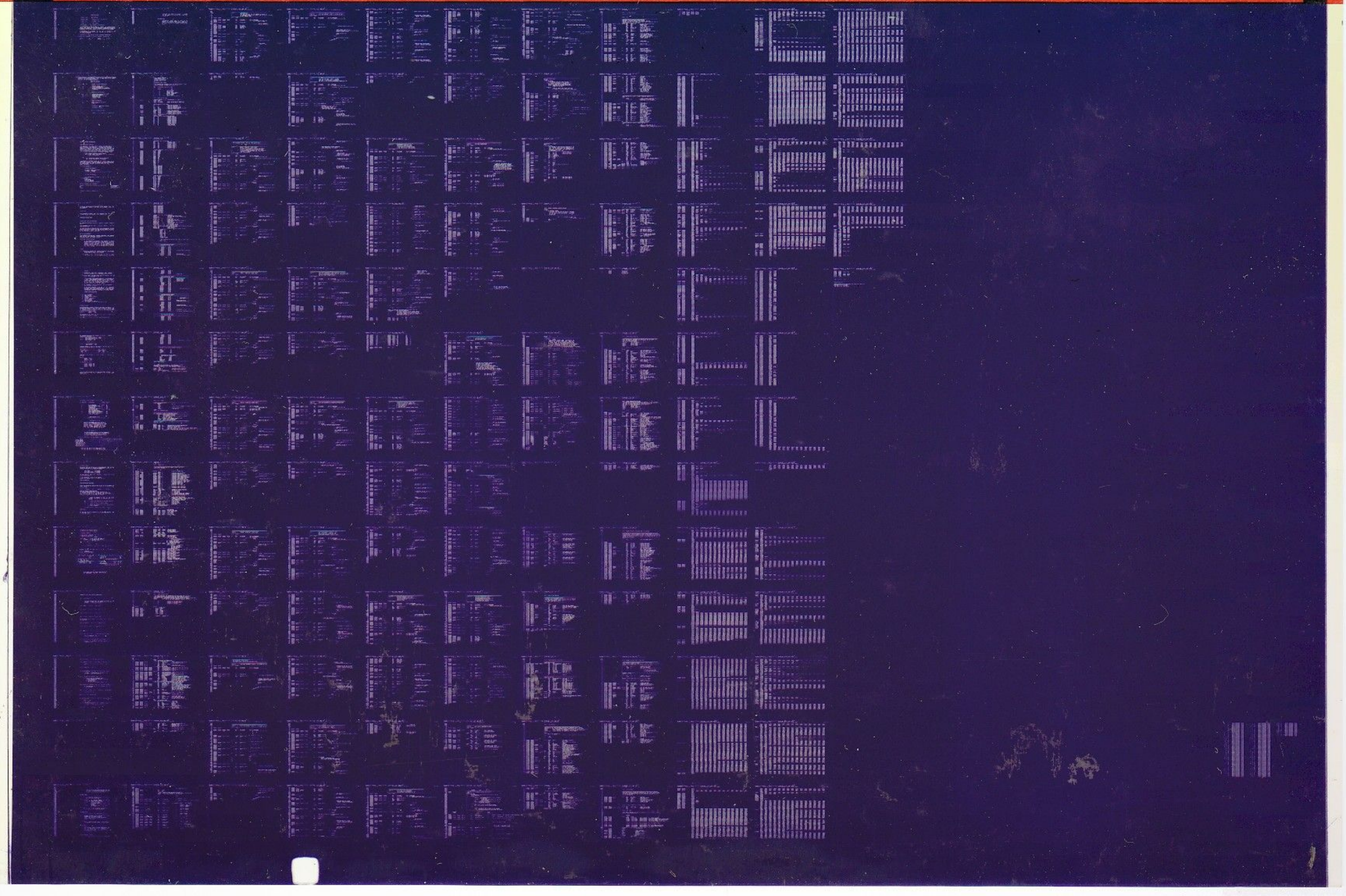
DLV11-F

OFF LINE TEST
CNDVCA0

AH-T434A-MC
FICHE 1 OF 1



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8200                                .REM    @
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8204                                                IDENTIFICATION
8205                                                --------------
8206
8207                                  PRODUCT CODE:       AC-T433A-MC
8208
8209                                  PRODUCT NAME:       CNDVCA0 DLV11-F OFFLINE TEST
8210
8211                                  PRODUCT DATE:       DECEMBER, 1982
8212
8213                                  AUTHOR:              ODES CHOATE
8214
8215                                  MAINTAINER:         DIAGNOSTIC SERVICES/ISS
8216
8217                                THE INFORMATION IN THIS DOCUMENT IS  SUBJECT  TO  CHANGE WITHOUT
8218                                NOTICE  AND  SHOULD  NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL
8219                                EQUIPMENT CORPORATION.  DIGITAL EQUIPMENT CORPORATION ASSUMES NO
8220                                RESPONSIBILITY FOR ANY ERRORS THAT MAY APPEAR IN THIS DOCUMENT.
8221
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8223                                SOFTWARE ON EQUIPMENT THAT IS NOT  SUPPLIED  BY  DIGITAL  OR ITS
8224                                AFFILIATED COMPANIES.
8225
8226                                COPYRIGHT (C) 1982,1983 BY DIGITAL EQUIPMENT CORPORATION
8227
8228                              THE FOLLOWING ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION:
8229
8230                                    DIGITAL          PDP              UNIBUS          MASSBUS
8231                                    DEC              DECUS            DECTAPE
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NOTE:CVDVCB DIAGNOSTIC WAS MODIFIED TO WORK ON 11/21 PROCESSOR BY LOWERING
PRIORITY 7 TO 6 AND ALSO ADDING A CALL TO CNMAC2.SML TO INIT BRKVEC
AND LKVEC AND WAS RENAMED TO CNDVCA.

TABLE OF CONTENTS

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8276
8277                            1.0     GENERAL PROGRAM INFORMATION.
8278                                    ------- ------- -----------
8279
8280                            1.1     PROGRAM PURPOSE (ABSTRACT).
8281
8282                                    THIS DIAGNOSTIC IS A LOGIC TEST TO VERIFY THE OPERATION OF THE
8283                                    DLV11-F  SERIAL  LINE INTERFACE.  THE USER CAN SELECTIVELY
8284                                    ENABLE AND DISABLE TESTING OF  THE  OPTIONS  BY  ALTERING  THE
8285                                    CONTENTS  OF  '$USER'.  THE DIAGNOSTIC IS DESIGNED TO TEST AND
8286                                    DETECT FAULTS TO THE LOGIC LEVEL  (NOT  TO  THE  CHIP  LEVEL).
8287                                    THIS TEST OPERATES ON UP TO SIXTEEN(16) IDENTICALLY CONFIGURED
8288                                    DLV11-F SERIAL LINE INTERFACES.  THE DEFAULT ADDRESSES ARE:
8289
8290                                            177560 -CONSOLE INTERFACE DEVICE ADDRESS
8291                                            175610 -FIRST SERIAL LINE ADDRESS  OF  15  CONSECUTIVE
8292                                                    SERIAL LINE DEVICES.
8293
8294
8295                                             60 - VECTOR FOR CONSOLE DEVICE INTERFACE.
8296                                            300 - VECTOR FOR FIRST OF 15 DEVICES.
8297
8298                                    THIS PROGRAM IS DESIGNED TO RUN  ON  ANY  PDP-11  WITH  4K  OF
8299                                    MEMORY AND A DLV11-F (LSI-BUS) MODULE.  IT CAN RUN UNDER XXDP,
8300                                    APT, AND ACT MONITORS, AND  ON  PROCESSORS  WITH  NO  HARDWARE
8301                                    SWITCH REGISTER.  A POWER FAILURE WILL CAUSE THE DIAG-
8302                                    NOSTIC TO RESTART.
8303
8304                            1.2     SYSTEM REQUIREMENTS.
8305
8306                                            HARDWARE REQUIREMENTS:
8307
8308                                            ANY PDP-11 FAMILY PROCESSOR
8309                                            4K MEMORY - MINIMUM
8310                                           A SPECIAL WRAP CONNECTOR OR EQUIVALENT (OPTIONAL)
8311
8312
8313                                            SOFTWARE REQUIREMENTS:
8314
8315
8316                                            THIS DIAGNOSTIC IS DESIGNED TO  RUN  IN  ANY  OF  THE
8317                                     FOLLOWING WAYS:
8318                                            STAND ALONE
8319                                            WITH APT MONITOR
8320                                            WITH ACT MONITOR
8321                                            WITH XXDP MONITOR (CHAINABLE)
8322
8323                            1.3     RELATED DOCUMENTS AND STANDARDS.
8324
8325                                    DIAGNOSTIC ENGINEERING STANDARDS AND CONVENTIONS        175-003-009-02
8326                                    APT                                                     MD-11-DZZMA
8327                                    ACT                                                     AUTOCAT-11-QZAUB
8328                                    SYSMAC                                                  MD-11-DZQAC
8329
8330
8331                            1.4     DIAGNOSTIC HIERARCHY PREREQUISITES.
```

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

1.5 ASSUMPTIONS.

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

2.0 OPERATING INSTRUCTIONS.

2.1 LOADING AND STARTING PROCEDURES.

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

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

THE USER CAN SELECT A SPECIFIC TEST TO BE EXECUTED BY SETTING SWITCH 8 IN THE SWITCH REGISTER AND THE TEST NUMBER (IN OCTAL) IN THE LOWER BYTE. (NOTE: ALL TESTS PREVIOUS TO THE SELECTED ONE ARE EXECUTED WITHOUT ITERATIONS.)

2.2 SPECIAL ENVIRONMENTS.

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

2.3 OPERATIONAL SWITCH SETTINGS

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

CONTROL:

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

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

```
8390
8391                                        PROGRAM.
8392
8393                                    2)  THE MACHINE WILL THEN TYPE:' SWR=XXXXXX  NEW=' (XXXXXX  IS
8394                                        THE OCTAL CONTENTS OF THE SOFTWARE SWITCH REGISTER.)
8395
8396                                    3)  AFTER THE 'NEW=' HAS BEEN TYPED THEN THE OPERATOR  CAN  DO
8397                                        ONE OF THE FOLLOWING AT THE TTY:
8398
8399                                        A)  TYPE A NUMBER TO BE LOADED INTO LOC.  176 FOLLOWED  BY
8400                                            A  <CR>.  (ONLY NUMBERS BETWEEN 0-7 WILL BE ACCEPTED).
8401                                            LEADING ZEROS NEED NOT BE TYPED, AND IF  MORE  THAN  6
8402                                            DIGITS  ARE  TYPED THE LAST 6 WILL BE USED.  IF A <CR>
8403                                            IS  THE  FIRST  KEY  DEPRESSED  THE  SOFTWARE   SWITCH
8404                                            REGISTER CONTENTS WILL NOT BE CHANGED.
8405
8406                                        B)  IF A CONTROL U <^U> IS DEPRESSED THEN THE PROGRAM WILL
8407                                            SEND YOU BACK TO STEP 3.
8408
8409                                        C)  IF THE INPUT CHARACTER IS NOT ONE  OF  THE  CHARACTERS
8410                                            MENTIONED ABOVE THEN A QUESTION MARK (?) WILL BE TYPED
8411                                            FOLLOWED BY A CARRAGE RETURN AND A LINE FEED SEQUENCE
8412                                            THEN PROCEED FROM STEP 3 (ERASING ALL PREVIOUS INPUT).
8413
8414                                            DYNAMIC SWITCH REGISTER
8415                                            ------- ------ --------
8416
8417                                    BIT 15 - HALT ON ERROR
8418                                        14 - LOOP ON TEST
8419                                        13 - INHIBIT ERROR TYPEOUTS
8420                                        12 - (UNUSED)
8421                                        11 - INHIBIT ITERATIONS
8422                                        10 - BELL ON ERROR
8423                                         9 - LOOP ON ERROR
8424                                         8 - LOOP ON TEST IN SWR<7:0>
8425                                       7:0 - TEST NUMBER TO LOOP ON (USED WITH BIT 8)
8426
8427
8428
8429                                2.4     PROGRAM OPTIONS.
8430
8431                                        THIS PROGRAM WILL SUPPORT TESTING OF MULTIPLE  DLV11-F'S.   IT
8432                                        REQUIRES THE ADDRESS OF THE FIRST RCSR (STORED AT '$BASE') AND
8433                                        ITS INTERRUPT VECTOR (STORED AT '$VECT1');  AND WILL  BE  ABLE
8434                                        TO  ADDRESS ANY DLV11-F STARTING AT THE SPECIFIED BASE ADDRESS
8435                                        UP TO 16 CONSECUTIVE DEVICES.
8436                                        EXAMPLES:       $BASE:  175610
8437                                                        $VECT1:    300
8438
8439                                        THE PROGRAM WILL BE  ABLE  TO  TEST  ANY  DLV11-F  WITHIN  THE
8440                                        ADDRESS RANGE 175610 --> 176000
8441
8442                                        $BASE AND $VECT1 DEFAULT TO 175610 AND 300 RESPECTIVELY.
```

```
8444
8445                    THE PROGRAM ASSOCIATES UNIT NUMBERS AS FOLLOWS:   (NUMBERS  IN
8446                    PARENTHESIS ARE OCTAL)
8447                    UNIT#0 -- BASE ADDRESS STORED AT '$BASE'
8448                              ASSOCIATED BASE VECTOR STORED AT '$VECT1'
8449                    UNIT#1 -- BASE ADDRESS + (10)
8450                              BASE VECTOR  + (10)
8451                              !
8452                              !    UP TO
8453                              !
8454                    UNIT#14 -- BASE ADDRESS + (160)
8455                              BASE VECTOR  + (160)
8456
8457                    LOCATION '$DEVM' IS USED AS A BIT MAP TO INDICATE  WHICH  UNIT
8458                    NUMBERS ARE PRESENT AND WILL BE TESTED.
8459
8460                     BIT 15 BIT 14  -    -    -       BIT 1  BIT 0
8461                    ---------------------------------------------
8462                    ! CON- ! UNIT !                  ! UNIT ! UNIT !
8463                    ! SOLE !  14  !                  ! #1   !  #0  !
8464                    ---------------------------------------------
8465
8466                    A BIT MAP CAN BE ENTERED AT  '$DEVM'  PRIOR  TO  STARTING  THE
8467                    PROGRAM.
8468
8469                    EXAMPLE:
8470                            $BASE:  175610
8471                            $VECTOR:   300
8472                            $DEVM:  100013
8473
8474                    THE PROGRAM WILL TEST-
8475
8476                            UNIT#0  175610  300
8477                            UNIT#1  175620  310
8478                            UNIT#3  175640  330
8479                            CONSOLE 177560   60
8480
8481                    OPTIONS
8482                    -------
8483
8484
8485                    LOCATION $USWR CONTAINS ALL THE USER SELECTABLE OPTIONS.   THE
8486                    VALUES   IN  THIS  WORD  MUST  CONFORM  TO  THE  ACTUAL  BOARD
8487                    CONFIGURATION.
```

THE DEFAULT VALUE OF $USWR IS AS FOLLOWS:

BIT POSITION	DEFINITION	DEFAULT VALUE
0-3	# OF DATA BITS	10(8) = 8
4	PARITY ENABLED -\(SEE	0 = NO
5	EVEN ODD PARITY-/ NOTE)	0 = ODD
6	COMMON SPEED	1 = YES
7	PROGRAMMABLE BAUD RATE	0 = NO
8-11	BAUD RATE OFFSET (SEE FOLLOWING NOTE)	02(8) = 110 BAUD
12	BREAK GENERATION ENABLED	1 = YES
13	WRAP CONNECTOR INSTALLED	0 = NO
14	MAINT JUMPER (SEE NOTE)	0 = NO
15	ERROR BITS ENABLED	0 = NO

NOTE ON BITS <4:5>
THIS DIAGNOSTIC DOES NOT TEST THE PARITY LOGIC.

NOTE ON BITS <7:11>

WHEN THE PROGRAMABLE BAUD RATE OPTION IS ENABLED THE PROGRAMABLE BAUD RATE TEST WILL EXIT WITH THE BAUD RATE SET TO THE SELECTED VALUE. TO CHANGE THE DEFAULT VALUE OF 110 BAUD REPLACE BITS <11:8> WITH THE OFFSET INDICATED IN THE TABLE AT THE END OF THE PBR TEST.(TEST #16)

NOTE ON BIT 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.

```
8546
8547                            2.5     EXECUTION TIMES.
8548
8549                                    EXECUTION TIMES ARE FOR AN LSI-11 PROCESSOR WITH  ALL  OPTIONS
8550                                    ENABLED ON THE DLV11-F (EXECPT FOR PROGRAMMABLE BAUD RATE), AT
8551                                    110 BAUD, AND NOT AT THE CONSOLE ADDRESS.
8552
8553                                            FIRST PASS-         90 SECONDS
8554                                            ADDITIONAL PASSES   95 SECONDS
8555                                            ADDITIONAL DEVICES  95 SECONDS
8556
8557                                    THE TEST TIME IS  BAUD  RATE  DEPENDANT;   HIGHER  BAUD  GIVES
8558                                    SHORTER PASS TIMES.
8559
8560                                    IF THE DIAGNOSTIC IS RUN AT THE CONSOLE
8561                                    ADDRESS THE RUNNING TIME IS 5 SECONDS PER PASS.
8562
8563                            3.0     ERROR INFORMATION.
8564                                    ----- ------------
8565
8566                            3.1     ERROR REPORTING PROCEDURE.
8567                                    ----- --------- ----------
8568
8569                                    SINCE THIS DIAGNOSTIC WAS DESIGNED TO FIT IN 4-K OF MEMORY THE
8570                                    ERROR  TYPEOUT IS VERY BRIEF.  THE FORMAT OF THE ERROR TYPEOUT
8571                                    IS AS FOLLOWS:
8572
8573                                    TEST#_____,ERROR#_____,PC=_____,ADDRESS=______,VECTOR=_____
8574
8575                                    WHERE ALL VALUES TYPED ARE OCTAL.
8576                                    THE ADDRESS AND VECTOR REFER TO THE FAILING SLU'S.
8577                                    FOR FURTHER INFORMATION THE LISTING MUST  BE  CONSULTED.
8578                                    BITS  15,13,10  AND  9  OF  THE  SWITCH  REGISTER  CONTROL THE
8579                                    SEQUENCE OF EVENTS AFTER AN ERROR IS CAUGHT.
8580
8581
8582                                            BIT 15 - CAUSES THE PROGRAM  TO  HALT  IN  THE  ERROR
8583                                                     ROUTINE.  CONTINUEING THE PROGRAM CAUSES IT TO
8584                                                     PROCEED.
8585
8586                                            BIT 13 - DISABLES THE PRINTING OF THE ERROR MESSAGE.
8587
8588                                            BIT 10 - CAUSES THE BELL TO RING ON ERROR.
8589
8590                                            BIT  9 - CAUSES THE DIAGNOSTIC TO LOOP FROM BEGINNING
8591                                                     OF TEST TO ERROR.
8592
8593                                           THE ERROR ROUTINE SUPPORTS THE CONTROL G FUNCTION.
8594
8595                            3.2     ERROR HALTS.
8596                                    ----- ------
8597
8598                                    THE ONLY HALT IN THIS DIAGNOSTIC IS IN THE ERROR ROUTINE,  AND
8599                                    IS  EXECUTED  ONLY  IF  BIT 15 OF THE SWITCH REGISTER IS A ONE
8600                                    WHEN AN ERROR OCCURS.
8601
```

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8603
8604                            4.0     PERFORMANCE AND PROGRESS REPORTS.
8605                                    ----------- --- -------- --------
8606
8607                            4.1     PERFORMANCE REPORTS.
8608
8609                                    AS EACH DEVICE  COMPLETES  ONE  PASS  OF  THE  DIAGNOSTIC  THE
8610                                    FOLLOWING WILL BE TYPED:
8611                                       CSR:_____,VECTOR:_____,ERRORS:_____
8612
8613                                    WHERE.'CSR:____' IS THE DEVICE CSR UNDER TEST
8614                                          'VECTOR:__' IS THE ASSOCIATED VECTOR
8615                                    AND   'ERRORS:__' IS THE TOTAL NUMBER OF ERRORS ON THIS DEVICE
8616                                                      ON THIS PASS.
8617
8618
8619                                                            NOTE
8620
8621                                        THIS IS TYPED AFTER THE DEVICE HAS COMPLETED ITS PASS.
8622
8623
8624
8625                                    AFTER ALL DEVICES HAVE BEEN EXERCISED AN END PASS STATEMENT IS
8626                                    TYPED:
8627                                             ''ENDPASS#     .''
8628                            5.0     DEVICE INFORMATION TABLES.
8629                                    ------ ----------- -------
8630
8631                                  15  14  13  12  11  10   9   8   7   6   5   4   3   2   1   0
8632                                 ***********************************************************************
8633                            RCSR !   !   !   !   !RCVR!   !   !   !RCVR!RCVR!   !   !   !   !   !RDR !
8634                                 !   !   !   !   !ACT !   !   !   !DONE!IE  !   !   !   !   !   !ENB !
8635                                 ***********************************************************************
8636                            RBUF !ERRO!OR  !FR  !P   !   !   !   !   !           RECEIVED DATA BUFFER    !
8637                                 !R   !ERR !ERR !ERR !   !   !   !   !                                   !
8638                                 ***********************************************************************
8639                            TCSR ! PROGRAMMABLE BAUD !PBR !   !   !   !XMIT!XMIT!   !   !   !MAIN!   !BREA!
8640                                 !   RATE  SELECT    !ENAB!   !   !   !RDY !IE  !   !   !   !T   !   !K   !
8641                                 ***********************************************************************
8642                            TBUF !   !   !   !   !   !   !   !   !        TRANSMITTER DATA BUFFER    !
8643                                 !   !   !   !   !   !   !   !   !                                   !
8644                                 ***********************************************************************
8645
8646
8647
8648                                                            NOTE
8649
8650                                    BLANK BOXES INDICATE UNUSED AND RESERVED
8651                                    BIT  POSITIONS.   SEE THE LISTING FOR AN
8652                                    EXPLANATION OF THE BITS.
8653
8654
8655
```

```
8657
8658                            6.0     SUMMARY OF TESTS AND SPECIAL SUBROUTINES.
8659                                    ------- -- ----- --- ------- ------------
8660
8661
8662                                    TEST 1 ADDRESSABILITY
8663                                    ---- -
8664
8665                                            THIS TEST VERIFIES THAT THE ADDRESS AS PLACED  IN  THE
8666                                            HARDWARE   P-TABLE  TO  BE  CORRECT  AND  THE  DLV11-F
8667                                            RESPONDS TO THAT ADDRESS SPACE.
8668
8669
8670                                    TEST 2 BREAK - TCSR0 SET, CLEAR, RESET
8671                                    ---- -
8672
8673
8674                                    TEST 3 MAINT - TCSR2 SET, CLEAR, RESET
8675                                    ---- -
8676
8677
8678                                    TEST 4 XMITIE - TCSR6 SET, CLEAR, RESET
8679                                    ---- -
8680
8681
8682                                    TEST  5 RCVRIE - RCSR6 SET, CLEAR, RESET
8683                                    ----  -
8684
8685                                    THE FOLLOWING 4 TESTS VERIFY  THAT  RESET  (INIT)  INITIALIZES
8686                                    READ ONLY BITS.
8687
8688
8689                                    TEST  6 RCVRDONE - RCSR 7 - IS CLEARED BY INIT
8690                                    ---- --
8691
8692
8693                                    TEST 7 RCVRACT - RCSR 11 - 15 CLEARED BY INIT
8694                                    ---- -
8695
8696
8697
8698                                    TEST 10 XMITRDY - TCSR 7 - IS SET BY INIT
8699                                    ---- --
8700
8701                                    TEST 11 XMIT RDY - TCSR 7 - CLEARS WHEN TBUF IS LOADED
8702                                    ---- --
8703                                            WITH  A  CHARACTER  AND  THAT IT SETS WITHIN A
8704                                            REASONABLE AMOUNT OF TIME.
8705
8706
8707                                    TEST 12 OUTPUTTING A CHAR FROM TBUF (WITH  MAINT  SET)
8708                                    ---- --
8709                                            RESULTS   IN   RCVRDONE   SETTING   WITHIN   A
8710                                            REASONABLE  AMOUNT  OF  TIME  AND  THAT  RESET
8711                                            CLEARS THE BIT.
```

```
8713
8714                                    TEST 13 RCVRDONE IS CLEARED BY READING RBUF
8715                                    ---- --
8716
8717                                    TEST 14 RCVRACT - RCSR 11 - SETS WHEN A START  BIT  IS
8718                                    ---- --
8719                                            RECEIVED  AND  CLEARS WHEN RCVRDONE - RCSR 7 -
8720                                            SETS
8721
8722
8723                                    TEST 15 OVERRUN BIT - RBUF 14
8724                                    ---- --
8725
8726
8727                                    TEST 16 PROGRAMMABLE BAUD RATE TEST TEST AT ALL SPEEDS
8728                                    ---- --
8729                                            AVAILABLE  A COMPARISON WILL BE MADE TO SEE IF
8730                                            NEW TIME IS LESS THAN PREVIOUS.
8731
8732
8733                                    TEST 17 TRANSMITTER INTERRUPT LOGIC TEST
8734                                    ---- --
8735                                            LOGICALLLY THIS IS 4 SEPARATE TESTS
8736                                                A) DOES TRANSMITTER INTERRUPT LOGIC WORK
8737                                                B) AT PRIORITY OF 0
8738                                                C) AND ONLY ONCE
8739                                                D) BUT NOT WITH INTERRUPT ENABLE CLEAR
8740
8741
8742                                    TEST 20 RECEIVER INTERRUPT LOGIC TEST THIS TEST COVERS ALL
8743                                    ---- --
8744                                            OF  THE RECEIVER SIDE OF THE INTERRUPT LOGIC IN
8745                                             CHARACTER MODE.
8746
8747
8748                                    TEST  21  TEST  ACTUAL  DATA  TRANSFERED  NON-INTERRUPT
8749                                    ----  --
8750                                            MAINTENANCE BIT SET
8751
8752
8753                                    TEST 22 TEST DATA THROUGH WRAP
8754                                    ---- --
8755
8756
8757                                    TEST 23 FULL DATA TRANSFER WITH INTERRUPTS AND MAINTENANCE
8758                                    ---- --
8759                                            MODE.
8760
8761
8762                                    TEST 24 TEST BREAK GENERATION LOGIC  TRANSMIT  KNOWN  CHAR
8763                                    ---- --
8764                                            WITH BREAK SET AND COMPARE RECEIVED WITH 0.
8765
8766
8767                                    TEST 25 NOT A TEST - SEND BACK TO LOOP
8768                                    ---- --
```

```
8769
```

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8771
8772                                                    NOTE
8773
8774                                        FOR ALL OF THE FOLLOWING ROUTINES THE  USE
8775                                        OF  (R5)  IS PART OF THE LINKAGE MECHANISM
8776                                        BETWEEN THE CALLER AND THE CALLED.
8777
8778
8779                                ROUTINE:TIMER
8780                                ------------
8781
8782                                        THIS ROUTINE IS USED TO TEST THE STATUS OF
8783                                        ANY BIT IN ANY REGISTER.
8784                                INPUTS:
8785                                        HOWLONG     THE  MAXIMUM  AMOUNT  OF  TIME  TO
8786                                                    SPEND IN THIS ROUTINE.
8787                                        WHICHBIT    A MASK WITH THE  BIT(S)  SET  THAT
8788                                                    ARE TO BE CHECKED
8789                                        REG         A POINTER TO THE  REGISTER  TO  BE
8790                                                    CHECKED
8791                                        SETCLR      THE DESIRED RESULTS -- EITHER  SET
8792                                                    OR  CLEAR
8793                                OUTPUT:
8794                                        THE 'C' BIT IS SET TO INDICATE AN ERROR BUT IT
8795                                        IS TESTED BY THE IF.ERROR STATEMENT.
8796
8797
8798                                RCUTINE:DATLNG
8799                                --------------
8800                                        THIS ROUTINE SETS UP A MASK FOR DATA, WITH -
8801
8802                                INPUT:  NOTHING IS PASSED TO THIS ROUTINE  BUT  GLOBAL
8803                                        INFORMATION IS ASSUMED TO EXIST:
8804                                        $USWR-- THE WORD FOR SOFTWARE PARAMETERS
8805                                        DATA-- A MASK FOR THE LOCATION  OF  THE  OCTAL
8806                                        NUMBER OF DATA BITS
8807
8808                                OUTPUT----
8809                                        MASK-- A MASK OF BINARY ZEROS  RIGHT-JUSTIFIED
8810                                        THE NUMBER OF WHICH IS DEFINED IN $USWR WORD.
8811
8812
8813                                ROUTINE:WAIT
8814                                ------------
8815                                        THIS ROUTINE IS USED TO DELAY EXECUTION OF THE
8816                                        MAIN  PROGRAM  FOR A SPECIFIED AMOUNT OF TIME.
8817                                        THIS  IS  ACCOMPLISHED  BY  INCREMENTING  A
8818                                        REGISTER UP TO A LIMIT.  THE INNER LOOP IS SET
8819                                        TO APPROXIMATE 1 MICRO SEC.
8820
8821
8822
8823                                SERVICE ROUTINE:  INTSRV
8824                                ------- --------  ------
8825                                        THIS GLOBAL ROUTINE DOES NOTHING BUT INCREMENT
```

```
8827
8828
8829
8830                                    'INTFLAG'  EACH TIME IT IS CALLED.  IT ASSUMES
8831                                    THAT THE MAIN CALLING ROUTINE WILL  KNOW  WHAT
8832                                    TO LOOK FOR.
8833
8834
8835                            ROUTINE:CYCLE
8836                            -------------
8837                                    THIS ROUTINE  CAUSES  ADRS  TO  POINT  TO  THE
8838                                    ADDRESS  OF  DLV11-F  UNDER  TEST,  ADRS +2 TO
8839                                    POINT TO THE VECTOR OF THE DLV11-F UNDER TEST.
8840                                    IT  KEEPS  TRACK OF THE CURRENT DEVICE AND BIT
8841                                    MASKS.
```

```
                        @
                        .TITLE  MAINDEC-11-CNDVC-A
                        ;*COPYRIGHT (C) 1982
                        ;*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
                        ;*****  THE FOLLOWING ODT START ADDRESS FOR SBC 11/21 IS ADDED
170000                  ODTST=  170000
                        ;*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
```

```
(1)                             ;*PRIORITY LEVEL DEFINITIONS
(1)             000000          PR0=    0               ;;PRIORITY LEVEL 0
(1)             000040          PR1=    40              ;;PRIORITY LEVEL 1
(1)             000100          PR2=    100             ;;PRIORITY LEVEL 2
(1)             000140          PR3=    140             ;;PRIORITY LEVEL 3
(1)             000200          PR4=    200             ;;PRIORITY LEVEL 4
(1)             000240          PR5=    240             ;;PRIORITY LEVEL 5
(1)             000300          PR6=    300             ;;PRIORITY LEVEL 6
(1)             000340          PR7=    340             ;;PRIORITY LEVEL 7
(1)
(1)                             ;*"SWITCH REGISTER" SWITCH DEFINITIONS
(1)             100000          SW15=   100000
(1)             040000          SW14=   40000
(1)             020000          SW13=   20000
(1)             010000          SW12=   10000
(1)             004000          SW11=   4000
(1)             002000          SW10=   2000
(1)             001000          SW09=   1000
(1)             000400          SW08=   400
(1)             000200          SW07=   200
(1)             000100          SW06=   100
(1)             000040          SW05=   40
(1)             000020          SW04=   20
(1)             000010          SW03=   10
(1)             000004          SW02=   4
(1)             000002          SW01=   2
(1)             000001          SW00=   1
(1)                             .EQUIV  SW09,SW9
(1)                             .EQUIV  SW08,SW8
(1)                             .EQUIV  SW07,SW7
(1)                             .EQUIV  SW06,SW6
(1)                             .EQUIV  SW05,SW5
(1)                             .EQUIV  SW04,SW4
(1)                             .EQUIV  SW03,SW3
(1)                             .EQUIV  SW02,SW2
(1)                             .EQUIV  SW01,SW1
(1)                             .EQUIV  SW00,SW0
(1)
(1)                             ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
(1)             100000          BIT15=  100000
(1)             040000          BIT14=  40000
(1)             020000          BIT13=  20000
(1)             010000          BIT12=  10000
(1)             004000          BIT11=  4000
(1)             002000          BIT10=  2000
(1)             001000          BIT09=  1000
(1)             000400          BIT08=  400
(1)             000200          BIT07=  200
(1)             000100          BIT06=  100
(1)             000040          BIT05=  40
(1)             000020          BIT04=  20
(1)             000010          BIT03=  10
(1)             000004          BIT02=  4
(1)             000002          BIT01=  2
(1)             000001          BIT00=  1
(1)                             .EQUIV  BIT09,BIT9
```

```
(1)                             .EQUIV  BIT08,BIT8
(1)                             .EQUIV  BIT07,BIT7
(1)                             .EQUIV  BIT06,BIT6
(1)                             .EQUIV  BIT05,BIT5
(1)                             .EQUIV  BIT04,BIT4
(1)                             .EQUIV  BIT03,BIT3
(1)                             .EQUIV  BIT02,BIT2
(1)                             .EQUIV  BIT01,BIT1
(1)                             .EQUIV  BIT00,BIT0
(1)
(1)                             ;*BASIC "CPU" TRAP VECTOR ADDRESSES
(1)     000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
(1)     000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
(1)     000014                  TBITVEC=14              ;;"T" BIT
(1)     000014                  TRTVEC= 14              ;;TRACE TRAP
(1)     000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
(1)     000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
(1)     000024                  PWRVEC= 24              ;;POWER FAIL
(1)     000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
(1)     000034                  TRAPVEC=34              ;;"TRAP" TRAP
(1)     000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
(1)     000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
(1)                             ;*****  THE FOLLOWING BREAK VECTOR AND LINE CLOCK VECTOR ARE INCLUDED
(1)     000100                  LKVEC=  100             ;;LINE CLOCK VECTOR
(1)     000140                  BRKVEC= 140             ;;BREAK VECTOR
(1)     000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
 8849   000004                          ILLMEM= 4
 8850   000001                          ADRS=   R1
 8851   000002                          GOOD=   R2
 8852   000003                          BAD=    R3
 8853   000001                          REGISTER=R1
 8854   000002                          BIT=    R2
 8855   000003                          FUNCT=  R3
 8856   000002                          LEAD=   R2
 8857   000004                          FOLLOW= R4
 8858   175610                          DLADDR= 175610
 8859
 8860                                   ; THE FOLLOWING DEFINITIONS APPLY TO THE GLOBAL SUBS
 8861   177777                          SET=    -1
 8862   000000                          CLR=    0
 8863
 8864
 8865                           ;;*************************************************************
 8866                                   ; RCSR REGISTER BIT NAMES
 8867                           ;;*************************************************************
 8868                                   ; UNUSED        BIT15
 8869                                   ; UNUSED        BIT14
 8870                                   ; UNUSED        BIT13
 8871                                   ; UNUSED        BIT12
 8872   004000                          RCVRACT=        BIT11           ; RECEIVER ACTIVE INDICATOR
 8873                                   ; UNUSED        BIT10
 8874                                   ; UNUSED        BIT09
 8875                                   ; UNUSED        BIT08
 8876   000200                          RCVRDONE=       BIT07           ; RECEIVER DONE
 8877   000100                          RCVRIE=         BIT06           ; RECEIVER INTERRUPT ENABLE
 8878                                   ; UNUSED        BIT05
```

```
                                        ; UNUSED        BIT04
                                        ; UNUSED        BIT03
                                        ; UNUSED        BIT02
                                        ; UNUSED        BIT01
000001                                  RDRRUN=         BIT00           ; READER RUN

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

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


                                ;;**************************************************************
                                        ; TBUF REGISTER BIT NAMES
                                ;;**************************************************************
                                        ; UNUSED        BIT15
                                        ; UNUSED        BIT14
                                        ; UNUSED        BIT13
                                        ; UNUSED        BIT12
                                        ; UNUSED        BIT11
```

```
                                        ; UNUSED        BIT10
                                        ; UNUSED        BIT09
                                        ; UNUSED        BIT08
000200                                  TDATA7=         BIT07       ; \
000100                                  TDATA6=         BIT06       ; !
000040                                  TDATA5=         BIT05       ; !
000020                                  TDATA4=         BIT04       ;  \ TRANSMITTER DATA BUFFER
000010                                  TDATA3=         BIT03       ;  /
000004                                  TDATA2=         BIT02       ; !
000002                                  TDATA1=         BIT01       ; !
000001                                  TDATA0=         BIT00       ; /

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

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

                                        ; BAUDE MUST BE ON THE UPPER
                                        ;  BYTE BOUNDRY OF $USWR.--4 BITS
007400                                      BAUD    =         7400
010000                                      BRK     =        10000
020000                                      WRAP    =        20000
040000                                      MAINTJUMP =      40000
100000                                      ERRBITS =     100000
                                ;;**************************************************************************
                                .SBTTL  TRAP CATCHER

(1)
(1)                                     .=0
(1)                             ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
(1)                             ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
(1)                             ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
(1)                                     .=174
(1)  000174  000000             DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
(1)  000176  000000             SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
(1)                             .SBTTL  STARTING ADDRESS(ES)
(1)  000200  000137  001336             JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
```

```
 8967
 8968                                   .SBTTL  ACT11 HOOKS
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;HOOKS REQUIRED BY ACT11
  (1)           000204                          $SVPC=.                 ;SAVE PC
  (1)           000046                          .=46
  (1)  000046   011404                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
  (1)           000052                          .=52
  (1)  000052   000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
  (1)           000204                          .=$SVPC                 ;; RESTORE PC
 8969           001000                  .=1000
 8970                                   .SBTTL  APT PARAMETER BLOCK
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
  (2)                                   ;;*****************************************************************
  (1)           001000                          .$X=.   ;;SAVE CURRENT LOCATION
  (1)           000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
  (1)  000024   000200                          200     ;;FOR APT START UP
  (1)           000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
  (1)  000044   001000                          $APTHDR ;;POINT TO APT HEADER BLOCK
  (1)           001000                          .=.$X   ;;RESET LOCATION COUNTER
  (2)                                   ;;*****************************************************************
  (1)                                   ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
  (1)                                   ;INTERFACE SPEC.
  (1)
  (1)  001000                           $APTHD:
  (1)  001000  000000                   $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
  (1)  001002  001174                   $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
  (1)  001004  000005                   $TSTM:  .WORD   5       ;;RUN TIM OF LONGEST TEST
  (1)  001006  000055                   $PASTM: .WORD   45.     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
  (1)  001010  000036                   $UNITM: .WORD   30.     ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
  (1)  001012  000030                           .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
 8971                                   .SBTTL  COMMON TAGS
  (1)
  (2)                                   ;;**********************************************************************
  (1)                                   ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
  (1)                                   ;*USED IN THE PROGRAM.
  (1)
  (1)           001100                          .=1100
  (1)  001100                           $CMTAG:                         ;;START OF COMMON TAGS
  (1)  001100  000000                           .WORD   0
  (1)  001102     000   000377          $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
  (1)  001103     000                   $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
  (1)  001104  000000                   $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
  (1)  001106  000000                   $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
  (1)  001110  000000                   $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
  (1)  001112  000000                   $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
  (1)  001114     000                   $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
  (1)  001115     001                   $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
  (1)  001116  000000                   $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
  (1)  001120  000000                   $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
  (1)  001122  000000                   $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
  (1)  001124  000000                   $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
  (1)  001126  000000                   $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
  (1)  001130  000000                           .WORD   0               ;;RESERVED--NOT TO BE USED
  (1)  001132  000000                           .WORD   0
  (1)  001134     000                   $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
  (1)  001135     000                   $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
  (1)  001136  000000                           .WORD   0
  (1)  001140  177570                   SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
  (1)  001142  177570                   DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
  (1)  001144  177560                   $TKS:   177560                  ;;TTY KBD STATUS
  (1)  001146  177562                   $TKB:   177562                  ;;TTY KBD BUFFER
  (1)  001150  177564                   $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
  (1)  001152  177566                   $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
  (1)  001154     000                   $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
  (1)  001155     002                   $FILLS: .BYTE   2
  (1)                                                                   ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
  (1)  001156     012                   $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
  (1)  001157     000                   $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
  (1)  001160  000000                   $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
  (1)  001162  000000                   $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
  (1)  001164  177607  000377           $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
  (1)  001170     077                   $QUES:  .ASCII  /?/             ;;QUESTION MARK
  (1)  001171     015                   $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
  (1)  001172  000012                   $LF:    .ASCIZ  <12>            ;;LINE FEED
  (2)                                   ;;**********************************************************************
  (2)                                   .SBTTL  APT MAILBOX-ETABLE
  (2)
  (3)                                   ;;**********************************************************************
  (2)                                   .EVEN
  (2)  001174                           $MAIL:                          ;;APT MAILBOX
  (2)  001174  000000                   $MSGTY: .WORD   AMSGTY           ;;MESSAGE TYPE CODE
  (2)  001176  000000                   $FATAL: .WORD   AFATAL           ;;FATAL ERROR NUMBER
  (2)  001200  000000                   $TESTN: .WORD   ATESTN           ;;TEST NUMBER
  (2)  001202  000000                   $PASS:  .WORD   APASS            ;;PASS COUNT
  (2)  001204  000000                   $DEVCT: .WORD   ADEVCT           ;;DEVICE COUNT
  (2)  001206  000000                   $UNIT:  .WORD   AUNIT            ;;I/O UNIT NUMBER
```

```
(2)  001210  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
(2)  001212  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
(2)  001214                        $ETABLE:                ;;APT ENVIRONMENT TABLE
(2)  001214     000                $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
(2)  001215     000                $ENVM:  .BYTE   AENVM
(2)                                ;;ENVIRONMENT MODE BITS
(2)  001216  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
(2)  001220  011110                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
(2)  001222  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
(2)                                ;*                      BITS 15-11=CPU TYPE
(2)                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
(2)                                ;*                              11/70=06,PDQ=07,Q=10
(2)                                ;*                      BIT 10=REAL TIME CLOCK
(2)                                ;*                      BIT  9=FLOATING POINT PROCESSOR
(2)                                ;*                      BIT  8=MEMORY MANAGEMENT
(2)  001224     000                $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
(2)  001225     000                $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
(2)                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
(2)                                ;*                              900 NSEC CORE=001
(2)                                ;*                              300 NSEC BIPOLAR=002
(2)                                ;*                              500 NSEC MOS=003
(2)  001226  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
(2)                                ;*                       MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
(2)  001230     000                $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
(2)  001231     000                $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
(2)  001232  000000                $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
(2)  001234     000                $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
(2)  001235     000                $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
(2)  001236  000000                $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
(2)  001240     000                $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
(2)  001241     000                $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
(2)  001242  000000                $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
(2)  001244  000300                $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
(2)  001246  000000                $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
(2)  001250  175610                $BASE:  .WORD   ABASE
(2)                                ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
(2)  001252  000001                $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
(2)  001254                        $ETEND:
(2)                                .MEXIT
```

```
   (1)                                  .SBTTL  ERROR POINTER TABLE
   (1)
   (1)                                  ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
   (1)                                  ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
   (1)                                  ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
   (1)                                  ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
   (1)                                  ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
   (1)
   (1)                                  ;*      EM              ;;POINTS TO THE ERROR MESSAGE
   (1)                                  ;*      DH              ;;POINTS TO THE DATA HEADER
   (1)                                  ;*      DT              ;;POINTS TO THE DATA
   (1)                                  ;*      DF              ;;POINTS TO THE DATA FORMAT
   (1)
   (1)
   (1)  001254                          $ERRTB:
  8972                                  ;;              GLOBAL DATA
  8973  001254  175610                      DLADD:  DLADDR
  8974  001256  000300                      DLVEC:  300
  8975  001260  175610                      RCSR:   DLADDR  +  0
  8976  001262  175612                      RBUF:   DLADDR  +  2
  8977  001264  175614                      TCSR:   DLADDR  +  4
  8978  001266  175615                      TCSRHI: DLADDR  +  5
  8979  001270  175616                      TBUF:   DLADDR  +  6
  8980  001272  000000                      I:      0
  8981  001274  000020                      .BLKW 20        ;FOR R5 STACK
  8982  001334  000000                      R5STACK:        .WORD 0
```

```
 8985
 8986  001336                          START:
  (1)                                  .SBTTL  INITIALIZE THE COMMON TAGS
  (1)                                  ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
  (1)  001336  012706  001100          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
  (1)  001342  005026                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
  (1)  001344  022706  001140          CMP     #SWR,R6 ;;DONE?
  (1)  001350  001374                  BNE     .-6             ;;LOOP BACK IF NO
  (1)  001352  012706  001100          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
  (1)                                  ;;INITIALIZE A FEW VECTORS
  (1)  001356  012737  013326  000020  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
  (1)  001364  012737  000300  000022  MOV     #PR6,@#IOTVEC+2 ;;LEVEL 6
  (1)  001372  012737  013126  000030  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
  (1)  001400  012737  000300  000032  MOV     #PR6,@#EMTVEC+2 ;;LEVEL 6
  (1)                                  ;;BIT02
  (1)  001406  012737  014260  000034  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
  (1)  001414  012737  000300  000036  MOV     #PR6,@#TRAPVEC+2;LEVEL 6
  (1)  001422  012737  011440  000024  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
  (1)  001430  012737  000300  000026  MOV     #PR6,@#PWRVEC+2 ;;LEVEL 6
  (1)  001436  016767  007710  007700  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
  (1)  001444  005067  177510          CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
  (1)  001450  005067  177506          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
  (1)  001454  112767  000001  177433  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
  (1)  001462  012767  001462  177416  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
  (1)  001470  012767  001470  177412  MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
  (2)                                  ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
  (2)                                  ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
  (2)  001476  013746  000004          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
  (2)  001502  012737  001536  000004  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
  (2)  001510  012767  177570  177422  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
  (2)  001516  012767  177570  177416  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
  (2)  001524  022777  177777  177406  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
  (2)  001532  001012                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
  (2)                                                          ;;AND  THE HARDWARE SWR IS NOT = -1
  (2)  001534  000403                  BR      65$             ;;BRANCH IF NO TIMEOUT
  (2)  001536  012716  001544  64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
  (2)  001542  000002                  RTI
  (2)  001544  012767  000176  177366  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
  (2)  001552  012767  000174  177362          MOV     #DISPREG,DISPLAY
  (2)  001560  012637  000004  66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
  (1)
  (2)  001564  005067  177412          CLR     $PASS           ;;CLEAR PASS COUNT
  (2)  001570  132767  000200  177417  BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
  (2)  001576  001403                  BEQ     67$             ;;YES,USE NON-APT SWITCH
  (2)  001600  012767  001216  177332  MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
  (2)  001606                          67$:
 8987                                  .SBTTL  TYPE PROGRAM NAME
  (1)                                  ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
  (1)  001606  005227  177777          INC     #-1             ;;FIRST TIME?
  (1)  001612  001037                  BNE     68$             ;;BRANCH IF NO
  (1)  001614  022737  011404  000042  CMP     #$ENDAD,@#42    ;;ACT-11?
  (1)  001622  001433                  BEQ     68$             ;;BRANCH IF YES
  (1)  001624  104401  001672          TYPE    ,69$            ;;TYPE ASCIZ STRING
  (2)                                  .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
  (2)  001630  005737  000042          TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
  (2)  001634  001012                  BNE     70$             ;;BRANCH IF YES
```

```
(2)  001636  126727  177352  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
(2)  001644  001406                          BEQ     70$             ;;BRANCH IF YES
(2)  001646  026727  177266  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
(2)  001654  001005                          BNE     71$             ;;BRANCH IF NO
(2)  001656  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
(2)  001660  000403                          BR      71$
(2)  001662  112767  000001  177244  70$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
(2)  001670                          71$:
(1)  001670  000410                          BR      68$             ;;GET OVER THE ASCIZ
(1)                                  ;;69$:   .ASCIZ  <CRLF>*MD-11-CNDVC-A*<CRLF>
(1)  001712                          68$:
```

```
 8989
 8994  001712                                                    WHILE $DEVM EQ #0 DO
  (4)  001712                                  $1:
  (6)  001712  005767  177334                         TST     $DEVM
  (9)  001716  001101                                 BNE     $2
 8995  001720                                           TYPTXT <<CRLF>!I HAVE NO DEVICE TO TEST.!>
 8996  001762                                           TYPTXT  <<CRLF>!SET UP $DEVM TO INDICATE ACTUAL CONFIGURATION.!>
 8997  002050                                           TYPTXT  <<CRLF>!TYPE PROCEED (P) TO CONTINUE.!>
 8998  002116  000000                                   HALT
 8999  002120                                                    ENDDO
  (4)  002120  000674                                 BR      $1
  (3)  002122                                  $2:
 9000  002122                                                    LET INITFLAG := #1
  (4)  002122  012767  000001  006754                MOV     #1,INITFLAG
 9001  002130                                                    LET BITMASK := #BIT15   ; START AT CONSOLE
  (4)  002130  012767  100000  006744                MOV     #BIT15,BITMASK
 9002  002136                                  LOOP:
 9003  002136                                           CALL    CYCLE           ; NO ARGUMENTS--ADDRS -> NEXT ADDRESS
  (3)  002136  004767  006520                         JSR     PC,CYCLE
 9004                                              ;                   ADDRS+2 -> NEXT VECTOR
 9005                                                                  ;GET UNIT ADDRESS
 9006  002142                                                    LET     DLADD := (ADRS)+
  (4)  002142  012167  177106                         MOV     (ADRS)+,DLADD
 9007                                                                  ;GET UNIT VECTOR
 9008  002146                                                    LET     DLVEC := (ADRS)
  (4)  002146  011167  177104                         MOV     (ADRS),DLVEC
 9009  002152                                                    LET     ADRS  := DLADD
  (4)  002152  016701  177076                         MOV     DLADD,ADRS
 9010                                                                  ;RCSR = DLADD  +  0
 9011  002156                                                    LET     RCSR  := DLADD
  (4)  002156  016767  177072  177074                MOV     DLADD,RCSR
 9012  002164                                                    LET     RBUF  := DLADD + #2
  (4)  002164  016767  177064  177070                MOV     DLADD,RBUF
  (7)  002172  062767  000002  177062                ADD     #2,RBUF
 9013  002200                                                    LET     TCSR  := DLADD + #4
  (4)  002200  016767  177050  177056                MOV     DLADD,TCSR
  (7)  002206  062767  000004  177050                ADD     #4,TCSR
 9014  002214                                                    LET     TCSRHI := DLADD + #5
  (4)  002214  016767  177034  177044                MOV     DLADD,TCSRHI
  (7)  002222  062767  000005  177036                ADD     #5,TCSRHI
 9015  002230                                                    LET     TBUF  := DLADD + #6
  (4)  002230  016767  177020  177032                MOV     DLADD,TBUF
  (7)  002236  062767  000006  177024                ADD     #6,TBUF
 9016  002244                                                    LET     R5    := #R5STACK
  (4)  002244  012705  001334                         MOV     #R5STACK,R5
 9021                                                                  ;;BRESET
  (1)  002250  000005                                 RESET
```

```
 9032
 9033                                ;;*********************************************************************
  (3)                                ;*TEST 1         ADDRESSABILITY
  (4)                                ;*              THIS TEST VERIFIES THAT THE ADDRESS AS PLACED IN
  (4)                                ;*              THE HARDWARE P-TABLE TO BE CORRECT AND THE DLV11-F RESPONDS
  (4)                                ;*              TO THAT ADDRESS SPACE
  (3)                                ;*********************************************************************
  (2)  002252  000004                TST1:   SCOPE
  (2)
  (1)  002254  012767  000002  176676        MOV     #2,$TIMES       ;;DO 2 ITERATIONS
  (2)  002262  012767  000001  176710        MOV     #1,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
 9038  002270                                                                LET     ADRS := DLADD
  (4)  002270  016701  176760                MOV     DLADD,ADRS
 9039                                                                       ; SET UP INTERRUPT
 9040  002274                                                           SETVEC  #ILLMEM,#INTSRV,#PR6
  (5)  002274  010146                        MOV     R1,-(SP)
  (5)  002276  012701  000004                MOV     #ILLMEM,R1
  (5)  002302  012721  010652                MOV     #INTSRV,(R1)+
  (5)  002306  012711  000300                MOV     #PR6,(R1)
  (5)  002312  012601                        MOV     (SP)+,R1
 9041  002314                                                           LET     I := #0
  (4)  002314  005067  176752                CLR     I
 9042  002320                                                           REPEAT
  (3)  002320                        $3:
 9043  002320                                                               BGNSUB
  (5)  002320  012767  002326  176562        MOV     #64$,$LPERR
 9044                                                                         ;CLEAR FLAG
 9045  002326                                                                LET INTFLAG := #0
  (4)  002326  005067  006326                CLR     INTFLAG
 9046
 9047                                                                         ;READ FLAG
 9048  002332  005711                    TST @ADRS
 9049  002334                                                                IF INTFLAG NE #0 THEN
  (6)  002334  005767  006320                TST     INTFLAG
  (9)  002340  001401                        BEQ     $4
 9050
 9051  002342                                                                ; FATAL ERROR
  (1)  002342  104001                        ERROR   1                           ERRDF 1,,NODL
 9052  002344                                                                ENDIF
  (4)  002344                        $4:
 9053  002344                                                           ENDSUB
 9054  002344                                                           LET     I := I + #2
  (7)  002344  062767  000002  176720        ADD     #2,I
 9055  002352                                                           LET     ADRS := DLADD + I
  (4)  002352  016701  176676                MOV     DLADD,ADRS
  (7)  002356  066701  176710                ADD     I,ADRS
 9056  002362                                                      UNTIL I EQ #8.
  (3)  002362  026727  176704  000010        CMP     I,#8.
  (6)  002370  001353                        BNE     $3
 9057  002372                                                      CLRVEC ILLMEM
  (3)  002372  010146                        MOV     R1,-(SP)    ;;PUSH R1 ON STACK
  (3)  002374  010246                        MOV     R2,-(SP)    ;;PUSH R2 ON STACK
  (5)  002376  012701  000004                MOV     #ILLMEM,R1
  (5)  002402  010102                        MOV     R1,R2
  (8)  002404  062702  000002                ADD     #2,R2
  (5)  002410  010221                        MOV     R2,(R1)+
```

```
   (5)  002412  005011                    CLR     (R1)
   (3)  002414  012602                    MOV     (SP)+,R2        ;;POP STACK INTO R2
   (3)  002416  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
 9058                                                                ;END OF TEST
 9059  002420                                  ENDTST
```

```
 9061
 9066                                   ;;*****************************************************************
 9067                                   ;* THE FOLLOWING 8 TESTS  TEST ALL 'READ WRITE' BITS
 9068                                   ;;*****************************************************************
 9069
 9070
 9078                                   ;;*****************************************************************
  (3)                                   ;*TEST 2        BREAK - TCSR0 SET, CLEAR, RESET
  (4)                                   ;*             THE BREAK BIT IS USUALLY USED ON THE CONSOLE
  (4)                                   ;*             DEVICE. IF ADDITIONAL DLV OPTIONS ARE USED
  (4)                                   ;*             IT IS RECOMMENDED TO REMOVE THE 'BG' JUMPER AND
  (4)                                   ;*             CLEAR BIT 12 IN $USWR WHICH WILL CAUSE THIS
  (4)                                   ;*             TEST TO BE SKIPPED.
  (3)                                   ;;*****************************************************************
  (2)  002420  000004                   TST2:   SCOPE
  (2)
  (1)  002422  012767  000010  176530           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  002430  012767  000002  176542           MOV     #2,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
 9079
 9084  002436                                                           IF #BRK NOTSETIN $USWR OR #APTENV SETIN $ENV THE
  (6)  002436  032767  010000  176554           BIT     #BRK,$USWR
  (8)  002444  001404                           BEQ     $5
  (6)  002446  032767  000001  176540           BIT     #APTENV,$ENV
  (9)  002454  001404                           BEQ     $6
  (6)  002456                           $5:
 9085  002456                                                               EXIT TEST   ; BREAK NOT INSTALLED
  (5)  002456  012767  000001  176474           MOV     #1,$TIMES
  (3)  002464  000452                           BR      TST3            ;;;EXIT THIS TEST
 9086  002466                                                           ENDIF
  (4)  002466                           $6:
 9087
 9088                                                       ; SEE IF IT IS CLEAR
 9089  002466                                                           BGNSUB
  (5)  002466  012767  002474  176414           MOV     #64$,$LPERR
 9090
 9091  002474                                                               IF      #BREAK SETIN @TCSR THEN
  (6)  002474  032777  000001  176562           BIT     #BREAK,@TCSR
  (9)  002502  001401                           BEQ     $7
 9092                                                                          ; BREAK DID NOT RESET IN TCSR
 9093  002504                                                                 ERRHRD 2,,DIDNOT
  (1)  002504  104002                           ERROR   2
 9094  002506                                                               ENDIF
  (4)  002506                           $7:
 9095  002506                                                           ENDSUB
 9096
 9097                                                       ; TRY TO SET BREAK BIT
 9098  002506                                                           BGNSUB
  (5)  002506  012767  002514  176374           MOV     #64$,$LPERR
 9099  002514                                                               LET     @TCSR := @TCSR SET.BY #BREAK
  (7)  002514  052777  000001  176542           BIS     #BREAK,@TCSR
 9100                                                                      ; STUCK TO 0
 9101  002522                                                               IF      #BREAK NOTSETIN @TCSR THEN
  (6)  002522  032777  000001  176534           BIT     #BREAK,@TCSR
  (9)  002530  001001                           BNE     $10
 9102                                                                          ; BREAK DID NOT SET IN TCSR
 9103  002532                                                                 ERRHRD 3,,DIDNOT
```

```
  (1)  002532  104003                          ERROR   3
9104   002534                                                              ENDIF
  (4)  002534                          $10:
9105   002534                                                            ENDSUB
9106
9107                                                    ; TRY TO CLEAR A SET BIT
9108   002534                                                            BGNSUB
  (5)  002534  012767  002542  176346          MOV     #64$,$LPERR
9109
9110   002542                                                              LET     @TCSR := @TCSR CLR.BY #BREAK
  (7)  002542  042777  000001  176514          BIC     #BREAK,@TCSR
9111                                                                    ; SHOULD HAVE CLEARED
9112   002550                                                           IF      #BREAK SETIN @TCSR THEN
  (6)  002550  032777  000001  176506          BIT     #BREAK,@TCSR
  (9)  002556  001401                          BEQ     $11
9113                                                                      ; BREAK  DID NOT CLEAR IN TCSR
9114   002560                                                             ERRHRD 4,,DIDNOT
  (1)  002560  104004                          ERROR   4
9115   002562                                                              ENDIF
  (4)  002562                          $11:
9116   002562                                                            ENDSUB
9117
9118                                                    ; NOW SEE IF RESET CLEARS IT
9119   002562                                                            BGNSUB
  (5)  002562  012767  002570  176320          MOV     #64$,$LPERR
9120
9121   002570                                                              LET     @TCSR := @TCSR SET.BY #BREAK
  (7)  002570  052777  000001  176466          BIS     #BREAK,@TCSR
9122                                                                      ; ISSUE BUS RESET
9123   002576                                                             BRESET
  (1)  002576  000005                          RESET
9124   002600                                                              IF      #BREAK SETIN @TCSR THEN
  (6)  002600  032777  000001  176456          BIT     #BREAK,@TCSR
  (9)  002606  001401                          BEQ     $12
9125                                                                        ; BREAK DID NOT RESET IN TCSR
9126   002610                                                               ERRHRD 5,,DIDNOT
  (1)  002610  104005                          ERROR   5
9127   002612                                                              ENDIF
  (4)  002612                          $12:
9128   002612                                                          ENDSUB
9129   002612                                                        ENDTST
9130
9131
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 3          MAINT - TCSR2 SET, CLEAR, RESET
                                ;;*****************************************************************
002612  000004                  TST3:   SCOPE

002614  012767  000010  176336          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
002622  012767  000003  176350          MOV     #3,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX

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

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

002666                                                              IF      #MAINT SETIN @TCSR THEN
002666  032777  000004  176370          BIT     #MAINT,@TCSR
002674  001401                        BEQ     $15
                                                                        ; MAINT DID NOT RESET IN TCSR
002676                                                                  ERRHRD 6,,DIDNOT
002676  104006                        ERROR   6
002700                                                              ENDIF
002700                          $15:
002700                                                          ENDSUB

                                                ; TRY TO SET MAINT BIT
002700                                                          BGNSUB
002700  012767  002706  176202          MOV     #64$,$LPERR
002706                                                              LET     @TCSR := @TCSR SET.BY #MAINT
002706  052777  000004  176350          BIS     #MAINT,@TCSR
                                                                        ; STUCK TO 0
002714                                                                  IF      #MAINT NOTSETIN @TCSR THEN
002714  032777  000004  176342          BIT     #MAINT,@TCSR
002722  001001                        BNE     $16
                                                                        ; MAINT DID NOT SET IN TCSR
002724                                                                  ERRHRD 7,,DIDNOT
002724  104007                        ERROR   7
002726                                                              ENDIF
002726                          $16:
002726                                                          ENDSUB

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

```
 9171  002734
  (7)  002734  042777  000004  176322          BIC     #MAINT,@TCSR
 9172
 9173  002742
  (6)  002742  032777  000004  176314          BIT     #MAINT,@TCSR
  (9)  002750  001401                          BEQ     $17
 9174
 9175  002752
  (1)  002752  104010                          ERROR   10
 9176  002754
  (4)  002754                          $17:
 9177  002754
 9178
 9179
 9180  002754
  (5)  002754  012767  002762  176126          MOV     #64$,$LPERR
 9181
 9182  002762
  (7)  002762  052777  000004  176274          BIS     #MAINT,@TCSR
 9183
 9184  002770
  (1)  002770  000005                          RESET
 9185  002772
  (6)  002772  032777  000004  176264          BIT     #MAINT,@TCSR
  (9)  003000  001401                          BEQ     $20
 9186
 9187  003002
  (1)  003002  104011                          ERROR   11
 9188  003004
  (4)  003004                          $20:
 9189  003004
 9190  003004
 9191
 9192
 9193
```

```
                                        LET     @TCSR := @TCSR CLR.BY #MAINT
                                            ; SHOULD HAVE CLEARED
                                        IF      #MAINT SETIN @TCSR THEN

                                            ; MAINT DID NOT CLEAR INTCSR
                                            ERRHRD 10,,DIDNOT
                                        ENDIF
                                    ENDSUB

                                ; NOW SEE IF RESET CLEARS IT
                                    BGNSUB

                                        LET     @TCSR := @TCSR SET.BY #MAINT
                                            ; ISSUE BUS RESET
                                        BRESET
                                        IF      #MAINT SETIN @TCSR THEN

                                            ; MAINT DID NOT RESET IN TCSR
                                            ERRHRD 11,,DIDNOT
                                        ENDIF

                                    ENDSUB
                                ENDTST
```

```
 9195
 9200                                   ;;*****************************************************************
 9201                                   ;;*****************************************************************
  (3)                                   ;*TEST 4          XMITIE - TCSR6 SET, CLEAR, RESET
  (3)                                   ;;*****************************************************************
  (2)  003004  000004                   TST4:   SCOPE
  (2)
  (1)  003006  012767  000010  176144           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  003014  012767  000004  176156           MOV     #4,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
 9202                                                                           ; USE PRIORITY OF 6
 9207  003022  012746  000300                   MOV     #PR6,-(SP)      ;;PUT NEW PS ON STACK
  (1)  003026  012746  003034                   MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
  (1)  003032  000002                           RTI                     ;;POP NEW PC AND PS
  (1)  003034                           64$:
 9212
 9217                                                   ; SEE IF IT IS CLEAR
 9218  003034                                                    BGNSUB
  (5)  003034  012767  003042  176046           MOV     #65$,$LPERR
 9219
 9220  003042                                                        IF      #XMITIE SETIN @TCSR THEN
  (6)  003042  032777  000100  176214           BIT     #XMITIE,@TCSR
  (9)  003050  001401                           BEQ     $21
 9221                                                                       ; XMITIE DID NOT RESET IN TCSR
 9222  003052                                                               ERRHRD 12,,DIDNOT
  (1)  003052  104012                           ERROR   12
 9223  003054                                                            ENDIF
  (4)  003054                           $21:
 9224  003054                                                     ENDSUB
 9225
 9226                                                   ; TRY TO SET XMITIE BIT
 9227  003054                                                    BGNSUB
  (5)  003054  012767  003062  176026           MOV     #64$,$LPERR
 9228  003062                                                        LET     @TCSR := @TCSR SET.BY #XMITIE
  (7)  003062  052777  000100  176174           BIS     #XMITIE,@TCSR
 9229                                                                   ; STUCK TO 0
 9230  003070                                                        IF      #XMITIE NOTSETIN @TCSR THEN
  (6)  003070  032777  000100  176166           BIT     #XMITIE,@TCSR
  (9)  003076  001001                           BNE     $22
 9231                                                                       ; XMIT DID NOT RESET IN TCSR
 9232  003100                                                               ERRHRD 13,,DIDNOT
  (1)  003100  104013                           ERROR   13
 9233  003102                                                            ENDIF
  (4)  003102                           $22:
 9234  003102                                                     ENDSUB
 9235
 9236                                                   ; TRY TO CLEAR A SET BIT
 9237  003102                                                    BGNSUB
  (5)  003102  012767  003110  176000           MOV     #64$,$LPERR
 9238
 9239  003110                                                        LET     @TCSR := @TCSR CLR.BY #XMITIE
  (7)  003110  042777  000100  176146           BIC     #XMITIE,@TCSR
 9240                                                                   ; SHOULD HAVE CLEARED
 9241  003116                                                        IF      #XMITIE SETIN @TCSR THEN
  (6)  003116  032777  000100  176140           BIT     #XMITIE,@TCSR
  (9)  003124  001401                           BEQ     $23
 9242                                                                       ;  XMIT DID NOT CLEAR IN TCSR
```

```
9243  003126                                                        ERRHRD 14,,DIDNOT
 (1)  003126  104014                    ERROR   14
9244  003130                                                      ENDIF
 (4)  003130                        $23:
9245  003130                                                    ENDSUB
9246
9247                                                 ; NOW SEE IF RESET CLEARS IT
9248  003130                                                    BGNSUB
 (5)  003130  012767  003136  175752    MOV     #64$,$LPERR
9249
9250  003136                                                    LET     @TCSR := @TCSR SET.BY #XMITIE
 (7)  003136  052777  000100  176120    BIS     #XMITIE,@TCSR
9251                                                            ; ISSUE BUS RESET
9252  003144                                                    BRESET
 (1)  003144  000005                    RESET
9253  003146                                                    IF      #XMITIE SETIN @TCSR THEN
 (6)  003146  032777  000100  176110    BIT     #XMITIE,@TCSR
 (9)  003154  001401                    BEQ     $24
9254                                                            ; XMIT DID NOT RESET IN TCSR
9255  003156                                                    ERRHRD 15,,DIDNOT
 (1)  003156  104015                    ERROR   15
9256  003160                                                    ENDIF
 (4)  003160                        $24:
9257  003160                                                  ENDSUB
9258  003160                                                ENDTST
9259
9260
9261
```

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

```
 9306                                                    ; NOW SEE IF RESET CLEARS IT
 9307  003272                                                          BGNSUB
  (5)  003272  012767  003300  175610          MOV     #64$,$LPERR
 9308
 9309  003300                                                              LET     @RCSR := @RCSR SET.BY #RCVRIE
  (7)  003300  052777  000100  175752          BIS     #RCVRIE,@RCSR
 9310                                                                        ; ISSUE BUS RESET
 9311  003306                                                              BRESET
  (1)  003306  000005                          RESET
 9312  003310                                                              IF      #RCVRIE SETIN @RCSR THEN
  (6)  003310  032777  000100  175742          BIT     #RCVRIE,@RCSR
  (9)  003316  001401                          BEQ     $30
 9313                                                                        ; RCVRIE DID NOT RESET IN RCSR
 9314  003320                                                                ERRHRD 40,,DIDNOT
  (1)  003320  104040                          ERROR   40
 9315  003322                                                              ENDIF
  (4)  003322                                $30:
 9316  003322                                                              CKLOOP
 9317  003322                                                          ENDSUB
 9318  003322                                                      ENDTST
 9319
 9320
 9321
 9322
```

```
 9324
 9329                                   ;;*********************************************************************
 9330                                   ;* THE FOLLOWING 4 TESTS VERIFY
 9331                                   ;* THAT RESET (INIT) INITIALIZES READ ONLY BITS.
 9332                                   ;;*********************************************************************
 9333                                   ;;*********************************************************************
  (3)                                   ;*TEST 6         TEST THAT RCVRDONE - RCSR 7 - IS CLEARED BY INIT
  (3)                                   ;;*********************************************************************
  (2)  003322  000004                   TST6:   SCOPE
  (2)
  (1)  003324  012767  000010  175626           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  003332  012767  000006  175640           MOV     #6,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
 9334
 9339
 9340
 9341
 9342  003340                                                   BGNSUB
  (5)  003340  012767  003346  175542           MOV     #64$,$LPERR
 9343  003346                                                       IF      #RCVRDONE SETIN @RCSR THEN
  (6)  003346  032777  000200  175704           BIT     #RCVRDONE,@RCSR
  (9)  003354  001402                           BEQ     $31
 9344
 9345                                                                  ;RCVRDONE SHOULD HAVE CLEARED BY INIT
 9346                                                                  ; RCVRDONE DID NOT CLEAR IN RCSR
 9347  003356                                                          ERRHRD 41,HRESET, DIDNOT
  (1)  003356  104041                           ERROR   41
 9348                                                                  ;REISSUE RESET
 9349  003360                                                          BRESET
  (1)  003360  000005                           RESET
 9350  003362                                                       ENDIF
  (4)  003362                           $31:
 9351                                                                  ;ALLOW LOOPING AFTER ERROR
 9352  003362                                                       CKLOOP
 9353  003362                                                   ENDSUB
 9354  003362                                               ENDTST
 9355
 9356
 9357
```

```
 9359
 9364                                ;;*****************************************************************
 9365                                ;;*****************************************************************
  (3)                                ;*TEST 7        TEST THAT RCVRACT - RCSR 11 - IS CLEARED BY INIT
  (3)                                ;;*****************************************************************
  (2) 003362  000004                 TST7:   SCOPE
  (2)
  (1) 003364  012767  000010  175566         MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2) 003372  012767  000007  175600         MOV     #7,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
 9366                                                                        !
 9367                                                                        !
 9372                                                                        !
 9373
 9374 003400                                                         IFB CONSOLE EQ #TRUE THEN
  (6) 003400  126727  005515  000001         CMPB    CONSOLE,#TRUE
  (9) 003406  001001                         BNE     $32
 9375                                                                    ;; EXECUTE TEST
 9376 003410                                                         ELSE
  (4) 003410  000416                         BR      $33
  (3) 003412                         $32:
 9377 003412                                                         IF #WRAP SETIN $USWR THEN
  (6) 003412  032767  020000  175600         BIT     #WRAP,$USWR
  (9) 003420  001401                         BEQ     $34
 9378                                                                    ;; EXECUTE TEST
 9379 003422                                                         ELSE
  (4) 003422  000411                         BR      $35
  (3) 003424                         $34:
 9380 003424                                                         IF #MAINT SETIN $USWR THEN
  (6) 003424  032767  000004  175566         BIT     #MAINT,$USWR
  (9) 003432  001401                         BEQ     $36
 9381                                                                    ;;EXECUTE TEST
 9382 003434                                                         ELSE
  (4) 003434  000404                         BR      $37
  (3) 003436                         $36:
 9383 003436                                                            EXIT TEST    ; LINE MUST BE TERMINATED
  (5) 003436  012767  000001  175514         MOV     #1,$TIMES
  (3) 003444  000414                         BR      TST10           ;;;EXIT THIS TEST
 9384 003446                                                         ENDIF
  (4) 003446                         $37:
 9385 003446                                                         ENDIF
  (4) 003446                         $35:
 9386 003446                                                         ENDIF
  (4) 003446                         $33:
 9387
 9388 003446                                                                BGNSUB
  (5) 003446  012767  003454  175434         MOV     #64$,$LPERR
 9389
 9390 003454                                                                    IF      #RCVRACT SETIN @RCSR THEN
  (6) 003454  032777  004000  175576         BIT     #RCVRACT,@RCSR
  (9) 003462  001405                         BEQ     $40
 9391
 9392                                                                       ;RESET SHOULD HAVE CLEARED RCVRACT
 9393 003464                                                                LET @TCSR := @TCSR CLR.BY #MAINT
  (7) 003464  042777  000004  175572         BIC     #MAINT,@TCSR
 9394 003472                                                                ERRHRD 44, HRESET, DIDNOT
  (1) 003472  104044                         ERROR   44
```

```
 9395
 9396                                                                    ;TESTING EFFECT OF RESET ON BIT
 9397
 9398                                                                    ;RCVRACT DID NOT CLEAR IN RCSR
 9399
 9400                                                                    ;ALLOW ANOTHER TRY
 9401  003474                                                            BRESET
  (1)  003474  000005                        RESET
 9402  003476                                                          ENDIF
  (4)  003476                        $40:
 9403                                                                    ;ALLOW LOOPING ON ERROR
 9404  003476                                                          CKLOOP
 9405  003476                                                       ENDSUB
 9406  003476                                                    ENDTST
 9407
```

```
 9409
 9414                                   ;;*****************************************************************
 9415                                   ;;*****************************************************************
  (3)                                   ;*TEST 10        TEST THAT XMITRDY - TCSR 7 - IS SET BY INIT
  (3)                                   ;;*****************************************************************
  (2)  003476  000004                   TST10:  SCOPE
  (2)
  (1)  003500  012767  000010  175452           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  003506  012767  000010  175464           MOV     #10,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 9416
 9421
 9422
 9423
 9424  003514                                                                 BGNSUB
  (5)  003514  012767  003522  175366           MOV     #64$,$LPERR
 9425
 9426  003522                                                                     IF      #XMITRDY NOTSETIN @TCSR THEN
  (6)  003522  032777  000200  175534           BIT     #XMITRDY,@TCSR
  (9)  003530  001002                           BNE     $41
 9427
 9428                                                                               ;RESET SHOULD HAVE SET BIT.
 9429                                                                               ;XMITRDY DID NOT SET IN TCSR (AFTER RESE
 9430  003532                                                                       ERRHRD 42,HRESET,DIDNOT
  (1)  003532  104042                           ERROR   42
 9431                                                                               ;ISSUE ANOTHER RESET
 9432  003534                                                                       BRESET
  (1)  003534  000005                           RESET
 9433  003536                                                                 ENDIF
  (4)  003536                           $41:
 9434                                                                               ;ALLOW LOOPING ON ERROR
 9435  003536                                                                   CKLOOP
 9436  003536                                                               ENDSUB
 9437  003536                                                           ENDTST
 9438
 9439
 9440
```

```
 9442
 9447                                   ;;*****************************************************************
 9452                                   ;;*****************************************************************
  (3)                                   ;*TEST 11        TEST THAT XMIT RDY - TCSR 7 - CLEARS
  (4)                                   ;*               WHEN TBUF IS LOADED WITH A CHARACTER
  (4)                                   ;*               AND THAT IT SETS WITHIN A REASONABLE AMOUNT OF TIME.
  (3)                                   ;;*****************************************************************
  (2)  003536  000004                   TST11:  SCOPE
  (2)
  (1)  003540  012767  000001  175412          MOV     #1,$TIMES       ;;DO 1 ITERATION
  (2)  003546  012767  000011  175424          MOV     #11,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 9457
 9458  003554                                                           IFB CONSOLE EQ #TRUE OR #APTENV SETIN $ENV THEN
  (6)  003554  126727  005341  000001          CMPB    CONSOLE,#TRUE
  (8)  003562  001404                          BEQ     $42
  (6)  003564  032767  000001  175422          BIT     #APTENV,$ENV
  (9)  003572  001404                          BEQ     $43
  (6)  003574                           $42:
 9459  003574                                                              EXIT TEST
  (5)  003574  012767  000001  175356          MOV     #1,$TIMES
  (3)  003602  000513                          BR      TST12           ;;;EXIT THIS TEST
 9460  003604                                                           ENDIF
  (4)  003604                           $43:
 9461
 9462  003604                                                           LET PASS := #1  ;INIT COUNT OF TIMES THRU
  (4)  003604  012767  000001  000212          MOV     #1,PASS
 9463  003612                                                           LOOP            ; START OF LOOP
  (3)  003612                           $44:
 9464                                                                                   ;  MAX OF 2 TIMES THRU
 9465  003612                                                              LET ERRORFLAG := #CLR
  (4)  003612  012767  000000  000206          MOV     #CLR,ERRORFLAG
 9466  003620                                                            LET EXITFLAG := #CLR
  (4)  003620  012767  000000  000202          MOV     #CLR,EXITFLAG
 9467                                                                       ; LOAD TBUF WITH ONE CHARACTER
 9468                                                                       ; WAIT FOR READY TO SET
 9469                                                                       ; (SHOULD BE VERY SHORT WAIT
 9470                                                                       ; SINCE UART DOUBLE BUFFERS ITS INPUT)
 9471
 9472                                                                   ;SEND A CHARACTER
 9473  003626                                                           LET @TBUF :B= #0
  (4)  003626  105077  175436                  CLRB    @TBUF
 9474                                                                   ;WAIT A MAXIMUM
 9475                                                                   ;OF 500 MSEC FOR
 9476                                                                   ;XMIT RDY TO SET IN TCSR
 9477  003632                                                           CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
  (3)  003632  010546                          MOV     R5,-(SP)
  (7)  003634  012745  177777                  MOV     #SET,-(R5)
  (6)  003640  016745  175420                  MOV     TCSR,-(R5)
  (5)  003644  012745  000200                  MOV     #XMITRDY,-(R5)
  (4)  003650  012745  000500                  MOV     #500,-(R5)
  (3)  003654  004767  004434                  JSR     PC,TIMER
  (3)  003660  012605                          MOV     (SP)+,R5
 9478                                                                   ;TIMER RETURNS AN ERROR IF BIT DID
 9479                                                                   ;NOT MEET CONDITION WITHIN TIME LIMIT
 9480  003662                                                           IF.ERROR THEN
  (6)  003662  103001                          BCC     $46
```

```
 9481                                                                    ;XMIT RDY DID NOT SET IN TCSR
 9482  003664                                                            ERRHRD 66,,DIDNOT
  (1)  003664  104066                    ERROR   66
 9483  003666                                                                  ENDIF
  (4)  003666                    $46:
 9484
 9485                                        ; LOAD TBUF WITH A SECOND CHARACTER
 9486                                        ; CHECK IMMEDIATELY THAT XMITRDY IS CLEAR
 9487                                        ; AND THEN WAIT FOR IT TO SET
 9488
 9489                                                                    ;SEND SECOND CHARACTER
 9490  003666                                                                LET @TBUF :B= #0
  (4)  003666  105077  175376               CLRB    @TBUF
 9491  003672  000240                              NOP                ; GIVE IT TIME TO CLEAR
 9492                                                                    ; XMITRDY SHOULD HAVE CLEARED UPON
 9493                                                                    ; RECEIPT OF A CHARACTER
 9494  003674                                                            IF #XMITRDY SETIN @TCSR THEN
  (6)  003674  032777  000200  175362       BIT     #XMITRDY,@TCSR
  (9)  003702  001404                       BEQ     $47
 9495                                                                    ; XMITRDY DID NOT CLEAR IN TCSR
 9496  003704                                                            LET ERRORFLAG := #SET
  (4)  003704  012767  177777  000114       MOV     #SET,ERRORFLAG
 9497                                                                          ; DEFER ERROR TYPEOUT
 9498
 9499  003712                                                                ELSE
  (4)  003712  000416                       BR      $50
  (3)  003714                    $47:
 9500                                                                    ;WAIT A MAXIMUM
 9501                                                                    ;OF 500 MSEC FOR
 9502                                                                    ;XMIT RDY TO SET IN TCSR
 9503  003714                                                            CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
  (3)  003714  010546                       MOV     R5,-(SP)
  (7)  003716  012745  177777               MOV     #SET,-(R5)
  (6)  003722  016745  175336               MOV     TCSR,-(R5)
  (5)  003726  012745  000200               MOV     #XMITRDY,-(R5)
  (4)  003732  012745  000500               MOV     #500,-(R5)
  (3)  003736  004767  004352               JSR     PC,TIMER
  (3)  003742  012605                       MOV     (SP)+,R5
 9504  003744                                                            IF.ERROR THEN
  (6)  003744  103001                       BCC     $51
 9505                                                                    ;XMIT RDY DID NOT SET IN TCSR
 9506  003746                                                            ERRHRD 70,,DIDNOT
  (1)  003746  104070                       ERROR   70
 9507  003750                                                            ENDIF
  (4)  003750                    $51:
 9508  003750                                                          ENDIF ; OF DEFERED ERROR CALL
  (4)  003750                    $50:
 9509  003750                                                        IF ERRORFLAG EQ #SET THEN
  (6)  003750  026727  000052  177777       CMP     ERRORFLAG,#SET
  (9)  003756  001011                       BNE     $52
 9510  003760                                                            IF PASS GT #1 THEN
  (6)  003760  026727  000040  000001       CMP     PASS,#1
  (9)  003766  003404                       BLE     $53
 9511                                                                    ; CALL ERROR IF 2ND TRY
 9512  003770                                                            ERRHRD 67,,DIDNOT
  (1)  003770  104067                       ERROR   67
```

```
 9513  00377?
  (4)  00377:  012767  177777  000030          MOV     #SET,EXITFLAG                   LET EXITFLAG := #SET
 9514  004000                                                                        ENDIF
  (4)  004000                              $53:
 9515  004000                                                                    ELSE            ; NO ERROR
  (4)  004000  000403                         BR      $54
  (3)  004002                              $52:
 9516  004002                                                                        LET EXITFLAG := #SET
  (4)  004002  012767  177777  000020          MOV     #SET,EXITFLAG
 9517  004010                                                                    ENDIF
  (4)  004010                              $54:
 9518  004010                                                                EXIF        EXITFLAG EQ #SET
  (3)  004010  026727  000014  177777          CMP     EXITFLAG,#SET
  (5)  004016  001401                          BEQ     $45
 9519  004020                                                                ENDLOOP
  (4)  004020  000674                          BR      $44
  (3)  004022                              $45:
 9520  004022                                                                    EXIT ; SKIP AROUND FLAG WORDS
  (3)  004022  000403                          BR      TST12               ;;;EXIT THIS TEST
 9521  004024  000000                      PASS:       0
 9522  004026  000000                      ERRORFLAG:  0
 9523  004030  000000                      EXITFLAG:   0
 9524  004032                                                                ENDTST
```

```
 9526
 9531                           ;;*********************************************************************
 9536                           ;;*********************************************************************
  (3)                           ;*TEST 12        TEST THAT OUTPUTTING A CHAR FROM TBUF (WITH MAINT SET)
  (4)                           ;*               RESULTS IN RCVRDONE SETTING WITHIN A REASONABLE AMOUNT OF TIME
  (4)                           ;*               AND THAT RESET CLEARS THE BIT.
  (3)                           ;*********************************************************************
  (2) 004032  000004            TST12:  SCOPE
  (2)
  (1) 004034  012767  000001  175116        MOV     #1,$TIMES       ;;DO 1 ITERATION
  (2) 004042  012767  000012  175130        MOV     #12,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 9541
 9542 004050                                                        IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
  (6) 004050  032767  040000  175142        BIT     #MAINTJUMP,$USWR
  (8) 004056  001404                        BEQ     $55
  (6) 004060  126727  005035  000001        CMPB    CONSOLE,#TRUE
  (9) 004066  001004                        BNE     $56
  (6) 004070                    $55:
 9543 004070                                                            EXIT TEST
  (5) 004070  012767  000001  175062        MOV     #1,$TIMES
  (3) 004076  000442                        BR      TST13           ;;;EXIT THIS TEST
 9544 004100                                                        ENDIF
  (4) 004100                    $56:
 9545
 9546                                                                   ; SET THE MAINTENANCE BIT
 9547 004100                                                        LET @TCSR := @TCSR SET.BY #MAINT
  (7) 004100  052777  000004  175156        BIS     #MAINT,@TCSR
 9548
 9549 004106                                                        BGNSUB
  (5) 004106  012767  004114  174774        MOV     #64$,$LPERR
 9550                                           ; SEND A CHARACTER AND LET IT WRAP AROUND
 9551
 9552 004114                                                            LET @TBUF :B= #0
  (4) 004114  105077  175150                CLRB    @TBUF
 9553
 9554                                                                   ; WAIT A MAXIMUM OF 50 MSEC
 9555                                                                   ; FOR RCVR DONE TO SET IN
 9556                                                                   ; RCSR
 9557 004120                                                            CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
  (3) 004120  010546                        MOV     R5,-(SP)
  (7) 004122  012745  177777                MOV     #SET,-(R5)
  (6) 004126  016745  175126                MOV     RCSR,-(R5)
  (5) 004132  012745  000200                MOV     #RCVRDONE,-(R5)
  (4) 004136  012745  000500                MOV     #500,-(R5)
  (3) 004142  004767  004146                JSR     PC,TIMER
  (3) 004146  012605                        MOV     (SP)+,R5
 9558
 9559                                                                   ;DIDN'T SET IN TIME
 9560 004150                                                        IF.ERROR THEN
  (6) 004150  103004                        BCC     $57
 9561                                                                   ; RCVRDONE DID NOT SET IN RCSR
 9562                                                                   ; CAN NOT LEAVE WITH MAINT SET
 9563 004152                                                        LET    @TCSR := @TCSR CLR.BY #MAINT
  (7) 004152  042777  000004  175104        BIC     #MAINT,@TCSR
 9564 004160                                                            ERRHRD 71,,DIDNOT
  (1) 004160  104071                        ERROR   71
```

```
 9565  004162                                                    ENDIF
  (4)  004162                        $57:
 9566
 9567  004162                                                ENDSUB
 9568
 9569  004162                                                BGNSUB
  (5)  004162  012767  004170  174720        MOV     #64$,$LPERR
 9570                                             ; NOW THAT IT IS SET SEE IF IT CAN BE RESET
 9571                                             ; THIS ALSO WILL CLEAR THE MAINT. BIT
 9572  004170                                                 BRESET
  (1)  004170  000005                        RESET
 9573
 9574  004172                                                 IF #RCVRDONE SETIN @RCSR THEN
  (6)  004172  032777  000200  175060        BIT     #RCVRDONE,@RCSR
  (9)  004200  001401                        BEQ     $60
 9575                                                              ; RCVRDONE DID NOT RESET IN RCSR.
 9576  004202                                                      ERRHRD 72,,DIDNOT
  (1)  004202  104072                        ERROR   72
 9577  004204                                                 ENDIF
  (4)  004204                        $60:
 9578  004204                                             ENDSUB
 9579  004204                                          ENDTST
```

```
 9581
 9586                                ;;*****************************************************************
 9587                                ;;*****************************************************************
  (3)                                ;*TEST 13        TEST THAT RCVRDONE IS CLEARED BY READING RBUF
  (3)                                ;;*****************************************************************
  (2) 004204  000004                 TST13:  SCOPE
  (2)
  (1) 004206  012767  000010  174744         MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2) 004214  012767  000013  174756         MOV     #13,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 9588
 9593 004222                                                         IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
  (6) 004222  032767  040000  174770         BIT     #MAINTJUMP,$USWR
  (8) 004230  001404                         BEQ     $61
  (6) 004232  126727  004663  000001         CMPB    CONSOLE,#TRUE
  (9) 004240  001004                         BNE     $62
  (6) 004242                         $61:
 9594 004242                                                             EXIT TEST
  (5) 004242  012767  000001  174710         MOV     #1,$TIMES
  (3) 004250  000440                         BR      TST14           ;;;EXIT THIS TEST
 9595 004252                                                         ENDIF
  (4) 004252                         $62:
 9596
 9597                                                                    ; SET MAINT. BIT
 9598 004252                                                         LET @TCSR := @TCSR SET.BY #MAINT
  (7) 004252  052777  000004  175004         BIS     #MAINT,@TCSR
 9599 004260                                                         BGNSUB
  (5) 004260  012767  004266  174622         MOV     #64$,$LPERR
 9600                                            ; OUTPUT A CHARACTER WITH MAINTENANCE
 9601                                            ; SET, AND WAIT FOR XMITRDY TO SET.
 9602
 9603                                                                    ; OUTPUT A CHARACTER
 9604 004266                                                         LET @TBUF :B= #0
  (4) 004266  105077  174776                 CLRB    @TBUF
 9605                                                                ; WAIT MAXIMUM OF 500 MSEC
 9606                                                                ; FOR RCVRDONE TO SET IN
 9607                                                                ; RCSR
 9608 004272                                                         CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
  (3) 004272  010546                         MOV     R5,-(SP)
  (7) 004274  012745  177777                 MOV     #SET,-(R5)
  (6) 004300  016745  174754                 MOV     RCSR,-(R5)
  (5) 004304  012745  000200                 MOV     #RCVRDONE,-(R5)
  (4) 004310  012745  000500                 MOV     #500,-(R5)
  (3) 004314  004767  003774                 JSR     PC,TIMER
  (3) 004320  012605                         MOV     (SP)+,R5
 9609 004322                                                         LET    @TCSR := @TCSR CLR.BY #MAINT
  (7) 004322  042777  000004  174734         BIC     #MAINT,@TCSR
 9610                                                                ; DID IT BECAME READY?
 9611 004330                                                         IF.ERROR  THEN
  (6) 004330  103001                         BCC     $63
 9612                                                                ;RCVRDONE DID NOT SET IN RCSR
 9613 004332                                                         ERRHRD 73,, DIDNOT
  (1) 004332  104073                         ERROR   73
 9614 004334                                                         ENDIF
  (4) 004334                         $63:
 9615 004334                                                     ENDSUB
 9616
```

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

                                                    ;READ BUFFER
                                                LET R0 :B= @RBUF
004334  117700  174722          MOVB    @RBUF,R0
                                                IF #RCVRDONE SETIN @RCSR THEN
004340  032777  000200  174712  BIT     #RCVRDONE,@RCSR
004346  001401                  BEQ     $64
                                                    ;RCVRDONE DID NOT CLEAR IN RCSR
                                                    ERRHRD 74,,DIDNOT
004350  104074                  ERROR   74
                                                ENDIF
004352                  $64:
                                            ENDTST
```

```
9629
9634                                    ;;*****************************************************************
9639                                    ;;*****************************************************************
 (3)                                    ;*TEST 14       TEST THAT RCVRACT - RCSR 11 - SETS
 (4)                                    ;*              WHEN A START BIT IS RECEIVED AND
 (4)                                    ;*              CLEARS WHEN RCVRDONE - RCSR 7 - SETS
 (3)                                    ;;*****************************************************************
 (2) 004352  000004                     TST14:  SCOPE
 (2)
 (1) 004354  012767  000010  174576             MOV     #10,$TIMES      ;;DO 10 ITERATIONS
 (2) 004362  012767  000014  174610             MOV     #14,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
9644 004370                                                             IFB CONSOLE EQ #TRUE OR #MAINTJUMP NOTSETIN $USW
 (6) 004370  126727  004525  000001             CMPB    CONSOLE,#TRUE
 (8) 004376  001404                             BEQ     $65
 (6) 004400  032767  040000  174612             BIT     #MAINTJUMP,$USWR
 (9) 004406  001004                             BNE     $66
 (6) 004410                             $65:
9645 004410                                                                     EXIT TEST
 (5) 004410  012767  000001  174542             MOV     #1,$TIMES
 (3) 004416  000526                             BR      TST15           ;;;EXIT THIS TEST
9646 004420                                                             ENDIF
 (4) 004420                             $66:
9647 004420                                                             IF #APTENV SETIN $ENV THEN
 (6) 004420  032767  000001  174566             BIT     #APTENV,$ENV
 (9) 004426  001404                             BEQ     $67
9648 004430                                                                     EXIT TEST
 (5) 004430  012767  000001  174522             MOV     #1,$TIMES
 (3) 004436  000516                             BR      TST15           ;;;EXIT THIS TEST
9649 004440                                                             ENDIF
 (4) 004440                             $67:
9650
9651
9652
9653 004440                                                     LET @TCSR := @TCSR SET.BY #MAINT
 (7) 004440  052777  000004  174616             BIS     #MAINT,@TCSR
9654 004446                                                             LET R0 := #CLR
 (4) 004446  012700  000000                     MOV     #CLR,R0
9655 004452                                                             LET R1 := #0
 (4) 004452  005001                             CLR     R1
9656                                                        ;LOAD A CHARACTER INTO TBUF
9657                                                        ;WAIT FOR RCVRACT TO SET
9658
9659                                                                    ;SEND A CHARACTER
9660 004454                                                         LET @TBUF :B= #0
 (4) 004454  105077  174610                     CLRB    @TBUF
9661 004460                                                     REPEAT
 (3) 004460                             $70:
9662 004460                                                         IF #RCVRACT SETIN @RCSR THEN
 (6) 004460  032777  004000  174572             BIT     #RCVRACT,@RCSR
 (9) 004466  001403                             BEQ     $71
9663 004470                                                             LET R0 := #SET
 (4) 004470  012700  177777                     MOV     #SET,R0
9664 004474                                                         ELSE
 (4) 004474  000401                             BR      $72
 (3) 004476                             $71:
9665 004476                                                             LET R1 := R1 + #1
```

```
  (7)  004476  005201                        INC     R1
9666   004500                                                          ENDIF
  (4)  004500                          $72:
9667   004500                                                        UNTIL R0 EQ #SET OR R1 HI MAX
  (4)  004500  020027  177777                CMP     R0,#SET
  (6)  004504  001403                        BEQ     $73
  (4)  004506  020167  000160                CMP     R1,MAX
  (7)  004512  101762                        BLOS    $70
  (4)  004514                          $73:
9668   004514                                                        IF R1 HI MAX THEN
  (6)  004514  020167  000152                CMP     R1,MAX
  (9)  004520  101410                        BLOS    $74
9669                                                                    ;IT NEVER SET
9670                                                                    ;RCVRACT DID NOT SET IN RCSR.
9671                                                                    ; CAN NOT LEAVE WITH MAINT SET
9672   004522                                                         LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  004522  042777  000004  174534        BIC     #MAINT,@TCSR
9673   004530                                                           ERRHRD 75,, DIDNOT
  (1)  004530  104075                        ERROR   75
9674   004532                                                           EXIT TEST
  (5)  004532  012767  000001  174420        MOV     #1,$TIMES
  (3)  004540  000455                        BR      TST15          ;;;EXIT THIS TEST
9675   004542                                                          ENDIF
  (4)  004542                          $74:
9676
9677
9678                                                        ;CHECK FOR TIMING OF RCVRACT. CLEARING
9679                                                        ;VS RCVRDONE SETTING
9680
9681
9682   004542                                                       WHILE #RCVRACT SETIN @RCSR DO
  (4)  004542                          $75:
  (6)  004542  032777  004000  174510        BIT     #RCVRACT,@RCSR
  (9)  004550  001421                        BEQ     $76
9683
9684   004552                                                           IF #RCVRDONE SETIN @RCSR THEN
  (6)  004552  032777  000200  174500        BIT     #RCVRDONE,@RCSR
  (9)  004560  001414                        BEQ     $77
9685   004562                                                              IF #RCVRACT SETIN @RCSR THEN
  (6)  004562  032777  004000  174470        BIT     #RCVRACT,@RCSR
  (9)  004570  001410                        BEQ     $100
9686                                                                    ;RCVRDONE AND RCVRACT
9687                                                                        ;BOTH SET
9688                                                                    ; CAN NOT LEAVE WITH MAINT SET
9689   004572                                                         LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  004572  042777  000004  174464        BIC     #MAINT,@TCSR
9690   004600                                                              ERRHRD 76, DONEACT
  (1)  004600  104076                        ERROR   76
9691                                                                    ;NO USE CONTINUING
9692   004602                                                               EXIT TST
  (5)  004602  012767  000001  174350        MOV     #1,$TIMES
  (3)  004610  000431                        BR      TST15          ;;;EXIT THIS TEST
9693   004612                                                           ENDIF
  (4)  004612                          $100:
9694   004612                                                          ENDIF
  (4)  004612                          $77:
```

```
 9695  004612                                                                 ENDDO
  (4)  004612  000753                    BR      $75
  (3)  004614                    $76:
 9696
 9697                                                                        ;RCVRACT = 0 NOW.
 9698  004614                                                                IF #RCVRDONE NOTSETIN @RCSR THEN
  (6)  004614  032777  000200  174436    BIT     #RCVRDONE,@RCSR
  (9)  004622  001010                    BNE     $101
 9699                                                                            ;RCVRDONE DID NOT SET IN RCSR
 9700                                                                            ; CAN NOT LEAVE WITH MAINT SET
 9701  004624                                                                LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  004624  042777  000004  174432    BIC     #MAINT,@TCSR
 9702  004632                                                                    ERRHRD 77,,DIDNOT
  (1)  004632  104077                    ERROR   77
 9703  004634                                                                    EXIT TEST
  (5)  004634  012767  000001  174316    MOV     #1,$TIMES
  (3)  004642  000414                    BR      TST15           ;;;EXIT THIS TEST
 9704  004644                                                                ENDIF
  (4)  004644                    $101:
 9705                                                   ;TEST THAT READING THE RECEIVER
 9706                                                   ;BUFFER CLEARS RCVRDONE
 9707
 9708
 9709                                                                        ;READ CHAR.
 9710  004644                                                                LET R0 := @RBUF
  (4)  004644  017700  174412            MOV     @RBUF,R0
 9711
 9712  004650                                                                IF #RCVRDONE SETIN @RCSR THEN
  (6)  004650  032777  000200  174402    BIT     #RCVRDONE,@RCSR
  (9)  004656  001404                    BEQ     $102
 9713                                                                            ;RCVRDONE DID NOT CLEAR IN RCSR
 9714                                                                            ; CAN NOT LEAVE WITH MAINT SET
 9715  004660                                                                LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  004660  042777  000004  174376    BIC     #MAINT,@TCSR
 9716  004666                                                                    ERRHRD 100,,DIDNOT
  (1)  004666  104100                    ERROR   100
 9717  004670                                                                ENDIF
  (4)  004670                    $102:
 9718
 9719  004670                                                                    EXIT
  (3)  004670  000401                    BR      TST15           ;;;EXIT THIS TEST
 9720  004672  070000                    MAX:70000
 9721
 9722  004674                                                        ENDTST
 9723
```

```
                                ;;*****************************************************************
                                ;;*****************************************************************
                                ;*TEST 15       TEST THE OVERRUN BIT - RBUF 14
                                ;;*****************************************************************
004674  000004                  TST15:  SCOPE
(1) 004676  012767  000010  174254      MOV     #10,$TIMES      ;;DO 10 ITERATIONS
(2) 004704  012767  000015  174266      MOV     #15,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
                                                                IF #ERRBITS NOTSETIN $USWR ORB CONSOLE EQ #TRUE
004712                                  
(6) 004712  032767  100000  174300      BIT     #ERRBITS,$USWR
(8) 004720  001404                      BEQ     $103
(6) 004722  126727  004173  000001      CMPB    CONSOLE,#TRUE
(9) 004730  001004                      BNE     $104
(6) 004732                      $103:
004732                                                              EXIT TEST
(5) 004732  012767  000001  174220      MOV     #1,$TIMES
(3) 004740  000547                      BR      TST16           ;;;EXIT THIS TEST
004742                                                          ENDIF
(4) 004742                      $104:
004742                                                          IF #MAINTJUMP NOTSETIN $USWR THEN
(6) 004742  032767  040000  174250      BIT     #MAINTJUMP,$USWR
(9) 004750  001004                      BNE     $105
004752                                                              EXIT TEST
(5) 004752  012767  000001  174200      MOV     #1,$TIMES
(3) 004760  000537                      BR      TST16           ;;;EXIT THIS TEST
004762                                                          ENDIF
(4) 004762                      $105:
004762                                                          LET @TCSR := @TCSR SET.BY #MAINT
(7) 004762  052777  000004  174274      BIS     #MAINT,@TCSR
004770                                                          BGNSUB
(5) 004770  012767  004776  174112      MOV     #64$,$LPERR
                                            ;OUTPUT 2 CHARACTERS WITH
                                            ;AMPLE DELAYS BETWEEN FOR RECEPTION.
                                            ;THIS SHOULD AN CAUSE OVERRUN ERROR.
                                                                    ;OUTPUT 1 CHARACTER
004776                                                          LET @TBUF :B= #0
(4) 004776  105077  174266              CLRB    @TBUF
                                                                    ;GO AWAY FOR 200 M SEC
005002                                                          WAITMS 200.
(4) 005002  010546                      MOV     R5,-(SP)
(5) 005004  012745  000310              MOV     #200.,-(R5)
(4) 005010  004767  003556              JSR     PC,WAIT
(4) 005014  012605                      MOV     (SP)+,R5
                                                                    ;OUTPUT 2ND CHARACTER
005016                                                          LET @TBUF :B= #0
(4) 005016  105077  174246              CLRB    @TBUF
                                                                    ;LET OVERRUN HAPPEN
```

```
 9762  005022                                                          WAITMS 200.
  (4)  005022  010546                    MOV     R5,-(SP)
  (5)  005024  012745  000310            MOV     #200.,-(R5)
  (4)  005030  004767  003536            JSR     PC,WAIT
  (4)  005034  012605                    MOV     (SP)+,R5
 9763
 9764                                                              ;READ BUFFER AND ERROR BITS
 9765  005036                                                    LET R4 := @RBUF
  (4)  005036  017704  174220            MOV     @RBUF,R4
 9766
 9767                                                              ;IT DIDN'T SET
 9768  005042                                                    IF #ORERR NOTSETIN R4 THEN
  (6)  005042  032704  040000            BIT     #ORERR,R4
  (9)  005046  001010                    BNE     $106
 9769                                                              ;ORERR DID NOT SET IN RBUF
 9770                                                              ; CAN NOT LEAVE WITH MAINT SET
 9771  005050                                                    LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  005050  042777  000004  174206    BIC     #MAINT,@TCSR
 9772  005056                                                        ERRHRD 101,,DIDNOT
  (1)  005056  104101                    ERROR   101
 9773
 9774                                                              ;NO USE COMPOUNDING ERRORS
 9775  005060                                                      EXIT TST
  (5)  005060  012767  000001  174072    MOV     #1,$TIMES
  (3)  005066  000474                    BR      TST16           ;;;EXIT THIS TEST
 9776  005070                                                          ENDIF
  (4)  005070                        $106:
 9777  005070                                                    ENDSUB
 9778
 9779                                    ;NOW SEE IF ERROR BIT SET WITH OVERRUN  ERROR:
 9780  005070                                                    BGNSUB
  (5)  005070  012767  005076  174012    MOV     #64$,$LPERR
 9781  005076                                                        IF #ERROR NOTSETIN R4 THEN
  (6)  005076  032704  100000            BIT     #ERROR,R4
  (9)  005102  001010                    BNE     $107
 9782
 9783                                                              ;ERROR DID NOT SET IN RBUF
 9784                                                              ; CAN NOT LEAVE WITH MAINT SET
 9785  005104                                                    LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  005104  042777  000004  174152    BIC     #MAINT,@TCSR
 9786  005112                                                        ERRHRD 102,,DIDNOT
  (1)  005112  104102                    ERROR   102
 9787
 9788                                                              ;-WHEN ORERR SET.
 9789                                                              ;GET OUT NOW.
 9790  005114                                                      EXIT TST
  (5)  005114  012767  000001  174036    MOV     #1,$TIMES
  (3)  005122  000456                    BR      TST16           ;;;EXIT THIS TEST
 9791  005124                                                          ENDIF
  (4)  005124                        $107:
 9792  005124                                                    ENDSUB
 9793
 9794  005124                                                    BGNSUB
  (5)  005124  012767  005132  173756    MOV     #64$,$LPERR
 9795                                        ;CHECK REAL RBUF TO SEE IF ORERR IS STILL SET.
 9796
```

```
                                                                    IF #ORERR NOTSETIN @RBUF THEN
 9797  005132
  (6)  005132  032777  040000  174122          BIT     #ORERR,@RBUF
  (9)  005140  001010                          BNE     $110
 9798
 9799                                                               ;READING RBUF CLEARED ORERR.
 9800                                                               ; CAN NOT LEAVE WITH MAINT SET
 9801  005142                                                      LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  005142  042777  000004  174114          BIC     #MAINT,@TCSR
 9802  005150                                                      ERRHRD 103,ITCLRED
  (1)  005150  104103                          ERROR   103
 9803                                                               ;SKIP REST OF TEST
 9804  005152                                                      EXIT TEST
  (5)  005152  012767  000001  174000          MOV     #1,$TIMES
  (3)  005160  000437                          BR      TST16              ;;;EXIT THIS TEST
 9805  005162                                                            ENDIF
  (4)  005162                          $110:
 9806  005162                                                    ENDSUB
 9807
 9808  005162                                                    BGNSUB
  (5)  005162  012767  005170  173720          MOV     #64$,$LPERR
 9809                                                  ;NOW SEE IF THEY CLEAR WHEN ANOTHER CHAR. IS RECEIVED
 9810
 9811                                                               ;SEND A CHARACTER AROUND.
 9812  005170                                                      LET @TBUF :B= #0
  (4)  005170  105077  174074                  CLRB    @TBUF
 9813                                                               ;LET IT CIRCULATE
 9814  005174                                                      WAITMS 200.
  (4)  005174  010546                          MOV     R5,-(SP)
  (5)  005176  012745  000310                  MOV     #200.,-(R5)
  (4)  005202  004767  003364                  JSR     PC,WAIT
  (4)  005206  012605                          MOV     (SP)+,R5
 9815
 9816  005210                                                      IF #ORERR SETIN @RBUF THEN
  (6)  005210  032777  040000  174044          BIT     #ORERR,@RBUF
  (9)  005216  001410                          BEQ     $111
 9817                                                               ;ORERR DID NOT CLEAR IN RBUF
 9818                                                               ; CAN NOT LEAVE WITH MAINT SET
 9819  005220                                                      LET    @TCSR := @TCSR CLR.BY #MAINT
  (7)  005220  042777  000004  174036          BIC     #MAINT,@TCSR
 9820  005226                                                      ERRHRD 104,,DIDNOT
  (1)  005226  104104                          ERROR   104
 9821
 9822                                                               ;-AFTER RECEIVING ANOTHER CHAR
 9823                                                               ;SKIP AROUND REST
 9824  005230                                                      EXIT TST
  (5)  005230  012767  000001  173722          MOV     #1,$TIMES
  (3)  005236  000410                          BR      TST16              ;;;EXIT THIS TEST
 9825  005240                                                            ENDIF
  (4)  005240                          $111:
 9826
 9827  005240                                                      IF #ERROR SETIN @RBUF THEN
  (6)  005240  032777  100000  174014          BIT     #ERROR,@RBUF
  (9)  005246  001404                          BEQ     $112
 9828                                                               ;ERROR DID NOT CLEAR IN RBUF
 9829                                                               ; CAN NOT LEAVE WITH MAINT SET
 9830  005250                                                      LET    @TCSR := @TCSR CLR.BY #MAINT
```

```
   (7)  005250  042777  000004  174006          BIC     #MAINT,@TCSR
 9831   005256                                                        ERRHRD 105,,DIDNOT
   (1)  005256  104105                          ERROR   105
 9832
 9833   005260                                                      ENDIF
   (4)  005260                          $112:
 9834   005260                                                  ENDSUB
 9835   005260                                              ENDTST
 9836
```

```
 9838
 9839
 9844                           ;;*****************************************************************
 9850                           ;;*****************************************************************
  (3)                           ;*TEST 16       PROGRAMMABLE BAUD RATE TEST
  (4)                           ;*              TEST AT ALL SPEEDS AVAILABLE
  (4)                           ;*              A COMPARISON WILL BE MADE TO SEE
  (4)                           ;*              IF NEW TIME IS LESS THAN PREVIOUS.
  (3)                           ;;*****************************************************************
  (2)  005260  000004           TST16:  SCOPE
  (2)
  (1)  005262  012767  000010  173670          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  005270  012767  000016  173702          MOV     #16,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 9855
 9856
 9857
 9858  005276                                                          IF #PBR NOTSETIN $USWR OR #MAINTJUMP NOTSETIN $U
  (6)  005276  032767  000200  173714          BIT     #PBR,$USWR
  (8)  005304  001404                          BEQ     $113
  (6)  005306  032767  040000  173704          BIT     #MAINTJUMP,$USWR
  (9)  005314  001004                          BNE     $114
  (6)  005316                   $113:
 9859  005316                                                              EXIT TEST
  (5)  005316  012767  000001  173634          MOV     #1,$TIMES
  (3)  005324  000553                          BR      TST17           ;;;EXIT THIS TEST
 9860  005326                                                          ENDIF
  (4)  005326                   $114:
 9861
 9862  005326                                                          IFB #APTENV SETIN $ENV THEN
  (6)  005326  132767  000001  173660          BITB    #APTENV,$ENV
  (9)  005334  001404                          BEQ     $115
 9863  005336                                                              EXIT TST
  (5)  005336  012767  000001  173614          MOV     #1,$TIMES
  (3)  005344  000543                          BR      TST17           ;;;EXIT THIS TEST
 9864  005346                                                          ENDIF
  (4)  005346                   $115:
 9865
 9866  005346                                                          LET ERRCHK := #0        ; CLEAR ERROR WORD
  (4)  005346  005067  002614                  CLR     ERRCHK
 9867  005352                                                          LET OLD := #-1
  (4)  005352  012767  177777  000270          MOV     #-1,OLD
 9868  005360                                                          LET OLD+2 := #-1
  (4)  005360  012767  177777  000264          MOV     #-1,OLD+2
 9869  005366                                                          LET @TCSR := @TCSR SET.BY #MAINT
  (7)  005366  052777  000004  173670          BIS     #MAINT,@TCSR
 9870                                                                        ;EACH BAUD RATE
 9871  005374                                                          INCR R3 FROM #0 TO #15. BY #1
  (4)  005374  005003                          CLR     R3
  (5)  005376  000401                          BR      $116
  (4)  005400                   $117:
  (8)  005400  005203                          INC     R3
  (5)  005402                   $116:
  (5)  005402  020327  000017                  CMP     R3,#15.
  (7)  005406  003062                          BGT     $120
 9872  005410                                                          LET R0 := @RBUF
  (4)  005410  017700  173646                  MOV     @RBUF,R0
```

```
 9873
 9874  005414
  (4)  005414  116377  005624  173644          MOVB    RATES(R3),@TCSRHI
 9875
 9876  005422
  (4)  005422  005002                          CLR     BIT
 9877
 9878  005424
  (4)  005424  005077  173640                  CLR     @TBUF
 9879
 9880  005430
  (4)  005430  005067  000210                  CLR     NEW
 9881  005434
  (4)  005434  005067  000206                  CLR     NEW+2
 9882  005440
  (4)  005440                          $121:
  (6)  005440  005702                          TST     BIT
  (9)  005442  001014                          BNE     $122
 9883  005444
  (6)  005444  032777  000200  173606          BIT     #RCVRDONE,@RCSR
  (9)  005452  001403                          BEQ     $123
 9884
 9885  005454
  (4)  005454  012702  000001                  MOV     #1,BIT
 9886  005460
  (4)  005460  000404                          BR      $124
  (3)  005462                          $123:
 9887
 9888  005462
  (7)  005462  005267  000156                  INC     NEW
 9889  005466
  (7)  005466  005567  000154                  ADC     NEW+2
 9890  005472
  (4)  005472                          $124:
 9891
 9892  005472
  (4)  005472  000762                          BR      $121
  (3)  005474                          $122:
 9893
 9894  005474
  (6)  005474  026767  000146  000150          CMP     NEW+2,OLD+2
  (9)  005502  103001                          BHIS    $125
 9895
 9896  005504
  (4)  005504  000414                          BR      $126
  (3)  005506                          $125:
 9897
 9898  005506
  (6)  005506  026767  000134  000136          CMP     NEW+2,OLD+2
  (9)  005514  001005                          BNE     $127
  (6)  005516  026767  000122  000124          CMP     NEW,OLD
  (9)  005524  103001                          BHIS    $127
 9899
 9900  005526
  (4)  005526  000403                          BR      $130
  (3)  005530                          $127:
```

```
    ;CHANGE BAUDE RATE
LET @TCSRHI :B= RATES(R3)

    ;FLAG
LET BIT := #0

    ;OUTPUT THE CHARACTER
LET @TBUF := #0

    ;INITIALIZE COUNTER
LET NEW := #0

LET NEW+2 := #0

WHILE BIT EQ #0 DO


    IF #RCVRDONE SETIN @RCSR THEN


    ;DONE - ITS READY
        LET BIT := #1

    ELSE


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

        LET NEW+2 := NEW+2 + CARRY

    ENDIF

    ;SIGNALS DONE
ENDDO


IF NEW+2 LO OLD+2 THEN

    ; OK
ELSE

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



        ;OK
    ELSE
```

```
                                                                        ;NEW+2 > OLD+2 OR
                                                                        ;(NEW+2 = OLD+2 AND
                                                                        ; NEW >= OLD)
                                                                        ;BAUD RATE DIDN'T CHANGE
                                                                    LET ERRCHK := #BIT2 ; SET ERROR INDICATOR
005530  012767  000004  002430          MOV     #BIT2,ERRCHK
                                                                        ENDIF
005536                          $130:
                                                                    ENDIF
005536                          $126:
                                                                        ;UPDATE OLD TIME
                                                                    LET OLD := NEW
005536  016767  000102  000104          MOV     NEW,OLD
                                                                    LET OLD+2 := NEW+2
005544  016767  000076  000100          MOV     NEW+2,OLD+2
                                                                ENDINC  ;BAUD RATE
005552  000712                          BR      $117
005554                          $120:
                                                            LET R3 :B= $USWR+1 AND #17      ; PUT BAUD BACK
005554  116703  173441                  MOVB    $USWR+1,R3
005560  110346                          MOVB    R3,-(SP)
005562  142716  000017                  BICB    #17,(SP)
005566  142603                          BICB    (SP)+,R3
                                                            LET R3 := R3 CLR.BY #177400
005570  042703  177400                  BIC     #177400,R3
                                                            LET @TCSRHI :B= RATES(R3)       ; LIKE HE WANTED IT
005574  116377  005624  173464          MOVB    RATES(R3),@TCSRHI
                                                                    ; CAN NOT LEAVE WITH MAINT SET
                                                                LET    @TCSR := @TCSR CLR.BY #MAINT
005602  042777  000004  173454          BIC     #MAINT,@TCSR
                                                            IF #BIT2 SETIN ERRCHK THEN
005610  032767  000004  002350          BIT     #BIT2,ERRCHK
005616  001401                          BEQ     $131
                                                                    ; REPORT DEFERED ERROR
                                                                ERRHRD      126
005620  104126                          ERROR   126
                                                            ENDIF
005622                          $131:
                                                            EXIT    ;SKIP TABLE
005622  000414                          BR      TST17           ;;;EXIT THIS TEST

005624                          RATES:  ;A TABLE OF THE ACTUAL BYTES TO MOVE INTO THE
                                ;UPPER BYTE OF XCSR FOR EACH BAUD RATE
                                ;** NOTE::      THE VALUE INDICATED IN THE COLUMN 'OFFSET
                                ;**             INTO TABLE' CAN BE PLACED INTO BITS<11:8>
                                ;**             OF LOCATION '$USWR' TO CAUSE THE CORROSPONDING
                                ;**             BAUD TO BE SELECTED IN THE DLV11-F UPON
                                ;**             COMPLETION OF THIS TEST.

                                                        ;       BAUD    OFFSET INTO TABLE
005624      010                 R0050:  .BYTE   010     ;       50      0
005625      030                 R0070:  .BYTE   030     ;       70      1
005626      050                 R0110:  .BYTE   050     ;       110     2
005627      070                 R0135:  .BYTE   070     ;       135     3
```

```
 9938  005630      110                 R0150:  .BYTE   110     ;       150     4
 9939  005631      130                 R0300:  .BYTE   130     ;       300     5
 9940  005632      150                 R0600:  .BYTE   150     ;       600     6
 9941  005633      170                 R0200:  .BYTE   170     ;       1200    7
 9942  005634      210                 R1800:  .BYTE   210     ;       1800    10
 9943  005635      230                 R2000:  .BYTE   230     ;       2000    11
 9944  005636      250                 R2400:  .BYTE   250     ;       2400    12
 9945  005637      270                 R3600:  .BYTE   270     ;       3600    13
 9946  005640      310                 R4800:  .BYTE   310     ;       4800    14
 9947  005641      330                 R7200:  .BYTE   330     ;       7200    15
 9948  005642      350                 R9600:  .BYTE   350     ;       9600    16
 9949  005643      370                 R10000: .BYTE   370     ;       19200   17
 9950
 9951  005644  000000  000000          NEW:    0,0
 9952  005650  000000  000000          OLD:    0,0
 9953  005654                                                          ENDTST
 9954
 9955
 9956
```

```
 9958
 9963                                ;;*****************************************************************
 9971                                ;;*****************************************************************
  (3)                                ;*TEST 17       TRANSMITTER INTERRUPT LOGIC TEST
  (4)                                ;*              LOGICALLLY THIS IS 4 SEPARATE TESTS
  (4)                                ;*              A) DOES TRANSMITTER INTERRUPT LOGIC WORK
  (4)                                ;*              B) AT PRIORITY OF 0
  (4)                                ;*              C) AND ONLY ONCE
  (4)                                ;*              D) BUT NOT WITH INTERRUPT ENABLE CLEAR
  (3)                                ;;*****************************************************************
  (2)  005654  000004                TST17:  SCOPE
  (2)
  (1)  005656  012767  000010  173274        MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  005664  012767  000017  173306        MOV     #17,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 9976
 9977
 9978
 9979  005672                                                        IF #APTENV SETIN $ENV THEN
  (6)  005672  032767  000001  173314        BIT     #APTENV,$ENV
  (9)  005700  001404                        BEQ     $132
 9980  005702                                                            EXIT TEST
  (5)  005702  012767  000001  173250        MOV     #1,$TIMES
  (3)  005710  000532                        BR      TST20           ;;;EXIT THIS TEST
 9981  005712                                                        ENDIF
  (4)  005712                        $132:
 9982
 9983
 9984                                                                    ;CLEAR 'INTERRUPT OCCURED' FLAG
 9985  005712                                                        LET INTFLAG := #0
  (4)  005712  005067  002742                CLR     INTFLAG
 9986
 9987                                                                    ;GET VECTOR ADDRESS
 9988  005716                                                        LET R3 := DLVEC
  (4)  005716  016703  173334                MOV     DLVEC,R3
 9989
 9990  005722                                                                ;FOR THE TRANSMITTER
  (7)  005722  062703  000004                ADD     #4,R3           LET R3 := R3 + #4
 9991
 9992  005726                                                                ;SET VECTOR TO POINT TO TRANS.SRV AT PRI
  (5)  005726  010146                        MOV     R1,-(SP)        SETVEC R3, #INTSRV, #PR6
  (5)  005730  010301                        MOV     R3,R1
  (5)  005732  012721  010652                MOV     #INTSRV,(R1)+
  (5)  005736  012711  000300                MOV     #PR6,(R1)
  (5)  005742  012601                        MOV     (SP)+,R1
 9993  005744                                                        BGNSUB
  (5)  005744  012767  005752  173136        MOV     #64$,$LPERR
 9994
 9995  005752                                                        ;; MAKE SURE THAT TRANSMITTER READY IS SET
  (3)  005752  010546                        MOV     R5,-(SP)        CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
  (7)  005754  012745  177777                MOV     #SET,-(R5)
  (6)  005760  016745  173300                MOV     TCSR,-(R5)
  (5)  005764  012745  000200                MOV     #XMITRDY,-(R5)
  (4)  005770  012745  000500                MOV     #500,-(R5)
  (3)  005774  004767  002314                JSR     PC,TIMER
  (3)  006000  012605                        MOV     (SP)+,R5
 9996
```

```
 9997                                                                   ;CLEAR INTERRUPT ENABLE
 9998  006002                                                         LET @TCSR := @TCSR CLR.BY #XMITIE
  (7)  006002  042777  000100  173254        BIC     #XMITIE,@TCSR
 9999
10004                                                                   ;SET IT TO 0
10005  006010  012746  000000                MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
  (1)  006014  012746  006022                MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
  (1)  006020  000002                        RTI                     ;;POP NEW PC AND PS
  (1)  006022                        65$:
10010
10011                                                                   ;NOW SET I.E. BIT
10012  006022                                                         LET @TCSR := @TCSR SET.BY #XMITIE
  (7)  006022  052777  000100  173234        BIS     #XMITIE,@TCSR
10013
10014                                                                   ;LET INTERRUPT HAVE TIME TO OCCUR
10015  006030                                                         WAITMS 200.
  (4)  006030  010546                        MOV     R5,-(SP)
  (5)  006032  012745  000310                MOV     #200.,-(R5)
  (4)  006036  004767  002530                JSR     PC,WAIT
  (4)  006042  012605                        MOV     (SP)+,R5
10016
10017                                                                   ;DID EXACTLY 1 INTERRUPT OCCUR
10018  006044                                                         IF INTFLAG NE #1 THEN
  (6)  006044  026727  002610  000001        CMP     INTFLAG,#1
  (9)  006052  001406                        BEQ     $133
10019                                                                   ;NO - WAS IT 0 OR MORE THAN ONCE
10020  006054                                                           IF INTFLAG EQ #0 THEN
  (6)  006054  005767  002600                TST     INTFLAG
  (9)  006060  001002                        BNE     $134
10021                                                                     ;TRANSMITTER DID NOT INTERRUPT IN TIME
10022  006062                                                               ERRHRD 106,,DIDNOT
  (1)  006062  104106                        ERROR   106
10023  006064                                                           ELSE
  (4)  006064  000401                        BR      $135
  (3)  006066                        $134:
10024                                                                     ;TWICE
10025                                                                     ;TRANSMITTER INTERRUPTED TWICE
10026  006066                                                               ERRHRD 107,,TWICE
  (1)  006066  104107                        ERROR   107
10027  006070                                                           ENDIF
  (4)  006070                        $135:
10028  006070                                                         ENDIF
  (4)  006070                        $133:
10029  006070                                                       ENDSUB
10030                                                           ;INTERRUPT WITHOUT INTERRUPT ENABLE SET
10031  006070                                                       BGNSUB
  (5)  006070  012767  006076  173012        MOV     #64$,$LPERR
10032                                                                   ;CLEAR 'INTERRUPT OCCURED' FLAG
10033  006076                                                         LET INTFLAG := #0
  (4)  006076  005067  002556                CLR     INTFLAG
10034                                                                   ;CLEAR INTERRUPT ENABLE
10035  006102                                                         LET @TCSR := @TCSR CLR.BY #XMITIE
  (7)  006102  042777  000100  173154        BIC     #XMITIE,@TCSR
10036                                                                   ;NO INTERRUPTS SHOULD OCCUR.
10041  006110  012746  000000                MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
  (1)  006114  012746  006122                MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
```

```
   (1)  006120  000002                    RTI                     ;;POP NEW PC AND PS
   (1)  006122                        65$:
10046                                                                   ;DARE IT TO HAPPEN
10047  006122                                                        WAITMS 2
   (4)  006122  010546                    MOV     R5,-(SP)
   (5)  006124  012745  000002            MOV     #2,-(R5)
   (4)  006130  004767  002436            JSR     PC,WAIT
   (4)  006134  012605                    MOV     (SP)+,R5
10048  006136                                                        IF INTFLAG NE #0 THEN
   (6)  006136  005767  002516            TST     INTFLAG
   (9)  006142  001401                    BEQ     $136
10049                                                                   ;INTERRUPT OCCURED WITH I E CLEARED
10050  006144                                                           ERRHRD 110,NOTENAB
   (1)  006144  104110                    ERROR   110
10051  006146                                                        ENDIF
   (4)  006146                        $136:
10052  006146                                                        BRESET
   (1)  006146  000005                    RESET
10053  006150                                                     ENDSUB
10054                                                                   ;RESTORE VECTOR AREA
10055  006150                                                     CLRVEC R3
   (3)  006150  010146                    MOV     R1,-(SP)        ;;PUSH R1 ON STACK
   (3)  006152  010246                    MOV     R2,-(SP)        ;;PUSH R2 ON STACK
   (5)  006154  012701  000003            MOV     #R3,R1
   (5)  006160  010102                    MOV     R1,R2
   (8)  006162  062702  000002            ADD     #2,R2
   (5)  006166  010221                    MOV     R2,(R1)+
   (5)  006170  005011                    CLR     (R1)
   (3)  006172  012602                    MOV     (SP)+,R2        ;;POP STACK INTO R2
   (3)  006174  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
10056
10057  006176                                                        ENDTST
10058
10059
10060
10061
10062
10063
```

```
10065
10070                                   ;;*****************************************************************
10076                                   ;;*****************************************************************
  (3)                                   ;*TEST 20       RECEIVER INTERRUPT LOGIC TEST
  (4)                                   ;*              THIS TEST COVERS ALL OF THE RECEIVER
  (4)                                   ;*              SIDE OF THE INTERRUPT LOGIC IN
  (4)                                   ;*              CHARACTER MODE.
  (3)                                   ;;*****************************************************************
  (2)  006176  000004                   TST20:  SCOPE
  (2)
  (1)  006200  012767  000010  172752           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  006206  012767  000020  172764           MOV     #20,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
10081  006214                                                           IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
  (6)  006214  032767  040000  172776           BIT     #MAINTJUMP,$USWR
  (8)  006222  001404                           BEQ     $137
  (6)  006224  126727  002671  000001           CMPB    CONSOLE,#TRUE
  (9)  006232  001002                           BNE     $140
  (6)  006234                           $137:
10082  006234  000167  000242                   JMP     TST21                   ;       EXIT TEST
10083  006240                                                           ENDIF
  (4)  006240                           $140:
10084
10085                                                                    ;CLEAR INTERRUPT OCCURED FLAG
10086                                                                    ;SET UP RECEIVER INTER.VECTOR
10087  006240                                                   SETVEC DLVEC,#INTSRV,#PR6
  (5)  006240  010146                           MOV     R1,-(SP)
  (5)  006242  016701  173010                   MOV     DLVEC,R1
  (5)  006246  012721  010652                   MOV     #INTSRV,(R1)+
  (5)  006252  012711  000300                   MOV     #PR6,(R1)
  (5)  006256  012601                           MOV     (SP)+,R1
10088                                           ;PRIORITY 0 AND MULTIPLE INTERRUPT TEST.-RCVRIE
10089  006260                                                   BGNSUB
  (5)  006260  012767  006266  172622           MOV     #64$,$LPERR
10090  006266                                                   LET INTFLAG := #0
  (4)  006266  005067  002366                   CLR     INTFLAG
10091                                                                    ;SET MAINT. BIT
10092  006272                                                   LET @TCSR := @TCSR SET.BY #MAINT
  (7)  006272  052777  000004  172764           BIS     #MAINT,@TCSR
10093                                                                    ;CLEAR INTERRUPTS
10094  006300                                                       LET @RCSR := @RCSR CLR.BY #RCVRIE
  (7)  006300  042777  000100  172752           BIC     #RCVRIE,@RCSR
10095                                                                    ;CHANGE PRIORITY
10096                                                                    ;..TO 0
10101  006306  012746  000000                   MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
  (1)  006312  012746  006320                   MOV     #65$,-(SP)      ;;PUT NEW PC ON  STACK
  (1)  006316  000002                           RTI                     ;;POP NEW PC AND PS
  (1)  006320                           65$:
10106
10107                                                                    ;SEND A CHARACTER
10108  006320                                                       LET @TBUF :B= #0
  (4)  006320  105077  172744                   CLRB    @TBUF
10109                                                                    ;WAIT A MAXIMUM
10110                                                                ;OF 500 MSEC FOR
10111                                                                ;RCVR DONE TO SET IN RCSR
10112  006324                                                       CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
  (3)  006324  010546                           MOV     R5,-(SP)
```

```
   (7)  006326  012745  177777          MOV     #SET,-(R5)
   (6)  006332  016745  172722          MOV     RCSR,-(R5)
   (5)  006336  012745  000200          MOV     #RCVRDONE,-(R5)
   (4)  006342  012745  000500          MOV     #500,-(R5)
   (3)  006346  004767  001742          JSR     PC,TIMER
   (3)  006352  012605                  MOV     (SP)+,R5
10113
10114  006354                                          ;SET INTERRUPT ENABLE
                                                LET @RCSR := @RCSR SET.BY #RCVRIE
   (7)  006354  052777  000100  172676    BIS     #RCVRIE,@RCSR
10115                                               ;LET IT COME IN.
10116  006362                                       WAITMS 1
   (4)  006362  010546                  MOV     R5,-(SP)
   (5)  006364  012745  000001          MOV     #1,-(R5)
   (4)  006370  004767  002176          JSR     PC,WAIT
   (4)  006374  012605                  MOV     (SP)+,R5
10117
10118  006376                                       LET R0 := @RBUF ; CLEAR RCVRDONE
   (4)  006376  017700  172660          MOV     @RBUF,R0
10119                                               ;DID HE DO IT RIGHT?
10120  006402                                       IF INTFLAG NE #1 THEN
   (6)  006402  026727  002252  000001    CMP     INTFLAG,#1
   (9)  006410  001411                  BEQ     $141
10121                                               ;NONE OCCURED
10122                                               ; CAN NOT LEAVE WITH MAINT SET
10123  006412                                   LET    @TCSR := @TCSR CLR.BY #MAINT
   (7)  006412  042777  000004  172644    BIC     #MAINT,@TCSR
10124  006420                                       IF INTFLAG EQ #0 THEN
   (6)  006420  005767  002234          TST     INTFLAG
   (9)  006424  001002                  BNE     $142
10125                                               ;RECEIVER DID NOT INTERRUPT IN TIME
10126  006426                                           ERRHRD 111,,DIDNOT
   (1)  006426  104111                  ERROR   111
10127                                               ;TWICE OR MORE
10128  006430                                       ELSE
   (4)  006430  000401                  BR      $143
   (3)  006432                  $142:
10129                                               ;RECEIVER INTERRUPTED TWICE
10130  006432                                           ERRHRD 112,,TWICE
   (1)  006432  104112                  ERROR   112
10131  006434                                       ENDIF
   (4)  006434                  $143:
10132  006434                                   ENDIF
   (4)  006434                  $141:
10133  006434                                ENDSUB
10134
10135
10136                                               ; CLEAR THE WORLD
10137  006434                                   LET @RCSR := @RCSR CLR.BY #RCVRIE
   (7)  006434  042777  000100  172616    BIC     #RCVRIE,@RCSR
10138
10139
10140                                               ;RESET MAINT. BIT.
10141  006442                                   LET @TCSR := @TCSR CLR.BY #MAINT
   (7)  006442  042777  000004  172614    BIC     #MAINT,@TCSR
10142
10143  006450                                   LET R4 := @DLVEC
```

```
   (4)  006450  017704  172602          MOV     @DLVEC,R4
                                                        CLRVEC R4
10144   006454
   (3)  006454  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
   (3)  006456  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
   (5)  006460  012701  000004          MOV     #R4,R1
   (5)  006464  010102                  MOV     R1,R2
   (8)  006466  062702  000002          ADD     #2,R2
   (5)  006472  010221                  MOV     R2,(R1)+
   (5)  006474  005011                  CLR     (R1)
   (3)  006476  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
   (3)  006500  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
10145   006502                                          ENDTST
```

```
10147
10152                                   ;;*****************************************************************
10156                                   ;;*****************************************************************
  (3)                                   ;*TEST 21       TEST ACTUAL DATA TRANSFERED
  (4)                                   ;*              NON-INTERRUPT MAINTENANCE BIT SET
  (3)                                   ;;*****************************************************************
  (2)  006502  000004                   TST21:  SCOPE
  (2)
  (1)  006504  012767  000001  172446           MOV     #1,$TIMES       ;;DO 1 ITERATION
  (2)  006512  012767  000021  172460           MOV     #21,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
10161  006520                                                           IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
  (6)  006520  032767  040000  172472           BIT     #MAINTJUMP,$USWR
  (8)  006526  001404                           BEQ     $144
  (6)  006530  126727  002365  000001           CMPB    CONSOLE,#TRUE
  (9)  006536  001004                           BNE     $145
  (6)  006540                           $144:                             EXIT TEST
10162  006540
  (5)  006540  012767  000001  172412           MOV     #1,$TIMES
  (3)  006546  000526                           BR      TST22           ;;;EXIT THIS TEST
10163  006550                                                           ENDIF
  (4)  006550                           $145:
10164
10165  006550                                                           LET ERRCHK := #0
  (4)  006550  005067  001412                   CLR     ERRCHK
10166                                                                            ;SET MAINT. BIT
10167  006554                                                           LET @TCSR := @TCSR SET.BY #MAINT
  (7)  006554  052777  000004  172502           BIS     #MAINT,@TCSR
10168
10169                                                                            ;CHANGE PRIORITY
10170                                                                            ;..TO 0
10175  006562  012746  000000                   MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
  (1)  006566  012746  006574                   MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
  (1)  006572  000002                           RTI                     ;;POP NEW PC AND PS
  (1)  006574                           64$:
10180                                                                            ;GET DATA MASK.
10181  006574                                                           CALL DATLNG OUT <R1>
  (4)  006574  162705  000002                   SUB     #1*2,R5
  (3)  006600  004767  001666                   JSR     PC,DATLNG
  (4)  006604  012501                           MOV     (R5)+,R1
10182  006606                                                           LET R0 := @RBUF ; START CLEAR
  (4)  006606  017700  172450                   MOV     @RBUF,R0
10183
10184                                                                            ;ALL BINARY CHAR.
10185  006612                                                           INCR R2 FROM #0 TO #377 BY #1
  (4)  006612  005002                           CLR     R2
  (5)  006614  000401                           BR      $146
  (4)  006616                           $147:
  (8)  006616  005202                           INC     R2
  (5)  006620                           $146:
  (5)  006620  020227  000377                   CMP     R2,#377
  (7)  006624  003062                           BGT     $150
10186
10187
10188                                                                    ;TRANSMIT CHAR IN R2
10189
10190  006626                                                           CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
```

```
   (3)  006626  010546                          MOV     R5,-(SP)
   (7)  006630  012745  177777                  MOV     #SET,-(R5)
   (6)  006634  016745  172424                  MOV     TCSR,-(R5)
   (5)  006640  012745  000200                  MOV     #XMITRDY,-(R5)
   (4)  006644  012745  000500                  MOV     #500,-(R5)
   (3)  006650  004767  001440                  JSR     PC,TIMER
   (3)  006654  012605                          MOV     (SP)+,R5
10191   006656
   (6)  006656  103003                          BCC     $151
10192   006660
   (7)  006660  052767  000010  001300          BIS     #BIT3,ERRCHK
10193   006666
   (4)  006666                          $151:
10194
10195
10196   006666
   (4)  006666  110277  172376                  MOVB    R2,@TBUF
10197
10198   006672
   (3)  006672  010546                          MOV     R5,-(SP)
   (7)  006674  012745  177777                  MOV     #SET,-(R5)
   (6)  006700  016745  172354                  MOV     RCSR,-(R5)
   (5)  006704  012745  000200                  MOV     #RCVRDONE,-(R5)
   (4)  006710  012745  000500                  MOV     #500,-(R5)
   (3)  006714  004767  001374                  JSR     PC,TIMER
   (3)  006720  012605                          MOV     (SP)+,R5
10199   006722
   (6)  006722  103003                          BCC     $152
10200   006724
   (7)  006724  052767  000020  001234          BIS     #BIT4,ERRCHK
10201   006732
   (4)  006732                          $152:
10202
10203   006732
   (4)  006732  017703  172324                  MOV     @RBUF,R3
10204
10205
10206
10207
10208
10209
10210   006736
   (4)  006736  010204                          MOV     R2,R4
   (7)  006740  040104                          BIC     R1,R4
10211   006742
   (7)  006742  040103                          BIC     R1,R3
10212
10213
10214   006744
   (6)  006744  020403                          CMP     R4,R3
   (9)  006746  001410                          BEQ     $153
10215
10216
10217   006750
   (7)  006750  042777  000004  172306          BIC     #MAINT,@TCSR
10218   006756
```

```
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
```

```
  (1)  006756  104116                        ERROR   116
10219  006760                                                          EXIT TEST ; ON ERROR
  (5)  006760  012767  000001  172172        MOV     #1,$TIMES
  (3)  006766  000416                        BR      TST22           ;;;EXIT THIS TEST
10220  006770                                                              ENDIF
  (4)  006770                          $153:
10221  006770                                                      ENDINC  ; R2
  (4)  006770  000712                        BR      $147
  (3)  006772                          $150:
10222
10223                                                                   ;RESET MAINT. BIT.
10224  006772                                                       LET @TCSR := @TCSR CLR.BY #MAINT
  (7)  006772  042777  000004  172264        BIC     #MAINT,@TCSR
10225  007000                                                       IF #BIT3 SETIN ERRCHK THEN
  (6)  007000  032767  000010  001160        BIT     #BIT3,ERRCHK
  (9)  007006  001401                        BEQ     $154
10226  007010                                                              ERRHRD 130
  (1)  007010  104130                        ERROR   130
10227  007012                                                       ENDIF
  (4)  007012                          $154:
10228  007012                                                       IF #BIT4 SETIN ERRCHK THEN
  (6)  007012  032767  000020  001146        BIT     #BIT4,ERRCHK
  (9)  007020  001401                        BEQ     $155
10229  007022                                                              ERRHRD 131
  (1)  007022  104131                        ERROR   131
10230  007024                                                       ENDIF
  (4)  007024                          $155:
10231  007024                                                   ENDTST
10232
10233
10234
```

```
10236
10241                                   ;;*****************************************************************
10242                                   ;;*****************************************************************
  (3)                                   ;*TEST 22       TEST DATA THROUGH WRAP
  (3)                                   ;;*****************************************************************
  (2)  007024  000004                   TST22:  SCOPE
  (2)
  (1)  007026  012767  000001  172124           MOV     #1,$TIMES       ;;DO 1 ITERATION
  (2)  007034  012767  000022  172136           MOV     #22,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
10247  007042                                                           IF #WRAP NOTSETIN $USWR OR #COMSPD NOTSETIN $USW
  (6)  007042  032767  020000  172150           BIT     #WRAP,$USWR
  (8)  007050  001404                           BEQ     $156
  (6)  007052  032767  000100  172140           BIT     #COMSPD,$USWR
  (9)  007060  001004                           BNE     $157
  (6)  007062                           $156:
10248                                                                       ;CAN'T TEST WITHOUT A WRAP
10249  007062                                                           EXIT TST
  (5)  007062  012767  000001  172070           MOV     #1,$TIMES
  (3)  007070  000516                           BR      TST23           ;;;EXIT THIS TEST
10250  007072                                                           ENDIF
  (4)  007072                           $157:
10251                                                                       ;DON'T USE MAINT.
10252  007072                                                           LET @TCSR := @TCSR CLR.BY #MAINT
  (7)  007072  042777  000004  172164           BIC     #MAINT,@TCSR
10253                                                                       ; IF A SPECIAL TURN AROUND CARD IS
10254                                                                       ;   CONNECTED IN PLACE OF THE WRAP
10255                                                                       ;  SETTING READER RUN WILL ENABLE IT.
10256                                                                       ; THIS MODULE IS ONLY USED IN MANUFACTUR
10257                                                                       ; AND ONLY ON THE CONSOLE DLV11-F.
10258                                                                       ; IF NO SPECIAL MODULE IS AVAILABLE,
10259                                                                       ; AND THE WRAP BIT IS SET IN $USWR
10260                                                                       ; THEN THIS TEST WILL ERROR ON THE CONSO
10261
10262  007100                                                           LET @RCSR := @RCSR SET.BY #11
  (7)  007100  052777  000011  172152           BIS     #11,@RCSR
10263                                                                       ;CHANGE PRIORITY
10264                                                                       ;..TO 0
10269  007106  012746  000000                MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
  (1)  007112  012746  007120                MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
  (1)  007116  000002                        RTI                     ;;POP NEW PC AND PS
  (1)  007120                           64$:
10274                                                                       ;GET DATA MASK
10275  007120                                                           CALL DATLNG OUT <R1>
  (4)  007120  162705  000002                SUB     #1*2,R5
  (3)  007124  004767  001342                JSR     PC,DATLNG
  (4)  007130  012501                        MOV     (R5)+,R1
10276  007132                                                           LET R0 := @RBUF ; START CLEAN
  (4)  007132  017700  172124                MOV     @RBUF,R0
10277                                                                       ;BINARY COUNT PATTERN
10278  007136                                                           INCR R2 FROM #0 TO #377 BY #1
  (4)  007136  005002                        CLR     R2
  (5)  007140  000401                        BR      $160
  (4)  007142                           $161:
  (8)  007142  005202                        INC     R2
  (5)  007144                           $160:
  (5)  007144  020227  000377                CMP     R2,#377
```

```
   (7)  007150  003063                        BGT     $162
10279
10280
10281                                                           ;TRANSMIT THE CHAR. IN R2.
10282
10283                                                               ; MAKE SURE IT'S READY
10284  007152                                                   CALL TIMER IN <#500,#XMITRDY,TCSR,#SET>
   (3)  007152  010546                        MOV     R5,-(SP)
   (7)  007154  012745  177777                MOV     #SET,-(R5)
   (6)  007160  016745  172100                MOV     TCSR,-(R5)
   (5)  007164  012745  000200                MOV     #XMITRDY,-(R5)
   (4)  007170  012745  000500                MOV     #500,-(R5)
   (3)  007174  004767  001114                JSR     PC,TIMER
   (3)  007200  012605                        MOV     (SP)+,R5
10285  007202                                                   IF.ERROR THEN
   (6)  007202  103005                        BCC     $163
10286  007204  104123                        ERROR   123                  ; TRANSMITTER NEVER BECAME READY
10287  007206                                                               EXIT TEST
   (5)  007206  012767  000001  171744        MOV     #1,$TIMES
   (3)  007214  000444                        BR      TST23        ;;;EXIT THIS TEST
10288  007216                                                           ENDIF
   (4)  007216                          $163:
10289
10290                                                               ;START IT ON ITS WAY
10291  007216                                                   LET @TBUF :B= R2
   (4)  007216  110277  172046                MOVB    R2,@TBUF
10292                                                           ; NOW WAIT FOR RECIEVER DONE
10293  007222                                                   CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
   (3)  007222  010546                        MOV     R5,-(SP)
   (7)  007224  012745  177777                MOV     #SET,-(R5)
   (6)  007230  016745  172024                MOV     RCSR,-(R5)
   (5)  007234  012745  000200                MOV     #RCVRDONE,-(R5)
   (4)  007240  012745  000500                MOV     #500,-(R5)
   (3)  007244  004767  001044                JSR     PC,TIMER
   (3)  007250  012605                        MOV     (SP)+,R5
10294  007252                                                       IF.ERROR THEN
   (6)  007252  103005                        BCC     $164
10295  007254                                                           ERRHRD 124
   (1)  007254  104124                        ERROR   124
10296                                                           ; RECIEVER NEVER BECAME READY
10297  007256                                                   EXIT TEST
   (5)  007256  012767  000001  171674        MOV     #1,$TIMES
   (3)  007264  000420                        BR      TST23        ;;;EXIT THIS TEST
10298  007266                                                       ENDIF
   (4)  007266                          $164:
10299
10300                                                               ;RETRIEVE
10301  007266                                                   LET R3 := @RBUF
   (4)  007266  017703  171770                MOV     @RBUF,R3
10302
10303                                                               ;STRIP OFF JUNK ON BOTH
10304  007272                                                   LET R4 := R2 CLR.BY R1
   (4)  007272  010204                        MOV     R2,R4
   (7)  007274  040104                        BIC     R1,R4
10305  007276                                                   LET R3 := R3 CLR.BY R1
   (7)  007276  040103                        BIC     R1,R3
```

```
10306
10307                                                                   ;WE HAVE TROUBLE
10308  007300                                                         IF R4 NE R3 THEN
  (6)  007300  020403                       CMP     R4,R3
  (9)  007302  001405                       BEQ     $165
10309                                                                   ;DATA COMPARE ERROR
10310  007304                                                           ERRHRD 117,COMP,SBWAS
  (1)  007304  104117                       ERROR   117
10311  007306                                                           EXIT TEST ; ON ERROR
  (5)  007306  012767  000001  171644       MOV     #1,$TIMES
  (3)  007314  000404                       BR      TST23          ;;;EXIT THIS TEST
10312  007316                                                         ENDIF
  (4)  007316                       $165:
10313
10314  007316                                                       ENDINC  ; R2
  (4)  007316  000711                       BR      $161
  (3)  007320                       $162:
10315                                                                   ; NOW THAT THE TEST IS DONE
10316                                                                   ;  WE WILL TOGGLE READER RUN
10317                                                                   ;  TO TURN OFF THE SPECIAL MODULE.
10318  007320                                                       LET @RCSR := @RCSR SET.BY #11
  (7)  007320  052777  000011  171732       BIS     #11,@RCSR
10319
10320
10321
10322  007326                                                   ENDTST
10323
10324
10325
10326
```

```
10328
10333                                   ;;*****************************************************************
10337                                   ;;*****************************************************************
  (3)                                   ;*TEST 23       FULL DATA TRANSFER WITH INTERRUPTS
  (4)                                   ;*              AND MAINTENANCE MODE.
  (3)                                   ;;*****************************************************************
  (2)  007326  000004                   TST23:  SCOPE
  (2)
  (1)  007330  012767  000001  171622           MOV     #1,$TIMES       ;;DO 1 ITERATION
  (2)  007336  012767  000023  171634           MOV     #23,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
10342
10343  007344                                                           IF #MAINTJUMP NOTSETIN $USWR ORB CONSOLE EQ #TRU
  (6)  007344  032767  040000  171646           BIT     #MAINTJUMP,$USWR
  (8)  007352  001404                           BEQ     $166
  (6)  007354  126727  001541  000001           CMPB    CONSOLE,#TRUE
  (9)  007362  001004                           BNE     $167
  (6)  007364                           $166:
10344  007364                                                               EXIT TEST
  (5)  007364  012767  000001  171566           MOV     #1,$TIMES
  (3)  007372  000553                           BR      TST24           ;;;EXIT THIS TEST
10345  007374                                                           ENDIF
  (4)  007374                           $167:
10346
10347                                                                        ;GET DATA MASK
10352  007374                                                           CALL DATLNG OUT <R3>
  (4)  007374  162705  000002                   SUB     #1*2,R5
  (3)  007400  004767  001066                   JSR     PC,DATLNG
  (4)  007404  012503                           MOV     (R5)+,R3
10353
10354
10355                                           ; THIS TEST WILL RUN BOTH TRANSMITTER AND
10356                                           ; RECIEVER AT FULL SPEED TESTING
10357                                           ; THE ABILITY OF THE MODULE
10358                                           ; TO HANDLE INTERRUPTS FROM BOTH SIDES
10359                                           ; AT ONCE. ALSO, THE DOUBLE BUFFERING LOGIC
10360                                           ; OF THE UART WILL BE FULLY TESTED.
10361                                           ;  THIS TEST WILL TRANSFER A MAXIMUM OF 400(8)
10362                                           ; CHARACTERS THROUGH THE MODULE, BUT IF AN ERROR
10363                                           ; IS DETECTED BY THE TEST A PREMATURE SHUTDOWN OCCURS.
10364
10365                                                                        ;CHANGE PRIORITY
10366                                                                        ;..TO 0
10371  007406  012746  000000                MOV     #PR0,-(SP)      ;;PUT NEW PS ON STACK
  (1)  007412  012746  007420                MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
  (1)  007416  000002                        RTI                     ;;POP NEW PC AND PS
  (1)  007420                           64$:
10376
10377  007420                                                               ;GET VECTOR ADDRESS
  (4)  007420  016701  171632                   MOV     DLVEC,R1        LET R1 := DLVEC
10378
10379  007424                                                               ;RCVR VECTOR
  (4)  007424  012721  007626                   MOV     #REC,(R1)+      LET (R1)+ := #REC
10380  007430
  (4)  007430  012721  000300                   MOV     #PR6,(R1)+      LET (R1)+ := #PR6
10381                                                                        ;POINT TO TRANSMITTER VECTOR
10382                                                                        ;AND SET IT UP ALSO
```

```
10383  007434
  (4)  007434  012721  007564                MOV     #TRAN,(R1)+          LET (R1)+ := #TRAN
10384  007440
  (4)  007440  012711  000300                MOV     #PR6,(R1)            LET (R1)  := #PR6
10385
10386                                                                       ; CLEAR ERROR COUNTER
10387  007444
  (4)  007444  005067  000106                CLR     ERRCNT               LET ERRCNT := #0
10388                                                                       ; INITIALIZE COUNTERS
10389  007450
  (4)  007450  012701  177777                MOV     #-1,R1               LET R1 := #-1
10390                                                                       ;RECEIVER STORAGE
10391  007454
  (4)  007454  005002                        CLR     R2                   LET R2 := #0
10392                                                                       ;# OF RECEIVED CHAR. COUNT.
10393  007456
  (4)  007456  012704  177777                MOV     #-1,R4               LET R4 := #-1
10394
10395  007462
  (1)  007462  000005                        RESET                        BRESET  ;SET UP ALL REGISTERS
10396                                                                       ;SET UP MAINTENANCE
10397  007464
  (7)  007464  052777  000004  171572        BIS     #MAINT,@TCSR         LET @TCSR := @TCSR SET.BY #MAINT
10398
10399                                                                       ;SET I.E. IN TRANSMITTER
10400  007472
  (7)  007472  052777  000100  171564        BIS     #XMITIE,@TCSR        LET @TCSR := @TCSR SET.BY #XMITIE
10401                                                                       ;AND RECEIVER
10402  007500
  (7)  007500  052777  000100  171552        BIS     #RCVRIE,@RCSR        LET @RCSR := @RCSR SET.BY #RCVRIE
10403
10404
10405                                                                       ;NOW WE WAIT UNTIL R4 COUNT (RECEIVED) IS EQUAL
10406  007506                                                               REPEAT
  (3)  007506                        $170:
10407  007506                                                               UNTIL R4 EQ NUMBER OR ERRCNT GT #0
  (4)  007506  020467  000046                CMP     R4,NUMBER
  (6)  007512  001403                        BEQ     $171
  (4)  007514  005767  000036                TST     ERRCNT
  (7)  007520  003772                        BLE     $170
  (4)  007522                        $171:
10408
10409  007522                                                               LET @TCSR := @TCSR CLR.BY #MAINT
  (7)  007522  042777  000004  171534        BIC     #MAINT,@TCSR
10410                                                                       ; CHECK FOR DATA COMPARE ERRORS.
10411  007530                                                               IF ERRCNT NE #0 THEN
  (6)  007530  005767  000022                TST     ERRCNT
  (9)  007534  001401                        BEQ     $172
10412                                                                           ;DATA COMPARE ERROR
10413  007536                                                                 ERRHRD 120,COMP,FIRST
  (1)  007536  104120                        ERROR   120
10414  007540                                                               ENDIF
  (4)  007540                        $172:
10415
10416  007540                                                               LET @TCSR := @TCSR CLR.BY #XMITIE
  (7)  007540  042777  000100  171516        BIC     #XMITIE,@TCSR
```

```
10417  007546                                                          LET @RCSR := @RCSR CLR.BY #RCVRIE
  (7)  007546  042777  000100  171504          BIC     #RCVRIE,@RCSR
10418  007554                                                          EXIT    ;SKIP OVER SUPPORT ROUTINES & STORAGE
  (3)  007554  000462                          BR      TST24           ;;;EXIT THIS TEST
10419
10420  007556  000000                  ERRCNT: 0
10421  007560  001000                  NUMBER: 1000
10422  007562     000                  SB:     .BYTE 0
10423  007563     000                  WAS:    .BYTE 0
10424
10425
10430                                  ;;*****************************************************************
10435                                                  ;TRANSMIT INTERRUPT HANDLER
10436  007564                                                          BGNSRV  TRAN
  (1)  007564                          TRAN:
10441                                  ;;*****************************************************************
10446
10447                                                                   ;INCREMENT CHAR COUNT
10448  007564                                                          LET R1 := R1 + #1
  (7)  007564  005201                          INC     R1
10449                                                                   ;SET UP FOR TRANSFER
10450  007566                                                          LET HOLD := R1 CLR.BY R3
  (4)  007566  010167  000030                  MOV     R1,HOLD
  (7)  007572  040367  000024                  BIC     R3,HOLD
10451                                                                   ;AND SEND.
10452  007576                                                          LET @TBUF := HOLD
  (4)  007576  016777  000020  171464          MOV     HOLD,@TBUF
10453                                                                   ;ALL DONE
10454  007604                                                          IF R1 EQ NUMBER THEN
  (6)  007604  020167  177750                  CMP     R1,NUMBER
  (9)  007610  001003                          BNE     $173
10455                                                                   ;STOP   INTERRUPT PROCESSING
10456  007612                                                          LET @TCSR := @TCSR CLR.BY #XMITIE
  (7)  007612  042777  000100  171444          BIC     #XMITIE,@TCSR
10457  007620                                                          ENDIF
  (4)  007620                          $173:
10458
10459  007620  000401                          BR      ZZZ                     ; EXIT SRV
10460
10461  007622  000000                      HOLD:0
10462
10463  007624                               ZZZ:                               ENDSRV
  (1)  007624  000002                          RTI
10464
10465
10466
10471                                  ;;*****************************************************************
10476                                                  ;RECEIVER INTERRUPT HANDLER
10477  007626                                                          BGNSRV  REC
  (1)  007626                          REC:
10482                                  ;;*****************************************************************
10487
10488                                                                   ;COUNT THIS CHAR.
10489  007626                                                          LET R4 := R4 + #1
  (7)  007626  005204                          INC     R4
10490                                                                   ;GET CHAR IN + MASK IT
```

```
10491  007630
  (4)  007630  017702  171426          MOV     @RBUF,R2          LET R2 := @RBUF CLR.BY R3
  (7)  007634  040302                  BIC     R3,R2
10492                                                             ;RHLD WILL CONTAIN EXPECTED INPUT
10493  007636                                                     LET RHLD := R4 CLR.BY R3
  (4)  007636  010467  000054          MOV     R4,RHLD
  (7)  007642  040367  000050          BIC     R3,RHLD
10494
10495                                                             ;DO THEY COMPARE
10496  007646                                                     IF R2 NE RHLD THEN
  (6)  007646  020267  000044          CMP     R2,RHLD
  (9)  007652  001412                  BEQ     $174
10497                                                             ;FIRST ERROR
10498  007654                                                     IF ERRCNT EQ #0 THEN
  (6)  007654  005767  177676          TST     ERRCNT
  (9)  007660  001005                  BNE     $175
10499                                                             ;SAVE RECORD OF FIRST MISS
10500  007662                                                         LET SB :B= RHLD
  (4)  007662  116767  000030  177672  MOVB    RHLD,SB
10501  007670                                                         LET WAS :B= R2
  (4)  007670  110267  177667          MOVB    R2,WAS
10502  007674                                                     ENDIF
  (4)  007674                  $175:
10503                                                             ;COUNT IT.
10504  007674                                                     LET ERRCNT := ERRCNT + #1
  (7)  007674  005267  177656          INC     ERRCNT
10505  007700                                                     ENDIF
  (4)  007700                  $174:
10506
10507                                                                 ;ALL DONE?
10508  007700                                                     IF R4 EQ NUMBER THEN
  (6)  007700  020467  177654          CMP     R4,NUMBER
  (9)  007704  001003                  BNE     $176
10509                                                                 ;STOP RECEIVER INTERRUPTS
10510  007706                                                         LET @RCSR := @RCSR CLR.BY #RCVRIE
  (7)  007706  042777  000100  171344  BIC     #RCVRIE,@RCSR
10511                                                                         ; INDICATE ALL DONE TO TIMER
10512                                                                 ;MAIN REPEAT LOOP IS CHECKING
10513                                                                 ;FOR 'R4 = NUMBER' ALSO
10514  007714                                                     ENDIF
  (4)  007714                  $176:
10515
10516  007714  000401                  BR      ZZZZ                ;  EXIT SRV
10517
10518  007716  000000                                                 RHLD:0
10519  007720                ZZZZ:
10520  007720                                                     ENDSRV
  (1)  007720  000002                  RTI
10521
10522  007722                                                 ENDTST
10523
10524
10525
```

```
10527
10532                                   ;;*****************************************************************
10539                                   ;;*****************************************************************
  (3)                                   ;*TEST 24        TEST BREAK GENERATION LOGIC
  (4)                                   ;*               TRANSMIT KNOWN CHAR WITH BREAK SET
  (4)                                   ;*               AND COMPARE RECEIVED WITH 0.
  (4)                                   ;*               FRAMING ERROR WILL ALSO BE CHECKED
  (4)                                   ;*               IF ERROR BITS ARE ENABLED.
  (3)                                   ;;*****************************************************************
  (2)  007722  000004                   TST24:  SCOPE
  (2)
  (1)  007724  012767  000010  171226           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
  (2)  007732  012767  000024  171240           MOV     #24,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
10544  007740                                                           IF #MAINTJUMP NOTSETIN $USWR OR #BRK NOTSETIN $U
  (6)  007740  032767  040000  171252           BIT     #MAINTJUMP,$USWR
  (8)  007746  001404                           BEQ     $177
  (6)  007750  032767  010000  171242           BIT     #BRK,$USWR
  (9)  007756  001004                           BNE     $200
  (6)  007760                           $177:
10545  007760                                                                   EXIT TEST
  (5)  007760  012767  000001  171172           MOV     #1,$TIMES
  (3)  007766  000500                           BR      TST25           ;;;EXIT THIS TEST
10546  007770                                                           ENDIF
  (4)  007770                           $200:
10547  007770                                                           IFB CONSOLE EQ #TRUE THEN
  (6)  007770  126727  001125  000001           CMPB    CONSOLE,#TRUE
  (9)  007776  001004                           BNE     $201
10548  010000                                                                   EXIT TEST
  (5)  010000  012767  000001  171152           MOV     #1,$TIMES
  (3)  010006  000470                           BR      TST25           ;;;EXIT THIS TEST
10549  010010                                                           ENDIF
  (4)  010010                           $201:
10550
10551  010010                                                   LET ERRCHK := #0        ; CLEAR ERROR WORD
  (4)  010010  005067  000152                   CLR     ERRCHK
10552                                                                    ;SET MAINTENANCE BIT
10553  010014                                                   LET @TCSR := @TCSR SET.BY #MAINT
  (7)  010014  052777  000004  171242           BIS     #MAINT,@TCSR
10554                                                                    ;SET BREAK BIT
10555  010022                                                   LET @TCSR := @TCSR SET.BY #BREAK
  (7)  010022  052777  000001  171234           BIS     #BREAK,@TCSR
10556                                                                    ;NON-ZERO CHAR. '*'
10557  010030                                                   LET @TBUF := #252
  (4)  010030  012777  000252  171232           MOV     #252,@TBUF
10558                                                                    ;WAIT FOR DONE
10559  010036                                                   CALL TIMER IN <#500,#RCVRDONE,RCSR,#SET>
  (3)  010036  010546                           MOV     R5,-(SP)
  (7)  010040  012745  177777                   MOV     #SET,-(R5)
  (6)  010044  016745  171210                   MOV     RCSR,-(R5)
  (5)  010050  012745  000200                   MOV     #RCVRDONE,-(R5)
  (4)  010054  012745  000500                   MOV     #500,-(R5)
  (3)  010060  004767  000230                   JSR     PC,TIMER
  (3)  010064  012605                           MOV     (SP)+,R5
10560  010066                                                   IF.ERROR THEN
  (6)  010066  103001                           BCC     $202
10561                                                                ; RECIEVER DONE DID NOT SET
```

```
10562  010070
  (1)  010070  104115                          ERROR   115
10563  010072
  (4)  010072                          $202:
10564
10565  010072
  (6)  010072  105777  171164                  TSTB    @RBUF
  (9)  010076  001404                          BEQ     $203
10566
10567  010100
  (7)  010100  052767  000001  000060          BIS     #BIT0,ERRCHK
10568  010106
  (4)  010106  000413                          BR      $204
  (3)  010110                          $203:
10569  010110
  (6)  010110  032767  100000  171102          BIT     #ERRBITS,$USWR
  (9)  010116  001407                          BEQ     $205
10570  010120
  (6)  010120  032777  020000  171134          BIT     #FRERR,@RBUF
  (9)  010126  001003                          BNE     $206
10571  010130
  (7)  010130  052767  000002  000030          BIS     #BIT1,ERRCHK
10572  010136
  (4)  010136                          $206:
10573  010136
  (4)  010136                          $205:
10574  010136
  (4)  010136                          $204:
10575
10576  010136
  (1)  010136  000005                          RESET
10577
10578  010140
  (6)  010140  032767  000001  000020          BIT     #BIT0,ERRCHK
  (9)  010146  001401                          BEQ     $207
10579  010150
  (1)  010150  104121                          ERROR   121
10580  010152
  (4)  010152                          $207:
10581  010152
  (6)  010152  032767  000002  000006          BIT     #BIT1,ERRCHK
  (9)  010160  001401                          BEQ     $210
10582  010162
  (1)  010162  104122                          ERROR   122
10583  010164
  (4)  010164                          $210:
10584  010164
  (3)  010164  000401                          BR      TST25           ;;;EXIT THIS TEST
10585  010166  000000               ERRCHK: .WORD 0
10586  010170                                                           ENDTST
10587
```

```
    ERRHRD 115
ENDIF

IFB @RBUF NE #0 THEN

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

IF #ERRBITS SETIN $USWR THEN

        IF #FRERR NOTSETIN @RBUF THEN

            LET ERRCHK := ERRCHK SET.BY #BIT1
        ENDIF
ENDIF
ENDIF

BRESET  ;CLEAN UP

IF #BIT0 SETIN ERRCHK THEN

    ERRHRD 121  ;BREAK ERROR
ENDIF
IF #BIT1 SETIN ERRCHK THEN

    ERRHRD 122  ; FRAMING ERROR
ENDIF

EXIT
ENDTST
```

```
 10589
 10594
 10595                                  ;;*********************************************************************
   (3)                                  ;*TEST 25       NOT A TEST - SEND BACK TO LOOP
   (3)                                  ;;*********************************************************************
   (2)  010170  000004                  TST25:  SCOPE
   (2)
   (1)  010172  012767  000001  170760          MOV     #1,$TIMES       ;;DO 1 ITERATION
 10596  010200  104401  010206                  TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1)  010204  000404                          BR      64$             ;;GET OVER THE ASCIZ
   (1)                                  ;;65$:  .ASCIZ  <CRLF>*CSR: *
   (1)  010216                          64$:
 10597  010216  016746  171032                  MOV     DLADD,-(SP)     ;;SAVE DLADD FOR TYPEOUT
   (1)  010222  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 10598  010224  104401  010232                  TYPE    ,67$            ;;TYPE ASCIZ STRING
   (1)  010230  000405                          BR      66$             ;;GET OVER THE ASCIZ
   (1)                                  ;;67$:  .ASCIZ  *,VECTOR: *
   (1)  010244                          66$:
 10599  010244  016746  171006                  MOV     DLVEC,-(SP)     ;;SAVE DLVEC FOR TYPEOUT
   (1)  010250  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 10600  010252  104401  010260                  TYPE    ,69$            ;;TYPE ASCIZ STRING
   (1)  010256  000405                          BR      68$             ;;GET OVER THE ASCIZ
   (1)                                  ;;69$:  .ASCIZ  *,ERRORS: *
   (1)  010272                          68$:
 10601  010272  016746  170614                  MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
   (1)  010276  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 10602  010300  005067  170606                  CLR     $ERTTL          ; RESET FOR NEXT DEVICE/PASS
 10603  010304  104401  001171                  TYPE    ,$CRLF
 10604  010310  000167  171622                  JMP     LOOP            ; BACK UP TO THE BEGINNING
```

```
10610
10615
10616                                   ;;BGNMOD        SUBS
10617                                ;;*****************************************************************
10622  010314                           ROUTINE TIMER <HOWLONG,WHICHBIT,REG,SETCLR>
  (2)  010314                        TIMER:
10623                                ;* ROUTINE:TIMER
10624                                ;*       THIS ROUTINE IS USED TO TEST THE STATUS OF ANY BIT
10625                                ;*       IN ANY REGISTER.
10626                                ;*       INPUTS:
10627                                ;*            HOWLONG    THE MAXIMUM AMOUNT OF TIME TO SPEND IN
10628                                ;*                       THIS ROUTINE.
10629                                ;*            WHICHBIT     A MASK WITH THE BIT(S) SET THAT ARE
10630                                ;*                         TO BE CHECKED.
10631                                ;*            REG     A POINTER TO THE REGISTER TO BE CHECKED
10632                                ;*            SETCLR  THE DESIRED RESULTS
10633                                ;*                    EITHER #SET OR #CLEAR
10634                                ;*       OUTPUT:
10635                                ;*            THE 'C' BIT IS SET TO INDICATE AN ERROR
10636                                ;*            BUT IT IS TESTED BY THE IF.ERROR STATEMENT
10637                                ;*
10638                                ;*
10639                                ;*            NOTE::  THE USE OF (R5) IS PART OF THE LINKAGE
10640                                ;*                    MECHANISM BETWEEN THE CALLER AND THE CALLED
10645                                ;;*****************************************************************
10650
10651          000001                                                TRUE=   1
10652          000000                                                FALSE=  0
10653
10654  010314                                                        LET     REGSAV := REG(R5) ; GET POINTER TO REGIST
  (4)  010314  016567  000004  000136        MOV     REG(R5),REGSAV
10655  010322                                                        LET     TIMSAV := HOWLONG(R5) ; SAVE HOWLONG FOR
  (4)  010322  016567  000000  000132        MOV     HOWLONG(R5),TIMSAV
10656  010330                                                        LET     FLAG :B= #FALSE ; INITIALIZE THE EXIT FLA
  (4)  010330  112767  000000  000126        MOVB    #FALSE,FLAG
10657
10658
10659                                                         ;       START OF AN INFINITE LOOP
10660
10661  010336                                                 LOOP
  (3)  010336                        $213:
10662                                                                ; TEST TO SEE IF WHICHBIT IS SET
10663  010336                                                    IF      WHICHBIT(R5)  NOTSETIN @REGSAV THEN
  (6)  010336  036577  000002  000114        BIT     WHICHBIT(R5),@REGSAV
  (9)  010344  001004                        BNE     $215
10664  010346                                                        LET     HOLDSC :B= #CLR
  (4)  010346  112767  000000  000111        MOVB    #CLR,HOLDSC
10665  010354                                                    ELSE
  (4)  010354  000403                        BR      $216
  (3)  010356                        $215:
10666  010356                                                        LET     HOLDSC :B= #SET ; REMEMBER THIS
  (4)  010356  112767  177777  000101        MOVB    #SET,HOLDSC
10667  010364                                                    ENDIF
  (4)  010364                        $216:
10668
10669                                                         ; NOW SEE IF THAT WAS WHAT WE WANTED
```

```
10670  010364                                                          IFB     HOLDSC EQ SETCLR(R5) THEN
  (6)  010364  126765  000075  000006          CMPB    HOLDSC,SETCLR(R5)
  (9)  010372  001003                          BNE     $217
10671                                                                 ; JUST THE THING WE NEEDED
10672  010374                                                               LET     FLAG :B= #TRUE
  (4)  010374  112767  000001  000062          MOVB    #TRUE,FLAG
10673  010402                                                          ENDIF
  (4)  010402                          $217:
10674
10675  010402                                                        EXIFB   FLAG EQ #TRUE OR TIMSAV LE #0
  (4)  010402  126727  000056  000001          CMPB    FLAG,#TRUE
  (6)  010410  001414                          BEQ     $214
  (4)  010412  005767  000044                  TST     TIMSAV
  (6)  010416  003411                          BLE     $214
10676                                                                 ; ONE WAY OR THE OTHER, WE ARE DONE
10677                                                               ; IF WE ARE STILL HERE THEN HANG AROUND A WHILE
10678
10679  010420                                                          WAITMS  1       ;WAIT FOR 1 MILLI-SECONDS
  (4)  010420  010546                          MOV     R5,-(SP)
  (5)  010422  012745  000001                  MOV     #1,-(R5)
  (4)  010426  004767  000140                  JSR     PC,WAIT
  (4)  010432  012605                          MOV     (SP)+,R5
10680  010434                                                          LET     TIMSAV := TIMSAV - #1 ; COUNTING DOWN
  (7)  010434  005367  000022                  DEC     TIMSAV
10681  010440                                                        ENDLOOP                 ; CONTINUED AT THE TOP
  (4)  010440  000736                          BR      $213
  (3)  010442                          $214:
10682
10683                                        ; ONLY 2 WAYS TO GET HERE
10684                                        ;       1). WE RAN OUT OF TIME---ERROR ! !
10685                                        ;       2). THE BIT IS IN THE CORRECT CONDITION--GOOD ! !
10686
10687  010442                                                          IFB     FLAG EQ #TRUE THEN
  (6)  010442  126727  000016  000001          CMPB    FLAG,#TRUE
  (9)  010450  001001                          BNE     $220
10688  010452                                                              RETURN  NO.ERROR    ; GOOD
  (4)  010452  000405                          BR      $211
10689  010454                                                          ENDIF
  (4)  010454                          $220:
10690  010454                                                          RETURN  ERROR           ; BAD
  (2)  010454  000261                          SEC
  (4)  010456  000404                          BR      $212
10691
10692  010460  000000                                                REGSAV: .WORD 0
10693  010462  000000                                                TIMSAV: .WORD 0
10694  010464     000                                                 FLAG:   .BYTE 0
10695  010465     000                                                 HOLDSC: .BYTE 0
10696                                                             ; WE ARE DONE  GO BACK HOME
10697  010466                                                              ENDRTN
  (3)  010466                          $211:
  (2)  010466  000241                          CLC
  (3)  010470                          $212:
  (2)  010470  000207                          RTS     PC
```

```
10699
10700
10705                                   ;;*****************************************************************
10710  010472                           ROUTINE DATLNG <MASK>
  (2)  010472                           DATLNG:
10711                                   ;* ROUTINE:DATLNG
10712                                   ;*       THIS ROUTINE SETS UP A MASK FOR DATA, WITH
10713                                   ;*  INPUT - NOTHING IS PASSED TO THIS ROUTINE
10714                                   ;*      BUT GLOBAL INFORMATION IS ASSUMED TO EXIST:
10715                                   ;*      $USWR-- THE WORD FOR SOFTWARE PARAMETERS
10716                                   ;*      DATA-- A MASK FOR THE LOCATION OF THE OCTAL
10717                                   ;*               NUMBER OF DATA BITS
10718                                   ;*  OUTPUT----
10719                                   ;*      MASK-- A MASK OF BINARY ONES RIGHT-JUSTIFIED
10720                                   ;*             THE NUMBER OF WHICH IS DEFINED IN $USWR WORD.
10721
10726                                   ;;*****************************************************************
10731
10732  010472                                                                   LET MASK(R5) := #0              ; START
  (4)  010472  005065  000000                CLR     MASK(R5)
10733  010476                                                                   LET NUMBR := $USWR AND #DATA
  (4)  010476  016767  170516  000062        MOV     $USWR,NUMBR
  (7)  010504  016746  000056                MOV     NUMBR,-(SP)
  (7)  010510  042716  000017                BIC     #DATA,(SP)
  (7)  010514  042667  000046                BIC     (SP)+,NUMBR
10734
10735  010520                                                                   INCR I FROM #1 TO NUMBR BY #1
  (4)  010520  012767  000001  170544        MOV     #1,I
  (5)  010526  000402                        BR      $223
  (4)  010530                        $224:
  (8)  010530  005267  170536                INC     I
  (5)  010534                        $223:
  (5)  010534  026767  170532  000024        CMP     I,NUMBR
  (7)  010542  003006                        BGT     $225
10736  010544                                                                       LET MASK(R5) := MASK(R5) SHIFT 1
  (8)  010544  006365  000000                ASL     MASK(R5)
10737  010550                                                                       LET MASK(R5) := MASK(R5) SET.BY #1
  (7)  010550  052765  000001  000000        BIS     #1,MASK(R5)
10738  010556                                                                   ENDINC
  (4)  010556  000764                        BR      $224
  (3)  010560                        $225:
10739  010560                                                                   LET MASK(R5) := COMP MASK(R5)
  (7)  010560  005165  000000                COM     MASK(R5)
10740  010564                                                               RETURN
  (4)  010564  000401                        BR      $221
10741  010566  000000                        NUMBR:0
10742  010570                                                           ENDRTN
  (3)  010570                        $221:
  (3)  010570                        $222:
  (2)  010570  000207                        RTS     PC
```

```
 10744
 10745
 10750
 10755  010572                          ;;*****************************************************************
   (2)  010572                          ROUTINE WAIT    <TIME>
 10756                                  WAIT:
 10757                                  ;* ROUTINE:WAIT
 10758                                  ;*       THIS ROUTINE IS USED TO DELAY EXECUTION OF THE
 10759                                  ;*       MAIN  PROGRAM  FOR A SPECIFIED AMOUNT OF TIME.
 10760                                  ;*       THIS   IS   ACCOMPLISHED   BY  INCREMENTING  A
 10761                                  ;*       REGISTER UP TO A LIMIT.  THE INNER LOOP IS SET
 10766                                  ;*       TO APPROXIMATE 1 MILLI SEC.
 10767  010572  010146                  ;;*****************************************************************
   (2)  010574  010246                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
   (2)  010576  010346                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 10772  010600                                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
   (4)  010600  016501  000000                  LET R1 := TIME(R5)
 10773  010604                                  MOV     TIME(R5),R1
   (4)  010604  012702  000001                  INCRU R2 FROM #1 TO R1 BY #1
   (5)  010610  000402                          MOV     #1,R2
   (4)  010612                                  BR      $230
   (8)  010612  062702  000001          $231:
   (5)  010616                                  ADD     #01,R2
   (5)  010616  020201                  $230:
   (7)  010620  101010                          CMP     R2,R1
 10774  010622                                  BHI     $232
   (4)  010622  005003                          INCR R3 FROM #0 TO #100 BY #1
   (5)  010624  000401                          CLR     R3
   (4)  010626                                  BR      $233
   (8)  010626  005203                  $234:
   (5)  010630                                  INC     R3
   (5)  010630  020327  000100          $233:
   (7)  010634  003001                          CMP     R3,#100
 10775  010636                                  BGT     $235
   (4)  010636  000773                          ENDINC
   (3)  010640                                  BR      $234
 10776  010640                          $235:
   (4)  010640  000764                          ENDINC
   (3)  010642                                  BR      $231
 10781  010642  012603                  $232:
   (2)  010644  012602                          MOV     (SP)+,R3        ;;POP STACK INTO R3
   (2)  010646  012601                          MOV     (SP)+,R2        ;;POP STACK INTO R2
 10786  010650                                  MOV     (SP)+,R1        ;;POP STACK INTO R1
   (3)  010650                          ENDRTN
   (3)  010650                          $226:
   (2)  010650  000207                  $227:
                                                RTS     PC
```

```
 10788
 10793
 10794                                  .SBTTL  INTSRV  INTERRUPT SERVICE ROUTINE
 10795                                  ;;*****************************************************************
 10796  010652                          INTSRV:
 10797                                  ;* SERVICE ROUTINE: INTSRV
 10798                                  ;*       THIS GLOBAL ROUTINE DOES NOTHING BUT INCREMENT
 10799                                  ;*       'INTFLAG'  EACH TIME IT IS CALLED.  IT ASSUMES
 10800                                  ;*       THAT THE MAIN CALLING ROUTINE WILL  KNOW  WHAT
 10801                                  ;*       TO LOOK FOR.
 10806                                  ;;*****************************************************************
 10811
 10812                                                  ;ADD 1 TO 'INTERRUPT OCCURED' FLAG
 10813  010652                                                          LET INTFLAG := INTFLAG + #1
   (7)  010652  005267  000002                  INC     INTFLAG
 10814  010656                                  ENDSRV                          ;THAT'S ALL
   (1)  010656  000002                          RTI
 10815  010660  000000                  INTFLAG:  0
```

```
10817
```

```
10819
10820  010662                          ROUTINE CYCLE
  (2)  010662                          CYCLE:
10825                                  ;;*****************************************************************
10826                                  ;* ROUTINE:     CYCLE
10827                                  ;*       THIS  ROUTINE  CAUSES  ADRS   TO POINT TO  THE
10828                                  ;*       ADDRESS  OF  DLV11-F  UNDER  TEST,  ADRS +2 TO
10829                                  ;*       POINT TO THE VECTOR OF THE DLV11-F UNDER TEST.
10830                                  ;*      IT  KEEPS  TRACK  OF THE CURRENT DEVICE AND BIT
10831                                  ;*      MASKS. THE CONSOLE IS TREATED SPECIAL BY THIS ROUTINE.
10832                                  ;*      IT IS ONLY TESTED ONCE IF UNDER APT. IF NOT UNDER APT
10833                                  ;*      ALL TESTS THAT REQUIRE THE MAINT BIT ARE NOT RUN.
10834                                  ;;*****************************************************************
10839  010662                                                  LET APTCON :B= #FALSE   ; SET DEFAULT VALUE
  (4)  010662  112767  000000  000230          MOVB    #FALSE,APTCON
10840  010670                                                  LET CONSOLE :B= #FALSE
  (4)  010670  112767  000000  000223          MOVB    #FALSE,CONSOLE
10841  010676                                                     REPEAT       ; UNTIL BITMASK SETIN $DEVM
  (3)  010676                          $240:
10842  010676                                                      IF BITMASK EQ #0 THEN
  (6)  010676  005767  000200                  TST     BITMASK
  (9)  010702  001027                          BNE     $241
10843  010704                                                          IF INITFLAG EQ #1 THEN
  (6)  010704  026727  000174  000001          CMP     INITFLAG,#1
  (9)  010712  001003                          BNE     $242
10844  010714                                                              LET INITFLAG := #0
  (4)  010714  005067  000164                  CLR     INITFLAG
10845  010720                                                          ELSE
  (4)  010720  000403                          BR      $243
  (3)  010722                          $242:
10846  010722                                                              CALL $EOP   ; AS A SUBROUTINE
  (3)  010722  004767  000370                  JSR     PC,$EOP
10847
10848  010726                          SPECIALADDRESS:                 ; BECAUSE $EOP RETURNS AS A JUMP
10849  010726                                                              LET R0 := POP
  (4)  010726  012600                          MOV     (SP)+,R0
10850  010730                                                          ENDIF
  (4)  010730                          $243:
10851  010730                                                          LET BITMASK := #1
  (4)  010730  012767  000001  000144          MOV     #1,BITMASK
10852  010736                                                          LET $DEVCT := #1
  (4)  010736  012767  000001  170240          MOV     #1,$DEVCT
10853  010744                                                          LET ADDRESS := $BASE
  (4)  010744  016767  170300  000134          MOV     $BASE,ADDRESS
10854  010752                                                          LET VECTOR := $VECT1
  (4)  010752  016767  170266  000130          MOV     $VECT1,VECTOR
10855  010760                                                      ELSE
  (4)  010760  000410                          BR      $244
  (3)  010762                          $241:
10856  010762                                                          LET R4 := #10
  (4)  010762  012704  000010                  MOV     #10,R4
10857  010766                                                          LET BITMASK := BITMASK ROTATE 1
  (8)  010766  006167  000110                  ROL     BITMASK
10858  010772                                                          LET ADDRESS  := ADDRESS + R4
  (7)  010772  060467  000110                  ADD     R4,ADDRESS
10859  010776                                                          LET VECTOR := VECTOR + R4
```

```
   (7)  010776  060467  000106                ADD     R4,VECTOR
10860   011002                                                        ENDIF
   (4)  011002                          $244:
10861   011002                                                       UNTIL   BITMASK SETIN $DEVM
   (3)  011002  036767  000074  170242        BIT     BITMASK,$DEVM
   (6)  011010  001732                        BEQ     $240
10862   011012                                                  IF BITMASK EQ #BIT15 THEN
   (6)  011012  026727  000064  100000        CMP     BITMASK,#BIT15
   (9)  011020  001023                        BNE     $245
10863   011022                                                       LET CONSOLE :B= #TRUE
   (4)  011022  112767  000001  000071        MOVB    #TRUE,CONSOLE
10864   011030                                                       LET ADDRESS := CONADR
   (4)  011030  016767  000060  000050        MOV     CONADR,ADDRESS
10865   011036                                                       LET VECTOR  := CONVECT
   (4)  011036  016767  000054  000044        MOV     CONVECT,VECTOR
10866                                ;;;;;;                          IF #CONMAINT NOTSETIN $USWR THEN
10867                                ;;;;;;                            LET NOCONMAINT :B= #TRUE
10868                                ;;;;;;                          ENDIF
10869   011044                                                       IF #APTENV SETIN $ENV THEN ; APT MODE
   (6)  011044  032767  000001  170142        BIT     #APTENV,$ENV
   (9)  011052  001406                        BEQ     $246
10870   011054                                                          IF $PASS NE #0 THEN  ; NOT FIRST PASS
   (6)  011054  005767  170122                TST     $PASS
   (9)  011060  001403                        BEQ     $247
10871                                                                                ; DEFINE DEVICE AS APT CONSOLE
10872   011062                                                               LET APTCON :B= #TRUE
   (4)  011062  112767  000001  000030        MOVB    #TRUE,APTCON
10873   011070                                                          ENDIF        ; FIRST PASS
   (4)  011070                          $247:
10874   011070                                                       ENDIF   ; APT
   (4)  011070                          $246:
10875   011070                                                     ENDIF                ; BITMASK
   (4)  011070                          $245:
10876
10877   011070                                                       LET ADRS := #ADDRESS
   (4)  011070  012701  011106                MOV     #ADDRESS,ADRS
10878   011074                                                  LET $DEVCT := $DEVCT + #1
   (7)  011074  005267  170104                INC     $DEVCT
10879   011100                                                  RETURN
   (4)  011100  000411                        BR      $236
10880   011102  100000              BITMASK:  100000                  ; CONSOLE FIRST
10881   011104  000001              INITFLAG: 1
10882   011106  000000              ADDRESS:  0
10883   011110  000000              VECTOR:   0
10884   011112  000000              OK:       0
10885   011114  177560              CONADR:   177560                  ; CONSOLE ADDRESS
10886   011116  000060              CONVECT:      60                  ; CONSOLE VECTOR
10887   011120     000              APTCON:   .BYTE 0
10888   011121     000              CONSOLE:  .BYTE 0
10889   011122     000              NOCONMANT: .BYTE 0
10890           011124                      .EVEN
10891
10892   011124                                                  ENDRTN
   (3)  011124                          $236:
   (3)  011124                          $237:
   (2)  011124  000207                        RTS     PC
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10893
10894
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 10896
 10897
 10898  011126                          ROUTINE MYTYPE
   (2)  011126                          MYTYPE:
 10903                                  ;;*****************************************************************
 10904  011126  104401  011134                TYPE    ,65$                    ;;TYPE ASCIZ STRING
   (1)  011132  000405                        BR      64$                     ;;GET OVER THE ASCIZ
   (1)                                  ;;65$:  .ASCIZ  <CRLF>*TEST # *
   (1)  011146                          64$:
 10905  011146  016746  170026                MOV     $TESTN,-(SP)            ;;SAVE $TESTN FOR TYPEOUT
   (1)  011152  104402                        TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 10906  011154  104401  011162                TYPE    ,67$                    ;;TYPE ASCIZ STRING
   (1)  011160  000405                        BR      66$                     ;;GET OVER THE ASCIZ
   (1)                                  ;;67$:  .ASCIZ  *,ERROR # *
   (1)  011174                          66$:
 10907  011174  116767  167714  167774        MOVB    $ITEMB,$FATAL           ; APT FATAL ERROR NUMBER
 10908  011202  016746  167770                MOV     $FATAL,-(SP)            ;;SAVE $FATAL FOR TYPEOUT
   (1)  011206  104403                        TYPOS                           ;;GO TYPE--OCTAL ASCII
   (1)  011210     006                        .BYTE   6                       ;;TYPE 6 DIGITS
   (1)  011211     000                        .BYTE   0                       ;;SUPPRESS LEADING ZEROS
 10909  011212  104401  011220                TYPE    ,69$                    ;;TYPE ASCIZ STRING
   (1)  011216  000404                        BR      68$                     ;;GET OVER THE ASCIZ
   (1)                                  ;;69$:  .ASCIZ  *,PC = *
   (1)  011230                          68$:
 10910  011230  016746  167662                MOV     $ERRPC,-(SP)            ;;SAVE $ERRPC FOR TYPEOUT
   (1)  011234  104402                        TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 10911  011236  104401  011244                TYPE    ,71$                    ;;TYPE ASCIZ STRING
   (1)  011242  000404                        BR      70$                     ;;GET OVER THE ASCIZ
   (1)                                  ;;71$:  .ASCIZ  *,CSR: *
   (1)  011254                          70$:
 10912  011254  016746  167774                MOV     DLADD,-(SP)             ;;SAVE DLADD FOR TYPEOUT
   (1)  011260  104402                        TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 10913  011262  104401  011270                TYPE    ,73$                    ;;TYPE ASCIZ STRING
   (1)  011266  000405                        BR      72$                     ;;GET OVER THE ASCIZ
   (1)                                  ;;73$:  .ASCIZ  *,VECTOR: *
   (1)  011302                          72$:
 10914  011302  016746  167750                MOV     DLVEC,-(SP)             ;;SAVE DLVEC FOR TYPEOUT
   (1)  011306  104402                        TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 10915  011310  104401  001171                TYPE    ,$CRLF
 10920  011314                          ENDRTN
   (3)  011314                          $250:
   (3)  011314                          $251:
   (2)  011314  000207                        RTS     PC
```

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 10922
 10927                                  .SBTTL  END OF PASS ROUTINE
   (1)
   (2)                                  ;;*********************************************************************
   (1)                                  ;*INCREMENT THE PASS NUMBER ($PASS)
   (1)                                  ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
   (1)                                  ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
   (1)                                  ;*IF THERES A MONITOR GO TO IT
   (1)                                  ;*IF THERE ISN'T JUMP TO SPECIALADDRESS
   (1)
   (1)  011316                          $EOP:
   (1)  011316  000004                          SCOPE
   (1)  011320  005067  167556                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
   (1)  011324  005067  167630                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
   (1)  011330  005267  167646                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
   (1)  011334  042767  100000  167640         BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
   (1)  011342  005327                          DEC     (PC)+           ;;LOOP?
   (1)  011344  000001                  $EOPCT: .WORD   1
   (1)  011346  003022                          BGT     $DOAGN          ;;YES
   (1)  011350  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
   (1)  011352  000001                  $ENDCT: .WORD   1
   (1)  011354  011344                          $EOPCT
   (1)  011356  104401  011423                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
   (2)  011362  016746  167614                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
   (2)  011366  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
   (1)  011370  104401  011420                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
   (1)  011374  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
   (1)  011400  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
   (1)  011402  000005                          RESET                   ;;CLEAR THE WORLD
   (1)  011404  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
   (1)  011406  000240                          NOP                     ;;SAVE ROOM
   (1)  011410  000240                          NOP                     ;;FOR
   (1)  011412  000240                          NOP                     ;;ACT11
   (1)  011414                          $DOAGN:
   (1)  011414  000137                          JMP     @(PC)+          ;;RETURN
   (1)  011416  010726                  $RTNAD: .WORD   SPECIALADDRESS
   (1)
   (1)
   (1)  011420     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
   (1)  011423     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
   (1)  011430  050040  051501  020123
   (1)  011436  000043
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 10929
 10930                                  .SBTTL  POWER DOWN AND UP ROUTINES
   (1)
   (2)                                  ;;*****************************************************************
   (1)                                  ;POWER DOWN ROUTINE
   (1)  011440  012737  011604  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
   (1)  011446  012737  000300  000026         MOV     #PR6,@#PWRVEC+2 ;;PRIO:6
   (3)  011454  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
   (3)  011456  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
   (3)  011460  010246                         MOV     R2,-(SP)        ;;PUSH R2 ON STACK
   (3)  011462  010346                         MOV     R3,-(SP)        ;;PUSH R3 ON STACK
   (3)  011464  010446                         MOV     R4,-(SP)        ;;PUSH R4 ON STACK
   (3)  011466  010546                         MOV     R5,-(SP)        ;;PUSH R5 ON STACK
   (3)  011470  017746  167444                 MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
   (1)  011474  010667  000110                 MOV     SP,$SAVR6       ;;SAVE SP
   (1)  011500  012737  011512  000024         MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
   (1)  011506  000000                         HALT
   (1)  011510  000776                         BR      .-2             ;;HANG UP
   (1)
   (2)                                  ;;*****************************************************************
   (1)                                  ;POWER UP ROUTINE
   (1)  011512  012737  011604  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
   (1)  011520  016706  000064                 MOV     $SAVR6,SP       ;;GET SP
   (1)  011524  005067  000060                 CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
   (1)  011530  005267  000054          1$:    INC     $SAVR6          ;;WAIT FOR THE INC
   (1)  011534  001375                         BNE     1$              ;;OF  WORD
   (3)  011536  012677  167376                 MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
   (3)  011542  012605                         MOV     (SP)+,R5        ;;POP STACK INTO R5
   (3)  011544  012604                         MOV     (SP)+,R4        ;;POP STACK INTO R4
   (3)  011546  012603                         MOV     (SP)+,R3        ;;POP STACK INTO R3
   (3)  011550  012602                         MOV     (SP)+,R2        ;;POP STACK INTO R2
   (3)  011552  012601                         MOV     (SP)+,R1        ;;POP STACK INTO R1
   (3)  011554  012600                         MOV     (SP)+,R0        ;;POP STACK INTO R0
   (1)  011556  012737  011440  000024         MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
   (1)  011564  012737  000300  000026         MOV     #PR6,@#PWRVEC+2 ;;PRIO:6
   (1)  011572  104401                         TYPE                    ;REPORT THE POWER FAILURE
   (1)  011574  011612                $PWRMG:  .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
   (1)  011576  012716                         MOV     (PC)+,(SP)      ;;RESTART AT START
   (1)  011600  001336                $PWRAD:  .WORD   START           ;;RESTART ADDRESS
   (1)  011602  000002                         RTI
   (1)  011604  000000                $ILLUP:  HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
   (1)  011606  000776                         BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
   (1)  011610  000000                $SAVR6:  0                       ;,PUT THE SP HERE
   (1)  011612  005015  047520  042527  $POWER: .ASCIZ   <15><12>''POWER''
   (1)  011620  000122
   (1)                                          .EVEN
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 10932
 10933                                  .SBTTL  TYPE ROUTINE
   (1)
   (2)                                  ;;*****************************************************************
   (1)                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
   (1)                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
   (1)                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
   (1)                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
   (1)                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
   (1)                                  ;*
   (1)                                  ;*CALL:
   (1)                                  ;*1) USING A TRAP INSTRUCTION
   (1)                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
   (1)                                  ;*OR
   (1)                                  ;*      TYPE
   (1)                                  ;*      MESADR
   (1)                                  ;*
   (1)
   (1)  011622  105767  167331          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
   (1)  011626  100002                          BPL     1$              ;;BR IF YES
   (1)  011630  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
   (1)  011632  000430                          BR      3$              ;;LEAVE
   (1)  011634  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
   (1)  011636  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
   (1)  011642  122767  000001  167344          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
   (1)  011650  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
   (1)  011652  132767  000100  167335          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
   (1)  011660  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
   (1)  011662  010067  000004                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
   (1)  011666  004767  000774                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
   (1)  011672  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
   (1)  011674  132767  000040  167313  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
   (1)  011702  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
   (1)  011704  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
   (1)  011706  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
   (1)  011710  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
   (1)  011712  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
   (1)  011714  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
   (1)  011720  000002                          RTI                     ;;RETURN
   (1)  011722  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
   (1)  011726  001430                          BEQ     8$
   (1)  011730  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
   (1)  011734  001006                          BNE     5$
   (1)  011736  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
   (1)  011740  104401                          TYPE                    ;;TYPE A CR AND LF
   (1)  011742  001171                          $CRLF
   (1)  011744  105067  000130                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
   (1)  011750  000755                          BR      2$              ;;GET NEXT CHARACTER
   (1)  011752  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
   (1)  011756  126726  167174          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
   (1)  011762  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
   (1)  011764  016746  167164                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
   (1)                                                                  ;;AND THE NULL CHAR.
   (1)  011770  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
   (1)  011774  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
   (1)  011776  004767  000032                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
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    (1)  012002  105367  000072              DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
    (1)  012006  000770                      BR      7$              ;;LOOP
    (1)
    (1)                                  ;HORIZONTAL TAB PROCESSOR
    (1)
    (1)  012010  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
    (1)  012014  004767  000014          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
    (1)  012020  132767  000007  000052          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
    (1)  012026  001372                          BNE     9$              ;;TAB STOP
    (1)  012030  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
    (1)  012032  000724                          BR      2$              ;;GET NEXT CHARACTER
    (1)  012034  105777  167110          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
    (1)  012040  100375                          BPL     $TYPEC
    (1)  012042  116677  000002  167102          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
    (1)
    (1)  012050  122766  000015  000002  CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
    (1)  012056  001003                          BNE     1$              ;;BRANCH IF NO
    (1)  012060  105067  000014                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
    (1)  012064  000406                          BR      $TYPEX          ;;EXIT
    (1)  012066  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
    (1)  012074  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
    (1)  012076  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
    (1)  012100  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
    (1)  012102  000207                  $TYPEX: RTS     PC
    (1)
    (1)
    (1)
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10935
10936                                   .SBTTL  TTY INPUT ROUTINE
  (1)
  (2)                                   ;;*****************************************************************
  (1)
  (1)
. (1)                                   .ENABL  LSB
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
  (1)                                   ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
  (1)                                   ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
  (1)                                   ;*WHEN OPERATING IN TTY FLAG MODE.
  (1)  012104  022767  000176  167026  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
  (1)  012112  001074                         BNE     15$             ;;BRANCH IF NO
  (1)  012114  105777  167024                 TSTB    @$TKS           ;;CHAR THERE?
  (1)  012120  100071                         BPL     15$             ;;IF NO, DON'T WAIT AROUND
  (1)  012122  117746  167020                 MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
  (1)  012126  042716  177600                 BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
  (1)  012132  022726  000007                 CMP     #7,(SP)+        ;;IS IT A CONTROL G?
  (1)  012136  001062                         BNE     15$             ;;NO, RETURN TO USER
  (1)  012140  126727  166770  000001         CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
  (1)  012146  001456                         BEQ     15$             ;;BRANCH IF YES
  (1)
  (1)  012150  104401  012631                 TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
  (1)  012154  104401  012636  $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
  (2)  012160  016746  166012                 MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
  (2)  012164  104402                         TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
  (1)  012166  104401  012647                 TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
  (1)  012172  005046                 19$:    CLR     -(SP)           ;;CLEAR COUNTER
  (1)  012174  005046                         CLR     -(SP)
  (1)                                         ;;THE NEW SWR
  (1)  012176  105777  166742         7$:     TSTB    @$TKS           ;;CHAR THERE?
  (1)  012202  100375                         BPL     7$              ;;IF NOT TRY AGAIN
  (1)
  (1)  012204  117746  166736                 MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
  (1)  012210  042716  177600                 BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
  (1)
  (1)
  (1)
  (1)  012214  021627  000025         9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
  (1)  012220  001005                         BNE     10$             ;;BRANCH IF NOT
  (1)  012222  104401  012624                 TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
  (1)  012226  062706  000006         20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
  (1)  012232  000757                         BR      19$             ;;LET'S TRY IT AGAIN
  (1)
  (1)
  (1)  012234  021627  000015         10$:    CMP     (SP),#15        ;;IS IT A <CR>?
  (1)  012240  001022                         BNE     16$             ;;BRANCH IF NO
  (1)  012242  005766  000004                 TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
  (1)  012246  001403                         BEQ     11$             ;;BRANCH IF YES
  (1)  012250  016677  000002  166662         MOV     2(SP),@SWR      ;;SAVE NEW SWR
  (1)  012256  062706  000006         11$:    ADD     #6,SP           ;;CLEAR UP STACK
  (1)  012262  104401  001171         14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
  (1)  012266  126727  166643  000001         CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
  (1)  012274  001003                         BNE     15$             ;;BRANCH IF NOT
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(1)  012276  012777  000100  166640          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
(1)  012304  000002                  15$:     RTI                     ;;RETURN
(1)  012306  004767  177522          16$:     JSR     PC,$TYPEC       ;;ECHO CHAR
(1)  012312  021627  000060                   CMP     (SP),#60        ;;CHAR < 0?
(1)  012316  002420                           BLT     18$             ;;BRANCH IF YES
(1)  012320  021627  000067                   CMP     (SP),#67        ;;CHAR > 7?
(1)  012324  003015                           BGT     18$             ;;BRANCH IF YES
(1)  012326  042726  000060                   BIC     #60,(SP)+       ;;STRIP-OFF ASCII
(1)  012332  005766  000002                   TST     2(SP)           ;;IS THIS THE FIRST CHAR
(1)  012336  001403                           BEQ     17$             ;;BRANCH IF YES
(1)  012340  006316                           ASL     (SP)            ;;NO, SHIFT PRESENT
(1)  012342  006316                           ASL     (SP)            ;;   CHAR OVER TO MAKE
(1)  012344  006316                           ASL     (SP)            ;;   ROOM FOR NEW ONE.
(1)  012346  005266  000002          17$:     INC     2(SP)           ;;KEEP COUNT OF CHAR
(1)  012352  056616  177776                   BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
(1)  012356  000707                           BR      7$              ;;GET THE NEXT ONE
(1)  012360  104401  001170          18$:     TYPE    ,$QUES          ;;TYPE ?<CR><LF>
(1)  012364  000720                           BR      20$             ;;SIMULATE CONTROL-U
(1)                                 .DSABL   LSB
(1)
(1)
(2)                                 ;;**********************************************************************
(1)                                 ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
(1)                                 ;*CALL:
(1)                                 ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
(1)                                 ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
(1)                                 ;*                              ;;WITH PARITY BIT STRIPPED OFF
(1)                                 ;
(1)
(1)  012366  011646          $RDCHR:  MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
(1)  012370  016666  000004  000002           MOV     4(SP),2(SP)     ;;SAVE THE PS
(1)  012376  105777  166542          1$:      TSTB    @$TKS           ;;WAIT FOR
(1)  012402  100375                           BPL     1$              ;;A CHARACTER
(1)  012404  117766  166536  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
(1)  012412  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
(1)  012420  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
(1)  012426  001013                           BNE     3$              ;;BRANCH IF NO
(1)  012430  105777  166510          2$:      TSTB    @$TKS           ;;WAIT FOR A CHARACTER
(1)  012434  100375                           BPL     2$              ;;LOOP UNTIL ITS THERE
(1)  012436  117746  166504                   MOVB    @$TKB,-(SP)     ;;GET CHARACTER
(1)  012442  042716  177600                   BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
(1)  012446  022627  000021                   CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
(1)  012452  001366                           BNE     2$              ;;IF NOT DISCARD IT
(1)  012454  000750                           BR      1$              ;;YES, RESUME
(1)  012456  026627  000004  000140  3$:      CMP     4(SP),#140      ;;IS IT UPPER CASE?
(1)  012464  002407                           BLT     4$              ;;BRANCH IF YES
(1)  012466  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
(1)  012474  003003                           BGT     4$              ;;BRANCH IF YES
(1)  012476  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
(1)  012504  000002                  4$:      RTI                     ;;GO BACK TO USER
(2)                                 ;;**********************************************************************
(1)                                 ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
(1)                                 ;*CALL:
(1)                                 ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
(1)                                 ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
(1)                                 ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
```

```
(1)
(1)  012506  010346                  $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
(1)  012510  012703  012614           1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
(1)  012514  022703  012624           2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
(1)  012520  101405                           BLOS    4$              ;;BR IF YES
(1)  012522  104410                           RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
(1)  012524  112613                           MOVB    (SP)+,(R3)      ;;GET CHARACTER
(1)  012526  122713  000177           10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
(1)  012532  001003                           BNE     3$              ;;SKIP IF NOT
(1)  012534  104401  001170           4$:     TYPE    ,$QUES          ;;TYPE A '?'
(1)  012540  000763                           BR      1$              ;;CLEAR THE BUFFER AND LOOP
(1)  012542  111367  000044           3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
(1)  012546  104401  012612                   TYPE    ,9$
(1)  012552  122723  000015                   CMPB    #15,(R3)+       ;;CHECK FOR RETURN
(1)  012556  001356                           BNE     2$              ;;LOOP IF NOT RETURN
(1)  012560  105063  177777                   CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
(1)  012564  104401  001172                   TYPE    ,$LF            ;;TYPE A LINE FEED
(1)  012570  012603                           MOV     (SP)+,R3        ;;RESTORE R3
(1)  012572  011646                           MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
(1)  012574  016666  000004  000002           MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
(1)  012602  012766  012614  000004           MOV     #$TTYIN,4(SP)
(1)  012610  000002                           RTI                     ;;RETURN
(1)  012612     000                   9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
(1)  012613     000                           .BYTE   0               ;;TERMINATOR
(1)  012614  000010                   $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
(1)  012624  052536  005015     000   $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
(1)  012631     136  006507  000012  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
(1)  012636  005015  053523  020122  $MSWR:  .ASCIZ  <15><12>/SWR = /
(1)  012644  020075     000
(1)  012647     040  047040  053505  $MNEW:  .ASCIZ  /  NEW = /
(1)  012654  036440  000040
```

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

```
    (1)         000200                  APTSIZE=200
    (1)         000001                  APTENV=001
    (1)         000100                  APTSPOOL=100
    (1)         000040                  APTCSUP=040
```

```
10941
10942                                   .SBTTL  ERROR HANDLER ROUTINE
  (1)
  (2)                                   ;;**********************************************************************
  (1)                                   ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
  (1)                                   ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
  (1)                                   ;*AND GO TO MYTYPE ON ERROR
  (1)                                   ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
  (1)                                   ;*SW15=1        HALT ON ERROR
  (1)                                   ;*SW13=1        INHIBIT ERROR TYPEOUTS
  (1)                                   ;*SW10=1        BELL ON ERROR
  (1)                                   ;*SW09=1        LOOP ON ERROR
  (1)                                   ;*CALL
  (1)                                   ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
  (1)
  (1)  013126                           $ERROR:
  (1)  013126  104407                           CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
  (1)  013130  105267  165747           7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
  (1)  013134  001775                           BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
  (1)  013136  016777  165740  165776         MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
  (1)  013144  032777  002000  165766         BIT     #BIT10,@SWR     ;;BELL ON ERROR?
  (1)  013152  001402                         BEQ     1$              ;;NO - SKIP
  (1)  013154  104401  001164                 TYPE    ,$BELL          ;;RING BELL
  (1)  013160  005267  165726           1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
  (1)  013164  011667  165726                 MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
  (1)  013170  162767  000002  165720         SUB     #2,$ERRPC
  (1)  013176  117767  165714  165710         MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
  (1)  013204  032777  020000  165726         BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
  (1)  013212  001004                         BNE     20$             ;;SKIP TYPEOUTS
  (1)  013214  004767  175706                 JSR     PC,MYTYPE       ;;GO TO USER ERROR ROUTINE
  (1)  013220  104401  001171                 TYPE    ,$CRLF
  (1)  013224                           20$:
  (1)  013224  122767  000001  165762         CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
  (1)  013232  001007                         BNE     2$              ;;NO,SKIP APT ERROR REPORT
  (1)  013234  116767  165654  000004         MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
  (1)  013242  004767  177430                 JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
  (1)  013246     000                 21$:    .BYTE   0
  (1)  013247     000                         .BYTE   0
  (1)  013250  000777                 22$:    BR      22$             ;;APT ERROR LOOP
  (1)  013252  005777  165662           2$:     TST     @SWR            ;;HALT ON ERROR
  (1)  013256  100002                         BPL     3$              ;;SKIP IF CONTINUE
  (1)  013260  000000                         HALT                    ;;HALT ON ERROR!
  (1)  013262  104407                         CKSWR                   ;,TEST FOR CHANGE IN SOFT-SWR
  (1)  013264  032777  001000  165646   3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
  (1)  013272  001402                         BEQ     4$              ;;BR IF NO
  (1)  013274  016716  165610                 MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
  (1)  013300  005767  165656           4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
  (1)  013304  001402                         BEQ     5$              ;;BR IF NONE
  (1)  013306  016716  165650                 MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
  (1)  013312                           5$:
  (1)  013312  022737  011404  000042         CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
  (1)  013320  001001                         BNE     6$              ;;BRANCH IF NO
  (1)  013322  000000                         HALT                    ;;YES
  (1)  013324                           6$:
  (1)  013324  000002                         RTI                     ;;RETURN
```

```
 10944
 10945                                  .SBTTL  SCOPE HANDLER ROUTINESTARS
   (1)                                  ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
   (1)                                  ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
   (1)                                  ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
   (1)                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
   (1)                                  ;*SW14=1        LOOP ON TEST
   (1)                                  ;*SW11=1        INHIBIT ITERATIONS
   (1)                                  ;*SW09=1        LOOP ON ERROR
   (1)                                  ;*SW08=1        LOOP ON TEST IN SWR<7:0>
   (1)                                  ;*CALL
   (1)                                  ;*      SCOPE           ;;SCOPE=IOT
   (1)
   (1)  013326                          $SCOPE:
   (1)  013326  104407                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
   (1)  013330  032777  040000  165602  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
   (1)  013336  001114                          BNE     $OVER           ;;YES IF SW14=1
   (1)                                  ;#####START OF CODE FOR THE XOR TESTER#####
   (1)  013340  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
   (1)                                                                  ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
   (1)  013342  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
   (1)  013346  012737  013366  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
   (1)  013354  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
   (1)  013360  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
   (1)  013364  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
   (1)  013366  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
   (1)  013370  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
   (1)  013374  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
   (1)  013376                          6$:;#####END OF CODE FOR THE XOR TESTER#####
   (1)  013376  032777  000400  165534          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
   (1)  013404  001404                          BEQ     2$              ;;BR IF NO
   (1)  013406  127767  165526  165466          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
   (1)  013414  001465                          BEQ     $OVER           ;;BR IF YES
   (1)  013416  105767  165461          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
   (1)  013422  001421                          BEQ     3$              ;;BR IF NO
   (1)  013424  126767  165465  165451          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
   (1)  013432  101015                          BHI     3$              ;;BR IF NO
   (1)  013434  032777  001000  165476          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
   (1)  013442  001404                          BEQ     4$              ;;BR IF NO
   (1)  013444  016767  165440  165434  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
   (1)  013452  000446                          BR      $OVER
   (1)  013454  105067  165423          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
   (1)  013460  005067  165474                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
   (1)  013464  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
   (1)  013466  032777  004000  165444  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
   (1)  013474  001011                          BNE     1$              ;;BR IF YES
   (1)  013476  005767  165500                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
   (1)  013502  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
   (1)  013504  005267  165374                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
   (1)  013510  026767  165444  165366          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
   (1)  013516  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
   (1)  013520  012767  000001  165356  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
   (1)  013526  016767  000052  165424          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
   (1)  013534  105267  165342          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
   (1)  013540  116767  165336  165432          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
   (1)  013546  011667  165334                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
```

```
    (1)  013552  011667  165332                    MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
    (1)  013556  005067  165400                    CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
    (1)  013562  112767  000001  165325            MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
    (1)  013570  016777  165306  165344  $OVER:    MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
    (1)  013576  016716  165304                    MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
    (1)  013602  000002                            RTI                     ;;FIXES PS
    (1)  013604  003720                  $MXCNT:   2000.                   ;;MAX. NUMBER OF ITERATIONS
```

```
10947
10948                                   .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
  (1)
  (2)                                   ;;**********************************************************************
  (1)                                   ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
  (1)                                   ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
  (1)                                   ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
  (1)                                   ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
  (1)                                   ;*REPLACED WITH SPACES.
  (1)                                   ;*CALL:
  (1)                                   ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
  (1)                                   ;*      TYPDS                   ;;GO TO THE ROUTINE
  (1)
  (1)  013606                           $TYPDS:
  (3)  013606  010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
  (3)  013610  010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
  (3)  013612  010246                           MOV     R2,-(SP)        ;;PUSH R2 ON STACK
  (3)  013614  010346                           MOV     R3,-(SP)        ;;PUSH R3 ON STACK
  (3)  013616  010546                           MOV     R5,-(SP)        ;;PUSH R5 ON STACK
  (1)  013620  012746  020200                   MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
  (1)  013624  016605  000020                   MOV     20(SP),R5       ;;GET THE INPUT NUMBER
  (1)  013630  100004                           BPL     1$              ;;BR IF INPUT IS POS.
  (1)  013632  005405                           NEG     R5              ;;MAKE THE BINARY NUMBER POS.
  (1)  013634  112766  000055  000001           MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
  (1)  013642  005000                   1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
  (1)  013644  012703  014022                   MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
  (1)  013650  112723  000040                   MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
  (1)  013654  005002                   2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
  (1)  013656  016001  014012                   MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
  (1)  013662  160105                   3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
  (1)  013664  002402                           BLT     4$              ;;BR IF DONE
  (1)  013666  005202                           INC     R2              ;;INCREASE THE BCD DIGIT BY 1
  (1)  013670  000774                           BR      3$
  (1)  013672  060105                   4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
  (1)  013674  005702                           TST     R2              ;;CHECK IF BCD DIGIT=0
  (1)  013676  001002                           BNE     5$              ;;FALL THROUGH IF 0
  (1)  013700  105716                           TSTB    (SP)            ;;STILL DOING LEADING 0'S?
  (1)  013702  100407                           BMI     7$              ;;BR IF YES
  (1)  013704  106316                   5$:     ASLB    (SP)            ;;MSD?
  (1)  013706  103003                           BCC     6$              ;;BR IF NO
  (1)  013710  116663  000001  177777           MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
  (1)  013716  052702  000060           6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
  (1)  013722  052702  000040           7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
  (1)  013726  110223                           MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
  (1)  013730  005720                           TST     (R0)+           ;;JUST INCREMENTING
  (1)  013732  020027  000010                   CMP     R0,#10          ;;CHECK THE TABLE INDEX
  (1)  013736  002746                           BLT     2$              ;;GO DO THE NEXT DIGIT
  (1)  013740  003002                           BGT     8$              ;;GO TO EXIT
  (1)  013742  010502                           MOV     R5,R2           ;;GET THE LSD
  (1)  013744  000764                           BR      6$              ;;GO CHANGE TO ASCII
  (1)  013746  105726                   8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
  (1)  013750  100003                           BPL     9$              ;;BR IF NO
  (1)  013752  116663  177777  177776           MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
  (1)  013760  105013                   9$:     CLRB    (R3)            ;;SET THE TERMINATOR
  (3)  013762  012605                           MOV     (SP)+,R5        ;;POP STACK INTO R5
  (3)  013764  012603                           MOV     (SP)+,R3        ;;POP STACK INTO R3
```

```
    (3)  013766  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
    (3)  013770  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
    (3)  013772  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
    (1)  013774  104401  014022                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
    (1)  014000  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
    (1)  014006  012616                        MOV     (SP)+,(SP)
    (1)  014010  000002                        RTI                     ;;RETURN TO USER
    (1)  014012  023420                $DTBL:  10000.
    (1)  014014  001750                        1000.
    (1)  014016  000144                        100.
    (1)  014020  000012                        10.
    (1)  014022  000004                $DBLK:  .BLKW   4
```

```
10950
10951                                   .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
  (1)                                   ;*OCTAL (ASCII) NUMBER AND TYPE IT.
  (1)                                   ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
  (1)                                   ;*CALL:
  (1)                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
  (1)                                   ;*      TYPOS                   ;;CALL FOR TYPEOUT
  (1)                                   ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
  (1)                                   ;*      .BYTE   M               ;;M=1 OR 0
  (1)                                   ;*                                      ;;1=TYPE LEADING ZEROS
  (1)                                   ;*                                      ;;0=SUPPRESS LEADING ZEROS
  (1)                                   ;*
  (1)                                   ;*$TYPON---ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
  (1)                                   ;*$TYPOS OR $TYPOC
  (1)                                   ;*CALL:
  (1)                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
  (1)                                   ;*      TYPON                   ;;CALL FOR TYPEOUT
  (1)                                   ;*
  (1)                                   ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
  (1)                                   ;*CALL:
  (1)                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
  (1)                                   ;*      TYPOC                   ;;CALL FOR TYPEOUT
  (1)
  (1)  014032  017646  000000           $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
  (1)  014036  116667  000001  000211           MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
  (1)  014044  112667  000207                   MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
  (1)  014050  062716  000002                   ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
  (1)  014054  000406                           BR      $TYPON
  (1)  014056  112767  000001  000171  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
  (1)  014064  112767  000006  000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
  (1)  014072  112767  000005  000154  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
  (1)  014100  010346                           MOV     R3,-(SP)        ;;SAVE R3
  (1)  014102  010446                           MOV     R4,-(SP)        ;;SAVE R4
  (1)  014104  010546                           MOV     R5,-(SP)        ;;SAVE R5
  (1)  014106  116704  000145                   MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
  (1)  014112  005404                           NEG     R4
  (1)  014114  062704  000006                   ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
  (1)  014120  110467  000132                   MOVB    R4,$OMODE       ;;SAVE IT FOR USE
  (1)  014124  116704  000125                   MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
  (1)  014130  016605  000012                   MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
  (1)  014134  005003                           CLR     R3              ;;CLEAR THE OUTPUT WORD
  (1)  014136  006105                   1$:     ROL     R5              ;;ROTATE MSB INTO "C"
  (1)  014140  000404                           BR      3$              ;;GO DO MSB
  (1)  014142  006105                   2$:     ROL     R5              ;;FORM THIS DIGIT
  (1)  014144  006105                           ROL     R5
  (1)  014146  006105                           ROL     R5
  (1)  014150  010503                           MOV     R5,R3
  (1)  014152  006103                   3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
  (1)  014154  105367  000076                   DECB    $OMODE          ;;TYPE THIS DIGIT?
  (1)  014160  100016                           BPL     7$              ;;BR IF NO
  (1)  014162  042703  177770                   BIC     #177770,R3      ;;GET RID OF JUNK
  (1)  014166  001002                           BNE     4$              ;;TEST FOR 0
  (1)  014170  005704                           TST     R4              ;;SUPPRESS THIS 0?
```

```
(1)  014172  001403                    BEQ     5$              ;;BR IF YES
(1)  014174  005204              4$:   INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
(1)  014176  052703  000060            BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
(1)  014202  052703  000040      5$:   BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
(1)  014206  110367  000040            MOVB    R3,8$           ;;SAVE FOR TYPING
(1)  014212  104401  014252            TYPE    ,8$             ;;GO TYPE THIS DIGIT
(1)  014216  105367  000032      7$:   DECB    $OCNT           ;;COUNT BY 1
(1)  014222  003347                    BGT     2$              ;;BR IF MORE TO DO
(1)  014224  002402                    BLT     6$              ;;BR IF DONE
(1)  014226  005204                    INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
(1)  014230  000744                    BR      2$              ;;GO DO THE LAST DIGIT
(1)  014232  012605              6$:   MOV     (SP)+,R5        ;;RESTORE R5
(1)  014234  012604                    MOV     (SP)+,R4        ;;RESTORE R4
(1)  014236  012603                    MOV     (SP)+,R3        ;;RESTORE R3
(1)  014240  016666  000002  000004    MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
(1)  014246  012616                    MOV     (SP)+,(SP)
(1)  014250  000002                    RTI                     ;;RETURN
(1)  014252     000              8$:   .BYTE   0               ;;STORAGE FOR ASCII DIGIT
(1)  014253     000                    .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
(1)  014254     000              $OCNT: .BYTE   0               ;;OCTAL DIGIT COUNTER
(1)  014255     000              $OFILL: .BYTE  0               ;;ZERO FILL SWITCH
(1)  014256  000000              $OMODE: .WORD  0               ;;NUMBER OF DIGITS TO TYPE
```

```
10953
10954                                   .SBTTL  TRAP DECODER
  (1)
  (2)                                   ;;**********************************************************************
  (1)                                   ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
  (1)                                   ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
  (1)                                   ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
  (1)                                   ;*GO TO THAT ROUTINE.
  (1)
  (1)  014260  010046                   $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
  (1)  014262  016600  000002                   MOV     2(SP),R0        ;;GET TRAP ADDRESS
  (1)  014266  005740                           TST     -(R0)           ;;BACKUP BY 2
  (1)  014270  111000                           MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
  (1)  014272  006300                           ASL     R0              ;;POSITION FOR INDEXING
  (1)  014274  016000  014314                   MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
  (1)  014300  000200                           RTS     R0              ;;GO TO ROUTINE
  (1)
  (1)
  (1)                                   ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
  (1)
  (1)  014302  011646                   $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
  (1)  014304  016666  000004  000002           MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
  (1)  014312  000002                           RTI                     ;;RESTORE THE PSW
  (1)
  (3)                                   .SBTTL  TRAP TABLE
  (3)
  (3)                                   ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
  (3)                                   ;*BY THE "TRAP" INSTRUCTION.
  (3)
  (3)                                   ;       ROUTINE
  (3)                                   ;       -------
  (3)  014314  014302                   $TRPAD: .WORD   $TRAP2
  (3)  014316  011622                           $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
  (3)  014320  014056                           $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
  (3)  014322  014032                           $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
  (3)  014324  014072                           $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
  (3)  014326  013606                           $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
  (1)
  (3)  014330  012154                           $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
  (1)
  (3)  014332  012104                           $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
  (3)  014334  012366                           $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
  (3)  014336  012506                           $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
10955                                   ;FOLLOWING CALL WAS ADDED TO INIT 11/21 SPECIFIC VECTORS.
10956           014340                  POINT=.                 ;SAVE POINTER
  (1)           000100                  .=100
  (1)  000100  014340                   $CLKVEC                 ;LKVEC  HANDLER
  (1)  000102  000300                   300                     ;INTERRUPT HANDLER PRI
  (1)           000140                  .=140                   ;BRKVEC
  (1)  000140  170000                   170000                  ;ODT START ADDRESS
  (1)  000142  000300                   300                     ;PRIORITY
  (1)           014340                  .=POINT                 ;RESTORE POINTER
  (1)  014340  104401  014346           $CLKVEC:        TYPE,CLKMES
  (1)  014344  000000                                   HALT
  (1)  014346  005015  045514  042526   CLKMES:  .ASCIZ <15><12>/LKVEC INTERRUPT - DISCONNECT LTC /
  (1)  014354  020103  047111  042524
```

```
   (1)  014362  051122  050125  020124
   (1)  014370  020055  044504  041523
   (1)  014376  047117  042516  052103
   (1)  014404  046040  041524  000040
 10957          000001                .END
```

```
ABASE = 175610           7969#   8971
ACDW1 = 000000           8971
ACDW2 = 000000           8971
ACPUOP= 000000           8971
ADDRES  011106          10853*  10858*  10864*  10877   10882#
ADDW0 = 000000           8971
ADDW1 = 000000           8971
ADDW10= 000000           8971
ADDW11= 000000           8971
ADDW12= 000000           8971
ADDW13= 000000           8971
ADDW14= 000000           8971
ADDW15= 000000           8971
ADDW2 = 000000           8971
ADDW3 = 000000           8971
ADDW4 = 000000           8971
ADDW5 = 000000           8971
ADDW6 = 000000           8971
ADDW7 = 000000           8971
ADDW8 = 000000           8971
ADDW9 = 000000           8971
ADEVCT= 000000           8971
ADEVM = 000001           7970#   8971
AENV  = 000000           8971
AENVM = 000000           8971
AFATAL= 000000           8971
AMADR1= 000000           8971
AMADR2= 000000           8971
AMADR3= 000000           8971
AMADR4= 000000           8971
AMAMS1= 000000           8971
AMAMS2= 000000           8971
AMAMS3= 000000           8971
AMAMS4= 000000           8971
AMSGAD= 000000           8971
AMSGLG= 000000           8971
AMSGTY= 000000           8971
AMTYP1= 000000           8971
AMTYP2= 000000           8971
AMTYP3= 000000           8971
AMTYP4= 000000           8971
APASS = 000000           8971
APRIOR= 000000           8971
APTCON  011120          10839*  10872*  10887#
APTCSU= 000040          10933   10939#
APTENV= 000001           9084    9458    9647    9862    9979   10869   10933   10939#  10942
APTSIZ= 000200           8986   10939#
APTSPO= 000100          10933   10939#
ASWREG= 000000           8971
ATESTN= 000000           8971
AUNIT = 000000           8971
AUSWR = 011110           7972#   8971
AVECT1= 000300           7971#   8971
AVECT2= 000000           8971
BAUD  = 007400           8959#
BITMAS  011102           9001*  10842   10851*  10857*  10861   10862   10880#
```

```
BIT0  = 000001          8848#  10567  10578
BIT00 = 000001          8848#   8883   8903   8924   8945
BIT01 = 000002          8848#   8902   8944
BIT02 = 000004          8848#   8901   8922   8943
BIT03 = 000010          8848#   8900   8942
BIT04 = 000020          8848#   8899   8941
BIT05 = 000040          8848#   8898   8940
BIT06 = 000100          8848#   8877   8897   8918   8939
BIT07 = 000200          8848#   8876   8896   8917   8938
BIT08 = 000400          8848#  10945
BIT09 = 001000          8848#  10942  10945
BIT1  = 000002          8848#  10571  10581
BIT10 = 002000          8848#  10942
BIT11 = 004000          8848#   8872   8912  10945
BIT12 = 010000          8848#   8891   8911
BIT13 = 020000          8848#   8890   8910  10942
BIT14 = 040000          8848#   8889   8909  10945
BIT15 = 100000          8848#   8888   8908   9001  10862
BIT2  = 000004          8848#   9905   9919
BIT3  = 000010          8848#  10192  10225
BIT4  = 000020          8848#  10200  10228
BIT5  = 000040          8848#
BIT6  = 000100          8848#
BIT7  = 000200          8848#
BIT8  = 000400          8848#
BIT9  = 001000          8848#
BPTVEC= 000014          8848#
BREAK = 000001          8924#   9091   9099   9101   9110   9112   9121   9124  10555
BRK   = 010000          8960#   9084  10544
BRKVEC= 000140          8848#
CKSWR = 104407         10942  10945  10954#
CLKMES  014346         10956#
CLR   = 000000          8862#   9465   9466   9654  10664
COMSPD= 000100          8954#  10247
CONADR  011114         10864  10885#
CONSOL  011121          9145   9374   9458   9542   9593   9644   9738  10081  10161  10343  10547  10840* 10863*
                       10888#
CONVEC  011116         10865  10886#
CR    = 000015          8848#  10933
CRLF  = 000200          8848#   8987   8995   8996   8997  10596  10904  10933
CYCLE   010662          9003  10820#
DATA  = 000017          8951#  10733
DATLNG  010472         10181  10275  10352  10710#
DDISP = 177570          8848#   8971   8986
DISPLA  001142          8971#   8986* 10942* 10945*
DISPRE  000174          8965#   8986
DLADD   001254          8973#   9006*  9009   9011   9012   9013   9014   9015   9038   9055  10597  10912
DLADDR= 175610          8858#   8973   8975   8976   8977   8978   8979
DLVEC   001256          8974#   9008*  9988  10087  10143  10377  10599  10914
DSWR  = 177570          8848#   8971   8986
EMTVEC= 000030          8848#   8986*
ERRBIT= 100000          8963#   9738  10569
ERRCHK  010166          9866*  9905*  9919  10165* 10192* 10200* 10225  10228  10551* 10567* 10571* 10578  10581
                       10585#
ERRCNT  007556         10387* 10407  10411  10420#  10498  10504*
ERROR = 100000          8888#   9781   9827
```

```
ERRORF  004026          9465*   9496*   9509    9522#
ERRVEC= 000004          8848#   8986*  10945*
EVENOD= 000040          8953#
EXITFL  004030          9466*   9513*   9516*   9518    9523#
FALSE = 000000         10652#  10656   10839   10840
FLAG    010464         10656*  10672*  10675   10687   10694#
FRERR = 020000          8890#  10570
GNS   = ****** U        8965    8987    8995    8996    8997   10596   10598   10600   10904   10906   10909   10911   10913
                       10954
GTSWR = 104406          8987   10954#
HOLD    007622         10450*  10452   10461#
HOLDSC  010465         10664*  10666*  10670   10695#
HOWLON= 000000         10622#  10655
HT    = 000011          8848#  10933
I       001272          8980#   9041*   9054*   9055    9056   10735*
ILLMEM= 000004          8849#   9040    9057
INITFL  011104          9000*  10843   10844*  10881#
INTFLA  010660          9045*   9049    9985*  10018   10020   10033*  10048   10090*  10120   10124   10813*  10815#
INTSRV  010652          9040    9992   10087   10796#
IOTVEC= 000020          8848#   8986*
LF    = 000012          8848#  10933
LKVEC = 000100          8848#
LOOP    002136          9002#  10604
MAINT = 000004          8922#   9152    9160    9162    9171    9173    9182    9185    9380    9393    9547    9563    9598
                        9609    9653    9672    9689    9701    9715    9745    9771    9785    9801    9819    9830    9869
                        9918   10092   10123   10141   10167   10217   10224   10252   10397   10409   10553
MAINTJ= 040000          8962#   9145    9542    9593    9644    9741    9858   10081   10161   10343   10544
MASK  = 000000         10710#  10732*  10736*  10737*  10739*
MAX     004672          9667    9668    9720#
MYTYPE  011126         10898#  10942
NEW     005644          9880*   9881*   9888*   9889*   9894    9898    9909    9910    9951#
NOCONM  011122         10889#
NUMBER  007560         10407   10421#  10454   10508
NUMBR   010566         10733*  10735   10741#
ODTST = 170000          8848#
OK      011112         10884#
OLD     005650          9867*   9868*   9894    9898    9909*   9910*   9952#
ORERR = 040000          8889#   9768    9797    9816
PARITY= 000020          8952#
PASS    004024          9462*   9510    9521#
PBAUDS= 004000          8912#
PBAUD0= 010000          8911#
PBAUD1= 020000          8910#
PBAUD2= 040000          8909#
PBAUD3= 100000          8908#
PBR   = 000200          8955*   9858
PERR  = 010000          8891#
PIRQ  = 177772          8848#
PIRQVE= 000240          8848#
POINT = 014340         10956#
PR0   = 000000          8848#  10005   10041   10101   10175   10269   10371
PR1   = 000040          8848#
PR2   = 000100          8848#
PR3   = 000140          8848#
PR4   = 000200          8848#
PR5   = 000240          8848#
```

```
PR6    = 000300          8848#   8986    9040    9207    9992   10087   10380   10384   10930
PR7    = 000340          8848#
PS     = 177776          8848#
PSW    = 177776          8848#
PWRVEC= 000024           8848#   8986*  10930*
RATES    005624          9874    9915    9925#
RBUF     001262          8976#   9012*   9621    9710    9765    9797    9816    9827    9872   10118   10182   10203   10276
                        10301   10491   10565   10570
RCSR     001260          8975#   9011*   9279    9287*   9289    9298*   9300    9309*   9312    9343    9390    9557    9574
                         9608    9623    9662    9682    9684    9685    9698    9712    9883   10094*  10112   10114*  10137*
                        10198   10262*  10293   10318*  10402*  10417*  10510*  10559
RCVRAC= 004000           8872#   9390    9662    9682    9685
RCVRDO= 000200           8876#   9343    9557    9574    9608    9623    9684    9698    9712    9883   10112   10198   10293
                        10559
RCVRIE= 000100           8877#   9279    9287    9289    9298    9300    9309    9312   10094   10114   10137   10402   10417
                        10510
RDATA0= 000001           8903#
RDATA1= 000002           8902#
RDATA2= 000004           8901#
RDATA3= 000010           8900#
RDATA4= 000020           8899#
RDATA5= 000040           8898#
RDATA6= 000100           8897#
RDATA7= 000200           8896#
RDCHR  = 104410         10936   10954#
RDLIN  = 104411         10954#
RDRRUN= 000001           8883#
REC      007626         10379   10477#
REG    = 000004         10622#  10654
REGSAV   010460         10654*  10663   10692#
RESVEC= 000010           8848#
RHLD     007716         10493*  10496   10500   10518#
R0050    005624          9934#
R0070    005625          9935#
R0110    005626          9936#
R0135    005627          9937#
R0150    005630          9938#
R0200    005633          9941#
R0300    005631          9939#
R0600    005632          9940#
R10000   005643          9949#
R1800    005634          9942#
R2000    005635          9943#
R2400    005636          9944#
R3600    005637          9945#
R4800    005640          9946#
R5STAC   001334          8982#   9016
R7200    005641          9947#
R9600    005642          9948#
SB       007562         10422#  10500*
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                        10112   10190   10198   10284   10293   10559   10666
SETCLR= 000006          10622#  10670
SPECIA   010726         10848#  10927
STACK  = 001100          8848#   8986
START    001336          8965    8986#  10930
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SW00   = 000001          8848#
SW01   = 000002          8848#
SW02   = 000004          8848#
SW03   = 000010          8848#
SW04   = 000020          8848#
SW05   = 000040          8848#
SW06   = 000100          8848#
SW07   = 000200          8848#
SW08   = 000400          8848#
SW09   = 001000          8848#
SW1    = 000002          8848#
SW10   = 002000          8848#
SW11   = 004000          8848#
SW12   = 010000          8848#
SW13   = 020000          8848#
SW14   = 040000          8848#
SW15   = 100000          8848#
SW2    = 000004          8848#
SW3    = 000010          8848#
SW4    = 000020          8848#
SW5    = 000040          8848#
SW6    = 000100          8848#
SW7    = 000200          8848#
SW8    = 000400          8848#
SW9    = 001000          8848#
TBITVE= 000014           8848#
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                        10291*  10452*  10557*
TCSR    001264           8977#   9013*   9091    9099*   9101    9110*   9112    9121*   9124    9152    9160*   9162    9171*
                         9173    9182*   9185    9220    9228*   9230    9239*   9241    9250*   9253    9393*   9426    9477
                         9494    9503    9547*   9563*   9598*   9609*   9653*   9672*   9689*   9701*   9715*   9745*   9771*
                         9785*   9801*   9819*   9830*   9869*   9918*   9995    9998*   10012*  10035*  10092*  10123*  10141*
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TDATA1= 000002           8944#
TDATA2= 000004           8943#
TDATA3= 000010           8942#
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TDATA5= 000040           8940#
TDATA6= 000100           8939#
TDATA7= 000200           8938#
TIME   = 000000          10755#  10772
TIMER   010314           9477    9503    9557    9608    9995    10112   10190   10198   10284   10293   10559   10622#
TIMSAV  010462          10655*  10675   10680*  10693#
TKVEC  = 000060          8848#
TPVEC  = 000064          8848#
TRAN    007564          10383   10436#
TRAPVE= 000034           8848#   8986*
TRTVEC= 000014           8848#
TRUE   = 000001          9145    9374    9458    9542    9593    9644    9738    10081   10161   10343   10547   10651#  10672
                        10675   10687   10863   10872
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TST16   005260          9739    9742    9775    9790    9804    9824    9850#
TST17   005654          9859    9863    9923    9971#
TST2    002420          9078#
TST20   006176          9980    10076#
TST21   006502          10082   10156#
TST22   007024          10162   10219   10242#
TST23   007326          10249   10287   10297   10311   10337#
TST24   007722          10344   10418   10539#
TST25   010170          10545   10548   10584   10595#
TST3    002612          9085    9139#
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TST5    003160          9271#
TST6    003322          9333#
TST7    003362          9365#
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TYPE  = 104401          8987    8995    8996    8997    10596   10598   10600   10603   10904   10906   10909   10911   10913
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TYPOC = 104402          10597   10599   10905   10910   10912   10914   10936   10954#
TYPON = 104404          10954#
TYPOS = 104403          10908   10954#
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WAIT    010572          9757    9762    9814    10015   10047   10116   10679   10755#
WAS     007563          10423#  10501*
WHICHB= 000002          10622#  10663
WRAP  = 020000          8961#   9377    10247
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XMITRD= 000200          8917#   9426    9477    9494    9503    9995    10190   10284
ZZZ     007624          10459   10463#
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                        9862    9882    9883    9894    9898    9919    9979   10018   10020   10048   10081   10120   10124
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                    10547   10565   10569   10570   10578   10581   10663   10670   10687   10842   10843   10862   10869
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         9385    9386    9402    9433    9458    9460    9463    9483    9499    9507    9508    9514    9515    9517    9519
         9542    9544    9565    9577    9593    9595    9614    9626    9644    9646    9649    9661    9664    9666    9667
         9675    9682    9693    9694    9695    9704    9717    9738    9740    9743    9776    9791    9805    9825    9833
         9858    9860    9864    9871    9882    9886    9890    9892    9896    9900    9906    9907    9912    9922    9981
        10023   10027   10028   10051   10081   10083   10128   10131   10132   10161   10163   10185   10193   10201   10220
        10221   10227   10230   10247   10250   10278   10288   10298   10312   10314   10343   10345   10406   10407   10414
        10457   10502   10505   10514   10544   10546   10549   10563   10568   10572   10573   10574   10580   10583   10622
        10661   10665   10667   10673   10681   10689   10697   10710   10735   10738   10742   10755   10773   10774   10775
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         9433    9460    9483    9499    9507    9508    9514    9515    9517    9518    9519    9544    9565    9577    9595
         9614    9626    9646    9649    9664    9666    9667    9675    9693    9694    9695    9704    9717    9740    9743
         9776    9791    9805    9825    9833    9860    9864    9871    9886    9890    9892    9896    9900    9906    9907
         9912    9922    9981   10023   10027   10028   10051   10083   10128   10131   10132   10163   10185   10193   10201
        10220   10221   10227   10230   10250   10278   10288   10298   10312   10314   10345   10407   10414   10457   10502
        10505   10514   10546   10549   10563   10568   10572   10573   10574   10580   10583   10665   10667   10673   10675
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         9791    9805    9825    9833    9860    9864    9871    9886    9890    9892    9896    9900    9906    9907    9912
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          9738    9741    9768    9781    9797    9816    9827    9858    9862    9871    9882    9883    9886    9892    9894
          9896    9898    9900    9919    9979   10018   10020   10023   10048   10081   10120   10124   10128   10161   10185
         10191   10199   10214   10225   10228   10247   10278   10285   10294   10308   10343   10406   10411   10454   10496
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          9738    9741    9768    9781    9797    9816    9827    9858    9862    9871    9882    9883    9886    9892    9894
          9896    9898    9900    9919    9979   10018   10020   10023   10048   10081   10120   10124   10128   10161   10185
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.HEADE      61#   7958#   8845
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.SWRHI     104#   7959#   8846
.SWRLO    8846#
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.$ASTA    5417#
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.$CMTA    1047#   7958#   8971
.$DB2D    4686#
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.$ERRO    2700#   7959#  10942
.$ERRT    2896#
.$MULT    4523#
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.$RAND    4307#
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. ABS.  014412     000

 ERRORS DETECTED:  0

 CNDVCA,CNDVCA/CRF/NL:TOC=CNMAC2.SML,CNMAC.MAC,CNDVCA.P11
 RUN-TIME: 75 78 4 SECONDS
 RUN-TIME RATIO: 235/158=1.4
 CORE USED:  43K  (86 PAGES)
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