AAV11

DIAGNOSTIC TEST

MD-11-DVAAA-A

EP-DVAAA-A-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN U.S.A

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DVAAA-A
PRODUCT NAME: AAV11 DIAGNOSTIC TEST
DATE: OCTOBER 1976
MAINTAINER: DIAGNOSTIC ENGINEERING

TABLE OF CONTENTS

1.0 ABSTRACT

THE AAV11 DIAGNOSTIC PROGRAM IS A SERIES OF TESTS DESIGNED
TO TEST ALL LOGIC FUNCTIONS AND DATA PATHS ACCESSIBLE.
TOTAL PROGRAM CONTROL IS ACCOMPLISHED THRU THE CONSOLE TERMINAL
VIA THE ODT/CONSOLE MICROCODE AND THE PROVISIONS OF SECTION 5.

2.0 REQUIREMENTS

2.1 EQUIPMENT

1. PDP11/03 COMPUTER OR LSI-11 PROCESSOR
2. DLV11 WITH I/O TYPE TERMINAL
3. AAV11 DAC OPTION

2.2 STORAGE

THE PROGRAM USES THE LOWER 4K OF MEMORY.

3.0 LOADING PROCEDURE

1. ASSURE THAT THE LSI-11 IS IN THE ODT MICROCODE STATE.
2. LOAD THE LOW OR HIGH SPEED READER WITH THE ABSOLUTE LOADER TAPE.
3. TYPE THE READER'S CSR ADDRESS (177560-LOW OR 177550-HIGH)
   AND CHARACTER 'L'.
4. AFTER TAPE IS LOADED, LOAD THE AAV11 BINARY TAPE INTO THE
   READER AND TYPE THE CHARACTER 'P'.
5. IF THE ABSOLUTE LOADER HAS ALREADY BEEN LOADED (STEPS 2 & 3),
   THEN ONLY THE STARTING ADDRESS OF THE ABSOLUTE LOADER AND
   THE CHARACTER 'G' NEED BE TYPED (WITH THE AAV11 BINARY TAPE
   IN THE APPROPRIATE READER).

4.0 STARTING PROCEDURE

1. MAKE SURE THE DEVICE BUS ADDRESS AGREE WITH THE
   DEFAULT VALUES DEFINED IN SECTION 7.1. IF NOT, CHANGE
   LOCATION(S) AS DESIRED VIA THE 'ADDRESS/' ODT COMMAND.
2. INSURE THAT THE HALT SWITCH IS DISABLED (IF ANY).
3. TYPE THE STARTING ADDRESS OF 200 AND THE CHARACTER G.
4. THE PROGRAM WILL RESPOND BY TYPING THE PROGRAM TITLE.

4.1 PROGRAM START

200	STARTING ADDRESS OF THE LOGIC TEST (WITH UP TO FOUR AAV1
204	STARTING ADDRESS OF THE RAMP LOOP
210	STARTING ADDRESS OF THE STATIC CALIBRATION
214	STARTING ADDRESS OF THE DYNAMIC CALIBRATION
230	STARTING ADDRESS OF THE LOGIC TEST (WITH UP TO SIXTEEN A
240	STARTING ADDRESS FOR THE OPTION TESTER.

5.0 SOFTWARE SWITCH REGISTER

5.1 OPTIONS

SWITCH	OCTAL	FUNCTION
SW15=1	100000	HALT ON ERROR
SW14=1	040000	LOOP ON TEST
SW13=1	020000	INHIBIT ERROR TYPEOUTS
SW11=1	004000	INHIBIT ITERATIONS
SW10=1	002000	BELL ON ERROR
SW09=1	001000	LOOP ON ERROR
SW08=1	000400	LOOP ON TEST IN SWR (7-0)

5.2 CONTROL

1. THE SOFTWARE SWITCH REGISTER 'SWREG' (LOC. 176) CAN BE CHANGED BY USING THE ODT FACILITIES.
2. THE SOFTWARE SWITCH REGISTER CAN BE CHANGED UNDER PROGRAM CONTROL BY TYPING THE 'CONTROL & G' KEYS. THIS KEYBOARD OPERATION WILL PRINT OUT THE CURRENT CONTENTS AND ACCEPT NEW OCTAL SWITCH REGISTER DATA TERMINATED WITH A CARRIAGE RETURN.
3. ONCE THE ODT MODE HAS BEEN ENTERED BECAUSE OF AN ERROR CONDITION WITH BIT15 SET (HALT ON ERROR), STEP #2 ABOVE IS OF NO VALUE, SO REPORT TO STEP #1 TO ALTER THE SOFTWARE SWITCH REGISTER IF DESIRED BEFORE TYPING 'P' (CONTINUE).
4. IF THE PROGRAM IS PERFORMING RESET INSTRUCTIONS, SEVERAL 'CONTROL & G' COMMANDS MAY BE NECESSARY TO BE ACKNOWLEDGE BY THE PROGRAM.

6.0 ERROR REPORTING

6.1 ERROR COMMENT

ALL ERRORS ARE ACCOMPANIED WITH AN ENGLISH LANGUAGE DESCRIPTIVE COMMENT AS TO THE TYPE OF FAILURE. FURTHER QUALIFICATION OF THE ERROR CAN BE OBTAINED IF NEEDED FROM THE COMMENT AT THE ERROR PC OR FROM THE TEST ITSELF.

6.2 ERROR DATA

#ERRPC	LISTING ADDRESS WHERE THE ERROR WAS DETECTED
#BUSADR	AAV11 BUS REG ADDRESS OF CONCERNED OPERATION
EXPCT	DATA THAT WAS EXPECTED
RCVD	DATA THAT WAS RECEIVED

#ALWAYS REPORTED

7.0 MISCELLANEOUS

7.1 AAV11 BUS ADDRESS MODIFICATION

MODIFY LOCATION 'SBASE' (LOC. 1250) IF BASE BUS ADDRESS IS NOT 170440.

*NOTE: USE THE LSI-11 ODT FACILITIES TO MODIFY THIS LOCATIONS
AFTER PROGRAM LOAD.

7.2 XXDP/APT NOTES

THIS DIAGNOSTIC IS CHAINABLE UNDER XXDP (REQUIRES 8K OR MORE).
THIS DIAGNOSTIC DOES SUPPORT "APT" BUT HAS NOT BEEN RUN UNDER IT.

7.3 POWER FAIL

A POWER FAILURE WILL CAUSE A RESTART MESSAGE ON POWER UP AT
WHICH TIME THE PROGRAM IS RESTARTED (ONLY ON SYSTEMS WITH
NON-VOLATILE MEMORY AND WITH APPROPRIATE HARDWARE).

7.4 MULTIPLE AAV11 INTERFACE TESTING

THIS PROGRAM DOES "AUTO-SIZE" THE NUMBER OF AAV11'S CONNECTED.
THIS DIAGNOSTIC WILL TEST SEQUENTIALLY UP TO 4 AAV11 INTERFACES,
WHEN STARTED AT 200 AND 16. WHEN STARTED AT ADDRESS 230,
WITH CONTIGUOUS BUS ADDRESSES. THE "AUTO-SIZE" CAN BE INHIBITED
BY THE OPERATOR SETTING BIT 15 OF LOCATION "SENV (LOC. 1214) AND
LOADING LOCATION 'SBASE' WITH THE ADDRESS OF THE ONE UNIT TO BE TESTED.

7.5 RESTRICTIONS

NONE

8.0 EXECUTION TIME

EXECUTION TIME RANGES FROM ABOUT 5 SECONDS WITH NO ITERATIONS
TO ABOUT 20 SECONDS WITH ITERATIONS ENABLED WITH ONE AAV11 CONNECTED.
AN END PASS MESSAGE INDICATES ALL TESTS HAVE COMPLETED ON ALL SELECTED UNITS.
END OF PASS WILL ALSO REPORT TOTAL ERROR COUNT AND ANY UNIT'S THAT HAD ERRORED.

9.0 PROGRAM TEST DESCRIPTIONS

9.1 LOGIC TESTS (SA 200)

THIS DIAGNOSTIC CONTAINS A SERIES OF INDEPENDENT TESTS DESIGNED
TO TEST LOGIC FUNCTIONS AND DATA PATHS OF THE AAV11 DAC CONTROL.
A COMPLETE LIST OF TESTS IS AVAILABLE IN THE TABLE OF CONTENTS
AT THE BEGINNING OF THE LISTING. THE COMMENT FIELD WITHIN
EACH TEST CAN BE BENEFICIAL IN TEST UNDERSTANDING.
WHEN STARTED AT LOCATION 200, THE PROGRAM WILL AUTO-SIZE UP TO 4
AAV11'S TO BE TESTED.

9.2 RAMP LOOP (SA 204)

THIS LOOP IS PROVIDED A METHOD FOR THE OPERATOR TO INSPECT AND VERIFY
ANALOG OPERATION OF ALL [illegible] BITS THE LOOP ALSO ENABLES THE OPERATOR TO VERIFY
THAT NO TWO DAC'S ARE INTERCONNECTED.

9.3 STATIC CALIBRATION LOOP (SA 210)

THIS LOOP PROVIDES THE OPERATOR WITH A SIMPLE LOOP FOR VERIFYING
THE INDIVIDUAL DAC BITS AND THE OPERATION OF DAC #3 DIGITAL OUTPUT BITS.
THE VALUE OF THE SWITCH REGISTER IS LOADED INTO ALL DAC'S
AND THE OUTPUT VOLTAGE CAN BE MONITORED.

9.4 DYNAMIC CALIBRATION LOOP (SA 214)

THIS PROVIDES THE OPERATOR WITH A LOOP THAT LOADS THE VALUE OF THE
SWITCH REGISTER INTO THE DAC'S AND THEN AFTER A DELAY CLEARS
THE DAC REGISTERS. THIS PROVIDES A SWITCHING PATTERN BETWEEN THE
SELECTED VOLTAGE AND 0.

9.5 EXTENDED UNITS (SA 230)

SAME FUNCTION AS LOGIC TEST BUT ON 16. AAV11'S

9.6 TESTER SUPPORT (SA 240)

INITIALL PERFORMS THE LOGIC TESTS AND THEN EMPLOYS A KNOWN
GOOD A TO D CONVERTER TO AID IN ADJUSTING THE POT'S ON THE
AAV11 BOARD. THE OPERATOR IS INFORMED AS TO WHICH POT TO ADJUST
AND WHICH D TO A CONVERTER IS TESTED.

10.0 LISTING

```
X
.TITLE  MAINDEC-11-DVAAA-A      AAV11   DIAGNOSTIC
;#COPYRIGHT (C) 1976
;#DIGITAL EQUIPMENT CORP.
;#MAYNARD, MASS. 01754
;#
;#PROGRAM BY RAYMOND SHOOP
;#
```

```
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-D2QAC-C1),MAR 24, 1976.
                                ;*
                                .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                          SWR=    177570          ;;HARDWARE SWITCH REGISTER
177570                          DISPLY= 177570          ;;HARDWARE DISPLAY REGISTER

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

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

                                ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                          SW15=   100000
040000                          SW14=   40000
020000                          SW13=   20000
010000                          SW12=   10000
004000                          SW11=   4000
002000                          SW10=   2000
001000                          SW09=   1000
000400                          SW08=   400
000200                          SW07=   200
```

```
                        .IOT
000100                  SW09=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

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

                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL  STRUCTIONS
000014                  TBITVEC=14              ;;T  BIT
000014                  TRTVEC= 14              ;;TRACE TRAP
000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                  PWRVEC= 24              ;;POWER FAIL
```

```
404             000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
405             000034                  TRAPVEC=34              ;;"TRAP" TRAP
406             000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
407             000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
408             000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
409
410             170440                          ABASE=170440
```

```
                                .SBTTL  OPERATIONAL SWITCH SETTINGS
                                ;#
                                ;#      SWITCH                  USE
                                ;#      ------          --------------------
                                ;#        15            HALT ON ERROR
                                ;#        14            LOOP ON TEST
                                ;#        13            INHIBIT ERROR TYPEOUTS
                                ;#        12            INHIBIT ITERATIONS
                                ;#        10            BELL ON ERROR
                                ;#         9            LOOP ON ERROR
                                ;#         8            LOOP ON TEST IN SWR<7:0>
                                .SBTTL  TRAP CATCHER

                                        .=0
                                ;#ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                ;#SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;#LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                                        .=174
000174  000000                  DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000                  SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  001450                  JMP     @#BEGIN ;;JUMP TO STARTING ADDRESS OF PROGRAM
  .+204 000137  006570                  JMP     FULRMP                  ;JUMP TO FULL RGMP LOOP
  .+210 000137  006656                  JMP     STATIC                  ;JUMP TO STATIC DAC CALIBRATION
  .+214 000137  006716                  JMP     DYNCAL                  ;JUMP TO DYNAMIC DAC CALIBRATION

000230  000137  001440                  .=230
                                        JMP     @#DDOK                  ;JUMP AND ENABLE EXTENDED UNITS (16.)

000240  000137  001432                  .=240
                                        JMP     @#TESTER                ;JUMP TO TESTER SA.

000100  000104  000200  000002          .=100
                                        104,200,2               ;B EVENT SAFE GUARD
```

```
                                .SBTTL  ACT11 HOOKS

                                ;;*****************************************************************
                                ;HOOKS REQUIRED BY ACT11
000106                                  $SVPC=.                 ;SAVE PC
000046                                  .=46
000046  005542                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
000052                                  .=52
000052  000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
000106                                  .=$SVPC                 ;; RESTORE PC
001000                                  .=1000
                                .SBTTL  APT PARAMETER BLOCK

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

                                $APTHD:
001000                          $HIBTS: .WORD   0               ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001000  000000                  $MBADR: .WORD   $MAIL           ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001002  001174                  $TSTM:  .WORD   30              ;;RUN TIM OF LONGEST TEST
001004  000030                  $PASTM: .WORD   10              ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001006  000010                  $UNITM: .WORD   30              ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001010  000030                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
001012  000031
```

```
                                .SBTTL  COMMON TAGS

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

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102  000                     $TSTNM: .BYTE   0       ;;CONTAINS THE TEST NUMBER
001103  000                     $ERFLG: .BYTE   0       ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0       ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0       ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0       ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0       ;;CONTAINS TOTAL ERRORS DETECTED
001114  000                     $ITEMB: .BYTE   0       ;;CONTAINS ITEM CONTROL BYTE
001115  001                     $ERMAX: .BYTE   1       ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0       ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $ DADR: .WORD   0       ;;CONTAINS ADDRESS OF 'G  D' DATA
001122  000000                  $  ADR: .WORD   0       ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0       ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0       ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0       ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000                     $AUTOB: .BYTE   0       ;;AUTOMATIC MODE INDICATOR
001135  000                     $INTAG: .BYTE   0       ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  $SWR:   .WORD   DSWR    ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP   ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560          ;;TTY KBD STATUS
001146  177562                  $TKB:   177562          ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564          ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566          ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000                     $NULL:  .BYTE   0       ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002                     $FILLS: .BYTE   2       ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012                     $FILLC: .BYTE   12      ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000                     $TPFLG: .BYTE   0       ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $TIMES: 0               ;;MAX. NUMBER OF ITERATIONS
001162  000000                  $ESCAPE:0               ;;ESCAPE ON ERROR ADDRESS
001164  177707  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001170  077                     $QUES:  .ASCII  /?/     ;;QUESTION MARK
001171  015                     $CRLF:  .ASCII  <15>    ;;CARRIAGE RETURN
001172  000012                  $LF:    .ASCIZ  <12>    ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                .EVEN
001174                          $MAIL:                  ;;APT MAILBOX
001174  000000                  AMSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
001176  000000                  AFATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
001200  000000                  ATESTN: .WORD   ATESTN  ;;TEST NUMBER
001202  000000                  APASS:  .WORD   APASS   ;;PASS COUNT
001204  000000                  ADEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
```

```
                                001206  000000          $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
                                001210  000000          $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
                                001212  000000          $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
                                001214                  $ETABLE:                ;;APT ENVIRONMENT TABLE
                                001214     000          $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
                                001215     000          $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
                                001216  000000          $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
                                001220  000000          $USWR:  .WORD   AUSWR   ;;USER SWITCHES
                                001222  000000          $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
                                                        ;*                      BITS 15-11=CPU TYPE
                                                        ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                                        ;*                              11/70=06,PDQ=07,Q=10
                                                        ;*                      BIT 10=REAL TIME CLOCK
                                                        ;*                      BIT  9=FLOATING POINT PROCESSOR
                                                        ;*                      BIT  8=MEMORY MANAGEMENT
                                001224     000          $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
                                001225     000          $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
                                                        ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
                                                        ;*                              900 NSEC CORE=001
                                                        ;*                              300 NSEC BIPOLAR=002
                                                        ;*                              500 NSEC MOS=003
                                001226  000000          $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
                                                        ;*                       MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
                                001230     000          $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
                                001231     000          $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
                                001232  000000          $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
                                001234     000          $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
                                001235     000          $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
                                001236  000000          $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
                                001240     000          $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
                                001241     000          $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
                                001242  000000          $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
                                001244  000000          $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
                                001246  000000          $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
                                001250  170440          $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
                                001252  000000          $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
                                001254  000000          $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
                                001256                  $ETEND:
                                                        .MEXIT
```

```
                                .SBTTL  ERROR POINTER TABLE

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

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


001256                          $ERRTB:


                                ;ITEM   1
001256  007122                          EM1                     ;BUT TIME-OUT WHEN REF. A DAC ADDRESS
001260  010322                          DH2                     ;ERRPC  BUSADR
001262  011112                          DT1                     ;$ERRPC $GOODAT
001264  011204                          DF0

                                ;ITEM   2
001266  007176                          EM2                     ;DAC #0 REGISTER IN ERROR
001270  010267                          DH1                     ;ERRPC  BUSADR  GOOD    BAD
001272  011120                          DT2                     ;$ERRPC DAC0    $GOODAT $BODAT
001274  011204                          DF0

                                ;ITEM   3
001276  007225                          EM3                     ;DAC #1 REGISTER IN ERROR
001300  010267                          DH1                     ;ERRPC  BUSADR  GOOD    BAD
001302  011132                          DT3                     ;$ERRPC DAC1    $GOODAT $BODAT
001304  011204                          DF0

                                ;ITEM   4
001306  007254                          EM4                     ;DAC #2 REGISTER IN ERROR
001310  010267                          DH1                     ;ERRPC  BUSADR  GOOD    BAD
001312  011144                          DT4                     ;$ERRPC DAC2    $GOODAT $BODAT
001314  011204                          DF0

                                ;ITEM   5
001316  007303                          EM5                     ;DAC #3 REGISTER IN ERROR
001320  010267                          DH1                     ;ERRPC  BUSADR  GOOD    BAD
001322  011156                          DT5                     ;$ERRPC DAC3    $GOODAT $BODAT
001324  011204                          DF0

                                ;ITEM   6
001326  007332                          EM6                     ;SELECTED DAC OFFSET POT IS NOT ADJUSTED CORRECTLY
001330  010337                          DH6                     ;ERRPC  BUSADR  EXPECT  MASK    SPREAD
001332  011170                          DT6                     ;$ERRPC DACBAD  $GOODAT $BODAT  SPREAD
001334  011204                          DF0
```

```
                                        ;ITEM   7
001336  007413                          EM7             ;SELECTED DAC GAIN POT IS NOT ADJUSTED CORRECTLY
001340  010337                          DH6             ;ERRPC  BUSADR  EXPECT  WAS     SPREAD
001342  011170                          DT6             ;$ERRPC DACBAD  $GOODAT  $BODAT  SPREAD
001344  011204                          DF0

                                        ;ITEM   10
001346  007472                          EM10            ;SELECTED DAC HAS A LINEARITY PROBLEM
001350  010337                          DH6             ;ERRPC  BUSADR  EXPECT  WAS     SPREAD
001352  011170                          DT6             ;$ERRPC DACBAD  $GOODAT  $BODAT  SPREAD
001354  011204                          DF0

                                        ;ITEM   11
001356  007537                          EM11            ;+15 VOLT SUPPLY IS INCORRECT
001360  010337                          DH6             ;ERRPC  BUSADR  EXPECT  WAS     SPREAD
001362  011170                          DT6             ;$ERRPC DACBAD  $GOODAT  $BODAT  SPREAD
001364  011204                          DF0

                                        ;ITEM   12
001366  007574                          EM12            ;-15 VOLT SUPPLY IS INCORRECT
001370  010337                          DH6             ;ERRPC  BUSADR  EXPECT  WAS     SPREAD
001372  011170                          DT6             ;$ERRPC DACBAD  $GOODAT  $BODAT  SPREAD
001374  011204                          DF0

                                        ;ITEM   13
001376  007631                          EM13            ;DAC #3 DIGITAL OUTPUT BITS IN ERROR
001400  010267                          DH1             ;ERRPC  BUSADR  GOOD    BAD
001402  011156                          DT5             ;$ERRPC DAC3    $GOODAT $BODAT
001404  011204                          DF0

                                        ;ITEM   14
001406  007675                          EM14            ;WAKE UP OPERATOR AND ADJUST THE POT
001410  000000                          0
001412  000000                          0
001414  000000                          0

001416  000010                  VADDR:  10              ;OFFSET TO NEXT AAV11 ADDRESS
001420  000000                  EVER:   0
001422  170440                  DAC0:   BASE
001424  170442                  DAC1:   BASE+2
001426  170444                  DAC2:   BASE+4
001430  170446                  DAC3:   BASE+6
```

```
   667  001432  005237  007020          TESTER: INC     WFTST           ;INDICATE TESTER MODE
   668  001436  000411                  BR      BEGIN1
   669  001440  012737  000021  007006  ADOOK:  MOV     #17.,NUMBOK     ;LOAD 16 MAX UNITS
   670  001446  000403                  BR      BEGINA
   671  001450  012737  000005  007006  BEGIN:  MOV     #5.,NUMBOK      ;LOAD 4 MAX UNITS
   672  001456  005037  007020          BEGINA: CLR     WFTST
   673  001462  005037  007012          BEGIN1: CLR     TEMP
   674  001466  005037  001420                  CLR     EVER
   675  001472  000005                          RESET
   676                          .SBTTL  INITIALIZE THE COMMON TAGS
   677                          ;;CLEAR THE COMMON TAGS (SCMTAG) AREA
   678  001474  012706  001100          MOV     #SCMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
   679  001500  005026                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
   680  001502  020627  001140          CMP     #SWR,R6 ;;DONE?
   681  001506  001374                  BNE     .-6             ;;LOOP BACK IF NO
   682  001510  012706  001100          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
   683                          ;;INITIALIZE A FEW VECTORS
   684  001514  012737  011524  000020  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
   685  001522  012737  000340  000022  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
   686  001530  012737  012006  000030  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
   687  001536  012737  000340  000032  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
   688  001544  012737  014412  000034  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
   689  001552  012737  000340  000036  MOV     #340,@#TRAPVEC+2;LEVEL 7
   690  001560  012737  012336  000024  MOV     #$PWRON,@#PWRVEC ;;POWER FAILURE VECTOR
   691  001566  012737  000340  000026  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
   692  001574  005037  001160          CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
   693  001600  005037  001162          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
   694  001604  112737  000001  001115  MOVB    #1,$LMAX        ;;ALLOW ONE ERROR PER TEST
   695  001612  012737  001612  001106  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
   696  001620  012737  001620  001110  MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
   697                          ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
   698                          ;;EQUAL TO A "-1" SETUP FOR A SOFTWARE SWITCH REGISTER.
   699  001626  013746  000004          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
   700  001632  012737  001666  000004  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
   701  001640  012737  177570  001140  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
   702  001646  012737  177570  001142  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
   703  001654  022777  177777  177256  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
   704  001662  001012                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
   705                                                          ;;AND  THE HARDWARE SWR IS NOT = -1
   706  001664  000403                  BR      65$             ;;BRANCH IF NO TIMEOUT
   707  001666  012716  001674  64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
   708  001672  000002                  RTI
   709  001674  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
   710  001702  012737  000174  001142          MOV     #DISPREG,DISPLAY
   711  001710  012637  000004  66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
   712
   713  001714  005037  001202          CLR     $PASS           ;;CLEAR PASS COUNT
   714  001720  132737  000200  001215  BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
   715  001726  001403                  BEQ     67$             ;;YES,USE NON-APT SWITCH
   716  001730  012737  001216  001140  MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
   717  001736                  67$:
   718  001736  005037  007004          CLR     BADCNT          ;RESET BAD INDICATOR
   719  001742  000137  002044          JMP     INIT1
```

```
                                        ;SUBROUTINE TO LOAD A TRAP CATCHER
                                        
001746  012702  000252          LDTRAP: MOV     #252,R2                 ;LOAD R2
001752  012701  000250                  MOV     #250,R1                 ;LOAD R1
001756  010221                  5$:     MOV     R2,(R1)+                ;LOAD .+2
001760  005021                          CLR     (R1)+                   ;LOAD HALT
001762  010102                          MOV     R1,R2                   ;LOAD R2
001764  005722                          TST     (R2)+                   ;BUMP R2
001766  020227  001002                  CMP     R2,#1002                ;TEST FOR LAST
001772  001371                          BNE     5$                      ;BR UNTIL DONE
                                        
                                        ;AND LOAD DEVICE ADDRESSES LOCA IONS
                                        
001774  012700  001400                  MOV     #BASE,R0                ;GET BASE ADDRESS
002000  010067  001414                  MOV     R0,DAC0         ;LOAD X ADDRESS
002004  010067  001416                  MOV     R0,DAC1         ;LOAD Y ADDRESS
002010  010067  001420                  MOV     R0,DAC2                 ;LOAD DAC #2
002014  010067  001422                  MOV     R0,DAC3                 ;LOAD DAC #3
002020  062767  000002  001424          ADD     #2,DAC1
002026  062767  000004  001426          ADD     #4,DAC2
002034  062767  000006  001430          ADD     #6,DAC3
002042  000207                          RTS     PC                       EXIT

002044  004737  001746          INIT1:  JSR     PC,LDTRAP
002050  005737  007012                  TST     TEMP            ;TEST IF START OR RESTART
002054  001012                          BNE     MTEST           ;RESTART
002056  005737  000042                  TST     @#42            ;TEST IF MONITOR
002062  001007                          BNE     MTEST           ;BR IF NOT
002064  005737  007020                  TST     HFTST           ;TEST IF ON TESTER
002070  001402                          BEQ     1$              ;BR IF NOT
002072  104401                          TYPE
002074  010011                          MSGSW                   ;TELL OPERATOR ABOUT TESTER SWITCHES
002076  104401                  1$:     TYPE                    ;CALL MESSAGE PRINTER VIA 'EMT'
002100  007040                          TITLE                   ;TYPE PROGRAM HEADER.
```

```
                                        .SBTTL  DETERMINE THE NUMBER OF AAV11 ON THIS SYSTEM
                                
002100  013737  001250  001126  MTEST:  MOV     $BASE,$BDDAT    ;GET THE BASE ADDRESS
002110  005037  007010                  CLR     MASKNM
002114  005037  001206                  CLR     $UNIT           ;CLEAR UNIT #
002120  012737  002164  000004          MOV     #2$,ERRVEC      ;LOAD TRAP RETURN
002126  005777  176774          1$:     TST     @$BDDAT         ;TEST IF ADDR EXISTS
002132  063737  001416  001126          ADD     VADDR,$BDDAT    ;UPDATE THE BUS ADDRESS
002140  005237  001206                  INC     $UNIT           ;UPDATE UNIT COUNT
002144  005737  001214                  TST     $ENV            ;TEST IF "DO NOT SIZE"
002150  100413                          BMI     3$              ;BR IF NO SIZEING
002152  023737  007006  001206          CMP     NUMBOK,$UNIT    ;TEST IF MAX. NUMBER
002160  001402                          BNE     1$              ;BR IF NOT
002162  000406                          BR      3$              ;;BR IF MAX.
002164  022626          2$:     CMP     (SP)+,(SP)+     ;CLEAN THE STACK
002166  005737  001206                  TST     $UNIT           ;TEST IF ANY EXIST
002172  001002                          BNE     3$              ;BR IF SOME ARE THERE
002174  104001                          ERROR   1               ;BASE ADDRESS CAUSED AN BUS TRAP
002176  000443                          BR      TST1            ;;IS $BASE CORRECT??
002200  005737  001420          3$:     TST     EVER            ;TEST IF # HAS BEEN REPORTED
002204  100422                          BMI     4$              ;BR IF IT HAS
002206  005737  007020                  TST     WFTST           ;TEST IF TESTER MODE
002212  001010                          BNE     6$              ;BR IF TESTER
002214  104401                          TYPE
002216  010224                          FOUND1                  ;TELL OPERATOR THE # OF AAV11'S
002220  013746  001206                  MOV     $UNIT,-(SP)
002224  104403                          TYPOS
002226      002                         .BYTE   2
002227      000                         .BYTE   0
002230  104401                          TYPE
002232  010250                          FOUND2
002234  013737  001206  001420  6$:     MOV     $UNIT,EVER      ;SAVE THE # OF AAV11'S FOR LATER
002242  052737  100000  001420          BIS     #BIT15,EVER     ;SET "REPORTED # FLAG"
002250  000405                          BR      5$              ;;
002252  123737  001420  001206  4$:     CMPB    EVER,$UNIT      ;TEST IF ANY HAVE GONE AWAY
002260  001401                          BEQ     5$              ;;BR IF ALL ARE STILL HERE
002262  104013                          ERROR   13              ;EXISTING UNIT FAILED TO RESPOND NOW
002264  005037  001206          5$:     CLR     $UNIT           ;RESET UNIT POINTER
002270  005037  001204                  CLR     $DEVCT          ;MAKE APT HAPPY
002274  004737  001746                  JSR     PC,LDTRAP       ;LOAD TRAP CATCHER AND BUS ADDRESSES
002300  012737  000001  007010          MOV     #BIT0,MASKNM    ;LOAD MASK NUMBER IF ERROR
```

```
                                ;;*****************************************************************
                                ;*TEST 1         TEST THAT THE AAV11 RESPONDS TO THE CPU
                                ;;*****************************************************************
002306  000004                  TST1:   SCOPE
002310  012737  002340  000004          MOV     #1$,ERRVEC      ;LOAD BUS TRAP RETURN
002316  005777  177100                  TST     @DACO           ;TEST DAC #0
002322  005777  177076                  TST     @DAC1           ;TEST DAC #1
002326  005777  177074                  TST     @DAC2           ;TEST DAC #2
002332  005777  177072                  TST     @DAC3           ;TEST DAC #3
002336  000407                          BR      2$              ;;GO AND RESTORE LOC. 4
002340  022626                  1$:     CMP     (SP)+,(SP)+     ;CLEAN THE STACK
002342  104001                          ERROR   1               ;ERROR, BUS TIMEOUT WHEN ADDRESSING THE AAV11
002344  012737  000006  000004          MOV     #6,ERRVEC       ;LOAD LOC 4
002352  000137  004530                  JMP     REMAIN          ;TEST IF ANY OTHER'S
002356  012737  000006  000004  2$:     MOV     #6,ERRVEC       ;LOAD RETURN
                                ;;*****************************************************************
                                ;*TEST 2         TEST THAT DACO REGISTER CAN BE CLEARED
                                ;;*****************************************************************
002364  000004                  TST2:   SCOPE
002366  005037  001124                  CLR     $GDDAT                  ;LOAD EXPECTED
002372  013777  001124  177022          MOV     $GDDAT,@DACO            ;LOAD REG
002400  017737  177016  001126          MOV     @DACO,$BDDAT            ;READ REG
002406  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
002414  001401                          BEQ     TST3            ;;BR IF EQUAL
002416  104002                          ERROR   2                       ;ERROR, DACO REGISTER NOT = 0

                                ;;*****************************************************************
                                ;*TEST 3         TEST THAT DACO REGISTER CAN BE LOADED WITH #7777
                                ;;*****************************************************************
002420  000004                  TST3:   SCOPE
002422  012737  007777  001124          MOV     #7777,$GDDAT            ;LOAD EXPECTED
002430  013777  001124  176764          MOV     $GDDAT,@DACO            ;LOAD REG
002436  017737  176760  001126          MOV     @DACO,$BDDAT            ;READ REG
002444  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
002452  001401                          BEQ     TST4            ;;BR IF EQUAL
002454  104002                          ERROR   2                       ;ERROR, DACO REGISTER NOT = 7777

                                ;;*****************************************************************
                                ;*TEST 4         TEST THAT DACO REGISTER CAN HOLD A FLOATING 1 PATTERN
                                ;;*****************************************************************
002456  000004                  TST4:   SCOPE
002460  012737  000100  001160          MOV     #100,$TIMES     ;;DO 100 ITERATIONS
002466  012737  004000  001124          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
002474  013777  001124  176720  1$:     MOV     $GDDAT,@DACO            ;LOAD DACO REGISTER
002502  017737  176714  001126          MOV     @DACO,$BDDAT            ;READ THE REGISTER
002510  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE THE DATA
002516  001401                          BEQ     2$              ;;BR IF SAME
002520  104002                          ERROR   2                       ;ERROR, DACO REGISTER FAILED TO HOLD A FLOATING
002522  006237  001124          2$:     ASR     $GDDAT                  ;CHANGE THE DATA
002526  001362                          BNE     1$                      ;BR AND TEST MORE DATA
```

```
                                        ;;*****************************************************************
                                        ;*TEST 5         TEST THAT DACO CAN HOLD A FLOATING 1 PATTERN (DYNAMICLY)
                                        ;;*****************************************************************
002530  000004                  TST5:   SCOPE
002532  012737  000100  001160          MOV     #100,$TIMES     ;;DO 100 ITERATIONS
002540  012737  004000  001124          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
002546  013777  001124  176646          MOV     $GDDAT,@DACO            ;LOAD DACO
002554  017737  176642  001126  1$:     MOV     @DACO,$BDDAT            ;READ THE REGISTER
002562  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE THE GOOD TO DACO
002570  001407                          BEQ     2$              ;;BR IF THE SAME
002572  017737  176624  001126          MOV     @DACO,$BDDAT            ;SAVE FOR TYPEOUT
002600  104002                          ERROR   2               ;DACO FAILED TO HOLD A FLOATING 1 PATTERN
002602  013777  001124  176612          MOV     $GDDAT,@DACO            ;LOAD DACO AGAIN
002610  005277  176606          2$:     ASR     @DACO           ;CHANGE THE DATA
002614  006237  001124                  ASR     $GDDAT          ;CHANGE THE EXPECTED
002620  001355                          BNE     1$              ;BR IF MORE DATA
                                        ;;*****************************************************************
                                        ;*TEST 6         TEST THE "SUB" INSTRUCTION WORKS ON DACO
                                        ;;*****************************************************************
002622  000004                  TST6:   SCOPE
002624  012737  000010  001160          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
002632  012737  007777  001124          MOV     #7777,$GDDAT            ;LOAD EXPECTED
002640  013777  001124  176554          MOV     $GDDAT,@DACO            ;LOAD DACO
002646  162737  000001  001124  1$:     SUB     #1,$GDDAT               ;SUB A VALUE
002654  162777  000001  176540          SUB     #1,@DACO                ;FROM EXPECTED AND DACO
002662  017737  176534  001126          MOV     @DACO,$BDDAT            ;READ THE REGISTER
002670  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
002676  001404                          BEQ     2$              ;;BR IF SAME
002700  104002                          ERROR   2               ;THE SUB INSTRUCTION FAILED ON DACO
002702  013777  001124  176512          MOV     $GDDAT,@DACO            ;LOAD THE REGISTER AGAIN
002710  005737  001124          2$:     TST     $GDDAT                  ;TEST FOR MORE DATA
002714  001354                          BNE     1$              ;;BR IF MORE DATA
                                        ;;*****************************************************************
                                        ;*TEST 7         TEST THAT DAC1 REGISTER CAN BE CLEARED
                                        ;;*****************************************************************
002716  000004                  TST7:   SCOPE
002720  005037  001124                  CLR     $GDDAT                  ;LOAD EXPECTED
002724  013777  001124  176472          MOV     $GDDAT,@DAC1            ;LOAD DAC1
002732  017737  176466  001126          MOV     @DAC1,$BDDAT            ;READ REG
002740  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
002746  001401                          BEQ     TST10           ;;BR IF EQUAL
002750  104003                          ERROR   3               ;ERROR, DAC1 REGISTER NOT = 0
                                        ;;*****************************************************************
                                        ;*TEST 10        TEST THAT DAC #1 REGISTER CAN BE LOADED WITH #7777
                                        ;;*****************************************************************
002752  000004                  TST10:  SCOPE
002754  012737  007777  001124          MOV     #7777,$GDDAT            ;LOAD EXPECTED
002762  013777  001124  176434          MOV     $GDDAT,@DAC1            ;LOAD DAC1
002770  017737  176430  001126          MOV     @DAC1,$BDDAT            ;READ REG
002776  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
003004  001401                          BEQ     TST11           ;;BR IF EQUAL
003006  104003                          ERROR   3               ;ERROR, DAC1 REGISTER NOT = 7777
```

```
                                ;;*****************************************************************
                                ;*TEST 11       TEST THAT DAC #1 REGISTER CAN HOLD A FLOATING 1 PATTERN
                                ;;*****************************************************************
000000                  TST11:  SCOPE
001160                          MOV     #100,STIMES     ;;DO 100 ITERATIONS
001124                          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
176370          1$:             MOV     $GDDAT,@DAC1            ;LOAD THE REGISTER
001126                          MOV     @DAC1,$BDDAT            ;READ THE REGISTER
001126                          CMP     $GDDAT,$BDDAT           ;COMPARE THE DATA
                                BEQ     2$              ;;BR IF DATA IS SAME
                                ERROR   3                       ;ERROR, DAC #1 REGISTER FAILED TO HOLD A FLOATIN
001124                  2$:     ASR     $GDDAT                  ;CHANGE THE DATA
                                BNE     1$                      ;BR AND TEST MORE DATA
                                ;;*****************************************************************
                                ;*TEST 12       TEST THAT DAC1 CAN HOLD A FLOATING 1 PATTERN (DYNAMICLY)
                                ;;*****************************************************************
000000                  TST12:  SCOPE
001160                          MOV     #100,STIMES     ;;DO 100 ITERATIONS
001124                          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
176316                          MOV     $GDDAT,@DAC1            ;LOAD DAC1
176312          1$:             MOV     @DAC1,$BDDAT            ;READ THE REGISTER
001126                          CMP     $GDDAT,$BDDAT           ;COMPARE THE GOOD TO DAC1
001407                          BEQ     2$              ;;BR IF THE SAME
176274                          MOV     @DAC1,$BDDAT            ;SAVE FOR TYPEOUT
                                ERROR   3                       ;DAC1 FAILED TO HOLD A FLOATING 1 PATTERN
176262                          MOV     $GDDAT,@DAC1            ;LOAD DAC1 AGAIN
                        2$:     ASR     @DAC1                   ;CHANGE THE DATA
001124                          ASR     $GDDAT                  ;CHANGE THE EXPECTED
                                BNE     1$                      ;BR IF MORE DATA
                                ;;*****************************************************************
                                ;*TEST 13       TEST THE "SUB" INSTRUCTION WORKS ON DAC1
                                ;;*****************************************************************
000000                  TST13:  SCOPE
001160                          MOV     #10,STIMES      ;;DO 10 ITERATIONS
001124                          MOV     #7777,$GDDAT            ;LOAD EXPECTED
176224                          MOV     $GDDAT,@DAC1            ;LOAD DAC1
001124          1$:             SUB     #1,$GDDAT               ;SUB A VALUE
176210                          SUB     #1,@DAC1                ;FROM EXPECTED AND DAC1
176204                          MOV     @DAC1,$BDDAT            ;READ THE REGISTER
001126                          CMP     $GDDAT,$BDDAT           ;COMPARE
001404                          BEQ     2$              ;;BR IF SAME
                                ERROR   3                       ;THE SUB INSTRUCTION FAILED ON DAC1
176162                          MOV     $GDDAT,@DAC1            ;LOAD THE REGISTER AGAIN
001124                  2$:     TST     $GDDAT                  ;TEST FOR MORE DATA
001354                          BNE     1$              ;;BR IF MORE DATA
```

```
                                ;;*****************************************************************
                                ;*TEST 14        TEST THAT THE DAC #2 REGISTER CAN BE CLEARED
                                ;*****************************************************************
003250  000004                  TST14:  SCOPE
003252  005037  001124                  CLR     $GDDAT                  ;LOAD EXPECTED
003256  013777  001124  176142          MOV     $GDDAT,@DAC2            ;LOAD REG
003264  017737  176136  001126          MOV     @DAC2,$BDDAT            ;READ REG
003272  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
003300  001401                          BEQ     TST15           ;;BR IF EQUAL
003302  104004                          ERROR   4                       ;ERROR,  DAC #2 REGISTER NOT = 0

                                ;;*****************************************************************
                                ;*TEST 15        TEST THAT THE DAC #2 REGISTER CAN BE LOADED WITH #7777
                                ;*****************************************************************
003304  000004                  TST15:  SCOPE
003306  012737  007777  001124          MOV     #7777,$GDDAT            ;LOAD EXPECTED
003314  013777  001124  176104          MOV     $GDDAT,@DAC2            ;LOAD REG
003322  017737  176100  001126          MOV     @DAC2,$BDDAT            ;READ REG
003330  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
003336  001401                          BEQ     TST16           ;;BR IF EQUAL
003340  104004                          ERROR   4                       ;ERROR,  DAC #2 REGISTER NOT = 7777

                                ;;*****************************************************************
                                ;*TEST 16        TEST THAT THE DAC #2 REGISTER CAN HOLD A FLOATING 1 PATTERN
                                ;*****************************************************************
003342  000004                  TST16:  SCOPE
003344  012737  000100  001160          MOV     #100,$TIMES     ;;DO 100 ITERATIONS
003352  012737  004000  001124          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
003360  013777  001124  176040  1$:     MOV     $GDDAT,@DAC2            ;LOAD DAC2 REGISTER
003366  017737  176034  001126          MOV     @DAC2,$BDDAT            ;READ THE REGISTER
003374  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE THE DATA
003402  001401                          BEQ     2$              ;;BR IF SAME
003404  104004                          ERROR   4                       ;ERROR, DAC #2 REGISTER FAILED TO HOLD A FLOATIN
003406  006237  001124          2$:     ASR     $GDDAT                  ;CHANGE THE DATA
003412  001362                          BNE     1$                      ;BR AND TEST MORE DATA

                                ;;*****************************************************************
                                ;*TEST 17        TEST THAT DAC2 CAN HOLD A FLOATING 1 PATTERN (DYNAMICLY)
                                ;*****************************************************************
003414  000004                  TST17:  SCOPE
003416  012737  000100  001160          MOV     #100,$TIMES     ;;DO 100 ITERATIONS
003424  012737  004000  001124          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
003432  013777  001124  175766          MOV     $GDDAT,@DAC2            ;LOAD DAC2
003440  017737  175762  001126  1$:     MOV     @DAC2,$GDDAT            ;READ THE REGISTER
003446  023737  001124  001126          CMP     $GDDAT,$GDDAT           ;COMPARE THE GOOD TO DAC2
003454  001407                          BEQ     2$              ;;BR IF THE SAME
003456  017737  175744  001126          MOV     @DAC2,$BDDAT            ;SAVE FOR TYPEOUT
003464  104004                          ERROR   4                       ;DAC2 FAILED TO HOLD A FLOATING 1 PATTERN
003466  013777  001124  175732          MOV     $GDDAT,@DAC2            ;LOAD DAC2 AGAIN
003474  006277  175726          2$:     ASR     @DAC2                   ;CHANGE THE DATA
003500  006237  001124                  ASR     $GDDAT                  ;CHANGE THE EXPECTED
003504  001355                          BNE     1$                      ;BR IF MORE DATA
```

```
                                ;;*****************************************************************
                                ;*TEST 20        TEST THE "SUB" INSTRUCTION WORKS ON DAC2
                                ;;*****************************************************************
003506  000004                  TST20:  SCOPE
003510  012737  000010  001160          MOV     #10.$TIMES      ;;DO 10 ITERATIONS
003516  012737  007777  001124          MOV     #7777,$GDDAT            ;LOAD EXPECTED
003524  013777  001124  175674          MOV     $GDDAT,@DAC2            ;LOAD DAC2
003532  162737  000001  001124  1$:     SUB     #1,$GDDAT               ;SUB A VALUE
003540  162777  000001  175660          SUB     #1,@DAC2                ;FROM EXPECTED AND DAC2
003546  017737  175654  001126          MOV     @DAC2,$ GDAT            ;READ THE REGISTER
003554  023737  001124  001126          CMP     $GDDAT,$.DDATI          ;COMPARE
003562  001404                          BEQ     2$              ;;BR IF SAME
003564  104004                          ERROR   4                       ;THE SUB INSTRUCTION FAILED ON DAC2
003566  013777  001124  175632          MOV     $GDDAT,@DAC2            ;LOAD THE REGISTER AGAIN
003574  005737  001124          2$:     TST     $GDDAT                  ;TEST FOR MORE DATA
003600  001354                          BNE     1$              ;;BR IF MORE DATA
                                ;;*****************************************************************
                                ;*TEST 21        TEST THAT THE DAC #3 REGISTER CAN BE CLEARED
                                ;;*****************************************************************
003602  000004                  TST21:  SCOPE
003604  005037  001124                  CLR     $GDDAT                  ;LOAD EXPECTED
003610  013777  001124  175617          MOV     $GDDAT,@DAC3            ;LOAD REG
003616  017737  175606  001126          MOV     @DAC3,$ DDAT            ;READ REG
003624  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
003632  001401                          BEQ     TST22           ;;BR IF EQUAL
003634  104005                          ERROR   5                       ;ERROR,  DAC #3 REGISTER NOT = 0
                                ;;*****************************************************************
                                ;*TEST 22        TEST THAT THE DAC #3 REGISTER CAN BE LOADED WITH #7777
                                ;;*****************************************************************
003636  000004                  TST22:  SCOPE
003640  012737  007777  001124          MOV     #7777,$GDDAT            ;LOAD EXPECTED
003646  013777  001124  175554          MOV     $GDDAT,@DAC3            ;LOAD REG
003654  017737  175550  001126          MOV     @DAC3,$BDDAT            ;READ REG
003662  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
003670  001401                          BEQ     TST23           ;;BR IF EQUAL
003672  104005                          ERROR   5                       ;ERROR,  DAC #3 REGISTER NOT = 7777
                                ;;*****************************************************************
                                ;*TEST 23        TEST THAT THE DAC #3 REGISTER CAN HOLD A FLOATING 1 PATTERN
                                ;;*****************************************************************
003674  000004                  TST23:  SCOPE
003676  012737  000100  001160          MOV     #100.$TIMES     ;;DO 100 ITERATIONS
003704  012737  004000  001124          MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
003712  013777  001124  175510  1$:     MOV     $GDDAT,@DAC3            ;LOAD DAC #3 REGISTER
003720  017737  175504  001126          MOV     @DAC3,$BDDAT            ;READ THE REGISTER
003726  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE THE DATA
003734  001401                          BEQ     2$              ;;BR IF SAME
003736  104005                          ERROR   5                       ;ERROR, DAC #3 REGISTER FAILED TO HOLD A FLOATIN
003740  006237  001124          2$:     ASR     $GDDAT                  ;CHANGE THE DATA
003744  001362                          BNE     1$                      ;BR AND TEST MORE DATA
```

```
1047                                    ;;*****************************************************************
1048                                    ;*TEST 24       TEST THAT DAC3 CAN HOLD A FLOATING 1 PATTERN (DYNAMICLY)
1049                                    ;;*****************************************************************
1050  003746  000004                    TST24:  SCOPE
1051  003750  012737  0 0100  001160            MOV     #100.$TIMES     ;;DO 100 ITERATIONS
1052  003756  012737  004000  001124            MOV     #BIT11,$GDDAT           ;LOAD EXPECTED
1053  003764  013777  001124  175436            MOV     $GDDAT,@DAC3            ;LOAD DAC3
1054  003772  017737  175432  001126    1$:     MOV     @DAC3,$BDDAT            ;READ THE REGISTER
1055  004000  023737  001124  001126            CMP     $GDDAT,$BDDAT           ;COMPARE THE GOOD TO DAC3
1056  004006  001407                            BEQ     2$              ;;BR IF THE SAME
1057  004010  017737  175414  001126            MOV     @DAC3,$BDDAT            ;SAVE FOR TYPEOUT
1058  004016  104005                            ERROR   5               ;DAC3 FAILED TO HOLD A FLOATING 1 PATTERN
1059  004020  013777  001124  175402            MOV     $GDDAT,@DAC3            ;LOAD DAC3 AGAIN
1060  004026  006277  175376            2$:     ASR     @DAC3           ;CHANGE THE DATA
1061  004032  006237  001124                    ASR     $GDDAT          ;CHANGE THE EXPECTED
1062  004036  001355                            BNE     1$              ;BR IF MORE DATA
1063                                    ;;*****************************************************************
1064                                    ;*TEST 25       TEST THE "SUB" INSTRUCTION WORKS ON DAC3
1065                                    ;;*****************************************************************
1066  004040  000004                    TST25:  SCOPE
1067  004042  012737  0000;0  001160            MOV     #10.$TIMES      ;;DO 10 ITERATIONS
1068  004050  012737  007777  001124            MOV     #7777,$GDDAT            ;LOAD EXPECTED
1069  004056  013777  001124  175344            MOV     $GDDAT,@DAC3            ;LOAD DAC3
1070  004064  162737  000001  001124    1$:     SUB     #1,$GDDAT               ;SUB A VALUE
1071  004072  162777  000001  175330            SUB     #1,@DAC3                ;FROM EXPECTED AND DAC3
1072  004100  017737  175324  001126            MOV     @DAC3,$BDDAT            ;READ THE REGISTER
1073  004106  023737  001124  001126            CMP     $GDDAT,$BDDATI          ;COMPARE
1074  004114  001404                            BEQ     2$              ;;BR IF SAME
1075  004116  104005                            ERROR   5               ;THE SUB INSTRUCTION FAILED ON DAC3
1076  004120  013777  001124  175302            MOV     $GDDAT,@DAC3            ;LOAD THE REGISTER AGAIN
1077  004126  005737  001124            2$:     TST     $GDDAT                  ;TEST FOR MORE DATA
1078  004132  001354                            BNE     1$              ;;BR IF MORE DATA
```

```
1079                                    ;;*****************************************************************
1080                                    ;*TEST 26       TEST THAT THE FOUR DAC REGISTERS CAN HOLD DIFFERENT DATA
1081                                    ;;*****************************************************************
1082  004134  000004                    TST26:  SCOPE
1083  004136  012777  001111  175256            MOV     #1111,@DAC0             ;LOAD DAC #0
1084  004144  012777  002222  175252            MOV     #2222,@DAC1             ;LOAD DAC #1
1085  004152  012777  004444  175246            MOV     #4444,@DAC2             ;LOAD DAC #2
1086  004160  012777  007777  175242            MOV     #7777,@DAC3             ;LOAD DAC #3
1087  004166  012737  001111  001124            MOV     #1111,$GDDAT            ;LOAD EXPECTED
1088  004174  017737  175222  001126            MOV     @DAC0,$BDDAT            ;READ REG
1089  004202  023737  001124  001126            CMP     $GDDAT,$BDDAT           ;COMPARE
1090  004210  001401                            BEQ     1$              ;;BR IF EQUAL
1091  004212  104002                            ERROR   2                       ;ERROR, SELECTED DAC #0 IN ERROR
1092
1093  004214  012737  002222  001124  1$:       MOV     #2222,$GDDAT            ;LOAD EXPECTED
1094  004222  017737  175176  001126            MOV     @DAC1,$BDDAT            ;READ REG
1095  004230  023737  001124  001126            CMP     $GDDAT,$BDDAT           ;COMPARE
1096  004236  001401                            BEQ     2$              ;;BR IF EQUAL
1097  004240  104003                            ERROR   3                       ;ERROR, SELECTED DAC #1 IN ERROR
1098
1099  004242  012737  004444  001124  2$:       MOV     #4444,$GDDAT            ;LOAD EXPECTED
1100  004250  017737  175152  001126            MOV     @DAC2,$BDDAT            ;READ REG
1101  004256  023737  001124  001126            CMP     $GDDAT,$BDDAT           ;COMPARE
1102  004264  001401                            BEQ     3$              ;;BR IF SAME
1103  004266  104004                            ERROR   4                       ;ERROR, SELECTED DAC #2 IN ERROR
1104
1105  004270  012737  007777  001124  3$:       MOV     #7777,$GDDAT            ;LOAD EXPECTED
1106  004276  017737  175126  001126            MOV     @DAC3,$BDDAT            ;READ REG
1107  004304  023737  001124  001126            CMP     $GDDAT,$BDDAT           ;COMPARE
1108  004312  001401                            BEQ     TST27           ;;BR IF SAME
1109  004314  104005                            ERROR   5                       ;ERROR, SELECTED DAC #3 IN ERROR
```

```
                                        ;;*****************************************************************
                                        ;*TEST 27       TEST THAT RESET CLEARS DAC #0 REGISTER
                                        ;;*****************************************************************
004316  000004                  TST27:  SCOPE
004320  012737  000010  001160          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004326  012777  177777  175066          MOV     #-1,@DAC0
004334  005037  001124                  CLR     $GDDAT                  ;LOAD EXPECTED
004340  000005                          RESET
004342  017737  175054  001126          MOV     @DAC0,$BDDAT            ;READ REG
004350  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
004356  001401                          BEQ     TST30           ;;BR IF EQUAL
004360  104002                          ERROR   2                       ;ERROR, RESET FAILED TO CLEAR DAC #0

                                        ;;*****************************************************************
                                        ;*TEST 30       TEST THAT RESET CLEARS DAC #1 REGISTER
                                        ;;*****************************************************************
004362  000004                  TST30:  SCOPE
004364  012737  000010  001160          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004372  012777  177777  175024          MOV     #-1,@DAC1
004400  005037  001124                  CLR     $GDDAT                  ;LOAD EXPECTED
004404  000005                          RESET
004406  017737  175012  001126          MOV     @DAC1,$BDDAT            ;READ REG
004414  023737  001124  001126          CMP     $GDDAT,$BDDAT           ;COMPARE
004422  001401                          BEQ     TST31           ;;BR IF EQUAL
004424  104003                          ERROR   3                       ;ERROR, RESET FAILED TO CLEAR DAC #1


                                        ;;*****************************************************************
                                        ;*TEST 31       TEST THAT RESET CLEARS DAC #2 REGISTER
                                        ;;*****************************************************************
004426  000004                  TST31:  SCOPE
004430  012737  000010  001160          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004436  012777  177777  174762          MOV     #-1,@DAC2               ;LOAD THE REGISTER
004444  005037  001124                  CLR     $GDDAT                  ;CLEAR EXPECTED
004450  000005                          RESET
004452  017737  174750  001126          MOV     @DAC2,$BDDAT            ;READ THE REGISTER
004460  001401                          BEQ     TST32           ;;BR IF CLEARED
004462  104004                          ERROR   4                       ;ERROR, RESET FAILED TO CLEAR DAC #2

                                        ;;*****************************************************************
                                        ;*TEST 32       TEST THAT RESET CLEARS DAC #3 REGISTER
                                        ;;*****************************************************************
004464  000004                  TST32:  SCOPE
004466  012737  000010  001160          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004474  012777  177777  174726          MOV     #-1,@DAC3               ;LOAD THE REGISTER
004502  005037  001124                  CLR     $GDDAT                  ;CLEAR THE EXPECTED
004506  012737  000001  007012          MOV     #1,TEMP
004514  000005                          RESET
004516  017737  174706  001126          MOV     @DAC3,$BDDAT            ;READ THE REGISTER
004524  001401                          BEQ     TST33           ;;BR IF CLEARED
004526  104005                          ERROR   5                       ;ERROR, RESET FAILED TO CLEAR DAC #3
```

```
                                        RCMAIN:
                                        ;;*****************************************************************
                                        ;*TEST 33       DETERMINE IF MORE AAVI1'S REMAIN TO BE TESTED
                                        ;;*****************************************************************
                                        TST33:  SCOPE
                                                MOV     #1,STIMES       ;;DO 1 ITERATION
                                                INC     $UNIT                   ;UPDATE UNIT #
                                                CMPB    $UNIT,EVER              ;TEST IF MORE
                                                BLO     TST34           ;;BR IF NO
                                                INC     $CSVCT                  ;ADPT UNIT #
                                                BIC     #[illegible],@VADCSR,DACO       ;UPDATE BUS ADDRESS
                                                BIC     #[illegible],@VADCSR,DAC1
                                                BIC     #[illegible],@VADCSR,DAC2
                                                BIC     #[illegible],@VADCSR,DAC3
                                                BIS     #[illegible],@VADCSR            ;CHANGE THE ERROR FLAG BIT
                                                CLR     $ISINM
                                                JMP     TST1                    ;TEST THE NEXT UNIT

                                        ;;*****************************************************************
                                        ;*TEST 34       DETERMINE IF RUNNING ON THE HARDWARE TESTER     (IF NOT REPORT END OF PA
                                        ;;*****************************************************************
                                        TST34:  SCOPE
                                                MOV     #1,STIMES       ;;DO 1 ITERATION
                                                TST     @#177560                ;TEST IF ON TESTER
                                                BIC     TST35           ;;BR TO TEST
                                                JMP     SEOP
```

```
1188                                    ;;*****************************************************************
1189                                    ;*TEST 35       TEST THAT DAC #3 OUTPUT BITS (0-3) FUNCTION
1190                                    ;;*****************************************************************
1191  004646  000004                    TST35:  SCOPE
1192  004650  012737  000001  001160            MOV     #1,STIMES       ;;DO 1 ITERATION
1193  004656  012737  000010  007014            MOV     #BIT3,STEMP             ;LOAD DAC PATTERN
1194  004664  012737  004000  001124            MOV     #BIT11,$GDDAT           ;LOAD EXPECTED PATTERN
1195
1196  004672  013777  007014  174530  1$:       MOV     STEMP,@DAC3             ;LOAD DAC REGISTER
1197  004700  017737  002120  001126            MOV     @DRIN,$BDDAT            ;READ THE REGISTER
1198  004706  042737  170377  001126            BIC     #170377,$BDDAT          ;MASK OFF OTHER BITS
1199  004714  023737  001124  001126            CMP     $GDDAT,$BDDAT           ;COMPARE
1200  004722  001401                            BEQ     2$              ;;BR IF THE SAME
1201  004724  104013                            ERROR   13              ;DAC #3 DIGITAL OUTPUT BITS IN ERROR
1202
1203  004726  006237  001124            2$:     ASR     $GDDAT                  ;ADJUST EXPECTED
1204  004732  006237  007014                    ASR     STEMP                   ;ADJUST LOADED PATTERN
1205  004736  001355                            BNE     1$
1206
1207                                    ;;*****************************************************************
1208                                    ;*TEST 36       VERIFY THE AAV11 +15 SUPPLY
1209                                    ;;*****************************************************************
1210  004740  000004                    TST36:  SCOPE
1211  004742  012737  000001  001160            MOV     #1,STIMES       ;;DO 1 ITERATION
1212  004750  013737  007032  001124            MOV     V5?44,$GDDAT            ;LOAD EXPECTED
1213  004756  004537  006302                    JSR     R5,CONVRT               ;SAMPLE THE CHANNEL
1214  004762  000012                            12
1215  004764  013737  007034  007016            MOV     V144,SPREAD             ;LOAD TOLERANCE
1216  004772  004737  006520                    JSR     PC,COMPAR               ;TEST IT
1217  004776  000401                            BR      TST37           ;;BR
1218  005000  104011                            ERROR   11              ;+15 VOLT SUPPLY IS WRONG
1219
1220                                    ;;*****************************************************************
1221                                    ;*TEST 37       VERIFY THE AAV11 -15 SUPPLY
1222                                    ;;*****************************************************************
1223  005002  000004                    TST37:  SCOPE
1224  005004  012737  000001  001160            MOV     #1,STIMES       ;;DO 1 ITERATION
1225  005012  013737  007036  001124            MOV     V2034,$GDDAT            ;LOAD EXPECTED
1226  005020  004537  006302                    JSR     R5,CONVRT               ;SAMPLE THE CHANNEL
1227  005024  000011                            11
1228  005026  013737  007034  007016            MOV     V144,SPREAD             ;LOAD TOLERANCE
1229  005034  004737  006520                    JSR     PC,COMPAR               ;TEST IT
1230  005040  000401                            BR      TST40           ;;BR
1231  005042  104012                            ERROR   12              ;-15 VOLT SUPPLY IS WRONG
1232
```

```
                                ;;*****************************************************************
                                ;*TEST 40        DACO OFFSET ADJUSTMENT
                                ;*****************************************************************
005044  000004                  TST40:  SCOPE
005046  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
005054  005737  001202                  TST     $PASS                   ;TEST IF FIRST PASS
005060  001006                          BNE     TST41           ;;BR IF NOT

005062  004537  005634                  JSR     R5,OFFDAC               ;LOAD AND EXECUTE DAC OFFSET ADJ.
005066  001422                          DACO                    ;DAC ADDRESS
005070  010726                          SELDO                   ;TYPEOUT ADDRESS
005072  010552                          ADJR46                  ;RES. TO ADJUST
005074  000013                          13                      ;RESULT CHANNEL #

                                ;;*****************************************************************
                                ;*TEST 41        DACO GAIN ADJUSTMENT
                                ;*****************************************************************
005076  000004                  TST41:  SCOPE
005100  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
005106  005737  001202                  TST     $PASS                   ;TEST IF FIRST PASS
005112  001005                          BNE     TST42           ;;BR IF NOT

005114  004537  005764                  JSR     R5,GAIDAC               ;LOAD AND EXECUTE DAC GAIN ADJ.
005120  001422                          DACO                    ;DAC ADDRESS
005122  010376                          ADJR34                  ;RES. TO ADJUST
005124  000013                          13                      ;CHANNEL # FOR RESULTS

                                ;;*****************************************************************
                                ;*TEST 42        DACO CALIBRATION
                                ;*****************************************************************
005126  000004                  TST42:  SCOPE
005130  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
005136  004537  006104                  JSR     R5,CALDAC               ;LOAD AND EXECUTE CALIBRATION
005142  001422                          DACO                    ;DAC ADDRESS
005144  000013                          13                      ;CHANNEL # FOR RESULTS
```

```
                                        ;;*****************************************************************
                                        ;*TEST 43        DAC1 OFFSET ADJUSTMENT
                                        ;;*****************************************************************
005146  000004                  TST43:  SCOPE
005150  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
005156  005737  001202                  TST     $PASS                   ;TEST IF FIRST PASS
005162  001006                          BNE     TST44           ;;BR IF NOT

005164  004537  005634                  JSR     R5,OFFDAC               ;LOAD AND EXECUTE DAC OFFSET ADJ.
005170  001424                          DAC1                    ;DAC ADDRESS
005172  010744                          SEL01                   ;TYPEOUT ADDRESS
005174  010605                          ADJR47                  ;RES. TO ADJUST
005176  000014                          14                      ;RESULT CHANNEL #

                                        ;;*****************************************************************
                                        ;*TEST 44        DAC1 GAIN ADJUSTMENT
                                        ;;*****************************************************************
005200  000004                  TST44:  SCOPE
005202  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
005210  005737  001202                  TST     $PASS                   ;TEST IF FIRST PASS
005214  001005                          BNE     TST45           ;;BR IF NOT

005216  004537  005764                  JSR     R5,GAIDAC               ;LOAD AND EXECUTE DAC GAIN ADJ.
005222  001424                          DAC1                    ;DAC ADDRESS
005224  010431                          ADJR35                  ;RES. TO ADJUST
005226  000014                          14                      ;CHANNEL # FOR RESULTS

                                        ;;*****************************************************************
                                        ;*TEST 45        DAC1 CALIBRATION
                                        ;;*****************************************************************
005230  000004                  TST45:  SCOPE
005232  012737  000001  001160          MOV     #1,$TIMES       ;;DO 1 ITERATION
005240  004537  006104                  JSR     R5,CALDAC               ;LOAD AND EXECUTE CALIBRATION
005244  001424                          DAC1                    ;DAC ADDRESS
005246  000014                          14                      ;CHANNEL # FOR RESULTS
```

```
1303                                    ;;**********************************************************************
1304                                    ;*TEST 46        DAC2 OFFSET ADJUSTMENT
1305                                    ;;**********************************************************************
1306  005250  000004                    TST46:  SCOPE
1307  005252  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
1308  005260  005737  001202                    TST     $PASS                   ;TEST IF FIRST PASS
1309  005264  001006                    BNE     TST47           ;;BR IF NOT
1310
1311  005266  004537  005634                    JSR     R5,OFFDAC               ;LOAD AND EXECUTE DAC OFFSET ADJ.
1312  005272  001426                    DAC2                            ;DAC ADDRESS
1313  005274  010762                    SEL02                           ;TYPEOUT ADDRESS
1314  005276  010640                    ADJR48                          ;RES. TO ADJUST
1315  005300  000016                    16                              ;RESULT CHANNEL #
1316
1317                                    ;;**********************************************************************
1318                                    ;*TEST 47        DAC2 GAIN ADJUSTMENT
1319                                    ;;**********************************************************************
1320  005302  000004                    TST47:  SCOPE
1321  005304  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
1322  005312  005737  001202                    TST     $PASS                   ;TEST IF FIRST PASS
1323  005316  001005                    BNE     TST50           ;;BR IF NOT
1324
1325  005320  004537  005764                    JSR     R5,GAIDAC               ;LOAD AND EXECUTE DAC GAIN ADJ.
1326  005324  001426                    DAC2                            ;DAC ADDRESS
1327  005326  010464                    ADJR36                          ;RES. TO ADJUST
1328  005330  000016                    16                              ;CHANNEL # FOR RESULTS
1329
1330                                    ;;**********************************************************************
1331                                    ;*TEST 50        DAC2 CALIBRATION
1332                                    ;;**********************************************************************
1333  005332  000004                    TST50:  SCOPE
1334  005334  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
1335  005342  004537  006104                    JSR     R5,CALDAC               ;LOAD AND EXECUTE CALIBRATION
1336  005346  001426                    DAC2                            ;DAC ADDRESS
1337  005350  000016                    16                              ;CHANNEL # FOR RESULTS
```

```
1338                                    ;;**************************************************************
1339                                    ;*TEST 51        DAC3 OFFSET ADJUSTMENT
1340                                    ;;**************************************************************
1341  005352  000004                    TST51:  SCOPE
1342  005354  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
1343  005362  005737  001202                    TST     $PASS                   ;TEST IF FIRST PASS
1344  005366  001006                    BNE     TST52           ;;BR IF NOT
1345
1346  005370  004537  005634            JSR     R5,OFFDAC               ;LOAD AND EXECUTE DAC OFFSET ADJ.
1347  005374  001430                    DAC3                            ;DAC ADDRESS
1348  005376  011000                    SEL03                           ;TYPEOUT ADDRESS
1349  005400  010673                    ADJR49                          ;RES. TO ADJUST
1350  005402  000015                    15                              ;RESULT CHANNEL #
1351
1352                                    ;;**************************************************************
1353                                    ;*TEST 52        DAC3 GAIN ADJUSTMENT
1354                                    ;;**************************************************************
1355  005404  000004                    TST52:  SCOPE
1356  005406  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
1357  005414  005737  001202                    TST     $PASS                   ;TEST IF FIRST PASS
1358  005420  001005                    BNE     TST53           ;;BR IF NOT
1359
1360  005422  004537  005764            JSR     R5,GAIDAC               ;LOAD AND EXECUTE DAC GAIN ADJ.
1361  005426  001430                    DAC3                            ;DAC ADDRESS
1362  005430  010517                    ADJR37                          ;RES. TO ADJUST
1363  005432  000015                    15                              ;CHANNEL # FOR RESULTS
1364
1365                                    ;;**************************************************************
1366                                    ;*TEST 53        DAC3 CALIBRATION
1367                                    ;;**************************************************************
1368  005434  000004                    TST53:  SCOPE
1369  005436  012737  000001  001160            MOV     #1,$TIMES       ;;DO 1 ITERATION
1370  005444  004537  006104                    JSR     R5,CALDAC               ;LOAD AND EXECUTE CALIBRATION
1371  005450  001430                    DAC3                            ;DAC ADDRESS
1372  005452  000015                    15                              ;CHANNEL # FOR RESULTS
```

```
                                        .SBTTL  END OF PASS ROUTINE

                                        ;;*****************************************************************
                                        ;*INCREMENT THE PASS NUMBER ($PASS)
                                        ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                        ;*IF THERES A MONITOR GO TO IT
                                        ;*IF THERE ISN'T JUMP TO INIT7

005454                                  $EOP:
005454  000004                                SCOPE
005456  005037  001102                       CLR     $TSTNM          ;;ZERO THE TEST NUMBER
005462  005037  001160                       CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
005466  005237  001202                       INC     $PASS           ;;INCREMENT THE PASS NUMBER
005472  042737  100000  001202               BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
                        005327                  DEC     (PC)+           ;;LOOP?
                        000001          $EOPCT: .WORD   1
                        003022                  BGT     $DOAGN          ;;YES
                        012737                  MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
                        000001          $ENDCT: .WORD   1
                                                $EOPCT
                        104401  005561          TYPE    ,$ENDMG         ;;TYPE "END PASS #"
                        013746  001202          MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
                        104405                  TYPOS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
                        104401  005556          TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
                        013700  000042  $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
                        001405                  BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
                                                RESET                   ;;CLEAR THE WORLD
                        000240          $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
                        000240                  NOP                     ;;SAVE ROOM
                        000240                  NOP                     ;;FOR
                        000240                  NOP                     ;;ACT11
                                        $DOAGN:
                        000137                  JMP     @(PC)+          ;;RETURN
                        005576          $RTNAD: .WORD   INIT7
                            377     377     000 $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
                            015 042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
                        050040  051501  020123
                        000043
                                        INIT7:  TST     #ETST                   ;TEST IF ON TESTER
                                                BNE     1$
                                                TYPE,   ERRTOT
                                                MOV     $ERTTL,-(SP)
                                                TYPOS
                                                TYPE,   MESGD
                                                MOV     BAOUNT,-(SP)    ;;SAVE BAOUNT FOR TYPEOUT
                                                TYPBN                   ;;GO TYPE--BINARY ASCII
                        000137  002044  1$:     JMP     INIT1                   ;TEST IT AGAIN
```

```
                                        .SBTTL  SUBROUTINE TO ADJUST THE DAC'S OFFSET POTS
                                
005762  012537  005762          OFFDAC: MOV     (R5)+,10$               ;GET BUS ADDRESS
005764  017737  000116  005762          MOV     @10$,10$                ;
005772  013737  005762  007002          MOV     10$,DACBAD              ;LOAD BUS ADDRES IF ERROR
005776  012537  005672                  MOV     (R5)+,11$               ;GET POINTER TO ASCII MESSAGE
006002  012537  005712                  MOV     (R5)+,12$               ;GET POINTER TO RES. MESSAGE
006006  012537  005732                  MOV     (R5)+,13$               ;GET AND SAVE CHANNEL #
006012  104401                          TYPE                            ;TELL OPERATOR TO SELECT DAC N
005672  010726                  11$:    SEL00
005674  004537  006212                  JSR     R5,SNOVLT               ;LOAD A VOLTAGE OF M5.1200 VOLTS.
005700  011064                          M51200
005702  012777  000000  000052          MOV     #0000,@10$              ;LOAD THE SELECTED DAC TO NULL
005710  104401                          TYPE                            ;TELL OPERATOR TO ADJUST RXX FOR NULL
005712  010[illegible]          12$:    ADJR46
005714  004737  006422          1$:     JSR     PC,CSPACE               ;WAIT UNTIL THE IS READY
005720  012737  000000  001124          MOV     #0000,SGDOAT            ;LOAD EXPECTED VALUE
005726  004537  006302                  JSR     R5,CONVRT               ;SAMPLE THE CHANNEL
005732  000013                  13$:    13
005734  012737  000002  007016          MOV     #2,SPREAD
005742  004737  006520                  JSR     PC,COMPAR               ;TEST RESULTS
005746  000404                          BR      2$              ;;BR IF WITHIN THE LIMIT
005750  104006                          ERROR   6       ;SELECTED DAC OFFSET POT WAS NOT ADJUSTED INCORRECTLY
005752  104401                          TYPE
005754  011016                          TRYAGN
005756  000756                          BR      1$                      ;LOOP AGAIN
005760  000205                  2$:     RTS     R5                      ;EXIT
005762  000000                  10$:    0
                                
                                        .SBTTL  SUBROUTINE TO ADJUST THE GAIN ADJUSTMENT POTS
                                
005764  012537  006102          GAIDAC: MOV     (R5)+,10$               ;GET BUS ADDRESS
005770  017737  000106  006102          MOV     @10$,10$                ;
005776  013737  006102  007002          MOV     10$,DACBAD              ;LOAD BUS ADDRESS IF ERROR
006004  012537  006032                  MOV     (R5)+,11$               ;GET ASCII RES. ADDRESS
006010  012537  006052                  MOV     (R5)+,12$               ;GET CHANNEL
006014  004537  006212                  JSR     R5,SNOVLT               ;LOAD + 5.1175 VOLTS
006020  011077                          P51175
006022  012777  007777  000052          MOV     #7777,@10$              ;LOAD THE DAC
006030  104401                          TYPE                            ;TELL OPERATOR WHICH RXX TO ADJUST FOR NULL
006032  010376                  11$:    ADJR34
006034  004737  006422          1$:     JSR     PC,CSPACE               ;WAIT FOR OPERATOR
006040  012737  007777  001124          MOV     #7777,SGDOAT            ;LOAD EXPECTED
006046  004537  006302                  JSR     R5,CONVRT               ;CONVERT THE VALUE
006052  000013                  12$:    13
006054  012737  000002  007016          MOV     #2,SPREAD               ;LOAD LIMIT
006062  004737  006520                  JSR     PC,COMPAR               ;TEST RESULTS
006066  000404                          BR      2$              ;;BR IF WITHIN LIMITS
006070  104007                          ERROR   7       ;SELECTED DAC GAIN POT WAS NOT ADJUSTED PROPERLY
006072  104401                          TYPE
006074  011016                          TRYAGN
006076  000756                          BR      1$
006100  000205                  2$:     RTS     R5                      ;EXIT
006102  000000                  10$:    0
```

```
                                        .SBTTL  SUBROUTINE TO TEST THE D/A CALIBRATION
                                
006104  012537  006210          CALDAC: MOV     (R5)+,10$               ;GET BUS ADDRESS
006110  012737  000074  006210          MOV     #10$,10$                ;
006116  013737  006210  007002          MOV     10$,DACBAD              ;LOAD BUS ADDRESS IF ERROR
006124  012537  006150                  MOV     (R5)+,11$               ;GET CHANNEL #

006130  012777  007400  000052          MOV     #7400,@10$              ;LOAD THE DAC
006136  012737  007400  001124          MOV     #7400,$GDDAT            ;LOAD THE EXPECTED VALUE

006144  004537  006302          1$:     JSR     R5,CONVRT               ;SAMPLE THE CHANNEL
006150  000013                  11$:    13

006152  012737  000003  007016          MOV     #3,SPREAD               ;LOAD TOLERANCE
006160  004737  006520                  JSR     PC,COMPAR               ;TEST THE RESULTS
006164  000401                          BR      2$              ;;BR
006166  104010                          ERROR   10              ;NON-LINEARITY IN DAC DETECTED
006170  162777  000400  000012  2$:     SUB     #400,@10$               ;ADJUST THE CONTENTS
006176  162737  000400  001124          SUB     #400,$GDDAT             ;ADJUST THE EXPECTED
006204  001357                          BNE     1$              ;;BR IF NOT DONE
006206  000205                          RTS     R5                      ;EXIT

006210  000000          10$:    0

                                        .SBTTL  SUBROUTINE TO LOAD A VOLTAGE INTO THE VOLTAGE SOURCE

006212  012500          SNOVLT: MOV     (R5)+,R0                ;LOAD THE POINTER
006214  112001          2$:     MOVB    (R0)+,R1                ;GET SOME DATA
006216  001421                  BEQ     3$                      ;BR IF TERM
006220  110177  000576          MOVB    R1,@FILZ                ;LOAD THE DATA
006224  012701  001000          MOV     #1000,R1
006230  005301          5$:     DEC     R1                      ;DELAY
006232  001376                  BNE     5$
006234  012777  000200  000560  BIS     #BIT7,@FILZ             ;SET BIT 7
006242  012701  001000          MOV     #1000,R1                ;LOAD DELAY
006246  005301          1$:     DEC     R1                      ;DELAY
006250  001376                  BNE     1$
006252  042777  000200  000542  BIC     #BIT7,@FILZ
006260  000755                  BR      2$

006262  012701  000000          3$:     MOV     #0,R1                   ;LOAD DELAY
006266  152777  000177  000526          BISB    #177,@FILZ              ;DISABLE BITS
006274  005301          4$:     DEC     R1                      ;DELAY
006276  001376                  BNE     4$
006300  000205                  RTS     R5                      ;EXIT
```

```
1521                                            .SBTTL  SUBROUTINE TO CONVERT CHANNEL N ON THE TESTER A/D
1522
1523  006302  012537  006414          CONVRT: MOV     (R5)+,10$               ;GET THE CHANNEL #
1524  006306  000337  006414                  SWAB    10$
1525  006312  042737  170377  006414          BIC     #170377,10$             ;MASK OUT OTHER BITS
1526  006320  013777  006414  000500          MOV     10$,@ADCS               ;SELECT CHANNEL
1527  006326  005037  006416                  CLR     11$
1528  006332  012737  000200  006420          MOV     #BIT7,12$               ;LOAD SHIFT COUNTER
1529  006340  105277  000462          1$:     INCB    @ADCS                   ;CONVERT CHANNEL
1530  006344  105777  000456          2$:     TSTB    @ADCS                   ;WAIT FOR DONE
1531  006350  100375                  BPL     2$
1532  006352  067737  000452  006416          ADD     @ADBR,11$               ;UPDATE CONVERSION
1533  006360  006237  006420                  ASR     12$                     ;FINISHED ?
1534  006364  001365                  BNE     1$
1535  006366  000257                  CCC
1536  006370  006037  006416                  ROR     11$
1537  006374  006237  006416                  ASR     11$
1538  006400  006237  006416                  ASR     11$                     ;JUSTIFY DATA
1539  006404  013737  006416  001126          MOV     11$,$BDDAT              ;LOAD ACTUAL (ADJUSTED)
1540  006412  000205                  RTS     R5                              ;EXIT
1541
1542  006414  000000          10$:    0
1543  006416  000000          11$:    0
1544  006420  000000          12$:    0
1545
1546                                            .SBTTL  SUBROUTINE TO LOOP UNTIL OPERATOR TYPES AN "SPACE"
1547
1548  006422  104401  007746          CSPACE: TYPE,   LDSPAC                  ;TELL OPERATOR TO HIT SPACE BAR
1549  006426  012737  000014  006516  3$:     MOV     #14,11$                 ;LOAD DELAY COUNTER
1550  006434  005037  006514                  CLR     10$
1551  006440  105777  172500          1$:     TSTB    @$TKS                   ;WAIT FOR OPERATOR
1552  006444  100410                  BMI     2$                              ;BR IF FLAG IS SET
1553  006446  005337  006514                  DEC     10$                     ;DELAY
1554  006452  001372                  BNE     1$                              ;BR IF NOT DONE
1555  006454  005337  006516                  DEC     11$                     ;DELAY AGAIN
1556  006460  001367                  BNE     1$
1557  006462  104014                  ERROR   14                              ;WAKE UP OPERATOR
1560  006464  000760                  BR      3$                              ;LOOP
1561  006466  017737  172454  006514  2$:     MOV     @$TKB,10$               ;READ THE CHARACTER
1562  006474  042737  177600  006514          BIC     #177600,10$             ;MASK OF OTHER BITS
1563  006502  022737  000040  006514          CMP     #40,10$                 ;TEST FOR "SPACE"
1564  006510  001346                  BNE     3$                              ;LOOP
1565  006512  000207                  RTS     PC                              ;EXIT
1566  006514  000000          10$:    0
1567  006516  000010          11$:    BIT3
1570
```

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                                        .SBTTL  SUBROUTINE TO COMPARE TWO LOCATIONS BY THE SPREAD

006520 010046                   COMPAR: MOV     R0,-(SP)                ;SAVE R0
006522 010146                           MOV     R1,-(SP)                ;SAVE R1
006524 013700 001124                    MOV     $GOODAT,R0              ;GET EXPECTED VALUE
006530 013701 001126                    MOV     $BODAT,R1               ;GET THE UNKNOWN
006534 160100                           SUB     R1,R0                   ;SUBTRACT
006536 100001                           BPL     8$
006540 005400                           NEG     R0
006542 020037 007016            8$:     CMP     R0,SPREAD               ;TEST IF DIFFERENCE IF > SHAN SPREAD
006546 003405                           BLE     10$
006550 012601                   9$:     MOV     (SP)+,R1                ;RESTORE R1
006552 012600                           MOV     (SP)+,R0                ;RESTORE R0
006554 062716 000002                    ADD     #2,(SP)                 ;MAKE AN ERROR EXIT
006560 000207                           RTS     PC                      ;EXIT

006562 012601                   10$:    MOV     (SP)+,R1
006564 012600                           MOV     (SP)+,R0
006566 000207                           RTS     PC                      ;EXIT FOR GOOD LIMIT TEST

                                        .SBTTL  FULL SCALE RAMP ON EACH RAMP

006570 012706 001100            FULRMP: MOV     #STACK,SP               ;LOAD POINTER
006574 004737 001746                    JSR     PC,LDTRAP               ;LOAD TRAP'S ADDRESS
006600 013700 001422            1$:     MOV     DAC0,R0         ;GET BUS ADDRESS
006604 004737 006642                    JSR     PC,10$                  ;LOAD THE RAMP ON DAC #1
006610 013700 001424                    MOV     DAC1,R0         ;GET BUS ADDRESS
006614 004737 006642                    JSR     PC,10$                  ;LOAD THE RAMP ON DAC #1
006620 013700 001426                    MOV     DAC2,R0         ;GET BUS ADDRESS
006624 004737 006642                    JSR     PC,10$                  ;LOAD THE RAMP ON DAC #2
006630 013700 001430                    MOV     DAC3,R0         ;GET THE BUS ADDRESS
006634 004737 006642                    JSR     PC,10$                  ;LOAD THE RAMP ON DAC #3
006640 000757                           BR      1$                      ;BR BACK

005642 005010                   10$:    CLR     (R0)                    ;CLEAR DAC
005644 062710 000010            11$:    ADD     #10,(R0)                ;UPDATE THE DATA
005650 005710                           TST     (R0)                    ;TEST IF DONE
005652 001374                           BNE     11$                     ;BR IF NOT
005654 000207                           RTS     PC                      ;EXIT
```

```
1606
1607                                            .SBTTL  STATIC DAC CALIBRATION
1608
1609  006656  012706  001100        STATIC:   MOV     #STACK,SP           ;LOAD STACK POINTER
1610  006662  004737  001746                  JSR     PC,LDTRAP           ;LOAD BUS ADDRESSES
1611  006666  104410                1$:       CKSWR                       ;TEST FOR CTRL G
1612  006670  017700  172244                  MOV     @SWR,R0             ;READ SWITCHES
1613  006674  010077  172522                  MOV     R0,@DAC0            ;LOAD DAC #0
1614  006700  010077  172520                  MOV     R0,@DAC1            ;LOAD DAC #1
1615  006704  010077  172516                  MOV     R0,@DAC2            ;LOAD DAC #2
1616  006710  010077  172514                  MOV     R0,@DAC3            ;LOAD DAC #3
1617  006714  000764                          BR      1$
1618
1619                                            .SBTTL  DYNAMIC DAC CALIBRATION
1620
1621  006716  012706  001100        DYNCAL:   MOV     #STACK,SP           ;LOAD STACK POINTER
1622  006722  004737  001746                  JSR     PC,LDTRAP           ;LOAD BUS ADDRESSES
1623  006726  104410                1$:       CKSWR                       ;TEST FOR CTRL G
1624  006730  017700  172204                  MOV     @SWR,R0             ;READ SWR
1625  006734  004737  006750                  JSR     PC,10$              ;LOAD THE SWR VALUE TO ALL DACS
1626  006740  005000                          CLR     R0                  ;CLEAR R0
1627  006742  004737  006750                  JSR     PC,10$              ;LOAD ALL DAC'S WITH 0
1628  006746  000767                          BR      1$
1629
1630  006750  010077  172446        10$:      MOV     R0,@DAC0            ;LOAD DAC #0
1631  006754  010077  172444                  MOV     R0,@DAC1            ;LOAD DAC #1
1632  006760  010077  172442                  MOV     R0,@DAC2            ;LOAD DAC #2
1633  006764  010077  172440                  MOV     R0,@DAC3            ;LOAD DAC #3
1634  006770  012700  000020                  MOV     #20,R0              ;LOAD DELAY COUNTER
1635  006774  005300                11$:      DEC     R0                  ;DELAY
1636  006776  100376                          BPL     11$                 ;WAIT
1637  007000  000207                          RTS     PC                  ;EXIT
1638
1639  007002  170440                DACBAD:   ABASE
1640  007004  000000                BADUNT:   0
1641  007006  000004                NUMBOK:   4.
1642  007010  000001                MASKNM:   BIT0
1643  007012  000000                TEMP:     0
1644  007014  000000                $TEMP:    0
1645  007016  000000                SPRDAD:   0
1646  007020  000000                WFTST:    0
1647  007022  167772                FIL2:     167772
1648  007024  167774                DRIN:     167774
1649  007026  170500                ADCS:     170500
1650  007030  170502                ADBR:     170502
1651  007032  005744                V5744:    5744
1652  007034  000144                V144:     144
1653  007036  002034                V2034:    2034
1654
1655
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                                                .SBTTL  ASCII MESSAGES

007040 005015 040412 053101  TITLE:  .ASCIZ  <15><12><12>'AAV11 DIAGNOSTIC TEST, (MAINDEC-11-DVAAA-A0)'<15><12>
007046 030461 042040 040511
007054 047107 051517 044524
007062 020103 042524 052123
007070 020054 046450 044501
007076 042116 041505 030455
007104 026461 053104 040501
007112 026501 030101 006451
007120 000012
007122 052502 020123 044524  EM1:    .ASCIZ  /BUS TIME-OUT WHEN REFERENCING A DAC ADDRESS/
007130 042515 047455 052125
007136 053440 042510 020116
007144 042522 042506 042522
007152 041516 047111 020107
007160 020101 040504 020105
007166 042101 051104 051505
007174 000123
007176 040504 030103 051040  EM2:    .ASCIZ  /DAC0 REGISTER IN ERROR/
007204 043505 051511 042524
007212 020122 047111 042440
007220 051122 051117 000000
007225 000104 041501 020061  EM3:    .ASCIZ  /DAC1 REGISTER IN ERROR/
007232 042522 044507 052123
007240 051105 044440 020116
007246 051105 047522 000122
007254 040504 031103 051040  EM4:    .ASCIZ  /DAC2 REGISTER IN ERROR/
007262 043505 051511 042524
007270 020122 047111 042440
007276 051122 051117 000000
007303 000104 041501 020063  EM5:    .ASCIZ  /DAC3 REGISTER IN ERROR/
007310 042522 044507 052123
007316 051105 044440 020116
007324 051105 047522 000122
007332 042523 042514 052103  EM6:    .ASCIZ  /SELECTED DAC OFFSET POT WAS ADJUSTED INCORRECTLY/
007340 042105 042040 041501
007346 047440 043106 042523
007354 020124 047520 020124
007362 040127 020123 042101
007370 053512 052123 042105
007376 044440 041516 051117
007404 042522 052103 054514
007412 000000
007413 000123 046105 041505  EM7:    .ASCIZ  /SELECTED DAC GAIN POT WAS ADJUSTED INCORRECTLY/
007420 042524 020104 040504
007426 020103 040507 047111
007434 040040 052117 053440
007442 051501 040440 045104
007450 051525 042524 020104
007456 047111 047503 051122
007464 041505 046124 000131
007472 042523 042514 052103  EM10:   .ASCIZ  /SELECTED DAC HAS A LINEARITY PROBLEM/
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1710  007500  042105  042040  041501
1711  007506  044040  051501  040140
1712  007514  046040  047111  042505
1713  007522  044522  054524  052040
1714  007530  047522  046102  046505
1715  007536      000
1716  007537      053  032461  052040  EM11:   .ASCIZ  /+15 VOLT SUPPLY IS INCORRECT/
1717  007544  046117  020124  052123
1718  007552  050120  044514  044440
1719  007560  020123  047111  047503
1720  007566  051122  041505  000124
1721  007574  030455  020065  047526  EM12:   .ASCIZ  /-15 VOLT SUPPLY IS INCORRECT/
1722  007602  052114  051440  050125
1723  007610  046120  020131  051511
1724  007616  044440  041516  051117
1725  007624  042522  042103      000
1726  007631      104  041501  021440  EM13:   .ASCIZ  /DAC #3 DIGITAL OUTPUT BITS IN ERROR/
1727  007636  020063  044504  042507
1728  007644  040524  020114  052517
1729  007652  050124  052125  041040
1730  007660  052111  020123  047111
1731  007666  042440  051122  051117
1732  007674      000
1733  007675      007  003407  040527  EM14:   .ASCIZ  <7><7><7>/WAKE UP OPERATOR AND ADJUST THE POT/<7><7>
1734  007702  042513  052440  020120
1735  007710  050117  051105  052101
1736  007716  051117  040440  042116
1737  007724  040440  045104  051525
1738  007732  020124  044124  020105
1739  007740  047620  003524  000007
1740  007746  042011  050105  042522  LDSPAC: .ASCIZ  /       DEPRESS THE "SPACE-BAR" WHEN DONE/
1741  007754  051523  052040  042510
1742  007762  021040  050123  041501
1743  007770  020105  047103  021122
1744  007776  053440  041510  020116
1745  010004  047504  041516      000
1746  010011      007  005015  042524  MSGSW:  .ASCII  <7><15><12>/TESTER SW1-2 AND SW1-5 ONLY MUST BE ON/
1747  010016  052123  051105  051440
1748  010024  030527  031055  040440
1749  010032  042116  051440  030527
1750  010040  032455  047440  046116
1751  010046  020131  052515  052123
1752  010054  041040  020105  047117
1753  010062  006407  051412  031127          .ASCII  <7><15><12>/SW2-2 SW2-4 AND SW2-5 MUST BE ON/
1754  010070  031105  051440  031127
1755  010076  032105  040440  042116
1756  010104  051440  031127  032455
1757  010112  046440  051525  020124
1758  010120  042502  047440      116
1759  010125      015  003412  047503          .ASCIZ  <15><12><7>/CONNECT AAV11 TO J09 OF TESTER ONLY/<15><12>
1760  010132  047116  041505  020124
1761  010140  040501  037526  020061
1762  010146  047524  045040  034460
1763  010154  047440  020106  042524
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1764  010162  052123  051105  047440
1765  010170  046116  000531  000012
1766  010176  021440  042440  051122  ERRTOT: .ASCIZ  / # ERRORS/
1767  010204  051117  000123
1768  010210  041040  042101  052440  MESGO:  .ASCIZ  / BAD UNITS /
1769  010216  044516  051524  000040
1770  010224     015     012          FOUND1: .BYTE   15,12
1771  010230  051120  043517  040522          .ASCIZ  /PROGRAM DETECTED /
1772  010234  020115  042504  042524
1773  010242  052103  042105  000040
1774  010250  034050  004451  040501  FOUND2: .ASCIZ  /(8)    AAV11(S)  /
1775  010256  030526  024061  024523
1776  010264  020040     000
1777  010267     106  051122  041520  DH1:    .ASCIZ  /ERRPC  BUSADR  EXPECT   WAS/
1778  010274  041011  051505  042101
1779  010302  020122  052440  050130
1780  010310  041505  020124  020040
1781  010316  040527  000123
1782  010322  051105  050124  004603  DH2:    .ASCIZ  /ERRPC  BUSADR/
1783  010330  052503  040523  051104
1784  010336     000
1785  010337     105  051122  041520  DH6:    .ASCIZ  /ERRPC  BUSADR  EXPECT  WAS     SPREAD/
1786  010344  041011  051505  042101
1787  010352  004522  054105  042520
1788  010360  052103  052411  051501
1789  010366  051411  051120  040606
1790  010374  000104
1791  010376  005015  040440  045104  ADJR34: .ASCIZ  <15><12>/ ADJUST R34 FOR A NULL  /
1792  010404  051525  020124  031522
1793  010412  020064  047506  020122
1794  010420  020101  052516  046114
1795  010426  020040     000
1796  010431     015  020012  042101  ADJR35: .ASCIZ  <15><12>/ ADJUST R35 FOR A NULL  /
1797  010436  052512  052123  051040
1798  010444  032463  043040  051117
1799  010452  040440  047040  046125
1800  010460  020114  000040
1801  010464  005015  040440  045104  ADJR36: .ASCIZ  <15><12>/ ADJUST R36 FOR A NULL  /
1802  010472  051525  020124  031522
1803  010500  020066  047506  020122
1804  010506  020101  052516  046114
1805  010514  020040     000
1806  010517     015  020012  042101  ADJR37: .ASCIZ  <15><12>/ ADJUST R37 FOR A NULL  /
1807  010524  052512  052123  051040
1808  010532  032463  043040  051117
1809  010540  040440  047040  046125
1810  010546  020114  000040
1811  010552  005015  040440  045104  ADJR46: .ASCIZ  <15><12>/ ADJUST R46 FOR A NULL  /
1812  010560  051525  020124  031522
1813  010566  020066  047506  020122
1814  010574  020101  052516  046114
1815  010602  020040     000
1816  010605     015  020012  042101  ADJR47: .ASCIZ  <15><12>/ ADJUST R47 FOR A NULL  /
1817  010612  052512  052123  051040
```

```
 1818  010620  033464  043040  051117
 1819  010626  040440  047040  046125
 1820  010634  020114  000040
 1821  010640  005015  040440  045104  ADJR48: .ASCIZ  <15><12>/ ADJUST R48 FOR A NULL  /
 1822  010646  051523  020124  032122
 1823  010654  020070  047506  020122
 1824  010662  020101  052515  046114
 1825  010670  020040     000
 1826  010673     015  020012  042101  ADJR49: .ASCIZ  <15><12>/ ADJUST R49 FOR A NULL  /
 1827  010700  052512  052123  051040
 1830  010706  034464  043040  051117
 1829  010714  040440  047040  046125
 1830  010722  020114  000040
 1831
 1832  010726  005015  042523  042514  SELD0:  .ASCIZ  <15><12>/SELECT DAC0/
 1833  010734  052103  042040  041501
 1834  010742  000060
 1835  010744  005015  042523  042514  SELD1:  .ASCIZ  <15><12>/SELECT DAC1/
 1836  010752  052103  042040  041501
 1837  010760  000061
 1838  010762  005015  042523  042514  SELD2:  .ASCIZ  <15><12>/SELECT DAC2/
 1839  010770  052103  042040  041501
 1840  010776  000062
 1841  011000  005015  042523  042514  SELD3:  .ASCIZ  <15><12>/SELECT DAC3/
 1842  011006  052103  042040  041501
 1843  011014  000063
 1844  011016  005015  042101  052512  TRYAGN: .ASCIZ  <15><12>/ADJUST THAT SAME POT AGAIN PLEASE/<15><12>
 1845  011024  052123  020040  040510
 1846  011032  020124  040523  042515
 1847  011040  050040  052117  042440
 1848  011046  040507  047111  050040
 1849  011054  042514  051501  006505
 1850  011062  000012
 1851          000001                          STX=1
 1852          000003                          ETX=3
 1853  011064     001                NS1200: .BYTE   STX
 1854  011065     116  030465  030062          .ASCII  /NS1200V/
 1855  011072  030060     126
 1856  011075     003     000                  .BYTE   ETX,0
 1857  011077     001                PS1175: .BYTE   STX
 1858  011100  030060  030461  032467          .ASCII  /PS1175V/
 1859  011106  000056
 1860  011110     003     000                  .BYTE   ETX,0
 1861                                          .EVEN
 1862  011112  001116  001126  000000  DT1:    $ERRPC,$BDDAT,0
 1863  011120  001116  001422  001124  DT2:    $ERRPC,DAC0,$GDDAT,$BDDAT,0
 1864  011126  001126  000000
 1865  011132  001116  001424  001124  DT3:    $ERRPC,DAC1,$GDDAT,$BDDAT,0
 1866  011140  001126  000000
 1867  011144  001116  001426  001124  DT4:    $ERRPC,DAC2,$GDDAT,$BDDAT,0
 1868  011152  001126  000000
 1869  011156  001116  001430  001124  DT5:    $ERRPC,DAC3,$GDDAT,$BDDAT,0
 1870  011164  001126  000000
 1871  011170  001116  007002  001124  DT6:    $ERRPC,DACBAD,$GDDAT,$BDDAT,SPREAD,0
```

```
 1872  011176  001126  007016  000000
 1873  011204  000000  000000  000000  DF0:    0,0,0,0,0,0,0,0
 1874  011212  000000  000000  000000
 1875  011220  000000  000000
 1876
 1877                                  .SBTTL  BINARY TO ASCII AND TYPE ROUTINE
 1878
 1879                                  ;;**********************************************************************
 1880                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 16-BIT
 1881                                  ;*BINARY-ASCII NUMBER AND TYPE IT.
 1882                                  ;*CALL:
 1883                                  ;*      MOV     NUMBER,-(SP)    ;;NUMBER TO BE TYPED
 1884                                  ;*      TYPBN                   ;;TYPE IT
 1885
 1886  011224  010146                  STYPBN: MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
 1887  011226  016601  000006                  MOV     6(SP),R1        ;;GET THE INPUT NUMBER
 1888  011232  000261                          SEC                     ;;SET "C" SO CAN KEEP TRACK OF THE NUMBER OF BITS
 1889  011234  112737  000060  011276  1$:     MOVB    #'0,$BIN        ;;SET CHARACTER TO AN ASCII "0".
 1890  011242  006101                          ROL     R1              ;;GET THIS BIT
 1891  011244  001406                          BEQ     2$              ;;DONE?
 1892  011246  105537  011276                  ADCB    $BIN            ;;NO--SET THE CHARACTER EQUAL TO THIS BIT
 1893  011252  104401  011276                  TYPE    ,$BIN           ;;GO TYPE THIS BIT
 1894  011256  000241                          CLC                     ;;CLEAR "C" SO CAN KEEP TRACK OF BITS
 1895  011260  000765                          BR      1$              ;;GO DO THE NEXT BIT
 1896  011262  012601                  2$:     MOV     (SP)+,R1        ;;POP THE STACK INTO R1
 1897  011264  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 1898  011272  012616                          MOV     (SP)+,(SP)
 1899  011274  000002                          RTI                     ;;RETURN TO USER
 1900  011276     000     000          $BIN:   .BYTE   0,0             ;;STORAGE FOR ASCII CHAR. AND TERMINATOR
 1901                                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
 1902
 1903                                  ;;**********************************************************************
 1904                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
 1905                                  ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
 1906                                  ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
 1907                                  ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
 1908                                  ;*REPLACED WITH SPACES.
 1909                                  ;*CALL:
 1910                                  ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
 1911                                  ;*      TYPDS                   ;;GO TO THE ROUTINE
 1912
 1913  011300                          $TYPDS:
 1914  011300  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 1915  011302  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 1916  011304  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 1917  011306  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 1918  011310  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 1919  011312  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
 1920  011316  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
 1921  011322  100004                          BPL     1$              ;;BR IF INPUT IS POS.
 1922  011324  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
 1923  011326  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
 1924  011334  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
 1925  011336  012703  011514                  MOV     #SOBLK,R3       ;;SETUP THE OUTPUT POINTER
```

```
 1926  011342  112723  000040                    MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
 1927  011346  005002                      2$:   CLR     R2              ;;CLEAR THE BCD NUMBER
 1928  011350  016001  011504                    MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
 1929  011354  160105                      3$:   SUB     R1,R5           ;;FORM THIS BCD DIGIT
 1930  011356  002402                            BLT     4$              ;;BR IF DONE
 1931  011360  005202                            INC     R2              ;;INCREASE THE BCD DIGIT BY 1
 1932  011362  000774                            BR      3$
 1933  011364  060105                      4$:   ADD     R1,R5           ;;ADD BACK THE CONSTANT
 1934  011366  005702                            TST     R2              ;;CHECK IF BCD DIGIT=0
 1935  011370  001002                            BNE     5$              ;;FALL THROUGH IF 0
 1936  011372  105716                            TSTB    (SP)            ;;STILL DOING LEADING 0'S?
 1937  011374  100407                            BMI     7$              ;;BR IF YES
 1938  011376  106316                      5$:   ASLB    (SP)            ;;M.D?
 1939  011400  103003                            BCC     6$              ;;BR IF NO
 1940  011402  116663  000001  177777            MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
 1941  011410  052702  000060                6$: BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
 1942  011414  052702  000040                7$: BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
 1943  011420  110223                            MOVB    R2,(R3)+        ;;PUT THIS CH.  .CTER IN THE OUTPUT BUFFER
 1944  011422  005720                            TST     (R0)+           ;;JUST INCREM.NTING
 1945  011424  020027  000010                    CMP     R0,#10          ;;CHECK THE T.  LE INDEX
 1946  011430  002746                            BLT     2$              ;;GO DO THE NEXT DIGIT
 1947  011432  003002                            BGT     8$              ;;GO TO EXIT
 1948  011434  010502                            MOV     R5,R2           ;;GET THE LSD
 1949  011436  000764                            BR      6$              ;;GO CHANGE TO ASCII
 1950  011440  105726                      8$:   TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
 1951  011442  100003                            BPL     9$              ;;BR IF NO
 1952  011444  116663  177777  177776            MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
 1953  011452  105013                      9$:   CLRB    (R3)            ;;SET THE TERMINATOR
 1954  011454  012605                            MOV     (SP)+,R5        ;;POP STACK INTO R5
 1955  011456  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
 1956  011460  012602                            MOV     (SP)+,R2        ;;POP STACK INTO R2
 1957  011462  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
 1958  011464  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
 1959  011466  104401  011514                    TYPE    ,$OBLK          ;;NOW TYPE THE NUMBER
 1960  011472  016666  000002  000004            MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 1961  011500  012616                            MOV     (SP)+,(SP)
 1962  011502  000002                            RTI                     ;;RETURN TO USER
 1963  011504  023420                      $DTBL:  10000.
 1964  011506  001750                              1000.
 1965  011510  000144                              100.
 1966  011512  000012                              10.
 1967  011514  000034                      $OBLK:  .BLKW   4
 1968                                      .SBTTL  SCOPE HANDLER ROUTINE
 1969
 1970                                      ;;**************************************************************
 1971                                      ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS, IT WILL INCREMENT
 1972                                      ;*AND LOAD THE TEST NU.  ER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
 1973                                      ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
 1974                                      ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 1975                                      ;*SW14=1          LOOP ON TEST
 1976                                      ;*SW11=1          INHIBIT ITERATIONS
 1977                                      ;*  09=1          LOOP ON E.  OR
 1978                                      ;*  08=1          LOOP ON TEST IN SWR<7:0>
 1979                                      ;*CALL
```

```
                                        ;*      SCOPE           ;;SCOPE=IOT
                                        $SCOPE:
                                                CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
                                                CKSWR
011530  032777  040000  167402  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
011536  001114                          BNE     $OVER           ;;YES IF SW14=1
                                        ;*****START OF CODE FOR THE XOR TESTER*****
011540  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
011542  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
011546  012737  011566  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
011554  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
011560  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
011564  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
011566  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
011570  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
011574  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
011576                          6$:;*****END OF CODE FOR THE XOR TESTER*****
011576  032777  000400  167334          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
011604  001404                          BEQ     2$              ;;BR IF NO
011606  127737  167326  001102          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
011614  001465                          BEQ     $OVER           ;;BR IF YES
011616  105737  001103          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
011622  001421                          BEQ     3$              ;;BR IF NO
011624  123737  001115  001103          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
011632  101015                          BHI     3$              ;;BR IF NO
011634  032777  001000  167276          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
011642  001404                          BEQ     4$              ;;BR IF NO
011644  013737  001110  001106  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
011652  000446                          BR      $OVER
011654  105037  001103          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
011660  005037  001160                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
011664  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
011666  032777  004000  167244  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
011674  001011                          BNE     1$              ;;BR IF YES
011676  005737  001202                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
011702  001406                          BEQ     1$              ;;    INHIBIT ITERATIONS
011704  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
011710  023737  001160  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
011716  002404                          BGE     $OVER           ;;BR IF MORE ITERATIONS REQUIRED
011720  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
011726  013737  012004  001160          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
011734  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
011740  113737  001102  001200          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
011746  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
011752  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
011756  005037  001162                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
011762  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
011770  013777  001102  167144  $OVER:  MOV     $TSTNM,@#DISPLAY ;;DISPLAY TEST NUMBER
011776  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
012002  000002                          RTI                     ;;FIXES PS
012004  003720                  $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
                                        .SBTTL  ERROR HANDLER ROUTINE
```

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

012006                                  $ERROR:
012006  104410                                  CKSWR                           ;;TEST FOR CHANGE IN SOFT-SWR
012010  053737  007010  007004                  BIS     MASKNM,@COUNT
012016  105237  001103                7$:      INCB    $ERFLG                  ;;SET THE ERROR FLAG
012022  001775                                  BEQ     7$                      ;;DON'T LET THE FLAG GO TO ZERO
012024  013777  001102  167110                  MOV     $TSTNM,@DISPLAY         ;;DISPLAY TEST NUMBER AND ERROR FLAG
012032  032777  002000  167100                  BIT     #BIT10,@SWR             ;;'BELL ON ERROR'
012040  001402                                  BEQ     1$                      ;;NO - SKIP
012042  104401  001164                          TYPE    ,$BELL                  ;;RING BELL
012046  005237  001112                1$:      INC     $ERTTL                  ;;COUNT THE NUMBER OF ERRORS
012052  011637  001116                          MOV     (SP),$ERRPC             ;;GET ADDRESS OF ERROR INSTRUCTION
012056  162737  000002  001116                SUB     #2,$ERRPC               ;;ADJUST PC
012064  117737  167[illegible]  001114        MOVB    @$ERRPC,$ITEMB          ;;STRIP AND SAVE THE ERROR ITEM CODE
012072  032777  0c00[illegible]  167040       BIT     #BIT13,@SWR             ;;SKIP TYPEOUT IF SET
012100  001004                                  BNE     20$                     ;;SKIP TYPEOUTS
012102  004737  012202                          JSR     PC,$ERRTYP              ;;GO TO USER ERROR ROUTINE
012106  104401  001171                          TYPE    ,$CRLF
012112                                  20$:
012112  122737  000001  001214                CMPB    #APTENV,$ENV            ;;RUNNING IN APT MODE
012120  001007                                  BNE     2$                      ;;NO,SKIP APT ERROR REPORT
012122  113737  001114  012134                MOVB    $ITEMB,21$              ;;SET ITEM NUMBER AS ERROR NUMBER
012130  004737  014162                          JSR     PC,$ATY4                ;;REPORT FATAL ERROR TO APT
012134  000                             21$:    .BYTE   0
012135  000                                     .BYTE   0
012136  000777                          22$:    BR      22$                     ;;APT ERROR LOOP
012140  005777  166774                2$:      TST     @$SWR                   ;;HALT ON ERROR
012144  100002                                  BPL     3$                      ;;SKIP IF CONTINUE
012146  000000                                  HALT                            ;;HALT ON ERROR!
012150  104410                                  CKSWR                           ;;TEST FOR CHANGE IN SOFT-SWR
012152  032777  001000  166760          3$:     BIT     #BIT09,@SWR             ;;LOOP ON ERROR SWITCH SET?
012160  001402                                  BEQ     4$                      ;;BR IF NO
012162  013716  001110                          MOV     $LPERR,(SP)             ;;FUDGE RETURN FOR LOOPING
012166  005737  001162                4$:      TST     $ESCAPE                 ;;CHECK FOR AN ESCAPE ADDRESS
012172  001402                                  BEQ     5$                      ;;BR IF NONE
012174  013716  001162                          MOV     $ESCAPE,(SP)            ;;FUDGE RETURN ADDRESS FOR ESCAPE
012200                                  5$:
012200  000002                                  RTI                             ;;RETURN
                                        .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE

                                        ;;**********************************************************************
                                        ;#THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
```

```
                                        ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" (SERRTB),
                                        ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.

012202                                  $ERRTYP:
012202  104401  001171                          TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
012204  010046                                  MOV     R0,-(SP)        ;;SAVE R0
012206  005000                                  CLR     R0              ;;PICKUP THE ITEM INDEX
012210  153700  001114                          BISB    @#$ITEMB,R0
012212  001004                                  BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                                        ;;TYPE THE PC OF THE ERROR
012214  013746  001116                          MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                                        ;;ERROR ADDRESS
012220  104402                                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
012222  000426                                  BR      6$              ;;GET OUT
012224  005300                          1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
012226  006300                                  ASL     R0              ;;      WORK FOR THE ERROR TABLE
012230  006300                                  ASL     R0
012232  006300                                  ASL     R0
012234  062700  001256                          ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
012240  012037  012254                          MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
012244  001404                                  BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
012246  104401                                  TYPE                    ;;TYPE THE "ERROR MESSAGE"
012250  000000                          2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
012252  104401  001171                          TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
012256  012037  012272                  3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
012262  001404                                  BEQ     5$              ;;SKIP TYPEOUT IF 0
012264  104401                                  TYPE                    ;;TYPE THE "DATA HEADER"
012266  000000                          4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
012270  104401  001171                          TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
012274  011000                          5$:     MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
012276  001004                                  BNE     7$              ;;GO TYPE THE DATA
012300  012600                          6$:     MOV     (SP)+,R0        ;;RESTORE R0
012302  104401  001171                          TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
012306  000207                                  RTS     PC              ;;RETURN
012310                                  7$:
012310  013046                                  MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
012312  104402                                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
012314  005710                                  TST     (R0)            ;;IS THERE ANOTHER NUMBER?
012316  001770                                  BEQ     6$              ;;BR IF NO
012320  104401  012332                          TYPE    ,8$             ;;TYPE TWO(2) SPACES
012324  000771                                  BR      7$              ;;LOOP
012326  040040  000           8$:     .ASCIZ  /  /                    ;;TWO(2) SPACES
012332                                  .EVEN
                                        .SBTTL  POWER DOWN AND UP ROUTINES

                                        ;;**************************************************************
                                        ;POWER DOWN ROUTINE
012336  012737  012732  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
012344  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
012352  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
012354  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
012356  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
012360  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
012362  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
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012364 010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
012366 017746 166546                 MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
012372 010637 012506                 MOV     SP,$SAVR6       ;;SAVE SP
012376 012737 012410 000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
012404 000000                        HALT
012406 000776                        BR      .-2             ;;HANG UP

                                     ;;*****************************************************************
                                     ;POWER UP ROUTINE
012410 012737 012502 000024 $PWRUP:  MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
012416 013706 012506                 MOV     $SAVR6,SP       ;;GET SP
012422 005037 012506                 CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
012426 005237 012506         1$:     INC     $SAVR6          ;;WAIT FOR THE INC
012432 001375                        BNE     1$              ;;OF WORD
012434 012677 166500                 MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
012440 012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
012442 012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
012444 012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
012446 012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
012450 012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
012452 012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
012454 012737 012336 000024          MOV     #$PWRON,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
012462 012737 000340 000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
012470 104401                        TYPE                    ;;REPORT THE POWER FAILURE
012472 012510                $PWRMG: .WORD   PWRMSG          ;;POWER FAIL MESSAGE POINTER
012474 012716                        MOV     (PC)+,(SP)      ;;RESTART AT BEGIN
012476 001450                $PWRAD: .WORD   BEGIN           ;;RESTART ADDRESS
012500 000002                        RTI
012502 000000                $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
012504 000776                        BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
012506 000000                $SAVR6: 0                       ;;PUT THE SP HERE
012510 005015 042522 052123  PWRMSG: .ASCIZ  <15><12>/RESTARTING AFTER A POWER FAILURE/<15><12><12>
012516 051101 044524 043516
012524 040440 052106 051105
012532 040440 052040 053517
012540 051105 044040 044501
012546 052514 042522 005015
012554 000012

                                     .EVEN

                                     .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

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

```
                                        ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                        ;*$TYPOS OR $TYPOC
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPON                   ;;CALL FOR TYPEOUT
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT

01[illegible]  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
01[illegible]  116637  000001  013001          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
01[illegible]  116637  01[illegible]03          MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
01[illegible]  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
01[illegible]  000[illegible]                  ER      $TYPON
01[illegible]  112737  000001  013001  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
01[illegible]  112737  000006  013003          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
01[illegible]  112737  000005  013000  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
01[illegible]  010346                          MOV     R3,-(SP)        ;;SAVE R3
01[illegible]  010446                          MOV     R4,-(SP)        ;;SAVE R4
01[illegible]  010546                          MOV     R5,-(SP)        ;;SAVE R5
01[illegible]  113704  013003                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
01[illegible]  005404                          NEG     R4
01[illegible]  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
01[illegible]  110437  013[illegible]          MOVB    R4,$OMODE       ;;SAVE IT FOR USE
01[illegible]  113704  013001                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
01[illegible]  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
                                               CLR     R3              ;;CLEAR THE OUTPUT WORD
                                       1$:     ROL     R5              ;;ROTATE MSB INTO "C"
                                               BR      3$              ;;GO DO MSB
                                       2$:     ROL     R5              ;;FORM THIS DIGIT
                                               ROL     R3
                                               ROL     R5
                                               MOV     R5,R3
                                       3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
                                       013002  DECB    $OMODE          ;;TYPE THIS DIGIT?
                                               BPL     7$              ;;BR IF NO
                                       177770  BIC     #177770,R3      ;;GET RID OF JUNK
                                               BNE     4$              ;;TEST FOR 0
                                               TST     R4              ;;SUPPRESS THIS 0?
                                               BEQ     5$              ;;BR IF YES
                                       4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
                                       000060  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
                                       000040  5$:     BIS     #' ,R3  ;;MAKE ASCII IF NOT ALREADY
                                               MOVB    R3,@S           ;;SAVE FOR TYPING
                                               TYPE    @S              ;;GO TYPE THIS DIGIT
                                       013000  7$:     DECB    $OCNT   ;;COUNT BY 1
                                               BGT     2$              ;;BR IF MORE TO DO
                                               BLT     6$              ;;BR IF DONE
                                               INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
                                               BR      2$              ;;GO DO THE LAST DIGIT
01[illegible]  000744                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
01[illegible]  012605                          MOV     (SP)+,R4        ;;RESTORE R4
01[illegible]  012604
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```
                                        MC,     (SP)+,R3        ;;RESTURE R3
012762  012603
012764  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
012772  012616                          MOV     (SP)+,(SP)
012774  000002                          RTI                     ;;RETURN
012776  000     000             8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
012777  000     000                     .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
013000  000     000             $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
013001  000     000             $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
013002  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
                                .SBTTL  TYPE ROUTINE

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

013004  105737  001157  STYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
013010  100002                  BPL     1$              ;;BR IF YES
013012  000000                  HALT                    ;;HALT HERE IF NO TERMINAL
013014  000430                  BR      3$              ;;LEAVE
013016  010046          1$:     MOV     R0,-(SP)        ;;SAVE R0
013020  017600  000002          MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
013024  122737  000001  001214  CMPB    @#APTENV,$ENV   ;;RUNNING IN APT MODE
013032  001011                  BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
013034  132737  000100  001215  BITB    @#APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
013042  001405                  BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
013044  010037  013054          MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
013050  004737  014152          JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
013054  000000          61$:    .WORD   0               ;;MESSAGE ADDRESS
013056  132737  000040  001215  62$:    BITB    @#APTCSUP,$ENVM ;;APT CONSOLE SUPPRESSED
013064  001003                  BNE     60$             ;;YES,SKIP TYPE OUT
013066  112046          2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
013070  001005                  BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
013072  005726                  TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
013074  012600          60$:    MOV     (SP)+,R0        ;;RESTORE R0
013076  062716  000002          ADD     #2,(SP)         ;;ADJUST RETURN PC
013102  000002                  RTI                     ;;RETURN
013104  122716  000011  4$:     CMPB    @#HT,(SP)       ;;BRANCH IF <HT>
013110  001430                  BEQ     8$
013112  122716  000200          CMPB    @#CRLF,(SP)     ;;BRANCH IF NOT <CRLF>
013116  001006                  BNE     5$
013120  005726                  TST     (SP)+           ;;POP  <CR><LF> EQUIV
013122  104401                  TYPE                    ;;TYPE A CR AND LF
013124  001171                  $CRLF
```

```
2304  013126  105037  013262            CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
2305  013132  000755                    BR      2$              ;;GET NEXT CHARACTER
2306  013134  004737  013216    5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
2307  013140  123726  001156    6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
2308  013144  001350                    BNE     2$              ;;IF NO GO GET NEXT CHAR.
2309  013146  013746  001154            MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
2310                                                            ;;AND THE NULL CHAR.
2311  013152  105366  000001    7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
2312  013156  002770                    BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
2313  013160  004737  013216            JSR     PC,$TYPEC       ;;GO TYPE A NULL
2314  013164  105337  013262            DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
2315  013170  000770                    BR      7$              ;;LOOP
2316
2317                                    ;HORIZONTAL TAB PROCESSOR
2318
2319  013172  112716  000040    8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
2320  013176  004737  013216    9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
2321  013202  132737  000007  013262    BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
2322  013210  001372                    BNE     9$              ;;TAB STOP
2323  013212  005726                    TST     (SP)+           ;;POP SPACE OFF STACK
2324  013214  000724                    BR      2$              ;;GET NEXT CHARACTER
2325  013216  105777  165726    $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
2326  013222  100375                    BPL     $TYPEC
2327  013224  116677  000002  165720    MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
2328  013232  122766  000015  000002    CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
2329  013240  001003                    BNE     1$              ;;BRANCH IF NO
2330  013242  105037  013262            CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
2331  013246  000403                    BR      $TYPEX          ;;EXIT
2332  013250  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
2333  013256  001402                    BEQ     $TYPEX          ;;BRANCH IF YES
2334  013260  105227                    INCB    (PC)+           ;;COUNT THE CHARACTER
2335  013262  000000            $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
2336  013264  000207            $TYPEX: RTS     PC
2337
2338                                    .SBTTL  TTY INPUT ROUTINE
2339
2340                                    ;;******************************************************************
2341                                    .ENABL  LSB
2342
2343                                    ;;******************************************************************
2344                                    ;#SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
2345                                    ;#ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
2346                                    ;#SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
2347                                    ;#WHEN OPERATING IN TTY FLAG MODE.
2348  013266  022737  000176  001140  $CKSWR: CMP     #$SWR,$SWR      ;;IS THE SOFT-SWR SELECTED?
2349  013274  001074                    BNE     1$              ;;BRANCH IF NO
2350  013276  105777  165642            TSTB    @$TKS           ;;CHAR THERE?
2351  013302  100071                    BPL     1$              ;;IF NO, DON'T WAIT AROUND
2352  013304  117746  165636            MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
2353  013310  042716  177600            BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
2354  013314  022726  000007            CMP     #7,(SP)+        ;;IS IT A CONTROL G?
2355  013320  001062                    BNE     1$              ;;NO, RETURN TO USER
2356  013322  123727  001134  000001    CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
2357  013330  001456                    BEQ     1$              ;;BRANCH IF YES
```

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2358
2359  013332  104401  014013            TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (↑G)
2360  013336  104401  014020  $GTSWR:   TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
2361  013342  013746  000176            MOV     $WREG,-(SP)     ;;SAVE $WREG FOR TYPEOUT
2362  013346  104402                    TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2363  013350  104401  014031            TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
2364  013354  005046          19$:      CLR     -(SP)           ;;CLEAR COUNTER
2365  013356  005046                    CLR     -(SP)           ;;THE NEW SWR
2366  013360  105777  165560  7$:       TSTB    @$TKS           ;;CHAR THERE?
2367  013364  100375                    BPL     7$              ;;IF NOT TRY AGAIN
2368
2369  013366  117746  165554            MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
2370  013372  042716  177600            BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
2371
2372
2373
2374  013376  021627  000025  9$:       CMP     (SP),#25        ;;IS IT A CONTROL-U?
2375  013402  001005                    BNE     10$             ;;BRANCH IF NOT
2376  013404  104401  014006            TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (↑U)
2377  013410  062706  000006  20$:      ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
2378  013414  000757                    BR      19$             ;;LET'S TRY IT AGAIN
2379
2390
2391  013416  021627  000015  10$:      CMP     (SP),#15        ;;IS IT A (CR)?
2392  013422  001022                    BNE     16$             ;;BRANCH IF NO
2393  013424  005766  000004            TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
2394  013430  001403                    BEQ     11$             ;;BRANCH IF YES
2395  013432  016677  000002  165500    MOV     2(SP),@SWR      ;;SAVE NEW SWR
2396  013440  062706  000006  11$:      ADD     #6,SP           ;;CLEAR UP STACK
2397  013444  104401  001171  14$:      TYPE    ,$CRLF          ;;ECHO (CR) AND (LF)
2398  013450  123727  001135  000001    CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
2399  013456  001003                    BNE     15$             ;;BRANCH IF NOT
2400  013460  012777  000100  165456    MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
2401  013466  000002  15$:      RTI                             ;;RETURN
2402  013470  004737  013216  16$:      JSR     PC,$TYPEC       ;;ECHO CHAR
2403  013474  021627  000060            CMP     (SP),#60        ;;CHAR < 0?
2404  013500  002420                    BLT     18$             ;;BRANCH IF YES
2405  013502  021627  000067            CMP     (SP),#67        ;;CHAR > 7?
2406  013506  003015                    BGT     18$             ;;BRANCH IF YES
2407  013510  042726  000060            BIC     #60,(SP)+       ;;STRIP-OFF ASCII
2408  013514  005766  000002            TST     2(SP)           ;;IS THIS THE FIRST CHAR
2409  013520  001403                    BEQ     17$             ;;BRANCH IF YES
2410  013522  006316                    ASL     (SP)            ;;NO, SHIFT PRESENT
2411  013524  006316                    ASL     (SP)            ;;    CHAR OVER TO MAKE
2412  013526  006316                    ASL     (SP)            ;;    ROOM FOR NEW ONE.
2413  013530  005266  000002  17$:      INC     2(SP)           ;;KEEP COUNT OF CHAR
2414  013534  056616  177776            BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
2415  013540  000707                    BR      7$              ;;GET THE NEXT ONE
2416  013542  104401  001170  18$:      TYPE    ,$QUES          ;;TYPE ?(CR)(LF)
2417  013546  000720                    BR      20$             ;;SIMULATE CONTROL-U
2418                          .DSABL    LSB
2419
2420
2421                          ;;*****************************************************************
```

```
                                        ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*CALL:
                                        ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                        ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                        ;
013550  011646                  SRDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
013552  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
013560  105777  165360          1$:     TSTB    @#TKS           ;;WAIT FOR
013564  100375                          BPL     1$              ;;A CHARACTER
013566  117766  165354  000004          MOVB    @#TKB,4(SP)     ;;READ THE TTY
013574  042766  177600  000004          BIC     #^C(177),4(SP)  ;;GET RID OF JUNK IF ANY
013602  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
013610  001013                          BNE     3$              ;;BRANCH IF NO
013612  105777  165326          2$:     TSTB    @#TKS           ;;WAIT FOR A CHARACTER
013616  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
013620  117746  165322                  MOVB    @#TKB,-(SP)     ;;GET CHARACTER
013624  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
013630  026427  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
013634  001366                          BNE     2$              ;;IF NOT DISCARD IT
013636  000750                          BR      1$              ;;YES, RESUME
013640  026627  000004  000140  3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
013646  002407                          BLT     4$              ;;BRANCH IF YES
013650  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
013656  003003                          BGT     4$              ;;BRANCH IF YES
013660  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
013666  000002                  4$:     RTI                     ;;GO BACK TO USER
                                        ;;**************************************************
                                        ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                        ;*CALL:
                                        ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
                                        ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                        ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
013670  010346                  $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
013672  012703  013776          1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
013676  022703  014006          2$:     CMP     #$TTYIN+B..,R3  ;;BUFFER FULL?
013702  101405                          BLOS    4$              ;;BR IF YES
013704  104411                          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
013706  112613                          MOVB    (SP)+,(R3)      ;;GET CHARACTER
013710  122713  000177          10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
013714  001003                          BNE     3$              ;;SKIP IF NOT
013716  104401  001170          4$:     TYPE    ,$QUES          ;;TYPE A '?'
013722  000763                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
013724  111337  013774          3$:     MOVB    (R3),@$$        ;;ECHO THE CHARACTER
013730  104401  013774                  TYPE    ,@$$
013734  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
013740  001356                          BNE     2$              ;;LOOP IF NOT RETURN
013742  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
013746  104401  001172                  TYPE    ,$LF            ;;TYPE A LINE FEED
013752  012603                          MOV     (SP)+,R3        ;;RESTORE R3
013754  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
013756  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
```

```
002466  013764  012766  013776  000004          MOV     @STTYIN,4(SP)
002467  013772  000002                          RTI                             ;;RETURN
002470  013774     000                  9$:     .BYTE   0                       ;;STORAGE FOR ASCII CHAR. TO TYPE
002471  013775     000                          .BYTE   0                       ;;TERMINATOR
002472  013776  000010                  $TTYIN: .BLKB   8.                      ;;RESERVE 8 BYTES FOR TTY INPUT
002473  014006  052536  005015     000  $CNTLU: .ASCIZ  /^U/<15><12>            ;;CONTROL "U"
002474  014013     136  006507  000012  $CNTLG: .ASCIZ  /^G/<15><12>            ;;CONTROL "G"
002475  014020  005015  053523  020122  $MSWR:  .ASCIZ  <15><12>/SWR = /
002476  014026  020075     000
002477  014031     040  047040  053505  $MNEW:  .ASCIZ  /  NEW = /
002500  014036  036440  000040
002501                                  .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
002502
002503                                  ;;**************************************************************
002504                                  ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
002505                                  ;*CHANGE IT TO BINARY.
002506                                  ;*CALL:
002507                                  ;*      RDOCT                           ;;READ AN OCTAL NUMBER
002510                                  ;*      RETURN HERE                     ;;LOW ORDER BITS ARE ON TOP OF THE STACK
002511                                  ;*                                      ;;HIGH ORDER BITS ARE IN $HIOCT
002512
002513  014042  011646                  $RDOCT: MOV     (SP),-(SP)              ;;PROVIDE SPACE FOR THE
002514  014044  016666  000004  000002          MOV     4(SP),2(SP)             ;;INPUT NUMBER
002515  014052  010046                          MOV     R0,-(SP)                ;;PUSH R0 ON STACK
002516  014054  010146                          MOV     R1,-(SP)                ;;PUSH R1 ON STACK
002517  014056  010246                          MOV     R2,-(SP)                ;;PUSH R2 ON STACK
002520  014060  104412                  1$:     RDLIN                           ;;READ AN ASCIZ LINE
002521  014062  012600                          MOV     (SP)+,R0                ;;GET ADDRESS OF 1ST CHARACTER
002522  014064  005001                          CLR     R1                      ;;CLEAR DATA WORD
002523  014066  005002                          CLR     R2
002524  014070  112046                  2$:     MOVB    (R0)+,-(SP)             ;;PICKUP THIS CHARACTER
002525  014072  001412                          BEQ     3$                      ;;IF ZERO GET OUT
002526  014074  006301                          ASL     R1                      ;;*2
002527  014076  006102                          ROL     R2
002530  014100  006301                          ASL     R1                      ;;*4
002531  014102  006102                          ROL     R2
002532  014104  006301                          ASL     R1                      ;;*8
002533  014106  006102                          ROL     R2
002534  014110  042716  177770                 BIC     #^C7,(SP)               ;;STRIP THE ASCII JUNK
002535  014114  060201                          ADD     (SP)+,R1                ;;ADD IN THIS DIGIT
002536  014116  000764                          BR      2$                      ;;LOOP
002537  014120  005726                  3$:     TST     (SP)+                   ;;CLEAN TERMINATOR FROM STACK
002540  014122  010166  000012                 MOV     R1,12(SP)               ;;SAVE THE RESULT
002541  014126  010267  014142                 MOV     R2,$HIOCT
002542  014132  012602                          MOV     (SP)+,R2                ;;POP STACK INTO R2
002543  014134  012601                          MOV     (SP)+,R1                ;;POP STACK INTO R1
002544  014136  012600                          MOV     (SP)+,R0                ;;POP STACK INTO R0
002545  014140  000002                          RTI                             ;;RETURN
002546  014142  000000                  $HIOCT: .WORD   0                       ;;HIGH ORDER BITS GO HERE
002547                                  .SBTTL  APT COMMUNICATIONS ROUTINE
002550
002551                                  ;;**************************************************************
002552  014144  112737  000001  014410  $ATY1:  MOVB    #1,$FFLG                ;;TO REPORT FATAL ERROR
002553  014152  112737  000001  014406  $ATY3:  MOVB    #1,$MFLG                ;;TO TYPE A MESSAGE
```

```
2520  014160  000403                          BR      $ATYC
2521  014162  112737  000001  014410  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
2522  014170                          $ATYC:
2523  014170  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
2524  014172  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2525  014174  105737  014406                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
2526  014200  001450                          BEQ     5$              ;;IF NOT:  BR
2527  014202  122737  000001  001214          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
2528  014210  001031                          BNE     3$              ;;IF NOT:  BR
2529  014212  132737  000100  001215          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
2530  014220  001425                          BEQ     3$              ;;IF NOT:  BR
2531  014222  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
2532  014226  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
2533  014234  005737  001174          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
2534  014240  001375                          BNE     1$              ;;IF NOT:  WAIT
2535  014242  010037  001210                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
2536  014246  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
2537  014250  001376                          BNE     2$
2538  014252  163700  001210                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
2539  014256  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
2540  014260  010037  001212                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
2541  014264  012737  000004  001174          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
2542  014272  000413                          BR      5$
2543  014274  017637  000004  014320  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
2544  014302  062766  000002  000004                  ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
2545  014310  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
2546  014314  004737  013004                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
2547  014320  000000                  4$:     .WORD   0
2548  014322                          5$:
2549  014322  105737  014410          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
2550  014326  001416                          BEQ     12$             ;;IF NOT:  BR
2551  014330  005737  001214                  TST     $ENV            ;;RUNNING UNDER APT?
2552  014334  001413                          BEQ     12$             ;;IF NOT:  BR
2553  014336  005737  001174          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
2554  014342  001375                          BNE     11$             ;;IF NOT:  WAIT
2555  014344  017637  000004  001176          MOV     @4(SP),$FATAL   ;;GET ERROR #
2556  014352  062766  000002  000004                  ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
2557  014360  005237  001174                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
2558  014364  105037  014410          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
2559  014370  105037  014407                  CLRB    $LFLG           ;;CLEAR LOG FLAG
2560  014374  105037  014406                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
2561  014400  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
2562  014402  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
2563  014404  000207                          RTS     PC              ;;RETURN
2564  014406  000           $MFLG:    .BYTE   0               ;;MESSG. FLAG
2565  014407  000           $LFLG:    .BYTE   0               ;;LOG FLAG
2566  014410  000           $FFLG:    .BYTE   0               ;;FATAL FLAG
2567  014412                          .EVEN
2568                  000200  APTSIZE=200
2569                  000001  APTENV=001
2570                  000100  APTSPOOL=100
2571                  000040  APTCSUP=040
2572
```

```
                                        .SBTTL  TRAP DECODER

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

014412  010046                  STRAP:  MOV     R0,-(SP)        ;;SAVE R0
014414  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
014420  005740                          TST     -(R0)           ;;BACKUP BY 2
014422  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
014424  006  0                          ASL     R0              ;;POSITION FOR INDEXING
014426  016  0  014446                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
014432  000200                          RTS     R0              ;;GO TO ROUTINE

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

014434  011646                  STRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
014436  016  6  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
014444  000002                          RTI                     ;;RESTORE THE PSW

                                        .SBTTL  TRAP TABLE

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

                                        ;       ROUTINE
                                        ;       -------
014446  014434                  $TRPAD: .WORD   $TRAP2
014450  013004                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
014452  012602                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
014454  012556                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
014456  012616                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
014460  011300                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
014462  011224                          $TYPBN  ;;CALL=TYPBN    TRAP+6(104406)  TYPE BINARY (ASCII) NUMBER

014464  013336                          $GTSWR  ;;CALL=GTSWR    TRAP+7(104407)  GET SOFT-SWR SETTING

014466  013266                          $CKSWR  ;;CALL=CKSWR    TRAP+10(104410) TEST FOR CHANGE IN SOFT-SWR
014470  013550                          $ROCHR  ;;CALL=ROCHR    TRAP+11(104411) TTY TYPEIN CHARACTER ROUTINE
014472  013670                          $ROLIN  ;;CALL=ROLIN    TRAP+12(104412) TTY TYPEIN STRING ROUTINE
014474  014042                          $ROOCT  ;;CALL=ROOCT    TRAP+13(104413) READ AN OCTAL NUMBER FROM TTY

000001                          .END
```

```
AAASE = 170440          410#    526     567     663     664     665     666    1639
ACCNT = 000000          526     569
ACFLG = 000000          526
ACFUCP= 000000          526     541
AOBR    007030         1532    1650#
AOCS    007026         1526#   1529#   1530    1649#
AOOOK   001440          439     669#
AOOOM0 = 000000         526
AOOOM1 = 000000         526
AOOOM1P= 000000         526
AOOOM2 = 000000         526
AOOOM2N= 000000         526
AOOOM2W= 000000         526
AOOOM4= 000000          526
AOOOM5= 000000          526
AOOOMA = 000000         526
AOOOMB = 000000         526
AOOOMC = 000000         526
AOOOMS = 000000         526
AOOOMT = 000000         526
AOOOM7 = 000000         526
AOOOM8 = 000000         526
AOOOM9 = 000000         526
ACEVCT= 000000          526     532
ALEVM = 000000          526     538
AOJR34  010376         1257    1461    1791#
AOJR35  010431         1292    1796#
AOJR36  010464         1327    1801#
AOJR37  010517         1362    1836#
AOJR46  010552         1244    1435    1811#
AOJR47  010605         1279    1816#
AOJR48  010640         1314    1821#
AOJR49  010673         1349    1856#
AOMV    = 000000        526     537
AOMVM = 000000          526     538
AOFATAL= 000000         526     552
AOSOR1= 000000          526     554
AOSOR2= 000000          526     558
AOSORM= 000000          526     562
AOSORMM= 000000         526     564
AOSOS1= 000000          526     548
AOSOS2= 000000          526     550
AOSOSM= 000000          526     552
AOSOSMM= 000000         526     556
AOSOA1= 000000          526     560
AOSOA2= 000000          526     562
AOSOAM= 000000          526     564
AOSOAMM= 000000         526     566
AOSOB1= 000000          526     544
AOSOB2= 000000          526     546
AOSOBM= 000000          526     548
AOSOBMM= 000000         526     550
AOTYP1= 000000          526     545
AOTYP2= 000000          526     557
AOTYP3= 000000          526     560
AOTYP4= 000000          526     563
AOSOS = 000000          526     531
AOSTOP= 000000          526
AOTCBT= 000040         2283    2571#
```

```
APTENV= 000001           2065    2282    2527    2569#
APTSIZ= 000200            714    2568#
APTSPC= 000100           2284    2529    2570#
ASWREG= 000000            526     539
ATESTN= 000000            526     530
AUNIT = 000000            526     533
AUSWR = 000000            526     540
AVECT1= 000000            526     565
AVECT2= 000000            526     566
BADUNT  007004            718*   1418    1640#   2049*
BEGIN   001450            433     671#   2168
BEGINA  001456            670     672#
BEGINI  001462            668     673#
BIT0  = 000001            394#    794    1642
BIT00 = 000001            394#    394
BIT01 = 000002            383#    393
BIT02 = 000004            382#    392
BIT03 = 000010            381#    391
BIT04 = 000020            380#    390
BIT05 = 000040            379#    389
BIT06 = 000100            378#    388
BIT07 = 000200            377#    387
BIT08 = 000400            376#    386    1999
BIT09 = 001000            375#    365    2007    2076
BIT1  = 000002            393#
BIT10 = 002000            374#   2053
BIT11 = 004000            373#    837    850     902     915     969     983    1038    1052    1194    2014
BIT12 = 010000            372#
BIT13 = 020000            371#   2060
BIT14 = 040000            370#   1985
BIT15 = 100000            369#    786
BIT2  = 000004            392#
BIT3  = 000010            391#   1193   1555
BIT4  = 000020            390#
BIT5  = 000040            389#
BIT6  = 000100            388#
BIT7  = 000200            387#   1508   1512    1528
BIT8  = 000400            386#
BIT9  = 001000            385#
LPTVEC= 000014            401#
CALDAC  006104           1265    1300   1335    1370    1477#
CKSUM = 104410           1611    1623   1963    1984    2048    2075    2613#
COMPAR  006520           1216    1229   1441    1467    1489    1569#
CONVRT  006302           1213    1226   1438    1464    1485    1523#
CR    = 000015            309#   2328   2338
CRLF  = 000200            310#   2299   2338
CSPACE  006422           1436    1462   1548#
DACLAD  007002           1425#   1454#  1479#   1639#   1871
DACO    001422            663#    734#   800     815#    816     826#    827     838#    839     851#    852     855     857#
                          858#    867#   869#    870     874#   1083#   1088    1115#   1118    1172#   1242    1256    1266
                         1591    1613#  1630#   1863
DAC1    001424            664#    735#   738#    801     882#    883     892#    893     903#    904     916#    917     920
                          922#    923#   932#    934#    935     939#   1084#   1094    1128#   1131    1173#   1277    1291
                         1301    1593   1614#   1631#   1865
```

```
DAC2    001426          665#  736*  739*  802   947*  948   958*  959   970*  971   984*  985   988
                        990*  991*  1000*  1002*  1003  1007*  1085*  1100  1142*  1145  1174*  1312  1326
                        1336  1595  1615*  1632*  1867
DAC3    001430          666#  737*  740*  803   1016*  1017  1027*  1028  1033*  1040  1053*  1054  1057
                        1059*  1060*  1069*  1071*  1072  1076*  1086*  1106  1154*  1158  1175*  1196*  1347
                        1361  1371  1597  1616*  1633*  1869
DDISP = 177570          316#  507   702
DF0     011204          593   599   605   611   617   623   629   635   641   647   653   1873#
DH1     010267          597   603   609   615   651   1777#
DH2     010322          591   1782#
DH6     010337          621   627   633   639   645   1785#
D       A  1142         507#  702*  710*  2029*  2052*
D       E  0174         430#  710
D       N  7024         1197  1648#
DSWR    = 177570        315#  506   701
DT1     011112          582   1853#
DT2     011120          588   1854#
DT3     011132          604   1855#
DT4     011144          610   1857#
DT5     011156          616   652   1859#
DT6     011170          622   628   634   640   646   1871#
DYNCRL  006716          436   1621#
EMTVEC= 000030          404#  686*  687*
EM1     007122          590   1668#
EM10    007472          632   1709#
EM11    007537          638   1716#
EM12    007574          644   1721#
EM13    007631          650   1726#
EM14    007675          656   1733#
EM2     007176          596   1676#
EM3     007225          602   1683#
EM4     007254          608   1688#
EM5     007303          614   1693#
EM6     007332          620   1692#
EM7     007413          626   1701#
ERRTOT  010176          1414  1766#
ERRVEC= 000004          397#  699   700*  711*  759*  799*  807*  809*  1990  1991*  1993*  1996*
ETX     = 000003        1852#  1856  1860
EVEB    001420          662#  674*  773   785*  786*  798   1169
FILE    007022          1504*  1508*  1512*  1516*  1647#
FOUND1  010224          778   1770#
FOUND2  010250          784   1774#
FULRMP  006570          434   1589#
GAIDAC  005764          1255  1290  1325  1360  1452#
GNS     = ######  U     429   2604  2605  2606  2607  2608  2609  2611  2613  2614  2615  2616
GTSWR   = 104407        2611#
HT      = 000011        307#  2297  2338
INIT1   007044          719   743#  1420
INIT2   007576          1406  1412#
IOTVEC= 000020          402#  684*  685*
LDSPAC  007746          1548  1740#
LDTRAP  001746          722#  743   793   1590  1610  1622
LF      = 000012        308#  2332  2338
MASKMM  007010          757*  794*  1176*  1642#  2049
```

```
MESGD   010210          1417    1768#
MSGSW   010011           751    1746#
MTEST   002102           745     747     756#
NUMBOK  007006           669#    671#    765    1641#
N51200  011064          1432    1853#
OFFDAC  005634          1241    1276    1311    1346    1423#
PC     =%000007          328#    741#    743#    793#   1216#   1229#   1387#   1390#   1400#   1405    1436#   1441#   1462#
                        1467#   1489#   1563#   1581#   1585#   1590#   1592#   1594#   1596#   1598#   1605#   1610#   1622#
                        1625#   1627#   1637#   2062#   2068#   2121#   2167    2287#   2306#   2313#   2320#   2334#   2336#
                        2392#   2546#   2563#
PIRQ    = 177772         3148
PIRQVE= 000240           4088
PR0     = 000000         3318
PR1     = 000040         3328
PR2     = 000100         3338
PR3     = 000140         3348
PR4     = 000200         3358
PR5     = 000240         3368
PR6     = 000300         3378
PR7     = 000340         3388
PS      = 177776         3118    312
PSW     = 177776         3128
PUMSG   012510          2166    2173#
PUMVEC= 000024           403#    690#    691#   2135#   2136#   2145#   2151#   2163#   2164#
PS1175  011077          1458    1857#
POCHR   = 104411        2451    2614#
POLIN   = 104412        2492    2615#
POOCT   = 104413        2616#
REMAIN  004530           808    1162#
RESVEC= 000310           398#
R0     =%000000          319#    733#    734     735     736     737    1397#   1400    1501#   1502    1569    1571#   1573#
                        1575#   1576    1579#   1584#   1591#   1593#   1595#   1597#   1601#   1602#   1603    1612#   1613
                        1614    1615    1616    1624#   1626#   1630    1631    1632    1633    1634#   1635#   1914    1924#
                        1928    1944    1945    1958#   2093    2094#   2095#   2102#   2103#   2104#   2105#   2106#   2107
                        2112    2117#   2119#   2123    2125    2137    2162#   2280    2281#   2286    2291    2294#   2489
                        2493#   2496    2512#   2523    2531#   2535    2536    2538#   2539#   2540    2562#   2581    2582#
                        2583    2584#   2585#   2586#   2587#
R1     =%000001          320#    723#    724#    725#    726    1502#   1504    1505#   1506#   1509#   1510#   1515#   1517#
                        1570    1572#   1573    1578#   1583#   1[illegible]   1[illegible]   1[illegible]   1915    1928#   1429    1933
                        1957#   2138    2161#   2490    2494#   2503#   2500#   2[illegible]   2505#   2[illegible]   2511#   2524    2561#
R2     =%000002          321#    722#    754     726#    727     728    1916    1927#   1931#   1934    1941#   1942#   1943
                        1948#   1956#   2139    2160#   2491    2495#   2499#   2501#   2503#   2509    2510#
R3     =%000003          322#    1917    1925#   1926#   1940#   1943#   1952#   1953#   1[illegible]   2140    2159#   2215    2224#
                        2230#   2231#   2234#   2239#   2240#   2241    2250#   2447    2448#   2449    2452#   2453    2457
                        2459    2461#   2463#
R4     =%000004          323#    2141    2[illegible]   2216    2218#   2219#   2220#   2221    2222#   2236    2238#   2246#   2249#
R5     =%000005          324#    1213#   1226#   1241#   1255#   1265#   1276#   1290#   1300#   1311#   1325#   1335#   1346#
                        1360#   1370#   1423    1426    1427    1428    1431#   1438#   1447#   1452    1455    1456    1457#
                        1464#   1473#   1477    1480    1485#   1495#   1501    1519#   1523    1540#   1918    1920#   1922#
                        1929#   1933#   1948    1954#   2142    2157#   2217    2223#   2225#   2227#   2228#   2229#   2230
                        2248#
R6     =%000006          325#    327     678#    679#    680
R7     =%000007          326#    328
SELDO   010726          1243    1430    1832#
```

DVAAAA.P11 CROSS REFERENCE TABLE

```
TESTER  001432              442    667#
TITLE   007040              753   1659#
TKVEC = 000060              406#
TPVEC = 000064              407#
TRAPVE= 000034              405#   688*   689*
TRTVEC= 000014              400#
TRYAGN  011016             1445   1471   1844#
TST1    002306              772    798#  1178
TST10   00[illegible]752    [illegible]95   890#
TST11   003010              895    900#
TST12   003062              913#
TST13   003154              929#
TST14   003250              945#
TST15   003304              950    956#
TST16   003342              961    967#
TST17   003414              981#
TST2    00[illegible]364    813#
TST20   00[illegible]506    997#
TST21   003602             1014#
TST22   003636             1019   1025#
TST23   003674             1030   1036#
TST24   003746             1050#
TST25   004040             1066#
TST26   004134             1082#
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                 849   854   862   863   864   865   872   876   878   879   880   881   886   893   899
                 890   891   896   897   899   900   901   906   911   912   913   914   919   927   928
                 929   930   937   941   943   944   945   946   951   954   957   958   959   965   969
                 966   967   968   973   979   980   991   992   987   995   996   997   998  1003  1009
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I06


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        1521    1546    1567    1587    1607    1619    1655    1657    1877    1901    1968    2033    2084    2131    2182
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         533     534     535     539     540     541     554     558     561     564     565     566     567     568     569
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ERRORS DETECTED: 0

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RUN-TIME:  54 64 6 SECONDS
CORE USED:  33K
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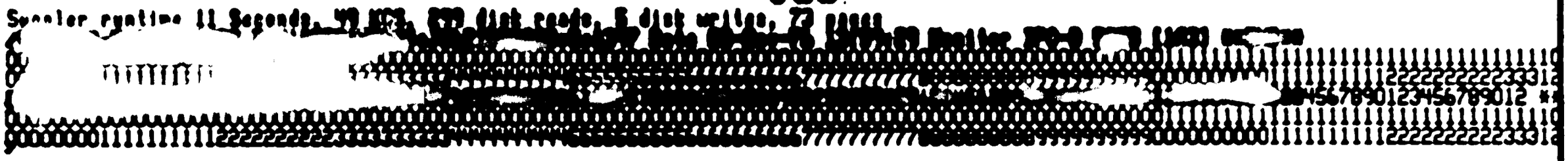
JOB



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 158                          ...E1    2582  014414  016600    ...E5
 209                          ...F1  .ODNIO=  000000            ...F5
 251                          ...G1  BHOUNT   007004            ...G5
 305                          ...H1  OH2      010322            ...H5
 359                          ...I1                             ...I5
                              ...J1                             ...J5
 420                          ...K1  TSTI1    003010            ...K5
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 729  001772  001371          ...E2                973     987   ...E6
 763  002144  005737          ...F2                930     931   ...F6
 804  002336  000407          ...G2                822     823   ...G6
 854  002570  001407          ...H2                849     864   ...H6
 906  003050  001401          ...I2               1260    1268   ...I6
 951  003302  104004          ...J2   **END** USER DAVIES,TOM   ...J6
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1277  005170  001424          ...E3
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1989                          ...G4
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