LSI-11

SUITCASE TEST

MD-11-DWQAA-A

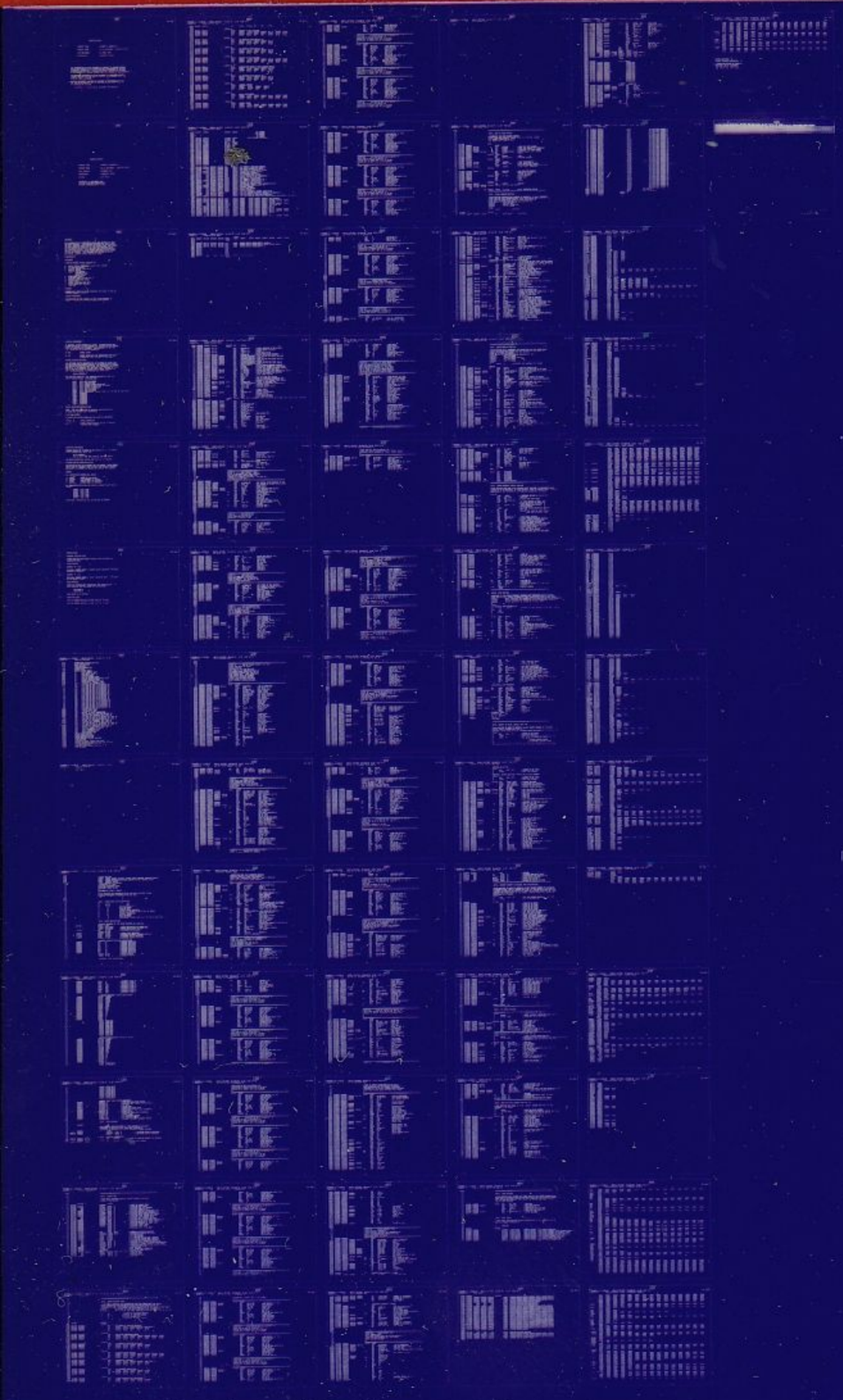
EP-DWQAA-A-DL-A

FICHE 1 OF 1

OCT 1976

digital

Made In U.S.A.



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DWQAA-A-D
PRODUCT NAME: LSI-11 SUITCASE 11W03-AA SYSTEM
DATE RELEASED: 21 APRIL 1976
MAINTAINER: DIAGNOSTIC GROUP

PROGRAM HISTORY

PRODUCT CODE: MAINDEC-11-DWQAA-A-D
PRODUCT NAME: LSI-11 SUITCASE 11W03-AA SYSTEM
DATE CREATED: DECEMBER 1975
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: JOHN EGOLF

1. ABSTRACT

MD-11-DWQAA-A IS A DIAGNOSTIC WHICH WAS WRITTEN TO TEST THE MS911 MODULE. THIS PROGRAM VERIFIES THE DATA WITHIN THE ROM, VERIFIES FUNCTIONS OF THE 600HZ CLOCK, AND CHECKS THE BUS BUFFER BY MEANS OF THE TEST BOX PROVIDED WITH THE 11W03-AA SYSTEM. THIS PROGRAM WAS WRITTEN EXPRESSLY FOR THE 11W03-AA SYSTEM AND TAKES ADVANTAGE OF ALL UNITS WITHIN THE SYSTEM. THIS PROGRAM MUST BE RUN AFTER ALL CPU TESTS, MEMORY TESTS, AND DLV11 TESTS.

2. REQUIREMENTS

2.1 EQUIPMENT

11W03-AA SYSTEM, WHICH CONSISTS OF:

A. KD11-F LSI-11 PROCESSOR (WITH 4K OF MEMORY)
B. 12K MOS RAM MEMORY
C. 2 DLV11 SERIAL LINE UNITS
D. SPECIAL MODULE
   MS911 - BUS BUFFER
           BOOTSTRAP ROM
           600HZ CLOCK
E. H780 POWER SUPPLY
F. ALUMINUM CASE 17 X 21 X 7.5"
G. SPECIAL OPERATORS PANEL
H. POWER CORD
I. CABLE, EXTERNAL BUS -6FT.
J. H9270 BACKPLANE ASSEMBLY
K. TEST BOX

2.2 STORAGE

PROGRAM WILL LOAD IN 4K BUT RESERVES THE RIGHT TO USE 16K (ADDRESS 000000 - 077777).

3. LOADING PROCEDURE

THIS PROGRAM MAY BE LOADED LIKE ANY OTHER PROGRAM IS LOADED. THERE ARE NO SPECIAL LOADING PROCEDURES.

4. STARTING PROCEDURE

IF DESIRED, AFTER PROGRAM IS LOADED, SOFTWARE SWITCH REGISTER MAY BE SET AS PER SECTION 4.1 (USING LSI-ODT) BEFORE START OF EXECUTION OF PROGRAM. AS DISCUSSED IN SECTION 4.2, THERE ARE TWO STARTING ADDRESSES:

SA 200	NORMAL START
SA 210	NORMAL START BUT THE OPPORTUNITY TO "GOTO" A SELECTED TEST IS GIVEN TO THE USER.

4.1 CONTROL SWITCH SETTINGS

THE SOFTWARE SWITCH REGISTER MAY BE ALTERED BY USING LSI-ODT AND MODIFYING ADDRESS 000176. AN EASIER WAY TO CHANGE THE SWITCH REGISTER IS THAT AFTER THE DIAGNOSTIC IS STARTED AND WHILE IT IS RUNNING THE USER MAY TYPE "CONTROL G" (↑G) AND IF THE CPU PRIORITY ALLOWS (AND A RESET INSTRUCTION ISN'T BEING EXECUTED) THE PROGRAM WILL PRINT OUT:

(SWR)=/000000/=/

THE USER MAY THEN HIT (CR) CARRIAGE RETURN OR TYPE (IN OCTAL) NEW SETTINGS. SWITCHES ARE:

SW15	SET: HALT ON ERROR
SW14	SET: LOOP ON TEST
SW13	SET: INHIBIT ERROR PRINT-OUT.
SW12	SET: ESCAPE TO NEXT TEST ON ERROR.
SW11	SET: INHIBIT ITERATIONS
SW10	SET: BELL ON ERROR
SW09	SET: LOOP ON ERROR
SW08	SET: CONFIDENCE; -PRINT TEST # AT 1ST END OF EACH TEST.
SW07	RESERVED
SW06	RESERVED
SW05	RESERVED
SW04	RESERVED
SW03	RESERVED
SW02	RESERVED
SW01	RESERVED
SW00	RESERVED

4.1.2 SWITCH REGISTER RESTRICTIONS

NONE. FOR THE EXCEPTION OF SW12 ALL SWITCH REGISTER OPTIONS ARE "SYSMAC.SML" COMPATABLE.

4.2 STARTING ADDRESS

AS MENTIONED BEFORE THERE ARE TWO STARTING ADDRESSES:

SA 200	NORMAL OPERATION
SA 210	NORMAL OPERATION WITH OPTION TO SPECIFY STARTING TEST NUMBER.

5. OPERATING PROCEDURE

SEQ 0005

PROGRAM SHOULD BE STARTED AS PER SECTION 4.2. ON INITIAL START PROGRAM WILL PRINT OUT:

MD-11-DWQAA-A
LSI-11 SUIT-CASE ROM, 600 HZ, AND BUS TESTS

AND BEGIN EXECUTION (OR ASK FOR TEST NO. IF SA=210).

5.2 PROGRAM AND/OR OPERATOR ACTION

SWR SHOULD BE SET TO "100000" HALT ON ERROR. AFTER ERROR MODIFY SWR TO "060000" LOOP ON TEST AND INHIBIT PRINTOUT AND START AT ADDRESS 210 SPECIFING FAILING TEST NUMBER.

6. ERRORS

ALL CONTROLABLE ERRORS WILL PRINT:

1) ERRPC ERROR PC (IN OCTAL)
2) $TSTNM TEST NUMBER (IN OCTAL)
3) $PASS PASSES MADE (IN DECIMAL)
4) $ERTLL ERRORS MADE (IN DECIMAL)

ALL PROCESSOR REGISTERS ARE SAVED IN MEMORY LOCATIONS ON ERRORS.

SAVR0 LOC: 1420
SAVR1 LOC: 1422
SAVR2 LOC: 1424
SAVR3 LOC: 1426
SAVR4 LOC: 1430
SAVR5 LOC: 1432

ADDITIONAL INFORMATION WILL BE PRINTED AS NEEDED.

7. RESTRICTIONS SEQ 0006

7.1 HARDWARE RESTRICTIONS

SYSTEM MUST BE CONFIGURED *EXACTLY* AS OUTLINED FOR 11M03-AA SYSTEM.

8. MISCELLANEOUS

8.1 CONTROL "G" (↑G)

THIS WILL ENABLE USER TO CHANGE SWITCH REGISTER (PROVIDED PROGRAM IS RUNNING).

8.2 CONTROL "T" (↑T)

THIS WILL ENABLE USER TO "GOTO" SELECTED TEST. (CPU MUST NOT BE DOING A RESET.)

8.3 PASS COMPLETE

THIS IS A "SYSMAC.SML" COMPATIBLE END PASS ROUTINE. AT PASS COMPLETE THE FOLLOWING WILL BE PRINTED:

```
END PASS #      1
END PASS #      2
```

PASS COUNT IS IN DECIMAL.

8.4 EXECUTION TIME

WITH NO ERRORS AND SW11=0 PASS TIME IS <8 MINS.

WITH NO ERRORS AND SW11=1 PASS TIME IS <2 MINS.

```
 4694
 4701                                .ENABLE ABS,AMA
 4702                                .MCALL  .SUPHI,.EQUAT,.SCATN,.SCMTAD,.SEOP,.SERROR,.SERRTYP,.TYPNAM
 4703                                .MCALL  .SIRP,.$TYPOCT,.$TYPDEC,.$SCOPE,.$TYPE,.HEADER,.SETUP
 4704                                .MCALL  .$RDOCT,.$READ
 4713                                .TITLE  MAINDEC-11-11W03A-A
  (1)                               ;*COPYRIGHT (C) 1975
  (1)                               ;*DIGITAL EQUIPMENT CORP.
  (1)                               ;*MAYNARD, MASS. 01754
  (1)                               ;*
  (1)                               ;*PROGRAM BY JOHN C. EGOLF
  (1)                               ;*
  (1)                               ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
  (1)                               ;*PACKAGE (MAINDEC-11-DZQAC-B1),FJG 29,1975.
  (1)                               ;*
 4714
 4715
  (1)                               .SBTTL  OPERATIONAL SWITCH SETTINGS
  (1)                               ;*
  (1)                               ;*      SWITCH                  USE
  (1)                               ;*      ------          ------------------
  (1)                               ;*        15            HALT ON ERROR
  (1)                               ;*        14            LOOP ON TEST
  (1)                               ;*        13            INHIBIT ERROR TYPEOUTS
  (1)                               ;*        12            SWITCH 12: ESCAPE TO NEXT TEST ON ERROR.
  (1)                               ;*        11            INHIBIT ITERATIONS
  (1)                               ;*        10            BELL ON ERROR
  (1)                               ;*         9            LOOP ON ERROR
  (1)                               ;*         8            CONFIDENCE: -PRINT TEST # AT 1ST END OF EACH TEST
 4716
  (1)                               .SBTTL  BASIC DEFINITIONS
  (1)
  (1)                               ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
  (1)            001100             STACK=  1100
  (1)                               .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
  (1)                               .EQUIV  TOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
  (1)            177776             PS=     177776          ;;PROCESSOR STATUS WORD
  (1)                               .EQUIV  PS,PSW
  (1)            177774             STKLMT= 177774          ;;STACK LIMIT REGISTER
  (1)            177772             PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
  (1)            177570             DSWR=   177570          ;;HARDWARE SWITCH REGISTER
  (1)            177570             DDISP=  177570          ;;HARDWARE DISPLAY REGISTER
  (1)
  (1)                               ;*GENERAL PURPOSE REGISTER DEFINITIONS
  (1)            000000             R0=     %0              ;;GENERAL REGISTER
  (1)            000001             R1=     %1              ;;GENERAL REGISTER
  (1)            000002             R2=     %2              ;;GENERAL REGISTER
  (1)            000003             R3=     %3              ;;GENERAL REGISTER
  (1)            000004             R4=     %4              ;;GENERAL REGISTER
  (1)            000005             R5=     %5              ;;GENERAL REGISTER
  (1)            000006             R6=     %6              ;;GENERAL REGISTER
  (1)            000007             R7=     %7              ;;GENERAL REGISTER
  (1)                               .EQUIV  R6,SP           ;;STACK POINTER
  (1)                               .EQUIV  R7,PC           ;;PROGRAM COUNTER
  (1)
  (1)                               ;*PRIORITY LEVEL DEFINITIONS
```

```
(1)                                PR0=    0               ;;PRIORITY LEVEL 0
(1)                                PR1=    40              ;;PRIORITY LEVEL 1
(1)                                PR2=    100             ;;PRIORITY LEVEL 2
(1)                                PR3=    140             ;;PRIORITY LEVEL 3
(1)                                PR4=    200             ;;PRIORITY LEVEL 4
(1)                                PR5=    240             ;;PRIORITY LEVEL 5
(1)                                PR6=    300             ;;PRIORITY LEVEL 6
(1)                                PR7=    340             ;;PRIORITY LEVEL 7
(1)
(1)                                ;*"SWITCH REGISTER" SWITCH DEFINITIONS
(1)                                SW15=   100000
(1)                                SW14=   40000
(1)                                SW13=   20000
(1)                                SW12=   10000
(1)                                SW11=   4000
(1)                                SW10=   2000
(1)                                SW09=   1000
(1)                                SW08=   400
(1)                                SW07=   200
(1)                                SW06=   100
(1)                                SW05=   40
(1)                                SW04=   20
(1)                                SW03=   10
(1)                                SW02=   4
(1)                                SW01=   2
(1)                                SW00=   1
(1)                                .EQUIV  SW09,SW9
(1)                                .EQUIV  SW08,SW8
(1)                                .EQUIV  SW07,SW7
(1)                                .EQUIV  SW06,SW6
(1)                                .EQUIV  SW05,SW5
(1)                                .EQUIV  SW04,SW4
(1)                                .EQUIV  SW03,SW3
(1)                                .EQUIV  SW02,SW2
(1)                                .EQUIV  SW01,SW1
(1)                                .EQUIV  SW00,SW0
(1)
(1)                                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
(1)                                BIT15=  100000
(1)                                BIT14=  40000
(1)                                BIT13=  20000
(1)                                BIT12=  10000
(1)                                BIT11=  4000
(1)                                BIT10=  2000
(1)                                BIT09=  1000
(1)                                BIT08=  400
(1)                                BIT07=  200
(1)                                BIT06=  100
(1)                                BIT05=  40
(1)                                BIT04=  20
(1)                                BIT03=  10
(1)                                BIT02=  4
(1)                                BIT01=  2
(1)                                BIT00=  1
(1)                                .EQUIV  BIT09,BIT9
(1)                                .EQUIV  BIT08,BIT8
```

```
(1)                             .EQUIV  BIT07,BIT7
(1)                             .EQUIV  BIT06,BIT6
(1)                             .EQUIV  BIT05,BIT5
(1)                             .EQUIV  BIT04,BIT4
(1)                             .EQUIV  BIT03,BIT3
(1)                             .EQUIV  BIT02,BIT2
(1)                             .EQUIV  BIT01,BIT1
(1)                             .EQUIV  BIT00,BIT0
(1)
(1)                             ;*BASIC "CPU" TRAP VECTOR ADDRESSES
(1)          000004             ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
(1)          000010             RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
(1)          000014             TBITVEC=14              ;;"T" BIT
(1)          000014             TRTVEC= 14              ;;TRACE TRAP
(1)          000014             BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
(1)          000020             IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
(1)          000024             PWRVEC= 24              ;;POWER FAIL
(1)          000030             EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
(1)          000034             TRAPVEC=34              ;;"TRAP" TRAP
(1)          000060             TKVEC=  60              ;;TTY KEYBOARD VECTOR
(1)          000064             TPVEC=  64              ;;TTY PRINTER VECTOR
(1)          000240             PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
4717
(1)                             .SBTTL  TRAP CATCHER
(1)
(1)          000000                     .=0
(1)                             ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
(1)                             ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
(1)                             ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
(1)          000174                     .=174
(1)  000174  000000             DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
(1)  000176  000000             SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
(1)
(1)                             .SBTTL  STARTING ADDRESS(ES)
(1)  000200  000137  003732             JMP     @#START         ;;JUMP TO STARTING ADDRESS OF PROGRAM
4718         000210             .=210
4719  000210  000137  003726             JMP     SETTST          ;ASK FOR TEST NUMBER.
```

```
                                ;*****************************************************************

                                .SBTTL  COMMON TAGS

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

                    001100              .=1100
001100                          $CMTAG:                 ;;START OF COMMON TAGS
001100  000000      $PASS:  .WORD   0                   ;;CONTAINS PASS COUNT
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      $GOADR: .WORD   0                   ;;CONTAINS ADDRESS O 'GOOD' DATA
001122  000000      $BOADR: .WORD   0                   ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000      $GODAT: .WORD   0                   ;;CONTAINS 'GOOD' DATA
001126  000000      $BODAT: .WORD   0                   ;;CONTAINS 'BAD' DATA
001130  000000              .WORD   0                   ;;RESERVED--NOT TO BE USED
001132  000000              .WORD   0
001134  000000              .WORD   0
001136  177570      $SWR:   .WORD   DSWR                ;;ADDRESS OF SWITCH REGISTER
001140  177570      DISPLAY: .WORD  DDISP               ;;ADDRESS OF DISPLAY REGISTER
001142  177560      $TKS:   177560                      ;;TTY KBD STATUS
001144  177562      $TKB:   177562                      ;;TTY KBD BUFFER
001146  177564      $TPS:   177564                      ;;TTY PRINTER STATUS REG. ADDRESS
001150  177566      $TPB:   177566                      ;;TTY PRINTER BUFFER REG. ADDRESS
001152  000         $NULL:  .BYTE   0                   ;;CONTAINS NULL CHARACTER FOR FILLS
001153  002         $FILLS: .BYTE   2                   ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001154  012         $FILLC: .BYTE   12                  ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001155  000         $TPFLG: .BYTE   0                   ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
(3) 001156  000000      $TMP0:  .WORD   0               ;;USER DEFINED
001160  000000      $TIMES: 0                           ;;MAX. NUMBER OF ITERATIONS
001162  000000      $ESCAPE:0                           ;;ESCAPE ON ERROR ADDRESS
001164  177607  000377  $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001170  077         $QUES:  .ASCII  /?/                 ;;QUESTION MARK
001171  015         $CRLF:  .ASCII  <15>                ;;CARRIAGE RETURN
001172  000012      $LF:    .ASCIZ  <12>                ;;LINE FEED
```

```
   (2)                                  ;*****************************************************************
   (1)
   (1)                                  .SBTTL  ERROR POINTER TABLE
   (1)
   (1)                                  ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
   (1)                                  ;*...E INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
   (1)                                  ;#LOCATION SITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
   (1)                                  ;#NOTE1:        IF SITEMB IS 0 THE ONLY PERTINENT DATA IS (SP-PPC).
   (1)                                  ;#NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
   (1)
   (1)                                  ;*      EM              ;;POINTS TO THE ERROR MESSAGE
   (1)                                  ;*      DH              ;;POINTS TO THE DATA HEADER
   (1)                                  ;*      DT              ;;POINTS TO THE DATA
   (1)                                  ;*      DF              ;;POINTS TO THE DATA FORMAT
   (1)
   (1)
   (1)  001174                          $ERRTB:
 4721                                   ;ERROR 1
 4722  001174  001442                          EM1     ;NO "BREPLY" FROM ROM ADDRESS.
 4723  001176  002520                          DH1     ;ERRPC   TSTNO   PASCNT  ERRCNT  ROM ADDRESS
 4724  001200  003650                          DT1     ;$ERRPC  MSKTST  $PASS   $ERTTL  SAVR0
 4725  001202  003716                          DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
 4726
 4727                                   ;ERROR 2
 4728  001204  001500                          EM2     ;ROM DATA COMPARISON ERROR.
 4729  001206  002574                          DH2     ;ERRPC   TSTNO   PASCNT  ERRCNT  ROMADD  WANTED  FOUND
 4730  001210  003664                          DT2     ;$ERRPC  MSKTST  $PASS   $ERTTL  SAVR0   SAVR5   SAVR4
 4731  001212  003716                          DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL   OCTAL   OCTAL
 4732
 4733                                   ;ERROR 3
 4734  001214  001533                          EM3     ;NO "BREPLY" FROM 600 HZ CLOCK.
 4735  001216  002662                          DH3     ;ERRPC   TSTNO   PASCNT  ERRCNT  CLKCSR
 4736  001220  003650                          DT1     ;$ERRPC  MSKTST  $PASS   $ERTTL  SAVR0
 4737  001222  003716                          DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
 4738
 4739                                   ;ERROR 4
 4740  001224  001572                          EM4     ;CLOCK R/W BITS FAILED.
 4741  001226  002731                          DH4     ;ERRPC   TSTNO   PASCNT  ERRCNT  CLKCSR  WANTED  FOUND
 4742  001230  003664                          DT2     ;$ERRPC  MSKTST  $PASS   $ERTTL  SAVR0   SAVR5   SAVR4
 4743  001232  003716                          DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL   OCTAL   OCTAL
 4744
 4745  001234  001624                   ;ERROR 5
 4746  001236  003017                          EM5     ;UNEXPECTED INTERUPT.
 4747  001240  003650                          DH5     ;ERRPC   TSTNO   PASCNT  ERRCNT  (SP)-TRAP PC
 4748  001242  003716                          DT1     ;$ERRPC  MSKYST  $PASS   $ERTTL  SAVR0
 4749                                          DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
 4750                                   ;ERROR 6
 4751  001244  001651                          EM6     ;NO INTERUPT FROM CLOCK.
 4752  001246  002662                          DH3     ;ERRPC   TSTNO   PASCNT  ERRCNT  CLKCSR
 4753  001250  003650                          DT1     ;$ERRPC  MSKTST  $PASS   $ERTTL  SAVR0
 4754  001252  003716                          DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
 4755
 4756                                   ;ERROR 7
 4757  001254  001701                          EM7     ;CLOCK INTERUPTS NOT CONSISTANT.
 4758  001256  002662                          DH3     ;ERRPC   TSTNO   PASCNT  ERRCNT  CLKCSR
 4759  001260  003650                          DT1     ;$ERRPC  MSKTST  $PASS   $ERTTL  SAVR0
```

```
4760  001262  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
4761
4762                                  ;ERROR 10
4763  001264  001741                        EM10    ;DEVICE "A" R/W FAILURE.
4764  001266  003210                        DH10    ;ERRPC   TSTNO   PASCNT  ERRCNT  DEV.A   WANTED  FOUND
4765  001270  003664                        DT2     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0   SAVR5   SAVR4
4766  001272  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL   OCTAL   OCTAL
4767
4768                                  ;ERROR 11
4769  001274  001771                        EM11    ;NO "BREPLY" FROM DEVICE 'A'.
4770  001276  003074                        DH6     ;ERRPC   TSTNO   PASCNT  ERRCNT  DEV.A
4771  001300  003650                        DT1     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0
4772  001302  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
4773
4774                                  ;ERROR 12
4775  001304  002026                        EM12    ;NO "BREPLY" FROM DEVICE 'B'.
4776  001306  003142                        DH7     ;ERRPC   TSTNO   PASCNT  ERRCNT  DEV.B
4777  001310  003650                        DT1     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0
4778  001312  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
4779
4780                                  ;ERROR 13
4781  001314  002063                        EM13    ;DEVICE "B" R/W FAILURE.
4782  001316  003276                        DH11    ;ERRPC   TSTNO   PASCNT  ERRCNT  DEV.B   WANTED  FOUND
4783  001320  003664                        DT2     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0   SAVR5   SAVR4
4784  001322  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL   OCTAL   OCTAL
4785
4786                                  ;ERROR 14
4787  001324  002113                        EM14    ;UNEXPECTED "BREPLY" FROM UNKNOWN DEVICE.
4788  001326  003364                        DH12    ;ERRPC   TSTNO   PASCNT  ERRCNT  DEVICE
4789  001330  003650                        DT1     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0
4790  001332  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
4791
4792                                  ;ERROR 15
4793  001334  002164                        EM15    ;NO INTERUPT FROM DEVICE 'B'.
4794  001336  003142                        DH7     ;ERRPC   TSTNO   PASCNT  ERRCNT  DEV.B
4795  001340  003650                        DT1     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0
4796  001342  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL
4797
4798                                  ;ERROR 16
4799  001344  002220                        EM16    ;GENERAL ERROR!
4800  001346  003433                        DH13    ;ERRPC   TSTNO   PASCNT  ERRCNT
4801  001350  003704                        DT3     ;SERRPC  MSKTST  $PASS   $ERTTL
4802  001352  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC
4803
4804                                  ;ERROR 17
4805  001354  002237                        EM17    ;DLV11 DATA ERROR.
4806  001356  003474                        DH14    ;ERRPC   TSTNO   PASCNT  ERRCNT  DLV11   WANTED  FOUND
4807  001360  003664                        DT2     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0   SAVR5   SAVR4
4808  001362  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL   OCTAL   OCTAL
4809
4810                                  ;ERROR 20
4811  001364  002261                        EM20    ;MEMORY ERROR.
4812  001366  003562                        DH15    ;ERRPC   TSTNO   PASCNT  ERRCNT  MEMORY  WANTED  FOUND
4813  001370  003664                        DT2     ;SERRPC  MSKTST  $PASS   $ERTTL  SAVR0   SAVR5   SAVR4
4814  001372  003716                        DF1     ;OCTAL   OCTAL   DEC     DEC     OCTAL   OCTAL   OCTAL
4815
```

```
 4817  001374  100000                  MEMSIZ: 100000                  ; 16K 100000
 4818                                                                  ; 12K 060000
 4819                                                                  ;  8K 040000
 4820                                                                  ;  4K 020000
 4821  001376  177546                  CLKCSR: 177546          ;CLOCK CONTROL REGISTER
 4822  001400  000100                  CLKVEC: 100
 4823  001402  000102                  CLKPTY: 102
 4824  001404  172524                  DEV.A:  172524
 4825  001406  165250                  DEV.B:  165250
 4826  001410  000340                  B.AVEC: 340
 4827  001412  000342                  B.APTY: 342
 4828  001414  000344                  B.BVEC: 344
 4829  001416  000346                  B.BPTY: 346
 4830  001420  000000                  SAVR0:  0
 4831  001422  000000                  SAVR1:  0
 4832  001424  000000                  SAVR2:  0
 4833  001426  000000                  SAVR3:  0
 4834  001430  000000                  SAVR4:  0
 4835  001432  000000                  SAVR5:  0
 4836  001434  000000                  MSKTST: 0
 4837  001436  000000                  TSTFLG: 0
 4838  001440  000000                  XXSCOP: 0
 4839
 4840  001442  047516  021040  051102  EM1:    .ASCIZ  /NO "BREPLY" FROM ROM ADDRESS./
 4841  001500  047522  020115  040504  EM2:    .ASCIZ  /ROM DATA COMPARISON ERROR./
 4842  001533      116 020117  041042  EM3:    .ASCIZ  /NO "BREPLY" FROM 600 HZ CLOCK./
 4843  001572  046103  041517  020113  EM4:    .ASCIZ  'CLOCK R/W OF BIT6 FAILED.'
 4844  001624  047125  054105  042520  EM5:    .ASCIZ  /UNEXPECTED INTERUPT./
 4845  001651      116 020117  047111  EM6:    .ASCIZ  /NO INTERUPT FROM CLOCK./
 4846  001701      103 047514  045503  EM7:    .ASCIZ  /CLOCK INTERUPTS NOT CONSISTANT./
 4847  001741      104 053105  041511  EM10:   .ASCIZ  'DEVICE "A" R/W FAILURE.'
 4848  001771      116 020117  041042  EM11:   .ASCIZ  /NO "BREPLY" FROM DEVICE 'A'./
 4849  002026  047516  021040  051102  EM12:   .ASCIZ  /NO "BREPLY" FROM DEVICE 'B'./
 4850  002063      104 053105  041511  EM13:   .ASCIZ  "DEVICE 'B' R/W FAILURE."
 4851  002113      125 042516  050130  EM14:   .ASCIZ  /UNEXPECTED "BREPLY" FROM UNKNOWN DEVICE./
 4852  002164  047516  041440  052116  EM15:   .ASCIZ  /NO INTERUPT FROM DEVICE 'B'/
 4853  002220  042507  042516  042122  EM16:   .ASCIZ  /GENERAL ERROR!/
 4854  002257      104 053114  030461  EM17:   .ASCIZ  /DLV11 DATA ERROR./
 4855  002321      115 046505  051117  EM20:   .ASCIZ  /MEMORY ERROR./
 4856  002377      015 044412  041516  EM21:   .ASCII  <15><12>/INCORRECT MEMORY SIZE FOUND./
 4857  003036      015 041412  040510          .ASCII  <15><12>/CHANGE LOCATION "MEMSIZ" TO SPECIFIC/
 4858  003133      015 051412  042111          .ASCII  <15><12>/SIZE IN YOUR CONFIGURATION./
 4859  002440  005015  046442  046505          .ASCII  <15><12>/"MEMSIZ" SHOULD BE 100000 FOR A 16K SYSTEM./<15><12><0>
 4860
 4861  002520  051105  050122  020103  DH1:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  ROM ADDRESS/
 4862  002574  051105  050122  020103  DH2:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  ROMADD  WANTED  FOUND/
 4863  002662  051105  050122  020103  DH3:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  CLKCSR/
 4864  002731      105 051122  041520  DH4:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  CLKCSR  WANTED  FOUND/
 4865  003017      105 051122  041520  DH5:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  (SP)-TRAP PC/
 4866  003074  051105  050122  020103  DH6:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  DEV.A/
 4870  003142  051105  050122  020103  DH7:    .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  DEV.B/
 4871  003210  051105  050122  020103  DH10:   .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  DEV.A   WANTED  FOUND/
 4872  003276  051105  050122  020103  DH11:   .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  DEV.B   WANTED  FOUND/
 4873  003354  051105  050122  020103  DH12:   .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  DEVICE/
 4874  003433      105 051122  041520  DH13:   .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  /
 4875  003474  051105  050122  020103  DH14:   .ASCIZ  /ERRPC    TSTNO  PASCNT  ERRCNT  DLV11   WANTED  FOUND/
```

D02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 4876  003562  051105  050122  020103  DH15:   .ASCIZ  /ERRPC   TSTNO  PASCNT  ERRCNT  MEMORY  WANTED  FOUND/
 4877                                  .EVEN
 4878
 4879  003650  001116  001434  001100  DT1:    .WORD   $ERRPC,MSKTST,$PASS,$ERTTL,SAVR0,0
 4880  003664  001116  001434  001100  DT2:    .WORD   $ERRPC,MSKTST,$PASS,$ERTTL,SAVR0,SAVR5,SAVR4,0
 4881  003704  001116  001434  001100  DT3:    .WORD   $ERRPC,MSKTST,$PASS,$ERTTL,0
 4882  003716                          DT4:
 4883  003716                          DT5:
 4884  003716                          DT6:
 4885  003716                          DT7:
 4886  003716                          DT10:
 4887  003716     000     000     001  DF1:    .BYTE   0,0,1,1,0,0,0,0
 4888                                  .EVEN
```

```
 4894  003726  005237  001436          SETTST: INC     TSTFLG          ;
 4895  003732                          START:
  (1)  003732  012706  001100                  MOV     #SCNTAG,R6      ;;FIRST LOCATION TO BE CLEARED
  (1)  003736  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
  (1)  003740  022706  001126                  CMP     #SBOOAT,R6      ;;DONE?
  (1)  003744  001374                          BNE     .-6             ;;LOOP BACK IF NO
  (1)  003746  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
  (1)  003752  012737  011270  000020          MOV     #SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
  (1)  003760  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;LEVEL 7
  (1)  003766  012737  011602  000030          MOV     #ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
  (1)  003774  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;LEVEL 7
  (1)  004002  012737  013454  000034          MOV     #TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
  (1)  004010  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
  (1)  004016  013737  011202  011174          MOV     @#NEXT,SEQPCT   ;;SETUP END-OF-PROGRAM COUNTER
  (1)  004024  005037  001160                  CLR     #TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
  (1)  004030  005037  001162                  CLR     #ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
  (1)  004034  112737  000001  001115          MOVB    #1,SERRMX       ;;ALLOW ONE ERROR PER TEST
  (1)  004042  012737  004042  001106          MOV     #.,SLPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
  (1)  004050  012737  004050  001110          MOV     #.,SLPERR       ;;SETUP THE ERROR LOOP ADDRESS
  (2)  004056  013746  000004                  MOV     @#4,-(SP)       ;;SAVE ERROR VECTOR
  (2)  004062  013746  000006                  MOV     @#6,-(SP)
  (2)  004066  012737  004102  000004          MOV     #64$,4          ;;SET UP TIME OUT VECTOR
  (2)  004074  005777  175036                  TST     @SUR            ;;TRY TO REFERENCE HARDWARE SUR
  (2)  004100  000407                          BR      65$             ;;BRANCH IF NO TIMEOUT TRAP OCCURS
  (2)  004102  012737  000176  001136  64$:    MOV     #SUREG,SUR      ;;POINT TO SOFTWARE SUR
  (2)  004110  012737  000174  001140          MOV     #DISREG,DISPLAY ;;POINT TO SOFTWARE DISPLAY REG
  (2)  004116  022626                          CMP     (SP)+,(SP)+     ;;RESTORE STACK
  (2)  004120  012637  000006          65$:    MOV     (SP)+,@#6       ;;RESTORE ERROR VECTOR
  (2)  004124  012637  000004                  MOV     (SP)+,@#4
 4896  004130  005227  177777                  INC     #-1             ;;FIRST TIME?
  (1)  004134  001055                          BNE     66$             ;;BRANCH IF NO
  (1)  004136  022737  011234  000042          CMP     #SENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
  (1)  004144  001451                          BEQ     66$             ;;BRANCH IF NO
  (1)  004146  104400  004154                  TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1)  004152  000446                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                               ;;67$:     .ASCIZ  <200>/MD-11-11WD3A-A/<15><12>/LSI-11 SUIT-CASE  ROM, 600 HZ CLK, AND BUS
  (1)  004270                       66$:
 4897  004270  012737  000006  000004          MOV     #6,4            ;
 4898  004276  005037  000006                  CLR     6               ;
 4899  004302  013777  001402  175070          MOV     CLKPTY,@CLKVEC  ;
 4900  004310  012777  000002  175064          MOV     #2,@CLKPTY      ;
 4901  004316  013777  001412  175064          MOV     B.APTY,@B.AVEC  ;
 4902  004324  005077  175062                  CLR     @B.APTY         ;
 4903  004330  013777  001416  175056          MOV     B.BPTY,@B.BVEC  ;
 4904  004336  005077  175054                  CLR     @B.BPTY         ;
 4905  004342  005037  000022                  CLR     @#IOTVEC+2      ;ZERO SCOPE PRIO.
 4906  004346  005037  001440                  CLR     XXSCOP          ;
 4907  004352  012737  014516  000060          MOV     #KBISR,@#60     ;SET VECTOR
 4908  004360  012737  000200  000062          MOV     #200,@#62       ;SET PRIO
 4909  004366  012777  000100  174546          MOV     #100,@#TKS      ;SET INTR ENABLE
 4910  004374  106427  000000                  MTPS    #0              ;SET PSW TO 0
 4911  004400  005737  001436                  TST     TSTFLG          ;FLAG SET?
 4912  004404  001431                          BEQ     TST1            ;
 4913  004406  005037  001436                  CLR     TSTFLG          ;ZERO FLAG
 4914  004412  104400  014631          X1$:    TYPE    ,XTSTN          ;TYPE "TEST NO: "
 4915  004416  104407                          RDOCT                   ;GET NUMBER
```

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 4916  004420  012600                        MOV     (SP)+,R0
 4917  004422  001773                        BEQ     X1$             ;BR IF NO NUMBER INPUT
 4918  004424  020037  015140                CMP     R0,LASTN        ;VALID TEST?
 4919  004430  101370                        BHI     X1$             ;BR IF NO
 4920  004432  110037  001102                MOVB    R0,$TSTNM       ;LOAD INITAL TEST NO.
 4921  004436  000241                        CLC                     ;
 4922  004440  006100                        ROL     R0              ;MOVE POWER OF 2.
 4923  004442  016037  015012  001106        MOV     TEST.TABLE(R0),$LPADR
 4924                                                                ;GET TEST PC.
 4925  004450  062737  000002  001106        ADD     #2,$LPADR       ;GET PAST SCOPE
 4926  004456  013737  001106  001110        MOV     $LPADR,$LPERR   ;
 4927  004464  000177  174416                JMP     @$LPADR         ;GOTO TEST.
 4928
 4935                                ;*****************************************************
  (3)                                ;*TEST 1        ROM "BREPLY" TEST
  (4)                                ;*TEST TO REFERENCE ALL 256. ADDRESS
  (4)                                ;*OF THE ROM ONLY MAKING SURE THAT
  (4)                                ;*THERE IS A "BREPLY" RESPONSE - NO DATA IS
  (4)                                ;*CHECKED IN THIS TEST.
  (3)                                ;*****************************************************
  (2)  004470  000004                TST1:   SCOPE
 4936  004472  012700  173000                MOV     #173000,R0      ;SET INITAL START ADDRESS OF ROM.
 4937  004476  012701  000400                MOV     #256.,R1        ;SET NUMBER OF WORDS TO BE TESTED.
 4938  004502  013746  000004                MOV     4,-(SP)         ;SAVE LOC 4.
 4939  004506  013746  000006                MOV     6,-(SP)         ;SAVE LOC 6.
 4940  004512  012737  004544  000004        MOV     #2$,4           ;SET TIME-OUT TRAP VECTOR.
 4941  004520  012737  000200  000006        MOV     #200,6          ;LOAD PRIORITY = 4
 4942  004526  005710                1$:     TST     (R0)            ;REFERENCE ROM ADDRESS.
 4943  004530  005710                        TST     (R0)            ;DO IT AGAIN.
 4944  004532  062700  000002        2$:     ADD     #2,R0           ;UPDATE ADDRESS.
 4945  004536  005301                        DEC     R1              ;ALL DONE?
 4946  004540  001372                        BNE     1$              ;BR IF NO
 4947  004542  000404                        BR      4$              ;CONTINUE TEST
 4948  004544  104001                3$:     ERROR   1               ;ROM DID NOT ISSUE "BREPLY".
 4949  004546  012716  004532                MOV     #2$,(SP)        ;SET RETURN ADDRESS
 4950  004552  000002                        RTI                     ;RETURN
 4951  004554  012637  000006        4$:     MOV     (SP)+,6         ;RESTORE ADD 6.
 4952  004560  012637  000004                MOV     (SP)+,4         ;RESTORE ADD 4.
 4953
 4954
 4960
 4961                                ;*****************************************************
  (3)                                ;*TEST 2        ROM WRITE TEST
  (4)                                ;*TEST THAT WRITING THE ROM
  (4)                                ;*PRODUCES A TIME-OUT TRAP.
  (4)                                ;*
  (3)                                ;*****************************************************
  (2)  004564  000004                TST2:   SCOPE
 4962  004566  012700  173000                MOV     #173000,R0      ;SET ROM ADDRESS
 4963  004572  012701  000400                MOV     #256.,R1        ;DO ALL ADDRESS
 4964  004576  013746  000004                MOV     4,-(SP)         ;STORE 4
 4965  004602  013746  000006                MOV     6,-(SP)         ;STORE 6
 4966  004606  012737  004632  000004        MOV     #2$,4           ;SET TRAP VECTOR
 4967  004614  012737  000200  000006        MOV     #200,6          ;PRIO.
 4968  004622  005020                1$:     CLR     (R0)+           ;WRITE ROM WITH ZERO.
 4969  004624  000240                        NOP                     ;
```

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4970  004626  104016                  ERROR   16              ;WRITE ROM AND NO TRAP.
4971  004630  024646                  CMP     -(SP),-(SP)     ;FAKE AN INTERUPT.
4972  004632  105301          2$:     DECB    R1              ;256 DONE?
4973  004634  001403                  BEQ     3$              ;BR IF YES
4974  004636  012716  004622          MOV     #1$,(SP)        ;SET RETURN
4975  004642  000002                  RTI                     ;RETURN
4976  004644  106427  000000  3$:     MTPS    #0              ;SET PTY TO 0
4977  004650  026626                  CMP     (SP)+,(SP)+     ;FAKE RTI
4978  004652  012637  000006          MOV     (SP)+,6         ;RESTORE 6
4979  004656  012637  000004          MOV     (SP)+,4         ;RESTORE 4
4980
4987                          ;*****************************************************************
 (3)                          ;*TEST 3        ROM DATA TEST
 (4)                          ;*TEST TO READ AND COMPARE ALL
 (4)                          ;*256 ROM ADDRESS TO THE ROM DATA
 (4)                          ;*MAP IN MEMORY.  ALL ADDRESSES ARE
 (4)                          ;*VERIFIED FOR GOOD DATA.
 (3)                          ;*****************************************************************
 (2)  004662  000004          TST3:   SCOPE
4988  004664  012700  173000          MOV     #173000,R0      ;SET START OF ROM ADDRESS.
4989  004670  012701  000400          MOV     #256.,R1        ;SET NUMBER OF WORDS TO CHECK.
4990  004674  012702  013516          MOV     #ROMMAP,R2      ;GET SOFTWARE ADDRESS
4991  004700  011004          1$:     MOV     (R0),R4         ;READ ROM.
4992  004702  011205                  MOV     (R2),R5         ;READ SOFTWARE IMAGE
4993  004704  020504                  CMP     R5,R4           ;ARE THEY GOOD?
4994  004706  001401                  BEQ     .+4             ;ROM DATA ERROR?
4995  004710  104002                  ERROR   2               ;BAD DATA IN ROMS!!
4996  004712  022022                  CMP     (R0)+,(R2)+     ;POP POINTERS
4997  004714  005301                  DEC     R1              ;ALL DONE?
4998  004716  001370                  BNE     1$              ;BR IF NOT DONE.
4999
5006
5007                          ;*****************************************************************
 (3)                          ;*TEST 4        600 HZ ADDRESS TEST
 (4)                          ;*TEST TO VERIFY A "NEPLY" RESPONSE
 (4)                          ;*FROM THE 600 HZ CLOCK.
 (4)                          ;*IT IS ASSUMED THAT THE CLOCK
 (4)                          ;*IS AT ADDRESS "177546".
 (3)                          ;*****************************************************************
 (2)  004720  000004          TST4:   SCOPE
5008  004722  013746  000004          MOV     4,-(SP)         ;SAVE ADDRESS 4.
5009  004726  013746  000006          MOV     6,-(SP)         ;SAVE ADDRESS 6.
5010  004732  012701  000017          MOV     #15.,R1         ;SET INTERNAL ICOUNT TO 15.
5011  004736  013700  001376          MOV     CLKCSR,R0       ;GET CLOCK CSR.
5012  004742  012737  004766  000004  MOV     #3$,4           ;SET TIME-OUT VECTOR.
5013  004750  012737  000200  000006  MOV     #200,6          ;SET PRIO.
5014  004756  005710          1$:     TST     (R0)            ;REFERENCE CLOCK CSR.
5015  004760  005301          2$:     DEC     R1              ;ICOUNT = 0?
5016  004762  001375                  BNE     1$              ;BR IF NO.
5017  004764  000404                  BR      4$              ;CONT TEST
5018  004766  104003          3$:     ERROR   3               ;TIME-OUT ERROR.
5019  004770  012716  004760          MOV     #2$,(SP)        ;SET RETURN ADD.
5020  004774  000002                  RTI                     ;RETURN.
5021  004776  012637  000006  4$:     MOV     (SP)+,6         ;RESTORE 6
5022  005002  012637  000004          MOV     (SP)+,4         ;RESTORE 4
5023
```

```
                                        ;*****************************************************************
                                        ;*TEST 5        600 HZ "EVENT ENABLE" R/W TEST
                                        ;*TEST THAT BIT6 OF 600HZ
                                        ;*CLOCK IS R/W.
                                        ;*SET PSW TO "4" AND SET BIT6
                                        ;*OF 600HZ CLOCK VERIFYING THAT NO
                                        ;*INTERRUPT OCCURED AND THAT BIT6
                                        ;*DID IT GET SET.  THEN CLEAR BIT6
                                        ;*AND VERIFY BIT6 IS CLEARED.
                                        ;*VERIFY NO INTERRUPT OCCURED.
                                        ;*THEN CLEAR PS VERIFYING THAT
                                        ;*THE INTERRUPT PENDING OCCURES.
                                        ;*
                                        ;*****************************************************************
005006  000004                  TST5:   SCOPE
005010  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
005016  106427  000200                  MTPS    #200            ;SET PRIO TO "4"
005022  013700  001376                  MOV     CLKCSR,R0       ;SET CLOCK CSR
005026  017746  174346                  MOV     @CLKVEC,-(SP)   ;SAVE CLKVEC
005032  017746  174344                  MOV     @CLKPTY,-(SP)   ;SAVE CLKPTY
005036  012777  005132  174334          MOV     #3$,@CLKVEC     ;SET CLOCK VECTOR
005044  012777  000200  174330          MOV     #200,@CLKPTY    ;SET CLOCK PRIORITY
005052  012701  000017                  MOV     #15.,R1         ;SET ICOUNT
005056  012705  000100          1$:     MOV     #BIT6,R5        ;SET EXPECTED
005062  010510                          MOV     R5,(R0)         ;WRITE BIT6
005064  011004                          MOV     (R0),R4         ;READ CSR
005066  020504                          CMP     R5,R4           ;COMPARE
005070  001401                          BEQ     .+4             ;DID BIT6 SET?
005072  104004                          ERROR   4               ;BIT6 NOT SET!
005074  012727  007640                  MOV     #4000.,(PC)+    ;DELAY TIME
005100  000000          65$:    0               ;STORAGE
005102  005337  005100                  DEC     65$             ;DELAY
005106  001375                          BNE     .-4
005110  040510                          BIC     R5,(R0)         ;CLEAR BIT6
005112  011004                          MOV     (R0),R4         ;READ CSR
005114  005005                          CLR     R5              ;CLEAR EXPECTED
005116  005704                          TST     R4              ;IS R4=0?
005120  001401                          BEQ     .+4             ;BR IF OK!
005122  104004                          ERROR   4               ;REGISTER NOT=0!
005124  005301                  2$:     DEC     R1              ;I COUNT=0?
005126  001353                          BNE     1$              ;BR IF NO
005130  000410                          BR      4$              ;CONT TEST.
005132  010037  001156          3$:     MOV     R0,$TMP0        ;SAVE R0
005136  104005                          ERROR   5               ;UNEXPECTED INTERRUPT
005140  013700  001156                  MOV     $TMP0,R0        ;RESTORE R0
005144  012716  005124                  MOV     #2$,(SP)        ;SET RETURN ADDRESS
005150  000002                          RTI                     ;EXIT
005152  005005                  4$:     CLR     R5
005154  012777  005204  174216          MOV     #5$,@CLKVEC
005162  012777  000200  174212          MOV     #200,@CLKPTY
005170  106427  000000                  MTPS    #0
005174  005205                          INC     R5
005176  001376                          BNE     .-2
005200  104006                          ERROR   6
005202  000401                          BR      6$
```

```
 5078  005204  022626                    5$:     CMP     (SP)+,(SP)+
 5079  005206  012677  174170            6$:     MOV     (SP)+,@CLKPTY   ;RESTORE CLKPTY
 5080  005212  012677  174162                    MOV     (SP)+,@CLKVEC   ;RESTORE CLKVEC
 5081  005216  106427  000000                    MTPS    #0              ;SET PRIO TO LVL 0
 5082
 5090
 5091                                    ;*****************************************************************
  (3)                                    ;*TEST 6        60 HZ INTERRUPT TEST
  (4)                                    ;*TEST THAT THE 60 HZ CLOCK
  (4)                                    ;*CAN INTERRUPT AND THAT THE
  (4)                                    ;*INTERRUPTS ARE WITHIN THE SAME
  (4)                                    ;*TIME SPAN.  200. INTERRUPTS WILL BE
  (4)                                    ;*EXECUTED
  (3)                                    ;*****************************************************************
  (2)  005222  000004                    TST6:   SCOPE
 5092  005224  017746  174150                    MOV     @CLKVEC,-(SP)   ;SAVE CLKVEC
 5093  005230  017746  174146                    MOV     @CLKPTY,-(SP)   ;SAVE CLKPTY
 5094  005234  012777  005310  174136            MOV     #2$,@CLKVEC     ;SET INTERRUPT VECTOR
 5095  005242  012777  000200  174132            MOV     #200,@CLKPTY    ;SET PRIO.
 5096  005250  012704  000310                    MOV     #200.,R4        ;SET ICOUNT
 5097  005254  012705  000002                    MOV     #2,R5           ;SET COUNT POSITION
 5098  005260  005001                            CLR     R1              ;ZERO COUNT UP.
 5099  005262  106427  000000                    MTPS    #0              ;CLEAR PSW
 5100  005266  013700  001376                    MOV     CLKCSR,R0       ;SAVE FOR PRINTOUT
 5101  005272  052777  000100  174076            BIS     #BIT6,@CLKCSR   ;SET EVENT ENABLE
 5102  005300  005201                    1$:     INC     R1              ;COUNT TIME
 5103  005302  001376                            BNE     1$              ;=0?
 5104  005304  104006                            ERROR   6               ;NO INTERRUPT
 5105  005306  000423                            BR      5$              ;EXIT TEST
 5106  005310  005305                    2$:     DEC     R5              ;HOW MANY INTERRUPTS?
 5107  005312  001414                            BEQ     3$              ;BR IF 2ND!
 5108  005314  100014                            BPL     4$              ;BR IF 1ST!
 5109  005316  010102                            MOV     R1,R2           ;MUST BE 3RD OR MORE!
 5110  005320  062702  000010                    ADD     #10,R2          ;GIVE TOLARENCE OF +10
 5111  005324  160302                            SUB     R3,R2           ;GET DIFFERENCE
 5112  005326  100001                            BPL     .+4             ;SKIP IF POSITIVE
 5113  005330  005402                            NEG     R2              ;MAKE POSITIVE
 5114  005332  026227  000270                    CMP     R2,#270         ;GIVE +270 TOLARENCE
 5115  005340  101401                            BLOS    .+4
 5116  005342  104007                            ERROR   7               ;INTERRUPTS OUT OF TOLERANCE
 5117  005344  000401                            BR      4$              ;CONT TEST
 5118  005346  010103                    3$:     MOV     R1,R3           ;SAVE COUNT
 5119  005350  005001                    4$:     CLR     R1              ;ZERO COUNTER
 5120  005352  005304                            DEC     R4              ;ICOUNT =0?
 5121  005354  001401                            BEQ     5$              ;BR IF YES
 5122  005356  000002                            RTI                     ;EXIT
 5123  005360  042777  000100  174012    5$:     BIC     #BIT6,@CLKCSR   ;CLEAR EVENT ENABLE
 5124  005366  022626                            CMP     (SP)+,(SP)+     ;POP INTR OFF STACK
 5125  005370  012677  174010                    MOV     (SP)+,@CLKPTY   ;RESTORE CLKPTY
 5126  005374  012677  174002                    MOV     (SP)+,@CLKVEC   ;RESTORE CLKVEC.
 5127  005376  106427  000000                    MTPS    #0              ;SET PRIO TO LEVEL 0
 5128
 5137
 5138                                    ;*****************************************************************
  (3)                                    ;*TEST 7        UNEXPECTED "BREPLY" TEST.
  (4)                                    ;*TEST TO SCAN THROUGH ALL ADDRESS
```

```
                                        ;#VERIFYING THAT ONLY EXPECTED DEVICES
                                        ;#RETURN "BREPLY".  THIS TEST CHECKS
                                        ;#ONLY THAT "UNEXPECTED REPLYS" AREN'T RECEIVED
                                        ;#NOT THAT ALL DEVICE ISSUE "BREPLY".
                                        ;#
                                        ;##################################################################
005402  000004                  TST7:   SCOPE
005404  012737  000003  001160          MOV     #3,$TIMES       ;;DO 3 ITERATIONS
005412  013746  000004                  MOV     4,-(SP)         ;SAVE 4
005416  013746  000006                  MOV     6,-(SP)         ;SAVE 6
005422  012737  005444  000004          MOV     #2$,4           ;SET TIME-OUT TRAP
005430  005037  000006                  CLR     6               ;
005434  005000                          CLR     R0              ;SET FIRST ADDRESS TO 0
005436  005710                  1$:     TST     (R0)            ;READ ADDRESS
005440  005720                          TST     (R0)+           ;POP ADDRESS
005442  000775                          BR      1$              ;CONTINUE TEST
005444  000026                  2$:     CMP     (SP)+,(SP)+     ;FAKE AN RTI
005446  023700  001374                  CMP     MEMSIZ,R0       ;16K ?
005452  001403                          BEQ     .+10            ;BR IF MEMORY SIZE IS CORRECT
005454  104016                          ERROR   16              ;INCORRECT MEMORY SIZE FOUND
005456  104400  002277                  TYPE    ,EM21           ;REPORT CHANGE MSG.
                                                                ;LOC SAVR0 HAS MEMORY FOUND.
005462  012737  005520  000004          MOV     #6$,4           ;RESET TIME-OUT TRAP
005470  005710                  3$:     TST     (R0)
005472  012701  014650                  MOV     #BREPLY.TABLE,R1 ;SET EXPECTED DEVICES
005476  022100                  4$:     CMP     (R1)+,R0        ;EXPECTED DEVICE?
005500  001002                          BNE     5$              ;BR IF NO
005502  062100                          ADD     (R1)+,R0        ;POP MODULO OFFSET
005504  000771                          BR      3$              ;CONT TEST
005506  005721                  5$:     TST     (R1)+           ;POP PAST OFFSET
005510  005711                          TST     (R1)            ;END OF TABLE?
005512  001371                          BNE     4$              ;BR IF NO
005514  104014                          ERROR   14              ;UNEXPECTED "BREPLY" FROM DEVICE.
005516  000401                          BR      7$              ;SKIP FAKE RTI
005520  022626                  6$:     CMP     (SP)+,(SP)+     ;FAKE RTI
005522  062700  000002          7$:     ADD     #2,R0           ;POP TO NEXT ADDRESS
005526  022700  177700                  CMP     #177700,R0      ;ALL DONE?
005532  001356                          BNE     3$
005534  012637  000006                  MOV     (SP)+,6         ;RESTOE 6
005540  012637  000004                  MOV     (SP)+,4 ;RESTORE 4

                                        ;##################################################################
                                        ;#TEST 10       "DEVICE 'A'" ADDRESS TEST
                                        ;#TEST TO VERIFY A "BREPLY" RESPONSE
                                        ;#FROM "DEVICE'A'".
                                        ;#IT IS ASSUMED THAT THE DEVICE
                                        ;#IS AT ADDRESS "172524".
                                        ;##################################################################
005544  000004                  TST10:  SCOPE
005546  013746  000004                  MOV     4,-(SP)         ;SAVE ADDRESS 4.
005552  013746  000006                  MOV     6,-(SP)         ;SAVE ADDRESS 6.
005556  012701  000017                  MOV     #15.,R1         ;SET INTERNAL ICOUNT TO 15.
005562  013700  001404                  MOV     DEV.A,R0        ;GET DEVICE CSR.
005566  012737  005612  000004          MOV     #3$,4           ;SET TIME-OUT VECTOR.
005574  012737  000200  000006          MOV     #200,6          ;SET PRIO.
005602  005710                  1$:     TST     (R0)            ;REFERENCE DEVICE CSR.
```

```
 5186  005604  005301                  2$:     DEC     R1              ;ICOUNT = 0?
 5187  005606  001375                          BNE     1$              ;BR IF NO.
 5188  005610  000404                          BR      4$              ;CONT TEST
 5189  005612  104011                  3$:     ERROR   11              ;TIME-OUT ERROR.
 5190  005614  012716  005604                  MOV     #2$,(SP)        ;SET RETURN ADD.
 5191  005620  000002                          RTI                     ;RETURN.
 5192  005622  012637  000006          4$:     MOV     (SP)+,6         ;RESTORE 6
 5193  005626  012637  000004                  MOV     (SP)+,4         ;RESTORE 4
 5194
 5217
  (5)                                    ;*****************************************************************
  (4)                                    ;*TEST 11       R/W TEST OF BIT 0 IN DEVICE 'A'
  (5)                                    ;*R/W TEST OF BIT 0 IN DEVICE 'A'.
  (5)                                    ;*WRITE BIT 0 VERIFY ONLY BIT 0 IS SET.
  (5)                                    ;*CLEAR BIT 0 VERIFY BIT 0 IS CLEARED.
  (5)                                    ;*
  (4)                                    ;*****************************************************************
  (3)  005632  000004                    TST11:  SCOPE
  (1)  005634  013700  001404                    MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
  (1)  005640  012705  000001                    MOV     #BIT0,R5        ;SET EXPECTED.
  (1)  005644  010510                            MOV     R5,(R0)         ;WRITE BIT0
  (1)  005646  011004                            MOV     (R0),R4         ;READ CSR
  (1)  005650  020504                            CMP     R5,R4           ;BIT OK?
  (2)  005652  001401                            BEQ     .+4             ;BR IF OK
  (1)  005654  104010                            ERROR   10              ;REGISTER HAS WRONG DATA.
  (1)  005656  040510                            BIC     R5,(R0)         ;CLEAR BIT0
  (1)  005660  011004                            MOV     (R0),R4         ;READ REGISTER.
  (1)  005662  042705  000001                    BIC     #BIT0,R5        ;ZERO EXPECTED
  (1)  005666  005704                            TST     R4              ;REGISTER OK?
  (2)  005670  001401                            BEQ     .+4             ;BR IF YES
  (1)  005672  104010                            ERROR   10              ;REGISTER NOT =0.
  (1)
  (5)                                    ;*****************************************************************
  (4)                                    ;*TEST 12       R/W TEST OF BIT 1 IN DEVICE 'A'
  (5)                                    ;*R/W TEST OF BIT 1 IN DEVICE 'A'.
  (5)                                    ;*WRITE BIT 1 VERIFY ONLY BIT 1 IS SET.
  (5)                                    ;*CLEAR BIT 1 VERIFY BIT 1 IS CLEARED.
  (5)                                    ;*
  (4)                                    ;*****************************************************************
  (3)  005674  000004                    TST12:  SCOPE
  (1)  005676  013700  001404                    MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
  (1)  005702  012705  000002                    MOV     #BIT1,R5        ;SET EXPECTED.
  (1)  005706  010510                            MOV     R5,(R0)         ;WRITE BIT1
  (1)  005710  011004                            MOV     (R0),R4         ;READ CSR
  (1)  005712  020504                            CMP     R5,R4           ;BIT OK?
  (2)  005714  001401                            BEQ     .+4             ;BR IF OK
  (1)  005716  104010                            ERROR   10              ;REGISTER HAS WRONG DATA.
  (1)  005720  040510                            BIC     R5,(R0)         ;CLEAR BIT1
  (1)  005722  011004                            MOV     (R0),R4         ;READ REGISTER.
  (1)  005724  042705  000002                    BIC     #BIT1,R5        ;ZERO EXPECTED
  (1)  005730  005704                            TST     R4              ;REGISTER OK?
  (2)  005732  001401                            BEQ     .+4             ;BR IF YES
  (1)  005734  104010                            ERROR   10              ;REGISTER NOT =0.
  (1)
  (5)                                    ;*****************************************************************
  (4)                                    ;*TEST 13       R/W TEST OF BIT 2 IN DEVICE 'A'
```

```
                                ;*R/W TEST OF BIT 2 IN DEVICE 'A'.
                                ;*WRITE BIT 2 VERIFY ONLY BIT 2 IS SET.
                                ;*CLEAR BIT 2 VERIFY BIT 2 IS CLEARED.
                                ;*
                                ;*****************************************************************
005736  000004                TST13:  SCOPE
005740  013700  001404                MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
005744  012705  000004                MOV     #BIT2,R5        ;SET EXPECTED.
005750  010510                        MOV     R5,(R0)         ;WRITE BIT2
005752  011004                        MOV     (R0),R4         ;READ CSR
005754  020504                        CMP     R5,R4           ;BIT OK?
005756  001401                        BEQ     .+4             ;BR IF OK
005760  104010                        ERROR   10              ;REGISTER HAS WRONG DATA.
005762  040510                        BIC     R5,(R0)         ;CLEAR BIT2
005764  011004                        MOV     (R0),R4         ;READ REGISTER.
005766  042705  000004                BIC     #BIT2,R5        ;ZERO EXPECTED
005772  005704                        TST     R4              ;REGISTER OK?
005774  001401                        BEQ     .+4             ;BR IF YES
005776  104010                        ERROR   10              ;REGISTER NOT =0.

                                ;*****************************************************************
                                ;*TEST 14        R/W TEST OF BIT 3 IN DEVICE 'A'
                                ;*R/W TEST OF BIT 3 IN DEVICE 'A'.
                                ;*WRITE BIT 3 VERIFY ONLY BIT 3 IS SET.
                                ;*CLEAR BIT 3 VERIFY BIT 3 IS CLEARED.
                                ;*
                                ;*****************************************************************
006000  000004                TST14:  SCOPE
006002  013700  001404                MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
006006  012705  000010                MOV     #BIT3,R5        ;SET EXPECTED.
006012  010510                        MOV     R5,(R0)         ;WRITE BIT3
006014  011004                        MOV     (R0),R4         ;READ CSR
006016  020504                        CMP     R5,R4           ;BIT OK?
006020  001401                        BEQ     .+4             ;BR IF OK
006022  104010                        ERROR   10              ;REGISTER HAS WRONG DATA.
006024  040510                        BIC     R5,(R0)         ;CLEAR BIT3
006026  011004                        MOV     (R0),R4         ;READ REGISTER.
006030  042705  000010                BIC     #BIT3,R5        ;ZERO EXPECTED
006034  005704                        TST     R4              ;REGISTER OK?
006036  001401                        BEQ     .+4             ;BR IF YES
006040  104010                        ERROR   10              ;REGISTER NOT =0.

                                ;*****************************************************************
                                ;*TEST 15        R/W TEST OF BIT 4 IN DEVICE 'A'
                                ;*R/W TEST OF BIT 4 IN DEVICE 'A'.
                                ;*WRITE BIT 4 VERIFY ONLY BIT 4 IS SET.
                                ;*CLEAR BIT 4 VERIFY BIT 4 IS CLEARED.
                                ;*
                                ;*****************************************************************
006042  000004                TST15:  SCOPE
006044  013700  001404                MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
006050  012705  000020                MOV     #BIT4,R5        ;SET EXPECTED.
006054  010510                        MOV     R5,(R0)         ;WRITE BIT4
006056  011004                        MOV     (R0),R4         ;READ CSR
006060  020504                        CMP     R5,R4           ;BIT OK?
006062  001401                        BEQ     .+4             ;BR IF OK
```

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(1)  006064  104010                        ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006066  040510                        BIC     R5,(R0)         ;CLEAR BIT4
(1)  006070  011004                        MOV     (R0),R4         ;READ REGISTER.
(1)  006072  042705  000020                BIC     #BIT4,R5        ;ZERO EXPECTED
(1)  006076  005704                        TST     R4              ;REGISTER OK?
(2)  006100  001401                        BEQ     .+4             ;BR IF YES
(1)  006102  104010                        ERROR   10              ;REGISTER NOT =0.
(1)
(5)                                 ;##################################################################
(4)                                 ;#TEST 16       R/W TEST OF BIT 5 IN DEVICE 'A'
(5)                                 ;#R/W TEST OF BIT 5 IN DEVICE 'A'.
(5)                                 ;#WRITE BIT 5 VERIFY ONLY BIT 5 IS SET.
(5)                                 ;#CLEAR BIT 5 VERIFY BIT 5 IS CLEARED.
(5)                                 ;#
(4)                                 ;##################################################################
(3)  006104  000004                 TST16:  SCOPE
(1)  006106  013700  001404                 MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006112  012705  000040                 MOV     #BIT5,R5        ;SET EXPECTED.
(1)  006116  010510                         MOV     R5,(R0)         ;WRITE BIT5
(1)  006120  011004                         MOV     (R0),R4         ;READ CSR
(1)  006122  020504                         CMP     R5,R4           ;BIT OK?
(2)  006124  001401                         BEQ     .+4             ;BR IF OK
(1)  006126  104010                         ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006130  040510                         BIC     R5,(R0)         ;CLEAR BIT5
(1)  006132  011004                         MOV     (R0),R4         ;READ REGISTER.
(1)  006134  042705  000040                 BIC     #BIT5,R5        ;ZERO EXPECTED
(1)  006140  005704                         TST     R4              ;REGISTER OK?
(2)  006142  001401                         BEQ     .+4             ;BR IF YES
(1)  006144  104010                         ERROR   10              ;REGISTER NOT =0.
(1)
(5)                                 ;##################################################################
(4)                                 ;#TEST 17       R/W TEST OF BIT 6 IN DEVICE 'A'
(5)                                 ;#R/W TEST OF BIT 6 IN DEVICE 'A'.
(5)                                 ;#WRITE BIT 6 VERIFY ONLY BIT 6 IS SET.
(5)                                 ;#CLEAR BIT 6 VERIFY BIT 6 IS CLEARED.
(5)                                 ;#
(4)                                 ;##################################################################
(3)  006146  000004                 TST17:  SCOPE
(1)  006150  013700  001404                 MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006154  012705  000100                 MOV     #BIT6,R5        ;SET EXPECTED.
(1)  006160  010510                         MOV     R5,(R0)         ;WRITE BIT6
(1)  006162  011004                         MOV     (R0),R4         ;READ CSR
(1)  006164  020504                         CMP     R5,R4           ;BIT OK?
(2)  006166  001401                         BEQ     .+4             ;BR IF OK
(1)  006170  104010                         ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006172  040510                         BIC     R5,(R0)         ;CLEAR BIT6
(1)  006174  011004                         MOV     (R0),R4         ;READ REGISTER.
(1)  006176  042705  000100                 BIC     #BIT6,R5        ;ZERO EXPECTED
(1)  006202  005704                         TST     R4              ;REGISTER OK?
(2)  006204  001401                         BEQ     .+4             ;BR IF YES
(1)  006206  104010                         ERROR   10              ;REGISTER NOT =0.
(1)
(5)                                 ;##################################################################
(4)                                 ;#TEST 20       R/W TEST OF BIT 7 IN DEVICE 'A'
(5)                                 ;#R/W TEST OF BIT 7 IN DEVICE 'A'.
(5)                                 ;#WRITE BIT 7 VERIFY ONLY BIT 7 IS SET.
```

```
(5)                                     ;*CLEAR BIT 7 VERIFY BIT 7 IS CLEARED.
(5)                                     ;*
(4)                                     ;*****************************************************************
(3)  006210  000004                     TST20:  SCOPE
(1)  006212  013700  001404                     MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006216  012705  000200                     MOV     #BIT7,R5        ;SET EXPECTED.
(1)  006222  010510                             MOV     R5,(R0)         ;WRITE BIT7
(1)  006224  011004                             MOV     (R0),R4         ;READ CSR
(1)  006226  020504                             CMP     R5,R4           ;BIT OK?
(2)  006230  001401                             BEQ     .+4             ;BR IF OK
(1)  006232  104010                             ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006234  040510                             BIC     R5,(R0)         ;CLEAR B,T7
(1)  006236  011004                             MOV     (R0),R4         ;READ REGISTER.
(1)  006240  042705  000200                     BIC     #BIT7,R5        ;ZERO EXPECTED
(1)  006244  005704                             TST     R4              ;REGISTER OK?
(2)  006246  001401                             BEQ     .+4             ;BR IF YES
(1)  006250  104010                             ERROR   10              ;REGISTER NOT =0.
(1)
(5)                                     ;*****************************************************************
(4)                                     ;*TEST 21       R/W TEST OF BIT 8 IN DEVICE 'A'
(5)                                     ;*R/W TEST OF BIT 8 IN DEVICE 'A'.
(5)                                     ;*WRITE BIT 8 VERIFY ONLY BIT 8 IS SET.
(5)                                     ;*CLEAR BIT 8 VERIFY BIT 8 IS CLEARED.
(5)                                     ;*
(4)                                     ;*****************************************************************
(3)  006252  000004                     TST21:  SCOPE
(1)  006254  013700  001404                     MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006260  012705  000400                     MOV     #BIT8,R5        ;SET EXPECTED.
(1)  006264  010510                             MOV     R5,(R0)         ;WRITE BIT8
(1)  006266  011004                             MOV     (R0),R4         ;READ CSR
(1)  006270  020504                             CMP     R5,R4           ;BIT OK?
(2)  006272  001401                             BEQ     .+4             ;BR IF OK
(1)  006274  104010                             ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006276  040510                             BIC     R5,(R0)         ;CLEAR BIT8
(1)  006300  011004                             MOV     (R0),R4         ;READ REGISTER.
(1)  006302  042705  000400                     BIC     #BIT8,R5        ;ZERO EXPECTED
(1)  006306  005704                             TST     R4              ;REGISTER OK?
(2)  006310  001401                             BEQ     .+4             ;BR IF YES
(1)  006312  104010                             ERROR   10              ;REGISTER NOT =0.
(1)
(5)                                     ;*****************************************************************
(4)                                     ;*TEST 22       R/W TEST OF BIT 9 IN DEVICE 'A'
(5)                                     ;*R/W TEST OF BIT 9 IN DEVICE 'A'.
(5)                                     ;*WRITE BIT 9 VERIFY ONLY BIT 9 IS SET.
(5)                                     ;*CLEAR BIT 9 VERIFY BIT 9 IS CLEARED.
(5)                                     ;*
(4)                                     ;*****************************************************************
(3)  006314  000004                     TST22:  SCOPE
(1)  006316  013700  001404                     MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006322  012705  001000                     MOV     #BIT9,R5        ;SET EXPECTED.
(1)  006326  010510                             MOV     R5,(R0)         ;WRITE BIT9
(1)  006330  011004                             MOV     (R0),R4         ;READ CSR
(1)  006332  020504                             CMP     R5,R4           ;BIT OK?
(2)  006334  001401                             BEQ     .+4             ;BR IF OK
(1)  006336  104010                             ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006340  040510                             BIC     R5,(R0)         ;CLEAR BIT9
```

```
(1)  006342  011004                    MOV     (R0),R4         ;READ REGISTER.
(1)  006344  042705  001000            BIC     #BIT9,R5        ;ZERO EXPECTED
(1)  006350  005704                    TST     R4              ;REGISTER OK?
(2)  006352  001401                    BEQ     .+4             ;BR IF YES
(1)  006354  104010                    ERROR   10              ;REGISTER NOT =0.
(1)
(5)                             ;*****************************************************************
(4)                             ;*TEST 23       R/W TEST OF BIT 10 IN DEVICE 'A'
(5)                             ;*R/W TEST OF BIT 10 IN DEVICE 'A'.
(5)                             ;*WRITE BIT 10 VERIFY ONLY BIT 10 IS SET.
(5)                             ;*CLEAR BIT 10 VERIFY BIT 10 IS CLEARED.
(5)                             ;*
(4)                             ;*****************************************************************
(3)  006356  000004             TST23:  SCOPE
(1)  006360  013700  001404             MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006364  012705  002000             MOV     #BIT10,R5       ;SET EXPECTED.
(1)  006370  010510                     MOV     R5,(R0)         ;WRITE BIT10
(1)  006372  011004                     MOV     (R0),R4         ;READ CSR
(1)  006374  020504                     CMP     R5,R4           ;BIT OK?
(2)  006376  001401                     BEQ     .+4             ;BR IF OK
(1)  006400  104010                     ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006402  040510                     BIC     R5,(R0)         ;CLEAR BIT10
(1)  006404  011004                     MOV     (R0),R4         ;READ REGISTER.
(1)  006406  042705  002000             BIC     #BIT10,R5       ;ZERO EXPECTED
(1)  006412  005704                     TST     R4              ;REGISTER OK?
(2)  006414  001401                     BEQ     .+4             ;BR IF YES
(1)  006416  104010                     ERROR   10              ;REGISTER NOT =0.
(1)
(5)                             ;*****************************************************************
(4)                             ;*TEST 24       R/W TEST OF BIT 11 IN DEVICE 'A'
(5)                             ;*R/W TEST OF BIT 11 IN DEVICE 'A'.
(5)                             ;*WRITE BIT 11 VERIFY ONLY BIT 11 IS SET.
(5)                             ;*CLEAR BIT 11 VERIFY BIT 11 IS CLEARED.
(5)                             ;*
(4)                             ;*****************************************************************
(3)  006420  000004             TST24:  SCOPE
(1)  006422  013700  001404             MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006426  012705  004000             MOV     #BIT11,R5       ;SET EXPECTED.
(1)  006432  010510                     MOV     R5,(R0)         ;WRITE BIT11
(1)  006434  011004                     MOV     (R0),R4         ;READ CSR
(1)  006436  020504                     CMP     R5,R4           ;BIT OK?
(2)  006440  001401                     BEQ     .+4             ;BR IF OK
(1)  006442  104010                     ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006444  040510                     BIC     R5,(R0)         ;CLEAR BIT11
(1)  006446  011004                     MOV     (R0),R4         ;READ REGISTER.
(1)  006450  042705  004000             BIC     #BIT11,R5       ;ZERO EXPECTED
(1)  006454  005704                     TST     R4              ;REGISTER OK?
(2)  006456  001401                     BEQ     .+4             ;BR IF YES
(1)  006460  104010                     ERROR   10              ;REGISTER NOT =0.
(1)
(5)                             ;*****************************************************************
(4)                             ;*TEST 25       R/W TEST OF BIT 12 IN DEVICE 'A'
(5)                             ;*R/W TEST OF BIT 12 IN DEVICE 'A'.
(5)                             ;*WRITE BIT 12 VERIFY ONLY BIT 12 IS SET.
(5)                             ;*CLEAR BIT 12 VERIFY BIT 12 IS CLEARED.
(5)                             ;*
```

```
(4)
(3)  006462  000004                ;*****************************************************************
(1)  006464  013700  001404  TST25: SCOPE
(1)  006470  012705  010000         MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006474  010510                 MOV     #BIT12,R5       ;SET EXPECTED.
(1)  006476  011004                 MOV     R5,(R0)         ;WRITE BIT12
(1)  006500  020504                 MOV     (R0),R4         ;READ CSR
(2)  006502  001401                 CMP     R5,R4           ;BIT OK?
(1)  006504  104010                 BEQ     .+4             ;BR IF OK
(1)  006506  040510                 ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006510  011004                 BIC     R5,(R0)         ;CLEAR BIT12
(1)  006512  042705  010000         MOV     (R0),R4         ;READ REGISTER.
(1)  006516  005704                 BIC     #BIT12,R5       ;ZERO EXPECTED
(2)  006520  001401                 TST     R4              ;REGISTER OK?
(1)  006522  104010                 BEQ     .+4             ;BR IF YES
(1)                                 ERROR   10              ;REGISTER NOT =0.
(5)
(4)                         ;*****************************************************************
(5)                         ;*TEST 26       R/W TEST OF BIT 13 IN DEVICE 'A'
(5)                         ;*R/W TEST OF BIT 13 IN DEVICE 'A'.
(5)                         ;*WRITE BIT 13 VERIFY ONLY BIT 13 IS SET.
(5)                         ;*CLEAR BIT 13 VERIFY BIT 13 IS CLEARED.
(4)                         ;*
(3)  006524  000004         ;*****************************************************************
(1)  006526  013700  001404  TST26: SCOPE
(1)  006532  012705  020000         MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006536  010510                 MOV     #BIT13,R5       ;SET EXPECTED.
(1)  006540  011004                 MOV     R5,(R0)         ;WRITE BIT13
(1)  006542  020504                 MOV     (R0),R4         ;READ CSR
(2)  006544  001401                 CMP     R5,R4           ;BIT OK?
(1)  006546  104010                 BEQ     .+4             ;BR IF OK
(1)  006550  040510                 ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006552  011004                 BIC     R5,(R0)         ;CLEAR BIT13
(1)  006554  042705  020000         MOV     (R0),R4         ;READ REGISTER.
(1)  006560  005704                 BIC     #BIT13,R5       ;ZERO EXPECTED
(2)  006562  001401                 TST     R4              ;REGISTER OK?
(1)  006564  104010                 BEQ     .+4             ;BR IF YES
(1)                                 ERROR   10              ;REGISTER NOT =0.
(5)
(4)                         ;*****************************************************************
(5)                         ;*TEST 27       R/W TEST OF BIT 14 IN DEVICE 'A'
(5)                         ;*R/W TEST OF BIT 14 IN DEVICE 'A'.
(5)                         ;*WRITE BIT 14 VERIFY ONLY BIT 14 IS SET.
(5)                         ;*CLEAR BIT 14 VERIFY BIT 14 IS CLEARED.
(4)                         ;*
(3)  006566  000004         ;*****************************************************************
(1)  006570  013700  001404  TST27: SCOPE
(1)  006574  012705  040000         MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006600  010510                 MOV     #BIT14,R5       ;SET EXPECTED.
(1)  006602  011004                 MOV     R5,(R0)         ;WRITE BIT14
(1)  006604  020504                 MOV     (R0),R4         ;READ CSR
(2)  006606  001401                 CMP     R5,R4           ;BIT OK?
(1)  006610  104010                 BEQ     .+4             ;BR IF OK
(1)  006612  040510                 ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006614  011004                 BIC     R5,(R0)         ;CLEAR BIT14
(1)  006616  042705  040000         MOV     (R0),R4         ;READ REGISTER.
                                    BIC     #BIT14,R5       ;ZERO EXPECTED
```

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(1)  006622  005704                        TST     R4              ;REGISTER OK?
(2)  006624  001401                        BEQ     .+4             ;BR IF YES
(1)  006626  104010                        ERROR   10              ;REGISTER NOT =0.
(1)
(5)                                 ;*****************************************************************
(4)                                 ;*TEST 30       R/W TEST OF BIT 15 IN DEVICE 'A'
(5)                                 ;*R/W TEST OF BIT 15 IN DEVICE 'A'
(5)                                 ;*WRITE BIT 15 VERIFY ONLY BIT 15 IS SET.
(5)                                 ;*CLEAR BIT 15 VERIFY BIT 15 IS CLEARED.
(5)                                 ;*
(4)                                 ;*****************************************************************
(3)  006630  000004                 TST30:  SCOPE
(1)  006632  013700  001404                 MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
(1)  006636  012705  100000                 MOV     #BIT15,R5       ;SET EXPECTED.
(1)  006642  010510                         MOV     R5,(R0)         ;WRITE BIT15
(1)  006644  011004                         MOV     (R0),R4         ;READ CSR
(1)  006646  020504                         CMP     R5,R4           ;BIT OK?
(2)  006650  001401                         BEQ     .+4             ;BR IF OK
(1)  006652  104010                         ERROR   10              ;REGISTER HAS WRONG DATA.
(1)  006654  040510                         BIC     R5,(R0)         ;CLEAR BIT15
(1)  006656  011004                         MOV     (R0),R4         ;READ REGISTER.
(1)  006660  042705  100000                 BIC     #BIT15,R5       ;ZERO EXPECTED
(1)  006664  005704                         TST     R4              ;REGISTER OK?
(2)  006666  001401                         BEQ     .+4             ;BR IF YES
(1)  006670  104010                         ERROR   10              ;REGISTER NOT =0.
5218
5224
5225                                ;*****************************************************************
(3)                                 ;*TEST 31       BINARY COUNT TEST
(4)                                 ;*TEST TO WRITE A BINARY COUNT PATTERN
(4)                                 ;*(000000-177777) THRU DEVICE 'A' REGISTER
(4)                                 ;*
(3)                                 ;*****************************************************************
(2)  006672  000004                 TST31:  SCOPE
(1)  006674  012737  000003  001160         MOV     #3,$TIMES       ;;DO 3 ITERATIONS
5226 006702  013700  001404                 MOV     DEV.A,R0        ;GET DEVICE 'A' CSR.
5227 006706  005005                         CLR     R5              ;ZERO EXPECTED
5228 006710  010510                 1$:     MOV     R5,(R0)         ;LOAD DATA
5229 006712  011004                         MOV     (R0),R4         ;READ DATA.
5230 006714  020504                         CMP     R5,R4           ;  S DATA GOOD?
5231 006716  001401                         BEQ     .+4             ;    IF YES
5232 006720  104010                         ERROR   10              ;REGISTER DATA ERROR.
5233 006722  005205                         INC     R5              ;UPDATE DATA
5234 006724  001371                         BNE     1$              ;BR IF NOT DONE
5235
5241
5242                                ;*****************************************************************
(3)                                 ;*TEST 32       1'S AND 0'S TEST
(4)                                 ;*TEST TO WRITE ALTERNATE 1'S AND 0'S
(4)                                 ;*(125252 AND 052525) INTO DEVICE 'A'.
(4)                                 ;*
(3)                                 ;*****************************************************************
(2)  006726  000004                 TST32:  SCOPE
(1)  006730  012737  000012  001160         MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
5243 006736  013700  001404                 MOV     DEV.A,R0        ;GET DEVICE 'A' CSR
5244 006742  005003                         CLR     R3              ;SET TO DO 128. TIMES
```

```
006744  012705  125252          MOV     #125252,R5      ;LOAD DATA
006750  010510          1$:     MOV     R5,(R0)         ;WRITE DATA
006752  011004                  MOV     (R0),R4         ;READ REGISTER
006754  020504                  CMP     R5,R4           ;DATA OK?
006756  001401                  BEQ     .+4             ;BR IF OK?
006760  104010                  ERROR   10              ;REGISTER R/W ERROR
006762  005105                  COM     R5              ;CHANGE DATA
006764  105203                  INCB    R3              ;DO 128. TIMES?
006766  100370                  BPL     1$              ;BR IF NO.


                        ;*****************************************************************
                        ;*TEST 33       DEVICE 'A' BYTE OPERATIONS
                        ;*TEST OF DEVICE 'A' BYTE OPERATIONS
                        ;*SET LOW BYTE OF DEVICE 'A' TO 0 AND
                        ;*SET HIGH BYTE OF DEVICE 'A' TO 3 THEN
                        ;*DO A 'INCB' ON LOW BYTE CHECK RESULTS
                        ;*DO A 'INCB' ON HIGH BYTE CHECK RESULTS
                        ;*CONTINUE TILL LOW BYTE GOES TO ZERO
                        ;*****************************************************************
006770  000004         TST33: SCOPE
006772  013700  001404          MOV     DEV.A,R0        ;LOAD DEVICE 'A' CSR.
006776  012710  001400          MOV     #3*400,(R0)     ;PLACE 3 IN HIGH BYTE
007002  005002                  CLR     R2              ;ZERO LOW BYTE IMAGE
007004  012703  000003          MOV     #3,R3           ;SET HIGH BYTE IMAGE TO 3.
007010  010001                  MOV     R0,R1           ;GET CSR
007012  005201                  INC     R1              ;MAKE EQUAL TO HIGH BYTE.
007014  105210          1$:     INCB    (R0)            ;ALTER LOW BYTE
007016  111004                  MOVB    (R0),R4         ;READ IT
007020  105202                  INCB    R2              ;ALTER LOW BYTE IMAGE
007022  110205                  MOVB    R2,R5           ;READ GOOD DATA
007024  020504                  CMP     R5,R4           ;IS DATA OK?
007026  001401                  BEQ     .+4             ;BR IF YES
007030  104010                  ERROR   10              ;REGISTER ERROR
007032  011004                  MOV     (R0),R4         ;READ WORD
007034  110237  001156          MOVB    R2,$TMP0        ;GET LOW BYTE
007040  110337  001157          MOVB    R3,$TMP0+1      ;GET HIGH BYTE
007044  013705  001156          MOV     $TMP0,R5        ;GOOD DATA
007050  020504                  CMP     R5,R4           ;STILL OK?
007052  001401                  BEQ     .+4
007054  104010                  ERROR   10              ;COMPARISON ERROR
007056  105705                  TSTB    R5              ;IF LOW BYTE =0 THEN DONE
007060  001410                  BEQ     2$              ;BR IF END OF TEST
007062  105211                  INCB    (R1)            ;ALTER HIGH BYTE
007064  111104                  MOVB    (R1),R4         ;READ IT
007066  105203                  INCB    R3              ;ALTER HIGH BYTE IMAGE
007070  110305                  MOVB    R3,R5           ;LOAD GOOD DATA
007072  020504                  CMP     R5,R4           ;DATA OK?
007074  001401                  BEQ     .+4             ;BR IF YES.
007076  104010                  ERROR   10              ;REGISTER ERROR
007100  000745                  BR      1$              ;CONT TEST
007102  000240          2$:     NOP


                        ;*****************************************************************
                        ;*TEST 34       BUS INITIALIZE TEST FOR DEVICE 'A'
```

F03


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   (4)                                  ;*TEST THAT ALL BITS IN DEVICE 'A'
   (4)                                  ;*REGISTER CAN BE CLEARED BY "INIT" (RESET INSTR).
   (4)                                  ;*
   (3)                                  ;*****************************************************************
   (2)  007104  000004                  TST34:  SCOPE
   (1)  007106  012737  000005  001160          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
5304    007114  013700  001404                  MOV     DEV.A,R0        ;GET CSR
5305    007120  012710  177777                  MOV     #-1,(R0)        ;SET ALL BITS
5306    007124  005005                          CLR     R5              ;SET EXPECTED TO ALL ZEROS
5307    007126  000005                          RESET                   ;ISSUE INIT
   (1)  007130  052777  000100  172004          BIS     #100,@STKS      ;SET INTR ENABLE
5308    007136  011004                          MOV     (R0),R4         ;READ REGISTER
5309    007140  001401                          BEQ     .+4             ;BR IF ALL ZEROS
5310    007142  104010                          ERROR   10              ;REGISTER NOT ALL ZEROS
5311
```

```
                                        ;*****************************************************************
                                        ;*TEST 35       "DEVICE 'B'" ADDRESS TEST (SEL 0)
                                        ;*TEST TO VERIFY A "REPLY" RESPONSE
                                        ;*FROM "DEVICE'B'" (SEL 0).
                                        ;*IT IS ASSUMED THAT THE DEVICE
                                        ;*IS AT ADDRESS "165250" (SEL 0).
                                        ;*****************************************************************
007144  000004                          TST35:  SCOPE
5321    007146  013746  000004                  MOV     4,-(SP)         ;SAVE ADDRESS 4.
5322    007152  013746  000006                  MOV     6,-(SP)         ;SAVE ADDRESS 6.
5323    007156  012701  000017                  MOV     #15.,R1         ;SET INTERNAL ICOUNT TO 15.
5324    007162  013700  001406                  MOV     DEV.B,R0        ;GET DEVICE CSR.
5325    007166  012737  007212  000004          MOV     #3$,4           ;SET TIME-OUT VECTOR.
5326    007174  012737  000200  000006          MOV     #200,6          ;SET PRIO.
5327    007202  005710                  1$:     TST     (R0)            ;REFERENCE DEVICE CSR.
5328    007204  005301                  2$:     DEC     R1              ;ICOUNT = 0?
5329    007206  001375                          BNE     1$              ;BR IF NO.
5330    007210  000404                          BR      4$              ;CONT TEST
5331    007212  104012                  3$:     ERROR   12              ;TIME-OUT ERROR.
5332    007214  012716  007204                  MOV     #2$,(SP)        ;SET RETURN ADD.
5333    007220  000002                          RTI                     ;RETURN.
5334    007222  012637  000006          4$:     MOV     (SP)+,6         ;RESTORE 6
5335    007226  012637  000004                  MOV     (SP)+,4         ;RESTORE 4
5336
5361
                                        ;*****************************************************************
                                        ;*TEST 36       R/W TEST OF BIT 6 IN DEVICE 'B' (SEL 0)
                                        ;*TEST THAT BIT 6 IN DEVICE 'B' (SEL 0)
                                        ;*IS R/W.
                                        ;*SET BIT 6 VERIFY IT IS SET.
                                        ;*CLEAR BIT 6 VERIFY IT IS CLEAR.
                                        ;*
                                        ;*****************************************************************
007232  000004                          TST36:  SCOPE
007234  106427  000200                          MTPS    #200
007240  013700  001406                          MOV     DEV.B,R0        ;LOAD CSR INTO R0
007244  012705  000100                          MOV     #BIT6,R5        ;SET BIT 6 INTO R5
007250  010510                                  MOV     R5,(R0)         ;WRITE BIT
007252  011004                                  MOV     (R0),R4         ;READ REGISTER
007254  020504                                  CMP     R5,R4           ;OK?
007256  001401                                  BEQ     .+4             ;BR IF OK.
007260  104013                                  ERROR   13              ;REGISTER R/W ERROR
007262  040510                                  BIC     R5,(R0)         ;CLEAR BIT 6
007264  011004                                  MOV     (R0),R4         ;READ DEVICE
007266  042705  000100                          BIC     #BIT6,R5        ;CLEAR EXPECTED
007272  005704                                  TST     R4              ;REGISTER =0?
007274  001401                                  BEQ     .+4             ;BR IF =0!
007276  104013                                  ERROR   13              ;REGISTER ERROR
                                        ;*****************************************************************
                                        ;*TEST 37       R/W TEST OF BIT 7 IN DEVICE 'B' (SEL 0)
                                        ;*TEST THAT BIT 7 IN DEVICE 'B' (SEL 0)
                                        ;*IS R/W.
                                        ;*SET BIT 7 VERIFY IT IS SET.
                                        ;*CLEAR BIT 7 VERIFY IT IS CLEAR.
```

```
(5)
(4)                                     ;#
(4)                                     ;*****************************************************************
(3)  007300  000004                     TST37:  SCOPE
(1)  007302  106427  000200                     MTPS    #200
(1)  007306  013700  001406                     MOV     DEV.B,R0        ;LOAD CSR INTO R0
(1)  007312  012705  000200                     MOV     #BIT7,R5        ;SET BIT 7 INTO R5
(1)  007316  010510                             MOV     R5,(R0)         ;WRITE BIT
(1)  007320  011004                             MOV     (R0),R4         ;READ REGISTER
(1)  007322  020504                             CMP     R5,R4           ;OK?
(2)  007324  001401                             BEQ     .+4             ;BR IF OK.
(1)  007326  104013                             ERROR   13              ;REGISTER R/W ERROR
(1)  007330  040510                             BIC     R5,(R0)         ;CLEAR BIT 7
(1)  007332  011004                             MOV     (R0),R4         ;READ DEVICE
(1)  007334  042705  000200                     BIC     #BIT7,R5        ;CLEAR EXPECTED
(1)  007340  005704                             TST     R4              ;REGISTER =0?
(2)  007342  001401                             BEQ     .+4             ;ER IF =0!
(1)  007344  104013                             ERROR   13              ;REGISTER ERROR
5362
5371
5372                                    ;*****************************************************************
(3)                                     ;*TEST 40       DEVICE 'B' INTERRUPT TEST (SEL 0)
(4)                                     ;*TEST OF DEVICE 'B' INTERRUPTS (SEL 0)
(4)                                     ;*SET BIT6 VERIFY NO INTERRUPT
(4)                                     ;*CLEAR BIT6; SET BIT7 -VERIFY NO INTERRUPT
(4)                                     ;*NOW SET BIT6 AGAIN -EXPECT INTERRUPT AT
(4)                                     ;*VECTOR "340".
(4)                                     ;#
(3)                                     ;*****************************************************************
(2)  007346  000004                     TST40:  SCOPE
5373 007350  106427  000000                     MTPS    #0
5374 007354  017746  172030                     MOV     @#B.AVEC,-(SP)  ;SAVE DVB VECTOR
5375 007360  017746  172026                     MOV     @#B.APTY,-(SP)  ;SAVE DVB PRIO
5376 007364  012777  007530  172016             MOV     # 5$,@#B.AVEC   ;LOAD VECTOR
5377 007372  012777  000200  172012             MOV     #200,@#B.APTY   ;LOAD PRIO
5400 007400  005001                             CLR     R1
5401 007402  013700  001406                     MOV     DEV.B,R0        ;
     007406  052710  000100             1$:     BIS     #BIT6,(R0)      ;SET EVENT ENABLE
     007412  000240                             NOP                     ;WASTE TIME
     007414  042710  000100                     BIC     #BIT6,(R0)      ;CLEAR IT
     007420  052710  000200                     BIS     #BIT7,(R0)      ;SET OTHER INTR
     007424  000240                             NOP                     ;WASTE TIME
     007426  012777  007446  171754             MOV     #2$,@#B.AVEC    ;SET GOOD VECTOR
     007434  052710  000100                     BIS     #BIT6,(R0)      ;SET IE
     007440  000240                             NOP                     ;WASTE TIME
     007442  104015                             ERROR   15              ;NO INTERRUPT
     007444  000407                             BR      4$              ;CONT TEST
     007446  005010                     2$:     CLR     (R0)            ;ZERO REGISTER
     007450  105203                             INCB    R3              ;UPDATE ICOUNT
     007452  100403                             BMI     3$              ;DONE?
     007454  012716  007406                     MOV     #1$,(SP)        ;SET RETURN
     007460  000002                             RTI                     ;EXIT
     007462  022626                     3$:     CMP     (SP)+,(SP)+     ;POP PC+PSW
     007464  005010                     4$:     CLR     (R0)            ;DSABLE DEVICE
     007466  012677  171720                     MOV     (SP)+,@#B.APTY  ;RESTORE PTY
     007472  012677  171712                     MOV     (SP)+,@#B.AVEC  ;RESTORE VEC
5394 007476  000404                             BR      6$              ;CONT TEST
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5400  007500  010002                  5$:   MOV   R0,R2          ;SAVE R0
5401  007502  011600                        MOV   (SP),R0        ;SAVE PC
5402  007504  104005                        ERROR 5              ;UNEXPECTED INTERUPT
5403  007506  010200                        MOV   R2,R0          ;RESTORE R0
5404  007510  106427  000000          6$:   MTPS  #0             ;ZERO PTY
5405
5412
5413                                  ;*********************************************************
  (3)                                 ;*TEST 41       "DEVICE 'B'" ADDRESS TEST (SEL 2)
  (4)                                 ;*TEST TO VERIFY A "B" REPLY RESPONSE
  (4)                                 ;*FROM "DEVICE'B'" (SEL 2).
  (4)                                 ;*IT IS ASSUMED THAT THE DEVICE
  (4)                                 ;*IS AT ADDRESS "165252" (SEL 2).
  (3)                                 ;*********************************************************
  (2)  007514  000004                 TST41: SCOPE
5414  007516  013746  000004                 MOV   4,-(SP)        ;SAVE ADDRESS 4.
5415  007522  013746  000006                 MOV   6,-(SP)        ;SAVE ADDRESS 6.
5416  007526  012701  000017                 MOV   #15.,R1        ;SET INTERNAL ICOUNT TO 15.
5417  007532  013700  001406                 MOV   DEV.B,R0       ;GET DEVICE CSR.
5418  007536  062700  000002                 ADD   #2,R0          ;MAKE IT SEL 2
5419  007542  012737  007566  000004        MOV   #3$,4          ;SET TIME-OUT VECTOR.
5420  007550  012737  000200  000006        MOV   #200,6         ;SET PRIO.
5421  007556  005710                  1$:   TST   (R0)           ;REFERENCE DEVICE CSR.
5422  007560  005301                  2$:   DEC   R1             ;ICOUNT = 0?
5423  007562  001375                        BNE   1$             ;BR IF NO.
5424  007564  000404                        BR    4$             ;CONT TEST
5425  007566  104012                  3$:   ERROR 12             ;TIME-OUT ERROR.
5426  007570  012716  007560               MOV   #2$,(SP)       ;SET RETURN ADD.
5427  007574  000002                        RTI                  ;RETURN.
5428  007576  012637  000006          4$:   MOV   (SP)+,6        ;RESTORE 6
5429  007602  012637  000004                MOV   (SP)+,4        ;RESTORE 4
5430
5457
  (5)                                 ;*********************************************************
  (4)                                 ;*TEST 42       R/W TEST OF BIT 6 IN DEVICE 'B' (SEL 2)
  (5)                                 ;*TEST THAT BIT 6 IN DEVICE 'B' (SEL 2)
  (5)                                 ;*IS R/W.
  (5)                                 ;*SET BIT 6 VERIFY IT IS SET.
  (5)                                 ;*CLEAR BIT 6 VERIFY IT IS CLEAR.
  (5)                                 ;*
  (4)                                 ;*********************************************************
  (3)  007606  000004                 TST42: SCOPE
  (1)  007610  106427  000200                MTPS  #200
  (1)  007614  013700  001406                MOV   DEV.B,R0       ;LOAD CSR INTO R0
  (1)  007620  062700  000002                ADD   #2,R0          ;MAKE IT SEL 2
  (1)  007624  012705  000100                MOV   #BIT6,R5       ;SET BIT 6 INTO R5
  (1)  007630  010510                        MOV   R5,(R0)        ;WRITE BIT
  (1)  007632  011004                        MOV   (R0),R4        ;READ REGISTER
  (1)  007634  020504                        CMP   R5,R4          ;OK?
  (2)  007636  001401                        BEQ   .+4            ;BR IF OK.
  (1)  007640  104013                        ERROR 13             ;REGISTER R/W ERROR
  (1)  007642  040510                        BIC   R5,(R0)        ;CLEAR BIT 6
  (1)  007644  011004                        MOV   (R0),R4        ;READ DEVICE
  (1)  007646  042705  000100               BIC   #BIT6,R5       ;CLEAR EXPECTED
  (1)  007652  005704                        TST   R4             ;REGISTER =0?
  (2)  007654  001401                        BEQ   .+4            ;BR IF =0!
```

```
   (1)  007656  104013                        ERROR   13              ;REGISTER ERROR
   (1)  007660  106427  000000                MTPS    #0              ;SET PTY TO 0
   (1)
   (5)                                ;*****************************************************************
   (4)                                ;*TEST 43       R/W TEST OF BIT 7 IN DEVICE 'B' (SEL 2)
   (5)                                ;*TEST THAT BIT 7 IN DEVICE 'B' (SEL 2)
   (5)                                ;*IS R/W.
   (5)                                ;*SET BIT 7 VERIFY IT IS SET.
   (5)                                ;*CLEAR BIT 7 VERIFY IT IS CLEAR.
   (5)                                ;*
   (4)                                ;*****************************************************************
   (3)  007664  000004                TST43:  SCOPE
   (1)  007666  106427  000200                MTPS    #200
   (1)  007672  013700  001406                MOV     DEV.B,R0        ;LOAD CSR INTO R0
   (1)  007676  062700  000002                ADD     #2,R0           ;MAKE IT SEL 2
   (1)  007702  012705  000200                MOV     #BIT7,R5        ;SET BIT 7 INTO R5
   (1)  007706  010510                        MOV     R5,(R0)         ;WRITE BIT
   (1)  007710  011004                        MOV     (R0),R4         ;READ REGISTER
   (1)  007712  020504                        CMP     R5,R4           ;OK?
   (2)  007714  001401                        BEQ     .+4             ;BR IF OK.
   (1)  007716  104013                        ERROR   13              ;REGISTER R/W ERROR
   (1)  007720  040510                        BIC     R5,(R0)         ;CLEAR BIT 7
   (1)  007722  011004                        MOV     (R0),R4         ;READ DEVICE
   (1)  007724  042705  000200                BIC     #BIT7,R5        ;CLEAR EXPECTED
   (1)  007730  005704                        TST     R4              ;REGISTER =0?
   (2)  007732  001401                        BEQ     .+4             ;BR IF =0!
   (1)  007734  104013                        ERROR   13              ;REGISTER ERROR
   (1)  007736  106427  000000                MTPS    #0              ;SET PTY TO 0
 5458
 5467
 5468                               ;*****************************************************************
  (3)                               ;*TEST 44       DEVICE 'B' INTERRUPT TEST (SEL 2)
  (4)                               ;*TEST OF DEVICE 'B' INTERRUPTS (SEL 2)
  (4)                               ;*SET BIT6 VERIFY NO INTERRUPT
  (4)                               ;*CLEAR BIT6; SET BIT7 -VERIFY NO INTERRUPT
  (4)                               ;*I/O SET BIT6 AGAIN -EXPECT INTERUPT AT
  (4)                               ;*VECTOR=344.
  (4)                               ;*
  (3)                               ;*****************************************************************
  (2)  007742  000004                TST44:  SCOPE
 5469  007744  106427  000000                MTPS    #0
 5470  007750  017746  171440                MOV     @#B.BVEC,-(SP)  ;SAVE DVB VECTOR
 5471  007754  017746  171436                MOV     @#B.BPTY,-(SP)  ;SAVE DVB PRIO
 5472  007760  012777  010100  171426        MOV     #5$,@#B.BVEC    ;LOAD VECTOR
 5473  007766  012777  000200  171422        MOV     #200,@#B.BPTY   ;LOAD PRIO
 5474  007774  005001                        CLR     R1
 5475  007776  013700  001406                MOV     DEV.B,R0        ;
 5476  010002  062700  000002                ADD     #2,R0           ;MAKE IT SEL 2
 5477  010006  052710  000100        1$:     BIS     #BIT6,(R0)      ;SET EVENT ENABLE
 5478  010012  000240                        NOP                     ;WASTE TIME
 5479  010014  042710  000100                BIC     #BIT6,(R0)      ;CLEAR IT
 5480  010020  052710  000200                BIS     #BIT7,(R0)      ;SET OTHER INTR
 5481  010024  000240                        NOP                     ;WASTE TIME
 5482  010026  012777  010046  171360        MOV     #2$,@#B.BVEC    ;SET GOOD VECTOR
 5483  010034  052710  000100                BIS     #BIT6,(R0)      ;SET IE
 5484  010040  000240                        NOP                     ;WASTE TIME
```

```
5485  010042  104015                          ERROR   15              ;NO INTERRUPT
5486  010044  000407                          BR      4$              ;CONT TEST
5487  010046  005010                  2$:     CLR     (R0)            ;ZERO REGISTER
5488  010050  105203                          INCB    R3              ;UPDATE ICOUNT
5489  010052  100403                          BMI     3$              ;DONE?
5490  010054  012716  010006                  MOV     #1$,(SP)        ;SET RETURN
5491  010060  000002                          RTI                     ;EXIT
5492  010062  022626                  3$:     CMP     (SP)+,(SP)+     ;POP PC+PSW
5493  010064  005010                  4$:     CLR     (R0)            ;DISABLE DEVICE
5494  010066  012677  171324                  MOV     (SP)+,@B.BPTY   ;RESTORE PTY
5495  010072  012677  171316                  MOV     (SP)+,@B.BVEC   ;RESTORE VEC
5496  010076  000404                          BR      6$              ;CONT TEST
5497  010100  010002                  5$:     MOV     R0,R2           ;SAVE R0
5498  010102  011600                          MOV     (SP),R0         ;SAVE PC.
5499  010104  104005                          ERROR   5               ;UNEXPECTED INTERUPT
5500  010106  010200                          MOV     R2,R0           ;RESTORE R0
5501  010110  106427  000000          6$:     MTPS    #0              ;ZERO PTY
5502
5509
5510                                  ;*********************************************************
 (3)                                  ;*TEST 45       TEST OF 'EVENT' AT DEVICE 'B'
 (4)                                  ;*TEST THAT SETTING BIT1 OF DEVICE 'B' (SEL 2)
 (4)                                  ;*CAUSES AN 'EVENT' VECTORING TO ADDRESS 100.
 (4)                                  ;*
 (4)                                  ;*
 (3)                                  ;*********************************************************
 (2)  010114  000004          TST45:  SCOPE
5511  010116  106427  000000          MTPS    #0              ;ZERO PSW
5512  010122  017746  171262          MOV     @CLKVEC,-(SP)   ;SAVE VEC
5513  010126  017746  171250          MOV     @CLKPTY,-(SP)   ;SAVE PTY
5514  010132  013700  001406          MOV     DEV.B,R0        ;GET CSR
5515  010136  062700  000002          ADD     #2,R0           ;MAKE IT SEL 2
5516  010142  005003                  CLR     R3              ;ICOUNTER=0
5517  010144  012777  010206  171226  MOV     #2$,@CLKVEC     ;SET VECTOR
5518  010152  012777  000200  171222  MOV     #200,@CLKPTY    ;SET PRIO
5519  010160  005010                  1$:     CLR     (R0)            ;ZERO REGISTER
5520  010162  052710  000002          BIS     #BIT1,(R0)      ;SET EVENT
5521  010166  005027                  CLR     (PC)+           ;STALL FOR TIME.
5522  010170  000000                  64$:    0
5523  010172  062737  000001  010170  ADD     #1,64$          ;INC TIMER
5524  010200  001374                  BNE     .-6             ;TIMER DONE?
5525  010202  104015                  ERROR   15              ;NO INTERRUPT
5526  010204  000406                  BR      4$              ;CONT
5527  010206  105203                  2$:     INCB    R3              ;ICOUNT=ICOUT+1
5528  010210  100403                  BMI     3$              ;BR IF DONE
5529  010212  012716  010160          MOV     #1$,(SP)        ;SET RTN
5530  010216  000002                  RTI                     ;EXIT
5531  010220  022626                  3$:     CMP     (SP)+,(SP)+     ;POP PC+PSW
5532  010222  005010                  4$:     CLR     (R0)            ;DISABLE DEVICE
5533  010224  012677  171152          MOV     (SP)+,@CLKPTY   ;RESTORE PTY
5534  010230  012677  171144          MOV     (SP)+,@CLKVEC   ;RESTORE VEC
5535  010234  106427  000000          MTPS    #0              ;PTY 0
5536
5544
5545                                  ;*********************************************************
 (3)                                  ;*TEST 46       DLV11 CHARACTER TEST
```

```
   (4)                                  ;*TEST TO OUTPUT CHARACTERS ON THE DLV11
   (4)                                  ;*NOT BEING USED AS THE CONSOLE INTERFACE.
   (4)                                  ;*PROGRAM WILL DO 2 FULL BINARY COUNT PATTERNS
   (4)                                  ;*AND THEN A SLIDE ASCII PATTERN FOR 5 ROWS.
   (4)                                  ;*
   (3)                                  ;**********************************************************************
   (2) 010240  000004                   TST46:  SCOPE
   (1) 010242  012737  000002  001160           MOV     #2,$TIMES       ;;DO 2 ITERATIONS
5546   010250  012700  175610           MOV     #175610,R0      ;SET DEVICE ADDRESS
5547   010254  012701  000002           MOV     #2,R1           ;SET BINARY COUNTER
5548   010260  005003                   CLR     R3              ;
5549   010262  005005                   CLR     R5              ;CLEAR COUNTER
5550   010264  005760  000002           TST     2(R0)           ;CLR RX DONE
5551   010270  005760  000002           TST     2(R0)           ;
5552   010274  105760  000004   1$:     TSTB    4(R0)           ;PRINTER READY?
5553   010300  100407                   BMI     64$             ;BR IF YES
5554   010302  023737  000000  000000   CMP     0,0             ;WASTE TIME
5555   010310  062703  000001           ADD     #1,R3           ;DELAY COUNTER+1
5556   010314  001367                   BNE     1$              ;DELAY DONE?  NO!
5557   010316  104016                   ERROR   16              ;TPS BIT7 <>1 (NOT READY)
5558   010320  110560  000006   64$:    MOVB    R5,6(R0)        ;LOAD DATA CHAR.
5559   010324  005003                   CLR     R3              ;CLEAR POINTER
5560   010326  105710           65$:    TSTB    (R0)            ;RECEIVER READY(DONE)?
5561   010330  100407                   BMI     66$             ;BR IF YES
5562   010332  023737  000000  000000   CMP     0,0             ;WASTE TIME.
5563   010340  062703  000001           ADD     #1,R3           ;
5564   010344  001370                   BNE     65$             ;DELAY DONE?  NO!
5565   010346  104016                   ERROR   16              ;RECEIVER NOT DONE.
5566   010350  016004  000002   66$:    MOV     2(R0),R4        ;READ DATA
5567   010354  020504                   CMP     R5,R4           ;DATA GOOD?
5568   010356  001401                   BEQ     67$             ;BR IF YES
5569   010360  104017                   ERROR   17              ;DATA COMPARE ERROR.
5570   010362  105205           67$:    INCB    R5              ;NEXT CHAR
5571   010364  001343                   BNE     1$              ;
5572   010366  005301                   DEC     R1              ;
5573   010370  001341                   BNE     1$              ;
5574   010372  105760  000004           TSTB    4(R0)           ;
5575   010376  100375                   BPL     .-4             ;
5576   010400  112760  000015  000006   MOVB    #15,6(R0)       ;
5577   010406  105760  000004           TSTB    4(R0)           ;
5578   010412  100375                   BPL     .-4             ;
5579   010414  112760  000012  000006   MOVB    #12,6(R0)       ;
5580   010422  012705  000005           MOV     #5.,R5          ;
5581   010426  012703  000040   2$:     MOV     #40,R3          ;
5582   010432  005203           3$:     INC     R3              ;
5583   010434  020327  000176           CMP     #176,R3         ;
5584   010440  001772                   BEQ     2$              ;
5585   010442  012701  000110           MOV     #72.,R1         ;
5586   010446  010304                   MOV     R3,R4           ;
5587   010450  105760  000004           TSTB    4(R0)           ;
5588   010454  100375                   BPL     .-4             ;
5589   010456  112760  000015  000006   MOVB    #15,6(R0)       ;
5590   010464  105760  000004           TSTB    4(R0)           ;
5591   010470  100375                   BPL     .-4             ;
5592   010472  112760  000012  000006   MOVB    #12,6(R0)       ;
5593   010500  022704  000176   4$:     CMP     #176,R4         ;
```

```
5594  010504  001002                        BNE     .+6
5595  010506  012704  000040                MOV     #40,R4          ;
5596  010512  105760  000004                TSTB    4(R0)           ;
5597  010516  100375                        BPL     .-4             ;
5598  010520  110460  000006                MOVB    R4,6(R0)        ;
5599  010524  005204                        INC     R4              ;
5600  010526  005301                        DEC     R1              ;
5601  010530  001363                        BNE     4$              ;
5602  010532  005305                        DEC     R5              ;
5603  010534  001336                        BNE     3$              ;
5604  010536  105760  000004                TSTB    4(R0)           ;TP READY?
5605  010542  100375                        BPL     .-4             ;BR IF NO
5606  010544  005760  000006                CLR     6(R0)           ;XMIT A ZERO.
5607  010550  105760  000004                TSTB    4(R0)           ;READY?
5608  010554  100375                        BPL     .-4             ;BR IF NO.
5609  010556  005760  000006                CLR     6(R0)           ;LOAD A ZERO.
5610  010562  105760  000004                TSTB    4(R0)           ;READY?
5611  010566  100375                        BPL     .-4             ;BR IF NO
5612  010570  005005                        CLR     R5              ;
5613  010572  005205                        INC     R5              ;
5614  010574  001376                        BNE     .-2             ;
5615  010576  005760  000002                TST     2(R0)           ;CLEAR RX FLAG.
5616
5623
5624                                  ;*****************************************************************
 (3)                                  ;#TEST 47       DLV11 INTERUPT TEST
 (4)                                  ;#TEST OF DLV11 INTERUPTS.
 (4)                                  ;#THIS TEST WILL EXECUTE 32. INTERUPTS ON
 (4)                                  ;#BOTH THE RECEIVER AND TRANSMITTER AND
 (4)                                  ;#WILL ALSO CHECK THE DATA.
 (3)                                  ;*****************************************************************
 (2)  010602  000004                  TST47:  SCOPE
 (1)  010604  012737  000002  001160          MOV     #2,$TIMES       ;;DO 2 ITERATIONS
5625  010612  012700  175610                MOV     #175610,R0      ;GET DLV11 CSR
5626  010616  013746  000300                MOV     300,-(SP)       ;SAVE
5627  010622  013746  000302                MOV     302,-(SP)       ;VECTORS
5628  010626  013746  000304                MOV     304,-(SP)       ;ON THE
5629  010632  013746  000306                MOV     306,-(SP)       ;STACK.
5630  010636  012737  010732  000304        MOV     #4$,304         ;SET TX VECTOR.
5631  010644  012737  000200  000306        MOV     #200,306        ;SET PRIO.
5632  010652  012737  010760  000300        MOV     #5$,300         ;SET RX VECTOR
5633  010660  012737  000200  000302        MOV     #200,302        ;SET PRIO.
5634  010666  005005                        CLR     R5              ;SET DATA POINTER TO ZERO
5635  010670  052760  000100  000004        BIS     #100,4(R0)      ;SET TX IE.
5636  010676  005003                1$:     CLR     R3              ;SET TIMER TO ZERO.
5637  010700  062703  000001        2$:     ADD     #1,R3           ;TIME WAITING FOR INTERUPTS.
5638  010704  001375                        BNE     2$              ;KEEP COUNTING.
5639  010706  104016                        ERROR   16              ;DLV11 INTERUPT PROBLEM.
5640  010710  012637  000306        3$:     MOV     (SP)+,306       ;RESTORE
5641  010714  012637  000304                MOV     (SP)+,304       ;ALL
5642  010720  012637  000302                MOV     (SP)+,302       ;DLV11
5643  010724  012637  000300                MOV     (SP)+,300       ;VECTORS.
5644  010730  000444                        BR      TST50           ;;;EXIT TEST
5645
5646  010732                        4$:     ;TRANSMITTER INTERUPTS TO HERE.
5647  010732  110560  000006                MOVB    R5,6(R0)        ;LOAD DATA CHAR.
```

```
5648  010736  042760  000100  000004          BIC     #100,4(R0)      ;DSABLE TX INTERUPTS.
5649  010744  052760  000100  000000          BIS     #100,0(R0)      ;ENABLE RX INTERUPTS.
5650  010752  012716  010676                  MOV     #1$,(SP)        ;SET RETURN
5651  010756  000002                          RTI                     ;EXIT ISR.
5652
5653  010760                          5$:     ;RECEIVER INTERUPTS TO HERE.
5654  010760  000240                          NOP                     ;
5655  010762  116004  000002                  MOVB    2(R0),R4        ;GET DATA REVEIVERD
5656  010766  020504                          CMP     R5,R4           ;DATA GOOD?
5657  010770  001401                          BEQ     6$              ;BE IF GOOD DATA
5658  010772  104017                          ERROR   17              ;DLV11 DATA ERROR (INTERUPTS)
5659  010774  005205                  6$:     INC     R5              ;UPDATE DATA CHAR.
5660  010776  022705  000040                  CMP     #32.,R5         ;ALL CHARS DONE?
5661  011002  001006                          BNE     7$              ;BR IF NO
5662  011004  042760  000100  000000          BIC     #100,0(R0)      ;DSABLE RX INTERUPTS.
5663  011012  012716  010710                  MOV     #3$,(SP)        ;SET RETURN
5664  011016  000002                          RTI                     ;RETURN
5665  011020  042760  000100  000000  7$:     BIC     #100,0(R0)      ;DSABLE RX INTERUPTS
5666  011026  052760  000100  000004          BIS     #100,4(R0)      ;ENABLE TX INTERUPTS
5667  011034  012716  010676                  MOV     #1$,(SP)        ;SET RETURN
5668  011040  000002                          RTI
5669
5677
5678                                  ;*****************************************************************
 (3)                                  ;*TEST 50       MINI MEMORY TEST
 (4)                                  ;*MINI MEMORY TESTS
 (4)                                  ;*ALL UNSED MEMORY WILL BE FILLED WITH ALL 1'S
 (4)                                  ;*AND THEN EACH ADDRESS WILL BE TESTED
 (4)                                  ;*WITH A FLOATING ZERO.
 (4)                                  ;*
 (3)                                  ;*****************************************************************
 (2)  011042  000004                  TST50:  SCOPE
 (1)  011044  012737  000002  001160          MOV     #2,$TIMES       ;;DO 2 ITERATIONS
5679  011052  013701  001374                  MOV     MEMSIZ,R1       ;GET MAX MEMORY SIZE.
5680  011056  162701  000310                  SUB     #310,R1         ;PROTECT ABL
5681  011062  012700  015142                  MOV     #CORMAX,R0      ;GET LAST ADDRESS USED BY PROGRAM
5682  011066  012720  177777          1$:     MOV     #177777,(R0)+   ;
5683  011072  020100                          CMP     R1,R0           ;ALL MEMORY FILLED?
5684  011074  001374                          BNE     1$              ;
5685  011076  012700  015142                  MOV     #CORMAX,R0      ;
5686  011102  042710  000001          2$:     BIC     #BIT0,(R0)      ;
5687  011106  012705  177776                  MOV     #^C<1>,R5       ;
5688  011112  011004                  3$:     MOV     (R0),R4         ;
5689  011114  020504                          CMP     R5,R4           ;
5690  011116  001401                          BEQ     4$              ;
5691  011120  104020                          ERROR   20              ;
5692  011122  000261                  4$:     SEC                     ;
5693  011124  006105                          ROL     R5              ;
5694  011126  000261                          SEC                     ;
5695  011130  006110                          ROL     (R0)            ;
5696  011132  103767                          BCS     3$              ;
5697  011134  005720                          TST     (R0)+           ;
5698  011136  100401                          BMI     .+4             ;
5699  011140  104016                          ERROR   16              ;GENERAL ERROR. BIT15<>1!
5700  011142  020100                          CMP     R1,R0           ;ALL MEMORY DONE?
5701  011144  001356                          BNE     2$              ;
```

5702

```
5758                                    ;*****************************************************************
 (1)
 (1)                                    .SBTTL  END OF PASS ROUTINE
 (1)
 (1)                                    ;*INCREMENT THE PASS NUMBER ($PASS)
 (1)                                    ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
 (1)                                    ;*IF THERES A MONITOR GO TO IT
 (1)                                    ;*IF THERE ISN'T JUMP TO TST1
 (1)
 (1)  011146                            $EOP:
 (1)  011146  000004                            SCOPE
 (1)  011150  005037  001102                    CLR     $TSTNM          ;;ZERO THE TEST NUMBER
 (1)  011154  005037  001160                    CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
 (1)  011160  005237  001100                    INC     $PASS           ;;INCREMENT THE PASS NUMBER
 (1)  011164  042737  100000  001100            BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
 (1)  011172  005327                            DEC     (PC)+           ;;LOOP?
 (1)  011174  000001            $EOPCT: .WORD   1
 (1)  011176  003C22                            BGT     $DOAGN          ;;YES
 (1)  011200  012737                            MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
 (1)  011202  000001            $ENDCT: .WORD   1
 (1)  011204  011174                            $EOPCT
 (1)  011206  104400  011250                    TYPE    ,$ENDMG         ;;TYPE "END PASS #"
 (2)  011212  013746  001100                    MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
 (2)  011216  104404                            TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 (1)  011220  104400  011265                    TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
 (1)  011224                            $GET42:
 (1)
 (1)  011224  013700  000042                    MOV     @#42,R0         ;;GET MONITOR ADDRESS
 (1)  011230  001405                            BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
 (1)  011232  000005                            RESET                   ;;CLEAR THE WORLD
 (1)  011234  004710            $ENDAD: JSR     PC,(R0)                 ;;GO TO MONITOR
 (1)  011236  000240                            NOP                     ;;SAVE ROOM
 (1)  011240  000240                            NOP                     ;;FOR
 (1)  011242  000240                            NOP                     ;;ACT11
 (1)  011244                            $DOAGN:
 (1)  011244  000137  004470                    JMP     @#TST1          ;;RETURN
 (1)  011250  005015  047105  020104    $ENDMG: .ASCIZ  <15><12>/END PASS #/
 (1)  011256  040520  051523  021440
 (1)  011264     000
 (1)  011265     377     377     000    $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
5759                                    ;*****************************************************************
 (1)
 (1)                                    .SBTTL  SCOPE HANDLER ROUTINE
 (1)
 (1)                                    ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS, IT WILL INCREMENT
 (1)                                    ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
 (1)                                    ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
 (1)                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 (1)                                    ;*SW14=1        LOOP ON TEST
 (1)                                    ;*SW11=1        INHIBIT ITERATIONS
 (1)                                    ;*SW09=1        LOOP ON ERROR
 (1)                                    ;*CALL
 (1)                                    ;*      SCOPE           ;;SCOPE=IOT
 (1)
 (1)  011270                            $SCOPE:
 (3)  011270  032777  000400  167640            BIT     #BIT8,@SWR      ;CONFIDENCE?
```

```
(3)  011276  001425                    BEQ     99$             ;BR IF NO
(3)  011300  123737  001102  001440     CMPB    $TSTNM,XXSCOP   ;WAS THIS TEST ALREADY TYPED OUT?
(3)  011306  001421                    BEQ     9$              ;BR IF YES
(3)  011310  123737  001102  015140     CMPB    $TSTNM,LASTN    ;LEGAL TEST #
(3)  011316  003015                    BGT     99$             ;BR IF NO
(3)  011320  105737  001102             TSTB    $TSTNM          ;TEST 0?
(3)  011324  001412                    BEQ     99$             ;BR IF YES (THERE IS NO TEST 0)
(3)  011326  113737  001102  001440     MOVB    $TSTNM,XXSCOP   ;LOAD FOR NEXT TIME
(3)  011334  104400  014644             TYPE    ,XTST           ;TYPE "T ".
(3)  011340  013746  001440             MOV     XXSCOP,-(SP)    ;
(3)  011344  104401                     TYPOC                   ;
(3)  011346  104400  014610             TYPE    ,XSPA           ;
(3)  011352                     99$:
(1)  011352  032777  040000  167556 1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
(1)  011360  001101                     BNE     $OVER           ;;YES IF SW14=1
(1)                             ;#####START OF CODE FOR THE XOR TESTER#####
(1)  011362  000416             $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
(1)                                                             ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
(1)  011364  013746  000004             MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
(1)  011370  012737  011410  000004     MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
(1)  011376  005737  177060             TST     @#177060        ;;TIME OUT ON XOR?
(1)  011402  012637  000004             MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
(1)  011406  000453                     BR      $SVLAD          ;;GO TO THE NEXT TEST
(1)  011410  022626             5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
(1)  011412  012637  000004             MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
(1)  011416  000413                     BR      7$              ;;LOOP ON THE PRESENT TEST
(1)  011420                     6$:;#####END OF CODE FOR THE XOR TESTER#####
(1)  011420  105737  001103     2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
(1)  011424  001421                     BEQ     3$              ;;BR IF NO
(1)  011426  123737  001115  001103     CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
(1)  011434  101015                     BHI     3$              ;;BR IF NO
(1)  011436  032777  001000  167472     BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
(1)  011444  001404                     BEQ     4$              ;;BR IF NO
(1)  011446  013737  001110  001106 7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
(1)  011454  000443                     BR      $OVER
(1)  011456  105037  001103         4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
(1)  011462  005037  001160             CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
(1)  011466  000415                     BR      1$              ;;ESCAPE TO THE NEXT TEST
(1)  011470  032777  004000  167440 3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
(1)  011476  001011                     BNE     1$              ;;BR IF YES
(1)  011500  005737  001100             TST     $PASS           ;;IF FIRST PASS OF PROGRAM
(1)  011504  001406                     BEQ     1$              ;;    INHIBIT ITERATIONS
(1)  011506  005237  001104             INC     $ICNT           ;;INCREMENT ITERATION COUNT
(1)  011512  023737  001160  001104     CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
(1)  011520  002021                     BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
(1)  011522  012737  000001  001104 1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
(1)  011530  013737  011600  001160     MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
(1)  011536  105237  001102         $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
(1)  011542  011637  001106             MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
(1)  011546  011637  001110             MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
(1)  011552  005037  001162             CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
(1)  011556  112737  000001  001115     MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
(1)  011564  013777  001102  167346 $OVER:    MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
(1)  011572  013716  001106             MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
(1)  011576  000002                     RTI                     ;;FIXES PS
(1)  011600  000100             $MXCNT: 100                     ;;MAX. NUMBER OF ITERATIONS
```

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 5760                                ;*****************************************************************
  (1)
  (1)                                .SBTTL  ERROR HANDLER ROUTINE
  (1)
  (1)                                ;#THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
  (1)                                ;#SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
  (1)                                ;#AND GO TO XERR1 ON ERROR
  (1)                                ;#THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
  (1)                                ;#SW15=1        HALT ON ERROR
  (1)                                ;#SW13=1        INHIBIT ERROR TYPEOUTS
  (1)                                ;#SW10=1        BELL ON ERROR
  (1)                                ;#SW09=1        LOOP ON ERROR
  (1)                                ;#CALL
  (1)                                ;#      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
  (1)
  (1)  011602                        $ERROR:
  (1)  011602  105237  001103        7$:     INCB    $ERRFLG         ;;SET THE ERROR FLAG
  (1)  011606  001775                        BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
  (1)  011610  013777  001102  167322        MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
  (1)  011616  032777  002000  167312        BIT     #BIT10,@SWR     ;;BELL ON ERROR?
  (1)  011624  001402                        BEQ     1$              ;;NO - SKIP
  (1)  011626  104400  001164                TYPE    ,$BELL          ;;RING BELL
  (1)  011632  005237  001112        1$:     INC     $ERRTTL         ;;COUNT THE NUMBER OF ERRORS
  (1)  011636  011637  001116                MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
  (1)  011642  162737  000002  001116        SUB     #2,$ERRPC       ;;
  (1)  011650  117737  167242  001114        MOVB    @ERRPC,$ITEMB   ;;STRIP AND SAVE THE ERROR ITEM CODE
  (1)  011656  032777  020000  167252        BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
  (1)  011664  001004                        BNE     20$             ;;SKIP TYPEOUTS
  (1)  011666  004737  012100                JSR     PC,XERR1        ;;GO TO USER ERROR ROUTINE
  (1)  011672  104400  001171                TYPE    ,$CRLF
  (1)  011676                        20$:
  (1)  011676  005777  167234        2$:     TST     @SWR            ;;HALT ON ERROR
  (1)  011702  100006                        BPL     3$              ;;SKIP IF CONTINUE
  (1)  011704  000000                        HALT                    ;;HALT ON ERROR!
  (1)  011706  022737  011234  000042        CMP     #SENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
  (1)  011714  001001                        BNE     3$              ;;BRANCH IF NO
  (1)  011716  000000                        HALT                    ;;YES
  (1)  011720  032777  001000  167210  3$:   BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
  (1)  011726  001402                        BEQ     4$              ;;BR IF NO
  (1)  011730  013716  001110                MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
  (1)  011734  005737  001162        4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
  (1)  011740  001402                        BEQ     5$              ;;BR IF NONE
  (1)  011742  013716  001162                MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
  (1)  011746                        5$:
  (3)  011746  010046                        MOV     R0,-(SP)        ;SAVE R0
  (3)  011750  010146                        MOV     R1,-(SP)        ;SAVE R1
  (3)  011752  032777  010000  167156        BIT     #BIT12,@SWR     ;ESCAPE TO NEXT TEST ON ERROR?
  (3)  011760  001443                        BEQ     90$             ;BR IF NO
  (4)  011762  000005                        RESET                   ;ISSUE INIT
  (4)  011764  052777  000100  167150        BIS     #100,@STKS      ;SET INTR ENABLE
  (3)  011772  106427  000000                MTPS    #0              ;SET PTY TO 0
  (3)  011776  012700  015014                MOV     #TEST.TABLE+2,R0 ;GET FIRST TEST PC
  (3)  012002  013701  001106                MOV     $LPADR,R1       ;GET CURRENT TEST PC
  (3)  012006  162701  000002                SUB     #2,R1           ;MAKE IT EQUALT TO TEST TABLE ENTRY
  (3)  012012  005710                91$:    TST     (R0)            ;AT END GOTO 90$
  (3)  012014  001425                        BEQ     90$             ;
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   (3)  012016  020120                        CMP     R1,(R0)+        ;LOOK FOR CURRENT TEST.
   (3)  012020  001404                        BEQ     9$              ;BR IF NOT FOUND
   (3)  012022  011067  012076                MOV     (R0),92$        ;SAVE TEST PC
   (3)  012026  062737  000002  012076        ADD     #2,92$          ;POP PAST SCOPE
   (3)  012034  012737  000001  001104        MOV     #1,$ICNT        ;
   (3)  012042  013737  011600  001160        MOV     $MXCNT,$TIMES   ;
   (3)  012050  012706  001100                MOV     #STACK,SP       ;SET SP
   (3)  012054  012746  000000                MOV     #0,-(SP)        ;SET PTY0
   (3)  012060  013746  012076                MOV     92$,-(SP)       ;
   (3)  012064  000137  011536                JMP     $SVLA0          ;GO INTO SCOPE ROUTINE
   (3)  012070  012601                90$:    MOV     (SP)+,R1        ;RESTORE R1
   (3)  012072  012700                        MOV     (SP)+,R0        ;RESTORE R0
   (3)  012074  000002                        RTI                     ;EXIT
   (3)  012076  000000                92$:    0                       ;SAVE TEST PC
   (3)
5761    012100  010037  001420        XERR1:  MOV     R0,SAVR0
   (1)  012104  010137  001422                MOV     R1,SAVR1
   (1)  012110  010237  001424                MOV     R2,SAVR2
   (1)  012114  010337  001426                MOV     R3,SAVR3
   (1)  012120  010437  001430                MOV     R4,SAVR4
   (1)  012124  010537  001432                MOV     R5,SAVR5
   (1)  012130  113737  001102  001434        MOVB    $TSTNM,MSKTST
   (3)                                ;******************************************************************
   (2)
   (2)                                .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
   (2)
   (2)                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
   (2)                                ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" (SERRTB),
   (2)                                ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
   (2)
   (2)  012136                        $ERRTYP:
   (2)  012136  104400  001171                TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
   (2)  012142  010046                        MOV     R0,-(SP)        ;;SAVE R0
   (2)  012144  005000                        CLR     R0              ;;PICKUP THE ITEM INDEX
   (2)  012146  153700  001114                BISB    @#$ITEMB,R0
   (2)  012152  001004                        BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
   (2)                                                                ;;TYPE THE PC OF THE ERROR
   (3)  012154  013746  001116                MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
   (3)                                                                ;;ERROR ADDRESS
   (3)  012160  104401                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
   (2)  012162  000445                        BR      10$             ;;GET OUT
   (2)  012164  005300                1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
   (2)  012166  006300                        ASL     R0              ;;      WORK FOR THE ERROR TABLE
   (2)  012170  006300                        ASL     R0
   (2)  012172  006300                        ASL     R0
   (2)  012174  062700  001174                ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
   (2)  012200  012037  012210                MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
   (2)  012204  001404                        BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
   (2)  012206  104400                        TYPE                    ;;TYPE THE "ERROR MESSAGE"
   (2)  012210  000000                2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
   (2)  012212  104400  001171                TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
   (2)  012216  012037  012226        3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
   (2)  012222  001404                        BEQ     5$              ;;SKIP TYPEOUT IF 0
   (2)  012224  104400                        TYPE                    ;;TYPE THE "DATA HEADER"
   (2)  012226  000000                4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
   (2)  012230  104400  001171                TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
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(2)  012234  010146                5$:     MOV     R1,-(SP)        ;;SAVE R1
(2)  012236  012001                        MOV     (R0)+,R1        ;;PICKUP "DATA TABLE" POINTER
(2)  012240  001415                        BEQ     9$              ;;BR IF NO DATA TO BE TYPED
(2)  012242  012000                        MOV     (R0)+,R0        ;;PICKUP "DATA FORMAT" POINTER
(2)  012244  105720                6$:     TSTB    (R0)+           ;;"OCTAL" OR "DECIMAL"
(2)  012246  001003                        BNE     7$              ;;BR IF DECIMAL
(3)  012250  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
(2)  012252  104401                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
(2)  012254  000402                        BR      8$
(3)  012256                        7$:
(3)  012256  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
(3)  012260  104404                        TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
(2)  012262  005711                8$:     TST     (R1)            ;;IS THERE ANOTHER NUMBER?
(2)  012264  001403                        BEQ     9$              ;;BR IF NO
(2)  012266  104400  012306                TYPE    ,11$            ;;TYPE TWO(2) SPACES
(2)  012272  000764                        BR      6$              ;;LOOP
(2)
(2)  012274  012601                9$:     MOV     (SP)+,R1        ;;RESTORE R1
(2)  012276  012600                10$:    MOV     (SP)+,R0        ;;RESTORE R0
(2)  012300  104400  001171                TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(2)  012304  000207                        RTS     PC              ;;RETURN
(2)  012306  020040     000       11$:    .ASCIZ  /  /            ;;TWO(2) SPACES
(2)  012312                                .EVEN
5762                               ;*****************************************************************
(1)
(1)                                .SBTTL  TYPE ROUTINE
(1)
(1)                                ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
(1)                                ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
(1)                                ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
(1)                                ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
(1)                                ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
(1)                                ;*
(1)                                ;*CALL:
(1)                                ;*1) USING A TRAP INSTRUCTION
(1)                                ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
(1)                                ;*OR
(1)                                ;*      TYPE
(1)                                ;*      MESADR
(1)                                ;*
(1)
(1)  012312  105737  001155        $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
(1)  012316  100002                        BPL     1$              ;;BR IF YES
(1)  012320  000000                        HALT                    ;;HALT HERE IF NO TERMINAL
(1)  012322  000407                        BR      3$              ;;LEAVE
(1)  012324  010046                1$:     MOV     R0,-(SP)        ;;SAVE R0
(1)  012326  017600  000002                MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
(1)  012332  112046                2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
(1)  012334  001005                        BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
(1)  012336  005726                        TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
(1)  012340  012600                6$:     MOV     (SP)+,R0        ;;RESTORE R0
(1)  012342  062716  000002        3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
(1)  012346  000002                        RTI                     ;;RETURN
(1)  012350  122716  000011        4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
(1)  012354  001426                        BEQ     8$
(1)  012356  122716  000200                CMPB    #TCRLF,(SP)     ;;BRANCH IF NOT <CRLF>
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(1)  012362  001004                        BNE     5$
(1)  012364  005726                        TST     (SP)+           ;;POP  <CR><LF> EQUIV
(1)  012366  104400                        TYPE                    ;;TYPE A CR AND LF
(1)  012370  001121                        $CRLF
(1)  012372  000757                        BR      2$              ;;GET NEXT CHARACTER
(1)  012374  004737  012456          5$:   JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
(1)  012400  123726  001154          6$:   CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
(1)  012404  001352                        BNE     2$              ;;IF NO GO GET NEXT CHAR.
(1)  012406  013746  001152                MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
(1)                                                                 ;;AND THE NULL CHAR.
(1)  012412  105366  000001          7$:   DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
(1)  012416  002770                        BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
(1)  012420  004737  012456                JSR     PC,$TYPEC       ;;GO TYPE A NULL
(1)  012424  105337  012522                DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
(1)  012430  000770                        BR      7$              ;;LOOP
(1)
(1)                                  ;HORIZONTAL TAB PROCESSOR
(1)
(1)  012432  112716  000040          8$:   MOVB    #40,(SP)        ;;REPLACE TAB WITH SPACE
(1)  012436  004737  012456          9$:   JSR     PC,$TYPEC       ;;TYPE A SPACE
(1)  012442  132737  000007  012522        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
(1)  012450  001372                        BNE     9$              ;;TAB STOP
(1)  012452  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
(1)  012454  000726                        BR      2$              ;;GET NEXT CHARACTER
(1)  012456  105777  166464          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
(1)  012462  100375                        BPL     $TYPEC
(1)  012464  116677  000002  166456        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
(1)  012472  122766  000015  000002        CMPB    #15,2(SP)       ;;BRANCH IF
(1)  012500  001003                        BNE     1$              ;;NOT <CR>
(1)  012502  105037  012522                CLRB    $CHARCNT        ;;
(1)  012506  000406                        BR      $TYPEX          ;;EXIT
(1)  012510  122766  000012  000002  1$:   CMPB    #12,2(SP)       ;;BRANCH IF
(1)  012516  002002                        BGE     $TYPEX          ;;<LF>
(1)  012520  105227                        INCB    (PC)+           ;;INC SPACE
(1)  012522  000000                $CHARCNT:.WORD  0               ;;COUNT
(1)  012524  000207                $TYPEX: RTS     PC
(1)                                ;;      EQUATES
(1)          000011                THT=11
(1)          000200                TCRLF=200
(1)
5763                               ;*****************************************************************
(1)
(1)                                .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
(1)
(1)                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
(1)                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
(1)                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
(1)                                ;*CALL:
(1)                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
(1)                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
(1)                                ;*      .BYTE   M               ;;M=1 OR 0
(1)                                ;*                                      ;;1=TYPE LEADING ZEROS
(1)                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
(1)                                ;*
(1)                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
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(1)                                         ;*STYPOS OR STYPOC
(1)                                         ;*CALL:
(1)                                         ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                                         ;*      TYPON                   ;;CALL FOR TYPEOUT
(1)                                         ;*
(1)                                         ;*STYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
(1)                                         ;*CALL:
(1)                                         ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                                         ;*      TYPOC                   ;;CALL FOR TYPEOUT
(1)
(1)  012526  017646  000000          STYPOS: MOV     2(SP),-(SP)     ;;PICKUP THE MODE
(1)  012732  116637  000001  012751          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
(1)  012740  112637  012753                   MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
(1)  012744  062716  000002                   ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
(1)  012750  000406                           BR      STYPON
(1)  012752  112737  000001  012751  STYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
(1)  012760  112737  000006  012753          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
(1)  012766  112737  000005  012750  STYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
(1)  012774  010346                           MOV     R3,-(SP)        ;;SAVE R3
(1)  013000  010446                           MOV     R4,-(SP)        ;;SAVE R4
(1)  013002  010546                           MOV     R5,-(SP)        ;;SAVE R5
(1)  013004  113704  012753                   MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
(1)  013010  005404                           NEG     R4
(1)  013012  060406  000006                   ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
(1)  013016  110437  012752                   MOVB    R4,$OMODE       ;;SAVE IT FOR USE
(1)  013022  113704  012751                   MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
(1)  013026  016605  000012                   MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
(1)  013032  005003                           CLR     R3              ;;CLEAR THE OUTPUT WORD
(1)  013034  006105                    1$:    ROL     R5              ;;ROTATE MSB INTO "C"
(1)  013036  103004                           BCC     3$              ;;GO DO MSB
(1)  013040  006105                    2$:    ROL     R5              ;;FORM THIS DIGIT
(1)  013042  006105                           ROL     R5
(1)  013044  006105                           ROL     R5
(1)  013046  010503                           MOV     R5,R3
(1)  013050  006103                    3$:    ROL     R3              ;;GET LSB OF THIS DIGIT
(1)  013052  105337  012752                   DECB    $OMODE          ;;TYPE THIS DIGIT?
(1)  013056  100016                           BPL     7$              ;;BR IF NO
(1)  013060  042703  177770                   BIC     #177770,R3      ;;GET RID OF JUNK
(1)  013064  001002                           BNE     4$              ;;TEST FOR 0
(1)  013066  005704                           TST     R4              ;;SUPPRESS THIS 0?
(1)  013070  001403                           BEQ     5$              ;;BR IF YES
(1)  013072  005204                    4$:    INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
(1)  013074  052703  000060                   BIS     #'0,R3          ;;MAKE IT ASCII
(1)  013100  052703  000040            5$:    BIS     #' ,R3          ;;MAKE IT ASCII IF NOT ALREADY
(1)  013104  110337  013146                   MOVB    R3,6$           ;;SAVE FOR TYPING
(1)  013110  104401  013146                   TYPE    ,6$             ;;GO TYPE THIS DIGIT
(1)  013114  105337  012750            7$:    DECB    $OCNT           ;;COUNT BY 1
(1)  013120  003347                           BGT     2$              ;;BR IF MORE TO DO
(1)  013122  002402                           BLT     6$              ;;BR IF 0
(1)  013124  005204                           INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
(1)  013126  000744                           BR      2$              ;;GO DO THE LAST DIGIT
(1)  013130  012605                    6$:    MOV     (SP)+,R5        ;;RESTORE R5
(1)  013132  012604                           MOV     (SP)+,R4        ;;RESTORE R4
(1)  013134  012603                           MOV     (SP)+,R3        ;;RESTORE R3
(1)  013136  016666  000002  000004           MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
(1)  013144  012616                           MOV     (SP)+,(SP)
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   (1)  012744  000002                        RTI                         ;;RETURN
   (1)  012746     000  BS:      .BYTE   0     ;;STORAGE FOR ASCII DIGIT
   (1)  012747     000              .BYTE   0     ;;TERMINATOR FOR TYPE ROUTINE
   (1)  012750     000  $OCNT:   .BYTE   0     ;;OCTAL DIGIT COUNTER
   (1)  012751     000  $OFILL:  .BYTE   0     ;;ZERO FILL SWITCH
   (1)  012752  000000  $OMODE:  .WORD   0     ;;NUMBER OF DIGITS TO TYPE
  5764                  ;*****************************************************************
   (1)
   (1)                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
   (1)
   (1)                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
   (1)                  ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
   (1)                  ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
   (1)                  ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
   (1)                  ;*REPLACED WITH SPACES.
   (1)                  ;*CALL:
   (1)                  ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
   (1)                  ;*      TYPOS                   ;;GO TO THE ROUTINE
   (1)
   (2)  012754          $TYPOS:
   (3)  012754  010046          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
   (3)  012756  010146          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
   (3)  012760  010246          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
   (3)  012762  010346          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
   (3)  012764  010546          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
   (1)  012766  012746  020200  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
   (1)  012772  016605  000020  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
   (1)  012776  100004          BPL     1$              ;;BR IF INPUT IS POS.
   (1)  013000  005405          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
   (1)  013002  112766  000055  000001  MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
   (1)  013010  005000  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
   (1)  013012  012703  013170  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
   (1)  013016  112723  000040  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
   (1)  013022  005002  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
   (1)  013024  016001  013160  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
   (1)  013030  160105  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
   (1)  013032  002402          BLT     4$              ;;BR IF DONE
   (1)  013034  005202          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
   (1)  013036  000774          BR      3$
   (1)  013040  060105  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
   (1)  013042  005702          TST     R2              ;;CHECK IF BCD DIGIT=0
   (1)  013044  001002          BNE     5$              ;;FALL THROUGH IF 0
   (1)  013046  105716          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
   (1)  013050  100407          BMI     7$              ;;BR IF YES
   (1)  013052  106316  5$:     ASLB    (SP)            ;;MSD?
   (1)  013054  103003          BCC     6$              ;;BR IF NO
   (1)  013056  116663  000001  177777  MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
   (1)  013064  052702  000060  6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
   (1)  013070  052702  000040  7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
   (1)  013074  110223          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
   (1)  013076  005720          TST     (R0)+           ;;JUST INCREMENTING
   (1)  013100  020027  000010  CMP     R0,#10          ;;CHECK THE TABLE INDEX
   (1)  013104  002746          BLT     2$              ;;GO DO THE NEXT DIGIT
   (1)  013106  003002          BGT     8$              ;;GO TO EXIT
   (1)  013110  010502          MOV     R5,R2           ;;GET THE LSD
   (1)  013112  000764          BR      6$              ;;GO CHANGE TO ASCII
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   (1)  013114  105726                    8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
   (1)  013116  100003                            BPL     9$              ;;BR IF NO
   (1)  013120  116663  177777  177776            MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
   (1)  013126  105013                    9$:     CLRB    (R3)            ;;SET THE TERMINATOR
   (3)  013130  012605                            MOV     (SP)+,R5        ;;POP STACK INTO R5
   (3)  013132  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
   (3)  013134  012602                            MOV     (SP)+,R2        ;;POP STACK INTO R2
   (3)  013136  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
   (3)  013140  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
   (1)  013142  104400  013170                    TYPE    ,$OBLK          ;;NOW TYPE THE NUMBER
   (1)  013146  016666  000002  000004            MOV     2(SP),4(SP)     ;;ADJUST THE STACK
   (1)  013154  012616                            MOV     (SP)+,(SP)
   (1)  013156  000002                            RTI                     ;;RETURN TO USER
   (1)  013160  023420            $DTBL:  10000.
   (1)  013162  001750                    1000.
   (1)  013164  000144                    100.
   (1)  013166  000012                    10.
   (1)  013170  000004            $OBLK:  .BLKW   4
 5765                             ;*****************************************************************
   (1)                            
   (1)                            .SBTTL  TTY INPUT ROUTINE
   (1)                            
   (1)                            ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
   (1)                            ;*CALL:
   (1)                            ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
   (1)                            ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
   (1)                            ;
   (1)                            
   (1)  013200  011646            $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
   (1)  013202  016666  000004  000002    MOV     4(SP),2(SP)     ;;SAVE THE PS
   (1)  013210  105777  165726    1$:     TSTB    @$TKS           ;;WAIT FOR
   (1)  013214  100375                    BPL     1$              ;;A CHARACTER
   (1)  013216  117766  165722  000004    MOVB    @$TKB,4(SP)     ;;READ THE TTY
   (1)  013224  042766  177600  000004    BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
   (1)  013232  000002                    RTI                     ;;GO BACK TO USER
   (2)                            ;*****************************************************************
   (1)                            ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
   (1)                            ;*CALL:
   (1)                            ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
   (1)                            ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
   (1)                            ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
   (1)                            
   (1)  013234  010346            $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
   (1)  013236  012703  013342    1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
   (1)  013242  022703  013352    2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
   (1)  013246  101405                    BLOS    4$              ;;BR IF YES
   (1)  013250  104405                    RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
   (1)  013252  112613                    MOVB    (SP)+,(R3)      ;;GET CHARACTER
   (1)  013254  122713  000177            CMPB    #177,(R3)       ;;IS IT A RUBOUT
   (1)  013260  001003                    BNE     3$              ;;SKIP IF NOT
   (1)  013262  104400  001170    4$:     TYPE    ,$QUES          ;;TYPE A '?'
   (1)  013266  000763                    BR      1$              ;;CLEAR THE BUFFER AND LOOP
   (1)  013270  111337  013340    3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
   (1)  013274  104400  013340            TYPE    ,9$
   (1)  013300  122723  000015            CMPB    #15,(R3)+       ;;CHECK FOR RETURN
   (1)  013304  001356                    BNE     2$              ;;LOOP IF NOT RETURN
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  (1)  013306  105063  177777                CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
  (1)  013312  104400  001172                TYPE    $LF             ;;TYPE A LINE FEED
  (1)  013316  012603                        MOV     (SP)+,R3        ;;RESTORE R3
  (1)  013320  011646                        MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
  (1)  013322  016666  000004  000002        MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
  (1)  013330  012766  013342  000004        MOV     #STTYIN,4(SP)
  (1)  013336  000002                        RTI                     ;;RETURN
  (1)  013340     000                9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
  (1)  013341     000                        .BYTE   0               ;;TERMINATOR
  (1)  013342  000010                STTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
5766                                 ;*****************************************************************
  (1)
  (1)                                .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
  (1)
  (1)                                ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
  (1)                                ;*CHANGE IT TO BINARY.
  (1)                                ;*CALL:
  (1)                                ;*      RDOCT                   ;;READ AN OCTAL NUMBER
  (1)                                ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
  (1)                                ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
  (1)
  (1)  013352  011646                SRDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
  (1)  013354  016666  000004  000002        MOV     4(SP),2(SP)     ;;INPUT NUMBER
  (3)  013362  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
  (3)  013364  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
  (3)  013366  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
  (1)  013370  104406                1$:     RDLIN                   ;;READ AN ASCIZ LINE
  (1)  013372  012600                        MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
  (1)  013374  005001                        CLR     R1              ;;CLEAR DATA WORD
  (1)  013376  005002                        CLR     R2
  (1)  013400  112046                2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
  (1)  013402  001412                        BEQ     3$              ;;IF ZERO GET OUT
  (1)  013404  006301                        ASL     R1              ;;*2
  (1)  013406  006102                        ROL     R2
  (1)  013410  006301                        ASL     R1              ;;*4
  (1)  013412  006102                        ROL     R2
  (1)  013414  006301                        ASL     R1              ;;*8
  (1)  013416  006102                        ROL     R2
  (1)  013420  042716  177770                BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
  (1)  013424  062601                        ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
  (1)  013426  000764                        BR      2$              ;;LOOP
  (1)  013430  005726                3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
  (1)  013432  010166  000012                MOV     R1,12(SP)       ;;SAVE THE RESULT
  (1)  013436  010237  013452                MOV     R2,$HIOCT
  (3)  013442  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
  (3)  013444  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
  (3)  013446  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
  (1)  013450  000002                        RTI                     ;;RETURN
  (1)  013452  000000                $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
```

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5768                                    ;*****************************************************************
 (1)
 (1)                                    .SBTTL  TRAP DECODER
 (1)
 (1)                                    ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
 (1)                                    ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 (1)                                    ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 (1)                                    ;*GO TO THAT ROUTINE.
 (1)
 (1)  013454  010046                    $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
 (1)  013456  016600  000002                    MOV     2(SP),R0        ;;GET TRAP ADDRESS
 (1)  013462  005740                            TST     -(R0)           ;;BACKUP BY 2
 (1)  013464  111000                            MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
 (1)  013466  006300                            ASL     R0              ;;POSITION FOR INDEXING
 (1)  013470  016000  013476                    MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
 (1)  013474  000200                            RTS     R0              ;;GO TO ROUTINE
 (1)
 (3)
 (3)                                    .SBTTL  TRAP TABLE
 (3)
 (3)                                    ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
 (3)                                    ;*BY THE "TRAP" INSTRUCTION.
 (3)
 (3)                                    ;       ROUTINE
 (3)                                    ;       -------
 (3)  013476                            $TRPAD:
 (3)  013476  012312                            $TYPE   ;;CALL=TYPE     TRAP+0(104400)  TTY TYPEOUT ROUTINE
 (3)  013500  012552                            $TYPOC  ;;CALL=TYPOC    TRAP+1(104401)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 (3)  013502  012526                            $TYPOS  ;;CALL=TYPOS    TRAP+2(104402)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 (3)  013504  012566                            $TYPON  ;;CALL=TYPON    TRAP+3(104403)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 (3)  013506  012754                            $TYPDS  ;;CALL=TYPDS    TRAP+4(104404)  TYPE DECIMAL NUMBER (WITH SIGN)
 (3)  013510  013200                            $RDCHR  ;;CALL=RDCHR    TRAP+5(104405)  TTY TYPEIN CHARACTER ROUTINE
 (3)  013512  013234                            $RDLIN  ;;CALL=RDLIN    TRAP+6(104406)  TTY TYPEIN STRING ROUTINE
 (3)  013514  013352                            $RDOCT  ;;CALL=RDOCT    TRAP+7(104407)  READ AN OCTAL NUMBER FROM TTY
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5770  013516                                  ROMMAP:
5778  013516  000400  000440  000167                .WORD   000400,000440,000167,000432,132710,100200,001775
5779  013534  102507  016005  000002                .WORD   102507,016005,000002,032705,177560,001406,005703
5780  013552  001100  120527  000101                .WORD   001100,120527,000101,001075,000207,042705,177760
5781  013570  126560  173064  000002                .WORD   126560,173064,000002,001066,000207
5782  013602     000     201     202                .BYTE   000,201,202,003,204,005,006,207
5783  013612     210     011     012                .BYTE   210,011,012,213,014,215,216,017
5784  013622  012700  175610  112710                .WORD   012700,175610,112710,000006,12706,077776,005003
5785  013640  004767  000142  020527                .WORD   004767,000142,020527,040001,001372,004767,00130
5786  013656  005705  001366  004767                .WORD   005705,001366,004767,000206,010502,162702,000004
5787  013674  004767  000174  010501                .WORD   004767,000174,010501,005702,001431,160705,022705
5788  013712  000240  003407  060205                .WORD   000240,003407,060205,022705,177704,003003,004767
5789  013730  000164  000733  004767                .WORD   000164,000733,004767,000046,005702,100402,110521
5790  013746  000772  105703  001403                .WORD   000772,105703,001403,004767,000141,000720,004767
5791  013764  000144  000723  004767                .WORD   000144,000723,004767,000012,105703,001366,004767
5792  014002  000126  010107  004767                .WORD   000126,010107,004767,177514,010546,111666,000001
5793  014020  042716  007760  004767                .WORD   042716,007760,004767,177476,006305,006305,006305
5794  014036  006305  042705  170017                .WORD   006305,042705,170017,052605,060503,005302,000207
5795  014054  032710  100200  001622                .WORD   032710,100200,001622,100734,016005,000002,100731
5796  014072  000207  004767  177706                .WORD   000207,004767,177706,010504,004767,177700,000305
5797  014110  105005  150405  000207                .WORD   105005,150405,000207,112705,000117,000405,112705
5798  014126  000102  000402  112705                .WORD   000102,000402,112705,000015,105760,000004,100375
5799  014144  110560  000006  000207                .WORD   110560,000006,000207
5800
5801  014152     240     037     015                .BYTE   240,037,015,005,024,224
5802  014160  005004  012700  177500                .WORD   005004,012700,177500,000005,010410,012701,173434
5803  014176  012702  000375  112103                .WORD   012702,000375,112103,112110,100407,130310,001776
5804  014214  105202  100772  116012                .WORD   105202,100772,116012,000002,000771,005710,100756
5805  014232  005002  120312  001377                .WORD   005002,120312,001377,00112
5806
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5812  014516  017746  164422          KBTSR:  MOV     @#TKB,-(SP)     ;SAVE CHAR
5813  014522  042716  000200                  BIC     #BIT7,(SP)      ;CLEAR BIT SEVEN
5814  014526  022716  000024                  CMP     #24,(SP)        ;WAS IT <^T> (TEST NO.)
5815  014532  001004                          BNE     3$              ;BR IF NO
5816  014534  012706  001100                  MOV     #STACK,SP       ;SET STACK
5817  014540  000137  004412                  JMP     X1$             ;GO TO ROUTINE
5818  014544  022726  000007          3$:     CMP     #7,(SP)+        ;WAS IT <^G>?
5819  014550  001016                          BNE     1$              ;BR IF NO
5820  014552  104400  014614                  TYPE    ,XSWR           ;SWR=
5821  014556  017746  164354                  MOV     @#SWR,-(SP)
5822  014562  104401                          TYPOC
5823  014564  104400  014625                  TYPE    ,EQUALS
5824  014570  104402                          PRDCT
5825  014572  105737  012342                  TSTB    @#TTYIN         ;WAS JUST <CR> HIT?
5826  014576  001406                          BEQ     2$              ;BR IF YES
5827  014600  011677  164332                  MOV     (SP),@#SWR      ;SET UP SWR
5828  014604  005726                  2$:     TST     (SP)+           ;SET STACK
5829  014606  000002                  1$:     RTI                     ;EXIT
5830  014610  020040  000040          XSPA:   .ASCIZ  /  /
5831  014614  042040  052523  024522  XSWR:   .ASCIZ  <200>"(SWR)=/"
5832  014622  052757  027475  000075  EQUALS: .ASCIZ  "/=/"
5833  014631  000200  042524  052123  XTSTN:  .ASCIZ  <200>/TEST NO: /
5834  014644  052200  000040          XTST:   .ASCIZ  <200>/T /
5835                                  .EVEN
5836
5837  014650                          BREPLY.TABLE:
5838  014650  165250  000004                  165250,004
5839  014654  172524  000004                  172524,004
5840  014660  173000  001000                  173000,512.
5841  014664  177546  000002                  177546,002
5842  014670  177550  000010                  177550,010
5843  014674  177560  000010                  177560,010
5844  014700  175610  000010                  175610,010
5845  014704  000000  000000                  000000,000
5846  014710  000000  000000                  000000,000
5847  014714  000000  000000                  000000,000
5848  014720  000000  000000                  000000,000
5849  014724  000000  000000                  000000,000
5850  014730  000000  000000                  000000,000
5851
5852                                  ;.PRINT .  ;DUBUG PC
5853  014734  011637  015006          DEBUG:  MOV     (SP),1$
5854  014740  162737  000002  015006          SUB     #2,1$
5855  014746  017737  000034  015010          MOV     @1$,2$
5856  014754  022737  106400  015010          CMP     #MTPS,2$
5857  014762  001401                          BEQ     .+4
5858  014764  000000                          HALT                    ;REAL TRAP TO ADDRESS '4'.
5859  014766  011637  015006                  MOV     (SP),1$
5860  014772  062716  000002                  ADD     #2,(SP)
5861  014776  017766  000004  000002          MOV     @1$,2(SP)
5862  015004  000002                          RTI
5863  015006  000000                  1$:     0
5864  015010  000000                  2$:     0
5865  015012                          TEST.TABLE:
5866  015012  000000                          0
5867  015014  004470                          TST1                    ;PC FOR TEST NUMBER 1
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(2)  015016  004564    TST2    ;PC FOR TEST NUMBER 2
(2)  015020  004662    TST3    ;PC FOR TEST NUMBER 3
(2)  015022  004720    TST4    ;PC FOR TEST NUMBER 4
(2)  015024  005006    TST5    ;PC FOR TEST NUMBER 5
(2)  015026  005222    TST6    ;PC FOR TEST NUMBER 6
(2)  015030  005402    TST7    ;PC FOR TEST NUMBER 7
(2)  015032  005544    TST10   ;PC FOR TEST NUMBER 10
(2)  015034  005632    TST11   ;PC FOR TEST NUMBER 11
(2)  015036  005674    TST12   ;PC FOR TEST NUMBER 12
(2)  015040  005736    TST13   ;PC FOR TEST NUMBER 13
(2)  015042  006000    TST14   ;PC FOR TEST NUMBER 14
(2)  015044  006042    TST15   ;PC FOR TEST NUMBER 15
(2)  015046  006104    TST16   ;PC FOR TEST NUMBER 16
(2)  015050  006146    TST17   ;PC FOR TEST NUMBER 17
(2)  015052  006210    TST20   ;PC FOR TEST NUMBER 20
(2)  015054  006252    TST21   ;PC FOR TEST NUMBER 21
(2)  015056  006314    TST22   ;PC FOR TEST NUMBER 22
(2)  015060  006356    TST23   ;PC FOR TEST NUMBER 23
(2)  015062  006420    TST24   ;PC FOR TEST NUMBER 24
(2)  015064  006462    TST25   ;PC FOR TEST NUMBER 25
(2)  015066  006524    TST26   ;PC FOR TEST NUMBER 26
(2)  015070  006566    TST27   ;PC FOR TEST NUMBER 27
(2)  015072  006630    TST30   ;PC FOR TEST NUMBER 30
(2)  015074  006672    TST31   ;PC FOR TEST NUMBER 31
(2)  015076  006736    TST32   ;PC FOR TEST NUMBER 32
(2)  015100  006770    TST33   ;PC FOR TEST NUMBER 33
(2)  015102  007104    TST34   ;PC FOR TEST NUMBER 34
(2)  015104  007144    TST35   ;PC FOR TEST NUMBER 35
(2)  015106  007232    TST36   ;PC FOR TEST NUMBER 36
(2)  015110  007300    TST37   ;PC FOR TEST NUMBER 37
(2)  015112  007346    TST40   ;PC FOR TEST NUMBER 40
(2)  015114  007514    TST41   ;PC FOR TEST NUMBER 41
(2)  015116  007606    TST42   ;PC FOR TEST NUMBER 42
(2)  015120  007664    TST43   ;PC FOR TEST NUMBER 43
(2)  015122  007742    TST44   ;PC FOR TEST NUMBER 44
(2)  015124  010114    TST45   ;PC FOR TEST NUMBER 45
(2)  015126  010240    TST46   ;PC FOR TEST NUMBER 46
(2)  015130  010602    TST47   ;PC FOR TEST NUMBER 47
(2)  015132  011042    TST50   ;PC FOR TEST NUMBER 50
5884 015134  011146    $EOP    ;END PASS PC
5885 015136  000000    0000    ;TABLE TERMINATOR -
5886 015140  000050  LASTN:  50
5887 015142  000000  CORMAX: 0
5890         000001  .END
```

```
BIT0    = 000001          4716#   5217    5686
BIT00   = 000001          4716#
BIT01   = 000002          4716#
BIT02   = 000004          4716#
BIT03   = 000010          4716#
BIT04   = 000020          4716#
BIT05   = 000040          4716#
BIT06   = 000100          4716#
BIT07   = 000200          4716#
BIT08   = 000400          4716#
BIT09   = 001000          4716#   5759    5760
BIT1    = 000002          4716#   5217    5520
BIT10   = 002000          4716#   5217    5760
BIT11   = 004000          4716#   5217    5759
BIT12   = 010000          4716#   5217    5760
BIT13   = 020000          4716#   5217    5760
BIT14   = 040000          4716#   5217    5759
BIT15   = 100000          4716#   5217
BIT2    = 000004          4716#   5217
BIT3    = 000010          4716#   5217
BIT4    = 000020          4716#   5217
BIT5    = 000040          4716#   5217
BIT6    = 000100          4716#   5046    5101    5123    5217    5361    5380    5382    5386    5457    5477    5479    5483
BIT7    = 000200          4716#   5217    5361    5383    5457    5480    5813
BIT8    = 000400          4716#   5217    5759
BIT9    = 001000          4716#   5217
BPTVEC= 000014            4716#
BREPLY  014650            5155    5843#
B.APTY  001412            4677#   4901    4902#   5375    5377#   5397#
B.AVEC  001410            4676#   4901#   5374    5376#   5395#   5398#
B.BPTY  001416            4629#   4903    4904#   5471    5473#   5491#
B.BVEC  001414            4828#   4903#   5470    5472#   5482#   5495#
CLKCSR  001376            4621#   5011    5040    5100    5101#   5123#
CLKPTY  001402            4673#   4679    4900#   5042    5044#   5072#   5079#   5093    5095#   5125#   5513    5518#   5533#
CLKVEC  001400            4672#   4899#   5041    5043#   5071#   5080#   5092    5094#   5126#   5512    5517#   5534#
CORMAX  015142            5681    5685    5889#
DDISP = 177570            4716#   4720
DEBUG   014734            5079#
DEV.A   001404            4824#   5182    5217    5226    5243    5265    5304
DEV.B   001406            4825#   5324    5281    5379    5417    5457    5475    5514
DF1     003716            4725    4731    4737    4743    4748    4754    4760    4766    4772    4778    4784    4790    4796
                          4802    4808    4814    4887#
DH1     002520            4723    4864#
DH10    003210            4764    4871#
DH11    003276            4782    4872#
DH12    003364            4788    4873#
DH13    003433            4800    4874#
DH14    003474            4806    4875#
DH15    003562            4812    4876#
DH2     002574            4729    4865#
DH3     002662            4735    4752    4758    4866#
DH4     002731            4741    4867#
DH5     003017            4746    4868#
DH6     003074            4770    4869#
DH7     003142            4776    4794    4870#
DISPLA  001140            4720#   4895*   5759*   5760*
```

```
DISPRE  000174          4717#  4895
DSWR  = 177570          4716#  4720
DT1     003650          4724   4736   4747   4753   4759   4771   4777   4789   4795   4879#
DT10    003716          48[illegible]#
DT2     003[illegible]64  4730   4742   4765   4783   4807   4813   4880#
DT3     003704          4801   4881#
DT4     003716          4[illegible]2#
DT5     003716          4[illegible]3#
DT6     003716          4[illegible]4#
DT7     003716          4885#
EMTVEC= 000030          4716#  4895#
EM1     001442          4722   4843#
EM10    001741          4763   4[illegible]0#
EM11    001771          4769   4[illegible]1#
EM12    002026          4775   4852#
EM13    002063          4781   4853#
EM14    002113          4787   4[illegible]4#
EM15    002164          4793   4[illegible]5#
EM16    002220          4799   4[illegible]6#
EM17    002237          4805   4[illegible]7#
EM2     001500          4728   4[illegible]4#
EM20    002261          4811   4858#
EM21    002277          4859#  5151
EM3     001533          4734   4845#
EM4     001572          4740   4[illegible]6#
EM5     001624          4745   4[illegible]7#
EM6     001651          4751   4[illegible]8#
EM7     001701          4757   4849#
EOMALS  014625          5823   5835#
E[illegible]RVEC= 000004  4716#  5759#
GMS   = ****** U        4717   4896   5768
IOTVEC= 000020          4716#  4895#  4905#
KBISR   014516          4907   5812#
LASTN   015140          4918   5759   5888#
MEMSIZ  001374          4817#  5148   5679
MSKTST  001434          4836#  4879   4880   4881   5761#
PC    =%000007          4716#  5052#  5521#  5758#  5760#  5761#  5762#
PIRQ  = 177772          4716#
PIRQVE= 000240          4716#
PR0   = 000000          4716#
PR1   = 000040          4716#
PR2   = 000100          4716#
PR3   = 000140          4716#
PR4   = 000200          4716#
PR5   = 000240          4716#
PR6   = 000300          4716#
PR7   = 000340          4716#
PS    = 177776          4716#
PSW   = 177776          4716#
PWRVEC= 000024          4716#
RDCHR = 104405          5765   5768#
RDLIN = 104406          5766   5768#
RDOCT = 104407          4915   5768#  5824
RESVEC= 000010          4716#
ROMMAP  013516          4990   5770#  5776   5808
R0    =%000000          4716#  4916#  4918   4920   4922#  4923   4936#  4942   4943   4944#  4962#  4968#  4988#
```

```
                    4991    4996    5011#   5014    5040#   5047#   5049    5056#   5057    5065    5067#   5100#   5143#
                    5144    5145    5148    5154    5167    5169    5167    5172#   5175    5205    5217#   5226#   5228#
                    5229    5243#   5246#   5247    5270    5271#   5272    5278    5304#   5305#   5308
                    5324#   5327    5331    5379#   5400    5401#   5403#
                    5417#   5430    5431    5457#   5463#   5487#   5493#   5497
                    5514    5515#   5519#   5546#   5551    5552    5558#   5560
                    5570#   5572    5579#   5590    5602#   5604    5606#
                    5615    5625#   5647#   5648#   5649#   5653    5662#   5665#   5666#
                    5681#   5686#   5688    5695#   5697    5700    5758#   5760#   5761#   5762#
                    5764#
R1      =x000001    4716#   4963#   4972#   4989#   4997#   5010#   5015#   5045#   5062#   5098#   5102#
                    5105    5155#   5156    5158    5160    5161    5181#   5186#   5269#   5270#   5287#
                    5370#   5416#   5462#   5474#   5547#   5572#   5585#   5600#   5679#   5680#
                    5761#   5764#   5766#
R2      =x000002    4716#   5109#   5110#   5111#   5113#   5114    5267#   5273#   5274    5279
                    5400#   5497#   5500    5761    5764#   5766#
R3      =x000003    4716#   5252#   5279#   5280    5289#   5290    5291#   5488#   5516#   5527#
                    5581#   5582#   5583    5586    5636#   5637#   5761    5763#   5764#
                    5765#
R4      =x000004    4716#   4991#   4993    5040#   5049    5057#   5059    5096#   5120#   5217#   5229#   5230    5247#
                    5270#   5282    5283#   5291    5300#   5361#   5457#   5566#   5567    5586#
                    5593    5595#   5598    5599#   5655#   5656    5659#   5689    5761    5763#
R5      =x000005    4716#   4992#   4993    5046#   5047    5049    5056    5058#   5070#   5074#   5097#   5106#   5217#
                    5227#   5228    5230    5233#   5245#   5246    5248    5251#   5274#   5275    5281#   5282    5285
                    5290#   5291    5306#   5361#   5457#   5549#   5558    5567    5570#   5580#   5602#   5612#   5613#
                    5634#   5647    5656    5659#   5660    5687#   5689    5693#   5761    5763#   5764#
R6      =x000006    4716#   4895#
R7      =x000007    4716#
SAVR0     001420    4830#   4879    4880    5761#
SAVR1     001422    4831#   5761#
SAVR2     001424    4832#   5761#
SAVR3     001426    4833#   5761#
SAVR4     001430    4834#   4[illegible]0   5761#
SAVR5     001432    4835#   4[illegible]0   5761#
SETTST    003726    4719    4894#
SP      =x000006    4716#   4895#   4916    4938#   4939#   4949#   4951    4952    4964#   4965#   4971    4974#   4977
                    4978    4979    5003#   5009#   5019#   5021    5022    5041#   5042#   5063#   5078    5079    5090
                    5092#   5093#   5124    5125    5126    5139#   5140#   5147    5165    5169    5170    5179#   5180#
                    5190#   5192    5193    5321#   5322#   5332#   5334    5335    5374#   5375#   5393#   5395    5397
                    5398    5401    5414#   5415#   5426#   5428    5429    5470#   5471#   5490#   5492    5494    5495
                    5498    5512#   5513#   5529#   5531    5533    5534    5626#   5627#   5628#   5629#   5640    5641
                    5642    5643    5650#   5663#   5667#   5758#   5759#   5760#   5761#   5762#   5763#   5764#   5765#
                    5766#   5768#   5812#   5813#   5814    5816#   5818    5821#   5827    5828    5859    5865    5866#
                    5867#
STACK =   001100    4716#   4895    5760    5816
START     003732    4717    4895#
STKLMT=   177774    4716#
SWR       001136    4720#   4895#   5759    5760    5821    5827#
SWREG     000176    4717#   4895
SW0     =   000001  4716#
SW00    =   000001  4716#
SW01    =   000002  4716#
SW02    =   000004  4716#
SW03    =   000010  4716#
SW04    =   000020  4716#
SW05    =   000040  4716#
```

```
SW06  = 000100          4716#
SW07  = 000200          4716#
SW08  = 000400          4716#
SW09  = 001000          4716#
SW1   = 000002          4716#
SW10  = 002000          4716#
SW11  = 004000          4716#
SW12  = 010000          4716#
SW13  = 020000          4716#
SW14  = 040000          4716#
SW15  = 100000          4716#
SW2   = 000004          4716#
SW3   = 000010          4716#
SW4   = 000020          4716#
SW5   = 000040          4716#
SW6   = 000100          4716#
SW7   = 000200          4716#
SW8   = 000400          4716#
SW9   = 001000          4716#
TBITVE= 000014          4716#
TCRLF = 000200          5762#
TEST.T  015012          4923    5760    5871#
THT   = 000011          5762#
TKVEC = 000060          4716#
TPVEC = 000064          4716#
TRAPVE= 000034          4716#   4895#
TRTVEC= 000014          4716#
TSTFLG  001436          4837#   4894#   4911    4913#
TST1    004470          4912    4935#   5758    5883
TST10   005544          5178#   5883
TST11   005632          5217#   5883
TST12   005674          5217#   5883
TST13   005736          5217#   5883
TST14   006000          5217#   5883
TST15   006042          5217#   5883
TST16   006104          5217#   5883
TST17   006146          5217#   5883
TST2    004564          4961#   5883
TST20   006210          5217#   5883
TST21   006252          5217#   5883
TST22   006314          5217#   5883
TST23   006356          5217#   5883
TST24   006420          5217#   5883
TST25   006462          5217#   5883
TST26   006524          5217#   5883
TST27   006566          5217#   5883
TST3    004662          4987#   5883
TST30   006630          5217#   5883
TST31   006672          5225#   5883
TST32   006726          5242#   5883
TST33   006770          5264#   5883
TST34   007104          5303#   5883
TST35   007144          5320#   5883
TST36   007232          5361#   5883
TST37   007300          5361#   5883
TST4    004720          5007#   5883
```

```
TST40   007346          5372#   5383
TST41   007514          5413#   5383
TST42   007606          5457#   5383
TST43   007664          5457#   5383
TST44   007742          5468#   5383
TST45   010114          5510#   5383
TST46   010240          5545#   5383
TST47   010602          5624#   5383
TST5    005006          5038#   5883
TST50   011042          5644    5678#   5883
TST6    005222          5091#   5883
TST7    005402          5138#   5383
TYPDS = 104404          5758    5761    5768#
TYPE  = 104400          4896    4914    5151    5758    5759    5760    5761    5762    5763    5764    5765    5768#   5820
                        5823
TYPOC = 104401          5759    5761    5768#   5822
TYPON = 104403          5768#
TYPOS = 104402          5768#
XERR1   012100          5720    5761#
XSPA    014610          5759    5833#
XSWR    014614          5820    5834#
XTST    014644          5759    5837#
XTSTN   014631          4914    5836#
XXSCOP  001440          4838#   4906#   5759#
X1$     004412          4914#   4917    4919    5817
$ERROR  001122          4720#
$ FCAT  001126          4720#   4895
$ FLL   001164          4720#   5760
$LA 3C  012522          5762#*
$CNTAG  001100          4720#   4895
$CR3  = 000000          4720#
$CRLF = 000001          4720#
SCRLF   001171          4720#   5760    5761    5762    5765
SDBLK   013170          5764#
SDORGN  011244          5758#
SDTBL   013160          5764#
SENCAD  011234          4896    5758#   5760
SENDCT  011202          4895    5758#
SENDMG  011250          5758#
SENULL  011265          5758#
SEOP    011146          5758#   5894
SEOPCT  011174          4895#   5758#
SERFLG  001103          4720#   5759#   5760#
SERMAX  001115          4720#   4895#   5759#
SERROR  011602          4895    5760#
SERRPC  001116          4720#   4879    4880    4881    5760#   5761
SERRTB  001174          4720#   5761
SERRTY  012136          5761#
SERTTL  001112          4720#   4879    4880    4881    5760#
SESCAP  001162          4720#   4895#   5759#   5760
SFILLC  001154          4720#   5762
SFILLS  001153          4720#   5762
SGOFOR  001120          4720#
SGOOAT  001124          4720#
SGET42  011224          5758#
SHD   = 000000          4713
```

DWDAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
$HIOCT  013452          5766#*
$ICNT   001104          4720#   5759#   5760#
$ITEMB  001114          4720#   5760#   5761
$LF     001172          4720#   5760    5762    5765
$LPMR   001106          47[illegible]#   4[illegible]#   49[illegible]#   49[illegible]#   4926    4927    5759#   5760
$LPER   001110          47[illegible]#   4[illegible]#   49[illegible]#   5759#   5760
$MAIL = ****** U        4[illegible]    4[illegible]    4961    4[illegible]    5007    5038    5091    5138    5178    5217    5225    5242    5264
                        5303    5320    5361    5372    5413    5457    5468    5510    5545    5624    5678    5759    5760
                        5762
$MXCNT  011600          5759#   5760
$NULL   001152          4720#   5762
$NWTST= 000001          4935#   4961#   4987#   5007#   5038#   5091#   5138#   5178#   5217#   5225#   5242#   5264#   5303#
                        5320#   5361#   5372#   5413#   5457#   5468#   5510#   5545#   5624#   5678#
$OCNT   012750          5763#*
$OMODE  012752          5763#*
$OVER   011564          5759#
$PASS   001100          4720#   4879    4880    4881    5758*   5759
$Q      = 000051        5874#   5883#
$[illegible]ES  001170          4720#   5760    5762    5765
$[illegible]HR  013[illegible]          5765#   5768
$[illegible]EC= ****** U        5768
$[illegible]LIN 013[illegible]          5765#   5768
$[illegible]OCT 013[illegible]          5766#   5768
$[illegible]SZ = 000010         5765#
$[illegible]   = ****** U        5768
$[illegible]E= ****** U          5768
$[illegible]E   011270          4[illegible]5   5759#
$[illegible]UP= 0[illegible]27          [illegible]3#   4895    4896    5758    5760
$[illegible]UP = 177777         4[illegible]3#
[illegible]AD   011536          5759#   5760
[illegible]   = 167[illegible]          4698#   4713    4715    4720    4895    4935    4961    4987    5007    5038    5091    5138    5178
                        5217    5225    5242    5264    5303    5320    5361    5372    5413    5457    5468    5510    5545
                        5624    5678    5758    5759    5760
$[illegible]K= 000000           5759
$[illegible]S   001160          4720#   4895*   5038*   5138*   5225*   5242*   5303*   5545*   5624*   5678*   5758*   5759*   5760*
$[illegible]B   001144          4720#   5765    5812
$[illegible]S   001142          4720#   49[illegible]9#   5307*   5760*   5765
$TMPO   001156          4720#   5065*   5067    5279*   5280*   5281
$TN     = 000051        4699#   4713    4912    4935#   4961#   4987#   5007#   5038#   5091#   5138#   5178#   5217#   5225#
                        5242#   5[illegible]54#   5303#   5320#   5361#   5372#   5413#   5457#   5468#   5510#   5545#   5624#   5644
                        5678#   5[illegible]76    5886
$TPB    001150          4720#   5762*
$TPFLG  001155          4720#   5762
$TPS    001146          4720#   5762
$TRAP   013454          4895    5768#
$TRP    = 000010        5768#
$TRPAD  013476          5768#
$TSTNM  001102          4720#   4920*   5758*   5759*   5760    5761
$TTYIN  013342          5765#   5825
$TYPBM= ****** U        5768
$TYPDS  012754          5764#   5768
$TYPE   012312          5762#   5768
$TYPEC  012456          5762#
$TYPEX  012524          5762#
$TYPOC  012552          5763#   5768
$TYPON  012566          5763#   5768
```

```
$TYPOS  012526          5763#   5768
$XTSTR  011362          5759#
$OFILL  012751          5763#*
$40CAT= ****** U        5759    5760
.     = 015144          4717#   4718#   4720#   4895    4896#   4994    5050    5055    5060    5075    5112    5115    5149
                        5217    5231    5249    5276    5283    5292    5309    5361    5457    5524    5575    5578    5588
                        5591    5594    5597    5605    5608    5611    5614    5638    5758    5759    5760    5761#   5762
                        5764#   5765#   5776#   5808#   5863
```

```
COMMEN  1023#  4716#
ENDCOM  1035#  4716#
ERROR   4716#  4948    4970    4995    5018    5051    5061    5066    5076    5104    5116    5150    5163    5189    5217
        5232   5250    5277    5284    5293    5310    5331    5361    5388    5402    5425    5457    5485    5499    5525
        5557   5565    5569    5639    5658    5691    5699
ESCAPE  1146#  4716#
GETPRI   797#
MSG     4920#  4935    4955#   4961    4981#   4987    5000#   5007    5024#   5038    5083#   5091    5129#   5138    5171#
        5178   5217#   5219#   5235    5236#   5242    5255#   5264    5297#   5303    5313#   5320    5361#   5363#   5372
        5406#  5413    5457#   5459#   5468    5503#   5510    5537#   5545    5617#   5624    5670#   5678
MULT    3529#  4716#
NEWTST  1079#  4716#  4935    4961    4987    5007    5038    5091    5138    5178    5217    5225    5242    5264    5303
        5320   5361    5372    5413    5457    5468    5510    5545    5624    5678
POP     1532#  4716#  5764    5766
PUSH    1524#  4716#  5764    5766
REPORT  4507#
SCOPE   4716#  4935    4961    4987    5007    5038    5091    5138    5178    5217    5225    5242    5264    5303    5320
        5361   5372    5413    5457    5468    5510    5545    5624    5678    5758
SETPRI   783#
SETTRA  5768#
SETUP    825#  4716#  4895
SKIP    1180#  4716#  4912    5644
SLASH    975#  4716#
SPACE   4716#
STARS    944#  4716#  4720    4935    4961    4987    5007    5038    5091    5138    5178    5217    5225    5242    5264
        5303   5320    5361    5372    5413    5457    5468    5510    5545    5624    5678    5758    5759    5760    5761
        5762   5763    5764    5765    5766    5768
SWRSU    918#  4895#
TRMTRP  5768#
TYPBIN  1479#  4716#
TYPOEC  1456#  4716#  5758    5761
TYPNAM  1265#  4702#  4896
TYPNUM  1455#  4716#
TYPOCS  1358#  4716#
TYPOCT  1321#  4716#  5761
TYPTXT  1275#  4716#
XERREN  5714#  5760
XSCOP   5742#  5759
$EGOLF  5704#  5761
$RESET  4709#  5307    5760
$SKIP   4705#  4994    5050    5060    5112    5115    5217    5231    5249    5276    5283    5292    5309    5361    5457
$$CMRE  4720#
$$CMTH  4720#
$$ESCA  1159#  4716#
$$NEWT  1113#  4716#  4935    4961    4987    5007    5038    5091    5138    5178    5217    5225    5242    5264    5303
        5320   5361    5372    5413    5457    5468    5510    5545    5624    5678
$$SET   5768#
$$SKIP  1193#  4716#  4912    5644
.EQUAT   166#  4702#  4716
.HEADE    39#  4703#  4713
.KT11    301#
.SETUP   737#  4703#  4893
.SWRHI    81#  4702#  4715
.SWRLO  4715#
.$ACT1  4102#
.$APTB  4150#
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.$APTY   4583#
.$ASTA   4467#
.$CATC    478#   4702#   4717
.$CMTA    580#   4702#   4720
.$D820   3736#
.$D820   3860#
.$DIV    3631#
.$EOP    1584#   4702#   5758
.$ERRO   2002#   4702#   5760
.$ERRT   2195#   4702#   5761
.$MULT   3567#
.$POWE   3280#
.$RAND   3343#
.$ROOE   2973#
.$ROOC   2881#   4704#   5766
.$READ   2665#   4704#   5765
.$F2A2   4004#
.$SAVE   3049#
.$S820   3821#
.$S820   3923#
.$SCOP   1794#   4703#   5759
.$SIZE   3405#
.$SUPR   3961#
.$TRAP   3149#   4703#   5768
.$TYPB   2580#
.$TYPD   2502#   4703#   5764
.$TYPE   2283#   4703#   5762
.$TYPO   2405#   4703#   5763
.$40CA    509#
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M05

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        5762  5763  5764  5766  5866
ASL     5761  5766  5768
ASLB    5764
BCC     5764
BCS     5696
BEQ     4896  4912  4917  4973  4994  5050  5060  5107  5121  5149  5217  5231  5249  5276  5283
        5286  5292  5309  5361  5457  5568  5584  5657  5690  5758  5759  5760  5761  5762  5763
        5766  5826  5863
BGE     5759  5762
BGT     5758  5759  5763  5764
BHI     4919  5759
BIC     5056  5123  5217  5361  5382  5457  5479  5648  5662  5665  5686  5758  5763  5765  5766
        5813
BIS     5101  5307  5380  5383  5386  5477  5480  5483  5520  5635  5649  5666  5760  5763  5764
BISB    5761
BIT     5759  5760
BITB    5762
BLOS    5115  5765
BLT     5762  5763  5764
BMI     5392  5489  5528  5553  5561  5698  5764
BNE     4895  4896  4946  4998  5016  5055  5063  5075  5103  5157  5162  5168  5187  5234  5329
        5423  5524  5556  5564  5571  5573  5594  5601  5603  5614  5638  5661  5684  5701  5759
        5760  5761  5762  5763  5764  5765  5815  5819
BPL     5108  5112  5253  5575  5578  5588  5591  5597  5605  5608  5611  5760  5762  5763  5764
        5765
BR      4895  4896  4947  5017  5064  5077  5105  5117  5146  5159  5164  5188  5294  5330  5389
        5399  5424  5486  5496  5526  5644  5759  5761  5762  5763  5764  5765  5766
CLC     4921
CLR     4895  4898  4902  4904  4905  4906  4913  4968  5058  5070  5098  5119  5142  5143  5227
        5244  5267  5306  5378  5390  5396  5474  5487  5493  5516  5519  5521  5532  5548  5549
        5559  5606  5609  5612  5634  5636  5758  5759  5761  5763  5764  5766
CLRB    5759  5762  5764  5765
CMP     4895  4896  4918  4971  4977  4993  4996  5049  5078  5114  5124  5147  5148  5156  5165
        5167  5217  5230  5248  5275  5292  5291  5361  5395  5457  5492  5531  5554  5562  5567
        5583  5593  5656  5660  5683  5689  5700  5759  5760  5764  5765  5814  5818  5862
CMPB    5759  5762  5765
COM     5251
DEC     4945  4997  5015  5054  5062  5106  5120  5186  5328  5422  5572  5600  5602  5758  5761
DECB    4972  5762  5763
EMT     4716
HALT    4717  5760  5762  5864
INC     4894  4896  5074  5102  5233  5270  5582  5599  5613  5659  5758  5759  5760  5763  5764
INCB    5252  5271  5273  5287  5289  5391  5488  5527  5570  5759  5760  5762
IOT     4716
JMP     4717  4719  4927  5758  5760  5817
JSR     5758  5760  5762
MOV     4895  4897  4899  4900  4901  4903  4907  4908  4909  4916  4923  4926  4936  4937  4938
        4939  4940  4941  4949  4951  4952  4962  4963  4964  4965  4966  4967  4974  4978  4979
        4988  4989  4990  4991  4992  5008  5009  5010  5011  5012  5013  5019  5021  5022  5038
        5040  5041  5042  5043  5044  5045  5046  5047  5048  5052  5057  5065  5067  5068  5071
        5072  5079  5080  5092  5093  5094  5095  5096  5097  5100  5109  5118  5125  5126  5138
        5139  5140  5141  5153  5155  5169  5170  5179  5180  5181  5182  5183  5184  5190  5192
        5193  5217  5225  5226  5228  5229  5242  5243  5245  5246  5247  5265  5266  5268  5269
        5278  5281  5303  5304  5305  5308  5321  5322  5323  5324  5325  5326  5332  5334  5335
        5361  5374  5375  5376  5377  5379  5385  5393  5397  5398  5400  5401  5403  5414  5415
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        5416  5417  5419  5420  5426  5428  5429  5457  5470  5471  5472  5473  5475  5482  5490
        5494  5495  5497  5498  5500  5512  5513  5514  5517  5518  5529  5533  5534  5545  5546
        5547  5566  5580  5581  5585  5586  5595  5624  5625  5626  5627  5628  5629  5630  5631
        5632  5633  5640  5641  5642  5643  5650  5663  5667  5678  5679  5681  5682  5685  5687
        5688  5758  5759  5760  5761  5762  5763  5764  5765  5766  5768  5812  5816  5821  5827
        5859  5861  5865  5867
MOVB    4895  4920  5272  5274  5279  5280  5288  5290  5558  5576  5579  5589  5592  5598  5647
        5655  5759  5760  5761  5762  5763  5764  5765  5766  5768
MTPS    4910  4976  5039  5073  5081  5099  5127  5361  5373  5404  5457  5469  5501  5511  5535
        5760  5862
NEG     5113  5763  5764
NOP     4969  5295  5381  5384  5387  5478  5481  5484  5654  5758
RESET   5307  5758  5760
ROL     4922  5693  5695  5763  5766
RTI     4950  4975  5020  5069  5122  5191  5333  5394  5427  5491  5530  5651  5664  5668  5759
        5760  5762  5763  5764  5765  5766  5829  5868
RTS     5761  5762  5768
SEC     5692  5694
SUB     5111  5680  5760  5764  5860
TRAP    5768
TST     4895  4911  4942  4943  5014  5059  5144  5145  5154  5160  5161  5185  5217  5327  5361
        5421  5457  5550  5551  5615  5697  5759  5760  5761  5762  5763  5764  5766  5768  5828
TSTB    5285  5552  5560  5574  5577  5587  5590  5596  5604  5607  5610  5759  5761  5762  5764
        5765  5825
.ASCII  4720  4859  4860  4861  4862
.ASCIZ  4720  4843  4844  4845  4846  4847  4848  4849  4850  4851  4852  4853  4854  4855  4856
        4857  4858  4864  4865  4866  4867  4868  4869  4870  4871  4872  4873  4874  4875  4876
        4896  5758  5761  5833  5834  5835  5836  5837
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.BLKW   5764
.BYTE   4720  4887  5758  5763  5765  5782  5783  5801
.ENABL     4  4701
.END    5890
.ENDC   4713  4715  4716  4717  4720  4893  4895  4896  4912  4935  4961  4987  5007  5038  5091
        5138  5178  5217  5225  5242  5264  5303  5320  5361  5372  5413  5457  5468  5510  5545
        5624  5644  5678  5758  5759  5760  5761  5762  5763  5764  5765  5766  5768
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.EVEN   4877  4888  4896  5761  5838
.IF     4713  4715  4716  4717  4720  4893  4895  4896  4912  4935  4961  4987  5007  5038  5091
        5138  5178  5217  5225  5242  5264  5303  5320  5361  5372  5413  5457  5468  5510  5545
        5624  5644  5678  5758  5759  5760  5761  5762  5763  5764  5765  5766  5768
.IFF    4715  4716  4720  4895  4912  4935  4961  4987  5007  5038  5091  5138  5178  5217  5225
        5242  5264  5303  5320  5361  5372  5413  5457  5468  5510  5545  5624  5644  5678  5758
        5759  5760  5761  5762  5763  5764  5765  5766  5768
.IFT    4896  5759  5760  5765  5766
.IFTF   4896  5759  5760  5765  5766
.IIF    4713  4715  4717  4720  4895  4896  4994  5050  5060  5112  5115  5217  5231  5249  5276
        5283  5292  5309  5361  5457  5758  5759  5760  5761  5762  5765  5768
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        5766  5773  5883  5886
.LIST      2  4693  4697  4700  4716  4717  4720  4842  4891  4892  4893  4895  4896  4935  4961
        4987  5007  5038  5091  5138  5178  5217  5225  5242  5264  5303  5320  5361  5372  5413
        5457  5468  5510  5545  5624  5678  5758  5759  5760  5765  5768  5777  5809  5810  5832
        5840  5841  5875  5883
.MACRO    39    81   166   301   478   509   580   737   783   797   825   918   944   975  1023
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DWQAA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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            1035    1079    1113    1146    1159    1180    1193    1206    1275    1321    1358    1405    1438    1469    1534
            1532    1584    1794    2002    2195    2283    2435    2502    2580    2665    2801    2973    3049    3143    3210
            3343    3405    3529    3567    3631    3736    3821    3910    3923    3961    4004    4102    4150    4420    4467
            4507    4583    4705    4709    4715    4720    4929    4935    4981    5000    5024    5083    5129    5171    5217
            5219    5236    5255    5297    5313    5361    5363    5406    5457    5459    5503    5537    5617    5670    5704
            5714    5743    5768
.MCALL      4702    4703    4704    4716    4895
.MLIST         1       3    4695    4696    4716    4717    4720    4840    4841    4890    4893    4895    4896    4935    4961
            4987    5007    5038    5091    5138    5178    5217    5225    5242    5264    5303    5320    5361    5372    5413
            5457    5468    5510    5545    5624    5678    5758    5759    5760    5765    5768    5771    5772    5807    5830
            5831    5839    5873    5883
.PAGE       4720    4816    4889    5767    5769    5811
.REPT       4717    4720    5876
.SBTTL      4715    4716    4717    4720    4935    4961    4987    5007    5038    5091    5138    5178    5217    5225    5242
            5264    5303    5320    5361    5372    5413    5457    5468    5510    5545    5624    5678    5758    5759    5760
            5761    5762    5763    5764    5765    5766    5768
.TITLE      4713
.WORD       4717    4720    4879    4880    4881    5758    5761    5762    5763    5766    5775    5778    5779    5780    5781
            5784    5785    5786    5787    5788    5789    5790    5791    5792    5793    5794    5795    5796    5797    5798
            5799    5802    5803    5804    5805
```

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

```
*,DWQAA/CRF=SYSMAC.B1,DWQAA.P11
RUN-TIME:  38  46  4 SECONDS
RUN-TIME RATIO:  326/89=3.6
CORE USED:  29K  (57 PAGES)
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