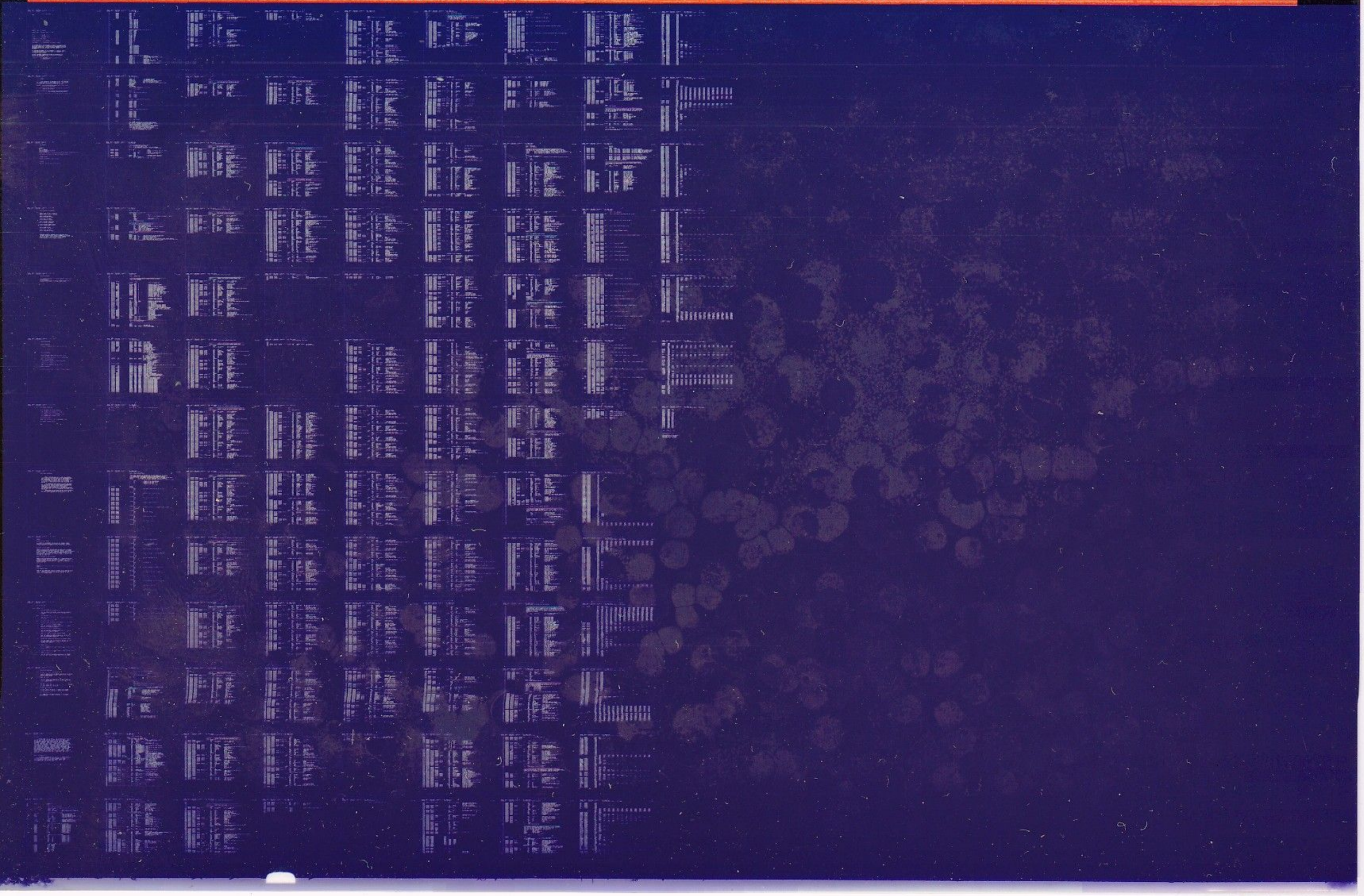
DT07

DT07 UNIBUS SW DIAG
CRDTABO

AH-F170B-MC
FICHE 1 OF 1



```
1
                .NLIST LOC,SEQ,BIN
    .REM_
```

PRODUCT CODE: AC-F169B-MC

PRODUCT NAME: CRDTAB0 UNIBUS SW DIAG

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1 .0 ABSTRACT:

THIS DIAGNOSTIC IS DESIGNED TO TEST THE FUNCTIONS AND CAPABILITIES OF THE DT07 UNIBUS SWITCH. THE DIAGNOSTIC IS DIVIDED INTO THREE MAJOR SECTIONS AS FOLLOWS:

MONOPORT; THIS SECTION TESTS A SINGLE PORT WITHOUT INTERACTION WITH OTHER PORTS.

MULTIPORT; THIS SECTION TESTS THE DT07 PORT WITH THE OTHER PORTS IN THE SYSTEM.

MANUAL INTERVENTION; THIS SECTION TESTS CERTAIN FUNCTIONS WHICH REQUIRE OPERATOR ASSISTANCE.

NPR TEST; THIS TEST CHECKS OUT THE NPR LINE ON THE SWITCH BUS.

SEQ 0003

2 .0 REQUIREMENTS:

2 .1 EQUIPMENT

PDP 11-COMPUTER
ASR-33 TELETYPE OR EQUIVALENT
DT07 PORT MODULE
MANUAL CONTROL PANEL (OPTIONAL BUT NEEDED FOR MANUAL INTERVENTION TEST!)

UBE <UNIBUS EXERCISER> (OPTIONAL BUT NEEDED FOR NPR TEST)

2 .2 PROGRAM STORAGE

PROGRAM REQUIRES 8 K WORDS OF MEMORY

2 .3 SOFTWARE

ABSOLUTE LOADER OR OTHER INPUT MEDIUM

3 .0 SWITCH REGISTER ASSIGNMENTS:

SW08(1)=LOOP ON TEST IN SWR<7:0>
SW08(0)=DO ALL TESTS IN SEQUENCE

SW09(1)=LOOP ON ERROR
SW09(0)=CONTINUE ON ERROR

SW10(1)=BELL ON ERROR
SW10(0)=NO BELL ON ERROR

SW11(1)=INHIBIT ITERATIONS
SW11(0)=ALLOW ITERATIONS

SW13(1)=INHIBIT ERROR TYPEOUTS
SW13(0)=ALLOW ERROR TYPEOUTS

SW14(1)=LOOP ON TEST
SW14(0)=DON'T LOOP ON TEST

SW15(1)=HALT ON ERROR
SW15(0)=CONTINUE ON ERROR

NOTE:

COMPUTERS WITHOUT A HARDWARE SWITCH REGISTER HAVE A SOFTWARE SWITCH REGISTER LOCATED IN MEMORY AT LOCATION 176 CALLED SWREG. THIS LOCATION CAN BE CHANGED EITHER MANUALLY OR BY TYPING THE CNTL+G KEYES TOGETHER THEN RESPONDING TO THE TERMINAL DIALOGUE.

4 .0 LOADING PROCEDURE:

THE STANDARD PROCEDURE FOR LOADING ABSOLUTE BINARY TAPES
SHOULD BE USED.
IF THE PROGRAM RESIDES ON A MASS STORAGE DEVICE SUCH AS
MAGTAPE OR DISK REFER TO THE XXDP USER'S GUIDE.

```
        5 .0        STARTING PROCEDURE:

        5 .1        STARTING ADDRESSES
                      200.INPUT PARAMETERS AND ALLOWS TEST SELECTION



        5 .2        STARTING SEQUENCES

        5 .2.1      STARTING SEQUENCE UNDER XXDP(CHAIN),APT OR ACT
                      START AT ADDRESS 200 ONLY. (DEFAULT PARAMETERS)
        5 .2.2      NORMAL STARTING SEQUENCE
                      LOAD PROGRAM ACCORDING TO LOADING PROCEDURE
                      LOAD AND START ADDRESS 200
                      INPUT ACTUAL PARAMETERS AND SELECT TEST
        5 .3        RESTART ADDRESSES

                    RESTART ADDRESSES ARE THE SAME AS STARTING ADDRESSES
```

6 .0 PRELIMINARY OPERATIONS:

6 .1 DEVICE ADDRESSES AND VECTOR ADDRESSES

THE STANDARD DEVICE ADDRESS IS 177420.

THE STANDARD DEVICE VECTOR ADDRESS IS 350.

THE STANDARD DEVICE PRIORITY LEVEL IS 7.

6 .2 DEVICE/OPTION SETUP

INSURE THAT THE DT07(S) ARE IN PROGRAMMABLE MODE.

6 .3 PRELIMINARY PROGRAMS NEEDED

NONE .

7 .0 OPERATIONAL PROCEDURES:

NORMAL OPERATION WOULD BE TO LOAD THIS PROGRAM, INSURE THAT ALL DT07 PORTS ARE IN THE PROGRAMMABLE MODE, RUN THE MONOPORT TEST ON EACH PORT IN THE SYSTEM,THEN RUN THE MULTIPORT TEST ON ALL PORTS IN THE SYSTEM.
IF YOU HAVE A MANUAL CONTROL PANEL, RUN THE MANUAL INTERVENTION TEST.IF YOU HAVE UBE ON THE SWITCH BUS,RUN THE NPR TEST.

THE PARAMETER INPUT ROUTINE IS TO BE USED WHENEVER YOU WISH TO INPUT OR CHANGE DIAGNOSTIC PARAMETERS INCLUDING DEVICE ADDRESS,VECTOR ADDRESS,INTERRUPT LEVEL, NUMBER AND I.D.#S OF OTHER PORTS TO BE TESTED.
THE PARAMETER INPUT ROUTINE WILL BE ENTERED AUTOMATICALY FROM THE MULTIPORT TEST IF NO PARAMETERS HAVE BEEN ENTERED PREVIOUSLY.

WHEN USING THE MULTIPORT SECTION, AFTER PARAMETERS HAVE BEEN ENTERED OR WHEN RESTARTING THE TEST, THE CPU WITH THE LOWEST NUMBERED DT07 PORT MUST BE STARTED LAST.

8.0 ERRORS:

8.1 MONOPORT SECTION ERRORS

ALL ERRORS IN THE MONOPORT SECTION HAVE THE GENERAL FORMAT;
ERROR PC,TEST#,GOOD DATA,BAD DATA,BAD DATA ADDRESS. CONTROL
OF ERROR PRINTOUT AND LOOPING IS BY THE SWITCH REGISTER OPTIONS.

8.2 MULTIPORT SECTION ERRORS

ERRORS IN THE MULTIPORT SECTION PRINT AN ERROR ID.#, A MESSAGE
BRIEFLY DESCRIBING THE ERROR AND THE CSR CONTENTS. ALL ERRORS
IN THIS SECTION ARE FATAL AND, THEREFORE, THE TEST MUST BE RESTARTED
ON ERROR. THERE IS NO ERROR LOOPING AND ERROR PRINTOUT IS AUTO-
MATIC. ERROR ID.#S 1A THRU 5A IDENTIFY ERRORS IN THE DT07 MODE
MULTIPORT TEST AND ERROR ID.#S 6 THRU 16 IDENTIFY ERRORS IN THE
DT03 MODE MULTIPORT TEST

8.3 MANUAL INTERVENTION SECTION ERRORS

ERRORS IN THIS SECTION PRINT AN ERROR ID.#, A BRIEF MESSAGE DES-
CRIBING THE ERROR, AND THE CSR CONTENTS AT ERROR TIME. THERE IS
NO ERROR LOOPING AND ERROR PRINTOUT IS AUTOMATIC; HOWEVER,
PRESSING CONTINUE, AFTER ERROR, WILL CAUSE THE FAILING SUBTEST TO
REPEAT EXECUTION.

8.4 NPR TEST

ERRORS IN THIS TEST PRINT A BRIEF MESSAGE DESCRIBING THE ERROR AND
ERROR PC.

8.5 MISCELLANEOUS ERRORS

THERE ARE TWO SUBROUTINES USED TO DETERMINE DEVICE MODE AND DEVICE
TIMING. ERRORS IN THESE ROUTINES ARE SELF-EXPLANATORY AND ARE
FATAL. THESE ERRORS USUALLY OCCUR BECAUSE ONE OF THE PORTS
WAS LEFT IN THE MANUAL MODE.

9.0 TEST DESCRIPTIONS:

9.1 MONOPORT TESTS

TEST1. TEST POST-RESET BIT PATTERN IN CSR.

THIS TEST CHECKS THE CONTROL STATUS REGISTER CONTENTS AFTER RESET TO INSURE THAT ANY RESET-CLEARABLE BITS ARE CLEARED.

TEST2. TEST READ/WRITE BITS IN CSR.

THIS TEST CHECKS THAT BITS 0 AND 6 CAN BE SET AND CLEARED IN THE CSR.

TEST3. TEST BYTE ACCESS IN CSR.

THIS TEST CHECKS THE BYTE ACCESS CAPABILITY OF THE CSR.

TEST4. CONNECT TEST WITHOUT INTERUPT ENABLE.

THIS TEST VERIFIES THE PROPER OPERATION OF THE CONNECT PROCESS WITH INTERUPTS DISABLED.

TEST5. RELEASE TEST WITHOUT INTERUPT ENABLE.

THIS TEST VERIFIES THE PROPER OPERATION OF THE RELEASE PROCESS WITH INTERUPTS DISABLED.

TEST6. CONNECT FAILURE TEST WITHOUT INTERUPT ENABLE.

THIS TEST CHECKS THE PROPER OPERATION OF THE DEVICE WHEN THE CONNECTION PROCESS CANNOT CONNECT TO THE SHARED BUS WITHOUT INTERUPTS ENABLED.

TEST7. RELEASE TEST WITHOUT BUS MASTERSHIP OR INTERUPT ENABLE.

THIS TEST CHECKS THAT THE DEVICE WILL RELEASE THE SHARED BUS WHEN UNIBUS MASTERSHIP CANNOT BE OBTAINED AND INTERUPTS ARE DISABLED.

TEST10. CONNECT TEST

THIS TEST VERIFIES THE CONNECT PROCESS UNDER INTERUPT CONTROL.

TEST11. RELEASE TEST

THIS TEST VERIFIES THE RELEASE PROCESS UNDER INTERUPT CONTROL.

TEST12. CONNECT FAILURE TEST

THIS TEST VERIFIES THE PROPER OPERATION OF THE CONNECT PROCESS,UNDER INTERUPT CONTROL,WHEN THE DEVICE CANNOT

OBTAIN BUS MASTERSHIP.

TEST13. RELEASE TEST WITHOUT BUS MASTERSHIP

THIS TEST VERIFIES THE THE PROPER OPERATION OF THE RELEASE PROCESS, UNDER INTERUPT CONTROL, WHEN THE DEVICE CANNOT OBTAIN BUS MASTERSHIP.

TEST14. RESET (RST) TEST

THIS TEST CHECKS THE OPERATION OF THE DEVICE RESET BIT (RST) IF AN EXTERNAL DEVICE REGISTER HAS BEEN INSERTED IN THE PARAMETER BLOCK.

TEST15. RESET HOLD (HLD) TEST

THIS TEST CHECKS THAT THE HLD BIT WILL HOLD THE SHARED BUS DURING AND AFTER A BUS RESET.

TEST16. HI-SPEED SWITCHING TEST

THIS TEST CAUSES THE DEVICE TO CONNECT AND DISCONNECT AT HIGH SPEED 1000 TIMES WHILE CHECKING FOR ERRORS.

TEST17. RESET-IN-NEUTRAL TEST

THIS TEST CHECKS FOR RESET-IN-NEUTRAL IF AN EXTERNAL DEVICE REGISTER IS PRESENT AND PRINTS OUT THE RESULT ON THE FIRST PASS.

9.2 MULTIPORT TEST

THE MULTIPORT TEST IS ACTUALLY TWO SEPARATE TESTS: ONE FOR THE DT07 IN DT03 MODE AND ONE FOR THE DT07 IN DT07 MODE. IN DT07 MODE THE PORT I.D.#S OF ALL THE PORTS TO BE TESTED ARE ARRANGED IN ASCENDING NUMERICAL ORDER THEN A MENU OF FUNCTIONS TO BE PERFORMED IS CREATED. EACH DT07 PORT WILL HAVE A TURN AS MASTER WHILE THE OTHER PORTS ARE SLAVES. THERE ARE TWO MASTER FUNCTIONS AND THREE SLAVE FUNCTIONS; THESE BEING: FUNCTION1 (MASTER) DETECT SELECTED SLAVE REQUEST AND REJECT IT, FUNCTION2 (MASTER) DETECT SELECTED SLAVE REQUEST AND IGNORE IT, FUNCTION3 (SLAVE) SEND REQUEST AND EXPECT REJECTION, FUNCTION4 (SLAVE) SEND REQUEST AND EXPECT CONNECTION, AND FUNCTION5 (SLAVE) OBSERVE REQUEST INDICATORS. IN DT03 MODE BOTH DT07S HAVE A TURN AS MASTER THEN AS SLAVE. THERE ARE TWO MASTER FUNCTIONS AND TWO SLAVE FUNCTIONS; THESE BEING: 1. RECEIVE REQUEST AND RELEASE THE SHARED BUS, 2. SEND REQUEST AND EXPECT REJECTION, 3. SEND REQUEST AND EXPECT CONNECTION, AND 4. DETECT REQUEST AND REJECT IT.

9.3 MANUAL INTERVENTION TEST

THE MANUAL INTERVENTION TEST VERIFIES THE PROPER OPERATION OF CERTAIN DEVICE FEATURES THAT REQUIRE MANUAL ASSISTANCE TO TEST. THIS TEST ALSO REQUIRES THE OPTIONAL MANUAL CONTROL PANEL FOR PROPER OPERATION. THE FEATURES TESTED ARE: MANUAL MODE, PORT POWER OK AND SWITCHED BUS POWER FAIL.

9.4 NPR TEST

THE NPR TEST CHECKS OUT THE NPR LINE ON THE SWITCH BUS.

```
                        $SWR=167400
                        $TN=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  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
(1)
(1)                     ;*MISCELLANEOUS DEFINITIONS
(1)             000011  HT=     11              ;;CODE FOR HORIZONTAL TAB
(1)             000012  LF=     12              ;;CODE FOR LINE FEED
(1)             000015  CR=     15              ;;CODE FOR CARRIAGE RETURN
(1)             000200  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
(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)             000006  SP=R6                   ;;STACK POINTER
(1)             000007  PC=R7                   ;;PROGRAM COUNTER
(1)
(1)                     ;*PRIORITY LEVEL DEFINITIONS
(1)             000000  PR0=    0               ;;PRIORITY LEVEL 0
(1)             000040  PR1=    40              ;;PRIORITY LEVEL 1
(1)             000100  PR2=    100             ;;PRIORITY LEVEL 2
(1)             000140  PR3=    140             ;;PRIORITY LEVEL 3
(1)             000200  PR4=    200             ;;PRIORITY LEVEL 4
(1)             000240  PR5=    240             ;;PRIORITY LEVEL 5
(1)             000300  PR6=    300             ;;PRIORITY LEVEL 6
(1)             000340  PR7=    340             ;;PRIORITY LEVEL 7
(1)
(1)                     ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
(1)             100000  SW15=   100000
(1)             040000  SW14=   40000
(1)             020000  SW13=   20000
(1)             010000  SW12=   10000
(1)             004000  SW11=   4000
(1)             002000  SW10=   2000
(1)             001000  SW09=   1000
(1)             000400  SW08=   400
(1)             000200  SW07=   200
```

```
.MAIN.  MACY11 30A(1052)  16-NOV-81  17:26  PAGE 12-1
CRDTAB.P11    16-NOV-81 17:16          BASIC DEFINITIONS                                    SEQ 0014

(1)             000100                  SW06=   100
(1)             000040                  SW05=   40
(1)             000020                  SW04=   20
(1)             000010                  SW03=   10
(1)             000004                  SW02=   4
(1)             000002                  SW01=   2
(1)             000001                  SW00=   1
(1)                                     .EQUIV  SW09,SW9
(1)                                     .EQUIV  SW08,SW8
(1)                                     .EQUIV  SW07,SW7
(1)                                     .EQUIV  SW06,SW6
(1)                                     .EQUIV  SW05,SW5
(1)                                     .EQUIV  SW04,SW4
(1)                                     .EQUIV  SW03,SW3
(1)                                     .EQUIV  SW02,SW2
(1)                                     .EQUIV  SW01,SW1
(1)                                     .EQUIV  SW00,SW0
(1)
(1)                                     ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
(1)             100000                  BIT15=  100000
(1)             040000                  BIT14=  40000
(1)             020000                  BIT13=  20000
(1)             010000                  BIT12=  10000
(1)             004000                  BIT11=  4000
(1)             002000                  BIT10=  2000
(1)             001000                  BIT09=  1000
(1)             000400                  BIT08=  400
(1)             000200                  BIT07=  200
(1)             000100                  BIT06=  100
(1)             000040                  BIT05=  40
(1)             000020                  BIT04=  20
(1)             000010                  BIT03=  10
(1)             000004                  BIT02=  4
(1)             000002                  BIT01=  2
(1)             000001                  BIT00=  1
(1)                                     .EQUIV  BIT09,BIT9
(1)                                     .EQUIV  BIT08,BIT8
(1)                                     .EQUIV  BIT07,BIT7
(1)                                     .EQUIV  BIT06,BIT6
(1)                                     .EQUIV  BIT05,BIT5
(1)                                     .EQUIV  BIT04,BIT4
(1)                                     .EQUIV  BIT03,BIT3
(1)                                     .EQUIV  BIT02,BIT2
(1)                                     .EQUIV  BIT01,BIT1
(1)                                     .EQUIV  BIT00,BIT0
(1)
(1)                                     ;*BASIC ''CPU'' TRAP VECTOR ADDRESSES
(1)             000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
(1)             000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
(1)             000014                  TBITVEC=14              ;;''T'' BIT
(1)             000014                  TRTVEC= 14              ;;TRACE TRAP
(1)             000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
(1)             000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
(1)             000024                  PWRVEC= 24              ;;POWER FAIL
(1)             000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
(1)             000034                  TRAPVEC=34              ;;''TRAP'' TRAP
```

```
(1)     000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
(1)     000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
(1)     000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
388     177420                  ABASE=177420            ;BASE DT07 BUS ADDRESS EQUATE
389     160350                  AVECT1=160350           ;BASE DT07 PRIORITY & VECTOR ADDRESS EQUATE
390     001124                  GOOD=$GDDAT
391     001126                  BAD=$BDDAT
392     000001                  REQ=BIT0
393     001122                  BADA=$BDADR
394                             .SBTTL  MEMORY MANAGEMENT DEFINITIONS
(1)
(1)                             ;*KT11 VECTOR ADDRESS
(1)
(1)     000250                  MMVEC=  250
(1)
(1)                             ;*KT11 STATUS REGISTER ADDRESSES
(1)
(1)     177572                  SR0=    177572
(1)     177574                  SR1=    177574
(1)     177576                  SR2=    177576
(1)     172516                  SR3=    172516
(1)
(1)                             ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS
(1)
(1)     172300                  KIPDR0= 172300
(1)     172302                  KIPDR1= 172302
(1)     172304                  KIPDR2= 172304
(1)     172306                  KIPDR3= 172306
(1)     172310                  KIPDR4= 172310
(1)     172312                  KIPDR5= 172312
(1)     172314                  KIPDR6= 172314
(1)     172316                  KIPDR7= 172316
(1)
(1)                             ;*KERNEL "I" PAGE ADDRESS REGISTERS
(1)
(1)     172340                  KIPAR0= 172340
(1)     172342                  KIPAR1= 172342
(1)     172344                  KIPAR2= 172344
(1)     172346                  KIPAR3= 172346
(1)     172350                  KIPAR4= 172350
(1)     172352                  KIPAR5= 172352
(1)     172354                  KIPAR6= 172354
(1)     172356                  KIPAR7= 172356
(1)
395                             .SBTTL  TRAP CATCHER
(1)
(1)     000000                          .=0
(1)                             ;*ALL UNUSED LOCATIONS OF THE VECTOR AREA CONTAIN
(1)                             ;*A ".+2, IOT" SEQUENCE TO CATCH AND PROCESS ILLEGAL
(1)                             ;*TRAPS AND INTERRUPTS THAT MIGHT OCCUR.
(1)                             ;*THE IOT TRAP WHICH IS TAKEN ON THE ILLEGAL TRAP/INT
(1)                             ;*TRAPS TO THE $SCOPE ROUTINE WHICH (IF THE RETURN PC IS
(1)                             ;*LESS THAN 1002) JUMPS TO THE $ERROR ROUTINE.
(1)                             ;*THE $ERROR ROUTINE WILL REPORT THE ERROR AS FOLLOWS:
(1)                             ;*      PC=YYYYYY UNEXPECTED TRAP TO XXX
(1)                             ;*AND RETURN TO THE PROGRAM AT PC=YYYYYY+2
```

TRAP CATCHER

SEQ 0016

```
(1)                                     ;*WHERE XXX=LOCATION OF ILLEGAL TRAP
(1)                                     ;*      YYYYYY=PC AT TIME OF TRAP
(1)                                     ;*NOTE: IF THE PROCESSOR IS NOT AN 11/05 THE PROGRAM
(1)                                     ;*      CAN BE STARTED AT ADDRESS 0 AS WELL AS ADDRESS 200.
(1)
(1)  000000  000000                     $40CAT: HALT                    ;;HALT
(1)  000002  000737                             BR      .-100           ;;BRANCH TO 177700 & TIME OUT (NOT ON
(1)                                                                     ;;11/05)
(1)  000004  002612                             .WORD   ROUT3           ;;VECTOR TO STARTING ADDRESS
(1)  000006  000340                             .WORD   340             ;;WITH PRIORITY LEVEL 7
(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 ADDRES(ES)
(1)  000200  000137  002612                     JMP     @#ROUT3 ;;GO TO START OF PROGRAM
```

```
  397                                   .SBTTL  ACT11 HOOKS
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;HOOKS REQUIRED BY ACT11
  (1)           000204                          $SVPC=.                 ;SAVE PC
  (1)           000046                          .=46
  (1)  000046   021640                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
  (1)           000052                          .=52
  (1)  000052   000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
  (1)           000204                          .=$SVPC                 ;; RESTORE PC
  398           001000                          .=1000
  399                                   .SBTTL  APT PARAMETER BLOCK
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
  (2)                                   ;;*****************************************************************
  (1)           001000                          .$X=.   ;;SAVE CURRENT LOCATION
  (1)           000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
  (1)  000024   000200                          200     ;;FOR APT START UP
  (1)           000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
  (1)  000044   001000                          $APTHDR ;;POINT TO APT HEADER BLOCK
  (1)           001000                          .=.$X   ;;RESET LOCATION COUNTER
  (2)                                   ;;*****************************************************************
  (1)                                   ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
  (1)                                   ;INTERFACE SPEC.
  (1)
  (1)  001000                           $APTHD:
  (1)  001000   000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
  (1)  001002   001206                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
  (1)  001004   000017                  $TSTM:  .WORD   15.     ;;RUN TIM OF LONGEST TEST
  (1)  001006   000074                  $PASTM: .WORD   60.     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
  (1)  001010   000000                  $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
  (1)  001012   000052                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
   400                                  .SBTTL  COMMON TAGS
   (1)
   (2)                                  ;;**********************************************************************
   (1)                                  ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
   (1)                                  ;*USED IN THE PROGRAM.
   (1)
   (1)            001100                        .=1100
   (1)  001100                          $CMTAG:                         ;;START OF COMMON TAGS
   (1)  001100  000000                          .WORD   0
   (1)  001102     000                  $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
   (1)  001103     000                  $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
   (1)  001104  000000                  $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
   (1)  001106  000000                  $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
   (1)  001110  000000                  $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
   (1)  001112  000000                  $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
   (1)  001114     000                  $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
   (1)  001115     001                  $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
   (1)  001116  000000                  $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
   (1)  001120  000000                  $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
   (1)  001122  000000                  $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
   (1)  001124  000000                  $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
   (1)  001126  000000                  $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
   (1)  001130  000000                          .WORD   0               ;;RESERVED--NOT TO BE USED
   (1)  001132  000000                          .WORD   0
   (1)  001134     000                  $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
   (1)  001135     000                  $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
   (1)  001136  000000                          .WORD   0
   (1)  001140  177570                  SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
   (1)  001142  177570                  DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
   (1)  001144  177560                  $TKS:   177560                  ;;TTY KBD STATUS
   (1)  001146  177562                  $TKB:   177562                  ;;TTY KBD BUFFER
   (1)  001150  177564                  $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
   (1)  001152  177566                  $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
   (1)  001154     000                  $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
   (1)  001155     002                  $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
   (1)  001156     012                  $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A ''LINE FEED''
   (1)  001157     000                  $TPFLG: .BYTE   0               ;;''TERMINAL AVAILABLE'' FLAG (BIT<07>=0=YES)
   (3)  001160  000000                  $TMP0:  .WORD   0               ;;USER DEFINED
   (3)  001162  000000                  $TMP1:  .WORD   0               ;;USER DEFINED
   (3)  001164  000000                  $TMP2:  .WORD   0               ;;USER DEFINED
   (3)  001166  000000                  $TMP3:  .WORD   0               ;;USER DEFINED
   (3)  001170  000000                  $TMP4:  .WORD   0               ;;USER DEFINED
   (1)  001172  000000                  $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
   (1)  001174  000000                  $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
   (1)  001176  177607  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
   (1)  001202     077                  $QUES:  .ASCII  /?/             ;;QUESTION MARK
   (1)  001203     015                  $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
   (1)  001204  000012                  $LF:    .ASCIZ  <12>            ;;LINE FEED
   (2)                                  ;;**********************************************************************
   (2)                                  .SBTTL  APT MAILBOX-ETABLE
   (2)
   (3)                                  ;;**********************************************************************
   (2)                                  .EVEN
   (2)  001206                          $MAIL:                          ;;APT MAILBOX
   (2)  001206  000000                  $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
   (2)  001210  000000                  $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
```

```
(2)  001212  000000                $TESTN: .WORD   ATESTN  ;;TEST NUMBER
(2)  001214  000000                $PASS:  .WORD   APASS   ;;PASS COUNT
(2)  001216  000000                $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
(2)  001220  000000                $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
(2)  001222  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
(2)  001224  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
(2)  001226                        $ETABLE:                ;;APT ENVIRONMENT TABLE
(2)  001226     000                $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
(2)  001227     000                $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
(2)  001230  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
(2)  001232  000000                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
(2)  001234  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
(2)                                ;*                      BITS 15-11=CPU TYPE
(2)                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
(2)                                ;*                              11/70=06.PDQ=07,Q=10
(2)                                ;*                      BIT 10=REAL TIME CLOCK
(2)                                ;*                      BIT  9=FLOATING POINT PROCESSOR
(2)                                ;*                      BIT  8=MEMORY MANAGEMENT
(2)  001236     000                $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
(2)  001237     000                $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
(2)                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
(2)                                ;*                              900 NSEC CORE=001
(2)                                ;*                              300 NSEC BIPOLAR=002
(2)                                ;*                              500 NSEC MOS=003
(2)  001240  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
(2)                                ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
(2)  001242     000                $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
(2)  001243     000                $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
(2)  001244  000000                $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
(2)  001246     000                $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
(2)  001247     000                $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
(2)  001250  000000                $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
(2)  001252     000                $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
(2)  001253     000                $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
(2)  001254  000000                $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
(2)  001256  160350                $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
(2)  001260  000000                $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
(2)  001262  177420                $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
(2)  001264  000000                $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
(2)  001266  000000                $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
(2)  001270  000000                $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
(2)  001272  000000                $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
(2)  001274  000000                $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
(2)  001276  000000                $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
(2)  001300  000000                $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
(2)  001302  000000                $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
(2)  001304  000000                $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
(2)  001306  000000                $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
(2)  001310  000000                $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
(2)  001312  000000                $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
(2)  001314  000000                $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
(2)  001316  000000                $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
(2)  001320  000000                $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
(2)  001322  000000                $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
(2)  001324  000000                $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
(2)  001326  000000                $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
```

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```
   (2)  001330  000000                $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
   (2)
   (2)
   (2)  001332                         $ETEND:
   (2)
```

```
    (1)                                 .SBTTL  ERROR POINTER TABLE
    (1)
    (1)                                 ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
    (1)                                 ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
    (1)                                 ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
    (1)                                 ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
    (1)                                 ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
    (1)
    (1)                                 ;*      EM              ;;POINTS TO THE ERROR MESSAGE
    (1)                                 ;*      DH              ;;POINTS TO THE DATA HEADER
    (1)                                 ;*      DT              ;;POINTS TO THE DATA
    (1)                                 ;*      DF              ;;POINTS TO THE DATA FORMAT
    (1)
    (1)
    (1)  001332                         $ERRTB:
   401                                  ;ERROR#1
   402  001332  033554                         EM1             ;POST-RESET CONDITIONS NOT MET IN CSR
   403  001334  035005                         DH1
   404  001336  035356                         DT1
   405  001340  000000                         0
   406                                  ;ERROR#2
   407  001342  033622                         EM2             ;READ/WRITE BIT FAILURE IN CSR
   408  001344  035005                         DH1
   409  001346  035356                         DT1
   410  001350  000000                         0
   411                                  ;ERROR#3
   412  001352  033661                         EM3             ;BYTE ACCESS FAILURE IN CSR
   413  001354  035005                         DH1
   414  001356  035356                         DT1
   415  001360  000000                         0
   416                                  ;ERROR#4
   417  001362  033715                         EM4             ;ERROR IN CONNECT PROCESS
   418  001364  035005                         DH1
   419  001366  035356                         DT1
   420  001370  000000                         0
   421                                  ;ERROR#5
   422  001372  033747                         EM5             ;INTERUPT DETECTED WITH INTERUPT ENABLE CLEARED
   423  001374  035005                         DH1
   424  001376  035356                         DT1
   425  001400  000000                         0
   426                                  ;ERROR#6
   427  001402  034027                         EM6             ;COULD NOT CONNECT
   428  001404  035005                         DH1
   429  001406  035356                         DT1
   430  001410  000000                         0
   431                                  ;ERROR#7
   432  001412  034052                         EM7             ;ERROR IN RELEASE PROCESS
   433  001414  035005                         DH1
   434  001416  035356                         DT1
   435  001420  000000                         0
   436                                  ;ERROR#10
   437  001422  034104                         EM10            ;NO INTERUPT DETECTED
   438  001424  035005                         DH1
   439  001426  035356                         DT1
   440  001430  000000                         0
   441                                  ;ERROR#11
```

```
   442  001432  034132                        EM11            ;INTERUPT AT WRONG PRIORITY
   443  001434  035005                        DH1
   444  001436  035356                        DT1
   445  001440  000000                        0
   446                                ;ERROR#12
   447  001442  034166                        EM12            ;CONNECT CONDITION FAILURE
   448  001444  035005                        DH1
   449  001446  035356                        DT1
   450  001450  000000                        0
   451                                ;ERROR#13
   452  001452  034221                        EM13            ;ERROR IN CONNECT FAILURE PROCESS
   453  001454  035005                        DH1
   454  001456  035356                        DT1
   455  001460  000000                        0
   456                                ;ERROR#14
   457  001462  034263                        EM14            ;ERROR IN RELEASE TEST W/C BUSS MASTERSHIP
   458  001464  035005                        DH1
   459  001466  035356                        DT1
   460  001470  000000                        0
   461                                ;ERROR#15
   462  001472  034342                        EM15            ;RELEASE CONDITIONS NOT MET
   463  001474  035005                        DH1
   464  001476  035356                        DT1
   465  001500  000000                        0
   466                                ;ERROR#16
   467  001502  034376                        EM16            ;TMO BIT NOT SET
   468  001504  035005                        DH1
   469  001506  035356                        DT1
   470  001510  000000                        0
   471                                ;ERROR#17
   472  001512  034417                        EM17            ;COULDN'T READ/WRITE EXTERNAL DEVICE
   473  001514  035050                        DH2
   474  001516  035372                        DT2
   475  001520  000000                        0
   476                                ;ERROR#20
   477  001522  034464                        EM20            ;RESET HOLD (HLD) DIDN'T DISABLE RESET
   478  001524  035005                        DH1
   479  001526  035356                        DT1
   480  001530  000000                        0
   481                                ;ERROR#21
   482  001532  034533                        EM21            ;RESET (RST) DIDN'T WORK
   483  001534  035121                        DH3
   484  001536  035406                        DT3
   485  001540  000000                        0
   486                                ;ERROR#22
   487  001542  034564                        EM22            ;RESET-IN-NEUTRAL OPERATION HAS CHANGED
   488  001544  035202                        DH4
   489  001546  035372                        DT2
   490  001550  000000                        0
   491                                ;ERROR+23
   492  001552  027474                        EM23            ;ERROR:NPR DATO NOT DONE
   493  001554  035274                        DH5
   494  001556  035420                        DT4
   495  001560  000000                        0
   496                                ;ERROR+24
   497  001562  027524                        EM24            ;ERROR:NPR DID NOT SET RDY
```

```
   498  001564  035274                        DH5
   499  001566  035420                        DT4
   500  001570  000000                        0
   501                                ;ERROR+25
   502  001572  027556                        EM25          ;ERROR:UBE DID NOT INTERRUPT WHEN NPR FINISHED
   503  001574  035307                        DH6
   504  001576  035424                        DT5
   505  001600  000000                        0
   506                                ;ERROR+26
   507  001602  027634                        EM26          ;ERROR:TWO LOC WRITTEN WHEN ONE NPR AND INT ON DONE ENABLE
   508  001604  035274                        DH5
   509  001606  035420                        DT4
   510  001610  000000                        0
   511                                ;ERROR+27
   512
   513  001612  027726                        EM27          ;ERROR:DEVICE DOESN'T EXIST ON SWITCH BUS
   514  001614  035274                        DH5
   515  001616  035420                        DT4
   516  001620  000000                        0
   517
   518
   519
   520
```

```
                                ;
                                ;       DT07 BUS REGISTER ADDRESS POINTERS
                                ;
001622  177420                  CSR:    177420                  ;COMMAND/STATUS REGISTER
                                ;
                                ;       DT07 VECTOR ADDRESS POINTERS
                                ;
001624  000350                  VEC0:   350                     ;NORMAL INTERRUPT VECTOR
001626  000352                  VEC2:   352                     ;
                                ;
                                ;       DT07 DEVICE LEVEL
                                ;
001630  000340                  PRI:    340
                                ;
                                ;       COMMAND STATUS REGISTER BIT ASSIGNMENTS
                                ;
                                ;       COMMON PROGRAM LOCATION(S)
                                ;
001632  000000                  TSTNUM: 0                       ;CONTAINS TEST NUMBER ON ERROR
                                ;;*****************************************************************
                                ;PROGRAM PARAMETER BLOCK
001634  000000                  DT03:   0000            ;DT03/DT07 MODE INDIACATER,0=DT07
001636  000000                  DEVAD:  0000            ;EXTERNAL DEVICE REGISTER ADDRESS
001640  000000                  DEVRW:  0000            ;READ/WRITE BITS IN ABOVE
001642  000000                  DEVRC:  0000            ;MASK OF RESET CLEARABLE BITS IN ABOVE
001644  177777                  PORTNO: -1              ;THIS PORT'S ID#
001646  177777                  EXPRT1: -1              ;EXTERNAL PORT ID (-1=NO PORT)
001650  177777                  EXPRT2: -1              ;       "       "       "
001652  177777                  EXPRT3: -1              ;       "       "       "
001654  177777                  EXPEND: -1              ;TABLE TERMINATOR
001656  000000                  EXPTCT: 0               ;# OF EXTERNAL PORTS
001660  177777                  SEQ:    -1              ;SEQUENCER
001662  177777                          -1
001664  177777                          -1
001666  177777                          -1
001670  177777                          -1
001672  001660                  SEQPTR: SEQ             ;SEQUENCER POINTER
001674  001662                  NEXENT: SEQ+2           ;NEXT ENTRY POINTER
001676  000011                  MENU:   .BLKW   9.      ;MENU STORAGE
001720  177777                          -1              ;MENU TERMINATOR
001722  000000                  CURFUN: 0               ;CURRANT FUNCTION
001724  000000                  CURID:  0               ;CURRANT SLAVE ID
001726  000000                  CYCLE:  0               ;SUBPASS COUNT
001730  000000                  COVID:  0               ;CONVERTED SLAVE ID
001732  000005                  TEMP1:  .BLKW 5         ;TEMPORARY STORAGE
001744  000000                  ONOFF:  0               ;MASTER/SLAVE INDIACATOR
001746  000000                  TIMA:   0
001750  000000                  TIMB:   0
001752  000000                  KONST:  0
001754  000001                  DLYCON: 1               ;RESET-IN-NEUTRAL CONDITION FLAG
001756  177777                  TRIN:   -1              ;TEST RESET IN NEUTRAL FLAG
001760  000000                  USEPAR: 0               ;USING PARIN FLAG 0=NOT USING
```

```
                                        .SBTTL PROGRAM START
001762                          START:
                                .SBTTL  INITIALIZE THE COMMON TAGS
                                ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
001762  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
001766  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
001770  022706  001140                  CMP     #SWR,R6 ;;DONE?
001774  001374                          BNE     .-6             ;;LOOP BACK IF NO
001776  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                ;;INITIALIZE A FEW VECTORS
002002  012737  032670  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
002010  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
002016  012737  032204  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
002024  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
002032  012737  033370  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
002040  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
002046  012737  033162  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
002054  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
002062  013737  021606  021600          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
002070  005037  001172                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
002074  005037  001174                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
002100  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
002106  012737  002106  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
002114  012737  002114  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                                ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
002122  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
002126  012737  002162  000004          MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
002134  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
002142  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
002150  022777  177777  176762          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
002156  001012                          BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                ;;AND  THE HARDWARE SWR IS NOT = -1
002160  000403                          BR      65$             ;;BRANCH IF NO TIMEOUT
002162  012716  002170          64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
002166  000002                          RTI
002170  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
002176  012737  000174  001142          MOV     #DISPREG,DISPLAY
002204  012637  000004          66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

002210  005037  001214                  CLR     $PASS           ;;CLEAR PASS COUNT
002214  132737  000200  001227          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
002222  001403                          BEQ     67$             ;;YES,USE NON-APT SWITCH
002224  012737  001230  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
002232                          67$:
002232  012737  026444  000004  SETUP1: MOV     #TRAP4,@#ERRVEC         ;POINT TO TRAP ROUTINE
002240  005000                          CLR     R0
002242  013700  001256                  MOV     $VECT1,R0       ;GET PRIORITY LEVEL
002246  042700  000777                  BIC     #777,R0         ;CLEAR UNWANTED BITS
002252  000300                          SWAB    R0
002254  010037  001630                  MOV     R0,PRI  ;SAVE DEVICE LEVEL
                                ;
                                ;       NOW SETUP BUS ADDRESS VALUES
                                ;
002260  013737  001262  001622  SETUP2: MOV     $BASE,CSR       ;STORE  BUS ADDRESS
                                ;
```

```
                                        ;       NOW SETUP VECTOR ADDRESSES
                                        ;
002266  012700  001624                  MOV     #VEC0,R0        ;SETUP VECTOR POINTER
002272  013701  001256                  MOV     $VECT1,R1       ;GET BASE VECTOR ADDR
002276  042701  177000                  BIC     #177000,R1      ;CLEAR UNWANTED BITS
002302  010120                  SETUP3: MOV     R1,(R0)+        ;PUT ADDRS
002304  062701  000002                  ADD     #2,R1           ;INCR.TO NEXT LOC.
002310  022700  001630                  CMP     #VEC2+2,R0      ;DONE ALL LOCATIONS?
002314  001372                          BNE     SETUP3          ;BR,IF NOT DONE
002316  005737  000042                  TST     @#42            ;TEST CHAIN MODE UNDER XXDP
002322  001052                          BNE     1$              ;BR,IF CHAIN MODE
                                        .SBTTL  TYPE PROGRAM NAME
                                        ;;TYPE  THE NAME OF THE PROGRAM IF FIRST PASS
002324  005227  177777                  INC     #-1             ;;FIRST TIME?
002330  001047                          BNE     64$             ;;BRANCH IF NO
002332  022737  021640  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
002340  001443                          BEQ     64$             ;;BRANCH IF YES
002342  104401  002410                  TYPE    ,65$            ;;TYPE ASCIZ STRING
                                        .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
002346  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
002352  001012                          BNE     66$             ;;BRANCH IF YES
002354  123727  001226  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
002362  001406                          BEQ     66$             ;;BRANCH IF YES
002364  023727  001140  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
002372  001005                          BNE     67$             ;;BRANCH IF NO
002374  104406                          GTSWR                   ;;GET SOFT-SWR SETTINGS
002376  000403                          BR      67$
002400  112737  000001  001134  66$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
002406                          67$:
002406  000420                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <CRLF>/MAINDEC-11-CRDTAB  DT07 TEST/<CRLF>
002450                          64$:
002450  005737  001760          1$:     TST     USEPAR          ;PARIN IN USE?
002454  001024                          BNE     RESTRT          ;BR=YES; SKIP OVER DEVICE ADDRESS DEPENDENT CODE
002456  012777  023022  177140          MOV     #OOPS,@VEC0     ;LOAD UNEXPECTED INTERUPT RETURN
002464  012777  000340  177134          MOV     #340,@VEC2      ;SET PRIORITY 7 ON INTERUPT
002472  005077  177124                  CLR     @CSR            ;DETERMINE STATUS OF PWR OK BIT
002476  000005                          RESET                   ;RESET THE BUSS
002500  000240                          NOP
002502  000240                          NOP
002504  000240                          NOP
002506  005037  001752                  CLR     KONST
002512  017737  177104  001752          MOV     @CSR,KONST      ;SAVE CSR
002520  042737  173777  001752          BIC     #173777,KONST   ;MASK EVERYTHING EXCEPT PWR OK
002526  012706  001100          RESTRT: MOV     #STACK,SP       ;RESET STACK POINTER
002532  012737  000002  000512          MOV     #2,@#512        ;PUT RTI IN UBE VECTORS
002540  012737  000002  000516          MOV     #2,@#516        ;DITTO
002546  012737  000002  000522          MOV     #2,@#522        ;DITTO
002554  012737  000002  000526          MOV     #2,@#526        ;DITTO
002562  000177  000104                  JMP     @ROUTE          ;GO DO IT
002566  012737  002676  002672  ROUT1:  MOV     #MONPRT,ROUTE   ;SET UP FOR MONOPORT
002574  000137  001762                  JMP     START
002600  012737  007556  002672  ROUT2:  MOV     #MULPRT,ROUTE   ;SET UP FOR MULTIPORT
002606  000137  001762                  JMP     START
002612  012737  000001  001760  ROUT3:  MOV     #1,USEPAR       ;SET FLAG
002620  012737  024756  002672          MOV     #PARIN,ROUTE    ;SET RETURN
```

GET VALUE FOR SOFTWARE SWITCH REGISTER SEQ 0027

```
                                                CLR     PARFLG  ;CLEAR PARAMETER FLAG
                                                JMP     START
002672                          ROUT4:          MOV     #1$,ROUTE       ;SET UP RETURN
                                                JMP     START
002672                          1$:             MOV     #MANIN,ROUTE    ;SET UP FOR MANUAL INTERVENTION TEST
                                                JSR     PC,DTIME        ;GO GET DEVICE TIMING
                                                JSR     PC,DMODE        ;GO GET DEVICE MODE
                                                JMP     MANIN
                                ROUTE:          MONPRT.                 ;MAIN TEST DISPATCHER
                                TEMP2:          0

                                MONPRT:
                                                JSR     PC,CNTLC        ;IS IT CONTROL C ?
                                                TST     PARFLG
                                                BMI     1$
                                                JSR     PC,GETADR
                                1$:             JSR     PC,DMODE
                                                JSR     PC,DTIME
                                                TST     @#42            ;XXDP CHAINMODE OR APT/ACT?
                                                BNE     TST1            ;SKIP PRINTOUT IF ANYONE OF THE ABOVE
                                                TST     $PASS           ;0 PASSES?
                                                BNE     3$              ;BR=NO
                                                TST     DT03            ;WHAT MODE IS DEVICE?
                                                BEQ     2$              ;BR =DT07 MODE
                                                TYPE    ,65$            ;;TYPE ASCIZ STRING
(1)                                             BR      64$             ;;GET OVER THE ASCIZ
(1)                             ;;65$:          .ASCIZ  <200>/THIS DT07 IS IN DT03 MODE./
(1)                             64$:
                                                BR      3$              ;GO START TESTS
                                2$:
(1)                                             TYPE    ,67$            ;;TYPE ASCIZ STRING
(1)                                             BR      66$             ;;GET OVER THE ASCIZ
(1)                             ;;67$:          .ASCIZ  <200>/THIS DT07 IS PORT# /
(1)                             66$:
                                                MOV     PORTNO,-(SP)    ;;SAVE PORTNO FOR TYPEOUT
(1)                                             TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                                3$:             JSR     PC,WAIT10       ;WAIT ONE SECOND
```

```
                                        .SBTTL

                                        ;;*******************************************************************
                                        ;*TEST 1         TEST POST-RESET BIT PATTERN IN CSR.IDX1
                                        ;;*******************************************************************
003060  000004                  TST1:   SCOPE
003062  012737  000062  001172          MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
003070  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL C?
003074  012737  000340  177776          MOV     #340,PSW        ;RISE PRIORITY
003102  012777  000101  176512          MOV     #101,@CSR       ;SET SOME BITS
003110  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA
003116  000005                          RESET                   ;INIT. BUS
003120  005200                  1$:     INC     R0              ;DELAY AWHILE
003122  001376                          BNE     1$
003124  017737  176472  001126          MOV     @CSR,BAD        ;STORE CONTENTS OF CSR AND
003132  013737  001622  001122          MOV     CSR,BADA        ;ADDRESS
003140  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
003146  001401                          BEQ     2$              ;BR IF OK
003150  104001                          ERROR+1                 ;POST-RESET CONDITIONS NOT MET IN CSR
003152                          2$:                             ;GO TO NEXT TEST
```

```
677                                     ;;*****************************************************************
(3)                                     ;*TEST 2        TEST READ/WRITE BITS IN CSR.IDX2
(3)                                     ;;*****************************************************************
(2)  003152  000004                     TST2:   SCOPE
(1)  003154  012737  000062  001172             MOV     #50.,$TIMES     ;;DO 50. ITERATIONS
678  003162  004737  026620                     JSR     PC,CNTLC        ;IS IT CONTROL C?
679
680  003166  012737  000340  177776             MOV     #340,PSW        ;LOCKOUT INTERUPTS
681  003174  005077  176422                     CLR     @CSR            ;ZERO CSR
682  003200  013737  001752  001124     1$:     MOV     KONST,GOOD      ;STORE GOOD DATA
683  003206  062737  000001  001124             ADD     #1,GOOD
684  003214  012737  003200  001110             MOV     #1$,$LPERR      ;SET LOOP-ON-ERROR ADDRESS
685  003222  013777  001124  176372             MOV     GOOD,@CSR       ;SET BIT PATTERN
686  003230  017737  176366  001126             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
687  003236  042737  120600  001126             BIC     #120600,BAD     ;MASK THE CONNECT PROCESS INDIACATORS
688  003244  042737  000074  001126             BIC     #74,BAD         ;MASK RQ0-3
689  003252  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
690  003260  001401                             BEQ     3$              ;BR IF OK
691  003262  104002                             ERROR+2                 ;READ/WRITE BIT FAILURE IN CSR
692  003264  013737  001752  001124     3$:     MOV     KONST,GOOD      ;STORE GOOD DATA
693  003272  062737  000100  001124             ADD     #100,GOOD
694  003300  012737  003264  001110             MOV     #3$,$LPERR      ;SET LOOP-ON-ERROR ADDRESS
695  003306  013777  001124  176306             MOV     GOOD,@CSR       ;SET BIT PATTERN
696  003314  017737  176302  001126             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
697  003322  042737  120600  001126             BIC     #120600,BAD     ;MASK THE CONNECT PROCESS INDIACATORS
698  003330  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
699  003336  001401                             BEQ     4$              ;BR IF OK
700  003340  104002                             ERROR+2                 ;READ/WRITE BIT FAILURE IN CSR
701  003342  013737  001752  001124     4$:     MOV     KONST,GOOD      ;STORE GOOD DATA
702  003350  012737  003342  001110             MOV     #4$,$LPERR      ;SET LOOP-ON-ERROR ADDRESS
703  003356  013777  001124  176236             MOV     GOOD,@CSR       ;SET BIT PATTERN
704  003364  017737  176232  001126             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
705  003372  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
706  003400  001401                             BEQ     5$              ;BR IF OK
707  003402  104002                             ERROR+2                 ;READ/WRITE BIT FAILURE IN CSR
708  003404                             5$:                              ;GO TO NEXT TEST
```

```
                                        ;;*************************************************************************
                                        ;*TEST 3         TEST OF BYTE ACCESS IN CSR.IDX3
                                        ;;*************************************************************************
003404  000004                  TST3:   SCOPE
003406  012737  000012  001172          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
003414  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTRL C?

003420  005077  176176                  CLR     @CSR            ;CLEAR CONTENTS OF CSR
003424  013700  001622                  MOV     CSR,R0          ;STORE ADDRESS OF CSR
003430  112710  000376                  MOVB    #376,@R0        ;TRY TO LOAD LOW ORDER BYTE
003434  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA
003442  062737  000100  001124          ADD     #100,GOOD
003450  011037  001126                  MOV     @R0,BAD         ;STORE BAD DATA
003454  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
003462  001401                          BEQ     2$              ;BR IF OK
003464  104003                          ERROR+3                 ;LOW BYTE ACCESS FAILURE IN CSR
003466  005077  176130          2$:     CLR     @CSR            ;CLEAR CSR
003472  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA (PWR OK)
003500  112760  000377  000001          MOVB    #377,1(R0)      ;TRY LOADING HI ORDER BYTE OF CSR
003506  011037  001126                  MOV     @R0,BAD         ;STORE CONTENTS OF CSR
003512  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
003520  001401                          BEQ     3$              ;BR IF OK
003522  104003                          ERROR+3                 ;HI-BYTE ACCESS FAILURE IN CSR
003524                          3$:                             ;GO TO NEXT TEST
```

```
                                        ;;*************************************************************************
                                        ;*TEST 4         CONNECT TEST WITHOUT INTERUPT ENABLE.IDX4
                                        ;;*************************************************************************
003524  000004                  TST4:   SCOPE
003526  012737  000012  001172          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
003534  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL  C?

003540  005000                  1$:     CLR     R0              ;SET DELAY TIMER
003542  012737  000000  177776          MOV     #0,PSW          ;LOWER PRIORITY
003550  005077  176046                  CLR     @CSR            ;CLEAR CSR
003554  012777  003736  176042          MOV     #8$,@VEC0       ;SET RETURN
003562  012737  000340  177776          MOV     #340,PSW        ;RISE PRIORITY
003570  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,REQ)
003576  062737  020001  001124          ADD     #20001,GOOD
003604  005737  001634                  TST     DT03            ;DT03 MODE?
003610  001003                          BNE     11$             ;BR IF DT03
003612  062737  000400  001124          ADD     #400,GOOD       ;SET BRQ IF DT07
003620  012777  000001  175774  11$:    MOV     #REQ,@CSR       ;SET REQ (BIT0)
003626  017737  175770  001126  2$:     MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
003634  042737  000074  001126          BIC     #74,BAD         ;MASK RQ0-3
003642  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
003650  001403                          BEQ     5$              ;BR IF OK
003652  005200                          INC     R0              ;DELAY
003654  001364                          BNE     2$              ;BR IF NOT DONE
003656  104004                          ERROR+4                 ;SWB ACT (BIT13),BRQ OR REQ NOT SET
003660  012737  000000  177776  5$:     MOV     #0,PSW          ;LOWER PRIORITY
003666  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,CON,REQ)
003674  062737  020201  001124          ADD     #20201,GOOD
003702  005000                          CLR     R0              ;RESET DELAY
003704  017737  175712  001126  6$:     MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
003712  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
003720  001403                          BEQ     7$              ;BR IF OK
003722  005200                          INC     R0              ;DELAY
003724  001367                          BNE     6$              ;BR IF NOT DONE
003726  104004                          ERROR+4                 ;CON(BIT7) NOT SET
003730  005077  175666          7$:     CLR     @CSR            ;CLEAR CSR AND DISCONNECT
003734  000406                          BR      9$              ;EXIT
003736                          8$:
003736  012600                  MOV     (SP)+,R0                ;;POP STACK INTO R0
003740  012600                  MOV     (SP)+,R0                ;;POP STACK INTO R0
003742  017737  175654  001126          MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
003750  104005                          ERROR+5                 ;INTERUPT DETECTED WITH INTERUPT ENABLE CLEARED
003752  012777  023022  175644  9$:     MOV     #OOPS,@VEC0     ;RESET RETURN
                                        ;GO TO NEXT TEST
```

```
                                        ;;*************************************************************************
                                        ;*TEST 5         RELEASE TEST WITHOUT INTERUPT ENABLE.IDX5
                                        ;;*************************************************************************
(2) 003760 000004                       TST5:   SCOPE
(1) 003762 012737 000012 001172                 MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
774 003770 004737 026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
775
776 003774 005000                       1$:     CLR     R0              ;SET DELAY TIMER
777 003776 012777 000001 175616                 MOV     #1,@CSR         ;CONNECT
778 004004 013737 001752 001124                 MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,CON,REQ)
779 004012 062737 020201 001124                 ADD     #20201,GOOD
780 004020 012737 000000 177776                 MOV     #0,PSW          ;DROP PRIORITY
781 004026 017737 175570 001126 2$:             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
782 004034 023737 001124 001126                 CMP     GOOD,BAD        ;COMPARE
783 004042 001404                               BEQ     3$              ;BR IF CONNECTED
784 004044 005200                               INC     R0              ;DELAY
785 004046 001367                               BNE     2$              ;BR IF NOT DONE
786 004050 104006                               ERROR+6                 ;COULD NOT CONNECT
787 004052 000461                               BR      7$              ;EXIT TEST
788 004054 012777 004220 175542 3$:             MOV     #8$,@VEC0       ;SET RETURN
789 004062 012737 000340 177776                 MOV     #340,PSW        ;RISE PRIORITY
790 004070 005000                               CLR     R0              ;SET DELAY TIMER
791 004072 042777 000001 175522                 BIC     #REQ,@CSR       ;CLEAR REQUEST
792 004100 013737 001752 001124                 MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,CON)
793 004106 062737 020200 001124                 ADD     #20200,GOOD
794 004114 005737 001634                        TST     DT03            ;DT03 MODE?
795 004120 001003                               BNE     4$              ;BR IF YES
796 004122 062737 000400 001124                 ADD     #400,GOOD       ;ADD BRQ IF DT07
797 004130 017737 175466 001126 4$:             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
798 004136 023737 001124 001126                 CMP     GOOD,BAD        ;COMPARE
799 004144 001403                               BEQ     5$              ;BR IF OK
800 004146 005200                               INC     R0              ;DELAY
801 004150 001367                               BNE     4$              ;BR IF NOT DONE
802 004152 104007                               ERROR+7                 ;BRQ NOT SET OR REQ NOT CLEARED
803 004154 012737 000000 177776 5$:             MOV     #0,PSW          ;DROP PRIORITY
804 004162 013737 001752 001124                 MOV     KONST,GOOD      ;STORE GOOD DATA (PWR OK)
805 004170 005000                               CLR     R0              ;RESET DELAY
806 004172 017737 175424 001126 6$:             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
807 004200 023737 001124 001126                 CMP     GOOD,BAD        ;COMPARE
808 004206 001403                               BEQ     7$              ;BR IF OK
809 004210 005200                               INC     R0              ;DELAY
810 004212 001367                               BNE     6$              ;BR IF NOT DONE
811 004214 104007                               ERROR+7                 ;CON OR SWB ACT NOT CLEARED
812 004216 000406                       7$:     BR      9$              ;EXIT
813 004220                              8$:
(2) 004220 012600                               MOV     (SP)+,R0        ;;POP STACK INTO R0
(2) 004222 012600                               MOV     (SP)+,R0        ;;POP STACK INTO R0
814 004224 017737 175372 001126                 MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
815 004232 104005                               ERROR+5                 ;INTERUPPT DETECTED WITH INTERUPT ENABLE CLRD
816 004234 012777 023022 175362 9$:             MOV     #OOPS,@VEC0     ;RESET RETURN
817                                                                     ;GO TO NEXT TEST
```

```
819                                     ;;*****************************************************************
(3)                                     ;*TEST 6        CONNECT FAILURE TEST WITHOUT INTERUPT ENABLE.IDX6
(3)                                     ;;*****************************************************************
(2)  004242  000004                     TST6:   SCOPE
(1)  004244  012737  000012  001172             MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
820  004252  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
821
822  004256  005000                     1$:     CLR     R0              ;SET DELAY TIMER
823  004260  012737  000000  177776             MOV     #0,PSW          ;LOWER PRIORITY
824  004266  005077  175330                    CLR     @CSR            ;CLEAR CSR
825  004272  012777  004524  175324             MOV     #8$,@VEC0       ;SET RETURN
826  004300  012737  000340  177776             MOV     #340,PSW        ;RISE PRIORITY
827  004306  013737  001752  001124             MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,REQ)
828  004314  062737  020001  001124             ADD     #20001,GOOD
829  004322  005737  001634                    TST     DT03            ;DT03 MODE?
830  004326  001003                             BNE     11$             ;BR IF DT03
831  004330  062737  000400  001124             ADD     #400,GOOD       ;ADD BRQ IF DT07
832  004336  012777  000001  175256  11$:      MOV     #REQ,@CSR       ;SET REQ (BIT0)
833  004344  017737  175252  001126  2$:       MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
834  004352  042737  000074  001126             BIC     #74,BAD         ;MASK RQ0-3
835  004360  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
836  004366  001403                             BEQ     3$              ;BR IF OK
837  004370  005200                             INC     R0              ;DELAY
838  004372  001364                             BNE     2$              ;BR IF NOT DONE
839  004374  104013                             ERROR+13                        ;SWB ACT (BIT13) OR REQ NOT SET
840  004376  005737  001634          3$:        TST     DT03            ;DT03 MODE?
841  004402  001024                             BNE     5$              ;BR IF YES
842  004404  013737  001752  001124             MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,BRQ,REQ)
843  004412  062737  020401  001124             ADD     #20401,GOOD
844  004420  005000                             CLR     R0              ;RESET DELAY
845  004422  017737  175174  001126  4$:       MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
846  004430  042737  000074  001126             BIC     #74,BAD         ;MASK RQ0-3
847  004436  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
848  004444  001403                             BEQ     5$              ;BR IF OK
849  004446  005200                             INC     R0              ;DELAY
850  004450  001364                             BNE     4$              ;BR IF NOT DONE
851  004452  104013                             ERROR+13                        ;BRQ(BIT8) DID NOT SET
852  004454  013737  001752  001124  5$:       MOV     KONST,GOOD      ;STORE GOOD DATA (TMO,PWR OK)
853  004462  062737  100000  001124             ADD     #100000,GOOD
854  004470  005000                             CLR     R0              ;RESET DELAY
855  004472  017737  175124  001126  6$:       MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
856  004500  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
857  004506  001403                             BEQ     7$              ;BR IF OK
858  004510  005200                             INC     R0              ;DELAY
859  004512  001367                             BNE     6$              ;BR IF NOT DONE
860  004514  104013                             ERROR+13                        ;TMO(BIT15) NOT SET
861  004516  005077  175100          7$:        CLR     @CSR            ;CLEAR CSR AND DISCONNECT
862  004522  000407                             BR      9$              ;EXIT
863  004524                           8$:
(2)  004524  012600                             MOV     (SP)+,R0        ;;POP STACK INTO R0
(2)  004526  012600                             MOV     (SP)+,R0        ;;POP STACK INTO R0
864  004530  017737  175066  001126             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
865  004536  104005                             ERROR+5                 ;INTERUPT DETECTED WITH INTERUPT ENABLE CLEARED
866  004540  000766                             BR      7$              ;GO CLEAR CSR
867  004542  012777  023022  175054  9$:       MOV     #OOPS,@VEC0     ;RESET RETURN
868                                             ;GO TO NEXT TEST
```

```
                                        ;;*****************************************************************
                                        ;*TEST 7        RELEASE TEST WITHOUT BUS MASTERSHIP OR INTERUPT ENABLE.IDX7
                                        ;;*****************************************************************
004550  000004                 TST7:    SCOPE
004552  012737  000012  001172          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
004560  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL C?

004564  005000                 1$:      CLR     R0              ;SET DELAY TIMER
004566  012777  000001  175026          MOV     #1,@CSR         ;CONNECT
004574  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,CON,REQ)
004602  062737  020201  001124          ADD     #20201,GOOD
004610  012737  000000  177776          MOV     #0,PSW          ;DROP PRIORITY
004616  017737  175000  001126  2$:     MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
004624  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
004632  001404                          BEQ     3$              ;BR IF CONNECTED
004634  005200                          INC     R0              ;DELAY
004636  001367                          BNE     2$              ;BR IF NOT DONE
004640  104006                          ERROR+6                 ;COULD NOT CONNECT
004642  000461                          BR      7$              ;EXIT TEST
004644  012777  005010  174752  3$:     MOV     #8$,@VEC0       ;SET RETURN
004652  012737  000340  177776          MOV     #340,PSW        ;RISE PRIORITY
004660  005000                          CLR     R0              ;SET DELAY TIMER
004662  042777  000001  174732          BIC     #REQ,@CSR       ;CLEAR REQUEST
004670  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,CON)
004676  062737  020200  001124          ADD     #20200,GOOD
004704  005737  001634                  TST     DT03            ;DT03 MODE?
004710  001003                          BNE     4$              ;BR IF YES
004712  062737  000400  001124          ADD     #400,GOOD       ;ADD BRQ IF DT07
004720  017737  174676  001126  4$:     MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
004726  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
004734  001403                          BEQ     5$              ;BR IF OK
004736  005200                          INC     R0              ;DELAY
004740  001367                          BNE     4$              ;BR IF NOT DONE
004742  104014                          ERROR+14                        ;BRQ NOT SET OR REQ NOT CLEARED
004744  013737  001752  001124  5$:     MOV     KONST,GOOD      ;STORE GOOD DATA (TMO,PWR OK)
004752  062737  100000  001124          ADD     #100000,GOOD
004760  005000                          CLR     R0              ;RESET DELAY
004762  017737  174634  001126  6$:     MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
004770  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
004776  001403                          BEQ     7$              ;BR IF OK
005000  005200                          INC     R0              ;DELAY
005002  001367                          BNE     6$              ;BR IF NOT DONE
005004  104014                          ERROR+14                        ;TMO NOT SET
005006  000406                  7$:     BR      9$              ;EXIT
005010                          8$:
005010  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
005012  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
005014  017737  174602  001126          MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
005022  104005                          ERROR+5                 ;INTERUPPT DETECTED WITH INTERUPT ENABLE CLRD
005024  012777  023022  174572  9$:     MOV     #OOPS,@VEC0     ;RESET RETURN
                                                                ;GO TO NEXT TEST
```

```
                                        ;;*****************************************************************
                                        ;*TEST 10        CONNECT TEST.IDX8
                                        ;;*****************************************************************
005032  000004                  TST10:  SCOPE
005034  012737  000012  001172          MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
005042  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL C?

005046  005077  174550                  CLR     @CSR            ;CLEAR CSR
005052  012737  000340  177776          MOV     #340,PSW        ;RISE PRIORITY
005060  013737  001630  001124          MOV     PRI,GOOD        ;STORE PRIORITY LEVEL
005066  012737  000340  001126          MOV     #340,BAD        ;STORE ACTUAL PRIORITY INDIACATOR
005074  012777  005150  174522          MOV     #2$,@VEC0       ;SET RETURN
005102  012777  000101  174512          MOV     #101,@CSR       ;SET I.E. AND REQ
005110  032777  020000  174504          BIT     #20000,@CSR     ;WAIT FOR SWB ACT TO APPEAR
005116  001774                          BEQ     .-6             ;BR IF NOT THERE
005120  162737  000040  177776  1$:     SUB     #40,PSW         ;LOWER PRIORITY UNTIL INTERUPTED
005126  000240                          NOP
005130  000240                          NOP
005132  000240                          NOP
005134  162737  000040  001126          SUB     #40,BAD         ;  "       "      INDIACATOR
005142  001366                          BNE     1$              ;BR UNTIL DONE
005144  104010                          ERROR+10                ;NO INTERUPT DETECTED
005146  000425                          BR      4$              ;EXIT
005150                          2$:
005150  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
005152  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
005154  023737  001124  001126          CMP     GOOD,BAD        ;CORRECT BREAK LEVEL?
005162  001401                          BEQ     3$              ;BR IF OK
005164  104011                          ERROR+11                ;INTERUPT AT WRONG PRIORITY
005166  017737  174430  001126  3$:     MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
005174  013737  001752  001124          MOV     KONST,GOOD      ;STORE GOOD DATA (SWB ACT,PWR OK,CON,IE,REQ)
005202  062737  020301  001124          ADD     #20301,GOOD
005210  023737  001124  001126          CMP     GOOD,BAD        ;COMPARE
005216  001401                          BEQ     4$              ;BR IF OK
005220  104012                          ERROR+12                ;CONNECT CONDITION FAILURE
005222  005077  174374          4$:     CLR     @CSR            ;CLEAR CSR
005226  005037  177776                  CLR     PSW             ;LOWER PRIORITY
005232  012777  023022  174364  5$:     MOV     #OOPS,@VEC0     ;RESET RETURN
                                        ;GO TO NEXT TEST
```

```
952
953                                     ;;*****************************************************************
(3)                                     ;*TEST 11        RELEASE TEST .IDX9
(3)                                     ;;*****************************************************************
(2)  005240  000004                     TST11:  SCOPE
(1)  005242  012737  C00012  001172             MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
954  005250  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
955
956  005254  005000                     1$:     CLR     R0              ;SET DELAY TIMER
957  005256  012777  000001  174336             MOV     #1,@CSR         ;CONNECT
958  005264  013737  001752  001124             MOV     KONST,GOOD
959  005272  062737  020201  001124             ADD     #20201,GOOD     ;STORE GOOD DATA (SWB ACT,PWR OK,CON,REQ)
960  005300  012737  000000  177776             MOV     #0,PSW          ;DROP PRIORITY
961  005306  017737  174310  001126  2$:        MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
962  005314  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
963  005322  001404                             BEQ     3$              ;BR IF CONNECTED
964  005324  005200                             INC     R0              ;DELAY
965  005326  001367                             BNE     2$              ;BR IF NOT DONE
966  005330  104006                             ERROR+6                 ;COULD NOT CONNECT
967  005332  000422                             BR      7$              ;EXIT TEST
968  005334  005737  001634             3$:     TST     DT03            ;DT03 MODE?
969  005340  001420                             BEQ     8$              ;BR=NO
970  005342  005000                             CLR     R0              ;SET DELAY TIMER
971  005344  042777  000001  174250             BIC     #REQ,@CSR       ;CLEAR REQUEST
972  005352  013737  001752  001124  5$:        MOV     KONST,GOOD      ;STORE GOOD DATA (PWR OK)
973  005360  017737  174236  001126  6$:        MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
974  005366  023737  001124  001126             CMP     GOOD,BAD        ;COMPARE
975  005374  001401                             BEQ     7$              ;BR IF OK
976  005376  104015                             ERROR+15                ;RELEASE CONDITIONS NOT MET
977  005400  000446                     7$:     BR      10$             ;GO TO NEXT TEST
978  005402  012777  005456  174214     8$:     MOV     #9$,@VEC0       ;SET RETURN
979  005410  052777  000100  174204             BIS     #100,@CSR       ;SET I.E.
980  005416  042777  000001  174176             BIC     #1,@CSR         ;CLR REQ.
981  005424  004737  022010                    JSR     PC,WAIT05       ;GO WAIT
982  005430  013737  001752  001124             MOV     KONST,GOOD      ;LOAD GOOD
983  005436  062737  000100  001124             ADD     #100,GOOD
984  005444  017737  174152  001126             MOV     @CSR,BAD
985  005452  104010                             ERROR+10                ;NO INTERUPT
986  005454  000420                             BR      10$             ;EXIT
987  005456  012706  001100             9$:     MOV     #STACK,SP       ;RESET STACK
988  005462  013737  001752  001124             MOV     KONST,GOOD      ;LOAD GOOD
989  005470  062737  000100  001124             ADD     #100,GOOD
990  005476  017737  174120  001126             MOV     @CSR,BAD
991  005504  023737  001124  001126             CMP     GOOD,BAD
992  005512  001401                             BEQ     10$
993  005514  104015                             ERROR+15
994  005516  005077  174100             10$:    CLR     @CSR            ;CLEAR AND DISCONNECT
995  005522  012777  023022  174074             MOV     #OOPS,@VEC0     ;RESET RETURN
```

```
  997
  998                                   ;;*****************************************************************
  (3)                                   ;*TEST 12       CONNECT FAILURE TEST.IDX10
  (3)                                   ;;*****************************************************************
  (2) 005530  000004                    TST12:  SCOPE
  (1) 005532  012737  000012  001172            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
  999 005540  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
 1000
 1001 005544  005077  174052                    CLR     @CSR            ;CLEAR CSR
 1002 005550  012737  000340  177776            MOV     #340,PSW        ;RISE PRIORITY
 1003 005556  005000                            CLR     R0              ;SET DELAY TIMER
 1004 005560  012777  005672  174036            MOV     #2$,@VEC0       ;SET RETURN
 1005 005566  013737  001752  001124            MOV     KONST,GOOD
 1006 005574  062737  100100  001124            ADD     #100100,GOOD    ;STORE GOOD DATA (TMO,PWR OK,IE)
 1007 005602  005737  001634                    TST     DT03            ;DT03 MODE?
 1008 005606  001003                            BNE     6$              ;BR IF DT03
 1009 005610  062737  000400  001124            ADD     #400,GOOD       ;ADD BRQ IF DT07
 1010 005616  012777  000101  173776  6$:       MOV     #101,@CSR       ;SET I.E. AND REQ
 1011 005624  017737  173772  001126  1$:       MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1012 005632  023737  001124  001126            CMP     GOOD,BAD        ;COMPARE
 1013 005640  001404                            BEQ     11$             ;BR IF OK
 1014 005642  005200                            INC     R0              ;DELAY
 1015 005644  001367                            BNE     1$              ;BR IF NOT DONE
 1016 005646  104016                            ERROR+16                ;TMO NOT SET
 1017 005650  000414                            BR      5$              ;EXIT
 1018 005652  005000                    11$:    CLR     R0              ;RESET DELAY
 1019 005654  012737  000000  177776            MOV     #0,PSW          ;DROP PRIORITY
 1020 005662  005200                    22$:    INC     R0              ;DELAY
 1021 005664  001376                            BNE     22$             ;BR IF NOT DONE
 1022 005666  104010                            ERROR+10                ;NO INTERUPT DETECTED
 1023 005670  000404                            BR      5$              ;EXIT
 1024 005672                            2$:
  (2) 005672  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2) 005674  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
 1025 005676  005077  173720            4$:     CLR     @CSR            ;CLEAR CSR
 1026 005702  012777  023022  173714    5$:     MOV     #OOPS,@VEC0     ;RESET RETURN
 1027                                           ;GO TC NEXT TEST
```

```
 1029
 1030                                   ;;*********************************************************************
  (3)                                   ;*TEST 13       RELEASE TEST WITHOUT BUSS MASTERSHIP.IDX11
  (3)                                   ;;*********************************************************************
  (2) 005710  000004                    TST13:  SCOPE
  (1) 005712  012737  000012  001172            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
 1031 005720  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
 1032
 1033 005724  005000                    1$:     CLR     R0              ;SET DELAY TIMER
 1034 005726  012777  000001  173666            MOV     #1,@CSR         ;CONNECT
 1035 005734  013737  001752  001124            MOV     KONST,GOOD
 1036 005742  062737  020201  001124            ADD     #20201,GOOD     ;STORE GOOD DATA (SWB ACT,PWR OK,CON,REQ)
 1037 005750  012737  000000  177776            MOV     #0,PSW          ;DROP PRIORITY
 1038 005756  017737  173640  001126  2$:      MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1039 005764  023737  001124  001126            CMP     GOOD,BAD        ;COMPARE
 1040 005772  001404                           BEQ     3$              ;BR IF CONNECTED
 1041 005774  005200                           INC     R0              ;DELAY
 1042 005776  001367                           BNE     2$              ;BR IF NOT DONE
 1043 006000  104006                           ERROR+6                 ;COULD NOT CONNECT
 1044 006002  000461                           BR      7$              ;EXIT TEST
 1045 006004  012777  006142  173612  3$:      MOV     #6$,@VEC0       ;SET RETURN
 1046 006012  012737  000340  177776            MOV     #340,PSW        ;RISE PRIORITY
 1047 006020  005000                           CLR     R0              ;SET DELAY TIMER
 1048 006022  012777  000100  173572            MOV     #100,@CSR       ;CLEAR REQUEST AND SET IE
 1049 006030  017737  173566  001126  4$:      MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1050 006036  013737  001752  001124            MOV     KONST,GOOD
 1051 006044  062737  100100  001124            ADD     #100100,GOOD    ;STORE GOOD DATA(TMO,PWR OK,IE)
 1052 006052  005737  001634                    TST     DT03            ;DT03 MODE?
 1053 006056  001003                           BNE     41$             ;BR IF DT03
 1054 006060  062737  000400  001124            ADD     #400,GOOD       ;ADD BRQ IF DT07
 1055 006066  023737  001124  001126  41$:      CMP     GOOD,BAD        ;COMPARE
 1056 006074  001404                           BEQ     5$              ;BR IF OK
 1057 006076  005200                           INC     R0              ;DELAY
 1058 006100  001353                           BNE     4$              ;BR IF NOT DONE
 1059 006102  104016                           ERROR+16                ;TMO NOT SET
 1060 006104  000420                           BR      7$              ;EXIT
 1061 006106  013737  001752  001124  5$:      MOV     KONST,GOOD
 1062 006114  062737  100100  001124            ADD     #100100,GOOD    ;STORE GOOD DATA (TMO,PWR OK,IE)
 1063 006122  005000                           CLR     R0              ;RESET DELAY
 1064 006124  012737  000000  177776            MOV     #0,PSW          ;DROP PRIORITY
 1065 006132  005200                    51$:    INC     R0              ;DELAY
 1066 006134  001376                           BNE     51$             ;BR IF NOT DONE
 1067 006136  104010                           ERROR+10                ;NO INTERUPT
 1068 006140  000402                           BR      7$              ;EXIT
 1069 006142                            6$:
  (2) 006142  012600                           MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2) 006144  012600                           MOV     (SP)+,R0        ;;POP STACK INTO R0
 1070 006146  012777  023022  173450  7$:      MOV     #OOPS,@VEC0     ;RESET RETURN
 1071                                                                   ;GO TO NEXT TEST
```

```
 1073
 1074
 1075                                   ;;*********************************************************************
  (3)                                   ;*TEST 14        RESET (RST) TEST.IDX12
  (3)                                   ;;*********************************************************************
  (2) 006154  000004                    TST14:  SCOPE
  (1) 006156  012737  000012  001172            MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
 1076 006164  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
 1077
 1078 006170  005737  001214                    TST     $PASS           ;FIRST PASS?
 1079 006174  001562                            BEQ     5$              ;SKIP TEST ON FIRST PASS
 1080 006176  005737  001754                    TST     DEVCON          ;RESET IN NEUTRAL?
 1081 006202  100557                            BMI     5$              ;BR=NO RESET IN NEUTRAL
 1082 006204  005737  001636                    TST     DEVAD           ;IS A DEVICE REGISTER PRESENT?
 1083 006210  001554                            BEQ     5$              ;EXIT IF NOT
 1084 006212  005737  0C1642                    TST     DEVRC           ;RESETABLE BITS PRESENT?
 1085 006216  001551                            BEQ     5$              ;BR=NO SO EXIT
 1086 006220  012737  000000  177776            MOV     #0,PSW          ;DROP PRIORITY
 1087 006226  012777  000001  173366            MOV     #REQ,@CSR       ;CONNECT
 1088 006234  105777  173362            1$:     TSTB    @CSR            ;CONNECTED?
 1089 006240  100417                            BMI     2$              ;BR IF YES
 1090 006242  005777  173354                    TST     @CSR            ;TIMEOUT?
 1091 006246  100372                            BPL     1$              ;BR IF NOT
 1092 006250  017737  173346  001126            MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1093 006256  013737  001752  001124            MOV     KONST,GOOD
 1094 006264  062737  020201  001124            ADD     #20201,GOOD     ;STORE GOOD DATA(SWB ACT,PWR OK,CON,REQ)
 1095 006272  104006                            ERROR+6                 ;COULDN'T CONNECT
 1096 006274  000137  006542                    JMP     5$
 1097
 1098 006300  004737  026562            2$:     JSR     PC,CKADR        ;GO CHECK DEVICE ADDRESS EXIST?
 1099 006304  005737  026560                    TST     FLAG            ;IF FLAG=1,TRAPPED
 1100 006310  001403                            BEQ     20$
 1101 006312  104027                            ERROR+27
 1102 006314  000137  006542                    JMP     5$              ;EXIT
 1103 006320                            20$:
 1104 006320  013777  001640  173310            MOV     DEVRW,@DEVAD    ;SET READ/WRITE BITS IN EXTERNAL DEVICE REGISTER
 1105 006326  017737  173304  001126            MOV     @DEVAD,BAD      ;STORE CONTENTS OF DEVAD
 1106 006334  005137  001640                    COM     DEVRW           ;COMPLEMENT R/W BITS
 1107 006340  043737  001640  001126            BIC     DEVRW,BAD       ;CLEAR OUT BITS NOT UNDER TEST
 1108 006346  005137  001640                    COM     DEVRW           ;RESTORE ORIGINAL PATTERN
 1109 006352  023737  001640  001126            CMP     DEVRW,BAD       ;DID THEY SET?
 1110 006360  001402                            BEQ     3$              ;BR IF YES
 1111 006362  104017                            ERROR+17                ;COULDN'T SET READ/WRITE BITS IN DEVAD
 1112 006364  000466                            BR      5$              ;EXIT
 1113 006366  052777  001000  173226    3$:     BIS     #1000,@CSR      ;SET RST
 1114 006374  012737  000002  022062            MOV     #2,TOCK         ;SET UP FOR 22MSEC COUNT
 1115 006402  004737  022022                    JSR     PC,WAIT
 1116 006406  032777  001000  173206    31$:    BIT     #1000,@CSR      ;STILL SET?
 1117 006414  001430                            BEQ     4$              ;BR=NO
 1118 006416  104401  006424                    TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1) 006422  000424                            BR      64$             ;;GET OVER THE ASCIZ
  (1)                                   ;;65$:  .ASCIZ  <200>/ERROR! RST(BIT9) DIDN'T CLEAR IN TIME./
  (1) 006474                            64$:
 1119 006474  000000                            HALT
 1120 006476  017737  173134  001126    4$:     MOV     @DEVAD,BAD      ;STORE CONTENTS OF DEVAD
 1121 006504  033737  001642  001126            BIT     DEVRC,BAD       ;RESET CONDITIONS MET?
```

```
 1122  006512  001413                          BEQ     5$              ;BR IF YES
 1123  006514  005200                          INC     R0              ;WAIT AWHILE
 1124  006516  001367                          BNE     4$
 1125  006520  013737  001642  001124          MOV     DEVRC,GOOD      ;SAVE DEVRC
 1126  006526  005137  001124                  COM     GOOD
 1127  006532  043737  001124  001126          BIC     GOOD,BAD        ;HI LITE BAD BITS
 1128  006540  104021                          ERROR+21                ;RESET (RST) DIDN'T WORK
 1129  006542  005077  173054          5$:     CLR     @CSR            ;SHUT DOWN AND GO TO NEXT TEST
```

```
 1131
 1132                                   ;;*********************************************************************
  (3)                                   ;*TEST 15        RESET HOLD (HLD) TEST.IDX13
  (3)                                   ;;*********************************************************************
  (2) 006546 000004                     TST15:  SCOPE
  (1) 006550 012737 000012 001172               MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
 1133 006556 004737 026620                      JSR     PC,CNTLC        ;IS IT CONTROL C?
 1134
 1135 006562 005737 001634                      TST     DT03            ;DT03 MODE
 1136 006566 001043                             BNE     3$              ;BR IF YES
 1137 006570 012737 000000 177776               MOV     #0,PSW          ;DROP PRIORITY
 1138 006576 012777 000001 173016               MOV     #REQ,@CSR       ;CONNECT
 1139 006604 105777 173012              1$:     TSTB    @CSR            ;CONNECTED?
 1140 006610 100416                             BMI     2$              ;BR IF YES
 1141 006612 005777 173004                      TST     @CSR            ;TIMEOUT?
 1142 006616 100372                             BPL     1$              ;BR IF NOT
 1143 006620 017737 172776 001126               MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1144 006626 013737 001752 001124               MOV     KONST,GOOD
 1145 006634 062737 020201 001124               ADD     #20201,GOOD     ;STORE GOOD DATA(SWB ACT,PWR OK,CON,REQ)
 1146 006642 104006                             ERROR+6                 ;COULDN'T CONNECT
 1147 006644 000414                             BR      3$              ;EXIT
 1148 006646 052777 000002 172746      2$:     BIS     #2,@CSR         ;SET HLD(BIT1)
 1149 006654 000005                             RESET                   ;DO RESET
 1150 006656 017737 172740 001126               MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1151 006664 032737 000200 001126               BIT     #200,BAD        ;STILL CONNECTED?
 1152 006672 001001                             BNE     3$              ;BR IF YES
 1153 006674 104020                             ERROR+20                ;HLD DIDN'T DISABLE RESET
 1154 006676 005077 172720              3$:     CLR     @CSR            ;SHUTDOWN AND GO TO NEXT TEST
```

```
                                        ;;*************************************************************************
                                        ;*TEST 16        HI-SPEED SWITCHING TEST.IDX14
                                        ;;*************************************************************************
                                        TST16:  SCOPE
006702  000004
006704  012737  000012  001172                  MOV     #10.,$TIMES     ;;DO 10. ITERATIONS
006712  004737  026620                          JSR     PC,CNTLC        ;IS IT CONTROL C?

006716  012701  001750                          MOV     #1000.,R1       ;SET COUNTER
006722  012737  000000  177776  11$:            MOV     #0,PSW          ;DROP PRIORITY
006730  012777  000001  172664                  MOV     #REQ,@CSR       ;CONNECT
006736  105777  172660          1$:             TSTB    @CSR            ;CONNECTED?
006742  100416                                  BMI     2$              ;BR IF YES
006744  005777  172652                          TST     @CSR            ;TIMEOUT?
006750  100372                                  BPL     1$              ;BR IF NOT
006752  017737  172644  001126                  MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
006760  013737  001752  001124                  MOV     KONST,GOOD
006766  062737  020201  001124                  ADD     #20201,GOOD     ;STORE GOOD DATA(SWB ACT,PWR OK,CON,REQ)
006774  104006                                  ERROR+6                 ;COULDN'T CONNECT
006776  000422                                  BR      5$              ;EXIT
007000  042777  000001  172614  2$:             BIC     #1,@CSR         ;RELEASE CONNECTION
007006  013737  001752  001124                  MOV     KONST,GOOD      ;STORE GOOD DATA(PWR OK)
007014  005000                                  CLR     R0              ;SET DELAY TIMER
007016  017737  172600  001126  3$:             MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
007024  023737  001124  001126                  CMP     GOOD,BAD        ;COMPARE
007032  001402                                  BEQ     4$              ;BR IF OK
007034  104015                                  ERROR+15                ;RELEASE CONDITIONS NOT MET
007036  000402                                  BR      5$              ;EXIT
007040  005301                          4$:     DEC     R1              ;COUNT A SUBPASS
007042  001327                                  BNE     11$             ;BR IF CONTINUE
007044  005077  172552                  5$:     CLR     @CSR            ;SHUTDOWN AND GO TO NEXT TEST


                                        ;;*************************************************************************
                                        ;*TEST 17        RESET-IN-NEUTRAL TEST.IDX15
                                        ;;*************************************************************************
                                        TST17:  SCOPE
007050  000004
007052  012737  000001  001172                  MOV     #1,$TIMES       ;;DO 1 ITERATION

007060  005737  001636                          TST     DEVAD           ;IS A DEVICE REGISTER PRESENT?
007064  001012                                  BNE     15$             ;CONTINUE TEST IF PRESENT
007066  000137  007540                          JMP     12$             ;GO EXIT
007072                                  13$:
007072  004737  026562                          JSR     PC,CKADR        ;CHECK IF DEVICE ADDRESS EXIST?
007076  005737  026560                          TST     FLAG            ;IF FLAG=1;TRAP OCCURED
007102  001437                                  BEQ     2$              ;BR:NO TRAP
007104  104027                                  ERROR+27
007106  000137  007540                          JMP     12$             ;GO EXIT
007112  005737  001642          15$:            TST     DEVRC           ;ANY RESETABLE BITS?
007116  001002                                  BNE     14$             ;BR=YES
007120  000137  007540                          JMP     12$             ;GO EXIT
007124  012737  000000  177776  14$:            MOV     #0,PSW          ;DROP PRIORITY
007132  012777  000001  172462                  MOV     #REQ,@CSR       ;CONNECT
```

```
1204  007140  105777  172456          1$:   TSTB    @CSR            ;CONNECTED?
1205  007144  100752                        BMI     13$             ;BR IF YES
1206  007146  005777  172450                TST     @CSR            ;TIMEOUT?
1207  007152  100372                        BPL     1$              ;BR IF NOT
1208  007154  017737  172442  001126        MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
1209  007162  013737  001752  001124        MOV     KONST,GOOD
1210  007170  062737  020201  001124        ADD     #20201,GOOD     ;STORE GOOD DATA(SWB ACT,PWR OK,CON,REQ)
1211  007176  104006                        ERROR+6                 ;COULDN'T CONNECT
1212  007200  000557                        BR      12$             ;EXIT
1213  007202                          2$:
1214  007202  013777  001640  172426        MOV     DEVRW,@DEVAD    ;SET READ/WRITE BITS IN EXTERNAL DEVICE REGISTER
1215  007210  017737  172422  001126        MOV     @DEVAD,BAD      ;STORE CONTENTS OF DEVAD
1216  007216  005137  001640                COM     DEVRW           ;COMPLEMENT R/W BITS
1217  007222  043737  001640  001126        BIC     DEVRW,BAD       ;CLEAR OUT BITS NOT UNDER TEST
1218  007230  005137  001640                COM     DEVRW           ;RESTORE ORIGINAL PATTERN
1219  007234  023737  001640  001126        CMP     DEVRW,BAD       ;DID THEY SET?
1220  007242  001402                        BEQ     3$              ;BR IF YES
1221  007244  104017                        ERROR+17                ;COULDN'T SET READ/WRITE BITS IN DEVAD
1222  007246  000534                        BR      12$             ;EXIT
1223  007250  005077  172346          3$:   CLR     @CSR            ;DISCONNECT
1224  007254  105777  172342          4$:   TSTB    @CSR            ;DONE?
1225  007260  100775                        BMI     4$              ;BR=NO
1226  007262  012737  000000  177776        MOV     #0,PSW          ;DROP PRIORITY
1227  007270  012777  000001  172324        MOV     #REQ,@CSR       ;CONNECT
1228  007276  105777  172320          5$:   TSTB    @CSR            ;CONNECTED?
1229  007302  100416                        BMI     6$              ;BR IF YES
1230  007304  005777  172312                TST     @CSR            ;TIMEOUT?
1231  007310  100372                        BPL     5$              ;BR IF NOT
1232  007312  017737  172304  001126        MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
1233  007320  013737  001752  001124        MOV     KONST,GOOD
1234  007326  062737  020201  001124        ADD     #20201,GOOD     ;STORE GOOD DATA(SWB ACT,PWR OK,CON,REQ)
1235  007334  104006                        ERROR+6                 ;COULDN'T CONNECT
1236  007336  000500                        BR      12$             ;EXIT
1237  007340  017737  172272  001126  6$:   MOV     @DEVAD,BAD      ;STORE CONTENTS OF DEVAD
1238  007346  033737  001642  001126        BIT     DEVRC,BAD       ;RESET CONDITIONS MET?
1239  007354  001403                        BEQ     7$              ;BR=YES
1240  007356  012702  177777                MOV     #-1,R2          ;SET R2 FOR NO RESET
1241  007362  000401                        BR      8$
1242  007364  005002                  7$:   CLR     R2              ;SET R2 FOR RESET
1243  007366  005737  001214          8$:   TST     $PASS           ;FIRST PASS?
1244  007372  001056                        BNE     11$             ;BR=NO
1245  007374  005702                        TST     R2              ;CHECK RESET CONDITION
1246  007376  001427                        BEQ     9$              ;BR=RESET
1247  007400  104401  007406                TYPE    ,65$            ;;TYPE ASCIZ STRING
 (1)  007404  000423                        BR      64$             ;;GET OVER THE ASCIZ
 (1)                              ;;65$:   .ASCIZ  <200>/THIS DT07 INHIBITS RESET-IN-NEUTRAL./
 (1)  007454                      64$:
1248  007454  000422                        BR      10$
1249  007456                           9$:
 (1)  007456  104401  007464                TYPE    ,67$            ;;TYPE ASCIZ STRING
 (1)  007462  000417                        BR      66$             ;;GET OVER THE ASCIZ
 (1)                              ;;67$:   .ASCIZ  <200>/THIS DT07 RESETS IN NEUTRAL./
 (1)  007522                      66$:
1250  007522  010237  001754          10$:  MOV     R2,DEVCON       ;STORE CONDITION
1251  007526  000404                        BR      12$
1252  007530  020237  001754          11$:  CMP     R2,DEVCON       ;HAS IT CHANGED?
```

```
 1253  007534  001401                        BEQ     12$             ;BR=NO
 1254  007536  104022                        ERROR+22                ;RESET-IN-NEUTRAL OPERATION HAS CHANGED
 1255  007540  005077  172056          12$:  CLR     @CSR            ;CLEAR AND DISCONNECT
 1256
 1257
```

```
 1259
 1260
 1261  007544  012737  002526  021652  MONEND: MOV     #RESTRT,$RTNAD  ;SET RETURN
 1262  007552  000137  021552                  JMP     $EOP            ;GO DO END PASS
 1263
```

```
                                        .SBTTL
                                        .SBTTL  MULTIPORT TEST
                                        MULPRT:
007556  004737  026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
007562  005737  026426                        TST     PARFLG          ;CHECK FOR PARAMETERS
007566  100404                              BMI     1$              ;BR=YES
007570  004737  026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
007574  004737  024756                        JSR     PC,PARIN        ;GO INPUT PARAMETERS
007600  012737  001000  001726      1$:       MOV     #1000,CYCLE     ;SET COUNTER
007606  005737  001754                        TST     DEVCON          ;RESET IN NEUTRAL OPTION USED?
007612  001003                              BNE     2$              ;BR=NO
007614  005037  001756                        CLR     TRIN            ;SET FLAG FOR TEST
007620  000403                              BR      2$+6            ;CONTINUE
007622  012737  177777  001756      2$:       MOV     #-1,TRIN        ;SET FLAG FOR NO TEST
007630  005737  001634                        TST     DT03            ;DT03 MODE?
007634  001404                              BEQ     3$              ;BR=DT07 MODE
007636  004737  026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
007642  000137  012762                        JMP     MULDT3          ;GO DO DT03 MULTIPORT
007646  012777  023022  171750      3$:       MOV     #OOPS,@VEC0     ;SET RETURN
007654  012777  000340  171744                MOV     #340,@VEC2      ;SET LEVEL
007662  004737  022320                        JSR     PC,SEQMAK       ;GO CONSTRUCT SEQUENCER
007666  004737  022666                        JSR     PC,SEQINT       ;INIT. SEQUENCER
007672  012737  000000  177776                MOV     #0,PSW          ;DROP PRIORITY
007700  023705  001644                        CMP     PORTNO,R5       ;MASTER OR SLAVE?
007704  001072                              BNE     SLAVE           ;BR=SLAVE
007706  012737  000632  022062                MOV     #632,TOCK       ;SET CLOCK FOR 5 SEC
007714  004737  022022                        JSR     PC,WAIT
007720  000407                              BR      MASTER          ;GO TO MASTER CODE AFTER SYNC WAIT
007722  023705  001644      DISPAT:   CMP     PORTNO,R5       ;MY TURN AS MASTER?
007726  001404                              BEQ     MASTER          ;BR=YES
007730  004737  026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
007734  000137  010072                        JMP     SLAVE           ;GO BE SLAVE
007740                              MASTER:
007740  004737  026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
007744  004737  022430                        JSR     PC,MASMEN       ;GO MAKE MASTER MENU
007750  012737  000001  022062                MOV     #1,TOCK
007756  004737  022022                        JSR     PC,WAIT
007762  004737  021674                        JSR     PC,CONNEC       ;GO CONNECT
007766  005037  001722      1$:       CLR     CURFUN          ;INSURE NO EXTRANEOUS BITS PRESENT
007772  116437  000001  001722              MOVB    1(R4),CURFUN    ;GET CURRANT FUNCTION
010000  005037  001724                        CLR     CURID           ;CLEAN IT OUT
010004  111437  001724                        MOVB    (R4),CURID      ;GET CURRANT ID
010010  000241                              CLC
010012  006137  001722                        ROL     CURFUN          ;DOUBLE IT
010016  012703  012746                        MOV     #TABM-2,R3      ;LOAD BASE ADDRESS
010022  063703  001722                        ADD     CURFUN,R3       ;ADD OFFSET
010026  011303                              MOV     @R3,R3          ;GET ACTUAL ADDRESS
010030  004713                              JSR     PC,@R3          ;GO DO IT
010032  005724                              TST     (R4)+           ;STEP THRU MENU
010034  022714  177777                        CMP     #-1,(R4)        ;DONE MENU?
010040  001352                              BNE     1$              ;BR=NO
010042  004737  022710                        JSR     PC,SEQSTP       ;GO STEP SEQUENCER
010046  005337  001726                        DEC     CYCLE           ;COUNT
010052  001402                              BEQ     2$              ;BR IF DONE
```

```
 1321  010054  000137  007722                    JMP     DISPAT          ;GO START AGAIN
 1322  010060  012737  007556  021652  2$:       MOV     #MULPRT,$RTNAD  ;SET UP RETURN
 1323  010066  000137  021554                    JMP     $EOP+2          ;GO DO END PASS
 1324  010072  004737  022516          SLAVE:    JSR     PC,SALMEN       ;GO MAKE SLAVE MENU
 1325  010076  004737  022064                    JSR     PC,SYNCUP       ;GO SYNCUP! 2 MINUTE TIME OUT
 1326  010102  005037  001722          1$:       CLR     CURFUN          ;CLEAN IT
 1327  010106  116437  000001  001722            MOVB    1(R4),CURFUN    ;GET CURRANT FUNCTION
 1328  010114  005037  001724                    CLR     CURID           ;CLEAN IT
 1329  010120  111437  001724                    MOVB    (R4),CURID      ;GET CURRANT ID
 1330  010124  000241                            CLC
 1331  010126  006137  001722                    ROL     CURFUN          ;DOUBLE IT
 1332  010132  012703  012746                    MOV     #TABM-2,R3      ;LOAD BASE ADDRESS
 1333  010136  063703  001722                    ADD     CURFUN,R3       ;ADD OFFSET
 1334  010142  011303                            MOV     @R3,R3          ;GET ACTUAL ADDRESS
 1335  010144  004713                            JSR     PC,@R3          ;GO DO IT
 1336  010146  005724                            TST     (R4)+           ;STEP THRU MENU
 1337  010150  022714  177777                    CMP     #-1,(R4)        ;DONE MENU
 1338  010154  001352                            BNE     1$              ;BR=NO
 1339  010156  004737  022710                    JSR     PC,SEQSTP       ;GO STEP SEQUENCER
 1340  010162  005337  001726                    DEC     CYCLE           ;COUNT
 1341  010166  001402                            BEQ     2$              ;BRIF DONE
 1342  010170  000137  007722                    JMP     DISPAT          ;GO START AGAIN
 1343  010174  012737  007556  021652  2$:       MOV     #MULPRT,$RTNAD  ;SET UP RETURN
 1344  010202  000137  021554                    JMP     $EOP+2          ;GO DO END PASS
 1345
 1346
 1347                                    ;EXTERNAL CONNECT REQUEST REJECTED
 1348
 1349  010206                            FUNCT1:
 1350  010206  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
 1351  010212  004737  021674                    JSR     PC,CONNEC       ;GO CONNECT
 1352  010216  004737  021732                    JSR     PC,CONID        ;GO CONVERT SLAVE ID
 1353  010222  012777  010362  171374            MOV     #1$,@VEC0       ;SET RETURN
 1354  010230  112777  000101  171364            MOVB    #101,@CSR       ;ENABLE INTERUPT
 1355  010236  005000                            CLR     R0              ;SET TIMER
 1356  010240  005200                            INC     R0              ;TIME OUT
 1357  010242  001376                            BNE     .-2             ;BR IF NOT DONE
 1358  010244  104401  010252                    TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1)  010250  000434                            BR      64$             ;;GET OVER THE ASCIZ
  (1)                               ;;65$:      .ASCIZ  <200>/ERROR1A! NO EXTERNAL REQUEST INTERUPT DETECTED.  CSR= /
  (1)  010342                       64$:
 1359  010342  017737  171254  001126            MOV     @CSR,BAD        ;SAVE CSR
 1360  010350  013746  001126                    MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  010354  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1361  010356  000000                            HALT
 1362  010360  000776                            BR      .-2
 1363  010362                            1$:
  (2)  010362  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2)  010364  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
 1364  010366  017737  171230  001126            MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1365  010374  032737  010000  001126            BIT     #10000,BAD      ;MAKE SURE EXT INT IS SET
 1366  010402  001036                            BNE     2$              ;BR = OK
 1367  010404  104401  010412                    TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1)  010410  000426                            BR      66$             ;;GET OVER THE ASCIZ
  (1)                               ;;67$:      .ASCIZ  <200>/ERROR1B! EXTERNAL INTERUPT NOT SET.  CSR= /
  (1)  010466                       66$:
```

```
 1368  010466  013746  001126                    MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  010472  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1369  010474  000000                            HALT
 1370  010476  000776                            BR      .-2
 1371  010500  033737  001730  001126  2$:       BIT     COVID,BAD       ;CORRECT SLAVE ID?
 1372  010506  001042                            BNE     3$              ;BR=YES
 1373  010510  104401  010516                    TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1)  010514  000432                            BR      68$             ;;GET OVER THE ASCIZ
  (1)                                   ;;69$:   .ASCIZ  <200>/ERROR1C! EXTERNAL REQUEST FROM WRONG PORT.  CSR= /
  (1)  010602                           68$:
 1374  010602  013746  001126                    MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  010606  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1375  010610  000000                            HALT
 1376  010612  000776                            BR      .-2
 1377  010614  012777  000101  171000  3$:       MOV     #101,@CSR       ;CLEAR EXT INT
 1378  010622  012777  023022  170774            MOV     #OOPS,@VEC0     ;RESET RETURN
 1379  010630  005037  177776                    CLR     PSW             ;LOWER PRIORITY
 1380  010634  000207                            RTS     PC
 1381
 1382
 1383                                   ;EXTERNAL REQUEST IGNORED
 1384
 1385  010636                           FUNCT2:
 1386  010636  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
 1387  010642  004737  021674                    JSR     PC,CONNEC       ;GO CONNECT
 1388  010646  004737  021732                    JSR     PC,CONID        ;GO CONVERT SLAVE ID
 1389  010652  012777  011144  170744            MOV     #1$,@VEC0       ;SET RETURN
 1390  010660  005737  001756                    TST     TRIN            ;CAN WE TEST RESET IN NEUTRAL?
 1391  010664  001052                            BNE     6$              ;BR=NO
 1392  010666  013777  001640  170742            MOV     DEVRW,@DEVAD    ;LOAD READ/WRITE BITS
 1393  010674  023777  001640  170734            CMP     DEVRW,@DEVAD    ;LOADED?
 1394  010702  001443                            BEQ     6$              ;BR=YES
 1395  010704  104401  010712                    TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1)  010710  000432                            BR      64$             ;;GET OVER THE ASCIZ
  (1)                                   ;;65$:   .ASCIZ  <200>/ERROR2F! COULDN'T LOAD EXTERNAL DEVICE REGISTER.../
  (1)  010776                           64$:
 1396  010776  013746  001636                    MOV     DEVAD,-(SP)     ;;SAVE DEVAD FOR TYPEOUT
  (1)  011002  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1397  011004  012737  177777  001756            MOV     #-1,TRIN        ;SET FLAG FOR NO TEST
 1398  011012  112777  000101  170602  6$:       MOVB    #101,@CSR       ;ENABLE INTERUPT
 1399  011020  005000                            CLR     R0              ;SET TIMER
 1400  011022  005200                            INC     R0              ;TIME OUT
 1401  011024  001376                            BNE     .-2             ;BR IF NOT DONE
 1402  011026  104401  011034                    TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1)  011032  000434                            BR      66$             ;;GET OVER THE ASCIZ
  (1)                                   ;;67$:   .ASCIZ  <200>/ERROR2A! NO EXTERNAL REQUEST INTERUPT DETECTED.  CSR= /
  (1)  011124                           66$:
 1403  011124  017737  170472  001126            MOV     @CSR,BAD        ;SAVE CSR
 1404  011132  013746  001126                    MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  011136  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1405  011140  000000                            HALT
 1406  011142  000776                            BR      .-2
 1407  011144                           1$:
  (2)  011144  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2)  011146  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
 1408  011150  017737  170446  001126            MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
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 1409  011156  032737  010000  001126          BIT     #10000,BAD      ;MAKE SURE EXT INT IS SET
 1410  011164  001036                          BNE     2$              ;BR = OK
 1411  011166  104401  011174                  TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1)  011172  000426                          BR      68$             ;;GET OVER THE ASCIZ
  (1)                                  ;;69$:  .ASCIZ  <200>/ERROR2B! EXTERNAL INTERUPT NOT SET.  CSR= /
  (1)  011250                          68$:
 1412  011250  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  011254  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1413  011256  000000                          HALT
 1414  011260  000776                          BR      .-2
 1415  011262  033737  001730  001126  2$:     BIT     COVID,BAD       ;CORRECT SLAVE ID?
 1416  011270  001042                          BNE     3$              ;BR=YES
 1417  011272  104401  011300                  TYPE    ,71$            ;;TYPE ASCIZ STRING
  (1)  011276  000432                          BR      70$             ;;GET OVER THE ASCIZ
  (1)                                  ;;71$:  .ASCIZ  <200>/ERROR2C! EXTERNAL REQUEST FROM WRONG PORT.  CSR= /
  (1)  011364                          70$:
 1418  011364  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  011370  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1419  011372  000000                          HALT
 1420  011374  000776                          BR      .-2
 1421  011376  012777  011514  170220  3$:     MOV     #4$,@VEC0       ;SET RETURN
 1422  011404  005037  177776                  CLR     PSW             ;LOWER PRIORITY
 1423  011410  004737  022010                  JSR     PC,WAIT05       ;WAIT
 1424  011414  104401  011422                  TYPE    ,73$            ;;TYPE ASCIZ STRING
  (1)  011420  000430                          BR      72$             ;;GET OVER THE ASCIZ
  (1)                                  ;;73$:  .ASCIZ  <200>/ERROR2D! SLAVE DIDN'T TAKE SHARED BUSS. CSR= /
  (1)  011502                          72$:
 1425  011502  017746  170114                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  011506  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1426  011510  000000                          HALT
 1427  011512  000776                          BR      .-2
 1428  011514                               4$:
  (2)  011514  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2)  011516  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2)  011520  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
 1429  011522  005777  170074                  TST     @CSR            ;TIMEOUT SET?
 1430  011526  100436                          BMI     5$              ;BR=YES
 1431  011530  104401  011536                  TYPE    ,75$            ;;TYPE ASCIZ STRING
  (1)  011534  000423                          BR      74$             ;;GET OVER THE ASCIZ
  (1)                                  ;;75$:  .ASCIZ  <200>/ERROR2E! NO TMO ON INTERUPT.  CSR= /
  (1)  011604                          74$:
 1432  011604  017737  170012  001126          MOV     @CSR,BAD        ;SAVE CSR
 1433  011612  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  011616  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1434  011620  000000                          HALT
 1435  011622  000776                          BR      .-2
 1436  011624  012777  023022  167772  5$:     MOV     #OOPS,@VEC0     ;RESET RETURN
 1437  011632  005077  167764                  CLR     @CSR            ;CLEAR CSR
 1438  011636  005037  177776                  CLR     PSW             ;LOWER PRIORITY
 1439  011642  000207                          RTS     PC              ;EXIT
 1440
 1441
 1442
 1443                                   ;SEND CONNECT REQUEST EXPECT REJECTION
 1444
 1445  011644                           FUNCT3:
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 1446  011644  004737  026620                JSR     PC,CNTLC        ;IS IT CONTROL C?
 1447  011650  005000                        CLR     R0              ;SET TIMERS
 1448  011652  012701  000400                MOV     #400,R1
 1449  011656  032777  020000  167736  1$:   BIT     #20000,@CSR     ;SWITCHED BUSS ACTIVE?
 1450  011664  001051                        BNE     2$              ;BR=YES
 1451  011666  005200                        INC     R0              ;TIME OUT
 1452  011670  001372                        BNE     1$
 1453  011672  005301                        DEC     R1
 1454  011674  001370                        BNE     1$
 1455  011676  017737  167720  001126        MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1456  011704  104401  011712                TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1) 011710  000432                        BR      64$             ;;GET OVER THE ASCIZ
   (1)                               ;;65$:  .ASCIZ  <200>/ERROR3A! NO SWITCHED BUSS MASTER DETECTED. CSR = /
   (1) 011776                        64$:
 1457  011776  013746  001126                MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
   (1) 012002  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1458  012004  000000                        HALT
 1459  012006  000776                        BR      .-2
 1460  012010  012777  012026  167606  2$:   MOV     #3$,@VEC0       ;SET RETURN
 1461  012016  012777  000101  167576        MOV     #101,@CSR       ;SET IE + REQ
 1462  012024  000001                        WAIT                    ;WAIT FOR INTERUPT
 1463  012026                            3$:
   (2) 012026  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
   (2) 012030  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 1464  012032  005777  167564                TST     @CSR            ;TIMEOUT?
 1465  012036  100435                        BMI     4$              ;BR=YES
 1466  012040  017737  167556  001126        MOV     @CSR,BAD        ;SAVE CSR
 1467  012046  104401  012054                TYPE    ,67$            ;;TYPE ASCIZ STRING
   (1) 012052  000422                        BR      66$             ;;GET OVER THE ASCIZ
   (1)                               ;;67$:  .ASCIZ  <200>/ERROR3B! NO TIMEOUT DETECTED. CSR=/
   (1) 012120                        66$:
 1468  012120  013746  001126                MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
   (1) 012124  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1469  012126  000000                        HALT
 1470  012130  000776                        BR      .-2
 1471  012132  005077  167464            4$: CLR     @CSR            ;CLEAR + DISCONNECT
 1472  012136  012777  023022  167460        MOV     #OOPS,@VEC0     ;RESET RETURN
 1473  012144  005037  177776                CLR     PSW             ;LOWER PRIORITY
 1474  012150  000207                        RTS     PC              ;EXIT
 1475                                    ;SEND CONNECT REQUEST EXPECT CONNECTION
 1476  012152                            FUNCT4:
 1477  012152  004737  026620                JSR     PC,CNTLC        ;IS IT CONTROL C?
 1478  012156  005000                        CLR     R0              ;SET TIMERS
 1479  012160  012701  000400                MOV     #400,R1
 1480  012164  032777  020000  167430  1$:   BIT     #20000,@CSR     ;SWITCHED BUSS ACTIVE?
 1481  012172  001051                        BNE     2$              ;BR=YES
 1482  012174  005200                        INC     R0              ;TIME OUT
 1483  012176  001372                        BNE     1$
 1484  012200  005301                        DEC     R1
 1485  012202  001370                        BNE     1$
 1486  012204  017737  167412  001126        MOV     @CSR,BAD        ;STORE CONTENTS OF CSR
 1487  012212  104401  012220                TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1) 012216  000432                        BR      64$             ;;GET OVER THE ASCIZ
   (1)                               ;;65$:  .ASCIZ  <200>/ERROR4A! NO SWITCHED BUSS MASTER DETECTED. CSR = /
   (1) 012304                        64$:
 1488  012304  013746  001126                MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
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  (1)  012310  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1489   012312  000000                          HALT
1490   012314  000776                          BR      .-2
1491   012316  013737  001746  001732  2$:     MOV     TIMA,TEMP1      ;SET TIMER
1492   012324  006337  001732                  ASL     TEMP1
1493   012330  032777  020000  167264  21$:    BIT     #20000,@CSR     ;SWB ACT SET?
1494   012336  001705                          BEQ     FUNCT4  ;BR=NO
1495   012340  005337  001732                  DEC     TEMP1
1496   012344  001371                          BNE     21$
1497   012346  012777  012364  167250          MOV     #3$,@VEC0       ;SET RETURN
1498   012354  012777  000101  167240          MOV     #101,@CSR       ;SET IE + REQ
1499   012362  000001                          WAIT                    ;WAIT FOR INTERUPT
1500   012364                          3$:
  (2)  012364  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
  (2)  012366  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
1501   012370  105777  167226                  TSTB    @CSR            ;CONNECTED?
1502   012374  100437                          BMI     4$              ;BR=YES
1503   012376  017737  167220  001126          MOV     @CSR,BAD        ;SAVE CSR
1504   012404  104401  012412                  TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1)  012410  000424                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                             ;;67$:  .ASCIZ  <200>/ERROR4B! CONNECT REQUEST FAILED. CSR=/
  (1)  012462                     66$:
1505   012462  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1)  012466  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1506   012470  000000                          HALT
1507   012472  000776                          BR      .-2
1508   012474  005737  001756          4$:     TST     TRIN            ;CAN WE TEST RESET IN NEUTRAL
1509   012500  001036                          BNE     5$              ;BR=NO
1510   012502  033777  001642  167126          BIT     DEVRC,@DEVAD    ;RESET CONDITIONS MET?
1511   012510  001432                          BEQ     5$              ;BR=YES
1512   012512  104401  012520                  TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1)  012516  000424                          BR      68$             ;;GET OVER THE ASCIZ
  (1)                             ;;69$:  .ASCIZ  <200>/ERROR4C! NO RESET IN NEUTRAL DETECTED./
  (1)  012570                     68$:
1513   012570  012737  177777  001756          MOV     #-1,TRIN        ;CANCEL FURTHER TESTING OF RESET IN NEUTRAL
1514   012576  005077  167020          5$:     CLR     @CSR            ;CLEAR + DISCONNECT
1515   012602  012777  023022  167014          MOV     #OOPS,@VEC0     ;RESET RETURN
1516   012610  005037  177776                  CLR     PSW             ;LOWER PRIORITY
1517   012614  000207                          RTS     PC              ;EXIT
1518                           ;OBSERVE REQUEST INDICATORS
1519   012616                  FUNCT5:
1520   012616  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL C?
1521   012622  004737  021732                  JSR     PC,CONID        ;GO CONVERT PORT ID
1522   012626  005000                          CLR     R0              ;SET TIMERS
1523   012630  012701  000400                  MOV     #400,R1
1524   012634  033777  001730  166760  1$:     BIT     COVID,@CSR      ;LOOK FOR REQUEST
1525   012642  001035                          BNE     2$              ;BR=FOUND IT
1526   012644  005200                          INC     R0              ;TIME OUT
1527   012646  001372                          BNE     1$
1528   012650  005301                          DEC     R1
1529   012652  001370                          BNE     1$
1530   012654  104401  012662                  TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1)  012660  000424                          BR      64$             ;;GET OVER THE ASCIZ
  (1)                             ;;65$:  .ASCIZ  <200>/ERROR5A! NO REQUEST ACTIVITY DETECTED./
  (1)  012732                     64$:
1531   012732  000000                          HALT
```

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 1532  012734  000776                          BR      .-2
 1533  012736  033777  001730  166656  2$:     BIT     COVID,@CSR      ;DID IT GO AWAY?
 1534  012744  001374                          BNE     2$              ;BR=NOT YET
 1535  012746  000207                          RTS     PC              ;EXIT
 1536
 1537
 1538  012750  010206                  TABM:   FUNCT1                  ;DISPATCH TABLE FOR MULTIPORT TEST
 1539  012752  010636                          FUNCT2
 1540  012754  011644                          FUNCT3
 1541  012756  012152                          FUNCT4
 1542  012760  012616                          FUNCT5
 1543
 1544
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 1546
 1547
 1548
 1549                                   .SBTTL
 1550                                   .SBTTL  BIPORT TEST IN DT03 MODE
 1551                                   .SBTTL
 1552
 1553  012762                           MULDT3:
 1554  012762  004737  026620                   JSR     PC,CNTLC        ;IS IT CONTROL C?
 1555  012766  012737  000000  177776           MOV     #0,PSW          ;LOWER PRIORITY
 1556  012774  005077  166622                   CLR     @CSR            ;START WITH A CLEAR REGISTER
 1557  013000  012737  002000  001726           MOV     #2000,CYCLE     ;SET SUB COUNT
 1558  013006  005037  022006                   CLR     TRIG            ;CLEAR TRIGGER
 1559  013012  032777  020000  166602  1$:      BIT     #20000,@CSR     ;ACTIVE?
 1560  013020  001401                           BEQ     11$             ;BR=NO
 1561  013022  000464                           BR      21$             ;GO BE SLAVE
 1562  013024  012777  013150  166572  11$:     MOV     #2$,@VEC0       ;SET RETURN
 1563  013032  012777  000101  166562           MOV     #101,@CSR       ;SEND REQUEST
 1564  013040  004737  021774                   JSR     PC,WAIT20       ;GO WAIT
 1565  013044  104401  013052                   TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1)  013050  000432                           BR      64$             ;;GET OVER THE ASCIZ
  (1)                                  ;;65$:   .ASCIZ  <200>/ERROR6! NO INTERUPT AFTER CONNECT REQUEST.  CSR= /
  (1)  013136                          64$:
 1566  013136  017746  166460                   MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  013142  104402                           TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1567  013144  000000                           HALT
 1568  013146  000776                           BR      .-2
 1569  013150  012706  001100          2$:      MOV     #STACK,SP       ;RESET STACK
 1570  013154  005037  177776                   CLR     PSW             ;LOWER PRIORITY
 1571  013160  005777  166436                   TST     @CSR            ;TIMEOUT?
 1572  013164  100007                           BPL     3$              ;BR=NO
 1573  013166  000240                           NOP
 1574  013170  000240                           NOP
 1575  013172  000240                           NOP
 1576  013174  005037  001744          21$:     CLR     ONOFF           ;INDIACATE FIRST SLAVE
 1577  013200  000137  014372                   JMP     SECT4           ;GO TO SECTION 4
 1578  013204  012737  177777  001744  3$:      MOV     #-1,ONOFF       ;INDIACATE FIRST MASTER
 1579
 1580                                   ;SECTION 2 : WAIT FOR EXTERNAL REQUEST THEN RELEASE SWITCH
 1581
 1582  013212  005737  001756          SECT2:   TST     TRIN            ;CAN WE TEST RESET IN NEUTRAL
 1583  013216  001052                           BNE     2$              ;BR=NO
 1584  013220  013777  001640  166410           MOV     DEVRW,@DEVAD    ;LOAD DEVICE REGISTER
 1585  013226  023777  001640  166402           CMP     DEVRW,@DEVAD    ;OK?
 1586  013234  001443                           BEQ     2$              ;BR=YES
 1587  013236  104401  013244                   TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1)  013242  000432                           BR      64$             ;;GET OVER THE ASCIZ
  (1)                                  ;;65$:   .ASCIZ  <200>/ERROR7A! COULDN'T LOAD EXTERNAL DEVICE REGISTER../
  (1)  013330                          64$:
 1588  013330  013746  001636                   MOV     DEVAD,-(SP)     ;;SAVE DEVAD FOR TYPEOUT
  (1)  013334  104402                           TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1589  013336  012737  177777  001756           MOV     #-1,TRIN        ;CANCEL FURTHER TESTING OF RESET IN NEUTRAL
 1590  013344  012777  013470  166252  2$:      MOV     #1$,@VEC0       ;SET RETURN
 1591  013352  012737  000632  022062           MOV     #632,TOCK       ;SET DELAY FOR 5 SECONDS
 1592  013360  004737  022022                   JSR     PC,WAIT
 1593  013364  104401  013372                   TYPE    ,67$            ;;TYPE ASCIZ STRING
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  (1) 013370 000432                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                                ;;67$:  .ASCIZ  <200>/ERROR7! NO EXTERNAL INTERUPT REQUEST SEEN.  CSR= /
  (1) 013456                         66$:
1594  013456 017746 166140                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1) 013462 104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1595  013464 000000                          HALT
1596  013466 000776                          BR      .-2
1597  013470 012706 001100              1$:   MOV     #STACK,SP       ;RESET STACK
1598  013474 013737 001752 001124            MOV     KONST,GOOD
1599  013502 062737 030301 001124            ADD     #30301,GOOD
1600  013510 023777 001124 166104            CMP     GOOD,@CSR       ;MAKE SURE IT'S AN EXTERNAL REQUEST
1601  013516 001435                          BEQ     SECT2A          ;BR=OK
1602  013520 104401 013526                   TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1) 013524 000425                          BR      68$             ;;GET OVER THE ASCIZ
  (1)                                ;;69$:  .ASCIZ  <200>/ERROR8! UNEXPECTED INTERUPT TYPE.  CSR= /
  (1) 013600                         68$:
1603  013600 017746 166016                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1) 013604 104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1604  013606 000000                          HALT
1605  013610 000776                          BR      .-2
1606  013612 000401                    SECT2A: BR      1$              ;RELEASE TYPE SWITCHBACK
1607  013614 000420                          BR      SECT2B          ;GO DO PASSIVE RELEASE
1608  013616 012737 000240 013612      1$:   MOV     #240,SECT2A     ;TURN SWITCHBACK
1609  013624 005077 165772             SECT2D: CLR     @CSR            ;DROP SWITCH ACTIVELY
1610  013630 005037 177776                    CLR     PSW             ;LOWER PRIORITY
1611  013634 105777 165762                    TSTB    @CSR            ;DROPPED?
1612  013640 100775                          BMI     .-4             ;BR=NO
1613  013642 032777 020000 165752            BIT     #20000,@CSR     ;PICKED UP?
1614  013650 001774                          BEQ     .-6             ;BR=NO
1615  013652 000137 014106                   JMP     SECT2C          ;GO TO EXIT
1616  013656 012737 000401 013612      SECT2B: MOV     #401,SECT2A     ;TURN SWITCHBACK
1617  013664 012777 014000 165732            MOV     #1$,@VEC0       ;SET RETURN
1618  013672 005037 177776                    CLR     PSW             ;LOWER PRIORITY
1619  013676 004737 021774                    JSR     PC,WAIT20       ;GO WAIT FOR TIMEOUT
1620  013702 104401 013710                   TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1) 013706 000427                          BR      64$             ;;GET OVER THE ASCIZ
  (1)                                ;;65$:  .ASCIZ  <200>/ERROR9! NO TIMEOUT INTERUPT DETECTED. CSR= /
  (1) 013766                         64$:
1621  013766 017746 165630                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1) 013772 104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1622  013774 000000                          HALT
1623  013776 000776                          BR      .-2
1624  014000 012706 001100              1$:   MOV     #STACK,SP       ;RESET STACK
1625  014004 005777 165612                    TST     @CSR            ;MAKE SURE IT'S A TIMEOUT
1626  014010 100705                          BMI     SECT2D          ;BR=OK
1627  014012 104401 014020                   TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1) 014016 000426                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                                ;;67$:  .ASCIZ  <200>/ERROR10! INTERUPT NOT CAUSED BY TMO. CSR= /
  (1) 014074                         66$:
1628  014074 017746 165522                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1) 014100 104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1629  014102 000000                          HALT
1630  014104 000776                          BR      .-2
1631  014106 005077 165510             SECT2C: CLR     @CSR            ;CLEAR CSR
1632  014112 005037 177776                    CLR     PSW             ;LOWER PRIORITY
1633
```

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                                        ;SECTION 3 : SEND REQUEST EXPECT REJECTION
                                        
014116  012737  000001  022062  SECT3:  MOV     #1,TOCK         ;SET MINIMUM TIME
014124  004737  022022                  JSR     PC,WAIT         ;GO WAIT
014130  012777  014240  165466          MOV     #1$,@VEC0       ;SET RETURN
014136  012777  000101  165456          MOV     #101,@CSR       ;SEND REQUEST
014144  004737  021774                  JSR     PC,WAIT20       ;GO WAIT FOR TIMEOUT
014150  104401  014156                  TYPE    ,65$            ;;TYPE ASCIZ STRING
(1)     014154  000424                  BR      64$             ;;GET OVER THE ASCIZ
(1)                             ;;65$:  .ASCIZ  <200>/ERROR11! NO INTERUPT DETECTED.  CSR= /
(1)     014226                  64$:
014226  017746  165370                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
(1)     014232  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
014234  000000                          HALT
014236  000776                          BR      .-2
014240  012706  001100          1$:     MOV     #STACK,SP       ;RESET STACK
014244  005777  165352                  TST     @CSR            ;TIMEOUT?
014250  100437                          BMI     2$              ;BR=YES
014252  104401  014260                  TYPE    ,67$            ;;TYPE ASCIZ STRING
(1)     014256  000427                  BR      66$             ;;GET OVER THE ASCIZ
(1)                             ;;67$:  .ASCIZ  <200>/ERROR12! INTERUPT NOT CAUSED BY TMO.  CSR= /
(1)     014336                  66$:
014336  017746  165260                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
(1)     014342  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
014344  000000                          HALT
014346  000776                          BR      .-2
014350  005077  165246          2$:     CLR     @CSR            ;CLEAR CSR
014354  005037  177776                  CLR     PSW             ;LOWER PRIORITY
014360  005737  022006                  TST     TRIG            ;IS TRIGGER SET?
014364  001402                          BEQ     SECT4           ;BR=NO
014366  000137  015236                  JMP     MULEND          ;FINISHED A SUB PASS
                                        
                                        ;SECTION 4 : SEND REQUEST EXPECT CONNECTION
                                        
014372  012777  014502  165224  SECT4:  MOV     #1$,@VEC0       ;SET RETURN
014400  012777  000101  165214          MOV     #101,@CSR       ;SEND REQUEST
014406  004737  021774                  JSR     PC,WAIT20       ;GO WAIT FOR TIMEOUT
014412  104401  014420                  TYPE    ,65$            ;;TYPE ASCIZ STRING
(1)     014416  000424                  BR      64$             ;;GET OVER THE ASCIZ
(1)                             ;;65$:  .ASCIZ  <200>/ERROR13! NO INTERUPT DETECTED.  CSR= /
(1)     014470                  64$:
014470  017746  165126                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
(1)     014474  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
014476  000000                          HALT
014500  000776                          BR      .-2
014502  012706  001100          1$:     MOV     #STACK,SP       ;RESET STACK
014506  013737  001752  001124          MOV     KONST,GOOD
014514  062737  020301  001124          ADD     #20301,GOOD
014522  023777  001124  165072          CMP     GOOD,@CSR       ;CONNECTED?
014530  001432                          BEQ     SECT5           ;BR=YES
014532  104401  014540                  TYPE    ,67$            ;;TYPE ASCIZ STRING
(1)     014536  000422                  BR      66$             ;;GET OVER THE ASCIZ
(1)                             ;;67$:  .ASCIZ  <200>/ERROR14! COULD NOT CONNECT.  CSR= /
(1)     014604                  66$:
014604  017746  165012                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
(1)     014610  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
```

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 1674  014612  000000                          HALT
 1675  014614  000776                          BR      .-2
 1676
 1677                                  ;SECTION 5 :DETECT EXTERNAL REQUEST AND REJECT IT
 1678
 1679  014616  005737  001756          SECT5:  TST     TRIN            ;CAN WE TEST RESET IN NEUTRAL?
 1680  014622  001041                          BNE     3$              ;BR=NO
 1681  014624  033777  001642  165004          BIT     DEVRC,@DEVAD    ;RESET CONDITION MET
 1682  014632  001435                          BEQ     3$              ;BR=YES
 1683  014634  104401  014642                  TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1)  014640  000427                          BR      64$             ;;GET OVER THE ASCIZ
  (1)                                  ;;65$:  .ASCIZ  <200>/ERROR15A! COULDN'T DETECT RESET IN NEUTRAL./
  (1)  014720                          64$:
 1684  014720  012737  177777  001756          MOV     #-1,TRIN        ;CANCEL FURTHER TESTING OF RESET IN NEUTRAL
 1685  014726  012777  015044  164670  3$:     MOV     #1$,@VEC0       ;SET RETURN
 1686  014734  005037  177776                  CLR     PSW             ;LOWER PRIORITY
 1687  014740  004737  021774                  JSR     PC,WAIT20       ;GO WAIT
 1688  014744  104401  014752                  TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1)  014750  000430                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                                  ;;67$:  .ASCIZ  <200>/ERROR15! NO EXTERNAL REQUEST DETECTED.  CSR= /
  (1)  015032                          66$:
 1689  015032  017746  164564                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  015036  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1690  015040  000000                          HALT
 1691  015042  000776                          BR      .-2
 1692  015044  012706  001100          1$:     MOV     #STACK,SP       ;RESET STACK
 1693  015050  013737  001752  001124          MOV     KONST,GOOD
 1694  015056  062737  030301  001124          ADD     #30301,GOOD
 1695  015064  023777  001124  164530          CMP     GOOD,@CSR       ;EXT. INT. ?
 1696  015072  001433                          BEQ     2$              ;BR=OK
 1697  015074  104401  015102                  TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1)  015100  000423                          BR      68$             ;;GET OVER THE ASCIZ
  (1)                                  ;;69$:  .ASCIZ  <200>/ERROR16! UNEXPECTED INTERUPT.  CSR= /
  (1)  015150                          68$:
 1698  015150  017746  164446                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  015154  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1699  015156  000000                          HALT
 1700  015160  000776                          BR      .-2
 1701  015162  012777  000101  164432  2$:     MOV     #101,@CSR       ;CLEAR EXT. INT.
 1702  015170  012777  023022  164426          MOV     #OOPS,@VEC0     ;RESET RETURN
 1703  015176  005037  177776                  CLR     PSW             ;LOWER PRIORITY
 1704
 1705  015202  005337  001726          DT3SP:  DEC     CYCLE           ;COUNT A SUBPASS
 1706  015206  001402                          BEQ     1$              ;BR=DONE
 1707  015210  000137  013212                  JMP     SECT2           ;CONTINUE
 1708  015214  005737  001744          1$:     TST     ONOFF           ;FIRST MASTER OR SLAVE
 1709  015220  001401                          BEQ     2$              ;BR=SLAVE
 1710  015222  000405                          BR      MULEND          ;MASTER REPORTS ENDPASS
 1711  015224  012737  177777  022006  2$:     MOV     #-1,TRIG        ;SET TRIGGER FOR SLAVE
 1712  015232  000137  013212                  JMP     SECT2           ;CONTINUE SLAVE AT SECT2
 1713
 1714  015236  005737  001744          MULEND: TST     ONOFF           ;WAS THIS FIRST SLAVE?
 1715  015242  001405                          BEQ     1$              ;BR=YES
 1716  015244  012737  012762  021652          MOV     #MULDT3,$RTNAD  ;SET RETURN
 1717  015252  000137  021554                  JMP     $EOP+2          ;GO DO ENDPASS
 1718  015256  012737  015270  021652  1$:     MOV     #2$,$RTNAD      ;SET RETURN
```

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 1719  015264  000137  021554            2$:     JMP     $EOP+2          ;GO DO ENDPASS
 1720  015270  004737  021774                    JSR     PC,WAIT20       ;WAIT 2 SECONDS
 1721  015274  000137  012762                    JMP     MULDT3          ;GO TO IT!
```

```
1723
1724                                    .SBTTL
1725                                    .SBTTL MANUAL INTERVENTION TEST
1726
1727  015300                            MANIN:
1728  015300  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
1729  015304  005737  001634                    TST     DT03            ;CHECK DT03 MODE
1730  015310  001402                            BEQ     MANMOD          ;BR=DT07 MODE
1731  015312  000137  016376                    JMP     PWROK           ;SKIP OVER MANUAL MODE TEST IF DT03
1732  015316                            MANMOD:
1733  015316  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
1734  015322  005077  164274                    CLR     @CSR            ;CLEAR CSR
1735  015326  104401  015334                    TYPE    ,65$            ;;TYPE ASCIZ STRING
 (1)  015332  000427                            BR      64$             ;;GET OVER THE ASCIZ
 (1)                                    ;;65$:  .ASCIZ  <200>/PUT THIS DT07 IN MANUAL MODE THEN TYPE <CR>./
 (1)  015412                            64$:
1736  015412  104410                            RDCHR
1737  015414  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
1738  015416  032777  002000  164176    1$:     BIT     #2000,@CSR      ;MANUAL MODE SET?
1739  015424  001042                            BNE     2$              ;BR=YES
1740  015426  104401  015434                    TYPE    ,67$            ;;TYPE ASCIZ STRING
 (1)  015432  000430                            BR      66$             ;;GET OVER THE ASCIZ
 (1)                                    ;;67$:  .ASCIZ  <200>/ERROR1!  MANUAL MODE (BIT10) IS NOT SET. CSR= /
 (1)  015514                            66$:
1741  015514  017746  164102                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  015520  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1742  015522  000000                            HALT
1743  015524  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
1744  015530  000672                            BR      MANMOD          ;GO TRY AGAIN
1745  015532  012777  000001  164062    2$:     MOV     #1,@CSR         ;TRY TO SET REQ IN MAN.MOD.
1746  015540  032777  000001  164054            BIT     #1,@CSR         ;SET?
1747  015546  001445                            BEQ     3$              ;BR=NO
1748  015550  104401  015556                    TYPE    ,69$            ;;TYPE ASCIZ STRING
 (1)  015554  000433                            BR      68$             ;;GET OVER THE ASCIZ
 (1)                                    ;;69$:  .ASCIZ  <200>/ERROR2! REQ BIT NOT DISABLED IN MANUAL MODE.  CSR= /
 (1)  015644                            68$:
1749  015644  017746  163752                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  015650  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1750  015652  000000                            HALT
1751  015654  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
1752  015660  000724                            BR      2$              ;TRY AGAIN
1753  015662                            3$:
 (1)  015662  104401  015670                    TYPE    ,71$            ;;TYPE ASCIZ STRING
 (1)  015666  000426                            BR      70$             ;;GET OVER THE ASCIZ
 (1)                                    ;;71$:  .ASCIZ  <200>/CONNECT THIS DT07 MANUALY THEN TYPE <CR>./
 (1)  015744                            70$:
1754  015744  104410                            RDCHR
1755  015746  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
1756  015750  032777  000001  163644            BIT     #1,@CSR         ;IS REQ SET NOW?
1757  015756  001041                            BNE     4$              ;BR=YES
1758  015760  104401  015766                    TYPE    ,73$            ;;TYPE ASCIZ STRING
 (1)  015764  000431                            BR      72$             ;;GET OVER THE ASCIZ
 (1)                                    ;;73$:  .ASCIZ  <200>/ERROR3! REQ. BIT NOT SET WHEN CONNECTED.  CSR= /
 (1)  016050                            72$:
1759  016050  017746  163546                    MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  016054  104402                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
```

```
1760  016056  000000                          HALT
1761  016060  000700                          BR      3$
1762  016062  000005                  4$:     RESET                   ;RESET THE BUSS
1763  016064  032777  000001  163530          BIT     #1,@CSR         ;REQ STILL THERE?
1764  016072  001034                          BNE     5$              ;BR=YES
1765  016074  104401  016102                  TYPE    ,75$            ;;TYPE ASCIZ STRING
 (1)  016100  000424                          BR      74$             ;;GET OVER THE ASCIZ
 (1)                                  ;;75$:  .ASCIZ  <200>/ERROR4! RESET CLEARED REQ. BIT.  CSR= /
 (1)  016152                          74$:
1766  016152  017746  163444                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  016156  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1767  016160  000000                          HALT
1768  016162  000737                          BR      4$
1769  016164                          5$:
 (1)  016164  104401  016172                  TYPE    ,77$            ;;TYPE ASCIZ STRING
 (1)  016170  000432                          BR      76$             ;;GET OVER THE ASCIZ
 (1)                                  ;;77$:  .ASCIZ  <200>/PUT THIS DT07 IN PROGRAMMABLE MODE THEN TYPE <CR>./
 (1)  016256                          76$:
1770  016256  104410                          RDCHR
1771  016260  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
1772  016262  032777  002000  163332          BIT     #2000,@CSR      ;MAN.MOD. GONE?
1773  016270  001442                          BEQ     PWROK           ;BR=YES
1774  016272  104401  016300                  TYPE    ,79$            ;;TYPE ASCIZ STRING
 (1)  016276  000432                          BR      78$             ;;GET OVER THE ASCIZ
 (1)                                  ;;79$:  .ASCIZ  <200>/ERROR5!  MANUAL MODE (BIT10) DIDN'T CLEAR.  CSR= /
 (1)  016364                          78$:
1775  016364  017746  163232                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  016370  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1776  016372  000000                          HALT
1777  016374  000673                          BR      5$
1778  016376                          PWROK:
1779  016376  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL C?
1780  016402  005077  163214                  CLR     @CSR            ;CLEAR DEVICE
1781  016406  104401  016414                  TYPE    ,65$            ;;TYPE ASCIZ STRING
 (1)  016412  000422                          BR      64$             ;;GET OVER THE ASCIZ
 (1)                                  ;;65$:  .ASCIZ  <200>/POWER UP ALL DT07S THEN TYPE <CR>./
 (1)  016460                          64$:
1782  016460  104410                          RDCHR
1783  016462  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
1784  016464  032777  004000  163130  1$:     BIT     #4000,@CSR      ;PWROK OK?
1785  016472  001034                          BNE     2$              ;BR=YES
1786  016474  104401  016502                  TYPE    ,67$            ;;TYPE ASCIZ STRING
 (1)  016500  000424                          BR      66$             ;;GET OVER THE ASCIZ
 (1)                                  ;;67$:  .ASCIZ  <200>/ERROR6! PWR.OK (BIT11) NOT SET.  CSR= /
 (1)  016552                          66$:
1787  016552  017746  163044                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  016556  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1788  016560  000000                          HALT
1789  016562  000705                          BR      PWROK
1790  016564  005037  177776          2$:     CLR     PSW             ;LOWER PRIORITY
1791  016570  004737  021674                  JSR     PC,CONNEC       ;GO CONNECT
1792  016574  104401  016602                  TYPE    ,69$            ;;TYPE ASCIZ STRING
 (1)  016600  000423                          BR      68$             ;;GET OVER THE ASCIZ
 (1)                                  ;;69$:  .ASCIZ  <200>/POWER DOWN OTHER CPU THEN TYPE <CR>./
 (1)  016650                          68$:
1793  016650  104410                          RDCHR
```

```
                                                MOV     (SP)+,R0        ;;POP STACK INTO R0
                                                BIT     #4000,@CSR      ;PWROK NOT OK?
                                                BEQ     3$              ;BR=OK
                                                TYPE    ,71$            ;;TYPE ASCIZ STRING
                                                BR      70$             ;;GET OVER THE ASCIZ
                                        ;;71$:  .ASCIZ  <200>/ERROR7! PWR. OK (BIT11) NOT CLEARED.  CSR= /
                                        70$:
                                                MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
                                                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                                                HALT
                                                JSR     PC,CNTLC        ;IS IT CONTROL C?
                                                BR      2$
                                        3$:     BIT     #200,@CSR       ;STILL CONNECTED?
                                                BNE     4$              ;BR=YES
                                                TYPE    ,73$            ;;TYPE ASCIZ STRING
                                                BR      72$             ;;GET OVER THE ASCIZ
                                        ;;73$:  .ASCIZ  <200>/ERROR8! LOST SHARED BUSS.  CSR= /
                                        72$:
                                                MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
                                                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                                                HALT
                                                JMP     PWROK
                                        4$:
                                                TYPE    ,75$            ;;TYPE ASCIZ STRING
                                                BR      74$             ;;GET OVER THE ASCIZ
                                        ;;75$:  .ASCIZ  <200>/RESTORE ALL DT07S TO ORIGINAL STATE THEN TYPE <CR>./
                                        74$:
                                                RDCHR
                                                MOV     (SP)+,R0        ;;POP STACK INTO R0

                                        SWBPWF:
                                                JSR     PC,CNTLC        ;IS IT CONTROL C?
                                                CLR     @CSR            ;CLEAR DEVICE
                                                MOV     @#PWRVEC,-(SP)          ;;PUSH @#PWRVEC ON STACK
                                                MOV     #11$,@#PWRVEC   ;SET RETURN
                                                MOV     #100,@CSR       ;SET I.E.
                                        1$:     CLR     PSW             ;LOWER PRIORITY
                                                TYPE    ,65$            ;;TYPE ASCIZ STRING
                                                BR      64$             ;;GET OVER THE ASCIZ
                                        ;;65$:  .ASCIZ  <200>/POWER DOWN THE SHARED BUSS THEN TYPE <CR>./
                                        64$:
                                                RDCHR
                                                MOV     (SP)+,R0        ;;POP STACK INTO R0
                                                BIT     #40000,@CSR     ;SWB PWF SET?
                                                BNE     2$              ;BR=YES
                                                TYPE    ,67$            ;;TYPE ASCIZ STRING
                                                BR      66$             ;;GET OVER THE ASCIZ
                                        ;;67$:  .ASCIZ  <200>/ERROR8!  SWB PWF (BIT14) NOT SET.  CSR= /
                                        66$:
                                                MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
                                                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                                                HALT
                                                BR      1$
                                        11$:    MOV     #STACK,SP       ;RESET STACK
                                                TST     -(SP)           ;POSITION STACK
                                                MOV     (SP)+,@#PWRVEC          ;;POP STACK INTO @#PWRVEC
```

```
 1831  017420  104401  017426                        TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1)  017424  000440                                BR      68$             ;;GET OVER THE ASCIZ
  (1)                                        ;;69$:  .ASCIZ  <200>/ERROR9!  TRAP THRU POWER FAIL VECTOR WHEN DISCONNECTED.  CSR= /
  (1)  017526                                68$:
 1832  017526  017746  162070                        MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  017532  104402                                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1833  017534  000000                                HALT
 1834  017536  000611                                BR      SWBPWF
 1835  017540                                     2$:
  (1)  017540  104401  017546                        TYPE    ,71$            ;;TYPE ASCIZ STRING
  (1)  017544  000423                                BR      70$             ;;GET OVER THE ASCIZ
  (1)                                        ;;71$:  .ASCIZ  <200>/POWER UP SHARED BUSS THEN TYPE <CR>/
  (1)  017614                                70$:
 1836  017614  104410                                RDCHR
 1837  017616  012600                                MOV     (SP)+,R0        ;;POP STACK INTO R0
 1838  017620  032777  040000  161774                BIT     #40000,@CSR     ;DID IT CLEAR?
 1839  017626  001441                                BEQ     3$              ;BR=YES
 1840  017630  104401  017636                        TYPE    ,73$            ;;TYPE ASCIZ STRING
  (1)  017634  000430                                BR      72$             ;;GET OVER THE ASCIZ
  (1)                                        ;;73$:  .ASCIZ  <200>/ERROR10!  SWB PWF (BIT14) DIDN'T CLEAR.  CSR= /
  (1)  017716                                72$:
 1841  017716  017746  161700                        MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  017722  104402                                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1842  017724  000000                                HALT
 1843  017726  000137  017212                        JMP     1$
 1844           017732                     ERREN=.
 1845  017732  005077  161664                3$:     CLR     @CSR    ;CLEAR IT
 1846  017736  012737  020170  000024                MOV     #PFVSEV,@#PWRVEC        ;SET RETURNS
 1847  017744  012777  021024  161652                MOV     #PWFSER,@VEC0
 1848  017752  005037  177776                        CLR     PSW
 1849  017756  004737  021674                        JSR     PC,CONNEC       ;GO CONNECT
 1850  017762  052777  000100  161632                BIS     #100,@CSR       ;SET I.E.
 1851  017770  104401  017776                        TYPE    ,75$            ;;TYPE ASCIZ STRING
  (1)  017774  000423                                BR      74$             ;;GET OVER THE ASCIZ
  (1)                                        ;;75$:  .ASCIZ  <200>/POWER THE SHARED BUSS DOWN THEN UP./
  (1)  020044                                74$:
 1852  020044  012737  011470  022062                MOV     #11470,TOCK     ;SET TIMER FOR 1 MIN.
 1853  020052  004737  022022                        JSR     PC,WAIT
 1854  020056  104401  020064                        TYPE    ,77$            ;;TYPE ASCIZ STRING
  (1)  020062  000435                                BR      76$             ;;GET OVER THE ASCIZ
  (1)                                        ;;77$:  .ASCIZ  <200>/ERROR11!  NO EVIDENCE OF POWER FAILURE DETECTED.  CSR= /
  (1)  020156                                76$:
 1855  020156  017746  161440                        MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  020162  104402                                TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 1856  020164  000000                                HALT
 1857  020166  000661                                BR      3$
 1858
 1859  020170                                PFVSEV:
 1860  020170  004737  026620                        JSR     PC,CNTLC        ;IS IT CONTROL C?
 1861  020174  017737  161422  001126                MOV     @CSR,BAD        ;SAVE CSR CONTENTS
 1862  020202  042737  000400  001126                BIC     #400,BAD        ;MASK BRQ IF PRESENT
 1863  020210  042777  000100  161404                BIC     #100,@CSR       ;DROP I.E.
 1864  020216  012737  020226  000024                MOV     #1$,@#PWRVEC    ;POINT TO POWER UP ROUTINE
 1865  020224  000000                                HALT    ;IF YOU STOPPED HERE NO POWER UP TRAP OCCURED
 1866  020226  017737  161370  002674  1$:     MOV     @CSR,TEMP2      ;STORE CSR
 1867  020234  013737  001752  001124                MOV     KONST,GOOD      ;ASSEMBLE GOOD DATA
```

```
1868  020242  062737  060301  001124          ADD     #60301,GOOD
1869  020250  023737  001124  001126          CMP     GOOD,BAD        ;CORRECT AT PWR DOWN?
1870  020256  001465                          BEQ     2$              ;BR=YES
1871  020260  104401  020266                  TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1) 020264  000433                          BR      64$             ;;GET OVER THE ASCIZ
  (1)                               ;;65$:    .ASCIZ  <200>/ERROR12!  CSR INCORRECT @ POWER DOWN TIME.  CSR WAS /
  (1) 020354                        64$:
1872  020354  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1) 020360  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1873  020362  104401  020370                  TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1) 020366  000410                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                               ;;67$:    .ASCIZ  <200>/IT SHOULD BE /
  (1) 020410                        66$:
1874  020410  013746  001124                  MOV     GOOD,-(SP)      ;;SAVE GOOD FOR TYPEOUT
  (1) 020414  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1875  020416  000000                          HALT
1876  020420  012706  001100          11$:    MOV     #STACK,SP       ;RESET STACK
1877  020424  005746                          TST     -(SP)           ;POSITION STACK
1878  020426  000137  017732                  JMP     ERREN
1879  020432  013737  002674  001126  2$:     MOV     TEMP2,BAD       ;GET PWR UP DATA
1880  020440  042737  000400  001126          BIC     #400,BAD        ;MASK BRQ IF PRESENT
1881  020446  162737  020301  001124          SUB     #20301,GOOD     ;CORRECT GOOD DATA
1882  020454  023737  001124  001126          CMP     GOOD,BAD        ;CORRECT @ PWR UP?
1883  020462  001460                          BEQ     3$              ;BR=YES
1884  020464  104401  020472                  TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1) 020470  000432                          BR      68$             ;;GET OVER THE ASCIZ
  (1)                               ;;69$:    .ASCIZ  <200>/ERROR13!  CSR INCORRECT @ POWER UP TIME. CSR WAS /
  (1) 020556                        68$:
1885  020556  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
  (1) 020562  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1886  020564  104401  020572                  TYPE    ,71$            ;;TYPE ASCIZ STRING
  (1) 020570  000410                          BR      70$             ;;GET OVER THE ASCIZ
  (1)                               ;;71$:    .ASCIZ  <200>/IT SHOULD BE /
  (1) 020612                        70$:
1887  020612  013746  001124                  MOV     GOOD,-(SP)      ;;SAVE GOOD FOR TYPEOUT
  (1) 020616  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1888  020620  000000                          HALT
1889  020622  000676                          BR      11$
1890  020624  032777  040000  160770  3$:     BIT     #40000,@CSR     ;DID SWB PWF CLEAR?
1891  020632  001442                          BEQ     4$              ;BR=YES
1892  020634  104401  020642                  TYPE    ,73$            ;;TYPE ASCIZ STRING
  (1) 020640  000430                          BR      72$             ;;GET OVER THE ASCIZ
  (1)                               ;;73$:    .ASCIZ  <200>/ERROR14!  SWB PWF (BIT14) DIDN'T CLEAR.  CSR= /
  (1) 020722                        72$:
1893  020722  017746  160674                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1) 020726  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1894  020730  000000                          HALT
1895  020732  004737  026620                  JSR     PC,CNTLC        ;IS IT CONTROL C?
1896  020736  000630                          BR      11$
1897  020740                            4$:
  (1) 020740  104401  020746                  TYPE    ,75$            ;;TYPE ASCIZ STRING
  (1) 020744  000420                          BR      74$             ;;GET OVER THE ASCIZ
  (1)                               ;;75$:    .ASCIZ  <200>/THIS DT07 TRAPS ON POWER FAIL!/
  (1) 021006                        74$:
1898          021006                POSTSV=.
1899  021006  012706  001100                  MOV     #STACK,SP       ;RESET STACK
```

```
1900  021012  005746                          TST     -(SP)           ;POSITION STACK
1901  021014  012637  000024                  MOV     (SP)+,@#PWRVEC          ;;POP STACK INTO @#PWRVEC
1902  021020  000137  021500                  JMP     MANEND
1903
1904  021024  017737  160572  001126  PWFSER: MOV     @CSR,BAD        ;SAVE CSR
1905  021032  042737  000400  001126          BIC     #400,BAD        ;MASK BRQ IF PRESENT
1906  021040  013737  001752  001124          MOV     KONST,GOOD      ;ASSEMBLE GOOD DATA
1907  021046  062737  060301  001124          ADD     #60301,GOOD
1908  021054  023737  001124  001126          CMP     GOOD,BAD        ;CORRECT @PWR DOWN?
1909  021062  001457                          BEQ     1$              ;BR=YES
1910  021064  104401  021072                  TYPE    ,65$            ;;TYPE ASCIZ STRING
 (1)  021070  000427                          BR      64$             ;;GET OVER THE ASCIZ
 (1)                                  ;;65$:  .ASCIZ  <200>/ERROR15!  CSR INCORRECT @ POWER DOWN.  WAS /
 (1)  021150                          64$:
1911  021150  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
 (1)  021154  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1912  021156  104401  021164                  TYPE    ,67$            ;;TYPE ASCIZ STRING
 (1)  021162  000406                          BR      66$             ;;GET OVER THE ASCIZ
 (1)                                  ;;67$:  .ASCIZ  <200>/SHOULD BE /
 (1)  021200                          66$:
1913  021200  013746  001124                  MOV     GOOD,-(SP)      ;;SAVE GOOD FOR TYPEOUT
 (1)  021204  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1914  021206  000000                          HALT
1915  021210  012706  001100          11$:    MOV     #STACK,SP       ;RESET STACK
1916  021214  005746                          TST     -(SP)           ;POSITION STACK
1917  021216  000137  017732                  JMP     ERREN
1918  021222  012737  000632  022062  1$:     MOV     #632,TOCK       ;SET TIMER FOR 5SEC.
1919  021230  004737  022022                  JSR     PC,WAIT ;GO WAIT
1920  021234  017737  160362  001126          MOV     @CSR,BAD        ;SAVE CSR
1921  021242  042737  000400  001126          BIC     #400,BAD        ;MASK BRQ IF PRESENT
1922  021250  162737  060201  001124          SUB     #60201,GOOD     ;CORRECT DATA
1923  021256  023737  001124  001126          CMP     GOOD,BAD        ;CORRECT NOW?
1924  021264  001455                          BEQ     2$              ;BR=YES
1925  021266  104401  021274                  TYPE    ,69$            ;;TYPE ASCIZ STRING
 (1)  021272  000431                          BR      68$             ;;GET OVER THE ASCIZ
 (1)                                  ;;69$:  .ASCIZ  <200>/ERROR16! CSR INCORRECT AFTER POWER UP. CSR WAS /
 (1)  021356                          68$:
1926  021356  017746  160240                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
 (1)  021362  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1927  021364  104401  021372                  TYPE    ,71$            ;;TYPE ASCIZ STRING
 (1)  021370  000406                          BR      70$             ;;GET OVER THE ASCIZ
 (1)                                  ;;71$:  .ASCIZ  <200>/SHOULD BE /
 (1)  021406                          70$:
1928  021406  013746  001124                  MOV     GOOD,-(SP)      ;;SAVE GOOD FOR TYPEOUT
 (1)  021412  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1929  021414  000000                          HALT
1930  021416  000674                          BR      11$
1931  021420                          2$:
 (1)  021420  104401  021426                  TYPE    ,73$            ;;TYPE ASCIZ STRING
 (1)  021424  000423                          BR      72$             ;;GET OVER THE ASCIZ
 (1)                                  ;;73$:  .ASCIZ  <200>/THIS DT07 INTERRUPTS ON POWER FAIL!/
 (1)  021474                          72$:
1932  021474  000137  021006                  JMP     POSTSV
1933
1934  021500                          MANEND:
 (1)  021500  104401  021506                  TYPE    ,65$            ;;TYPE ASCIZ STRING
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   (1)  021504  000420                        BR      64$             ;;GET OVER THE ASCIZ
   (1)                                ;;65$:  .ASCIZ  <200>/MANUAL INTERVENTION TEST DONE./
   (1)  021546                        64$:
  1935  021546  000000                        HALT
  1936  021550  000776                        BR      .-2
```

```
  1938                                ;       NEWTST  <<INSERT NEXT TEST HERE>>
```

```
 1940                                   .SBTTL  END OF PASS ROUTINE
  (1)
  (2)                                   ;;**********************************************************************
  (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 RESTRT
  (1)
  (1)  021552                           $EOP:
  (1)  021552  000004                           SCOPE
  (1)  021554  005037  001102                   CLR     $TSTNM          ;;ZERO THE TEST NUMBER
  (1)  021560  005037  001172                   CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
  (1)  021564  005237  001214                   INC     $PASS           ;;INCREMENT THE PASS NUMBER
  (1)  021570  042737  100000  001214          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
  (1)  021576  005327                           DEC     (PC)+           ;;LOOP?
  (1)  021600  000001           $EOPCT: .WORD   1
  (1)  021602  003022                           BGT     $DOAGN          ;;YES
  (1)  021604  012737                           MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
  (1)  021606  000001           $ENDCT: .WORD   1
  (1)  021610  021600                           $EOPCT
  (1)  021612  104401  021657                   TYPE    ,$ENDMG         ;;TYPE "END PASS #"
  (2)  021616  013746  001214                   MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
  (2)  021622  104405                           TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
  (1)  021624  104401  021654                   TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
  (1)  021630  013700  000042   $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
  (1)  021634  001405                           BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
  (1)  021636  000005                           RESET                   ;;CLEAR THE WORLD
  (1)  021640  004710           $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
  (1)  021642  000240                           NOP                     ;;SAVE ROOM
  (1)  021644  000240                           NOP                     ;;FOR
  (1)  021646  000240                           NOP                     ;;ACT11
  (1)  021650                           $DOAGN:
  (1)  021650  000137                           JMP     @(PC)+          ;;RETURN
  (1)  021652  002526           $RTNAD: .WORD   RESTRT
  (1)  021654     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
  (1)  021657     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
  (1)  021664  050040  051501  020123
  (1)  021672  000043
```

```
                                        .SBTTL USER ROUTINES

021674  012737  000240  021710  CONNEC: MOV     #240,2$         ;SET SWITCH
021702  105777  157714          1$:     TSTB    @CSR            ;ALL READY CONNECTED?
021706  100410                          BMI     3$              ;BR = YES
021710  000774                  2$:     BR      1$              ;CONTINUE
021712  012777  000001  157702          MOV     #1,@CSR         ;CONNECT
021720  012737  000774  021710          MOV     #774,2$         ;RESTORE SWITCH
021726  000765                          BR      1$              ;BR UNTIL CONNECTED
021730  000207                  3$:     RTS     PC              ;EXIT

021732  012737  000004  001730  CONID:  MOV     #4,COVID        ;CONVERT SLAVE ID
021740  013700  001724                  MOV     CURID,R0        ;SAVE CURRANT ID
021744  001405                  1$:     BEQ     2$              ;BR IF DONE
021746  000241                          CLC
021750  006137  001730                  ROL     COVID           ;SHIFT ID
021754  005300                          DEC     R0              ;COUNT DOWN TO ZERO
021756  000772                          BR      1$
021760  000207                  2$:     RTS     PC              ;EXIT

021762  012737  000122  022062  WAIT10: MOV     #122,TOCK               ;SET CLOCK
021770  000137  022022                  JMP     WAIT
021774  012737  000244  022062  WAIT20: MOV     #244,TOCK               ;SET CLOCK
022002  000137  022022                  JMP     WAIT
022006  000000                  TRIG:   000
022010  012737  000051  022062  WAIT05: MOV     #51,TOCK                ;SET CLOCK
022016  000137  022022                  JMP     WAIT
022022  013737  001746  022060  WAIT:   MOV     TIMA,TICK       ;SET BASE TIMER
022030  005777  157566          1$:     TST     @CSR
022034  000400                          BR      .+2
022036  005337  022060                  DEC     TICK
022042  001372                          BNE     1$
022044  005337  022062                  DEC     TOCK
022050  001364                          BNE     WAIT
022052  005237  022062                  INC     TOCK
022056  000207                          RTS     PC
022060  000000                  TICK:   0
022062  000000                  TOCK:   0


022064  005000                  SYNCUP: CLR     R0              ;SET DELAY TIME
022066  012701  000400                  MOV     #400,R1
022072  032777  020000  157522  1$:     BIT     #20000,@CSR             ;BUSS ACTIVE?
022100  001434                          BEQ     2$              ;BR=NO
022102  005200                          INC     R0              ;TIME OUT
022104  001372                          BNE     1$
022106  005301                          DEC     R1
022110  001370                          BNE     1$
022112  104401  022120                  TYPE    ,65$            ;;TYPE ASCIZ STRING
(1)     022116  000420                  BR      64$             ;;GET OVER THE ASCIZ
(1)                             ;;65$:  .ASCIZ  <200>/SYNCRONIZATION FAILURE!  CSR= /
(1)     022160                  64$:
022160  017746  157436                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
```

```
  (1)  022164  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
1995   022166  000000                          HALT
1996   022170  000776                          BR      .-2
1997   022172  005000                  2$:     CLR     R0              ;RESET DELAY TIME
1998   022174  012701  000000                  MOV     #0,R1
1999   022200  032777  020000  157414  3$:     BIT     #20000,@CSR     ;BUSS ACTIVE?
2000   022206  001043                          BNE     4$              ;BR=YES
2001   022210  005200                          INC     R0              ;TIME OUT
2002   022212  001372                          BNE     3$
2003   022214  005301                          DEC     R1
2004   022216  001370                          BNE     3$
2005   022220  104401  022226                  TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1)  022224  000427                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                                  ;;67$:  .ASCIZ  <200>/MASTER PORT DIDN'T TAKE SHARED BUSS!  CSR= /
  (1)  022304                          66$:
2006   022304  017746  157312                  MOV     @CSR,-(SP)      ;;SAVE @CSR FOR TYPEOUT
  (1)  022310  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2007   022312  000000                          HALT
2008   022314  000776                          BR      .-2
2009   022316  000207                  4$:     RTS     PC              ;EXIT
2010
2011
2012
2013                                         ;CONSTRUCT SEQUENCER
2014   022320  012701  001644          SEQMAK: MOV     #PORTNO,R1      ;STORE ADDRESS OF DATA
2015   022324  012702  001732                  MOV     #TEMP1,R2       ;SET TEMPORARY STORAGE POINTER
2016   022330  012703  001660                  MOV     #SEQ,R3         ;LOAD FIRST SEQUENCER ADDRESS
2017   022334  005037  001656                  CLR     EXPTCT          ;CLEAR PORT COUNT
2018   022340  012122                  1$:     MOV     (R1)+,(R2)+     ;FILL TEMP
2019   022342  005237  001656                  INC     EXPTCT          ;COUNT THEM
2020   022346  005711                          TST     @R1             ;LAST ONE
2021   022350  100373                          BPL     1$              ;BR=NO
2022   022352  012712  177777                  MOV     #-1,@R2         ;TERMINATE DATA
2023   022356  005001                          CLR     R1              ;LOAD DETECTOR
2024   022360  012702  001732          2$:     MOV     #TEMP1,R2       ;RESET DATA POINTER
2025   022364  020112                  3$:     CMP     R1,(R2)         ;ID FOUND?
2026   022366  001407                          BEQ     5$              ;BR=YES
2027   022370  005722                  4$:     TST     (R2)+           ;STEP AND TEST FOR LAST
2028   022372  100374                          BPL     3$              ;BR IF NOT DONE
2029   022374  005201                          INC     R1              ;STEP DETECTOR
2030   022376  022701  000004                  CMP     #4,R1           ;CHECK FOR DONE
2031   022402  001366                          BNE     2$              ;BR IF NOT DONE
2032   022404  000404                          BR      6$              ;FINISH UP
2033   022406  011223                  5$:     MOV     @R2,(R3)+       ;LOAD SEQUENCER
2034   022410  012712  000400                  MOV     #400,@R2        ;ERASE ENTRY
2035   022414  000765                          BR      4$              ;CONTINUE
2036   022416  005337  001656          6$:     DEC     EXPTCT          ;CORRECT EXTERNAL PORT COUNT
2037   022422  012713  177777                  MOV     #-1,@R3         ;TERMINATE SEQUENCER
2038   022426  000207                          RTS     PC              ;EXIT
2039
2040
2041
2042                                         ;ROUTINE TO ASSEMBLE MENUS
2043   022430  012737  177777  001744  MASMEN: MOV     #-1,ONOFF       ;SET MASTER/SLAVE INDICATOR
2044   022436  004737  023124                  JSR     PC,FLUSHM       ;GO FLUSH MENU
2045   022442  012701  001676                  MOV     #MENU,R1        ;SET POINTER
```

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2046  022446  117721  157222           1$:     MOVB    @NEXENT,(R1)+   ;LOAD MENU WITH SLAVE ID
2047  022452  112721  000001                   MOVB    #1,(R1)+        ;LOAD FUNCTION #1
2048  022456  004737  022764                   JSR     PC,STPNEX       ;GET NEXT SLAVE ID
2049  022462  000771                           BR      1$              ;CONTINUE
2050  022464  004737  022764           2$:     JSR     PC,STPNEX       ;GO GET NEXT ID
2051  022470  000405                           BR      3$              ;BR=NOT FINISHED
2052  022472  012711  177777                   MOV     #-1,@R1         ;TERMINATE MENU
2053  022476  012704  001676                   MOV     #MENU,R4        ;STORE MENUS
2054  022502  000207                           RTS     PC              ;EXIT
2055  022504  117721  157164           3$:     MOVB    @NEXENT,(R1)+
2056  022510  112721  000002                   MOVB    #2,(R1)+        ;LOAD FUNCTION #2
2057  022514  000763                           BR      2$              ;CONTINUE
2058
2059
2060  022516  005037  001744           SALMEN: CLR     ONOFF           ;CLR MASTER/SLAVE INDICATOR
2061  022522  004737  023124                   JSR     PC,FLUSHM       ;GO FLUSH MENU
2062  022526  012701  001676                   MOV     #MENU,R1        ;SET POINTER
2063  022532  027737  157136  001644   1$:     CMP     @NEXENT,PORTNO  ;IS THIS ME?
2064  022540  001010                           BNE     3$              ;BR=NO
2065  022542  117721  157126                   MOVB    @NEXENT,(R1)+   ;LOAD SLAVE ID
2066  022546  112721  000003                   MOVB    #3,(R1)+        ;LOAD FUNCTION 3
2067  022552  004737  022764           2$:     JSR     PC,STPNEX       ;GO GET NEXT ID
2068  022556  000765                           BR      1$              ;BR=NOT DONE
2069  022560  000405                           BR      4$              ;GO TO NEXT SET
2070  022562  117721  157106           3$:     MOVB    @NEXENT,(R1)+
2071  022566  112721  000005                   MOVB    #5,(R1)+        ;LOAD FUNCTION 5
2072  022572  000767                           BR      2$              ;CONTINUE
2073  022574  004737  022764           4$:     JSR     PC,STPNEX       ;GO GET NEXT ID
2074  022600  000405                           BR      5$              ;GO CONTINUE
2075  022602  012711  177777                   MOV     #-1,@R1         ;TERMINATE MENU
2076  022606  012704  001676                   MOV     #MENU,R4        ;STORE MENUS
2077  022612  000207                           RTS     PC              ;EXIT
2078  022614  027737  157054  001644   5$:     CMP     @NEXENT,PORTNO  ;IS THIS ME?
2079  022622  001014                           BNE     7$              ;BR=NO
2080  022624  117721  157044                   MOVB    @NEXENT,(R1)+
2081  022630  112721  000004                   MOVB    #4,(R1)+        ;LOAD FUNCTION 4
2082  022634  004737  022764           6$:     JSR     PC,STPNEX       ;GO GET NEXT ID
2083  022640  000765                           BR      5$              ;CONTINUE
2084  022642  012711  177777                   MOV     #-1,@R1         ;TERMINATE MENU
2085  022646  012704  001676                   MOV     #MENU,R4        ;STORE MENUS
2086  022652  000207                           RTS     PC              ;EXIT
2087  022654  117721  157014           7$:     MOVB    @NEXENT,(R1)+
2088  022660  112721  000005                   MOVB    #5,(R1)+        ;LOAD FUNCTION 5
2089  022664  000763                           BR      6$              ;CONTINUE
2090
2091
2092                                   ;ROUTINE TO INIT SEQUENCER
2093
2094  022666  012737  001660  001672   SEQINT: MOV     #SEQ,SEQPTR     ;SET POINTER TO FIRST ENTRY
2095  022674  012737  001662  001674           MOV     #SEQ+2,NEXENT   ;GET NEXT ENTRY
2096  022702  017705  156764                   MOV     @SEQPTR,R5      ;LOAD R5
2097  022706  000207                           RTS     PC              ;EXIT
2098  022710  062737  000002  001672   SEQSTP: ADD     #2,SEQPTR       ;STEP SEQUENCER
2099  022716  005777  156750                   TST     @SEQPTR         ;CHECK FOR END
2100  022722  100761                           BMI     SEQINT          ;RELOAD IF DONE
2101  022724  017705  156742                   MOV     @SEQPTR,R5
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 2102  022730  013737  001672  001674          MOV     SEQPTR,NEXENT   ;STEP NEXT ENTRY
 2103  022736  062737  000002  001674          ADD     #2,NEXENT
 2104  022744  005777  156724                  TST     @NEXENT         ;OFF THE END?
 2105  022750  100401                          BMI     2$              ;BR=YES
 2106  022752  000207                  1$:     RTS     PC              ;NO! EXIT
 2107  022754  012737  001660  001674  2$:     MOV     #SEQ,NEXENT     ;CORRECT POINTER
 2108  022762  000773                          BR      1$              ;EXIT
 2109  022764  062737  000002  001674  STPNEX: ADD     #2,NEXENT       ;STEP NEXT ENTRY
 2110  022772  005777  156676                  TST     @NEXENT         ;OFF THE END?
 2111  022776  100003                          BPL     1$              ;BR=NO
 2112  023000  012737  001660  001674          MOV     #SEQ,NEXENT     ;RESET
 2113  023006  027705  156662          1$:     CMP     @NEXENT,R5      ;BACK TO CURRENT DT07?
 2114  023012  001002                          BNE     2$              ;BR=NO
 2115  023014  062716  000002                  ADD     #2,@SP          ;SET UP FINISHED RETURN
 2116  023020  000207                  2$:     RTS     PC              ;EXIT
 2117
 2118
 2119  023022  011637  001126          OOPS:   MOV     @SP,BAD         ;SAVE ERROR PC
 2120  023026  104401  023034                  TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1) 023032  000427                          BR      64$             ;;GET OVER THE ASCIZ
   (1)                            ;;65$:   .ASCIZ  <200>/UNEXPECTED INTERUPT FROM DT07 AT ADDRESS.../
   (1) 023112                     64$:
 2121  023112  013746  001126                  MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
   (1) 023116  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 2122  023120  000000                          HALT
 2123  023122  000776                          BR      .-2
 2124
 2125  023124  012700  001676          FLUSHM: MOV     #MENU,R0        ;SET POINTER
 2126  023130  012701  000013                  MOV     #11.,R1         ;SET FLUSH COUNT
 2127  023134  012720  177777          1$:     MOV     #-1,(R0)+       ;FLUSH WITH -1
 2128  023140  005301                          DEC     R1              ;COUNT
 2129  023142  001374                          BNE     1$              ;CONT.
 2130  023144  000207                          RTS     PC              ;EXIT
 2131  023146  012700  001634          FLUSHP: MOV     #DT03,R0        ;LOAD POINTER
 2132  023152  012701  000017                  MOV     #15.,R1         ;SET COUNT
 2133  023156  012720  177777                  MOV     #-1,(R0)+       ;FLUSH
 2134  023162  005020                          CLR     (R0)+
 2135  023164  012720  177777          1$:     MOV     #-1,(R0)+       ;FLUSH WITH -1
 2136  023170  005301                          DEC     R1              ;COUNT
 2137  023172  001374                          BNE     1$              ;CONT
 2138  023174  000207                          RTS     PC              ;EXIT
 2139
 2140
 2141  023176                          DMODE:
 2142  023176  012737  000340  177776  3$:     MOV     #340,PSW        ;RISE PRIORITY
 2143  023204  012777  000001  156410          MOV     #1,@CSR         ;CONNECT
 2144  023212  017737  156404  001126  4$:     MOV     @CSR,BAD        ;SAVE CSR
 2145  023220  032737  000400  001126          BIT     #400,BAD        ;LOOK FOR BRQ
 2146  023226  001010                          BNE     5$              ;BR=FOUND
 2147  023230  032737  100000  001126          BIT     #100000,BAD     ;DID WE TIME OUT?
 2148  023236  001765                          BEQ     4$              ;BR=NO
 2149  023240  012737  177777  001634          MOV     #-1,DT03        ;INDIACATE DT03 MODE
 2150  023246  000531                          BR      8$              ;EXIT
 2151  023250  005037  001634          5$:     CLR     DT03            ;INDIACATE DT07 MODE
 2152  023254  013700  001126                  MOV     BAD,R0          ;SAVE IMAGE
 2153  023260  042700  177703                  BIC     #177703,R0      ;SAVE ONLY RQ0-3
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```
 2154  023264  000241                        CLC                     ;CONVERT RQ BIT
 2155  023266  006000                        ROR     R0
 2156  023270  006000                        ROR     R0
 2157  023272  005002                        CLR     R2
 2158  023274  032700  000001        6$:     BIT     #1,R0           ;BIT SET?
 2159  023300  001051                        BNE     7$              ;BR=YES
 2160  023302  005202                        INC     R2              ;STEP INDIACATOR
 2161  023304  000241                        CLC
 2162  023306  006000                        ROR     R0
 2163  023310  022702  000004              CMP     #4,R2           ;TOO HIGH?
 2164  023314  101367                        BHI     6$              ;BR =NO
 2165  023316  104401  023324              TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1) 023322  000433                        BR      64$             ;;GET OVER THE ASCIZ
   (1)                             ;;65$:  .ASCIZ  <200>/ERROR!  BRQ DETECTED WITHOUT ANY RQ. BIT SET.  CSR= /
   (1) 023412                      64$:
 2166  023412  013746  001126              MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
   (1) 023416  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 2167  023420  000000                        HALT                    ;FATAL ERROR BRQ SEEN BUT NO RQ
 2168  023422  000776                        BR      .-2
 2169  023424  010237  001644        7$:     MOV     R2,PORTNO       ;LOAD PORT ID#
 2170  023430  000241                        CLC
 2171  023432  006000                        ROR     R0              ;MAKE SURE ONLY ONE RQ IS PRESENT
 2172  023434  001436                        BEQ     8$              ;BR=OK
 2173  023436  104401  023444              TYPE    ,67$            ;;TYPE ASCIZ STRING
   (1) 023442  000426                        BR      66$             ;;GET OVER THE ASCIZ
   (1)                             ;;67$:  .ASCIZ  <200>/ERROR!  MORE THAN ONE RQ. BIT SET.  CSR= /
   (1) 023520                      66$:
 2174  023520  013746  001126              MOV     BAD,-(SP)       ;;SAVE BAD FOR TYPEOUT
   (1) 023524  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 2175  023526  000000                        HALT
 2176  023530  000776                        BR      .-2
 2177  023532  005077  156064        8$:     CLR     @CSR            ;CLEAR AND DISCONNECT AND EXIT
 2178  023536  000207                        RTS     PC
 2179
 2180
 2181  023540  012737  000340  177776  DTIME:  MOV     #340,PSW        ;LOCK OUT INTERUPTS
 2182  023546  005037  001746              CLR     TIMA            ;CLEAR TIMERS
 2183  023552  005077  156044              CLR     @CSR            ;CLEAR DEVICE
 2184  023556  105777  156040        1$:     TSTB    @CSR            ;MAKE SURE IT'S CLEAR
 2185  023562  100775                        BMI     1$
 2186  023564  005277  156032              INC     @CSR            ;SET REQ
 2187  023570  005777  156026        2$:     TST     @CSR            ;TMO SET?
 2188  023574  100424                        BMI     3$              ;BR=YES
 2189  023576  005237  001746              INC     TIMA            ;COUNT
 2190  023602  001372                        BNE     2$
 2191  023604  104401  023612              TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1) 023610  000415                        BR      64$             ;;GET OVER THE ASCIZ
   (1)                             ;;65$:  .ASCIZ  <200>/ERROR! TIMING TOO LONG!/
   (1) 023644                      64$:
 2192  023644  000000                        HALT
 2193  023646  005037  177776        3$:     CLR     PSW             ;LOWER PRIORITY
 2194  023652  012777  000001  155742        MOV     #1,@CSR         ;CONNECT
 2195  023660  105777  155736        4$:     TSTB    @CSR            ;CONNECTED?
 2196  023664  100375                        BPL     4$
 2197  023666  005037  001750              CLR     TIMB            ;CLAER WATCHDOG TIMER
 2198  023672  012737  000340  177776        MOV     #340,PSW        ;RISE PRIORITY
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 2199  023700  005377  155716          DEC     @CSR            ;DROP REQ
 2200  023704  005777  155712  5$:     TST     @CSR            ;LOOK FOR TMO
 2201  023710  100430                  BMI     6$              ;BR=FOUND
 2202  023712  005237  001750          INC     TIMB
 2203  023716  001372                  BNE     5$
 2204  023720  104401  023726          TYPE    ,67$            ;;TYPE ASCIZ STRING
   (1) 023724  000421                  BR      66$             ;;GET OVER THE ASCIZ
   (1)                         ;;67$:  .ASCIZ  <200>/ERROR! WATCHDOG TIMING TOO LONG!/
   (1) 023770                  66$:
 2205  023770  000000                  HALT
 2206  023772  013700  001746  6$:     MOV     TIMA,R0         ;COMPARE TIMING FOR PROPER RATIO
 2207  023776  013701  001750          MOV     TIMB,R1
 2208  024002  005002                  CLR     R2
 2209  024004  012703  000031          MOV     #25.,R3
 2210  024010  060002          7$:     ADD     R0,R2           ;MULTIPLY TIMA BY 25
 2211  024012  005303                  DEC     R3
 2212  024014  001375                  BNE     7$              ;BR=NOT DONE
 2213  024016  160102          8$:     SUB     R1,R2           ;DIVIDE TIMA BY TIMB
 2214  024020  005203                  INC     R3
 2215  024022  020102                  CMP     R1,R2           ;DONE?
 2216  024024  101774                  BLOS    8$              ;BR=NO
 2217  024026  020327  000033          CMP     R3,#33          ;TOO LOW?
 2218  024032  103034                  BHIS    9$              ;BR=NO
 2219  024034  104401  024042          TYPE    ,69$            ;;TYPE ASCIZ STRING
   (1) 024040  000427                  BR      68$             ;;GET OVER THE ASCIZ
   (1)                         ;;69$:  .ASCIZ  <200>%ERROR! WATCHDOG/REQUEST TIMER RATIO TOO LOW!%
   (1) 024120                  68$:
 2220  024120  000000                  HALT
 2221  024122  000776                  BR      .-2
 2222  024124  020327  000044  9$:     CMP     R3,#44          ;TOO HIGH?
 2223  024130  101435                  BLOS    11$             ;BR=NO
 2224  024132  104401  024140          TYPE    ,71$            ;;TYPE ASCIZ STRING
   (1) 024136  000430                  BR      70$             ;;GET OVER THE ASCIZ
   (1)                         ;;71$:  .ASCIZ  <200>%ERROR! WATCHDOG/REQUEST TIMER RATIO TOO HIGH!%
   (1) 024220                  70$:
 2225  024220  000000                  HALT
 2226  024222  000776                  BR      .-2
 2227  024224  005077  155372  11$:     CLR     @CSR            ;CLEAR AND DISCONNECT
 2228  024230  000207                  RTS     PC
 2229
 2230
 2231                                   ;PROGRAM PARAMETER INPUT ROUTINE
 2232
 2233  024232  012737  177777  026426  GETADR: MOV     #-1,PARFLG      ;SET PARFLG
 2234  024240  005037  001760          CLR     USEPAR          ;CLEAR FLAG
 2235  024244  004737  023146          JSR     PC,FLUSHP       ;GO FLUSH OUT PARAMETER BLOCK
 2236  024250  104401  024256          TYPE    ,65$            ;;TYPE ASCIZ STRING
   (1) 024254  000433                  BR      64$             ;;GET OVER THE ASCIZ
   (1)                         ;;65$:  .ASCIZ  <200>/DO YOU WANT TO CHANGE THE DEVICE ADDRESSES?(Y OR N)/
   (1) 024344                  64$:
 2237  024344  104410                  RDCHR
 2238  024346  012600                  MOV     (SP)+,R0        ;STORE CHAR.
 2239  024350  110037  026430          MOVB    R0,ECHOB
 2240  024354  104401  026430          TYPE    ,ECHOB
 2241  024360  022700  000131          CMP     #'Y,R0          ;YES?
 2242  024364  001173                  BNE     10$             ;BR=NO
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  2243  024366  104401  024374            TYPE    ,67$            ;;TYPE ASCIZ STRING
   (1)  024372  000444                    BR      66$             ;;GET OVER THE ASCIZ
   (1)                            ;;67$:  .ASCIZ  <200>/IN THE FOLLOWING THREE PRINTOUTS TYPE THE NEW DATA OR 0 IF NO CHAN
   (1)  024504                    66$:
  2244  024504  104401  024512            TYPE    ,69$            ;;TYPE ASCIZ STRING
   (1)  024510  000411                    BR      68$             ;;GET OVER THE ASCIZ
   (1)                            ;;69$:  .ASCIZ  <200>/DEVICE ADDRESS= /
   (1)  024534                    68$:
  2245  024534  013746  001622            MOV     CSR,-(SP)       ;;SAVE CSR FOR TYPEOUT
   (1)  024540  104402                    TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
  2246  024542  104401  034647            TYPE    ,SPACE
  2247  024546  104412                    RDOCT
  2248  024550  012600                    MOV     (SP)+,R0        ;STORE INFO
  2249  024552  001402                    BEQ     11$
  2250  024554  010037  001262            MOV     R0,$BASE
  2251  024560                 11$:
   (1)  024560  104401  024566            TYPE    ,71$            ;;TYPE ASCIZ STRING
   (1)  024564  000411                    BR      70$             ;;GET OVER THE ASCIZ
   (1)                            ;;71$:  .ASCIZ  <200>/DEVICE VECTOR= /
   (1)  024610                    70$:
  2252  024610  013700  001256            MOV     $VECT1,R0
  2253  024614  042700  177000            BIC     #177000,R0
  2254  024620  010046                    MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
   (1)  024622  104402                    TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
  2255  024624  104401  034647            TYPE    ,SPACE
  2256  024630  104412                    RDOCT
  2257  024632  012600                    MOV     (SP)+,R0
  2258  024634  001402                    BEQ     12$
  2259  024636  010001                    MOV     R0,R1           ;SAVE IT TEMPORARILY
  2260  024640  000404                    BR      14$             ;JUMP OVER NEXT TWO LINES
  2261  024642  013701  001256    12$:    MOV     $VECT1,R1       ;SAVE OLD VECTOR ADDRESS
  2262  024646  042701  177000            BIC     #177000,R1      ;MASK OUT JUNK
  2263  024652                 14$:
   (1)  024652  104401  024660            TYPE    ,73$            ;;TYPE ASCIZ STRING
   (1)  024656  000410                    BR      72$             ;;GET OVER THE ASCIZ
   (1)                            ;;73$:  .ASCIZ  <200>/BREAK LEVEL= /
   (1)  024700                    72$:
  2264  024700  013700  001256            MOV     $VECT1,R0
  2265  024704  042700  000777            BIC     #777,R0
  2266  024710  000300                    SWAB    R0
  2267  024712  010046                    MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
   (1)  024714  104402                    TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
  2268  024716  104401  034647            TYPE    ,SPACE
  2269  024722  104412                    RDOCT
  2270  024724  012600                    MOV     (SP)+,R0
  2271  024726  001405                    BEQ     13$
  2272  024730  000300                    SWAB    R0
  2273  024732  060100                    ADD     R1,R0
  2274  024734  010037  001256            MOV     R0,$VECT1
  2275  024740  000405                    BR      10$
  2276  024742  042737  000777  001256  13$:    BIC     #777,$VECT1
  2277  024750  060137  001256            ADD     R1,$VECT1
  2278  024754                 10$:
  2279  024754  000207                    RTS     PC              ;RETURN
  2280  024756                 PARIN:
  2281  024756  004737  024232            JSR     PC,GETADR
```

```
2282  024762  012737  024774  002672          MOV     #REPAR,ROUTE    ;SET RETURN
2283
2284  024770  000137  001762                  JMP     START
2285          024774                          REPAR=.
2286  024774  004737  023176                  JSR     PC,DMODE        ;GO GET MODE AND ID#
2287  025000  004737  023540                  JSR     PC,DTIME        ;GO GET DEVICE TIMING
2288  025004  005737  001634                  TST     DT03            ;WHAT MODE?
2289  025010  001422                          BEQ     20$             ;BR=DT07
2290  025012  104401  025020                  TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1) 025016  000416                          BR      64$             ;;GET OVER THE ASCIZ
  (1)                           ;;65$:  .ASCIZ  <200>/THIS DT07 IS IN DT03 MODE./
  (1) 025054                    64$:
2291  025054  000421                          BR      1$              ;CONTINUE AT 1$
2292  025056                    20$:
  (1) 025056  104401  025064                  TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1) 025062  000413                          BR      66$             ;;GET OVER THE ASCIZ
  (1)                           ;;67$:  .ASCIZ  <200>/THIS DT07 IS PORT# /
  (1) 025112                    66$:
2293  025112  013746  001644                  MOV     PORTNO,-(SP)    ;;SAVE PORTNO FOR TYPEOUT
  (1) 025116  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2294  025120                    1$:
  (1) 025120  104401  025126                  TYPE    ,69$            ;;TYPE ASCIZ STRING
  (1) 025124  000447                          BR      68$             ;;GET OVER THE ASCIZ
  (1)                           ;;69$:  .ASCIZ  <200>/TYPE THE ADDRESS OF AN EXTERNAL DEVICE REGISTER ON THE SHARED BUSS
  (1) 025244                    68$:
2295  025244  104412                          RDOCT
2296  025246  012637  001636                  MOV     (SP)+,DEVAD     ;STORE IN DEVAD
2297  025252  001523                          BEQ     2$              ;SKIP OVER NEXT TWO QUESTIONS IF NO DEVICE
2298  025254  104401  025262                  TYPE    ,71$            ;;TYPE ASCIZ STRING
  (1) 025260  000442                          BR      70$             ;;GET OVER THE ASCIZ
  (1)                           ;;71$:  .ASCIZ  <200> % TYPE AN OCTAL MASK OF READ/WRITE BITS IN ABOVE DEVICE REGISTER..
  (1) 025366                    70$:
2299  025366  104412                          RDOCT
2300  025370  012637  001640                  MOV     (SP)+,DEVRW     ;STORE BIT PATTERN
2301  025374  104401  025402                  TYPE    ,73$            ;;TYPE ASCIZ STRING
  (1) 025400  000445                          BR      72$             ;;GET OVER THE ASCIZ
  (1)                           ;;73$:  .ASCIZ  <200> % TYPE AN OCTAL MASK OF RESET-CLEARABLE BITS IN ABOVE DEVICE REGIS
  (1) 025514                    72$:
2302  025514  104412                          RDOCT
2303  025516  012637  001642                  MOV     (SP)+,DEVRC     ;STORE BIT PATTERN
2304  025522  005737  001634          2$:     TST     DT03            ;NO NEED TO CONTINUE IF DT03 MODE
2305  025526  001067                          BNE     7$              ;BR=DT03
2306  025530                    3$:4$:
  (1) 025530  104401  025536                  TYPE    ,75$            ;;TYPE ASCIZ STRING
  (1) 025534  000427                          BR      74$             ;;GET OVER THE ASCIZ
  (1)                           ;;75$:  .ASCIZ  <200>/HOW MANY OTHER PORTS ARE THERE TO BE TESTED?/
  (1) 025614                    74$:
2307  025614  104412                          RDOCT
2308  025616  012637  001656                  MOV     (SP)+,EXPTCT    ;STORE EXTERNAL PORT COUNT
2309  025622  001431                          BEQ     7$              ;GO TO 7$
2310  025624  012700  001646          5$:     MOV     #EXPRT1,R0      ;SET POINTER
2311  025630  013701  001656                  MOV     EXPTCT,R1
2312  025634                    6$:
  (1) 025634  104401  025642                  TYPE    ,77$            ;;TYPE ASCIZ STRING
  (1) 025640  000416                          BR      76$             ;;GET OVER THE ASCIZ
  (1)                           ;;77$:  .ASCIZ  <200>/TYPE IN EXTERNAL PORT ID../
```

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  (1)  025676                                    76$:
2313   025676  104412                                  RDOCT
2314   025700  012620                                  MOV     (SP)+,(R0)+     ;STORE IT
2315   025702  005301                                  DEC     R1              ;COUNT IT
2316   025704  001353                                  BNE     6$              ;CONTINUE LOAD IF NOT DONE
2317   025706                                    7$:
  (1)  025706  104401  025714                        TYPE    ,79$            ;;TYPE ASCIZ STRING
  (1)  025712  000422                                BR      78$             ;;GET OVER THE ASCIZ
  (1)                                       ;;79$:   .ASCIZ  <200>/SELECT TEST. (0 FOR HELP MESSAGE)/
  (1)  025760                               78$:
2318   025760  104412                                  RDOCT
2319   025762  012600                                  MOV     (SP)+,R0
2320   025764  001003                                  BNE     8$
2321   025766  104401  034651                        TYPE    ,SELMS
2322   025772  000745                                BR      7$
2323   025774  022700  000004                8$:     CMP     #4,R0   ;TEST FOR NPR?
2324   026000  001002                                BNE     18$     ;NO:BR
2325   026002  000137  026652                        JMP     TSTNPR  ;GO CHECK FOR NPR LINE
2326   026006  022700  000004                18$:    CMP     #4,R0   ;VALID TEST?
2327   026012  101016                                BHI     9$
2328   026014  104401  026022                        TYPE    ,81$            ;;TYPE ASCIZ STRING
  (1)  026020  000412                                BR      80$             ;;GET OVER THE ASCIZ
  (1)                                       ;;81$:   .ASCIZ  <200>/INVALID SELECTION!/
  (1)  026046                               80$:
2329   026046  000717                                BR      7$
2330   026050  022700  000002                9$:     CMP     #2,R0           ;MULTIPORT?
2331   026054  001044                                BNE     21$             ;BR=NO
2332   026056  005737  001656                        TST     EXPTCT          ;ONLY ONE PORT?
2333   026062  001041                                BNE     21$             ;BR=NO
2334   026064  005737  001634                        TST     DT03            ;DT03 MODE?
2335   026070  001036                                BNE     21$             ;BR=YES
2336   026072  104401  026100                        TYPE    ,83$            ;;TYPE ASCIZ STRING
  (1)  026076  000432                                BR      82$             ;;GET OVER THE ASCIZ
  (1)                                       ;;83$:   .ASCIZ  <200>/CAN NOT RUN THE MULTIPORT TEST WITH ONLY ONE PORT!/
  (1)  026164                               82$:
2337   026164  000650                                BR      7$
2338   026166  022700  000002                21$:    CMP     #2,R0           ;MULTIPORT TEST?
2339   026172  001057                                BNE     22$             ;BR=NO
2340   026174  104401  026202                        TYPE    ,85$            ;;TYPE ASCIZ STRING
  (1)  026200  000454                                BR      84$             ;;GET OVER THE ASCIZ
  (1)                                       ;;85$:   .ASCIZ  <200>/THE DT07 WITH THE LOWEST PORT# MUST BE STARTED LAST WHEN RUNNING/<
  (1)  026332                               84$:
2341   026332  000241                        22$:    CLC
2342   026334  006100                                ROL     R0
2343   026336  016016  026434                        MOV     TX(R0),(SP)
2344   026342  104401  026350                        TYPE    ,87$            ;;TYPE ASCIZ STRING
  (1)  026346  000424                                BR      86$             ;;GET OVER THE ASCIZ
  (1)                                       ;;87$:   .ASCIZ  <200>/TYPE <CR> WHEN READY TO CONTINUE TEST./
  (1)  026420                               86$:
2345   026420  104410                                  RDCHR
2346   026422  012600                                  MOV     (SP)+,R0
2347   026424  000207                                  RTS     PC              ;EXIT
2348   026426  000000                        PARFLG:  000                    ;PARAMETERS PRESENT FLAG
2349   026430     000      200      000      ECHOB:   .BYTE   0,200,0         ;ECHO BYTE
2350            026434                              .EVEN
2351   026434  000000                        TX:      0
```

```
                                                ROUT1
                                                ROUT2
                                                ROUT4


                                TRAP4:
(2)  026444  012600                             MOV     (SP)+,R0        ;;POP STACK INTO R0
2358 026446  104401  026454                     TYPE    ,65$            ;;TYPE ASCIZ STRING
(1)  026452  000422                             BR      64$             ;;GET OVER THE ASCIZ
(1)                             ;;65$:  .ASCIZ  <200>/UNEXPECTED TRAP TO VECTOR 4 FROM../
(1)  026520                     64$:
2359 026520  010046                             MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
(1)  026522  104402                             TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2360 026524  000000                             HALT
2361 026526  000137  001762                     JMP     START
2362
2363 026532                     ERROUT:
2364 026532  016637  000004  000004             MOV     4(SP),@#ERRVEC  ;ADJUST STACK
2365 026540  005237  026560                     INC     FLAG
2366 026544  016666  000002  000004             MOV     2(SP),4(SP)     ;PS
2367 026552  011666  000002                     MOV     (SP),2(SP)      ;PC
2368 026556  000002                             RTI
2369
2370 026560  000000                     FLAG:   0
2371
2372 026562  010246                     CKADR:  MOV     R2,-(SP)        ;SAVE R2
2373 026564  013702  001636                     MOV     DEVAD,R2        ;DEVICE ADDRESS IN R2
2374 026570  013746  000004                     MOV     @#ERRVEC,-(SP)  ;SAVE OLD TRAP ADDRESS
2375 026574  012737  026532  000004             MOV     #ERROUT,@#ERRVEC        ;NEW TRAP ADDRESS
2376 026602  005037  026560                     CLR     FLAG            ;INITIALIZE FLAG
2377 026606  005712                             TST     (R2)            ;IS ADDRESS ADDRESSABLE?
2378 026610  000240                             NOP
2379 026612  005726                             TST     (SP)+           ;RESTORE OLD TRAP ADDRESS
2380 026614  010226                             MOV     R2,(SP)+        ;RESTORE R2
2381 026616  000207                             RTS     PC
2382
2383 026620                     CNTLC:
2384 026620  105777  152320                     TSTB    @$TKS           ;IS CHAR THERE?
2385 026624  100011                             BPL     1$              ;NO RETURN
2386 026626  117746  152314                     MOVB    @$TKB,-(SP)     ;PUT CHAR ON STACK
2387 026632  042716  177600                     BIC     #^C177,(SP)     ;STRIP OFF UNWANTED BITS
2388 026636  022726  000003                     CMP     #3,(SP)+        ;IS IT CONTROL C?
2389 026642  001002                             BNE     1$              ;NO RETURN
2390 026644  000137  002612                     JMP     ROUT3           ;GO TO START AGAIN
2391 026650  000207                     1$:     RTS     PC
2392
```

```
2394                                    ;
2395                                    ;CHECK OUT NPR LINE ON THE SWITCH BUS
2396                                    ;
2397  026652                            TSTNPR:
2398  026652  005037  027404                    CLR     PASS            ;CLEAR PASS COUNT
2399  026656  005037  027410                    CLR     NUM             ;CLEAR NUM
2400  026662  104401  026670                    TYPE    ,65$            ;;TYPE ASCIZ STRING
  (1) 026666  000417                            BR      64$             ;;GET OVER THE ASCIZ
  (1)                               ;;65$:      .ASCIZ  <200>/TEST NPR LINE ON SWITCH BUS/
  (1) 026726                        64$:
2401  026726  104401  026734                    TYPE    ,67$            ;;TYPE ASCIZ STRING
  (1) 026732  000415                            BR      66$             ;;GET OVER THE ASCIZ
  (1)                               ;;67$:      .ASCIZ  <200>/TYPE CONTROL C TO EXIT/<200>
  (1) 026766                        66$:
2402  026766                        NPR:
2403  026766  004737  026620                    JSR     PC,CNTLC        ;IS IT CONTROL C?
2404  026772  005237  027410                    INC     NUM             ;COUNT NUMBER OF ITERATION
2405  026776  012737  000003  027406            MOV     #3,BRCNT        ;COUNTER FOR BR LEVEL
2406  027004  012702  027460                    MOV     #BRLV,R2        ;POINTER TO BRLEVEL TABLE
2407  027010  012706  001100                    MOV     #STACK,SP       ;RESTORE STACK
2408  027014  012737  000000  177776            MOV     #0,PSW          ;DROP PRIORITY
2409  027022  012777  000001  152572            MOV     #REQ,@CSR       ;CONNECT
2410  027030  105777  152566           7$:      TSTB    @CSR            ;CONNECTED?
2411  027034  100421                            BMI     8$              ;BR IF YES
2412  027036  005777  152560                    TST     @CSR            ;TIME OUT?
2413  027042  100372                            BPL     7$              ;BR IF NOT
2414  027044  017737  152552  001126            MOV     @CSR,BAD        ;STORE CONTENT OF CSR
2415  027052  013737  001752  001124            MOV     KONST,GOOD      ;
2416  027060  062737  020201  001124            ADD     #20201,GOOD     ;STORE GOOD DATA
2417  027066  104006                            ERROR+6                 ;COUNTN'T CONNECT
2418  027070  005077  152526                    CLR     @CSR            ;CLEAR CSR
2419  027074  000137  002612                    JMP     ROUT3
2420  027100                            8$:
2421  027100  004737  026620                    JSR     PC,CNTLC        ;
2422  027104  022702  027470                    CMP     #BREND,R2       ;IS IT END OF TABLE?
2423  027110  001504                            BEQ     5$              ;YES:BR
2424  027112  012706  001100                    MOV     #STACK,SP       ;RESTORE STACK
2425  027116  012737  000340  177776            MOV     #340,@#PSW      ;LOCK OUT INTERRUPT
2426  027124  004737  030020                    JSR     PC,CLRREG       ;CLEAR ALL UBE REGISTER
2427  027130  005037  027434                    CLR     BUFF1           ;CLEAR BUFF LOCATION
2428  027134  012777  177777  000250            MOV     #177777,@BEBD   ;LOAD UBE DATA REG WITH TEST DATA
2429  027142  012777  027434  000246            MOV     #BUFF1,@BEBA    ;LOAD UBE ADDRESS REG WITH BUFF ADR
2430  027150  012777  177777  000236            MOV     #177777,@BECC   ;SET UBE TO DO ONE CYCLE
2431  027156  012777  003041  000234            MOV     #3041,@BECR1    ;HAVE UBE SEND DATA VIA NPR
2432  027164  000240                            NOP                     ;ALLOW UBE TO SET BUS
2433  027166  004737  030074                    JSR     PC,CRDY         ;CHECK READY SET
2434  027172  005704                            TST     R4              ;DID RDY SET?
2435  027174  001037                            BNE     1$              ;BRANCH TO ERROR IF RDY DIDN'T SET
2436  027176  005737  027434                    TST     BUFF1           ;WAS DATAO DONE?
2437  027202  001445                            BEQ     2$              ;BRANCH TO ERROR IF NPR NOT DONE
2438  027204  005037  027434                    CLR     BUFF1           ;CLEAR BUF LOCATION
2439  027210  005037  027436                    CLR     BUFF1+2         ;CLEAR BUF LOCATION PLUS 2
2440  027214  012777  027262  000204            MOV     #3$,@INTVEC     ;SETUP FOR INTERRUPT
2441  027222  012777  027434  000166            MOV     #BUFF1,@BEBA    ;LOAD TEST ADDRESS
2442  027230  012777  177777  000156            MOV     #177777,@BECC   ;SETUP UBE TO DO 1 CYCLE
2443  027236  005237  027406                    INC     BRCNT           ;COUNT BR LEVEL
```

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2444  027242  012277  000152                  MOV     (R2)+,@BECR1    ;HAVE UBE DO DATO NPR+INT
2445                                                                    ;WHEN DONE VIA DIFF BR LEVEL
2446                                                                    ;BR LEVEL = (4,5,6,7)
2447  027246  005037  177776                  CLR     @#PSW           ;ALLOW UBE TO INTERRUPT
2448  027252  004737  030074                  JSR     PC,CRDY         ;WAIT FOR INTERRUPT OR READY TO SET
2449  027256  104025                          ERROR+25
2450  027260  000443                          BR      4$              ;RESTORE TRAP
2451
2452  027262  005737  027436          3$:     TST     BUFF1+2         ;DID NPR WRITE MORE THAN ONE LOC?
2453  027266  001440                          BEQ     4$              ;GO TO END OF TEST
2454  027270  104026                          ERROR+26
2455  027272  000436                          BR      4$
2456
2457  027274  104024                  1$:     ERROR+24                ;ERROR:NPR DIDN'T SET RDY
2458  027276  012777  006003  000114          MOV     #6003,@BECR1    ;HAVE UBE SET ITS READY
2459  027304  005037  177776                  CLR     @#PSW           ;
2460  027310  004737  030074                  JSR     PC,CRDY         ;WAIT TILL SET
2461  027314  000425                          BR      4$              ;RESTORE TRAP
2462  027316  104023                  2$:     ERROR+23
2463  027320  000423                          BR      4$
2464  027322                          5$:
2465  027322  022737  001750  027410          CMP     #1000.,NUM
2466  027330  001013                          BNE     11$
2467  027332  005237  027404                  INC     PASS
2468  027336  104401  030002                  TYPE    ,ENDMG
2469  027342  013746  027404                  MOV     PASS,-(SP)
2470  027346  104405                          TYPDS
2471  027350  104401  027777                  TYPE    ,NULL
2472  027354  005037  027410                  CLR     NUM
2473  027360  004737  030052          11$:    JSR     PC,RCATCH
2474  027364  000137  026766                  JMP NPR
2475
2476  027370  004737  030052          4$:     JSR     PC,RCATCH       ;RESTORE TRAP
2477  027374  004737  026620                  JSR     PC,CNTLC        ;
2478  027400  000137  027100                  JMP     8$              ;
2479
2480
2481  027404  000000          PASS:   0
2482  027406  000000          BRCNT:  0
2483  027410  000000          NUM:    0
2484  027412  170000          BEBD:   .WORD   170000
2485  027414  170002          BECC:   .WORD   170002
2486  027416  170004          BEBA:   .WORD   170004
2487  027420  170006          BECR1:  .WORD   170006
2488  027422  170010          BECR2:  .WORD   170010
2489  027424  170014          BERE:   .WORD   170014
2490  027426  000510          INTVEC: .WORD   510
2491  027430  000000                  0
2492  027432  000000                  0
2493
2494  027434  000011          BUFF1:  .BLKW   11
2495  027456  000000                  0
2496
2497  027460  003143          BRLV:   3143                    ;DATO AT BR4
2498  027462  003145                  3145                    ;DATO AT BR5
2499  027464  003151                  3151                    ;DATO AT BR6
```

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                                                                3161                    ;DATO AT BR7
                                                        BREND:  0
                                                                0
                                                        EM23:   .ASCIZ  /ERROR:NPR DATO NOT DONE/
                                                        EM24:   .ASCIZ  /ERROR:NPR DID NOT SET RDY/
                                                        EM25:   .ASCIZ  /ERROR:UBE DID NOT INTERRUPT WHEN NPR FINISHED/
                                                        EM26:   .ASCIZ  /ERROR:TWO LOC WRITTEN WHEN ONE NPR AND INT ON DONE ENABLE/
                                                        EM27:   .ASCIZ  /ERROR:DEVICE DOESN'T EXIST ON SWITCH BUS/
                                                        NULL:   .BYTE   -1,-1,0         ;NULL CHARACTER STRING
                                                        ENDMG:  .ASCIZ  <15><12>/END PASS #/
                                                                .EVEN
                                                        ;SUBROUTINE TO TYPE PC OF ERROR MESSAGE
                                                        ;TERRPC:BIT     #SW13,@SWR      ;INHIBIT ERROR PRINT OUT
                                                        ;       BNE     1$              ;BRANCH IF YES
                                                        ;       TYPE    ,MSG15          ;TYPE PC OF ERROR MESSAGE
                                                        ;       MOV     $ERRPC,-(SP)    ;SAVE $ERRPC FOR TYPEOUT
                                                        ;       TYPOC
                                                        ;1$:    RTS     PC
                                                        ;SUBROUTINE TO CLEAR ALL UBE REG
```

```
2525
2526  030020
2527  030020  005077  177400          ;
2528  030024  005077  177372          CLRREG:
2529  030030  005077  177364                  CLR     @#BERE   ;CLEAR ERROR CONDITION
2530  030034  005077  177356                  CLR     @#BECR2  ;CLEAR BECR2 REG
2531  030040  005077  177350                  CLR     @#BECR1  ;CLEAR BECR1 REG
2532  030044  005077  177342                  CLR     @#BEBA   ;CLEAR BEBA REG
2533  030050  000207                          CLR     @#BECC   ;CLEAR BECC REG
2534                                          CLR     @#BEBD   ;CLEAR BEBD REG
2535                                          RTS     PC
2536
2537  030052  010546                  ;SUBROUTINE TO RESTORE TRAP CATCHER TO UBE VECTOR AREA
2538  030054  013705  027426
2539  030060  005725                  RCATCH: MOV     R5,-(SP)        ;SAVE R5 ON STACK
2540  030062  010577  177340                  MOV     INTVEC,R5       ;GET INTVEC
2541  030066  005015                          TST     (R5)+           ;CALCULATE INTVEC+2
2542  030070  012605                          MOV     R5,@#INTVEC     ;PUT INTVEC+2 IN INTVEC
2543  030072  000207                          CLR     (R5)            ;PUT HALT IN INTVEC+2
2544                                          MOV     (SP)+,R5        ;RESTORE R5
2545                                          RTS     PC
2546
2547  030074  005004                  ;SUBROUTINE TO CHECK RDY BIT SET
2548  030076  005005
2549  030100  005205                  CRDY:   CLR     R4
2550  030102  105777  177312                  CLR     R5
2551  030106  100405                  2$:     INC     R5              ;UPDATE COUNTER
2552  030110  032705  000200                  TSTB    @#BECR1         ;SEE IF RDY SET
2553  030114  001771                          BMI     1$              ;BRANCH IF SET
2554  030116  012704  000001                  BIT     #200,R5         ;WAITED>100MICROSEC
2555  030122  000207                          BEQ     2$              ;CONTINUE TO LOCK FOR RDY IF R5 NOT=128
2556                                          MOV     #1,R4           ;SET R4=1 TO INDICATE ERROR
2557                                  1$:     RTS     PC              ;RETURN
2558
```

```
 2560                                   .NLIST  MC,MD,CND
 2561                                   .SBTTL  TYPE ROUTINE
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
  (1)                                   ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
  (1)                                   ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
  (1)                                   ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
  (1)                                   ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
  (1)                                   ;*
  (1)                                   ;*CALL:
  (1)                                   ;*1) USING A TRAP INSTRUCTION
  (1)                                   ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
  (1)                                   ;*OR
  (1)                                   ;*      TYPE
  (1)                                   ;*      MESADR
  (1)                                   ;*
  (1)
  (1)  030124  105737  001157           $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
  (1)  030130  100002                           BPL     1$              ;;BR IF YES
  (1)  030132  000000                           HALT                    ;;HALT HERE IF NO TERMINAL
  (1)  030134  000430                           BR      3$              ;;LEAVE
  (1)  030136  010046                   1$:     MOV     R0,-(SP)        ;;SAVE R0
  (1)  030140  017600  000002                   MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
  (1)  030144  122737  000001  001226           CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
  (1)  030152  001011                           BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
  (1)  030154  132737  000100  001227           BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
  (1)  030162  001405                           BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
  (1)  030164  010037  030174                   MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
  (1)  030170  004737  030414                   JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
  (1)  030174  000000                   61$:    .WORD   0               ;;MESSAGE ADDRESS
  (1)  030176  132737  000040  001227   62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
  (1)  030204  001003                           BNE     60$             ;;YES,SKIP TYPE OUT
  (1)  030206  112046                   2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
  (1)  030210  001005                           BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
  (1)  030212  005726                           TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
  (1)  030214  012600                   60$:    MOV     (SP)+,R0        ;;RESTORE R0
  (1)  030216  062716  000002           3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
  (1)  030222  000002                           RTI                     ;;RETURN
  (1)  030224  122716  000011           4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
  (1)  030230  001430                           BEQ     8$
  (1)  030232  122716  000200                   CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
  (1)  030236  001006                           BNE     5$
  (1)  030240  005726                           TST     (SP)+           ;;POP  <CR><LF> EQUIV
  (1)  030242  104401                           TYPE                    ;;TYPE A CR AND LF
  (1)  030244  001203                           $CRLF
  (1)  030246  105037  030402                   CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
  (1)  030252  000755                           BR      2$              ;;GET NEXT CHARACTER
  (1)  030254  004737  030336           5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
  (1)  030260  123726  001156           6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
  (1)  030264  001350                           BNE     2$              ;;IF NO GO GET NEXT CHAR.
  (1)  030266  013746  001154                   MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
  (1)                                           ;;AND THE NULL CHAR.
  (1)  030272  105366  000001           7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
  (1)  030276  002770                           BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
  (1)  030300  004737  030336                   JSR     PC,$TYPEC       ;;GO TYPE A NULL
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(1)  030304  105337  030402                DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
(1)  030310  000770                        BR      7$              ;;LOOP
(1)
(1)                                ;HORIZONTAL TAB PROCESSOR
(1)
(1)  030312  112716  000040        8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
(1)  030316  004737  030336        9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
(1)  030322  132737  000007  030402        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
(1)  030330  001372                        BNE     9$              ;;TAB STOP
(1)  030332  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
(1)  030334  000724                        BR      2$              ;;GET NEXT CHARACTER
(1)  030336  105777  150606        $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
(1)  030342  100375                        BPL     $TYPEC
(1)  030344  116677  000002  150600        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
(1)  030352  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
(1)  030360  001003                        BNE     1$              ;;BRANCH IF NO
(1)  030362  105037  030402                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
(1)  030366  000406                        BR      $TYPEX          ;;EXIT
(1)  030370  122766  000012  000002  1$:   CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
(1)  030376  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
(1)  030400  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
(1)  030402  000000                $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
(1)  030404  000207                $TYPEX: RTS     PC
(1)
2562                               .SBTTL  APT COMMUNICATIONS ROUTINE
(1)
(2)                                ;;**************************************************************************
(1)  030406  112737  000001  030652 $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
(1)  030414  112737  000001  030650 $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
(1)  030422  000403                        BR      $ATYC
(1)  030424  112737  000001  030652 $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
(1)  030432                        $ATYC:
(3)  030432  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  030434  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(1)  030436  105737  030650                TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
(1)  030442  001450                        BEQ     5$              ;;IF NOT:  BR
(1)  030444  122737  000001  001226        CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
(1)  030452  001031                        BNE     3$              ;;IF NOT:  BR
(1)  030454  132737  000100  001227        BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
(1)  030462  001425                        BEQ     3$              ;;IF NOT:  BR
(1)  030464  017600  000004                MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
(1)  030470  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
(1)  030476  005737  001206        1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
(1)  030502  001375                        BNE     1$              ;;IF NOT:  WAIT
(1)  030504  010037  001222                MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
(1)  030510  105720                2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
(1)  030512  001376                        BNE     2$
(1)  030514  163700  001222                SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
(1)  030520  006200                        ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
(1)  030522  010037  001224                MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
(1)  030526  012737  000004  001206        MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
(1)  030534  000413                        BR      5$
(1)  030536  017637  000004  030562 3$:    MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
(1)  030544  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
(3)  030552  013746  177776                MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
(1)  030556  004737  030124                JSR     PC,$TYPE        ;;CALL TYPE MACRO
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(1)  030562  000000                    4$:     .WORD   0
(1)  030564                             5$:
(1)  030564  105737  030652            10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
(1)  030570  001416                             BEQ     12$             ;;IF NOT:  BR
(1)  030572  005737  001226                     TST     $ENV            ;;RUNNING UNDER APT?
(1)  030576  001413                             BEQ     12$             ;;IF NOT:  BR
(1)  030600  005737  001206            11$:     TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
(1)  030604  001375                             BNE     11$             ;;IF NOT:  WAIT
(1)  030606  017637  000004  001210             MOV     @4(SP),$FATAL   ;;GET ERROR #
(1)  030614  062766  000002  000004             ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
(1)  030622  005237  001206                     INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
(1)  030626  105037  030652            12$:     CLRB    $FFLG           ;;CLEAR FATAL FLAG
(1)  030632  105037  030651                     CLRB    $LFLG           ;;CLEAR LOG FLAG
(1)  030636  105037  030650                     CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
(3)  030642  012601                             MOV     (SP)+,R1        ;;POP STACK INTO R1
(3)  030644  012600                             MOV     (SP)+,R0        ;;POP STACK INTO R0
(1)  030646  000207                             RTS     PC              ;;RETURN
(1)  030650     000             $MFLG:  .BYTE   0               ;;MESSG. FLAG
(1)  030651     000             $LFLG:  .BYTE   0               ;;LOG FLAG
(1)  030652     000             $FFLG:  .BYTE   0               ;;FATAL FLAG
(1)          030654                     .EVEN
(1)          000200             APTSIZE=200
(1)          000001             APTENV=001
(1)          000100             APTSPOOL=100
(1)          000040             APTCSUP=040
2563                            .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
(1)
(2)                             ;;**************************************************************************
(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)  030654  011646            $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
(1)  030656  016666  000004  000002    MOV     4(SP),2(SP)     ;;INPUT NUMBER
(3)  030664  010046                    MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  030666  010146                    MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(3)  030670  010246                    MOV     R2,-(SP)        ;;PUSH R2 ON STACK
(1)  030672  104411            1$:     RDLIN                   ;;READ AN ASCIZ LINE
(1)  030674  012600                    MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
(1)  030676  005001                    CLR     R1              ;;CLEAR DATA WORD
(1)  030700  005002                    CLR     R2
(1)  030702  112046            2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
(1)  030704  001412                    BEQ     3$              ;;IF ZERO GET OUT
(1)  030706  006301                    ASL     R1              ;;*2
(1)  030710  006102                    ROL     R2
(1)  030712  006301                    ASL     R1              ;;*4
(1)  030714  006102                    ROL     R2
(1)  030716  006301                    ASL     R1              ;;*8
(1)  030720  006102                    ROL     R2
(1)  030722  042716  177770            BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
(1)  030726  062601                    ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
(1)  030730  000764                    BR      2$              ;;LOOP
(1)  030732  005726            3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
```

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(1)  030734  010166  000012              MOV     R1,12(SP)       ;;SAVE THE RESULT
(1)  030740  010237  030754              MOV     R2,$HIOCT
(3)  030744  012602                      MOV     (SP)+,R2        ;;POP STACK INTO R2
(3)  030746  012601                      MOV     (SP)+,R1        ;;POP STACK INTO R1
(3)  030750  012600                      MOV     (SP)+,R0        ;;POP STACK INTO R0
(1)  030752  000002                      RTI                     ;;RETURN
(1)  030754  000000              $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
2564                             .SBTTL  TTY INPUT ROUTINE
(1)
(2)                              ;;**************************************************************************
(1)                              .ENABL  LSB
(1)
(2)                              ;;**************************************************************************
(1)                              ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
(1)                              ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
(1)                              ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
(1)                              ;*WHEN OPERATING IN TTY FLAG MODE.
(1)  030756  022737  000176  001140 $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
(1)  030764  001074                      BNE     15$             ;;BRANCH IF NO
(1)  030766  105777  150152              TSTB    @$TKS           ;;CHAR THERE?
(1)  030772  100071                      BPL     15$             ;;IF NO, DON'T WAIT AROUND
(1)  030774  117746  150146              MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
(1)  031000  042716  177600              BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
(1)  031004  022726  000007              CMP     #7,(SP)+        ;;IS IT A CONTROL G?
(1)  031010  001062                      BNE     15$             ;;NO, RETURN TO USER
(1)  031012  123727  001134  000001      CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
(1)  031020  001456                      BEQ     15$             ;;BRANCH IF YES
(1)
(1)  031022  104401  031503              TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
(1)  031026  104401  031510      $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
(2)  031032  013746  000176              MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
(2)  031036  104402                      TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
(1)  031040  104401  031521              TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
(1)  031044  005046              19$:    CLR     -(SP)           ;;CLEAR COUNTER
(1)  031046  005046                      CLR     -(SP)           ;;THE NEW SWR
(1)  031050  105777  150070      7$:     TSTB    @$TKS           ;;CHAR THERE?
(1)  031054  100375                      BPL     7$              ;;IF NOT TRY AGAIN
(1)
(1)  031056  117746  150064              MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
(1)  031062  042716  177600              BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
(1)
(1)
(1)
(1)  031066  021627  000025      9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
(1)  031072  001005                      BNE     10$             ;;BRANCH IF NOT
(1)  031074  104401  031476              TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
(1)  031100  062706  000006      20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
(1)  031104  000757                      BR      19$             ;;LET'S TRY IT AGAIN
(1)
(1)
(1)  031106  021627  000015      10$:    CMP     (SP),#15        ;;IS IT A <CR>?
(1)  031112  001022                      BNE     16$             ;;BRANCH IF NO
(1)  031114  005766  000004              TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
(1)  031120  001403                      BEQ     11$             ;;BRANCH IF YES
(1)  031122  016677  000002  150010      MOV     2(SP),@SWR      ;;SAVE NEW SWR
(1)  031130  062706  000006      11$:    ADD     #6,SP           ;;CLEAR UP STACK
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(1)  031134  104401  001203            14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
(1)  031140  123727  001135  000001             CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
(1)  031146  001003                             BNE     15$             ;;BRANCH IF NOT
(1)  031150  012777  000100  147766             MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
(1)  031156  000002                     15$:    RTI                     ;;RETURN
(1)  031160  004737  030336             16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
(1)  031164  021627  000060                     CMP     (SP),#60        ;;CHAR < 0?
(1)  031170  002420                             BLT     18$             ;;BRANCH IF YES
(1)  031172  021627  000067                     CMP     (SP),#67        ;;CHAR > 7?
(1)  031176  003015                             BGT     18$             ;;BRANCH IF YES
(1)  031200  042726  000060                     BIC     #60,(SP)+       ;;STRIP-OFF ASCII
(1)  031204  005766  000002                     TST     2(SP)           ;;IS THIS THE FIRST CHAR
(1)  031210  001403                             BEQ     17$             ;;BRANCH IF YES
(1)  031212  006316                             ASL     (SP)            ;;NO, SHIFT PRESENT
(1)  031214  006316                             ASL     (SP)            ;;   CHAR OVER TO MAKE
(1)  031216  006316                             ASL     (SP)            ;;   ROOM FOR NEW ONE.
(1)  031220  005266  000002             17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
(1)  031224  056616  177776                     BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
(1)  031230  000707                             BR      7$              ;;GET THE NEXT ONE
(1)  031232  104401  001202             18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
(1)  031236  000720                             BR      20$             ;;SIMULATE CONTROL-U
(1)                                     .DSABL  LSB
(1)
(1)
(2)                                     ;;**************************************************************************
(1)                                     ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
(1)                                     ;*CALL:
(1)                                     ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
(1)                                     ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
(1)                                     ;*                              ;;WITH PARITY BIT STRIPPED OFF
(1)                                     ;
(1)
(1)  031240  011646             $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
(1)  031242  016666  000004  000002     MOV     4(SP),2(SP)     ;;SAVE THE PS
(1)  031250  105777  147670     1$:     TSTB    @$TKS           ;;WAIT FOR
(1)  031254  100375                     BPL     1$              ;;A CHARACTER
(1)  031256  117766  147664  000004     MOVB    @$TKB,4(SP)     ;;READ THE TTY
(1)  031264  042766  177600  000004     BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
(1)  031272  026627  000004  000023     CMP     4(SP),#23       ;;IS IT A CONTROL-S?
(1)  031300  001013                     BNE     3$              ;;BRANCH IF NO
(1)  031302  105777  147636     2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
(1)  031306  100375                     BPL     2$              ;;LOOP UNTIL ITS THERE
(1)  031310  117746  147632             MOVB    @$TKB,-(SP)     ;;GET CHARACTER
(1)  031314  042716  177600             BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
(1)  031320  022627  000021             CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
(1)  031324  001366                     BNE     2$              ;;IF NOT DISCARD IT
(1)  031326  000750                     BR      1$              ;;YES, RESUME
(1)  031330  026627  000004  000140 3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
(1)  031336  002407                     BLT     4$              ;;BRANCH IF YES
(1)  031340  026627  000004  000175     CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
(1)  031346  003003                     BGT     4$              ;;BRANCH IF YES
(1)  031350  042766  000040  000004     BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
(1)  031356  000002             4$:     RTI                     ;;GO BACK TO USER
(2)                                     ;;**************************************************************************
(1)                                     ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
(1)                                     ;*CALL:
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    (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)  031360  010346                 $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
    (1)  031362  012703  031466         1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
    (1)  031366  022703  031476         2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
    (1)  031372  101405                         BLOS    4$              ;;BR IF YES
    (1)  031374  104410                         RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
    (1)  031376  112613                         MOVB    (SP)+,(R3)      ;;GET CHARACTER
    (1)  031400  122713  000177         10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
    (1)  031404  001003                         BNE     3$              ;;SKIP IF NOT
    (1)  031406  104401  001202         4$:     TYPE    ,$QUES          ;;TYPE A '?'
    (1)  031412  000763                         BR      1$              ;;CLEAR THE BUFFER AND LOOP
    (1)  031414  111337  031464         3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
    (1)  031420  104401  031464                 TYPE    ,9$
    (1)  031424  122723  000015                 CMPB    #15,(R3)+       ;;CHECK FOR RETURN
    (1)  031430  001356                         BNE     2$              ;;LOOP IF NOT RETURN
    (1)  031432  105063  177777                 CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
    (1)  031436  104401  001204                 TYPE    ,$LF            ;;TYPE A LINE FEED
    (1)  031442  012603                         MOV     (SP)+,R3        ;;RESTORE R3
    (1)  031444  011646                         MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
    (1)  031446  016666  000004  000002        MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
    (1)  031454  012766  031466  000004        MOV     #$TTYIN,4(SP)
    (1)  031462  000002                         RTI                     ;;RETURN
    (1)  031464     000         9$:     .BYTE   0                       ;;STORAGE FOR ASCII CHAR. TO TYPE
    (1)  031465     000                 .BYTE   0                       ;;TERMINATOR
    (1)  031466  000010         $TTYIN: .BLKB   8.                      ;;RESERVE 8 BYTES FOR TTY INPUT
    (1)  031476  052536  005015    000  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
    (1)  031503     136  006507  000012 $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
    (1)  031510  005015  053523  020122 $MSWR:  .ASCIZ  <15><12>/SWR = /
    (1)  031516  020075     000
    (1)  031521     040  047040  053505 $MNEW:  .ASCIZ  /  NEW = /
    (1)  031526  036440  000040
2565
    (1)                                 .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
    (1)
    (2)                                 ;;******************************************************************
    (1)                                 ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
    (1)                                 ;*OCTAL (ASCII) NUMBER AND TYPE IT.
    (1)                                 ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
    (1)                                 ;*CALL:
    (1)                                 ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
    (1)                                 ;*      TYPOS                   ;;CALL FOR TYPEOUT
    (1)                                 ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
    (1)                                 ;*      .BYTE   M               ;;M=1 OR 0
    (1)                                 ;*                                      ;;1=TYPE LEADING ZEROS
    (1)                                 ;*                                      ;;0=SUPPRESS LEADING ZEROS
    (1)                                 ;*
    (1)                                 ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
    (1)                                 ;*$TYPOS OR $TYPOC
    (1)                                 ;*CALL:
    (1)                                 ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
    (1)                                 ;*      TYPON                   ;;CALL FOR TYPEOUT
    (1)                                 ;*
    (1)                                 ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
    (1)                                 ;*CALL:
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    (1)                                 ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
    (1)                                 ;*      TYPOC                   ;;CALL FOR TYPEOUT
    (1)
    (1)  031532  017646  000000        $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
    (1)  031536  116637  000001 031755         MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
    (1)  031544  112637  031757                 MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
    (1)  031550  062716  000002                 ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
    (1)  031554  000406                         BR      $TYPON
    (1)  031556  112737  000001 031755  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
    (1)  031564  112737  000006 031757          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
    (1)  031572  112737  000005 031754  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
    (1)  031600  010346                         MOV     R3,-(SP)        ;;SAVE R3
    (1)  031602  010446                         MOV     R4,-(SP)        ;;SAVE R4
    (1)  031604  010546                         MOV     R5,-(SP)        ;;SAVE R5
    (1)  031606  113704  031757                 MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
    (1)  031612  005404                         NEG     R4
    (1)  031614  062704  000006                 ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
    (1)  031620  110437  031756                 MOVB    R4,$OMODE       ;;SAVE IT FOR USE
    (1)  031624  113704  031755                 MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
    (1)  031630  016605  000012                 MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
    (1)  031634  005003                         CLR     R3              ;;CLEAR THE OUTPUT WORD
    (1)  031636  006105                 1$:     ROL     R5              ;;ROTATE MSB INTO "C"
    (1)  031640  000404                         BR      3$              ;;GO DO MSB
    (1)  031642  006105                 2$:     ROL     R5              ;;FORM THIS DIGIT
    (1)  031644  006105                         ROL     R5
    (1)  031646  006105                         ROL     R5
    (1)  031650  010503                         MOV     R5,R3
    (1)  031652  006103                 3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
    (1)  031654  105337  031756                 DECB    $OMODE          ;;TYPE THIS DIGIT?
    (1)  031660  100016                         BPL     7$              ;;BR IF NO
    (1)  031662  042703  177770                 BIC     #177770,R3      ;;GET RID OF JUNK
    (1)  031666  001002                         BNE     4$              ;;TEST FOR 0
    (1)  031670  005704                         TST     R4              ;;SUPPRESS THIS 0?
    (1)  031672  001403                         BEQ     5$              ;;BR IF YES
    (1)  031674  005204                 4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
    (1)  031676  052703  000060                 BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
    (1)  031702  052703  000040         5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
    (1)  031706  110337  031752                 MOVB    R3,8$           ;;SAVE FOR TYPING
    (1)  031712  104401  031752                 TYPE    ,8$             ;;GO TYPE THIS DIGIT
    (1)  031716  105337  031754         7$:     DECB    $OCNT           ;;COUNT BY 1
    (1)  031722  003347                         BGT     2$              ;;BR IF MORE TO DO
    (1)  031724  002402                         BLT     6$              ;;BR IF DONE
    (1)  031726  005204                         INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
    (1)  031730  000744                         BR      2$              ;;GO DO THE LAST DIGIT
    (1)  031732  012605                 6$:     MOV     (SP)+,R5        ;;RESTORE R5
    (1)  031734  012604                         MOV     (SP)+,R4        ;;RESTORE R4
    (1)  031736  012603                         MOV     (SP)+,R3        ;;RESTORE R3
    (1)  031740  016666  000002 000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
    (1)  031746  012616                         MOV     (SP)+,(SP)
    (1)  031750  000002                         RTI                     ;;RETURN
    (1)  031752     000                 8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
    (1)  031753     000                         .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
    (1)  031754     000                 $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
    (1)  031755     000                 $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
    (1)  031756  000000                 $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
 2566                                   .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
```

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(1)
(2)                                     ;;**********************************************************************
(1)                                     ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
(1)                                     ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
(1)                                     ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
(1)                                     ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
(1)                                     ;*REPLACED WITH SPACES.
(1)                                     ;*CALL:
(1)                                     ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
(1)                                     ;*      TYPDS                   ;;GO TO THE ROUTINE
(1)
(1)  031760                             $TYPDS:
(3)  031760  010046                             MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  031762  010146                             MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(3)  031764  010246                             MOV     R2,-(SP)        ;;PUSH R2 ON STACK
(3)  031766  010346                             MOV     R3,-(SP)        ;;PUSH R3 ON STACK
(3)  031770  010546                             MOV     R5,-(SP)        ;;PUSH R5 ON STACK
(1)  031772  012746  020200                     MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
(1)  031776  016605  000020                     MOV     20(SP),R5       ;;GET THE INPUT NUMBER
(1)  032002  100004                             BPL     1$              ;;BR IF INPUT IS POS.
(1)  032004  005405                             NEG     R5              ;;MAKE THE BINARY NUMBER POS.
(1)  032006  112766  000055  000001             MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
(1)  032014  005000                     1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
(1)  032016  012703  032174                     MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
(1)  032022  112723  000040                     MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
(1)  032026  005002                     2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
(1)  032030  016001  032164                     MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
(1)  032034  160105                     3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
(1)  032036  002402                             BLT     4$              ;;BR IF DONE
(1)  032040  005202                             INC     R2              ;;INCREASE THE BCD DIGIT BY 1
(1)  032042  000774                             BR      3$
(1)  032044  060105                     4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
(1)  032046  005702                             TST     R2              ;;CHECK IF BCD DIGIT=0
(1)  032050  001002                             BNE     5$              ;;FALL THROUGH IF 0
(1)  032052  105716                             TSTB    (SP)            ;;STILL DOING LEADING 0'S?
(1)  032054  100407                             BMI     7$              ;;BR IF YES
(1)  032056  106316                     5$:     ASLB    (SP)            ;;MSD?
(1)  032060  103003                             BCC     6$              ;;BR IF NO
(1)  032062  116663  000001  177777             MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
(1)  032070  052702  000060             6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
(1)  032074  052702  000040             7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
(1)  032100  110223                             MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
(1)  032102  005720                             TST     (R0)+           ;;JUST INCREMENTING
(1)  032104  020027  000010                     CMP     R0,#10          ;;CHECK THE TABLE INDEX
(1)  032110  002746                             BLT     2$              ;;GO DO THE NEXT DIGIT
(1)  032112  003002                             BGT     8$              ;;GO TO EXIT
(1)  032114  010502                             MOV     R5,R2           ;;GET THE LSD
(1)  032116  000764                             BR      6$              ;;GO CHANGE TO ASCII
(1)  032120  105726                     8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
(1)  032122  100003                             BPL     9$              ;;BR IF NO
(1)  032124  116663  177777  177776             MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
(1)  032132  105013                     9$:     CLRB    (R3)            ;;SET THE TERMINATOR
(3)  032134  012605                             MOV     (SP)+,R5        ;;POP STACK INTO R5
(3)  032136  012603                             MOV     (SP)+,R3        ;;POP STACK INTO R3
(3)  032140  012602                             MOV     (SP)+,R2        ;;POP STACK INTO R2
(3)  032142  012601                             MOV     (SP)+,R1        ;;POP STACK INTO R1
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   (3)  032144  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
   (1)  032146  104401  032174                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
   (1)  032152  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
   (1)  032160  012616                          MOV     (SP)+,(SP)
   (1)  032162  000002                          RTI                     ;;RETURN TO USER
   (1)  032164  023420                $DTBL:    10000.
   (1)  032166  001750                          1000.
   (1)  032170  000144                          100.
   (1)  032172  000012                          10.
   (1)  032174  000004                $DBLK:    .BLKW   4
  2567
   (1)                                          .SBTTL  ERROR HANDLER ROUTINE
   (2)
   (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 $ERRTYP 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)  032204                        $ERROR:
   (1)  032204  104407                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
   (2)  032206  113737  001102  001632          MOVB    $TSTNM,TSTNUM   ;SET UP TEST # ON ERROR
   (1)  032214  105237  001103        7$:       INCB    $ERFLG          ;;SET THE ERROR FLAG
   (1)  032220  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
   (1)  032222  013777  001102  146712          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
   (1)  032230  032777  002000  146702          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
   (1)  032236  001402                          BEQ     1$              ;;NO - SKIP
   (1)  032240  104401  001176                  TYPE    ,$BELL          ;;RING BELL
   (1)  032244  005237  001112        1$:       INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
   (1)  032250  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
   (1)  032254  162737  000002  001116          SUB     #2,$ERRPC
   (1)  032262  117737  146630  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
   (1)  032270  032777  020000  146642          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
   (1)  032276  001055                          BNE     20$             ;;SKIP TYPEOUTS
   (1)  032300  021627  001002                  CMP     (SP),#1002      ;;IF RETURN PC LESS THAN 1002
   (1)  032304  101046                          BHI     12$             ;;ERROR IS ILLEGAL TRAP
   (1)                                ;;PROCESS UNEXPECTED TRAP OR INTERRUPT
   (1)  032306  016637  000004  001116          MOV     4(SP),$ERRPC    ;;GET PC AT TIME OF FALSE TRAP
   (1)  032314  162737  000002  001116          SUB     #2,$ERRPC       ;;ADJUST PC
   (1)  032322  104401  032366                  TYPE    ,10$            ;;TYPE HEADER
   (2)  032326  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
   (2)  032332  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
   (1)  032334  104401  032374                  TYPE    ,11$
   (1)  032340  162716  000004                  SUB     #4,(SP)         ;;GET FALSE TRAP VECTOR ADDR
   (1)  032344  011637  001116                  MOV     (SP),$ERRPC
   (2)  032350  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
   (2)  032354  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
   (1)  032356  104401  001203                  TYPE    ,$CRLF
   (1)  032362  022626                          CMP     (SP)+,(SP)+     ;;POP FALSE TRAP VECTOR PC&ADDR
   (1)  032364  000422                          BR      20$
   (1)  032366  050200  036503  000040  10$:    .ASCIZ  <200>'PC= '
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(1)  032374  020040  047125  054105  11$:    .ASCIZ  '  UNEXPECTED TRAP TO '
(1)  032402  042520  052103  042105
(1)  032410  052040  040522  020120
(1)  032416  047524  000040
(1)                                  .EVEN
(1)  032422                     12$:
(1)  032422  004737  032534          JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
(1)  032426  104401  001203          TYPE    ,$CRLF
(1)  032432                     20$:
(1)  032432  122737  000001  001226  CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
(1)  032440  001007                  BNE     2$              ;;NO,SKIP APT ERROR REPORT
(1)  032442  113737  001114  032454  MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
(1)  032450  004737  030424          JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
(1)  032454     000             21$: .BYTE   0
(1)  032455     000                  .BYTE   0
(1)  032456  000777             22$: BR      22$             ;;APT ERROR LOOP
(1)  032460  005777  146454     2$:  TST     @SWR            ;;HALT ON ERROR
(1)  032464  100002                  BPL     3$              ;;SKIP IF CONTINUE
(1)  032466  000000                  HALT                    ;;HALT ON ERROR!
(1)  032470  104407                  CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
(1)  032472  032777  001000  146440  3$:  BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
(1)  032500  001402                  BEQ     4$              ;;BR IF NO
(1)  032502  013716  001110          MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
(1)  032506  005737  001174     4$:  TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
(1)  032512  001402                  BEQ     5$              ;;BR IF NONE
(1)  032514  013716  001174          MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
(1)  032520                     5$:
(1)  032520  022737  021640  000042  CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
(1)  032526  001001                  BNE     6$              ;;BRANCH IF NO
(1)  032530  000000                  HALT                    ;;YES
(1)  032532                     6$:
(1)  032532  000002                  RTI                     ;;RETURN
2568                            .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
(1)
(2)                             ;;**********************************************************************
(1)                             ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
(1)                             ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
(1)                             ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
(1)
(1)  032534                     $ERRTYP:
(1)  032534  104401  001203          TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  032540  010046                  MOV     R0,-(SP)        ;;SAVE R0
(1)  032542  005000                  CLR     R0              ;;PICKUP THE ITEM INDEX
(1)  032544  153700  001114          BISB    @#$ITEMB,R0
(1)  032550  001004                  BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
(1)                                                          ;;TYPE THE PC OF THE ERROR
(2)  032552  013746  001116          MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
(2)                                                          ;;ERROR ADDRESS
(2)  032556  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
(1)  032560  000426                  BR      6$              ;;GET OUT
(1)  032562  005300             1$:  DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
(1)  032564  006300                  ASL     R0              ;;      WORK FOR THE ERROR TABLE
(1)  032566  006300                  ASL     R0
(1)  032570  006300                  ASL     R0
(1)  032572  062700  001332          ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
(1)  032576  012037  032606          MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
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(1)  032602  001404                        BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
(1)  032604  104401                        TYPE                    ;;TYPE THE "ERROR MESSAGE"
(1)  032606  000000                  2$:   .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
(1)  032610  104401  001203              TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  032614  012037  032624        3$:   MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
(1)  032620  001404                        BEQ     5$              ;;SKIP TYPEOUT IF 0
(1)  032622  104401                        TYPE                    ;;TYPE THE "DATA HEADER"
(1)  032624  000000                  4$:   .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
(1)  032626  104401  001203              TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  032632  011000                  5$:   MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
(1)  032634  001004                        BNE     7$              ;;GO TYPE THE DATA
(1)  032636  012600                  6$:   MOV     (SP)+,R0        ;;RESTORE R0
(1)  032640  104401  001203              TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
(1)  032644  000207                        RTS     PC              ;;RETURN
(1)  032646                          7$:
(2)  032646  013046                        MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
(2)  032650  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
(1)  032652  005710                        TST     (R0)            ;;IS THERE ANOTHER NUMBER?
(1)  032654  001770                        BEQ     6$              ;;BR IF NO
(1)  032656  104401  032664                TYPE    ,8$             ;;TYPE TWO(2) SPACES
(1)  032662  000771                        BR      7$              ;;LOOP
(1)  032664  020040  000             8$:   .ASCIZ  /  /            ;;TWO(2) SPACES
(1)          032670                        .EVEN
2569                                .SBTTL  SCOPE HANDLER ROUTINE
(1)
(2)                                 ;;**********************************************************************
(1)                                 ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
(1)                                 ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
(1)                                 ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
(1)                                 ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
(1)                                 ;*SW14=1        LOOP ON TEST
(1)                                 ;*SW11=1        INHIBIT ITERATIONS
(1)                                 ;*SW09=1        LOOP ON ERROR
(1)                                 ;*SW08=1        LOOP ON TEST IN SWR<7:0>
(1)                                 ;*CALL
(1)                                 ;*      SCOPE           ;;SCOPE=IOT
(1)
(1)  032670                         $SCOPE:
(1)  032670  104407                        CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
(1)                                 ;;GO TO ERROR ROUTINE IF RETURN PC LESS THAN 1002
(1)                                 ;;OTHERWISE CONTINUE
(1)  032672  021627  001002                CMP     (SP),#1002      ;;UNEXPECTED TRAP OR INTERRRUPT
(1)  032676  101002                        BHI     1$              ;;ARE TRAPPED HERE VIA IOT
(1)  032700  000137  032204                JMP     $ERROR          ;;GO PROCESS UNEXPECTED TRAP
(1)  032704  032777  040000  146226  1$:   BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
(1)  032712  001114                        BNE     $OVER           ;;YES IF SW14=1
(1)                                 ;#####START OF CODE FOR THE XOR TESTER#####
(1)  032714  000416                 $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
(1)                                                                 ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
(1)  032716  013746  000004                MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
(1)  032722  012737  032742  000004        MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
(1)  032730  005737  177060                TST     @#177060        ;;TIME OUT ON XOR?
(1)  032734  012637  000004                MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
(1)  032740  000463                        BR      $SVLAD          ;;GO TO THE NEXT TEST
(1)  032742  022626                  5$:   CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
(1)  032744  012637  000004                MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
```

```
    (1)  032750  000423                        BR      7$              ;;LOOP ON THE PRESENT TEST
    (1)  032752                        6$:;#####END OF CODE FOR THE XOR TESTER######
    (1)  032752  032777  000400  146160        BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
    (1)  032760  001404                        BEQ     2$              ;;BR IF NO
    (1)  032762  127737  146152  001102        CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
    (1)  032770  001465                        BEQ     $OVER           ;;BR IF YES
    (1)  032772  105737  001103        2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
    (1)  032776  001421                        BEQ     3$              ;;BR IF NO
    (1)  033000  123737  001115  001103        CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
    (1)  033006  101015                        BHI     3$              ;;BR IF NO
    (1)  033010  032777  001000  146122        BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
    (1)  033016  001404                        BEQ     4$              ;;BR IF NO
    (1)  033020  013737  001110  001106  7$:   MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
    (1)  033026  000446                        BR      $OVER
    (1)  033030  105037  001103        4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
    (1)  033034  005037  001172                CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
    (1)  033040  000415                        BR      1$              ;;ESCAPE TO THE NEXT TEST
    (1)  033042  032777  004000  146070  3$:   BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
    (1)  033050  001011                        BNE     1$              ;;BR IF YES
    (1)  033052  005737  001214                TST     $PASS           ;;IF FIRST PASS OF PROGRAM
    (1)  033056  001406                        BEQ     1$              ;;      INHIBIT ITERATIONS
    (1)  033060  005237  001104                INC     $ICNT           ;;INCREMENT ITERATION COUNT
    (1)  033064  023737  001172  001104        CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
    (1)  033072  002024                        BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
    (1)  033074  012737  000001  001104  1$:   MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
    (1)  033102  013737  033160  001172        MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
    (1)  033110  105237  001102        $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
    (1)  033114  113737  001102  001212        MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
    (1)  033122  011637  001106                MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
    (1)  033126  011637  001110                MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
    (1)  033132  005037  001174                CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
    (1)  033136  112737  000001  001115        MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
    (1)  033144  013777  001102  145770  $OVER: MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
    (1)  033152  013716  001106                MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
    (1)  033156  000002                        RTI                     ;;FIXES PS
    (1)  033160  003720                $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
2570
    (1)                                .SBTTL  POWER DOWN AND UP ROUTINES
    (2)
    (1)                                ;;**************************************************************************
    (1)                                ;POWER DOWN ROUTINE
    (1)  033162  012737  033326  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
    (1)  033170  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
    (3)  033176  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
    (3)  033200  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
    (3)  033202  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
    (3)  033204  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
    (3)  033206  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
    (3)  033210  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
    (3)  033212  017746  145722                MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
    (1)  033216  010637  033332                MOV     SP,$SAVR6       ;;SAVE SP
    (1)  033222  012737  033234  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
    (1)  033230  000000                        HALT
    (1)  033232  000776                        BR      .-2             ;;HANG UP
    (1)
    (2)
    (1)                                ;;**************************************************************************
                                       ;POWER UP ROUTINE
```

```
(1)  033234  012737  033326  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
(1)  033242  013706  033332          MOV     $SAVR6,SP        ;;GET SP
(1)  033246  005037  033332          CLR     $SAVR6           ;;WAIT LOOP FOR THE TTY
(1)  033252  005237  033332  1$:     INC     $SAVR6           ;;WAIT FOR THE INC
(1)  033256  001375                  BNE     1$               ;;OF  WORD
(3)  033260  012677  145654          MOV     (SP)+,@SWR       ;;POP STACK INTO @SWR
(3)  033264  012605                  MOV     (SP)+,R5         ;;POP STACK INTO R5
(3)  033266  012604                  MOV     (SP)+,R4         ;;POP STACK INTO R4
(3)  033270  012603                  MOV     (SP)+,R3         ;;POP STACK INTO R3
(3)  033272  012602                  MOV     (SP)+,R2         ;;POP STACK INTO R2
(3)  033274  012601                  MOV     (SP)+,R1         ;;POP STACK INTO R1
(3)  033276  012600                  MOV     (SP)+,R0         ;;POP STACK INTO R0
(1)  033300  012737  033162  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
(1)  033306  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
(1)  033314  104401                  TYPE                     ;;REPORT THE POWER FAILURE
(1)  033316  033334          $PWRMG: .WORD   PWRMSG           ;;POWER FAIL MESSAGE POINTER
(1)  033320  012716                  MOV     (PC)+,(SP)       ;;RESTART AT RESTRT
(1)  033322  002526          $PWRAD: .WORD   RESTRT           ;;RESTART ADDRESS
(1)  033324  000002                  RTI
(1)  033326  000000          $ILLUP: HALT                     ;;THE POWER UP SEQUENCE WAS STARTED
(1)  033330  000776                  BR      .-2              ;; BEFORE THE POWER DOWN WAS COMPLETE
(1)  033332  000000          $SAVR6: 0                        ;;PUT THE SP HERE
2571 033334  005015  042522  052123  PWRMSG: .ASCIZ  <15><12>/RESTARTED FROM POWER FAIL/
     033342  051101  042524  020104
     033350  051106  046517  050040
     033356  053517  051105  043040
     033364  044501  000114
2572                                 .EVEN
2573                                 .SBTTL  TRAP DECODER
(1)
(2)                                  ;;******************************************************************
(1)                                  ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
(1)                                  ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
(1)                                  ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
(1)                                  ;*GO TO THAT ROUTINE.
(1)
(1)  033370  010046          $TRAP:  MOV     R0,-(SP)         ;;SAVE R0
(1)  033372  016600  000002          MOV     2(SP),R0         ;;GET TRAP ADDRESS
(1)  033376  005740                  TST     -(R0)            ;;BACKUP BY 2
(1)  033400  111000                  MOVB    (R0),R0          ;;GET RIGHT BYTE OF TRAP
(1)  033402  006300                  ASL     R0               ;;POSITION FOR INDEXING
(1)  033404  016000  033424          MOV     $TRPAD(R0),R0    ;;INDEX TO TABLE
(1)  033410  000200                  RTS     R0               ;;GO TO ROUTINE
(1)
(1)
(1)                                  ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
(1)
(1)  033412  011646          $TRAP2: MOV     (SP),-(SP)       ;;MOVE THE PC DOWN
(1)  033414  016666  000004  000002  MOV     4(SP),2(SP)      ;;MOVE THE PSW DOWN
(1)  033422  000002                  RTI                      ;;RESTORE THE PSW
(1)
(3)                                  .SBTTL  TRAP TABLE
(3)
(3)                                  ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
(3)                                  ;*BY THE "TRAP" INSTRUCTION.
(3)
```

```
    (3)                                 ;       ROUTINE
    (3)                                 ;       -------
    (3)   033424  033412                $TRPAD: .WORD   $TRAP2
    (3)   033426  030124                        $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
    (3)   033430  031556                        $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
    (3)   033432  031532                        $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
    (3)   033434  031572                        $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
    (3)   033436  031760                        $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
    (1)
    (3)   033440  031026                        $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
    (1)
    (3)   033442  030756                        $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
    (3)   033444  031240                        $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
    (3)   033446  031360                        $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
    (3)   033450  030654                        $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
  2574                                  .SBTTL  RANDOM NUMBER GENERATOR ROUTINE
    (1)
    (2)                                 ;;**************************************************************************
    (1)                                 ;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
    (1)                                 ;*WITH A RANGE OF 0 TO 2(+33)-1.
    (1)                                 ;*CALL:
    (1)                                 ;*      JSR     PC,$RAND        ;;CALL THE ROUTINE
    (1)                                 ;*      RETURN                  ;;RETURN HERE THE RANDOM
    (1)                                 ;*                              ;;NUMBER WILL BE IN
    (1)                                 ;*                              ;;$HINUM,$LONUM
    (1)
    (1)   033452                        $RAND:
    (3)   033452  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
    (3)   033454  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
    (3)   033456  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
    (1)   033460  013700  033552                MOV     $LONUM,R0       ;;SET R0 WITH LOW
    (1)   033464  013701  033550                MOV     $HINUM,R1       ;;SET R1 WITH HIGH
    (1)   033470  012702  177771                MOV     #-7,R2          ;;SET SHIFT COUNT
    (1)   033474  006300                1$:     ASL     R0              ;;SHIFT R0 LEFT AND
    (1)   033476  006101                        ROL     R1              ;;ROTATE CARRY INTO R1 AND
    (1)   033500  005202                        INC     R2              ;;CHECK FOR DONE
    (1)   033502  001374                        BNE     1$              ;;CONTINUE SHIFT LOOP
    (1)   033504  063700  033552                ADD     $LONUM,R0       ;;ADD NUMBER TO MAKE X 129
    (1)   033510  005501                        ADC     R1              ;;PROPOGATE CARRY
    (1)   033512  063701  033550                ADD     $HINUM,R1       ;;ADD NUMBER TO MAKE X 129
    (1)   033516  062700  001057                ADD     #1057,R0        ;;ADD LOW CONSTANT
    (1)   033522  005501                        ADC     R1              ;;PROPOGATE CARRY
    (1)   033524  062701  047401                ADD     #47401,R1       ;;ADD HIGH CONSTANT
    (1)   033530  010037  033552                MOV     R0,$LONUM       ;;SAVE R0
    (1)   033534  010137  033550                MOV     R1,$HINUM       ;;SAVE R1
    (3)   033540  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
    (3)   033542  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
    (3)   033544  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
    (1)   033546  000207                        RTS     PC              ;;RETURN
    (1)   033550  176543                $HINUM: .WORD   176543
    (1)   033552  123456                $LONUM: .WORD   123456
```

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                                                        .SBTTL  ASCII MESSAGES
                                                
033554  047520  052123  051055  EM1:    .ASCIZ  /POST-RESET CONDITIONS NOT MET IN CSR./
033562  051505  052105  041440
033570  047117  044504  044524
033576  047117  020123  047516
033604  020124  042515  020124
033612  047111  041440  051123
033620  000056
033622  042522  042101  053457  EM2:    .ASCIZ  %READ/WRITE BIT FAILURE IN CSR.%
033630  044522  042524  041040
033636  052111  043040  044501
033644  052514  042522  044440
033652  020116  051503  027122
033660     000
033661     102  052131  020105  EM3:    .ASCIZ  /BYTE ACCESS FAILURE IN CSR./
033666  041501  042503  051523
033674  043040  044501  052514
033702  042522  044440  020116
033710  051503  027122     000
033715     105  051122  051117  EM4:    .ASCIZ  /ERROR IN CONNECT PROCESS./
033722  044440  020116  047503
033730  047116  041505  020124
033736  051120  041517  051505
033744  027123     000
033747     111  052116  051105  EM5:    .ASCIZ  /INTERUPT DETECTED WITH INTERUPT ENABLE CLEARED./
033754  050125  020124  042504
033762  042524  052103  042105
033770  053440  052111  020110
033776  047111  042524  052522
034004  052120  042440  040516
034012  046102  020105  046103
034020  040505  042522  027104
034026     000
034027     103  052517  042114  EM6:    .ASCIZ  /COULD NOT CONNECT./
034034  047040  052117  041440
034042  047117  042516  052103
034050  000056
034052  051105  047522  020122  EM7:    .ASCIZ  /ERROR IN RELEASE PROCESS./
034060  047111  051040  046105
034066  040505  042523  050040
034074  047522  042503  051523
034102  000056
034104  047516  044440  052116  EM10:   .ASCIZ  /NO INTERUPT DETECTED./
034112  051105  050125  020124
034120  042504  042524  052103
034126  042105  000056
034132  047111  042524  052522  EM11:   .ASCIZ  /INTERUPT AT WRONG PRIORITY./
034140  052120  040440  020124
034146  051127  047117  020107
034154  051120  047511  044522
034162  054524  000056
034166  047503  047116  041505  EM12:   .ASCIZ  /CONNECT CONDITION FAILURE./
034174  020124  047503  042116
034202  052111  047511  020116
034210  040506  046111  051125
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                034216  027105     000
 2588           034221     105  051122  051117  EM13:   .ASCIZ  /ERROR IN CONNECT FAILURE PROCESS./
                034226  044440  020116  047503
                034234  047116  041505  020124
                034242  040506  046111  051125
                034250  020102  051120  041517
                034256  051505  027123     000
 2589           034263     105  051122  051117  EM14:   .ASCIZ  /ERROR IN RELEASE TEST WITHOUT BUSS MASTERSHIP./
                034270  044440  020116  042522
                034276  042514  051501  020105
                034304  042524  052123  053440
                034312  052111  047510  052125
                034320  041040  051525  020123
                034326  040515  052123  051105
                034334  044123  050111  000056
 2590           034342  042522  042514  051501  EM15:   .ASCIZ  /RELEASE CONDITIONS NOT MET./
                034350  020105  047503  042116
                034356  052111  047511  051516
                034364  047040  052117  046440
                034372  052105  000056
 2591           034376  046524  020117  044502  EM16:   .ASCIZ  /TMO BIT NOT SET./
                034404  020124  047516  020124
                034412  042523  027124     000
 2592           034417     103  052517  042114  EM17:   .ASCIZ  %COULDN'T READ/WRITE EXTERNAL DEVICE.%
                034424  023516  020124  042522
                034432  042101  053457  044522
                034440  042524  042440  052130
                034446  051105  040516  020114
                034454  042504  044526  042503
                034462  000056
 2593           034464  042522  042523  020124  EM20:   .ASCIZ  /RESET HOLD (HLD) DIDN'T DISABLE RESET./
                034472  047510  042114  024040
                034500  046110  024504  042040
                034506  042111  023516  020124
                034514  044504  040523  046102
                034522  020105  042522  042523
                034530  027124     000
 2594           034533     122  051505  052105  EM21:   .ASCIZ  /RESET (RST) DIDN'T WORK./
                034540  024040  051522  024524
                034546  042040  042111  023516
                034554  020124  047527  045522
                034562  000056
 2595           034564  044124  020105  050117  EM22:   .ASCIZ  /THE OPERATION OF THE RESET-IN-NEUTRAL HAS CHANGED./
                034572  051105  052101  047511
                034600  020116  043117  052040
                034606  042510  051040  051505
                034614  052105  044455  026516
                034622  042516  052125  040522
                034630  020114  040510  020123
                034636  044103  047101  042507
                034644  027104     000
 2596           034647     040     000          SPACE:  .ASCIZ  / /
 2597           034651     200  036460  044124  SELMS:  .ASCII  <200>/0=THIS MESSAGE/
                034656  051511  046440  051505
                034664  040523  042507
 2598           034670  030600  046475  047117          .ASCII  <200>/1=MONOPORT TEST/
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                034676  050117  051117  020124
                034704  042524  052123
 2599           034710  031200  046475  046125          .ASCII  <200>/2=MULTIPORT TEST/
                034716  044524  047520  052122
                034724  052040  051505     124
 2600           034731     200  036463  040515          .ASCII  <200>/3=MANUAL INTERVENTION TEST/
                034736  052516  046101  044440
                034744  052116  051105  042526
                034752  052116  047511  020116
                034760  042524  052123
 2601           034764  032200  052075  051505          .ASCIZ  <200>/4=TEST NPR LINE/
                034772  020124  050116  020122
                035000  044514  042516     000
 2602           035005     105  051122  051117  DH1:    .ASCII  /ERROR  TEST#   SHOULD  WAS     FROM/<200>
                035012  052011  051505  021524
                035020  051411  047510  046125
                035026  004504  040527  004523
                035034  051106  046517     200
 2603           035041     120  004503  041011          .ASCIZ  /PC             BE/
                035046  000105
 2604           035050  051105  047522  004522  DH2:    .ASCII  /ERROR  TEST#   WROTE   READ    DEVICE ADDRESS/<200>
                035056  042524  052123  004443
                035064  051127  052117  004505
                035072  042522  042101  042011
                035100  053105  041511  020105
                035106  042101  051104  051505
                035114  100123
 2605           035116  041520     000                  .ASCIZ  /PC/
 2606           035121     105  051122  051117  DH3:    .ASCII  /ERROR  TEST#   BITS FAILING RESET      DEVICE ADDRESS/<200>
                035126  052011  051505  021524
                035134  041011  052111  020123
                035142  040506  046111  047111
                035150  020107  042522  042523
                035156  004524  042504  044526
                035164  042503  040440  042104
                035172  042522  051523     200
 2607           035177     120  000103                  .ASCIZ  /PC/
 2608           035202  051105  047522  004522  DH4:    .ASCII  /ERROR  TEST#   RESET   READ    DEVICE ADDRESS/<200>
                035210  042524  052123  004443
                035216  042522  042523  004524
                035224  042522  042101  042011
                035232  053105  041511  020105
                035240  042101  051104  051505
                035246  100123
 2609           035250  041520  020040  020040          .ASCIZ  /PC             BITS/
                035256  020040  020040  020040
                035264  020040  041040  052111
                035272  000123
 2610           035274  051105  047522  100122  DH5:    .ASCII  /ERROR/<200>
 2611           035302  050040  020103     000          .ASCIZ  / PC /
 2612           035307     105  051122  051117  DH6:    .ASCII  /ERROR          BR/<200>
                035314  020040  020040  020040
                035322  020040  020040  051102
                035330     200
 2613           035331     040  041520  020040          .ASCIZ  / PC            LEVEL/
                035336  020040  020040  020040
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        035344  020040  046040  053105
        035352  046105     000
 2614           035356                       .EVEN
 2615   035356  001116  001632  001124  DT1:  $ERRPC,TSTNUM,GOOD,BAD,BADA,0
        035364  001126  001122  000000
 2616   035372  001116  001632  001640  DT2:  $ERRPC,TSTNUM,DEVRW,BAD,DEVAD,0
        035400  001126  001636  000000
 2617   035406  001116  001632  001126  DT3:  $ERRPC,TSTNUM,BAD,DEVAD,0
        035414  001636  000000
 2618   035420  001116  000000          DT4:  $ERRPC,0
 2619   035424  001116  027406  000000  DT5:  $ERRPC,BRCNT,0
 2620           000001                       .END
```

```
ABASE = 177420            388#    400
ACDW1 = 000000            400
ACDW2 = 000000            400
ACPUOP= 000000            400
ADDW0 = 000000            400
ADDW1 = 000000            400
ADDW10= 000000            400
ADDW11= 000000            400
ADDW12= 000000            400
ADDW13= 000000            400
ADDW14= 000000            400
ADDW15= 000000            400
ADDW2 = 000000            400
ADDW3 = 000000            400
ADDW4 = 000000            400
ADDW5 = 000000            400
ADDW6 = 000000            400
ADDW7 = 000000            400
ADDW8 = 000000            400
ADDW9 = 000000            400
ADEVCT= 000000            400
ADEVM = 000000            400
AENV  = 000000            400
AENVM = 000000            400
AFATAL= 000000            400
AMADR1= 000000            400
AMADR2= 000000            400
AMADR3= 000000            400
AMADR4= 000000            400
AMAMS1= 000000            400
AMAMS2= 000000            400
AMAMS3= 000000            400
AMAMS4= 000000            400
AMSGAD= 000000            400
AMSGLG= 000000            400
AMSGTY= 000000            400
AMTYP1= 000000            400
AMTYP2= 000000            400
AMTYP3= 000000            400
AMTYP4= 000000            400
APASS = 000000            400
APRIOR= 000000            400
APTCSU= 000040           2561     2562#
APTENV= 000001           2561     2562#    2567
APTSIZ= 000200            579     2562#
APTSPO= 000100           2561     2562#
ASWREG= 000000            400
ATESTN= 000000            400
AUNIT = 000000            400
AUSWR = 000000            400
AVECT1= 160350            389#     400
AVECT2= 000000            400
BAD   = 001126            391#     670*     672      686*     687*     688*     689      696*     697*     698      704*     705      719*
                          720      726*     727      747*     748*     749      758*     759      767*     781*     782      797*     798
                          806*     807      814*     833*     834*     835      845*     846*     847      855*     856      864*     879*
                          880      895*     896      904*     905      912*     924*     933*     938      941*     944      961*     962
```

```
                        973*   974    984*   990*   991   1011*  1012  1038*  1039  1049*  1055  1092*  1105*
                       1107*  1109   1120*  1121   1127*  1143*  1150*  1151  1168*  1176*  1177  1208*  1215*
                       1217*  1219   1232*  1237*  1238   1359*  1360  1364*  1365  1368   1371  1374   1403*
                       1404   1408*  1409   1412   1415   1418   1432*  1433  1455*  1457   1466* 1468   1486*
                       1488   1503*  1505   1861*  1862*  1869   1872  1879*  1880*  1882  1885  1904*  1905*
                       1908   1911   1920*  1921*  1923   2119*  2121  2144*  2145  2147   2152  2166   2174
                       2414*  2615   2616   2617
BADA  = 001122          393#   671*  2615
BEBA    027416         2429*  2441*  2486#  2530*
BEBD    027412         2428*  2484#  2532*
BECC    027414         2430*  2442*  2485#  2531*
BECR1   027420         2431*  2444*  2458*  2487#  2529*  2550
BECR2   027422         2488#  2528*
BERE    027424         2489#  2527*
BIT0  = 000001          387#   392
BIT00 = 000001          387#
BIT01 = 000002          387#
BIT02 = 000004          387#
BIT03 = 000010          387#
BIT04 = 000020          387#
BIT05 = 000040          387#
BIT06 = 000100          387#
BIT07 = 000200          387#
BIT08 = 000400          387#  2569
BIT09 = 001000          387#  2567   2569
BIT1  = 000002          387#
BIT10 = 002000          387#  2567
BIT11 = 004000          387#  2569
BIT12 = 010000          387#
BIT13 = 020000          387#  2567
BIT14 = 040000          387#  2569
BIT15 = 100000          387#
BIT2  = 000004          387#
BIT3  = 000010          387#
BIT4  = 000020          387#
BIT5  = 000040          387#
BIT6  = 000100          387#
BIT7  = 000200          387#
BIT8  = 000400          387#
BIT9  = 001000          387#
BPTVEC= 000014          387#
BRCNT   027406         2405*  2443*  2482#  2619
BREND   027470         2422   2501#
BRLV    027460         2406   2497#
BUFF1   027434         2427*  2429   2436   2438*  2439*  2441  2452  2494#
CKADR   026562         1098   1194   2372#
CKSWR = 104407         2567   2569   2573#
CLRREG  030020         2426   2526#
CNTLC   026620          639    663    678    712    734    774   820   872   919   954   999  1031  1076
                       1133   1159   1270   1273   1283   1297  1300  1350  1386  1446  1477  1520  1554
                       1728   1733   1743   1751   1779   1800  1813  1860  1895  2383#  2403  2421  2477
CONID   021732         1352   1388   1521   1954#
CONNEC  021674         1304   1351   1387   1791   1849   1945#
COVID   001730          565#  1371   1415   1524   1533   1954*  1958*
CR    = 000015          387#  2561
CRDY    030074         2433   2448   2460   2547#
```

```
CRLF  = 000200   387#   602   2561
CSR     001622   525#   589*   607*   613    665*   670    671    681*   685*   686    695*   696    703*
                 704    714*   715    723*   738*   746*   747    758    764*   767    777*   781    791*
                 797    806    814    824*   832*   833    845    855    861*   864    875*   879    889*
                 895    904    912    921*   926*   927    941    947*   957*   961    971*   973    979*
                 980*   984    990    994*   1001*  1010*  1011   1025*  1034*  1038   1048*  1049   1087*
                1088   1090   1092   1113*  1116   1129*  1138*  1139   1141   1143   1148*  1150   1154*
                1163*  1164   1166   1168   1173*  1176   1183*  1203*  1204   1206   1208   1223*  1224
                1227*  1228   1230   1232   1255*  1354*  1359   1364   1377*  1398*  1403   1408   1425
                1429   1432   1437*  1449   1455   1461*  1464   1466   1471*  1480   1486   1493   1498*
                1501   1503   1514*  1524   1533   1556*  1559   1563*  1566   1571   1594   1600   1603
                1609*  1611   1613   1621   1625   1628   1631*  1639*  1642   1646   1649   1652*  1661*
                1664   1670   1673   1689   1695   1698   1701*  1734*  1738   1741   1745*  1746   1749
                1756   1759   1763   1766   1772   1775   1780*  1784   1787   1795   1798   1802   1805
                1814*  1817*  1822   1825   1832   1838   1841   1845*  1850*  1855   1861   1863*  1866
                1890   1893   1904   1920   1926   1946   1949*  1971   1987   1994   1999   2006   2143*
                2144   2177*  2183*  2184   2186*  2187   2194*  2195   2199*  2200   2227*  2245   2409*
                2410   2412   2414   2418*
CURFUN  001722   562#   1305*  1306*  1310*  1312   1326*  1327*  1331*  1333
CURID   001724   563#   1307*  1308*  1328*  1329*  1955
CYCLE   001726   564#   1275*  1319*  1340*  1557*  1705*
DDISP = 177570   387#   400    579
DEVAD   001636   544#   1082   1104*  1105   1120   1190   1214*  1215   1237   1392*  1393   1396   1510
                1584*  1585   1588   1681   2296*  2373   2616   2617
DEVCON  001754   571#   1080   1250*  1252   1276
DEVRC   001642   546#   1084   1121   1125   1199   1238   1510   1681   2303*
DEVRW   001640   545#   1104   1106*  1107   1108*  1109   1214   1216*  1217   1218*  1219   1392   1393
                1584   1585   2300*  2616
DH1     035005   403    408    413    418    423    428    433    438    443    448    453    458    463
                 468    478   2602#
DH2     035050   473   2604#
DH3     035121   483   2606#
DH4     035202   488   2608#
DH5     035274   493    498    508    514   2610#
DH6     035307   503   2612#
DISPAT  007722  1295#  1321   1342
DISPLA  001142   400#   579*  2567*  2569*
DISPRE  000174   395#   579
DMODE   023176   633    643   2141#  2286
DSWR  = 177570   387#   400    579
DTIME   023540   632    644   2181#  2287
DT03    001634   543#   649    743    794    829    840    892    968   1007   1052   1135   1281   1729
                2131   2149*  2151*  2288   2304   2334
DT1     035356   404    409    414    419    424    429    434    439    444    449    454    459    464
                 469    479   2615#
DT2     035372   474    489   2616#
DT3     035406   484   2617#
DT3SP   015202  1705#
DT4     035420   494    499    509    515   2618#
DT5     035424   504   2619#
ECHOB   026430  2239*  2240   2349#
EMTVEC= 000030   387#   579*
EM1     033554   402   2578#
EM10    034104   437   2585#
EM11    034132   442   2586#
EM12    034166   447   2587#
```

```
EM13    034221            452    2588#
EM14    034263            457    2589#
EM15    034342            462    2590#
EM16    034376            467    2591#
EM17    034417            472    2592#
EM2     033622            407    2579#
EM20    034464            477    2593#
EM21    034533            482    2594#
EM22    034564            487    2595#
EM23    027474            492    2504#
EM24    027524            497    2505#
EM25    027556            502    2506#
EM26    027634            507    2507#
EM27    027726            513    2508#
EM3     033661            412    2580#
EM4     033715            417    2581#
EM5     033747            422    2582#
EM6     034027            427    2583#
EM7     034052            432    2584#
ENDMG   030002           2468    2511#
ERREN = 017732           1844#   1878    1917
ERROUT  026532           2363#   2375
ERRVEC= 000004            387#    579*    580*   2364*   2374    2375*   2569*
EXPEND  001654            551#
EXPRT1  001646            548#   2310
EXPRT2  001650            549#
EXPRT3  001652            550#
EXPTCT  001656            552#   2017*   2019*   2036*   2308*   2311    2332
FLAG    026560           1099    1195    2365*   2370#   2376*
FLUSHM  023124           2044    2061    2125#
FLUSHP  023146           2131#   2235
FUNCT1  010206           1349#   1538
FUNCT2  010636           1385#   1539
FUNCT3  011644           1445#   1540
FUNCT4  012152           1476#   1494    1541
FUNCT5  012616           1519#   1542
GETADR  024232            642    2233#   2281
GNS   = ****** U          395     602     651     653    1118    1247    1249    1358    1367    1373    1395    1402    1411
                         1417    1424    1431    1456    1467    1487    1504    1512    1530    1565    1587    1593    1602
                         1620    1627    1641    1648    1663    1672    1683    1688    1697    1735    1740    1748    1753
                         1758    1765    1769    1774    1781    1786    1792    1797    1804    1808    1819    1824    1831
                         1835    1840    1851    1854    1871    1873    1884    1886    1892    1897    1910    1912    1925
                         1927    1931    1934    1993    2005    2120    2165    2173    2191    2204    2219    2224    2236
                         2243    2244    2251    2263    2290    2292    2294    2298    2301    2306    2312    2317    2328
                         2336    2340    2344    2358    2400    2401    2573
GOOD  = 001124            390#    666*    672     682*    683*    685     689     692*    693*    695     698     701*    703
                          705     717*    718*    720     724*    727     741*    742*    745*    749     755*    756*    759
                          778*    779*    782     792*    793*    796*    798     804*    807     827*    828*    831*    835
                          842*    843*    847     852*    853*    856     876*    877*    880     890*    891*    894*    896
                          901*    902*    905     923*    938     942*    943*    944     958*    959*    962     972*    974
                          982*    983*    988*    989*    991    1005*   1006*   1009*   1012    1035*   1036*   1039    1050*
                         1051*   1054*   1055    1061*   1062*   1093*   1094*   1125*   1126*   1127    1144*   1145*   1169*
                         1170*   1174*   1177    1209*   1210*   1233*   1234*   1598*   1599*   1600    1668*   1669*   1670
                         1693*   1694*   1695    1867*   1868*   1869    1874    1881*   1882    1887    1906*   1907*   1908
                         1913    1922*   1923    1928    2415*   2416*   2615
GTSWR = 104406            602    2573#
```

```
HT     = 000011            387#   2561
INTVEC  027426            2440*   2490#   2538    2540*
IOTVEC= 000020             387#    579*
KIPAR0= 172340             394#
KIPAR1= 172342             394#
KIPAR2= 172344             394#
KIPAR3= 172346             394#
KIPAR4= 172350             394#
KIPAR5= 172352             394#
KIPAR6= 172354             394#
KIPAR7= 172356             394#
KIPDR0= 172300             394#
KIPDR1= 172302             394#
KIPDR2= 172304             394#
KIPDR3= 172306             394#
KIPDR4= 172310             394#
KIPDR5= 172312             394#
KIPDR6= 172314             394#
KIPDR7= 172316             394#
KONST   001752             570#    612*    613*    614*    666     682     692     701     717     724     741     755     778
                           792     804     827     842     852     876     890     901     942     958     972     982     988
                          1005    1035    1050    1061    1093    1144    1169    1174    1209    1233    1598    1668    1693
                          1867    1906    2415
LF     = 000012             387#   2561
MANEND  021500            1902    1934#
MANIN   015300             631     634    1727#
MANMOD  015316            1730    1732#   1744
MASMEN  022430            1301    2043#
MASTER  007740            1294    1296    1299#
MENU    001676             560#   2045    2053    2062    2076    2085    2125
MMVEC  = 000250             394#
MONEND  007544            1261#
MONPRT  002676             621     635     638#
MULDT3  012762            1284    1553#   1716    1721
MULEND  015236            1656    1710    1714#
MULPRT  007556             623    1269#   1322    1343
NEXENT  001674             559#   2046    2055    2063    2065    2070    2078    2080    2087    2095*   2102*   2103*   2104
                          2107*   2109*   2110    2112*   2113
NPR     026766            2402#   2474
NULL    027777            2471    2510#
NUM     027410            2399*   2404*   2465    2472*   2483#
ONOFF   001744             567#   1576*   1578*   1708    1714    2043*   2060*
OOPS    023022             605     769     816     867     914     949     995    1026    1070    1285    1378    1436    1472
                          1515    1702    2119#
PARFLG  026426             627*    640    1271    2233*   2348#
PARIN   024756             626    1274    2280#
PASS    027404            2398*   2467*   2469    2481#
PFVSEV  020170            1846    1859#
PIRQ   = 177772             387#
PIRQVE= 000240              387#
PORTNO  001644             547#    654    1290    1295    2014    2063    2078    2169*   2293
POSTSV= 021006            1898#   1932
PRI     001630             534#    585*    923
PR0    = 000000             387#
PR1    = 000040             387#
PR2    = 000100             387#
```

```
PR3    = 000140   387#
PR4    = 000200   387#
PR5    = 000240   387#
PR6    = 000300   387#
PR7    = 000340   387#
PS     = 177776   387#
PSW    = 177776   387#   664*  680*  737*  740*  754*  780*  789*  803*  823*  826*  878*  887*
                  922*  929*  948*  960*  1002* 1019* 1037* 1046* 1064* 1086* 1137* 1162* 1202*
                  1226* 1289* 1379* 1422* 1438* 1473* 1516* 1555* 1570* 1610* 1618* 1632* 1653*
                  1686* 1703* 1790* 1818* 1848* 2142* 2181* 2193* 2198* 2408* 2425* 2447* 2459*
PWFSER 021024     1847  1904#
PWRMSG 033334     2570  2571#
PWROK  016376     1731  1773  1778#  1789  1807
PWRVEC= 000024      387#   579*  1815  1816*  1830*  1846*  1864*  1901*  2570*
RCATCH 030052     2473  2476  2537#
RDCHR  = 104410   1736  1754  1770  1782  1793  1809  1820  1836  2237  2345  2564  2573#
RDLIN  = 104411   2563  2573#
RDOCT  = 104412   2247  2256  2269  2295  2299  2302  2307  2313  2318  2573#
REPAR  = 024774   2282  2285#
REQ    = 000001    392#   746   791   832   889   971  1087  1138  1163  1203  1227  2409
RESTRT 002526      604   615#  1261  1940  2570
RESVEC= 000010     387#
ROUTE  002672      620   621*  623*  626*  629*  631*  635#  2282*
ROUT1  002566      621#  2352
ROUT2  002600      623#  2353
ROUT3  002612      395   625#  2390  2419
ROUT4  002636      629#  2354
SALMEN 022516     1324  2060#
SECT2  013212     1582#  1707  1712
SECT2A 013612     1601  1606#  1608*  1616*
SECT2B 013656     1607  1616#
SECT2C 014106     1615  1631#
SECT2D 013624     1609#  1626
SECT3  014116     1636#
SECT4  014372     1577  1655  1660#
SECT5  014616     1671  1679#
SELMS  034651     2321  2597#
SEQ    001660      553#   558   559  2016  2094  2095  2107  2112
SEQINT 022666     1288  2094#  2100
SEQMAK 022320     1287  2014#
SEQPTR 001672      558#  2094*  2096  2098*  2099  2101  2102
SEQSTP 022710     1318  1339  2098#
SETUP1 002232      580#
SETUP2 002260      589#
SETUP3 002302      596#   599
SLAVE  010072     1291  1298  1324#
SPACE  034647     2246  2255  2268  2596#
SR0    = 177572   394#
SR1    = 177574   394#
SR2    = 177576   394#
SR3    = 172516   394#
STACK  = 001100    387#   579   615   987  1569  1597  1624  1645  1667  1692  1828  1876  1899
                  1915  2407  2424
START  001762      579#   622   624   628   630  2284  2361
STKLMT= 177774     387#
STPNEX 022764     2048  2050  2067  2073  2082  2109#
```

```
SWBPWF  017162          1812#  1834
SWR     001140           400#   579*    602   2564*   2567    2569    2570*
SWREG   000176           395#   579     602    2564
SW0   = 000001           387#
SW00  = 000001           387#
SW01  = 000002           387#
SW02  = 000004           387#
SW03  = 000010           387#
SW04  = 000020           387#
SW05  = 000040           387#
SW06  = 000100           387#
SW07  = 000200           387#
SW08  = 000400           387#
SW09  = 001000           387#
SW1   = 000002           387#
SW10  = 002000           387#
SW11  = 004000           387#
SW12  = 010000           387#
SW13  = 020000           387#
SW14  = 040000           387#
SW15  = 100000           387#
SW2   = 000004           387#
SW3   = 000010           387#
SW4   = 000020           387#
SW5   = 000040           387#
SW6   = 000100           387#
SW7   = 000200           387#
SW8   = 000400           387#
SW9   = 001000           387#
SYNCUP  022064          1325   1985#
TABM    012750          1311   1332   1538#
TBITVE= 000014           387#
TEMP1   001732           566#  1491*  1492*  1495*   2015    2024
TEMP2   002674           636#  1866*  1879
TICK    022060          1970*  1973*  1979#
TIMA    001746           568#  1491   1970   2182*   2189*   2206
TIMB    001750           569#  2197*  2202*  2207
TKVEC = 000060           387#
TOCK    022062          1114*  1292*  1302*  1591*   1636*   1852*   1918*   1963*   1965*   1968*   1975*   1977*   1980#
TPVEC = 000064           387#
TRAPVE= 000034           387#   579*
TRAP4   026444           580   2357#
TRIG    022006          1558*  1654   1711*  1967#
TRIN    001756           572#  1278*  1280*  1390    1397*   1508    1513*   1582    1589*   1679    1684*
TRTVEC= 000014           387#
TSTNPR  026652          2325   2397#
TSTNUM  001632           540#  2567*  2615   2616    2617
TST1    003060           646    662#
TST10   005032           918#
TST11   005240           953#
TST12   005530           998#
TST13   005710          1030#
TST14   006154          1075#
TST15   006546          1132#
TST16   006702          1158#
TST17   007050          1188#
```

```
TST2     003152              677#
TST3     003404              711#
TST4     003524              733#
TST5     003760              773#
TST6     004242              819#
TST7     004550              871#
TX       026434             2343    2351#
TYPDS  = 104405             1940    2470    2573#
TYPE   = 104401              602     651     653    1118    1247    1249    1358    1367    1373    1395    1402    1411    1417
                            1424    1431    1456    1467    1487    1504    1512    1530    1565    1587    1593    1602    1620
                            1627    1641    1648    1663    1672    1683    1688    1697    1735    1740    1748    1753    1758
                            1765    1769    1774    1781    1786    1792    1797    1804    1808    1819    1824    1831    1835
                            1840    1851    1854    1871    1873    1884    1886    1892    1897    1910    1912    1925    1927
                            1931    1934    1940    1993    2005    2120    2165    2173    2191    2204    2219    2224    2236
                            2240    2243    2244    2246    2251    2255    2263    2268    2290    2292    2294    2298    2301
                            2306    2312    2317    2321    2328    2336    2340    2344    2358    2400    2401    2468    2471
                            2561    2564    2565    2566    2567    2568    2570    2573#
TYPOC  = 104402              654    1360    1368    1374    1396    1404    1412    1418    1425    1433    1457    1468    1488
                            1505    1566    1588    1594    1603    1621    1628    1642    1649    1664    1673    1689    1698
                            1741    1749    1759    1766    1775    1787    1798    1805    1825    1832    1841    1855    1872
                            1874    1885    1887    1893    1911    1913    1926    1928    1994    2006    2121    2166    2174
                            2245    2254    2267    2293    2359    2564    2567    2568    2573#
TYPON  = 104404             2573#
TYPOS  = 1C4403             2573#
USEPAR   001760              573#    603     625*   2234*
VECO     001624              529#    593     605*    739*    769*    788*    816*    825*    867*    886*    914*    925*    949*
                             978*    995*   1004*   1026*   1045*   1070*   1285*   1353*   1378*   1389*   1421*   1436*   1460*
                            1472*   1497*   1515*   1562*   1590*   1617*   1638*   1660*   1685*   1702*   1847*
VEC2     001626              530#    598     606*   1286*
WAIT     022022             1115    1293    1303    1592    1637    1853    1919    1964    1966    1969    1970#   1976
WAIT05   022010              981    1423    1968#
WAIT10   021762              655    1963#
WAIT20   021774             1564    1619    1640    1662    1687    1720    1965#
$APTHD   001000              399#
$ASTAT=  ****** U           2562
$ATYC    030432             2562#
$ATY1    030406             2562#
$ATY3    030414             2561    2562#
$ATY4    030424             2562#   2567
$AUTOB   001134              400#    602*   2564
$BASE    001262              400#    589    2250*
$BDADR   001122              393     400#
$BDDAT   001126              391     400#
$BELL    001176              400#   2567
$CDW1    001266              400#
$CDW2    001270              400#
$CHARC   030402             2561#*
$CKSWR   030756             2564#   2573
$CMTAG   001100              400#    579
$CM3   = 000000              400#
$CM4   = 000005              400#
$CNTLG   031503             2564#
$CNTLU   031476             2564#
$CPUOP   001234              400#
$CRLF    001203              400#   2561    2564    2567    2568
$DBLK    032174             2566#
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$DDW1   001274            400#
$DDW10  001316            400#
$DDW11  001320            400#
$DDW12  001322            400#
$DDW13  001324            400#
$DDW14  001326            400#
$DDW15  001330            400#
$DDW2   001276            400#
$DDW3   001300            400#
$DDW4   001302            400#
$DDW5   001304            400#
$DDW6   001306            400#
$DDW7   001310            400#
$DDW8   001312            400#
$DDW9   001314            400#
$DEVCT  001216            400#
$DEVM   001264            400#
$DOAGN  021650           1940#
$DTBL   032164           2566#
$ENDAD  021640            397     602    1940#   2567
$ENDCT  021606            579    1940#
$ENDMG  021657           1940#
$ENULL  021654           1940#
$ENV    001226            400#    602    2561    2562    2567
$ENVM   001227            400#    579    2561    2562
$EOP    021552           1262    1323    1344    1717    1719    1940#
$EOPCT  021600            579*   1940#
$ERFLG  001103            400#   2567*   2569*
$ERMAX  001115            400#    579*   2569*
$ERROR  032204            579    2567#   2569
$ERRPC  001116            400#   2567*   2568    2615    2616    2617    2618    2619
$ERRTB  001332            400#   2568
$ERRTY  032534           2567    2568#
$ERTTL  001112            400#   2567*
$ESCAP  001174            400#    579*   2567    2569*
$ETABL  001226            400#
$ETEND  001332            399     400#
$FATAL  001210            400#   2562*
$FFLG   030652           2562#*
$FILLC  001156            400#   2561
$FILLS  001155            400#   2561
$GDADR  001120            400#
$GDDAT  001124            390     400#
$GET42  021630           1940#
$GTSWR  031026           2564#   2573
$HIBTS  001000            399#
$HINUM  033550           2574#*
$HIOCT  030754           2563#*
$ICNT   001104            400#   2569*
$ILLUP  033326           2570#
$INTAG  001135            400#   2564
$ITEMB  001114            400#   2567*   2568
$LF     001204            400#   2561    2564    2567
$LFLG   030651           2562#*
$LONUM  033552           2574#*
```

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$LPADR  001106            400#    579*   2569*
$LPERR  001110            400#    579*    684*    694*    702*   2567   2569*
$MADR1  001240            400#
$MADR2  001244            400#
$MADR3  001250            400#
$MADR4  001254            400#
$MAIL   001206            399     400#    579     602    2561   2567   2569
$MAMS1  001236            400#
$MAMS2  001242            400#
$MAMS3  001246            400#
$MAMS4  001252            400#
$MBADR  001002            399#
$MFLG   030650           2562#*
$MNEW   031521           2564#
$MSGAD  001222            400#   2562*
$MSGLG  001224            400#   2562*
$MSGTY  001206            400#   2562*
$MSWR   031510           2564#
$MTYP1  001237            400#
$MTYP2  001243            400#
$MTYP3  001247            400#
$MTYP4  001253            400#
$MXCNT  033160           2569#
$NULL   001154            400#   2561
$NWTST= 000001            662#    677#    711#    733#    773#    819#    871#    918#    953#    998#   1030#   1075#   1132#
                         1158#   1188#
$OCNT   031754           2565#*
$OMODE  031756           2565#*
$OVER   033144           2569#
$PASS   001214            400#    579*    647    1078    1243   1940*   2569
$PASTM  001006            399#
$PWRAD  033322           2570#
$PWRDN  033162             579   2570#
$PWRMG  033316           2570#
$PWRUP  033234           2570#
$QUES   001202            400#   2561    2564    2567
$RAND   033452           2574#
$RDCHR  031240           2564#   2573
$RDDEC= ****** U         2573
$RDLIN  031360           2564#   2573
$RDOCT  030654           2563#   2573
$RDSZ = 000010           2564#
$RTNAD  021652           1261*   1322*   1343*   1716*   1718*   1940#
$R2A  = ****** U         2573
$SAVRE= ****** U         2573
$SAVR6  033332           2570#*
$SCOPE  032670             579   2569#
$SETUP= 000137             577#    579     602    1940    2564   2567   2569
$STUP = 177777             577#
$SVLAD  033110           2569#
$SVPC = 000204             397#
$SWR  = 167400             384#    400     579     662     677    711    733    773    819    871    918    953    998
                          1030   1075   1132   1158   1188   1940   2567   2569   2570
$SWREG  001230            400#    579
$SWRMK= 000000           2569
$TESTN  001212            400#   2569*
```

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$TIMES   001172         400#   579*   662*   677*   711*   733*   773*   819*   871*   918*   953*   998*  1030*
                       1075*  1132*  1158*  1188*  1940*  2569*
$TKB     001146         400#  2386   2564
$TKS     001144         400#  2384   2564*
$TMP0    001160         400#
$TMP1    001162         400#
$TMP2    001164         400#
$TMP3    001166         400#
$TMP4    001170         400#
$TN    = 000020         385#   662#   677#   711#   733#   773#   819#   871#   918#   953#   998#  1030#  1075#
                       1132#  1158#  1188#
$TPB     001152         400#  2561*
$TPFLG   001157         400#  2561
$TPS     001150         400#  2561
$TRAP    033370         579   2573#
$TRAP2   033412        2573#
$TRP   = 000013        2573#
$TRPAD   033424        2573#
$TSTM    001004         399#
$TSTNM   001102         400#  1940*  2567   2569*
$TTYIN   031466        2564#
$TYPBN=  ****** U      2573
$TYPDS   031760        2566#  2573
$TYPE    030124        2561#  2562   2573
$TYPEC   030336        2561#  2564
$TYPEX   030404        2561#
$TYPOC   031556        2565#  2573
$TYPON   031572        2565#  2573
$TYPOS   031532        2565#  2573
$UNIT    001220         400#
$UNITM   001010         399#
$USWR    001232         400#
$VECT1   001256         400#   582    594   2252   2261   2264   2274*  2276*  2277*
$VECT2   001260         400#
$XTSTR   032714        2569#
$$GET4=  000000        1940#
$OFILL   031755        2565#*
$40CAT   000000         395#  2567   2569
.      = 035432         395#   397#   398#   399#   400#   560#   566#   579    602#   653#   928   1357   1362
                       1370   1373#  1376   1401   1406   1414   1417#  1420   1424#  1427   1431#  1435   1456#
                       1459   1470   1487#  1490   1504#  1507   1532   1565#  1568   1587#  1593#  1596   1605
                       1612   1614   1620#  1623   1630   1641#  1644   1648#  1651   1663#  1666   1675   1683#
                       1688#  1691   1700   1748#  1753#  1758#  1774#  1797#  1808#  1835#  1844   1851#  1854#
                       1873#  1884#  1886#  1898   1910#  1925#  1931#  1936   1940   1972   1996   2005#  2008
                       2120#  2123   2168   2173#  2176   2191#  2221   2224#  2226   2236#  2243#  2251#  2263#
                       2285   2292#  2317#  2340#  2350#  2400#  2401#  2494#  2513#  2561   2562#  2564#  2566#
                       2567   2568#  2569   2570   2614#
.$ASTA=  ****** U      2562
.$X    = 001000         399#
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COMMEN   387#
ENDCOM   387#
ERROR    387#   674   691   700   707   722   729   753   763   768   786   802   811   815   839
          851   860   865   884   900   909   913   935   940   946   966   976   985   993  1016
         1022  1043  1059  1067  1095  1101  1111  1128  1146  1153  1171  1179  1197  1211  1221
         1235  1254  2417  2449  2454  2457  2462
ESCAPE   387#
GETPRI   387#
GETSWR   387#   602#
MULT     387#
NEWTST   387#   662   677   711   733   773   819   871   918   953   998  1030  1075  1132  1158
         1188
POP      387#   766   813   863   911   937  1024  1069  1363  1407  1428  1463  1500  1737  1755
         1771  1783  1794  1810  1821  1830  1837  1901  2357  2562  2563  2566  2570  2574
PUSH     387#  1815  2562  2563  2566  2570  2574
REPORT   387#
SCOPE    387#   662   677   711   733   773   819   871   918   953   998  1030  1075  1132  1158
         1188  1940
SETPRI   387#
SETTRA  2573#
SETUP    387#   579
SKIP     387#
SLASH    387#
SPACE    387#
STARS    387#   397   399   400   541   662   677   711   733   773   819   871   918   953   998
         1030  1075  1132  1158  1188  1940  2561  2562  2563  2564  2565  2566  2567  2568  2569
         2570  2573  2574
SWRSU    387#   579#
TRMTRP  2573#
TYPBIN   387#
TYPDEC   387#  1940
TYPNAM   380#   387#   602
TYPNUM   387#
TYPOCS   380#   387#
TYPOCT   387#   654  1360  1368  1374  1396  1404  1412  1418  1425  1433  1457  1468  1488  1505
         1566  1588  1594  1603  1621  1628  1642  1649  1664  1673  1689  1698  1741  1749  1759
         1766  1775  1787  1798  1805  1825  1832  1841  1855  1872  1874  1885  1887  1893  1911
         1913  1926  1928  1994  2006  2121  2166  2174  2245  2254  2267  2293  2359  2564  2567
         2568
TYPTXT   387#   651   653  1118  1247  1249  1358  1367  1373  1395  1402  1411  1417  1424  1431
         1456  1467  1487  1504  1512  1530  1565  1587  1593  1602  1620  1627  1641  1648  1663
         1672  1683  1688  1697  1735  1740  1748  1753  1758  1765  1769  1774  1781  1786  1792
         1797  1804  1808  1819  1824  1831  1835  1840  1851  1854  1871  1873  1884  1886  1892
         1897  1910  1912  1925  1927  1931  1934  1993  2005  2120  2165  2173  2191  2204  2219
         2224  2236  2243  2244  2251  2263  2290  2292  2294  2298  2301  2306  2312  2317  2328
         2336  2340  2344  2358  2400  2401
$$CMRE   400#
$$CMTM   400#
$$ESCA   387#
$$NEWT   387#   662   677   711   733   773   819   871   918   953   998  1030  1075  1132  1158
         1188
$$SET   2573#
$$SETM   579#
$$SKIP   387#
.EQUAT   380#   387
.HEADE   379#
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.MAIN.  MACY11 30A(1052)  16-NOV-81  17:26  PAGE 15-1
CRDTAB.P11    16-NOV-81 17:16          CROSS REFERENCE TABLE -- MACRO NAMES                    SEQ 0111

.KT11     379#    394
.SETUP    379#    577
.SWRHI    381#
.$ACT1    382#    397
.$APTB    382#    400#
.$APTH    382#    399
.$APTY    382#   2562
.$CMTA    380#    400
.$EOP     381#   1940
.$ERRO    381#   2567
.$ERRT    381#   2568
.$POWE    380#   2570
.$RAND    379#   2574
.$RDOC    379#   2563
.$READ    382#   2564
.$SCOP    381#   2569
.$TRAP    379#   2573
.$TYPD    381#   2566
.$TYPE    382#   2561
.$TYPO    380#   2565
.$40CA    380#    395

. ABS.  035432     000

 ERRORS DETECTED:  0

 CRDTAB,CRDTAB.LST/CRF=CRDTAB.P11
 RUN-TIME: 122 66 6 SECONDS
 RUN-TIME RATIO: 459/195=2.3
 CORE USED:  26K  (51 PAGES)
```