
2067                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2068  007032  042777  020000  172666          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2069  007040  052777  020000  172660          BIS     #CLK,@TXCSR     ;POKE CLK UP
2070                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2071  007046  042777  020000  172652          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2072  007054  052777  020000  172644          BIS     #CLK,@TXCSR     ;POKE CLK UP
```

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2073  007062  012767  000010  172032          MOV     #8.,SHIFT       ;# OF SHIFTS
2074  007070  012767  000125  172402          MOV     #125,$TMP1      ;DATA CHARACTER
2075  007076  016703  172614                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
2076  007102  042777  040000  172616  1$:     BIC     #MTDATA,@TXCSR  ;CLEAR MAINT DATA
2077  007110  000241                          CLC
2078  007112  006067  172362                  ROR     $TMP1   ;FORCE CARRY
2079  007116  103003                          BCC     2$
2080  007120  052777  040000  172600          BIS     #MTDATA,@TXCSR  ;SET MTDATA
2081  007126  042777  020000  172572  2$:     BIC     #CLK,@TXCSR     ;POKE CLK
2082  007134  052777  020000  172564          BIS     #CLK,@TXCSR     ;
2083  007142  012700  000377                  MOV     #377,R0 ;EXPECTED
2084  007146  017701  172544                  MOV     @RXDBUF,R1      ;ACTUAL
2085  007152  020001                          CMP     R0,R1
2086  007154  001401                          BEQ     .+4
2087  007156  104002                          ERROR   2
2088                                          ;DATA CHARACTER SHOULD COMPARE.....
2089  007160  005367  171736                  DEC     SHIFT   ;IS IT THE LAST SHIFT ?
2090  007164  001346                          BNE     1$      ;NO ...SHIFT SOME MORE
2091  007166  052777  000400  172532          BIS     #MRESET,@TXCSR  ;MASTER RESET
2092  007174  012777  020000  172520          MOV     #SYNEXT,@PARCSR ;SET THE MODE
2093  007202  052777  000400  172516          BIS     #MRESET,@TXCSR  ;MASTER RESET
2094
2095                                  ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
2096  007210  012777  064001  172510          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
2097
2098                                  ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
2099  007216  012777  026026  172476          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
2100                                  ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
2101  007224  042777  020000  172474          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2102  007232  052777  020000  172466          BIS     #CLK,@TXCSR     ;POKE CLK UP
2103  007240  012767  000010  171654          MOV     #8.,SHIFT       ;# OF SHIFTS
2104  007246  012767  000125  172224          MOV     #125,$TMP1      ;DATA CHARACTER
2105  007254  005067  172222                  CLR     $TMP2
2106  007260  105167  172216                  COMB    $TMP2   ;MAKE LOW BYTE ALL 1'S
2107                                          ;TO MATCH RXDBUF'S CONTENTS AFTER A MASTER RESET
2108  007264  042777  040000  172434  5$:     BIC     #MTDATA,@TXCSR  ;CLR MAINT DATA
2109  007272  000241                          CLC
2110  007274  006067  172200                  ROR     $TMP1   ;FORCE CARRY
2111  007300  103003                          BCC     6$
2112  007302  052777  040000  172416          BIS     #MTDATA,@TXCSR
2113  007310  106067  172166          6$:     RORB    $TMP2   ;PICK UP CARRY BIT
2114  007314  042777  020000  172404          BIC     #CLK,@TXCSR
2115  007322  052777  020000  172376          BIS     #CLK,@TXCSR
2116  007330  016700  172146                  MOV     $TMP2,R0        ;EXPECTED
2117  007334  017701  172356                  MOV     @RXDBUF,R1      ;ACTUAL
2118  007340  020001                          CMP     R0,R1
2119  007342  001401                          BEQ     .+4
2120  007344  104002                          ERROR   2       ;DATA CHARACTER SHOULD COMPARE...
2121                                          ;THE DATA CHARACTER SHOULD BE SEEN AS IT
2122                                          ;SHIFTS ACROSS THE RECEIVER DATA OUTPUT
2123  007346  005367  171550                  DEC     SHIFT
2124  007352  001344                          BNE     5$
2125
2126                                  ;;THIS TEST VERIFYS TX DONE FUNCTION, DONE = 1
2127                                  ;;MODE:   SYNC INTERNAL
2128                                  ;;PARITY:   NO PARITY (NOPAR)
```

```
                                        ;;LENGTH:   EIGHT
                                        ;;
                                        ;;*****************************************************************************
007354  000004                        TST17:  SCOPE

007356  052777  000400  172342                BIS     #MRESET,@TXCSR  ;MASTER RESET
007364  012777  030000  172330                MOV     #SYNINT,@PARCSR ;SET THE MODE
007372  052777  000400  172326                BIS     #MRESET,@TXCSR  ;MASTER RESET

                                        ;SET MAINTENANCE MODE & SEND
                                                ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
007400  012777  004020  172320                MOV     #MINT!SEND,@TXCSR

                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
007406  012777  036026  172306                MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR

007414  105777  172306                       TSTB    @TXCSR          ;TXDONE?
007420  100401                               BMI     .+4
007422  104004                               ERROR   4                       ;TXDONE SHOULD BE SET
007424  112777  000021  172300               MOVB    #21,@TXDBUF     ;LOAD ANY CHAR
007432  052777  020000  172266               BIS     #CLK,@TXCSR     ;POKE CLK UP
007440  042777  020000  172260               BIC     #CLK,@TXCSR     ;POKE CLK DOWN
007446  105777  172254                       TSTB    @TXCSR
007452  100001                               BPL     .+4
007454  104004                               ERROR   4                       ;TXDONE SHOULD BE CLR

007456  052777  020000  172242               BIS     #CLK,@TXCSR     ;POKE CLK UP
007464  042777  020000  172234               BIC     #CLK,@TXCSR     ;POKE CLK DOWN
007472  105777  172230                       TSTB    @TXCSR
007476  100401                               BMI     .+4
007500  104004                               ERROR   4                       ;TXDONE SHOULD BE SET


                                        ;;THIS TEST PROVES THAT RXERR FREEZES THE "RECEIVER
                                        ;;RESET" WHILE IN STRIP SYNC MODE
                                        ;;THIS TEST FIRST PROVES THAT AUTOMATIC RESETS OCCUR
                                        ;;WHEN STRIP SYNC IS SET AND SYNC CHARACTERS ARE SENT
                                        ;;BUT IF AN ERROR SHOULD OCCUR...THIS AUTOMATIC RESET
                                        ;;IS DISCOMBOBULATED
                                        ;;IE:   FORCE OVERRUN (OVERRUN) WHILE STRIP SYNC IS SET
                                        ;;BY TRANSMITTING A DATA CHARACTER THEN TRANSMIT A SYNC CHARACTER
                                        ;;AND DON'T READ THAT DATA CHARACTER.  NOTE:  NORMALLY THE LOGIC
                                        ;;RESETS THE RXDONE & ERROR FLAGS PROVIDING THAT ONLY SYNC CHARACTERS ARE
                                        ;;STRIPPED
                                        ;;MODE:   SYNC EXTERNAL (SYNEXT)
                                        ;;LENGTH:   EIGHT
                                        ;;NOTE:   THIS TEST USES BOTH RECEIVER AND TRANSMITTER LOGIC
                                        ;;

                                        ;;*****************************************************************************
007502  000004                        TST20:  SCOPE

007504  052777  000400  172214                BIS     #MRESET,@TXCSR  ;MASTER RESET
007512  012777  020000  172202                MOV     #SYNEXT,@PARCSR ;SET THE MODE
007520  052777  000400  172200                BIS     #MRESET,@TXCSR  ;MASTER RESET
```

```
2185
2186                                    ;SET MAINTENANCE MODE & SEND
2187                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
2188  007526  012777  004020  172172            MOV     #MINT!SEND,@TXCSR
2189
2190                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
2191  007534  012777  026026  172160            MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
2192  007542  112777  000026  172162            MOVB    #26,@TXDBUF     ;LOAD SYNC CHAR
2193  007550  052777  000420  172134            BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SYNC SEARCH & STRIP SYNC
2194  007556  016703  172134                    MOV     RXDBUF,R3       ;SET UP FOR ERROR MESSAGE
2195  007562  012767  000003  171334            MOV     #3,COUNT        ;# OF TIMES SYNC WILL BE SENT
2196  007570  052777  020000  172130            BIS     #CLK,@TXCSR     ;POKE CLK UP
2197  007576  042777  020000  172122            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2198  007604  012767  000010  171310  2$:       MOV     #8.,SHIFT       ;# OF SHIFTS
2199  007612                          1$:
2200  007612  052777  020000  172106            BIS     #CLK,@TXCSR     ;POKE CLK UP
2201  007620  042777  020000  172100            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2202  007626  005367  171270                    DEC     SHIFT
2203  007632  001367                            BNE     1$
2204  007634  105777  172052                    TSTB    @RXCSR          ;RXDONE?
2205  007640  100001                            BPL     .+4
2206  007642  104004                            ERROR   4                       ;RXDONE SHOULD NOT ASSERT
2207  007644  005367  171254                    DEC     COUNT
2208  007650  001355                            BNE     2$
2209  007652  012700  000026                    MOV     #26,R0          ;EXPECTED
2210  007656  017701  172034                    MOV     @RXDBUF,R1      ;ACTUAL
2211  007662  020001                            CMP     R0,R1
2212  007664  001401                            BEQ     .+4
2213  007666  104002                            ERROR   2               ;NOTE THAT OVERRUN SHOULD NOT OCCUR, ALSO
2214                                                                    ;SECOND & 3RD SYNC CHARACTER CAME FROM
2215                                                                    ;SYNC HOLDING REGISTER
2216  007670  012767  000003  171226            MOV     #3,COUNT        ;# OF TIMES
2217  007676  112777  000025  172026            MOVB    #25,@TXDBUF     ;LOAD ANY CHAR....HOWEVER...
2218                                            ;ONE MORE SYNC CHAR WILL BE SENT BEFORE
2219                                            ;THE "25" CHAR IS SENT (THE DNA BIT IS
2220                                            ;ALREADY UP)
2221
2222  007704  012767  000010  171210  4$:       MOV     #8.,SHIFT       ;# OF SHIFTS
2223
2224  007712                          3$:
2225  007712  052777  020000  172006            BIS     #CLK,@TXCSR     ;POKE CLK UP
2226  007720  042777  020000  172000            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2227  007726  005367  171170                    DEC     SHIFT
2228  007732  001367                            BNE     3$
2229  007734  005367  171164                    DEC     COUNT
2230  007740  001361                            BNE     4$
2231  007742  105777  171744                    TSTB    @RXCSR  ;RXDONE = 1 ?
2232  007746  100401                            BMI     .+4
2233  007750  104004                            ERROR   4       ;RXDONE SHOULD BE SET
2234  007752  012700  140026                    MOV     #RXERR!OVRRUN!26,R0 ;EXPECTED
2235  007756  017701  171734                    MOV     @RXDBUF,R1      ;ACTUAL
2236  007762  020001                            CMP     R0,R1
2237  007764  001401                            BEQ     .+4
2238  007766  104002                            ERROR   2               ;NOTE THAT OVRRUN SHOULD OCCUR,
2239                                                                    ;ALSO SECOND SYNC CHARACTER CAME
2240                                                                    ;FROM SYNC HOLDING REGISTER
```

```
                                                                ;SUMMARY:  THE OVRRUN STOPPED
                                                                ;THE AUTOMATIC RESETTING OF
                                                                ;RXDONE & ERROR FLAGS.....CHECK THIS

                                        ;;THIS TEST VERIFYS THAT EITHER SEQUENCE OF
                                        ;;LOADING TXDBUF AND SETTING SEND
                                        ;;DOES CAUSE TRANSMISSION
                                        ;;MODE:  SYNC EXT
                                        ;;LENGTH:  EIGHT
                                        ;;
                                        ;;**********************************************************************
007770  000004                          TST21:  SCOPE

007772  052777  000400  171726                  BIS     #MRESET,@TXCSR  ;MASTER RESET
010000  012777  020000  171714                  MOV     #SYNEXT,@PARCSR ;SET THE MODE
010006  052777  000400  171712                  BIS     #MRESET,@TXCSR  ;MASTER RESET

                                        ;SET MAINTENANCE MODE & SEND
                                                ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
010014  012777  004020  171704                  MOV     #MINT!SEND,@TXCSR

                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
010022  012777  026026  171672                  MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
010030  016703  171672                          MOV     TXCSR,R3        ;SET UP FOR ERROR MESSAGE
010034  042777  000020  171664                  BIC     #SEND,@TXCSR    ;DROP SEND
010042  012767  000025  171430                  MOV     #25,$TMP1
010050  112777  000025  171654                  MOVB    #25,@TXDBUF     ;LOAD CHARACTER
010056  052777  000020  171642                  BIS     #SEND,@TXCSR    ;SET SEND
                                        ;GET INTO SYNCRONIZATION
010064  052777  020000  171634                  BIS     #CLK,@TXCSR     ;POKE CLK UP
010072  042777  020000  171626                  BIC     #CLK,@TXCSR     ;POKE CLK DOWN
010100  012767  000010  171014                  MOV     #8.,SHIFT       ;# OF SHIFTS
010106  005000                          1$:     CLR     R0
010110  006067  171364                          ROR     $TMP1
010114  103002                                  BCC     2$
010116  052700  002000                          BIS     #BITW,R0        ;EQUIV OF BIT WINDOW

010122                                  2$:
010122  052777  020000  171576                  BIS     #CLK,@TXCSR     ;POKE CLK UP
010130  042777  020000  171570                  BIC     #CLK,@TXCSR     ;POKE CLK DOWN
010136  017701  171564                          MOV     @TXCSR,R1       ;ACTUAL
010142  042701  075777                          BIC     #075777,R1      ;SAVE BIT WINDOW & DNA
010146  020001                                  CMP     R0,R1
010150  001401                                  BEQ     .+4
010152  104003                                  ERROR   3               ;BIT WINDOW DID NOT MATCH ACTUAL DATA BIT
                                                                        ;ALSO CHECK DNA
010154  005367  170742                          DEC     SHIFT
010160  001352                                  BNE     1$


                                        ;THIS TEST VERIFYS THAT DROPPING OF SEND IN THE
                                        ;;MIDDLE OF TRANSMITTING A CHARACTER DOES INDEED
                                        ;;FINISH TRANSMITTING THAT CHARACTER
                                        ;;MODE:  SYNC EXT
                                        ;;LENGTH:  EIGHT
```

```
2297                                    ;;
2298
2299                                    ;;**********************************************************************
2300  010162  000004                    TST22:  SCOPE
2301
2302  010164  052777  000400  171534            BIS     #MRESET,@TXCSR  ;MASTER RESET
2303  010172  012777  020000  171522            MOV     #SYNEXT,@PARCSR ;SET THE MODE
2304  010200  052777  000400  171520            BIS     #MRESET,@TXCSR  ;MASTER RESET
2305
2306                                    ;SET MAINTENANCE MODE & SEND
2307                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
2308  010206  012777  004020  171512            MOV     #MINT!SEND,@TXCSR
2309
2310                                    ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
2311  010214  012777  026026  171500            MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
2312  010222  016703  171500                    MOV     TXCSR,R3        ;SETUP FOR ERROR MESSAGE
2313  010226  112777  000252  171476            MOVB    #252,@TXDBUF    ;LOAD DATA CHAR.
2314  010234  012767  000252  171236            MOV     #252,$TMP1      ;SHIFTED CHAR
2315  010242  012767  000010  170652            MOV     #8.,SHIFT       ;# OF SHIFTS
2316                                            ;GET INTO SYNCRONIZATION
2317  010250  052777  020000  171450            BIS     #CLK,@TXCSR     ;POKE CLK UP
2318  010256  042777  020000  171442            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2319
2320  010264  005000                    1$:     CLR     R0
2321  010266  006067  171206                    ROR     $TMP1           ;FORCE CARRY
2322  010272  103002                            BCC     2$
2323  010274  052700  002000                    BIS     #BITW,R0        ;EQUIV OF BIT WINDOW
2324
2325  010300                            2$:
2326  010300  052777  020000  171420            BIS     #CLK,@TXCSR     ;POKE CLK UP
2327  010306  042777  020000  171412            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2328  010314  017701  171406                    MOV     @TXCSR,R1       ;ACTUAL
2329  010320  042701  075777                    BIC     #075777,R1      ;SAVE ONLY BIT WINDOW & DNA
2330  010324  020001                            CMP     R0,R1
2331  010326  001401                            BEQ     .+4
2332  010330  104003                            ERROR   3               ;BIT WINDOW DID NOT MATCH
2333                                                                    ;ACTUAL DATA BIT
2334  010332  005367  170564                    DEC     SHIFT
2335  010336  022767  000003  170556            CMP     #3,SHIFT
2336  010344  001003                            BNE     3$
2337  010346  042777  000020  171352            BIC     #SEND,@TXCSR    ;DROP SEND
2338  010354  005767  170542            3$:     TST     SHIFT
2339  010360  001341                            BNE     1$              ;DO IT AGAIN?
2340
2341
2342
2343                                    ;;THIS TEST VERIFYS THAT RXDONE ASSERTS WHEN STRIP SYNC IS SET
2344                                    ;;MODE:  SYNC INTERNAL
2345                                    ;;LENGTH:  EIGHT
2346                                    ;;
2347                                    ;;**********************************************************************
2348  010362  000004                    TST23:  SCOPE
2349  010364  052777  000400  171334            BIS     #MRESET,@TXCSR  ;MASTER RESET
2350  010372  012777  030000  171322            MOV     #SYNINT,@PARCSR ;SET THE MODE
2351  010400  052777  000400  171320            BIS     #MRESET,@TXCSR  ;MASTER RESET
2352
```

```
                                        ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
010406  012777  064001  171312            MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR

                                        ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
010414  012777  036026  171300            MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR

010422  052777  000420  171262            BIS     #SYNSCH!STPSYN,@RXCSR   ;SET SYNC SEARCH &
                                                                          ;STRIP SYNC
                                            ;POKE CLK TO GET RECEIVER INTO SYNCRONIZATION.....
010430  042777  020000  171270            BIC     #CLK,@TXCSR     ;POKE CLK
010436  052777  020000  171262            BIS     #CLK,@TXCSR     ;
                                        ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
010444  042777  020000  171254            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
010452  052777  020000  171246            BIS     #CLK,@TXCSR     ;POKE CLK UP
010460  016703  171232                    MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
010464  012767  000002  170432            MOV     #2,COUNT        ;# OF TIMES OF SYNC CHARS.
                                            ;TEST TO SEE HOW MANY SYNC CHARS  NEEDED
010472  105767  170450                    TSTB    SYNCNO
010476  100402                            BMI     3$      ;WILL IT BE ONE OR TWO ?
010500  005367  170420                    DEC     COUNT   ;MAKE IT ONE LESS
010504  012767  000010  170410  3$:       MOV     #8.,SHIFT       ;#OF SHIFTS
010512  012767  000026  170760            MOV     #26,$TMP1       ;SYNC CHAR
010520  004767  006446                    JSR     PC,RPOKE
010524  005367  170374                    DEC     COUNT   ;IS IT THE LAST SYNC CHAR ?
010530  001365                            BNE     3$      ;GO AGAIN AND SHIFT IN ANOTHER SYNC CHAR
010532  032777  004000  171152            BIT     #RECACT,@RXCSR  ;RECACT=1?
010540  001001                            BNE     .+4
010542  104004                            ERROR   4       ;RECACT SHOULD BE ASSERTED
010544  105777  171142                    TSTB    @RXCSR          ;RXDONE=0?
010550  100001                            BPL     .+4
010552  104004                            ERROR   4               ;RXDONE SHOULD NOT BE ASSERTED
010554  012767  000010  170340            MOV     #8.,SHIFT       ;#OF SHIFTS
010562  012767  000025  170710            MOV     #25,$TMP1       ;ANY CHARACTER
010570  004767  006376                    JSR     PC,RPOKE
010574  105777  171112                    TSTB    @RXCSR          ;RXDONE=1?
010600  100401                            BMI     .+4
010602  104004                            ERROR   4               ;RXDONE SHOULD NOW BE ASSERTED
010604  012700  000025                    MOV     #25,R0          ;EXPECTED
010610  017701  171102                    MOV     @RXDBUF,R1      ;ACTUAL
010614  020001                            CMP     R0,R1
010616  001401                            BEQ     .+4
010620  104002                            ERROR   2               ;CHARACTERS SHOULD BE MATCHED


                                        ;;THIS TEST VERIFYS THAT BY DROPPING SYNSCH
                                        ;;IN THE MIDDLE OF A CHARACTER, SYNC CHARACTER SEQUENCE
                                        ;;IS NEEDED BEFORE RECACT, RXDONE ASSERT AGAIN.
                                        ;;ALSO NOTE:  SINCE RECACT IS DEPENDENT ON MATCH DETECT,
                                        ;;AND IF SYNSCH IS DROPPED IN THE MIDDLE OF
                                        ;;A SYNC CHARACTER AND THEN RAISED AGAIN ;RXDONE SHOULD
                                        ;;NOT ASSERT UNTIL NEW SYNC CHARACTER SEQUENCE.....HOWEVER
                                        ;;ONE "PAD" CHARACTER MUST PRECEED THIS JUGGLING OF SEARCH SYNC (SYNSCH)
                                        ;;MODE:  SYNC INTERNAL (SYNINT)
                                        ;;LENGTH:  EIGHT
                                        ;;
```

```
 2409
 2410                                   ;;*****************************************************************
 2411  010622  000004                  TST24:  SCOPE
 2412
 2413  010624  052777  000400  171074          BIS     #MRESET,@TXCSR  ;MASTER RESET
 2414  010632  012777  030000  171062          MOV     #SYNINT,@PARCSR ;SET THE MODE
 2415  010640  052777  000400  171060          BIS     #MRESET,@TXCSR  ;MASTER RESET
 2416
 2417                                   ;SET MAINT DATA,CLK,BREAK,&MAINTENANCE MODE
 2418  010646  012777  064001  171052          MOV     #MTDATA!CLK!MINT!BREAK,@TXCSR
 2419
 2420                                   ;SET MODE ,# OF BITS,PARITY SENSE,&LOAD SYNC REG
 2421  010654  012777  036026  171040          MOV     #SYNINT!EIGHT!NOPAR!26,@PARCSR
 2422
 2423  010662  052777  000020  171022          BIS     #SYNSCH,@RXCSR  ;SET SYNC SEARCH
 2424                                          ;POKE CLK TO GET RECEIVER INTO SYNCROIZATION....
 2425  010670  042777  020000  171030          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2426  010676  052777  020000  171022          BIS     #CLK,@TXCSR     ;POKE CLK UP
 2427                                   ;POKE CLK TO GET LOGIC INTO SYNCRONIZATION
 2428  010704  042777  020000  171014          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
 2429  010712  052777  020000  171006          BIS     #CLK,@TXCSR     ;POKE CLK UP
 2430  010720  012767  000002  170176          MOV     #2,COUNT        ;# OF TIMES
 2431  010726  016703  170764                  MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
 2432  010732  012767  000010  170162  1$:     MOV     #8.,SHIFT       ;# OF SHIFTS
 2433  010740  012767  000026  170532          MOV     #26,$TMP1       ;SYNC CHAR.
 2434  010746  004767  006220                  JSR     PC,RPOKE
 2435  010752  005367  170146                  DEC     COUNT
 2436  010756  001403                          BEQ     2$
 2437                                   ;TEST TO SEE HOW MANY SYNC CHARACTERS NEEDED
 2438  010760  105767  170162                  TSTB    SYNCNO
 2439  010764  100762                          BMI     1$
 2440
 2441  010766  032777  004000  170716  2$:     BIT     #RECACT,@RXCSR  ;RECACT=1?
 2442  010774  001001                          BNE     .+4
 2443  010776  104004                          ERROR   4                       ;RECACT SHOULD BE SET
 2444  011000  105777  170706                  TSTB    @RXCSR  ;RXDONE = 0?
 2445  011004  100001                          BPL     .+4
 2446  011006  104004                          ERROR   4       ;RXDONE SHOULD = 0
 2447                                   ;THE FOLLOWING ALLOWS THE RECEIVER "CHIP" TO RECOGNIZE THE DROPPING OF SYNSCH
 2448                                   ;...BASICALLY IT SIMULATES THE "PAD" CHARACTER REQUIREMENT AT THE END
 2449                                   ;OF DATA TRANSFER.
 2450                                   ;ONE "PAD" CHARACTER  IS REQUIRED TO FLUSH OUT SYNC CHARACTER
 2451                                   ;AND ...YOU HAVE TO DROP SYNSCH ON THE NEXT OR FOLLOWING CHARACTER
 2452                                   ;FOR A "CLEAN" RESTART
 2453  011010  012767  000010  170104          MOV     #8.,SHIFT       ;# OF SHIFTS
 2454  011016  012767  000025  170454          MOV     #25,$TMP1       ;"PAD" CHARACTER
 2455  011024  004767  006142                  JSR     PC,RPOKE        ;SHIFT IN "PAD" CHARACTER
 2456  011030  105777  170656                  TSTB    @RXCSR  ;RXDONE = 1 ?
 2457  011034  100401                          BMI     .+4
 2458  011036  104004                          ERROR   4       ;RXDONE SHOULD = 1
 2459  011040  017701  170652                  MOV     @RXDBUF,R1      ;STORE ACTUAL & CLEAR RXDONE
 2460  011044  012700  000025                  MOV     #25,R0  ;EXPECTED
 2461  011050  020001                          CMP     R0,R1   ;COMPARE EXPECTED DATA VS ACTUAL DATA
 2462  011052  001401                          BEQ     .+4
 2463  011054  104002                          ERROR   2       ;DATA SHOULD COMPARE WITHOUT ERROR FLAGS
 2464                                   ;THE FOLLOWING IS THE SYNC CHARACTER AFTER THE "PAD" CHARACTER
```

```
                                        ;IN WHICH SEARCH SYNC (SYNSCH) IS JUGGLED TO CREATE AN ABORT SITUATION
                                        ;AT THE END OF A DATA TRANSFER SEQUENCE
011056  012767  000004  170036          MOV     #4,SHIFT        ;# OF SHIFTS
011064  012767  000026  170406          MOV     #26,$TMP1       ;SYNC CHAR.
011072  004767  006074                  JSR     PC,RPOKE
011076  032777  004000  170606          BIT     #RECACT,@RXCSR  ;RECACT=1?
011104  001001                          BNE     .+4
011106  104004                          ERROR   4                       ;RECACT SHOULD  STILL BE SET
011110  105777  170576                  TSTB    @RXCSR  ;RXDONE = 0 ?
011114  100001                          BPL     .+4
011116  104004                          ERROR   4       ;RXDONE SHOULD = 0 FROM PREVIOUS READING OF RXDBUF
011120  042777  000020  170564          BIC     #SYNSCH,@RXCSR  ;DROP SEARCH SYNC
011126  032777  004000  170556          BIT     #RECACT,@RXCSR  ;RECACT=0?
011134  001401                          BEQ     .+4
011136  104004                          ERROR   4                       ;RECACT SHOULD NOT BE SET
                                        ;NOW SHIFT TWO BITS TO ALLOW SEARCH SYNC =0 TO TAKE
                                        ;EFFECT IN THE LOGIC(THIS ALLOWS THE RECEIVER CHIP TO SEE
                                        ;THE DROPPING OF SEARCH SYNC)
011140  012767  000002  167754          MOV     #2,SHIFT        ;# OF SHIFTS
011146  004767  006020                  JSR     PC,RPOKE
011152  052777  000020  170532          BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
011160  032777  004000  170524          BIT     #RECACT,@RXCSR
011166  001401                          BEQ     .+4
011170  104004                          ERROR   4       ;RECACT =0 ?
011172  105777  170514                  TSTB    @RXCSR  ;RXDONE = 0 ?
011176  100001                          BPL     .+4
011200  104004                          ERROR   4       ;RXDONE = 0 ?
011202  012767  000002  167712          MOV     #2,SHIFT        ;# OF SHIFTS TO FINISH UP THE SYNC CHARACTER
011210  004767  005756                  JSR     PC,RPOKE
011214  032777  004000  170470          BIT     #RECACT,@RXCSR  ;RECACT=0?
011222  001401                          BEQ     .+4
011224  104004                          ERROR   4                       ;RECACT SHOULD NOT BE SET
011226  105777  170460                  TSTB    @RXCSR          ;RXDONE=0?
011232  100001                          BPL     .+4
011234  104004                          ERROR   4                       ;RXDONE SHOULD NOT BE ASSERTED
011236  012700  000025                  MOV     #25,R0          ;EXPECTED
011242  017701  170450                  MOV     @RXDBUF,R1      ;ACTUAL
011246  020001                          CMP     R0,R1   ;COMPARE EXPECTED VS ACTUAL
011250  001401                          BEQ     .+4
011252  104002                          ERROR   2               ;CHARACTERS SHOULD BE MATCHED.....
                                        ;REMBEMBER THAT THE " 25 " FROZE WHEN SYNSCH WAS DROPPED
                                        ;THEREFORE ....25 WILL BE READ AND NOT 26
                                ;THE FOLLOWING VERIFYS THAT THE RE SYNCRONIZATION COMES UP "CLEAN"
011254  012767  000002  167642          MOV     #2,COUNT        ;# OF TIMES OF SYNC CHARS.
                                        ;
                                        ;TEST TO SEE HOW MANY SYNC CHARS  NEEDED
011262  105767  167660                  TSTB    SYNCNO  ;HOW MANY SYNCS ARE YOU STRAPPED FOR ?
011266  100402                          BMI     3$      ;WILL IT BE ONE OR TWO ?
011270  005367  167630                  DEC     COUNT   ;IT WAS ONLY ONE NEEDED
011274  012767  000010  167620  3$:     MOV     #8.,SHIFT       ;#OF SHIFTS
011302  012767  000026  170170          MOV     #26,$TMP1       ;SYNC CHAR
011310  004767  005656                  JSR     PC,RPOKE
011314  005367  167604                  DEC     COUNT   ;IS IT THE LAST SYNC CHAR ?
011320  001365                          BNE     3$      ;GO AGAIN AND SHIFT IN ANOTHER SYNC CHAR
011322  032777  004000  170362          BIT     #RECACT,@RXCSR  ;RECACT=1?
011330  001001                          BNE     .+4
```

```
                                        ERROR   4       ;RECACT SHOULD BE ASSERTED
011332  104004
                                        TSTB    @RXCSR          ;RXDONE=0?
011334  105777  170352
                                        BPL     .+4
011340  100001
                                        ERROR   4                       ;RXDONE SHOULD NOT BE ASSERTED
011342  104004
                                        MOV     #8.,SHIFT       ;#OF SHIFTS
011344  012767  000010  167550
                                        MOV     #25,$TMP1       ;ANY CHARACTER
011352  012767  000025  170120
                                        JSR     PC,RPOKE
011360  004767  005606
                                        TSTB    @RXCSR          ;RXDONE=1?
011364  105777  170322
                                        BMI     .+4
011370  100401
                                        ERROR   4                       ;RXDONE SHOULD NOW BE ASSERTED
011372  104004
                                        MOV     #25,R0          ;EXPECTED
011374  012700  000025
                                        MOV     @RXDBUF,R1      ;ACTUAL
011400  017701  170312
                                        CMP     R0,R1
011404  020001
                                        BEQ     .+4
011406  001401
                                        ERROR   2               ;CHARACTERS SHOULD BE MATCHED
011410  104002


                                ;;THIS TEST VERIFYS THAT HDX MODE DISQUALIFIES THE
                                ;;RECEIVER WHEN SEND IS ASSERTED
                                ;;MODE:   SYNC EXT
                                ;;LENGTH:   EIGHT
                                ;;NOTE:   THIS TEST WORKS ONLY IN MAINT. EXTERNAL MODE
                                ;;THIS TEST USES BOTH RECEIVER & TRANSMITTER LOGIC
                                ;;*****************************************************************
011412  000004                TST25:  SCOPE
                                        TSTB    JMRBY
011414  105767  167533
                                        BPL     1$              ;GET OUT OF THIS TEST IF "NO"
011420  100155
                                        MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
011422  016703  170270
                                        BIS     #MRESET,@TXCSR  ;MASTER RESET
011426  052777  000400  170272
                                        MOV     #SYNEXT,@PARCSR ;SET THE MODE
011434  012777  020000  170260
                                        BIS     #MRESET,@TXCSR  ;MASTER RESET
011442  052777  000400  170256

                                ;SET MAINTENANCE MODE & SEND
                                        ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
011450  012777  010020  170250          MOV     #MEXT!SEND,@TXCSR

                                ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
011456  012777  026026  170236          MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
011464  052777  000020  170220          BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
011472  112777  000025  170232          MOVB    #25,@TXDBUF     ;ANY CHARACTER
                                        ;POKE CLK FOR SYNCRONIZATION
011500  052777  020000  170220          BIS     #CLK,@TXCSR     ;POKE CLK UP
                                        ;WAIT FOR CABLE & DRIVER DELAYS
011506  016702  167406                  MOV     HOLD,R2 ;WAIT THIS AMT
011512  005302                          DEC     R2      ;WAIT
011514  001376                          BNE     .-2
                                        ;EXIT...
011516  042777  020000  170202          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
                                        ;WAIT FOR CABLE & DRIVER DELAYS
011524  016702  167370                  MOV     HOLD,R2 ;WAIT THIS AMT
011530  005302                          DEC     R2      ;WAIT
011532  001376                          BNE     .-2
                                        ;EXIT...
011534  012767  000010  167360          MOV     #8.,SHIFT       ;# OF SHIFTS
011542                          2$:
```

```
2577  011542  052777  020000  170156          BIS     #CLK,@TXCSR     ;POKE CLK UP
2578                                          ;WAIT FOR CABLE & DRIVER DELAYS
2579  011550  016702  167344                  MOV     HOLD,R2 ;WAIT THIS AMT
2580  011554  005302                          DEC     R2      ;WAIT
2581  011556  001376                          BNE     .-2
2582                                          ;EXIT...
2583  011560  042777  020000  170140          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2584                                          ;WAIT FOR CABLE & DRIVER DELAYS
2585  011566  016702  167326                  MOV     HOLD,R2 ;WAIT THIS AMT
2586  011572  005302                          DEC     R2      ;WAIT
2587  011574  001376                          BNE     .-2
2588                                          ;EXIT...
2589  011576  005367  167320                  DEC     SHIFT   ;# OF SHIFTS
2590  011602  022767  000003  167312          CMP     #3,SHIFT        ;IS IT TIME TO LOAD NEXT CHAR ?
2591  011610  001003                          BNE     3$
2592  011612  112777  000024  170112          MOVB    #24,@TXDBUF     ;LOAD NEXT CHAR.
2593  011620  005767  167276          3$:     TST     SHIFT
2594  011624  001346                          BNE     2$
2595  011626  105777  170060                  TSTB    @RXCSR          ;RXDONE=1?
2596  011632  100401                          BMI     .+4
2597  011634  104004                          ERROR   4                       ;RXDONE SHOULD BE SET
2598  011636  012700  000025                  MOV     #25,R0          ;EXPECTED
2599  011642  017701  170050                  MOV     @RXDBUF,R1      ;ACTUAL
2600  011646  020001                          CMP     R0,R1
2601  011650  001401                          BEQ     .+4
2602  011652  104002                          ERROR   2               ;CHARACTERS SHOULD COMPARE
2603  011654  052777  000010  170044          BIS     #HDXEN,@TXCSR   ;SET HALF DUPLEX HDX
2604  011662  012767  000010  167232          MOV     #8.,SHIFT       ;# OF SHIFT
2605  011670                          4$:
2606  011670  052777  020000  170030          BIS     #CLK,@TXCSR     ;POKE CLK UP
2607                                          ;WAIT FOR CABLE & DRIVER DELAYS
2608  011676  016702  167216                  MOV     HOLD,R2 ;WAIT THIS AMT
2609  011702  005302                          DEC     R2      ;WAIT
2610  011704  001376                          BNE     .-2
2611                                          ;EXIT...
2612  011706  042777  020000  170012          BIC     #CLK,@TXCSR     ;POKE CLK DOWN
2613                                          ;WAIT FOR CABLE & DRIVER DELAYS
2614  011714  016702  167200                  MOV     HOLD,R2 ;WAIT THIS AMT
2615  011720  005302                          DEC     R2      ;WAIT
2616  011722  001376                          BNE     .-2
2617                                          ;EXIT...
2618  011724  005367  167172                  DEC     SHIFT
2619  011730  001357                          BNE     4$
2620  011732  105777  167754                  TSTB    @RXCSR          ;RXDONE=0?
2621  011736  100001                          BPL     .+4
2622  011740  104004                          ERROR   4                       ;RXDONE SHOULD NOT BE ASSERTED
2623                                                                  ;CHECK OUT HDX LOGIC
2624  011742  017701  167750                  MOV     @RXDBUF,R1      ;ACTUAL
2625  011746  020001                          CMP     R0,R1
2626  011750  001401                          BEQ     .+4
2627  011752  104002                          ERROR   2               ;CHARACTERS SHOULD COMPARE
2628                                          ;NOTE THAT CHARACTER 25 WILL BE FROZEN
2629                                          ;IN THE RXDBUF EVEN THOUGH CHARACTER 24 WAS
2630                                          ;SENT TO THE RECEIVER
2631
2632  011754                          1$:
```

```
                                        ;;THIS TEST VERIFYS THAT BREAK FORCES A SPACE CONDITION
                                        ;;ON THE LINE WHILE TRANSMITTING
                                        ;;THIS TEST USES BOTH THE RECEIVER AND TRANSMITTER LOGIC
                                        ;;MODE:   SYNC EXT (SYNEXT)
                                        ;;LENGTH:   EIGHT
                                        ;;
                                        ;;*****************************************************************
011754  000004                    TST26:  SCOPE
011756  052777  000400  167742            BIS     #MRESET,@TXCSR  ;MASTER RESET
011764  012777  020000  167730            MOV     #SYNEXT,@PARCSR ;SET THE MODE
011772  052777  000400  167726            BIS     #MRESET,@TXCSR  ;MASTER RESET

                                        ;SET MAINTENANCE MODE & SEND
                                            ;NOTE: BIT WINDOW&CLK ARE CLEARED (MTDATA=0)
012000  012777  004020  167720            MOV     #MINT!SEND,@TXCSR

                                        ;SET MODE,# OF BITS,PARITY SENSE,& LOAD SYNC REG
012006  012777  026026  167706            MOV     #SYNEXT!EIGHT!NOPAR!26,@PARCSR
012014  052777  000020  167670            BIS     #SYNSCH,@RXCSR  ;SET SEARCH SYNC
012022  016703  167670                    MOV     RXDBUF,R3       ;FOR ERROR MESSAGE
012026  012767  000002  167070            MOV     #2,COUNT        ;# OF TIMES
012034  112777  000025  167670            MOVB    #25,@TXDBUF     ;ANY CHARACTER
                                        ;POKE CLK FOR SYNCRONIZATION
012042  052777  020000  167656            BIS     #CLK,@TXCSR     ;POKE CLK UP
012050  042777  020000  167650            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
012056  012700  000025                    MOV     #25,R0          ;EXPECTED
012062  012767  000010  167032    1$:     MOV     #8.,SHIFT       ;# OF SHIFTS

012070                            2$:
012070  052777  020000  167630            BIS     #CLK,@TXCSR     ;POKE CLK UP
012076  042777  020000  167622            BIC     #CLK,@TXCSR     ;POKE CLK DOWN
012104  005367  167012                    DEC     SHIFT
012110  022767  000003  167004            CMP     #3,SHIFT
012116  001003                            BNE     3$
012120  112777  000024  167604            MOVB    #24,@TXDBUF     ;LOAD NEXT CHAR
012126  005767  166770            3$:     TST     SHIFT
012132  001356                            BNE     2$
012134  105777  167552                    TSTB    @RXCSR          ;RXDONE=1?
012140  100401                            BMI     .+4
012142  104004                            ERROR   4
012144  017701  167546                    MOV     @RXDBUF,R1      ;ACTUAL
012150  020001                            CMP     R0,R1
012152  001401                            BEQ     .+4
012154  104003                            ERROR   3
012156  052777  000001  167542            BIS     #BREAK,@TXCSR   ;SET BREAK
012164  012700  000000                    MOV     #0,R0           ;EXPECTED
012170  005367  166730                    DEC     COUNT
012174  001332                            BNE     1$


                                        ;;THIS TEST VERIFYS THAT DSC CAUSES AN INTERRUPT
                                        ;;THIS TEST ONLY WORKS IN MAINT EXTERNAL MODE
                                        ;;INTERRUPT VECTOR:   DURIV
```

```
2689                                    ;;**********************************************************************
2690  012176  000004                    TST27:  SCOPE
2691  012200  105767  166747                    TSTB    JMRBY           ;IN MAINT EXTERNAL?
2692  012204  100073                            BPL     3$              ;IF ANSWER NO JUMP AROUND TEST
2693  012206  052777  000400  167512            BIS     #MRESET,@TXCSR  ;MASTER RESET
2694  012214  105767  166731                    TSTB    OPTCLR  ;IS THE OPTIONAL CLR JUMPER IN ?
2695  012220  100405                            BMI     5$      ;YES
2696  012222  012777  000000  167462            MOV     #0,@RXCSR       ;CLR THE UNRESETTABLE BITS
2697  012230  005777  167456                    TST     @RXCSR  ;GET RID OF DSC BY READING RXCSR
2698  012234  012777  012256  167474  5$:       MOV     #4$,@DURIV      ;SET UP TRAPCATCHER
2699  012242  016777  004564  167470            MOV     DUPRT,@DURIS    ;
2700  012250  106427  000000                    MTPS    #0      ;ALLOW INTERRUPTS
2701  012254  000422                            BR      1$      ;JUMP AROUND INTERRUPT SVC ROUTINE
2702                                  ;THE FOLLOWING IS THE INTERRUPT SVC ROUTINE
2703  012256  106427  000340          4$:       MTPS    #340    ;DON'T ALLOW ANYMORE INTERRUPTS
2704  012262  005777  167424                    TST     @RXCSR          ;DSC=1?
2705  012266  100401                            BMI     .+4
2706  012270  104004                            ERROR   4                       ;FALSE INTERRUPT
2707  012272  042777  000040  167412            BIC     #DSINTE,@RXCSR  ;CLEAR INTERRUPT ENABLE
2708  012300  012716  012370                    MOV     #2$,(SP)        ;SET UP RETURN LOCATION
2709  012304  016777  167430  167424            MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2710  012312  012777  000000  167420            MOV     #0,@DURIS       ;
2711  012320  000002                            RTI
2712
2713  012322  052777  000040  167362  1$:       BIS     #DSINTE,@RXCSR  ;SET INTERRUPT ENABLE
2714  012330  052777  000002  167354            BIS     #DTR,@RXCSR     ;TRY TO CAUSE INTERRUPT
2715  012336  005000                            CLR     R0
2716  012340  005200                            INC     R0              ;WAIT FOR INTERRUPT
2717  012342  001376                            BNE     .-2
2718  012344  016777  167370  167364            MOV     DURIS,@DURIV    ;RESTORE TRAPCATCHER
2719  012352  012777  000000  167360            MOV     #0,@DURIS       ;
2720
2721  012360  042777  000040  167324            BIC     #DSINTE,@RXCSR  ;CLEAR INTERRUPT ENABLE
2722  012366  104004                            ERROR   4                       ;INTERRUPT FAILED TO OCCUR
2723  012370  106427  000340          2$:       MTPS    #340
2724  012374                         3$:
2725
2726
2727                                    ;END OF PASS
2728                                    ;TYPE NAME OF TEST
2729                                    ;UPDATE PASS COUNT
2730                                    ;CHECK FOR EXIT TO ACT-11
2731                                    ;RESTART TEST
2732
2733  012374  000004                    .EOP:   SCOPE
2734  012376  004767  000340                    JSR     PC,CKSWR
2735  012402  104401                            TYPE                            ;TYPE NAME OF TEST
2736  012404  015532                            MEPASS
2737  012406  104413  012640                    CONVRT  ,OUTCRY
2738  012412  104401  015351                    TYPE    ,DEVICE
2739  012416  105767  166530                    TSTB    MULTD   ;ARE YOU RUNNING MULTIPLE DEVICES ?
2740  012422  001511                            BEQ     CCC     ;NO, JUMP AROUND
2741  012424  005767  166536                    TST     ACTREG  ;ARE ANY DEVICES ACTIVE ?
2742  012430  001007                            BNE     RUNIT   ;YES
2743  012432  104401  015363                    TYPE    ,MCOW   ;NO
2744  012436  016700  166524                    MOV     ACTREG,R0       ;DISPLAY ACTREG
```

```
2745  012442  000000                          HALT            ;SELECT SOMETHING TO RUN @ ACTREG:
2746                                          ;SELECT SWITCHES & HIT CONTINUE (PUT SW00 =1)
2747  012444  000167  167502                  JMP     .START  ;START OVER AGAIN.....YOU DESELECTED EVERYTHING
2748  012450  062767  000010  166476  RUNIT:  ADD     #10,BASEADD     ;NEXT BLOCK (ADDRESSES)
2749  012456  062767  000010  166476  ZERO:   ADD     #10,BASEIV      ;NEXT BLOCK (VECTORS)
2750  012464  000241                          CLC
2751  012466  006167  166476                  ROL     ROTADD  ;UP DATE ROTATING POINTER
2752  012472  103410                          BCS     2$      ;IS IT THE LAST DEVICE
2753                                                          ;TO BE TESTED IN THIS PASS ?
2754  012474  036767  166470  166464          BIT     ROTADD,ACTREG   ;TEST THIS DEVICE FOR ACTIVE STATUS
2755  012502  001762                          BEQ     RUNIT   ;IF NOT ACTIVE, TRY NEXT ADDRESS
2756  012504  004767  000034                  JSR     PC,REPLAY       ;CALCULATE NEW PARAMETERS
2757  012510  000167  000210                  JMP     RESTRT  ;YES IT WAS ACTIVE,TEST THIS DEVICE
2758  012514  012767  000001  166446  2$:     MOV     #1,ROTADD       ;OK!,NOW SET UP  ROTATING
2759                                                          ;POINTER FOR NEXT MULTIPLE PASS
2760  012522  016767  166430  166424          MOV     KEEPADD,BASEADD ;RESTORE BASE ADDRESS
2761  012530  016767  166430  166424          MOV     KEEPIV,BASEIV   ;RESTORE BASE INTERRUPT VECTORS
2762  012536  004767  000002                  JSR     PC,REPLAY       ;CALC NEW PARAMETERS
2763  012542  000441                          BR      CCC     ;JUMP AROUND REPLAY
2764  012544  016767  166404  004416  REPLAY: MOV     BASEADD,DUBASE  ;SET UP FOR NEW ADDRESSES
2765  012552  004767  004260                  JSR     PC,DUADDR       ;CREATE NEW ADDRESSES
2766  012556  016767  166400  167152          MOV     BASEIV,DURIV    ;CREATE DURIV
2767  012564  062767  000002  166370          ADD     #2,BASEIV
2768  012572  016767  166364  167140          MOV     BASEIV,DURIS    ;CREATE DURIS
2769  012600  062767  000002  166354          ADD     #2,BASEIV
2770  012606  016767  166350  167126          MOV     BASEIV,DUTIV    ;CREATE DUTIV
2771  012614  062767  000002  166340          ADD     #2,BASEIV
2772  012622  016767  166334  167114          MOV     BASEIV,DUTIS    ;CREATE DUTIS
2773  012630  016767  167102  166324          MOV     DURIV,BASEIV    ;RESTORE
2774  012636  000207                          RTS     PC
2775
2776  012640  000001                  OUTCRY: 1
2777  012642     006      002                 .BYTE   6,2
2778  012644  001712                          RXCSR
2779
2780  012646                          CCC:
2781  012646  005067  166530                  CLR     $TSTNM                  ;CLEAR TEST NUMBER
2782  012652  005067  166540                  CLR     $ERRPC                  ;CLEAR LAST ERROR PC
2783  012656  005067  166521                  CLR     $ERFLG                  ;CLEAR ERROR FLAG
2784  012662  005267  166224                  INC     PASCNT                  ;UPDATE PASS COUNT
2785  012666  016767  166220  166206          MOV     PASCNT,LIGHTS           ;DISPLAY PASS COUNT
2786  012674  016767  166212  166632          MOV     PASCNT,$PASS            ;PASS COUNT TO APT
2787  012702  013701  000042                  MOV     @#42,R1                 ;CHECK FOR ACT-11 OR DDP
2788  012706  001406                          BEQ     RESTRT          ;IF NO CONTINUE TESTING
2789  012710  000005                          RESET
2790  012712  000005                          RESET
2791  012714  004711                  $ENDAD: JSR     PC,(R1)
2792  012716  000240                          NOP
2793  012720  000240                          NOP
2794  012722  000240                          NOP
2795  012724                          RESTRT:
2796  012724  012767  003376  166454          MOV     #TST1+2,$LPADR  ;LOAD LAST ADDR
2797  012732  004767  000004                  JSR     PC,CKSWR
2798  012736  000167  170346                  JMP     .BEGIN
2799
2800                                          ;CHECK SWITCH REGISTER ROUTINE.
```

```
                                        ;CHECKS TO ALLOW FOR < G> TO ALLOW
                                        ;THE CHANGING OF LOCATION 176

012742  005737  000042          CKSWR:  TST     @#42
012746  001040                          BNE     OUT
012750  022767  000176  166462          CMP     #SWREG,SWR      ;SOFTWARE SWR PRESENT?
012756  001034                          BNE     OUT             ;NO--LEAVE
012760  105777  166460                  TSTB    @$TKS           ;CHECK TTY READY
012764  100031                          BPL     OUT             ;NO--LEAVE
012766  017767  166454  000422          MOV     @$TKB,..MSG     ;GET CHARACTER
012774  042767  177600  000414          BIC     #177600,..MSG   ;STRIP JUNK
013002  122767  000007  000406          CMPB    #7,..MSG        ;IS IT < G> ?
013010  001017                          BNE     OUT             ;NO
013012  104401  016137                  TYPE    ,MCNTG
013016  005137  013056          CNTLU:  COM     @#RDSW
013022  104401  016147                  TYPE    ,MMSWR
013026  104413                          CONVRT
013030  013060                          SWREGL
013032  104406  016160                  INSTR,MMNEW
013036  104410                          PARAM
013040  000000                          0
013042  177777                          177777
013044  000176                          SWREG
013046     000     001          .BYTE   0,1
013050  005037  013056          OUT:    CLR     @#RDSW
013054  000207                          RTS     PC
013056  000000                  RDSW:   .WORD   0
013060  000001                  SWREGL: 1
013062     006     002                  .BYTE   6,2
013064  000176                          SWREG
013066  000005                          5

                                        ;CHECK FOR FREEZE ON CURRENT DATA

013070  004767  177646          .SCOP1: JSR     PC,CKSWR
013074  032777  001000  166336          BIT     #SW09,@SWR
013102  001402                          BEQ     1$
013104  016716  166000                  MOV     LOCK,(SP)
013110  000002                  1$:     RTI
                                .SBTTL  TYPE ROUTINE

                                ;;**************************************************************
                                ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                ;*
                                ;*CALL:
                                ;*1) USING A TRAP INSTRUCTION
                                ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                ;*OR
                                ;*      TYPE
                                ;*      MESADR
                                ;*
```

```
2857
2858  013112  105767  166341          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
2859  013116  100002                          BPL     1$              ;;BR IF YES
2860  013120  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
2861  013122  000430                          BR      3$              ;;LEAVE
2862  013124  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
2863  013126  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
2864  013132  122767  000001  166406          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
2865  013140  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
2866  013142  132767  000100  166377          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
2867  013150  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
2868  013152  010067  000004                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
2869  013156  004767  000006'                 JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
2870  013162  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
2871  013164  132767  000040  166355  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
2872  013172  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
2873  013174  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
2874  013176  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
2875  013200  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
2876  013202  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
2877  013204  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
2878  013210  000002                          RTI                     ;;RETURN
2879  013212  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
2880  013216  001430                          BEQ     8$
2881  013220  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
2882  013224  001006                          BNE     5$
2883  013226  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
2884  013230  104401                          TYPE                    ;;TYPE A CR AND LF
2885  013232  001523                          $CRLF
2886  013234  105067  000130                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
2887  013240  000755                          BR      2$              ;;GET NEXT CHARACTER
2888  013242  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
2889  013246  126726  166204          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
2890  013252  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
2891  013254  016746  166174                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
2892                                                                  ;;AND THE NULL CHAR.
2893  013260  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
2894  013264  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
2895  013266  004767  000032                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
2896  013272  105367  000072                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
2897  013276  000770                          BR      7$              ;;LOOP
2898
2899                                  ;HORIZONTAL TAB PROCESSOR
2900
2901  013300  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
2902  013304  004767  000014          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
2903  013310  132767  000007  000052          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
2904  013316  001372                          BNE     9$              ;;TAB STOP
2905  013320  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
2906  013322  000724                          BR      2$              ;;GET NEXT CHARACTER
2907  013324  105777  166120          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
2908  013330  100375                          BPL     $TYPEC
2909  013332  116677  000002  166112          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
2910  013340  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
2911  013346  001003                          BNE     1$              ;;BRANCH IF NO
2912  013350  105067  000014                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
```

```
2913  013354  000406                          BR      $TYPEX          ;;EXIT
2914  013356  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
2915  013364  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
2916  013366  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
2917  013370  000000                $CHARCNT: .WORD   0               ;;CHARACTER COUNT STORAGE
2918  013372  000207                $TYPEX:   RTS     PC
2919
2920
2921                                          ;ASCII STRING INPUT ROUTINE
2922
2923  013374  017667  000000  000014  .INSTR:  MOV     @(SP),.MSG      ;PICK UP MESSAGE
2924  013402  062716  000002                  ADD     #2,(SP)         ;JUMP AROUND MESSAGE FOR RTI
2925  013406  105767  166134                  TSTB    $ENV            ;APT CONTROL
2926  013412  001036                          BNE     INSTR2          ;YES NO TYPE
2927  013414  104401                .INST1:   TYPE
2928  013416  000000                .MSG:     0
2929  013420  012704  016172                  MOV     #INBUF,R4       ;GET STARTING LOC OF INBUF
2930  013424  012703  000007                  MOV     #7,R3           ;MAX # OF CHARS
2931  013430  105777  166010          1$:     TSTB    @$TKS   ;TTY FLAG
2932  013434  100375                          BPL     1$
2933  013436  117714  166004                  MOVB    @$TKB,(R4)      ;TAKE CHAR
2934  013442  142714  000200                  BICB    #200,(R4)       ;STRIP
2935  013446  121427  000025                  CMPB    (R4),#25        ;IS IT < G>
2936  013452  001760                          BEQ      INST1
2937  013454  122427  000015                  CMPB    (R4)+,#15       ;CHECK FOR CR
2938  013460  001413                          BEQ     INSTR2
2939  013462  105777  165762          2$:     TSTB    @$TPS   ;TEST FLAG
2940  013466  100375                          BPL     2$
2941  013470  117777  165752  165754          MOVB    @$TKB,@$TPB     ;ECHO CHARACTER
2942  013476  005303                          DEC     R3      ;DID YOU TYPE TOO MANY CHARS ?
2943  013500  001353                          BNE     1$
2944  013502  104401                .INSTE:   TYPE
2945  013504  015457                          MQM     ;?
2946  013506  000742                          BR      .INST1  ;RETRY
2947  013510  000002                INSTR2:   RTI
2948
2949                                          ;CONVERT ASCII STRING TO OCTAL
2950
2951  013512  011605                .PARAM:   MOV     (SP),R5 ;PUT CONTENTS OF SP INTO R5
2952  013514  012567  000162                  MOV     (R5)+,LOLIM     ;PUT LOW LIMIT INTO LOLIM
2953  013520  012567  000160                  MOV     (R5)+,HILIM     ;PUT HIGH LIMIT INTO HILIM
2954  013524  012567  000156                  MOV     (R5)+,DEVADR    ;PUT STORE LOC INTO DEVADR
2955  013530  112567  000154                  MOVB    (R5)+,LOBITS    ;PUT MASK INTO LOBITS
2956  013534  112567  000151                  MOVB    (R5)+,ADRCNT    ;PUT COUNT INTO ADRCNT
2957  013540  010516                          MOV     R5,(SP) ;RESTORE RETURN ADDR ON STACK FOR RTI
2958  013542  005005                PARAM1:   CLR     R5
2959  013544  012704  016172                  MOV     #INBUF,R4
2960  013550  122714  000015                  CMPB    #15,(R4)        ;CR ?
2961  013554  001420                          BEQ     PARERR  ;YOU TYPED CR TOO SOON !
2962  013556  121427  000060          1$:     CMPB    (R4),#60        ;LOW LIMIT ASCII 0
2963  013562  002415                          BLT     PARERR
2964  013564  121427  000067                  CMPB    (R4),#67        ;HIGH LIMIT ASCII 7
2965  013570  003012                          BGT     PARERR
2966  013572  142714  000060                  BICB    #60,(R4)        ;CONVERT TO OCTAL
2967  013576  152405                          BISB    (R4)+,R5        ;STORE AWAY ITS AN OK CHAR
2968  013600  122714  000015                  CMPB    #15,(R4)        ;CR ?
```

```
2969  013604  001414                        BEQ     LIMITS  ;NOW CHECK FOR HIGH &LOW LIMIT CONDS
2970  013606  006305                        ASL     R5      ;ALLOCATE ROOM FOR NEXT CHAR
2971  013610  006305                        ASL     R5
2972  013612  006305                        ASL     R5
2973  013614  000760                        BR      1$
2974  013616  122714  000015        PARERR: CMPB    #15,(R4)        ;CR?
2975  013622  001003                        BNE     120$
2976  013624  005737  013056                TST     @#RDSW          ;CK SWR USED
2977  013630  001023                        BNE     PARTI
2978  013632  104407                120$:   INSTER  ;RETRY
2979  013634  000742                        BR      PARAM1
2980
2981                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
2982
2983  013636  020567  000042        LIMITS: CMP     R5,HILIM
2984  013642  101365                        BHI     PARERR  ;THE # IS TOO HIGH
2985  013644  020567  000032                CMP     R5,LOLIM
2986  013650  103762                        BLO     PARERR  ;THE # IS TOO LOW
2987  013652  136705  000032                BITB    LOBITS,R5       ;TEST BY MASKINGTHE #
2988  013656  001357                        BNE     PARERR
2989
2990                                        ;STORE NUMBER AT SPECIFIED ADDRESS
2991
2992  013660  016704  000022                MOV     DEVADR,R4       ;GET STARTING ADDR OF
2993  013664  010524                1$:     MOV     R5,(R4)+        ;STORE AT THIS ADDR
2994  013666  062705  000002                ADD     #2,R5
2995  013672  105367  000013                DECB    ADRCNT  ;HOW MANY TIMES + 2 ?
2996  013676  001372                        BNE     1$
2997  013700  000002                PARTI:  RTI
2998  013702  000000                LOLIM:  0
2999  013704  000000                HILIM:  0
3000  013706  000000                DEVADR: 0
3001  013710  000000                LOBITS: 0
3002          013711                ADRCNT=LOBITS+1
3003
3004                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5
3005
3006  013712  016667  000004  165206 .SAV05: MOV     4(SP),SAVPC
3007
3008                                        ;SAVE R0-R5
3009
3010  013720  010567  165550        SV05:   MOV     R5,$REG5
3011  013724  010467  165542                MOV     R4,$REG4
3012  013730  010367  165534                MOV     R3,$REG3
3013  013734  010267  165526                MOV     R2,$REG2
3014  013740  010167  165520                MOV     R1,$REG1
3015  013744  010067  165512                MOV     R0,$REG0
3016  013750  000002                        RTI
3017
3018                                        ;RESTORE R0-R5
3019
3020  013752  016700  165504        .RES05: MOV     $REG0,R0
3021  013756  016701  165502                MOV     $REG1,R1
3022  013762  016702  165500                MOV     $REG2,R2
3023  013766  016703  165476                MOV     $REG3,R3
3024  013772  016704  165474                MOV     $REG4,R4
```

```
3025  013776  016705  165472                  MOV     $REG5,R5
3026  014002  000002                          RTI
3027
3028                                          ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
3029
3030  014004  104401                .CONVR:   TYPE
3031  014006  015463                          MCRLF   ;CR  LF
3032  014010  017601  000000                  MOV     @(SP),R1        ;PICK UP DATA POINTER
3033  014014  062716  000002                  ADD     #2,(SP) ;SET UP SP FOR RTI
3034  014020  012167  000130                  MOV     (R1)+,WRDCNT    ;PICK UP # OF WORDS FROM TABLE
3035  014024  112167  000126          1$:     MOVB    (R1)+,CHRCNT    ;PICK UP # OF CHARS FROM TABLE
3036  014030  112167  000123                  MOVB    (R1)+,SPACNT    ;PICK UP # OF SPACES FROM TABLE
3037  014034  013167  000120                  MOV     @(R1)+,BINWRD   ;PICK UP ADDRESS OF  MSG
3038                                                                  ;FROM TABLE
3039  014040  016704  000114          2$:     MOV     BINWRD,R4       ;SAVE
3040  014044  116705  000106                  MOVB    CHRCNT,R5       ;SAVE
3041  014050  012700  016234                  MOV     #TEMP,R0        ;STARTING ADDRESS OF TEMP BLOCK
3042  014054  010403                  3$:     MOV     R4,R3           ;SAVE
3043  014056  042703  177770                  BIC     #177770,R3      ;CLR OUT UPPER BITS .. SAVE CHAR
3044  014062  062703  000260                  ADD     #260,R3 ;CONVERT TO ASCII
3045  014066  110320                          MOVB    R3,(R0)+        ;STORE AWAY
3046  014070  006204                          ASR     R4      ;SHIFT FOR NEXT #
3047  014072  006204                          ASR     R4      ;DITTO
3048  014074  006204                          ASR     R4      ;DITTO
3049  014076  005305                          DEC     R5      ;DEC CHAR COUNT
3050  014100  001365                          BNE     3$      ;DO IT AGAIN ?
3051  014102  012703  016276                  MOV     #MDATA,R3       ;STARTING ADDRESS OF MDATA BLOCK
3052  014106  114023                  4$:     MOVB    -(R0),(R3)+     ;REVERSE THE ORDER OF NUMBERS
3053  014110  105367  000042                  DECB    CHRCNT  ;DEC CHAR COUNT
3054  014114  001374                          BNE     4$      ;DO IT AGAIN ?
3055  014116  105767  000035                  TSTB    SPACNT  ;HOW MANY SPACES ?
3056  014122  001405                          BEQ     6$      ;TYPE # IF BR =0
3057  014124  112723  000240          5$:     MOVB    #240,(R3)+      ;"SPACE" IN ASCII
3058  014130  105367  000023                  DECB    SPACNT  ;DEC # OF SPACE COUNT
3059  014134  001373                          BNE     5$      ;DO IT AGAIN ?
3060  014136  105013                  6$:     CLRB    (R3)    ;INSERT "0" FOR TTY OUTPUT ROUTINE
3061  014140  104401                          TYPE
3062  014142  016276                          MDATA   ;THIS MESSAGE
3063  014144  005367  000004                  DEC     WRDCNT  ;HOW MANY #'S ?
3064  014150  001325                          BNE     1$      ;DO THIS ROUTINE AGAIN IF NOT EQUAL TO 0
3065  014152  000002                          RTI     ;RETURN TO PROGRAM
3066  014154  000000                WRDCNT:   0
3067  014156  000000                CHRCNT:   0
3068          014157                SPACNT=CHRCNT+1
3069  014160  000000                BINWRD:   0
3070
3071                                          ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
3072                                          ;BUFFER TO THE CHARACTERS "N" AND "Y".
3073                                          ;IF THE CHARACTER IS "N" CLEAR THE FLAG
3074                                          ;IF THE CHARACTER IS "Y" SET THE FLAG
3075
3076  014162  017605  000000        .SETFLG:  MOV     @(SP),R5
3077  014166  122767  000116  001776          CMPB    #'N,INBUF       ;IS IT "N" ?
3078  014174  001002                          BNE     1$
3079  014176  105015                          CLRB    (R5)    ;000
3080  014200  000406                          BR      2$
```

```
3081  014202  122767  000131  001762  1$:     CMPB    #'Y,INBUF       ;IS IT "Y" ?
3082  014210  001005                          BNE     3$
3083  014212  112715  177777                  MOVB    #-1,(R5)        ;377
3084  014216  062716  000002          2$:     ADD     #2,(SP)
3085  014222  000002                          RTI
3086  014224  104407                  3$:     INSTER  ;RETRY
3087  014226  000755                          BR      .SETFLG
3088                                  .SBTTL  ERROR HANDLER ROUTINE
3089
3090                                  ;;**********************************************************************
3091                                  ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
3092                                  ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
3093                                  ;*AND GO TO SAVIT ON ERROR
3094                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
3095                                  ;*SW15=1         HALT ON ERROR
3096                                  ;*SW13=1         INHIBIT ERROR TYPEOUTS
3097                                  ;*SW10=1         BELL ON ERROR
3098                                  ;*SW09=1         LOOP ON ERROR
3099                                  ;*CALL
3100                                  ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
3101
3102  014230                          $ERROR:
3103  014230  105267  165147          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
3104  014234  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
3105  014236  016777  165140  165176          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
3106  014244  032777  002000  165166          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
3107  014252  001402                          BEQ     1$              ;;NO - SKIP
3108  014254  104401  001516                  TYPE    ,$BELL          ;;RING BELL
3109  014260  005267  165126          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
3110  014264  011667  165126                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
3111  014270  162767  000002  165120          SUB     #2,$ERRPC
3112  014276  117767  165114  165110          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
3113  014304  032777  020000  165126          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
3114  014312  001004                          BNE     20$             ;;SKIP TYPEOUTS
3115  014314  004767  000072                  JSR     PC,SAVIT        ;;GO TO USER ERROR ROUTINE
3116  014320  104401  001523                  TYPE    ,$CRLF
3117  014324                          20$:
3118  014324  122767  000001  165214          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
3119  014332  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
3120  014334  116767  165054  000004          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
3121  014342  004767  000016'                 JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
3122  014346     000          21$:    .BYTE   0
3123  014347     000                  .BYTE   0
3124  014350  000777          22$:    BR      22$             ;;APT ERROR LOOP
3125  014352  005777  165062  2$:     TST     @SWR            ;;HALT ON ERROR
3126  014356  100001                  BPL     3$              ;;SKIP IF CONTINUE
3127  014360  000000                  HALT                    ;;HALT ON ERROR!
3128  014362  032777  001000  165050  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
3129  014370  001402                  BEQ     4$              ;;BR IF NO
3130  014372  016716  165012          MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
3131  014376  005767  165112  4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
3132  014402  001402                  BEQ     5$              ;;BR IF NONE
3133  014404  016716  165104          MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
3134  014410                  5$:
3135  014410  000002                  RTI                     ;;RETURN
3136  014412  010067  164512  SAVIT: MOV     R0,HLD0
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3137  014416  010167  164510                  MOV     R1,HLD1
3138  014422  010267  164506                  MOV     R2,HLD2
3139  014426  010367  164504                  MOV     R3,HLD3
3140  014432  010467  164502                  MOV     R4,HLD4
3141  014436  010567  164500                  MOV     R5,HLD5
3142  014442  016767  164734  164474          MOV     $TSTNM,HLD6
3143
3144                                  .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
3145
3146                                  ;;**********************************************************************
3147                                  ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
3148                                  ;*ERROR IS TO BE REPORTED.  IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
3149                                  ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
3150
3151  014450                          $ERRTYP:
3152  014450  104401  001523                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
3153  014454  010046                          MOV     R0,-(SP)        ;;SAVE R0
3154  014456  005000                          CLR     R0              ;;PICKUP THE ITEM INDEX
3155  014460  153700  001414                  BISB    @#$ITEMB,R0
3156  014464  001004                          BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
3157                                                                  ;;TYPE THE PC OF THE ERROR
3158  014466  016746  164724                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
3159                                                                  ;;ERROR ADDRESS
3160  014472  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3161  014474  000426                          BR      6$              ;;GET OUT
3162  014476  005300                  1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
3163  014500  006300                          ASL     R0              ;;      WORK FOR THE ERROR TABLE
3164  014502  006300                          ASL     R0
3165  014504  006300                          ASL     R0
3166  014506  062700  001652                  ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
3167  014512  012067  000004                  MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
3168  014516  001404                          BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
3169  014520  104401                          TYPE                    ;;TYPE THE "ERROR MESSAGE"
3170  014522  000000                  2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
3171  014524  104401  001523                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
3172  014530  012067  000004          3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
3173  014534  001404                          BEQ     5$              ;;SKIP TYPEOUT IF 0
3174  014536  104401                          TYPE                    ;;TYPE THE "DATA HEADER"
3175  014540  000000                  4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
3176  014542  104401  001523                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
3177  014546  011000                  5$:     MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
3178  014550  001004                          BNE     7$              ;;GO TYPE THE DATA
3179  014552  012600                  6$:     MOV     (SP)+,R0        ;;RESTORE R0
3180  014554  104401  001523                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
3181  014560  000207                          RTS     PC              ;;RETURN
3182  014562                          7$:
3183  014562  013046                          MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
3184  014564  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3185  014566  005710                          TST     (R0)            ;;IS THERE ANOTHER NUMBER?
3186  014570  001770                          BEQ     6$              ;;BR IF NO
3187  014572  104401  014600                  TYPE    ,8$             ;;TYPE TWO(2) SPACES
3188  014576  000771                          BR      7$              ;;LOOP
3189  014600  020040      000         8$:     .ASCIZ  /  /            ;;TWO(2) SPACES
3190          014604                          .EVEN
3191                                  .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
3192
```

```
                                ;;**********************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                ;*      .BYTE   M               ;;M=1 OR 0
                                ;*                                      ;;1=TYPE LEADING ZEROS
                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                ;*
                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                ;*$TYPOS OR $TYPOC
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPON                   ;;CALL FOR TYPEOUT
                                ;*
                                ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOC                   ;;CALL FOR TYPEOUT

014604  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
014610  116667  000001  000211          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
014616  112667  000207                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
014622  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
014626  000406                          BR      $TYPON
014630  112767  000001  000171  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
014636  112767  000006  000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
014644  112767  000005  000154  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
014652  010346                          MOV     R3,-(SP)        ;;SAVE R3
014654  010446                          MOV     R4,-(SP)        ;;SAVE R4
014656  010546                          MOV     R5,-(SP)        ;;SAVE R5
014660  116704  000145                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
014664  005404                          NEG     R4
014666  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
014672  110467  000132                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
014676  116704  000125                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
014702  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
014706  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
014710  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
014712  000404                          BR      3$              ;;GO DO MSB
014714  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
014716  006105                          ROL     R5
014720  006105                          ROL     R5
014722  010503                          MOV     R5,R3
014724  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
014726  105367  000076                  DECB    $OMODE          ;;TYPE THIS DIGIT?
014732  100016                          BPL     7$              ;;BR IF NO
014734  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
014740  001002                          BNE     4$              ;;TEST FOR 0
014742  005704                          TST     R4              ;;SUPPRESS THIS 0?
014744  001403                          BEQ     5$              ;;BR IF YES
014746  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
014750  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
```

```
3249  014754  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
3250  014760  110367  000040                  MOVB    R3,8$           ;;SAVE FOR TYPING
3251  014764  104401  015024                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
3252  014770  105367  000032          7$:     DECB    $OCNT           ;;COUNT BY 1
3253  014774  003347                          BGT     2$              ;;BR IF MORE TO DO
3254  014776  002402                          BLT     6$              ;;BR IF DONE
3255  015000  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
3256  015002  000744                          BR      2$              ;;GO DO THE LAST DIGIT
3257  015004  012605          6$:     MOV     (SP)+,R5        ;;RESTORE R5
3258  015006  012604                  MOV     (SP)+,R4        ;;RESTORE R4
3259  015010  012603                  MOV     (SP)+,R3        ;;RESTORE R3
3260  015012  016666  000002  000004  MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
3261  015020  012616                  MOV     (SP)+,(SP)
3262  015022  000002                  RTI                     ;;RETURN
3263  015024     000          8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
3264  015025     000                  .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
3265  015026     000          $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
3266  015027     000          $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
3267  015030  000000          $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
3268                                  ;ENTER HERE ON POWER FAILURE
3269
3270
3271  015032                  $PWRDN:
3272  015032  010046          .PFAIL: MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
3273  015034  010146                  MOV     R1,-(SP)
3274  015036  010246                  MOV     R2,-(SP)
3275  015040  010346                  MOV     R3,-(SP)
3276  015042  010446                  MOV     R4,-(SP)
3277  015044  010546                  MOV     R5,-(SP)
3278  015046  016746  162752          MOV     24,-(SP)
3279  015052  010667  164040          MOV     SP,SAVSP                ;SAVE STACK POINTER
3280  015056  012767  015070  162740  MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
3281  015064  000000                  HALT                            ;HALT ON POWER DOWN NORMAL
3282  015066  000777                  BR      .
3283
3284                                  ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
3285
3286  015070  016706  164022  RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
3287  015074  012605                  MOV     (SP)+,R5                ;RESTORE R0-R5
3288  015076  012604                  MOV     (SP)+,R4
3289  015100  012603                  MOV     (SP)+,R3
3290  015102  012602                  MOV     (SP)+,R2
3291  015104  012601                  MOV     (SP)+,R1
3292  015106  012600                  MOV     (SP)+,R0
3293  015110  012767  015032  162706  MOV     #.PFAIL,24              ;SET UP FOR POWER FAILURE
3294  015116  106427  000340          MTPS    #340
3295  015122  012706  001100          MOV     #STACK,SP
3296  015126  005067  001102          CLR     TEMP
3297  015132  005267  001076          INC     TEMP
3298  015136  001375                  BNE     .-4
3299  015140  104413                  CONVRT
3300  015142  015164                  PFTAB
3301  015144  104401                  TYPE
3302  015146  015466                  MPFAIL
3303  015150  005067  164227          CLR     $ERFLG
3304  015154  005067  164236          CLR     $ERRPC
```

```
3305  015160  000177  163720                  JMP     @RETURN
3306  015164  000001                  PFTAB:  1
3307  015166     006     002                  .BYTE   6,2
3308  015170  000207                          RETURN
3309  015172  005015  042012  053125  MTITLE: .ASCIZ  <15><12><12>/DUV11 DZDUU-B TAPE E /<15><12>
3310  015200  030461  042040  042132
3311  015206  052525  041055  052040
3312  015214  050101  020105  020105
3313  015222  005015     000
3314  015225     015  053012  041505  MVECTO: .ASCIZ  <15><12>/VEC ADD-/
3315  015232  040440  042104  000055
3316  015240  005015  051461  020124  MREGAD: .ASCIZ  <15><12>/1ST DEV: REC CSR ADD-/
3317  015246  042504  035126  051040
3318  015254  041505  041440  051123
3319  015262  040440  042104  000055
3320  015270  005015  052515  052114  MMULT:  .ASCIZ  <15><12>/MULT DEV ? (Y OR N)-/
3321  015276  042040  053105  037440
3322  015304  024040  020131  051117
3323  015312  047040  026451     000
3324  015317     015  046012  051501  MLASTD: .ASCIZ  <15><12>/LAST DEV: REC CSR ADDR-/
3325  015324  020124  042504  035126
3326  015332  051040  041505  041440
3327  015340  051123  040440  042104
3328  015346  026522     000
3329  015351     075  042504  044526  DEVICE: .ASCIZ  /=DEVICE  /
3330  015356  042503  020040     000
3331  015363     015  051412  046105  MCOW:   .ASCIZ  <15><12>/SELECT TO RUN @ACTREG/
3332  015370  041505  020124  047524
3333  015376  051040  047125  040040
3334  015404  041501  051124  043505
3335  015412     000
3336  015413     015  047412  043126  MRANGE: .ASCIZ  <15><12>/OVFLO: RETYPE LAST DEV RXCSR ADDS-/
3337  015420  047514  051072  052105
3338  015426  050131  020105  040514
3339  015434  052123  042040  053105
3340  015442  051040  041530  051123
3341  015450  040440  042104  026523
3342  015456     000
3343  015457     040  037440     000  MQM:    .ASCIZ  /  ?/
3344  015463     015  000012          MCRLF:  .ASCIZ   <15><12>
3345  015466  043120  044501  026114  MPFAIL: .ASCIZ  /PFAIL,  RESTART AT TEST IN PROGRESS/
3346  015474  020040  042522  052123
3347  015502  051101  020124  052101
3348  015510  052040  051505  020124
3349  015516  047111  050040  047522
3350  015524  051107  051505  000123
3351  015532  005015  047105  020104  MEPASS: .ASCIZ  <15><12>/END OF PASS TAPE E/
3352  015540  043117  050040  051501
3353  015546  020123  040524  042520
3354  015554  042440     000
3355  015557     015  051012     000  MR:     .ASCIZ  <15><12>/R/
3356  015563     015  052012  051505  MTSTPC: .ASCIZ  <15><12>/TEST PC-/
3357  015570  020124  041520  000055
3358  015576  005015  047514  045503  MLOCK:  .ASCIZ  <15><12>/LOCK ON  TEST? (Y OR N)-/
3359  015604  047440  020116  052040
3360  015612  051505  037524  024040
```

```
 3361  015620  020131  051117  047040
 3362  015626  026451     000
 3363  015631     015  021412  047440  MSYNC:  .ASCIZ  <15><12>/# OF SYNC CHARS SELECTED ( 1 OR 2)-/
 3364  015636  020106  054523  041516
 3365  015644  041440  040510  051522
 3366  015652  051440  046105  041505
 3367  015660  042524  020104  020050
 3368  015666  020061  051117  031040
 3369  015674  026451     000
 3370  015677     015  044412  020123  MWIRE6: .ASCIZ  <15><12>/IS SEC XMIT SWITCH E55-2 IN? (Y OR N)-/
 3371  015704  042523  020103  046530
 3372  015712  052111  051440  044527
 3373  015720  041524  020110  032505
 3374  015726  026465  020062  047111
 3375  015734  020077  054450  047440
 3376  015742  020122  024516  000055
 3377  015750  005015  051511  051440  MWIRE5: .ASCIZ  <15><12>/IS SEC REC SWITCH E55-3 IN? (Y OR N)-/
 3378  015756  041505  051040  041505
 3379  015764  051440  044527  041524
 3380  015772  020110  032505  026465
 3381  016000  020063  047111  020077
 3382  016006  054450  047440  020122
 3383  016014  024516  000055
 3384  016020  005015  051511  047440  MWIRE4: .ASCIZ  <15><12>/IS OPT CLR ENABLE SWITCH E55-1 IN? (Y OR N)-/
 3385  016026  052120  041440  051114
 3386  016034  042440  040516  046102
 3387  016042  020105  053523  052111
 3388  016050  044103  042440  032465
 3389  016056  030455  044440  037516
 3390  016064  024040  020131  051117
 3391  016072  047040  026451     000
 3392  016077     015  005012  031510  MEXTJ:  .ASCIZ  <15><12><12>/H315 CONNECTOR ON ?(Y OR N)-/
 3393  016104  032461  041440  047117
 3394  016112  042516  052103  051117
 3395  016120  047440  020116  024077
 3396  016126  020131  051117  047040
 3397  016134  026451     000
 3398  016137     015  020012  043536  MCNTG:  .ASCIZ  <15><12>/  G  /
 3399  016144  020040     000
 3400  016147     040  053523  036522  MMSWR:  .ASCIZ  / SWR=   /
 3401  016154  020040  000040
 3402  016160  020040  047040  053505  MMNEW:  .ASCIZ  /   NEW=  /
 3403  016166  020075  000040
 3404                                  .EVEN
 3405
 3406                                  ;BUFFERS FOR INPUT-OUTPUT
 3407
 3408  016172  000000                  INBUF:  0
 3409          016234                  .=.+40
 3410  016234  000000                  TEMP:   0
 3411          016276                  .=.+40
 3412  016276  000000                  MDATA:  0
 3413          016340                  .=.+40
 3414                                  .SBTTL  SCOPE HANDLER ROUTINE
 3415
 3416                                  ;;**********************************************************************
```

```
                                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS.  IT WILL INCREMENT
                                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG. (DISPLAY<7:0>)
                                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW14=1         LOOP ON TEST
                                ;*SW11=1         INHIBIT ITERATIONS
                                ;*SW09=1         LOOP ON ERROR
                                ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                                ;*CALL
                                ;*      SCOPE           ;;SCOPE=IOT

016340                          $SCOPE:

                                        ;SCOPE LOOP AND INTERATION HANDLER

016340                          .SCOPE:
016340  004767  174376                  JSR     PC,CKSWR
016344  005067  163046                  CLR     $ERRPC          ;CLEAR LAST ERROR PC
016350  022716  003376                  CMP     #TST1+2,(SP)    ;IS SCOPE AT BEGINING OF TEST 1?
016354  001422                          BEQ     $XTSTR          ;YES NO LOOP.

016356  032777  040000  163054  TTST:   BIT     #BIT14,@SWR     ;THIS CODE IS FOR TESTING FOR BIT 14
016364  001412                          BEQ     1$              ;ON LSI WHICH SYSMAC CANNOT HANDLE
016366  016767  163010  163012          MOV     $TSTNM,$LPADR
016374  000406                          BR      1$
016376  105777  163042                  TSTB    @$TKS           ;KEYBOARD DONE?
016402  100123                          BPL     $OVER           ;BR IF NO
016404  017766  163036  177776          MOV     @$TKB,-2(SP)    ;CLEAR DONE BIT
016412  032777  040000  163020  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
016420  001114                          BNE     $OVER           ;;YES IF SW14=1
                                ;#####START OF CODE FOR THE XOR TESTER#####
016422  000416                $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
016424  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
016430  012737  016450  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
016436  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
016442  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
016446  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
016450  022626                5$:       CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
016452  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
016456  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
016460                          6$: ;#####END OF CODE FOR THE XOR TESTER#####
016460  032777  000400  162752          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
016466  001404                          BEQ     2$              ;;BR IF NO
016470  127767  162744  162704          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
016476  001465                          BEQ     $OVER           ;;BR IF YES
016500  105767  162677                2$:       TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
016504  001421                          BEQ     3$              ;;BR IF NO
016506  126767  162703  162667          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
016514  101015                          BHI     3$              ;;BR IF NO
016516  032777  001000  162714          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
016524  001404                          BEQ     4$              ;;BR IF NO
016526  016767  162656  162652  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
016534  000446                          BR      $OVER
016536  105067  162641                4$:       CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
016542  005067  162744                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
```

```
3473  016546  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
3474  016550  032777  004000  162662  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
3475  016556  001011                          BNE     1$              ;;BR IF YES
3476  016560  005767  162750                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
3477  016564  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
3478  016566  005267  162612                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
3479  016572  026767  162714  162604          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
3480  016600  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
3481  016602  012767  000001  162574  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
3482  016610  016767  000056  162674          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
3483  016616  105267  162560          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
3484  016622  116767  162554  162702          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
3485  016630  011667  162552                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
3486  016634  011667  162550                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
3487  016640  005067  162650                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
3488  016644  112767  000001  162543          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
3489  016652  016777  162524  162562  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
3490  016660  016716  162522                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
3491  016664  000002                  4$:     RTI
3492  016666  001407                  BRW:    1407
3493  016670  000432                  BRX:    432
3494  016672  000005                  $MXCNT: 5                       ;;MAX. NUMBER OF ITERATIONS
3495                                   .SBTTL  TRAP DECODER
3496
3497                                   ;;**************************************************************
3498                                   ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
3499                                   ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
3500                                   ;*OF THE DESIRED ROUTINE.  THEN USING THE ADDRESS OBTAINED IT WILL
3501                                   ;*GO TO THAT ROUTINE.
3502
3503  016674  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
3504  016676  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
3505  016702  005740                          TST     -(R0)           ;;BACKUP BY 2
3506  016704  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
3507  016706  006300                          ASL     R0              ;;POSITION FOR INDEXING
3508  016710  016000  016730                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
3509  016714  000200                          RTS     R0              ;;GO TO ROUTINE
3510
3511
3512                                   ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
3513
3514  016716  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
3515  016720  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
3516  016726  000002                          RTI                     ;;RESTORE THE PSW
3517
3518                                   .SBTTL  TRAP TABLE
3519
3520                                   ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
3521                                   ;*BY THE "TRAP" INSTRUCTION.
3522
3523                                   ;       ROUTINE
3524                                   ;       -------
3525  016730  016716                  $TRPAD: .WORD   $TRAP2
3526  016732  013112                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
3527  016734  014630                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
3528  016736  014604                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
```

```
3529  016740  014644                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
3530
3531
3532  016742  013070                          .SCOP1  ;;CALL=SCOP1    TRAP+5(104405)
3533  016744  013374                          .INSTR  ;;CALL=INSTR    TRAP+6(104406)
3534  016746  013502                          .INSTER ;;CALL=INSTER   TRAP+7(104407)
3535  016750  013512                          .PARAM  ;;CALL=PARAM    TRAP+10(104410)
3536  016752  013712                          .SAV05  ;;CALL=SAV05    TRAP+11(104411)
3537  016754  013752                          .RES05  ;;CALL=RES05    TRAP+12(104412)
3538  016756  014004                          .CONVRT ;;CALL=CONVRT   TRAP+13(104413)
3539  016760  014162                          .SETFLG ;;CALL=SETFLG   TRAP+14(104414)
3540                                  ;*****************************************************************
3541                                  ;UTILITIES
3542                                  ;*****************************************************************
3543
3544                                  ;THIS UTILITY CALCULATES PRIORITY LEVEL
3545  016762  006367  000044          DULEV:  ASL     DUPRT   ;SHIFT LEFT
3546  016766  006367  000040                  ASL     DUPRT   ;
3547  016772  006367  000034                  ASL     DUPRT   ;
3548  016776  006367  000030                  ASL     DUPRT   ;
3549  017002  006367  000024                  ASL     DUPRT   ;
3550  017006  016767  000020  000020          MOV     DUPRT,LESS1     ;MOVE THIS TO LESS1
3551  017014  162767  000001  000012          SUB     #1,LESS1        ;CREATE LESS1
3552  017022  042767  000037  000004          BIC     #37,LESS1       ;CLEAR TNZVC
3553  017030  000207                          RTS     PC
3554  017032  000240                  DUPRT:  PR5
3555  017034  000200                  LESS1:  PR4     ;LEVEL TO ALLOW INTERRUPTS
3556
3557                                          ;NEW DU ADDRESSES
3558  017036  016767  000126  162646  DUADDR: MOV     DUBASE,RXCSR    ;XXX0
3559  017044  005267  000120                  INC     DUBASE
3560  017050  016767  000114  162636          MOV     DUBASE,HRXCSR   ;XXX1
3561  017056  005267  000106                  INC     DUBASE
3562  017062  016767  000102  162626          MOV     DUBASE,RXDBUF   ;XXX2
3563  017070  016767  000074  162624          MOV     DUBASE,PARCSR   ;XXX2
3564  017076  005267  000066                  INC     DUBASE
3565  017102  016767  000062  162610          MOV     DUBASE,HRXDBUF  ;XXX3
3566  017110  016767  000054  162606          MOV     DUBASE,HPARCSR  ;XXX3
3567  017116  005267  000046                  INC     DUBASE
3568  017122  016767  000042  162576          MOV     DUBASE,TXCSR    ;XXX4
3569  017130  005267  000034                  INC     DUBASE
3570  017134  016767  000030  162566          MOV     DUBASE,HTXCSR   ;XXX5
3571  017142  005267  000022                  INC     DUBASE
3572  017146  016767  000016  162556          MOV     DUBASE,TXDBUF   ;XXX6
3573  017154  005267  000010                  INC     DUBASE
3574  017160  016767  000004  162546          MOV     DUBASE,HTXDBUF  ;XXX7
3575  017166  000207                          RTS     PC
3576  017170  000000                  DUBASE: 0
3577
3578                                          ;THIS UTILITY POKES THE MAINT DATA BASED UPON THE
3579                                          ;INFORMATION CONTAINED IN $TMP1 AND IT IS
3580                                          ;SHIFTED IN BY THE CONTENTS OF SHIFT
3581  017172  042777  040000  162526  RPOKE:  BIC     #MTDATA,@TXCSR
3582  017200  005067  162276                  CLR     $TMP2
3583  017204  006067  162270                  ROR     $TMP1   ;FORCE CARRY
3584  017210  006067  162266                  ROR     $TMP2   ;PICK UP CARRY IN BIT 15
```

```
3585  017214  006267  162262                  ASR     $TMP2   ;SHIFT INTO BIT 14
3586  017220  042767  100000  162254          BIC     #BIT15,$TMP2    ;CLR BIT 15
3587  017226  056777  162250  162472          BIS     $TMP2,@TXCSR    ;POKE MAINT DATA
3588  017234  042777  020000  162464          BIC     #CLK,@TXCSR     ;POKE CLK
3589  017242  052777  020000  162456          BIS     #CLK,@TXCSR     ;
3590  017250  005367  161646                  DEC     SHIFT
3591  017254  001346                          BNE     RPOKE
3592  017256  000207                          RTS     PC
3593
3594                                          ;THIS ROUTINE CALCULATES ODD PARITY FOR AN 8 BIT CHAR
3595  017260  016767  162214  162214  ODD8:   MOV     $TMP1,$TMP2     ;SAVE TEMP1
3596  017266  005067  162212                  CLR     $TMP3
3597  017272  012727  000010                  MOV     #8.,(PC)+
3598  017276  000000                  4$:     0
3599  017300  006067  162176          1$:     ROR     $TMP2
3600  017304  005567  162174                  ADC     $TMP3
3601  017310  005367  177762                  DEC     4$
3602  017314  001371                          BNE     1$
3603  017316  006067  162162                  ROR     $TMP3
3604  017322  103404                          BCS     2$
3605  017324  052767  000400  162146          BIS     #BIT8,$TMP1     ;SET ODD PARITY
3606  017332  000403                          BR      3$
3607  017334  042767  000400  162136  2$:     BIC     #BIT8,$TMP1     ;CLR EVEN PARITY
3608                                          ;$TMP1 NOW HAS ODD PARITY CHARACTER
3609  017342  000207                  3$:     RTS     PC
3610
3611                                          ;THIS ROUTINE CALCULATES EVEN PARITY FOR AN 8 BIT CHARACTER
3612  017344  016767  162130  162130  EVEN8:  MOV     $TMP1,$TMP2     ;SAVE TEMP1
3613  017352  005067  162126                  CLR     $TMP3
3614  017356  012727  000010                  MOV     #8.,(PC)+
3615  017362  000000                  4$:     0
3616  017364  006067  162112          1$:     ROR     $TMP2
3617  017370  005567  162110                  ADC     $TMP3
3618  017374  005367  177762                  DEC     4$
3619  017400  001371                          BNE     1$
3620  017402  006067  162076                  ROR     $TMP3
3621  017406  103004                          BCC     2$
3622  017410  052767  000400  162062          BIS     #BIT8,$TMP1     ;SET EVEN PARITY
3623  017416  000403                          BR      3$
3624  017420  042767  000400  162052  2$:     BIC     #BIT8,$TMP1     ;CLR ODD PARITY
3625                                          ;$TMP1 NOW HAS EVEN PARITY CHARACTER
3626  017426  000207                  3$:     RTS     PC
3627  017430  062716  000002          TRPREG: ADD     #2,(SP) ;ALLOW IT TO "CRUNCH" INTO HLT BACK
3628                                                          ;IN MAIN PART OF THE PROGRAM
3629  017434  000002                          RTI
3630          000001                  .END
```

```
AAA     003200            1294#
ABASE = 000000             877     918
ACDW1 = 000000             877     920
ACDW2 = 000000             877     921
ACPUOP= 000000             877     892
ACTREG  001166             736#   1250*   1264*   1265*   1272*   2741    2744    2754
ADDW0 = 000000             877     922
ADDW1 = 000000             877     923
ADDW10= 000000             877     932
ADDW11= 000000             877     933
ADDW12= 000000             877     934
ADDW13= 000000             877     935
ADDW14= 000000             877     936
ADDW15= 000000             877     937
ADDW2 = 000000             877     924
ADDW3 = 000000             877     925
ADDW4 = 000000             877     926
ADDW5 = 000000             877     927
ADDW6 = 000000             877     928
ADDW7 = 000000             877     929
ADDW8 = 000000             877     930
ADDW9 = 000000             877     931
ADEVCT= 000000             877     883
ADEVM = 000000             877     919
ADRCNT= 013711            2956*   2995*   3002#
AENV  = 000000             877     888
AENVM = 000000             877     889
AFATAL= 000000             877     880
AMADR1= 000000             877     905
AMADR2= 000000             877     909
AMADR3= 000000             877     912
AMADR4= 000000             877     915
AMAMS1= 000000             877     899
AMAMS2= 000000             877     907
AMAMS3= 000000             877     910
AMAMS4= 000000             877     913
AMSGAD= 000000             877     885
AMSGLG= 000000             877     886
AMSGTY= 000000             877     879
AMTYP1= 000000             877     900
AMTYP2= 000000             877     908
AMTYP3= 000000             877     911
AMTYP4= 000000             877     914
APASS = 000000             877     882
APRIOR= 000000             877
APTCSU= 000040             537#   2871
APTENV= 000001             537#   2864    3118
APTSIZ= 000200             537#   1169
APTSPO= 000100             537#   2866
ASWREG= 000000             877     890
ATESTN= 000000             877     881
AUNIT = 000000             877     884
AUSWR = 000000             877     891
AVECT1= 000000             877     916
AVECT2= 000000             877     917
BASEAD  001154             731#   1232*   1269*   1270    1276*   1278*   2748*   2760*   2764
```

```
BASEIV  001162            734#   1242*  2749*  2761*  2766   2767*  2768   2769*  2770   2771*  2772   2773*
BBB     003026           1249    1253#
BINWRD  014160           3037*   3039   3069#
BITW  = 002000            803#    996#  1375   1428   1481   1534   1587   1640   1694   1747   1800   1853   1906
                         1959    2276   2323
BIT0  = 000001            666#    779    810    972   1003
BIT00 = 000001            656#    666
BIT01 = 000002            655#    665
BIT02 = 000004            654#    664
BIT03 = 000010            653#    663
BIT04 = 000020            652#    662
BIT05 = 000040            651#    661
BIT06 = 000100            650#    660
BIT07 = 000200            649#    659
BIT08 = 000400            648#    658   3459
BIT09 = 001000            647#    657   3128   3467
BIT1  = 000002            665#    778    971
BIT10 = 002000            646#    769    803    962    996   3106
BIT11 = 004000            645#    768    961   3474
BIT12 = 010000            644#    767    784    960    977
BIT13 = 020000            643#    766    783    802    959    976    995   3113
BIT14 = 040000            642#    765    782    801    958    975    994   3438   3445
BIT15 = 100000            641#    764    781    800    957    974    993   3586
BIT2  = 000004            664#    777    970
BIT3  = 000010            663#    776    809    969   1002
BIT4  = 000020            662#    775    808    968   1001
BIT5  = 000040            661#    774    807    967   1000
BIT6  = 000100            660#    773    806    966    999
BIT7  = 000200            659#    772    805    965    998
BIT8  = 000400            658#    771    787    804    964    980    997   3605   3607   3622   3624
BIT9  = 001000            657#    770    786    963    979
BPTVEC= 000014            673#
BREAK = 000001            810#   1003#  2006   2063   2096   2354   2418   2680
BRW     016666           3492#
BRX     016670           3493#
CARDET= 010000            767#    960#
CCC     012646           2740    2763   2780#
CHRCNT  014156           3035*   3040   3053*  3067#  3068
CKSWR   012742           2734    2797   2804#  2836   3433
CLK   = 020000            802#    995#  1370   1371   1377   1378   1388   1423   1424   1430   1431   1441   1476
                         1477    1483   1484   1494   1529   1530   1536   1537   1547   1582   1583   1589   1590
                         1600    1635   1636   1642   1643   1653   1689   1690   1696   1697   1707   1742   1743
                         1749    1750   1760   1795   1796   1802   1803   1813   1848   1849   1855   1856   1866
                         1901    1902   1908   1909   1919   1954   1955   1961   1962   1972   2006   2012   2013
                         2015    2016   2029   2030   2032   2033   2063   2068   2069   2071   2072   2081   2082
                         2096    2101   2102   2114   2115   2149   2150   2155   2156   2196   2197   2200   2201
                         2225    2226   2270   2271   2279   2280   2317   2318   2326   2327   2354   2362   2363
                         2365    2366   2418   2425   2426   2428   2429   2563   2569   2577   2583   2606   2612
                         2659    2660   2665   2666   3588   3589
CNTLU   013016           1199    2815#
CONVRT= 104413           2737    2817   3299   3538#
COUNT   001124            711#   2034*  2041*  2195*  2207*  2216*  2229*  2368*  2372*  2376*  2430*  2435*  2508*
                         2513*   2517*  2656*  2682*
CR    = 000015            581#   2910   2920
CRLF  = 000200            582#   2881   2920
CTS   = 020000            766#    959#
```

```
DDISP = 177570          588#   844    1157
DEVADR  013706         2954*  2992    3000#
DEVICE  015351         2738   3329#
DF1     002132         1028   1032    1036   1040   1086#
DH1     002067         1026   1030    1034   1075#
DISPLA  001442          844#  1157*   1165*  1190*  3105*  3489*
DISPRE  000174          685#  1165    1190
DNA   = 100000          800#   993#
DNAINT= 000040          807#  1000#
DSC   = 100000          764#   957#
DSINTE= 000040          774#   967#   2707   2713   2721
DSR   = 001000          770#   963#
DSWR  = 177570          587#   843    1156
DTR   = 000002          778#   971#   2714
DT1     002116         1027   1031    1035   1081#
DT4     002126         1039   1084#
DUADDR  017036         1231   2765    3558#
DUBASE  017170         1227   1230    2764*  3558   3559*  3560   3561*  3562   3563   3564*  3565   3566   3567*
                       3568   3569*   3570   3571*  3572   3573*  3574   3576#
DULEV   016762         1289   3545#
DUPRT   017032         1288*  2699    3545*  3546*  3547*  3548*  3549*  3550   3554#
DURIS   001740         1055#  2699*   2709   2710*  2718   2719*  2768*
DURIV   001736         1054#  1238    1241   1242   2698*  2709*  2718*  2766*  2773
DUTIS   001744         1057#  2772*
DUTIV   001742         1056#  2770*
EIGHT = 006000          795#   988#   1470   1523   1576   1629   1683   1736   1789   1842   1895   1948   2009
                       2066   2099    2143   2191   2263   2311   2357   2421   2559   2653
EMTVEC= 000030          676#  1141*   1142*
EM1     001762         1025   1061#
EM2     002022         1029   1067#
EM3     002043         1033   1070#
EM4     001746         1037   1059#
ERRCNT  001114          704#
ERRVEC= 000004          669#   1154   1155*  1166*  3450   3451*  3453*  3456*
EVEN8   017344         3612#
EVEPAR= 001400          798#   991#   1364   1470   1576   1683   1789   1895
EVPAR = 000400          787#   980#
FIVE  = 000000          792#   985#
FRMERR= 020000          783#   976#
GNS   = ****** U       3526   3527    3528   3529   3532   3533   3534   3535   3536   3537   3538   3539
HDXEN = 000010          809#  1002#   2603
HILIM   013704         2953*  2983    2999#
HLD0    001130          713#  1081    3136*
HLD1    001132          714#  1081    3137*
HLD2    001134          715#  3138*
HLD3    001136          716#  3139*
HLD4    001140          717#  3140*
HLD5    001142          718#  3141*
HLD6    001144          719#  3142*
HOLD    001120          709#  2565    2571   2579   2585   2608   2614
HPARCS  001724         1048#  3566*
HRXCSR  001714         1044#  3560*
HRXDBU  001720         1046#  3565*
HT    = 000011          579#  2879    2920
HTXCSR  001730         1050#  3570*
HTXDBU  001734         1052#  3574*
```

```
INBUF   016172          1297    1301    2929    2959    3077    3081    3408#
INIFLG  001172           744#   1200    1203*
INSTER= 104407          1305    2978    3086    3534#
INSTR = 104406          1222    1233    1243    1254    1279    1295    1308    1312    1316    1320    1331    2819    3533#
INSTR2  013510          2926    2938    2947#
IOTVEC= 000020           674#   1139*   1140*
ISYMOD= 000000           791#    984#   1356    1364    1409    1417    1568    1576    1621    1629
JMRBY   001153           727#   1208*   1323    2547    2691
KEEPAD  001156           732#   1230*   1232    1276    1278    2760
KEEPIV  001164           735#   1241*   2761
LASTAD  001160           733#   1259    1270    1284
LESS1   017034          3550*   3551*   3552*   3555#
LF    = 000012           580#   2914    2920
LIGHTS  001102           694#   2785*
LIMITS  013636          2969    2983#
LOBITS  013710          2955*   2987    3001#   3002
LOCK    001110           702#   2839
LOKFLG  001174           746#
LOLIM   013702          2952*   2985    2998#
MCNTG   016137          2814    3398#
MCOW    015363          2743    3331#
MCRLF   015463          3031    3344#
MDATA   016276          3051    3062    3412#
MEPASS  015532          2736    3351#
MEXT  = 010000           814#   1007#   2556
MEXTJ   016077          1221    3392#
MINT  = 004000           813#   1006#   1361    1414    1467    1520    1573    1626    1680    1733    1786    1839    1892
                        1945    2006    2063    2096    2140    2188    2260    2308    2354    2418    2650
MLASTD  015317          1255    3324#
MLOCK   015576          3358#
MMNEW   016160          2819    3402#
MMSWR   016147          2816    3400#
MMULT   015270          1244    3320#
MPFAIL  015466          3302    3345#
MQM     015457          2945    3343#
MR      015557          1342    3355#
MRANGE  015413          1280    3336#
MREGAD  015240          1223    3316#
MRESET= 000400           804#    997#   1355    1357    1408    1410    1461    1463    1514    1516    1567    1569    1620
                        1622    1674    1676    1727    1729    1780    1782    1833    1835    1886    1888    1939    1941
                        2001    2003    2058    2060    2091    2093    2134    2136    2182    2184    2254    2256    2302
                        2304    2349    2351    2413    2415    2550    2552    2644    2646    2693
MSYNC   015631          1296    3363#
MTDATA= 040000           801#    994#   2006    2063    2076    2080    2096    2108    2112    2354    2418    3581
MTITLE  015172          1202    3309#
MTSTPC  015563          1332    3356#
MULTD   001152           726#   1246    1247    2739
MVECTO  015225          1234    3314#
MWIRE4  016020          1317    3384#
MWIRE5  015750          1313    3377#
MWIRE6  015677          1309    3370#
NEXT    001106           701#
NOPAR = 000000           796#    989#   2009    2066    2099    2143    2191    2263    2311    2357    2421    2559    2653
ODDPAR= 001000           797#    990#   1417    1523    1629    1736    1842    1948
ODD8    017260          3595#
ONCE    002610          1201    1204#
```

```
OPTCLR  001151            725#  1319  2694
OUT     013050           2805  2807  2809  2813  2825#
OUTCRY  012640           2737  2776#
OUTMUL  003166           1252  1277  1288#
OVRRUN= 040000            782#  975#  2234
PARAM = 104410           1224  1235  1256  1281  1333  2820  3535#
PARAM1  013542           2958#  2979
PARCSR  001722           1047#  1356#  1364#  1409#  1417#  1462#  1470#  1515#  1523#  1568#  1576#  1621#  1629#
                         1675#  1683#  1728#  1736#  1781#  1789#  1834#  1842#  1887#  1895#  1940#  1948#  2002#
                         2009#  2059#  2066#  2092#  2099#  2135#  2143#  2183#  2191#  2255#  2263#  2303#  2311#
                         2350#  2357#  2414#  2421#  2551#  2559#  2645#  2653#  3563#
PAREN = 001000            786#  979#
PARER = 010000            784#  977#
PARERR  013616           2961  2963  2965  2974#  2984  2986  2988
PARTI   013700           2977  2997#
PASCNT  001112            703#  1177#  2784#  2785  2786
PFTAB   015164           3300  3306#
PIRQ  = 177772            586#
PIRQVE= 000240            680#
POPRO = 012600            759#  952#
POP1SP= 005726            757#  950#
POP2SP= 022626            761#  954#
PR0   = 000000            603#
PR1   = 000040            604#
PR2   = 000100            605#
PR3   = 000140            606#
PR4   = 000200            607#  3555
PR5   = 000240            608#  3554
PR6   = 000300            609#
PR7   = 000340            610#
PS    = 177776            583#  584
PSW   = 177776            584#
PUSHR0= 010046            758#  951#
PUSH1S= 005746            756#  949#
PUSH2S= 024646            760#  953#
PWRVEC= 000024            675#  1145#  1146#
RDSW    013056           2815#  2825#  2827#  2976
RECACT= 004000            768#  961#  2020  2035  2043  2378  2441  2470  2477  2486  2494  2519
REPLAY  012544           2756  2762  2764#
RESTAR  015070           3280  3286#
RESTRT  012724           2757  2788  2795#
RESVEC= 000010            670#
RESOS = 104412           3537#
RETURN  001104            700#  1182#  1339#  1341#  1343  3305
RING  = 040000            765#  958#
RINTEN= 000100            773#  966#
ROTADD  001170            739#  1251#  1263#  1265  1267#  1272  1275#  2751#  2754  2758#
RPOKE   017172           2019  2025  2040  2375  2386  2434  2455  2469  2484  2493  2516  2527  3581#
                         3591
RTS   = 000004            777#  970#
RUNA  = ****** U            1    51   141   514
RUNB  = ****** U            1    51   141   514
RUNC  = ****** U            1    51   141   514
RUND  = ****** U            1    51   141   514
RUNE  = 000000              1    51   141   514
RUNF  = ****** U           21    57   144   519
```

```
RUNIT   012450          2742    2748#   2755
RXCSR   001712          1043#   2010*   2020    2035    2043    2193*   2204    2231    2359*   2378    2381    2387    2423*
                        2441    2444    2456    2470    2473    2476*   2477    2485*   2486    2489    2494    2497    2519
                        2522    2528    2560*   2595    2620    2654*   2673    2696*   2697    2704    2707*   2713*   2714*
                        2721*   2778    3558*
RXDBUF  001716          1045#   2075    2084    2117    2194    2210    2235    2367    2391    2431    2459    2501    2532
                        2549    2599    2624    2655    2676    3562*
RXDONE= 000200           772#    965#
RXERR = 100000           781#    974#   2234
SAVIT   014412          3115    3136#
SAVPC   001126           712#   3006*
SAVSP   001116           705#   3279*   3286
SAVO5 = 104411          3536#
SCOP1 = 104405          3532#
SEND  = 000020           808#   1001#   1361    1414    1467    1520    1573    1626    1680    1733    1786    1839    1892
                        1945    2140    2188    2260    2265    2268    2308    2337    2556    2650
SEREC   001150           724#   1315
SETFLG= 104414          1245    1310    1314    1318    1322    3539#
SEVEN = 004000           794#    987#   1364    1417
SEXMIT  001147           723#   1311
SHIFT   001122           710#   1368*   1385*   1421*   1438*   1474*   1491*   1527*   1544*   1580*   1597*   1633*   1650*
                        1687*   1704*   1740*   1757*   1793*   1810*   1846*   1863*   1899*   1916*   1952*   1969*   2017*
                        2023*   2038*   2073*   2089*   2103*   2123*   2198*   2202*   2222*   2227*   2272*   2287*   2315*
                        2334*   2335    2338    2373*   2384*   2432*   2453*   2467*   2483*   2492*   2514*   2525*   2575*
                        2589*   2590    2593    2604*   2618*   2662*   2667*   2668    2671    3590*
SIX   = 002000           793#    986#
SPACNT= 014157          3036*   3055    3058*   3068#
SRD   = 002000           769#    962#
STACK = 001100           574#   1137    1173    1327    3295
STD   = 000010           776#    969#
STFLG   001173           745#   1176*
STKLMT= 177774           585#
STPSYN= 000400           771#    964#   2193    2359
SVO5    013720          3010#
SWR     001440           843#   1135    1156*   1158    1164*   1171*   1187    1189*   1194    1210    1329    2806    2837
                        3106    3113    3125    3128    3438    3445    3459    3461    3467    3474
SWREG   000176           686#   1164    1189    1194    2806    2823    2830
SWREGL  013060          2818    2828#
SW0   = 000001           638#
SW00  = 000001           628#    638    1210
SW01  = 000002           627#    637    1329
SW02  = 000004           626#    636
SW03  = 000010           625#    635
SW04  = 000020           624#    634
SW05  = 000040           623#    633
SW06  = 000100           622#    632
SW07  = 000200           621#    631
SW08  = 000400           620#    630
SW09  = 001000           619#    629    2837
SW1   = 000002           637#
SW10  = 002000           618#
SW11  = 004000           617#
SW12  = 010000           616#
SW13  = 020000           615#
SW14  = 040000           614#
SW15  = 100000           613#
```

```
SW2    = 000004            636#
SW3    = 000010            635#
SW4    = 000020            634#
SW5    = 000040            633#
SW6    = 000100            632#
SW7    = 000200            631#
SW8    = 000400            630#
SW9    = 001000            629#
SYNCNO  001146             722#  1299*  1303*  1999   2370   2438   2511
SYNEXT= 020000             790#   983#  2092   2099   2183   2191   2255   2263   2303   2311   2551   2559   2645
                          2653
SYNINT= 030000             789#   982#  1462   1470   1515   1523   1675   1683   1728   1736   1781   1789   1834
                          1842   1887  1895   1940   1948   2002   2009   2059   2066   2135   2143   2350   2357
                          2414   2421
SYNSCH= 000020             775#   968#  2010   2193   2359   2423   2476   2485   2560   2654
SYSTST= 014000             815#  1008#
TBITVE= 000014             671#
TEMP    016234            3041   3296*  3297*  3410#
TKVEC  = 000060            678#
TPVEC  = 000064            679#
TRAPVE= 000034             677#  1143*  1144*
TRPREG  017430            3627#
TRTVEC= 000014             672#
TST1    003374            1334   1341   1354#  2796   3435
TST10   005246            1726#
TST11   005454            1779#
TST12   005662            1832#
TST13   006070            1885#
TST14   006276            1938#
TST15   006504            1998#
TST16   006772            2057#
TST17   007354            2132#
TST2    003602            1407#
TST20   007502            2180#
TST21   007770            2252#
TST22   010162            2300#
TST23   010362            2348#
TST24   010622            2411#
TST25   011412            2546#
TST26   011754            2643#
TST27   012176            2690#
TST3    004010            1460#
TST4    004216            1513#
TST5    004424            1566#
TST6    004632            1619#
TST7    005040            1673#
TTST    016356            3438#
TXCSR   001726            1049#  1355*  1357*  1361*  1365   1370*  1371*  1377*  1378*  1379   1388*  1390   1408*
                          1410*  1414*  1418   1423*  1424*  1430*  1431*  1432   1441*  1443   1461*  1463*  1467*
                          1471   1476*  1477*  1483*  1484*  1485   1494*  1496   1514*  1516*  1520*  1524   1529*
                          1530*  1536*  1537*  1538   1547*  1549   1567*  1569*  1573*  1577   1582*  1583*  1589*
                          1590*  1591   1600*  1602   1620*  1622*  1626*  1630   1635*  1636*  1642*  1643*  1644
                          1653*  1655   1674*  1676*  1680*  1684   1689*  1690*  1696*  1697*  1698   1707*  1709
                          1727*  1729*  1733*  1737   1742*  1743*  1749*  1750*  1751   1760*  1762   1780*  1782*
                          1786*  1790   1795*  1796*  1802*  1803*  1804   1813*  1815   1833*  1835*  1839*  1843
                          1848*  1849*  1855*  1856*  1857   1866*  1868   1886*  1888*  1892*  1896   1901*  1902*
```

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                        1908*   1909*   1910    1919*   1921    1939*   1941*   1945*   1949    1954*   1955*   1961*   1962*
                        1963    1972*   1974    2001*   2003*   2006*   2012*   2013*   2015*   2016*   2029*   2030*   2032*
                        2033*   2058*   2060*   2063*   2068*   2069*   2071*   2072*   2076*   2080*   2081*   2082*   2091*
                        2093*   2096*   2101*   2102*   2108*   2112*   2114*   2115*   2134*   2136*   2140*   2145    2149*
                        2150*   2151    2155*   2156*   2157    2182*   2184*   2188*   2196*   2197*   2200*   2201*   2225*
                        2226*   2254*   2256*   2260*   2264    2265*   2268*   2270*   2271*   2279*   2280*   2281    2302*
                        2304*   2308*   2312    2317*   2318*   2326*   2327*   2328    2337*   2349*   2351*   2354*   2362*
                        2363*   2365*   2366*   2413*   2415*   2418*   2425*   2426*   2428*   2429*   2550*   2552*   2556*
                        2563*   2569*   2577*   2583*   2603*   2606*   2612*   2644*   2646*   2650*   2659*   2660*   2665*
                        2666*   2680*   2693*   3568*   3581*   3587*   3588*   3589*
TXDBUF  001732          1051#   1366*   1419*   1472*   1525*   1578*   1631*   1685*   1738*   1791*   1844*   1897*   1950*
                        2148*   2192*   2217*   2267*   2313*   2561*   2592*   2657*   2670*   3572*
TXDONE= 000200           805#    998#
TXINTE= 000100           806#    999#
TYPE  = 104401          1202    1342    2735    2738    2743    2814    2816    2884    2927    2944    3030    3061    3108
                        3116    3152    3169    3171    3174    3176    3180    3187    3251    3301    3526#
TYPOC = 104402          3160    3184    3527#
TYPON = 104404          3529#
TYPOS = 104403          3528#
USER  = 000000           812#   1005#
VOID  = 000001           779#    972#
WRDCNT  014154          3034*   3063*   3066#
ZERO    012456          2749#
$APTHD  002136          1108    1114#
$ASTAT= ****** U         537
$ATYC   000024R          537#
$ATY1   000000R          537#
$ATY3   000006R          537#    2869
$ATY4   000016R          537#    3121
$AUTOB  001434           840#
$BASE   001602           918#
$BDADR  001422           835#
$BDDAT  001426           837#
$BELL   001516           869#    3108    3136
$CDW1   001606           920#
$CDW2   001610           921#
$CHARC  013370          2886*   2896*   2903    2912*   2917#
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$CM1  = 000006           855#    856#    857#    858#    859#    860#    861#
$CM2  = 000014           855#    856#    857#    858#    859#    860#    861#
$CM3  = 000006           853#    855
$CM4  = 000006           861#    862#    863#    864#    865#    866#    867#
$CPUOP  001554           892#
$CRLF   001523           871#   2885    2920    3116    3136    3152    3171    3176    3180
$DDW0   001612           922#
$DDW1   001614           923#
$DDW10  001636           932#
$DDW11  001640           933#
$DDW12  001642           934#
$DDW13  001644           935#
$DDW14  001646           936#
$DDW15  001650           937#
$DDW2   001616           924#
$DDW3   001620           925#
$DDW4   001622           926#
```

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$DDW5   001624            927#
$DDW6   001626            928#
$DDW7   001630            929#
$DDW8   001632            930#
$DDW9   001634            931#
$DEVCT  001536            883#
$DEVM   001604            919#
$E    = 000002            535#
$ENDAD  012714           1095    2791#
$ENV    001546            537     888#   1204    2864    2925    3118
$ENVM   001547            537     889#   1169    2866    2871
$ERFLG  001403            826#   1178*   2783*   3103*   3136    3303*   3419    3463    3465    3471*   3495
$ERMAX  001415            832#   1149*   3465    3488*   3495
$ERROR  014230           1141    3102#
$ERRPC  001416            833#   1081    1084    1180*   2782*   3110*   3111*   3112    3136    3158    3304*   3434*
$ERRTB  001652           1023#   3166
$ERRTY  014450           3151#
$ERTTL  001412            830#   1179*   3109*   3136
$ESCAP  001514            868#   1148*   3131    3133    3136    3487*
$ETABL  001546            887#
$ETEND  001652            940#   1120
$FATAL  001530            537*    880#
$FFLG   000244R           537#*
$FILLC  001456            851#   2889    2920
$FILLS  001455            850#   2920
$GDADR  001420            834#
$GDDAT  001424            836#
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$HIBTS  002136           1115#
$ICNT   001404            827#   3478*   3479    3481*   3494
$INTAG  001435            841#
$ITEMB  001414            831#   3112*   3120    3136    3155
$LF     001524            872#   2920    3136
$LFLG   000243R           537#*
$LPADR  001406            828#   1150*   2796*   3440*   3469*   3485*   3490    3494
$LPERR  001410            829#   1151*   3130    3469    3486*   3494
$MADR1  001560            905#
$MADR2  001564            909#
$MADR3  001570            912#
$MADR4  001574            915#
$MAIL   001526            878#   1116    1120    1168    2864    3118    3484
$MAMS1  001556            899#
$MAMS2  001562            907#
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$MBADR  002140           1116#
$MFLG   000242R           537#*
$MSGAD  001542            537*    885#
$MSGLG  001544            537*    886#
$MSGTY  001526            537*    879#
$MTYP1  001557            900#
$MTYP2  001563            908#
$MTYP3  001567            911#
$MTYP4  001573            914#
$MXCNT  016672           3482    3494#
$N    = 000000            535#   2727#
```

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$NWTST= 000000           1353# 1406# 1459# 1512# 1565# 1618# 1672# 1725# 1778# 1831# 1884# 1937# 1997#
                         2056# 2131# 2179# 2251# 2299# 2347# 2410# 2545# 2642# 2689#
$OCNT   015026           3223* 3252* 3265#
$OMODE  015030           3218* 3222* 3227  3230* 3241* 3267#
$OVER   016652           3443  3446  3462  3470  3480  3489#
$PASS   001534            882# 1168* 2786* 3476  3495
$PASTM  002144           1118#
$PWRDN  015032           1145  3271#
$QUES   001522            870# 2920  3136
$RDCHR= ****** U         3532
$RDDEC= ****** U         3532
$RDLIN= ****** U         3532
$RDOCT= ****** U         3532
$REGAD  001460            853#
$REG0   001462            855# 3015* 3020
$REG1   001464            856# 3014* 3021
$REG2   001466            857# 3013* 3022
$REG3   001470            858# 3012* 3023
$REG4   001472            859# 3011* 3024
$REG5   001474            860# 3010* 3025
$R2A  = ****** U         3532
$SAVRE= ****** U         3532
$SCOPE  016340           1139  3428#
$SETUP= 000017           1121# 1138  1139  1141  1143  1145  1147  1148  1150  3103  3128  3135  3429
$STUP = 177777           1121#
$SVLAD  016616           3454  3483#
$SVPC = 002136           1093# 1098
$SWR  = 177400            526#  867   868   869  1147  1148  1150  1151  1355  1408  1461  1514  1567
                         1620  1674  1727  1780  1833  1886  1939  1999  2058  2133  2181  2253  2301
                         2349  2412  2547  2644  2691  3094  3095  3096  3097  3098  3106  3113  3125
                         3128  3136  3420  3421  3422  3423  3424  3445  3457  3459  3460  3463  3464
                         3465  3472  3473  3474  3486  3489  3494
$SWREG  001550            890# 1171
$SWRMK= 000000           3424  3425  3461
$TESTN  001532            881# 3484*
$TIMES  001512            867# 1147* 3472* 3479  3482* 3494
$TKB    001446            846# 2810  2933  2941  3444
$TKS    001444            845# 2808  2931  3442
$TMP0   001476            861#
$TMP1   001500            862# 1367* 1373* 1420* 1426* 1473* 1479* 1526* 1532* 1579* 1585* 1632* 1638*
                         1686* 1692* 1739* 1745* 1792* 1798* 1845* 1851* 1898* 1904* 1951* 1957* 2018*
                         2024* 2039* 2074* 2078* 2104* 2110* 2266* 2274* 2314* 2321* 2374* 2385* 2433*
                         2454* 2468* 2515* 2526* 3583* 3595  3605* 3607* 3612  3622* 3624*
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                         3616*
$TMP3   001504            864# 3596* 3600* 3603* 3613* 3617* 3620*
$TMP4   001506            865#
$TMP5   001510            866#
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                         1672  1674# 1725  1727# 1778  1780# 1831  1833# 1884  1886# 1937  1939# 1997
                         1999# 2056  2058# 2131  2133# 2179  2181# 2251  2253# 2299  2301# 2347  2349#
                         2410  2412# 2545  2547# 2642  2644# 2689  2691#
$TPB    001452            848# 2909* 2920  2941*
$TPFLG  001457            852# 2858  2920
$TPS    001450            847# 2907  2920  2939
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$TRAP2  016716           3514#   3525
$TRP  = 000015           3518#   3527#   3528#   3529#   3530#   3532    3533#   3534#   3535#   3536#   3537#   3538#   3539#
                         3540#
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$TSTM   002142           1117#
$TSTNM  001402            825#   1181*   1336    1339    2781*   3105    3136    3142    3419    3440    3461    3483*   3484
                         3489    3495
$TYPBN= ****** U         3530
$TYPDS= ****** U         3530
$TYPE   013112            537    2858#   3518    3526
$TYPEC  013324           2888    2895    2902    2907#   2908
$TYPEX  013372           2913    2915    2918#
$TYPOC  014630           3221#   3527
$TYPON  014644           3220    3223#   3529
$TYPOS  014604           3216#   3528
$UNIT   001540            884#
$UNITM  002146           1119#
$USWR   001552            891#   1206
$VECT1  001576            916#
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$XTSTR  016422           3436    3448#
$OFILL  015027           3217*   3221*   3231    3266#
$40CAT= ****** U         3115    3445
.     = 017436            537#    571#    684#    687#    692#    747#    748#    822#    873    1079#   1093    1094#   1096#
                         1098#   1104    1105#   1107#   1109#   1136    1150    1151    1382    1393    1435    1446    1488
                         1499    1541    1552    1594    1605    1647    1658    1701    1712    1754    1765    1807    1818
                         1860    1871    1913    1924    1966    1977    2021    2036    2044    2086    2119    2146    2152
                         2158    2205    2212    2232    2237    2284    2331    2379    2382    2388    2393    2442    2445
                         2457    2462    2471    2474    2478    2487    2490    2495    2498    2503    2520    2523    2529
                         2534    2567    2573    2581    2587    2596    2601    2610    2616    2621    2626    2674    2678
                         2705    2717    2920    3136    3190#   3282    3298    3409#   3411#   3413#   3494    3495
.BEGIN  003310           1198    1209    1212    1327#   2798
.CONVR  014004           3030#   3538
.EOP    012374           2733#
.INSTE  013502           2944#   3534
.INSTR  013374           2923#   3533
.INST1  013414           2927#   2936    2946
.MSG    013416           2810*   2811*   2812    2923*   2928#
.PARAM  013512           2951#   3535
.PFAIL  015032           1175    3272#   3293
.RESOS  013752           3020#   3537
.SAVOS  013712           3006#   3536
.SCOPE  016340           3432#
.SCOP1  013070           2836#   3532
.SETFL  014162           3076#   3087    3539
.START  002152            688    1130#   1182    2747
.$ASTA= ****** U          537    1104#   1109
.$X   = 002136
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COMMEN    681#
ENDCOM    681#
ERROR     575#  1383  1394  1436  1447  1489  1500  1542  1553  1595  1606  1648  1659  1702  1713
         1755  1766  1808  1819  1861  1872  1914  1925  1967  1978  2022  2037  2045  2087  2120
         2147  2153  2159  2206  2213  2233  2238  2285  2332  2380  2383  2389  2394  2443  2446
         2458  2463  2472  2475  2479  2488  2491  2496  2499  2504  2521  2524  2530  2535  2597
         2602  2622  2627  2675  2679  2706  2722
ESCAPE    681#
GETPRI    681#
GETSWR    681#
MULT      681#
NEWTST    681#  1353  1406  1459  1512  1565  1618  1672  1725  1778  1831  1884  1937  1997  2056
         2131  2179  2251  2299  2347  2410  2545  2642  2689
POP       537   681#
PRGEND    559#  2726
PRGFRT    538#   560
PUSH      537   681#
PUSSYF    556#  2563  2576  2605
REPORT    526#   681#
RSETUP    543#  2001  2058  2091  2349  2413
SC        535#  3429
SCOPE     576#  1354  1407  1460  1513  1566  1619  1673  1726  1779  1832  1885  1938  1998  2057
         2132  2180  2252  2300  2348  2411  2546  2643  2690  2733
SC1       535#  3491
SETPRI    681#
SETTRA    526#  3518#  3527  3528  3529  3532  3533  3534  3535  3536  3537  3538  3539
SETUP     681#  1130
SKIP      681#
SLASH     681#
SPACE     681#
STARS     537   681#   818   873   876  1091  1101  1103  1110  1353  1406  1459  1512  1565  1618
         1672  1725  1778  1831  1884  1937  1997  2056  2131  2179  2251  2299  2347  2410  2545
         2642  2689  2843  3090  3146  3193  3416  3497
SWRSU     681#  1152#
TRMTRP   3518#
TSETUP    544#  1355  1408  1461  1514  1567  1620  1674  1727  1780  1833  1886  1939  2134  2182
         2254  2302  2550  2644
TYPBIN    681#
TYPDEC    681#
TYPNAM    681#
TYPNUM    681#
TYPOCS    681#
TYPOCT    681#  3158  3182
TYPTXT    681#
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$BINAR    555#
$BUFFE    537#  3405
$CABLE    557#
$CATCH    529#   571
$CK       536#  2799
$CLRVE    535#  1204
$CONVR    537#  3027
$DNA      553#
$EOP      536#  2726
$GETFL    535#  1243  1308  1312  1316  1320
$GETPA    535#  1222  1233  1253  1279  1331
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$GETSY    535#   1290
$HEADE    526#    560
$INSTR    537#   2920
$ISOB     551#
$MATCH    548#
$MRR      542#
$MRRW     540#
$MRW      541#
$MSG      537#   3309
$NEED     558#   3136
$PARAM    537#   2948
$PFAIL    537#   3268
$POKE     546#   1370   1376   1423   1429   1476   1482   1529   1535   1582   1588   1635   1641   1689   1695
         1742    1748   1795   1801   1848   1854   1901   1907   1954   1960   2149   2155   2196   2199   2224
         2270    2278   2317   2325   2659   2664
$POKER    547#   2014   2028   2031   2067   2070   2100   2364   2427
$RCNET    558#
$RECAC    546#
$REG      537#   3003
$RESET    539#   1355   1357   1408   1410   1461   1463   1514   1516   1567   1569   1620   1622   1674   1676
         1727    1729   1780   1782   1833   1835   1886   1888   1939   1941   2001   2003   2058   2060   2091
         2093    2134   2136   2182   2184   2254   2256   2302   2304   2349   2351   2413   2415   2550   2552
         2644    2646   2693
$RXACT    545#
$SCOPE    535#   3414
$SCOP1    536#   2833
$SETFL    535#   3070
$SETVE    530#    681
$START    535#   1122
$STRIP    552#
$SYMBO    526#    749    942
$SYNCR    548#   2010   2423
$TRPAR    554#   1345   1398   1451   1504   1557   1610   1664   1717   1770   1823   1876   1929
$TSTNO    535#   1353   1406   1459   1512   1565   1618   1672   1725   1778   1831   1884   1937   1997   2056
         2131    2179   2251   2299   2347   2410   2545   2642   2689
$UNIBU    538#
$VARIA    533#    691
$WORDF    549#
$WORDO    548#
$WORDP    550#
$$CMRE    816#    855    856    857    858    859    860
$$CMTM    816#    861    862    863    864    865    866
$$ESCA    681#
$$NEWT    681#   1353   1406   1459   1512   1565   1618   1672   1725   1778   1831   1884   1937   1997   2056
         2131    2179   2251   2299   2347   2410   2545   2642   2689
$$SET    3518#   3527   3528   3529   3532   3533   3534   3535   3536   3537   3538   3539
$$SETM   1168#
$$SKIP    681#
.EQUAT    526#    571
.HEADE    526#
.SETUP    526#   1121
.$ACT1    526#   1089
.$APTB    526#    874#
.$APTH    526#   1099
.$APTY    526#    537
.$CATC    526#
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.$CMTA    526#     816
.$EOP     526#
.$ERRO    526#    3088
.$ERRT    526#    3144
.$POWE    526#
.$SCOP    526#    3414
.$TRAP    526#    3495
.$TYPE    526#    2841
.$TYPO    526#    3191


. ABS.   017436     000


 ERRORS DETECTED:   0

 DZDUUB,DZDUUB/SOL/CRF=DZDUU1/EQ:RUNE,DZDUU2,DZDUUB
 RUN-TIME:  21 12 1 SECONDS
 RUN-TIME RATIO:  289/35=8.2
 CORE USED:   30K  (59 PAGES)
```