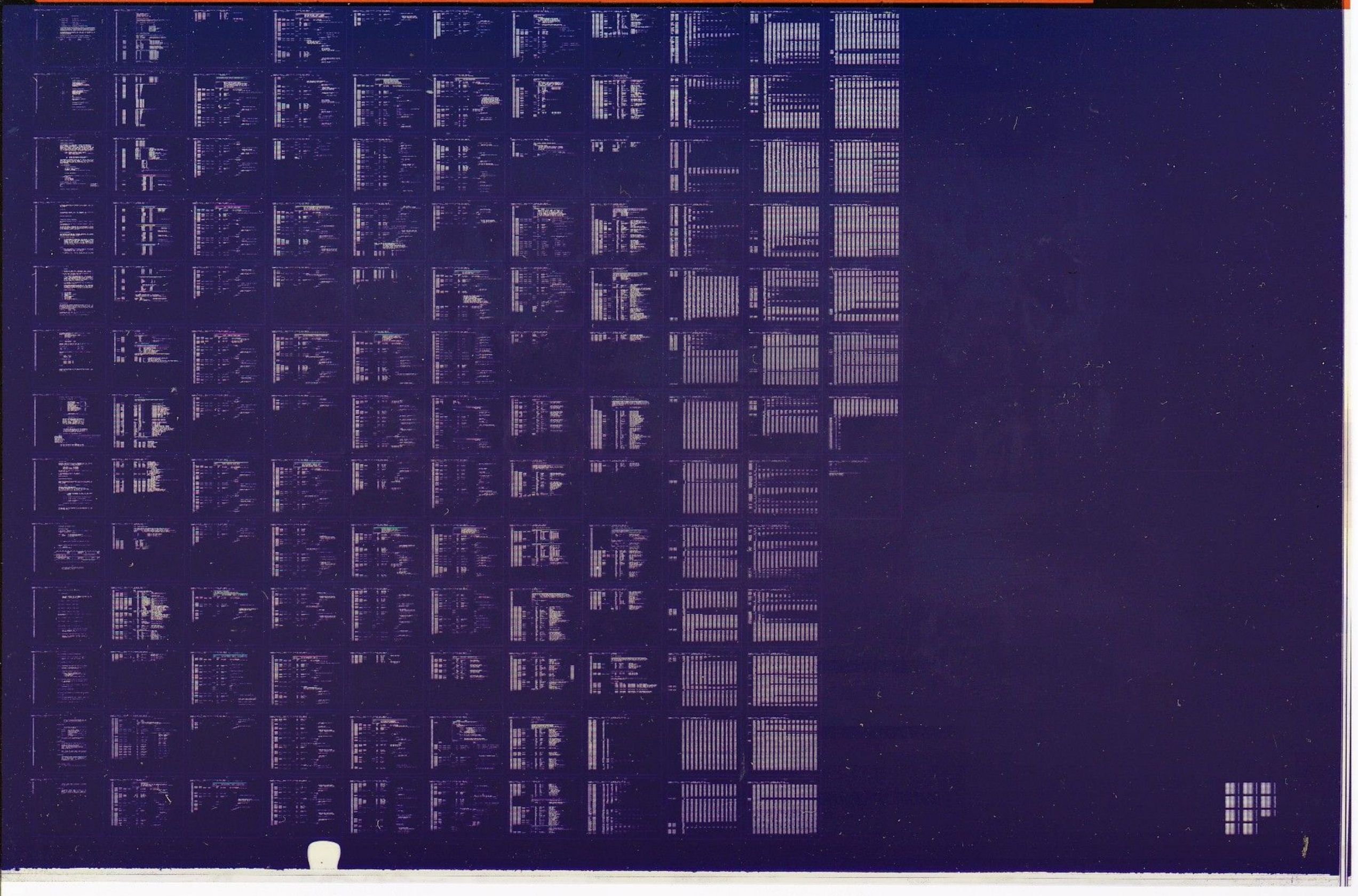
DLV-11F DLV-11F OFFLNE TST
CVDVCCO

AH-E007C-MC
FICHE 01 OF 01

FEB 1985
digital
Made In USA



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                        .REM    0
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IDENTIFICATION

PRODUCT CODE: AC-E006C-MC

PRODUCT NAME: CVDVCCO DLV11-F OFFLINE TEST

PRODUCT DATE: AUGUST 1984

AUTHOR: ODES CHOATE

MAINTAINER: DIAGNOSTIC ENGINEERING GROUP

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                                1.0     GENERAL PROGRAM INFORMATION.
                                        ------- ------- -----------


                                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.
```

```
126                                     NO SPECIAL DIAGNOSTICS ARE REQUIRED TO RUN  BEFORE  THIS,  BUT
127                                     THE  PROCESSOR,  MEMORY,  AND  BUS  ARE  ASSUMED  TO BE FULLY
128                                     OPERATIONAL.
129
130
131                             1.5     ASSUMPTIONS.
132
133
134                                     THIS DIAGNOSTIC ASSUMES  THAT  THE  OPERATOR  HAS  INITIALIZED
135                                     LOCATION '$USWR' AND '$DEVM' TO THE PROPER VALUES.
136
137
138                             2.0     OPERATING INSTRUCTIONS.
139                                     --------- ------------
140
141
142                             2.1     LOADING AND STARTING PROCEDURES.
143
144                                     USE STANDARD PROCEDURE FOR PDP-11  ABSOLUTE  BINARY  FORMATTED
145                                     MEDIA.
146
147                                     THIS DIAGNOSTIC HAS ONLY ONE (1) STARTING  ADDRESS.   200  FOR
148                                     START AND RESTART.
149
150                                     THE USER CAN SELECT A SPECIFIC TEST TO BE EXECUTED BY  SETTING
151                                     SWITCH 8 IN THE SWITCH REGISTER AND THE TEST NUMBER (IN OCTAL)
152                                     IN THE LOWER BYTE.  (NOTE:  ALL TESTS PREVIOUS TO THE SELECTED
153                                     ONE ARE EXECUTED WITHOUT ITERATIONS.)
154
155
156                             2.2     SPECIAL ENVIRONMENTS.
157
158                                     THIS DIAGNOSTIC FOLLOWS THE  STANDARD  PROCEDURE  FOR  RUNNING
159                                     UDER  APT,ACT,XXDP  MONITORS, AS DESCRIBED IN THEIR RESPECTIVE
160                                     PROCEDURES MANUAL AND SYSMAC PACKAGE.
161
162                             2.3     OPERATIONAL SWITCH SETTINGS
163
164                                             IF THE DIAGNOSTIC IS RUN ON A  CPU  WITHOUT  A  SWITCH
165                                             REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH
166                                             ALLOWS  THE  USER  THE  SAME  SWITCH  OPTIONS  AS  THE
167                                             HARDWARE  SWITCH  REGISTER.   IF  THE  HARDWARE SWITCH
168                                             REGISTER DOES NOT EXIST OR IF ONE DOES AND IT CONTAINS
169                                             ALL  ONES  (177777)  THEN THE SOFTWARE SWITCH REGISTER
170                                             (LOC.  176) is USED.
171
172
173                                     CONTROL:
174
175                                     THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE
176                                             SWITCH REGISTER (LOC.  176) FROM THE TTY.  THIS CAN BE
177                                             ACCOMPLISHED BY DOING THE FOLLOWING:
178
179                                     1)  TYPE CONTROL G <↑G>;  THIS WILL ALLOW  THE  TTY  TO  ENTER
180                                             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 PROGRAMMABLE BAUD RATE OPTION IS ENABLED THE PROGRAMMABLE 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 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

TEST #	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	20	21	22	23	24
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.
```

```
                        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@_____."
                        ..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 BOXFS 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
```

```
602
603
604                             'INTFLAG'  EACH TIME IT IS CALLED.  IT ASSUMES
605                             THAT THE MAIN CALLING ROUTINE WILL  KNOW  WHAT
606                             TO LOOK FOR.
607
608
609                         ROUTINE:CYCLE
610                         ------------
611                             THIS ROUTINE  CAUSES  ADRS  TO  POINT  TO  THE
612                             ADDRESS  OF  DLV11-F  UNDER  TEST,  ADRS +2 TO
613                             POINT TO THE VECTOR OF THE DLV11-F UNDER TEST.
614                             IT  KEEPS  TRACK OF THE CURRENT DEVICE AND BIT
615                             MASKS.
```

```
                                .
                                .TITLE  MAINDEC-11-DVDVC-C
                                ;*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
```

```
MAINDEC-11-DVDVC-C     MACY11 30A(1052)  12-SEP-84  15:41  PAGE 16
CVDVCC.P11    12-SEP-84 08:55           BASIC DEFINITIONS

                                        PR1=    40              ;;PRIORITY LEVEL 1
                                        PR2=    100             ;;PRIORITY LEVEL 2
                                        PR3=    140             ;;PRIORITY LEVEL 3
                                        PR4=    200             ;;PRIORITY LEVEL 4
                                        PR5=    240             ;;PRIORITY LEVEL 5
                                        PR6=    300             ;;PRIORITY LEVEL 6
                                        PR7=    340             ;;PRIORITY LEVEL 7

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

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

```
                                .EQUIV  BIT06,BIT6
                                .EQUIV  BIT05,BIT5
                                .EQUIV  BIT04,BIT4
                                .EQUIV  BIT03,BIT3
                                .EQUIV  BIT02,BIT2
                                .EQUIV  BIT01,BIT1
                                .EQUIV  BIT00,BIT0

                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004                          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014                          TBITVEC=14              ;;"T" BIT
000014                          TRTVEC= 14              ;;TRACE TRAP
000014                          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                          PWRVEC= 24              ;;POWER FAIL
000030                          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                          TRAPVEC=34              ;;"TRAP" TRAP
000060                          TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                          TPVEC=  64              ;;TTY PRINTER VECTOR
000240                          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
000004                                  ILLMEM= 4
000001                                  ADRS=   R1
000002                                  GOOD=   R2
000003                                  BAD=    R3
000001                                  REGISTER=R1
000002                                  BIT=    R2
000003                                  FUNCT=  R3
000002                                  LEAD=   R2
000004                                  FOLLOW= R4
175610                                  DLADDR= 175610

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


                        ;;**************************************************************
                                ; RCSR REGISTER BIT NAMES
                        ;;**************************************************************
                                ; 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.

                                DATA    =           17
                                PARITY  =           20
                                EVENODD =           40
                                COMSPD  =          100
                                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

                                .=0
000000                  ;*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
                                .=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  011410                          $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                  $TSTTM: .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   OSWR            ;;ADDRESS OF SWITCH REGISTER
001142  177570          DISPLAY: .WORD  ODISP           ;;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  000C00          $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  ;;IXTERRUPT 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
```

```
1001                                    .SBTTL  ERROR POINTER TABLE
1002
1003                                    ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
1004                                    ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
1005                                    ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
1006                                    ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
1007                                    ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
1008
1009                                    ;*      EM              ;;POINTS TO THE ERROR MESSAGE
1010                                    ;*      DH              ;;POINTS TO THE DATA HEADER
1011                                    ;*      DT              ;;POINTS TO THE DATA
1012                                    ;*      DF              ;;POINTS TO THE DATA FORMAT
1013
1014
1015  001254                            $ERRTB:
1016                                    ;;              GLOBAL DATA
1017  001254  175610                        DLADD:  DLADDR
1018  001256  000300                        DLVEC:  300
1019  001260  175610                        RCSR:   DLADDR  +  0
1020  001262  175612                        RBUF:   DLADDR  +  2
1021  001264  175614                        TCSR:   DLADDR  +  4
1022  001266  175615                        TCSRHI: DLADDR  +  5
1023  001270  175616                        TBUF:   DLADDR  +  6
1024  001272  000000                        I:      0
1025  001274  000020                        .BLKW 20        ;FOR R5 STACK
1026  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     #1CMTAG,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  013404  000020                 MOV     #1SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
1037  001364  012737  000340  000022                 MOV     #340,@#IOTVEC+2 ;;LEVEL 7
1038  001372  012737  013204  000030                 MOV     #1ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
1039  001400  012737  000340  000032                 MOV     #340,@#EMTVEC+2 ;;LEVEL 7
1040  001406  012737  014336  000034                 MOV     #1TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
1041  001414  012737  000340  000036                 MOV     #340,@#TRAPVEC+2;LEVEL 7
1042  001422  012737  011444  000024                 MOV     #1PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
1043  001430  012737  000340  000026                 MOV     #340,@#PWRVEC+2 ;;LEVEL 7
1044  001436  016767  007714  007704                 MOV     1ENDCT,1EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
1045  001444  005067  177510                        CLR     1TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
1046  001450  005067  177506                        CLR     1ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
1047  001454  112767  000001  177433                 MOVB    #1.1ERMAX       ;;ALLOW ONE ERROR PER TEST
1048  001462  012767  001462  177416                 MOV     #.,1LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
1049  001470  012767  001470  177412                 MOV     #.,1LPERR       ;;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     1PASS           ;;CLEAR PASS COUNT
1067  001570  132767  000200  177417                 BITB    #APTSIZE,1ENVM  ;;TEST USER SIZE UNDER APT
1068  001576  001403                                 BEQ     67$             ;;YES,USE NON-APT SWITCH
1069  001600  012767  001216  177332                 MOV     #1SWREG,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  011410  000042                 CMP     #1ENDAD,@#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    1ENV,#1         ;;ARE WE RUNNING UNDER APT?
1082  001644  001406                                 BEQ     70$             ;;BRANCH IF YES
```

L2


```
 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$:   .ASCIZ  <CRLF>*MD-11-DVDVC-C*<CRLF>
 1091  001712                          68$:
```

```
1092  001712                                                    WHILE $DEVM EQ #0 DO
1093  001712                                  50000$:
1094  001712  005767  177334                        TST     $DEVM
1095  001716  001101                                BNE     50001$
1096  001720                                          TYPTXT <<CRLF>!I HAVE NO DEVICE TO TEST.!>
1097  001762                                        TYPTXT  <<CRLF>!SET UP $DEVM TO INDICATE ACTUAL CONFIGURATION.!>
1098  002050                                        TYPTXT  <<CRLF>!TYPE PROCEED (P) TO CONTINUE.!>
1099  002116  000000                               HALT
1100  002120                                                    ENDDO
1101  002120  000674                               BR      50000$
1102  002122                                  50001$:
1103  002122                                                    LET INITFLAG := #1
1104  002122  012767  000001  006760               MOV     #1,INITFLAG
1105  002130                                                    LET BITMASK := #BIT15   ; START AT CONSOLE
1106  002130  012767  100000  006750               MOV     #BIT15,BITMASK
1107  002136                                  LOOP:
1108  002136                                        CALL    CYCLE           ; NO ARGUMENTS--ADDRS -> NEXT ADDRESS
1109  002136  004767  006524                       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
```

```
1158                                    ;;*****************************************************************
1159                                    ;*TEST 1         ADDRESSABILITY
1160                                    ;*              THIS TEST VERIFIES THAT THE ADDRESS AS PLACED IN
1161                                    ;*              THE HARDWARE P-TABLE TO BE CORRECT AND THE DLV11-F RESPONDS
1162                                    ;*              TO THAT ADDRESS SPACE
1163                                    ;;*****************************************************************
1164  002252  000004                   TST1:   SCOPE
1165  002254  012767  000002  176676           MOV     #2,$TIMES       ;;DO 2 ITERATIONS
1166  002262  012767  000001  176710           MOV     #1,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1167  002270                                                                   LET     ADRS := DLADD
1168  002270  016701  176760                   MOV     DLADD,ADRS
1169                                                                             ; SET UP INTERRUPT
1170  002274                                                                   SETVEC  #ILLMEM,#INTSRV,#PR7
1171  002274  010146                           MOV     R1,-(SP)
1172  002276  012701  000004                   MOV     #ILLMEM,R1
1173  002302  012721  010656                   MOV     #INTSRV,(R1)+
1174  002306  012711  000340                   MOV     #PR7,(R1)
1175  002312  012601                           MOV     (SP)+,R1
1176  002314                                                                   LET     I := #0
1177  002314  005067  176752                   CLR     I
1178  002320                                                                   REPEAT
1179  002320                          50002$:
1180  002320                                                                       BGNSUB
1181  002320  012767  002326  176562           MOV     #64$,$LPERR
1182                                                                                 ;CLEAR FLAG
1183  002326                                                                         LET INTFLAG := #0
1184  002326  005067  006332                   CLR     INTF ;G
1185
1186                                                                               ;READ FLAG
1187  002332  005711                           TST @ADRS
1188  002334                                                                       IF INTFLAG NE #0 THEN
1189  002334  005767  006324                   TST     INTFLAG
1190  002340  001401                           BEQ     50003$
1191                                                                               ; FATAL ERROR
1192  002342                                                                           ERRDF 1,,NODL
1193  002342  104001                           ERROR   1
1194  002344                                                                       ENDIF
1195  002344                          50003$:
1196  002344                                                                   ENDSUB
1197  002344                                                                   LET     I := I + #2
1198  002344  062767  000002  176720           ADD     #2,I
1199  002352                                                                   LET     ADRS := DLADD + I
1200  002352  016701  176676                   MOV     DLADD,ADRS
1201  002356  066701  176710                   ADD     I,ADRS
1202  002362                                                           UNTIL I EQ #8.
1203  002362  026727  176704  000010           CMP     I,#8.
1204  002370  001353                           BNE     50002$
1205  002372                                                           CLRVEC ILLMEM
1206  002372  010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
```

```
1187  002374  010246                    MOV     R2,-(SP)        ;;PUSH R2 ON STACK
1188  002376  012701  000004            MOV     #ILLMEM,R1
1189  002402  010102                    MOV     R1,R2
1190  002404  062702  000002            ADD     #2,R2
1191  002410  010221                    MOV     R2,(R1)+
1192  002412  005011                    CLR     (R1)
1193  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     50004$
002446  032767  000001  176540          BIT     #APTENV,@ENV
002454  001404                        BEQ     50005$
002456                          50004$:                                 EXIT TEST    ; BREAK NOT INSTALLED
002456  012767  000001  176474          MOV     #1,@TIMES
002464  000452                        BR      TST3                    ;;;EXIT THIS TES.
002466                                                                  ENDIF
002466                          50005$:

                                                        ; SEE IF IT IS CLEAR
002466                                                                  BGNSUB
002466  012767  002474  176414          MOV     #64$,@LPERR
002474                                                                  IF      #BREAK SETIN @TCSR THEN
002474  032777  000001  176562          BIT     #BREAK,@TCSR
002502  001401                        BEQ     50006$
                                                                            ; BREAK DID NOT RESET IN TCSR
002504                                                                      ERRHRD 2,,DIDNOT
002504  104002                        ERROR   2
002506                                                                  ENDIF
002506                          50006$:
002506                                                                  ENDSUB

                                                        ; TRY TO SET BREAK BIT
002506                                                                  BGNSUB
002506  012767  002514  176374          MOV     #65$,@LPERR
002514                                                                  LET     @TCSR := @TCSR SET.BY #BREAK
002514  052777  000001  176542          BIS     #BREAK,@TCSR
                                                                        ; STUCK TO 0
002522                                                                  IF      #BREAK NOTSETIN @TCSR THEN
002522  032777  000001  176534          BIT     #BREAK,@TCSR
002530  001001                        BNE     50007$
                                                                            ; BREAK DID NOT SET IN TCSR
002532                                                                      ERRHRD 3,,DIDNOT
002532  104003                        ERROR   3
002534                                                                  ENDIF
```

```
002534                          50007$:
002534                                                          ENDSUB

                                                        ; TRY TO CLEAR A SET BIT
002534                                                          BGNSUB
002534  012767  002542  176346          MOV     #66$,$LPERR

002542                                                                  LET     @TCSR := @TCSR CLR.BY #BRE
002542  042777  000001  176514          BIC     #BREAK,@TCSR
                                                                        ; SHOULD HAVE CLEARED
002550                                                                  IF      #BREAK SETIN @TCSR THEN
002550  032777  000001  176506          BIT     #BREAK,@TCSR
002556  001401                          BEQ     50010$
                                                                        ; BREAK  DID NOT CLEAR IN TCSR
002560                                                                  ERRHRD 4,,DIDNOT
002560  104004                          ERROR   4
002562                                                                  ENDIF
002562                          50010$:
002562                                                          ENDSUB

                                                        ; NOW SEE IF RESET CLEARS IT
002562                                                          BGNSUB
002562  012767  002570  176320          MOV     #67$,$LPERR

002570                                                                  LET     @TCSR := @TCSR SET.BY #BREAK
002570  052777  000001  176466          BIS     #BREAK,@TCSR
                                                                        ; ISSUE BUS RESET
002576                                                                  BRESET
002576  000005                          RESET
002600                                                                  IF      #BREAK SETIN @TCSR THEN
002600  032777  000001  176456          BIT     #BREAK,@TCSR
002606  001401                          BEQ     50011$
                                                                        ; BREAK DID NOT RESET IN TCSR
002610                                                                  ERRHRD 5,,DIDNOT
002610  104005                          ERROR   5
002612                                                                  ENDIF
002612                          50011$:
002612                                                          ENDSUB
002612                                                      ENDTST
```

```
1294                                    ;;*****************************************************************
1295                                    ;;*****************************************************************
1296                                    ;*TEST 3          MAINT - TCSR2 SET, CLEAR, RESET
1297                                    ;;*****************************************************************
1298  002612  000004                    TST3:   SCOPE
1299  002614  012767  000010  176336            MOV     #10.,$TIMES         ;;DO 10 ITERATIONS
1300  002622  012767  000003  176350            MOV     #3.,$TESTN          ;;SET TEST NUMBER IN APT MAIL BOX
1301
1302  002630                                                                IF @#MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ @#TRU
1303  002630  032767  040000  176362            BIT     @#MAINTJUMP,$USWR
1304  002636  001404                            BEQ     50012$
1305  002640  126727  006261  000001            CMPB    CONSOLE,@#TRUE
1306  002646  001004                            BNE     50013$
1307  002650                            50012$:
1308  002650                                                                    EXIT TEST
1309  002650  012767  000001  176302            MOV     #1,$TIMES
1310  002656  000452                            BR      TST4                ;;;EXIT THIS TEST
1311  002660                                                                ENDIF
1312  002660                            50013$:
1313
1314                                                        ; SEE IF IT IS CLEAR
1315  002660                                                                BGNSUB
1316  002660  012767  002666  176222            MOV     #64$,$LPERR
1317
1318  002666                                                                    IF      @#MAINT SETIN @TCSR THEN
1319  002666  032777  000004  176370            BIT     @#MAINT,@TCSR
1320  002674  001401                            BEQ     50014$
1321                                                                        ; MAINT DID NOT RESET IN TCSR
1322  002676                                                                ERRHRD 6,,DIDNOT
1323  002676  104006                            ERROR   6
1324  002700                                                                ENDIF
1325  002700                            50014$:
1326  002700                                                            ENDSUB
1327
1328                                                        ; TRY TO SET MAINT BIT
1329  002700                                                            BGNSUB
1330  002700  012767  002706  176202            MOV     #65$,$LPERR
1331  002706                                                                LET     @TCSR := @TCSR SET.BY @#MAINT
1332  002706  052777  000004  176350            BIS     @#MAINT,@TCSR
1333                                                                    ; STUCK TO 0
1334  002714                                                            IF      @#MAINT NOTSETIN @TCSR THEN
1335  002714  032777  000004  176342            BIT     @#MAINT,@TCSR
1336  002722  001001                            BNE     50015$
1337                                                                    ; MAINT DID NOT SET IN TCSR
1338  002724                                                            ERRHRD 7,,DIDNOT
1339  002724  104007                            ERROR   7
1340  002726                                                            ENDIF
1341  002726                            50015$:
1342  002726                                                        ENDSUB
1343
1344                                                        ; TRY TO CLEAR A SET BIT
1345  002726                                                            BGNSUB
1346  002726  012767  002734  176154            MOV     #66$,$LPERR
1347
1348  002734                                                                LET     @TCSR :- @TCSR CLR.BY @#MAINT
1349  002734  042777  000004  176322            BIC     @#MAINT,@TCSR
```

```
1350
1351  002742                                                        ; SHOULD HAVE CLEARED
1352  002742  032777  000004  176314          BIT     @MAINT,@TCSR  IF      @MAINT SETIN @TCSR THEN
1353  002750  001401                          BEQ     50016$
1354                                                                ; MAINT DID NOT CLEAR INTCSR
1355  002752                                                        ERRHRD 10,,DIDNOT
1356  002752  104010                          ERROR   10
1357  002754                                                        ENDIF
1358  002754                          50016$:
1359  002754                                                      ENDSUB
1360
1361                                                      ; NOW SEE IF RESET CLEARS IT
1362  002754                                                      BGNSUB
1363  002754  012767  002762  176126          MOV     #67$,$LPERR
1364
1365  002762                                                      LET     @TCSR := @TCSR SET.BY @MAINT
1366  002762  052777  000004  176274          BIS     @MAINT,@TCSR
1367                                                              ; ISSUE BUS RESET
1368  002770                                                      BRESET
1369  002770  000005                          RESET
1370  002772                                                      IF      @MAINT SETIN @TCSR THEN
1371  002772  032777  000004  176264          BIT     @MAINT,@TCSR
1372  003000  001401                          BEQ     50017$
1373                                                              ; MAINT DID NOT RESET IN TCSR
1374  003002                                                      ERRHRD 11,,DIDNOT
1375  003002  104011                          ERROR   11
1376  003004                                                      ENDIF
1377  003004                          50017$:
1378  003004                                                    ENDSUB
1379  003004                                                  ENDTST
1380
1381
1382
```

```
1383                                    ;;*****************************************************************
1384                                    ;;*****************************************************************
1385                                    ;*TEST 4          XMITIE - TCSR6 SET, CLEAR, RESET
1386                                    ;;*****************************************************************
1387  003004  000004               TST4:   SCOPE
1388  003006  012767  000010  176144        MOV     #10.,#TIMES     ;;DO 10 ITERATIONS
1389  003014  012767  000004  176156        MOV     #4,#TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1390                                                                ; USE PRIORITY OF 7
1391  003022  012746  000340               MOV     #PR7,-(SP)      ;;PUT NEW PS ON STACK
1392  003026  012746  003034               MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
1393  003032  000002                       RTI                     ;;POP NEW PC AND PS
1394  003034                        64$:
1395
1396                                                  ; SEE IF IT IS CLEAR
1397  003034                                                        BGNSUB
1398  003034  012767  003042  176046        MOV     #65$,#LPERR
1399
1400  003042                                                            IF      #XMITIE SETIN @TCSR THEN
1401  003042  032777  000100  176214        BIT     #XMITIE,@TCSR
1402  003050  001401                       BEQ     50020$
1403                                                                ; XMITIE DID NOT RESET IN TCSR
1404  003052                                                        ERRHRD 12,,DIDNOT
1405  003052  104012                       ERROR   12
1406  003054                                                            ENDIF
1407  003054                        50020$:
1408  003054                                                        ENDSUB
1409
1410                                                  ; TRY TO SET XMITIE BIT
1411  003054                                                        BGNSUB
1412  003054  012767  003062  176026        MOV     #66$,#LPERR
1413  003062                                                            LET     @TCSR := @TCSR SET.BY #XMITIE
1414  003062  052777  000100  176174        BIS     #XMITIE,@TCSR
1415                                                              ; STUCK TO 0
1416  003070                                                    IF      #XMITIE NOTSETIN @TCSR THEN
1417  003070  032777  000100  176166        BIT     #XMITIE,@TCSR
1418  003076  001001                       BNE     50021$
1419                                                                ; XMIT DID NOT RESET IN TCSR
1420  003100                                                        ERRHRD 13,,DIDNOT
1421  003100  104013                       ERROR   13
1422  003102                                                            ENDIF
1423  003102                        50021$:
1424  003102                                                        ENDSUB
1425
1426                                                  ; TRY TO CLEAR A SET BIT
1427  003102                                                        BGNSUB
1428  003102  012767  003110  176000        MOV     #67$,#LPERR
1429
1430  003110                                                            LET     @TCSR := @TCSR CLR.BY #XMITIE
1431  003110  042777  000100  176146        BIC     #XMITIE,@TCSR
1432                                                              ; SHOULD HAVE CLEARED
1433  003116                                                    IF      #XMITIE SETIN @TCSR THEN
1434  003116  032777  000100  176140        BIT     #XMITIE,@TCSR
1435  003124  001401                       BEQ     50022$
1436                                                                ;  XMIT DID NOT CLEAR IN TCSR
1437  003126                                                        ERRHRD 14.,DIDNOT
1438  003126  104014                       ERROR   14
```

```
1439  003130                                                                    ENDIF
1440  003130                          50022$:
1441  003130                                                                ENDSUB
1442
1443                                                        ; NOW SEE IF RESET CLEARS IT
1444  003130                                                                BGNSUB
1445  003130  012767  003136  175752          MOV     #68$,$LPERR
1446
1447  003136                                                                LET     @TCSR := @TCSR SET.BY #XMITIE
1448  003136  052777  000100  176120          BIS     #XMITIE,@TCSR
1449                                                                            ; ISSUE BUS RESET
1450  003144                                                                BRESET
1451  003144  000005                          RESET
1452  003146                                                                IF      #XMITIE SETIN @TCSR THEN
1453  003146  032777  000100  176110          BIT     #XMITIE,@TCSR
1454  003154  001401                          BEQ     50023$
1455                                                                            ; XMIT DID NOT RESET IN TCSR
1456  003156                                                                    ERRHRD 15,,DIDNOT
1457  003156  104015                          ERROR   15
1458  003160                                                                ENDIF
1459  003160                          50023$:
1460  003160                                                                ENDSUB
1461  003160                                                              ENDTST
1462
1463
1464
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*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
003204                                                              IF      @RCVRIE SETIN @RCSR THEN
003204  032777  000100  176046          BIT     @RCVRIE,@RCSR
003212  001401                          BEQ     50024$
                                                                ; RCVRIE DID NOT RESET IN RCSR
                                                                ERRHRD 35.,DIDNOT
003214
003214  104035                          ERROR   35
003216                                                          ENDIF
003216                          50024$:
003216                                                      ENDSUB
                                                ; TRY TO SET RCVRIE BIT
003216                                                      BGNSUB
003216  012767  003224  175664          MOV     #65$,$LPERR
003224                                                          LET     @RCSR := @RCSR SET.BY @RCVRIE
003224  052777  000100  176026          BIS     @RCVRIE,@RCSR
                                                            ; STUCK TO 0
003232                                                      IF      @RCVRIE NOTSETIN @RCSR THEN
003232  032777  000100  176020          BIT     @RCVRIE,@RCSR
003240  001001                          BNE     50025$
                                                                ; RCVRIE DID NOT SET IN RCSR
                                                                ERRHRD 36.,DIDNOT
003242
003242  104036                          ERROR   36
003244                                                          ENDIF
003244                          50025$:
003244                                                      ENDSUB
                                                ; TRY TO CLEAR A SET BIT
003244                                                      BGNSUB
003244  012767  003252  175636          MOV     #66$,$LPERR
003252                                                          LET     @RCSR := @RCSR CLR.BY @RCVRIE
003252  042777  000100  176000          BIC     @RCVRIE,@RCSR
                                                            ; SHOULD HAVE CLEARED
003260                                                      IF      @RCVRIE SETIN @RCSR THEN
003260  032777  000100  175772          BIT     @RCVRIE,@RCSR
003266  001401                          BEQ     50026$
                                                                ; RCVRIE DID NOT CLEAR IN RCSR
                                                                ERRHRD 37.,DIDNOT
003270
003270  104037                          ERROR   37
003272                                                          ENDIF
003272                          50026$:
003272                                                      ENDSUB
                                                ; NOW SEE IF RESET CLEARS IT
003272                                                      BGNSUB
```

```
1521  003272  012767  003300  175610          MOV     #67$,$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                  IF      #RCVRIE SETIN @RCSR THEN
1528  003310
1529  003310  032777  000100  175742          BIT     #RCVRIE,@RCSR
1530  003316  001401                          BEQ     50027$
1531                                                                  ; RCVRIE DID NOT RESET IN RCSR
1532  003320                                                          ERRHRD 40,,DIDNOT
1533  003320  104040                          ERROR   40
1534  003322                                                          ENDIF
1535  003322                          50027$:
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         IF      #RCVRDONE SETIN @RCSR THEN
003346
003346  032777  000200  175704          BIT     #RCVRDONE,@RCSR
003354  001402                          BEQ     50030$


                                                                        ;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                  50030$:
                                                                        ;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                                                                    IFB CONSOLE EQ #TRUE THEN
1590  003400
1591  003400  126727  005521  000001            CMPB    CONSOLE,#TRUE
1592  003406  001001                            BNE     50031$
1593                                                                        ;; EXECUTE TEST
1594  003410                                                            ELSE
1595  003410  000416                            BR      50032$
1596  003412                            50031$:
1597  003412                                                            IF #WRAP SETIN $USWR THEN
1598  003412  032767  020000  175600            BIT     #WRAP,$USWR
1599  003420  001401                            BEQ     50033$
1600                                                                        ;; EXECUTE TEST
1601  003422                                                            ELSE
1602  003422  000411                            BR      50034$
1603  003424                            50033$:
1604  003424                                                            IF #MAINT SETIN $USWR THEN
1605  003424  032767  000004  175566            BIT     #MAINT,$USWR
1606  003432  001401                            BEQ     50035$
1607                                                                        ;;EXECUTE TEST
1608  003434                                                            ELSE
1609  003434  000404                            BR      50036$
1610  003436                            50035$:
1611  003436                                                               EXIT TEST     ; LINE MUST BE TERMINATED
1612  003436  012767  000001  175514            MOV     #1,$TIMES
1613  003444  000414                            BR      TST10           ;;;EXIT THIS TEST
1614  003446                                                            ENDIF
1615  003446                            50036$:
1616  003446                                                            ENDIF
1617  003446                            50034$:
1618  003446                                                            ENDIF
1619  003446                            50032$:
1620
1621  003446                                                                BGNSUB
1622  003446  012767  003454  175434            MOV     #64$,$LPERR
1623
1624  003454                                                                IF      #RCVRACT SETIN @RCSR THEN
1625  003454  032777  004000  175576            BIT     #RCVRACT,@RCSR
1626  003462  001405                            BEQ     50037$
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
1634                                                                        ;TESTING EFFECT OF RESET ON BIT
```

```
1635
1636                                                                    ;RCVRACT DID NOT CLEAR IN RCSR
1637
1638                                                                    ;ALLOW ANOTHER TRY
1639  003474                                                            BRESET
1640  003474  000005                       RESET
1641  003476                                                          ENDIF
1642  003476                          500378:
1643                                                                    ;ALLOW LOOPING ON ERROR
1644  003476                                                          CKLOOP
1645  003476                                                        ENDSUB
1646  003476                                                      ENDTST
1647
```

```
                        T7      TEST THAT RCVRACT - RCSR 11 - IS CLEARED BY INIT

                        ;;**********************************************************************
                        ;;**********************************************************************
                        ;*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     50040$

                                                                    ;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                                                              @RESET
003534  000005                          RESET
003536                                                          ENDIF
003536                          50040$:
                                                                    ;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
                                                                IFB CONSOLE EQ @TRUE OR @APTENV SETIN $ENV THEN
003554  126727  005345  000001        CMPB    CONSOLE,@TRUE
003562  001404                        BEQ     50041$
003564  032767  000001  175422        BIT     @APTENV,$ENV
003572  001404                        BEQ     50042$
003574                          50041$:                             EXIT TEST
003574  012767  000001  175356        MOV     #1,$TIMES
003602  000513                        BR      TST12           ;;;EXIT THIS TEST
                                                                ENDIF
003604                          50042$:
                                                                LET PASS := #1  ;INIT COUNT OF TIMES THRU
003604  012767  000001  000212        MOV     #1,PASS
                                                                LOOP            ; START OF LOOP
003612                          50043$:                                 ;  MAX OF 2 TIMES THRU
                                                                   LET ERRORFLAG := @CLR
003612  012767  000000  000206        MOV     @CLR,ERRORFLAG
                                                                    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  004440                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     50045$
                                                                ;XMIT RDY DID NOT SET IN TCSR
003664                                                         ERRHRD 66.,.DIDNOT
```

```
1738  003664  104066                          ERROR   66
1739  003666                                                                  ENDIF
1740  003666                          500458:
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     500468
1755
1756  003704                                                                  ; XMITRDY DID NOT CLEAR IN TCSR
1757  003704  012767  177777  000114         MOV     @SET,ERRORFLAG          LET ERRORFLAG := @SET
1758                                                                                  ; DEFER ERROR TYPEOUT
1759
1760  003712                                                              ELSE
1761  003712  000416                         BR      500478
1762  003714                          500468:
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  004356                 JSR     PC,TIMER
1773  003742  012605                         MOV     (SP)+,R5
1774  003744
1775  003744  103001                         BCC     500508                  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                          500508:
1781  003750                                                                ENDIF ; OF DEFERED ERROR CALL
1782  003750                          500478:
1783  003750                                                              IF ERRORFLAG EQ #SET THEN
1784  003750  026727  000052  177777         CMP     ERRORFLAG,#SET
1785  003756  001011                         BNE     500518                  IF PASS GT #1 THEN
1786  003760
1787  003760  026727  000040  000001         CMP     PASS,#1
1788  003766  003404                         BLE     500528                      ; 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                          500524:
1796  004000                                                                  ELSE            ; NO ERROR
1797  004000  000403                         BR      500534
1798  004002                          500514:
1799  004002                                                                      LET EXITFLAG := #SET
1800  004002  012767  177777  000020         MOV     #SET,EXITFLAG
1801  004010                                                                  ENDIF
1802  004010                          500534:
1803  004010                                                                EXIF        EXITFLAG EQ #SET
1804  004010  026727  000014  177777         CMP     EXITFLAG,#SET
1805  004016  001401                         BEQ     500444
1806  004020                                                                ENDLOOP
1807  004020  000674                         BR      500434
1808  004022                          500444:
1809  004022                                                                  EXIT ; SKIP AROUND FLAG WORDS
1810  004024  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
                                                                IF @MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ @TRU
004050  032767  040000  175142        BIT     @MAINTJUMP,$USWR
004056  001404                        BEQ     50054$
004060  126727  005041  000001        CMPB    CONSOLE,@TRUE
004066  001004                        BNE     50055$
004070                          50054$:                             EXIT TEST
004070  012767  000001  175062        MOV     #1,$TIMES
004076  000442                        BR      TST13           ;;;EXIT THIS TEST
                                                                ENDIF
004100                          50055$:
                                                                ; SET THE MAINTENANCE BIT
004100                                                          LET @TCSR := @TCSR SET.BY @MAINT
004100  052777  000004  175156        BIS     @MAINT,@TCSR
                                                                BGNSUB
004106
004106  012767  004114  174774        MOV     #64$,$LPERR
                                        ; SEND A CHARACTER AND LET IT WRAP AROUND
                                                                LET @TBUF :B= #0
004114
004114  105077  175150                CLRB    @TBUF
                                                                ; WAIT A MAXIMUM OF 50 MSEC
                                                                ; FOR RCVR DONE TO SET IN
                                                                ; RCSR
004120                                                          CALL TIMER IN <#500,@RCVRDONE,RCSR,#SET>
004120  010546                        MOV     R5,-(SP)
004122  012745  177777                MOV     #SET,-(R5)
004126  016745  175126                MOV     RCSR,-(R5)
004132  012745  000200                MOV     #RCVRDONE,-(R5)
004136  012745  000500                MOV     #500,-(R5)
004142  004767  004152                JSR     PC,TIMER
004146  012605                        MOV     (SP)+,R5
                                                                ;DIDN'T SET IN TIME
004150                                                          IF.ERROR THEN
004150  103004                        BCC     50056$
                                                                ; 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  1040^1                        ERROR   71
004162                                                          ENDIF
004162                          50056$:
```

```
1871
1872  004162                                                        ENDSUB
1873
1874  004162                                                        BGNSUB
1875  004162  012767  004170  174720          MOV     #65$,$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     50057$
1884                                                                ; RCVRDONE DID NOT RESET IN RCSR.
1885  004202                                                        ERRHRD 72,,DIDNOT
1886  004202  104072                          ERROR   72
1887  004204                                                            ENDIF
1888  004204                          50057$:
1889  004204                                                        ENDSUB
1890  004204                                                    ENDTST
```

```
1891                                    ;;**********************************************************************
1892                                    ;;**********************************************************************
1893                                    ;*TEST 13        TEST THAT RCVRDONE IS CLEARED BY READING RBUF
1894                                    ;;**********************************************************************
1895  004204  000004                   TST13:  SCOPE
1896  004206  012767  000010  174744           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1897  004214  012767  000013  174756           MOV     #13,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1898                                                                    IF @MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ @TRU
1899  004222
1900  004222  032767  040000  174770           BIT     @MAINTJUMP,$USWR
1901  004230  001404                           BEQ     50060$
1902  004232  126727  004667  000001           CMPB    CONSOLE,@TRUE
1903  004240  001004                           BNE     50061$
1904  004242                           50060$:
1905  004242                                                              EXIT TEST
1906  004242  012767  000001  174710           MOV     #1,$TIMES
1907  004250  000440                           BR      TST14           ;;;EXIT THIS TEST
1908  004252                                                            ENDIF
1909  004252                           50061$:
1910
1911                                                                        ; SET MAINT. BIT
1912  004252                                                            LET @TCSR := @TCSR SET.BY @MAINT
1913  004252  052777  000004  175004           BIS     @MAINT,@TCSR
1914  004260                                                            BGNSUB
1915  004260  012767  004266  174622           MOV     #64$,$LPERR
1916                                              ; OUTPUT A CHARACTER WITH MAINTENANCE
1917                                              ; SET, AND WAIT FOR XMITRDY TO SET.
1918
1919                                                                        ; OUTPUT A CHARACTER
1920  004266                                                            LET @TBUF :B= #0
1921  004266  105077  174776                   CLRB    @TBUF
1922                                                                    ; WAIT MAXIMUM OF 500 MSEC
1923                                                                    ; FOR RCVRDONE TO SET IN
1924                                                                    ; RCSR
1925  004272                                                            CALL TIMER IN <#500,@RCVRDONE,RCSR,#SET>
1926  004272  010546                           MOV     R5,-(SP)
1927  004274  012745  177777                   MOV     #SET,-(R5)
1928  004300  016745  174754                   MOV     RCSR,-(R5)
1929  004304  012745  000200                   MOV     #RCVRDONE,-(R5)
1930  004310  012745  000500                   MOV     #500,-(R5)
1931  004314  004767  004000                   JSR     PC,TIMER
1932  004320  012605                           MOV     (SP)+,R5
1933  004322
1934  004322  042777  000004  174734           BIC     @MAINT,@TCSR    LET     @TCSR := @TCSR CLR.BY @MAINT
1935
1936  004330                                                                ; DID IT BECAME READY?
1937  004330  103001                           BCC     50062$          IF.ERROR  THEN
1938
1939  004332                                                                ;RCVRDONE DID NOT SET IN RCSR
1940  004332  104073                           ERROR   73              ERRMRD 73,, DIDNOT
1941  004334                                                            ENDIF
1942  004334                           50062$:
1943  004334                                                          ENDSUB
1944
1945                                              ; NOW THAT IT IS SET LETS SEE IF READING THE
1946                                              ; 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     50063$
1955                                                                        ;RCVRDONE DID NOT CLEAR IN RCSR
1956  004350                                                                ERRHRD 74,,DIDNOT
1957  004350  104074                  ERROR   74
1958  004352                                                          ENDIF
1959  004352                  50063$:
1960  004352                                                  ENDTST
```

```
1961                                    ;;*****************************************************************
1962                                    ;;*****************************************************************
1963                                    ;*TEST 14        TEST THAT RCVRACT - RCSR 11 - SETS
1964                                    ;*              WHEN A START BIT IS RECEIVED AND
1965                                    ;*              CLEARS WHEN RCVRDONE - RCSR 7 - SETS
1966                                    ;;*****************************************************************
1967  004352  000004                    TST14:  SCOPE
1968  004354  012767  000010  174576            MOV     #10.,$TIMES     ;;DO 10 ITERATIONS
1969  004362  012767  000014  174610            MOV     #14.,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
1970  004370                                                                    IFB CONSOLE EQ @TRUE OR @MAINTJUMP NOTSETIN $USW
1971  004370  126727  004531  000001            CMPB    CONSOLE,@TRUE
1972  004376  001404                            BEQ     50064$
1973  004400  032767  040000  174612            BIT     @MAINTJUMP,$USWR
1974  004406  001004                            BNE     50065$
1975  004410                                50064$:                                 EXIT TEST
1976  004410
1977  004410  012767  000001  174542            MOV     #1,$TIMES
1978  004416  000526                            BR      TST15           ;;;EXIT THIS TEST
1979  004420                                                                    ENDIF
1980  004420                                50065$:                             IF @APTENV SETIN $ENV THEN
1981  004420
1982  004420  032767  000001  174566            BIT     @APTENV,$ENV
1983  004426  001404                            BEQ     50066$
1984  004430                                                                    EXIT TEST
1985  004430  012767  000001  174522            MOV     #1,$TIMES
1986  004436  000516                            BR      TST15           ;;;EXIT THIS TEST
1987  004440                                                                    ENDIF
1988  004440                                50066$:
1989
1990
1991
1992  004440                                                            LET @TCSR := @TCSR SET.BY @MAINT
1993  004440  052777  000004  174616            BIS     @MAINT,@TCSR
1994  004446                                                                LET R0 := @CLR
1995  004446  012700  000000                    MOV     @CLR,R0
1996  004452                                                                LET R1 := #0
1997  004452  005001                            CLR     R1
1998                                                  ;LOAD A CHARACTER INTO TBUF
1999                                                  ;WAIT FOR RCVRACT TO SET
2000
2001                                                                      ;SEND A CHARACTER
2002  004454                                                        LET @TBUF :B= #0
2003  004454  105077  174610                    CLRB    @TBUF
2004  004460                                                    REPEAT
2005  004460                                50067$:                     IF @RCVRACT SETIN @RCSR THEN
2006  004460
2007  004460  032777  004000  174572            BIT     @RCVRACT,@RCSR
2008  004466  001403                            BEQ     50070$
2009  004470                                                            LET R0 := @SET
2010  004470  012700  177777                    MOV     @SET,R0
2011  004474                                                        ELSE
2012  004474  000401                            BR      50071$
2013  004476                                50070$:
2014  004476                                                            LET R1 := R1 + #1
2015  004476  005201                            INC     R1
2016  004500                                                        ENDIF
```

```
2017  004500                          500071$:
2018  004500                                                          UNTIL R0 EQ #SET OR R1 HI MAX
2019  004500  020027  177777                CMP     RC,#SET
2020  004504  001403                        BEQ     50072$
2021  004506  020167  000160                CMP     R1,MAX
2022  004512  101762                        BLOS    50067$
2023  004514                          50072$:
2024  004514                                                          IF R1 HI MAX THEN
2025  004514  020167  000152                CMP     R1,MAX
2026  004520  101410                        BLOS    50073$
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,$TIMES
2036  004540  000455                        BR      TST15           ;;;EXIT THIS TEST
2037  004542                                                              ENDIF
2038  004542                          50073$:
2039
2040                                                          ;CHECK FOR TIMING OF RCVRACT. CLEARING
2041                                                          ;VS RCVRDONE SETTING
2042
2043
2044
2045  004542                                                          WHILE #RCVRACT SETIN @RCSR DO
2046  004542                          50074$:
2047  004542  032777  004000  174510        BIT     #RCVRACT,@RCSR
2048  004550  001421                        BEQ     50075$
2049
2050  004552                                                              IF #RCVRDONE SETIN @RCSR THEN
2051  004552  032777  000200  174500        BIT     #RCVRDONE,@RCSR
2052  004560  001414                        BEQ     50076$
2053  004562                                                                 IF #RCVRACT SETIN @RCSR THEN
2054  004562  032777  004000  174470        BIT     #RCVRACT,@RCSR
2055  004570  001410                        BEQ     50077$
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,$TIMES
2066  004610  000431                        BR      TST15           ;;;EXIT THIS TEST
2067  004612                                                               ENDIF
2068  004612                          50077$:
2069  004612                                                              ENDIF
2070  004612                          50076$:
2071  004612                                                          ENDDO
2072  004612  000753                        BR      50074$
```

```
2073  004614                          50075$:
2074
2075                                                                ;RCVRACT = 0 NOW.
2076  004614                                                        IF @RCVRDONE NOTSETIN @RCSR THEN
2077  004614  032777  000200  174436          BIT     @RCVRDONE,@RCSR
2078  004622  001010                          BNE     50100$
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,$TIMES
2087  004642  000414                          BR      TST15           ;;;EXIT THIS TEST
2088  004644                                                        ENDIF
2089  004644                          50100$:
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     50101$
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                          50101$:
2109
2110  004670                                                            EXIT
2111  004670  000401                          BR      TST15           ;;;EXIT THIS TEST
2112  004672  070000                          MAX:70000
2113
2114  004674                                                        ENDTST
2115
```

```
2116
2117                                    ;;**********************************************************************
2118                                    ;;**********************************************************************
2119                                    ;*TEST 15        TEST THE OVERRUN BIT - RBUF 14
2120                                    ;;**********************************************************************
2121  004674  000004                    TST15:  SCOPE
2122  004676  012767  000010  174254            MOV     #10.,$TIMES     ;;DO 10 ITERATIONS
2123  004704  012767  000015  174266            MOV     #15.,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
2124
2125  004712                                                            IF @ERRBITS NOTSETIN $USWR ORB CONSOLE EQ @TRUE
2126  004712  032767  100000  174300            BIT     @ERRBITS,$USWR
2127  004720  001404                            BEQ     50102$
2128  004722  126727  004177  000001            CMPB    CONSOLE,@TRUE
2129  004730  001004                            BNE     50103$
2130  004732                                50102$:
2131  004732                                                                EXIT TEST
2132  004732  012767  000001  174220            MOV     #1,$TIMES
2133  004740  000547                            BR      TST16           ;;;EXIT THIS TEST
2134  004742                                                            ENDIF
2135  004742                                50103$:
2136  004742                                                            IF @MAINTJUMP NOTSETIN $USWR THEN
2137  004742  032767  040000  174250            BIT     @MAINTJUMP,$USWR
2138  004750  001004                            BNE     50104$
2139  004752                                                                EXIT TEST
2140  004752  012767  000001  174200            MOV     #1,$TIMES
2141  004760  000537                            BR      TST16           ;;;EXIT THIS TEST
2142  004762                                                            ENDIF
2143  004762                                50104$:
2144
2145  004762                                                        LET @TCSR := @TCSR SET.BY @MAINT
2146  004762  052777  000004  174274            BIS     @MAINT,@TCSR
2147
2148
2149
2150  004770                                                        BGNSUB
2151  004770  012767  004776  174112            MOV     #64$,$LPERR
2152                                                    ;OUTPUT 2 CHARACTERS WITH
2153                                                    ;AMPLE DELAYS BETWEEN FOR RECEPTION.
2154                                                    ;THIS SHOULD AN CAUSE OVERRUN ERROR.
2155
2156                                                                        ;OUTPUT 1 CHARACTER
2157  004776                                                        LET @TBUF :B= 40
2158  004776  105077  174266                    CLRB    @TBUF
2159                                                                        ;GO AWAY FOR 200 M SEC
2160  005002                                                        WAITMS 200.
2161  005002  010546                            MOV     R5,-(SP)
2162  005004  012745  000310                    MOV     #200.,-(R5)
2163  005010  004767  003562                    JSR     PC,WAIT
2164  005014  012605                            MOV     (SP)+,R5
2165
2166                                                                        ;OUTPUT 2ND CHARACTER
2167  005016                                                        LET @TBUF :B= 40
2168  005016  105077  174246                    CLRB    @TBUF
2169                                                                        ;LET OVERRUN HAPPEN
2170  005022                                                        WAITMS 200.
2171  005022  010546                            MOV     R5,-(SP)
```

```
2172  005024  012745  000310          MOV     @200.,-(R5)
2173  005030  004767  003542          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     50105$
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                                                        ;NO USE COMPOUNDING ERRORS
2192  005060                                              EXIT TST
2193  005060  012767  000001  174072  MOV     @1,$TIMES
2194  005066  000474                  BR      TST16       ;;;EXIT THIS TEST
2195  005070                                                  ENDIF
2196  005070                          50105$:
2197  005070                                              ENDSUB
2198
2199                                                      ;NOW SEE IF ERROR BIT SET WITH OVERRUN  ERROR:
2200  005070                                              BGNSUB
2201  005070  012767  005076  174012  MOV     @65$,@LPERR
2202  005076                                                  IF @ERROR NOTSETIN R4 THEN
2203  005076  032704  100000          BIT     @ERROR,R4
2204  005102  001010                  BNE     50106$
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,$TIMES
2217  005122  000456                  BR      TST16       ;;;EXIT THIS TEST
2218  005124                                                  ENDIF
2219  005124                          50106$:
2220  005124                                              ENDSUB
2221
2222  005124                                              BGNSUB
2223  005124  012767  005132  173756  MOV     @66$,@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     50107$
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,ITCLRED
2235  005150  104103                        ERROR   103
2236                                                          ;SKIP REST OF TEST
2237  005152                                                EXIT TEST
2238  005152  012767  000001  174000        MOV     #1,$TIMES
2239  005160  000437                        BR      TST16           ;;;EXIT THIS TEST
2240  005162                                                ENDIF
2241  005162                          50107$:
2242  005162                                              ENDSUB
2243
2244  005162                                              BGNSUB
2245  005162  012767  005170  173720        MOV     #67$,$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  003370                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     50110$
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,$TIMES
2272  005236  000410                        BR      TST16           ;;;EXIT THIS TEST
2273  005240                                                ENDIF
2274  005240                          50110$:
2275
```

```
2276  005240                                                    IF @ERROR SETIN @RBUF THEN
2277  005240  032777  100000  174014          BIT     @ERROR,@RBUF
2278  005246  001404                          BEQ     501118
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                                                        ENDIF
2286  005260
2287  005260                          501118:                 ENDSUB
2288  005260                                                ENDTST
2289  005260
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                                                                        IF @PBR NOTSETIN $USMR OR @MAINTJUMP NOTSETIN $U
2305  005276
2306  005276  032767  000200  173714            BIT     @PBR,$USMR
2307  005304  001404                            BEQ     S01128$
2308  005306  032767  040000  173704            BIT     @MAINTJUMP,$USMR
2309  005314  001004                            BNE     S01138$
2310  005316                            S01128$:
2311  005316                                                                      EXIT TEST
2312  005316  012767  000001  173634            MOV     #1,$TIMES
2313  005324  000553                            BR      TST17               ;;;EXIT THIS TEST
2314  005326                                                                ENDIF
2315  005326                            S01138$:
2316
2317  005326                                                                IFB @APTENV SETIN $ENV THEN
2318  005326  132767  000001  173660            BITB    @APTENV,$ENV
2319  005334  001404                            BEQ     S01148$
2320  005336                                                                  EXIT TST
2321  005336  012767  000001  173614            MOV     #1,$TIMES
2322  005344  000543                            BR      TST17               ;;;EXIT THIS TEST
2323  005346                                                                ENDIF
2324  005346                            S01148$:
2325
2326  005346                                                                LET ERRCHK := #0          ; CLEAR ERROR WORD
2327  005346  005067  002620                    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 BTCSR := BTCSR SET.BY @MAINT
2333  005366  052777  000004  173670            BIS     @MAINT,BTCSR
2334                                                                              ;EACH BAUD RATE
2335  005374                                                                INCR R3 FROM #0 TO #15. BY #1
2336  005374  005003                            CLR     R3
2337  005376  000401                            BR      S01158$
2338  005400                            S01168$:
2339  005400  005203                            INC     R3
2340  005402                            S01158$:
2341  005402  020327  000017                    CMP     R3,#15.
2342  005406  003062                            BGT     S01178$
2343  005410                                                                LET R0 := @RBUF
2344  005410  017700  173646                    MOV     @RBUF,R0
2345                                                                              ;CHANGE BAUDE RATE
2346  005414                                                                  LET BTCSRHI :B= RATES(R3)
```

```
2347  005414  116377  005624  173644          MOVB    RATES(R3),@TCSRHI
2348
2349  005422                                                              ;FLAG
2350  005422  005002                          CLR     BIT                LET BIT := 0
2351
2352  005424                                                              ;OUTPUT THE CHARACTER
2353  005424  005077  173640                  CLR     @TBUF              LET @TBUF := 0
2354
2355  005430                                                              ;INITIALIZE COUNTER
2356  005430  005067  000210                  CLR     NEW                LET NEW := 0
2357  005434
2358  005434  005067  000206                  CLR     NEW+2              LET NEW+2 := 0
2359  005440
2360  005440                          50120$:                             WHILE BIT EQ 0 DO
2361  005440  005702                          TST     BIT
2362  005442  001014                          BNE     50121$
2363  005444                                                                  IF @RCVRDONE SETIN @RCSR THEN
2364  005444  032777  000200  173606          BIT     @RCVRDONE,@RCSR
2365  005452  001403                          BEQ     50122$
2366
2367  005454                                                                  ;DONE - ITS READY
2368  005454  012702  000001                  MOV     #1,BIT                     LET BIT := 1
2369  005460
2370  005460  000404                          BR      50123$                  ELSE
2371  005462                          50122$:
2372                                                                          ;OTHERWISE-INCREMENT TIME
2373  005462                                                                     LET NEW := NEW + 1
2374  005462  005267  000156                  INC     NEW
2375  005466                                                                     LET NEW+2 := NEW+2 + CARRY
2376  005466  005567  000154                  ADC     NEW+2
2377  005472                                                                  ENDIF
2378  005472                          50123$:
2379                                                                          ;SIGNALS DONE
2380  005472                                                              ENDDO
2381  005472  000762                          BR      50120$
2382  005474                          50121$:
2383
2384  005474                                                              IF NEW+2 LO OLD+2 THEN
2385  005474  026767  000146  000150          CMP     NEW+2,OLD+2
2386  005502  103001                          BHIS    50124$
2387                                                                          ; OK
2388  005504                                                              ELSE
2389  005504  000414                          BR      50125$
2390  005506                          50124$:
2391                                                                          ; NEW+2 >= OLD+2
2392  005506                                                                  IF NEW+2 EQ OLD+2 AND NEW LO OLD THEN
2393  005506  026767  000134  000136          CMP     NEW+2,OLD+2
2394  005514  001005                          BNE     50126$
2395  005516  026767  000122  000124          CMP     NEW,OLD
2396  005524  103001                          BHIS    50126$
2397                                                                              ;OK
2398  005526                                                                  ELSE
2399  005526  000403                          BR      50127$
2400  005530                          50126$:                                     ;NEW+2 > OLD+2 OR
2401                                                                              ;(NEW+2 = OLD+2 AND
2402
```

```
2403
2404
2405  005530
2406  005530  012767  000004  002434          MOV     #BIT2,ERRCHK                    ; NEW >= OLD)
2407  005536                                                                          ;BAUD RATE DIDN'T CHANGE
2408  005536                              50127$:                                   LET ERRCHK := #BIT2 ; SET ERROR INDICATOR
2409  005536
2410  005536                              50125$:                                       ENDIF
2411
2412  005536                                                                        ENDIF
2413  005536  016767  000102  000104          MOV     NEW,OLD                         ;UPDATE OLD TIME
2414  005544                                                                        LET OLD := NEW
2415  005544  016767  000076  000100          MOV     NEW+2,OLD+2                     LET OLD+2 := NEW+2
2416
2417  005552                                                                    ENDINC  ;BAUD RATE
2418  005552  000712                          BR      50116$
2419  005554                              50117$:
2420  005554                                                                LET R3 :B= @USWR+1 AND #17      ; PUT BAUD BACK
2421  005554  116703  173441                MOVB    @USWR+1,R3
2422  005560  110346                          MOVB    R3,-(SP)
2423  005562  142716  000017                  BICB    #17,(SP)
2424  005566  142603                          BICB    (SP)+,R3
2425  005570                                                                LET R3 := R3 CLR.BY #177400
2426  005570  042703  177400                  BIC     #177400,R3
2427  005574                                                                LET @TCSRHI :B= RATES(R3)       ; LIKE HE WANTED IT
2428  005574  116377  005624  173464          MOVB    RATES(R3),@TCSRHI
2429
2430                                                                              ; CAN NOT LEAVE WITH MAINT SET
2431  005602                                                                    LET    @TCSR := @TCSR CLR.BY #MAINT
2432  005602  042777  000004  173454          BIC     #MAINT,@TCSR
2433  005610                                                                IF #BIT2 SETIN ERRCHK THEN
2434  005610  032767  000004  002354          BIT     #BIT2,ERRCHK
2435  005616  001401                          BEQ     50130$
2436                                                                              ; REPORT DEFERED ERROR
2437  005620                                                                    ERRHRD      126
2438  005620  104126                          ERROR   126
2439  005622                                                                    ENDIF
2440  005622                              50130$:
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
```

```
2476                                    ;;*****************************************************************
2477                                    ;;*****************************************************************
2478                                    ;*TEST 17        TRANSMITTER INTERRUPT LOGIC TEST
2479                                    ;*              LOGICALLLY THIS IS 4 SEPARATE TESTS
2480                                    ;*              A) DOES TRANSMITTER INTERRUPT LOGIC WORK
2481                                    ;*              B) AT PRIORITY OF 0
2482                                    ;*              C) AND ONLY ONCE
2483                                    ;*              D) BUT NOT WITH INTERRUPT ENABLE CLEAR
2484                                    ;;*****************************************************************
2485  005654  000004                    TST17:  SCOPE
2486  005656  012767  000010  173274            MOV     #10.,$TIMES         ;;DO 10 ITERATIONS
2487  005664  012767  000017  173306            MOV     #17.,$TESTN         ;;SET TEST NUMBER IN APT MAIL BOX
2488
2489
2490
2491  005672                                                                IF @APTENV SETIN $ENV THEN
2492  005672  032767  000001  173314            BIT     @APTENV,$ENV
2493  005700  001404                            BEQ     50131$
2494  005702                                                                    EXIT TEST
2495  005702  012767  000001  173250            MOV     #1,$TIMES
2496  005710  000534                            BR      TST20               ;;;EXIT THIS TEST
2497  005712                                                                ENDIF
2498  005712                                501315:
2499
2500
2501                                                                              ;CLEAR 'INTERRUPT OCCURED' FLAG
2502  005712                                                                LET INTFLAG := #0
2503  005712  005067  002746                    CLR     INTFLAG
2504
2505                                                                              ;GET VECTOR ADDRESS
2506  005716                                                                LET R3 := DLVEC
2507  005716  016703  173334                    MOV     DLVEC,R3
2508
2509  005722                                                                      ;FOR THE TRANSMITTER
2510  005722  062703  000004                    ADD     #4,R3                LET R3 := R3 + #4
2511
2512  005726                                                                      ;SET VECTOR TO POINT TO TRANS.SRV AT PRI
2513  005726  010146                            MOV     R1,-(SP)             SETVEC R3, #INTSRV, #PR7
2514  005730  010301                            MOV     R3,R1
2515  005732  012721  010656                    MOV     #INTSRV,(R1)+
2516  005736  012711  000340                    MOV     #PR7,(R1)
2517  005742  012601                            MOV     (SP)+,R1
2518  005744                                                                BGNSUB
2519  005744  012767  005752  173136            MOV     #64$,$LPERR
2520
2521  005752                                                                ;; MAKE SURE THAT TRANSMITTER READY IS SET
2522  005752  010546                            MOV     R5,-(SP)             CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
2523  005754  012745  177777                    MOV     #SET,-(R5)
2524  005760  016745  173300                    MOV     TCSR,-(R5)
2525  005764  012745  000200                    MOV     #XMITRDY,-(R5)
2526  005770  012745  000500                    MOV     #500.,-(R5)
2527  005774  004767  002320                    JSR     PC,TIMER
2528  006000  012605                            MOV     (SP)+,R5
2529
2530                                                                              ;CLEAR INTERRUPT ENABLE
2531  006002                                                                LET @TCSR := @TCSR CLR.BY #XMITIE
```

```
2532  006002  042777  000100  173254          BIC     #XMITIE,@TCSR
2533
2534                                                                    ;SET IT TO 0
2535  006010  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
2536  006014  012746  006022                  MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
2537  006020  000002                          RTI                     ;;POP NEW PC AND PS
2538  006022                          65$:
2539
2540                                                                    ;NOW SET I.E. BIT
2541  006022                                                          LET @TCSR := @TCSR SET.BY #XMITIE
2542  006022  052777  000100  173234          BIS     #XMITIE,@TCSR
2543
2544                                                                    ;LET INTERRUPT HAVE TIME TO OCCUR
2545  006030                                                          WAITMS 200.
2546  006030  010546                          MOV     R5,-(SP)
2547  006032  012745  000310                  MOV     #200.,-(R5)
2548  006036  004767  002534                  JSR     PC,WAIT
2549  006042  012605                          MOV     (SP)+,R5
2550
2551                                                                    ;DID EXACTLY 1 INTERRUPT OCCUR
2552  006044                                                          IF INTFLAG NE #1 THEN
2553  006044  026727  002614  000001          CMP     INTFLAG,#1
2554  006052  001406                          BEQ     50132$
2555
2556  006054                                                              ;NO - WAS IT 0 OR MORE THAN ONCE
2557  006054  005767  002604                  TST     INTFLAG             IF INTFLAG EQ #0 THEN
2558  006060  001002                          BNE     50133$
2559
2560  006062                                                              ;TRANSMITTER DID NOT INTERRUPT IN TIME
2561  006062  104106                          ERROR   106                     ERRHRD 106,,DIDNOT
2562  006064
2563  006064  000401                          BR      50134$              ELSE
2564  006066                          50133$:
2565                                                                      ;TWICE
2566                                                                      ;TRANSMITTER INTERRUPTED TWICE
2567  006066                                                                  ERRHRD 107,,TWICE
2568  006066  104107                          ERROR   107
2569  006070                                                              ENDIF
2570  006070                          50134$:
2571  006070                                                          ENDIF
2572  006070                          50132$:
2573  006070                                                      ENDSUB
2574                                                      ;INTERRUPT WITHOUT INTERRUPT ENABLE SET
2575  006070                                                      BGNSUB
2576  006070  012767  006076  173012          MOV     #66$,@LPERR
2577                                                                  ;CLEAR 'INTERRUPT OCCURED' FLAG
2578  006076                                                          LET INTFLAG := #0
2579  006076  005067  002562                  CLR     INTFLAG
2580                                                                  ;CLEAR INTERRUPT ENABLE
2581  006102                                                          LET @TCSR := @TCSR CLR.BY #XMITIE
2582  006102  042777  000100  173154          BIC     #XMITIE,@TCSR
2583                                                                  ;NO INTERRUPTS SHOULD OCCUR.
2584  006110  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
2585  006114  012746  006122                  MOV     #67$,-(SP)      ;;PUT NEW PC ON  STACK
2586  006120  000002                          RTI                     ;;POP NEW PC AND PS
2587  006122                          67$:
```

```
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  002442           JSR     PC,WAIT
2593  006134  012605                   MOV     (SP)+,R5
2594  006136                                                          IF INTFLAG NE #0 THEN
2595  006136  005767  002522           TST     INTFLAG
2596  006142  001401                   BEQ     50135$
2597                                                                      ;INTERRUPT OCCURED WITH I E CLEARED
2598  006144                                                              ERRMRD 110,NOTENAB
2599  006144  104110                   ERROR   110
2600  006146                                                          ENDIF
2601  006146                       50135$:
2602  006146                                                          BRESET
2603  006146  000005                   RESET
2604  006150                                                      ENDSUB
2605                                                                      ;RESTORE VECTOR AREA
2606  006150                                                          LET R4 := @DLVEC
2607  006150  017704  173102           MOV     @DLVEC,R4
2608  006154                                                          CLRVEC R4
2609  006154  010146                   MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2610  006156  010246                   MOV     R2,-(SP)        ;;PUSH R2 ON STACK
2611  006160  012701  000004           MOV     #R4,R1
2612  006164  010102                   MOV     R1,R2
2613  006166  062702  000002           ADD     #2,R2
2614  006172  010221                   MOV     R2,(R1)+
2615  006174  005011                   CLR     (R1)
2616  006176  012602                   MOV     (SP)+,R2        ;;POP STACK INTO R2
2617  006200  012601                   MOV     (SP)+,R1        ;;POP STACK INTO R1
2618  006202                                                      ENDTST
2619
2620
2621
2622
2623
2624
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 20        RECEIVER INTERRUPT LOGIC TEST
                                ;*              THIS TEST COVERS ALL OF THE RECEIVER
                                ;*              SIDE OF THE INTERRUPT LOGIC IN
                                ;*              CHARACTER MODE.
                                ;;*****************************************************************
006202  000004                  TST20:  SCOPE
006204  012767  000010  172746          MOV     #10.,$TIMES         ;;DO 10 ITERATIONS
006212  012767  000020  172760          MOV     #20.,$TESTN         ;;SET TEST NUMBER IN APT MAIL BOX
006220                                                              IF @#MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
006220  032767  040000  172772          BIT     @#MAINTJUMP,$USWR
006226  001404                          BEQ     50136$
006230  126727  002671  000001          CMPB    CONSOLE,#TRUE
006236  001002                          BNE     50137$
006240                          50136$:
006240  000167  000242                  JMP     TST21                       ;       EXIT TEST
006244                                                              ENDIF
006244                          50137$:
                                                                            ;CLEAR INTERRUPT OCCURED FLAG
                                                                            ;SET UP RECEIVER INTER.VECTOR
006244                                                              SETVEC DLVEC,#INTSRV,#PR7
006244  010146                          MOV     R1,-(SP)
006246  016701  173004                  MOV     DLVEC,R1
006252  012721  010656                  MOV     #INTSRV,(R1)+
006256  012711  000340                  MOV     #PR7,(R1)
006262  012601                          MOV     (SP)+,R1
                                ;PRIORITY 0 AND MULTIPLE INTERRUPT TEST.-RCVRIE
                                                                    @GNSUB
006264
006264  012767  006272  172616          MOV     #64$,$LPERR
006272                                                              LET INTFLAG := #0
006272  005067  002366                  CLR     INTFLAG
                                                                            ;SET MAINT. BIT
006276                                                              LET @TCSR := @TCSR SET.BY #MAINT
006276  052777  000004  172760          BIS     #MAINT,@TCSR
                                                                            ;CLEAR INTERRUPTS
006304                                                                  LET @RCSR := @RCSR CLR.BY #RCVRIE
006304  042777  000100  172746          BIC     #RCVRIE,@RCSR
                                                                            ;CHANGE PRIORITY
                                                                            ;..TO 0
006312  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
006316  012746  006324                  MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
006322  000002                          RTI                     ;;POP NEW PC AND PS
006324                          65$:
                                                                            ;SEND A CHARACTER
                                                                        LET @TBUF :B= #0
006324  105077  172740                  CLRB    @TBUF
                                                                            ;WAIT A MAXIMUM
                                                                        ;OF 500 MSEC FOR
                                                                        ;RCVR DONE TO SET IN RCSR
                                                                        CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
006330
006330  010546                          MOV     R5,-(SP)
006332  012745  177777                  MOV     #SET,-(R5)
006336  016745  172716                  MOV     RCSR,-(R5)
```

```
2681  006342  012745  000200                  MOV     #RCVRDONE,-(R5)
2682  006346  012745  000500                  MOV     #500,-(R5)
2683  006352  004767  001742                  JSR     PC,TIMER
2684  006356  012605                          MOV     (SP)+,R5
2685                                                                    ;SET INTERRUPT ENABLE
2686  006360                                                        LET @RCSR := @RCSR SET.BY #RCVRIE
2687  006360  052777  000100  172672          BIS     #RCVRIE,@RCSR
2688                                                                    ;LET IT COME IN.
2689  006366                                                        WAITMS 1
2690  006366  010546                          MOV     R5,-(SP)
2691  006370  012745  000001                  MOV     #1,-(R5)
2692  006374  004767  002176                  JSR     PC,WAIT
2693  006400  012605                          MOV     (SP)+,R5
2694
2695  006402                                                        LET R0 := @RBUF ; CLEAR RCVRDONE
2696  006402  017700  172654                  MOV     @RBUF,R0
2697                                                                    ;DID HE DO IT RIGHT?
2698  006406                                                        IF INTFLAG NE #1 THEN
2699  006406  026727  002252  000001          CMP     INTFLAG,#1
2700  006414  001411                          BEQ     50140$
2701
2702                                                                    ;NONE OCCURED
2703  006416                                                            ; CAN NOT LEAVE WITH MAINT SET
2704  006416  042777  000004  172640          BIC     #MAINT,@TCSR    LET     @TCSR := @TCSR CLR.BY #MAINT
2705  006424
2706  006424  005767  002234                  TST     INTFLAG         IF INTFLAG EQ #0 THEN
2707  006430  001002                          BNE     50141$
2708                                                                    ;RECEIVER DID NOT INTERRUPT IN TIME
2709  006432                                                                ERRHRD 111,,DIDNOT
2710  006432  104111                          ERROR   111
2711                                                                    ;TWICE OR MORE
2712  006434                                                            ELSE
2713  006434  000401                          BR      50142$
2714  006436                          50141$:
2715                                                                    ;RECEIVER INTERRUPTED TWICE
2716  006436                                                                ERRHRD 112,,TWICE
2717  006436  104112                          ERROR   112
2718  006440                                                            ENDIF
2719  006440                          50142$:
2720  006440                                                        ENDIF
2721  006440                          50140$:
2722  006440                                                    ENDSUB
2723
2724
2725                                                                    ; CLEAR THE WORLD
2726  006440                                                        LET @RCSR := @RCSR CLR.BY #RCVRIE
2727  006440  042777  000100  172612          BIC     #RCVRIE,@RCSR
2728
2729
2730                                                                    ;RESET MAINT. BIT.
2731  006446                                                        LET @TCSR := @TCSR CLR.BY #MAINT
2732  006446  042777  000004  172610          BIC     #MAINT,@TCSR
2733
2734  006454                                                        LET R4 := @DLVEC
2735  006454  017704  172576                  MOV     @DLVEC,R4
2736  006460                                                        CLRVEC R4
```

```
 2737  006460  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 2738  006462  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 2739  006464  012701  000004                MOV     #R4,R1
 2740  006470  010102                        MOV     R1,R2
 2741  006472  062702  000002                ADD     #2,R2
 2742  006476  010221                        MOV     R2,(R1)+
 2743  006500  005011                        CLR     (R1)
 2744  006502  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 2745  006504  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 2746  006506                                                              ENDTST
```

```
2747                                    ;;*****************************************************************
2748                                    ;;*****************************************************************
2749                                    ;*TEST 21        TEST ACTUAL DATA TRANSFERED
2750                                    ;*                NON-INTERRUPT MAINTENANCE BIT SET
2751                                    ;;*****************************************************************
2752  006506  000004                   TST21:  SCOPE
2753  006510  012767  000001  172442           MOV     #1,$TIMES       ;;DO 1 ITERATION
2754  006516  012767  000021  172454           MOV     #21,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2755  006524                                                             IF @#MAINTJUMP NOTSETIN $USMR ORB CONSOLE EQ #TRU
2756  006524  032767  040000  172466           BIT     @#MAINTJUMP,$USMR
2757  006532  001404                           BEQ     50143$
2758  006534  126727  002365  000001           CMPB    CONSOLE,#TRUE
2759  006542  001004                           BNE     50144$
2760  006544                                  50143$:
2761  006544                                                                 EXIT TEST
2762  006544  012767  000001  172406           MOV     #1,$TIMES
2763  006552  000526                           BR      TST22           ;;;EXIT THIS TEST
2764  006554                                                             ENDIF
2765  006554                                  50144$:
2766
2767  006554                                                             LET ERRCHK := #0
2768  006554  005067  001412                   CLR     ERRCHK
2769                                                                             ;SET MAINT. BIT
2770  006560                                                             LET @TCSR := @TCSR SET.BY @#MAINT
2771  006560  052777  000004  172476           BIS     @#MAINT,@TCSR
2772
2773                                                                         ;CHANGE PRIORITY
2774                                                                         ;..TO 0
2775  006566  012746  000000                   MOV     @#PRO,-(SP)     ;;PUT NEW PS ON STACK
2776  006572  012746  006600                   MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
2777  006576  000002                           RTI                     ;;POP NEW PC AND PS
2778  006600                                  64$:
2779                                                                         ;GET DATA MASK.
2780  006600                                                             CALL DATLNG OUT <R1>
2781  006600  162705  000002                   SUB     #1+2,R5
2782  006604  004767  001666                   JSR     PC,DATLNG
2783  006610  012501                           MOV     (R5)+,R1
2784  006612                                                             LET R0 := @#RBUF ; START CLEAR
2785  006612  017700  172444                   MOV     @#RBUF,R0
2786
2787
2788  006616                                                                     ;ALL BINARY CHAR.
2789  006616  005002                           CLR     R2                  INCR R2 FROM #0 TO #377 BY #1
2790  006620  000401                           BR      50145$
2791  006622                                  50146$:
2792  006622  005202                           INC     R2
2793  006624                                  50145$:
2794  006624  020227  000377                   CMP     R2,#377
2795  006630  003062                           BGT     50147$
2796
2797
2798                                                                     ;TRANSMIT CHAR IN R2
2799
2800  006632                                                             CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
2801  006632  010546                           MOV     R5,-(SP)
2802  006634  012745  177777                   MOV     #SET,-(R5)
```

```
2803  006640  016745  172420          MOV     TCSR,-(R5)
2804  006644  012745  000200          MOV     #XMITRDY,-(R5)
2805  006650  012745  000500          MOV     #500,-(R5)
2806  006654  004767  001440          JSR     PC,TIMER
2807  006660  012605                  MOV     (SP)+,R5
2808  006662
2809  006662  103003                  BCC     50150$
2810  006664
2811  006664  052767  000010  001300  BIS     #BIT3,ERRCHK
2812  006672
2813  006672                  50150$:
2814
2815
2816  006672
2817  006672  110277  172372          MOVB    R2,@TBUF
2818
2819  006676
2820  006676  010546                  MOV     R5,-(SP)
2821  006700  012745  177777          MOV     #SET,-(R5)
2822  006704  016745  172350          MOV     RCSR,-(R5)
2823  006710  012745  000200          MOV     #RCVRDONE,-(R5)
2824  006714  012745  000500          MOV     #500,-(R5)
2825  006720  004767  001374          JSR     PC,TIMER
2826  006724  012605                  MOV     (SP)+,R5
2827  006726
2828  006726  103003                  BCC     50151$
2829  006730
2830  006730  052767  000020  001234  BIS     #BIT4,ERRCHK
2831  006736
2832  006736                  50151$:
2833
2834  006736
2835  006736  017703  172320          MOV     @RBUF,R3
2836
2837
2838
2839
2840
2841
2842  006742
2843  006742  010204                  MOV     R2,R4
2844  006744  040104                  BIC     R1,R4
2845  006746
2846  006746  040103                  BIC     R1,R3
2847
2848
2849  006750
2850  006750  020403                  CMP     R4,R3
2851  006752  001410                  BEQ     50152$
2852
2853
2854  006754
2855  006754  042777  000004  172302  BIC     #MAINT,@TCSR
2856  006762
2857  006762  104116                  ERROR   116
2858  006764
```

```
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
```

```
2859  006764  012767  000001  172166          MOV     #1,@TIMES
2860  006772  000416                          BR      TST22           ;;;EXIT THIS TEST
2861  006774                                                              ENDIF
2862  006774                          501526$:
2863  006774                                                          ENDINC  ; R2
2864  006774  000712                          BR      501466$
2865  006776                          501476$:
2866
2867                                                                  ;RESET MAINT. BIT.
2868  006776                                                          LET @TCSR := @TCSR CLR.BY @MAINT
2869  006776  042777  000004  172260          BIC     @MAINT,@TCSR
2870  007004                                                          IF @BIT3 SETIN ERRCHK THEN
2871  007004  032767  000010  001160          BIT     @BIT3,ERRCHK
2872  007012  001401                          BEQ     501536$
2873  007014                                                                  ERRHRD 130
2874  007014  104130                          ERROR   130
2875  007016                                                          ENDIF
2876  007016                          501536$:
2877  007016                                                          IF @BIT4 SETIN ERRCHK THEN
2878  007016  032767  000020  001146          BIT     @BIT4,ERRCHK
2879  007024  001401                          BEQ     501546$
2880  007026                                                                  ERRHRD 131
2881  007026  104131                          ERROR   131
2882  007030                                                          ENDIF
2883  007030                          501546$:
2884  007030                                                      ENDTST
2885
2886
2887
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 22        TEST DATA THROUGH WRAP
                                ;;*****************************************************************
007030  000004                  TST22:  SCOPE
007032  012767  000001  172120          MOV     #1,$TIMCS       ;;DO 1 ITERATION
007040  012767  000022  172132          MOV     #22.,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
                                                                        IF @WRAP NOTSETIN $USWR OR @CONSPD NOTSETIN $USW
007046
007046  032767  020000  172144          BIT     @WRAP,$USWR
007054  001404                          BEQ     50155$
007056  032767  000100  172134          BIT     @CONSPD,$USWR
007064  001004                          BNE     50156$
007066                          50155$:
                                                                        ;CAN'T TEST WITHOUT A WRAP
007066                                                                EXIT TST
007066  012767  000001  172064          MOV     #1,$TIMES
007074  000516                          BR      TST23           ;;;EXIT THIS TEST
007076                                                                ENDIF
007076                          50156$:
                                                                        ;DON'T USE MAINT.
007076                                                                LET @TCSR := @TCSR CLR.BY @MAINT
007076  042777  000004  172160          BIC     @MAINT,@TCSR
                                                                        ; IF A SPECIAL TURN AROUND CARD IS
                                                                        ;   CONNECTED IN PLACE OF THE WRAP
                                                                        ;  SETTING READER RUN WILL ENABLE IT.
                                                                        ; THIS MODULE IS ONLY USED IN MANUFACTUR
                                                                        ; AND ONLY ON THE CONSOLE DLV11-F.
                                                                        ; IF NO SPECIAL MODULE IS AVAILABLE,
                                                                        ; AND THE WRAP BIT IS SET IN $USWR
                                                                        ; THEN THIS TEST WILL ERROR ON THE CONSO
007104                                                                  LET @RCSR := @RCSR SET.BY #11
007104  052777  000011  172146          BIS     #11,@RCSR
                                                                        ;CHANGE PRIORITY
                                                                        ;..TO 0
007112  012746  000000                  MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
007116  012746  007124                  MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
007122  000002                          RTI                     ;;POP NEW PC AND PS
007124                          64$:
                                                                        ;GET DATA MASK
007124                                                                CALL DATLNG OUT <R1>
007124  162705  000002                  SUB     #1+2,R5
007130  004767  001342                  JSR     PC,DATLNG
007134  012501                          MOV     (R5)+,R1
007136                                                                LET R0 := @RBUF ; START CLEAN
007136  017700  172120                  MOV     @RBUF,R0
                                                                        ;BINARY COUNT PATTERN
007142                                                                INCR R2 FROM #0 TO #377 BY #1
007142  005002                          CLR     R2
007144  000401                          BR      50157$
007146                          50160$:
007146  005202                          INC     R2
007150                          50157$:
007150  020227  000377                  CMP     R2,#377
007154  003063                          BGT     50161$
```

```
2944
2945                                                                    ;TRANSMIT THE CHAR. IN R2.
2946
2947                                                                        ; MAKE SURE IT'S READY
2948  007156                                                            CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
2949  007156  010546                    MOV     R5,-(SP)
2950  007160  012745  177777            MOV     #SET,-(R5)
2951  007164  016745  172074            MOV     TCSR,-(R5)
2952  007170  012745  000200            MOV     #XMITRDY,-(R5)
2953  007174  012745  000500            MOV     #500,-(R5)
2954  007200  004767  001114            JSR     PC,TIMER
2955  007204  012605                    MOV     (SP)+,R5
2956  007206                                                            IF.ERROR THEN
2957  007206  103005                    BCC     501628
2958  007210  104123                    ERROR   123                         ; TRANSMITTER NEVER BECAME READY
2959  007212                                                                EXIT TEST
2960  007212  012767  000001  171740    MOV     #1,$TIMES
2961  007220  000444                    BR      TST23           ;;;EXIT THIS TEST
2962  007222                                                            ENDIF
2963  007222                        501628:
2964
2965                                                                        ;START IT ON ITS WAY
2966  007222                                                            LET @TBUF :@= R2
2967  007222  110277  172042            MOVB    R2,@TBUF
2968                                                                    ; NOW WAIT FOR RECIEVER DONE
2969  007226                                                            CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
2970  007226  010546                    MOV     R5,-(SP)
2971  007230  012745  177777            MOV     #SET,-(R5)
2972  007234  016745  172020            MOV     RCSR,-(R5)
2973  007240  012745  000200            MOV     #RCVRDONE,-(R5)
2974  007244  012745  000500            MOV     #500,-(R5)
2975  007250  004767  001044            JSR     PC,TIMER
2976  007254  012605                    MOV     (SP)+,R5
2977  007256                                                                IF.ERROR THEN
2978  007256  103005                    BCC     501638
2979  007260                                                                    ERRNRD 124
2980  007260  104124                    ERROR   124                     ; RECIEVER NEVER BECAME READY
2981                                                                    EXIT TEST
2982  007262
2983  007262  012767  000001  171670    MOV     #1,$TIMES
2984  007270  000420                    BR      TST23           ;;;EXIT THIS TEST
2985  007272                                                            ENDIF
2986  007272                        501638:
2987
2988                                                                        ;RETRIEVE
2989  007272                                                            LET R3 := @RBUF
2990  007272  017703  171764            MOV     @RBUF,R3
2991
2992                                                                        ;STRIP OFF JUNK ON BOTH
2993  007276                                                            LET R4 := R2 CLR.BY R1
2994  007276  010204                    MOV     R2,R4
2995  007300  040104                    BIC     R1,R4
2996  007302                                                            LET R3 := R3 CLR.BY R1
2997  007302  040103                    BIC     R1,R3
2998
2999                                                                        ;WE HAVE TROUBLE
```

```
3000  007304                                                          IF R4 NE R3 THEN
3001  007304  020403                          CMP     R4,R3
3002  007306  001405                          BEQ     50164$
3003                                                                      ;DATA COMPARE ERROR
3004  007310                                                              ERRHRD 117,COMP,SBWAS
3005  007310  104117                          ERROR   117
3006  007312                                                              EXIT TEST ; ON ERROR
3007  007312  012767  000001  171640          MOV     #1,$TIMES
3008  007320  000404                          BR      TST23          ;;;EXIT THIS TEST
3009  007322                                                          ENDIF
3010  007322                          50164$:
3011
3012  007322                                                      ENDINC  ; R2
3013  007322  000711                          BR      50160$
3014  007324                          50161$:
3015                                                                    ; NOW THAT THE TEST IS DONE
3016                                                                    ;  WE WILL TOGGLE READER RUN
3017                                                                    ;  TO TURN OFF THE SPECIAL MODULE.
3018  007324                                                          LET @RCSR := @RCSR SET.BY #11
3019  007324  052777  000011  171726          BIS     #11,@RCSR
3020
3021
3022
3023  007332                                                      ENDTST
3024
3025
3026
3027
```

```
3028                                    ;;*****************************************************************
3029                                    ;;*****************************************************************
3030                                    ;*TEST 23        FULL DATA TRANSFER WITH INTERRUPTS
3031                                    ;*              AND MAINTENANCE MODE.
3032                                    ;;*****************************************************************
3033  007332  000004                    TST23:  SCOPE
3034  007334  012767  000001  171616            MOV     #1,$TIMES       ;;DO 1 ITERATION
3035  007342  012767  000023  171630            MOV     #23,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
3036
3037  007350                                                            IF @MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ @TRU
3038  007350  032767  040000  171642            BIT     @#MAINTJUMP,$USWR
3039  007356  001404                            BEQ     50165$
3040  007360  126727  001541  000001            CMPB    CONSOLE,#TRUE
3041  007366  001004                            BNE     50166$
3042  007370                                50165$:
3043  007370                                                                EXIT TEST
3044  007370  012767  000001  171562            MOV     #1,$TIMES
3045  007376  000553                            BR      TST24           ;;;EXIT THIS TEST
3046  007400                                                            ENDIF
3047  007400                                50166$:
3048
3049                                                                    ;GET DATA MASK
3050  007400                                                            CALL DATLNG OUT <R3>
3051  007400  162705  000002                    SUB     #1*2,R5
3052  007404  004767  001066                    JSR     PC,DATLNG
3053  007410  012503                            MOV     (R5)+,R3
3054
3055
3056                                    ; THIS TEST WILL RUN BOTH TRANSMITTER AND
3057                                    ; RECIEVER AT FULL SPEED TESTING
3058                                    ; THE ABILITY OF THE MODULE
3059                                    ; TO HANDLE INTERRUPTS FROM BOTH SIDES
3060                                    ; AT ONCE. ALSO, THE DOUBLE BUFFERING LOGIC
3061                                    ; OF THE UART WILL BE FULLY TESTED.
3062                                    ;  THIS TEST WILL TRANSFER A MAXIMUM OF 400(8)
3063                                    ; CHARACTERS THROUGH THE MODULE, BUT IF AN ERROR
3064                                    ; IS DETECTED BY THE TEST A PREMATURE SHUTDOWN OCCURS.
3065
3066                                                                    ;CHANGE PRIORITY
3067                                                                    ;..TO 0
3068  007412  012746  000000                    MOV     @#PR0,-(SP)     ;;PUT NEW PS ON STACK
3069  007416  012746  007424                    MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
3070  007422  000002                            RTI                     ;;POP NEW PC AND PS
3071  007424                                64$:
3072                                                                    ;GET VECTOR ADDRESS
3073  007424                                                                LET R1 := DLVEC
3074  007424  016701  171626                    MOV     DLVEC,R1
3075                                                                    ;RCVR VECTOR
3076  007430                                                                LET (R1)+ := #REC
3077  007430  012721  007632                    MOV     #REC,(R1)+
3078  007434                                                                LET (R1)+ := #PR7
3079  007434  012721  000340                    MOV     #PR7,(R1)+
3080                                                                    ;POINT TO TRANSMITTER VECTOR
3081                                                                    ;AND SET IT UP ALSO
3082  007440                                                                LET (R1)+ := #TRAN
3083  007440  012721  007570                    MOV     #TRAN,(R1)+
```

```
3084  007444                                                    LET (R1)  := @PR7
3085  007444  012711  000340          MOV     @PR7,(R1)
3086
3087                                                                  ; CLEAR ERROR COUNTER
3088  007450                                                    LET ERRCNT := @0
3089  007450  005067  000106          CLR     ERRCNT
3090                                                                  ; INITIALIZE COUNTERS
3091  007454                                                    LET R1 := @-1
3092  007454  012701  177777          MOV     @-1,R1
3093                                                                  ;RECEIVER STORAGE
3094  007460                                                    LET R2 := @0
3095  007460  005002                  CLR     R2
3096                                                                  ;# OF RECEIVED CHAR. COUNT.
3097  007462                                                    LET R4 := @-1
3098  007462  012704  177777          MOV     @-1,R4
3099
3100  007466                                                    @RESET  ;SET UP ALL REGISTERS
3101  007466  000005                  RESET
3102                                                                  ;SET UP MAINTENANCE
3103  007470                                                    LET @TCSR := @TCSR SET.BY @MAINT
3104  007470  052777  000004  171566  BIS     @MAINT,@TCSR
3105
3106                                                                  ;SET I.E. IN TRANSMITTER
3107  007476                                                    LET @TCSR := @TCSR SET.BY @XMITIE
3108  007476  052777  000100  171560  BIS     @XMITIE,@TCSR
3109                                                                  ;AND RECEIVER
3110  007504                                                    LET @RCSR := @RCSR SET.BY @RCVRIE
3111  007504  052777  000100  171546  BIS     @RCVRIE,@RCSR
3112
3113
3114                                                          ;NOW WE WAIT UNTIL R4 COUNT (RECEIVED) IS EQUAL
3115  007512                                                  REPEAT
3116  007512                  501674:
3117  007512                                                  UNTIL R4 EQ NUMBER OR ERRCNT GT @0
3118  007512  020467  000046          CMP     R4,NUMBER
3119  007516  001403                  BEQ     501704
3120  007520  005767  000036          TST     ERRCNT
3121  007524  003772                  BLE     501674
3122  007526                  501704:
3123
3124  007526                                                  LET @TCSR := @TCSR CLR.BY @MAINT
3125  007526  042777  000004  171530  BIC     @MAINT,@TCSR
3126                                                                  ; CHECK FOR DATA COMPARE ERRORS.
3127  007534                                                  IF ERRCNT NE @0 THEN
3128  007534  005767  000022          TST     ERRCNT
3129  007540  001401                  BEQ     501714
3130
3131  007542                                                        ;DATA COMPARE ERROR
3132  007542  104120                  ERROR   120                 ERRHRD 120,COMP,FIRST
3133  007544
3134  007544                  501714:                           ENDIF
3135
3136  007544                                                  LET @TCSR := @TCSR CLR.BY @XMITIE
3137  007544  042777  000100  171512  BIC     @XMITIE,@TCSR
3138  007552                                                  LET @RCSR := @RCSR CLR.BY @RCVRIE
3139  007552  042777  000100  171500  BIC     @RCVRIE,@RCSR
```

```
                                                                    EXIT    ;SKIP OVER SUPPORT ROUTINES & STORAGE
007560  000462                          BR      TST24           ;;;EXIT THIS TEST

007562  000000                  ERRCNT: 0
007564  001000                  NUMBER: 1000
007566     000                  SB:     .BYTE 0
007567     000                  WAS:    .BYTE 0


                        ;;*****************************************************************
                                                ;TRANSMIT INTERRUPT HANDLER
                                                                BGNSRV  TRAN
007570                  TRAN:
                        ;;*****************************************************************

                                                                    ;INCREMENT CHAR COUNT
007570                                                          LET R1 := R1 + #1
007570  005201                          INC     R1

                                                                    ;SET UP FOR TRANSFER
007572                                                          LET HOLD := R1 CLR.BY R3
007572  010167  000030                  MOV     R1,HOLD
007576  040367  000024                  BIC     R3,HOLD

                                                                    ;AND SEND.
007602                                                          LET @TBUF := HOLD
007602  016777  000020  171460          MOV     HOLD,@TBUF

                                                                    ;ALL DONE
007610                                                          IF R1 EQ NUMBER THEN
007610  020167  177750                  CMP     R1,NUMBER
007614  001003                          BNE     50172$

                                                                        ;STOP   INTERRUPT PROCESSING
                                                                    LET @TCSR := @TCSR CLR.BY #XMITIE
007616  042777  000100  171440          BIC     #XMITIE,@TCSR
                                                                ENDIF
007624                          50172$:

007624  000401                          BR      ZZZ                 ; EXIT SRV

007626  000000                      HOLD:0

007630                          ZZZ:                            ENDSRV
007630  000002                          RTI


                        ;;*****************************************************************
                                                ;RECEIVER INTERRUPT HANDLER
                                                                BGNSRV  REC
007632                  REC:
                        ;;*****************************************************************

                                                                    ;COUNT THIS CHAR.
007632                                                          LET R4 := R4 + #1
007632  005204                          INC     R4

                                                                    ;GET CHAR IN + MASK IT
007634                                                          LET R2 := @RBUF CLR.BY R3
007634  017702  171422                  MOV     @RBUF,R2
```

```
3196  007640  040302                          BIC     R3,R2
3197
3198  007642
3199  007642  010467  000054                  MOV     R4,RMLD
3200  007646  040367  000050                  BIC     R3,RMLD
3201
3202
3203  007652
3204  007652  020267  000044                  CMP     R2,RMLD
3205  007656  001412                          BEQ     50173$
3206
3207  007660
3208  007660  005767  177676                  TST     ERRCNT
3209  007664  001005                          BNE     50174$
3210
3211  007666
3212  007666  116767  000030  177672          MOVB    RMLD,SB
3213  007674
3214  007674  110267  177667                  MOVB    R2,WAS
3215  007700
3216  007700                          50174$:
3217
3218  007700
3219  007700  005267  177656                  INC     ERRCNT
3220  007704
3221  007704                          50173$:
3222
3223
3224  007704
3225  007704  020467  177654                  CMP     R4,NUMBER
3226  007710  001003                          BNE     50175$
3227
3228  007712
3229  007712  042777  000100  171340          BIC     @RCVRIE,@RCSR
3230
3231
3232
3233  007720
3234  007720                          50175$:
3235
3236  007720  000401                          BR      ZZZZ
3237
3238  007722  000000
3239  007724                           ZZZZ:
3240  007724
3241  007724  000002                          RTI
3242
3243  007726
3244
3245
3246
```

```
    ;RMLD WILL CONTAIN EXPECTED INPUT
LET RMLD := R4 CLR.BY R3


    ;DO THEY COMPARE
IF R2 NE RMLD THEN


    ;FIRST ERROR
    IF ERRCNT EQ #0 THEN


    ;SAVE RECORD OF FIRST MISS
        LET SB :B= RMLD

        LET WAS :B= R2

    ENDIF

    ;COUNT IT.
    LET ERRCNT := ERRCNT + #1

ENDIF


    ;ALL DONE?
IF R4 EQ NUMBER THEN


    ;STOP RECEIVER INTERRUPTS
    LET @RCSR := @RCSR CLR.BY @RCVRIE

            ; INDICATE ALL DONE TO TIMER
    ;MAIN REPEAT LOOP IS CHECKING
    ;FOR 'R4 = NUMBER' ALSO
ENDIF


    ; EXIT SRV

    RMLD:0

ENDSRV


ENDTST
```

```
3247                                    ;;*****************************************************************
3248                                    ;;*****************************************************************
3249                                    ;*TEST 24        TEST BREAK GENERATION LOGIC
3250                                    ;*              TRANSMIT KNOWN CHAR WITH BREAK SET
3251                                    ;*              AND COMPARE RECEIVED WITH 0.
3252                                    ;*              FRAMING ERROR WILL ALSO BE CHECKED
3253                                    ;*              IF ERROR BITS ARE ENABLED.
3254                                    ;;*****************************************************************
3255  007726  000004                    TST24:  SCOPE
3256  007730  012767  000010  171222            MOV     #10.,$TIMES         ;;DO 10 ITERATIONS
3257  007736  012767  000024  171234            MOV     #24.,$TESTN         ;;SET TEST NUMBER IN APT MAIL BOX
3258  007744                                                                        IF @#MAINTJUMP NOTSETIN $USWR OR @#BRK NOTSETIN $U
3259  007744  032767  040000  171246            BIT     @#MAINTJUMP,$USWR
3260  007752  001404                            BEQ     50176$
3261  007754  032767  010000  171236            BIT     @#BRK,$USWR
3262  007762  001004                            BNE     50177$
3263  007764                                50176$:
3264  007764                                                                            EXIT TEST
3265  007764  012767  000001  171166            MOV     #1,$TIMES
3266  007772  000500                            BR      TST25               ;;;EXIT THIS TEST
3267  007774                                                                        ENDIF
3268  007774                                50177$:
3269  007774                                                                        IFB CONSOLE EQ #TRUE THEN
3270  007774  126727  001125  000001            CMPB    CONSOLE,#TRUE
3271  010002  001004                            BNE     50200$
3272  010004                                                                            EXIT TEST
3273  010004  012767  000001  171146            MOV     #1,$TIMES
3274  010012  000470                            BR      TS125               ;;;EXIT THIS TEST
3275  010014                                                                        ENDIF
3276  010014                                50200$:
3277
3278  010014
3279  010014  005067  000152                    CLR     ERRCHK                  LET ERRCHK := #0        ; CLEAR ERROR WORD
3280
3281  010020                                                                        ;SET MAINTENANCE BIT
3282  010020  052777  000004  171236            BIS     #MAINT,@TCSR            LET @TCSR := @TCSR SET.BY #MAINT
3283
3284  010026                                                                        ;SET BREAK BIT
3285  010026  052777  000001  171230            BIS     #BREAK,@TCSR            LET @TCSR := @TCSR SET.BY #BREAK
3286
3287  010034                                                                        ;NON-ZERO CHAR. '*'
3288  010034  012777  000252  171226            MOV     #252,@TBUF              LET @TBUF := #252
3289
3290  010042                                                                        ;WAIT FOR DONE
3291  010042  010546                            MOV     R5,-(SP)                CALL TIMER IN <#500,#RCVRDONF,RCSR,#SET>
3292  010044  012745  177777                    MOV     #SET,-(R5)
3293  010050  016745  171204                    MOV     RCSR,-(R5)
3294  010054  012745  000200                    MOV     #RCVRDONE,-(R5)
3295  010060  012745  000500                    MOV     #500,-(R5)
3296  010064  004767  000230                    JSR     PC,TIMER
3297  010070  012605                            MOV     (SP)+,R5
3298  010072
3299  010072  103001                            BCC     50201$                  IF.ERROR THEN
3300
3301  010074                                                                        ; RECIEVER DONE DID NOT SET
3302  010074  104115                            ERROR   115                     ERRHRD 115
```

```
3303  010076
3304  010076                                  50201$:
3305
3306  010076
3307  010076  105777  171160                       TSTB    @RBUF
3308  010102  001404                               BEQ     50202$
3309
3310  010104
3311  010104  052767  000001  000060               BIS     #BIT0,ERRCHK
3312  010112
3313  010112  000413                               BR      50203$
3314  010114                                  50202$:
3315  010114
3316  010114  032767  100000  171076               BIT     #ERRBITS,$USWR
3317  010122  001407                               BEQ     50204$
3318  010124
3319  010124  032777  020000  171130               BIT     #FRERR,@RBUF
3320  010132  001003                               BNE     50205$
3321  010134
3322  010134  052767  000002  000030               BIS     #BIT1,ERRCHK
3323  010142
3324  010142                                  50205$:
3325  010142
3326  010142                                  50204$:
3327  010142
3328  010142                                  50203$:
3329
3330  010142
3331  010142  000005                               RESET
3332
3333  010144
3334  010144  032767  000001  000020               BIT     #BIT0,ERRCHK
3335  010152  001401                               BEQ     50206$
3336  010154
3337  010154  104121                               ERROR   121
3338  010156
3339  010156                                  50206$:
3340  010156
3341  010156  032767  000002  000006               BIT     #BIT1,ERRCHK
3342  010164  001401                               BEQ     50207$
3343  010166
3344  010166  104122                               ERROR   122
3345  010170
3346  010170                                  50207$:
3347  010170
3348  010170  000401                               BR      TST25           ;;;EXIT THIS TEST
3349  010172  000000                          ERRCHK: .WORD 0
3350  010174                                                              ENDTST
3351
```

```
ENDTF

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
```

```
3352
3353                                    ;;*****************************************************************
3354                                    ;*TEST 25        NOT A TEST - SEND BACK TO LOOP
3355                                    ;;*****************************************************************
3356  010174  000004                   TST25:  SCOPE
3357  010176  012767  000001  170754           MOV     #1,$TIMES       ;;DO 1 ITERATION
3358  010204  104401  010212                   TYPE    ,65$            ;;TYPE ASCIZ STRING
3359  010210  000404                           BR      64$             ;;GET OVER THE ASCIZ
3360                                    ;;65$:  .ASCIZ  <CRLF>*CSR: *
3361  010222                            64$:
3362  010222  016746  171026                   MOV     DLADD,-(SP)     ;;SAVE DLADD FOR TYPEOUT
3363  010226  104402                           TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3364  010230  104401  010236                   TYPE    ,67$            ;;TYPE ASCIZ STRING
3365  010234  000405                           BR      66$             ;;GET OVER THE ASCIZ
3366                                    ;;67$:  .ASCIZ  *,VECTOR: *
3367  010250                            66$:
3368  010250  016746  171002                   MOV     DLVEC,-(SP)     ;;SAVE DLVEC FOR TYPEOUT
3369  010254  104402                           TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3370  010256  104401  010264                   TYPE    ,69$            ;;TYPE ASCIZ STRING
3371  010262  000405                           BR      68$             ;;GET OVER THE ASCIZ
3372                                    ;;69$:  .ASCIZ  *,ERRORS: *
3373  010276                            68$:
3374  010276  016746  170610                   MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
3375  010302  104405                           TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
3376  010304  005067  170602                   CLR     $ERTTL          ; RESET FOR NEXT DEVICE/PASS
3377  010310  104401  001171                   TYPE    ,$CRLF
3378  010314  000167  171616                   JMP     LOOP            ; BACK UP TO THE BEGINNING
```

```
3379
3380                                        ;;BGNMOD        SUBS
3381                                    ;;*****************************************************************
3382  010320                              ROUTINE TIMER <HOWLONG,WHICHBIT,REG,SETCLR>
3383  010320                            TIMER:
3384                                    ;* ROUTINE:TIMER
3385                                    ;*      THIS ROUTINE IS USED TO TEST THE STATUS OF ANY BIT
3386                                    ;*      IN ANY REGISTER.
3387                                    ;*      INPUTS:
3388                                    ;*           HOWLONG    THE MAXIMUM AMOUNT OF TIME TO SPEND IN
3389                                    ;*                      THIS ROUTINE.
3390                                    ;*           WHICHBIT     A MASK WITH THE BIT(S) SET THAT ARE
3391                                    ;*                      TO BE CHECKED.
3392                                    ;*           REG     A POINTER TO THE REGISTER TO BE CHECKED
3393                                    ;*           SETCLR  THE DESIRED RESULTS
3394                                    ;*                   EITHER @SET OR @CLEAR
3395                                    ;*      OUTPUT:
3396                                    ;*           THE 'C' BIT IS SET TO INDICATE AN ERROR
3397                                    ;*           BUT IT IS TESTED BY THE IF.ERROR STATEMENT
3398                                    ;*
3399                                    ;*
3400                                    ;*           NOTE::  THE USE OF (R5) IS PART OF THE LINKAGE
3401                                    ;*                   MECHANISM BETWEEN THE CALLER AND THE CALLED
3402                                    ;;*****************************************************************
3403                                    .ENABL LSB
3404          000001                                                    TRUE=  1
3405          000000                                                    FALSE=  0
3406
3407  010320                            LET     REGSAV := REG(R5) ; GET POINTER TO REGIST
3408  010320  016567  000004  000136            MOV     REG(R5),REGSAV
3409  010326                            LET     TIMSAV := HOWLONG(R5) ; SAVE HOWLONG FOR
3410  010326  016567  000000  000132            MOV     HOWLONG(R5),TIMSAV
3411  010334                            LET     FLAG :B= @FALSE ; INITIALIZE THE EXIT FLA
3412  010334  112767  000000  000126            MOVB    @FALSE,FLAG
3413
3414
3415                                    ;       START OF AN INFINITE LOOP
3416
3417  010342                            LOOP
3418  010342                          50002$:
3419                                          ; TEST TO SEE IF WHICHBIT IS SET
3420  010342                                IF      WHICHBIT(R5)  NOTSET IN @REGSAV THEN
3421  010342  036577  000002  000114            BIT     WHICHBIT(R5),@REGSAV
3422  010350  001004                            BNE     50004$
3423  010352                                    LET     HOLDSC :B= @CLR
3424  010352  112767  000000  000111            MOVB    @CLR,HOLDSC
3425  010360                                ELSE
3426  010360  000403                            BR      50005$
3427  010362                          50004$:
3428  010362                                    LET     HOLDSC :B= @SET ; REMEMBER THIS
3429  010362  112767  177777  000101            MOVB    @SET,HOLDSC
3430  010370                                ENDIF
3431  010370                          50005$:
3432                                          ; NOW SEE IF THAT WAS WHAT WE WANTED
3433                                          IFB     HOLDSC EQ SETCLR(R5) THEN
3434  010370
```

```
3435  010370  126765  000075  000006          CMPB    HOLDSC,SETCLR(R5)
3436  010376  001003                          BNE     50006$
3437                                                                  ; JUST THE THING WE NEEDED
3438  010400                                                              LET     FLAG :B= @TRUE
3439  010400  112767  000001  000062          MOVB    @TRUE,FLAG
3440  010406                                                            ENDIF
3441  010406                          50006$:
3442
3443  010406                                                          EXIFB   FLAG EQ @TRUE OR TIMSAV LE #0
3444  010406  126727  000056  000001          CMPB    FLAG,@TRUE
3445  010414  001414                          BEQ     50003$
3446  010416  005767  000044                  TST     TIMSAV
3447  010422  003411                          BLE     50003$
3448                                                                  ; ONE WAY OR THE OTHER, WE ARE DONE
3449                                                                ; IF WE ARE STILL HERE THEN HANG AROUND A WHILE
3450
3451  010424                                                              WAITMS  1           ;WAIT FOR 1 MILLI-SECONDS
3452  010424  010546                          MOV     R5,-(SP)
3453  010426  012745  000001                  MOV     #1,-(R5)
3454  010432  004767  000140                  JSR     PC,WAIT
3455  010436  012605                          MOV     (SP)+,R5
3456  010440
3457  010440  005367  000022                  DEC     TIMSAV                  LET     TIMSAV := TIMSAV - #1 ; COUNTING DOWN
3458  010444
3459  010444  000736                          BR      50002$                ENDLOOP                   ; CONTINUED AT THE TOP
3460  010446                          50003$:
3461
3462                                          ; ONLY 2 WAYS TO GET HERE
3463                                          ;       1). WE RAN OUT OF TIME---ERROR ! !
3464                                          ;       2). THE BIT IS IN THE CORRECT CONDITION--GOOD ! !
3465
3466  010446                                                              IFB     FLAG EQ @TRUE THEN
3467  010446  126727  000016  000001          CMPB    FLAG,@TRUE
3468  010454  001001                          BNE     50007$
3469  010456                                                                  RETURN  NO.ERROR    ; GOOD
3470  010456  000405                          BR      50000$
3471  010460                                                              ENDIF
3472  010460                          50007$:
3473  010460                                                              RETURN  ERROR           ; BAD
3474  010460  000261                          SEC
3475  010462  000404                          BR      50001$
3476
3477  010464  000000                                                      REGSAV: .WORD 0
3478  010466  000000                                                      TIMSAV: .WORD 0
3479  010470     000                                                      FLAG:   .BYTE 0
3480  010471     000                                                      HOLDSC: .BYTE 0
3481                                                                ; WE ARE DONE  GO BACK HOME
3482  010472                                                              ENDRTN
3483  010472                          50000$:
3484  010472  000241                          CLC
3485  010474                          50001$:
3486  010474  000207                          RTS     PC
3487                                  .DSABL LSB
```

```
3488
3489                                    ;;*****************************************************************
3490  010476                            ROUTINE DATLNG <MASK>
3491  010476                            DATLNG:
3492                                    ;* ROUTINE:DATLNG
3493                                    ;*       THIS ROUTINE SETS UP A MASK FOR DATA, WITH
3494                                    ;*  INPUT - NOTHING IS PASSED TO THIS ROUTINE
3495                                    ;*       BUT GLOBAL INFORMATION IS ASSUMED TO EXIST:
3496                                    ;*       $USWR-- THE WORD FOR SOFTWARE PARAMETERS
3497                                    ;*       DATA-- A MASK FOR THE LOCATION OF THE OCTAL
3498                                    ;*                NUMBER OF DATA BITS
3499                                    ;*  OUTPUT----
3500                                    ;*       MASK-- A MASK OF BINARY ONES RIGHT-JUSTIFIED
3501                                    ;*                THE NUMBER OF WHICH IS DEFINED IN $USWR WORD.
3502
3503                                    ;;*****************************************************************
3504                                    .ENABL LSB
3505  010476                                                                    LET MASK(R5) := #0              ; START
3506  010476  005065  000000                   CLR     MASK(R5)
3507  010502                                                                    LET NUMBR := $USWR AND #DATA
3508  010502  016767  170512  000062           MOV     $USWR,NUMBR
3509  010510  016746  000056                   MOV     NUMBR,-(SP)
3510  010514  042716  000017                   BIC     #DATA,(SP)
3511  010520  042667  000046                   BIC     (SP)+,NUMBR
3512
3513  010524                                                                    INCR I FROM #1 TO NUMBR BY #1
3514  010524  012767  000001  170540           MOV     #1,I
3515  010532  000402                           BR      500028
3516  010534                            500038:
3517  010534  005267  170532                   INC     I
3518  010540                            500028:
3519  010540  026767  170526  000024           CMP     I,NUMBR
3520  010546  003006                           BGT     500048
3521  010550                                                                        LET MASK(R5) := MASK(R5) SHIFT 1
3522  010550  006365  000000                   ASL     MASK(R5)
3523  010554                                                                        LET MASK(R5) := MASK(R5) SET.BY #1
3524  010554  052765  000001  000000           BIS     #1,MASK(R5)
3525  010562                                                                    ENDINC
3526  010562  000764                           BR      500038
3527  010564                            500048:
3528  010564                                                                    LET MASK(R5) := COMP MASK(R5)
3529  010564  005165  000000                   COM     MASK(R5)
3530  010570                                                                RETURN
3531  010570  000401                           BR      500008
3532  010572  000000                           NUMBR:0
3533  010574                                                            ENDRTN
3534  010574                            500008:
3535  010574                            500018:
3536  010574  000207                           RTS     PC
3537                                    .DSABL LSB
```

```
3538
3539                                    ;;*****************************************************************
3540  010576                            ROUTINE WAIT    <TIME>
3541  010576                            WAIT:
3542                                    ;* ROUTINE:WAIT
3543                                    ;*       THIS ROUTINE IS USED TO DELAY EXECUTION OF THE
3544                                    ;*       MAIN  PROGRAM  FOR A SPECIFIED AMOUNT OF TIME.
3545                                    ;*       THIS   IS   ACCOMPLISHED   BY  INCREMENTING  A
3546                                    ;*       REGISTER UP TO A LIMIT.  THE INNER LOOP IS SET
3547                                    ;*       TO APPROXIMATE 1 MILLI SEC.
3548                                    ;;*****************************************************************
3549  010576  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3550  010600  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3551  010602  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
3552  010604                                    LET R1 := TIME(R5)
3553  010604  016501  000000                    MOV     TIME(R5),R1
3554  010610                                    INCRU R2 FROM #1 TO R1 BY #1
3555  010610  012702  000001                    MOV     #1,R2
3556  010614  000402                            BR      500021
3557  010616                            500031:
3558  010616  062702  000001                    ADD     #01,R2
3559  010622                            500021:
3560  010622  020201                            CMP     R2,R1
3561  010624  101010                            BHI     500041
3562  010626                                    INCR R3 FROM #0 TO #100 BY #1
3563  010626  005003                            CLR     R3
3564  010630  000401                            BR      500051
3565  010632                            500061:
3566  010632  005203                            INC     R3
3567  010634                            500051:
3568  010634  020327  000100                    CMP     R3,#100
3569  010640  003001                            BGT     500071
3570  010642                                    ENDINC
3571  010642  000773                            BR      500061
3572  010644                            500071:
3573  010644                                    ENDINC
3574  010644  000764                            BR      500031
3575  010646                            500041:
3576  010646  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
3577  010650  012602                            MOV     (SP)+,R2        ;;POP STACK INTO R2
3578  010652  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
3579  010654                            ENDRTN
3580  010654                            500001:
3581  010654                            500011:
3582  010654  000207                            RTS     PC
```

```
                                .SBTTL  INTSRV  INTERRUPT SERVICE ROUTINE
                                ;;*****************************************************************
                                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
010656                                  INC     INTFLAG
010662                                  ENDSRV                          ;THAT'S ALL
010662  000002                          RTI
010664  000000                INTFLAG:  0
```

```
                                ROUTINE CYCLE
                                CYCLE:
                                ;;*****************************************************************
                                ;* 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. THE CONSOLE IS TREATED SPECIAL BY THIS ROUTINE.
                                ;*      IT IS ONLY TESTED ONCE IF UNDER APT. IF NOT UNDER APT
                                ;*      ALL TESTS THAT REQUIRE THE MAINT BIT ARE NOT RUN.
                                ;;*****************************************************************
                                .ENABL LSB
010666                                                  LET APTCON :B= @FALSE   ; SET DEFAULT VALUE
010666  112767  000000  000230          MOVB    @FALSE,APTCON
010674                                                  LET CONSOLE :B= @FALSE
010674  112767  000000  000223          MOVB    @FALSE,CONSOLE
                                                          REPEAT        ; UNTIL BITMASK SETIN $DEVM
010702                                  50002$:
010702                                                    IF BITMASK EQ @0 THEN
010702  005767  000200                  TST     BITMASK
010706  001027                          BNE     50003$
010710                                                        IF INITFLAG EQ @1 THEN
010710  026727  000174  000001          CMP     INITFLAG,@1
010716  001003                          BNE     50004$
010720                                                            LET INITFLAG := @0
010720  005067  000164                  CLR     INITFLAG
                                                          ELSE
010724  000403                          BR      50005$
                                        50004$:
010726                                                            CALL $EOP   ; AS A SUBROUTINE
010726  004767  000370                  JSR     PC,$EOP
                                                    ; BECAUSE $EOP RETURNS AS A JUMP
                                SPECIALADDRESS:                       LET R0 := POP
010732                                                        ENDIF
010732  012600                          MOV     (SP)+,R0
                                                            LET BITMASK := @1
010734                                  50005$:
010734                                                      LET $DEVCT := @1
010734  012767  000001  000144          MOV     @1,BITMASK
                                                            LET ADDRESS := $BASE
010742  012767  000001  170234          MOV     @1,$DEVCT
                                                            LET VECTOR := $VECT1
010750  016767  170274  000134          MOV     $BASE,ADDRESS
                                                          ELSE
010756  016767  170262  000130          MOV     $VECT1,VECTOR
                                                            LET R4 := @10
010764  000410                          BR      50006$
                                        50003$:
010766                                                      LET BITMASK := BITMASK ROTATE 1
010766  012704  000010                  MOV     @10,R4
                                                            LET ADDRESS  := ADDRESS + R4
010772  006167  000110                  ROL     BITMASK
                                                            LET VECTOR := VECTOR + R4
010776  060467  000110                  ADD     R4,ADDRESS
011002
```

```
3656  011002  060467  000106                ADD     R4,VECTOR
3657  011006                                                        ENDIF
3658  011006                          500061$:
3659  011006                                                      UNTIL   BITMASK SETIN $DEVM
3660  011006  036767  000074  170236        BIT     BITMASK,$DEVM
3661  011014  001732                        BEQ     50002$
3662  011016                                                  IF BITMASK EQ #BIT15 THEN
3663  011016  026727  000064  100000        CMP     BITMASK,#BIT15
3664  011024  001023                        BNE     50007$
3665  011026                                                  LET CONSOLE :B= #TRUE
3666  011026  112767  000001  000071        MOVB    #TRUE,CONSOLE
3667  011034                                                  LET ADDRESS := CONADR
3668  011034  016767  000060  000050        MOV     CONADR,ADDRESS
3669  011042                                                  LET VECTOR  := CONVECT
3670  011042  016767  000054  000044        MOV     CONVECT,VECTOR
3671                           ;;;;;;                         IF #CONMAINT NOTSETIN $USER THEN
3672                           ;;;;;;                             LET NOCONMAINT :B= #TRUE
3673                           ;;;;;;                         ENDIF
3674  011050                                                  IF #APTENV SETIN $ENV THEN ; APT MODE
3675  011050  032767  000001  170136        BIT     #APTENV,$ENV
3676  011056  001406                        BEQ     50010$
3677  011060                                                     IF $PASS NE #0 THEN  ; NOT FIRST PASS
3678  011060  005767  170116                TST     $PASS
3679  011064  001403                        BEQ     50011$
3680                                                                     ; DEFINE DEVICE AS APT CONSOLE
3681  011066                                                         LET APTCON :B= #TRUE
3682  011066  112767  000001  000030        MOVB    #TRUE,APTCON
3683  011074                                                     ENDIF        ; FIRST PASS
3684  011074                          50011$:
3685  011074                                                  ENDIF   ; APT
3686  011074                          50010$:
3687  011074                                                ENDIF               ; BITMASK
3688  011074                          50007$:
3689
3690  011074                                                  LET ADRS := #ADDRESS
3691  011074  012701  011112                MOV     #ADDRESS,ADRS
3692  011100                                                LET $DEVCT := $DEVCT + #1
3693  011100  005267  170100                INC     $DEVCT
3694  011104                                                RETURN
3695  011104  000411                        BR      50000$
3696  011106  100000                  BITMASK:      100000                  ; CONSOLE FIRST
3697  011110  000001                  INITFLAG:     1
3698  011112  000000                  ADDRESS:      0
3699  011114  000000                  VECTOR:       0
3700  011116  000000                  OK:           0
3701  011120  177560                  CONADR:       177560                  ; CONSOLE ADDRESS
3702  011122  000060                  CONVECT:          60                  ; CONSOLE VECTOR
```

```
  3703  011124     000                 APTCON:         .BYTE 0
  3704  011125     000                 CONSOLE:        .BYTE 0
  3705  011126     000                 NOCONMANT:      .BYTE 0
  3706          011130                         .EVEN
  3707
  3708  011130                                                 ENDRTN
  3709  011130                         50000$:
  3710  011130                         50001$:
  3711  011130  000207                        RTS     PC
  3712
  3713                                 .DSABL LSB
```

```
3714
3715  011132                                  ROUTINE MYTYPE
3716  011132                                  MYTYPE:
3717                                          ;;*****************************************************************
3718  011132  104401  011140                          TYPE    ,65$                    ;;TYPE ASCIZ STRING
3719  011136  000405                                  BR      64$                     ;;GET OVER THE ASCIZ
3720                                          ;;65$:  .ASCIZ  <CRLF>*TEST # *
3721  011152                                  64$:
3722  011152  016746  170022                          MOV     $TESTN,-(SP)            ;;SAVE $TESTN FOR TYPEOUT
3723  011156  104402                                  TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3724  011160  104401  011166                          TYPE    ,67$                    ;;TYPE ASCIZ STRING
3725  011164  000405                                  BR      66$                     ;;GET OVER THE ASCIZ
3726                                          ;;67$:  .ASCIZ  *,ERROR # *
3727  011200                                  66$:
3728  011200  116767  167710  167770                  MOVB    $ITEMB,$FATAL           ; APT FATAL ERROR NUMBER
3729  011206  016746  167764                          MOV     $FATAL,-(SP)            ;;SAVE $FATAL FOR TYPEOUT
3730  011212  104403                                  TYPOS                           ;;GO TYPE--OCTAL ASCII
3731  011214     006                                  .BYTE   6                       ;;TYPE 6 DIGITS
3732  011215     000                                  .BYTE   0                       ;;SUPPRESS LEADING ZEROS
3733  011216  104401  011224                          TYPE    ,69$                    ;;TYPE ASCIZ STRING
3734  011222  000404                                  BR      68$                     ;;GET OVER THE ASCIZ
3735                                          ;;69$:  .ASCIZ  *,PC = *
3736  011234                                  68$:
3737  011234  016746  167656                          MOV     $ERRPC,-(SP)            ;;SAVE $ERRPC FOR TYPEOUT
3738  011240  104402                                  TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3739  011242  104401  011250                          TYPE    ,71$                    ;;TYPE ASCIZ STRING
3740  011246  000404                                  BR      70$                     ;;GET OVER THE ASCIZ
3741                                          ;;71$:  .ASCIZ  *,CSR: *
3742  011260                                  70$:
3743  011260  016746  167770                          MOV     DLADD,-(SP)             ;;SAVE DLADD FOR TYPEOUT
3744  011264  104402                                  TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3745  011266  104401  011274                          TYPE    ,73$                    ;;TYPE ASCIZ STRING
3746  011272  000405                                  BR      72$                     ;;GET OVER THE ASCIZ
3747                                          ;;73$:  .ASCIZ  *,VECTOR: *
3748  011306                                  72$:
3749  011306  016746  167744                          MOV     DLVEC,-(SP)             ;;SAVE DLVEC FOR TYPEOUT
3750  011312  104402                                  TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
3751  011314  104401  001171                          TYPE    ,$CRLF
3752  011320                                  ENDRTN
3753  011320                                  50000$:
3754  011320                                  50001$:
3755  011320  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

011322                          $EOP:
011322  000004                          SCOPE
011324  005067  167552                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
011330  005067  167624                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
011334  005267  167642                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
011340  042767  100000  167634        BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
011346  005327                  $EOPCT: DEC     (PC)+           ;;LOOP?
011350  000001                          .WORD   1
011352  003022                  $ENDCT: BGT     $DOAGN          ;;YES
011354  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
011356  000001                          .WORD   1
011360  011350                          $EOPCT
011362  104401  011427                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
011366  016746  167610                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
011372  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
011374  104401  011424                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
011400  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
011404  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
011406  000005                          RESET                   ;;CLEAR THE WORLD
011410  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
011412  000240                          NOP                     ;;SAVE ROOM
011414  000240                          NOP                     ;;FOR
011416  000240                          NOP                     ;;ACT11
011420                          $DOAGN:
011420  000137                          JMP     @(PC)+          ;;RETURN
011422  010732                  $RTNAD: .WORD   SPECIALADDRESS
011424     377       377   000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
011427     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
011434  050040  051501  020123
011442  000043
```

```
                                        .SBTTL  POWER DOWN AND UP ROUTINES

                                        ;;**********************************************************************
                                        ;POWER DOWN ROUTINE
011444  012737  011610  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
011452  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
011460  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011462  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
011464  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
011466  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
011470  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
011472  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
011474  017746  167440                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
011500  010667  000110                  MOV     SP,$SAVR6       ;;SAVE SP
011504  012737  011516  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
011512  000000                          HALT
011514  000776                          BR      .-2             ;;HANG UP

                                        ;;**********************************************************************
                                        ;POWER UP ROUTINE
011516  012737  011610  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
011524  016706  000064                  MOV     $SAVR6,SP       ;;GET SP
011530  005067  000060                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
011534  005267  000054          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
011540  001375                          BNE     1$              ;;OF  WORD
011542  012677  167372                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
011546  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
011550  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
011552  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
011554  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
011556  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
011560  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
011562  012737  011444  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
011570  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
011576  104401                          TYPE                    ;REPORT THE POWER FAILURE
011600  011616                  $PWRMG: .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
011602  012716                          MOV     (PC)+,(SP)      ;;RESTART AT START
011604  001336                  $PWRAD: .WORD   START           ;;RESTART ADDRESS
011606  000002                          RTI
011610  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
011612  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
011614  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
011616  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
011624  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
                                ;*

011626  105767  167325          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
011632  100002                          BPL     1$              ;;BR IF YES
011634  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
011636  000430                          BR      3$              ;;LEAVE
011640  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
011642  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
011646  122767  000001  167340          CMPB    @APTENV,$ENV    ;;RUNNING IN APT MODE
011654  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
011656  132767  000100  167331          BITB    @APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
011664  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
011666  010067  000004                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
011672  004767  001046                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
011676  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
011700  132767  000040  167307  62$:    BITB    @APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
011706  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
011710  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
011712  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
011714  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
011716  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
011720  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
011724  000002                          RTI                     ;;RETURN
011726  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
011732  001430                          BEQ     8$
011734  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
011740  001006                          BNE     5$
011742  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
011744  104401                          TYPE                    ;;TYPE A CR AND LF
011746  001171                          $CRLF
011750  105067  000202                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
011754  000755                          BR      2$              ;;GET NEXT CHARACTER
011756  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
011762  126726  167170          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS ?
011766  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
011770  016746  167160                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
011774  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
012000  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
012002  004767  000032                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
012006  105367  000144                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
```

```
3896  012012  000770                        BR      7$              ;;LOOP
3897
3898                                  ;HORIZONTAL TAB PROCESSOR
3899
3900  012014  112716  000040          8$:   MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
3901  012020  004767  000014          9$:   JSR     PC,$TYPEC       ;;TYPE A SPACE
3902  012024  132767  000007  000124        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
3903  012032  001372                        BNE     9$              ;;TAB STOP
3904  012034  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
3905  012036  000724                        BR      2$              ;;GET NEXT CHARACTER
3906  012040                          $TYPEC:
3907  012040  105777  167100                TSTB    @#TKS           ;;CHAR IN KYBD BUFFER?          ;MJD001
3908  012044  100022                        BPL     10$             ;;BR IF NOT                     ;MJD001
3909  012046  017746  167074                MOV     @#TKB,-(SP)     ;;GET CHAR                      ;MJD001
3910  012052  042716  177600                BIC     #177600,(SP)    ;;STRIP EXTRANEOUS BITS         ;MJD001
3911  012056  122716  000023                CMPB    #$XOFF,(SP)     ;;WAS CHAR XOFF                 ;MJD001
3912  012062  001012                        BNE     102$            ;;BR IF NOT                     ;MJD001
3913  012064                          101$:                                                         ;MJD001
3914  012064  105777  167054                TSTB    @#TKS           ;;WAIT FOR CHAR                 ;MJD001
3915  012070  100375                        BPL     101$                                            ;MJD001
3916  012072  117716  167050                MOVB    @#TKB,(SP)      ;;GET CHAR                      ;MJD001
3917  012076  042716  177600                BIC     #177600,(SP)    ;;STRIP IT                      ;MJD001
3918  012102  122716  000021                CMPB    #$XON,(SP)      ;;WAS IT XON?                   ;MJD001
3919  012106  001366                        BNE     101$            ;;BR IF NOT                     ;MJD001
3920  012110                          102$:                                                         ;MJD001
3921  012110  005726                        TST     (SP)+           ;;FIX STACK                     ;MJD001
3922  012112                          10$:                                                          ;MJD001
3923  012112  105777  167032                TSTB    @#TPS           ;;WAIT UNTIL PRINTER IS READY
3924  012116  100375                        BPL     10$                                             ;MJD001
3925  012120  116677  000002  167024        MOVB    2(SP),@#TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
3926  012126  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
3927  012134  001003                        BNE     1$              ;;BRANCH IF NO
3928  012136  105067  000014                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
3929  012142  000406                        BR      $TYPEX          ;;EXIT
3930  012144  122766  000012  000002  1$:   CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
3931  012152  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
3932  012154  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
3933  012156  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
3934  012160  000207          $TYPEX: RTS     PC
3935
```

```
                                        .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.
012162  022767  000176  166750  $CKSWR: CMP     @SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
012170  001074                        BNE     15$             ;;BRANCH IF NO
012172  105777  166746                TSTB    @#TKS           ;;CHAR THERE?
012176  100071                        BPL     15$             ;;IF NO, DON'T WAIT AROUND
012200  117746  166742                MOVB    @#TKB,-(SP)     ;;SAVE THE CHAR
012204  042716  177600                BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
012210  022726  000007                CMP     #7,(SP)+        ;;IS IT A CONTROL G?
012214  001062                        BNE     15$             ;;NO, RETURN TO USER
012216  126727  166712  000001        CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
012224  001456                        BEQ     15$             ;;BRANCH IF YES

012226  104401  012707                TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
012232  104401  012714        $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
012236  016746  165734                MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
012242  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
012244  104401  012725                TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
012250  005046                19$:    CLR     -(SP)           ;;CLEAR COUNTER
012252  005046                        CLR     -(SP)           ;;THE NEW SWR
012254  105777  166664        7$:     TSTB    @#TKS           ;;CHAR THERE?
012260  100375                        BPL     7$              ;;IF NOT TRY AGAIN

012262  117746  166660                MOVB    @#TKB,-(SP)     ;;PICK UP CHAR
012266  042716  177600                BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII


012272  021627  000025        9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
012276  001005                        BNE     10$             ;;BRANCH IF NOT
012300  104401  012702                TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
012304  062706  000006        20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
012310  000757                        BR      19$             ;;LET'S TRY IT AGAIN

012312  021627  000015        10$:    CMP     (SP),#15        ;;IS IT A <CR>?
012316  001022                        BNE     16$             ;;BRANCH IF NO
012320  005766  000004                TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
012324  001403                        BEQ     11$             ;;BRANCH IF YES
012326  016677  000002  166604        MOV     2(SP),@SWR      ;;SAVE NEW SWR
012334  062706  000006        11$:    ADD     #6,SP           ;;CLEAR UP STACK
012340  104401  001171        14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
012344  126727  166565  000001        CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
012352  001003                        BNE     15$             ;;BRANCH IF NOT
012354  012777  000100  166562        MOV     #100,@#TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
012362  000002                15$:    RTI                     ;;RETURN
012364  004767  177450        16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
012370  021627  000060                CMP     (SP),#60        ;;CHAR < 0?
```

```
                                        BLT     18$                     ;;BRANCH IF YES
                                        CMP     (SP),#67                ;;CHAR > 7?
                                        BGT     18$                     ;;BRANCH IF YES
                                        BIC     #60,(SP)+               ;;STRIP-OFF ASCII
                                        TST     2(SP)                   ;;IS THIS THE FIRST CHAR
                                        BEQ     17$                     ;;BRANCH IF YES
                                        ASL     (SP)                    ;;NO, SHIFT PRESENT
                                        ASL     (SP)                    ;;   CHAR OVER TO MAKE
                                        ASL     (SP)                    ;;   ROOM FOR NEW ONE.
                                17$:    INC     2(SP)                   ;;KEEP COUNT OF CHAR
                                        BIS     -2(SP),(SP)             ;;SET IN NEW CHAR
                                        BR      7$                      ;;GET THE NEXT ONE
                                18$:    TYPE    ,$QUES                  ;;TYPE ?<CR><LF>
                                        BR      20$                     ;;SIMULATE CONTROL-U
                                .DSABL  LSB
                                ;;**************************************************************
                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*CALL:
                                ;*      RDCHR                           ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*      RETURN HERE                     ;;CHARACTER IS ON THE STACK
                                ;*                                      ;;WITH PARITY BIT STRIPPED OFF
                                ;
                                $RDCHR: MOV     (SP),-(SP)              ;;PUSH DOWN THE PC
                                        MOV     4(SP),2(SP)             ;;SAVE THE PS
                                1$:     TSTB    @#TKS                   ;;WAIT FOR
                                        BPL     1$                      ;;A CHARACTER
                                        MOVB    @#TKB,4(SP)             ;;READ THE TTY
                                        BIC     #^C<177>,4(SP)          ;;GET RID OF JUNK IF ANY
                                        CMP     4(SP),#23               ;;IS IT A CONTROL-S?
                                        BNE     3$                      ;;BRANCH IF NO
                                2$:     TSTB    @#TKS                   ;;WAIT FOR A CHARACTER
                                        BPL     2$                      ;;LOOP UNTIL ITS THERE
                                        MOVB    @#TKB,-(SP)             ;;GET CHARACTER
                                        BIC     #^C177,(SP)             ;;MAKE IT 7-BIT ASCII
                                        CMP     (SP)+,#21               ;;IS IT A CONTROL-Q?
                                        BNE     2$                      ;;IF NOT DISCARD IT
                                        BR      1$                      ;;YES, RESUME
                                3$:     CMP     4(SP),#140              ;;IS IT UPPER CASE?
                                        BLT     4$                      ;;BRANCH IF YES
                                        CMP     4(SP),#175              ;;IS IT A SPECIAL CHAR?
                                        BGT     4$                      ;;BRANCH IF YES
                                        BIC     #40,4(SP)               ;;MAKE IT UPPER CASE
                                4$:     RTI                             ;;GO BACK TO USER
                                ;;**************************************************************
                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                ;*CALL:
                                ;*      RDLIN                           ;;INPUT A STRING FROM THE TTY
                                ;*      RETURN HERE                     ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                ;*                                      ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

                                $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
                                1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
                                2$:     CMP     #$TTYIN+8.,R3           ;;BUFFER FULL?
```

```
4048  012576  101405                        BLOS    4$              ;;BR IF YES
4049  012600  104410                        RDCHR                   ;;GO READ ONE CHARACTER FROM THE TT
4050  012602  112613                        MOVB    (SP)+,(R3)      ;;GET CHARACTER
4051  012604  122713  000177          10$:  CMPB    #177,(R3)       ;;IS IT A RUBOUT
4052  012610  001003                        BNE     3$              ;;SKIP IF NOT
4053  012612  104401  001170          4$:   TYPE    ,$QUES          ;;TYPE A  ?'
4054  012616  000763                        BR      1$              ;;CLEAR THE BUFFER AND LOOP
4055  012620  111367  000044          3$:   MOVB    (R3),9$         ;;ECHO THE CHARACTER
4056  012624  104401  012670                TYPE    ,9$
4057  012630  122723  000015                CMPB    #15,(R3)+       ;;CHECK FOR RETURN
4058  012634  001356                        BNE     2$              ;;LOOP IF NOT RETURN
4059  012636  105063  177777                CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
4060  012642  104401  001172                TYPE    ,$LF            ;;TYPE A LINE FEED
4061  012646  012603                        MOV     (SP)+,R3        ;;RESTORE R3
4062  012650  011646                        MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
4063  012652  016666  000004  000002        MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
4064  012660  012766  012672  000004        MOV     #$TTYIN,4(SP)
4065  012666  000002                        RTI                     ;;RETURN
4066  012670     000                 9$:    .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
4067  012671     000                        .BYTE   0               ;;TERMINATOR
4068  012672  000010              $TTYIN:   .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
4069  012702  052536  005015       000    $CNTLU:   .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
4070  012707     136  006507  000012    $CNTLG:   .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
4071  012714  005015  053523  020122    $MSWR:    .ASCIZ  <15><12>/SWR = /
4072  012722  020075     000
4073  012725     040  047040  053505    $MNEW:    .ASCIZ  /  NEW = /
4074  012732  056440  000040
```

```
                                        .SBTTL  APT COMMUNICATIONS ROUTINE
                                        ;;*****************************************************************
012736  112767  000001  000236  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
012744  112767  000001  000226  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
012752  000403                        BR      $ATYC
012754  112767  000001  000220  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
012762                          $ATYC:
012762  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
012764  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
012766  105767  000206                TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
012772  001450                        BEQ     5$              ;;IF NOT:  BR
012774  122767  000001  166212        CMPB    @#PTENV,#ENV    ;;OPERATING UNDER APT?
013002  001031                        BNE     3$              ;;IF NOT:  BR
013004  132767  000100  166203        BITB    @#PTSPOOL,#ENVM ;;SHOULD SPOOL MESSAGES?
013012  001425                        BEQ     3$              ;;IF NOT:  BR
013014  017600  000004                MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
013020  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
013026  005767  166142          1$:   TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
013032  001375                        BNE     1$              ;;IF NOT:  WAIT
013034  010067  166150                MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
013040  105720                  2$:   TSTB    (R0)+           ;;FIND END OF MESSAGE
013042  001376                        BNE     2$
013044  166700  166140                SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
013050  006200                        ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
013052  010067  166134                MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
013056  012767  000004  166110        MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
013064  000413                        BR      5$
013066  017667  000004  000016  3$:   MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
013074  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
013102  016746  164670                MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
013106  004767  176514                JSR     PC,$TYPE        ;;CALL TYPE MACRO
013112  000000                  4$:   .WORD   0
013114                          5$:
013114  105767  000062          10$:  TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
013120  001416                        BEQ     12$             ;;IF NOT:  BR
013122  005767  166066                TST     $ENV            ;;RUNNING UNDER APT?
013126  001413                        BEQ     12$             ;;IF NOT:  BR
013130  005767  166040          11$:  TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
013134  001375                        BNE     11$             ;;IF NOT:  WAIT
013136  017667  000004  166032        MOV     @4(SP),$FATAL   ;;GET ERROR #
013144  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
013152  005267  166016                INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
013156  105067  000020          12$:  CLRB    $FFLG           ;;CLEAR FATAL FLAG
013162  105067  000013                CLRB    $LFLG           ;;CLEAR LOG FLAG
013166  105067  000006                CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
```

```
 4121  013172  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
 4122  013174  012600                    MOV     (SP)+,R0        ;;POP STACK INTO R0
 4123  013176  000207                    RTS     PC              ;;RETURN
 4124  013200     000          $MFLG:    .BYTE   0               ;;MESSG. FLAG
 4125  013201     000          $LFLG:    .BYTE   0               ;;LOG FLAG
 4126  013202     000          $FFLG:    .BYTE   0               ;;FATAL FLAG
 4127           013204                    .EVEN
 4128           000200          APTSIZE=200
 4129           000001          APTENV=001
 4130           000100          APTSPOOL=100
 4131           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

013204                          $ERROR:
013204  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
013206  105267  165671          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
013212  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
013214  016777  165662  165720          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
013222  032777  002000  165710          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
013230  001402                          BEQ     1$              ;;NO - SKIP
013232  104401  001164                  TYPE    .$BELL          ;;RING BELL
013236  005267  165650          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
013242  011667  165650                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
013246  162767  000002  165642          SUB     #2,$ERRPC
013254  117767  165636  165632          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
013262  032777  020000  165650          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
013270  001004                          BNE     20$             ;;SKIP TYPEOUTS
013272  004767  175634                  JSR     PC,MYTYPE       ;;GO TO USER ERROR ROUTINE
013276  104401  001171                  TYPE    .$CRLF
013302                          20$:
013302  122767  000001  165704          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
013310  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
013312  116767  165576  000004          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
013320  004767  177430                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
013324     000                  21$:    .BYTE   0
013325     000                          .BYTE   0
013326  000777                  22$:    BR      22$             ;;APT ERROR LOOP
013330  005777  165604          2$:     TST     @SWR            ;;HALT ON ERROR
013334  100002                          BPL     3$              ;;SKIP IF CONTINUE
013336  000000                          HALT                    ;;HALT ON ERROR!
013340  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
013342  032777  001000  165570  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
013350  001402                          BEQ     4$              ;;BR IF NO
013352  016716  165532                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
013356  005767  165600          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
013362  001402                          BEQ     5$              ;;BR IF NONE
013364  016716  165572                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
013370                          5$:
013370  022737  011410  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
013376  001001                          BNE     6$              ;;BRANCH IF NO
013400  000000                          HALT                    ;;YES
013402                          6$:
013402  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

013404                          #SCOPE:
                                        CKSWR                           ;;TEST  FOR CHANGE IN SOFT-SWR
013404  104407                  1#:     BIT     #BIT14,@SWR             ;;LOOP ON PRESENT TEST?
013406  032777  040000  165524          BNE     #OVER                   ;;YES IF SW14=1
013414  001114                  ;@@@@@START OF CODE FOR THE XOR TESTER@@@@@
013416  000416                  #XTSTR: BR      6#                      ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
013420  013746  000004                  MOV     @#ERRVEC,-(SP)          ;;SAVE THE CONTENTS OF THE ERROR VECTOR
013424  012737  013444  000004          MOV     #5#,@#ERRVEC            ;;SET FOR TIMEOUT
013432  005737  177060                  TST     @#177060                ;;TIME OUT ON XOR?
013436  012637  000004                  MOV     (SP)+,@#ERRVEC          ;;RESTORE THE ERROR VECTOR
013442  000463                  5#:     BR      #SVLAD                  ;;GO TO THE NEXT TEST
013444  022626                          CMP     (SP)+,(SP)+             ;;CLEAR THE STACK AFTER A TIME OUT
013446  012637  000004                  MOV     (SP)+,@#ERRVEC          ;;RESTORE THE ERROR VECTOR
013452  000423                  6#:     BR      7#                      ;;LOOP ON THE PRESENT TEST
013454                          ;;@@@@@END OF CODE FOR THE XOR TESTER@@@@@
013454  032777  000400  165456          BIT     @#BIT08,@SWR            ;;LOOP ON SPEC. TEST?
013462  001404                          BEQ     2#                      ;;BR IF NO
013464  127767  165450  165410          CMPB    @SWR,#TSTNM             ;;ON THE RIGHT TEST?    SWR<7:0>
013472  001465                          BEQ     #OVER                   ;;BR IF YES
013474  105767  165403          2#:     TSTB    #ERFLG                  ;;HAS AN ERROR OCCURRED?
013500  001421                          BEQ     3#                      ;;BR IF NO
013502  126767  163407  165373          CMPB    #ERMAX,#ERFLG           ;;MAX. ERRORS FOR THIS TEST OCCURRED?
013510  101015                          BHI     3#                      ;;BR IF NO
013512  032777  001000  165420          BIT     @#BIT09,@SWR            ;;LOOP ON ERROR?
013520  001404                          BEQ     4#                      ;;BR IF NO
013522  016767  165362  165356  7#:     MOV     #LPERR,#LPADR           ;;SET LOOP ADDRESS TO LAST SCOPE
013530  000446                          BR      #OVER
013532  105067  165345          4#:     CLRB    #ERFLG                  ;;ZERO THE ERROR FLAG
013536  005067  165416                  CLR     #TIMES                  ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
013542  000415                          BR      1#                      ;;ESCAPE TO THE NEXT TEST
013544  032777  004000  165366  3#:     BIT     @#BIT11,@SWR            ;;INHIBIT ITERATIONS?
013552  001011                          BNE     1#                      ;;BR IF YES
013554  005767  165422                  TST     #PASS                   ;;IF FIRST PASS OF PROGRAM
013560  001406                          BEQ     1#                      ;;      INHIBIT ITERATIONS
013562  005267  165316                  INC     #ICNT                   ;;INCREMENT ITERATION COUNT
013566  026767  165366  165310          CMP     #TIMES,#ICNT            ;;CHECK THE NUMBER OF ITERATIONS MADE
013574  002024                          BGE     #OVER                   ;;BR IF MORE ITERATION REQUIRED
013576  012767  000001  165300  1#:     MOV     #1,#ICNT                ;;REINITIALIZE THE ITERATION COUNTER
013604  016767  000052  165346          MOV     #MXCNT,#TIMES           ;;SET NUMBER OF ITERATIONS TO DO
013612  105267  165264          #SVLAD: INCB    #TSTNM                  ;;COUNT TEST NUMBERS
013616  116767  165260  165354          MOVB    #TSTNM,#TESTN           ;;SET TEST NUMBER IN APT MAILBOX
```

```
 4242  013624  011667  165256                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 4243  013630  011667  165254                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 4244  013634  005067  165322                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 4245  013640  112767  000001  165247          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 4246  013646  016777  165230  165266  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 4247  013654  016716  165226                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 4248  013660  000002                          RTI                     ;;FIXES PS
 4249  013662  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

013664                          $TYPDS:
013664  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
013666  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
013670  010246                         MOV     R2,-(SP)        ;;PUSH R2 ON STACK
013672  010346                         MOV     R3,-(SP)        ;;PUSH R3 ON STACK
013674  010546                         MOV     R5,-(SP)        ;;PUSH R5 ON STACK
013676  012746  020200                 MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
013702  016605  000020                 MOV     20(SP),R5       ;;GET THE INPUT NUMBER
013706  100004                         BPL     1$              ;;BR IF INPUT IS POS.
013710  005405                         NEG     R5              ;;MAKE THE BINARY NUMBER POS.
013712  112766  000055  000001         MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
013720  005000                 1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
013722  012703  014100                 MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
013726  112723  000040                 MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
013732  005002                 2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
013734  016001  014070                 MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
013740  160105                 3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
013742  002402                         BLT     4$              ;;BR IF DONE
013744  005202                         INC     R2              ;;INCREASE THE BCD DIGIT BY 1
013746  000774                         BR      3$
013750  060105                 4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
013752  005702                         TST     R2              ;;CHECK IF BCD DIGIT=0
013754  001002                         BNE     5$              ;;FALL THROUGH IF 0
013756  105716                         TSTB    (SP)            ;;STILL DOING LEADING 0'S?
013760  100407                         BMI     7$              ;;BR IF YES
013762  106316                 5$:     ASLB    (SP)            ;;MSD?
013764  103003                         BCC     6$              ;;BR IF NO
013766  116663  000001  177777         MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
013774  052702  000060         6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
014000  052702  000040         7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
014004  110223                         MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
014006  005720                         TST     (R0)+           ;;JUST INCREMENTING
014010  020027  000010                 CMP     R0,#10          ;;CHECK THE TABLE INDEX
014014  002746                         BLT     2$              ;;GO DO THE NEXT DIGIT
014016  003002                         BGT     8$              ;;GO TO EXIT
014020  010502                         MOV     R5,R2           ;;GET THE LSD
014022  000764                         BR      6$              ;;GO CHANGE TO ASCII
014024  105726                 8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
014026  100003                         BPL     9$              ;;BR IF NO
014030  116663  177777  177776         MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
014036  105013                 9$:     CLRB    (R3)            ;;SET THE TERMINATOR
014040  012605                         MOV     (SP)+,R5        ;;POP STACK INTO R5
014042  012603                         MOV     (SP)+,R3        ;;POP STACK INTO R3
014044  012602                         MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
 4306  014046  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
 4307  014050  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
 4308  014052  104401  014100                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
 4309  014056  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 4310  014064  012616                          MOV     (SP)+,(SP)
 4311  014066  000002                          RTI                     ;;RETURN TO USER
 4312  014070  023420                  $DTBL:  10000.
 4313  014072  001750                          1000.
 4314  014074  000144                          100.
 4315  014076  000012                          10.
 4316  014100  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

014110  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
014114  116667  000001  000211          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
014122  112667  000207                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
014126  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
014132  000406                          BR      $TYPON
014134  112767  000001  000171  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
014142  112767  000006  000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
014150  112767  000005  000154  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
014156  010346                          MOV     R3,-(SP)        ;;SAVE R3
014160  010446                          MOV     R4,-(SP)        ;;SAVE R4
014162  010546                          MOV     R5,-(SP)        ;;SAVE R5
014164  116704  000145                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
014170  005404                          NEG     R4
014172  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
014176  110467  000132                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
014202  116704  000125                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
014206  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
014212  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
014214  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
014216  000404                          BR      3$              ;;GO DO MSB
014220  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
014222  006105                          ROL     R5
014224  006105                          ROL     R5
014226  010503                          MOV     R5,R3
014230  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
014232  105367  000076                  DECB    $OMODE          ;;TYPE THIS DIGIT?
014236  100016                          BPL     7$              ;;BR IF NO
014240  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
014244  001002                          BNE     4$              ;;TEST FOR 0
014246  005704                          TST     R4              ;;SUPPRESS THIS 0?
014250  001403                          BEQ     5$              ;;BR IF YES
```

```
 4373  014252  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 4374  014254  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 4375  014260  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 4376  014264  110367  000040                  MOVB    R3,8$           ;;SAVE FOR TYPING
 4377  014270  104401  014330                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
 4378  014274  105367  000032          7$:     DECB    $OCNT           ;;COUNT BY 1
 4379  014300  003347                  BCT     2$                      ;;BR IF MORE TO DO
 4380  014302  002402                  BLT     6$                      ;;BR IF DONE
 4381  014304  005204                  INC     R4                      ;;INSURE LAST DIGIT ISN'T A BLANK
 4382  014306  000744                  BR      2$                      ;;GO DO THE LAST DIGIT
 4383  014310  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
 4384  014312  012604                  MOV     (SP)+,R4                ;;RESTORE R4
 4385  014314  012603                  MOV     (SP)+,R3                ;;RESTORE R3
 4386  014316  016666  000002  000004  MOV     2(SP),4(SP)             ;;SET THE STACK FOR RETURNING
 4387  014324  012616                  MOV     (SP)+,(SP)
 4388  014326  000002                  RTI                             ;;RETURN
 4389  014330     000          8$:     .BYTE   0                       ;;STORAGE FOR ASCII DIGIT
 4390  014331     000                  .BYTE   0                       ;;TERMINATOR FOR TYPE ROUTINE
 4391  014332     000          $OCNT:  .BYTE   0                       ;;OCTAL DIGIT COUNTER
 4392  014333     000          $OFILL: .BYTE   0                       ;;ZERO FILL SWITCH
 4393  014334  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.

014336  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
014340  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
014344  005740                          TST     -(R0)           ;;BACKUP BY 2
014346  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
014350  006300                          ASL     R0              ;;POSITION FOR INDEXING
014352  016000  014372                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
014356  000200                          RTS     R0              ;;GO TO ROUTINE

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

014360  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
014362  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
014370  000002                          RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

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

                                ;       ROUTINE
                                ;       -------
014372  014360                  $TRPAD: .WORD   $TRAP2
014374  011626                          $TYPE   ;;CALL-TYPE     TRAP*1(104401)  TTY TYPEOUT ROUTINE
014376  014134                          $TYPOC  ;;CALL-TYPOC    TRAP*2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
014400  014110                          $TYPOS  ;;CALL-TYPOS    TRAP*3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
014402  014150                          $TYPON  ;;CALL-TYPON    TRAP*4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
014404  013664                          $TYPOS  ;;CALL-TYPOS    TRAP*5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

014406  012232                          $GTSWR  ;;CALL-GTSWR    TRAP*6(104406)  GET SOFT-SWR SETTING

014410  012162                          $CKSWR  ;;CALL-CKSWR    TRAP*7(104407)  TEST FOR CHANGE IN SOFT-SWR
014412  012444                          $RDCHR  ;;CALL-RDCHR    TRAP*10(104410) TTY TYPEIN CHARACTER ROUTINE
014414  012564                          $RDLIN  ;;CALL-RDLIN    TRAP*11(104411) TTY TYPEIN STRING ROUTINE
        000001                  .END
```

```
ABASE  - 175610              1#    956     997
ACDM1  - 000000            956
ACDM2  - 000000            956
ACPUDP - 000000            956     971
ADDRES  011112            3643*   3654*   3668*   3691    3698#
ADDM0  - 000000            956
ADDM1  - 000000            956
ADDM10 - 000000            956
ADDM11 - 000000            956
ADDM12 - 000000            956
ADDM13 - 000000            956
ADDM14 - 000000            956
ADDM15 - 000000            956
ADDM2  - 000000            956
ADDM3  - 000000            956
ADDM4  - 000000            956
ADDM5  - 000000            956
ADDM6  - 000000            956
ADDM7  - 000000            956
ADDM8  - 000000            956
ADDM9  - 000000            956
ADEVCT - 000000            956     962
ADEVM  - 100000              1#    956     998
AENV   - 000000            956     967
AENVM  - 000000            956     968
AFATAL - 000000            956     959
AHADR1 - 000000            956     984
AHADR2 - 000000            956     988
AHADR3 - 000000            956     991
AHADR4 - 000000            956     994
AHAMS1 - 000000            956     978
AHAMS2 - 000000            956     986
AHAMS3 - 000000            956     989
AHAMS4 - 000000            956     992
AHSGAD - 000000            956     964
AHSELG - 000000            956     965
AHSGTY - 000000            956     958
AHTYP1 - 000000            956     979
AHTYP2 - 000000            956     987
AHTYP3 - 000000            956     990
AHTYP4 - 000000            956     993
APASS  - 000000            956     961
APRIOR - 000000            956
APTCON  011124            3614*   3682*   3703#
APTCSU - 000040           3870    4131#
APTENV - 000001           1217    1695    1982    2318    2492    3675    3863    4087    4129#   4163
APTSIZ - 000200           1067    4120#
APTSPO - 000100           3865    4089    4130#
ASSEMB - 000010              1
ASWREG - 000000            956     969
ATESTH - 000000            956     960
AUNIT  - 000000            956     963
AUSWR  - 011110              1#    956     970
AVECT1 - 000300              1#    956     995
AVECT2 - 000000            956     996
BAUD   - 007400           8594#
```

```
$ITMAS  011106          1106#   3620    3639#   3652#   3660    3663    3696#
$IT0  = 000001           734#   3311    3334
$IT00 = 000001           724#    734     783     803     824     845
$IT01 = 000002           723#    733     802     844
$IT02 = 000004           722#    732     801     822     843
$IT03 = 000010           721#    731     800     842
$IT04 = 000020           720#    730     799     841
$IT05 = 000040           719#    729     798     840
$IT06 = 000100           718#    728     777     797     818     839
$IT07 = 000200           717#    727     776     796     817     838
$IT08 = 000400           716#    726    4216
$IT09 = 001000           715#    725    4174    4224
$IT1  = 000002           733#   3322    3341
$IT10 = 002000           714#   4151
$IT11 = 004000           713#    772     812    4231
$IT12 = 010000           712#    791     811
$IT13 = 020000           711#    790     810    4158
$IT14 = 040000           710#    789     809    4202
$IT15 = 100000           709#    788     808    1106    3663
$IT2  = 000004           732#   2406    2434
$IT3  = 000010           731#   2811    2871
$IT4  = 000020           730#   2830    2878
$IT5  = 000040           729#
$IT6  = 000100           728#
$IT7  = 000200           727#
$IT8  = 000400           726#
$IT9  = 001000           725#
$PTVEC= 000014           741#
BREAK = 000001           824#   1231    1244    1247    1261    1264    1278    1283    3285
BRK   = 010000           860#   1215    3261
CKSWR = 104407          4147    4173    4201   4433#
CLR   = 000000           762#   1710    1712    1995    3424
COMSPD= 000100           854#   2898
CONADR  011120          3668    3701#
CONSOL  011125          1305    1591    1693    1828    1902    1971    2128    2638    2758    3040    3270    3616#   3666#
                        3704#
CONVEC  011122          3670    3702#
CR    = 000015           649#   3926    3936
CRLF  = 000200           650#   1091    1097    1098    1099    3361    3721    3880    3936
CYCLE   010666          1109    3601#
DATA  = 000017           851#   3509    3510
DATLNG  010476          2782    2930    3052   3491#
DDISP = 177570           656#    937    1055
DIAGMC= 000000             1
DISPLA  001142           937#   1055#   1063#   4150#   4246#
DISPRE  000174           872#   1063
DLADD   001254          1017#   1113#   1118    1121    1123    1126    1129    1132    1148    1180    3362    3743
DLADDR= 175610           758#   1017    1019    1020    1021    1022    1023
DLVEC   001256          1018#   1116#   2507    2607    2649    2735    3074    3368    3749
DSWR  = 177570           655#    936    1054
EMTVEC= 000030           744#   1038#   1039#
ERRBIT= 100000           863#   2126    3316
ERRCHK  010172          2327#   2405#   2434    2768#   2811#   2830#   2871    2878    3279#   3311#   3322#   3334    3341
                        3349#
ERRCNT  007562          3089#   3120    3128   3143#   3208    3219#
ERROR = 100000           788#   2203    2277
```

CROSS REFERENCE TABLE - USER SYMBOLS

```
ERRORF  004026          1710* 1757* 1784  1812#
ERRVEC- 000004           737# 1052  1053* 1064* 4207  4208* 4210* 4213*
EVENOD- 000040          8534#
EXITFL  004030          1712* 1793* 1800* 1804  1813#
FALSE - 000000          3405# 3412  3614  3616
FLAG    C10470          3412* 3439* 3444  3467  3479#
FRERR - 020000           790# 3319
GNS   - ****** U         871  1090  1097  1098  1099  3360  3366  3372  3720  3726  3735  3741  3747
                        4425  4426  4427  4428  4429  4431  4433  4434  4435
GTSWR - 104406          1085  4431#
HOLD    007626          3160* 3161* 3164  3177#
HOLDSC  010471          3424* 3429* 3435  3480#
HOWLON- 000000          3384# 3410
HT    - 000011           647# 3878  3936
I       001272          1024# 1157* 1178* 1181  1183  3514* 3517* 3519
ILLMEM- 000004           749# 1152  1188
INITFL  011110          1104* 3623  3626* 3697#
INTFLA  010664          1164* 1169  2503* 2553  2557  2579* 2595  2657* 2699  2706  3596* 3599#
INTSRV  010656          1153  2515  2650  3586#
IOTVEC- 000020           742# 1036* 1037*
LF    - 000012           648# 3930  3936
LOOP    002136          1107# 3378
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  2660  2704  2732  2771  2855  2869  2909  3104  3125  3282
MAINTJ- 040000           862# 1303  1826  1900  1973  2137  2308  2636  2756  3038  3259
MASK  - 000000          3492# 3506* 3522* 3524* 3529*
MAX     004672          2021  2025  2112#
MYTYPE  011132          3716# 4160
NEW     005644          2356* 2358* 2374* 2376* 2385  2393  2395  2413  2415  2470#
NOCOMM  011126          3705#
NUMBER  007564          3118  3144# 3167  3225
NUMBR   010572          3508* 3509  3511* 3519  3532#
OK      011116          3700#
OLD     005650          2329* 2331* 2385  2393  2395  2413* 2415* 2471#
ONEWR - 040000           789# 2182  2227  2259
PARITY- 000020           852#
PASS    004024          1705* 1787  1811#
PBAUDS- 004000           812#
PBAUDO- 010000           811#
PBAUD1- 020000           810#
PBAUD2- 040000           809#
PBAUD3- 100000           808#
PBR   - 000200          8554  2306
PERR  - 010000           791#
PIRQ  - 177772           654#
PIRQVE- 000240           748#
PR0   - 000000          6714# 2535  2584  2666  2775  2923  3068
PR1   - 000040          6724#
PR2   - 000100          6734#
PR3   - 000140          6744#
PR4   - 000200          6754#
PR5   - 000240          6764#
PR6   - 000300          6774#
PR7   - 000340          6784# 1154  1391  2516  2651  3079  3085
PS    - 177776          6514#  652
```

```
PSW    = 177776            6520#
PWRVEC= 000024             7430#  1042*  1043*  3799*  3800*  3809*  3815*  3827*  3828*
RATES   005624            2347#  2428#  24444#
RBUF    001262            10200#  1123*  1124*  1950   2096   2178   2227   2259   2277   2344   2696   2785   2835
                          2933#  2990#  3195#  3307#  3319#
RCSR    001260            10190#  1121*  1477#  1490*  1493#  1507*  1510#  1524*  1529#  1560#  1625#  1854#  1882#
                          1928#  1953#  2007#  2047#  2051#  2054#  2077#  2099#  2364#  2663*  2680#  2687*  2727*
                          2822#  2920*  2972#  3019*  3111*  3139*  3229*  3293#
RCVRAC= 004000             7720#  1625#  2007#  2047#  2054#
RCVRDO= 000200             7760#  1560#  1855#  1882#  1929#  1953#  2051#  2077#  2099#  2364#  2631#  2823#  2973#
                          3294#
RCVRIE= 000100             7770#  1477#  1490#  1493#  1507#  1510#  1524#  1529#  2663#  2687#  2727#  3111#  3139#
                          3229#
RDATA0= 000001             8030#
RDATA1= 000002             8020#
RDATA2= 000004             8010#
RDATA3= 000010             8000#
RDATA4= 000020             7990#
RDATA5= 000040             7980#
RDATA6= 000100             7970#
RDATA7= 000200             7960#
RDCHR  = 104410           4049#  44340#
RDLIN  = 104411           4435*#
RDRRUN= 000001             7830#
REC     007632            3077#  31870#
REG    = 000004           33840#  3408#
REGSAV  010464            3408*  3421#  34770#
RESVEC= 000010             7380#
RMLD    007722            3199*  3200*  3204#  3212#  32380#
R0050   005624            24530#
R0070   005625            24540#
R0110   005626            24550#
R0135   005627            24560#
R0150   005630            24570#
R0200   005633            24600#
R0300   005631            24580#
R0400   005632            24590#
R10000  005643            24680#
R1800   005634            24610#
R2000   005635            24620#
R2400   005636            24630#
R3600   005637            24640#
R4800   005640            24650#
R5STAC  001334            10260#  1135#
R7200   005641            24660#
R9600   005642            24670#
SB      007566            31450#  3212*
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SETCLR= 000006            33840#  3435#
SPECIA  010732            36330#  3790#
STACK  = 001100             6420#  1034#
START   001336             875#  10270#  3832#
STKLMT= 177774             6530#
SWR     001140             9360#  1032#  1054*  1056#  1062*  1069*  1083#  3807#  3820*  3946#  3983*  4151#  4158#
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SW07  = 000200          6894#   699
SW08  = 000400          6884#   698
SW09  = 001000          6874#   697
SW1   = 000002          7054#
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SW2   = 000004          7044#
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SW4   = 000020          7024#
SW5   = 000040          7014#
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                        1349#  1352   1366#  1371   1401   1414#  1417   1431#  1434   1448#  1453   1630#  1663
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                        3285#
TCSRMI  001266          1022#  1129#  1130#  2347#  2428#
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TDATA1= 000002           844#
TDATA2= 000004           843#
TDATA3= 000010           842#
TDATA4= 000020           841#
TDATA5= 000040           840#
TDATA6= 000100           839#
TDATA7= 000200           838#
TIME  = 000000          3542#  3553
TIMER   010320          1730   1772   1857   1931   2527   2683   2806   2825   2954   2975   3296   3383#
TIMSAV  010466          3410#  3446   3457#  3478#
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TPVEC = 000064           747#
TRAN    007570          3083   3152#
TRAPVE= 000034           745#  1040#  1041#
TRTVEC= 000014           740#
TRUE  = 000001          1305   1591   1693   1828   1902   1971   2128   2638   2758   3040   3270   3404#  3439
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TST1    002252          1144#
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TST20   006202          2496    2632#
TST21   006506          2641    2752#
TST22   007030          2763    2860    2892#
TST23   007332          2904    2961    2984    3008    3033#
TST24   007726          3045    3141    3255#
TST25   010174          3266    3274    3348    3356#
TST3    002612          1222    1298#
TST4    003004          1310    1387#
TST5    003160          1469#
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TST7    003362          1585#
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TYPON   104404          4428#
TYPOS   104403          3730    4427#
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	16230#	16300#	16310#	16420#	16600#	16610#	16740#	16990#	17000#	17020#	17050#	17060#	17100#
	17110#	17120#	17130#	17200#	17210#	17400#	17480#	17490#	17570#	17580#	17610#	17620#	17800#
	17820#	17930#	17940#	17950#	17970#	17980#	18000#	18010#	18020#	18040#	1805	18070#	18080#
	18320#	18330#	18350#	18390#	18400#	18420#	18430#	18460#	18470#	18660#	18670#	18700#	18750#
	18760#	18880#	19060#	19070#	19090#	19130#	19140#	19150#	19160#	19210#	19220#	19340#	19350#
	19420#	19500#	19510#	19590#	19770#	19780#	19800#	19850#	19860#	19880#	19930#	19940#	19950#
	19960#	19970#	19980#	20030#	20040#	20100#	20110#	20120#	20130#	20150#	20160#	20170#	20190#
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	20730#	20820#	20830#	20860#	20870#	20890#	20960#	20970#	21040#	21050#	21080#	21320#	21330#
	21350#	21400#	21410#	21430#	21460#	21470#	21510#	21520#	21580#	21590#	21680#	21690#	21780#
	21790#	21870#	21880#	21930#	21940#	21960#	22010#	22020#	22090#	22100#	22160#	22170#	22190#
	22230#	22240#	22330#	22340#	22380#	22390#	22410#	22450#	22460#	22500#	22510#	22640#	22650#
	22710#	22720#	22740#	22820#	22830#	22870#	23120#	23130#	23150#	23210#	23220#	23240#	23270#
	23280#	23290#	23300#	23310#	23320#	23330#	23340#	23400#	23430#	23440#	23450#	23470#	23480#
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                    2132#  2140#  2193#  2216#  2238#  2271#  2300#  2312#  2321#  2486#  2495#  2633#  2753#
                    2762#  2859#  2893#  2903#  2960#  2983#  3007#  3034#  3044#  3256#  3265#  3273#  3357#
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                    3256#  3257    3266    3274    3348    3353    3357#
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$TPFLG  001157       945#  3857    3936
$TPS    001150       940#  3923    3936
$TRAP   014336      1040    4402#
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$TRP  - 000012      4417#  4426#  4427#  4428#  4429#  4430#  4431    4432#  4433    4434#  4435#  4436#
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                    1959    1976#   1980    1984#   1988    2006#   2019    2027#   2038    2047#   2072    2079#   2089
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                    2274    2279#   2287    2311#   2315    2320#   2324    2338#   2340    2343#   2419    2436#   2440
                    2494#   2498    2555#   2572    2597#   2601    2641#   2643    2701#   2721    2761#   2765    2791#
                    2793    2796#   2865    2873#   2876    2880#   2883    2901#   2906    2938#   2940    2943#   3014
                    3043#   3047    3117#   3118    3130#   3134    3169#   3173    3206#   3221    3227#   3234    3264#
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                    3419#   3459    3469#   3472    3516#   3518    3521#   3527    3557#   3559    3562#   3575    3619#
                    3660    3665#   3688
#TSK1 - 050010       1096#   1101    1171#   1175    1600#   1603    1604#   1617    1708#   1804    1807    2009#   2013
                    2014#   2017    2049#   2072    2343#   2418    2559#   2564    2565#   2570    2708#   2714    2715#
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#TSK2 - 050011       1607#   1610    1611#   1615    1736#   1740    1755#   1762    1763#   1782    1786#   1798    1799#
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                    2852#   2862    2958#   2963    2979#   2986    3003#   3010    3321#   3324    3423#   3427    3428#
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#TSK3 - 050006       1776#   1780    1789#   1795    2056#   2068    2363#   2381    2397#   2400    2401#   2408    3570#
                    3571
#TSK4 - 050123       2366#   2371    2372#   2378
#TSTM   001004        905#
#TSTMM  001102        918#   3767#   4150    4186    4191    4218    4240#   4241    4246    4250
#TTYIN  012672       4046    4047    4064    4068#
#TYPBN- ****** U     4430
#TYPDS  013664       4262#   4429
#TYPE   011626       3857#   4106    4417    4425
#TYPEC  012040       3887    3894    3901    3906#   3990
#TYPEX  012160       3929    3931    3934#
#TYPOC  014134       4347#   4426
#TYPON  014150       4346    4349#   4428
#TYPOS  014110       4342#   4427
#UNIT   001206        963#
#UNITM  001010        907#
#USWR   001220        970#   1215    1303    1598    1605    1826    1900    1973    2126    2137    2306    2308    2421
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#VECT2  001246        996#
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#XON  - 000021       3918    3936
#XTSTR  013416       4205#
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                    1953#   1971#   1973#   1982#   2007#   2025#   2047#   2051#   2054#   2077#   2099#   2126#   2128#
                    2137#   2182#   2203#   2227#   2259#   2277#   2306#   2308#   2318#   2361#   2364#   2385#   2393#
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                    3261#   3270#   3307#   3316#   3319#   3334#   3341#   3421#   3435#   3467#   3620#   3623#   3663#
                    3675#   3678#
##CASE- 000000          1#
##GDST - 000067          1#   2422#   3509#
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                    1303#   1312#   1319#   1325#   1335#   1341#   1352#   1358#   1371#   1377#   1401#   1407#   1417#
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                    27650   28090   28130   28280   28320   28500   28620   28710   28760   28780   28830   28960   29060
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                    32080   32160   32210   32250   32340   32590   32680   32700   32760   32990   33040   33070   3313
                    33160   33190   33240   33260   33280   33340   33390   33410   33460   34210   3426    34310   34350
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                    13120   13190   13210   13250   13350   13370   13410   13520   13540   13580   13710   13730   13770
                    14010   14030   14070   14170   14190   14230   14340   14360   14400   14530   14550   14590   14770
                    14790   14830   14930   14950   14990   15100   15120   15160   15290   15310   15350   15600   15620
                    15710   15910   15930   15980   16000   16050   16070   16150   16170   16190   16250   16270   16420
                    16630   16650   16740   16930   16950   16980   17020   17350   17400   17530   17550   17750   17800
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                    18820   18840   18880   19000   19020   19050   19090   19370   19420   19530   19550   19590   19710
                    19730   19760   19800   19820   19840   19880   20070   20090   20170   20250   20270   20380   20460
                    20470   20490   20510   20530   20540   20560   20680   20700   20770   20790   20890   20990   21010
                    21080   21260   21280   21310   21350   21370   21390   21430   21820   21840   21960   22030   22050
                    22190   22270   22290   22410   22590   22610   22740   22770   22790   22870   23060   23080   23110
                    23150   23180   23200   23240   23600   23610   23630   23640   23660   23780   23850   23870   23930
                    23950   23970   24080   24100   24340   24360   24400   24920   24940   24980   25530   25550   25570
                    25590   25700   25720   25950   25970   26010   26360   26380   26410   26430   26990   27010   27060
                    27080   27190   27210   27560   27580   27610   27650   28090   28130   28280   28320   28500   28520
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                    29780   29860   30010   30030   30100   30380   30400   30430   30470   31280   31300   31340   31670
                    31690   31730   32040   32060   32080   32100   32160   32210   32250   32270   32340   32590   32610
                    32640   32680   32700   32720   32760   32990   33040   33070   33090   33160   33180   33190   33210
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                    34370   34410   34670   34690   34720   36200   36220   36230   36250   36370   36580   36630   36650
                    36750   36770   36780   36800   36840   36860   36880
$$FROM= 000000        10    11090   17250   17670   18520   19260   21610   21710   22530   25220   25460   25900   26780
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                    1373    14020   1403    14180   1419    14350   1436    14540   1455    14780   1479    14940   1495
                    15110   1512    15300   1531    15610   1562    15920   1593    15990   1600    16060   1607    16260
                    1627    16640   1665    16960   1697    17350   1736    17540   1755    17750   1776    17850   1786
                    17880   1789    18290   1830    18620   1863    18830   1884    19030   1904    19370   1938    19540
                    1955    19740   1975    19830   1984    20080   2009    20220   2023    20260   2027    20480   2049
                    20520   2053    20550   2056    20780   2079    21000   2101    21290   2130    21380   2139    21830
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                    27590   2760    28090   2810    28280   2829    28510   2852    28720   2873    28790   2880    28990
                    2900    29570   2958    29780   2979    30020   3003    30410   3042    31210   3122    31290   3130
                    31680   3169    32050   3206    32090   3210    32260   3227    32620   3263    32710   3272    32990
                    3300    33080   3309    33170   3318    33200   3321    33350   3336    33420   3343    34220   3423
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                    3677    3679#   3680
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$$REG  = 177777        1#
$$RETU= 000000         1#   3384#   3470#   3474#   3484    3492#   3535    3542#   3581    3602#   3710    3717#   3754
$$RTN1= 050000         1#   3384#   3470    3483    3492#   3531    3534    3542#   3580    3602#   3695    3709    3717#
                    3753
$$RTN2= 050001         1#   3384#   3475    3485    3492#   3535    3542#   3581    3602#   3710    3717#   3754
$$SRC  = 000027        1#   2422#   3509#
$$TGSV= 000000         1#
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$40CA       1#
1170        1#


 ABS.  014416      000


ERRORS DETECTED:  0

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RUN TIME RATIO: 246/162=1.5
CORE USED:  43K  (85 PAGES)
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