DLV11-E

OFFLINE TEST

MD-11-DVDVA-A

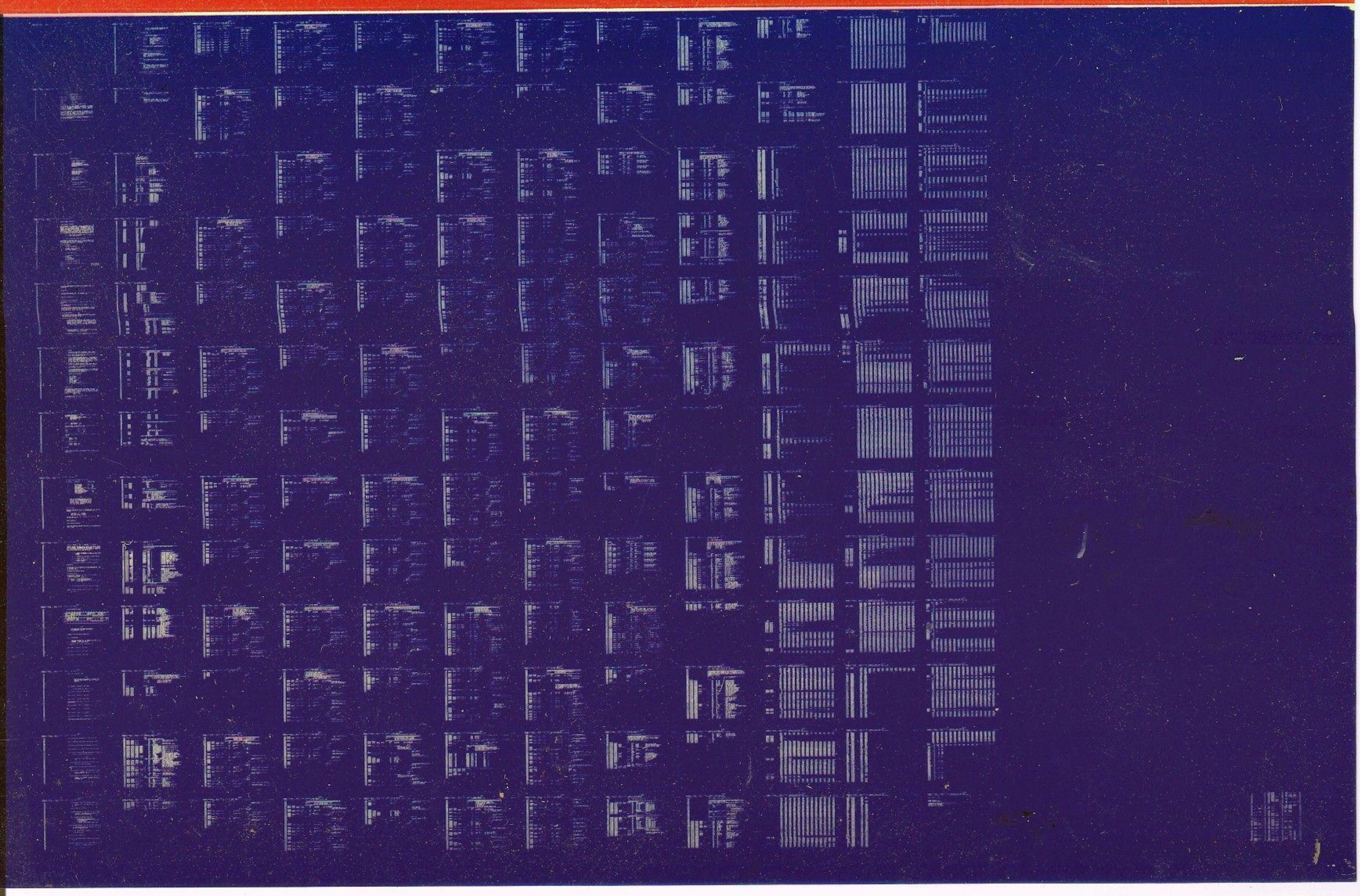
EP-DVDVA-A-DL-A

FICHE 1 OF 1

JUN 1977

digital

MADE IN USA



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                                .REM    a
```

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DVDVA-A-D

PRODUCT NAME: DLV11-E OFFLINE TEST

PRODUCT DATE: APRIL, 1977

AUTHOR: ODES CHOATE

MAINTAINER: DIAGNOSTIC ENGINEERING GROUP

TABLE OF CONTENTS

1.0 GENERAL PROGRAM INFORMATION.

1.1 PROGRAM PURPOSE (ABSTRACT).

THIS DIAGNOSTIC IS A LOGIC TEST TO VERIFY THE OPERATION OF THE DLV11-E SERIAL LINE INTERFACE. THE PROGRAM AS SET INITIALLY DEFAULTS TO ALL OPTIONS, EXCEPT PROGRAMMABLE BAUD RATE, ENABLED AND A WRAP CABLE CONNECTED. THE USER CAN SELECTIVELY ENABLE AND DISABLE TESTING OF THE OPTIONS BY ALTERING THE CONTENTS OF '$USER'. THE DIAGNOSTIC IS DESIGNED TO TEST AND DETECT FAULTS TO THE LOGIC LEVEL (NOT TO THE CHIP LEVEL). THIS TEST OPERATES ON UP TO SIXTEEN(16) IDENTICALLY CONFIGURED DLV11-E SERIAL LINE INTERFACES. THE DEFAULT ADDRESSES ARE:

175610 -FIRST SERIAL LINE ADDRESS OF 16 CONSECUTIVE SERIAL LINE DEVICES.

300 - VECTOR FOR FIRST OF 16 DEVICES.

THIS PROGRAM IS DESIGNED TO RUN ON ANY PDP-11 WITH 4K OF MEMORY AND A DLV11-E (LSI-BUS) MODULE. IT CAN RUN UNDER XXDP, APT, AND ACT MONITORS, AND ON PROCESSORS WITH NO HARDWARE SWITCH REGISTER. POWER FAIL IS SUPPORTED.

1.2 SYSTEM REQUIREMENTS.

1. HARDWARE REQUIREMENTS:

ANY PDP-11 FAMILY PROCESSOR
4K MEMORY - MINIMUM
H315 - CABLE TURN AROUND PLUG (OR EQUIVALENT)

SOFTWARE REQUIREMENTS:

THIS DIAGNOSTIC IS DESIGNED TO RUN IN ANY OF THE FOLLOWING WAYS:
STAND ALONE
WITH APT MONITOR
WITH ACT MONITOR
WITH XXDP MONITOR (CHAINABLE)

1.3 RELATED DOCUMENTS AND STANDARDS.

DIAGNOSTIC ENGINEERING STANDARDS AND CONVENTIONS	175-003-009-02
APT	MD-11-DZZMA
ACT	AUTOCAT-11-QZAUB
SYSMAC	MD-11-DZQAC

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES.

NO SPECIAL DIAGNOSTICS ARE REQUIRED TO RUN BEFORE THIS, BUT THE PROCESSOR, MEMORY, AND BUS ARE ASSUMED TO BE FULLY OPERATIONAL.

1.5 ASSUMPTIONS.

THIS DIAGNOSTIC ASSUMES THAT THE OPERATOR HAS INITIALIZED LOCATION '$USWR' AND '$DEVM' TO THE PROPER VALUES.

2.0 OPERATING INSTRUCTIONS.

2.1 LOADING AND STARTING PROCEDURES.

USE STANDARD PROCEDURE FOR PDP-11 ABSOLUTE BINARY FORMATTED MEDIA.

THIS DIAGNOSTIC HAS ONLY ONE (1) STARTING ADDRESS. 200 FOR START AND RESTART.

THE USER CAN SELECT A SPECIFIC TEST TO BE EXECUTED BY SETTING SWITCH 8 IN THE SWITCH REGISTER AND THE TEST NUMBER (IN OCTAL) IN THE LOWER BYTE. (NOTE: ALL TESTS PREVIOUS TO THE SELECTED ONE ARE EXECUTED IN QUICK VERIFY MODE.)

2.2 SPECIAL ENVIRONMENTS.

THIS DIAGNOSTIC FOLLOWS THE STANDARD PROCEDURE FOR RUNNING UDER APT,ACT,XXDP MONITORS, AS DESCRIBED IN THEIR RESPECTIVE PROCEDURES MANUAL AND SYSMAC PACKAGE.

2.3 OPERATIONAL SWITCH SETTINGS

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

CONTROL:

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

1) TYPE CONTROL G (↑G); THIS WILL ALLOW THE TTY TO ENTER DATA INTO LOC. 176 AT SELECTED POINTS WITHIN THE

PROGRAM.

2) THE MACHINE WILL THEN TYPE:' SWR=XXXXXX NEW=' (XXXXXX IS THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)

3) AFTER THE 'NEW=' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE OF THE FOLLOWING AT THE TTY:

A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>. (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED). LEADING ZEROS NEED NOT BE TYPED, AND IF MORE THAN 6 DIGITS ARE TYPED THE LAST 6 WILL BE USED. IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH REGISTER CONTENTS WILL NOT BE CHANGED.

B) A RUBOUT WILL DELETE THE LAST INPUT VALUE AND WILL DELIMIT ALL DELETED CHARACTERS BETWEEN BACK SLASHES.

C) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL SEND YOU BACK TO STEP 2.

D) IF THE INPUT CHARACTER IS NOT ONE OF THE CHARACTERS MENTIONED ABOVE THEN A QUESTION MARK (?) WILL BE TYPED AND WILL WAIT FOR THE OPERATOR TO ENTER THE "SWREG" DATA AGAIN USING VALID CHARACTERS.

DYNAMIC SWITCH REGISTER
------- ------ --------

```
BIT 15 - HALT ON ERROR
    14 - LOOP ON TEST
    13 - INHIBIT ERROR TYPEOUTS
    12 - (UNUSED)
    11 - INHIBIT ITERATIONS
    10 - BELL ON ERROR
     9 - LOOP ON ERROR
     8 - LOOP ON TEST IN SWR<7:0>
   7:0 - TEST NUMBER TO LOOP ON (USED WITH BIT 8)
```

2.4 PROGRAM OPTIONS.

THIS PROGRAM WILL SUPPORT TESTING OF MULTIPLE DLV11-E'S. IT REQUIRES THE ADDRESS OF THE FIRST RCSR (STORED AT '$BASE') AND ITS INTERRUPT VECTOR (STORED AT '$VECT1'); AND WILL BE ABLE TO ADDRESS ANY DLV11-E STARTING AT THE SPECIFIED BASE ADDRESS UP TO 16 CONSECUTIVE DEVICES.

```
EXAMPLES:       $BASE:  175610
                $VECT1:    300
```

THE PROGRAM WILL BE ABLE TO TEST ANY DLV11-E WITHIN THE ADDRESS RANGE 175610 --> 176000

$BASE AND $VECT1 DEFAULT TO 175610 AND 300 RESPECTIVELY.

```
                        THE PROGRAM ASSOCIATES UNIT NUMBERS AS FOLLOWS:   (NUMBERS  IN
                        PARENTHESIS ARE OCTAL).
                        UNIT#0 -- BASE ADDRESS STORED AT '$BASE'
                                  ASSOCIATED BASE VECTOR STORED AT '$VECT1'
                        UNIT#1 -- BASE ADDRESS + (10)
                                  BASE VECTOR  + (10)
                                  :
                                  :    UP TO
                                  :
                        UNIT#15 -- BASE ADDRESS + (170)
                                   BASE VECTOR  + (170)

                        LOCATION '$DEVM' IS USED AS A BIT MAP TO INDICATE  WHICH  UNIT
                        NUMBERS ARE PRESENT AND WILL BE TESTED.

                        BIT 15                    BIT 1    BIT 0
                        ------------------------------------------
                        !UNIT!                   !UNIT  !   UNIT!
                        ! 15 !                   ! #1   !    #0 !
                        ------------------------------------------

                        A BIT MAP CAN BE ENTERED AT  '$DEVM'  PRIOR  TO  STARTING  THE
                        PROGRAM.

                        EXAMPLE:
                                $BASE:  175610
                                $VECTOR:   300
                                $DEVM:      13

                        THE PROGRAM WILL TEST-

                                UNIT#0  175610  300
                                UNIT#1  175620  310
                                UNIT#3  175640  330

                        OPTIONS
                        -------


                        LOCATION $USWR CONTAINS ALL THE USER SELECTABLE OPTIONS.   THE
                        VALUES   IN  THIS  WORD  MUST  CONFORM  TO  THE  ACTUAL  BOARD
                        CONFIGURATION.
```

THE DEFAULT VALUE OF $USWR IS AS FOLLOWS:

BIT POSITION	DEFINITION	DEFAULT VALUE
0-3	#OF DATA BITS	10(8) = 8
4	PARITY ENABLED	0 = NO
5	EVEN ODD PARITY	0 = ODD
6	COMMON SPEED	1 = YES
7	PROGRAMMABLE BAUD RATE	0 = NO
8-11	BAUD RATE OFFSET (SEE FOLLOWING NOTE)	05(8) = 110 BAUD
12	BREAK GENERATION ENABLED	1 = YES
13	CABLE TERMINATED (H3FS)	1 = YES
14	FR AND FD JUMPERS IN	1 = YES
15	(NOT DEFINED)	

NOTE

WHEN THE PROGRAMABLE BAUD RATE OPTION IS ENABLED THE PROGRAMABLE BAUD RATE TEST WILL EXIT WITH THE BAUD RATE SET TO THE SELECTED VALUE. TO CHANGE THE DEFAULT VALUE OF 110 BAUD REPLACE BITS <11:8> WITH THE OFFSET INDICATED IN THE TABLE AT THE END OF THE PBR TEST.

2.5 EXECUTION TIMES.

EXECUTION TIMES ARE FOR AN LSI-11 PROCESSOR WITH ALL OPTIONS ENABLED ON THE DLV11-E (EXECPT FOR PROGRAMMABLE BAUD RATE), AT 110 BAUD.

FIRST PASS-	2 MINUTE
ADDITIONAL PASSES	2 MINUTES
ADDITIONAL DEVICES	2 MINUTES

THE TEST TIME IS BAUD RATE DEPENDANT; HIGHER BAUD GIVES SHORTER PASS TIMES.

3.0 ERROR INFORMATION.

3.1 ERROR REPORTING PROCEDURE.

SINCE THIS DIAGNOSTIC WAS DESIGNED TO FIT IN 4-K OF MEMORY THE ERROR TYPEOUT IS VERY BRIEF. THE FORMAT OF THE ERROR TYPEOUT IS AS FOLLOWS:

```
                        TEST#+++++,ERROR#+++++,PC=+++++,ADDRESS=++++++,VECTOR=+++++

                        WHERE ALL VALUES TYPED ARE OCTAL EXCEPT THE ERROR NUMBER,
                        WHICH IS DECIMAL.  THE ADDRESS AND VECTOR REFER TO THE FAILING
                        SLU'S FOR FURTHER INFORMATION THE LISTING MUST BE CONSULTED.
                        BITS 15,13,10 AND 9 OF THE SWITCH REGISTER CONTROL THE
                        SEQUENCE OF EVENTS AFTER AN ERROR IS CAUGHT.


                                BIT 15 - CAUSES THE PROGRAM TO HALT IN THE ERROR
                                         ROUTINE.  CONTINUEING THE PROGRAM CAUSES IT TO
                                         PROCEED.

                                BIT 13 - DISABLES THE PRINTING OF THE ERROR MESSAGE.

                                BIT 10 - CAUSES THE BELL TO RING.

                                BIT  9 - CAUSES THE DIAGNOSTIC TO LOOP FROM BEGINNING
                                         OF TEST TO ERROR.

                               THE ERROR ROUTINE SUPPORTS THE CONTROL G FUNCTION.

                    3.2     ERROR HALTS.
                            ----- ------

                        THE ONLY HALT IN THIS DIAGNOSTIC IS IN THE ERROR ROUTINE, AND
                        IS EXECUTED ONLY IF BIT 15 OF THE SWITCH REGISTER IS A ONE
                        WHEN AN ERROR OCCURS.

                    4.0 PERFORMANCE AND PROGRESS REPORTS.
                        ----------- --- -------- --------

                    4.1 PERFORMANCE REPORTS.

                        AS EACH DEVICE COMPLETES ONE PASS OF THE DIAGNOSTIC THE
                        FOLLOWING WILL BE TYPED:
                           CSR:+++++,VECTOR:+++++,ERRORS:+++++

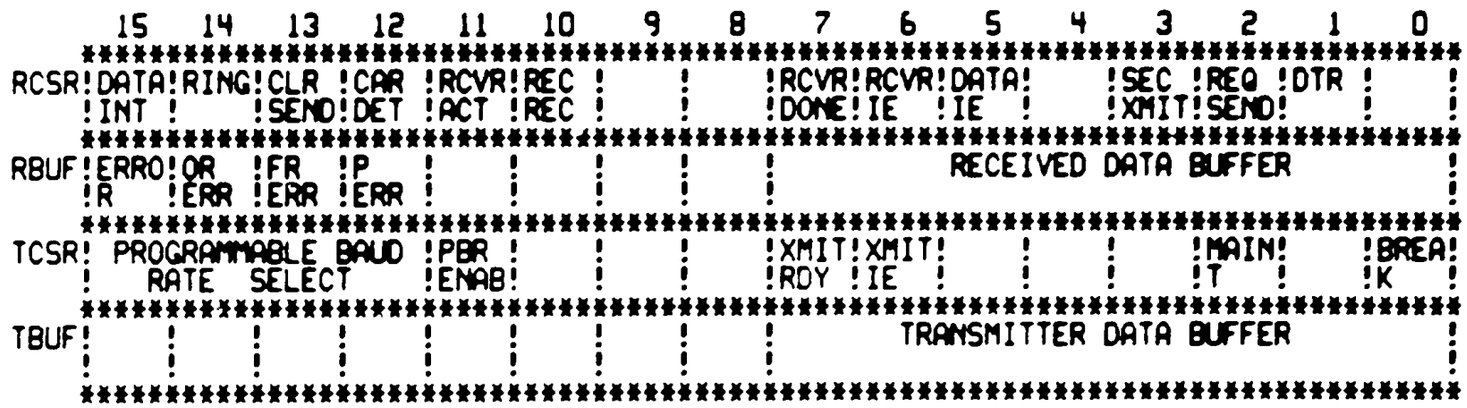
                        WHERE.'CSR:+++++' IS THE DEVICE CSR UNDER TEST
                              'VECTOR:++' IS THE ASSOCIATED VECTOR
                        AND   'ERRORS:++' IS THE TOTAL NUMBER OF ERRORS ON THIS DEVICE
                                          ON THIS PASS.


                                                NOTE

                            THIS IS TYPED AFTER THE DEVICE HAS COMPLETED ITS PASS.


                        AFTER ALL DEVICES HAVE BEEN EXERCISED AN END PASS STATEMENT IS
                        TYPED:
                                "ENDPASS#+++++."
```

5.0 DEVICE INFORMATION TABLES.



NOTE

BLANK BOXES INDICATE UNUSED AND RESERVED BIT POSITIONS. SEE THE LISTING FOR AN EXPLANATION OF THE BITS.

6.0 SUMMARY OF TESTS AND SPECIAL SUBROUTINES.

TEST 1 ADDRESSABILITY

THIS TEST VERIFIES THAT THE ADDRESS AS PLACED IN THE HARDWARE P-TABLE TO BE CORRECT AND THE DLV11-E RESPONDS TO THAT ADDRESS SPACE.

THE FOLLOWING 8 TESTS TEST ALL 'READ WRITE' BITS

TEST 2 BREAK - TCSR0 SET, CLEAR, RESET

TEST 3 MAINT - TCSR2 SET, CLEAR, RESET

TEST 4 XMITIE - TCSR6 SET, CLEAR, RESET

```
                        TEST 5 DTR - RCSR1 SET, CLEAR
                        ---- -

                                                NOTE

                                RESET DOES NOT CLEAR THIS BIT.  WE CANNOT TEST
                                FOR  AN  INITIAL  CONDITION  AS  THIS  BIT  IS
                                UNDEFINED  UPON  POWER  UP  AND  INIT  DOESN'T
                                AFFECT IT.



                        TEST 6 REQSEND - RCSR2 SET, CLEAR, RESET
                        ---- -

                               THIS TEST ASSUMES THAT JUMPER FR IS IN.

                        TEST 7 SECXMIT - RCSR3 SET, CLEAR, RESET
                        ---- -

                        TEST 10 DATAIE - RCSR5 SET, CLEAR, RESET
                        ---- --

                        TEST 11 RCVRIE - RCSR6 SET, CLEAR, RESET
                        ---- --

                        THE FOLLOWING 4 TESTS VERIFY  THAT  RESET  (INIT)  INITIALIZES
                        READ ONLY BITS.

                        TEST 12 RCVRDONE - RCSR 7 - IS CLEARED BY INIT
                        ---- --

                        TEST 13 XMITRDY - TCSR 7 - IS SET BY INIT
                        ---- --

                        TEST 14 DATAINT - RCSR 15 - IS CLEARED BY INIT.
                        ---- --

                        TEST 15 RCVRACT - RCSR 11 - 15 CLEARED BY INIT
                        ---- --

                        THE FOLLOWING 4 TESTS VERIFY  THAT  THE  EIA  SIGNALS  CAN  BE
                        TRANSMITTED AND RECEIVED THROUGH THE CABLE.
```

```
                        TEST 16 CARDET SETS AND CLEARS AS DTR SETS AND CLEARS
                        ---- --

                        TEST 17 CLRSEND SETS AND CLEARS AS DTR SETS AND CLEARS
                        ---- --

                        TEST 20 RING SETS AND CLEARS AS REQSEND SETS AND CLEARS
                        ---- --

                        TEST 21 SECREC SETS AND CLEARS AS SECXMIT SETS AND CLEARS
                        ---- --

                        TEST 22 DATAINT (RCSR-15) SETS WHEN DTR CHANGES STATE AND THAT
                        ---- --     DATAINT IS CLEARED AFTER READING RCSR

                                                NOTE

                                        DTR IS TIED TO BOTH CARDET AND CLRSEND BY  THE
                                        H315.

                        TEST 23 DATAINT SETS WHEN RING SETS AND  THAT  DATAINT
                        ---- --     DOES NOT SET WHEN RING CLEARS

                        TEST 24 DATAINT SETS WHEN SECREC CHANGES STATE
                        ---- --

                        TEST 25 XMIT RDY - TCSR 7 - CLEARS WHEN TBUF IS LOADED
                        ---- --     WITH  A  CHARACTER  AND  THAT IT SETS WITHIN A
                                    REASONABLE AMOUNT OF TIME.

                        TEST 26 OUTPUTTING A CHAR FROM TBUF (WITH  MAINT  SET)
                        ---- --     RESULTS   IN   RCVRDONE   SETTING   WITHIN   A
                                    REASONABLE  AMOUNT  OF  TIME  AND  THAT  RESET
                                    CLEARS THE BIT.

                        TEST 27 RCVRDONE IS CLEARED BY READING RBUF
                        ---- --
```

```
                        TEST 30 RCVRACT - RCSR 11 - SETS WHEN A START  BIT  IS
                        ---- --
                                RECEIVED  AND  CLEARS WHEN RCVRDONE - RCSR 7 -
                                SETS


                        TEST 31 OVERRUN BIT - RBUF 14
                        ---- --


                        TEST 32 PROGRAMMABLE BAUD RATE TEST TEST AT ALL SPEEDS
                        ---- --
                                AVAILABLE  A COMPARISON WILL BE MADE TO SEE IF
                                NEW TIME IS LESS THAN PREVIOUS.


                        TEST 33 TRANSMITTER INTERRUPT LOGIC TEST
                        ---- --
                                LOGICALLLY THIS IS 4 SEPARATE TESTS
                                    A) DOES TRANSMITTER INTERRUPT LOGIC WORK
                                    B) AT PRIORITY OF 0
                                    C) AND ONLY ONCE
                                    D) BUT NOT WITH INTERRUPT ENABLE CLEAR


                TEST 34 RECEIVER INTERRUPT LOGIC TEST THIS TEST COVERS ALL
                ---- --
                        OF  THE RECEIVER SIDE OF THE INTERRUPT LOGIC, BOTH
                        DATASET AND CHARACTER MODES.


                TEST  35  TEST  ACTUAL  DATA  TRANSFERED  NON-INTERRUPT
                ----  --
                        MAINTENANCE BIT SET


                TEST 36 TEST DATA THROUGH CABLE
                ---- --


                TEST 37 FULL DATA TRANSFER WITH INTERRUPTS AND MAINTENANCE
                ---- --
                        MODE.


                TEST 40 TEST BREAK GENERATION LOGIC  TRANSMIT  KNOWN  CHAR
                ---- --
                        WITH BREAK SET AND COMPARE RECEIVED WITH 0.


                TEST 41 NOT A TEST - SEND BACK TO LOOP
                ---- --
```

```
                                NOTE

                FOR ALL OF THE FOLLOWING ROUTINES THE USE
                OF (R5) IS PART OF THE LINKAGE MECHANISM
                BETWEEN THE CALLER AND THE CALLED.


        ROUTINE:TIMER
        -------------

                THIS ROUTINE IS USED TO TEST THE STATUS OF
                ANY BIT IN ANY REGISTER.
INPUTS:
                HOWLONG     THE MAXIMUM AMOUNT OF TIME TO
                            SPEND IN THIS ROUTINE.
                WHICHBIT    A MASK WITH THE BIT(S) SET THAT
                            ARE TO BE CHECKED
                REG         A POINTER TO THE REGISTER TO BE
                            CHECKED
                SETCLR      THE DESIRED RESULTS -- EITHER SET
                            OR CLEAR
OUTPUT:
                THE 'C' BIT IS SET TO INDICATE AN ERROR BUT IT
                IS TESTED BY THE IF.ERROR STATEMENT.


ROUTINE:DATLNG
--------------
                THIS ROUTINE SETS UP A MASK FOR DATA, WITH -

INPUT:  NOTHING IS PASSED TO THIS ROUTINE BUT GLOBAL
        INFORMATION IS ASSUMED TO EXIST:
        $USWR-- THE WORD FOR SOFTWARE PARAMETERS
        DATA-- A MASK FOR THE LOCATION OF THE OCTAL
        NUMBER OF DATA BITS

OUTPUT----
        MASK-- A MASK OF BINARY ZEROS RIGHT-JUSTIFIED
        THE NUMBER OF WHICH IS DEFINED IN $USWR WORD.


ROUTINE:WAIT
------------
        THIS ROUTINE IS USED TO DELAY EXECUTION OF THE
        MAIN PROGRAM FOR A SPECIFIED AMOUNT OF TIME.
        THIS IS ACCOMPLISHED BY INCREMENTING A
        REGISTER UP TO A LIMIT.  THE INNER LOOP IS SET
        TO APPROXIMATE 1 MICRO SEC.


SERVICE ROUTINE:  INTSRV
------- --------  ------
        THIS GLOBAL ROUTINE DOES NOTHING BUT INCREMENT
```

```
                        'INTFLAG'  EACH TIME IT IS CALLED.  IT ASSUMES
                        THAT THE MAIN CALLING ROUTINE WILL  KNOW  WHAT
                        TO LOOK FOR.


                ROUTINE:CYCLE
                -------------
                        THIS ROUTINE  CAUSES  ADRS  TO  POINT  TO  THE
                        ADDRESS  OF  DLV11-E  UNDER  TEST,  ADRS +2 TO
                        POINT TO THE VECTOR OF THE DLV11-E UNDER TEST.
                        IT  KEEPS  TRACK OF THE CURRENT DEVICE AND BIT
                        MASKS.
```

```
                        .TITLE  MAINDEC-11-DVDVA-A
                        ;*COPYRIGHT (C) 1977
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY ODES CHOATE
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                        ;*
                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            LOOP ON TEST IN SWR<7:0>

                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
000110                  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
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
000014                  TBITVEC=14              ;;"T" BIT
000014                  TRTVEC= 14              ;;TRACE TRAP
000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                  PWRVEC= 24              ;;POWER FAIL
000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                  TRAPVEC=34              ;;"TRAP" TRAP
000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
000004                          ILLMEM= 4
000001                          ADRS=   R1
000002                          GOOD=   R2
000003                          BAD=    R3
000001                          REGISTER=R1
000002                          BIT=    R2
000003                          FUNCT=  R3
000002                          LEAD=   R2
000004                          FOLLOW= R4
175610                          DLADDR= 175610

                        ; THE FOLLOWING DEFINITIONS APPLY TO THE GLOBAL SUBS
177777                  SET=    -1
000000                  CLR=    0


                ;;**************************************************************
                        ; RCSR REGISTER BIT NAMES
                ;;**************************************************************
100000                  DATAINT=        BIT15           ; DATASET INTERRUPT
040000                  RING=           BIT14           ; RINGING SIGNAL INDICATOR
020000                  CLRSEND=        BIT13           ; CLEAR TO SEND FROM DATASET
010000                  CARDET=         BIT12           ; CARRIER DETECT
004000                  RCVRACT=        BIT11           ; RECEIVER ACTIVE INDICATOR
002000                  SECREC=         BIT10           ; SECONDARY RECEIVE
                        ; UNUSED        BIT09
                        ; UNUSED        BIT08
000200                  RCVRDONE=       BIT07           ; RECEIVER DONE
000100                  RCVRIE=         BIT06           ; RECEIVER INTERRUPT ENABLE
000040                  DATAIE=         BIT05           ; DATASET INTERRUPT ENABLE
                        ; UNUSED        BIT04
000010                  SECXMIT=        BIT03           ; SECONDARY TRANSMIT DATA
000004                  REQSEND=        BIT02           ; REQUEST TO SEND
000002                  DTR=            BIT01           ; DATA TERMINAL READY
                        ; UNUSED        BIT00
```

```
                        ;;*****************************************************************
                        ;               RBUF REGISTER BIT NAMES
                        ;;*****************************************************************
100000                  ERROR=          BIT15           ; ERROR INDICATOR
040000                  ORERR=          BIT14           ; OVERRUN ERROR
020000                  FRERR=          BIT13           ; FRAMING ERROR
010000                  PERR=           BIT12           ; PARITY ERROR
                        ; UNUSED        BIT11
                        ; UNUSED        BIT10
                        ; UNUSED        BIT09
                        ; UNUSED        BIT08
000200                  RDATA7=         BIT07           ; \
000100                  RDATA6=         BIT06           ; !
000040                  RDATA5=         BIT05           ; !
000020                  RDATA4=         BIT04           ;  \    RECEIVED DATA BITS
000010                  RDATA3=         BIT03           ;  /
000004                  RDATA2=         BIT02           ; !
000002                  RDATA1=         BIT01           ; !
000001                  RDATA0=         BIT00           ; /

                        ;;*****************************************************************
                        ;               TCSR REGISTER BIT NAMES
                        ;;*****************************************************************
100000                  PBAUD3=         BIT15           ; \
040000                  PBAUD2=         BIT14           ;  \    PROGRAMMABLE BAUD
020000                  PBAUD1=         BIT13           ;  /    RATE  BITS
010000                  PBAUD0=         BIT12           ; /
004000                  PBAUDSET=       BIT11           ; ENABLE SETTING OF
                                                        ; PROGRAMMABLE BAUDE RATE
                        ; UNUSED        BIT10
                        ; UNUSED        BIT09
                        ; UNUSED        BIT08
000200                  XMITRDY=        BIT07           ; TRANSMITTER READY
000100                  XMITIE=         BIT06           ; TRANSMITTER INTERRUPT ENABLE
                        ; UNUSED        BIT05
                        ; UNUSED        BIT04
                        ; UNUSED        BIT03
000004                  MAINT=          BIT02           ; MAINTENANCE SET BIT
                        ; UNUSED        BIT01
000001                  BREAK=          BIT00           ; SEND BREAK (CONTINUOUS SPACE)


                        ;;*****************************************************************
                        ;               TBUF REGISTER BIT NAMES
                        ;;*****************************************************************
                        ; UNUSED        BIT15
                        ; UNUSED        BIT14
                        ; UNUSED        BIT13
                        ; UNUSED        BIT12
                        ; UNUSED        BIT11
                        ; UNUSED        BIT10
                        ; UNUSED        BIT09
                        ; UNUSED        BIT08
000200                  TDATA7=         BIT07           ; \
000100                  TDATA6=         BIT06           ; !
```

```
                000040                          TDATA5=         BIT05           ; !
                000020                          TDATA4=         BIT04           ; \ TRANSMITTER DATA BUFFER
                000010                          TDATA3=         BIT03           ; /
                000004                          TDATA2=         BIT02           ; !
                000002                          TDATA1=         BIT01           ; !
                000001                          TDATA0=         BIT00           ; /


                                        ;;**************************************************************
                                                ; FLAG BITS TO BE USE OR CLEARED IN $USWR.

                000017                          DATA =          17
                000020                          PARITY =        20
                000040                          EVENODD =       40
                000100                          COMSPD =        100
                000200                          PBR =           200

                                                ; BAUDE MUST BE ON THE UPPER
                                                ;  BYTE BOUNDRY OF $USWR.--4 BITS
                007400                          BAUD =          7400
                010000                          BRK =           10000
                020000                          CABLE =         20000
                040000                          FRFD =          40000
                                        ;;**************************************************************
                                        .SBTTL  TRAP CATCHER

                000000                          .=0
                                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                        ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                000174                          .=174
000174  000000                         DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000                         SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                        .SBTTL  STARTING ADDRESS(ES)
000200  000137  001336                          JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
```

```
                                .SBTTL  ACT11 HOOKS

                                ;;******************************************************************
                                ;HOOKS REQUIRED BY ACT11
                                        $SVPC=.                 ;SAVE PC
000204                                  .=46
000046                                  $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOF
012214                                  .=52
000052                                  .WORD   0               ;;2)SET LOC.52 TO ZERO
000000                                  .=$SVPC                 ;; RESTORE PC
000204                          .=1000
001000                          .SBTTL  APT PARAMETER BLOCK

                                ;;******************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;******************************************************************
                                        .$X=.   ;;SAVE CURRENT LOCATION
001000                                  .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024                                  200     ;;FOR APT START UP
000200                                  .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044                                  $APTHDR ;;POINT TO APT HEADER BLOCK
001000                                  .=.$X   ;;RESET LOCATION COUNTER
001000                          ;;******************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.

001000                          $APTHD:
001000  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001002  001174                  $MBADR: .WORD   $MAIL   ;;AD. ESS OF APT MAILBOX (BITS 0-15)
001004  000005                  $TSTM:  .WORD   5       ;;RUN TIM OF LONGEST TEST
001006  000055                  $PASTM: .WORD   45.     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001010  000036                  $UNITM: .WORD   30.     ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001012  000030                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
                                .SBTTL  COMMON TAGS

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

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102  000                     $TSTNM: .BYTE   0       ;;CONTAINS THE TEST NUMBER
001103  000                     $ERFLG: .BYTE   0       ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0       ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0       ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0       ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0       ;;CONTAINS TOTAL ERRORS DETECTED
001114  000                     $ITEMB: .BYTE   0       ;;CONTAINS ITEM CONTROL BYTE
001115  001                     $ERMAX: .BYTE   1       ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0       ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0       ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0       ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0       ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0       ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0       ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000                     $AUTOB: .BYTE   0       ;;AUTOMATIC MODE INDICATOR
001135  000                     $INTAG: .BYTE   0       ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  SWR:    .WORD   DSWR    ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP   ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560          ;;TTY KBD STATUS
001146  177562                  $TKB:   177562          ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564          ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566          ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000                     $NULL:  .BYTE   0       ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002                     $FILLS: .BYTE   2       ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012                     $FILLC: .BYTE   12      ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000                     $TPFLG: .BYTE   0       ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $TIMES: 0               ;;MAX. NUMBER OF ITERATIONS
001162  000000                  $ESCAPE:0               ;;ESCAPE ON ERROR ADDRESS
001164  177607  000377         $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001170  077                     $QUES:  .ASCII  /?/     ;;QUESTION MARK
001171  015                     $CRLF:  .ASCII  <15>    ;;CARRIAGE RETURN
001172  000012                  $LF:    .ASCIZ  <12>    ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                .EVEN
001174                          $MAIL:                  ;;APT MAILBOX
001174  000000                  $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
001176  000000                  $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
001200  000000                  $TESTN: .WORD   ATESTN  ;;TEST NUMBER
001202  000000                  $PASS:  .WORD   APASS   ;;PASS COUNT
001204  000000                  $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
001206  000000                  $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
001210  000000                  $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
```

```
1017  001212  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
1018  001214                        $ETABLE:                ;;APT ENVIRONMENT TABLE
1019  001214      000               $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
1020  001215      000               $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
1021  001216  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
1022  001220  071110                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
1023  001222  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
1024                                ;*                      BITS 15-11=CPU TYPE
1025                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
1026                                ;*                              11/70=06,PDQ=07,Q=10
1027                                ;*                      BIT 10=REAL TIME CLOCK
1028                                ;*                      BIT  9=FLOATING POINT PROCESSOR
1029                                ;*                      BIT  8=MEMORY MANAGEMENT
1030  001224      000               $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
1031  001225      000               $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
1032                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
1033                                ;*                              900 NSEC CORE=001
1034                                ;*                              300 NSEC BIPOLAR=002
1035                                ;*                              500 NSEC MOS=003
1036  001226  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
1037                                ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
1038  001230      000               $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
1039  001231      000               $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
1040  001232  000000                $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
1041  001234      000               $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
1042  001235      000               $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
1043  001236  000000                $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
1044  001240      000               $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
1045  001241      000               $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
1046  001242  000000                $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
1047  001244  000300                $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
1048  001246  000000                $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
1049  001250  175610                $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
1050  001252  000001                $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
1051  001254                        $ETEND:
1052                                .MEXIT
```

ERROR POINTER TABLE SEQ 0024

```
                                .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


001254                          $ERRTB:
                                ;;              GLOBAL DATA
001254  175610                      DLADD:  DLADDR
001256  000300                      DLVEC:  300
001260  175610                      RCSR:   DLADDR  +  0
001262  175612                      RBUF:   DLADDR  +  2
001264  175614                      TCSR:   DLADDR  +  4
001266  175615                      TCSRHI: DLADDR  +  5
001270  175616                      TBUF:   DLADDR  +  6
001272  000000                      I:      0
001274  000020                      .BLKW 20        ;FOR R5 STACK
001334  000000                      R5STACK:        .WORD 0
```

```
1079  001336                                  START:
1080                                          .SBTTL  INITIALIZE THE COMMON TAGS
1081                                          ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
1082  001336  012706  001100                         MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
1083  001342  005026                                 CLR     (R6)+           ;;CLEAR MEMORY LOCATION
1084  001344  022706  001140                         CMP     #SWR,R6 ;;DONE?
1085  001350  001374                                 BNE     .-6             ;;LOOP BACK IF NO
1086  001352  012706  001100                         MOV     #STACK,SP       ;;SETUP THE STACK POINTER
1087                                          ;;INITIALIZE A FEW VECTORS
1088  001356  012737  014132  000020                 MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
1089  001364  012737  000340  000022                 MOV     #340,@#IOTVEC+2 ;;LEVEL 7
1090  001372  012737  013732  000030                 MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
1091  001400  012737  000340  000032                 MOV     #340,@#EMTVEC+2 ;;LEVEL 7
1092  001406  012737  015064  000034                 MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
1093  001414  012737  000340  000036                 MOV     #340,@#TRAPVEC+2;LEVEL 7
1094  001422  012737  012252  000024                 MOV     #$PWRON,@#PWRVEC ;;POWER FAILURE VECTOR
1095  001430  012737  000340  000026                 MOV     #340,@#PWRVEC+2 ;;LEVEL 7
1096  001436  016767  010520  010510                 MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
1097  001444  005067  177510                        CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
1098  001450  005067  177506                        CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
1099  001454  112767  000001  177433                 MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
1100  001462  012767  001462  177416                 MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
1101  001470  012767  001470  177412                 MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
1102                                          ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
1103                                          ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
1104  001476  013746  000004                         MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
1105  001502  012737  001536  000004                 MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
1106  001510  012767  177570  177422                 MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
1107  001516  012767  177570  177416                 MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
1108  001524  022777  177777  177406                 CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
1109  001532  001012                                 BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
1110                                                                          ;;AND  THE HARDWARE SWR IS NOT = -1
1111  001534  000403                                 BR      65$             ;;BRANCH IF NO TIMEOUT
1112  001536  012716  001544          64$:          MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
1113  001542  000002                                 RTI
1114  001544  012767  000176  177366  65$:          MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
1115  001552  012767  000174  177362                 MOV     #DISPREG,DISPLAY
1116  001560  012637  000004          66$:          MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
1117
1118  001564  005067  177412                        CLR     $PASS           ;;CLEAR PASS COUNT
1119  001570  132767  000200  177417                 BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
1120  001576  001403                                 BEQ     67$             ;;YES,USE NON-APT SWITCH
1121  001600  012767  001216  177332                 MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
1122  001606                          67$:
1123                                          .SBTTL  TYPE PROGRAM NAME
1124                                          ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
1125  001606  005227  177777                        INC     #-1             ;;FIRST TIME?
1126  001612  001037                                 BNE     68$             ;;BRANCH IF NO
1127  001614  022737  012214  000042                 CMP     #$ENDAD,@#42    ;;ACT-11?
1128  001622  001433                                 BEQ     68$             ;;BRANCH IF YES
1129  001624  104401  001672                        TYPE    ,69$            ;;TYPE ASCIZ STRING
1130                                          .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
1131  001630  005737  000042                        TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
1132  001634  001012                                 BNE     70$             ;;BRANCH IF YES
1133  001636  126727  177352  000001                 CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
1134  001644  001406                                 BEQ     70$             ;;BRANCH IF YES
```

```
1135  001646  026727  177266  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
1136  001654  001005                          BNE     71$             ;;BRANCH IF NO
1137  001656  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
1138  001660  000403                          BR      71$
1139  001662  112767  000001  177244  70$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDIC^TOR
1140  001670                        71$:
1141  001670  000410                          BR      68$             ;;GET OVER THE ASCIZ
1142                                  ;;69$:   .ASCIZ  <CRLF>#MD-11-DVDVA-A#<CRLF>
1143  001712                        68$:
```

```
1144  001712                                        LET INITFLAG := #1
1145  001712  012767  000001  010176        MOV     #1,INITFLAG
1146  001720                              LOOP:
1147  001720                              CALL    CYCLE           ; NO ARGUMENTS--ADDRS -> NEXT ADDRESS
1148  001720  004767  010042              JSR     PC,CYCLE
1149                                                ;               ADDRS+2 -> NEXT VECTOR
1150                                                                ;GET UNIT ADDRESS
1151  001724                                                LET     DLADD := (ADRS)+
1152  001724  012167  177324              MOV     (ADRS)+,DLADD
1153                                                                ;GET UNIT VECTOR
1154  001730                                                LET     DLVEC := (ADRS)
1155  001730  011167  177322              MOV     (ADRS),DLVEC
1156  001734                                                LET     ADRS  := DLADD
1157  001734  016701  177314              MOV     DLADD,ADRS
1158                                                                ;RCSR = DLADD  +  0
1159  001740                                                LET     RCSR  := DLADD
1160  001740  016767  177310  177312      MOV     DLADD,RCSR
1161  001746                                                LET     RBUF  := DLADD + #2
1162  001746  016767  177302  177306      MOV     DLADD,RBUF
1163  001754  062767  000002  177300      ADD     #2,RBUF
1164  001762                                                LET     TCSR  := DLADD + #4
1165  001762  016767  177266  177274      MOV     DLADD,TCSR
1166  001770  062767  000004  177266      ADD     #4,TCSR
1167  001776                                                LET     TCSRHI := DLADD + #5
1168  001776  016767  177252  177262      MOV     DLADD,TCSRHI
1169  002004  062767  000005  177254      ADD     #5,TCSRHI
1170  002012                                                LET     TBUF  := DLADD + #6
1171  002012  016767  177236  177250      MOV     DLADD,TBUF
1172  002020  062767  000006  177242      ADD     #6,TBUF
1173  002026                                                LET     R5    := #R5STACK
1174  002026  012705  001334              MOV     #R5STACK,R5
1175                                                                ;;BRESET
1176  002032  000005                      RESET
```

```
1177                                    ;;*****************************************************************
1178                                    ;*TEST 1         ADDRESSABILITY
1179                                    ;*              THIS TEST VERIFIES THAT THE ADDRESS AS PLACED IN
1180                                    ;*              THE HARDWARE P-TABLE TO BE CORRECT AND THE DLV11-E RESPONDS
1181                                    ;*              TO THAT ADDRESS SPACE
1182                                    ;*****************************************************************
1183  002034  000004                   $TST1:  SCOPE
1184  002036  012767  000002  177114           MOV     #2,$TIMES       ;;DO 2 ITERATIONS
1185  002044  012767  000001  177126           MOV     #1,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1186  002052                                                                   LET     ADRS := DLADD
1187  002052  016701  177176                   MOV     DLADD,ADRS
1188                                                                     ; SET UP INTERRUPT
1189  002056                                                           SETVEC  #ILLMEM,#INTSRV,#PR7
1190  002056  010146                           MOV     R1,-(SP)
1191  002060  012701  000004                   MOV     #ILLMEM,R1
1192  002064  012721  011574                   MOV     #INTSRV,(R1)+
1193  002070  012711  000340                   MOV     #PR7,(R1)
1194  002074  012601                           MOV     (SP)+,R1
1195  002076                                                           LET     I := #0
1196  002076  005067  177170                   CLR     I
1197  002102                                                           REPEAT
1198  002102                           $1:
1199  002102
1200  002102  012767  002110  177000           MOV     #64$,$LPERR
1201                                                                       BGNSUB
1202  002110                                                                   ;CLEAR FLAG
1203  002110  005067  007466                   CLR     INTFLAG                LET INTFLAG := #0
1204
1205                                                                       ;READ FLAG
1206  002114  005711                           TST @ADRS
1207  002116                                                               IF INTFLAG NE #0 THEN
1208  002116  005767  007460                   TST     INTFLAG
1209  002122  001401                           BEQ     $2
1210                                                                     ; FATAL ERROR
1211  002124                                                                 ERRDF 1,,NODL
1212  002124  104001                           ERROR   1
1213  002126                                                               ENDIF
1214  002126                           $2:
1215  002126                                                           ENDSUB
1216  002126                                                           LET     I := I + #2
1217  002126  062767  000002  177136           ADD     #2,I
1218  002134                                                           LET     ADRS := DLADD + I
1219  002134  016701  177114                   MOV     DLADD,ADRS
1220  002140  066701  177126                   ADD     I,ADRS
1221  002144                                                       UNTIL I EQ #8.
1222  002144  026727  177122  000010           CMP     I,#8.
1223  002152  001353                           BNE     $1
1224  002154                                                           CLRVEC ILLMEM
1225  002154  010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
1226  002156  010246                           MOV     R2,-(SP)        ;;PUSH R2 ON STACK
1227  002160  012701  000004                   MOV     #ILLMEM,R1
1228  002164  010102                           MOV     R1,R2
1229  002166  062702  000002                   ADD     #2,R2
1230  002172  010221                           MOV     R2,(R1)+
1231  002174  005011                           CLR     (R1)
1232  002176  012602                           MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
  1233  002200  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
  1234                                                            ;END OF TEST
  1235  002202                                                    ENDTST
```

```
                        ;;*****************************************************************
                        ;* THE FOLLOWING 8 TESTS  TEST ALL 'READ WRITE' BITS
                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;*TEST 2        BREAK - TCSR0 SET, CLEAR, RESET
                        ;*               THIS BIT IS THE ONLY ONE IN THIS POSITION
                        ;*               THAT IS READ AND WRITE.
                        ;;*****************************************************************
002202  000004    TST2:   SCOPE
002204  012767  000010  176746          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
002212  012767  000002  176760          MOV     #2,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX

                                                ; SEE IF IT IS CLEAR
                                                                BGNSUB
002220
002220  012767  002226  176662          MOV     #64$,$LPERR

                                                                    IF      #BREAK SETIN @TCSR THEN
002226
002226  032777  000001  177030          BIT     #BREAK,@TCSR
002234  001401                          BEQ     $3

                                                                        ; BREAK DID NOT RESET IN TCSR
                                                                        ERRHRD 2,,DIDNOT
002236
002236  104002                          ERROR   2
                                                                    ENDIF
002240
002240                          $3:
                                                                ENDSUB

                                                ; TRY TO SET BREAK BIT
                                                                BGNSUB
002240
002240  012767  002246  176642          MOV     #64$,$LPERR
                                                                    LET     @TCSR := @TCSR SET.BY #BREAK
002246
002246  052777  000001  177010          BIS     #BREAK,@TCSR

                                                                    ; STUCK TO 0
                                                                    IF      #BREAK NOTSETIN @TCSR THEN
002254
002254  032777  000001  177002          BIT     #BREAK,@TCSR
002262  001001                          BNE     $4

                                                                        ; BREAK DID NOT SET IN TCSR
                                                                        ERRHRD 3,,DIDNOT
002264
002264  104003                          ERROR   3
                                                                    ENDIF
002266
002266                          $4:
                                                                ENDSUB

                                                ; TRY TO CLEAR A SET BIT
                                                                BGNSUB
002266
002266  012767  002274  176614          MOV     #64$,$LPERR

                                                                    LET     @TCSR := @TCSR CLR.BY #BREAK
002274
002274  042777  000001  176762          BIC     #BREAK,@TCSR

                                                                    ; SHOULD HAVE CLEARED
                                                                    IF      #BREAK SETIN @TCSR THEN
002302
002302  032777  000001  176754          BIT     #BREAK,@TCSR
002310  001401                          BEQ     $5

                                                                        ; BREAK  DID NOT CLEAR IN TCSR
                                                                        ERRHRD 4,,DIDNOT
002312
002312  104004                          ERROR   4
                                                                    ENDIF
002314
```

```
1292  002314                          $5:
1293  002314                                                          ENDSUB
1294
1295                                                          ; NOW SEE IF RESET CLEARS IT
1296  002314                                                          BGNSUB
1297  002314  012767  002322  176566          MOV     #64$,$LPERR
1298
1299  002322                                                              LET     @TCSR := @TCSR SET.BY #BREAK
1300  002322  052777  000001  176734          BIS     #BREAK,@TCSR
1301                                                                  ; ISSUE BUS RESET
1302  002330                                                          BRESET
1303  002330  000005                          RESET                  IF      #BREAK SETIN @TCSR THEN
1304  002332
1305  002332  032777  000001  176724          BIT     #BREAK,@TCSR
1306  002340  001401                          BEQ     $6
1307                                                                  ; BREAK DID NOT RESET IN TCSR
1308  002342                                                          ERRHRD 5,,DIDNOT
1309  002342  104005                          ERROR   5
1310  002344                                                          ENDIF
1311  002344                          $6:
1312  002344                                                      ENDSUB
1313  002344                                                  ENDTST
1314
1315
```

```
1316                                    ;;*****************************************************************
1317                                    ;;*****************************************************************
1318                                    ;*TEST 3          MAINT - TCSR2 SET, CLEAR, RESET
1319                                    ;;*****************************************************************
1320  002344  000004                    $ST3:   SCOPE
1321  002346  012767  000010  176604            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1322  002354  012767  000003  176616            MOV     #3,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1323
1324                                                    ; SEE IF IT IS CLEAR
1325  002362                                                            BGNSUB
1326  002362  012767  002370  176520            MOV     #64$,$LPERR
1327
1328  002370                                                              IF      #MAINT SETIN @TCSR THEN
1329  002370  032777  000004  176666            BIT     #MAINT,@TCSR
1330  002376  001401                            BEQ     $7
1331
1332  002400                                                                  ; MAINT DID NOT RESET IN TCSR
1333  002400  104006                                                         ERRHRD 6,,DIDNOT
1334  002402                                    ERROR   6
1335  002402                                                              ENDIF
1336  002402                                $7:
1337
1338                                                    ; TRY TO SET MAINT BIT
1339  002402                                                            BGNSUB
1340  002402  012767  002410  176500            MOV     #64$,$LPERR
1341  002410                                                                LET     @TCSR := @TCSR SET.BY #MAINT
1342  002410  052777  000004  176646            BIS     #MAINT,@TCSR
1343                                                                    ; STUCK TO 0
1344  002416                                                            IF      #MAINT NOTSETIN @TCSR THEN
1345  002416  032777  000004  176640            BIT     #MAINT,@TCSR
1346  002424  001001                            BNE     $10
1347
1348  002426                                                                  ; MAINT DID NOT SET IN TCSR
1349  002426  104007                                                         ERRHRD 7,,DIDNOT
1350  002430                                                              ENDIF
1351  002430                                $10:
1352  002430                                                          ENDSUB
1353
1354                                                    ; TRY TO CLEAR A SET BIT
1355  002430                                                            BGNSUB
1356  002430  012767  002436  176452            MOV     #64$,$LPERR
1357
1358  002436                                                                LET     @TCSR := @TCSR CLR.BY #MAINT
1359  002436  042777  000004  176620            BIC     #MAINT,@TCSR
1360                                                                    ; SHOULD HAVE CLEARED
1361  002444                                                            IF      #MAINT SETIN @TCSR THEN
1362  002444  032777  000004  176612            BIT     #MAINT,@TCSR
1363  002452  001401                            BEQ     $11
1364
1365  002454                                                                  ; MAINT DID NOT CLEAR INTCSR
1366  002454  104010                                                         ERRHRD 8,,DIDNOT
1367  002456                                    ERROR   8
1368  002456                                                              ENDIF
1369  002456                                $11:
1370                                                                  ENDSUB
1371                                                    ; NOW SEE IF RESET CLEARS IT
```

```
1372  002456
1373  002456  012767  002464  176424          MOV     #64$,$LPERR
1374
1375  002464
1376  002464  052777  000004  176572          BIS     #MAINT,@TCSR
1377
1378  002472
1379  002472  000005                          RESET
1380  002474
1381  002474  032777  000004  176562          BIT     #MAINT,@TCSR
1382  002502  001401                          BEQ     $12
1383
1384  002504
1385  002504  104011                          ERROR   9
1386  002506
1387  002506                          $12:
1388  002506
1389  002506
1390
1391
1392
```

```
BGNSUB

    LET     @TCSR := @TCSR SET.SY #MAINT

        ; ISSUE BUS RESET
    BRESET

    IF      #MAINT SETIN @TCSR THEN

        ; MAINT DID NOT RESET IN TCSR
        ERRHRD 9,,DIDNOT

    ENDIF

ENDSUB
ENDTST
```

```
1393                                    ;;**********************************************************************
1394                                    ;;**********************************************************************
1395                                    ;*TEST 4          XMITIE - TCSR6 SET, CLEAR, RESET
1396                                    ;;**********************************************************************
1397  002506  000004                   TST4:   SCOPE
1398  002510  012767  000010  176442           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1399  002516  012767  000004  176454           MOV     #4,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1400                                                                    ; USE PRIORITY OF 7
1401  002524  012746  000340                   MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
1402  002530  012746  002536                   MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
1403  002534  000002                           RTI                     ;;POP NEW PC AND PS
1404  002536                            64$:
1405
1406                                                    ; SEE IF IT IS CLEAR
1407  002536                                                            BGNSUB
1408  002536  012767  002544  176344           MOV     #65$,$LPERR
1409
1410  002544                                                                IF      #XMITIE SETIN @TCSR THEN
1411  002544  032777  000100  176512           BIT     #XMITIE,@TCSR
1412  002552  001401                           BEQ     $13
1413                                                                        ; XMITIE DID NOT RESET IN TCSR
1414  002554                                                                ERRHRD 10,,DIDNOT
1415  002554  104012                           ERROR   10
1416  002556                                                                ENDIF
1417  002556                            $13:
1418  002556                                                            ENDSUB
1419
1420                                                    ; TRY TO SET XMITIE BIT
1421  002556                                                            BGNSUB
1422  002556  012767  002564  176324           MOV     #64$,$LPERR
1423  002564                                                                LET     @TCSR := @TCSR SET.BY #XMITIE
1424  002564  052777  000100  176472           BIS     #XMITIE,@TCSR
1425                                                                    ; STUCK TO 0
1426  002572                                                            IF      #XMITIE NOTSETIN @TCSR THEN
1427  002572  032777  000100  176464           BIT     #XMITIE,@TCSR
1428  002600  001001                           BNE     $14
1429                                                                        ; XMIT DID NOT RESET IN TCSR
1430  002602                                                                ERRHRD 11,,DIDNOT
1431  002602  104013                           ERROR   11
1432  002604                                                                ENDIF
1433  002604                            $14:
1434  002604                                                            ENDSUB
1435
1436                                                    ; TRY TO CLEAR A SET BIT
1437  002604                                                            BGNSUB
1438  002604  012767  002612  176276           MOV     #64$,$LPERR
1439
1440  002612                                                                LET     @TCSR := @TCSR CLR.BY #XMITIE
1441  002612  042777  000100  176444           BIC     #XMITIE,@TCSR
1442                                                                    ; SHOULD HAVE CLEARED
1443  002620                                                            IF      #XMITIE SETIN @TCSR THEN
1444  002620  032777  000100  176436           BIT     #XMITIE,@TCSR
1445  002626  001401                           BEQ     $15
1446                                                                        ;  XMIT DID NOT CLEAR IN TCSR
1447  002630                                                                ERRHRD 12,,DIDNOT
1448  002630  104014                           ERROR   12
```

```
002632                                                  ENDIF
002632                          $15:
002632                                               ENDSUB

                                            ; NOW SEE IF RESET CLEARS IT
002632                                               BGNSUB
002632  012767  002640  176250        MOV     #64$,$LPERR

002640                                                  LET     @TCSR := @TCSR SET.BY #XMITIE
002640  052777  000100  176416        BIS     #XMITIE,@TCSR

                                                           ; ISSUE BUS RESET
002646                                                  BRESET
002646  000005                        RESET
002650                                                  IF      #XMITIE SETIN @TCSR THEN
002650  032777  000100  176406        BIT     #XMITIE,@TCSR
002656  001401                        BEQ     $16

                                                           ; XMIT DID NOT RESET IN TCSR
002660                                                     ERRHRD 13,,DIDNOT
002660  104015                        ERROR   13
J02662                                                  ENDIF
002662                          $16:
002662                                               ENDSUB
J02662                                            ENDTST
```

```
                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;*TEST 5         DTR - RCSR1    SET, CLEAR
                        ;*              NOTE:  RESET DOES NOT CLEAR THIS BIT
                        ;*              THIS BIT IS THE ONLY ONE IN THIS POSITION
                        ;*              THAT IS READ AND WRITE.
                        ;*              WE CANNOT TEST FOR AN INITIAL CONDITION
                        ;*              AS THIS BIT IS UNDEFINED UPON POWER UP AND
                        ;*              INIT DOESN'T AFFECT IT.
                        ;;*****************************************************************
002662  000004         TST5:   SCOPE
002664  012767  000010  176266          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
002672  012767  000005  176300          MOV     #5,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
                                                ; TRY TO CLEAR DTR BIT
                                                                BGNSUB
002700
002700  012767  002706  176202          MOV     #64$,$LPERR
002706                                                              LET     @RCSR := @RCSR CLR.BY #DTR
002706  042777  000002  176344          BIC     #DTR,@RCSR
                                                                ; STUCK TO 0
002714                                                          IF      #DTR SETIN @RCSR THEN
002714  032777  000002  176336          BIT     #DTR,@RCSR
002722  001401                        BEQ     $17
                                                                ; DTR DID NOT CLEAR IN RCSR
002724                                                          ERRHRD 14,,DIDNOT
002724  104016                        ERROR   14
002726                                                          ENDIF
002726                         $17:
                                                                ENDSUB
                                                ; TRY TO SET  DTR
002726                                                          BGNSUB
002726  012767  002734  176154          MOV     #64$,$LPERR
                                                                LET     @RCSR := @RCSR SET.BY #DTR
002734
002734  052777  000002  176316          BIS     #DTR,@RCSR
002742                                                          IF      #DTR NOTSETIN @RCSR THEN
002742  032777  000002  176310          BIT     #DTR,@RCSR
002750  001001                        BNE     $20
                                                                ; DTR DID NOT SET IN RCSR
002752                                                          ERRHRD 15,,DIDNOT
002752  104017                        ERROR   15
002754                                                          ENDIF
002754                         $20:
                                                                ENDSUB
                                                ; TRY TO CLEAR IT AGAIN
002754                                                          BGNSUB
002754  012767  002762  176126          MOV     #64$,$LPERR
002762                                                              LET     @RCSR := @RCSR CLR.BY #DTR
002762  042777  000002  176270          BIC     #DTR,@RCSR
                                                                ; SHOULD HAVE CLEARED IT
002770                                                          IF      #DTR SETIN @RCSR THEN
002770  032777  000002  176262          BIT     #DTR,@RCSR
002776  001401                        BEQ     $21
                                                                ; DTR DID NOT CLEAR IN RCSR
003000                                                          ERRHRD 16,,DIDNOT
```

```
003000  104020              ERROR   16
003002                                              ENDIF
003002          $21:
003002                                          ENDSUB
003002                                      ENDTST
```

```
1539                                    ;;**********************************************************************
1540                                    ;;**********************************************************************
1541                                    ;*TEST 6          REQSEND - RCSR2          SET, CLEAR, RESET
1542                                    ;*               THIS TEST ASSUMES THAT ; MPER FR IS IN
1543                                    ;;**********************************************************************
1544  003002  000004                   TST6:   SCOPE
1545  003004  012767  000010  176146           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1546  003012  012767  000006  176160           MOV     #6,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1547  003020                                                                   IF #FRFD NOTSETIN $USWR THEN
1548  003020  032767  040000  176172           BIT     #FRFD,$USWR
1549  003026  001004                           BNE     $22
1550  003030                                                                       EXIT TST
1551  003030  012767  000001  176122           MOV     #1,$TIMES
1552  003036  000452                           BR      TST7            ;;;EXIT THIS TEST
1553  003040                                                                   ENDIF
1554  003040                           $22:
1555
1556                                                   ; SEE IF IT IS CLEAR
1557  003040                                                                   BGNSUB
1558  003040  012767  003046  176042           MOV     #64$,$LPERR
1559
1560  003046                                                                       IF      #REQSEND SETIN @RCSR THEN
1561  003046  032777  000004  176204           BIT     #REQSEND,@RCSR
1562  003054  001401                           BEQ     $23
1563                                                                                    ; REQSEND DID NOT RESET IN RCSR
1564  003056                                                                           ERRHRD 17,,DIDNOT
1565  003056  104021                           ERROR   17
1566  003060                                                                       ENDIF
1567  003060                           $23:
1568  003060                                                                   ENDSUB
1569
1570                                                   ; TRY TO SET REQSEND BIT
1571  003060                                                                   BGNSUB
1572  003060  012767  003066  176022           MOV     #64$,$LPERR
1573  003066                                                                       LET     @RCSR := @RCSR SET.BY #REQSEND
1574  003066  052777  000004  176164           BIS     #REQSEND,@RCSR
1575                                                                                ; STUCK TO 0
1576  003074                                                                       IF      #REQSEND NOTSETIN @RCSR THEN
1577  003074  032777  000004  176156           BIT     #REQSEND,@RCSR
1578  003102  001001                           BNE     $24
1579                                                                                    ; REQSEND DID NOT SET IN RCSR
1580  003104                                                                           ERRHRD 18,,DIDNOT
1581  003104  104022                           ERROR   18
1582  003106                                                                       ENDIF
1583  003106                           $24:
1584  003106                                                                   ENDSUB
1585
1586                                                   ; TRY TO CLEAR A SET BIT
1587  003106                                                                   BGNSUB
1588  003106  012767  003114  175774           MOV     #64$,$LPERR
1589
1590  003114                                                                       LET     @RCSR := @RCSR CLR.BY #REQSEND
1591  003114  042777  000004  176136           BIC     #REQSEND,@RCSR
1592                                                                                ; SHOULD HAVE CLEARED
1593  003122                                                                       IF      #REQSEND SETIN @RCSR THEN
1594  003122  032777  000004  176130           BIT     #REQSEND,@RCSR
```

```
1595  003130  001401                    BEQ     $25
1596                                                    ; REQSEND DID NOT CLEAR IN RCSR
1597  003132                                            ERRHRD 19,,DIDNOT
1598  003132  104023                    ERROR   19
1599  003134                                          ENDIF
1600  003134                          $25:
1601  003134                                        ENDSUB
1602
1603                                            ; NOW SEE IF RESET CLEARS IT
1604  003134                                        BGNSUB
1605  003134  012767  003142  175746    MOV     #64$,$LPERR
1606
1607  003142                                          LET     @RCSR := @RCSR SET.BY #REQSEND
1608  003142  052777  000004  176110    BIS     #REQSEND,@RCSR
1609                                                  ; ISSUE BUS RESET
1610  003150                                          BRESET
1611  003150  000005                    RESET
1612  003152                                          IF      #REQSEND SETIN @RCSR THEN
1613  003152  032777  000004  176100    BIT     #REQSEND,@RCSR
1614  003160  001401                    BEQ     $26
1615                                                    ; REQSEND DID NOT RESET IN RCSR
1616  003162                                            ERRHRD 20,,DIDNOT
1617  003162  104024                    ERROR   20
1618  003164                                          ENDIF
1619  003164                          $26:
1620  003164                                        ENDSUB
1621  003164                                        ENDTST
1622
1623
1624
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 7         SECXMIT - RCSR3        SET, CLEAR, RESET
                                ;*              THIS BIT IS THE ONLY ONE IN THIS POSITION
                                ;*              THAT IS READ AND WRITE.
                                ;;*****************************************************************
003164  000004                  TST7:   SCOPE
003166  012767  000010  175764          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003174  012767  000007  175776          MOV     #7,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
                                                        ; SEE IF IT IS CLEAR
                                                                BGNSUB
003202
003202  012767  003210  175700          MOV     #64$,$LPERR
                                                                  IF    #SECXMIT SETIN @RCSR THEN
003210
003210  032777  000010  176042          BIT     #SECXMIT,@RCSR
003216  001401                          BEQ     $27
                                                                     ; SECXMIT DID NOT RESET IN RCSR
                                                                    ERRHRD 21,,DIDNOT
003220
003220  104025                          ERROR   21
                                                                  ENDIF
003222
003222                          $27:                                 ENDSUB
003222
                                                        ; TRY TO SET SECXMIT BIT
003222                                                          BGNSUB
003222  012767  003230  175660          MOV     #64$,$LPERR
                                                                  LET   @RCSR := @RCSR SET.BY #SECXMIT
003230
003230  052777  000010  176022          BIS     #SECXMIT,@RCSR
                                                                  ; STUCK TO 0
                                                                  IF    #SECXMIT NOTSETIN @RCSR THEN
003236
003236  032777  000010  176014          BIT     #SECXMIT,@RCSR
003244  001001                          BNE     $30
                                                                     ; SECXMIT DID NOT SET IN RCSR
                                                                    ERRHRD 22,,DIDNOT
003246
003246  104026                          ERROR   22
                                                                  ENDIF
003250
003250                          $30:                               ENDSUB
003250
                                                        ; TRY TO CLEAR A SET BIT
003250                                                          BGNSUB
003250  012767  003256  175632          MOV     #64$,$LPERR
                                                                  LET   @RCSR := @RCSR CLR.BY #SECXMIT
003256
003256  042777  000010  175774          BIC     #SECXMIT,@RCSR
                                                                  ; SHOULD HAVE CLEARED
                                                                  IF    #SECXMIT SETIN @RCSR THEN
003264
003264  032777  000010  175766          BIT     #SECXMIT,@RCSR
003272  001401                          BEQ     $31
                                                                     ; SECXMIT DID NOT CLEAR IN RCSR
                                                                    ERRHRD 23,,DIDNOT
003274
003274  104027                          ERROR   23
                                                                  ENDIF
003276
003276                          $31:                               ENDSUB
003276
```

```
1681  003276                                                          BGNSUB
1682  003276  012767  003304  175604          MOV     #64$,$LPERR
1683                                                    ; NOW SEE IF RESET CLEARS IT
1684
1685  003304                                                          LET     @RCSR := @RCSR SET.BY #SECXMIT
1686  003304  052777  000010  175746          BIS     #SECXMIT,@RCSR
1687                                                        ; ISSUE BUS RESET
1688  003312                                                          BRESET
1689  003312  000005                          RESET
1690  003314                                                          IF      #SECXMIT SETIN @RCSR THEN
1691  003314  032777  000010  175736          BIT     #SECXMIT,@RCSR
1692  003322  001401                          BEQ     $32
1693                                                        ; SECXMIT DID NOT RESET IN RCSR
1694  003324                                                          ERRHRD 24,,DIDNOT
1695  003324  104030                          ERROR   24
1696  003326                                                          ENDIF
1697  003326                          $32:
1698  003326                                                      ENDSUB
1699  003326                                                  ENDTST
1700
1701
1702
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 10        DATAIE - RCSR5 SET, CLEAR, RESET
                                ;*              THIS BIT IS THE ONLY ONE IN THIS POSITION
                                ;*              THAT IS READ AND WRITE.
                                ;;**********************************************************************
003326  000004                  TST10:  SCOPE
003330  012767  000010  175622          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003336  012767  000010  175634          MOV     #10,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                ; SEE IF IT IS CLEAR
003344                                                          BGNSUB
003344  012767  003352  175536          MOV     #64$,$LPERR
                                                                IF      #DATAIE SETIN @RCSR THEN
003352
003352  032777  000040  175700          BIT     #DATAIE,@RCSR
003360  001401                          BEQ     $33
                                                                    ; DATAIE DID NOT RESET IN RCSR
                                                                    ERRHRD 25,,DIDNOT
003362
003362  104031                          ERROR   25
                                                                ENDIF
003364
003364                          $33:                            ENDSUB
003364
                                                ; TRY TO SET DATAIE BIT
003364                                                          BGNSUB
003364  012767  003372  175516          MOV     #64$,$LPERR
                                                                LET     @RCSR := @RCSR SET.BY #DATAIE
003372
003372  052777  000040  175660          BIS     #DATAIE,@RCSR
                                                            ; STUCK TO 0
003400                                                      IF      #DATAIE NOTSETIN @RCSR THEN
003400  032777  000040  175652          BIT     #DATAIE,@RCSR
003406  001001                          BNE     $34
                                                                    ; DATAIE DID NOT SET IN RCSR
                                                                    ERRHRD 26,,DIDNOT
003410
003410  104032                          ERROR   26
                                                                ENDIF
003412
003412                          $34:                            ENDSUB
003412
                                                ; TRY TO CLEAR A SET BIT
003412                                                          BGNSUB
003412  012767  003420  175470          MOV     #64$,$LPERR
                                                                LET     @RCSR := @RCSR CLR.BY #DATAIE
003420
003420  042777  000040  175632          BIC     #DATAIE,@RCSR
                                                            ; SHOULD HAVE CLEARED
003426                                                      IF      #DATAIE SETIN @RCSR THEN
003426  032777  000040  175624          BIT     #DATAIE,@RCSR
003434  001401                          BEQ     $35
                                                                    ; DATAIE DID NOT CLEAR IN RCSR
                                                                    ERRHRD 27,,DIDNOT
003436
003436  104033                          ERROR   27
                                                                ENDIF
003440
003440                          $35:                            ENDSUB
003440
```

```
1759                                                    ; NOW SEE IF RESET CLEARS IT
1760  003440                                                        BGNSUB
1761  003440  012767  003446  175442          MOV     #64$,$LPERR
1762
1763  003446                                                            LET     @RCSR := @RCSR SET.BY #DATAIE
1764  003446  052777  000040  175604          BIS     #DATAIE,@RCSR
1765                                                                ; ISSUE BUS RESET
1766  003454                                                        BRESET
1767  003454  000005                  RESET
1768  003456                                                        IF      #DATAIE SETIN @RCSR THEN
1769  003456  032777  000040  175574          BIT     #DATAIE,@RCSR
1770  003464  001401                  BEQ     $36
1771                                                                ; DATAIE DID NOT RESET IN RCSR
1772  003466                                                        ERRHRD 28,,DIDNOT
1773  003466  104034                  ERROR   28
1774  003470                                                        ENDIF
1775  003470                          $36:
1776  003470                                                    ENDSUB
1777  003470                                                ENDTST
1778
1779
1780
```

```
1781                                    ;;*****************************************************************
1782                                    ;;*****************************************************************
1783                                    ;*TEST 11        RCVRIE - RCSR6 SET, CLEAR, RESET
1784                                    ;*              THIS BIT IS THE ONLY ONE IN THIS POSITION
1785                                    ;*              THAT IS READ AND WRITE.
1786                                    ;;*****************************************************************
1787  003470  000004                    TST11:  SCOPE
1788  003472  012767  000010  175460            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1789  003500  012767  000011  175472            MOV     #11,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1790                                                            ; SEE IF IT IS CLEAR
1791  003506                                                            BGNSUB
1792  003506  012767  003514  175374            MOV     #64$,$LPERR
1793
1794  003514                                                                IF      #RCVRIE SETIN @RCSR THEN
1795  003514  032777  000100  175536            BIT     #RCVRIE,@RCSR
1796  003522  001401                            BEQ     $37
1797                                                                ; RCVRIE DID NOT RESET IN RCSR
1798  003524                                                            ERRHRD 29,,DIDNOT
1799  003524  104035                            ERROR   29
1800  003526                                                            ENDIF
1801  003526                                $37:
1802  003526                                                          ENDSUB
1803
1804                                                        ; TRY TO SET RCVRIE BIT
1805  003526                                                            BGNSUB
1806  003526  012767  003534  175354            MOV     #64$,$LPERR
1807  003534                                                                LET     @RCSR := @RCSR SET.BY #RCVRIE
1808  003534  052777  000100  175516            BIS     #RCVRIE,@RCSR
1809                                                                ; STUCK TO 0
1810  003542                                                            IF      #RCVRIE NOTSETIN @RCSR THEN
1811  003542  032777  000100  175510            BIT     #RCVRIE,@RCSR
1812  003550  001001                            BNE     $40
1813                                                                ; RCVRIE DID NOT SET IN RCSR
1814  003552                                                            ERRHRD 30,,DIDNOT
1815  003552  104036                            ERROR   30
1816  003554                                                            ENDIF
1817  003554                                $40:
1818  003554                                                          ENDSUB
1819
1820                                                        ; TRY TO CLEAR A SET BIT
1821  003554                                                            BGNSUB
1822  003554  012767  003562  175326            MOV     #64$,$LPERR
1823
1824  003562                                                                LET     @RCSR := @RCSR CLR.BY #RCVRIE
1825  003562  042777  000100  175470            BIC     #RCVRIE,@RCSR
1826                                                                ; SHOULD HAVE CLEARED
1827  003570                                                            IF      #RCVRIE SETIN @RCSR THEN
1828  003570  032777  000100  175462            BIT     #RCVRIE,@RCSR
1829  003576  001401                            BEQ     $41
1830                                                                ; RCVRIE DID NOT CLEAR IN RCSR
1831  003600                                                            ERRHRD 31,,DIDNOT
1832  003600  104037                            ERROR   31
1833  003602                                                            ENDIF
1834  003602                                $41:
1835  003602                                                          ENDSUB
1836
```

```
1837                                                    ; NOW SEE IF RESET CLEARS IT
1838  003602                                                        BGNSUB
1839  003602  012767  003610  175300          MOV     #64$,$LPERR
1840
1841  003610                                                            LET     @RCSR := @RCSR SET.BY #RCVRIE
1842  003610  052777  000100  175442          BIS     #RCVRIE,@RCSR
1843                                                                    ; ISSUE BUS RESET
1844  003616                                                            BRESET
1845  003616  000005                  RESET
1846  003620                                                            IF      #RCVRIE SETIN @RCSR THEN
1847  003620  032777  000100  175432          BIT     #RCVRIE,@RCSR
1848  003626  001401                  BEQ     $42
1849                                                                        ; RCVRIE DID NOT RESET IN RCSR
1850  003630                                                                ERRHRD 32,,DIDNOT
1851  003630  104040                  ERROR   32
1852  003632                                                            ENDIF
1853  003632                          $42:
1854  003632                                                            CKLOOP
1855  003632                                                        ENDSUB
1856  003632                                                ENDTST
1857
1858
1859
1860
```

```
                                ;;*****************************************************************
                                ;* THE FOLLOWING 4 TESTS VERIFY
                                ;* THAT RESET (INIT) INITIALIZES READ ONLY BITS.
                                ;*****************************************************************
                                ;*****************************************************************
                                ;*TEST 12        TEST THAT RCVRDONE - RCSR 7 - IS CLEARED BY INIT
                                ;*****************************************************************
003632  000004                  TST12:  SCOPE
003634  012767  000010  175316          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003642  012767  000012  175330          MOV     #12,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX



003650                                                          BGNSUB
003650  012767  003656  175232          MOV     #64$,$LPERR
003656                                      IF      #RCVRDONE SETIN @RCSR THEN
003656  032777  000200  175374          BIT     #RCVRDONE,@RCSR
003664  001402                          BEQ     $43

                                            ;RCVRDONE SHOULD HAVE CLEARED BY INIT
                                            ; RCVRDONE DID NOT CLEAR IN RCSR
003666                                      ERRHRD 33,HRESET, DIDNOT
003666  104041                  ERROR   33

                                            ;REISSUE RESET
003670                                      $RESET
003670  000005                  RESET
003672                                      ENDIF
003672                          $43:
                                                ;ALLOW LOOPING AFTER ERROR
003672                                      CKLOOP
003672                                  ENDSUB
003672                          ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 13        TEST THAT XMITRDY - TCSR 7 - IS SET BY INIT
                                ;;**********************************************************************
                                ;;**********************************************************************
003672  000004                  $ST13:  SCOPE
003674  012767  000010  175256          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003702  012767  000013  175270          MOV     #13,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX


003710                                                                  BGNSUB
003710  012767  003716  175172          MOV     #64$,$LPERR

003716                                      IF      #XMITRDY NOTSETIN @TCSR THEN
003716  032777  000200  175340          BIT     #XMITRDY,@TCSR
003724  001002                          BNE     $44

                                            ;RESET SHOULD HAVE SET BIT.
                                            ;XMITRDY DID NOT SET IN TCSR (AFTER RESE
003726                                      ERRHRD 34,HRESET,DIDNOT
003726  104042                          ERROR   34

                                            ;ISSUE ANOTHER RESET
003730                                      HRESET
003730  000005                          RESET

                                        ENDIF
003732  003732                  $44:
                                                    ;ALLOW LOOPING ON ERROR
003732                                          CKLOOP
003732                                      ENDSUB
003732                                  ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 14        TEST THAT DATAINT - RCSR 15 - IS CLEARED BY INIT.
                                ;;**********************************************************************
003732  000004                  TST14:  SCOPE
003734  012767  000010  175216          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003742  012767  000014  175230          MOV     #14,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX


003750                                                  BGNSUB
003750  012767  003756  175132          MOV     #64$,$LPERR
003756                                      IF      #DATAINT SETIN @RCSR THEN
003756  032777  100000  175274          BIT     #DATAINT,@RCSR
003764  001402                          BEQ     $45

003766                                          ERRHRD 35, HRESET, DIDNOT
003766  104043                          ERROR   35

                                        ;TESTING EFFECT OF RESET ON BIT

                                        ;DATAINT DID NOT CLEAR IN RCSR
                                        ;ALLOW A FRESH START
003770                                  @RESET
003770  000005                          RESET
003772                                      ENDIF
003772                          $45:
003772                                      CKLOOP
003772                                  ENDSUB
003772                              ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;;*TEST 15        TEST THAT RCVRACT - RCSR 11 - 15 CLEARED BY INIT
                                ;;**********************************************************************
003772  000004                  TST15:  SCOPE
003774  012767  000010  175156          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004002  012767  000015  175170          MOV     #15,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

004010                                                          IF      #CABLE NOTSETIN $USWR THEN
004010  032767  020000  175202          BIT     #CABLE,$USWR
004016  001004                          BNE     $46
                                                                        ; CAN'T TEST WITHOUT BERG OR H315.
004020                                                              EXIT TST
004020  012767  000001  175132          MOV     #1,$TIMES
004026  000411                          BR      TST16           ;;;EXIT THIS TEST
004030                                                          ENDIF
004030                          $46:

004030                                                          BGNSUB
004030  012767  004036  175052          MOV     #64$,$LPERR

004036                                                              IF      #RCVRACT SETIN @RCSR THEN
004036  032777  004000  175214          BIT     #RCVRACT,@RCSR
004044  001402                          BEQ     $47

                                                                        ;RESET SHOULD HAVE CLEARED RCVRACT
004046                                                                  ERRHRD 36, HRESET, DIDNOT
004046  104044                          ERROR   36

                                                                        ;TESTING EFFECT OF RESET ON BIT

                                                                        ;RCVRACT DID NOT CLEAR IN RCSR

                                                                        ;ALLOW ANOTHER TRY
004050                                                                  @RESET
004050  000005                          RESET
004052                                                              ENDIF
004052                          $47:

                                                                        ;ALLOW LOOPING ON ERROR
004052                                                              CKLOOP
004052                                                          ENDSUB
004052                                                      ENDTST
```

```
2012                                    ;;*****************************************************************
2013                                    ;* THE FOLLOWING 4 TESTS VERIFY
2014                                    ;* THAT THE EIA SIGNALS CAN BE TRANSMITTED
2015                                    ;* AND RECEIVED THROUGH THE CABLE
2016                                    ;;*****************************************************************
2017                                    ;;*****************************************************************
2018                                    ;*TEST 16        TEST THAT CARDET SETS AND CLEARS
2019                                    ;*              AS  DTR   SETS AND CLEARS
2020                                    ;;*****************************************************************
2021  004052  000004                    TST16:  SCOPE
2022  004054  012767  000010  175076            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
2023  004062  012767  000016  175110            MOV     #16,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2024                                                                            ; CAN WE USE THE WRAPAROUND??
2025  004070                                                                IF      #CABLE NOTSETIN $USWR THEN
2026  004070  032767  020000  175122            BIT     #CABLE,$USWR
2027  004076  001004                            BNE     $50
2028                                                                            ; CAN'T TEST WITHOUT BERG OR H315.
2029  004100                                                                EXIT TST
2030  004100  012767  000001  175052            MOV     #1,$TIMES
2031  004106  000441                            BR      TST17           ;;;EXIT THIS TEST
2032  004110                                                                ENDIF
2033  004110                                $50:
2034
2035                                                                            ; DTR AND
2036                                                                            ; CARDET ARE CONNECTED
2037
2038                                                                        ; BY THE H315 OR EQUIV.
2039
2040                                                            ; CLEAR
2041  004110                                                            BGNSUB
2042  004110  012767  004116  174772            MOV     #64$,$LPERR
2043
2044                                                                        ; CLEAR  DTR
2045  004116                                                            LET     @RCSR := @RCSR CLR.BY #DTR
2046  004116  042777  000002  175134            BIC     #DTR,@RCSR
2047                                                                        ; CARDET SHOULD FOLLOW
2048  004124                                                            IF      #CARDET SETIN @RCSR THEN
2049  004124  032777  010000  175126            BIT     #CARDET,@RCSR
2050  004132  001401                            BEQ     $51
2051                                                                        ; CARDET DID NOT
2052  004134                                                            ERRHRD 37,,FORCE
2053  004134  104045                            ERROR   37
2054
2055                                                                        ;  CLEAR WITH DTR
2056  004136                                                            ENDIF
2057  004136                                $51:
2058  004136                                                        ENDSUB
2059
2060                                                            ; SET
2061  004136                                                        BGNSUB
2062  004136  012767  004144  174744            MOV     #64$,$LPERR
2063
2064                                                                        ; SET DTR
2065  004144                                                            LET     @RCSR := @RCSR SET.BY #DTR
2066  004144  052777  000002  175106            BIS     #DTR,@RCSR
2067                                                                        ; CARDET SHOULD FOLLOW
```

```
2068  004152
2069  004152  032777  010000  175100          BIT     #CARDET,@RCSR
2070  004160  001001                          BNE     $52
2071
2072  004162
2073  004162  104046                          ERROR   38
2074
2075
2076  004164
2077  004164                          $52:
2078  004164
2079
2080                                                    ; CLEAR
2081  004164
2082  004164  012767  004172  174716          MOV     #64$,$LPERR
2083
2084
2085  004172
2086  004172  042777  000002  175060          BIC     #DTR,@RCSR
2087
2088  004200
2089  004200  032777  010000  175052          BIT     #CARDET,@RCSR
2090  004206  001401                          BEQ     $53
2091
2092  004210
2093  004210  104047                          ERROR   39
2094
2095
2096  004212
2097  004212                          $53:
2098  004212                                                      ENDSUB
2099  004212                                                  ENDTST
2100
2101
2102
2103
```

```
    IF      #CARDET NOTSETIN @RCSR THEN

        ; CARDET DID NOT SET
        ERRHRD 38,,FORCE

        ;  WITH DTR
    ENDIF

ENDSUB

BGNSUB

        ; CLEAR  DTR
    LET     @RCSR := @RCSR CLR.BY #DTR

        ; CARDET SHOULD FOLLOW
    IF      #CARDET SETIN @RCSR THEN

        ; CARDET DID NOT
        ERRHRD 39,,FORCE

        ;  CLEAR WITH DTR
    ENDIF
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 17        TEST THAT CLRSEND SETS AND CLEARS
                                ;*              AS  DTR   SETS AND CLEARS
                                ;;**********************************************************************
004212  000004                  TST17:  SCOPE
004214  012767  000010  174736          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004222  012767  000017  174750          MOV     #17,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ; CAN WE USE THE WRAPAROUND??
004230                                                          IF      @CABLE NOTSETIN $USWR THEN
004230  032767  020000  174762          BIT     #CABLE,$USWR
004236  001004                        BNE     $54
                                                                        ; CAN'T TEST WITHOUT BERG OR H315.
004240                                                              EXIT TST
004240  012767  000001  174712          MOV     #1,$TIMES
004246  000441                        BR      TST20           ;;;EXIT THIS TEST
004250                                                          ENDIF
004250                          $54:
                                                                        ; DTR AND
                                                                        ; CLRSEND ARE CONNECTED
                                                                ; BY THE H315 OR EQUIV.
                                                ; CLEAR
004250                                                          BGNSUB
004250  012767  004256  174632          MOV     #64$,$LPERR
                                                                ; CLEAR  DTR
                                                            LET   @RCSR := @RCSR CLR.BY #DTR
004256                                                      ; CLRSEND SHOULD FOLLOW
004256  042777  000002  174774          BIC     #DTR,@RCSR  IF    #CLRSEND SETIN @RCSR THEN
004264
004264  032777  020000  174766          BIT     #CLRSEND,@RCSR
004272  001401                        BEQ     $55
004274                                                          ; CLRSEND DID NOT
004274  104050                        ERROR   40              ERRHRD 40,,.FORCE
                                                                ;  CLEAR WITH DTR
                                                            ENDIF
004276
004276                          $55:                    ENDSUB
004276
                                                ; SET
004276                                                      BGNSUB
004276  012767  004304  174604          MOV     #64$,$LPERR
                                                                ; SET DTR
                                                            LET   @RCSR := @RCSR SET.BY #DTR
004304                                                      ; CLRSEND SHOULD FOLLOW
004304  052777  000002  174746          BIS     #DTR,@RCSR  IF    #CLRSEND NOTSETIN @RCSR THEN
004312
004312  032777  020000  174740          BIT     #CLRSEND,@RCSR
004320  001001                        BNE     $56
                                                                ; CLRSEND DID NOT SET
```

```
2160  004322
2161  004322  104051                    ERROR   41
2162
2163
2164  004324
2165  004324                        $56:
2166  004324
2167
2168                                                ; CLEAR
2169  004324
2170  004324  012767  004332  174556    MOV     #64$,$LPERR
2171
2172
2173  004332
2174  004332  042777  000002  174720    BIC     #DTR,@RCSR
2175
2176  004340
2177  004340  032777  020000  174712    BIT     #CLRSEND,@RCSR
2178  004346  001401                    BEQ     $57
2179
2180  004350
2181  004350  104052                    ERROR   42
2182
2183
2184  004352
2185  004352                        $57:
2186  004352
2187  004352                            ENDTST
2188
2189
2190
2191
```

```
        ERRHRD 41,,FORCE

            WITH DTR
    ENDIF
ENDSUB

BGNSUB

    ; CLEAR  DTR
    LET     @RCSR := @RCSR CLR.BY #DTR

    ; CLRSEND SHOULD FOLLOW
    IF      #CLRSEND SETIN @RCSR THEN

        ; CLRSEND DID NOT
        ERRHRD 42,,FORCE

        ;  CLEAR WITH DTR
    ENDIF
ENDSUB
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 20        TEST THAT RING SETS AND CLEARS
                                ;*              AS  REQSEND    SETS AND CLEARS
                                ;;*****************************************************************
004352  000004                  TST20:  SCOPE
004354  012767  000010  174576          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004362  012767  000020  174610          MOV     #20,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ; CAN WE USE THE WRAPAROUND??
                                                                IF      #CABLE NOTSETIN $USWR THEN
004370
004370  032767  020000  174622          BIT     #CABLE,$USWR
004376  001004                          BNE     $60
                                                                        ; CAN'T TEST WITHOUT BERG OR H315.
                                                                    EXIT TST
004400
004400  012767  000001  174552          MOV     #1,$TIMES
004406  000441                          BR      TST21           ;;;EXIT THIS TEST
                                                                ENDIF
004410
004410                          $60:
                                                                        ; REQSEND AND
                                                                        ; RING ARE CONNECTED

                                                                ; BY THE H315 OR EQUIV.

                                ; CLEAR
004410                                                          BGNSUB
004410  012767  004416  174472          MOV     #64$,$LPERR

                                                                    ; CLEAR  REQSEND
                                                                LET     @RCSR := @RCSR CLR.BY #REQSEND
004416
004416  042777  000004  174634          BIC     #REQSEND,@RCSR
                                                                    ; RING SHOULD FOLLOW
004424                                                          IF      #RING SETIN @RCSR THEN
004424  032777  040000  174626          BIT     #RING,@RCSR
004432  001401                          BEQ     $61

                                                                    ; RING DID NOT
                                                                ERRHRD 43,,FORCE

004434
004434  104053                          ERROR   43
                                                                    ;  CLEAR WITH REQSEND
                                                                ENDIF
004436
004436                          $61:                        ENDSUB
004436

                                ; SET                       BGNSUB
004436
004436  012767  004444  174444          MOV     #64$,$LPERR

                                                                    ; SET REQSEND
                                                                LET     @RCSR := @RCSR SET.BY #REQSEND
004444
004444  052777  000004  174606          BIS     #REQSEND,@RCSR
                                                                    ; RING SHOULD FOLLOW
004452                                                          IF      #RING NOTSETIN @RCSR THEN
004452  032777  040000  174600          BIT     #RING,@RCSR
004460  001001                          BNE     $62

                                                                    ; RING DID NOT SET
```

```
2248  004462
2249  004462  104054                    ERROR   44
2250
2251
2252  004464
2253  004464                        $62:
2254  004464
2255
2256                                                ; CLEAR
2257  004464
2258  004464  012767  004472  174416    MOV     #64$,$LPERR
2259
2260
2261  004472
2262  004472  042777  000004  174560    BIC     #REQSEND.@RCSR
2263
2264  004500
2265  004500  032777  040000  174552    BIT     #RING,@RCSR
2266  004506  001401                    BEQ     $63
2267
2268  004510
2269  004510  104055                    ERROR   45
2270
2271
2272  004512
2273  004512                        $63:
2274  004512
2275  004512
2276
2277
2278
2279
```

```
        ERRHRD 44,,FORCE

    ;  WITH REQSEND
    ENDIF

ENDSUB

BGNSUB

    ; CLEAR  REQSEND
    LET    @RCSR := @RCSR CLR.BY #REQSEND

    ; RING SHOULD FOLLOW
    IF     #RING SETIN @RCSR THEN

    ; RING DID NOT
    ERRHRD 45,,FORCE

    ;  CLEAR WITH REQSEND
    ENDIF

        ENDSUB
ENDTST
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 21        TEST THAT SECREC SETS AND CLEARS
                                ;*              AS  SECXMIT    SETS AND CLEARS
                                ;;*****************************************************************
004512  000004                  TST21:  SCOPE
004514  012767  000010  174436          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004522  012767  000021  174450          MOV     #21,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ; CAN WE USE THE WRAPAROUND??
                                                                IF      #CABLE NOTSETIN $USWR THEN
004530
004530  032767  020000  174462          BIT     #CABLE,$USWR
004536  001004                          BNE     $64
                                                                    ; CAN'T TEST WITHOUT BERG OR H315.
                                                                EXIT TST
004540
004540  012767  000001  174412          MOV     #1,$TIMES
004546  000441                          BR      TST22           ;;;EXIT THIS TEST
                                                                ENDIF
004550                          $64:

                                                                    ; SECXMIT AND
                                                                    ; SECREC ARE CONNECTED

                                                                ; BY THE H315 OR EQUIV.

                                                        ; CLEAR
004550                                                          BGNSUB
004550  012767  004556  174332          MOV     #64$,$LPERR

004556
004556  042777  000010  174474          BIC     #SECXMIT,@RCSR
                                                                    ; CLEAR  SECXMIT
                                                                LET     @RCSR := @RCSR CLR.BY #SECXMIT
004564
004564  032777  002000  174466          BIT     #SECREC,@RCSR
004572  001401                          BEQ     $65
                                                                    ; SECREC SHOULD FOLLOW
                                                                IF      #SECREC SETIN @RCSR THEN
004574
004574  104056                          ERROR   46
                                                                    ; SECREC DID NOT
                                                                    ERRHRD 46,,FORCE
004576                                                              ;  CLEAR WITH SECXMIT
                                                                ENDIF
004576                          $65:
004576
                                                        ; SET
004576                                                          BGNSUB
004576  012767  004604  174304          MOV     #64$,$LPERR

004604
004604  052777  000010  174446          BIS     #SECXMIT,@RCSR
                                                                    ; SET SECXMIT
                                                                LET     @RCSR := @RCSR SET.BY #SECXMIT
004612
004612  032777  002000  174440          BIT     #SECREC,@RCSR
004620  001001                          BNE     $66
                                                                    ; SECREC SHOULD FOLLOW
                                                                IF      #SECREC NOTSETIN @RCSR THEN
                                                                    ; SECREC DID NOT SET
```

```
2336  004622
2337  004622  104057                  ERROR   47
2338
2339
2340  004624
2341  004624                  $66:
2342  004624
2343
2344                                            ; CLEAR
2345  004624
2346  004624  012767  004632  174256          MOV     #64$,$LPERR
2347
2348
2349  004632
2350  004632  042777  000010  174420          BIC     #SECXMIT,@RCSR
2351
2352  004640
2353  004640  032777  002000  174412          BIT     #SECREC,@RCSR
2354  004646  001401                          BEQ     $67
2355
2356  004650
2357  004650  104060                  ERROR   48
2358
2359
2360  004652
2361  004652                  $67:
2362  004652
2363  004652
2364
2365
2366
2367
```

```
        ERRHRD 47,,FORCE

        ; WITH SECXMIT
    ENDIF

ENDSUB

BGNSUB

        ; CLEAR  SECXMIT
    LET   @RCSR := @RCSR CLR.BY #SECXMIT

        ; SECREC SHOULD FOLLOW
    IF    #SECREC SETIN @RCSR THEN

        ; SECREC DID NOT
        ERRHRD 48,.FORCE

        ; CLEAR WITH SECXMIT
    ENDIF

ENDSUB
ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 22        TEST THAT DATAINT (RCSR-15) SETS
                                ;*              WHEN DTR CHANGES STATE
                                ;* AND THAT DATAINT IS CLEARED AFTER READING RCSR
                                ;* NOTE DTR IS TIED TO BOTH CARDET AND CLRSEND BY THE H315
                                ;;**********************************************************************
004652  000004                  TST22:  SCOPE
004654  012767  000010  174276          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004662  012767  000022  174310          MOV     #22,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ; CAN WE USE THE WRAPAROUND??
004670                                                          IF      #CABLE NOTSETIN $USWR THEN
004670  032767  020000  174322          BIT     #CABLE,$USWR
004676  001004                        BNE     $70
                                                                        ; CAN'T TEST WITHOUT BERG OR H315.
004700                                                                  EXIT TST
004700  012767  000001  174252          MOV     #1,$TIMES
004706  000463                        BR      TST23           ;;;EXIT THIS TEST
004710                                                          ENDIF
004710                          $70:
                                                                        ;MAKE SURE NOTHING UNEXPECTED HAPPENS
004710  012746  000340                  MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
004714  012746  004722                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
004720  000002                        RTI                     ;;POP NEW PC AND PS
004722                          64$:
                                                                ;READ TWICE - CLEARS
                                                                BGNSUB
004722                                  
004722  012767  004730  174160          MOV     #65$,$LPERR
                                                                        ; CLEAR DTR
                                                                LET     @RCSR := @RCSR CLR.BY #DTR
004730                                  
004730  042777  000002  174322          BIC     #DTR,@RCSR
                                                                        ;WAIT 10 MICRO-SEC FOR CABLE
004736                                                          WAITUS  10
004736  010546                        MOV     R5, (SP)
004740  012745  000010                  MOV     #10,-(R5)
004744  004767  004544                  JSR     PC,WAIT
004750  012605                        MOV     (SP)+,R5
                                                                        ; READ RCSR - TO CLEAR DATAINT
004752                                                          LET     R3 := @RCSR
004752  017703  174302                  MOV     @RCSR,R3
                                                                        ; READ RCSR AGAIN
004756                                                          IF      #DATAINT SETIN @RCSR THEN
004756  032777  100000  174274          BIT     #DATAINT,@RCSR
004764  001401                        BEQ     $71
                                                                        ; READING RCSR DID NOT CLEAR DATAINT
004766                                                                  ERRHRD 49,EDATAINT
004766  104061                        ERROR   49
004770                                                          ENDIF
004770                          $71:
                                
004770                                                          ENDSUB
                                
                                                        ;  DTR SETTING SETS DATAINT
004770                                                          BGNSUB
```

```
2424  004770  012767  004776  174112          MOV     #64$,$LPERR
2425
2426
2427  004776
2428  004776  052777  000002  174254          BIS     #DTR,@RCSR
2429  005004
2430  005004  032777  100000  174246          BIT     #DATAINT,@RCSR
2431  005012  001001                          BNE     $72
2432
2433  005014
2434  005014  104062                          ERROR   50
2435  005016
2436  005016                          $72:
2437
2438  005016
2439  005016  032777  100000  174234          BIT     #DATAINT,@RCSR
2440  005024  001401                          BEQ     $73
2441
2442  005026
2443  005026  104063                          ERROR   51
2444  005030
2445  005030                          $73:
2446  005030
2447
2448                                                  ; DTR CLEARING SETS DATAINT
2449  005030
2450  005030  012767  005036  174052          MOV     #64$,$LPERR
2451
2452
2453  005036
2454  005036  042777  000002  174214          BIC     #DTR,@RCSR
2455  005044
2456  005044  032777  100000  174206          BIT     #DATAINT,@RCSR
2457  005052  001001                          BNE     $74
2458
2459  005054
2460  005054  104064                          ERROR   52
2461  005056
2462  005056                          $74:
2463  005056
2464  005056
2465
2466
2467
```

```
        ;SET DTR
    LET     @RCSR  := @RCSR SET.BY #DTR

    IF      #DATAINT NOTSETIN @RCSR THEN

        ;SETTING DTR DID NOT SET DATAINT
        ERRHRD 50,, E2DATA

    ENDIF

    IF      #DATAINT SETIN @RCSR THEN

        ;READING RCSR DID NOT CLEAR DATAINT
        ERRHRD 51,EDATAINT

    ENDIF

ENDSUB

    BGNSUB

        ;CLEAR DTR
    LET     @RCSR := @RCSR CLR.BY #DTR

    IF      #DATAINT NOTSETIN @RCSR THEN

        ;CLEARING DTR DID NOT SET DATAINT
        ERRHRD 52,,E2DATA

    ENDIF

ENDSUB
ENDTST
```

```
2468                                    ;;**************************************************************
2469                                    ;;**************************************************************
2470                                    ;*TEST 23        TEST THAT DATAINT SETS WHEN RING SETS
2471                                    ;*              AND THAT DATAINT DOES NOT SET WHEN RING CLEARS
2472                                    ;;**************************************************************
2473  005056  000004                    TST23:  SCOPE
2474  005060  012767  000010  174072            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
2475  005066  012767  000023  174104            MOV     #23,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2476                                                                            ; CAN WE USE THE WRAPAROUND??
2477  005074                                                                IF      #CABLE NOTSETIN $USWR THEN
2478  005074  032767  020000  174116            BIT     #CABLE,$USWR
2479  005102  001004                            BNE     $75
2480                                                                            ; CAN'T TEST WITHOUT BERG OR H315.
2481  005104                                                                EXIT TST
2482  005104  012767  000001  174046            MOV     #1,$TIMES
2483  005112  000473                            BR      TST24           ;;;EXIT THIS TEST
2484  005114                                                                ENDIF
2485  005114                            $75:
2486
2487                                                                            ;NO INTERRUPTS
2488  005114  012746  000340                    MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
2489  005120  012746  005126                    MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
2490  005124  000002                            RTI                     ;;POP NEW PC AND PS
2491  005126                            64$:
2492
2493                                                            ;START OFF WITH EVERYTHING CLEAR
2494  005126                                                                BGNSUB
2495  005126  012767  005134  173754            MOV     #65$,$LPERR
2496
2497                                                                        ;CLEAR RING
2498  005134                                                            LET     @RCSR := @RCSR CLR.BY #REQSEND
2499  005134  042777  000004  174116            BIC     #REQSEND,@RCSR
2500                                                                        ;WAIT 10 MICRO-SEC FOR CABLE
2501  005142                                                            WAITUS  10
2502  005142  010546                            MOV     R5,-(SP)
2503  005144  012745  000010                    MOV     #10,-(R5)
2504  005150  004767  004340                    JSR     PC,WAIT
2505  005154  012605                            MOV     (SP)+,R5
2506
2507  005156                                                                ;READ ONCE
2508  005156  017703  174076                                           LET     R3 := @RCSR
2509                                                                        ;READ TWICE
2510  005162                                                            IF      #DATAINT SETIN @RCSR THEN
2511  005162  032777  100000  174070            BIT     #DATAINT,@RCSR
2512  005170  001401                            BEQ     $76
2513                                                                        ;READING RCSR DID NOT CLEAR DATAINT
2514  005172                                                                ERRHRD 53, EDATAINT
2515  005172  104065                            ERROR   53
2516  005174                                                            ENDIF
2517  005174                            $76:
2518  005174                                                        ENDSUB
2519
2520                                                    ;       SET RING --> SET DATAINT
2521  005174                                                                BGNSUB
2522  005174  012767  005202  173706            MOV     #64$,$LPERR
2523
```

```
2524                                                                    ;WE ARE SETTING RING
2525                                                                    ; SET RING
2526  005202                                                        LET     @RCSR := @RCSR SET.BY #REQSEND
2527  005202  052777  000004  174050          BIS     #REQSEND,@RCSR
2528                                                                    ;WAIT 10 MICRO-SEC FOR CABLE
2529  005210                                                        WAITUS  10
2530  005210  010546                          MOV     R5,-(SP)
2531  005212  012745  000010                  MOV     #10,-(R5)
2532  005216  004767  004272                  JSR     PC,WAIT
2533  005222  012605                          MOV     (SP)+,R5
2534  005224                                                        IF      #DATAINT NOTSETIN @RCSR THEN
2535  005224  032777  100000  174026          BIT     #DATAINT,@RCSR
2536  005232  001001                          BNE     $77
2537                                                                    ;SETTING RING DID NOT SET DATAINT
2538  005234                                                            ERRHRD 82,, E2DATA
2539  005234  104122                          ERROR   82
2540  005236                                                        ENDIF
2541  005236                          $77:
2542  005236                                                    ENDSUB
2543
2544                                                        ;CLEAR RING CAUSES NO CHANGE IN DATAINT (CLEAR)
2545  005236                                                    BGNSUB
2546  005236  012767  005244  173644          MOV     #64$,$LPERR
2547
2548                                                                    ;CLEAR RING
2549  005244                                                        LET     @RCSR := @RCSR CLR.BY #REQSEND
2550  005244  042777  000004  174006          BIC     #REQSEND,@RCSR
2551                                                                    ;WAIT 10 MICRO-SEC FOR CABLE
2552  005252                                                        WAITUS  10
2553  005252  010546                          MOV     R5,-(SP)
2554  005254  012745  000010                  MOV     #10,-(R5)
2555  005260  004767  004230                  JSR     PC,WAIT
2556  005264  012605                          MOV     (SP)+,R5
2557  005266                                                        IF      #DATAINT SETIN @RCSR THEN
2558  005266  032777  100000  173764          BIT     #DATAINT,@RCSR
2559  005274  001401                          BEQ     $100
2560                                                                    ;CLEARING RING SET DATAINT
2561  005276                                                            ERRHRD 83, CLRRNG
2562  005276  104123                          ERROR   83
2563  005300                                                        ENDIF
2564  005300                          $100:
2565  005300                                                    ENDSUB
2566  005300                                                    EXIT    ;SKIP AROUND MESSAGE
2567  005300  000400                          BR      TST24           ;;;EXIT THIS TEST
2568  005302                                                        ENDTST
2569
2570
2571
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 24        TEST THAT DATAINT SETS WHEN SECREC CHANGES STATE
                                ;;*****************************************************************
005302  000004                  $TST24: SCOPE
005304  012767  000010  173646          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
005312  012767  000024  173660          MOV     #24,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ; CAN WE USE THE WRAPAROUND??
005320                                                                  IF      #CABLE NOTSETIN $USWR THEN
005320  032767  020000  173672          BIT     #CABLE,$USWR
005326  001004                        BNE     $101
                                                                        ; CAN'T TEST WITHOUT BERG OR H315.
                                                                      .IT'TST
005330
005330  012767  000001  173622          MOV     #1,$TIMES
005336  000454                        BR      TST25           ;;;EXIT THIS TEST
                                                                ENDIF
005340                          $101:
                                                                        ;NO INTERRUPTS
005340  012746  000340                  MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
005344  012746  005352                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
005350  000002                        RTI                     ;;POP NEW PC AND PS
005352                          64$:
                                                                ;START FRESH
                                                                        ;CLEAR SECREC
005352                                                          LET     @RCSR := @RCSR CLR.BY #SECXMIT
005352  042777  000010  173700          BIC     #SECXMIT,@RCSR
005360                                                          LET     R3 := @RCSR
005360  017703  173674                  MOV     @RCSR,R3
                                                        ;SET SECREC --> DATAINT SET
                                                        BGNSUB
005364
005364  012767  005372  173516          MOV     #65$,$LPERR
                                                                    ;SET SECREC
005372                                                          LET     @RCSR := @RCSR SET.BY #SECXMIT
005372  052777  000010  173660          BIS     #SECXMIT,@RCSR
                                                                    ;WAIT 10 MICRO-SEC FOR CABLE
005400                                                          WAITUS  10
005400  010546                        MOV     R5,-(SP)
005402  012745  000010                MOV     #10,-(R5)
005406  004767  004102                JSR     PC,WAIT
005412  012605                        MOV     (SP)+,R5
005414                                                          IF      #DATAINT NOTSETIN @RCSR THEN
005414  032777  100000  173636          BIT     #DATAINT,@RCSR
005422  001001                        BNE     $102
                                                                    ;SETTING SECREC DID NOT SET DATAINT
                                                                    ERRHRD 84,, E2DATA
005424
005424  104124                          ERROR   84
                                                                ENDIF
005426                          $102:
005426                                                  ENDSUB
                                                ;CLEAR SECREC --> DATAINT SET
```

```
2628  005426
2629  005426  012767  005434  173454          MOV     #64$,$LPERR
2630
2631  005434
2632  005434  042777  000010  173616          BIC     #SECXMIT,@RCSR
2633
2634  005442
2635  005442  010546                          MOV     R5,-(SP)
2636  005444  012745  000010                  MOV     #10,-(R5)
2637  005450  004767  004040                  JSR     PC,WAIT
2638  005454  012605                          MOV     (SP)+,R5
2639  005456
2640  005456  032777  100000  173574          BIT     #DATAINT,@RCSR
2641  005464  001001                          BNE     $103
2642
2643  005466
2644  005466  104125                          ERROR   85
2645  005470
2646  005470                          $103:
2647  005470
2648  005470
2649
2650
2651
```

```
BGNSUB

    ;CLEAR SECREC
LET     @RCSR := @RCSR CLR.BY #SECXMIT

    ;WAIT 10 MICRO-SEC FOR CABLE
WAITUS  10



IF      #DATAINT NOTSETIN @RCSR THEN

    ;CLEARING SECREC DID NOT SET DATAINT
    ERRHRD 85,, E2DATA

ENDIF

ENDSUB
ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 25        TEST THAT XMIT RDY - TCSR 7 - CLEARS
                                ;*              WHEN TBUF IS LOADED WITH A CHARACTER
                                ;*              AND THAT IT SETS WITHIN A REASONABLE AMOUNT OF TIME.
                                ;;**********************************************************************
005470  000004                  TST25:  SCOPE
005472  012767  000010  173460          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
005500  012767  000025  173472          MOV     #25,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

005506                                                          BGNSUB
005506  012767  005514  173374          MOV     #64$,$LPERR
                                            ; LOAD TBUF WITH ONE CHARACTER
                                            ; WAIT FOR READY TO SET
                                            ; (SHOULD BE VERY SHORT WAIT
                                            ; SINCE UART DOUBLE BUFFERS ITS INPUT)

                                                                ;SEND A CHARACTER
                                                            LET @TBUF :B= #0
005514
005514  105077  173550                  CLRB    @TBUF

                                                                ;WAIT A MAXIMUM
                                                                ;OF 50 MSEC FOR
                                                                ;XMIT RDY TO SET IN TCSR
005520                                                      CALL TIMER IN (#5,#XMITRDY,TCSR,#SET)
005520  010546                          MOV     R5,-(SP)
005522  012745  177777                  MOV     #SET,-(R5)
005526  016745  173532                  MOV     TCSR,-(R5)
005532  012745  000200                  MOV     #XMITRDY,-(R5)
005536  012745  000005                  MOV     #5,-(R5)
005542  004767  003470                  JSR     PC,TIMER
005546  012605                          MOV     (SP)+,R5
                                                                ;TIMER RETURNS AN ERROR IF BIT DID
                                                                ;NOT MEET CONDITION WITHIN TIME LIMIT
005550                                                      IF.ERROR THEN
005550  103001                          BCC     $104
                                                                ;XMIT RDY DID NOT SET IN TCSR
005552                                                          ERRHRD 54,,DIDNOT
005552  104066                          ERROR   54
005554                                                      ENDIF
005554                          $104:
                                                        ENDSUB
                                                        BGNSUB
005554
005554  012767  005562  173326          MOV     #64$,$LPERR
                                            ; LOAD TBUF WITH A SECOND CHARACTER
                                            ; CHECK IMMEDIATELY THAT XMITRDY IS CLEAR
                                            ; AND THEN WAIT FOR IT TO SET

                                                                ;SEND SECOND CHARACTER
005562                                                      LET @TBUF :B= #0
005562  105077  173502                  CLRB    @TBUF
005566  000240                                  NOP             ; GIVE IT TIME TO CLEAR
                                                                ; XMITRDY SHOULD HAVE CLEARED UPON
                                                                ; RECEIPT OF A CHARACTER
005570                                                      IF #XMITRDY SETIN @TCSR THEN
005570  032777  000200  173466          BIT     #XMITRDY,@TCSR
```

```
2708  005576  001401                    BEQ     $105
2709                                                          ; XMITRDY DID NOT CLEAR IN TCSR
2710  005600                                                  ERRHRD 55,,DIDNOT
2711  005600  104067                    ERROR   55
2712  005602                                                  ENDIF
2713  005602                          $105:
2714
2715                                                          ;WAIT A MAXIMUM
2716                                                          ;OF 50 MSEC FOR
2717                                                          ;XMIT RDY TO SET IN TCSR
2718  005602                                                  CALL TIMER IN <#5,#XMITRDY,TCSR,#SET>
2719  005602  010546                    MOV     R5,-(SP)
2720  005604  012745  177777            MOV     #SET,-(R5)
2721  005610  016745  173450            MOV     TCSR,-(R5)
2722  005614  012745  000200            MOV     #XMITRDY,-(R5)
2723  005620  012745  000005            MOV     #5,-(R5)
2724  005624  004767  003406            JSR     PC,TIMER
2725  005630  012605                    MOV     (SP)+,R5
2726  005632                                                  IF.ERROR THEN
2727  005632  103001                    BCC     $106
2728                                                          ;XMIT RDY DID NOT SET IN TCSR
2729  005634                                                  ERRHRD 56,,DIDNOT
2730  005634  104070                    ERROR   56
2731  005636                                                  ENDIF
2732  005636                          $106:
2733  005636                                              ENDSUB
2734  005636                                          ENDTST
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 26        TEST THAT OUTPUTTING A CHAR FROM TBUF (WITH MAINT SET)
                                ;*              RESULTS IN RCVRDONE SETTING WITHIN A REASONABLE AMOUNT OF TIME
                                ;*              AND THAT RESET CLEARS THE BIT.
                                ;;*****************************************************************
005636  000004                TST26:  SCOPE
005640  012767  000010  173312        MOV     #10,$TIMES      ;;DO 10 ITERATIONS
005646  012767  000026  173324        MOV     #26,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

                                                                ; SET THE MAINTENANCE BIT
005654                                                      LET @TCSR := @TCSR SET.BY #MAINT
005654  052777  000004  173402        BIS     #MAINT,@TCSR

005662                                                      BGNSUB
005662  012767  005670  173220        MOV     #64$,$LPERR
                                        ; SEND A CHARACTER AND LET IT WRAP AROUND

005670                                                          LET @TBUF :B= #0
005670  105077  173374                CLRB    @TBUF

                                                                ; WAIT A MAXIMUM OF 50 MSEC
                                                                ; FOR RCVR DONE TO SET IN
                                                                ; RCSR
005674                                                          CALL TIMER IN <#5,#RCVRDONE,RCSR,#SET>
005674  010546                        MOV     R5,-(SP)
005676  012745  177777                MOV     #SET,-(R5)
005702  016745  173352                MOV     RCSR,-(R5)
005706  012745  000200                MOV     #RCVRDONE,-(R5)
005712  012745  000005                MOV     #5,-(R5)
005716  004767  003314                JSR     PC,TIMER
005722  012605                        MOV     (SP)+,R5

                                                            ;DIDN'T SET IN TIME
005724                                                      IF.ERROR THEN
005724  103001                        BCC     $107

                                                                ; RCVRDONE DID NOT SET IN RCSR
                                                                ERRHRD 57,,DIDNOT
005726
005726  104071                        ERROR   57
005730                                                          ENDIF
005730                          $107:

005730                                                      ENDSUB

005730                                                      BGNSUB
005730  012767  005736  173152        MOV     #64$,$LPERR
                                        ; NOW THAT IT IS SET SEE IF IT CAN BE RESET
                                        ; THIS ALSO WILL CLEAR THE MAINT. BIT
005736                                                          BRESET
005736  000005                        RESET

005740                                                          IF #RCVRDONE SETIN @RCSR THEN
005740  032777  000200  173312        BIT     #RCVRDONE,@RCSR
005746  001401                        BEQ     $110

                                                                ; RCVRDONE DID NOT RESET IN RCSR.
                                                                ERRHRD 58,,DIDNOT
005750
```

```
2791  005750  104072                ERROR   58
2792  005752                                                        ENDIF
2793  005752                $110:
2794  005752                                                    ENDSUB
2795  005752                                                ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 27        TEST THAT RCVRDONE IS CLEARED BY READING RBUF
                                ;;**********************************************************************
005752  000004                  TST27:  SCOPE
005754  012767  000010  173176          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
005762  012767  000027  173210          MOV     #27,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

                                                                        ; SET MAINT. BIT
005770                                                          LET @TCSR := @TCSR SET.BY #MAINT
005770  052777  000004  173266          BIS     #MAINT,@TCSR
005776                                                          BGNSUB
005776  012767  006004  173104          MOV     #6$,$LPERR
                                            ; OUTPUT A CHARACTER WITH MAINTENANCE
                                            ; SET, AND WAIT FOR XMITRDY TO SET.

                                                                        ; OUTPUT A CHARACTER
006004                                                              LET @TBUF :B= #0
006004  105077  173260                  CLRB    @TBUF

                                                                    ; WAIT MAXIMUM OF 500 MSEC
                                                                    ; FOR RCVRDONE TO SET IN
                                                                    ; RCSR
006010                                                              CALL TIMER IN <#50,#RCVRDONE,RCSR,#SET>
006010  010546                          MOV     R5,-(SP)
006012  012745  177777                  MOV     #SET,-(R5)
006016  016745  173236                  MOV     RCSR,-(R5)
006022  012745  000200                  MOV     #RCVRDONE,-(R5)
006026  012745  000050                  MOV     #50,-(R5)
006032  004767  003200                  JSR     PC,TIMER
006036  012605                          MOV     (SP)+,R5

                                                                        ; DID IT BECAME READY?
006040                                                              IF.ERROR  THEN
006040  103001                  BCC     $111

                                                                        ;RCVRDONE DID NOT SET IN RCSR
                                                                        ERRHRD 59,, DIDNOT
006042                                                              ENDIF
006042  104073                  ERROR   59
006044
006044                          $111:                                   ENDSUB

                                            ; NOW THAT IT IS SET LETS SEE IF READING THE
                                            ; BUFFER CLEARS RCVRDONE.

                                                                        ;READ BUFFER
006044                                                              LET R0 :B= @RBUF
006044  117700  173212                  MOVB    @RBUF,R0

006050                                                              IF #RCVRDONE SETIN @RCSR THEN
006050  032777  000200  173202          BIT     #RCVRDONE,@RCSR
006056  001401                  BEQ     $112

                                                                        ;RCVRDONE DID NOT CLEAR IN RCSR
                                                                        ERRHRD 60,,DIDNOT
006060
006060  104074                  ERROR   60
006062                                                              ENDIF
006062                          $112:                           ENDTST
006062
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 30        TEST THAT RCVRACT - RCSR 11 - SETS
                                ;*              WHEN A START BIT IS RECEIVED AND
                                ;*              CLEARS WHEN RCVRDONE - RCSR 7 - SETS
                                ;;**********************************************************************
006062  000004                  TST30:  SCOPE
006064  012767  000010  173066          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
006072  012767  000030  173100          MOV     #30,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        LET @TCSR := @TCSR SET.BY #MAINT
006100
006100  052777  000004  173156          BIS     #MAINT,@TCSR
                                                                        LET FLAG :B= #CLR
006106
006106  112767  000000  003272          MOVB    #CLR,FLAG
                                                                        LET COUNT := #0
006114
006114  005067  000172                  CLR     COUNT
                                            ;LOAD A CHARACTER INTO TBUF
                                            ;WAIT FOR RCVRACT TO SET
                                ;
                                ;
                                                                    ;SEND A CHARACTER
006120                                                          LET @TBUF :B= #0
006120  105077  173144                  CLRB    @TBUF
                                                                REPEAT
006124
006124                          $113:
006124  032777  004000  173126          BIT     #RCVRACT,@RCSR
006132  001404                          BEQ     $114
                                                                    LET FLAG :B= #SET
006134
006134  112767  177777  003244          MOVB    #SET,FLAG
                                                                ELSE
006142
006142  000402                          BR      $115
006144                          $114:
                                                                    LET COUNT := COUNT + #1
006144
006144  005267  000142                  INC     COUNT
                                                                ENDIF
006150
006150                          $115:
                                                               UNTIL FLAG EQ #SET OR COUNT HI MAX
006150
006150  026727  003232  177777          CMP     FLAG,#SET
006156  001404                          BEQ     $116
006160  026767  000126  000122          CMP     COUNT,MAX
006166  101756                          BLOS    $113
006170                          $116:
                                                               IF COUNT HI MAX THEN
006170
006170  026767  000116  000112          CMP     COUNT,MAX
006176  101405                          BLOS    $117
                                                                    ;IT NEVER SET
                                                                    ;RCVRACT DID NOT SET IN RCSR.
                                                                    ERRHRD 61,, DIDNOT
006200
006200  104075                          ERROR   61
                                                                    EXIT TEST
006202
006202  012767  000001  172750          MOV     #1,$TIMES
006210  000441                          BR      TST31           ;;;EXIT THIS TEST
                                                                ENDIF
006212
006212                          $117:
```

```
                                                        ;CHECK FOR TIMING OF RCVRACT. CLEARING
                                                        ;VS RCVRDONE SETTING

                                                                                WHILE #RCVRACT SETIN @RCSR DO
006212                                  $120:
006212  032777  004000  173040          BIT     #RCVRACT,@RCSR
006220  001416                          BEQ     $121
                                                                                    IF #RCVRDONE SETIN @RCSR THEN
006222
006222  032777  000200  173030          BIT     #RCVRDONE,@RCSR
006230  001411                          BEQ     $122
006232                                                                                 IF #RCVRACT SETIN @RCSR THEN
006232  032777  004000  173020          BIT     #RCVRACT,@RCSR
006240  001405                          BEQ     $123

                                                                                ;RCVRDONE AND RCVRACT
                                                                                    ;BOTH SET
006242                                                                              ERRHRD 62, DONEACT
006242  104076                          ERROR   62
                                                                                ;NO USE CONTINUING
006244                                                                              EXIT TST
006244  012767  000001  172706          MOV     #1,$TIMES
006252  000420                          BR      TST31           ;;;EXIT THIS TEST
006254                                                                               ENDIF
006254                                  $123:                                       ENDIF
006254                                  $122:
006254                                                                          ENDDO
006254  000756                          BR      $120
006256                                  $121:

                                                                                ;RCVRACT = 0 NOW.
006256                                                                          IF #RCVRDONE NOTSETIN @RCSR THEN
006256  032777  000200  172774          BIT     #RCVRDONE,@RCSR
006264  001001                          BNE     $124

                                                                                    ;RCVRDONE DID NOT SET IN RCSR
006266                                                                              ERRHRD 63,,DIDNOT
006266  104077                          ERROR   63
                                                                                    ;SET IT BACK.
006270                                                                          ENDIF
006270                                  $124:
                                                        ;TEST THAT READING THE RECEIVER
                                                        ;BUFFER CLEARS RCVRDONE


                                                                                    ;READ CHAR.
006270                                                                          LET R0 := @RBUF
006270  017700  172766                  MOV     @RBUF,R0

006274                                                                          IF #RCVRDONE SETIN @RCSR THEN
006274  032777  000200  172756          BIT     #RCVRDONE,@RCSR
006302  001401                          BEQ     $125

                                                                                    ;RCVRDONE DID NOT CLEAR IN RCSR
006304                                                                              ERRHRD 64,,DIDNOT
006304  104100                          ERROR   64
006306                                                                          ENDIF
```

```
2964  006306                          $125:
2965
2966  006306                                                          EXIT
2967  006306  000402                          BR      TST31           ;;;EXIT THIS TEST
2968  006310  070000                          MAX:70000
2969  006312  000000                          COUNT:  0
2970
2971  006314                                                      ENDTST
2972
```

```
2973
2974                                    ;;*****************************************************************
2975                                    ;;*****************************************************************
2976                                    ;*TEST 31        TEST THE OVERRUN BIT - RBUF 14
2977                                    ;;*****************************************************************
2978  006314  000004                    TST31:  SCOPE
2979  006316  012767  000010  172634            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
2980  006324  012767  000031  172646            MOV     #31,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2981
2982  006332                                                            BGNSUB
2983  006332  012767  006340  172550            MOV     #64$,$LPERR
2984                                                        ;OUTPUT 2 CHARACTERS WITH
2985                                                        ;AMPLE DELAYS BETWEEN FOR RECEPTION.
2986                                                        ;THIS SHOULD AN CAUSE OVERRUN ERROR.
2987
2988                                                                        ;OUTPUT 1 CHARACTER
2989  006340                                                            LET @TBUF :B= #0
2990  006340  105077  172724                    CLRB    @TBUF
2991                                                                        ;GO AWAY FOR 500 M SEC
2992  006344                                                            WAITUS 50
2993  006344  010546                    MOV     R5,-(SP)
2994  006346  012745  000050            MOV     #50,-(R5)
2995  006352  004767  003136            JSR     PC,WAIT
2996  006356  012605                    MOV     (SP)+,R5
2997
2998                                                                        ;OUTPUT 2ND CHARACTER
2999  006360                                                            LET @TBUF :B= #0
3000  006360  105077  172704                    CLRB    @TBUF
3001                                                                        ;LET OVERRUN HAPPEN
3002  006364                                                            WAITUS 50
3003  006364  010546                    MOV     R5,-(SP)
3004  006366  012745  000050            MOV     #50,-(R5)
3005  006372  004767  003116            JSR     PC,WAIT
3006  006376  012605                    MOV     (SP)+,R5
3007
3008                                                                        ;READ BUFFER AND ERROR BITS
3009  006400                                                            LET R4 := @RBUF
3010  006400  017704  172656                    MOV     @RBUF,R4
3011
3012                                                                        ;IT DIDN'T SET
3013  006404                                                            IF #ORERR NOTSETIN R4 THEN
3014  006404  032704  040000                    BIT     #ORERR,R4
3015  006410  001005                    BNE     $126
3016                                                                        ;ORERR DID NOT SET IN RBUF
3017  006412                                                            ERRHRD 65,,DIDNOT
3018  006412  104101                    ERROR   65
3019
3020                                                                        ;NO USE COMPOUNDING ERRORS
3021  006414                                                            EXIT TST
3022  006414  012767  000001  172536            MOV     #1,$TIMES
3023  006422  000500                    BR      TST32           ;;;EXIT THIS TEST
3024  006424                                                                ENDIF
3025  006424                            $126:
3026  006424                                                        ENDSUB
3027
3028                                    ;NOW SEE IF ERROR BIT SET WITH OVERRUN  ERROR:
```

```
3029  006424                                                          BGNSUB
3030  006424  012767  006432  172456        MOV     #64$,$LPERR
3031  006432                                    IF #ERROR NOTSETIN R4 THEN
3032  006432  032704  100000                BIT     #ERROR,R4
3033  006436  001005                        BNE     $127
3034
3035                                                                      ;ERROR DID NOT SET IN RBUF
3036  006440                                                              ERRHRD 66,,DIDNOT
3037  006440  104102                        ERROR   66
3038
3039                                                                      ;-WHEN ORERR SET.
3040                                                                      ;GET OUT NOW.
3041  006442                                                              EXIT TST
3042  006442  012767  000001  172510        MOV     #1,$TIMES
3043  006450  000465                        BR      TST32           ;;;EXIT THIS TEST
3044  006452                                                          ENDIF
3045  006452                          $127:
3046  006452                                                          ENDSUB
3047
3048  006452                                                          BGNSUB
3049  006452  012767  006460  172430        MOV     #64$,$LPERR
3050                                            ;CHECK REAL RBUF TO SEE IF ORERR IS STILL SET.
3051
3052  006460                                                          IF #ORERR NOTSETIN @RBUF THEN
3053  006460  032777  040000  172574        BIT     #ORERR,@RBUF
3054  006466  001002                        BNE     $130
3055
3056                                                                      ;READING RBUF CLEARED ORERR.
3057  006470                                                              ERRHRD 67,ITCLRED
3058  006470  104103                        ERROR   67
3059                                                                      ;SKIP REST OF TEST
3060  006472                                                              EXIT
3061  006472  000454                        BR      TST32           ;;;EXIT THIS TEST
3062  006474                                                          ENDIF
3063  006474                          $130:
3064  006474                                                      ENDSUB
3065
3066  006474                                                      BGNSUB
3067  006474  012767  006502  172406        MOV     #64$,$LPERR
3068                                            ;NOW SEE IF THEY CLEAR WHEN ANOTHER CHAR. IS RECEIVED
3069
3070                                                                  ;SEND A CHARACTER AROUND.
3071  006502                                                      LET @TBUF :B= #0
3072  006502  105077  172562                CLRB    @TBUF
3073                                                                  ;LET IT CIRCULATE
3074  006506                                                      WAITUS 50
3075  006506  010546                        MOV     R5,-(SP)
3076  006510  012745  000050                MOV     #50,-(R5)
3077  006514  004767  002774                JSR     PC,WAIT
3078  006520  012605                        MOV     (SP)+,R5
3079
3080  006522                                                      IF #ORERR SETIN @RBUF THEN
3081  006522  032777  040000  172532        BIT     #ORERR,@RBUF
3082  006530  001405                        BEQ     $131
3083                                                                  ;ORERR DID NOT CLEAR IN RBUF
3084  006532                                                          ERRHRD 68,,DIDNOT
```

```
                        ERROR   68

                                                        ;-AFTER RECEIVING ANOTHER CHAR
                                                        ;SKIP AROUND REST
                                                        EXIT TST
006534
006534  012767  000001  172416        MOV     #1,$TIMES
006542  000430                        BR      TST32           ;;;EXIT THIS TEST
                                                        ENDIF
006544
006544                          $131:
006544
                                                        IF #ERROR SETIN @RBUF THEN
006544  032777  100000  172510        BIT     #ERROR,@RBUF
006552  001401                        BEQ     $132
                                                        ;ERROR DID NOT CLEAR IN RBUF
                                                        ERRHRD 69,,DIDNOT
006554
006554  104105                        ERROR   69
006556                                                  ENDIF
006556                          $132:
006556                                                  ENDSUB
006556                                                  EXIT
006556  000422                        BR      TST32           ;;;EXIT THIS TEST
006560  042522  042101  047111                          ITCLRED:        .ASCIZ  /READING RBUF CLEARED OV
006566  020107  041122  043125
006574  041440  042514  051101
006602  042105  047440  042526
006610  051122  047125  042440
006616  051122  051117  000056
                                                                .EVEN
006624                                                  ENDTST
```

```
3116
3117                                    ;;*****************************************************************
3118                                    ;;*****************************************************************
3119                                    ;*TEST 32        PROGRAMMABLE BAUD RATE TEST
3120                                    ;*              TEST AT ALL SPEEDS AVAILABLE
3121                                    ;*              A COMPARISON WILL BE MADE TO SEE
3122                                    ;*              IF NEW TIME IS LESS THAN PREVIOUS.
3123                                    ;;*****************************************************************
3124  006624  000004                   TST32:  SCOPE
3125  006626  012767  000010  172324           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
3126  006634  012767  000032  172336           MOV     #32,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                        IF #PBR NOTSETIN $USWR THEN
3127  006642
3128  006642  032767  000200  172350           BIT     #PBR,$USWR
3129  006650  001004                           BNE     $133
3130  006652                                                  EXIT TST
3131  006652  012767  000001  172300           MOV     #1,$TIMES
3132  006660  000542                           BR      TST33           ;;;EXIT THIS TEST
                                                        ENDIF
3133  006662
3134  006662                           $133:
3135
3136  006662                                                  LET OLD := #-1
3137  006662  012767  177777  000272           MOV     #-1,OLD
3138  006670                                                  LET OLD+2 := #-1
3139  006670  012767  177777  000266           MOV     #-1,OLD+2
3140  006676                                                  LET @TCSR := @TCSR SET.BY #MAINT
3141  006676  052777  000004  172360           BIS     #MAINT,@TCSR
3142                                                  ;EACH BAUD RATE
3143  006704                                  INCR R3 FROM #0 TO #15. BY #1
3144  006704  005003                           CLR     R3
3145  006706  000401                           BR      $134
3146  006710                           $135:
3147  006710  005203                           INC     R3
3148  006712                           $134:
3149  006712  020327  000017                   CMP     R3,#15.
3150  006716  003060                           BGT     $136
3151  006720                                  LET R0 := @RBUF
3152  006720  017700  172336                   MOV     @RBUF,R0
3153                                                  ;CHANGE BAUDE RATE
3154  006724                                      LET @TCSRHI :8= RATES(R3)
3155  006724  116377  007104  172334           MOVB    RATES(R3),@TCSRHI
3156                                                  ;FLAG
3157  006732                                      LET BIT := #0
3158  006732  005002                           CLR     BIT
3159                                                  ;OUTPUT THE CHARACTER
3160  006734                                      LET @TBUF := #0
3161  006734  005077  172330                   CLR     @TBUF
3162                                                  ;INITIALIZE COUNTER
3163  006740                                      LET NEW := #0
3164  006740  005067  000212                   CLR     NEW
3165  006744                                      LET NEW+2 := #0
3166  006744  005067  000210                   CLR     NEW+2
3167  006750                                      WHILE BIT EQ #0 DO
3168  006750                           $137:
3169  006750  005702                           TST     BIT
3170  006752  001014                           BNE     $140
3171  006754                                          IF #RCVRDONE SETIN @RCSR THEN
```

```
3172  006754  032777  000200  172276          BIT     #RCVRDONE,@RCSR
3173  006762  001403                          BEQ     $141
3174
3175  006764
3176  006764  012702  000001                  MOV     #1,BIT
3177  006770
3178  006770  000404                          BR      $142
3179  006772                          $141:
3180
3181  006772
3182  006772  005267  000160                  INC     NEW
3183  006776
3184  006776  005567  000156                  ADC     NEW+2
3185  007002
3186  007002                          $142:
3187
3188  007002
3189  007002  000762                          BR      $137
3190  007004                          $140:
3191
3192  007004
3193  007004  026767  000150  000152          CMP     NEW+2,OLD+2
3194  007012  103001                          BHIS    $143
3195
3196  007014
3197  007014  000412                          BR      $144
3198  007016                          $143:
3199
3200  007016
3201  007016  026767  000136  000140          CMP     NEW+2,OLD+2
3202  007024  001005                          BNE     $145
3203  007026  026767  000124  000126          CMP     NEW,OLD
3204  007034  103001                          BHIS    $145
3205
3206  007036
3207  007036  000401                          BR      $146
3208  007040                          $145:
3209
3210
3211
3212
3213  007040
3214  007040  104126                          ERROR   86
3215  007042
3216  007042                          $146:
3217  007042
3218  007042                          $144:
3219
3220  007042
3221  007042  016767  000110  000112          MOV     NEW,OLD
3222  007050
3223  007050  016767  000104  000106          MOV     NEW+2,OLD+2
3224
3225  007056
3226  007056  000714                          BR      $135
3227  007060                          $136:
```

```
        ;DONE - ITS READY
            LET BIT := #1

        ELSE


        ;OTHERWISE-INCREMENT TIME
            LET NEW := NEW + #1

            LET NEW+2 := NEW+2 + CARRY

        ENDIF

        ;SIGNALS DONE
    ENDDO


    IF NEW+2 LO OLD+2 THEN

        ; OK
    ELSE
        ; NEW+2 >= OLD+2
        IF NEW+2 EQ OLD+2 AND NEW LO OLD THEN



            ;OK
        ELSE

            ;NEW+2 > OLD+2 OR
            ;(NEW+2 = OLD+2 AND
            ; NEW >= OLD)
            ;BAUD RATE DIDN'T CHANGE
            ERRHRD 86, BAUDRATE

        ENDIF

    ENDIF

        ;UPDATE OLD TIME
    LET OLD := NEW

    LET OLD+2 := NEW+2


ENDINC  ;BAUD RATE
```

```
3228  007060                                                    LET R3 :B= $USWR+1 AND #17      ; PUT BAUD BACK
3229  007060  116703  172135                MOVB    $USWR+1,R3
3230  007064  110346                       MOVB    R3,-(SP)
3231  007066  142716  000017               BICB    #17,(SP)
3232  007072  142603                       BICB    (SP)+,R3
3233  007074                                                    LET @TCSRHI :B= RATES(R3)       ; LIKE HE WANTED IT
3234  007074  116377  007104  172164       MOVB    RATES(R3),@TCSRHI
3235
3236  007102                                                            EXIT    ;SKIP TABLE
3237  007102  000431                       BR      TST33           ;;;EXIT THIS TEST
3238
3239  007104                        RATES:  ;A TABLE OF THE ACTUAL BYTES TO MOVE INTO THE
3240                                ;UPPER BYTE OF XCSR FOR EACH BAUD RATE
3241                                ;** NOTE::      THE VALUE INDICATED IN THE COLUMN 'OFFSET
3242                                ;**             INTO TABLE' CAN BE PLACED INTO BITS<11:8>
3243                                ;**             OF LOCATION '$USWR' TO CAUSE THE CORROSPONDING
3244                                ;**             BAUD TO BE SELECTED IN THE DLV11-E UPON
3245                                ;**             COMPLETION OF THIS TEST.
3246
3247                                                            ;       BAUD    OFFSET INTO TABLE
3248  007104     010                R0050:  .BYTE   010        ;       50      0
3249  007105     030                R0070:  .BYTE   030        ;       70      1
3250  007106     050                R0110:  .BYTE   050        ;       110     2
3251  007107     070                R0135:  .BYTE   070        ;       135     3
3252  007110     110                R0150:  .BYTE   110        ;       150     4
3253  007111     130                R0300:  .BYTE   130        ;       300     5
3254  007112     150                R0600:  .BYTE   150        ;       600     6
3255  007113     170                R0200:  .BYTE   170        ;       1200    7
3256  007114     210                R1800:  .BYTE   210        ;       1800    10
3257  007115     230                R2000:  .BYTE   230        ;       2000    11
3258  007116     250                R2400:  .BYTE   250        ;       2400    12
3259  007117     270                R3600:  .BYTE   270        ;       3600    13
3260  007120     310                R4800:  .BYTE   310        ;       4800    14
3261  007121     330                R7200:  .BYTE   330        ;       7200    15
3262  007122     350                R9600:  .BYTE   350        ;       9600    16
3263  007123     370                R10000: .BYTE   370        ;       19200   17
3264
3265  007124  040502  042125  051040  BAUDRATE:       .ASCIZ  /BAUD RATE DIDN'T CHANGE./
3266  007132  052101  020105  044504
3267  007140  047104  052047  041440
3268  007146  040510  043516  027105
3269  007154     000
3270          007156                  .EVEN
3271  007156  000000  000000          NEW:    0,0
3272  007162  000000  000000          OLD:    0,0
3273  007166                                                                  ENDTST
3274
3275
3276
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 33        TRANSMITTER INTERRUPT LOGIC TEST
                                ;*               LOGICALLLY THIS IS 4 SEPARATE TESTS
                                ;*               A) DOES TRANSMITTER INTERRUPT LOGIC WORK
                                ;*               B) AT PRIORITY OF 0
                                ;*               C) AND ONLY ONCE
                                ;*               D) BUT NOT WITH INTERRUPT ENABLE CLEAR
                                ;;**********************************************************************
007166  000004                  TST33:  SCOPE
007170  012767  000010  171762          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
007176  012767  000033  171774          MOV     #33,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ;CLEAR 'INTERRUPT OCCURED' FLAG
                                                                LET INTFLAG := #0
007204  005067  002372                  CLR     INTFLAG

                                                                        ;GET VECTOR ADDRESS
                                                                LET R3 := DLVEC
007210  016703  172042                  MOV     DLVEC,R3
                                                                        ;FOR THE TRANSMITTER
                                                                LET R3 := R3 + #4
007214  062703  000004                  ADD     #4,R3
                                                                        ;SET VECTOR TO POINT TO TRANS.SRV AT PRI
                                                                SETVEC R3, #INTSRV, #PR7
007220  010146                  MOV     R1,-(SP)
007222  010301                  MOV     R3,R1
007224  012721  011574          MOV     #INTSRV,(R1)+
007230  012711  000340          MOV     #PR7,(R1)
007234  012601                  MOV     (SP)+,R1
                                                                BGNSUB
007236  012767  007244  171644          MOV     #65$,$LPERR
                                                                        ;CLEAR INTERRUPT ENABLE
                                                                LET @TCSR := @TCSR CLR.BY #XMITIE
007244  042777  000100  172012          BIC     #XMITIE,@TCSR

                                                                        ;SET IT TO 0
007252  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
007256  012746  007264                  MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
007262  000002                  RTI                             ;;POP NEW PC AND PS
007264                          65$:

                                                                        ;NOW SET I.E. BIT
                                                                LET @TCSR := @TCSR SET.BY #XMITIE
007264  052777  000100  171772          BIS     #XMITIE,@TCSR

                                                                        ;LET INTERRUPT HAVE TIME TO OCCUR
                                                                WAITUS 10
007272  010546                  MOV     R5,-(SP)
007274  012745  000010                  MOV     #10,-(R5)
007300  004767  002210                  JSR     PC,WAIT
007304  012605                  MOV     (SP)+,R5

                                                                        ;DID EXACTLY 1 INTERRUPT OCCUR
                                                                IF INTFLAG NE #1 THEN
007306  026727  002270  000001          CMP     INTFLAG,#1
007314  001406                  BEQ     $147
```

```
3333
3334  007316
3335  007316  005767  002260          TST     INTFLAG                         ;NO - WAS IT 0 OR MORE THAN ONCE
3336  007322  001002                  BNE     $150                            IF INTFLAG EQ #0 THEN
3337
3338  007324
3339  007324  104106                  ERROR   70                              ;TRANSMITTER DID NOT INTERRUPT IN TIME
3340  007326                                                                      ERRHRD 70,,DIDNOT
3341  007326  000401                  BR      $151                            ELSE
3342  007330                  $150:
3343
3344
3345  007330
3346  007330  104107                  ERROR   71                              ;TWICE
3347  007332                                                                  ;TRANSMITTER INTERRUPTED TWICE
3348  007332                  $151:                                               ERRHRD 71,,TWICE
3349  007332                                                                  ENDIF
3350  007332                  $147:                                       ENDIF
3351  007332                                                              ENDSUB
3352                                                          ;INTERRUPT WITHOUT INTERRUPT ENABLE SET
3353  007332                                                              BGNSUB
3354  007332  012767  007340  171550  MOV     #64$,$LPERR
3355                                                                          ;CLEAR 'INTERRUPT OCCURED' FLAG
3356  007340                                                                  LET INTFLAG := #0
3357  007340  0C5067  002236          CLR     INTFLAG
3358                                                                          ;CLEAR INTERRUPT ENABLE
3359  007344                                                                  LET @TCSR := @TCSR CLR.BY #XMITIE
3360  007344  042777  000100  171712  BIC     #XMITIE,@TCSR
3361                                                                          ;NO INTERRUPTS SHOULD OCCUR.
3362  007352  012746  000000          MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
3363  007356  012746  007364          MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
3364  007362  000002                  RTI                     ;;POP NEW PC AND PS
3365  007364                  65$:
3366                                                                          ;DARE IT TO HAPPEN
3367  007364                                                                  WAITUS 10
3368  007364  010546                  MOV     R5,-(SP)
3369  007366  012745  000010          MOV     #10,-(R5)
3370  007372  004767  002116          JSR     PC,WAIT
3371  007376  012605                  MOV     (SP)+,R5
3372  007400                                                                  IF INTFLAG NE #0 THEN
3373  007400  005767  002176          TST     INTFLAG
3374  007404  001401                  BEQ     $152
3375                                                                              ;INTERRUPT OCCURED WITH I E CLEARED
3376  007406                                                                      ERRHRD 72,NOTENAB
3377  007406  104110                  ERROR   72                              ENDIF
3378  007410
3379  007410                  $152:                                           BRESET
3380  007410
3381  007410  000005                  RESET                               ENDSUB
3382  007412                                                                  ;RESTORE VECTOR AREA
3383                                                                      CLRVEC R3
3384  007412
3385  007412  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3386  007414  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3387  007416  012701  000003          MOV     #R3,R1
3388  007422  010102                  MOV     R1,R2
```

```
3389  007424  062702  000002          ADD     #2,R2
3390  007430  010221                  MOV     R2,(R1)+
3391  007432  005011                  CLR     (R1)
3392  007434  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
3393  007436  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
3394
3395  007440                                                      ENDTST
3396
3397
3398
3399
3400
3401
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 34        RECEIVER INTERRUPT LOGIC TEST
                                ;*              THIS TEST COVERS ALL OF THE RECEIVER
                                ;*              SIDE OF THE INTERRUPT LOGIC, BOTH DATASET
                                ;*              AND CHARACTER MODES.
                                ;;**********************************************************************
007440  000004                  ↑ST34:  SCOPE
007442  012767  000010  171510          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
007450  012767  000034  171522          MOV     #34,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ;CLEAR INTERRUPT OCCURED FLAG
                                                                        ;SET UP RECEIVER INTER.VECTOR
007456                                                          SETVEC DLVEC,#INTSRV,#PR7
007456  010146                          MOV     R1,-(SP)
007460  016701  171572                  MOV     DLVEC,R1
007464  012721  011574                  MOV     #INTSRV,(R1)+
007470  012711  000340                  MOV     #PR7,(R1)
007474  012601                          MOV     (SP)+,R1
                                        ;PRIORITY 0 AND MULTIPLE INTERRUPT TEST.-RCVRIE
007476                                                          BGNSUB
007476  012767  007504  171404          MOV     #64$,$LPERR
007504                                                          LET INTFLAG := #0
007504  005067  002072                  CLR     INTFLAG
                                                                        ;SET MAINT. BIT
007510                                                          LET @TCSR := @TCSR SET.BY #MAINT
007510  052777  000004  171546          BIS     #MAINT,@TCSR
                                                                        ;CLEAR INTERRUPTS
007516                                                          LET @RCSR := @RCSR CLR.BY #RCVRIE
007516  042777  000100  171534          BIC     #RCVRIE,@RCSR
                                                                        ;CHANGE PRIORITY
                                                                        ;..TO 0
007524  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
007530  012746  007536                  MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
007534  000002                          RTI                     ;;POP NEW PC AND PS
007536                          65$:
                                                                        ;SEND A CHARACTER
007536                                                          LET @TBUF :B= #0
007536  105077  .71526                  CLRB    @TBUF
                                                                        ;WAIT A MAXIMUM
                                                                ;OF 50 MSEC FOR
                                                                ;XMIT RDY TO SET IN TCSR
007542                                                          CALL TIMER IN (#50,#XMITRDY,TCSR,#SET)
007542  010546                          MOV     R5,-(SP)
007544  012745  177777                  MOV     #SET,-(R5)
007550  016745  171510                  MOV     TCSR,-(R5)
007554  012745  000200                  MOV     #XMITRDY,-(R5)
007560  012745  000050                  MOV     #50,-(R5)
007564  004767  001446                  JSR     PC,↑TIMER
007570  012605                          MOV     (SP)+,R5
                                                                        ;SET INTERRUPT ENABLE
007572                                                          LET @RCSR := @RCSR SET.BY #RCVRIE
007572  052777  000100  171460          BIS     #RCVRIE,@RCSR
                                                                        ;LET IT COME IN.
007600                                                          WAITUS 10
007600  010546                          MOV     R5,-(SP)
```

```
3458  007602  012745  000010          MOV     #10,-(R5)
3459  007606  004767  001702          JSR     PC,WAIT
3460  007612  012605                  MOV     (SP)+,R5
3461
3462                                                    ;DID HE DO IT RIGHT?
3463  007614                                          IF INTFLAG NE #1 THEN
3464  007614  026727  001762  000001          CMP     INTFLAG,#1
3465  007622  001406                  BEQ     $153
3466
3467  007624                                              ;NONE OCCURED
3468  007624  005767  001752                  TST     INTFLAG     IF INTFLAG EQ #0 THEN
3469  007630  001002                  BNE     $154
3470
3471  007632                                              ;RECEIVER DID NOT INTERRUPT IN TIME
3472  007632  104111                  ERROR   73              ERRHRD 73,,DIDNOT
3473
3474  007634                                              ;TWICE OR MORE
3475  007634  000401                  BR      $155        ELSE
3476  007636                  $154:
3477
3478  007636                                              ;RECEIVER INTERRUPTED TWICE
3479  007636  104112                  ERROR   74              ERRHRD 74,,TWICE
3480  007640
3481  007640                  $155:                       ENDIF
3482  007640
3483  007640                  $153:                   ENDIF
3484
3485  007640                                                  ;RESET MAINT. BIT.
3486  007640  042777  000004  171416          BIC     #MAINT,@TCSR    LET @TCSR := @TCSR CLR.BY #MAINT
3487  007646                                          ENDSUB
3488
3489
3490
3491
3492
3493
3494                                          ;INTERRUPT WITHOUT I E SET.
3495  007646                                          BGNSUB
3496  007646  012767  007654  171234          MOV     #64$,$LPERR
3497  007654                                          LET @TCSR := @TCSR SET.BY #MAINT
3498  007654  052777  000004  171402          BIS     #MAINT,@TCSR
3499
3500                                                  ;CLEAR INTERRUPT FLAG
3501  007662                                      LET INTFLAG := #0
3502  007662  005067  001714                  CLR     INTFLAG
3503                                                  ;CLEAR INTERRUPT
3504  007666                                      LET @RCSR := @RCSR CLR.BY #RCVRIE
3505  007666  042777  000100  171364          BIC     #RCVRIE,@RCSR
3506                                                  ;DON'T LET THEM IN
3507  007674  012746  000340                  MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
3508  007700  012746  007706                  MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
3509  007704  000002                  RTI                             ;;POP NEW PC AND PS
3510  007706                  65$:
3511                                                  ;DARE IT
3512  007706                                      WAITUS 10
3513  007706  010546                  MOV     R5,-(SP)
```

```
3514  007710  012745  000010          MOV     #10,-(R5)
3515  007714  004767  001574          JSR     PC,WAIT
3516  007720  012605                  MOV     (SP)+,R5
3517                                                        ;DID IT HAPPEN?
3518  007722                                              IF INTFLAG NE #0 THEN
3519  007722  005767  001654          TST     INTFLAG
3520  007726  001401                  BEQ     $156
3521                                                            ;INTERRUPT OCCURED AT PRIORITY 7
3522  007730                                                    ERRHRD 77,NOTENAB
3523  007730  104115                  ERROR   77
3524  007732                                                  ENDIF
3525  007732                      $156:
3526                                                            ;CLEAR THE WORLD
3527  007732                                                  BRESET
3528  007732  000005                  RESET
3529
3530                                                        ;RESET MAINT. BIT.
3531  007734                                              LET @TCSR := @TCSR CLR.BY #MAINT
3532  007734  042777  000004  171322  BIC     #MAINT,@TCSR
3533  007742                                              ENDSUB
3534
3535                              ;PRIORITY 0 AND MULTIPLE INTERRUPT TEST.-DATAIE
3536  007742                                              BGNSUB
3537  007742  012767  007750  171140  MOV     #64$,$LPERR
3538  007750                                              IF #CABLE NOTSETIN $USWR THEN
3539  007750  032767  020000  171242  BIT     #CABLE,$USWR
3540  007756  001004                  BNE     $157
3541                                                            ;CAN'T TEST WITHOUT A CABLE
3542  007760                                                  EXIT TST
3543  007760  012767  000001  171172  MOV     #1,$TIMES
3544  007766  000463                  BR      TST35           :::EXIT THIS TEST
3545  007770                                                  ENDIF
3546  007770                      $157:
3547                                                            ; CLEAR 'INTFLAG'
3548  007770                                                  LET INTFLAG := #0
3549  007770  005067  001606          CLR     INTFLAG
3550                                                            ;CLEAR INTERRUPTS
3551  007774                                                  LET @RCSR := @RCSR CLR.BY #DATAIE
3552  007774  042777  000040  171256  BIC     #DATAIE,@RCSR
3553                                                            ;CHANGE PRIORITY
3554                                                            ;..TO 5
3555  010002  012746  000000          MOV     #PRC,-(SP)      ;;PUT NEW PS ON STACK
3556  010006  012746  010014          MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
3557  010012  000002                  RTI                     ;;POP NEW PC AND PS
3558  010014                      64$:
3559  010014                                                  LET @RCSR := @RCSR CLR.BY #REQSEND
3560  010014  042777  000004  171236  BIC     #REQSEND,@RCSR
3561                                                            ;SET INTERRUPT ENABLE
3562  010022                                                  LET @RCSR := @RCSR SET.BY #DATAIE
3563  010022  052777  000040  171230  BIS     #DATAIE,@RCSR
3564  010030                                                  LET    @RCSR := @RCSR SET.BY #REQSEND
3565  010030  052777  000004  171222  BIS     #REQSEND,@RCSR
3566                                                            ;LET IT COME IN.
3567  010036                                                  WAITUS 10
3568  010036  010546                  MOV     R5,-(SP)
3569  010040  012745  000010          MOV     #10,-(R5)
```

```
3570  010044  004767  001444          JSR     PC,WAIT
3571  010050  012605                  MOV     (SP)+,R5
3572
3573
3574  010052
3575  010052  026727  001524  000001  CMP     INTFLAG,#1
3576  010060  001406                  BEQ     $160
3577
3578  010062
3579  010062  005767  001514          TST     INTFLAG
3580  010066  001002                  BNE     $161
3581
3582  010070
3583  010070  104113                  ERROR   75
3584
3585  010072
3586  010072  000401                  BR      $162
3587  010074                  $161:
3588
3589  010074
3590  010074  104114                  ERROR   76
3591  010076
3592  010076                  $162:
3593  010076
3594  010076                  $160:
3595  010076
3596  010076  042777  000040  171154  BIC     #DATAIE,@RCSR
3597  010104
3598
3599  010104
3600  010104  017704  171146          MOV     @DLVEC,R4
3601  010110
3602  010110  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3603  010112  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3604  010114  012701  000004          MOV     #R4,R1
3605  010120  010102                  MOV     R1,R2
3606  010122  062702  000002          ADD     #2,R2
3607  010126  010221                  MOV     R2,(R1)+
3608  010130  005011                  CLR     (R1)
3609  010132  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
3610  010134  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
3611  010136
```

```
    ; DID IT DO IT RIGHT?
IF INTFLAG NE #1 THEN


    ;NONE OCCURED
    IF INTFLAG EQ #0 THEN


    ;DATAINT  DID NOT INTERRUPT IN TIME
        ERRHRD 75,,DIDNOT

    ;TWICE OR MORE
    ELSE


    ; DATAINT INTERRUPTED TWICE
        ERRHRD 76,,TWICE

    ENDIF

ENDIF

LET @RCSR := @RCSR CLR.BY #DATAIE
                                ENDSUB

                                LET R4 := @DLVEC
                                CLRVEC R4
                                ENDTST
```

```
                        ;;**********************************************************************
                        ;;**********************************************************************
                        ;*TEST 35        TEST ACTUAL DATA TRANSFERED
                        ;*                NON-INTERRUPT MAINTENANCE BIT SET
                        ;;**********************************************************************
010136  000004          TST35:  SCOPE
010140  012767  000001  171012          MOV     #1,$TIMES       ;;DO 1 ITERATION
010146  012767  000035  171024          MOV     #35,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                ;SET MAINT. BIT
                                                        LET @TCSR := @TCSR SET.BY #MAINT
010154
010154  052777  000004  171102          BIS     #MAINT,@TCSR
                                                                ;CHANGE PRIORITY
                                                                ;..TO 0
010162  012746  000000                  MOV     #PRO,-(SP)      ;;PUT NEW PS ON STACK
010166  012746  010174                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
010172  000002                          RTI                     ;;POP NEW PC AND PS
010174                          64$:
                                                                ;GET DATA MASK.
                                                        CALL DATLNG OUT <R1>
010174
010174  162705  000002                  SUB     #1*2,R5
010200  004767  001210                  JSR     PC,DATLNG
010204  012501                          MOV     (R5)+,R1
                                                                ;ALL BINARY CHAR.
                                                        INCR R2 FROM #0 TO #377 BY #1
010206
010206  005002                          CLR     R2
010210  000401                          BR      $163
010212                          $164:
010212  005202                          INC     R2
010214                          $163:
010214  020227  000377                  CMP     R2,#377
010220  003023                          BGT     $165
                        ;TRANSMIT CHAR IN R2
                        REPEAT
010222
010222                          $166:
                                    ;IS IT READY?
                        UNTIL #XMITRDY SETIN @TCSR
010222
010222  032777  000200  171034          BIT     #XMITRDY,@TCSR
010230  001774                          BEQ     $166
                                    ;TRANSMIT IT
                        LET @TBUF :B= R2
010232
010232  110277  171032                  MOVB    R2,@TBUF
                        REPEAT
010236
010236                          $167:
                                    ;WAIT TILL ITS HERE
                        UNTIL #RCVRDONE SETIN @RCSR
010236
010236  032777  000200  171014          BIT     #RCVRDONE,@RCSR
010244  001774                          BEQ     $167
                                    ;AND SAVE IT
                        LET R3 := @RBUF
010246
```

```
3668  010246  017703  171010          MOV     @RBUF,R3
3669
3670                                                    ;COMPARE TO SEE IF WE RECEIVED IT ALL
3671
3672                                                        ;CLEAN OFF NON-DATA BITS
3673                                                        ;ON BOTH TRANSMITTED AND
3674                                                    LET R4 := R2 CLR.BY R1
3675  010252
3676  010252  010204          MOV     R2,R4
3677  010254  040104          BIC     R1,R4
3678  010256                                            LET R3 := R3 CLR.BY R1
3679  010256  040103          BIC     R1,R3
3680
3681                                                    ;RECEIVED DATA
3682  010260                                            IF R4 NE R3 THEN
3683  010260  020403          CMP     R4,R3
3684  010262  001401          BEQ     $170
3685
3686  010264                                                ;DATA COMPARE ERROR
3687  010264  104116          ERROR   78                    ERRHRD 78,COMP,SBWAS
3688
3689  010266                                                ;<TRANSMITTED> <RECEIVED>
3690  010266              $170:                         ENDIF
3691  010266
3692  010266  000751          BR      $164        ENDINC  ; R2
3693  010270              $165:
3694
3695                                                        ;RESET MAINT. BIT.
3696  010270                                            LET @TCSR := @TCSR CLR.BY #MAINT
3697  010270  042777  000004  170766  BIC     #MAINT,@TCSR
3698  010276                                        ENDTST
3699
3700
3701
```

```
3702                                    ;;**********************************************************************
3703                                    ;;**********************************************************************
3704                                    ;*TEST 36        TEST DATA THROUGH CABLE
3705                                    ;;**********************************************************************
3706  010276  000004                    T$T36:  SCOPE
3707  010300  012767  000001  170652            MOV     #1,$TIMES       ;;DO 1 ITERATION
3708  010306  012767  000036  170664            MOV     #36,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
3709  010314                                                                    IF #CABLE NOTSETIN $USWR THEN
3710  010314  032767  020000  170676            BIT     #CABLE,$USWR
3711  010322  001004                            BNE     $171
3712                                                                                ;CAN'T TEST WITHOUT A CABLE
3713  010324                                                                  EXIT TST
3714  010324  012767  000001  170626            MOV     #1,$TIMES
3715  010332  000456                            BR      T$T37           ;;;EXIT THIS TEST
3716  010334                                                                    ENDIF
3717  010334                                $171:
3718                                                                              ;DON'T USE MAINT.
3719  010334                                                                  LET @TCSR := @TCSR CLR.BY #MAINT
3720  010334  042777  000004  170722            BIC     #MAINT,@TCSR
3721                                                                              ;CHANGE PRIORITY
3722                                                                              ;..TO 0
3723  010342  012746  000000                    MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
3724  010346  012746  010354                    MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
3725  010352  000002                            RTI                     ;;POP NEW PC AND PS
3726  010354                                64$:
3727                                                                              ;GET DATA MASK
3728  010354                                                                  CALL DATLNG OUT <R1>
3729  010354  162705  000002                    SUB     #1*2,R5
3730  010360  004767  001030                    JSR     PC,DATLNG
3731  010364  012501                            MOV     (R5)+,R1
3732  010366                                                                LET R0 := @RBUF ; START CLEAN
3733  010366  017700  170670                    MOV     @RBUF,R0
3734                                                                              ;BINARY COUNT PATTERN
3735  010372                                                                INCR R2 FROM #0 TO #377 BY #1
3736  010372  005002                            CLR     R2
3737  010374  000401                            BR      $172
3738  010376                                $173:
3739  010376  005202                            INC     R2
3740  010400                                $172:
3741  010400  020227  000377                    CMP     R2,#377
3742  010404  003031                            BGT     $174
3743
3744
3745                                                                            ;TRANSMIT THE CHAR. IN R2.
3746
3747  010406                                                                  REPEAT
3748  010406                                $175:
3749                                                                              ;WAIT ON READY
3750  010406                                                                  UNTIL #XMITRDY SETIN @TCSR
3751  010406  032777  000200  170650            BIT     #XMITRDY,@TCSR
3752  010414  001774                            BEQ     $175
3753
3754                                                                              ;START IT ON ITS WAY
3755  010416                                                                  LET @TBUF :B= R2
3756  010416  110277  170646                    MOVB    R2,@TBUF
3757                                                                              ;GIVE IT A HEAD START.
```

```
3758  010422
3759  010422  010546                      MOV     R5,-(SP)
3760  010424  012745  000010              MOV     #10,-(R5)
3761  010430  004767  001060              JSR     PC,WAIT
3762  010434  012605                      MOV     (SP)+,R5
3763  010436
3764  010436                      $176:
3765
3766  010436
3767  010436  032777  000200  170614      BIT     #RCVRDONE,@RCSR
3768  010444  001774                      BEQ     $176
3769
3770
3771  010446
3772  010446  017703  170610              MOV     @RBUF,R3
3773
3774
3775  010452
3776  010452  010204                      MOV     R2,R4
3777  010454  040104                      BIC     R1,R4
3778  010456
3779  010456  040103                      BIC     R1,R3
3780
3781
3782  010460
3783  010460  020403                      CMP     R4,R3
3784  010462  001401                      BEQ     $177
3785
3786  010464
3787  010464  104117                      ERROR   79
3788
3789  010466
3790  010466                      $177:
3791
3792  010466
3793  010466  000743                      BR      $173
3794  010470                      $174:
3795
3796
3797
3798  010470
3799
3800
3801
3802
```

```
WAITUS 10


REPEAT

    ;IS IT HERE
UNTIL #RCVRDONE SETIN @RCSR


    ;RETRIEVE
LET R3 := @RB.


    ;STRIP OFF JUNK ON BOTH
LET R4 := R2 CLR.BY R1

LET R3 := R3 CLR.BY R1

    ;WE HAVE TROUBLE
IF R4 NE R3 THEN

                ;DATA COMPARE ERROR
                ERRHRD 79,COMP,SBWAS

                ;<R2> <R3>
            ENDIF

        ENDINC  ; R2


ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 37        FULL DATA TRANSFER WITH INTERRUPTS
                                ;*               AND MAINTENANCE MODE.
                                ;;**********************************************************************
010470  000004          TST37:  SCOPE
010472  012767  000001  170460        MOV     #1,$TIMES       ;;DO 1 ITERATION
010500  012767  000037  170472        MOV     #37,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

                                                                ;GET DATA MASK
                                                        CALL DATLNG OUT <R3>
010506
010506  162705  000002              SUB     #1*2,R5
010512  004767  000676              JSR     PC,DATLNG
010516  012503                      MOV     (R5)+,R3

                                ;SINCE THIS WILL BE A FULL SPEED INTERRUPT TEST
                                ;IF A DATA COMPARE ERROR OCCURS THE REPORT
                                ;WILL BE DEFERRED UNTIL ALL DATA PATTERNS HAVE
                                ;BEEN TRANSFERED.  IF THE NUMBER OF CHAR. TRANSMITTED
                                ;DOES NOT EQUAL THE NUMBER RECEIVED THIS ALSO WILL
                                ;BE REPORTED.

                                                                ;CHANGE PRIORITY
                                                                ;..TO 0
010520  012746  000000              MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
010524  012746  010532              MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
010530  000002                      RTI                     ;;POP NEW PC AND PS
010532                  64$:

                                                                ;GET VECTOR ADDRESS
                                                        LET R1 := DLVEC
010532
010532  016701  170520              MOV     DLVEC,R1

                                                                ;RCVR VECTOR
                                                        LET (R1)+ := #REC
010536
010536  012721  010710              MOV     #REC,(R1)+
                                                        LET (R1)+ := #PR7
010542
010542  012721  000340              MOV     #PR7,(R1)+

                                                                ;POINT TO TRANSMITTER VECTOR
                                                                ;AND SET IT UP ALSO
                                                        LET (R1)+ := #TRAN
010546
010546  012721  010646              MOV     #TRAN,(R1)+
                                                        LET (R1)  := #PR7
010552
010552  012711  000340              MOV     #PR7,(R1)

                                                                ;START COUNT AT 0
                                                        LET R1 := #0
010556
010556  005001                      CLR     R1

                                                                ;RECEIVER STORAGE
                                                        LET R2 := #0
010560
010560  005002                      CLR     R2

                                                                ;# OF RECEIVED CHAR. COUNT.
                                                        LET R4 := #0
010562
010562  005004                      CLR     R4

                                                        BRESET  ;SET UP ALL REGISTERS
010564
010564  000005                      RESET
```

```
3859
3860  010566
3861  010566  052777  000004  170470          BIS     #MAINT,@TCSR            ;SET UP MAINTENANCE
3862                                        LET @TCSR := @TCSR SET.BY #MAINT
3863
3864  010574                                                                    ;SET I.E. IN TRANSMITTER
3865  010574  052777  000100  170462          BIS     #XMITIE,@TCSR           LET @TCSR := @TCSR SET.BY #XMITIE
3866                                                                            ;AND RECEIVER
3867  010602                                                                LET @RCSR := @RCSR SET.BY #RCVRIE
3868  010602  052777  000100  170450          BIS     #RCVRIE,@RCSR
3869
3870
3871                                                                        ;NOW WE WAIT UNTIL R4 COUNT (RECEIVED) IS EQUAL
3872  010610                                                                REPEAT
3873  010610                          $200:
3874  010610                                                                UNTIL R4 HIS NUMBER
3875  010610  020467  000026                  CMP     R4,NUMBER
3876  010614  103775                          BLO     $200
3877
3878                                                                            ;DATA COMPARE ERRORS.
3879  010616                                                                IF ERRCNT NE #0 THEN
3880  010616  005767  000016                  TST     ERRCNT
3881  010622  001405                          BEQ     $201
3882
3883  010624                                                                    ; SET UP FOR ERROR PRINTING
3884  010624  016702  000014                  MOV     SB,R2                       LET R2 := SB
3885  010630
3886  010630  016703  000011                  MOV     WAS,R3                      LET R3 := WAS
3887                                                                                ;DATA COMPARE ERROR
3888  010634                                                                    ERRHRD 80,COMP,FIRST
3889  010634  104120                          ERROR   80
3890  010636                                                                ENDIF
3891  010636                          $201:
3892
3893                                                                        ;<R3> OCCURED, FIRST: SB <SB>, WAS <WAS>
3894  010636                                                                EXIT    ;SKIP OVER SUPPORT ROUTINES & STORAGE
3895  010636  000462                          BR      TST40           ;;;EXIT THIS TEST
3896
3897  010640  000000                                                        ERRCNT: 0
3898  010642  001000                                                        NUMBER: 1000
3899  010644     000                                                        SB:     .BYTE 0
3900  010645     000                                                        WAS:    .BYTE 0
3901
3902
3903
3904                                                                            ;TRANSMIT INTERRUPT HANDLER
3905  010646                                                                BGNSRV  TRAN
3906  010646                          TRAN:
3907
3908                                                                            ;SET UP FOR TRANSFER
3909  010646                                                                LET HOLD := R1      CLR.BY R3
3910  010646  010167  000032                  MOV     R1,HOLD
3911  010652  040367  000026                  BIC     R3,HOLD
3912                                                                            ;AND SEND.
3913  010656                                                                LET @TBUF := HOLD
3914  010656  016777  000022  170404          MOV     HOLD,@TBUF
```

```
3915
3916  010664                                                          ;INCREMENT CHAR COUNT
3917  010664  005201                        INC     R1              LET R1 := R1 + #1
3918
3919  010666                                                          ;ALL DONE
3920  010666  020167  177750                CMP     R1,NUMBER       IF R1 EQ NUMBER THEN
3921  010672  001003                        BNE     $202
3922
3923  010674                                                          ;STOP   INTERRUPT PROCESSING
3924  010674  042777  000100  170362        BIC     #XMITIE,@TCSR   LET @TCSR := @TCSR CLR.BY #XMITIE
3925  010702                                                          ENDIF
3926  010702                          $202:
3927
3928  010702  000401                        BR      ZZZ             ; EXIT SRV
3929
3930  010704  000000                                                  HOLD:0
3931
3932  010706                          ZZZ:                            ENDSRV
3933  010706  000002                        RTI
3934
3935
3936
3937                                                                  ;RECEIVER INTERRUPT HANDLER
3938  010710                                                          BGNSRV  REC
3939  010710                          REC:
3940
3941                                                                  ;GET CHAR IN + MASK IT
3942  010710                                                          LET R2 := @RBUF CLR.BY R3
3943  010710  017702  170346                MOV     @RBUF,R2
3944  010714  040302                        BIC     R3,R2
3945
3946  010716                                                          ;RHLD WILL CONTAIN EXPECTED INPUT
3947  010716  010467  000056                MOV     R4,RHLD         LET RHLD := R4 CLR.BY R3
3948  010722  040367  000052                BIC     R3,RHLD
3949
3950
3951  010726                                                          ;DO THEY COMPARE
3952  010726  020267  000046                CMP     R2,RHLD         IF R2 NE RHLD THEN
3953  010732  001412                        BEQ     $203
3954
3955  010734                                                          ;FIRST ERROR
3956  010734  005767  177700                TST     ERRCNT          IF ERRCNT EQ #0 THEN
3957  010740  001005                        BNE     $204
3958
3959  010742                                                          ;SAVE RECORD OF FIRST MISS
3960  010742  116767  000032  177674        MOVB    RHLD,SB             LET SB :B= RHLD
3961  010750                                                              LET WAS :B= R2
3962  010750  110267  177671                MOVB    R2,WAS          ENDIF
3963  010754
3964  010754                          $204:                           ;COUNT IT.
3965                                                                  LET ERRCNT := ERRCNT + #1
3966  010754
3967  010754  005267  177660                INC     ERRCNT          ENDIF
3968  010760
3969  010760                          $203:
3970
```

```
3971
3972  010760
3973  010760  005204                    INC     R4                          ;COUNT THIS CHAR.
3974                                                                        LET R4 := R4 + #1
3975  010762
3976  010762  020467  177654            CMP     R4,NUMBER                   ;ALL DONE?
3977  010766  001003                    BNE     $205                      \ IF R4 EQ NUMBER THEN
3978
3979  010770
3980  010770  042777  000100  170262    BIC     #RCVRIE,@RCSR               ;STOP RECEIVER INTERRUPTS
3981                                                                        LET @RCSR := @RCSR CLR.BY #RCVRIE
3982  010776
3983  010776                          $205:                                 ;MAIN REPEAT LOOP IS CHECKING
3984                                                                        ENDIF
3985
3986  010776  000401                    BR      ZZZZ                        ;FOR 'R4 = NUMBER' ALSO
3987                                                                      ; EXIT SRV
3988  011000  000000
3989  011002                           ZZZZ:                                RHLD:0
3990  011002
3991  011002  000002                    PTI                             ENDSRV
3992
3993  011004                                                          ENDTST
3994
3995
3996
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 40        TEST BREAK GENERATION LOGIC
                                ;*               TRANSMIT KNOWN CHAR WITH BREAK SET
                                ;*               AND COMPARE RECEIVED WITH 0.
                                ;;**********************************************************************
011004  000004                  TST40:  SCOPE
011006  012767  000010  170144          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
011014  012767  000040  170156          MOV     #40,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        ;SET MAINTENANCE BIT
011022                                                          LET @TCSR := @TCSR SET.BY #MAINT
011022  052777  000004  170234          BIS     #MAINT,@TCSR
                                                                        ;SET BREAK BIT
011030                                                          LET @TCSR := @TCSR SET BY #BREAK
011030  052777  000001  170226          BIS     #BREAK,@TCSR
                                                                        ;NON-ZERO CHAR. '*'
011036                                                          LET @TBUF := #252
011036  012777  000252  170224          MOV     #252,@TBUF
011044                                                          REPEAT
011044                                  $206:
                                                                        ;WAIT FOR DONE
011044                                                          UNTIL  #RCVRDONE SETIN @RCSR
011044  032777  000200  170206          BIT     #RCVRDONE,@RCSR
011052  001774                          BEQ     $206
                                                                IFB @RBUF NE #0 THEN
011054
011054  105777  170202                  TSTB    @RBUF
011060  001401                          BEQ     $207
                                                                        ; BREAK DID NOT EQUAL 0
                                                                    ERRHRD 81 ,BADBRK
011062
011062  104121                          ERROR   81
                                                                ENDIF
011064
011064                                  $207:
                                                                BRESET  ;CLEAN UP
011064
011064  000005                          RESET
                                                                EXIT
011066
011066  000413                          BR      TST41           ;;;EXIT THIS TEST
011070  051102  040505  020113                                  BADBRK: .ASCIZ  /BREAK DID NOT EQUAL 0/
011076  044504  020104  047516
011104  020124  050505  040525
011112  020114  000060
                                ENDTST
011116
```

```
 4040
 4041                                   ;;**********************************************************************
 4042                                   ;*TEST 41        NOT A TEST - SEND BACK TO LOOP
 4043                                   ;;**********************************************************************
 4044  011116  000004                  TST41:  SCOPE
 4045  011120  012767  000001  170032          MOV     #1,$TIMES       ;;DO 1 ITERATION
 4046  011126  104401  011134                  TYPE    ,65$            ;;TYPE ASCIZ STRING
 4047  011132  000404                          BR      64$             ;;GET OVER THE ASCIZ
 4048                                   ;;65$:  .ASCIZ  <CRLF>*CSR: *
 4049  011144                          64$:
 4050  011144  016746  170104                  MOV     DLADD,-(SP)     ;;SAVE DLADD FOR TYPEOUT
 4051  011150  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 4052  011152  104401  011160                  TYPE    ,67$            ;;TYPE ASCIZ STRING
 4053  011156  000405                          BR      66$             ;;GET OVER THE ASCIZ
 4054                                   ;;67$:  .ASCIZ  *,VECTOR: *
 4055  011172                          66$:
 4056  011172  016746  170060                  MOV     DLVEC,-(SP)     ;;SAVE DLVEC FOR TYPEOUT
 4057  011176  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 4058  011200  104401  011206                  TYPE    ,69$            ;;TYPE ASCIZ STRING
 4059  011204  000405                          BR      68$             ;;GET OVER THE ASCIZ
 4060                                   ;;69$:  .ASCIZ  *,ERRORS: *
 4061  011220                          68$:
 4062  011220  016746  167666                  MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
 4063  011224  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 4064  011226  005067  167660                  CLR     $ERTTL          ;RESET FOR NEXT DEVICE/PASS
 4065  011232  000167  170462                  JMP     LOOP            ;BACK UP TO THE BEGINNING
```

```
4066
4067                                    ;;BGNMOD        SUBS
4068                                ;;**************************************************************
4069  011236                                                ROUTINE TIMER (HOWLONG,WHICHBIT,REG,SETCLR)
4070  011236                        TIMER:
4071                                ;* ROUTINE:TIMER
4072                                ;*      THIS ROUTINE IS USED TO TEST THE STATUS OF ANY BIT
4073                                ;*      IN ANY REGISTER.
4074                                ;*      INPUTS:
4075                                ;*            HOWLONG    THE MAXIMUM AMOUNT OF TIME TO SPEND IN
4076                                ;*                       THIS ROUTINE.
4077                                ;*            WHICHBIT     A MASK WITH THE BIT(S) SET THAT ARE
4078                                ;*                         TO BE CHECKED.
4079                                ;*            REG      A POINTER TO THE REGISTER TO BE CHECKED
4080                                ;*            SETCLR   THE DESIRED RESULTS
4081                                ;*                     EITHER #SET OR #CLEAR
4082                                ;*      OUTPUT:
4083                                ;*            THE 'C' BIT IS SET TO INDICATE AN ERROR
4084                                ;*            BUT IT IS TESTED BY THE IF.ERROR STATEMENT
4085                                ;*
4086                                ;*
4087                                ;*            NOTE::  THE USE OF (R5) IS PART OF THE LINKAGE
4088                                ;*                    MECHANISM BETWEEN THE CALLER AND THE CALLED
4089                                ;;**************************************************************
4090
4091          000001                                        TRUE=   1
4092          000000                                        FALSE=  0
4093
4094  011236                        LET     REGSAV := REG(R5) ; GET POINTER TO REGIST
4095  011236  016567  000004  000136        MOV     REG(R5),REGSAV
4096  011244                        LET     TIMSAV := HOWLONG(R5) ; SAVE HOWLONG FOR
4097  011244  016567  000000  000132        MOV     HOWLONG(R5),TIMSAV
4098  011252                        LET     FLAG :B= #FALSE ; INITIALIZE THE EXIT FLA
4099  011252  112767  000000  000126        MOVB    #FALSE,FLAG
4100
4101
4102                                ;       START OF AN INFINITE LOOP
4103
4104  011260                        LOOP
4105  011260                    $212:
4106                                    ; TEST TO SEE IF WHICHBIT IS SET
4107  011260                        IF      WHICHBIT(R5)  NOTSETIN @REGSAV THEN
4108  011260  035577  000002  000114        BIT     WHICHBIT(R5),@REGSAV
4109  011266  001004                        BNE     $214
4110  011270                            LET     HOLDSC :B= #CLR
4111  011270  112767  000000  000111        MOVB    #CLR,HOLDSC
4112  011276                        ELSE
4113  011276  000403                        BR      $215
4114  011300                    $214:
4115  011300                            LET     HOLDSC :B= #SET ; REMEMBER THIS
4116  011300  112767  177777  000101        MOVB    #SET,HOLDSC
4117  011306                        ENDIF
4118  011306                    $215:
4119
4120                                ; NOW SEE IF THAT WAS WHAT WE WANTED
4121  011306                        IFB     HOLDSC EQ SETCLR(R5) THEN
```

```
4122  011306  126765  000075  000006          CMPB    HOLDSC,SETCLR(R5)
4123  011314  001003                          BNE     $216
4124
4125  011316
4126  011316  112767  000001  000062          MOVB    #TRUE,FLAG
4127  011324
4128  011324                          $216:
4129
4130  011324
4131  011324  126727  000056  000001          CMPB    FLAG,#TRUE
4132  011332  001414                          BEQ     $213
4133  011334  005767  000044                  TST     TIMSAV
4134  011340  003411                          BLE     $213
4135
4136
4137
4138  011342
4139  011342  010546                          MOV     R5,-(SP)
4140  011344  012745  000010                  MOV     #10,-(R5)
4141  011350  004767  000140                  JSR     PC,WAIT
4142  011354  012605                          MOV     (SP)+,R5
4143  011356
4144  011356  005367  000022                  DEC     TIMSAV
4145  011362
4146  011362  000736                          BR      $212
4147  011364                          $213:
4148
4149                                          ; ONLY 2 WAYS TO GET HERE
4150                                          ;       1). WE RAN OUT OF TIME---ERROR ! !
4151                                          ;       2). THE BIT IS IN THE CORRECT CONDITION--GOOD ! !
4152
4153  011364                                                          IFB     FLAG EQ #TRUE THEN
4154  011364  126727  000016  000001          CMPB    FLAG,#TRUE
4155  011372  001001                          BNE     $217
4156  011374                                                              RETURN  NO.ERROR    ; GOOD
4157  011374  000405                          BR      $210
4158  011376                                                          ENDIF
4159  011376                          $217:
4160  011376                                                          RETURN  ERROR           ; BAD
4161  011376  000261                          SEC
4162  011400  000404                          BR      $211
4163
4164  011402  000000                                                  REGSAV: .WORD 0
4165  011404  000000                                                  TIMSAV: .WORD 0
4166  011406     000                                                  FLAG:   .BYTE 0
4167  011407     000                                                  HOLDSC: .BYTE 0
4168                                                          ; WE ARE DONE  GO BACK HOME
4169  011410                                                              ENDRTN
4170  011410                          $210:
4171  011410  000241                          CLC
4172  011412                          $211:
4173  011412  000207                          RTS     PC
```

```
        ; JUST THE THING WE NEEDED
            LET     FLAG :B= #TRUE

        ENDIF


    EXIFB   FLAG EQ #TRUE OR TIMSAV LE #0


        ; ONE WAY OR THE OTHER, WE ARE DONE
; IF WE ARE STILL HERE THEN HANG AROUND A WHILE

        WAITUS  10          ;WAIT FOR 10 MILLI-SECONDS


        LET     TIMSAV := TIMSAV - #1 ; COUNTING DOWN

    ENDLOOP                     ; CONTINUED AT THE TOP
```

```
                                ;;*****************************************************************
                                ROUTINE DATLNG (MASK)
                                DATLNG:
                                ;* ROUTINE:DATLNG
                                ;*       THIS ROUTINE SETS UP A MASK FOR DATA, WITH
                                ;*  INPUT - NOTHING IS PASSED TO THIS ROUTINE
                                ;*      BUT GLOBAL INFORMATION IS ASSUMED TO EXIST:
                                ;*      $USWR-- THE WORD FOR SOFTWARE PARAMETERS
                                ;*      DATA-- A MASK FOR THE LOCATION OF THE OCTAL
                                ;*               NUMBER OF DATA BITS
                                ;*  OUTPUT----
                                ;*      MASK-- A MASK OF BINARY ONES RIGHT-JUSTIFIED
                                ;*               THE NUMBER OF WHICH IS DEFINED IN $USWR WORD.
                                ;;*****************************************************************
                                                                        LET MASK(R5) := #0              ; START
011414  005065  000000                  CLR     MASK(R5)
                                                                        LET NUMBR := $USWR AND #DATA
011420  016767  167574  000062          MOV     $USWR,NUMBR
011426  016746  000056                  MOV     NUMBR,-(SP)
011432  042716  000017                  BIC     #DATA,(SP)
011436  042667  000046                  BIC     (SP)+,NUMBR

011442                                                                  INCR I FROM #1 TO NUMBR BY #1
011442  012767  000001  167622          MOV     #1,I
011450  000402                          BR      $222
011452                          $223:
011452  005267  167614                  INC     I
011456                          $222:
011456  026767  167610  000024          CMP     I,NUMBR
011464  003006                          BGT     $224
011466                                                                      LET MASK(R5) := MASK(R5) SHIFT #1
011466  006365  000000                  ASL     MASK(R5)
011472                                                                      LET MASK(R5) := MASK(R5) SET.BY #1
011472  052765  000001  000000          BIS     #1,MASK(R5)
011500                                                                  ENDINC
011500  000764                          BR      $223
011502                          $224:
011502                                                                  LET MASK(R5) := COMP MASK(R5)
011502  005165  000000                  COM     MASK(R5)
011506                                                          RETURN
011506  000401                          BR      $220
011510  000000                          NUMBR:0
011512                                                  ENDRTN
011512                          $220:
011512                          $221:
011512  000207                          RTS     PC
```

```
                                ;;*****************************************************************
                                ROUTINE WAIT    (TIME)
                                WAIT:
                                ;* ROUTINE:WAIT
                                ;*      THIS ROUTINE IS USED TO DELAY EXECUTION OF THE
                                ;*      MAIN  PROGRAM  FOR A SPECIFIED AMOUNT OF TIME.
                                ;*      THIS   IS   ACCOMPLISHED   BY  INCREMENTING  A
                                ;*      REGISTER UP TO A LIMIT.  THE INNER LOOP IS SET
                                ;*      TO APPROXIMATE 1 MICRO SEC.
                                ;;*****************************************************************
011514  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
011516  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
011520  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
011522                                  LET R1 := TIME(R5)
011522  016501  000000                  MOV     TIME(R5),R1
011526                                  INCRU R2 FROM #1 TO R1 BY #1
011526  012702  000001                  MOV     #1,R2
011532  000402                          BR      $227
011534                          $230:
011534  062702  000001                  ADD     #01,R2
011540                          $227:
011540  020201                          CMP     R2,R1
011542  101010                          BHI     $231
011544                                  INCR R3 FROM #0 TO #700 BY #1
011544  005003                          CLR     R3
011546  000401                          BR      $232
011550                          $233:
011550  005203                          INC     R3
011552                          $232:
011552  020327  000700                  CMP     R3,#700
011556  003001                          BGT     $234
011560                                  ENDINC
011560  000773                          BR      $233
011562                          $234:
011562                                  ENDINC
011562  000764                          BR      $230
011564                          $231:
011564  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
011566  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
011570  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
011572                          ENDRTN
011572                          $225:
011572                          $226:
011572  000207                          RTS     PC
```

```
                                .SBTTL  INTSRV  INTERRUPT SERVICE ROUTINE
                                ;;*****************************************************************
011574                          INTSRV:
                                ;* SERVICE ROUTINE: INTSRV
                                ;*       THIS GLOBAL ROUTINE DOES NOTHING BUT INCREMENT
                                ;*       'INTFLAG'  EACH TIME IT IS CALLED.  IT ASSUMES
                                ;*       THAT THE MAIN CALLING ROUTINE WILL  KNOW  WHAT
                                ;*       TO LOOK FOR.
                                ;;*****************************************************************

                                                ;ADD 1 TO 'INTERRUPT OCCURED' FLAG
                                                                LET INTFLAG := INTFLAG + #1
011574  005267  000002                INC     INTFLAG
011600                                  ENDSRV                  ;THAT'S ALL
011600  000002                          RTI
011602  000000                INTFLAG:  0
```

```
                                ROUTINE MYTYPE
                                MYTYPE:
                                ;;*****************************************************************
011604  104401  011612                TYPE    ,65$            ;;TYPE ASCIZ STRING
011610  000405                      BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <CRLF>*TEST # *
                                64$:
011624                                  MOV     $TESTN,-(SP)    ;;SAVE $TESTN FOR TYPEOUT
011624  016746  167350                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011630  104402                        TYPE    ,67$            ;;TYPE ASCIZ STRING
011632  104401  011640                BR      66$             ;;GET OVER THE ASCIZ
011636  000405                  ;;67$:  .ASCIZ  *,ERROR # *
                                66$:
011652                                  MOVB    $ITEMB,$FATAL   ; APT FATAL ERROR NUMBER
011652  116767  167236  167316        MOV     $FATAL,-(SP)    ;;SAVE $FATAL FOR TYPEOUT
011660  016746  167312                TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
011664  104405                        TYPE    ,69$            ;;TYPE ASCIZ STRING
011666  104401  011674                BR      68$             ;;GET OVER THE ASCIZ
011672  000404                  ;;69$:  .ASCIZ  *,PC = *
                                68$:
011704                                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
011704  016746  167206                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011710  104402                        TYPE    ,71$            ;;TYPE ASCIZ STRING
011712  104401  011720                BR      70$             ;;GET OVER THE ASCIZ
011716  000404                  ;;71$:  .ASCIZ  *,CSR: *
                                70$:
011730                                  MOV     DLADD,-(SP)     ;;SAVE DLADD FOR TYPEOUT
011730  016746  167320                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011734  104402                        TYPE    ,73$            ;;TYPE ASCIZ STRING
011736  104401  011744                BR      72$             ;;GET OVER THE ASCIZ
011742  000405                  ;;73$:  .ASCIZ  *,VECTOR: *
                                72$:
011756                                  MOV     DLVEC,-(SP)     ;;SAVE DLVEC FOR TYPEOUT
011756  016746  167274                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011762  104402                  ENDRTN
011764                          $235:
011764                          $236:
011764  000207                        RTS     PC
```

```
4324  011766                          ROUTINE CYCLE
4325  011766                          CYCLE:
4326                                  ;;*****************************************************************
4327                                  ;* ROUTINE:     CYCLE
4328                                  ;*       THIS  ROUTINE  CAUSES  ADRS   TO POINT TO  THE
4329                                  ;*       ADDRESS  OF  DLV11-E  UNDER  TEST,  ADRS +2 TO
4330                                  ;*       POINT TO THE VECTOR OF THE DLV11-E UNDER TEST.
4331                                  ;*      IT  KEEPS  TRACK  OF THE CURRENT DEVICE AND BIT
4332                                  ;*      MASKS.
4333                                  ;;*****************************************************************
4334  011766                                                  REPEAT
4335  011766                          $241:
4336  011766                                                      IF BITMASK EQ #0 THEN
4337  011766  005767  000122                  TST     BITMASK
4338  011772  001027                          BNE     $242
4339  011774                                                          IF INITFLAG EQ #1 THEN
4340  011774  026727  000116  000001          CMP     INITFLAG,#1
4341  012002  001003                          BNE     $243
4342  012004                                                              LET INITFLAG := #0
4343  012004  005067  000106                  CLR     INITFLAG
4344  012010                                                          ELSE
4345  012010  000403                          BR      $244
4346  012012                          $243:
4347  012012                                                              CALL $EOP   ; AS A SUBROUTINE
4348  012012  004767  000110                  JSR     PC,$EOP
4349                                  ; BECAUSE $EOP RETURNS AS A JUMP
4350  012016                          SPECIALADDRESS:                         LET R0 := POP
4351  012016                                                          ENDIF
4352  012016  012600                          MOV     (SP)+,R0
4353  012020                                                          LET BITMASK := #1
4354  012020                          $244:
4355  012020                                                          LET $DEVCT := #1
4356  012020  012767  000001  000066          MOV     #1,BITMASK
4357  012026                                                          LET ADDRESS := $BASE
4358  012026  012767  000001  167150          MOV     #1,$DEVCT
4359  012034                                                          LET VECTOR := $VECT1
4360  012034  016767  167210  000056          MOV     $BASE,ADDRESS
4361  012042                                                      ELSE
4362  012042  016767  167176  000052          MOV     $VECT1,VECTOR
4363  012050                                                          LET R4 := #10
4364  012050  000410                          BR      $245
4365  012052                          $242:                           LET BITMASK := BITMASK ROTATE 1
4366  012052                                                          LET ADDRESS  := ADDRESS + R4
4367  012052  012704  000010                  MOV     #10,R4
4368  012056                                                          LET VECTOR := VECTOR + R4
4369  012056  006167  000032                  ROL     BITMASK
4370  012062                                                      ENDIF
4371  012062  060467  000032                  ADD     R4,ADDRESS
4372  012066                          $245:                   UNTIL   BITMASK SETIN $DEVM
4373  012066  060467  000030                  ADD     R4,VECTOR
4374  012072
4375  012072
4376  012072
4377  012072  036767  000016  167152          BIT     BITMASK,$DEVM
4378  012100  001732                          BEQ     $241
4379
```

```
012102                                                 LET ADRS := #ADDRESS
012102  012701  012120            MOV     #ADDRESS,ADRS
012106                                            LET $DEVCT := $DEVCT + #1
012106  005267  167072            INC     $DEVCT
012112                                            RETURN
012112  000404                    BR      $237
012114  000000           BITMASK:         0
012116  000001           INITFLAG:        1
012120  000000           ADDRESS:         0
012122  000000           VECTOR:          0

012124                                            ENDRTN
012124                   $237:
012124                   $240:
012124  000207                    RTS     PC


```

```
                                .SBTTL  END OF PASS ROUTINE

                                ;;**************************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
                                ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN T JUMP TO SPECIALADDRESS

012126                          $EOP:
                                        SCOPE
012126  000004
012130  005067  166746                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
012134  005067  167020                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
012140  005267  167036                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
012144  042767  100000  167030          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
012152  005327                          DEC     (PC)+           ;;LOOP?
012154  000001                  $EOPCT: .WORD   1
012156  003022                          BGT     $DOAGN          ;;YES
012160  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
012162  000001                  $ENDCT: .WORD   1
012164  012154                          $EOPCT
012166  104401  012233                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
012172  016746  167004                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
012176  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
012200  104401  012230                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
012204  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
012210  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
012212  000005                          RESET                   ;;CLEAR THE WORLD
012214  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
012216  000240                          NOP                     ;;SAVE ROOM
012220  000240                          NOP                     ;;FOR
012222  000240                          NOP                     ;;ACT11
012224                          $DOAGN:
012224  000137                          JMP     @(PC)+          ;;RETURN
012226  012016                  $RTNAD: .WORD   SPECIALADDRESS
012230     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
012233     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
012240  050040  051501  020123
012246  000043
```

```
                                .SBTTL  POWER DOWN AND UP ROUTINES

                                ;;*****************************************************************
                                ;POWER DOWN ROUTINE
012250  012737  012410  000024 $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
012256  012737  000340  000026         MOV     #340,@#PWRVEC+2  ;;PRIO:7
012264  010046                        MOV     R0,-(SP)         ;;PUSH R0 ON STACK
012266  010146                        MOV     R1,-(SP)         ;;PUSH R1 ON STACK
012270  010246                        MOV     R2,-(SP)         ;;PUSH R2 ON STACK
012272  010346                        MOV     R3,-(SP)         ;;PUSH R3 ON STACK
012274  010446                        MOV     R4,-(SP)         ;;PUSH R4 ON STACK
012276  010546                        MOV     R5,-(SP)         ;;PUSH R5 ON STACK
012300  017746  166634                MOV     @SWR,-(SP)       ;;PUSH @SWR ON STACK
012304  010667  000104                MOV     SP,$SAVR6        ;;SAVE SP
012310  012737  012322  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
012316  000000                        HALT
012320  000776                        BR      -2               ;;HANG UP

                                ;;*****************************************************************
                                ;POWER UP ROUTINE
012322  012737  012410  000024 $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
012330  016706  000060                MOV     $SAVR6,SP        ;;GET SP
012334  005067  000054                CLR     $SAVR6           ;;WAIT LOOP FOR THE TTY
012340  005267  000050         1$:    INC     $SAVR6           ;;WAIT FOR THE INC
012344  001375                        BNE     1$               ;;OF  WORD
012346  012677  166566                MOV     (SP)+,@SWR       ;;POP STACK INTO @SWR
012352  012605                        MOV     (SP)+,R5         ;;POP STACK INTO R5
012354  012604                        MOV     (SP)+,R4         ;;POP STACK INTO R4
012356  012603                        MOV     (SP)+,R3         ;;POP STACK INTO R3
012360  012602                        MOV     (SP)+,R2         ;;POP STACK INTO R2
012362  012601                        MOV     (SP)+,R1         ;;POP STACK INTO R1
012364  012600                        MOV     (SP)+,R0         ;;POP STACK INTO R0
012366  012737  012250  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
012374  012737  000340  000026        MOV     #340,@#PWRVEC+2  ;;PRIO:7
012402  104401                        TYPE                     ;REPORT THE POWER FAILURE
012404  012416               $PWRMG:  .WORD   $POWER           ;;POWER FAIL MESSAGE POINTER
012406  000002                        RTI
012410  000000               $ILLUP:  HALT                     ;;THE POWER UP SEQUENCE WAS STARTED
012412  000776                        BR      .-2              ;;  BEFORE THE POWER DOWN WAS COMPLETE
012414  000000               $SAVR6:  0                        ;;PUT THE SP HERE
012416  005015  047520  042527 $POWER: .ASCIZ  <15><12>"POWER"
012424  000122
                                .EVEN
```

```
                                .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
                                ;*

012426  105767  166525          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
012432  100002                         BPL     1$              ;;BR IF YES
012434  000000                         HALT                    ;;HALT HERE IF NO TERMINAL
012436  000430                         BR      3$              ;;LEAVE
012440  010046                  1$:    MOV     R0,-(SP)        ;;SAVE R0
012442  017600  000002                 MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
012446  122767  000001  166540         CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
012454  001011                         BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
012456  132767  000100  166531         BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
012464  001405                         BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
012466  010067  000004                 MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
012472  004767  000774                 JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
012476  000000                  61$:   .WORD   0               ;;MESSAGE ADDRESS
012500  132767  000040  166507  62$:   BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
012506  001003                         BNE     60$             ;;YES,SKIP TYPE OUT
012510  112046                  2$:    MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
012512  001005                         BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
012514  005726                         TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
012516  012600                  60$:   MOV     (SP)+,R0        ;;RESTORE R0
012520  062716  000002          3$:    ADD     #2,(SP)         ;;ADJUST RETURN PC
012524  000002                         RTI                     ;;RETURN
012526  122716  000011          4$:    CMPB    #HT,(SP)        ;;BRANCH IF <HT>
012532  001430                         BEQ     8$
012534  122716  000200                 CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
012540  001006                         BNE     5$
012542  005726                         TST     (SP)+           ;;POP  <CR><LF> EQUIV
012544  104401                         TYPE                    ;;TYPE A CR AND LF
012546  001171                         $CRLF
012550  105067  000130                 CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
012554  000755                         BR      2$              ;;GET NEXT CHARACTER
012556  004767  000056          5$:    JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
012562  126726  166370          6$:    CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
012566  001350                         BNE     2$              ;;IF NO GO GET NEXT CHAR.
012570  016746  166360                 MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                               ;;AND THE NULL CHAR.
012574  105366  000001          7$:    DECB    1(SF)           ;;DOES A NULL NEED TO BE TYPED?
012600  002770                         BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
012602  004767  000032                 JSR     PC,$TYPEC       ;;GO TYPE A NULL
012606  105367  000072                 DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
```

```
4535  012612  000770                        BR      7$              ;;LOOP
4536
4537                                  ;HORIZONTAL TAB PROCESSOR
4538
4539  012614  112716  000040          8$:   MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
4540  012620  004767  000014          9$:   JSR     PC,$TYPEC       ;;TYPE A SPACE
4541  012624  132767  000007  000052        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
4542  012632  001372                        BNE     9$              ;;TAB STOP
4543  012634  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
4544  012636  000724                        BR      2$              ;;GET NEXT CHARACTER
4545  012640  105777  166304        $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
4546  012644  100375                        BPL     $TYPEC
4547  012646  116677  000002  166276        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
4548  012654  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
4549  012662  001003                        BNE     1$              ;;BRANCH IF NO
4550  012664  105067  000014                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
4551  012670  000406                        BR      $TYPEX          ;;EXIT
4552  012672  122766  000012  000002  1$:   CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
4553  012700  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
4554  012702  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
4555  012704  000000          $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
4556  012706  000207          $TYPEX: RTS     PC
4557
```

```
                        .SBTTL  TTY INPUT ROUTINE

                        ;;**********************************************************************
                        .ENABL  LSB

                        ;;**********************************************************************
                        ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
                        ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
                        ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
                        ;*WHEN OPERATING IN TTY FLAG MODE.
012710  022767  000176  166222  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
012716  001074                        BNE     15$             ;;BRANCH IF NO
012720  105777  166220                TSTB    @$TKS           ;;CHAR THERE?
012724  100071                        BPL     15$             ;;IF NO, DON'T WAIT AROUND
012726  117746  166214                MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
012732  042716  177600                BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
012736  022726  000007                CMP     #7,(SP)+        ;;IS IT A CONTROL G?
012742  001062                        BNE     15$             ;;NO, RETURN TO USER
012744  126727  166164  000001        CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
012752  001456                        BEQ     15$             ;;BRANCH IF YES

012754  104401  013435                TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
012760  104401  013442        $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
012764  016746  165206                MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
012770  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
012772  104401  013453                TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
012776  005046          19$:    CLR     -(SP)           ;;CLEAR COUNTER
013000  005046                  CLR     -(SP)           ;;THE NEW SWR
013002  105777  166136          7$:     TSTB    @$TKS           ;;CHAR THERE?
013006  100375                  BPL     7$              ;;IF NOT TRY AGAIN

013010  117746  166132                MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
013014  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII


013020  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
013024  001005                  BNE     10$             ;;BRANCH IF NOT
013026  104401  013430                TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
013032  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
013036  000757                  BR      19$             ;;LET'S TRY IT AGAIN

013040  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
013044  001022                  BNE     16$             ;;BRANCH IF NO
013046  005766  000004                TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
013052  001403                        BEQ     11$             ;;BRANCH IF YES
013054  016677  000002  166056        MOV     2(SP),@SWR      ;;SAVE NEW SWR
013062  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
013066  104401  001171          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
013072  126727  166037  000001        CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
013100  001003                        BNE     15$             ;;BRANCH IF NOT
013102  012777  000100  166034        MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
013110  000002          15$:    RTI                     ;;RETURN
013112  004767  177522          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
013116  021627  000060                CMP     (SP),#60        ;;CHAR < 0?
```

```
                                        BLT     18$             ;;BRANCH IF YES
                                        CMP     (SP),#67        ;;CHAR > 7?
                                        BGT     18$             ;;BRANCH IF YES
                                        BIC     #60,(SP)+       ;;STRIP-OFF ASCII
                                        TST     2(SP)           ;;IS THIS THE FIRST CHAR
                                        BEQ     17$             ;;BRANCH IF YES
                                        ASL     (SP)            ;;NO, SHIFT PRESENT
                                        ASL     (SP)            ;;   CHAR OVER TO MAKE
                                        ASL     (SP)            ;;   ROOM FOR NEW ONE.
                                17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
                                        BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
                                        BR      7$              ;;GET THE NEXT ONE
                                18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
                                        BR      20$             ;;SIMULATE CONTROL-U
                                .DSABL  LSB


                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*CALL:
                                ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                ;
                                $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
                                        MOV     4(SP),2(SP)     ;;SAVE THE PS
                                1$:     TSTB    @$TKS           ;;WAIT FOR
                                        BPL     1$              ;;A CHARACTER
                                        MOVB    @$TKB,4(SP)     ;;READ THE TTY
                                        BIC     #^C(177),4(SP)  ;;GET RID OF JUNK IF ANY
                                        CMP     4(SP),#23       ;;IS IT A CONTROL-S?
                                        BNE     3$              ;;BRANCH IF NO
                                2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
                                        BPL     2$              ;;LOOP UNTIL ITS THERE
                                        MOVB    @$TKB,-(SP)     ;;GET CHARACTER
                                        BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
                                        CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
                                        BNE     2$              ;;IF NOT DISCARD IT
                                        BR      1$              ;;YES, RESUME
                                3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
                                        BLT     4$              ;;BRANCH IF YES
                                        CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
                                        BGT     4$              ;;BRANCH IF YES
                                        BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
                                4$:     RTI                     ;;GO BACK TO USER
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                ;*CALL:
                                ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
                                ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

                                $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
                                1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
                                2$:     CMP     #$TTYIN+80.,R3  ;;BUFFER FULL?
```

```
4670  013324  101405                          BLOS    4$              ;;BR IF YES
4671  013326  104410                          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
4672  013330  112613                          MOVB    (SP)+,(R3)      ;;GET CHARACTER
4673  013332  122713  000177          10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
4674  013336  001003                          BNE     3$              ;;SKIP IF NOT
4675  013340  104401  001170          4$:     TYPE    $QUES           ;;TYPE A '?'
4676  013344  000763                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
4677  013346  111367  000044          3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
4678  013352  104401  013416                  TYPE    9$
4679  013356  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
4680  013362  001356                          BNE     2$              ;;LOOP IF NOT RETURN
4681  013364  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
4682  013370  104401  001172                  TYPE    $LF             ;;TYPE A LINE FEED
4683  013374  012603                          MOV     (SP)+,R3        ;;RESTORE R3
4684  013376  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
4685  013400  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
4686  013406  012766  013420  000004          MOV     #$TTYIN,4(SP)
4687  013414  000002                          RTI                     ;;RETURN
4688  013416     000          9$:     .BYTE   0                       ;;STORAGE FOR ASCII CHAR. TO TYPE
4689  013417     000                  .BYTE   0                       ;;TERMINATOR
4690  013420  000010          $TTYIN: .BLKB   8.                      ;;RESERVE 8 BYTES FOR TTY INPUT
4691  013430  052536  005015     000  $CNTLU: .ASCIZ  /↑U/<15><12>    ;;CONTROL "U"
4692  013435     136  006507  000012  $CNTLG: .ASCIZ  /↑G/<15><12>    ;;CONTROL "G"
4693  013442  005015  053523  020123  $MSWR:  .ASCIZ  <15><12>/SWR = /
4694  013450  020075     000
4695  013453     040  047040  053505  $MNEW:  .ASCIZ  /  NEW = /
4696  013460  036440  000040
```

```
                                        .SBTTL  APT COMMUNICATIONS ROUTINE

                                        ;;**********************************************************************
013464  112767  000001  000236  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
013472  112767  000001  000226  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
013500  000403                          BR      $ATYC
013502  112767  000001  000220  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
013510                          $ATYC:
013510  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
013512  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
013514  105767  000206                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
013520  001450                          BEQ     5$              ;;IF NOT:  BR
013522  122767  000001  165464          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
013530  001031                          BNE     3$              ;;IF NOT:  BR
013532  132767  000100  165455          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
013540  001425                          BEQ     3$              ;;IF NOT:  BR
013542  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
013546  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
013554  005767  165414          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
013560  001375                          BNE     1$              ;;IF NOT:  WAIT
013562  010067  165422                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
013566  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
013570  001376                          BNE     2$
013572  166700  165412                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
013576  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
013600  010067  165406                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
013604  012767  000004  165362          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
013612  000413                          BR      5$
013614  017667  000004  000016  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
013622  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
013630  016746  164142                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
013634  004767  176566                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
013640  000000                  4$:     .WORD   0
013642                          5$:
013642  105767  000062          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
013646  001416                          BEQ     12$             ;;IF NOT:  BR
013650  005767  165340                  TST     $ENV            ;;RUNNING UNDER APT?
013654  001413                          BEQ     12$             ;;IF NOT:  BR
013656  005767  165312          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
013662  001375                          BNE     11$             ;;IF NOT:  WAIT
013664  017667  000004  165304          MOV     @4(SP),$FATAL   ;;GET ERROR #
013672  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
013700  005267  165270                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
013704  105067  000020          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
013710  105067  000013                  CLRB    $LFLG           ;;CLEAR LOG FLAG
013714  105067  000006                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
013720  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
013722  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
013724  000207                          RTS     PC              ;;RETURN
013726     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
013727     000          $LFLG:  .BYTE   0               ;;LOG FLAG
013730     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
        013732                          .EVEN
        000200          APTSIZE=200
        000001          APTENV=001
        000100          APTSPOOL=100
```

```
  4753          000040                  APTCSUP=040
```

```
                                .SBTTL  ERROR HANDLER ROUTINE

                                ;;**********************************************************************
                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                ;*AND GO TO MYTYPE ON ERROR
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW15=1         HALT ON ERROR
                                ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                ;*SW10=1         BELL ON ERROR
                                ;*SW09=1         LOOP ON ERROR
                                ;*CALL
                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER

013732                          $ERROR:
013732  104407                          CKSWR                           ;;TEST FOR CHANGE IN SOFT-SWR
013734  105267  165143        7$:     INCB    $ERFLG                  ;;SET THE ERROR FLAG
013740  001775                        BEQ     7$                      ;;DON'T LET THE FLAG GO TO ZERO
013742  016777  165134  165172        MOV     $TSTNM,@DISPLAY         ;;DISPLAY TEST NUMBER AND ERROR FLAG
013750  032777  002000  165162        BIT     #BIT10,@SWR             ;;BELL ON ERROR?
013756  001402                        BEQ     1$                      ;;NO - SKIP
013760  104401  001164                TYPE    ,$BELL                  ;;RING BELL
013764  005267  165122        1$:     INC     $ERTTL                  ;;COUNT THE NUMBER OF ERRORS
013770  011667  165122                MOV     (SP),$ERRPC             ;;GET ADDRESS OF ERROR INSTRUCTION
013774  162767  000002  165114        SUB     #2,$ERRPC
014002  117767  165110  165104        MOVB    @$ERRPC,$ITEMB          ;;STRIP AND SAVE THE ERROR ITEM CODE
014010  032777  020000  165122        BIT     #BIT13,@SWR             ;;SKIP TYPEOUT IF SET
014016  001004                        BNE     20$                     ;;SKIP TYPEOUTS
014020  004767  175560                JSR     PC,MYTYPE               ;;GO TO USER ERROR ROUTINE
014024  104401  001171                TYPE    ,$CRLF
014030                          20$:
014030  122767  000001  165156        CMPB    #APTENV,$ENV            ;;RUNNING IN APT MODE
014036  001007                        BNE     2$                      ;;NO,SKIP APT ERROR REPORT
014040  116767  165050  000004        MOVB    $ITEMB,21$              ;;SET ITEM NUMBER AS ERROR NUMBER
014046  004767  177430                JSR     PC,$ATY4                ;;REPORT FATAL ERROR TO APT
014052     000            21$:     .BYTE   0
014053     000                     .BYTE   0
014054  000777            22$:     BR      22$                     ;;APT ERROR LOOP
014056  005777  165056        2$:     TST     @SWR                    ;;HALT ON ERROR
014062  100002                        BPL     3$                      ;;SKIP IF CONTINUE
014064  000000                        HALT                            ;;HALT ON ERROR!
014066  104407                        CKSWR                           ;;TEST FOR CHANGE IN SOFT-SWR
014070  032777  001000  165042  3$:     BIT     #BIT09,@SWR             ;;LOOP ON ERROR SWITCH SET?
014076  001402                        BEQ     4$                      ;;BR IF NO
014100  016716  165004                MOV     $LPERR,(SP)             ;;FUDGE RETURN FOR LOOPING
014104  005767  165052        4$:     TST     $ESCAPE                 ;;CHECK FOR AN ESCAPE ADDRESS
014110  001402                        BEQ     5$                      ;;BR IF NONE
014112  016716  165044                MOV     $ESCAPE,(SP)            ;;FUDGE RETURN ADDRESS FOR ESCAPE
014116                          5$:
014116  022737  012214  000042        CMP     #$ENDAD,@#42            ;;ACT-11 AUTO-ACCEPT?
014124  001001                        BNE     6$                      ;;BRANCH IF NO
014126  000000                        HALT                            ;;YES
014130                          6$:
014130  000002                        RTI                             ;;RETURN
```

```
                                .SBTTL  SCOPE HANDLER ROUTINE

                                ;;*************************************************************
                                ;*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

014132                          $SCOPE:
014132  104407                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
014134  032777  040000  164776  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
014142  001114                          BNE     $OVER           ;;YES IF SW14=1
                                ;*****START OF CODE FOR THE XOR TESTER*****
014144  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
014146  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
014152  012737  014172  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
014160  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
014164  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
014170  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
014172  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
014174  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
014200  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
014202                          6$:;*****END OF CODE FOR THE XOR TESTER*****
014202  032777  000400  164730          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
014210  001404                          BEQ     2$              ;;BR IF NO
014212  127767  164722  164662          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
014220  001465                          BEQ     $OVER           ;;BR IF YES
014222  105767  164655          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
014226  001421                          BEQ     3$              ;;BR IF NO
014230  126767  164661  164645          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
014236  101015                          BHI     3$              ;;BR IF NO
014240  032777  001000  164672          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
014246  001404                          BEQ     4$              ;;BR IF NO
014250  016767  164634  164630  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
014256  000446                          BR      $OVER
014260  105067  164617          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
014264  005067  164670                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
014270  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
014272  032777  004000  164640  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
014300  001011                          BNE     1$              ;;BR IF YES
014302  005767  164674                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
014306  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
014310  005267  164570                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
014314  026767  164640  164562          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
014322  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
014324  012767  000001  164552  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
014332  016767  000052  164620          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
014340  105267  164536          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
014344  116767  164532  164626          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
```

```
 4864  014352  011667  164530                 MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 4865  014356  011667  164526                 MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 4866  014362  005067  164574                 CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 4867  014366  112767  000001  164521         MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 4868  014374  016777  164502  164540 $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 4869  014402  016716  164500                 MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 4870  014406  000002                         RTI                     ;;FIXES PS
 4871  014410  003720                 $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
```

```
                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

                                ;;*****************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                                ;*REPLACED WITH SPACES.
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                                ;*      TYPDS                   ;;GO TO THE ROUTINE

014412                          $TYPDS:
014412  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
014414  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
014416  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
014420  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
014422  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
014424  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
014430  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
014434  100004                          BPL     1$              ;;BR IF INPUT IS POS.
014436  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
014440  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
014446  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
014450  012703  014626                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
014454  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
014460  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
014462  016001  014616                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
014466  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
014470  002402                          BLT     4$              ;;BR IF DONE
014472  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
014474  000774                          BR      3$
014476  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
014500  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
014502  001002                          BNE     5$              ;;FALL THROUGH IF 0
014504  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
014506  100407                          BMI     7$              ;;BR IF YES
014510  106316                  5$:     ASLB    (SP)            ;;MSD?
014512  103003                          BCC     6$              ;;BR IF NO
014514  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
014522  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
014526  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
014532  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
014534  005720                          TST     (R0)+           ;;JUST INCREMENTING
014536  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
014542  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
014544  003002                          BGT     8$              ;;GO TO EXIT
014546  010502                          MOV     R5,R2           ;;GET THE LSD
014550  000764                          BR      6$              ;;GO CHANGE TO ASCII
014552  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
014554  100003                          BPL     9$              ;;BR IF NO
014556  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
014564  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
014566  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
014570  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
014572  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
 4928  014574  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 4929  014576  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 4930  014600  104401  014626                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
 4931  014604  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 4932  014612  012616                        MOV     (SP)+,(SP)
 4933  014614  000002                        RTI                     ;;RETURN TO USER
 4934  014616  023420                $DTBL:  10000.
 4935  014620  001750                        1000.
 4936  014622  000144                        100.
 4937  014624  000012                        10.
 4938  014626  000004                $DBLK:  .BLKW   4
```

```
                        .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                        ;;*****************************************************************
                        ;*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

014636  017646  000000  $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
014642  116667  000001  000211  MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
014650  112667  000207          MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
014654  062716  000002          ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
014660  000406                  BR      $TYPON
014662  112767  000001  000171 $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
014670  112767  000006  000165        MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
014676  112767  000005  000154 $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
014704  010346                  MOV     R3,-(SP)        ;;SAVE R3
014706  010446                  MOV     R4,-(SP)        ;;SAVE R4
014710  010546                  MOV     R5,-(SP)        ;;SAVE R5
014712  116704  000145          MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
014716  005404                  NEG     R4
014720  062704  000006          ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
014724  110467  000132          MOVB    R4,$OMODE       ;;SAVE IT FOR USE
014730  116704  000125          MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
014734  016605  000012          MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
014740  005003                  CLR     R3              ;;CLEAR THE OUTPUT WORD
014742  006105          1$:     ROL     R5              ;;ROTATE MSB INTO "C"
014744  000404                  BR      3$              ;;GO DO MSB
014746  006105          2$:     ROL     R5              ;;FORM THIS DIGIT
014750  006105                  ROL     R5
014752  006105                  ROL     R5
014754  010503                  MOV     R5,R3
014756  006103          3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
014760  105367  000076          DECB    $OMODE          ;;TYPE THIS DIGIT?
014764  100016                  BPL     7$              ;;BR IF NO
014766  042703  177770          BIC     #177770,R3      ;;GET RID OF JUNK
014772  001002                  BNE     4$              ;;TEST FOR 0
014774  005704                  TST     R4              ;;SUPPRESS THIS 0?
014776  001403                  BEQ     5$              ;;BR IF YES
```

```
 4995  015000  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 4996  015002  052703  000060                   BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 4997  015006  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 4998  015012  110367  000040                   MOVB    R3,8$           ;;SAVE FOR TYPING
 4999  015016  104401  015056                   TYPE    ,8$             ;;GO TYPE THIS DIGIT
 5000  015022  105367  000032          7$:     DECB    $OCNT           ;;COUNT BY 1
 5001  015026  003347                          BGT     2$              ;;BR IF MORE TO DO
 5002  015030  002402                          BLT     6$              ;;BR IF DONE
 5003  015032  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
 5004  015034  000744                          BR      2$              ;;GO DO THE LAST DIGIT
 5005  015036  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
 5006  015040  012604                          MOV     (SP)+,R4        ;;RESTORE R4
 5007  015042  012603                          MOV     (SP)+,R3        ;;RESTORE R3
 5008  015044  016666  000002  000004         MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
 5009  015052  012616                          MOV     (SP)+,(SP)
 5010  015054  000002                          RTI                     ;;RETURN
 5011  015056     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
 5012  015057     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
 5013  01506C     000                  $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
 5014  015061     000                  $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
 5015  015062  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
```

```
                                .SBTTL  TRAP DECODER

                                ;;**************************************************************
                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                ;*GO TO THAT ROUTINE.

015064  010046          $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
015066  016600  000002          MOV     2(SP),R0        ;;GET TRAP ADDRESS
015072  005740                  TST     -(R0)           ;;BACKUP BY 2
015074  111000                  MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
015076  006300                  ASL     R0              ;;POSITION FOR INDEXING
015100  016000  015120          MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
015104  000200                  RTS     R0              ;;GO TO ROUTINE


                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

015106  011646          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
015110  016666  000004  000002  MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
015116  000002                  RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

                                ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.

                                ;       ROUTINE
                                ;       -------
015120  015106          $TRPAD: .WORD   $TRAP2
015122  012426                  $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
015124  014662                  $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
015126  014636                  $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
015130  014676                  $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
015132  014412                  $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

015134  012760                  $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING

015136  012710                  $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT SWR
015140  013172                  $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
015142  013312                  $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
        000001          .END
```

```
ABASE = 175610            3#   1008    1049
ACOM1 = 000000         1008
ACOM2 = 000000         1008
ACPUDP= 000000         1008    1023
ADDRES  012120         4360*   4371*   4381    4388#
ADDW0 = 000000         1008
ADDW1 = 000000         1008
ADDW10= 000000         1008
ADDW11= 000000         1008
ADDW12= 000000         1008
ADDW13= 000000         1008
ADDW14= 000000         1008
ADDW15= 000000         1008
ADDW2 = 000000         1008
ADDW3 = 000000         1008
ADDW4 = 000000         1008
ADDW5 = 000000         1008
ADDW6 = 000000         1008
ADDW7 = 000000         1008
ADDW8 = 000000         1008
ADDW9 = 000000         1008
ADEVCT= 000000         1008    1014
ADEVM = 000001            3#   1008    1050
AENV  = 000000         1008    1019
AENVM = 000000         1008    1020
AFATAL= 000000         1008    1011
AMADR1= 000000         1008    1036
AMADR2= 000000         1008    1040
AMADR3= 000000         1008    1043
AMADR4= 000000         1008    1046
AMAMS1= 000000         1008    1030
AMAMS2= 000000         1008    1038
AMAMS3= 000000         1008    1041
AMAMS4= 000000         1008    1044
AMSGAD= 000000         1008    1016
AMSGLG= 000000         1008    1017
AMSGTY= 000000         1008    1010
AMTYP1= 000000         1008    1031
AMTYP2= 000000         1008    1039
AMTYP3= 000000         1008    1042
AMTYP4= 000000         1008    1045
APASS = 000000         1008    1013
APRIOR= 000000         1008
APTCSU= 000040         4509    4753#
APTENV= 000001         4502    4709    4751#   4785
APTSIZ= 000200         1119    4750#
APTSPO= 000100         4504    4711    4752#
ASWREG= 000000         1008    1021
ATESTM= 000000         1008    1012
AUNIT = 000000         1008    1015
AUSWR = 071110            3#   1008    1022
AVECT1= 000300            3#   1008    1047
AVECT2= 000000         1008    1048
BADBRK  011070         4034#
BAUD  = 007400          912#
BAUDRA  007124         3265#
```

```
BITMAS  012114          4337    4356*   4369*   4377    4386#
BIT0   = 000001          787#
BIT00  = 000001          777#    787     856     877     898
BIT01  = 000002          776#    786     835     855     897
BIT02  = 000004          775#    785     834     854     875     896
BIT03  = 000010          774#    784     833     853     895
BIT04  = 000020          773#    783     852     894
BIT05  = 000040          772#    782     831     851     893
BIT06  = 000100          771#    781     830     850     871     892
BIT07  = 000200          770#    780     829     849     870     891
BIT08  = 000400          769#    779     4838
BIT09  = 001000          768#    778     4796    4846
BIT1   = 000002          786#
BIT10  = 002000          767#    826     4773
BIT11  = 004000          766#    825     865     4853
BIT12  = 010000          765#    824     844     864
BIT13  = 020000          764#    823     843     863     4780
BIT14  = 040000          763#    822     842     862     4824
BIT15  = 100000          762#    821     841     861
BIT2   = 000004          785#
BIT3   = 000010          784#
BIT4   = 000020          783#
BIT5   = 000040          782#
BIT6   = 000100          781#
BIT7   = 000200          780#
BIT8   = 000400          779#
BIT9   = 001000          778#
BPTVEC= 000014           794#
BREAK  = 000001          877#    1253    1266    1269    1283    1286    1300    1305    1011
BRK    = 010000          913#
CABLE  = 020000          914#    1976    2026    2114    2202    2290    2380    2478    2581    3539    3710
CARDET= 010000           824#    2049    2069    2089
CKSWR  = 104407         4769    4795    4823    5055#
CLR    = 000000          815#    2865    4111
CLRSEN= 020000           823#    2137    2157    2177
COMSPD= 000100           907#
COUNT   006312          2867*   2885*   2891    2895    2969#
CR     = 000015          702#    4548    4558
CRLF   = 000200          703#    1143    4049    4292    4519    4558
CYCLE   011766          1148    4325#
DATA   = 000017          904#    4195    4196
DATAIE= 000040           831#    1717    1730    1733    1747    1750    1764    1769    3552    3563    3596
DATAIN= 100000           821#    1946    2412    2430    2439    2456    2511    2535    2558    2618    2640
DATLNG  011414          3633    3730    3815    4177#
DDISP  = 177570          709#     989    1107
DISPLA  001142           989#    1107*   1115*   4772*   4868*
DISPRE  000174           924#    1115
DLADD   001254          1069#   1152*   1157    1160    1162    1165    1168    1171    1187    1219    4050    4312
DLADDR= 175610           811#    1069    1071    1072    1073    1074    1075
DLVEC   001256          1070#   1155*   3295    3416    3600    3834    4056    4318
DSWR   = 177570          708#     988    1106
DTR    = 000002          835#    1492    1495    1509    1511    1524    1527    2046    2066    2086    2134    2154    2174
                        2400    2428    2454
EMTVEC= 000030           797#    1090*   1091*
ERRCNT  010640          3880    3897#   3956    3967*
ERROR  = 100000C         841#    3032    3096
```

F10


```
ERRVEC= 000004            790* 1104  1105* 1116* 4829  4830* 4832* 4835*
EVENOD= 000040            906*
FALSE = 000000           4092* 4099
FLAG    011406           2865* 2880* 2889  4099* 4126* 4131  4154  4166*
FRERR = 020000            843*
FRFD  = 040000            915* 1548
GNS   = ****** U          923  1142  4048  4054  4060  4291  4297  4304  4310  4316  5047  5048  5049
                         5050  5051  5053  5055  5056  5057
GTSWR = 104406           1137  5053*
HOLD    010704           3910* 3911* 3914  3930*
HOLDSC  011407           4111* 4116* 4122  4167*
HOWLON= 000000           4071* 4097
HT    = 000011            700* 4517  4558
I       001272           1076* 1196* 1217* 1220  1222  4200* 4203* 4205
ILLMEM= 000004            802* 1191  1227
INITFL  012116           1145* 4340  4343* 4387*
INTFLA  011602           1203* 1208  3291* 3331  3335  3357* 3373  3424* 3464  3468  3502* 3519  3549*
                         3575  3579  4281* 4284*
INTSRV  011574           1192  3303  3417  4271*
IOTVEC= 000020            795* 1088* 1089*
TTCLRE  006560           3107*
_F    = 000012            701* 4552  4558
LOOP    001720           1146* 4065
MAINT = 000004            875* 1329  1342  1345  1359  1362  1376  1381  2747  2806  2863  3141  3427
                         3486  3498  3532  3622  3697  3720  3861  4008
MASK  = 000000           4178* 4192* 4208* 4210* 4215*
MAX     006310           2891  2895  2968*
MYTYPE  011604           4287* 4782
NEW     007156           3164* 3166* 3182* 3184* 3193  3201  3203  3221  3223  3271*
NUMBER  010642           3875  3898* 3920  3976
NUMBR   011510           4194* 4195  4197* 4205  4218*
OLD     007162           3137* 3139* 3193  3201  3203  3221* 3223* 3272*
ORERR = 040000            842* 3014  3053  3081
PARITY= 000020            905*
PBAUDS= 004000            865*
PBAUD0= 010000            864*
PBAUD1= 020000            863*
PBAUD2= 040000            862*
PBAUD3= 100000            861*
PBR   = 000200            908* 3128
PERR  = 010000            844*
PIRQ  = 177772            707*
PIRQVE= 000240            801*
PR0   = 000000            724* 3313  3362  3433  3555  3626  3723  3828
PR1   = 000040            725*
PR2   = 000100            726*
PR3   = 000140            727*
PR4   = 000200            728*
PR5   = 000240            729*
PR6   = 000300            730*
PR7   = 000340            731* 1193  1401  2390  2488  2591  3304  3418  3507  3839  3845
PS    = 177776            704*  705
PSW   = 177776            705*
PWRVEC= 000024            796* 1094* 1095* 4440* 4441* 4450* 4456* 4468* 4469*
RATES   007104           3153  3234  3239*
RBUF    001262           1072* 1162* 1163* 2841  2955  3010  3053  3081  3096  3152  3668  3733  3772
```

```
                    3943    4023
RCSR    001260      1071#   1160*   1492*   1495    1509*   1511    1524*   1527    1561    1574*   1577    1591*   1594
                    1608*   1613    1639    1652*   1655    1669*   1672    1686*   1691    1717    1730*   1733    1747*
                    1750    1764*   1769    1795    1808*   1811    1825*   1828    1842*   1847    1879    1946    1991
                    2046*   2049    2066*   2069    2086*   2089    2134*   2137    2154*   2157    2174*   2177    2222*
                    2225    2242*   2245    2262*   2265    2310*   2313    2330*   2333    2350*   2353    2400*   2409
                    2412    2428*   2430    2439    2454*   2456    2499*   2508    2511    2527*   2535    2550*   2558
                    2600*   2602    2610*   2618    2632*   2640    2762    2787    2821    2844    2877    2914    2918
                    2921    2941    2958    3172    3430*   3454*   3505*   3552*   3560*   3563*   3565*   3596*   3664
                    3767    3868*   3980*   4019
RCVRAC= 004000       825#   1991    2877    2914    2921
RCVRDO= 000200       829#   1879    2763    2787    2822    2844    2918    2941    2958    3172    3664    3767    4019
RCVRIE= 000100       830#   1795    1808    1811    1825    1828    1842    1847    3430    3454    3505    3868    3980
RDATA0= 000001       856#
RDATA1= 000002       855#
RDATA2= 000004       854#
RDATA3= 000010       853#
RDATA4= 000020       852#
RDATA5= 000040       851#
RDATA6= 000100       850#
RDATA7= 000200       849#
RDCHR = 104410      4671    5056#
RDLIN = 104411      5057#
REC     010710      3837    3939#
REG   = 000004      4071#   4095
REGSAV  011402      4095*   4108    4164#
REQSEN= 000004       834#   1561    1574    1577    1591    1594    1608    1613    2222    2242    2262    2499    2527
                    2550    3560    3565
RESVEC= 000010       791#
RHLD    011000      3947*   3948*   3952    3960    3988#
RING  = 040000       822#   2225    2245    2265
R0050   007104      3248#
R0070   007105      3249#
R0110   007106      3250#
R0135   007107      3251#
R0150   007110      3252#
R0200   007113      3255#
R0300   007111      3253#
R0600   007112      3254#
R100000 007123      3263#
R1800   007114      3256#
R2000   007115      3257#
R2400   007116      3258#
R3600   007117      3259#
R4800   007120      3260#
RSSTAC  001334      1078#   1174
R7200   007121      3261#
R9600   007122      3262#
SB      010644      3884    3899#   3960*
SECREC= 002000       826#   2313    2333    2353
SECXMI= 000010       833#   1639    1652    1655    1669    1672    1686    1691    2310    2330    2350    2600    2610
                    2632
SET   = 177777       814#   2677    2720    2761    2820    2880    2889    3446    4116
SETCLR= 000006      4071#   4122
SPECIA  012016      4350#   4431
STACK = 001100       695#   1086
```

```
START   001336            927    1079#
STKLMT= 177774            706#
SWR     001140            988#   1084    1106*   1108    1114*   1121*   1135    4448    4461*   4568    4605*   4773    4780
                         4792    4796    4824    4838    4840    4846    4853
SWREG   000176            925#   1114    1135    4568    4581
SW0   = 000001            759#
SW00  = 000001            749#    759
SW01  = 000002            748#    758
SW02  = 000004            747#    757
SW03  = 000010            746#    756
SW04  = 000020            745#    755
SW05  = 000040            744#    754
SW06  = 000100            743#    753
SW07  = 000200            742#    752
SW08  = 000400            741#    751
SW09  = 001000            740#    750
SW1   = 000002            758#
SW10  = 002000            739#
SW11  = 004000            738#
SW12  = 010000            737#
SW13  = 020000            736#
SW14  = 040000            735#
SW15  = 100000            734#
SW2   = 000004            757#
SW3   = 000010            756#
SW4   = 000020            755#
SW5   = 000040            754#
SW6   = 000100            753#
SW7   = 000200            752#
SW8   = 000400            751#
SW9   = 001000            750#
TBITVE= 000014            792#
TBUF    001270           1075#   1171*   1172*   2671*   2702*   2754*   2814*   2873*   2990*   3000*   3072*   3161*   3440*
                         3658*   3756*   3914*   4014*
TCSR    001264           1073#   1165*   1166*   1253    1266*   1269    1283*   1286    1300*   1305    1329    1342*   1345
                         1359*   1362    1376*   1381    1411    1424*   1427    1441*   1444    1458*   1463    1913    2678
                         2707    2721    2747*   2806*   2863*   3141*   3310*   3320*   3360*   3427*   3447    3486*   3498*
                         3532*   3622*   3653    3697*   3720*   3751    3861*   3865*   3924*   4008*   4011*
TCSRHI  001266           1074#   1168*   1169*   3155*   3234*
TDATA0= 000001            898#
TDATA1= 000002            897#
TDATA2= 000004            896#
TDATA3= 000010            895#
TDATA4= 000020            894#
TDATA5= 000040            893#
TDATA6= 000100            892#
TDATA7= 000200            891#
TIME  = 000000           4227#   4238
TIMER   011236           2681    2724    2765    2824    3450    4070#
TIMSAV  011404           4097*   4133    4144*   4165#
TKVEC = 000060            799#
TPVEC = 000064            800#
TRAN    010646           3843    3906#
TRAPVE= 000034            798#   1092*   1093*
TRTVEC= 000014            793#
TRUE  = 000001           4091#   4126    4131    4154
```

```
TST1    002034          1183#
TST10   003326          1709#
TST11   003470          1787#
TST12   003632          1868#
TST13   003672          1902#
TST14   003732          1936#
TST15   003772          1970#
TST16   004052          1981    2021#
TST17   004212          2031    2109#
TST2    002202          1244#
TST20   004352          2119    2197#
TST21   004512          2207    2285#
TST22   004652          2295    2375#
TST23   005056          2385    2473#
TST24   005302          2483    2567    2576#
TST25   005470          2586    2658#
TST26   005636          2741#
TST27   005752          2800#
TST3    002344          1320#
TST30   006062          2858#
TST31   006314          2903    2930    2967    2978#
TST32   006624          3023    3043    3061    3091    3106    3124#
TST33   007166          3132    3237    3286#
TST34   007440          3409#
TST35   010136          3544    3617#
TST36   010276          3706#
TST37   010470          3715    3808#
TST4    002506          1397#
TST40   011004          3895    4003#
TST41   011116          4033    4044#
TST5    002662          1485#
TST6    003002          1544#
TST7    003164          1552    1631#
TYPDS = 104405          4063    4301    4420    5051#
TYPE  = 104401          1129    4046    4052    4058    4289    4295    4302    4308    4314    4418    4421    4470    4522
                        4579    4580    4583    4596    4607    4626    4675    4678    4682    4775    4783    4930    4999
                        5047#
TYPOC = 104402          4051    4057    4294    4307    4313    4319    4582    5048#
TYPON = 104404          5050#
TYPOS = 104403          5049#
VECTOR  012122          4362*   4373*   4389#
WAIT    011514          2405    2504    2532    2555    2615    2637    2995    3005    3077    3326    3370    3459    3515
                        3570    3761    4141    4226#
WAS     010645          3886    3900#   3962#
WHICHB= 000002          4071#   4108
XMITIE= 000100           871#   1411    1424    1427    1441    1444    1458    1463    3310    3320    3360    3865    3924
XMITRD= 000200           870#   1913    2679    2707    2722    3448    3653    3751
ZZZ     010706          3928    3932#
ZZZZ    011002          3986    3989#
$APTHD  001000           948     954#
$ASTAT= ****** U        4731    4746
$ATYC   013510          4702    4704#
$ATY1   013464          4700#
$ATY3   013472          4507    4701#
$ATY4   013502          4703#   4788
$AUTOB  001134           985#   1139*   4576    4697
```

```
$BASE   001250          1049#   4360
$BOADR  001122           980#
$BODAT  001126           982#
$BELL   001164          1000#   4775    4808
$BGNLE= 177777             3#
$CHARC  012704          4524#   4534#   4541    4550#   4555#
$CKSWR  012710          4568#   5055
$CMTAG  001100           968#   1081    1082    1090    1096    1097    1098
$CM3  = 000000           998#
$CNTLG  013435          4579    4692#
$CNTLU  013430          4596    4691#
$CPUOP  001222          1023#
$CRLF   001171          1002#   4523    4558    4607    4691    4783    4808
$DBLK   014626          4896    4930    4938#
$DEVCT  001204          1014#   4358*   4383*
$DEVM   001252          1050#   4377
$DOAGN  012224          4414    4423    4429#
$DTBL   014616          4899    4934#
$ENDAD  012214           934    1127    4425#   4803
$ENDCT  012162          1096    4416#
$ENDMG  012233          4418    4433#
$ENULL  012230          4421    4432#
$ENV    001214          1019#   1133    4502    4709    4733    4785
$ENVM   001215          1020#   1119    4504    4509    4711
$EOP    012126          4348    4406#
$EOPCT  012154          1096*   4413#   4417
$ERFLG  001103           971#   4770*   4808    4813    4842    4844    4850*   4872
$ERMAX  001115           977#   1099*   4844    4867*   4872
$ERRFL= 000000          1145#   1146    1148#   1152#   1153    1155#   1156    1157#   1158    1160#   1161    1162#   1164
                        1165#   1167    1168#   1170    1171#   1173    1174#   1175    1187#   1188    1190#   1191#   1192#
                        1193#   1194#   1195    1196#   1197    1200#   1201    1203#   1204    1217#   1218    1219#   1221
                        1227#   1228#   1230#   1231#   1232    1250#   1251    1264#   1265    1266#   1267    1280#   1281
                        1283#   1284    1297#   1298    1300#   1301    1326#   1327    1340#   1341    1342#   1343    1356#
                        1357    1359#   1360    1373#   1374    1376#   1377    1408#   1409    1422#   1423    1424#   1425
                        1438#   1439    1441#   1442    1455#   1456    1458#   1459    1490#   1491    1492#   1493    1506#
                        1507    1509#   1510    1522#   1523    1524#   1525    1551#   1552    1558#   1559    1572#   1573
                        1574#   1575    1588#   1589    1591#   1592    1605#   1606    1608#   1609    1636#   1637    1650#
                        1651    1652#   1653    1666#   1667    1669#   1670    1682#   1683    1686#   1687    1714#   1715
                        1728#   1729    1730#   1731    1744#   1745    1747#   1748    1761#   1762    1764#   1765    1792#
                        1793    1806#   1807    1808#   1809    1822#   1823    1825#   1826    1839#   1840    1842#   1843
                        1877#   1878    1910#   1911    1944#   1945    1980#   1981    1988#   1989    2030#   2031    2042#
                        2043    2046#   2047    2062#   2063    2066#   2067    2082#   2083    2086#   2087    2118#   2119
                        2130#   2131    2134#   2135    2150#   2151    2154#   2155    2170#   2171    2174#   2175    2206#
                        2207    2218#   2219    2222#   2223    2238#   2239    2242#   2243    2258#   2259    2262#   2263
                        2294#   2295    2306#   2307    2310#   2311    2326#   2327    2330#   2331    2346#   2347    2350#
                        2351    2384#   2385    2397#   2398    2400#   2401    2403#   2409#   2410    2424#   2425    2428#
                        2429    2450#   2451    2454#   2455    2482#   2483    2495#   2496    2499#   2500    2502#   2508#
                        2509    2522#   2523    2527#   2528    2530#   2546#   2547    2550#   2551    2553#   2585#   2586
                        2600#   2601    2602#   2603    2606#   2607    2610#   2611    2613#   2629#   2630    2632#   2633
                        2635#   2663#   2664    2671#   2672    2676#   2695#   2696    2702#   2703    2719#   2747#   2748
                        2750#   2751    2754#   2755    2760#   2780#   2781    2806#   2807    2808#   2809    2814#   2815
                        2819#   2841#   2842    2863#   2864    2865#   2866    2867#   2868    2873#   2874    2880#   2881
                        2885#   2886    2902#   2903    2929#   2930    2955#   2956    2993#   2984    2990#   2991    2993#
                        3000#   3001    3003#   3010#   3011    3022#   3023    3030#   3031    3042#   3043    3049#   3050
                        3067#   3068    3072#   3073    3075#   3090#   3091    3131#   3132    3137#   3138    3139#   3140
                        3141#   3142    3144#   3145    3147    3151    3152#   3153    3155#   3156    3158#   3159    3161#
```

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                    3162    3164#   3165    3166#   3167    3176#   3177    3182#   3183    3184#   3185    3221#   3222
                    3223#   3224    3229#   3233    3234#   3235    3291#   3292    3295#   3296    3298#   3299    3301#
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$R2A  = ****** L     5058
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$SAVRE= ****** U     5058
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                     4207   4243#  4247   4251#  4255
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1307 1311# 1329# 1331 1335# 1345# 1347 1351# 1362# 1364 1368# 1381# 1383
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1563 1567# 1577# 1579 1583# 1594# 1596 1600# 1613# 1615 1619# 1639# 1641
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2233# 2245# 2247 2253# 2265# 2267 2273# 2290# 2292 2297# 2313# 2315 2321#
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3958 3964# 3969# 3976# 3978 3983# 4023# 4025 4029# 4108# 4110 4118# 4122#
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1718# 1719 1734# 1735 1751# 1752 1770# 1771 1796# 1797 1812# 1813 1829#
1830 1848# 1849 1880# 1881 1914# 1915 1947# 1948 1977# 1978 1992# 1993
2027# 2028 2050# 2051 2070# 2071 2090# 2091 2115# 2116 2138# 2139 2158#
2159 2178# 2179 2203# 2204 2226# 2227 2246# 2247 2266# 2267 2291# 2292
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3882 3921# 3922 3953# 3954 3957# 3958 3977# 3978 4020# 4021 4024# 4025
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$$RETU= 000000
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$45      003772            1947    1959#
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$47      004052            1992    2006#
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$56      004324            2158    2165#
$57      004352            2178    2185#
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$71      004770            2413    2418#
$72      005016            2431    2436#
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                        1288    1306    1307    1330    1331    1346    1347    1363    1364    1382    1383    1412    1413
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                        3173    3174    3194    3195    3202    3203    3204    3205    3270#   3332    3333    3336    3337
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                        3978    4020    4021    4024    4025    4049#   4109    4110    4123    4124    4155    4156    4292#
                        4305#   4311#   4338    4339    4341    4342    4378    4379    4432    4436    4452    4474    4558
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CLRVEC      3#  1224  3384  3601
COMMEN      1#   802#
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DECRU       1#
DEFAUL      1#
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ENDSUB      3#  1215  1260  1276  1293  1312  1336  1352  1369  1388  1418  1434  1451  1470  1502
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ENDSW              3#
ENDTST             3#   1235    1313    1389    1471    1535    1621    1699    1777    1856    1894    1928    1962    2010    2099
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                3798    3993    4039
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ERRDF              3#   1211
ERRHRD             3#   1256    1272    1289    1308    1332    1348    1365    1384    1414    1430    1447    1466    1498    1514
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EXIFB              1#   4130
EXIT               3#   1550    1979    2029    2117    2205    2293    2383    2481    2566    2584    2901    2928    2966    3021
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GETPRI             1#    802#
GETSWR             1#    802#   1130#
GPHARD             3#
GPRMA              3#
GPRMD              3#
GPRML              3#
HEADER             3#
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INCRU              1#   4239
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LASTAD             3#
LEAVE              1#
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LOCAL           1#
LOOP            1#      4104
MSG         1177#   1179    1239#   1241    1476#   1478    1540#   1542    1626#   1628    1704#   1706    1782#   1784    2017#
            2019    2105#   2107    2193#   2195    2281#   2283    2369#   2371    2469#   2471    2653#   2655    2736#   2738
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MULT            1#    802#
NEWTST          1#    802#  1177    1239    1317    1394    1476    1540    1626    1704    1782    1865    1899    1933    1967
            2017    2105    2193    2281    2369    2469    2573    2653    2736    2797    2853    2975    3118    3278    3403
            3613    3703    3804    3998    4041
NOLOCA          1#
POINTE          3#
POP             1#    802#  1232    3392    3609    4261    4461    4462    4743    4744    4925
PRINTB          3#
PUSH            1#    802#  1225    3385    3602    4234    4442    4448    4704    4706    4727    4884
REPEAT          1#   1197   2874    3649    3660    3747    3763    3872    4015    4334
REPORT          1#      3#    802#
RETURN          1#   4156   4160    4216    4384
ROUTIN          1#   4069   4176    4225    4286    4324
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SCOPE         697#   1183   1244    1320    1397    1485    1544    1631    1709    1787    1868    1902    1936    1970    2021
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            3706    3808    4003    4044    4407
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SETPRI          1#    802#  1401    2390    2488    2591    3313    3362    3433    3507    3555    3626    3723    3828
SETTRA       5039#   5048   5049    5050    5051    5053    5055    5056    5057
SETUP           1#    802#  1079
SETVEC          3#   1189   3300    3414
SKIP            1#    802#  1552    1981    2031    2119    2207    2295    2385    2483    2567    2586    2903    2930    2967
            3023    3043    3061    3091    3106    3132    3237    3544    3715    3895    4033
SLASH           1#    802#
SPACE         802#
STARS           1#    802#   818     820     838     840     858     860     880     882     901     916     930     941     943
             950    963    1004    1007    1177    1192    1236    1238    1239    1243    1316    1317    1319    1393    1394
            1396    1475    1476    1484    1539    1540    1543    1625    1626    1630    1703    1704    1708    1781    1782
            1786    1861    1864    1865    1867    1898    1899    1901    1932    1933    1935    1966    1967    1969    2012
            2016    2017    2020    2104    2105    2108    2192    2193    2196    2280    2281    2284    2368    2369    2374
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STRUCT          1#      3#
SWPSU           1#    802#  1102#
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TYPOCT      1#    802#  4050  4056  4293  4306  4312  4318  4581
TYPTXT      1#    802#  4046  4052  4058  4289  4295  4302  4308  4314
UNTIL       1#   1221  2888  3652  3663  3750  3766  3874  4018  4376
UNTILB      1#
WAITMS      3#
WAITUS      3#   2402  2501  2529  2552  2612  2634  2992  3002  3074  3323  3367  3456  3512  3567
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WHILE       1#   2912  3167
WHILEB      1#
$ADDON      1#   1198  1199  1208  1210  1253  1255  1269  1271  1286  1288  1305  1307  1329  1331
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ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

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RUN-TIME RATIO: 4641/195=23.7
CORE USED: 43K (85 PAGES)