DLV11-F

DLV11-F OFFLINE TEST
CVDVCB0

AH-E007B-MC

FICHE 1 OF 1

JUN 1978
digital
MADE IN USA

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                        .REM    @


                                        IDENTIFICATION
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                                PRODUCT CODE:       AC-E006B-MC

                                PRODUCT NAME:       CVDVCB0 DLV11-F OFFLINE TEST

                                PRODUCT DATE:       MARCH, 1978

                                AUTHOR:              ODES CHOATE

                                MAINTAINER:         DIAGNOSTIC ENGINEERING GROUP
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1.0     GENERAL PROGRAM INFORMATION.
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1.1     PROGRAM PURPOSE (ABSTRACT).

        THIS DIAGNOSTIC IS A LOGIC TEST TO VERIFY THE OPERATION OF THE
        DLV11-F  SERIAL  LINE INTERFACE.  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-F SERIAL LINE INTERFACES.  THE DEFAULT ADDRESSES ARE:

                177560 -CONSOLE INTERFACE DEVICE ADDRESS
                175610 -FIRST SERIAL LINE ADDRESS  OF  15  CONSECUTIVE
                        SERIAL LINE DEVICES.


                    60 - VECTOR FOR CONSOLE DEVICE INTERFACE.
                   300 - VECTOR FOR FIRST OF 15 DEVICES.

        THIS PROGRAM IS DESIGNED TO RUN  ON  ANY  PDP-11  WITH  4K  OF
        MEMORY AND A DLV11-F (LSI-BUS) MODULE.  IT CAN RUN UNDER XXDP,
        APT, AND ACT MONITORS, AND  ON  PROCESSORS  WITH  NO  HARDWARE
        SWITCH REGISTER.  A POWER FAILURE WILL CAUSE THE DIAG-
        NOSTIC TO RESTART.

1.2     SYSTEM REQUIREMENTS.

                 HARDWARE REQUIREMENTS:

                 ANY PDP-11 FAMILY PROCESSOR
                 4K MEMORY - MINIMUM
                A SPECIAL WRAP CONNECTOR OR EQUIVALENT (OPTIONAL)


                 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.
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NO SPECIAL DIAGNOSTICS ARE REQUIRED TO RUN BEFORE THIS, BUT THE PROCESSOR, MEMORY, AND BUS ARE ASSUMMED 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 WITHOUT ITERATIONS.)

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)  IF A CONTROL U < U> IS DEPRESSED THEN THE PROGRAM WILL
                            SEND YOU BACK TO STEP 3.

                        C)  IF THE INPUT CHARACTER IS NOT ONE  OF  THE  CHARACTERS
                            MENTIONED ABOVE THEN A QUESTION MARK (?) WILL BE TYPED
                            FOLLOWED BY A CARRAGE RETURN AND A LINE FEED SEQUENCE
                            THEN PROCEED FROM STEP 3 (ERASING ALL PREVIOUS INPUT).

                            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-F'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-F 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-F  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#14 -- BASE ADDRESS + (160)
                                   BASE VECTOR  + (160)

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

                         BIT 15 BIT 14  -    -    -       BIT 1  BIT 0
                        ---------------------------------------------
                        ! CON- ! UNIT !                  ! UNIT ! UNIT !
                        ! SOLE !  14  !                  ! #1   !  #0  !
                        ---------------------------------------------

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

                        EXAMPLE:
                                $BASE:   175610
                                $VECTOR:    300
                                $DEVM:   100013

                        THE PROGRAM WILL TEST-

                                UNIT#0  175610  300
                                UNIT#1  175620  310
                                UNIT#3  175640  330
                                CONSOLE 177560   60

                        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 - (SEE	0 = NO
5	EVEN ODD PARITY-/ NOTE)	0 = ODD
6	COMMON SPEED	1 = YES
7	PROGRAMMABLE BAUD RATE	0 = NO
8-11	BAUD RATE OFFSET (SEE FOLLOWING NOTE)	02(8) = 110 BAUD
12	BREAK GENERATION ENABLED	1 = YES
13	WRAP CONNECTOR INSTALLED	0 = NO
14	MAINT JUMPER (SEE NOTE)	0 = NO
15	ERROR BITS ENABLED	0 = NO

NOTE ON BITS <4:5>

THIS DIAGNOSTIC DOES NOT TEST THE PARITY LOGIC.

NOTE ON BITS <7:11>

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. (TEST #16)

NOTE ON BIT 13

THIS SWITCH WHEN ON WILL ALLOW THE TESTING OF THE EIA DRIVERS AND RECEIVERS OR THE 20 MA DRIVERS AND RECEIVERS.

IN ORDER TO TEST THE EIA DRIVERS AND RECEIVERS A WRAP CONNECTOR THAT CONNECTS PINS F TO J AND PINS M TO E MUST BE INSTALLED IN THE 40-PIN HEADER.

IN ORDER TO TEST THE 20MA DRIVERS AND RECEIVERS A WRAP CONNECTOR THAT CONNECTS PINS E TO H AND PINS K TO KK MUST BE INSTALLED IN THE 40-PIN HEADER.

NOTE ON BIT 14

THIS SWITCH WHEN ON WILL ALLOW THE DIAGNOSTIC TO TEST IN MAINTAINCE MODE. IT IS ASSUMED THAT THE MAINTAINCE JUMPER IS INSTALLED ON ALL OF THE DLV11-F MODULES WHEN THIS BIT IS SET.

DLV11-F INDIVIDUAL TEST REQUIREMENTS TABLE

I 1

SEQ 0008

TEST #	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	20	21	22	23	
CONSOLE DEVICE			++				**		++	++	++	++	++			++	++		++	++
APT ENVIRONMENT		++							++			++		++	++					
(MAINT) BIT SET			--				**			--	--	--	--	--		--	--		--	--
(WRAP CON) BIT SET							**											--		
(ERROR BITS) BIT SET													--							
(COM SPD) BIT SET																		--		
(BREAK) BIT SET		--																		--
(PROG BAUD RATE) BIT SET														--						

++ TEST WILL NOT RUN IF THIS CONDITION IS TRUE.
-- TEST WILL NOT RUN IF THIS CONDITION IS FALSE.
** TEST WILL NOT RUN IF ALL OF THE CONDITIONS IN THIS COLUMN ARE FALSE.

```
                        2.5     EXECUTION TIMES.

                                EXECUTION TIMES ARE FOR AN LSI-11 PROCESSOR WITH  ALL  OPTIONS
                                ENABLED ON THE DLV11-F (EXECPT FOR PROGRAMMABLE BAUD RATE), AT
                                110 BAUD, AND NOT AT THE CONSOLE ADDRESS.

                                        FIRST PASS-         90 SECONDS
                                        ADDITIONAL PASSES   95 SECONDS
                                        ADDITIONAL DEVICES  95 SECONDS

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

                                IF THE DIAGNOSTIC IS RUN AT THE CONSOLE
                                ADDRESS THE RUNNING TIME IS 5 SECONDS PER PASS.

                        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.
                                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 ON ERROR.

                                        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.
```

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                        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.
                                ------ ----------- -------

                              15  14  13  12  11  10   9   8   7   6   5   4   3   2   1   0
                            ***********************************************************************
                        RCSR!   !   !   !   !RCVR!   !   !   !RCVR!RCVR!   !   !   !   !   !RDR !
                            !   !   !   !   !ACT !   !   !   !DONE!IE  !   !   !   !   !   !ENB !
                            ***********************************************************************
                        RBUF!ERRO!OR !FR !P  !   !   !   !   !           RECEIVED DATA BUFFER    !
                            !R  !ERR !ERR !ERR !   !   !   !   !                                   !
                            ***********************************************************************
                        TCSR! PROGRAMMABLE BAUD !PBR !   !   !   !XMIT!XMIT!   !   !   !MAIN!   !BREA!
                            !   RATE  SELECT    !ENAB!   !   !   !RDY !IE  !   !   !   !T   !   !K   !
                            ***********************************************************************
                        TBUF!   !   !   !   !   !   !   !   !           TRANSMITTER DATA BUFFER !
                            !   !   !   !   !   !   !   !   !                                   !
                            ***********************************************************************


                                                        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-F
                                        RESPONDS TO THAT ADDRESS SPACE.


                                TEST 2 BREAK - TCSR0 SET, CLEAR, RESET
                                ---- -


                                TEST 3 MAINT - TCSR2 SET, CLEAR, RESET
                                ---- -


                                TEST 4 XMITIE - TCSR6 SET, CLEAR, RESET
                                ---- -


                                TEST  5 RCVRIE - RCSR6 SET, CLEAR, RESET
                                ----  -

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


                                TEST  6 RCVRDONE - RCSR 7 - IS CLEARED BY INIT
                                ---- --


                                TEST 7 RCVRACT - RCSR 11 - 15 CLEARED BY INIT
                                ---- -


                                TEST 10 XMITRDY - TCSR 7 - IS SET BY INIT
                                ---- --

                                TEST 11 XMIT RDY - TCSR 7 - CLEARS WHEN TBUF IS LOADED
                                ---- --
                                        WITH  A  CHARACTER  AND  THAT IT SETS WITHIN A
                                        REASONABLE AMOUNT OF TIME.


                                TEST 12 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 13 RCVRDONE IS CLEARED BY READING RBUF
                        ---- --

                        TEST 14 RCVRACT - RCSR 11 - SETS WHEN A START  BIT  IS
                        ---- --
                                RECEIVED  AND  CLEARS WHEN RCVRDONE - RCSR 7 -
                                SETS


                        TEST 15 OVERRUN BIT - RBUF 14
                        ---- --


                        TEST 16 PROGRAMMABLE BAUD RATE TEST TEST AT ALL SPEEDS
                        ---- --
                                AVAILABLE  A COMPARISON WILL BE MADE TO SEE IF
                                NEW TIME IS LESS THAN PREVIOUS.


                        TEST 17 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 20 RECEIVER INTERRUPT LOGIC TEST THIS TEST COVERS ALL
                        ---- --
                                OF  THE RECEIVER SIDE OF THE INTERRUPT LOGIC IN
                                 CHARACTER MODE.


                        TEST  21  TEST  ACTUAL   DATA   TRANSFERED   NON-INTERRUPT
                        ----  --
                                MAINTENANCE BIT SET


                        TEST 22 TEST DATA THROUGH WRAP
                        ---- --


                        TEST 23 FULL DATA TRANSFER WITH INTERRUPTS AND MAINTENANCE
                        ---- --
                                MODE.


                        TEST 24 TEST BREAK GENERATION LOGIC  TRANSMIT  KNOWN  CHAR
                        ---- --
                                WITH BREAK SET AND COMPARE RECEIVED WITH 0.


                        TEST 25 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-F  UNDER  TEST,  ADRS +2 TO
                        POINT TO THE VECTOR OF THE DLV11-F UNDER TEST.
                        IT  KEEPS  TRACK OF THE CURRENT DEVICE AND BIT
                        MASKS.
```

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                        @
                        .TITLE  MAINDEC-ZZ-CVDVCB-
                        ;*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 ***
001100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

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

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

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
```

```
                                ;*"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
                        ;;**************************************************************
                                ; UNUSED         BIT15
                                ; UNUSED         BIT14
                                ; UNUSED         BIT13
                                ; UNUSED         BIT12
004000                          RCVRACT=        BIT11           ; RECEIVER ACTIVE INDICATOR
                                ; UNUSED         BIT10
                                ; UNUSED         BIT09
                                ; UNUSED         BIT08
000200                          RCVRDONE=       BIT07           ; RECEIVER DONE
000100                          RCVRIE=         BIT06           ; RECEIVER INTERRUPT ENABLE
                                ; UNUSED         BIT05
                                ; UNUSED         BIT04
                                ; UNUSED         BIT03
                                ; UNUSED         BIT02
                                ; UNUSED         BIT01
000001                          RDRRUN=         BIT00           ; READER RUN
```

```
                        ;;*****************************************************************
                        ; 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                          WRAP    =    20000
040000                          MAINTJUMP =  40000
100000                          ERRBITS =   100000
                        ;;**********************************************************************
                        .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
000204                                  $SVPC=.                 ;SAVE PC
000046                                  .=46
000046  011404                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
000052                                  .=52
000052  000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
000204                                  .=$SVPC                 ;; RESTORE PC
001000                          .=1000
                                .SBTTL  APT PARAMETER BLOCK

                                ;;**********************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;**********************************************************************
001000                                  .$X=.   ;;SAVE CURRENT LOCATION
000024                                  .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                          200     ;;FOR APT START UP
000044                                  .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  001000                          $APTHDR ;;POINT TO APT HEADER BLOCK
001000                                  .=.$X   ;;RESET LOCATION COUNTER
                                ;;**********************************************************************
                                ;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   ;;ADDRESS 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
```

```
  965  001212  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
  966  001214                      $ETABLE:                    ;;APT ENVIRONMENT TABLE
  967  001214      000             $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
  968  001215      000             $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
  969  001216  000000              $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
  970  001220  011110              $USWR:  .WORD   AUSWR   ;;USER SWITCHES
  971  001222  000000              $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
  972                              ;*                      BITS 15-11=CPU TYPE
  973                              ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
  974                              ;*                              11/70=06,PDQ=07,Q=10
  975                              ;*                      BIT 10=REAL TIME CLOCK
  976                              ;*                      BIT  9=FLOATING POINT PROCESSOR
  977                              ;*                      BIT  8=MEMORY MANAGEMENT
  978  001224      000             $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S.  BYTE
  979  001225      000             $MTYP1: .BYTE   AMTYP1  ;;MEM.  TYPE,BLK#1
  980                              ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
  981                              ;*                              900 NSEC CORE=001
  982                              ;*                              300 NSEC BIPOLAR=002
  983                              ;*                              500 NSEC MOS=003
  984  001226  000000              $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
  985                              ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
  986  001230      000             $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S.  BYTE
  987  001231      000             $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
  988  001232  000000              $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
  989  001234      000             $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
  990  001235      000             $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
  991  001236  000000              $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
  992  001240      000             $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
  993  001241      000             $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
  994  001242  000000              $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
  995  001244  000300              $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
  996  001246  000000              $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
  997  001250  175610              $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
  998  001252  100000              $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
  999  001254                      $ETEND:
 1000                              .MEXIT
```

```
                                .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
```

```
1027  001336                                START:
1028                                        .SBTTL  INITIALIZE THE COMMON TAGS
1029                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
1030  001336  012706  001100                       MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
1031  001342  005026                       CLR     (R6)+           ;;CLEAR MEMORY LOCATION
1032  001344  022706  001140               CMP     #SWR,R6 ;;DONE?
1033  001350  001374                       BNE     .-6             ;;LOOP BACK IF NO
1034  001352  012706  001100               MOV     #STACK,SP       ;;SETUP THE STACK POINTER
1035                                        ;;INITIALIZE A FEW VECTORS
1036  001356  012737  013326  000020       MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
1037  001364  012737  000340  000022       MOV     #340,@#IOTVEC+2 ;;LEVEL 7
1038  001372  012737  013126  000030       MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
1039  001400  012737  000340  000032       MOV     #340,@#EMTVEC+2 ;;LEVEL 7
1040  001406  012737  014260  000034       MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
1041  001414  012737  000340  000036       MOV     #340,@#TRAPVEC+2;LEVEL 7
1042  001422  012737  011440  000024       MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
1043  001430  012737  000340  000026       MOV     #340,@#PWRVEC+2 ;;LEVEL 7
1044  001436  016767  007710  007700       MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
1045  001444  005067  177510               CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
1046  001450  005067  177506               CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
1047  001454  112767  000001  177433       MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
1048  001462  012767  001462  177416       MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
1049  001470  012767  001470  177412       MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
1050                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER.  IF NOT FOUND OR IT IS
1051                                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
1052  001476  013746  000004               MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
1053  001502  012737  001536  000004       MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
1054  001510  012767  177570  177422       MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
1055  001516  012767  177570  177416       MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
1056  001524  022777  177777  177406       CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
1057  001532  001012                       BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
1058                                                                ;;AND  THE HARDWARE SWR IS NOT = -1
1059  001534  000403                       BR      65$             ;;BRANCH IF NO TIMEOUT
1060  001536  012716  001544       64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
1061  001542  000002                       RTI
1062  001544  012767  000176  177366 65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
1063  001552  012767  000174  177362       MOV     #DISPREG,DISPLAY
1064  001560  012637  000004       66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
1065
1066  001564  005067  177412               CLR     $PASS           ;;CLEAR PASS COUNT
1067  001570  132767  000200  177417       BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
1068  001576  001403                       BEQ     67$             ;;YES,USE NON-APT SWITCH
1069  001600  012767  001216  177332       MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
1070  001606                        67$:
1071                                        .SBTTL  TYPE PROGRAM NAME
1072                                        ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
1073  001606  005227  177777               INC     #-1             ;;FIRST TIME?
1074  001612  001037                       BNE     68$             ;;BRANCH IF NO
1075  001614  022737  011404  000042       CMP     #$ENDAD,@#42    ;;ACT-11?
1076  001622  001433                       BEQ     68$             ;;BRANCH IF YES
1077  001624  104401  001672               TYPE    ,69$            ;;TYPE ASCIZ STRING
1078                                        .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
1079  001630  005737  000042               TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
1080  001634  001012                       BNE     70$             ;;BRANCH IF YES
1081  001636  126727  177352  000001       CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
1082  001644  001406                       BEQ     70$             ;;BRANCH IF YES
```

```
1083  001646  026727  177266  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
1084  001654  001005                          BNE     71$             ;;BRANCH IF NO
1085  001656  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
1086  001660  000403                          BR      71$
1087  001662  112767  000001  177244  70$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
1088  001670                        71$:
1089  001670  000410                          BR      68$             ;;GET OVER THE ASCIZ
1090                                ;;69$:    .ASCIZ  <CRLF>*MD-ZZ-CVDVC-B*<CRLF>
1091  001712                        68$:
```

```
1092  001712                                                    WHILE $DEVM EQ #0 DO
1093  001712                          $1:
1094  001712  005767  177334                TST     $DEVM
1095  001716  001101                        BNE     $2
1096  001720                                  TYPTXT <<CRLF>!I HAVE NO DEVICE TO TEST.!>
1097  001762                                TYPTXT  <<CRLF>!SET UP $DEVM TO INDICATE ACTUAL CONFIGURATION.!>
1098  002050                                TYPTXT  <<CRLF>!TYPE PROCEED (P) TO CONTINUE.!>
1099  002116  000000                        HALT
1100  002120                                                    ENDDO
1101  002120  000674                        BR      $1
1102  002122                          $2:
1103  002122                                                    LET INITFLAG := #1
1104  002122  012767  000001  006754        MOV     #1,INITFLAG
1105  002130                                                    LET BITMASK := #BIT15   ; START AT CONSOLE
1106  002130  012767  100000  006744        MOV     #BIT15,BITMASK
1107  002136                          LOOP:
1108  002136                                CALL    CYCLE           ; NO ARGUMENTS--ADDRS -> NEXT ADDRESS
1109  002136  004767  006520                JSR     PC,CYCLE
1110                                                              ;               ADDRS+2 -> NEXT VECTOR
1111                                                              ;               GET UNIT ADDRESS
1112  002142                                                    LET     DLADD := (ADRS)+
1113  002142  012167  177106                MOV     (ADRS)+,DLADD
1114                                                              ;               GET UNIT VECTOR
1115  002146                                                    LET     DLVEC := (ADRS)
1116  002146  011167  177104                MOV     (ADRS),DLVEC
1117  002152                                                    LET     ADRS  := DLADD
1118  002152  016701  177076                MOV     DLADD,ADRS
1119                                                              ;RCSR = DLADD  +  0
1120  002156                                                  LET     RCSR  := DLADD
1121  002156  016767  177072  177074        MOV     DLADD,RCSR
1122  002164                                                  LET     RBUF  := DLADD + #2
1123  002164  016767  177064  177070        MOV     DLADD,RBUF
1124  002172  062767  000002  177062        ADD     #2,RBUF
1125  002200                                                  LET     TCSR  := DLADD + #4
1126  002200  016767  177050  177056        MOV     DLADD,TCSR
1127  002206  062767  000004  177050        ADD     #4,TCSR
1128  002214                                                  LET     TCSRHI := DLADD + #5
1129  002214  016767  177034  177044        MOV     DLADD,TCSRHI
1130  002222  062767  000005  177036        ADD     #5,TCSRHI
1131  002230                                                  LET     TBUF  := DLADD + #6
1132  002230  016767  177020  177032        MOV     DLADD,TBUF
1133  002236  062767  000006  177024        ADD     #6,TBUF
1134  002244                                                  LET     R5    := #R5STACK
1135  002244  012705  001334                MOV     #R5STACK,R5
1136                                                              ;;BRESET
1137  002250  000005                        RESET
```

```
                                ;;**********************************************************************
                                ;*TEST 1         ADDRESSABILITY
                                ;*              THIS TEST VERIFIES THAT THE ADDRESS AS PLACED IN
                                ;*              THE HARDWARE P-TABLE TO BE CORRECT AND THE DLV11-F RESPONDS
                                ;*              TO THAT ADDRESS SPACE
                                ;;**********************************************************************
002252  000004                TST1:   SCOPE
002254  012767  000002  176676        MOV     #2,$TIMES       ;;DO 2 ITERATIONS
002262  012767  000001  176710        MOV     #1,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
002270                                                                  LET     ADRS := DLADD
002270  016701  176760                MOV     DLADD,ADRS
                                                                        ; SET UP INTERRUPT
002274                                                                  SETVEC  #ILLMEM,#INTSRV,#PR7
002274  010146                        MOV     R1,-(SP)
002276  012701  000004                MOV     #ILLMEM,R1
002302  012721  010652                MOV     #INTSRV,(R1)+
002306  012711  000340                MOV     #PR7,(R1)
002312  012601                        MOV     (SP)+,R1
002314                                                                  LET     I := #0
002314  005067  176752                CLR     I
002320                                                                  REPEAT
002320                        $3:
002320                                                                      BGNSUB
002320  012767  002326  176562        MOV     #64$,$LPERR
                                                                            ;CLEAR FLAG
                                                                            LET INTFLAG := #0
002326  005067  006326                CLR     INTFLAG
                                                                            ;READ FLAG
002332  005711                        TST @ADRS
                                                                            IF INTFLAG NE #0 THEN
002334  005767  006320                TST     INTFLAG
002340  001401                        BEQ     $4
                                                                            ; FATAL ERROR
002342                                                                          ERRDF 1,,NODL
002342  104001                        ERROR   1
                                                                            ENDIF
002344                        $4:
                                                                        ENDSUB
                                                                        LET     I := I + #2
002352  062767  000002  176720        ADD     #2,I
                                                                        LET     ADRS := DLADD + I
002352  016701  176676                MOV     DLADD,ADRS
002356  066701  176710                ADD     I,ADRS
002362                                                              UNTIL I EQ #8.
002362  026727  176704  000010        CMP     I,#8.
002370  001353                        BNE     $3
002372                                                              CLRVEC ILLMEM
002372  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
002374  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
002376  012701  000004                MOV     #ILLMEM,R1
002402  010102                        MOV     R1,R2
002404  062702  000002                ADD     #2,R2
002410  010221                        MOV     R2,(R1)+
002412  005011                        CLR     (R1)
002414  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
1194  002416  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
1195                                                              ;END OF TEST
1196  002420                                                    ENDTST
```

```
                                ;;**********************************************************************
                                ;* THE FOLLOWING 8 TESTS  TEST ALL 'READ WRITE' BITS
                                ;;**********************************************************************


                                ;;**********************************************************************
                                ;*TEST 2         BREAK - TCSR0 SET, CLEAR, RESET
                                ;*               THE BREAK BIT IS USUALLY USED ON THE CONSOLE
                                ;*               DEVICE.  IF ADDITIONAL DLV OPTIONS ARE USED
                                ;*               IT IS RECOMMENDED TO REMOVE THE 'BG' JUMPER AND
                                ;*               CLEAR BIT 12 IN $USWR WHICH WILL CAUSE THIS
                                ;*               TEST TO BE SKIPPED.
                                ;;**********************************************************************
002420  000004                TST2:   SCOPE
002422  012767  000010  176530          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
002430  012767  000002  176542          MOV     #2,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX

002436                                                          IF #BRK NOTSETIN $USWR OR #APTENV SETIN $ENV THE
002436  032767  010000  176554          BIT     #BRK,$USWR
002444  001404                        BEQ     $5
002446  032767  000001  176540          BIT     #APTENV,$ENV
002454  001404                        BEQ     $6
002456                          $5:
002456                                                              EXIT TEST   ; BREAK NOT INSTALLED
002456  012767  000001  176474          MOV     #1,$TIMES
002464  000452                        BR      TST3            ;;;EXIT THIS TEST
002466                                                          ENDIF
002466                          $6:

                                                        ; SEE IF IT IS CLEAR
002466                                                  BGNSUB
002466  012767  002474  176414      MOV     #64$,$LPERR

002474                                                      IF      #BREAK SETIN @TCSR THEN
002474  032777  000001  176562      BIT     #BREAK,@TCSR
002502  001401                    BEQ     $7

                                                            ; BREAK DID NOT RESET IN TCSR
002504                                                      ERRHRD 2,,DIDNOT
002504  104002                    ERROR   2
002506                                                  ENDIF
002506                          $7:
002506                                                  ENDSUB

                                                    ; TRY TO SET BREAK BIT
002506                                                  BGNSUB
002506  012767  002514  176374      MOV     #64$,$LPERR
002514                                                      LET     @TCSR := @TCSR SET. BY #BREAK
002514  052777  000001  176542      BIS     #BREAK,@TCSR

                                                            ; STUCK TO 0
002522                                                      IF      #BREAK NOTSETIN @TCSR THEN
002522  032777  000001  176534      BIT     #BREAK,@TCSR
002530  001001                    BNE     $10

                                                            ; BREAK DID NOT SET IN TCSR
002532                                                      ERRHRD 3,,DIDNOT
002532  104003                    ERROR   3
002534                                                  ENDIF
```

```
1253  002534                          $10:
1254  002534                                                          ENDSUB
1255
1256                                                          ; TRY TO CLEAR A SET BIT
1257  002534                                                          BGNSUB
1258  002534  012767  002542  176346          MOV     #64$,$LPERR
1259
1260  002542                                                            LET     @TCSR := @TCSR CLR.BY #BREAK
1261  002542  042777  000001  176514          BIC     #BREAK,@TCSR
1262                                                                ; SHOULD HAVE CLEARED
1263  002550                                                            IF      #BREAK SETIN @TCSR THEN
1264  002550  032777  000001  176506          BIT     #BREAK,@TCSR
1265  002556  001401                          BEQ     $11
1266                                                                ; BREAK  DID NOT CLEAR IN TCSR
1267  002560                                                            ERRHRD 4,,DIDNOT
1268  002560  104004                          ERROR   4
1269  002562                                                            ENDIF
1270  002562                          $11:
1271  002562                                                          ENDSUB
1272
1273                                                          ; NOW SEE IF RESET CLEARS IT
1274  002562                                                          BGNSUB
1275  002562  012767  002570  176320          MOV     #64$,$LPERR
1276
1277  002570                                                            LET     @TCSR := @TCSR SET.BY #BREAK
1278  002570  052777  000001  176466          BIS     #BREAK,@TCSR
1279                                                                ; ISSUE BUS RESET
1280  002576                                                            BRESET
1281  002576  000005                          RESET
1282  002600                                                            IF      #BREAK SETIN @TCSR THEN
1283  002600  032777  000001  176456          BIT     #BREAK,@TCSR
1284  002606  001401                          BEQ     $12
1285                                                                ; BREAK DID NOT RESET IN TCSR
1286  002610                                                            ERRHRD 5,,DIDNOT
1287  002610  104005                          ERROR   5
1288  002612                                                            ENDIF
1289  002612                          $12:
1290  002612                                                        ENDSUB
1291  002612                                                    ENDTST
1292
1293
```

```
                                        ;;**********************************************************************
                                        ;;**********************************************************************
                                        ;*TEST 3          MAINT - TCSR2 SET, CLEAR, RESET
                                        ;;**********************************************************************
002612  000004                    TST3:   SCOPE
002614  012767  000010  176336            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
002622  012767  000003  176350            MOV     #3,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX

002630                                                          IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
002630  032767  040000  176362            BIT     #MAINTJUMP,$USWR
002636  001404                            BEQ     $13
002640  126727  006255  000001            CMPB    CONSOLE,#TRUE
002646  001004                            BNE     $14
002650                              $13:
002650                                                              EXIT TEST
002650  012767  000001  176302            MOV     #1,$TIMES
002656  000452                            BR      TST4            ;;;EXIT THIS TEST
002660                                                          ENDIF
002660                              $14:

                                                    ; SEE IF IT IS CLEAR
002660                                                          BGNSUB
002660  012767  002666  176222            MOV     #64$,$LPERR

002666                                                              IF      #MAINT SETIN @TCSR THEN
002666  032777  000004  176370            BIT     #MAINT,@TCSR
002674  001401                            BEQ     $15

                                                                    ; MAINT DID NOT RESET IN TCSR
002676                                                              ERRHRD 6,,DIDNOT
002676  104006                            ERROR   6
002700                                                              ENDIF
002700                              $15:
002700                                                          ENDSUB

                                                    ; TRY TO SET MAINT BIT
002700                                                          BGNSUB
002700  012767  002706  176202            MOV     #64$,$LPERR
002706                                                              LET     @TCSR := @TCSR SET.BY #MAINT
002706  052777  000004  176350            BIS     #MAINT,@TCSR

                                                                    ; STUCK TO 0
002714                                                              IF      #MAINT NOTSETIN @TCSR THEN
002714  032777  000004  176342            BIT     #MAINT,@TCSR
002722  001001                            BNE     $16

                                                                    ; MAINT DID NOT SET IN TCSR
002724                                                              ERRHRD 7,,DIDNOT
002724  104007                            ERROR   7
002726                                                              ENDIF
002726                              $16:
002726                                                          ENDSUB

                                                    ; TRY TO CLEAR A SET BIT
002726                                                          BGNSUB
002726  012767  002734  176154            MOV     #64$,$LPERR

002734                                                              LET     @TCSP := @TCSR CLR.BY #MAINT
002734  042777  000004  176322            BIC     #MAINT,@TCSR
```

```
1350                                                                    ; SHOULD HAVE CLEARED
1351  002742                                                          IF      #MAINT SETIN @TCSR THEN
1352  002742  032777  000004  176314          BIT     #MAINT,@TCSR
1353  002750  001401                          BEQ     $17
1354                                                                    ; MAINT DID NOT CLEAR INTCSR
1355  002752                                                            ERRHRD 10,,DIDNOT
1356  002752  104010                          ERROR   10
1357  002754                                                          ENDIF
1358  002754                          $17:
1359  002754                                                        ENDSUB
1360
1361                                                    ; NOW SEE IF RESET CLEARS IT
1362  002754                                                        BGNSUB
1363  002754  012767  002762  176126          MOV     #64$,$LPERR
1364
1365  002762                                                          LET     @TCSR := @TCSR SET BY #MAINT
1366  002762  052777  000004  176274          BIS     #MAINT,@TCSR
1367                                                                  ; ISSUE BUS RESET
1368  002770                                                          BRESET
1369  002770  000005                          RESET
1370  002772                                                          IF      #MAINT SETIN @TCSR THEN
1371  002772  032777  000004  176264          BIT     #MAINT,@TCSR
1372  003000  001401                          BEQ     $20
1373                                                                  ; MAINT DID NOT RESET IN TCSR
1374  003002                                                          ERRHRD 11,,DIDNOT
1375  003002  104011                          ERROR   11
1376  003004                                                          ENDIF
1377  003004                          $20:
1378  003004                                                        ENDSUB
1379  003004                                                      ENDTST
1380
1381
1382
```

```
                                        ;;**********************************************************************
                                        ;;**********************************************************************
                                        ;*TEST 4          XMITIE - TCSR6 SET, CLEAR, RESET
                                        ;;**********************************************************************
003004  000004                  TST4:   SCOPE
003006  012767  000010  176144          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003014  012767  000004  176156          MOV     #4,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
                                                                ; USE PRIORITY OF 7
003022  012746  000340                  MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
003026  012746  003034                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
003032  000002                          RTI                     ;;POP NEW PC AND PS
003034                          64$:

                                                ; SEE IF IT IS CLEAR
003034                                                  BGNSUB
003034  012767  003042  176046          MOV     #65$,$LPERR

003042                                                  IF      #XMITIE SETIN @TCSR THEN
003042  032777  000100  176214          BIT     #XMITIE,@TCSR
003050  001401                          BEQ     $21
                                                        ; XMITIE DID NOT RESET IN TCSR
003052                                                  ERRHRD 12,,DIDNOT
003052  104012                          ERROR   12
003054                                                  ENDIF
003054                          $21:
003054                                                  ENDSUB

                                                ; TRY TO SET XMITIE BIT
003054                                                  BGNSUB
003054  012767  003062  176026          MOV     #64$,$LPERR
003062                                                  LET     @TCSR := @TCSR SET BY #XMITIE
003062  052777  000100  176174          BIS     #XMITIE,@TCSR
                                                        ; STUCK TO 0
003070                                                  IF      #XMITIE NOTSETIN @TCSR THEN
003070  032777  000100  176166          BIT     #XMITIE,@TCSR
003076  001001                          BNE     $22
                                                        ; XMIT DID NOT RESET IN TCSR
003100                                                  ERRHRD 13,,DIDNOT
003100  104013                          ERROR   13
003102                                                  ENDIF
003102                          $22:
003102                                                  ENDSUB

                                                ; TRY TO CLEAR A SET BIT
003102                                                  BGNSUB
003102  012767  003110  176000          MOV     #64$,$LPERR

003110                                                  LET     @TCSR := @TCSR CLR BY #XMITIE
003110  042777  000100  176146          BIC     #XMITIE,@TCSR
                                                        ; SHOULD HAVE CLEARED
003116                                                  IF      #XMITIE SETIN @TCSR THEN
003116  032777  000100  176140          BIT     #XMITIE,@TCSR
003124  001401                          BEQ     $23
                                                        ;  XMIT DID NOT CLEAR IN TCSR
003126                                                  ERRHRD 14,,DIDNOT
003126  104014                          ERROR   14
```

```
003130                                                                       ENDIF
003130                              $23:
003130                                                                  ENDSUB

                                                    ; NOW SEE IF RESET CLEARS IT
003130                                                                  BGNSUB
003130  012767  003136  175752              MOV     #64$,$LPERR

003136                                                                       LET     @TCSR := @TCSR SET.BY #XMITIE
003136  052777  000100  176120              BIS     #XMITIE,@TCSR
                                                                                  ; ISSUE BUS RESET
003144                                                                       BRESET
003144  000005                              RESET
003146                                                                       IF      #XMITIE SETIN @TCSR THEN
003146  032777  000100  176110              BIT     #XMITIE,@TCSR
003154  001401                              BEQ     $24

                                                                                  ; XMIT DID NOT RESET IN TCSR
003156                                                                            ERRHRD 15,,DIDNOT
003156  104015                              ERROR   15
003160                                                                       ENDIF
003160                              $24:
003160                                                                  ENDSUB
003160                                                             ENDTST
```

```
                                        ;;*****************************************************************
                                        ;;*****************************************************************
                                        ;*TEST 5         RCVRIE - RCSR6 SET, CLEAR, RESET
                                        ;;*****************************************************************
003160  000004                  TST5:   SCOPE
003162  012767  000010  175770          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003170  012767  000005  176002          MOV     #5,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
                                                ; SEE IF IT IS CLEAR
003176                                                          BGNSUB
003176  012767  003204  175704          MOV     #64$,$LPERR
                                                                IF      #RCVRIE SETIN @RCSR THEN
003204
003204  032777  000100  176046          BIT     #RCVRIE,@RCSR
003212  001401                          BEQ     $25
                                                                    ; RCVRIE DID NOT RESET IN RCSR
                                                                    ERRHRD 35,,DIDNOT
003214
003214  104035                          ERROR   35
                                                                ENDIF
003216                          $25:
003216                                                      ENDSUB
                                                ; TRY TO SET RCVRIE BIT
003216                                                          BGNSUB
003216  012767  003224  175664          MOV     #64$,$LPERR
                                                                LET     @RCSR := @RCSR SET BY #RCVRIE
003224
003224  052777  000100  176026          BIS     #RCVRIE,@RCSR
                                                                    ; STUCK TO 0
                                                                IF      #RCVRIE NOTSETIN @RCSR THEN
003232
003232  032777  000100  176020          BIT     #RCVRIE,@RCSR
003240  001001                          BNE     $26
                                                                    ; RCVRIE DID NOT SET IN RCSR
                                                                    ERRHRD 36,,DIDNOT
003242
003242  104036                          ERROR   36
                                                                ENDIF
003244                          $26:
003244                                                      ENDSUB
                                                ; TRY TO CLEAR A SET BIT
003244                                                          BGNSUB
003244  012767  003252  175636          MOV     #64$,$LPERR
                                                                LET     @RCSR := @RCSR CLR BY #RCVRIE
003252
003252  042777  000100  176000          BIC     #RCVRIE,@RCSR
                                                                    ; SHOULD HAVE CLEARED
                                                                IF      #RCVRIE SETIN @RCSR THEN
003260
003260  032777  000100  175772          BIT     #RCVRIE,@RCSR
003266  001401                          BEQ     $27
                                                                    ; RCVRIE DID NOT CLEAR IN RCSR
                                                                    ERRHRD 37,,DIDNOT
003270
003270  104037                          ERROR   37
                                                                ENDIF
003272                          $27:
003272                                                      ENDSUB
                                                ; NOW SEE IF RESET CLEARS IT
003272                                                          BGNSUB
```

```
1521  003272  012767  003300  175610          MOV     #64$,$LPERR
1522
1523  003300                                                          LET     @RCSR := @RCSR SET.BY #RCVRIE
1524  003300  052777  000100  175752          BIS     #RCVRIE,@RCSR
1525                                                                      ; ISSUE BUS RESET
1526  003306                                                          BRESET
1527  003306  000005                          RESET
1528  003310                                                          IF      #RCVRIE SETIN @RCSR THEN
1529  003310  032777  000100  175742          BIT     #RCVRIE,@RCSR
1530  003316  001401                          BEQ     $30
1531                                                                      ; RCVRIE DID NOT RESET IN RCSR
1532  003320                                                              ERRHRD 40,,DIDNOT
1533  003320  104040                          ERROR   40
1534  003322                                                          ENDIF
1535  003322                          $30:
1536  003322                                                          CKLOOP
1537  003322                                                      ENDSUB
1538  003322                                                  ENDTST
1539
1540
1541
1542
```

```
                                ;;*****************************************************************
                                ;* THE FOLLOWING 4 TESTS VERIFY
                                ;* THAT RESET (INIT) INITIALIZES READ ONLY BITS.
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 6          TEST THAT RCVRDONE - RCSR 7 - IS CLEARED BY INIT
                                ;;*****************************************************************
003322  000004                  TST6:   SCOPE
003324  012767  000010  175626          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003332  012767  000006  175640          MOV     #6,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX


003340                                                  BGNSUB
003340  012767  003346  175542          MOV     #64$,$LPERR
003346                                      IF      #RCVRDONE SETIN @RCSR THEN
003346  032777  000200  175704          BIT     #RCVRDONE,@RCSR
003354  001402                          BEQ     $31


                                                        ;RCVRDONE SHOULD HAVE CLEARED BY INIT
                                                        ; RCVRDONE DID NOT CLEAR IN RCSR
003356                                                  ERRHRD 41,HRESET, DIDNOT
003356  104041                          ERROR   41
                                                        ;REISSUE RESET
003360                                                  BRESET
003360  000005                          RESET
003362                                              ENDIF
003362                  $31:
                                                        ;ALLOW LOOPING AFTER ERROR
003362                                              CKLOOP
003362                                          ENDSUB
003362                                      ENDTST
```

```
1579                                    ;;**********************************************************************
1580                                    ;;**********************************************************************
1581                                    ;*TEST 7         TEST THAT RCVRACT - RCSR 11 - IS CLEARED BY INIT
1582                                    ;;**********************************************************************
1583  003362  000004                    TST7:   SCOPE
1584  003364  012767  000010  175566            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1585  003372  012767  000007  175600            MOV     #7,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1586
1587
1588
1589
1590  003400                                                            IFB CONSOLE EQ #TRUE THEN
1591  003400  126727  005515  000001            CMPB    CONSOLE,#TRUE
1592  003406  001001                            BNE     $32
1593                                                                        ;; EXECUTE TEST
1594  003410                                                            ELSE
1595  003410  000416                            BR      $33
1596  003412                            $32:
1597  003412                                                            IF #WRAP SETIN $USWR THEN
1598  003412  032767  020000  175600            BIT     #WRAP,$USWR
1599  003420  001401                            BEQ     $34
1600                                                                        ;; EXECUTE TEST
1601  003422                                                            ELSE
1602  003422  000411                            BR      $35
1603  003424                            $34:
1604  003424                                                            IF #MAINT SETIN $USWR THEN
1605  003424  032767  000004  175566            BIT     #MAINT,$USWR
1606  003432  001401                            BEQ     $36
1607                                                                        ;;EXECUTE TEST
1608  003434                                                            ELSE
1609  003434  000404                            BR      $37
1610  003436                            $36:
1611  003436                                                               EXIT TEST    ; LINE MUST BE TERMINATED
1612  003436  012767  000001  175514            MOV     #1,$TIMES
1613  003444  000414                            BR      TST10           ;;;EXIT THIS TEST
1614  003446                                                            ENDIF
1615  003446                            $37:                            ENDIF
1616  003446
1617  003446                            $35:                            ENDIF
1618  003446
1619  003446                            $33:
1620
1621  003446                                                                  BGNSUB
1622  003446  012767  003454  175434            MOV     #64$,$LPERR
1623                                                                           IF     #RCVRACT SETIN @RCSR THEN
1624  003454
1625  003454  032777  004000  175576            BIT     #RCVRACT,@RCSR
1626  003462  001405                            BEQ     $40
1627
1628                                                                           ;RESET SHOULD HAVE CLEARED RCVRACT
1629  003464                                                                   LET @TCSR := @TCSR CLR.BY #MAINT
1630  003464  042777  000004  175572            BIC     #MAINT,@TCSR
1631  003472                                                                   ERRHRD 44, HRESET, DIDNOT
1632  003472  104044                            ERROR   44
1633                                                                           ;TESTING EFFECT OF RESET ON BIT
1634
```

```
1635
1636
1637
1638
1639  003474
1640  003474  000005                    RESET
1641  003476
1642  003476                        $40:
1643
1644  003476
1645  003476
1646  003476
1647
                                                        ;RCVRACT DID NOT CLEAR IN RCSR

                                                        ;ALLOW ANOTHER TRY
                                                        BRESET

                                                    ENDIF

                                                        ;ALLOW LOOPING ON ERROR
                                                    CKLOOP
                                                ENDSUB
                                            ENDTST
```

```
                        ;;*****************************************************************
                        ;;*****************************************************************
                        ;*TEST 10        TEST THAT XMITRDY - TCSR 7 - IS SET BY INIT
                        ;;*****************************************************************
003476  000004          TST10:  SCOPE
003500  012767  000010  175452          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
003506  012767  000010  175464          MOV     #10,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX


003514                                                  BGNSUB
003514  012767  003522  175366          MOV     #64$,$LPERR

003522                                      IF      #XMITRDY NOTSETIN @TCSR THEN
003522  032777  000200  175534          BIT     #XMITRDY,@TCSR
003530  001002                          BNE     $41


                                            ;RESET SHOULD HAVE SET BIT.
                                            ;XMITRDY DID NOT SET IN TCSR (AFTER RESE
003532                                      ERRHRD 42,HRESET,DIDNOT
003532  104042                          ERROR   42

                                            ;ISSUE ANOTHER RESET
003534                                      BRESET
003534  000005                          RESET

003536                                  ENDIF
003536                  $41:

                                                ;ALLOW LOOPING ON ERROR
003536                                      CKLOOP
003536                                  ENDSUB
003536                              ENDTST
```

```
                                        ;;**********************************************************************
                                        ;;**********************************************************************
                                        ;*TEST 11        TEST THAT XMIT RDY - TCSR 7 - CLEARS
                                        ;*              WHEN TBUF IS LOADED WITH A CHARACTER
                                        ;*              AND THAT IT SETS WITHIN A REASONABLE AMOUNT OF TIME.
                                        ;;**********************************************************************
003536  000004                    TST11:  SCOPE
003540  012767  000001  175412          MOV     #1,$TIMES       ;;DO 1 ITERATION
003546  012767  000011  175424          MOV     #11,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

003554                                                          IFB CONSOLE EQ #TRUE OR #APTENV SETIN $ENV THEN
003554  126727  005341  000001          CMPB    CONSOLE,#TRUE
003562  001404                          BEQ     $42
003564  032767  000001  175422          BIT     #APTENV,$ENV
003572  001404                          BEQ     $43
003574                                $42:
003574                                                              EXIT TEST
003574  012767  000001  175356          MOV     #1,$TIMES
003602  000513                          BR      TST12           ;;;EXIT THIS TEST
003604                                                          ENDIF
003604                                $43:

003604                                                          LET PASS := #1  ;INIT COUNT OF TIMES THRU
003604  012767  000001  000212          MOV     #1,PASS
003612                                                          LOOP            ; START OF LOOP
003612                                $44:
                                                                ;  MAX OF 2 TIMES THRU
003612                                                             LET ERRORFLAG := #CLR
003612  012767  000000  000206          MOV     #CLR,ERRORFLAG
003620                                                              LET EXITFLAG := #CLR
003620  012767  000000  000202          MOV     #CLR,EXITFLAG
                                                ; LOAD TBUF WITH ONE CHARACTER
                                                ; WAIT FOR READY TO SET
                                                ; (SHOULD BE VERY SHORT WAIT
                                                ; SINCE UART DOUBLE BUFFERS ITS INPUT)


                                                                ;SEND A CHARACTER
003626                                                          LET @TBUF :B= #0
003626  105077  175436                  CLRB    @TBUF

                                                                ;WAIT A MAXIMUM
                                                                ;OF 500 MSEC FOR
                                                                ;XMIT RDY TO SET IN TCSR
003632                                                          CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
003632  010546                          MOV     R5,-(SP)
003634  012745  177777                  MOV     #SET,-(R5)
003640  016745  175420                  MOV     TCSR,-(R5)
003644  012745  000200                  MOV     #XMITRDY,-(R5)
003650  012745  000500                  MOV     #500.,-(R5)
003654  004767  004434                  JSR     PC,TIMER
003660  012605                          MOV     (SP)+,R5

                                                                ;TIMER RETURNS AN ERROR IF BIT DID
                                                                ;NOT MEET CONDITION WITHIN TIME LIMIT
003662                                                          IF.ERROR THEN
003662  103001                          BCC     $46

                                                                ;XMIT RDY DID NOT SET IN TCSR
003664                                                          ERRHRD 66,,DIDNOT
```

```
1738  003664  104066                          ERROR   66
1739  003666                                                                  ENDIF
1740  003666                          $46:
1741
1742                                                    ; LOAD TBUF WITH A SECOND CHARACTER
1743                                                    ; CHECK IMMEDIATELY THAT XMITRDY IS CLEAR
1744                                                    ; AND THEN WAIT FOR IT TO SET
1745
1746                                                                        ;SEND SECOND CHARACTER
1747  003666                                                              LET @TBUF :B= #0
1748  003666  105077  175376                 CLRB    @TBUF
1749  003672  000240                                 NOP                ; GIVE IT TIME TO CLEAR
1750                                                                        ; XMITRDY SHOULD HAVE CLEARED UPON
1751                                                                        ; RECEIPT OF A CHARACTER
1752  003674                                                            IF #XMITRDY SETIN @TCSR THEN
1753  003674  032777  000200  175362         BIT     #XMITRDY,@TCSR
1754  003702  001404                         BEQ     $47
1755
1756  003704                                                                  ; XMITRDY DID NOT CLEAR IN TCSR
1757  003704  012767  177777  000114         MOV     #SET,ERRORFLAG          LET ERRORFLAG := #SET
1758
1759                                                                                  ; DEFER ERROR TYPEOUT
1760  003712                                                            ELSE
1761  003712  000416                         BR      $50
1762  003714                          $47:
1763                                                                        ;WAIT A MAXIMUM
1764                                                                        ;OF 500 MSEC FOR
1765                                                                        ;XMIT RDY TO SET IN TCSR
1766  003714                                                            CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
1767  003714  010546                         MOV     R5,-(SP)
1768  003716  012745  177777                 MOV     #SET,-(R5)
1769  003722  016745  175336                 MOV     TCSR,-(R5)
1770  003726  012745  000200                 MOV     #XMITRDY,-(R5)
1771  003732  012745  000500                 MOV     #500,-(R5)
1772  003736  004767  004352                 JSR     PC,TIMER
1773  003742  012605                         MOV     (SP)+,R5
1774  003744
1775  003744  103001                         BCC     $51                     IF.ERROR THEN
1776
1777  003746                                                                      ;XMIT RDY DID NOT SET IN TCSR
1778  003746  104070                         ERROR   70                          ERRHRD 70,,DIDNOT
1779  003750                                                                  ENDIF
1780  003750                          $51:
1781  003750                                                                ENDIF ; OF DEFERED ERROR CALL
1782  003750                          $50:
1783  003750                                                            IF ERRORFLAG EQ #SET THEN
1784  003750  026727  000052  177777         CMP     ERRORFLAG,#SET
1785  003756  001011                         BNE     $52                     IF PASS GT #1 THEN
1786  003760
1787  003760  026727  000040  000001         CMP     PASS,#1
1788  003766  003404                         BLE     $53                         ; CALL ERROR IF 2ND TRY
1789                                                                              ERRHRD 67,,DIDNOT
1790  003770
1791  003770  104067                         ERROR   67                          LET EXITFLAG := #SET
1792  003772
1793  003772  012767  177777  000030         MOV     #SET,EXITFLAG
```

```
1794  004000                                                          ENDIF
1795  004000                          $53:
1796  004000                                                        ELSE            ; NO ERROR
1797  004000  000403                         BR      $54
1798  004002                          $52:
1799  004002                                                          LET EXITFLAG := #SET
1800  004002  012767  177777  000020         MOV     #SET,EXITFLAG
1801  004010                                                        ENDIF
1802  004010                          $54:
1803  004010                                                      EXIF        EXITFLAG EQ #SET
1804  004010  026727  000014  177777         CMP     EXITFLAG,#SET
1805  004016  001401                         BEQ     $45
1806  004020                                                      ENDLOOP
1807  004020  000674                         BR      $44
1808  004022                          $45:
1809  004022                                                          EXIT ; SKIP AROUND FLAG WORDS
1810  004022  000403                         BR      TST12           ;;;EXIT THIS TEST
1811  004024  000000                  PASS:          0
1812  004026  000000                  ERRORFLAG:     0
1813  004030  000000                  EXITFLAG:      0
1814  004032                                                      ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 12        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.
                                ;;**********************************************************************
004032  000004                TST12:  SCOPE
004034  012767  000001  175116        MOV     #1,$TIMES       ;;DO 1 ITERATION
004042  012767  000012  175130        MOV     #12,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

004050                                                          IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
004050  032767  040000  175142        BIT     #MAINTJUMP,$USWR
004056  001404                        BEQ     $55
004060  126727  005035  000001        CMPB    CONSOLE,#TRUE
004066  001004                        BNE     $56
004070                          $55:
004070                                                              EXIT TEST
004070  012767  000001  175062        MOV     #1,$TIMES
004076  000442                        BR      TST13           ;;;EXIT THIS TEST
004100                                                          ENDIF
004100                          $56:

                                                                    ; SET THE MAINTENANCE BIT
004100                                                          LET @TCSR := @TCSR SET.BY #MAINT
004100  052777  000004  175156        BIS     #MAINT,@TCSR

004106                                                          BGNSUB
004106  012767  004114  174774        MOV     #64$,$LPERR
                                        ; SEND A CHARACTER AND LET IT WRAP AROUND

004114                                                              LET @TBUF :B= #0
004114  105077  175150                CLRB    @TBUF


                                ; WAIT A MAXIMUM OF 50 MSEC
                                ; FOR RCVR DONE TO SET IN
                                ; RCSR
                                CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>

004120
004120  010546                        MOV     R5,-(SP)
004122  012745  177777                MOV     #SET,-(R5)
004126  016745  175126                MOV     RCSR,-(R5)
004132  012745  000200                MOV     #RCVRDONE,-(R5)
004136  012745  000500                MOV     #500,-(R5)
004142  004767  004146                JSR     PC,TIMER
004146  012605                        MOV     (SP)+,R5


004150                                  ;DIDN'T SET IN TIME
004150  103004                        BCC     $57             IF.ERROR THEN

                                        ; RCVRDONE DID NOT SET IN RCSR
                                        ; CAN NOT LEAVE WITH MAINT SET
004152                                  LET     @TCSR := @TCSR CLR.BY #MAINT
004152  042777  000004  175104        BIC     #MAINT,@TCSR
004160                                      ERRHRD 71,,DIDNOT
004160  104071                        ERROR   71
004162                                  ENDIF
004162                          $57:
```

```
1871
1872  004162                                                    ENDSUB
1873
1874  004162                                                    BGNSUB
1875  004162  012767  004170  174720          MOV     #64$,$LPERR
1876                                              ; NOW THAT IT IS SET SEE IF IT CAN BE RESET
1877                                              ; THIS ALSO WILL CLEAR THE MAINT. BIT
1878  004170                                                        BRESET
1879  004170  000005                           RESET
1880
1881  004172                                                        IF #RCVRDONE SETIN @RCSR THEN
1882  004172  032777  000200  175060          BIT     #RCVRDONE,@RCSR
1883  004200  001401                           BEQ     $60
1884
1885  004202                                                            ; RCVRDONE DID NOT RESET IN RCSR.
1886  004202  104072                                                   ERRHRD 72,,DIDNOT
                                                ERROR   72
1887  004204                                                        ENDIF
1888  004204                                $60:
1889  004204                                                    ENDSUB
1890  004204                                                ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 13        TEST THAT RCVRDONE IS CLEARED BY READING RBUF
                                ;;**********************************************************************
004204  000004                  TST13:  SCOPE
004206  012767  000010  174744          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004214  012767  000013  174756          MOV     #13,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

004222                                                          IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
004222  032767  040000  174770          BIT     #MAINTJUMP,$USWR
004230  001404                        BEQ     $61
004232  126727  004663  000001        CMPB    CONSOLE,#TRUE
004240  001004                        BNE     $62
004242                          $61:
004242                                                              EXIT TEST
004242  012767  000001  174710        MOV     #1,$TIMES
004250  000440                        BR      TST14           ;;;EXIT THIS TEST
004252                                                          ENDIF
004252                          $62:

                                                                    ; SET MAINT. BIT
004252                                                          LET @TCSR := @TCSR SET.BY #MAINT
004252  052777  000004  175004        BIS     #MAINT,@TCSR
004260                                                          BGNSUB
004260  012767  004266  174622        MOV     #64$,$LPERR
                                        ; OUTPUT A CHARACTER WITH MAINTENANCE
                                        ; SET, AND WAIT FOR XMITRDY TO SET.

                                                                ; OUTPUT A CHARACTER
004266                                                          LET @TBUF :B= #0
004266  105077  174776                CLRB    @TBUF

                                                                ; WAIT MAXIMUM OF 500 MSEC
                                                                ; FOR RCVRDONE TO SET IN
                                                                ; RCSR
004272                                                          CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
004272  010546                        MOV     R5,-(SP)
004274  012745  177777                MOV     #SET,-(R5)
004300  016745  174754                MOV     RCSR,-(R5)
004304  012745  000200                MOV     #RCVRDONE,-(R5)
004310  012745  000500                MOV     #500,-(R5)
004314  004767  003774                JSR     PC,TIMER
004320  012605                        MOV     (SP)+,R5
004322                                                          LET     @TCSR := @TCSR CLR.BY #MAINT
004322  042777  000004  174734        BIC     #MAINT,@TCSR

                                                                ; DID IT BECAME READY?
004330                                                          IF.ERROR  THEN
004330  103001                        BCC     $63

                                                                ;RCVRDONE DID NOT SET IN RCSR
004332                                                          ERRHRD 73,, DIDNOT
004332  104073                        ERROR   73
004334                                                          ENDIF
004334                          $63:
004334                                                      ENDSUB

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

```
1947
1948                                                                    ;READ BUFFER
1949  004334                                                          LET R0 : B= @RBUF
1950  004334  117700  174722          MOVB    @RBUF,R0
1951
1952  004340                                                          IF #RCVRDONE SETIN @RCSR THEN
1953  004340  032777  000200  174712  BIT     #RCVRDONE,@RCSR
1954  004346  001401                  BEQ     $64
1955                                                                    ;RCVRDONE DID NOT CLEAR IN RCSR
1956  004350                                                            ERRHRD 74,,DIDNOT
1957  004350  104074                  ERROR   74
1958  004352                                                          ENDIF
1959  004352                  $64:
1960  004352                                                  ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 14        TEST THAT RCVRACT - RCSR 11 - SETS
                                ;*              WHEN A START BIT IS RECEIVED AND
                                ;*              CLEARS WHEN RCVRDONE - RCSR 7 - SETS
                                ;;**********************************************************************
004352  000004                  TST14:  SCOPE
004354  012767  000010  174576          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004362  012767  000014  174610          MOV     #14,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
004370                                                                  IFB CONSOLE EQ #TRUE OR #MAINTJUMP NOTSETIN $USW
004370  126727  004525  000001          CMPB    CONSOLE,#TRUE
004376  001404                          BEQ     $65
004400  032767  040000  174612          BIT     #MAINTJUMP,$USWR
004406  001004                          BNE     $66
004410                          $65:
004410                                                                      EXIT TEST
004410  012767  000001  174542          MOV     #1,$TIMES
004416  000526                          BR      TST15           ;;;EXIT THIS TEST
004420                                                                  ENDIF
004420                          $66:
004420                                                                  IF #APTENV SETIN $ENV THEN
004420  032767  000001  174566          BIT     #APTENV,$ENV
004426  001404                          BEQ     $67
004430                                                                      EXIT TEST
004430  012767  000001  174522          MOV     #1,$TIMES
004436  000516                          BR      TST15           ;;;EXIT THIS TEST
004440                                                                  ENDIF
004440                          $67:
                                
                                
004440                                                          LET @TCSR := @TCSR SET.BY #MAINT
004440  052777  000004  174616          BIS     #MAINT,@TCSR
004446                                                              LET R0 := #CLR
004446  012700  000000                  MOV     #CLR,R0
004452                                                              LET R1 := #0
004452  005001                          CLR     R1
                                            ;LOAD A CHARACTER INTO TBUF
                                            ;WAIT FOR RCVRACT TO SET
                                
                                                                    ;SEND A CHARACTER
004454                                                          LET @TBUF :B= #0
004454  105077  174610          CLRB    @TBUF
004460                                                      REPEAT
004460                          $70:
004460                                                          IF #RCVRACT SETIN @RCSR THEN
004460  032777  004000  174572          BIT     #RCVRACT,@RCSR
004466  001403                          BEQ     $71
004470                                                              LET R0 := #SET
004470  012700  177777                  MOV     #SET,R0
004474                                                      ELSE
004474  000401                          BR      $72
004476                          $71:
004476                                                              LET R1 := R1 + #1
004476  005201                          INC     R1
004500                                                          ENDIF
```

```
2017  004500                          $72:
2018  004500                                                                  UNTIL R0 EQ #SET OR R1 HI MAX
2019  004500  020027  177777                  CMP     R0,#SET
2020  004504  001403                          BEQ     $73
2021  004506  020167  000160                  CMP     R1,MAX
2022  004512  101762                          BLOS    $70
2023  004514                          $73:
2024  004514                                                                  IF R1 HI MAX THEN
2025  004514  020167  000152                  CMP     R1,MAX
2026  004520  101410                          BLOS    $74
2027                                                                                ;IT NEVER SET
2028                                                                                ;RCVRACT DID NOT SET IN RCSR.
2029                                                                                ; CAN NOT LEAVE WITH MAINT SET
2030  004522                                                                  LET     @TCSR := @TCSR CLR. BY #MAINT
2031  004522  042777  000004  174534          BIC     #MAINT,@TCSR
2032  004530                                                                        ERRHRD 75,, DIDNOT
2033  004530  104075                          ERROR   75
2034  004532                                                                        EXIT TEST
2035  004532  012767  000001  174420          MOV     #1,$TIMES
2036  004540  000455                          BR      TST15           ;;;EXIT THIS TEST
2037  004542                                                                  ENDIF
2038  004542                          $74:
2039
2040
2041                                                          ;CHECK FOR TIMING OF RCVRACT. CLEARING
2042                                                          ;VS RCVRDONE SETTING
2043
2044
2045  004542                                                                  WHILE #RCVRACT SETIN @RCSR DO
2046  004542                          $75:
2047  004542  032777  004000  174510          BIT     #RCVRACT,@RCSR
2048  004550  001421                          BEQ     $76
2049
2050  004552                                                                        IF #RCVRDONE SETIN @RCSR THEN
2051  004552  032777  000200  174500          BIT     #RCVRDONE,@RCSR
2052  004560  001414                          BEQ     $77
2053  004562                                                                           IF #RCVRACT SETIN @RCSR THEN
2054  004562  032777  004000  174470          BIT     #RCVRACT,@RCSR
2055  004570  001410                          BEQ     $100
2056                                                                                ;RCVRDONE AND RCVRACT
2057                                                                                   ;BOTH SET
2058                                                                                ; CAN NOT LEAVE WITH MAINT SET
2059  004572                                                                  LET     @TCSR := @TCSR CLR. BY #MAINT
2060  004572  042777  000004  174464          BIC     #MAINT,@TCSR
2061  004600                                                                           ERRHRD 76, DONEACT
2062  004600  104076                          ERROR   76
2063                                                                                ;NO USE CONTINUING
2064  004602                                                                           EXIT TST
2065  004602  012767  000001  174350          MOV     #1,$TIMES
2066  004610  000431                          BR      TST15           ;;;EXIT THIS TEST
2067  004612                                                                        ENDIF
2068  004612                          $100:
2069  004612                                                                  ENDIF
2070  004612                          $77:
2071  004612                                                                  ENDDO
2072  004612  000753                          BR      $75
```

```
2073  004614                          $76:
2074
2075                                                                    ;RCVRACT = 0 NOW.
2076  004614                                                            IF #RCVRDONE NOTSETIN @RCSR THEN
2077  004614  032777  000200  174436          BIT     #RCVRDONE,@RCSR
2078  004622  001010                          BNE     $101
2079                                                                        ;RCVRDONE DID NOT SET IN RCSR
2080                                                                        ; CAN NOT LEAVE WITH MAINT SET
2081  004624                                                            LET     @TCSR := @TCSR CLR.BY #MAINT
2082  004624  042777  000004  174432          BIC     #MAINT,@TCSR
2083  004632                                                                ERRHRD 77,,DIDNOT
2084  004632  104077                          ERROR   77
2085  004634                                                                EXIT TEST
2086  004634  012767  000001  174316          MOV     #1,$TIMES
2087  004642  000414                          BR      TST15           ;;;EXIT THIS TEST
2088  004644                                                            ENDIF
2089  004644                          $101:
2090                                                  ;TEST THAT READING THE RECEIVER
2091                                                  ;BUFFER CLEARS RCVRDONE
2092
2093
2094                                                                        ;READ CHAR.
2095  004644                                                            LET R0 := @RBUF
2096  004644  017700  174412          MOV     @RBUF,R0
2097
2098  004650                                                            IF #RCVRDONE SETIN @RCSR THEN
2099  004650  032777  000200  174402          BIT     #RCVRDONE,@RCSR
2100  004656  001404                          BEQ     $102
2101                                                                        ;RCVRDONE DID NOT CLEAR IN RCSR
2102                                                                        ; CAN NOT LEAVE WITH MAINT SET
2103  004660                                                            LET     @TCSR := @TCSR CLR.BY #MAINT
2104  004660  042777  000004  174376          BIC     #MAINT,@TCSR
2105  004666                                                                ERRHRD 100,,DIDNOT
2106  004666  104100                          ERROR   100
2107  004670                                                            ENDIF
2108  004670                          $102:
2109
2110  004670                                                                EXIT
2111  004670  000401                          BR      TST15           ;;;EXIT THIS TEST
2112  004672  070000                          MAX: 70000
2113
2114  004674                                                        ENDTST
2115
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 15       TEST THE OVERRUN BIT - RBUF 14
                                ;;**********************************************************************
004674  000004                  TST15:  SCOPE
004676  012767  000010  174254          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004704  012767  000015  174266          MOV     #15,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

004712                                                          IF #ERRBITS NOTSETIN $USWR ORB CONSOLE EQ #TRUE
004712  032767  100000  174300          BIT     #ERRBITS,$USWR
004720  001404                        BEQ     $103
004722  126727  004173  000001        CMPB    CONSOLE,#TRUE
004730  001004                        BNE     $104
004732                          $103:
004732                                                              EXIT TEST
004732  012767  000001  174220          MOV     #1,$TIMES
004740  000547                        BR      TST16           ;;;EXIT THIS TEST
004742                                                          ENDIF
004742                          $104:
004742                                                          IF #MAINTJUMP NOTSETIN $USWR THEN
004742  032767  040000  174250          BIT     #MAINTJUMP,$USWR
004750  001004                        BNE     $105
004752                                                              EXIT TEST
004752  012767  000001  174200          MOV     #1,$TIMES
004760  000537                        BR      TST16           ;;;EXIT THIS TEST
004762                                                          ENDIF
004762                          $105:

004762                                                          LET @TCSR := @TCSR SET.BY #MAINT
004762  052777  000004  174274          BIS     #MAINT,@TCSR


004770                                                          BGNSUB
004770  012767  004776  174112          MOV     #64$,$LPERR
                                            ;OUTPUT 2 CHARACTERS WITH
                                            ;AMPLE DELAYS BETWEEN FOR RECEPTION.
                                            ;THIS SHOULD AN CAUSE OVERRUN ERROR.

                                                                ;OUTPUT 1 CHARACTER
004776                                                      LET @TBUF :B= #0
004776  105077  174266                  CLRB    @TBUF
                                                                ;GO AWAY FOR 200 M SEC
005002                                                      WAITMS 200.
005002  010546                          MOV     R5,-(SP)
005004  012745  000310                  MOV     #200.,-(R5)
005010  004767  003556                  JSR     PC,WAIT
005014  012605                          MOV     (SP)+,R5

                                                                ;OUTPUT 2ND CHARACTER
005016                                                      LET @TBUF :B= #0
005016  105077  174246                  CLRB    @TBUF
                                                                ;LET OVERRUN HAPPEN
005022                                                      WAITMS 200.
005022  010546                          MOV     R5,-(SP)
```

```
2172  005024  012745  000310          MOV     #200.,-(R5)
2173  005030  004767  003536          JSR     PC,WAIT
2174  005034  012605                  MOV     (SP)+,R5
2175
2176                                                        ;READ BUFFER AND ERROR BITS
2177  005036                                              LET R4 := @RBUF
2178  005036  017704  174220          MOV     @RBUF,R4
2179
2180                                                        ;IT DIDN'T SET
2181  005042                                              IF #ORERR NOTSETIN R4 THEN
2182  005042  032704  040000          BIT     #ORERR,R4
2183  005046  001010                  BNE     $106
2184
2185                                                        ;ORERR DID NOT SET IN RBUF
2186  005050                                              ; CAN NOT LEAVE WITH MAINT SET
2187  005050  042777  000004  174206  BIC     #MAINT,@TCSR  LET    @TCSR := @TCSR CLR.BY #MAINT
2188  005056
2189  005056  104101                  ERROR   101             ERRHRD 101,,DIDNOT
2190
2191
2192  005060                                                  ;NO USE COMPOUNDING ERRORS
2193  005060  012767  000001  174072  MOV     #1,$TIMES       EXIT TST
2194  005066  000474                  BR      TST16   ;;;EXIT THIS TEST
2195  005070                                                      ENDIF
2196  005070                  $106:
2197  005070                                                  ENDSUB
2198
2199                                                  ;NOW SEE IF ERROR BIT SET WITH OVERRUN  ERROR:
2200  005070                                                  BGNSUB
2201  005070  012767  005076  174012  MOV     #64$,$LPERR
2202  005076                                                      IF #ERROR NOTSETIN R4 THEN
2203  005076  032704  100000          BIT     #ERROR,R4
2204  005102  001010                  BNE     $107
2205
2206                                                        ;ERROR DID NOT SET IN RBUF
2207                                                        ; CAN NOT LEAVE WITH MAINT SET
2208  005104                                              LET    @TCSR := @TCSR CLR.BY #MAINT
2209  005104  042777  000004  174152  BIC     #MAINT,@TCSR
2210  005112                                                  ERRHRD 102,,DIDNOT
2211  005112  104102                  ERROR   102
2212
2213                                                        ;-WHEN ORERR SET.
2214                                                        ;GET OUT NOW.
2215  005114                                                EXIT TST
2216  005114  012767  000001  174036  MOV     #1,$TIMES
2217  005122  000456                  BR      TST16   ;;;EXIT THIS TEST
2218  005124                                                  ENDIF
2219  005124                  $107:
2220  005124                                                  ENDSUB
2221
2222  005124                                                  BGNSUB
2223  005124  012767  005132  173756  MOV     #64$,$LPERR
2224                                  ;CHECK REAL RBUF TO SEE IF ORERR IS STILL SET.
2225
2226  005132                                                      IF #ORERR NOTSETIN @RBUF THEN
2227  005132  032777  040000  174122  BIT     #ORERR,@RBUF
```

```
2228  005140  001010                        BNE     $110
2229
2230                                                          ;READING RBUF CLEARED ORERR.
2231                                                          ; CAN NOT LEAVE WITH MAINT SET
2232  005142                                                LET     @TCSR := @TCSR CLR. BY #MAINT
2233  005142  042777  000004  174114        BIC     #MAINT,@TCSR
2234  005150                                                ERRHRD 103,,TCLRED
2235  005150  104103                        ERROR   103
2236                                                          ;SKIP REST OF TEST
2237  005152                                                EXIT TEST
2238  005152  012767  000001  174000        MOV     #1,$TIMES
2239  005160  000437                        BR      TST16           ;;;EXIT THIS TEST
2240  005162                                                ENDIF
2241  005162                          $110:
2242  005162                                              ENDSUB
2243
2244  005162                                              BGNSUB
2245  005162  012767  005170  173720        MOV     #64$,$LPERR
2246                                  ;NOW SEE IF THEY CLEAR WHEN ANOTHER CHAR.  IS RECEIVED
2247
2248                                                          ;SEND A CHARACTER AROUND.
2249  005170                                                LET @TBUF :B= #0
2250  005170  105077  174074                CLRB    @TBUF
2251                                                          ;LET IT CIRCULATE
2252  005174                                                WAITMS 200.
2253  005174  010546                        MOV     R5,-(SP)
2254  005176  012745  000310                MOV     #200.,-(R5)
2255  005202  004767  003364                JSR     PC,WAIT
2256  005206  012605                        MOV     (SP)+,R5
2257
2258  005210                                                IF #ORERR SETIN @RBUF THEN
2259  005210  032777  040000  174044        BIT     #ORERR,@RBUF
2260  005216  001410                        BEQ     $111
2261                                                          ;ORERR DID NOT CLEAR IN RBUF
2262                                                          ; CAN NOT LEAVE WITH MAINT SET
2263  005220                                                LET     @TCSR := @TCSR CLR. BY #MAINT
2264  005220  042777  000004  174036        BIC     #MAINT,@TCSR
2265  005226                                                ERRHRD 104,,DIDNOT
2266  005226  104104                        ERROR   104
2267
2268                                                          ;-AFTER RECEIVING ANOTHER CHAR
2269                                                          ;SKIP AROUND REST
2270  005230                                                EXIT TST
2271  005230  012767  000001  173722        MOV     #1,$TIMES
2272  005236  000410                        BR      TST16           ;;;EXIT THIS TEST
2273  005240                                                ENDIF
2274  005240                          $111:
2275
2276  005240                                                IF #ERROR SETIN @RBUF THEN
2277  005240  032777  100000  174014        BIT     #ERROR,@RBUF
2278  005246  001404                        BEQ     $112
2279                                                          ;ERROR DID NOT CLEAR IN RBUF
2280                                                          ; CAN NOT LEAVE WITH MAINT SET
2281  005250                                                LET     @TCSR := @TCSR CLR. BY #MAINT
2282  005250  042777  000004  174006        BIC     #MAINT,@TCSR
2283  005256                                                ERRHRD 105,,DIDNOT
```

```
2284  005256  104105                    ERROR   105
2285
2286  005260                                                    ENDIF
2287  005260                          $112:
2288  005260                                                ENDSUB
2289  005260                                              ENDTST
2290
```

```
2291
2292                                    ;;**********************************************************************
2293                                    ;;**********************************************************************
2294                                    ;*TEST 16        PROGRAMMABLE BAUD RATE TEST
2295                                    ;*              TEST AT ALL SPEEDS AVAILABLE
2296                                    ;*              A COMPARISON WILL BE MADE TO SEE
2297                                    ;*              IF NEW TIME IS LESS THAN PREVIOUS.
2298                                    ;;**********************************************************************
2299  005260  000004                    TST16:  SCOPE
2300  005262  012767  000010  173670            MOV     #10,$TIMES      ;;DO 10 ITERATIONS
2301  005270  012767  000016  173702            MOV     #16,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2302
2303
2304
2305  005276                                                            IF #PBR NOTSETIN $USWR OR #MAINTJUMP NOTSETIN $U
2306  005276  032767  000200  173714            BIT     #PBR,$USWR
2307  005304  001404                            BEQ     $113
2308  005306  032767  040000  173704            BIT     #MAINTJUMP,$USWR
2309  005314  001004                            BNE     $114
2310  005316                            $113:
2311  005316                                                                EXIT TEST
2312  005316  012767  000001  173634            MOV     #1,$TIMES
2313  005324  000553                            BR      TST17           ;;;EXIT THIS TEST
2314  005326                                                            ENDIF
2315  005326                            $114:
2316
2317  005326                                                            IFB #APTENV SETIN $ENV THEN
2318  005326  132767  000001  173660            BITB    #APTENV,$ENV
2319  005334  001404                            BEQ     $115
2320  005336                                                                EXIT TST
2321  005336  012767  000001  173614            MOV     #1,$TIMES
2322  005344  000543                            BR      TST17           ;;;EXIT THIS TEST
2323  005346                                                            ENDIF
2324  005346                            $115:
2325
2326  005346                                                            LET ERRCHK := #0        ; CLEAR ERROR WORD
2327  005346  005067  002614                    CLR     ERRCHK
2328  005352                                                            LET OLD := #-1
2329  005352  012767  177777  000270            MOV     #-1,OLD
2330  005360                                                            LET OLD+2 := #-1
2331  005360  012767  177777  000264            MOV     #-1,OLD+2
2332  005366                                                            LET @TCSR := @TCSR SET.BY #MAINT
2333  005366  052777  000004  173670            BIS     #MAINT,@TCSR
2334                                                                    ;EACH BAUD RATE
2335  005374                                                            INCR R3 FROM #0 TO #15. BY #1
2336  005374  005003                            CLR     R3
2337  005376  000401                            BR      $116
2338  005400                            $117:
2339  005400  005203                            INC     R3
2340  005402                            $116:
2341  005402  020327  000017                    CMP     R3,#15.
2342  005406  003062                            BGT     $120
2343  005410                                                            LET R0 := @RBUF
2344  005410  017700  173646                    MOV     @RBUF,R0
2345                                                                    ;CHANGE BAUDE RATE
2346  005414                                                        LET @TCSRHI :B= RATES(R3)
```

```
2347  005414  116377  005624  173644          MOVB    RATES(R3),@TCSRHI
2348
2349  005422
2350  005422  005002                          CLR     BIT
2351
2352  005424
2353  005424  005077  173640                  CLR     @TBUF
2354
2355  005430
2356  005430  005067  000210                  CLR     NEW
2357  005434
2358  005434  005067  000206                  CLR     NEW+2
2359  005440
2360  005440                          $121:
2361  005440  005702                          TST     BIT
2362  005442  001014                          BNE     $122
2363  005444
2364  005444  032777  000200  173606          BIT     #RCVRDONE,@RCSR
2365  005452  001403                          BEQ     $123
2366
2367  005454
2368  005454  012702  000001                  MOV     #1,BIT
2369  005460
2370  005460  000404                          BR      $124
2371  005462                          $123:
2372
2373  005462
2374  005462  005267  000156                  INC     NEW
2375  005466
2376  005466  005567  000154                  ADC     NEW+2
2377  005472
2378  005472                          $124:
2379
2380  005472
2381  005472  000762                          BR      $121
2382  005474                          $122:
2383
2384  005474
2385  005474  026767  000146  000150          CMP     NEW+2,OLD+2
2386  005502  103001                          BHIS    $125
2387
2388  005504
2389  005504  000414                          BR      $126
2390  005506                          $125:
2391
2392  005506
2393  005506  026767  000134  000136          CMP     NEW+2,OLD+2
2394  005514  001005                          BNE     $127
2395  005516  026767  000122  000124          CMP     NEW,OLD
2396  005524  103001                          BHIS    $127
2397
2398  005526
2399  005526  000403                          BR      $130
2400  005530                          $127:
2401
2402
```

```
    ;FLAG
LET BIT := #0

    ;OUTPUT THE CHARACTER
LET @TBUF := #0

    ;INITIALIZE COUNTER
LET NEW := #0

LET NEW+2 := #0

WHILE BIT EQ #0 DO


    IF #RCVRDONE SETIN @RCSR THEN


    ;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
```

```
2403                                                                    ; NEW >= OLD)
2404                                                                    ;BAUD RATE DIDN'T CHANGE
2405  005530                                                          LET ERRCHK := #BIT2 ; SET ERROR INDICATOR
2406  005530  012767  000004  002430          MOV     #BIT2,ERRCHK
2407  005536                                                              ENDIF
2408  005536                          $130:
2409  005536                                                          ENDIF
2410  005536                          $126:
2411                                                                    ;UPDATE OLD TIME
2412  005536                                                          LET OLD := NEW
2413  005536  016767  000102  000104          MOV     NEW,OLD
2414  005544                                                          LET OLD+2 := NEW+2
2415  005544  016767  000076  000100          MOV     NEW+2,OLD+2
2416
2417  005552                                                      ENDINC  ;BAUD RATE
2418  005552  000712                          BR      $117
2419  005554                          $120:
2420  005554                                                  LET R3 :B= $USWR+1 AND #17      ; PUT BAUD BACK
2421  005554  116703  173441                 MOVB    $USWR+1,R3
2422  005560  110346                          MOVB    R3,-(SP)
2423  005562  142716  000017                 BICB    #17,(SP)
2424  005566  142603                          BICB    (SP)+,R3
2425  005570                                                  LET R3 := R3 CLR.BY #177400
2426  005570  042703  177400                 BIC     #177400,R3
2427  005574                                                  LET @TCSRHI :B= RATES(R3)       ; LIKE HE WANTED IT
2428  005574  116377  005624  173464          MOVB    RATES(R3),@TCSRHI
2429
2430                                                                  ; CAN NOT LEAVE WITH MAINT SET
2431  005602                                                          LET    @TCSR := @TCSR CLR.BY #MAINT
2432  005602  042777  000004  173454          BIC     #MAINT,@TCSR
2433  005610                                                      IF #BIT2 SETIN ERRCHK THEN
2434  005610  032767  000004  002350          BIT     #BIT2,ERRCHK
2435  005616  001401                          BEQ     $131
2436                                                                      ; REPORT DEFERED ERROR
2437  005620                                                          ERRHRD      126
2438  005620  104126                          ERROR   126
2439  005622                                                      ENDIF
2440  005622                          $131:
2441  005622                                                      EXIT    ;SKIP TABLE
2442  005622  000414                          BR      TST17           ;;;EXIT THIS TEST
2443
2444  005624                          RATES:  ;A TABLE OF THE ACTUAL BYTES TO MOVE INTO THE
2445                                  ;UPPER BYTE OF XCSR FOR EACH BAUD RATE
2446                                  ;** NOTE::      THE VALUE INDICATED IN THE COLUMN 'OFFSET
2447                                  ;**             INTO TABLE' CAN BE PLACED INTO BITS<11:8>
2448                                  ;**             OF LOCATION '$USWR' TO CAUSE THE CORROSPONDING
2449                                  ;**             BAUD TO BE SELECTED IN THE DLV11-F UPON
2450                                  ;**             COMPLETION OF THIS TEST.
2451
2452                                                          ;       BAUD    OFFSET INTO TABLE
2453  005624      010                 R0050:  .BYTE   010     ;       50      0
2454  005625      030                 R0070:  .BYTE   030     ;       70      1
2455  005626      050                 R0110:  .BYTE   050     ;       110     2
2456  005627      070                 R0135:  .BYTE   070     ;       135     3
2457  005630      110                 R0150:  .BYTE   110     ;       150     4
2458  005631      130                 R0300:  .BYTE   130     ;       300     5
```

```
2459  005632  150                 R0600:  .BYTE  150  ;  600    6
2460  005633  170                 R0200:  .BYTE  170  ;  1200   7
2461  005634  210                 R1800:  .BYTE  210  ;  1800   10
2462  005635  230                 R2000:  .BYTE  230  ;  2000   11
2463  005636  250                 R2400:  .BYTE  250  ;  2400   12
2464  005637  270                 R3600:  .BYTE  270  ;  3600   13
2465  005640  310                 R4800:  .BYTE  310  ;  4800   14
2466  005641  330                 R7200:  .BYTE  330  ;  7200   15
2467  005642  350                 R9600:  .BYTE  350  ;  9600   16
2468  005643  370                 R10000: .BYTE  370  ;  19200  17
2469
2470  005644  000000  000000      NEW:    0,0
2471  005650  000000  000000      OLD:    0,0
2472  005654                                              ENDTST
2473
2474
2475
```

```
                        ;;**********************************************************************
                        ;;**********************************************************************
                        ;*TEST 17        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
                        ;;**********************************************************************
005654  000004          TST17:  SCOPE
005656  012767  000010  173274          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
005664  012767  000017  173306          MOV     #17,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX


005672                                                          IF #APTENV SETIN $ENV THEN
005672  032767  000001  173314          BIT     #APTENV,$ENV
005700  001404                        BEQ     $132
005702                                                              EXIT TEST
005702  012767  000001  173250          MOV     #1,$TIMES
005710  000532                        BR      TST20           ;;;EXIT THIS TEST
005712                                                          ENDIF
005712                          $132:


                                                                        ;CLEAR 'INTERRUPT OCCURED' FLAG
005712                                                          LET INTFLAG := #0
005712  005067  002742                MOV     INTFLAG


                                                                        ;GET VECTOR ADDRESS
005716                                                          LET R3 := DLVEC
005716  016703  173334                MOV     DLVEC,R3

                                                                        ;FOR THE TRANSMITTER
005722                                                          LET R3 := R3 + #4
005722  062703  000004                ADD     #4,R3

                                                                        ;SET VECTOR TO POINT TO TRANS. SRV AT PRI
005726                                                          SETVEC R3, #INTSRV, #PR7
005726  010146                      MOV     R1,-(SP)
005730  010301                      MOV     R3,R1
005732  012721  010652              MOV     #INTSRV,(R1)+
005736  012711  000340              MOV     #PR7,(R1)
005742  012601                      MOV     (SP)+,R1
005744                                                          BGNSUB
005744  012767  005752  173136      MOV     #64$,$LPERR

                                                                ;; MAKE SURE THAT TRANSMITTER READY IS SET
005752                                                          CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
005752  010546                      MOV     R5,-(SP)
005754  012745  177777              MOV     #SET,-(R5)
005760  016745  173300              MOV     TCSR,-(R5)
005764  012745  000200              MOV     #XMITRDY,-(R5)
005770  012745  000500              MOV     #500,-(R5)
005774  004767  002314              JSR     PC,TIMER
006000  012605                      MOV     (SP)+,R5


                                                                        ;CLEAR INTERRUPT ENABLE
006002                                                              LET @TCSR := @TCSR CLR. BY #XMITIE
```

```
006002  042777  000100  173254          BIC     #XMITIE,@TCSR
                                                                                ;SET IT TO 0
006010  012746  000000                  MOV     #PR0,-(SP)          ;;PUT NEW PS ON STACK
006014  012746  006022                  MOV     #65$,-(SP)          ;;PUT NEW PC ON  STACK
006020  000002                          RTI                         ;;POP NEW PC AND PS
006022                          65$:
                                                                                ;NOW SET I.E. BIT
006022                                                                  LET @TCSR := @TCSR SET.BY #XMITIE
006022  052777  000100  173234          BIS     #XMITIE,@TCSR
                                                                                ;LET INTERRUPT HAVE TIME TO OCCUR
006030                                                                  WAITMS 200.
006030  010546                          MOV     R5,-(SP)
006032  012745  000310                  MOV     #200.,-(R5)
006036  004767  002530                  JSR     PC,WAIT
006042  012605                          MOV     (SP)+,R5
                                                                                ;DID EXACTLY 1 INTERRUPT OCCUR
006044                                                                  IF INTFLAG NE #1 THEN
006044  026727  002610  000001          CMP     INTFLAG,#1
006052  001406                          BEQ     $133
                                                                                ;NO - WAS IT 0 OR MORE THAN ONCE
006054                                                                          IF INTFLAG EQ #0 THEN
006054  005767  002600                  TST     INTFLAG
006060  001002                          BNE     $134
                                                                                ;TRANSMITTER DID NOT INTERRUPT IN TIME
006062                                                                              ERRHRD 106,,DIDNOT
006062  104106                          ERROR   106
006064                                                                          ELSE
006064  000401                          BR      $135
006066                          $134:
                                                                                ;TWICE
                                                                                ;TRANSMITTER INTERRUPTED TWICE
006066                                                                              ERRHRD 107,,TWICE
006066  104107                          ERROR   107
006070                                                                          ENDIF
006070                          $135:
006070                                                                  ENDIF
006070                          $133:
006070                                                              ENDSUB
                                                        ;INTERRUPT WITHOUT INTERRUPT ENABLE SET
006070                                                              BGNSUB
006070  012767  006076  173012          MOV     #64$,$LPERR
                                                                                ;CLEAR 'INTERRUPT OCCURED' FLAG
006076                                                                  LET INTFLAG := #0
006076  005067  002556                  CLR     INTFLAG
                                                                                ;CLEAR INTERRUPT ENABLE
006102                                                                  LET @TCSR := @TCSR CLR.BY #XMITIE
006102  042777  000100  173154          BIC     #XMITIE,@TCSR
                                                                                ;NO INTERRUPTS SHOULD OCCUR.
006110  012746  000000                  MOV     #PR0,-(SP)          ;;PUT NEW PS ON STACK
006114  012746  006122                  MOV     #65$,-(SP)          ;;PUT NEW PC ON  STACK
006120  000002                          RTI                         ;;POP NEW PC AND PS
006122                          65$:
```

```
2588                                                                    ;DARE IT TO HAPPEN
2589  006122                                                          WAITMS 2
2590  006122  010546                     MOV     R5,-(SP)
2591  006124  012745  000002             MOV     #2,-(R5)
2592  006130  004767  002436             JSR     PC,WAIT
2593  006134  012605                     MOV     (SP)+,R5
2594  006136                                                          IF INTFLAG NE #0 THEN
2595  006136  005767  002516             TST     INTFLAG
2596  006142  001401                     BEQ     $136
2597                                                                    ;INTERRUPT OCCURED WITH I E CLEARED
2598  006144                                                            ERRHRD 110,NOTENAB
2599  006144  104110                     ERROR   110
2600  006146                                                          ENDIF
2601  006146                          $136:
2602  006146                                                          BRESET
2603  006146  000005                     RESET
2604  006150                                                        ENDSUB
2605                                                                    ;RESTORE VECTOR AREA
2606  006150                                                        CLRVEC R3
2607  006150  010146                     MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2608  006152  010246                     MOV     R2,-(SP)        ;;PUSH R2 ON STACK
2609  006154  012701  000003             MOV     #R3,R1
2610  006160  010102                     MOV     R1,R2
2611  006162  062702  000002             ADD     #2,R2
2612  006166  010221                     MOV     R2,(R1)+
2613  006170  005011                     CLR     (R1)
2614  006172  012602                     MOV     (SP)+,R2        ;;POP STACK INTO R2
2615  006174  012601                     MOV     (SP)+,R1        ;;POP STACK INTO R1
2616
2617  006176                                                        ENDTST
2618
2619
2620
2621
2622
2623
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 20        RECEIVER INTERRUPT LOGIC TEST
                                ;*              THIS TEST COVERS ALL OF THE RECEIVER
                                ;*              SIDE OF THE INTERRUPT LOGIC IN
                                ;*              CHARACTER MODE.
                                ;;**********************************************************************
006176  000004                  TST20:  SCOPE
006200  012767  000010  172752          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
006206  012767  000020  172764          MOV     #20,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
006214                                                          IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
006214  032767  040000  172776          BIT     #MAINTJUMP,$USWR
006222  001404                        BEQ     $137
006224  126727  002671  000001        CMPB    CONSOLE,#TRUE
006232  001002                        BNE     $140
006234                          $137:
006234  000167  000242                JMP     TST21                   ;       EXIT TEST
006240                                                          ENDIF
006240                          $140:
                                                                        ;CLEAR INTERRUPT OCCURED FLAG
                                                                        ;SET UP RECEIVER INTER. VECTOR
006240                                                          SETVEC DLVEC,#INTSRV,#PR7
006240  010146                        MOV     R1,-(SP)
006242  016701  173010                MOV     DLVEC,R1
006246  012721  010652                MOV     #INTSRV,(R1)+
006252  012711  000340                MOV     #PR7,(R1)
006256  012601                        MOV     (SP)+,R1
                                ;PRIORITY 0 AND MULTIPLE INTERRUPT TEST.-RCVRIE
006260                                                          BGNSUB
006260  012767  006266  172622        MOV     #64$,$LPERR
006266                                                          LET INTFLAG := #0
006266  005067  002366                CLR     INTFLAG
                                                                        ;SET MAINT. BIT
006272                                                          LET @TCSR := @TCSR SET.BY #MAINT
006272  052777  000004  172764        BIS     #MAINT,@TCSR
                                                                        ;CLEAR INTERRUPTS
006300                                                              LET @RCSR := @RCSR CLR.BY #RCVRIE
006300  042777  000100  172752        BIC     #RCVRIE,@RCSR
                                                                        ;CHANGE PRIORITY
                                                                        ;..TO 0
006306  012746  000000                MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
006312  012746  006320                MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
006316  000002                        RTI                     ;;POP NEW PC AND PS
006320                          65$:
                                                                        ;SEND A CHARACTER
006320                                                              LET @TBUF :B= #0
006320  105077  172744                CLRB    @TBUF
                                                                        ;WAIT A MAXIMUM
                                                                    ;OF 500 MSEC FOR
                                                                    ;RCVR DONE TO SET IN RCSR
                                                                    CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
006324
006324  010546                        MOV     R5,-(SP)
006326  012745  177777                MOV     #SET,-(R5)
006332  016745  172722                MOV     RCSR,-(R5)
```

```
2680  006336  012745  000200                  MOV     #RCVRDONE,-(R5)
2681  006342  012745  000500                  MOV     #500.,-(R5)
2682  006346  004767  001742                  JSR     PC,TIMER
2683  006352  012605                          MOV     (SP)+,R5
2684
2685  006354                                                  ;SET INTERRUPT ENABLE
2686  006354  052777  000100  172676          BIS     #RCVRIE,@RCSR   LET @RCSR := @RCSR SET.BY #RCVRIE
2687
2688  006362                                                  ;LET IT COME IN.
2689  006362  010546                          MOV     R5,-(SP)        WAITMS 1
2690  006364  012745  000001                  MOV     #1,-(R5)
2691  006370  004767  002176                  JSR     PC,WAIT
2692  006374  012605                          MOV     (SP)+,R5
2693
2694  006376
2695  006376  017700  172660                  MOV     @RBUF,R0        LET R0 := @RBUF ; CLEAR RCVRDONE
2696
2697  006402                                                  ;DID HE DO IT RIGHT?
2698  006402  026727  002252  000001          CMP     INTFLAG,#1      IF INTFLAG NE #1 THEN
2699  006410  001411                          BEQ     $141
2700
2701                                                          ;NONE OCCURED
2702  006412                                                  ; CAN NOT LEAVE WITH MAINT SET
2703  006412  042777  000004  172644          BIC     #MAINT,@TCSR    LET   @TCSR := @TCSR CLR.BY #MAINT
2704  006420
2705  006420  005767  002234                  TST     INTFLAG                 IF INTFLAG EQ #0 THEN
2706  006424  001002                          BNE     $142
2707
2708  006426                                                          ;RECEIVER DID NOT INTERRUPT IN TIME
2709  006426  104111                          ERROR   111                         ERRHRD 111,,DIDNOT
2710
2711  006430                                                          ;TWICE OR MORE
2712  006430  000401                          BR      $143                    ELSE
2713  006432                          $142:
2714
2715  006432                                                                  ;RECEIVER INTERRUPTED TWICE
2716  006432  104112                          ERROR   112                         ERRHRD 112,,TWICE
2717  006434
2718  006434                          $143:                           ENDIF
2719  006434
2720  006434                          $141:                   ENDIF
2721  006434                                                  ENDSUB
2722
2723
2724                                                                  ; CLEAR THE WORLD
2725  006434                                                  LET @RCSR := @RCSR CLR.BY #RCVRIE
2726  006434  042777  000100  172616          BIC     #RCVRIE,@RCSR
2727
2728
2729                                                                  ;RESET MAINT. BIT.
2730  006442                                                  LET @TCSR := @TCSR CLR.BY #MAINT
2731  006442  042777  000004  172614          BIC     #MAINT,@TCSR
2732
2733  006450                                                  LET R4 := @DLVEC
2734  006450  017704  172602                  MOV     @DLVEC,R4
2735  006454                                                  CLRVEC R4
```

```
 2736  006454  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 2737  006456  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 2738  006460  012701  000004                MOV     #R4,R1
 2739  006464  010102                        MOV     R1,R2
 2740  006466  062702  000002                ADD     #2,R2
 2741  006472  010221                        MOV     R2,(R1)+
 2742  006474  005011                        CLR     (R1)
 2743  006476  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 2744  006500  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 2745  006502                                                        ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 21        TEST ACTUAL DATA TRANSFERED
                                ;*               NON-INTERRUPT MAINTENANCE BIT SET
                                ;;**********************************************************************
006502  000004                  TST21:  SCOPE
006504  012767  000001  172446          MOV     #1,$TIMES       ;;DO 1 ITERATION
006512  012767  000021  172460          MOV     #21,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
006520                                                                  IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
006520  032767  040000  172472          BIT     #MAINTJUMP,$USWR
006526  001404                          BEQ     $144
006530  126727  002365  000001          CMPB    CONSOLE,#TRUE
006536  001004                          BNE     $145
006540                          $144:
006540                                                                      EXIT TEST
006540  012767  000001  172412          MOV     #1,$TIMES
006546  000526                          BR      TST22           ;;;EXIT THIS TEST
006550                                                                  ENDIF
006550                          $145:
006550                                                          LET ERRCHK := #0
006550  005067  001412                  CLR     ERRCHK
                                                                        ;SET MAINT. BIT
006554                                                          LET @TCSR := @TCSR SET.BY #MAINT
006554  052777  000004  172502          BIS     #MAINT,@TCSR
                                                                        ;CHANGE PRIORITY
                                                                        ;..TO 0
006562  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
006566  012746  006574                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
006572  000002                          RTI                     ;;POP NEW PC AND PS
006574                          64$:
                                                                        ;GET DATA MASK.
006574                                                          CALL DATLNG OUT <R1>
006574  162705  000002                  SUB     #1*2,R5
006600  004767  001666                  JSR     PC,DATLNG
006604  012501                          MOV     (R5)+,R1
006606                                                          LET R0 := @RBUF ; START CLEAR
006606  017700  172450                  MOV     @RBUF,R0
                                                                        ;ALL BINARY CHAR.
006612                                                          INCR R2 FROM #0 TO #377 BY #1
006612  005002                          CLR     R2
006614  000401                          BR      $146
006616                          $147:
006616  005202                          INC     R2
006620                          $146:
006620  020227  000377                  CMP     R2,#377
006624  003062                          BGT     $150
                                ;TRANSMIT CHAR IN R2
                                CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
006626
006626  010546                  MOV     R5,-(SP)
006630  012745  177777          MOV     #SET,-(R5)
```

```
2802  006634  016745  172424                  MOV     TCSR,-(R5)
2803  006640  012745  000200                  MOV     #XMITRDY,-(R5)
2804  006644  012745  000500                  MOV     #500.,-(R5)
2805  006650  004767  001440                  JSR     PC,TIMER
2806  006654  012605                          MOV     (SP)+,R5
2807  006656
2808  006656  103003                          BCC     $151
2809  006660
2810  006660  052767  000010  001300          BIS     #B;T3,ERRCHK
2811  006666
2812  006666                          $151:
2813
2814
2815  006666
2816  006666  110277  172376                  MOVB    R2,@TBUF
2817
2818  006672
2819  006672  010546                          MOV     R5,-(SP)
2820  006674  012745  177777                  MOV     #SET,-(R5)
2821  006700  016745  172354                  MOV     RCSR,-(R5)
2822  006704  012745  000200                  MOV     #RCVRDONE,-(R5)
2823  006710  012745  000500                  MOV     #500.,-(R5)
2824  006714  004767  001374                  JSR     PC,TIMER
2825  006720  012605                          MOV     (SP)+,R5
2826  006722
2827  006722  103003                          BCC     $152
2828  006724
2829  006724  052767  000020  001234          BIS     #BIT4,ERRCHK
2830  006732
2831  006732                          $152:
2832
2833  006732
2834  006732  017703  172324                  MOV     @RBUF,R3
2835
2836
2837
2838
2839
2840
2841  006736
2842  006736  010204                          MOV     R2,R4
2843  006740  040104                          BIC     R1,R4
2844  006742
2845  006742  040103                          BIC     R1,R3
2846
2847
2848  006744
2849  006744  020403                          CMP     R4,R3
2850  006746  001410                          BEQ     $153
2851
2852
2853  006750
2854  006750  042777  000004  172306          BIC     #MAINT,@TCSR
2855  006756
2856  006756  104116                          ERROR   116
2857  006760
```

```
IF.ERROR THEN

    LET ERRCHK := ERRCHK SET.BY #BIT3

ENDIF


    ;TRANSMIT IT
LET @TBUF :B= R2

CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>




IF.ERROR THEN

    LET ERRCHK := ERRCHK SET.BY #BIT4

ENDIF

    ;AND SAVE IT
LET R3 := @RBUF


;COMPARE TO SEE IF WE RECEIVED IT ALL

    ;CLEAN OFF NON-DATA BITS
    ;ON BOTH TRANSMITTED AND
LET R4 := R2 CLR.BY R1

LET R3 := R3 CLR.BY R1

;RECEIVED DATA
IF R4 NE R3 THEN


    ;DATA COMPARE ERROR
    ; CAN NOT LEAVE WITH MAINT SET
LET    @TCSR := @TCSR CLR.BY #MAINT

    ERRHRD 116,COMP,SBWAS

    EXIT TEST ; ON ERROR
```

```
2858  006760  012767  000001  172172          MOV     #1,$TIMES
2859  006766  000416                          BR      TST22   ,       ;;;EXIT THIS TEST
2860  006770                                                                  ENDIF
2861  006770                          $153:
2862  006770                                                          ENDINC  ; R2
2863  006770  000712                          BR      $147
2864  006772                          $150:
2865
2866                                                                  ;RESET MAINT. BIT.
2867  006772                                                          LET @TCSR := @TCSR CLR. BY #MAINT
2868  006772  042777  000004  172264          BIC     #MAINT,@TCSR
2869  007000                                                          IF #BIT3 SETIN ERRCHK THEN
2870  007000  032767  000010  001160          BIT     #BIT3,ERRCHK
2871  007006  001401                          BEQ     $154
2872  007010                                                                  ERRHRD 130
2873  007010  104130                          ERROR   130
2874  007012                                                          ENDIF
2875  007012                          $154:
2876  007012                                                          IF #BIT4 SETIN ERRCHK THEN
2877  007012  032767  000020  001146          BIT     #BIT4,ERRCHK
2878  007020  001401                          BEQ     $155
2879  007022                                                                  ERRHRD 131
2880  007022  104131                          ERROR   131
2881  007024                                                          ENDIF
2882  007024                          $155:
2883  007024                                                  ENDTST
2884
2885
2886
```

```
2887                                    ;;**********************************************************************
2888                                    ;;**********************************************************************
2889                                    ;*TEST 22        TEST DATA THROUGH WRAP
2890                                    ;;**********************************************************************
2891  007024  000004                    TST22:  SCOPE
2892  007026  012767  000001  172124            MOV     #1,$TIMES       ;;DO 1 ITERATION
2893  007034  012767  000022  172136            MOV     #22,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2894  007042                                                                    IF #WRAP NOTSETIN $USWR OR #COMSPD NOTSETIN $USW
2895  007042  032767  020000  172150            BIT     #WRAP,$USWR
2896  007050  001404                           BEQ     $156
2897  007052  032767  000100  172140            BIT     #COMSPD,$USWR
2898  007060  001004                           BNE     $157
2899  007062                            $156:
2900                                                                              ;CAN'T TEST WITHOUT A WRAP
2901  007062                                                                  EXIT TST
2902  007062  012767  000001  172070            MOV     #1,$TIMES
2903  007070  000516                           BR      TST23           ;;;EXIT THIS TEST
2904  007072                                                                    ENDIF
2905  007072                            $157:
2906                                                                              ;DON'T USE MAINT.
2907  007072                                                                  LET @TCSR := @TCSR CLR. BY #MAINT
2908  007072  042777  000004  172164            BIC     #MAINT,@TCSR
2909                                                                              ; IF A SPECIAL TURN AROUND CARD IS
2910                                                                              ;   CONNECTED IN PLACE OF THE WRAP
2911                                                                              ;  SETTING READER RUN WILL ENABLE IT.
2912                                                                              ; THIS MODULE IS ONLY USED IN MANUFACTUR
2913                                                                              ; AND ONLY ON THE CONSOLE DLV11-F.
2914                                                                              ; IF NO SPECIAL MODULE IS AVAILABLE,
2915                                                                              ; AND THE WRAP BIT IS SET IN $USWR
2916                                                                              ; THEN THIS TEST WILL ERROR ON THE CONSO
2917
2918  007100                                                                  LET @RCSR := @RCSR SET. BY #11
2919  007100  052777  000011  172152            BIS     #11,@RCSR
2920                                                                              ;CHANGE PRIORITY
2921                                                                              ;..TO 0
2922  007106  012746  000000                   MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
2923  007112  012746  007120                   MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
2924  007116  000002                           RTI                     ;;POP NEW PC AND PS
2925  007120                            64$:
2926                                                                              ;GET DATA MASK
2927  007120                                                                  CALL DATLNG OUT <R1>
2928  007120  162705  000002                   SUB     #1*2,R5
2929  007124  004767  001342                   JSR     PC,DATLNG
2930  007130  012501                           MOV     (R5)+,R1
2931  007132                                                                  LET R0 := @RBUF ; START CLEAN
2932  007132  017700  172124                   MOV     @RBUF,R0
2933                                                                              ;BINARY COUNT PATTERN
2934  007136                                                                  INCR R2 FROM #0 TO #377 BY #1
2935  007136  005002                           CLR     R2
2936  007140  000401                           BR      $160
2937  007142                            $161:
2938  007142  005202                           INC     R2
2939  007144                            $160:
2940  007144  020227  000377                   CMP     R2,#377
2941  007150  003063                           BGT     $162
2942
```

```
2943
2944                                                        ;TRANSMIT THE CHAR.  IN R2.
2945
2946                                                            ; MAKE SURE IT'S READY
2947  007152                                                CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
2948  007152  010546                   MOV     R5,-(SP)
2949  007154  012745  177777           MOV     #SET,-(R5)
2950  007160  016745  172100           MOV     TCSR,-(R5)
2951  007164  012745  000200           MOV     #XMITRDY,-(R5)
2952  007170  012745  000500           MOV     #500,-(R5)
2953  007174  004767  001114           JSR     PC,TIMER
2954  007200  012605                   MOV     (SP)+,R5
2955  007202                                                IF.ERROR THEN
2956  007202  103005                   BCC     $163
2957  007204  104123                   ERROR   123                                  ; TRANSMITTER NEVER BECAME READY
2958  007206                                                                       EXIT TEST
2959  007206  012767  000001  171744   MOV     #1,$TIMES
2960  007214  000444                   BR      TST23               ;;;EXIT THIS TEST
2961  007216                                                ENDIF
2962  007216                       $163:
2963
2964                                                            ;START IT ON ITS WAY
2965  007216                                                LET @TBUF :B= R2
2966  007216  110277  172046           MOVB    R2,@TBUF
2967                                                        ; NOW WAIT FOR RECIEVER DONE
2968  007222                                                CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
2969  007222  010546                   MOV     R5,-(SP)
2970  007224  012745  177777           MOV     #SET,-(R5)
2971  007230  016745  172024           MOV     RCSR,-(R5)
2972  007234  012745  000200           MOV     #RCVRDONE,-(R5)
2973  007240  012745  000500           MOV     #500,-(R5)
2974  007244  004767  001044           JSR     PC,TIMER
2975  007250  012605                   MOV     (SP)+,R5
2976  007252                                                    IF.ERROR THEN
2977  007252  103005                   BCC     $164
2978  007254                                                        ERRHRD 124
2979  007254  104124                   ERROR   124
2980                                                        ; RECIEVER NEVER BECAME READY
2981  007256                                                EXIT TEST
2982  007256  012767  000001  171674   MOV     #1,$TIMES
2983  007264  000420                   BR      TST23               ;;;EXIT THIS TEST
2984  007266                                                    ENDIF
2985  007266                       $164:
2986
2987                                                            ;RETRIEVE
2988  007266                                                LET R3 := @RBUF
2989  007266  017703  171770           MOV     @RBUF,R3
2990
2991                                                            ;STRIP OFF  JUNK ON BOTH
2992  007272                                                LET R4 := R2 CLR.BY R1
2993  007272  010204                   MOV     R2,R4
2994  007274  040104                   BIC     R1,R4
2995  007276                                                LET R3 := R3 CLR.BY R1
2996  007276  040103                   BIC     R1,R3
2997
2998                                                            ;WE HAVE TROUBLE
```

```
                                                                    IF R4 NE R3 THEN
007300  020403                          CMP     R4,R3
007302  001405                          BEQ     $165
                                                                        ;DATA COMPARE ERROR
                                                                        ERRHRD 117,COMP,SBWAS
007304
007304  104117                          ERROR   117
007306                                                                  EXIT TEST ; ON ERROR
007306  012767  000001  171644          MOV     #1,$TIMES
007314  000404                          BR      TST23           ;;;EXIT THIS TEST
                                                                    ENDIF
007316                          $165:
                                                                ENDINC  ; R2
007316  000711                          BR      $161
007320                          $162:
                                                                        ; NOW THAT THE TEST IS DONE
                                                                        ;  WE WILL TOGGLE READER RUN
                                                                        ;  TO TURN OFF THE SPECIAL MODULE.
007320                                                                  LET @RCSR := @RCSR SET.BY #11
007320  052777  000011  171732          BIS     #11,@RCSR


007326                                                          ENDTST
```

```
                                ;;**********************************************************************
                                ;;**********************************************************************
                                ;*TEST 23        FULL DATA TRANSFER WITH INTERRUPTS
                                ;*              AND MAINTENANCE MODE.
                                ;;**********************************************************************
007326  000004                  TST23:  SCOPE
007330  012767  000001  171622          MOV     #1,$TIMES       ;;DO 1 ITERATION
007336  012767  000023  171634          MOV     #23,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX

007344                                                          IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
007344  032767  040000  171646          BIT     #MAINTJUMP,$USWR
007352  001404                        BEQ     $166
007354  126727  001541  000001        CMPB    CONSOLE,#TRUE
007362  001004                        BNE     $167
007364                          $166:
007364                                                              EXIT TEST
007364  012767  000001  171566        MOV     #1,$TIMES
007372  000553                        BR      TST24           ;;;EXIT THIS TEST
007374                                                          ENDIF
007374                          $167:

                                                                    ;GET DATA MASK
007374                                                          CALL DATLNG OUT <R3>
007374  162705  000002                SUB     #1*2,R5
007400  004767  001066                JSR     PC,DATLNG
007404  012503                        MOV     (R5)+,R3


                                ; THIS TEST WILL RUN BOTH TRANSMITTER AND
                                ; RECIEVER AT FULL SPEED TESTING
                                ; THE ABILITY OF THE MODULE
                                ; TO HANDLE INTERRUPTS FROM BOTH SIDES
                                ; AT ONCE. ALSO, THE DOUBLE BUFFERING LOGIC
                                ; OF THE UART WILL BE FULLY TESTED.
                                ;  THIS TEST WILL TRANSFER A MAXIMUM OF 400(8)
                                ; CHARACTERS THROUGH THE MODULE, BUT IF AN ERROR
                                ; IS DETECTED BY THE TEST A PREMATURE SHUTDOWN OCCURS.


                                                                    ;CHANGE PRIORITY
                                                                    ;.. TO 0
007406  012746  000000          MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
007412  012746  007420          MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
007416  000002                  RTI                     ;;POP NEW PC AND PS
007420                  64$:
                                                                    ;GET VECTOR ADDRESS
007420                                                          LET R1 := DLVEC
007420  016701  171632          MOV     DLVEC,R1
                                                                    ;RCVR VECTOR
007424                                                          LET (R1)+ := #REC
007424  012721  007626          MOV     #REC,(R1)+
007430                                                          LET (R1)+ := #PR7
007430  012721  000340          MOV     #PR7,(R1)+
                                                                    ;POINT TO TRANSMITTER VECTOR
                                                                    ;AND SET IT UP ALSO
007434                                                          LET (R1)+ := #TRAN
007434  012721  007564          MOV     #TRAN,(R1)+
```

```
3083  007440                                                    LET (R1)  := #PR7
3084  007440  012711  000340          MOV     #PR7,(R1)
3085
3086                                                            ; CLEAR ERROR COUNTER
3087  007444                                                    LET ERRCNT := #0
3088  007444  005067  000106          CLR     ERRCNT
3089                                                            ; INITIALIZE COUNTERS
3090  007450                                                    LET R1 := #-1
3091  007450  012701  177777          MOV     #-1,R1
3092                                                            ;RECEIVER STORAGE
3093  007454                                                    LET R2 := #0
3094  007454  005002                  CLR     R2
3095                                                            ;# OF RECEIVED CHAR. COUNT.
3096  007456                                                    LET R4 := #-1
3097  007456  012704  177777          MOV     #-1,R4
3098
3099  007462                                                    BRESET  ;SET UP ALL REGISTERS
3100  007462  000005                  RESET
3101                                                            ;SET UP MAINTENANCE
3102  007464                                                    LET @TCSR := @TCSR SET BY #MAINT
3103  007464  052777  000004  171572  BIS     #MAINT,@TCSR
3104
3105                                                            ;SET I.E. IN TRANSMITTER
3106  007472                                                    LET @TCSR := @TCSR SET BY #XMITIE
3107  007472  052777  000100  171564  BIS     #XMITIE,@TCSR
3108                                                            ;AND RECEIVER
3109  007500                                                    LET @RCSR := @RCSR SET BY #RCVRIE
3110  007500  052777  000100  171552  BIS     #RCVRIE,@RCSR
3111
3112
3113                                                            ;NOW WE WAIT UNTIL R4 COUNT (RECEIVED) IS EQUAL
3114  007506                                                    REPEAT
3115  007506                  $170:
3116  007506
3117  007506  020467  000046          CMP     R4,NUMBER       UNTIL R4 EQ NUMBER OR ERRCNT GT #0
3118  007512  001403                  BEQ     $171
3119  007514  005767  000036          TST     ERRCNT
3120  007520  003772                  BLE     $170
3121  007522                  $171:
3122
3123  007522                                                    LET @TCSR := @TCSR CLR BY #MAINT
3124  007522  042777  000004  171534  BIC     #MAINT,@TCSR
3125                                                            ; CHECK FOR DATA COMPARE ERRORS.
3126  007530                                                    IF ERRCNT NE #0 THEN
3127  007530  005767  000022          TST     ERRCNT
3128  007534  001401                  BEQ     $172
3129
3130  007536                                                        ;DATA COMPARE ERROR
3131  007536  104120                  ERROR   120                 ERRHRD 120,COMP,FIRST
3132  007540                                                    ENDIF
3133  007540                  $172:
3134
3135  007540                                                    LET @TCSR := @TCSR CLR BY #XMITIE
3136  007540  042777  000100  171516  BIC     #XMITIE,@TCSR
3137  007546                                                    LET @RCSR := @RCSR CLR BY #RCVRIE
3138  007546  042777  000100  171504  BIC     #RCVRIE,@RCSR
```

```
                                                                    EXIT    ;SKIP OVER SUPPORT ROUTINES & STORAGE
007554  000462                      BR      TST24           ;;;EXIT THIS TEST

007556  000000              ERRCNT: 0
007560  001000              NUMBER: 1000
007562     000              SB:     .BYTE 0
007563     000              WAS:    .BYTE 0


                            ;;**********************************************************************
                                                ;TRANSMIT INTERRUPT HANDLER
                                                                    BGNSRV  TRAN
007564                      TRAN:
                            ;;**********************************************************************

                                                                        ;INCREMENT CHAR COUNT
007564                                                              LET R1 := R1 + #1
007564  005201                      INC     R1
                                                                        ;SET UP FOR TRANSFER
007566                                                              LET HOLD := R1 CLR.BY R3
007566  010167  000030              MOV     R1,HOLD
007572  040367  000024              BIC     R3,HOLD

                                                                        ;AND SEND.
007576                                                              LET @TBUF := HOLD
007576  016777  000020  171464      MOV     HOLD,@TBUF

                                                                        ;ALL DONE
007604                                                              IF R1 EQ NUMBER THEN
007604  020167  177750              CMP     R1,NUMBER
007610  001003                      BNE     $173

                                                                            ;STOP   INTERRUPT PROCESSING
007612                                                                      LET @TCSR := @TCSR CLR.BY #XMITIE
007612  042777  000100  171444      BIC     #XMITIE,@TCSR
007620                                                              ENDIF
007620                      $173:

007620  000401                      BR      ZZZ                     ; EXIT SRV

007622  000000                  HOLD: 0

007624                      ZZZ:                                ENDSRV
007624  000002                      RTI


                            ;;**********************************************************************
                                                ;RECEIVER INTERRUPT HANDLER
                                                                    BGNSRV  REC
007626                      REC:
                            ;;**********************************************************************

                                                                        ;COUNT THIS CHAR.
007626                                                              LET R4 := R4 + #1
007626  005204                      INC     R4
                                                                        ;GET CHAR IN + MASK IT
007630                                                              LET R2 := @RBUF CLR.BY R3
007630  017702  171426              MOV     @RBUF,R2
```

```
3195  007634  040302                      BIC     R3,R2
3196
3197  007636                                                  ;RHLD WILL CONTAIN EXPECTED INPUT
3198  007636  010467  000054              MOV     R4,RHLD   LET RHLD := R4 CLR.BY R3
3199  007642  040367  000050              BIC     R3,RHLD
3200
3201                                                          ;DO THEY COMPARE
3202  007646                                                IF R2 NE RHLD THEN
3203  007646  020267  000044              CMP     R2,RHLD
3204  007652  001412                      BEQ     $174
3205
3206  007654                                                  ;FIRST ERROR
3207  007654  005767  177676              TST     ERRCNT      IF ERRCNT EQ #0 THEN
3208  007660  001005                      BNE     $175
3209
3210  007662                                                  ;SAVE RECORD OF FIRST MISS
3211  007662  116767  000030  177672      MOVB    RHLD,SB         LET SB := B= RHLD
3212  007670
3213  007670  110267  177667              MOVB    R2,WAS          LET WAS := B= R2
3214  007674
3215  007674                      $175:                       ENDIF
3216
3217  007674                                                  ;COUNT IT.
3218  007674  005267  177656              INC     ERRCNT      LET ERRCNT := ERRCNT + #1
3219  007700                                                ENDIF
3220  007700                      $174:
3221
3222
3223  007700                                                  ;ALL DONE?
3224  007700  020467  177654              CMP     R4,NUMBER   IF R4 EQ NUMBER THEN
3225  007704  001003                      BNE     $176
3226
3227  007706                                                      ;STOP RECEIVER INTERRUPTS
3228  007706  042777  000100  171344      BIC     #RCVRIE,@RCSR   LET @RCSR := @RCSR CLR.BY #RCVRIE
3229
3230                                                                  ; INDICATE ALL DONE TO TIMER
3231                                                          ;MAIN REPEAT LOOP IS CHECKING
3232  007714                                                  ;FOR 'R4 = NUMBER' ALSO
3233  007714                      $176:                       ENDIF
3234
3235  007714  000401                      BR      ZZZZ            ;  EXIT SRV
3236
3237  007716  000000                                              RHLD: 0
3238  007720                      ZZZZ:                       ENDSRV
3239  007720
3240  007720  000002                      RTI
3241
3242  007722                                                ENDTST
3243
3244
3245
```

```
3246                                    ;;**********************************************************************
3247                                    ;;**********************************************************************
3248                                    ;*TEST 24        TEST BREAK GENERATION LOGIC
3249                                    ;*              TRANSMIT KNOWN CHAR WITH BREAK SET
3250                                    ;*              AND COMPARE RECEIVED WITH 0.
3251                                    ;*              FRAMING ERROR WILL ALSO BE CHECKED
3252                                    ;*              IF ERROR BITS ARE ENABLED.
3253                                    ;;**********************************************************************
3254  007722  000004                TST24:  SCOPE
3255  007724  012767  000010  171226        MOV     #10,$TIMES      ;;DO 10 ITERATIONS
3256  007732  012767  000024  171240        MOV     #24,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
3257  007740                                                                IF #MAINTJUMP NOTSETIN $USWR OR #BRK NOTSETIN $U
3258  007740  032767  040000  171252        BIT     #MAINTJUMP,$USWR
3259  007746  001404                        BEQ     $177
3260  007750  032767  010000  171242        BIT     #BRK,$USWR
3261  007756  001004                        BNE     $200
3262  007760                        $177:
3263  007760                                                                EXIT TEST
3264  007760  012767  000001  171172        MOV     #1,$TIMES
3265  007766  000500                        BR      TST25           ;;;EXIT THIS TEST
3266  007770                                                                ENDIF
3267  007770                        $200:
3268  007770                                                                IFB CONSOLE EQ #TRUE THEN
3269  007770  126727  001125  000001        CMPB    CONSOLE,#TRUE
3270  007776  001004                        BNE     $201
3271  010000                                                                EXIT TEST
3272  010000  012767  000001  171152        MOV     #1,$TIMES
3273  010006  000470                        BR      TST25           ;;;EXIT THIS TEST
3274  010010                                                                ENDIF
3275  010010                        $201:
3276
3277  010010                                                        LET ERRCHK := #0         ; CLEAR ERROR WORD
3278  010010  005067  000152                CLR     ERRCHK
3279                                                                        ;SET MAINTENANCE BIT
3280  010014                                                        LET @TCSR := @TCSR SET.BY #MAINT
3281  010014  052777  000004  171242        BIS     #MAINT,@TCSR
3282                                                                        ;SET BREAK BIT
3283  010022                                                        LET @TCSR := @TCSR SET.BY #BREAK
3284  010022  052777  000001  171234        BIS     #BREAK,@TCSR
3285                                                                        ;NON-ZERO CHAR.  '*'
3286  010030                                                        LET @TBUF := #252
3287  010030  012777  000252  171232        MOV     #252,@TBUF
3288                                                                        ;WAIT FOR DONE
3289  010036                                                        CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
3290  010036  010546                        MOV     R5,-(SP)
3291  010040  012745  177777                MOV     #SET,-(R5)
3292  010044  016745  171210                MOV     RCSR,-(R5)
3293  010050  012745  000200                MOV     #RCVRDONE,-(R5)
3294  010054  012745  000500                MOV     #500,-(R5)
3295  010060  004767  000230                JSR     PC,TIMER
3296  010064  012605                        MOV     (SP)+,R5
3297  010066                                                        IF.ERROR THEN
3298  010066  103001                        BCC     $202
3299                                                                    ; RECIEVER DONE DID NOT SET
3300  010070                                                            ERRHRD 115
3301  010070  104115                ERROR   115
```

```
3302  010072
3303  010072                          $202:
3304
3305  010072
3306  010072  105777  171164                TSTB    @RBUF
3307  010076  001404                        BEQ     $203
3308
3309  010100
3310  010100  052767  000001  000060        BIS     #B:TO,ERRCHK
3311  010106
3312  010106  000413                        BR      $204
3313  010110                          $203:
3314  010110
3315  010110  032767  100000  171102        BIT     #ERRBITS,$USWR
3316  010116  001407                        BEQ     $205
3317  010120
3318  010120  032777  020000  171134        BIT     #FRERR,@RBUF
3319  010126  001003                        BNE     $206
3320  010130
3321  010130  052767  000002  000030        BIS     #BIT1,ERRCHK
3322  010136
3323  010136                          $206:
3324  010136
3325  010136                          $205:
3326  010136
3327  010136                          $204:
3328
3329  010136
3330  010136  000005                        RESET
3331
3332  010140
3333  010140  032767  000001  000020        BIT     #BIT0,ERRCHK
3334  010146  001401                        BEQ     $207
3335  010150
3336  010150  104121                        ERROR   121
3337  010152
3338  010152                          $207:
3339  010152
3340  010152  032767  000002  000006        BIT     #BIT1,ERRCHK
3341  010160  001401                        BEQ     $210
3342  010162
3343  010162  104122                        ERROR   122
3344  010164
3345  010164                          $210:
3346  010164
3347  010164  000401                        BR      TST25
3348  010166  000000                ERRCHK: .WORD 0
3349  010170
3350
```

```
ENDIF

IFB @RBUF NE #0 THEN

        ; BREAK DID NOT EQUAL 0
    LET ERRCHK := ERRCHK SET.BY #BIT0

ELSE

IF #ERRBITS SETIN $USWR THEN

        IF #FRERR NOTSETIN @RBUF THEN

            LET ERRCHK := ERRCHK SET.BY #BIT1

        ENDIF

ENDIF

ENDIF

BRESET  ;CLEAN UP

        IF #BIT0 SETIN ERRCHK THEN

            ERRHRD 121  ;BREAK ERROR

        ENDIF

        IF #BIT1 SETIN ERRCHK THEN

            ERRHRD 122  ; FRAMING ERROR

        ENDIF

        EXIT
;;;EXIT THIS TEST

ENDTST
```

```
                                ;;**********************************************************************
                                ;*TEST 25        NOT A TEST - SEND BACK TO LOOP
                                ;;**********************************************************************
010170  000004                  TST25:  SCOPE
010172  012767  000001  170760          MOV     #1,$TIMES       ;;DO 1 ITERATION
010200  104401  010206                  TYPE    ,65$            ;;TYPE ASCIZ STRING
010204  000404                  ;;65$:  BR      64$             ;;GET OVER THE ASCIZ
                                ;;      .ASCIZ  <CRLF>*CSR: *
010216                          64$:
010216  016746  171032                  MOV     DLADD,-(SP)     ;;SAVE DLADD FOR TYPEOUT
010222  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
010224  104401  010232                  TYPE    ,67$            ;;TYPE ASCIZ STRING
010230  000405                  ;;67$:  BR      66$             ;;GET OVER THE ASCIZ
                                ;;      .ASCIZ  *,VECTOR: *
010244                          66$:
010244  016746  171006                  MOV     DLVEC,-(SP)     ;;SAVE DLVEC FOR TYPEOUT
010250  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
010252  104401  010260                  TYPE    ,69$            ;;TYPE ASCIZ STRING
010256  000405                  ;;69$:  BR      68$             ;;GET OVER THE ASCIZ
                                ;;      .ASCIZ  *,ERRORS: *
010272                          68$:
010272  016746  170614                  MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
010276  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
010300  005067  170606                  CLR     $ERTTL          ; RESET FOR NEXT DEVICE/PASS
010304  104401  001171                  TYPE    ,$CRLF
010310  000167  171622                  JMP     LOOP            ; BACK UP TO THE BEGINNING
```

```
                                ;;BGNMOD        SUBS
                               ;;*****************************************************************
                                  ROUTINE TIMER <HOWLONG,WHICHBIT,REG,SETCLR>
                               TIMER:
                               ;* 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
                               ;*
                               ;*
                               ;*             NOTE::  THE USE OF (R5) IS PART OF THE LINKAGE
                               ;*                     MECHANISM BETWEEN THE CALLER AND THE CALLED
                               ;;*****************************************************************

000001                                                  TRUE=   1
000000                                                  FALSE=  0

010314
010314  016567  000004  000136          MOV     REG(R5),REGSAV          LET     REGSAV := REG(R5) ; GET POINTER TO REGIST
010322
010322  016567  000000  000132          MOV     HOWLONG(R5),TIMSAV      LET     TIMSAV := HOWLONG(R5) ; SAVE HOWLONG FOR
010330
010330  112767  000000  000126          MOVB    #FALSE,FLAG             LET     FLAG :B= #FALSE ; INITIALIZE THE EXIT FLA


                                                                        ;       START OF AN INFINITE LOOP

010336                                                                  LOOP
010336                          $213:
                                                                            ; TEST TO SEE IF WHICHBIT IS SET
010336  036577  000002  000114          BIT     WHICHBIT(R5),@REGSAV        IF      WHICHBIT(R5)  NOTSETIN @REGSAV THEN
010344  001004                          BNE     $215
010346                                                                      LET     HOLDSC :B= #CLR
010346  112767  000000  000111          MOVB    #CLR,HOLDSC             ELSE
010354
010354  000403                          BR      $216
010356                          $215:                                       LET     HOLDSC :B= #SET ; REMEMBER THIS
010356                                                                  ENDIF
010356  112767  177777  000101          MOVB    #SET,HOLDSC
010364                                                                  ; NOW SEE IF THAT WAS WHAT WE WANTED
010364                          $216:                                   IFB     HOLDSC EQ SETCLR(R5) THEN


010364
```

```
3434  010364  126765  000075  000006          CMPB    HOLDSC,SETCLR(R5)
3435  010372  001003                          BNE     $217
3436                                                        ; JUST THE THING WE NEEDED
3437  010374                                                      LET     FLAG := B= #TRUE
3438  010374  112767  000001  000062          MOVB    #TRUE,FLAG
3439  010402                                                    ENDIF
3440  010402                          $217:
3441
3442  010402                                                  EXIFB   FLAG EQ #TRUE OR TIMSAV LE #0
3443  010402  126727  000056  000001          CMPB    FLAG,#TRUE
3444  010410  001414                          BEQ     $214
3445  010412  005767  000044                  TST     TIMSAV
3446  010416  003411                          BLE     $214
3447                                                        ; ONE WAY OR THE OTHER, WE ARE DONE
3448                                                    ; IF WE ARE STILL HERE THEN HANG AROUND A WHILE
3449
3450  010420                                                    WAITMS  1       ;WAIT FOR 1 MILLI-SECONDS
3451  010420  010546                          MOV     R5,-(SP)
3452  010422  012745  000001                  MOV     #1,-(R5)
3453  010426  004767  000140                  JSR     PC,WAIT
3454  010432  012605                          MOV     (SP)+,R5
3455  010434
3456  010434  005367  000022                  DEC     TIMSAV          ; COUNTING DOWN
3457  010440                                                  ENDLOOP                 ; CONTINUED AT THE TOP
3458  010440  000736                          BR      $213
3459  010442                          $214:
3460
3461                                          ; ONLY 2 WAYS TO GET HERE
3462                                          ;       1). WE RAN OUT OF TIME---ERROR ! !
3463                                          ;       2). THE BIT IS IN THE CORRECT CONDITION--GOOD ! !
3464
3465  010442                                                    IFB     FLAG EQ #TRUE THEN
3466  010442  126727  000016  000001          CMPB    FLAG,#TRUE
3467  010450  001001                          BNE     $220
3468  010452                                                        RETURN  NO.ERROR    ; GOOD
3469  010452  000405                          BR      $211
3470  010454                                                    ENDIF
3471  010454                          $220:
3472  010454                                                    RETURN  ERROR           ; BAD
3473  010454  000261                          SEC
3474  010456  000404                          BR      $212
3475
3476  010460  000000                                          REGSAV: .WORD 0
3477  010462  000000                                          TIMSAV: .WORD 0
3478  010464     000                                          FLAG:   .BYTE 0
3479  010465     000                                          HOLDSC: .BYTE 0
3480                                                  ; WE ARE DONE  GO BACK HOME
3481  010466                                                      ENDRTN
3482  010466                          $211:
3483  010466  000241                          CLC
3484  010470                          $212:
3485  010470  000207                          RTS     PC
```

```
                                ;;**********************************************************************
                                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
010472  005065  000000                  CLR     MASK(R5)
                                                                        LET NUMBR := $USWR AND #DATA
010476  016767  170516  000062          MOV     $USWR,NUMBR
010504  016746  000056                  MOV     NUMBR,-(SP)
010510  042716  000017                  BIC     #DATA,(SP)
010514  042667  000046                  BIC     (SP)+,NUMBR
                                                                        INCR I FROM #1 TO NUMBR BY #1
010520  012767  000001  170544          MOV     #1,I
010526  000402                  BR      $223
                        $224:
010530  005267  170536                  INC     I
                        $223:
010534  026767  170532  000024          CMP     I,NUMBR
010542  003006                  BGT     $225
                                                            LET MASK(R5) := MASK(R5) SHIFT 1
010544  006365  000000                  ASL     MASK(R5)
                                                            LET MASK(R5) := MASK(R5) SET.BY #1
010550  052765  000001  000000          BIS     #1,MASK(R5)
                                                        ENDINC
010556  000764                  BR      $224
                        $225:
                                                        LET MASK(R5) := COMP MASK(R5)
010560  005165  000000                  COM     MASK(R5)
                                                    RETURN
010564  000401                  BR      $221
010566  000000                  NUMBR: 0
                                                ENDRTN
                        $221:
                        $222:
010570  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 MILLI SEC.
                                ;;**********************************************************************
010572  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
010574  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
010576  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
010600                                  LET R1 := TIME(R5)
010600  016501  000000                  MOV     TIME(R5),R1
010604                                  INCRU R2 FROM #1 TO R1 BY #1
010604  012702  000001                  MOV     #1,R2
010610  000402                          BR      $230
010612                          $231:
010612  062702  000001                  ADD     #01,R2
010616                          $230:
010616  020201                          CMP     R2,R1
010620  101010                          BHI     $232
010622                                  INCR R3 FROM #0 TO #100 BY #1
010622  005003                          CLR     R3
010624  000401                          BR      $233
010626                          $234:
010626  005203                          INC     R3
010630                          $233:
010630  020327  000100                  CMP     R3,#100
010634  003001                          BGT     $235
010636                                  ENDINC
010636  000773                          BR      $234
010640                          $235:
010640                                  ENDINC
010640  000764                          BR      $231
010642                          $232:
010642  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
010644  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
010646  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
010650                          ENDRTN
010650                          $226:
010650                          $227:
010650  000207                          RTS     PC
```

```
                                .SBTTL  INTSRV  INTERRUPT SERVICE ROUTINE
                                ;;**********************************************************************
010652                          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
010652  005267  000002                INC     INTFLAG
010656                                ENDSRV                          ;THAT'S ALL
010656  000002                       RTI
010660  000000                INTFLAG:  0
```

```
3597  010662                          ROUTINE CYCLE
3598  010662                          CYCLE:
3599                                  ;;*****************************************************************
3600                                  ;* ROUTINE:     CYCLE
3601                                  ;*       THIS  ROUTINE  CAUSES  ADRS   TO POINT TO  THE
3602                                  ;*       ADDRESS  OF  DLV11-F  UNDER  TEST,  ADRS +2 TO
3603                                  ;*       POINT TO THE VECTOR OF THE DLV11-F UNDER TEST.
3604                                  ;*      IT  KEEPS  TRACK  OF THE CURRENT DEVICE AND BIT
3605                                  ;*      MASKS. THE CONSOLE IS TREATED SPECIAL BY THIS ROUTINE.
3606                                  ;*      IT IS ONLY TESTED ONCE IF UNDER APT.  IF NOT UNDER APT
3607                                  ;*      ALL TESTS THAT REQUIRE THE MAINT BIT ARE NOT RUN.
3608                                  ;;*****************************************************************
3609  010662                                                  LET APTCON :B= #FALSE   ; SET DEFAULT VALUE
3610  010662  112767  000000  000230         MOVB    #FALSE,APTCON
3611  010670                                                  LET CONSOLE :B= #FALSE
3612  010670  112767  000000  000223         MOVB    #FALSE,CONSOLE
3613  010676                                             REPEAT       ; UNTIL BITMASK SETIN $DEVM
3614  010676                          $240:
3615  010676                                              IF BITMASK EQ #0 THEN
3616  010676  005767  000200                 TST     BITMASK
3617  010702  001027                         BNE     $241
3618  010704                                                  IF INITFLAG EQ #1 THEN
3619  010704  026727  000174  000001         CMP     INITFLAG,#1
3620  010712  001003                         BNE     $242
3621  010714                                                      LET INITFLAG := #0
3622  010714  005067  000164                 CLR     INITFLAG
3623  010720                                                  ELSE
3624  010720  000403                         BR      $243
3625  010722                          $242:
3626  010722                                                      CALL $EOP   ; AS A SUBROUTINE
3627  010722  004767  000370                 JSR     PC,$EOP
3628
3629  010726                          SPECIALADDRESS:                 ; BECAUSE $EOP RETURNS AS A JUMP
3630  010726                                                          LET R0 := POP
3631  010726  012600                 MOV     (SP)+,R0
3632  010730                                                      ENDIF
3633  010730                          $243:
3634  010730                                                      LET BITMASK := #1
3635  010730  012767  000001  000144         MOV     #1,BITMASK
3636  010736                                                      LET $DEVCT := #1
3637  010736  012767  000001  170240         MOV     #1,$DEVCT
3638  010744                                                      LET ADDRESS := $BASE
3639  010744  016767  170300  000134         MOV     $BASE,ADDRESS
3640  010752                                                      LET VECTOR := $VECT1
3641  010752  016767  170266  000130         MOV     $VECT1,VECTOR
3642  010760                                                  ELSE
3643  010760  000410                         BR      $244
3644  010762                          $241:
3645  010762                                                      LET R4 := #10
3646  010762  012704  000010                 MOV     #10,R4
3647  010766                                                      LET BITMASK := BITMASK ROTATE 1
3648  010766  006167  000110                 ROL     BITMASK
3649  010772                                                      LET ADDRESS  := ADDRESS + R4
3650  010772  060467  000110                 ADD     R4,ADDRESS
3651  010776                                                      LET VECTOR := VECTOR + R4
3652  010776  060467  000106                 ADD     R4,VECTOR
```

```
3653  011002                                                          ENDIF
3654  011002                          $244:
3655  011002                                                      UNTIL   BITMASK SETIN $DEVM
3656  011002  036767  000074  170242          BIT     BITMASK,$DEVM
3657  011010  001732                          BEQ     $240
3658  011012                                                  IF BITMASK EQ #BIT15 THEN
3659  011012  026727  000064  100000          CMP     BITMASK,#BIT15
3660  011020  001023                          BNE     $245
3661  011022                                                      LET CONSOLE :B= #TRUE
3662  011022  112767  000001  000071          MOVB    #TRUE,CONSOLE
3663  011030                                                      LET ADDRESS := CONADR
3664  011030  016767  000060  000050          MOV     CONADR,ADDRESS
3665  011036                                                      LET VECTOR  := CONVECT
3666  011036  016767  000054  000044          MOV     CONVECT,VECTOR
3667                                  ;;;;;;                      IF #CONMAINT NOTSETIN $USWR THEN
3668                                  ;;;;;;                          LET NOCONMAINT :B= #TRUE
3669                                  ;;;;;;                      ENDIF
3670  011044                                                      IF #APTENV SETIN $ENV THEN ; APT MODE
3671  011044  032767  000001  170142          BIT     #APTENV,$ENV
3672  011052  001406                          BEQ     $246
3673  011054                                                          IF $PASS NE #0 THEN  ; NOT FIRST PASS
3674  011054  005767  170122                  TST     $PASS
3675  011060  001403                          BEQ     $247
3676                                                                          ; DEFINE DEVICE AS APT CONSOLE
3677  011062                                                              LET APTCON :B= #TRUE
3678  011062  112767  000001  000030          MOVB    #TRUE,APTCON
3679  011070                                                          ENDIF        ; FIRST PASS
3680  011070                          $247:
3681  011070                                                      ENDIF   ; APT
3682  011070                          $246:
3683  011070                                                  ENDIF                   ; BITMASK
3684  011070                          $245:
3685
3686  011070                                                      LET ADRS := #ADDRESS
3687  011070  012701  011106          MOV     #ADDRESS,ADRS
3688  011074                                                  LET $DEVCT := $DEVCT + #1
3689  011074  005267  170104          INC     $DEVCT
3690  011100                                                  RETURN
3691  011100  000411                  BR      $236
3692  011102  100000          BITMASK:        100000                  ; CONSOLE FIRST
3693  011104  000001          INITFLAG:       1
3694  011106  000000          ADDRESS:        0
3695  011110  000000          VECTOR:         0
3696  011112  000000          OK:             0
3697  011114  177560          CONADR:         177560                  ; CONSOLE ADDRESS
3698  011116  000060          CONVECT:            60                  ; CONSOLE VECTOR
3699  011120     000          APTCON:         .BYTE 0
3700  011121     000          CONSOLE:        .BYTE 0
3701  011122     000          NOCONMANT:      .BYTE 0
3702           011124                  .EVEN
3703
3704  011124                                                  ENDRTN
3705  011124                          $236:
3706  011124                          $237:
3707  011124  000207                  RTS     PC
3708
```

```
3709
```

```
011126                              ROUTINE MYTYPE
011126                              MYTYPE:
                                    ;;*******************************************************************
011126  104401  011134                      TYPE    ,65$            ;;TYPE ASCIZ STRING
011132  000405                              BR      64$             ;;GET OVER THE ASCIZ
                                    ;;65$:  .ASCIZ  <CRLF>*TEST # *
011146                              64$:
011146  016746  170026                      MOV     $TESTN,-(SP)    ;;SAVE $TESTN FOR TYPEOUT
011152  104402                              TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011154  104401  011162                      TYPE    ,67$            ;;TYPE ASCIZ STRING
011160  000405                              BR      66$             ;;GET OVER THE ASCIZ
                                    ;;67$:  .ASCIZ  *,ERROR # *
011174                              66$:
011174  116767  167714  167774              MOVB    $ITEMB,$FATAL   ; APT FATAL ERROR NUMBER
011202  016746  167770                      MOV     $FATAL,-(SP)    ;;SAVE $FATAL FOR TYPEOUT
011206  104403                              TYPOS                   ;;GO TYPE--OCTAL ASCII
011210     006                              .BYTE   6               ;;TYPE 6 DIGITS
011211     000                              .BYTE   0               ;;SUPPRESS LEADING ZEROS
011212  104401  011220                      TYPE    ,69$            ;;TYPE ASCIZ STRING
011216  000404                              BR      68$             ;;GET OVER THE ASCIZ
                                    ;;69$:  .ASCIZ  *,PC = *
011230                              68$:
011230  016746  167662                      MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
011234  104402                              TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011236  104401  011244                      TYPE    ,71$            ;;TYPE ASCIZ STRING
011242  000404                              BR      70$             ;;GET OVER THE ASCIZ
                                    ;;71$:  .ASCIZ  *,CSR: *
011254                              70$:
011254  016746  167774                      MOV     DLADD,-(SP)     ;;SAVE DLADD FOR TYPEOUT
011260  104402                              TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011262  104401  011270                      TYPE    ,73$            ;;TYPE ASCIZ STRING
011266  000405                              BR      72$             ;;GET OVER THE ASCIZ
                                    ;;73$:  .ASCIZ  *,VECTOR: *
011302                              72$:
011302  016746  167750                      MOV     DLVEC,-(SP)     ;;SAVE DLVEC FOR TYPEOUT
011306  104402                              TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
011310  104401  001171                      TYPE    ,$CRLF
011314                              ENDRTN
011314                              $250:
011314                              $251:
011314  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

011316                          $EOP:
011316  000004                          SCOPE
011320  005067  167556                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
011324  005067  167630                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
011330  005267  167646                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
011334  042767  100000  167640        BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
011342  005327                          DEC     (PC)+           ;;LOOP?
011344  000001                  $EOPCT: .WORD   1
011346  003022                          BGT     $DOAGN          ;;YES
011350  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
011352  000001                  $ENDCT: .WORD   1
011354  011344                          $EOPCT
011356  104401  011423                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
011362  016746  167614                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
011366  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
011370  104401  011420                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
011374  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
011400  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
011402  000005                          RESET                   ;;CLEAR THE WORLD
011404  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
011406  000240                          NOP                     ;;SAVE ROOM
011410  000240                          NOP                     ;;FOR
011412  000240                          NOP                     ;;ACT11
011414                          $DOAGN:
011414  000137                          JMP     @(PC)+          ;;RETURN
011416  010726                  $RTNAD: .WORD   SPECIALADDRESS
011420     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
011423     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
011430  050040  051501  020123
011436  000043
```

```
                                        .SBTTL  POWER DOWN AND UP ROUTINES

                                        ;;**********************************************************************
                                        ;POWER DOWN ROUTINE
011440  012737  011604  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
011446  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
011454  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011456  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
011460  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
011462  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
011464  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
011466  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
011470  017746  167444                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
011474  010667  000110                  MOV     SP,$SAVR6       ;;SAVE SP
011500  012737  011512  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
011506  000000                          HALT
011510  000776                          BR      .-2             ;;HANG UP

                                        ;;**********************************************************************
                                        ;POWER UP ROUTINE
011512  012737  011604  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
011520  016706  000064                  MOV     $SAVR6,SP       ;;GET SP
011524  005067  000060                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
011530  005267  000054          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
011534  001375                          BNE     1$              ;;OF  WORD
011536  012677  167376                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
011542  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
011544  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
011546  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
011550  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
011552  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
011554  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
011556  012737  011440  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
011564  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
011572  104401                          TYPE                    ;REPORT THE POWER FAILURE
011574  011612          $PWRMG: .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
011576  012716                  MOV     (PC)+,(SP)      ;;RESTART AT START
011600  001336          $PWRAD: .WORD   START           ;;RESTART ADDRESS
011602  000002                  RTI
011604  000000          $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
011606  000776                  BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
011610  000000          $SAVR6: 0                       ;;PUT THE SP HERE
011612  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
011620  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
                                ;*

011622  105767  167331          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
011626  100002                  1$:     BPL     1$              ;;BR IF YES
011630  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
011632  000430                          BR      3$              ;;LEAVE
011634  010046                          MOV     R0,-(SP)        ;;SAVE R0
011636  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
011642  122767  000001  167344          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
011650  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
011652  132767  000100  167335          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
011660  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
011662  010067  000004                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
011666  004767  000774                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
011672  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
011674  132767  000040  167313  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
011702  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
011704  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
011706  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
011710  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
011712  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
011714  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
011720  000002                          RTI                     ;;RETURN
011722  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
011726  001430                          BEQ     8$
011730  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
011734  001006                          BNE     5$
011736  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
011740  104401                          TYPE                    ;;TYPE A CR AND LF
011742  001171                          $CRLF
011744  105067  000130                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
011750  000755                          BR      2$              ;;GET NEXT CHARACTER
011752  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
011756  126726  167174          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
011762  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
011764  016746  167164                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
011770  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
011774  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
011776  004767  000032                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
012002  105367  000072                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
```

```
3892  012006  000770                        BR      7$              ;;LOOP
3893
3894                                  ;HORIZONTAL TAB PROCESSOR
3895
3896  012010  112716  000040          8$:   MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
3897  012014  004767  000014          9$:   JSR     PC,$TYPEC       ;;TYPE A SPACE
3898  012020  132767  000007  000052        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
3899  012026  001372                        BNE     9$              ;;TAB STOP
3900  012030  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
3901  012032  000724                        BR      2$              ;;GET NEXT CHARACTER
3902  012034  105777  167110          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
3903  012040  100375                        BPL     $TYPEC
3904  012042  116677  000002  167102        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
3905  012050  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
3906  012056  001003                        BNE     1$              ;;BRANCH IF NO
3907  012060  105067  000014                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
3908  012064  000406                        BR      $TYPEX          ;;EXIT
3909  012066  122766  000012  000002  1$:   CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
3910  012074  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
3911  012076  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
3912  012100  000000          $CHARCNT: .WORD 0               ;;CHARACTER COUNT STORAGE
3913  012102  000207          $TYPEX: RTS     PC
3914
```

```
                                        .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.
012104  022767  000176  167026  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
012112  001074                          BNE     15$             ;;BRANCH IF NO
012114  105777  167024                  TSTB    @$TKS           ;;CHAR THERE?
012120  100071                          BPL     15$             ;;IF NO, DON'T WAIT AROUND
012122  117746  167020                  MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
012126  042716  177600                  BIC     #C177,(SP)      ;;STRIP-OFF THE ASCII
012132  022726  000007                  CMP     #7,(SP)+        ;;IS IT A CONTROL G?
012136  001062                          BNE     15$             ;;NO, RETURN TO USER
012140  126727  166770  000001          CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
012146  001456                          BEQ     15$             ;;BRANCH IF YES

012150  104401  012631                  TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G ( G)
012154  104401  012636          $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
012160  016746  166012                  MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
012164  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
012166  104401  012647                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
012172  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
012174  005046                          CLR     -(SP)           ;;THE NEW SWR
012176  105777  166742          7$:     TSTB    @$TKS           ;;CHAR THERE?
012202  100375                          BPL     7$              ;;IF NOT TRY AGAIN

012204  117746  166736                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
012210  042716  177600                  BIC     #C177,(SP)      ;;MAKE IT 7-BIT ASCII


012214  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
012220  001005                          BNE     10$             ;;BRANCH IF NOT
012222  104401  012624                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U ( U)
012226  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
012232  000757                          BR      19$             ;;LET'S TRY IT AGAIN


012234  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
012240  001022                          BNE     16$             ;;BRANCH IF NO
012242  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
012246  001403                          BEQ     11$             ;;BRANCH IF YES
012250  016677  000002  166662          MOV     2(SP),@SWR      ;;SAVE NEW SWR
012256  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
012262  104401  001171          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
012266  126727  166643  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
012274  001003                          BNE     15$             ;;BRANCH IF NOT
012276  012777  000100  166640          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
012304  000002                  15$:    RTI                     ;;RETURN
012306  004767  177522          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
012312  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
```

```
3971  012316  002420                          BLT     18$             ;;BRANCH IF YES
3972  012320  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
3973  012324  003015                          BGT     18$             ;;BRANCH IF YES
3974  012326  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
3975  012332  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
3976  012336  001403                          BEQ     17$             ;;BRANCH IF YES
3977  012340  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
3978  012342  006316                          ASL     (SP)            ;;    CHAR OVER TO MAKE
3979  012344  006316                          ASL     (SP)            ;;    ROOM FOR NEW ONE.
3980  012346  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
3981  012352  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
3982  012356  000707                          BR      7$              ;;GET THE NEXT ONE
3983  012360  104401  001170          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
3984  012364  000720                          BR      20$             ;;SIMULATE CONTROL-U
3985                                  .DSABL  LSB
3986
3987
3988                                  ;;**********************************************************************
3989                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
3990                                  ;*CALL:
3991                                  ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
3992                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
3993                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
3994                                  ;
3995
3996  012366  011646                  $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
3997  012370  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
3998  012376  105777  166542          1$:     TSTB    @$TKS           ;;WAIT FOR
3999  012402  100375                          BPL     1$              ;;A CHARACTER
4000  012404  117766  166536  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
4001  012412  042766  177600  000004          BIC     # C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
4002  012420  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
4003  012426  001013                          BNE     3$              ;;BRANCH IF NO
4004  012430  105777  166510          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
4005  012434  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
4006  012436  117746  166504                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
4007  012442  042716  177600                  BIC     # C177,(SP)     ;;MAKE IT 7-BIT ASCII
4008  012446  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
4009  012452  001366                          BNE     2$              ;;IF NOT DISCARD IT
4010  012454  000750                          BR      1$              ;;YES, RESUME
4011  012456  026627  000004  000140  3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
4012  012464  002407                          BLT     4$              ;;BRANCH IF YES
4013  012466  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
4014  012474  003003                          BGT     4$              ;;BRANCH IF YES
4015  012476  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
4016  012504  000002                  4$:     RTI                     ;;GO BACK TO USER
4017                                  ;;**********************************************************************
4018                                  ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
4019                                  ;*CALL:
4020                                  ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
4021                                  ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
4022                                  ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
4023
4024  012506  010346                  $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
4025  012510  012703  012614          1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
4026  012514  022703  012624          2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
```

```
4027  012520  101405          BLOS    4$              ;;BR IF YES
4028  012522  104410          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
4029  012524  112613          MOVB    (SP)+,(R3)      ;;GET CHARACTER
4030  012526  122713  000177  10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
4031  012532  001003          BNE     3$              ;;SKIP IF NOT
4032  012534  104401  001170  4$:     TYPE    ,$QUES          ;;TYPE A '?'
4033  012540  000763          BR      1$              ;;CLEAR THE BUFFER AND LOOP
4034  012542  111367  000044  3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
4035  012546  104401  012612          TYPE    ,9$
4036  012552  122723  000015          CMPB    #15,(R3)+       ;;CHECK FOR RETURN
4037  012556  001356          BNE     2$              ;;LOOP IF NOT RETURN
4038  012560  105063  177777          CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
4039  012564  104401  001172          TYPE    ,$LF            ;;TYPE A LINE FEED
4040  012570  012603          MOV     (SP)+,R3        ;;RESTORE R3
4041  012572  011646          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
4042  012574  016666  000004  000002  MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
4043  012602  012766  012614  000004  MOV     #$TTYIN,4(SP)
4044  012610  000002          RTI                     ;;RETURN
4045  012612     000  9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR.  TO TYPE
4046  012613     000          .BYTE   0               ;;TERMINATOR
4047  012614  000010  $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
4048  012624  052536  005015     000  $CNTLU: .ASCIZ  / U/<15><12>    ;;CONTROL "U"
4049  012631     136  006507  000012  $CNTLG: .ASCIZ  / G/<15><12>    ;;CONTROL "G"
4050  012636  005015  053523  020122  $MSWR:  .ASCIZ  <15><12>/SWR = /
4051  012644  020075     000
4052  012647     040  047040  053505  $MNEW:  .ASCIZ  /  NEW = /
4053  012654  036440  000040
```

```
                                        .SBTTL  APT COMMUNICATIONS ROUTINE

                                        ;;**********************************************************************
012660  112767  000001  000236  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
012666  112767  000001  000226  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
012674  000403                  BR      $ATYC
012676  112767  000001  000220  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
012704                          $ATYC:
012704  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
012706  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
012710  105767  000206          TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
012714  001450                  BEQ     5$              ;;IF NOT:  BR
012716  122767  000001  166270  CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
012724  001031                  BNE     3$              ;;IF NOT:  BR
012726  132767  000100  166261  BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
012734  001425                  BEQ     3$              ;;IF NOT:  BR
012736  017600  000004          MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
012742  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
012750  005767  166220          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
012754  001375                  BNE     1$              ;;IF NOT:  WAIT
012756  010067  166226          MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
012762  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
012764  001376                  BNE     2$
012766  166700  166216          SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
012772  006200                  ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
012774  010067  166212          MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
013000  012767  000004  166166  MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
013006  000413                  BR      5$
013010  017667  000004  000016  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
013016  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
013024  016746  164746          MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
013030  004767  176566          JSR     PC,$TYPE        ;;CALL TYPE MACRO
013034  000000                  4$:     .WORD   0
013036                          5$:
013036  105767  000062          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
013042  001416                  BEQ     12$             ;;IF NOT:  BR
013044  005767  166144          TST     $ENV            ;;RUNNING UNDER APT?
013050  001413                  BEQ     12$             ;;IF NOT:  BR
013052  005767  166116          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
013056  001375                  BNE     11$             ;;IF NOT:  WAIT
013060  017667  000004  166110  MOV     @4(SP),$FATAL   ;;GET ERROR #
013066  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
013074  005267  166074          INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
013100  105067  000020          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
013104  105067  000013          CLRB    $LFLG           ;;CLEAR LOG FLAG
013110  105067  000006          CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
013114  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
013116  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
013120  000207                  RTS     PC              ;;RETURN
013122     000                  $MFLG:  .BYTE   0       ;;MESSG. FLAG
013123     000                  $LFLG:  .BYTE   0       ;;LOG FLAG
013124     000                  $FFLG:  .BYTE   0       ;;FATAL FLAG
013126                                  .EVEN
000200                  APTSIZE=200
000001                  APTENV=001
000100                  APTSPOOL=100
```

```
 4110          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

013126                          $ERROR:
013126  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
013130  105267  165747          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
013134  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
013136  016777  165740  165776          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
013144  032777  002000  165766          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
013152  001402                          BEQ     1$              ;;NO - SKIP
013154  104401  001164                  TYPE    ,$BELL          ;;RING BELL
013160  005267  165726          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
013164  011667  165726                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
013170  162767  000002  165720          SUB     #2,$ERRPC
013176  117767  165714  165710          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
013204  032777  020000  165726          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
013212  001004                          BNE     20$             ;;SKIP TYPEOUTS
013214  004767  175706                  JSR     PC,MYTYPE       ;;GO TO USER ERROR ROUTINE
013220  104401  001171                  TYPE    ,$CRLF
013224                          20$:
013224  122767  000001  165762          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
013232  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
013234  116767  165654  000004          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
013242  004767  177430                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
013246     000          21$:    .BYTE   0
013247     000                  .BYTE   0
013250  000777          22$:    BR      22$             ;;APT ERROR LOOP
013252  005777  165662          2$:     TST     @SWR            ;;HALT ON ERROR
013256  100002                          BPL     3$              ;;SKIP IF CONTINUE
013260  000000                          HALT                    ;;HALT ON ERROR!
013262  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
013264  032777  001000  165646  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
013272  001402                          BEQ     4$              ;;BR IF NO
013274  016716  165610                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
013300  005767  165656          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
013304  001402                          BEQ     5$              ;;BR IF NONE
013306  016716  165650                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
013312                          5$:
013312  022737  011404  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
013320  001001                          BNE     6$              ;;BRANCH IF NO
013322  000000                          HALT                    ;;YES
013324                          6$:
013324  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

013326                          $SCOPE:
013326  104407                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
013330  032777  040000  165602  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
013336  001114                          BNE     $OVER           ;;YES IF SW14=1
                                ;#####START OF CODE FOR THE XOR TESTER#####
013340  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
013342  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
013346  012737  013366  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
013354  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
013360  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
013364  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
013366  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
013370  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
013374  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
013376                          6$: ;#####END OF CODE FOR THE XOR TESTER#####
013376  032777  000400  165534          BIT     #BIT08,@SWR     ;;LOOP ON SPEC.  TEST?
013404  001404                          BEQ     2$              ;;BR IF NO
013406  127767  165526  165466          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
013414  001465                          BEQ     $OVER           ;;BR IF YES
013416  105767  165461          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
013422  001421                          BEQ     3$              ;;BR IF NO
013424  126767  165465  165451          CMPB    $ERMAX,$ERFLG   ;;MAX.  ERRORS FOR THIS TEST OCCURRED?
013432  101015                          BHI     3$              ;;BR IF NO
013434  032777  001000  165476          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
013442  001404                          BEQ     4$              ;;BR IF NO
013444  016767  165440  165434  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
013452  000446                          BR      $OVER
013454  105067  165423          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
013460  005067  165474                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
013464  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
013466  032777  004000  165444  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
013474  001011                          BNE     1$              ;;BR IF YES
013476  005767  165500                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
013502  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
013504  005267  165374                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
013510  026767  165444  165366          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
013516  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
013520  012767  000001  165356  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
013526  016767  000052  165424          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
013534  105267  165342          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
013540  116767  165336  165432          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
```

```
4221  013546  011667  165334                 MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
4222  013552  011667  165332                 MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
4223  013556  005067  165400                 CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
4224  013562  112767  000001  165325         MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
4225  013570  016777  165306  165344 $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
4226  013576  016716  165304                 MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
4227  013602  000002                         RTI                     ;;FIXES PS
4228  013604  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

013606                          $TYPDS:
013606  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
013610  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
013612  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
013614  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
013616  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
013620  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
013624  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
013630  100004                          BPL     1$              ;;BR IF INPUT IS POS.
013632  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
013634  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
013642  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
013644  012703  014022                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
013650  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
013654  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
013656  016001  014012                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
013662  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
013664  002402                          BLT     4$              ;;BR IF DONE
013666  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
013670  000774                          BR      3$
013672  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
013674  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
013676  001002                          BNE     5$              ;;FALL THROUGH IF 0
013700  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
013702  100407                          BMI     7$              ;;BR IF YES
013704  106316                  5$:     ASLB    (SP)            ;;MSD?
013706  103003                          BCC     6$              ;;BR IF NO
013710  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
013716  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
013722  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
013726  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
013730  005720                          TST     (R0)+           ;;JUST INCREMENTING
013732  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
013736  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
013740  003002                          BGT     8$              ;;GO TO EXIT
013742  010502                          MOV     R5,R2           ;;GET THE LSD
013744  000764                          BR      6$              ;;GO CHANGE TO ASCII
013746  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
013750  100003                          BPL     9$              ;;BR IF NO
013752  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
013760  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
013762  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
013764  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
013766  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
 4285  013770  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 4286  013772  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 4287  013774  104401  014022                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
 4288  014000  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 4289  014006  012616                        MOV     (SP)+,(SP)
 4290  014010  000002                        RTI                     ;;RETURN TO USER
 4291  014012  023420                $DTBL:  10000.
 4292  014014  001750                        1000.
 4293  014016  000144                        100.
 4294  014020  000012                        10.
 4295  014022  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

 014032  017646  000000        $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
 014036  116667  000001 000211          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
 014044  112667  000207                 MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
 014050  062716  000002                 ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
 014054  000406                         BR      $TYPON
 014056  112767  000001 000171 $TYPOC:  MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
 014064  112767  000006 000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
 014072  112767  000005 000154 $TYPON:  MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
 014100  010346                         MOV     R3,-(SP)        ;;SAVE R3
 014102  010446                         MOV     R4,-(SP)        ;;SAVE R4
 014104  010546                         MOV     R5,-(SP)        ;;SAVE R5
 014106  116704  000145                 MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
 014112  005404                         NEG     R4
 014114  062704  000006                 ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
 014120  110467  000132                 MOVB    R4,$OMODE       ;;SAVE IT FOR USE
 014124  116704  000125                 MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
 014130  016605  000012                 MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
 014134  005003                         CLR     R3              ;;CLEAR THE OUTPUT WORD
 014136  006105                 1$:     ROL     R5              ;;ROTATE MSB INTO "C"
 014140  000404                         BR      3$              ;;GO DO MSB
 014142  006105                 2$:     ROL     R5              ;;FORM THIS DIGIT
 014144  006105                         ROL     R5
 014146  006105                         ROL     R5
 014150  010503                         MOV     R5,R3
 014152  006103                 3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
 014154  105367  000076                 DECB    $OMODE          ;;TYPE THIS DIGIT?
 014160  100016                         BPL     7$              ;;BR IF NO
 014162  042703  177770                 BIC     #177770,R3      ;;GET RID OF JUNK
 014166  001002                         BNE     4$              ;;TEST FOR 0
 014170  005704                         TST     R4              ;;SUPPRESS THIS 0?
 014172  001403                         BEQ     5$              ;;BR IF YES
```

```
 4352  014174  005204                    4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 4353  014176  052703  000060                    BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 4354  014202  052703  000040            5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 4355  014206  110367  000040                    MOVB    R3,8$           ;;SAVE FOR TYPING
 4356  014212  104401  014252                    TYPE    ,8$             ;;GO TYPE THIS DIGIT
 4357  014216  105367  000032            7$:     DECB    $OCNT           ;;COUNT BY 1
 4358  014222  003347                            BGT     2$              ;;BR IF MORE TO DO
 4359  014224  002402                            BLT     6$              ;;BR IF DONE
 4360  014226  005204                            INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
 4361  014230  000744                            BR      2$              ;;GO DO THE LAST DIGIT
 4362  014232  012605                    6$:     MOV     (SP)+,R5        ;;RESTORE R5
 4363  014234  012604                            MOV     (SP)+,R4        ;;RESTORE R4
 4364  014236  012603                            MOV     (SP)+,R3        ;;RESTORE R3
 4365  014240  016666  000002  000004            MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
 4366  014246  012616                            MOV     (SP)+,(SP)
 4367  014250  000002                            RTI                     ;;RETURN
 4368  014252     000                    8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
 4369  014253     000                            .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
 4370  014254     000                $OCNT:      .BYTE   0               ;;OCTAL DIGIT COUNTER
 4371  014255     000                $OFILL:     .BYTE   0               ;;ZERO FILL SWITCH
 4372  014256  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.

014260  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
014262  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
014266  005740                          TST     -(R0)           ;;BACKUP BY 2
014270  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
014272  006300                          ASL     R0              ;;POSITION FOR INDEXING
014274  016000  014314                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
014300  000200                          RTS     R0              ;;GO TO ROUTINE


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

014302  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
014304  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
014312  000002                          RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

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

                                ;       ROUTINE
                                ;       -------
014314  014302                  $TRPAD: .WORD   $TRAP2
014316  011622                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
014320  014056                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
014322  014032                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
014324  014072                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
014326  013606                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

014330  012154                          $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING

014332  012104                          $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
014334  012366                          $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
014336  012506                          $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
        000001                  .END
```

```
ABASE = 175610              1#    956     997
ACDW1 = 000000             956
ACDW2 = 000000             956
ACPUOP= 000000             956     971
ADDRES  011106            3639*  3650*  3664*  3687   3694#
ADDW0 = 000000             956
ADDW1 = 000000             956
ADDW10= 000000             956
ADDW11= 000000             956
ADDW12= 000000             956
ADDW13= 000000             956
ADDW14= 000000             956
ADDW15= 000000             956
ADDW2 = 000000             956
ADDW3 = 000000             956
ADDW4 = 000000             956
ADDW5 = 000000             956
ADDW6 = 000000             956
ADDW7 = 000000             956
ADDW8 = 000000             956
ADDW9 = 000000             956
ADEVCT= 000000             956     962
ADEVM = 100000              1#     956     998
AENV  = 000000             956     967
AENVM = 000000             956     968
AFATAL= 000000             956     959
AMADR1= 000000             956     984
AMADR2= 000000             956     988
AMADR3= 000000             956     991
AMADR4= 000000             956     994
AMAMS1= 000000             956     978
AMAMS2= 000000             956     986
AMAMS3= 000000             956     989
AMAMS4= 000000             956     992
AMSGAD= 000000             956     964
AMSGLG= 000000             956     965
AMSGTY= 000000             956     958
AMTYP1= 000000             956     979
AMTYP2= 000000             956     987
AMTYP3= 000000             956     990
AMTYP4= 000000             956     993
APASS = 000000             956     961
APRIOR= 000000             956
APTCON  011120            3610*  3678*  3699#
APTCSU= 000040            3866    4110#
APTENV= 000001            1217    1695   1982   2318   2492   3671   3859   4066   4108#  4142
APTSIZ= 000200            1067    4107#
APTSPO= 000100            3861    4068   4109#
ASWREG= 000000             956     969
ATESTN= 000000             956     960
AUNIT = 000000             956     963
AUSWR = 011110              1#     956     970
AVECT1= 000300              1#     956     995
AVECT2= 000000             956     996
BAUD  = 007400             859#
BITMAS  011102            1106*  3616   3635*  3648*  3656   3659   3692#
```

```
BIT0   = 000001   734#  3310  3333
BIT00  = 000001   724#   734   783   803   824   845
BIT01  = 000002   723#   733   802   844
BIT02  = 000004   722#   732   801   822   843
BIT03  = 000010   721#   731   800   842
BIT04  = 000020   720#   730   799   841
BIT05  = 000040   719#   729   798   840
BIT06  = 000100   718#   728   777   797   818   839
BIT07  = 000200   717#   727   776   796   817   838
BIT08  = 000400   716#   726  4195
BIT09  = 001000   715#   725  4153  4203
BIT1   = 000002   733#  3321  3340
BIT10  = 002000   714#  4130
BIT11  = 004000   713#   772   812  4210
BIT12  = 010000   712#   791   811
BIT13  = 020000   711#   790   810  4137
BIT14  = 040000   710#   789   809  4181
BIT15  = 100000   709#   788   808  1106  3659
BIT2   = 000004   732#  2406  2434
BIT3   = 000010   731#  2810  2870
BIT4   = 000020   730#  2829  2877
BIT5   = 000040   729#
BIT6   = 000100   728#
BIT7   = 000200   727#
BIT8   = 000400   726#
BIT9   = 001000   725#
BPTVEC= 000014   741#
BREAK  = 000001   824#  1231  1244  1247  1261  1264  1278  1283  3284
BRK    = 010000   860#  1215  3260
CKSWR  = 104407  4126  4152  4180  4412#
CLR    = 000000   762#  1710  1712  1995  3423
COMSPD= 000100   854#  2897
CONADR  011114  3664  3697#
CONSOL  011121  1305  1591  1693  1828  1902  1971  2128  2637  2757  3039  3269  3612*  3662*
                3700#
CONVEC  011116  3666  3698#
CR     = 000015   649#  3905  3915
CRLF   = 000200   650#  1091  1097  1098  1099  3360  3717  3876  3915
CYCLE   010662  1109  3598#
DATA   = 000017   851#  3507  3508
DATLNG  010472  2781  2929  3051  3489#
DDISP  = 177570   656#   937  1055
DISPLA  001142   937#  1055*  1063*  4129*  4225*
DISPRE  000174   872#  1063
DLADD   001254  1017#  1113*  1118  1121  1123  1126  1129  1132  1148  1180  3361  3739
DLADDR= 175610   758#  1017  1019  1020  1021  1022  1023
DLVEC   001256  1018#  1116*  2507  2648  2734  3073  3367  3745
DSWR   = 177570   655#   936  1054
EMTVEC= 000030   744#  1038*  1039*
ERRBIT= 100000   863#  2126  3315
ERRCHK  010166  2327*  2406*  2434  2767*  2810*  2829*  2870  2877  3278*  3310*  3321*  3333  3340
                3348#
ERRCNT  007556  3088*  3119  3127  3142#  3207  3218*
ERROR  = 100000   788#  2203  2277
ERRORF  004026  1710*  1757*  1784  1812#
ERRVEC= 000004   737#  1052  1053*  1064*  4186  4187*  4189*  4192*
```

```
EVENOD= 000040          853#
EXITFL  004030         1712*  1793*  1800*  1804   1813#
FALSE = 000000         3404#  3411   3610   3612
FLAG    010464         3411*  3438*  3443   3466   3478#
FRERR = 020000          790#  3318
GNS   = ****** U        871   1090   1097   1098   1099   3359   3365   3371   3716   3722   3731   3737   3743
                       4404   4405   4406   4407   4408   4410   4412   4413   4414
GTSWR = 104406         1085   4410#
HOLD    007622         3159*  3160*  3163   3176#
HOLDSC  010465         3423*  3428*  3434   3479#
HOWLON= 000000         3383#  3409
HT    = 000011          647#  3874   3915
I       001272         1024#  1157*  1178*  1181   1183   3512*  3515*  3517
ILLMEM= 000004          749#  1152   1188
INITFL  011104         1104*  3619   3622*  3693#
INTFLA  010660         1164*  1169   2503*  2553   2557   2579*  2595   2656*  2698   2705   3593*  3596#
INTSRV  010652         1153   2515   2649   3583#
IOTVEC= 000020          742#  1036*  1037*
LF    = 000012          648#  3909   3915
LOOP    002136         1107#  3377
MAINT = 000004          822#  1319   1332   1335   1349   1352   1366   1371   1605   1630   1839   1866   1913
                       1934   1993   2031   2060   2082   2104   2146   2187   2209   2233   2264   2282   2333
                       2432   2659   2703   2731   2770   2854   2868   2908   3103   3124   3281
MAINTJ= 040000          862#  1303   1826   1900   1973   2137   2308   2635   2755   3037   3258
MASK  = 000000         3490#  3504*  3520*  3522*  3527*
MAX     004672         2021   2025   2112#
MYTYPE  011126         3712#  4139
NEW     005644         2356*  2358*  2374*  2376*  2385   2393   2395   2413   2415   2470#
NOCONM  011122         3701#
NUMBER  007560         3117   3143#  3166   3224
NUMBR   010566         3506*  3507   3509*  3517   3530#
OK      011112         3696#
OLD     005650         2329*  2331*  2385   2393   2395   2413*  2415*  2471#
ORERR = 040000          789#  2182   2227   2259
PARITY= 000020          852#
PASS    004024         1705*  1787   1811#
PBAUDS= 004000          812#
PBAUD0= 010000          811#
PBAUD1= 020000          810#
PBAUD2= 040000          809#
PBAUD3= 100000          808#
PBR   = 000200          855#  2306
PERR  = 010000          791#
PIRQ  = 177772          654#
PIRQVE= 000240          748#
PR0   = 000000          671#  2535   2584   2665   2774   2922   3067
PR1   = 000040          672#
PR2   = 000100          673#
PR3   = 000140          674#
PR4   = 000200          675#
PR5   = 000240          676#
PR6   = 000300          677#
PR7   = 000340          678#  1154   1391   2516   2650   3078   3084
PS    = 177776          651#   652
PSW   = 177776          652#
PWRVEC= 000024          743#  1042*  1043*  3795*  3796*  3805*  3811*  3823*  3824*
```

```
RATES   005624          2347   2428   2444#
RBUF    001262          1020#  1123*  1124*  1950   2096   2178   2227   2259   2277   2344   2695   2784   2834
                        2932   2989   3194   3306   3318
RCSR    001260          1019#  1121*  1477   1490*  1493   1507*  1510   1524*  1529   1560   1625   1854   1882
                        1928   1953   2007   2047   2051   2054   2077   2099   2364   2662*  2679   2686*  2726*
                        2821   2919*  2971   3018*  3110*  3138*  3228*  3292
RCVRAC= 004000           772#  1625   2007   2047   2054
RCVRDO= 000200           776#  1560   1855   1882   1929   1953   2051   2077   2099   2364   2680   2822   2972
                        3293
RCVRIE= 000100           777#  1477   1490   1493   1507   1510   1524   1529   2662   2686   2726   3110   3138
                        3228
RDATA0= 000001           803#
RDATA1= 000002           802#
RDATA2= 000004           801#
RDATA3= 000010           800#
RDATA4= 000020           799#
RDATA5= 000040           798#
RDATA6= 000100           797#
RDATA7= 000200           796#
RDCHR = 104410          4028   4413#
RDLIN = 104411          4414#
RDRRUN= 000001           783#
REC     007626          3076   3186#
REG   = 000004          3383#  3407
REGSAV  010460          3407*  3420   3476#
RESVEC= 000010           738#
RHLD    007716          3198*  3199*  3203   3211   3237#
R0050   005624          2453#
R0070   005625          2454#
R0110   005626          2455#
R0135   005627          2456#
R0150   005630          2457#
R0200   005633          2460#
R0300   005631          2458#
R0600   005632          2459#
R10000  005643          2468#
R1800   005634          2461#
R2000   005635          2462#
R2400   005636          2463#
R3600   005637          2464#
R4800   005640          2465#
R5STAC  001334          1026#  1135
R7200   005641          2466#
R9600   005642          2467#
SB      007562          3144#  3211*
SET   = 177777           761#  1726   1757   1768   1784   1793   1800   1804   1853   1927   2010   2019   2523
                        2678   2801   2820   2949   2970   3291   3428
SETCLR= 000006          3383#  3434
SPECIA  010726          3629#  3786
STACK = 001100           642#  1034
START   001336           875   1027#  3828
STKLMT= 177774           653#
SWR     001140           936#  1032   1054*  1056   1062*  1069*  1083   3803   3816*  3925   3962*  4130   4137
                        4149   4153   4181   4195   4197   4203   4210
SWREG   000176           873#  1062   1083   3925   3938
SWO   = 000001           706#
```

```
SW00  = 000001          696#    706
SW01  = 000002          695#    705
SW02  = 000004          694#    704
SW03  = 000010          693#    703
SW04  = 000020          692#    702
SW05  = 000040          691#    701
SW06  = 000100          690#    700
SW07  = 000200          689#    699
SW08  = 000400          688#    698
SW09  = 001000          687#    697
SW1   = 000002          705#
SW10  = 002000          686#
SW11  = 004000          685#
SW12  = 010000          684#
SW13  = 020000          683#
SW14  = 040000          682#
SW15  = 100000          681#
SW2   = 000004          704#
SW3   = 000010          703#
SW4   = 000020          702#
SW5   = 000040          701#
SW6   = 000100          700#
SW7   = 000200          699#
SW8   = 000400          698#
SW9   = 001000          697#
TBITVE= 000014          739#
TBUF    001270         1023#   1132*   1133*   1720*   1748*   1846*   1921*   2003*   2158*   2168*   2250*   2353*   2672*
                       2816*   2966*   3163*   3287*
TCSR    001264         1021#   1126*   1127*   1231    1244*   1247    1261*   1264    1278*   1283    1319    1332*   1335
                       1349*   1352    1366*   1371    1401    1414*   1417    1431*   1434    1448*   1453    1630*   1663
                       1727    1753    1769    1839*   1866*   1913*   1934*   1993*   2031*   2060*   2082*   2104*   2146*
                       2187*   2209*   2233*   2264*   2282*   2333*   2432*   2524    2532*   2542*   2582*   2659*   2703*
                       2731*   2770*   2802    2854*   2868*   2908*   2950    3103*   3107*   3124*   3136*   3170*   3281*
                       3284*
TCSRHI  001266         1022#   1129*   1130*   2347*   2428*
TDATA0= 000001          845#
TDATA1= 000002          844#
TDATA2= 000004          843#
TDATA3= 000010          842#
TDATA4= 000020          841#
TDATA5= 000040          840#
TDATA6= 000100          839#
TDATA7= 000200          838#
TIME  = 000000         3539#   3550
TIMER   010314         1730    1772    1857    1931    2527    2682    2805    2824    2953    2974    3295    3382#
TIMSAV  010462         3409*   3445    3456*   3477#
TKVEC = 000060          746#
TPVEC = 000064          747#
TRAN    007564         3082    3151#
TRAPVE= 000034          745#   1040*   1041*
TRTVEC= 000014          740#
TRUE  = 000001         1305    1591    1693    1828    1902    1971    2128    2637    2757    3039    3269    3403#   3438
                       3443    3466    3662    3678
TST1    002252         1144#
TST10   003476         1613    1652#
TST11   003536         1688#
```

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TST12   004032          1700    1810    1821#
TST13   004204          1833    1895#
TST14   004352          1907    1967#
TST15   004674          1978    1986    2036    2066    2087    2111    2121#
TST16   005260          2133    2141    2194    2217    2239    2272    2299#
TST17   005654          2313    2322    2442    2485#
TST2    002420          1210#
TST20   006176          2496    2631#
TST21   006502          2640    2751#
TST22   007024          2762    2859    2891#
TST23   007326          2903    2960    2983    3007    3032#
TST24   007722          3044    3140    3254#
TST25   010170          3265    3273    3347    3355#
TST3    002612          1222    1298#
TST4    003004          1310    1387#
TST5    003160          1469#
TST6    003322          1550#
TST7    003362          1583#
TYPDS = 104405          3374    3775    4408#
TYPE  = 104401          1077    1097    1098    1099    3357    3363    3369    3376    3714    3720    3729    3735    3741
                        3747    3773    3776    3825    3879    3936    3937    3940    3953    3964    3983    4032    4035
                        4039    4132    4140    4287    4356    4404#
TYPOC = 104402          3362    3368    3719    3734    3740    3746    3939    4405#
TYPON = 104404          4407#
TYPOS = 104403          3726    4406#
VECTOR  011110          3641*   3652*   3666*   3695#
WAIT    010572          2163    2173    2255    2548    2592    2691    3453    3538#
WAS     007563          3145#   3213*
WHICHB= 000002          3383#   3420
WRAP  = 020000           861#   1598    2895
XMITIE= 000100           818#   1401    1414    1417    1431    1434    1448    1453    2532    2542    2582    3107    3136
                        3170
XMITRD= 000200           817#   1663    1728    1753    1770    2525    2803    2951
ZZZ     007624          3174    3178#
ZZZZ    007720          3235    3238#
$APTHD  001000           896     902#
$ASTAT= ****** U        4088    4103
$ATYC   012704          4059    4061#
$ATY1   012660          4057#
$ATY3   012666          3864    4058#
$ATY4   012676          4060#   4145
$AUTOB  001134           933#   1087*   3933    4054
$BASE   001250           997#   3639
$BDADR  001122           928#
$BDDAT  001126           930#
$BELL   001164           948#   4132    4165
$BGNLE= 177777             1#
$CHARC  012100          3881*   3891*   3898    3907*   3912#
$CKSWR  012104          3925#   4412
$CMTAG  001100           916#   1029    1030    1038    1044    1045    1046
$CM3  = 000000           946#
$CNTLG  012631          3936    4049#
$CNTLU  012624          3953    4048#
$CPUOP  001222           971#
$CRLF   001171           950#   3376    3747    3880    3915    3964    4048    4140    4165
$DBLK   014022          4253    4287    4295#
```

```
$DEVCT  001204            962#   3637*  3689*
$DEVM   001252            998#   1094   3656
$DOAGN  011414           3769    3778   3784#
$DTBL   014012           4256    4291#
$ENDAD  011404            882    1075   3780#  4160
$ENDCT  011352           1044    3771#
$ENDMG  011423           3773    3788#
$ENULL  011420           3776    3787#
$ENV    001214            967#   1081   1217   1695   1982   2318   2492   3671   3859   4066   4090   4142
$ENVM   001215            968#   1067   3861   3866   4068
$EOP    011316           3627    3761#
$EOPCT  011344           1044*   3768#  3772
$ERFLG  001103            919#   4127*  4165   4170   4199   4201   4207*  4229
$ERMAX  001115            925#   1047*  4201   4224*  4229
$ERRFL= 000000           1104#   1105   1106#  1107   1109#  1113#  1114   1116#  1117   1118#  1119   1121#  1122
                         1123#   1125   1126#  1128   1129#  1131   1132#  1134   1135#  1136   1148#  1149   1151#
                         1152#   1153#  1154#  1155#  1156   1157#  1158   1161#  1162   1164#  1165   1178#  1179
                         1180#   1182   1188#  1189#  1191#  1192#  1193   1221#  1222   1228#  1229   1242#  1243
                         1244#   1245   1258#  1259   1261#  1262   1275#  1276   1278#  1279   1309#  1310   1316#
                         1317    1330#  1331   1332#  1333   1346#  1347   1349#  1350   1363#  1364   1366#  1367
                         1398#   1399   1412#  1413   1414#  1415   1428#  1429   1431#  1432   1445#  1446   1448#
                         1449    1474#  1475   1488#  1489   1490#  1491   1504#  1505   1507#  1508   1521#  1522
                         1524#   1525   1558#  1559   1612#  1613   1622#  1623   1630#  1631   1660#  1661   1699#
                         1700    1705#  1706   1710#  1711   1712#  1713   1720#  1721   1725#  1748#  1749   1757#
                         1758    1767#  1793#  1794   1800#  1801   1832#  1833   1839#  1840   1842#  1843   1846#
                         1847    1852#  1866#  1867   1875#  1876   1906#  1907   1913#  1914   1915#  1916   1921#
                         1922    1926#  1934#  1935   1950#  1951   1977#  1978   1985#  1986   1993#  1994   1995#
                         1996    1997#  1998   2003#  2004   2010#  2011   2015#  2016   2031#  2032   2035#  2036
                         2060#   2061   2065#  2066   2082#  2083   2086#  2087   2096#  2097   2104#  2105   2132#
                         2133    2140#  2141   2146#  2147   2151#  2152   2158#  2159   2161#  2168#  2169   2171#
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D 10

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POINTE            1#
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REPEAT            1#    1158    2004    3114    3613
REPORT            1#     749#
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ROUTIN            1#    3381    3488    3537    3597    3711
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SPACE           749#
STARS           749#     765     767     785     787     805     807     827     829     848     864     878     889     891     898
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UNTILB            1#
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 RUN-TIME RATIO: 1737/207=8.3
 CORE USED: 34K (67 PAGES)