

IDENTIFICATION

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Product Code: MAIndec-11-DCKBQ-A-D  
Product Name: PDP 11/45 Console Switch Test  
Date Created: January 10, 1973  
Maintainer: Diagnostic Group  
Author: Joe Stubblebine

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Maynard, Mass.

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## 1,0 ABSTRACT

This program is designed to test the PDP11/45 console switches. In order to run, memory management must be available. Due to the nature of the program, extensive operator intervention is required. The operator instructions are fully described in the listings. The second phase of this program allows the operator to test the micro-break register and the PDP11/45 maintenance card.

## 2,0 REQUIREMENTS

## 2,1 Equipment

PDP11/45 with memory management,

## 2,2 Storage

program requires 4K of storage;

## 2,3 Preliminary Programs

None,

## 3,0 LOADING PROCEDURE

Use standard procedure for ABS tape.

## 4,0 STARTUP PROCEDURE

## 4,1 Control switch settings

None,

## 4,2 Starting Address

The program should always be started at 200.

#### 4.3 Program and/or Operator Action

- 1, Load program into memory using ABS loader;
- 2, Load address 200,
- 3, Press start,
- 4, When program halts refer to the listing for operator instructions.

#### 5.0 ERRORS

##### 5.1 Detection of an Error Results in a Halt

#### 6.0 PROGRAM DESCRIPTION

Checks out the use of the PDP11/45 console switches along with the micro-break register and the maintenance card. Once started the program sets up memory management and halts; Refer to the listing for operator instructions;

LIST SEQ  
LIST ME  
ABS  
TITLE TEST DCKBQ=A CONSOLE TEST  
CONSOLE TEST= THIS TEST CHECKS CONSOLE OPERATIONS WITH MEMORY  
MANAGEMENT

GENERAL REGISTER ASSIGNMENTS

000000 R0=X0  
000001 R1=X1  
000002 R2=X2  
000003 R3=X3  
000004 R4=X4  
000005 R5=X5  
000006 R6=X6  
000007 PC=X7  
000008 R10=X0  
000009 R11=X1  
000010 R12=X2  
000011 R13=X3  
000012 R14=X4  
000013 R15=X5

FLOATING POINT REGISTERS

000000 AC0=X0  
000001 AC1=X1  
000002 AC2=X2  
000003 AC3=X3  
000004 AC4=X4  
000005 AC5=X5

STACK POINTER REGISTERS

000006 KSP=X6 ;KERNEL STACK POINTER  
000006 SSP=X6 ;SUPERVISOR STACK POINTER  
000006 USP=X6 ;USER STACK POINTER

STATUS REGISTER BIT ASSIGNMENTS

000001 Cb1  
000002 Vb2  
000004 Zb4  
000010 Nb10  
000020 Tb20 ;TTY BIT  
000340 PRTY7=340 ;PRIORITY LEVEL 7  
000200 PRTY4=200 ;PRIORITY LEVEL 4  
004000 REQ=4000 ;SELECTS R10-R15  
000000 KMH=000000 ;KERNEL MODE  
040000 SH=040000 ;SUPERVISORY MODE  
140000 UM=140000 ;USER MODE  
000000 PKM=000000 ;PREVIOUS KERNEL MODE  
010000 PSM=010000 ;PREVIOUS SUPERVISORY MODE  
030000 PUM=030000 ;PREVIOUS USER MODE  
004000 REC=004000 ;SELECT R10-R15

VECTOR ADDRESSES

000004 ERRVEC=4 ;ADDRESS OF ERROR VECTOR  
000010 RESVEC=10 ;ADDRESS OF RESERVED INST. TRAP VECTOR  
000014 TBITVEC=14 ;ADDRESS OF TTY BIT TRAP VECTOR  
000020 IOTVEC=20 ;ADDRESS OF IOT TRAP VECTOR  
000024 PFVEC=24 ;ADDRESS OF POWER FAIL TRAP VECTOR  
000030 EMTVEC=30 ;ADDRESS OF EMT VECTOR  
000034 TRAPVEC=34 ;ADDRESS OF TRAP VECTOR  
000064 TPVEC=64 ;ADDRESS OF TTY PRINTER INTERRUPT VECTOR  
000240 PIRVEC=240 ;ADDRESS OF PIRQ VECTOR  
000244 FPVEC=244 ;ADDRESS OF FLOATING POINT INT. VECTOR  
000250 MHVEC=250 ;ADDRESS OF MEMORY MGMT ERROR TRAP VECTOR

REGISTER ADDRESSES

177776 PSH=177776 ;ADDRESS OF STATUS REGISTER  
177774 SLR=177774 ;ADDRESS OF STACK LIMIT REGISTER  
177772 PIRQ=177772 ;ADDRESS OF PROGRAM INTERRUPT REQUEST  
177770 USBREAK=177770 ;ADDRESS OF MICRO BREAK REGISTER  
177560 TKB=177560 ;ADDRESS OF KEYBOARD CSR  
177562 TKB=177562 ;ADDRESS OF KEYBOARD BUFFER  
177564 TPS=177564 ;ADDRESS OF TELEPRINTER CSR  
177566 TPB=177566 ;ADDRESS OF TELEPRINTER BUFFER  
177570 SHR=177570 ;ADDRESS OF CONSOL SWITCH REGISTER  
177570 DISPLAY=177570 ;ADDRESS OF CONSOL DISPLAY REGISTER

INITIAL STACK POINTER SETTINGS

000000 KPTR=1000 ;BOTTOM OF KERNEL STACK  
000700 SPTR=700 ;SUPERVISORY STACK SETTING  
000600 UPTR=600 ;USER STACK SETTING  
000740 REDPTR=740 ;RED STACK PTR

MISCELLANEOUS BIT ASSIGNMENTS

100000 BIT1=100000  
040000 BIT14=040000  
020000 BIT13=020000  
004000 BIT8=004000  
000100 BIT6=000100  
010000 PIR4=010000 ;LEVEL 4 PROGRAM INT. RQST;

MEMORY MANAGEMENT REGISTER SRB BIT ASSIGNMENTS

000001 ZMM=1 ;ENABLE MEMORY MANAGEMENT  
000000 VSB=0  
000002 VS1=2  
000004 VS2=4  
000006 VS3=6  
000010 VS4=10  
000012 VS5=12  
000014 VS6=14  
000016 VS7=16  
000020 DS=20  
000000 IS=0  
000140 UPO=140  
000040 SPO=40  
000000 KPO=000  
000200 IC=200 ;INSTRUCTION COMPLETE

```

000400      DM#400      |DESTINATION MODE
001000      TE#1000     |TRAP ENABLE
004000      OST#4000   |OST ABORT FLAG
010000      MMT#10000  |MEMORY MANAGEMENT TRAP
020000      AV#20000   |ACCESS VIOLATION ABORT
040000      PLA#40000  |PAGE LENGTH ABORT
100000      NRA#100000 |NON-RESIDENT ABORT

000010      |PAGE DESCRIPTOR REGISTER (PDR) BIT ASSIGNMENTS
000000      ED#10     |EXPANSION DIRECTION BIT IN PDR
000010      UP#0      |EXPAND UP
000200      DWN#10    |EXPAND DOWN
000100      A#200     |A' BIT IN PDR
000100      H#100     |H' BIT IN PDR

ISR1 BIT ASSIGNMENTS
000010      S1#10     |
000020      S2#20     |
000040      S4#40     |
000060      S8#60     |
000100      S16#100   |
000370      S31#370   |
000360      S32#360   |
000340      S34#340   |
000320      S36#320   |
000300      S38#300   |
000000      O#0       |
004000      O1#4000   |
010000      O2#10000  |
174000      OM1#174000 |
170000      OM2#170000 |
000000      OR0#000   |
000400      OR1#400   |
001000      OR2#1000  |
001400      OR3#1400  |
002000      OR4#2000  |
002400      OR5#2400  |
003000      OR6#3000  |
003400      OR7#3400  |

ISR3 BIT ASSIGNMENTS
000001      UOE#1     |USER '0' SPACE ENABLE
000002      SOE#2     |SUPERVISOR '0' SPACE ENABLE
000004      KOE#4     |KERNEL '0' SPACE ENABLE

MEMORY MANAGEMENT REGISTER ADDRESS ASSIGNMENTS
177572      SR0#177572 |ADDRESS OF MEMORY MGMT REGISTER SR0
177574      SR1#177574 |" " " " " " SR1
177576      SR2#177576 |" " " " " " SR2
172516      SR3#172516 |ADDRESS OF MEMORY MGMT REGISTER SR3

177600      U1PDR0#177600 |ADDRESS OF USER '0' PDR'S
177602      U1PDR1#177602 |
177604      U1PDR2#177604 |

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177606      U1PDR3#177606 |
177610      U1PDR4#177610 |
177612      U1PDR5#177612 |
177614      U1PDR6#177614 |
177616      U1PDR7#177616 |

177620      UDPR0#177620 |ADDRESS OF USER '0' PDR'S
177622      UDPR1#177622 |
177624      UDPR2#177624 |
177626      UDPR3#177626 |
177630      UDPR4#177630 |
177632      UDPR5#177632 |
177634      UDPR6#177634 |
177636      UDPR7#177636 |

177640      U1PAR0#177640 |
177642      U1PAR1#177642 |
177644      U1PAR2#177644 |
177646      U1PAR3#177646 |
177650      U1PAR4#177650 |
177652      U1PAR5#177652 |
177654      U1PAR6#177654 |
177656      U1PAR7#177656 |

177660      UDPAR0#177660 |
177662      UDPAR1#177662 |
177664      UDPAR2#177664 |
177666      UDPAR3#177666 |
177670      UDPAR4#177670 |
177672      UDPAR5#177672 |
177674      UDPAR6#177674 |
177676      UDPAR7#177676 |

172200      S1PDR0#172200 |
172202      S1PDR1#172202 |
172204      S1PDR2#172204 |
172206      S1PDR3#172206 |
172210      S1PDR4#172210 |
172212      S1PDR5#172212 |
172214      S1PDR6#172214 |
172216      S1PDR7#172216 |

172220      SDPR0#172220 |
172222      SDPR1#172222 |
172224      SDPR2#172224 |
172226      SDPR3#172226 |
172230      SDPR4#172230 |
172232      SDPR5#172232 |
172234      SDPR6#172234 |
172236      SDPR7#172236 |

172240      S1PAR0#172240 |
172242      S1PAR1#172242 |
172244      S1PAR2#172244 |

```

```

172246 S1PAR3=172246
172250 S1PAR4=172250
172252 S1PAR5=172252
172254 S1PAR6=172254
172256 S1PAR7=172256

172260 SDPAR0=172260
172262 SDPAR1=172262
172264 SDPAR2=172264
172266 SDPAR3=172266
172270 SDPAR4=172270
172272 SDPAR5=172272
172274 SDPAR6=172274
172276 SDPAR7=172276

172300 K1PDR0=172300
172302 K1PDR1=172302
172304 K1PDR2=172304
172306 K1PDR3=172306
172310 K1PDR4=172310
172312 K1PDR5=172312
172314 K1PDR6=172314
172316 K1PDR7=172316

172320 K0PDR0=172320
172322 K0PDR1=172322
172324 K0PDR2=172324
172326 K0PDR3=172326
172330 K0PDR4=172330
172332 K0PDR5=172332
172334 K0PDR6=172334
172336 K0PDR7=172336

172340 K1PAR0=172340
172342 K1PAR1=172342
172344 K1PAR2=172344
172346 K1PAR3=172346
172350 K1PAR4=172350
172352 K1PAR5=172352
172354 K1PAR6=172354
172356 K1PAR7=172356

172360 K0PAR0=172360
172362 K0PAR1=172362
172364 K0PAR2=172364
172366 K0PAR3=172366
172370 K0PAR4=172370
172372 K0PAR5=172372
172374 K0PAR6=172374
172376 K0PAR7=172376

```

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;ACCESS CONTROL FIELD DEFINITIONS (IN PDR)
NR0=0 ;NON-RESIDENT ABORT ALL REFS;
RDOT=1 ;TRAP ON READ,ABORT ON WRITE

```

```

000002 RDO=2 ;READ,ABORT ON WRITE
000003 NR3=3 ;UNUSED ABORT ALL
000004 RWT=4 ;TRAP ON READ & WRITE
000005 RWTW=5 ;READ,TRAP ON WRITE
000006 RW6 ;READ & WRITE
000007 NR7=7 ;ABORT ALL

```

```

;INSTRUCTION EQUATES
HLT=HALT
SCOPE=EMT ;SCOPE IS AN EMT TRAP
TYPE=IOT ;TYPE IS AN IOT TRAP

```

```

;LIST MC
;NLIST MC,MO,SEQ

```

```

;FILL TRAP AND INTERRUPT VECTOR AREA WITH
I,+2
;HALT
;UNEXPECTED TRAPS/INTERRUPTS WILL HALT AT VECTOR ADDRESS *2
;AND DISPLAY IN THE ADDRESS LIGHTS THE VECTOR ADDRESS *4

```

```

000004 ;NLIST MC,SEQ
000400 ;ERRVEC
000030 ;WORD SHLT
000030 000434 ;EMTVEC
;WORD SCOPEA

```

```

000176 ;s176
000176 HALT ;ERROR! TO IDENTIFY WHICH TEST FAILED
;EXAMINE R1(R11), THE CONTENTS OF WHICH IS THE PC OF THE LAST TEST SUCCESSFULLY COMPLETED, THE TOP WORD ON THE KERNEL STACK CONTAINS THE VIRTUAL ADDRESS OF THE HLT INSTRUCTION IN THE TEST THAT FAILED;

```

```

000200 000167 000704 ;s200
JMP START ;GO START TEST

```

```

000400 ;s400
000400 042737 000001 177572 ;SUPERVISOR/USER HLT (HALT) TRAP SERVICE ROUTINE
SHLTI BIC #1,00000 ;TURN MEM MGMT OFF
SUB #2,(KSP) ;POINT PC TO TRAPPING INST;
TST #0(KSP) ;WAS IT A HLT (HALT)
BEQ SHLTA
ADD #2,(KSP) ;RESTORE PC TO TRAPPING INST;
JMP #ERRVEC+2 ;GO HALT AT 0
000430 000137 000176 SHLTA JMP #0176 ;GO HALT AT ADDRESS 176

```

```

;SCOPE (EMT) SERVICE ROUTINE
SCOPEA
000434 CLR #000 ;DISABLE MEMORY MGMT
000440 011601 MOV (KSP),R1 ;SAVE PC IN R1
000442 012706 MOV #KPTR,KSP ;SET KERNEL STACK PTR
000446 000046 CLR =(KSP) ;SET UP FOR KERNEL MODE ON RETURN
000450 210146 MOV R1,=(KSP) ;RETURN IN LINE
000452 212746 MOV #SPTR,=(KSP) ;SUPER STACK PTR ON KERNEL STACK

```

```

000456 012746 000000      MOV      #UPTR,=(KSP) ;USER STACK PTR ON KERNEL STACK
000462 012737 030000 177776      MOV      #PUH,##PSW ;PREVIOUS USER MODE
000470 106606      MTPD    USP ;SET USER STACK PTR
000472 006237 177776      ASR      ##PSW ;PREV SUPER MODE
000476 106606      MTPD    SSP ;SET SUPER STACK PTR
000500 032737 000400 177570      BIT      #BIT8,##SHR ;LOAD MICRO BREAK REG?
000506 001403      BEQ     SCOPEX ;LOAD SR0=7 INTO MICRO BREAK REG,
000510 113737 177570 177776      MOV     SCOPEX ;RETURN TO NEXT TEST IN KERNEL MODE
000516 000006      RTT     ;WITH ALL STACK PTRS SET UP

001000      ;=1000
001000 000000      ;TAGS
001002 000000      ;ICNT1
001002 000000      ;SR0T1
001004 001004      ;TEMP=,
001012 001012      ;=,46

001110      ;=1110

```

```

;*****
;START CONSOLE TEST
;*****

001110 000240      STARTI  NOP
001112 005007 177602      CLR     ICNT ;CLEAR PASS COUNT
001116 016737 177606 177570      MOV     ICNT,##DISPLAY ;DISPLAY PASS COUNT
001124 012706 001000      MOV     #KPTR,KSP ;SET KERNEL STACK PTR
001130 104000      MOV     SCOPE ;SCOPE SETS ALL STACK PTRS
001132 012737 000400 177774      MOV     #400,##SLR ;SET STACK LIMIT @ 1000
001140 005037 000252      CLR     ##HHVEC+2 ;KERNEL MODE ON ABORT
001144 012737 000007 172516      MOV     #KOE+5DE+UDE,##SRS

;*****
;ROUTINE TO CLEAR MEMORY MANAGEMENT REGISTERS,
;*****

001152 000240      MM01   NOP
001154 005037 177572      CLR     ##SR0 ;DISABLE MEM MGMT
001160 012702 177600      MOV     #UIPDR0,R2
001164 012703 000040      MOV     #40,R3
001170 005022      CLR     (R2)+
001172 077302      SOB    R3,=-2
001174 012702 172200      MOV     #SIPDR0,R2
001200 012703 000100      MOV     #100,R3
001204 005022      CLR     (R2)+
001206 077302      SOB    R3,=-2

001210      MMK1
001210 012737 073000 172300      MOV     #107+256,=400+UP+RH,##KIPDR0 ;SET KIPDR0=RH UP 107 BLOCKS
001216 012737 077400 172320      MOV     #200+256,=400+UP+RH,##KOPDR0 ;SET KOPDR0=RH UP 200 BLOCKS
001224 012737 177400 172200      MOV     #400+256,=400+UP+RH,##SIPDR0 ;SET SIPDR0=RH UP 400 BLOCKS
001232 012737 177400 172220      MOV     #400+256,=400+UP+RH,##SDPDR0 ;SET SDPDR0=RH UP 400 BLOCKS
001240 012737 177400 177600      MOV     #400+256,=400+UP+RH,##UIPDR0 ;SET UIPDR0=RH UP 400 BLOCKS
001246 012737 177400 177620      MOV     #400+256,=400+UP+RH,##UDPDR0 ;SET UDPDR0=RH UP 400 BLOCKS
001254 012737 177400 172336      MOV     #400+256,=400+UP+RH,##KOPDR7 ;SET KOPDR7=RH UP 400 BLOCKS
001262 012737 000006 172322      MOV     #1+256,=400+UP+RH,##KOPDR1 ;SET KOPDR1=RH UP 1 BLOCKS
001270 012737 000006 172302      MOV     #1+256,=400+UP+RH,##KIPDR1 ;SET KIPDR1=RH UP 1 BLOCKS
001276 012737 000006 172202      MOV     #1+256,=400+UP+RH,##SIPDR1 ;SET SIPDR1=RH UP 1 BLOCKS
001304 012737 000006 172222      MOV     #1+256,=400+UP+RH,##SDPDR1 ;SET SDPDR1=RH UP 1 BLOCKS
001312 012737 000006 177602      MOV     #1+256,=400+UP+RH,##UIPDR1 ;SET UIPDR1=RH UP 1 BLOCKS
001320 012737 000006 177622      MOV     #1+256,=400+UP+RH,##UDPDR1 ;SET UDPDR1=RH UP 1 BLOCKS

001326 005037 172340      CLR     ##KIPAR0 ;VA=PA,0000-10677
001332 005037 172360      CLR     ##KOPAR0 ;VA=PA,00-1077
001336 012767 007000 171932      MOV     #7000,KOPAR7 ;VA=160000=177776,PA=760000-777776
;I/O PAGE)
001344 012737 000107 172302      MOV     #107,##KOPAR1 ;PA=16700=16777,VA=20000-20077
001352 012737 000170 172342      MOV     #170,##KIPAR1 ;PA=17000=17077,VA=20000-20077
001360 012737 000171 172262      MOV     #171,##SDPAR1 ;PA=17100=17177,VA=20000-20077
001366 012737 000172 172242      MOV     #172,##SIPAR1 ;PA=17200=17277,VA=20000-20077
001374 012737 000173 177502      MOV     #173,##UDPAR1 ;PA=17300=17377,VA=20000-20077
001402 012737 000174 177642      MOV     #174,##UIPAR1 ;PA=17400=17477,VA=20000-20077

```



\*\*\*\*\*  
LOAD PHYSICAL ADDRESSES INTO MEMORY TO BE EXAMINED  
\*\*\*\*\*

```

001410 012737 016700 016700      MOV    #16700,0#16700
001416 012737 017002 017002      MOV    #17002,0#17002
001424 012737 017104 017104      MOV    #17104,0#17104
001432 012737 017210 017210      MOV    #17210,0#17210
001440 012737 017320 017320      MOV    #17320,0#17320
001446 012737 017440 017440      MOV    #17440,0#17440

001454 000107 000172                JMP    CHK1          ;GO START TEST
;TELEPRINTER MANAGER
001460 032737 000100 177564      PRINT  BIT          ;IS TELEPRINTER AVAILABLE
001466 001374                BNE    PRINT
001470 013667 000040      MOV    0(SP)+,CHARPTR ;GET START OF MESSAGE ADDRESS
001474 002746 000002      ADD    #2,-(SP)      ;ADJUST RETURN PC
001500 052737 000100 177564      BIS    #100,0#TPS    ;SET IE
001506 000207                RTS    PC            ;RETURN

;TELEPRINTER INTERRUPT SERVICE ROUTINE
001510 016700 000020      TP1SR1 MOV    CHARPTR,R0 ;GET CHARACTER ADDRESS
001514 100710                TSTB   (R0)          ;INVALID CHAR?
001516 001000                BNE    TPA          ;
001520 042737 000100 177564      BIC    #100,0#TPS    ;DISABLE IE
001526 002716 000002      ADD    #2,(SP)      ;ADJUST RETURN PC
001532 000002                RTI
001534 112037 177566      TPA1  MOVB   (R0)+,0#TPB ;LOAD CHARACTER
001540 010027                MOV    R0,(PC)+     ;RESTORE PTR
001542 000000                CHARPTR0 ;CONTAINS ADDRESS OF CHAR TO BE PRINTED
001544 000002                RTI

;OCTAL TO ASCII TYPE ROUTINE
001546 013740 177564      O2A1  MOV    0#TPS,-(SP) ;SAVE TELEPRINTER STATUS
001552 010246                MOV    R2,-(SP)     ;AND REGISTERS ON THE
001554 010146                MOV    R1,-(SP)     ;STACK
001556 010046                MOV    R0,-(SP)     ;
001560 012700                MOV    (PC)+,R0     ;GET DATA TO BE TYPED
001562 000000      O2BTYP1 ,WORD 0 ;CONTAINS OCTAL
;VALUE TO BE TYPED
001564 012701 000000      MOV    #0,R1        ;CHARACTER COUNT
001570 000002                CLR    R2           ;WORKING REGISTER
001572 006100                ROL   R0            ;GET FIRST OCTAL DIGIT
001574 006102                ROL   R2           ;& PUT INTO R2
001576 002702 000200      IS1  ADD    #200,R2   ;FORM ASCII
001602 100737 177564      TSTB   0#TPS       ;WAIT FOR TELEPRINTER
001606 100375                BPL   ,=4
001610 010237 177566      MOV    R2,0#IPB     ;TYPE DIGIT
001614 000002                CLR   R2           ;CLEAR WORKING REGISTER
001616 006100                ROL   R0           ;GET NEXT DIGIT
001620 006102                ROL   R2
001622 006100                ROL   R0
001624 006102                ROL   R2

```

```

001626 006100                ROL   R0
001630 006102                ROL   R2
001632 000301                DEC   R1
001634 001300                BNE   IS
001636 012600                MOV   (SP)+,R0     ;RESTORE REGISTERS
001640 012601                MOV   (SP)+,R1
001642 012602                MOV   (SP)+,R2
001644 012637 177564      MOV   (SP)+,0#TPS  ;AND TELEPRINTER STATUS
001650 000207                RTS   PC           ;AND RETURN

000000                Y=0

```

```
.....  
|CONSOLE DEPOSIT/EXAMINE TEST  
|.....  
001652 012737 000001 177572 CHK11 MOV #1,0#SRB |ENABLE MEMORY MANAGEMENT  
001660 000000 |HALT |PERFORM THE FOLLOWING TESTS
```

```
.....  
|CONSOLE TEST 0  
|SET ADDRESS SELECTOR SWITCH TO K0 POSITION  
|LOAD ADDRESS 20000  
|EXAMINE  
|DATA LIGHTS SHOULD DISPLAY 16700  
|DEPOSIT 20002  
|.....
```

```
.....  
|CONSOLE TEST 1  
|SET ADDRESS SELECTOR SWITCH TO K1 POSITION  
|LOAD ADDRESS 20002  
|EXAMINE  
|DATA LIGHTS SHOULD DISPLAY 17002  
|DEPOSIT 20004  
|.....
```

```
.....  
|CONSOLE TEST 2  
|SET ADDRESS SELECTOR SWITCH TO S0 POSITION  
|LOAD ADDRESS 20004  
|EXAMINE  
|DATA LIGHTS SHOULD DISPLAY 17104  
|DEPOSIT 20010  
|.....
```

```
.....  
|CONSOLE TEST 3  
|SET ADDRESS SELECTOR SWITCH TO S1 POSITION  
|LOAD ADDRESS 20010  
|EXAMINE  
|DATA LIGHTS SHOULD DISPLAY 17210  
|DEPOSIT 20020  
|.....
```

```
.....  
|CONSOLE TEST 4  
|SET ADDRESS SELECTOR SWITCH TO U0 POSITION  
|LOAD ADDRESS 20020  
|EXAMINE  
|DATA LIGHTS SHOULD DISPLAY 17320  
|DEPOSIT 20040  
|.....
```

```
.....  
|CONSOLE TEST 5
```

```
|SET ADDRESS SELECTOR SWITCH TO U1 POSITION  
|LOAD ADDRESS 20040  
|EXAMINE  
|DATA LIGHTS SHOULD DISPLAY 17440  
|DEPOSIT 20100  
|.....
```

```
.....  
|PRESS CONTINUE  
|.....
```

\*\*\*\*\*  
ROUTINE TO CHECK DEPOSITS AS REQUESTED IN CONSOLE TESTS 1-5  
\*\*\*\*\*

001662	005037	177572		CLR	0#SR0	DISABLE MEMORY MGMT
001666	022737	020002	016700	CMP	#20002,0#16700	
001674	001401			BEQ	,*4	
001676	000000			HLT		INCORRECT DEPOSIT TEST 0
001700	022737	020004	017002	CMP	#20004,0#17002	
001706	001401			BEQ	,*4	
001710	000000			HLT		INCORRECT DEPOSIT TEST 1
001712	022737	020010	017104	CMP	#20010,0#17104	
001720	001401			BEQ	,*4	
001722	000000			HLT		INCORRECT DEPOSIT TEST 2
001724	022737	020020	017210	CMP	#20020,0#17210	
001732	001401			BEQ	,*4	
001734	000000			HLT		INCORRECT DEPOSIT TEST 3
001736	022737	020040	017320	CMP	#20040,0#17320	
001744	001401			BEQ	,*4	
001746	000000			HLT		INCORRECT DEPOSIT TEST 4
001750	022737	020100	017440	CMP	#20100,0#17440	
001756	001401			BEQ	,*4	
001760	000000			HLT		INCORRECT DEPOSIT TEST 5

\*\*\*\*\*  
CHECK THAT AN ADDRESS WHICH IS NOT MAPPED RESIDENT WILL  
NOT ABORT WHEN EXAMINED VIA THE CONSOLE  
\*\*\*\*\*

001762	012737	020100	020100	MOV	#20100,0#20100	ADDRESS 20100 IS OUTSIDE THE MAPPED AREA (PAGE LENGTH ERROR)
001770	005237	177572		INC	0#SR0	ENABLE MEMORY MGMT
001774	000000			HALT		PERFORM THE FOLLOWING OPERATIONS

\*\*\*\*\*  
ISET ADDRESS SELECT SWITCH TO "USER I" POSITION  
ILA=20100  
IEXAMINE  
IADDRESS ERROR LIGHT SHOULD LIGHT  
ILA=20100  
IADDRESS ERROR LIGHT SHOULD GO OUT  
ISET ADDRESS SELECT SWITCH TO CONSOLE PHYSICAL POSITION  
IEXAMINE  
IDATA LIGHTS SHOULD DISPLAY 20100  
IPRESS CONTINUE  
\*\*\*\*\*

\*\*\*\*\*  
THIS NEXT SET OF TESTS DEMONSTRATES THAT THE CONSOLE WILL DISPLAY  
THE PHYSICAL ADDRESS WHEN THE PROGRAM IS RUNNING, IF THE ADDRESS  
SELECTION SWITCH IS IN THE CONSOLE PHYSICAL POSITION, AND THAT THE  
CONSOLE WILL DISPLAY THE PROGRAM ADDRESS WHEN THE PROGRAM IS RUNNING, IF  
THE ADDRESS SELECTION SWITCH IS IN THE PROGRAM PHYSICAL POSITION,  
\*\*\*\*\*

001776 012737 001510 000064 MOV #TPISR,#TPVEC ISET TELEPRINTER INTERRUPT VECTOR  
002004 012737 000200 000066 MOV #PRTY4,#TPVEC+2)AND STATUS ON INTERRUPT

\*\*\*\*\*  
ISETUP KERNEL MEMORY MANAGEMENT REGISTERS  
\*\*\*\*\*

002012 012737 002272 000060 MOV #TTYINT,#60 ISETUP READER INTERRUPT VECTOR  
002020 005037 000062 CLR #62  
002024 012737 077404 172304 MOV #200#256,#400#UP\*RH,#KIPDR2 ISET KIPDR2\*RH UP 200 BLOCKS  
002032 012737 077406 172324 MOV #200#256,#400#UP\*RH,#KOPDR2 ISET KOPDR2\*RH UP 200 BLOCKS  
002040 000167 040000 JMP ,#40004 IEXECUTES THE FOLLOWING INSTRUCTIONS  
IAT VIRTUAL ADDRESS 40004  
002044 012702 002310 MOV #WAIT,R2 IGET ADDRESS OF WAIT LOOP  
002050 042702 000002 ADD #2,R2  
002054 012703 001562 MOV #02BTR,R3  
002060 004767 177374 JSR PC,PRINT IGO TO PRINT MANAGER  
002064 002370 INST2 IPRINT INSTRUCTIONS  
002066 004767 000214 JSR PC,LOOP IGO EXECUTE BR  
002072 010213 MOV R2,(R3) IGET PHYSICAL ADDRESS OF WAIT INSTRUCTION  
002074 004767 177444 JSR PC,O2A IPRINT PHYSICAL ADDRESS  
002100 004767 177354 JSR PC,PRINT  
002104 002444 LIGHTS  
002106 004767 000172 JSR PC,LOOP IEXECUTE BR , WHILE PRINTING  
002112 004767 177342 JSR PC,PRINT  
002116 002521 MES1  
002120 004767 000100 JSR PC,LOOP IWAIT FOR MESSAGE TO GO OUT  
002124 005037 177562 CLR #HTKB ICLEAR KEYBOARD BUFFER  
002130 012737 000100 177560 MOV #100,#HTKS IENABLE TELETYPE INTERRUPT  
002136 004767 000144 JSR PC,WAIT IWAIT FOR TELETYPE INTERRUPT  
002142 004767 177312 JSR PC,PRINT  
002146 002314 INST1 IPRINT INSTRUCTIONS  
002150 004767 000130 JSR PC,LOOP IEXECUTE BR , WHILE PRINTING  
002154 010213 MOV R2,(R3) IGET PHYSICAL ADDRESS OF LOOP  
002156 002713 040000 ADD #4000,(R3) IFORM PROGRAM ADDRESS  
002162 004767 177360 JSR PC,O2A ITYPE PROGRAM ADDRESS OF LOOP  
002166 004767 177200 JSR PC,PRINT  
002172 002444 LIGHTS  
002174 004767 000104 JSR PC,LOOP IGO EXECUTE BR , WHILE PRINTING  
002200 004767 177254 JSR PC,PRINT  
002204 002521 MES1  
002206 004767 000072 JSR PC,LOOP IWAIT FOR MESSAGE TO GO OUT  
002212 005037 177562 CLR #HTKB ICLEAR THE KEYBOARD BUFFER  
002216 012737 000100 177560 MOV #100,#HTKS IENABLE TELETYPE INTERRUPT  
002224 004767 000060 JSR PC,WAIT IWAIT FOR TELETYPE INTERRUPT  
002230 102707 040000 SUB #40000,PC IRETURN EXECUTES FOLLOWING INSTRUCTION

002234 000000 HALT

\*\*\*\*\*  
THE CONSOLE SWITCH TEST IS NOW FINISHED, IF YOU WISH TO CHECK  
THE MICRO-BREAK LOGIC ON THE MAINTENANCE CARD PERFORM THE  
FOLLOWING STEPS,  
I  
IINSERT THE MAINTENANCE CARD,  
IENABLE THE MICRO-BREAK STOP SWITCH ON THE MAINTENANCE CARD,  
ISWITCHES 2,3,AND 4 SHOULD BE TO THE LEFT POSITION,  
IPRESS CONTINUE,  
IDISPLAY THE MICRO-BREAK REGISTER ON THE CONSOLE,  
ITHE PROCESSOR SHOULD HAVE HALTED WITH 37374 DISPLAYED,  
ISTEP THE MAINT STEP SWITCH THREE TIMES,  
I37003 SHOULD NOW BE DISPLAYED,  
ISTEP THE MAINT STEP SWITCH ONE MORE TIME,  
ITHE ADDRESS DISPLAYED SHOULD BE OF THE NEXT HALT INSTRUCTION #2,  
ICLEAR THE MICRO-BREAK SWITCH,  
ITHE PROGRAM IS FINISHED,  
\*\*\*\*\*

002236 012737 000374 177770 MOV #374,#UBREAK ILOAD 374 INTO THE MICRO-BREAK REGISTER  
002244 000005 RESET IPROCESSOR SHOULD STOP DURING THIS INSTRUCTION  
002246 012737 000003 177770 MOV #3,#UBREAK ILOAD 3 INTO THE MICRO-BREAK REGISTER  
002254 012701 004000 MOV #4000,R1  
002260 012737 004004 004000 MOV #4004,#4000  
002266 010031 MOV R0,(R1)+ IPROCESSOR SHOULD HALT DURING THIS INSTRUCTION  
002270 000000 HALT ITEST IS COMPLETE

```

002272 005037 177560      TTYINT; CLR      @#TKS      ;CLEAR THE INTERRUPT
002276 005037 177562      CLR      @#TKB      ;CLEAR KEYBOARD BUFFER
002302 000002

002304 000777      LOOP;   BR        ;
002306 000207      RTS        PC

002310 000001      WAIT;   WAIT      ;WAIT FOR TELETYPE INTERRUPT
002312 000207      RTS        PC

;MESSAGES
002314 042523 020124 042101  INST1; ,ASCIZ 'SET ADRS SEL SWITCH TO CONSOLE PHYS POSIT'<15><12>
002322 051522 051440 046105
002330 051440 044527 041524
002336 020110 047524 041440
002344 047117 047523 042514
002352 050040 054510 020123
002360 047520 044523 006524
002366 000012

002370 042523 020124 042101  INST2; ,ASCIZ 'SET ADRS SEL SWITCH TO PROGRAM PHYS POSIT'<15><12>
002376 051522 051440 046105
002404 051440 044527 041524
002412 020110 047524 050040
002420 047522 051107 046501
002426 050040 054510 020123
002434 047520 044523 006524
002442 000012

002444 051440 047510 046125  LIGHTS; ,ASCIZ ' SHOULD BE DISPLAYED IN THE ADDRESS LIGHTS'<15><12>
002452 020104 042502 042040
002460 051511 046120 054901
002466 042105 044440 020116
002474 044124 020105 042101
002502 051104 051505 020123
002510 044514 044107 051524
002516 005015      000
002521 123      051124 045511  MEB1; ,ASCIZ '/STRIKE ANY TELETYPE KEY WHEN READY TO PROCEED'<15><12>
002526 020105 047101 020131
002534 042524 042514 054924
002542 042520 045440 054905
002550 053440 042510 020116
002556 042522 042101 020131
002564 047524 050040 047522
002572 042503 042504 005015
002600 000

002601 015 000012      CRLF; ,ASCIZ <15><12>
000001      ;END
    
```

CROSS REFERENCE TABLE

A	= 000200	121#							
AC0	=X000000	25#							
AC1	=X000001	26#							
AC2	=X000002	27#							
AC3	=X000003	28#							
AC4	=X000004	29#							
AC5	=X000005	30#							
AVA	= 020000	113#							
BEGIN	001116	351#							
BIT13	= 020000	86#							
BIT14	= 040000	87#							
BIT15	= 100000	84#							
BIT6	= 000100	90#							
BIT8	= 000400	89#	330						
C	= 000001	38#							
CHARPT	001542	414#	420	420#					
CHK1	001652	410	460#						
CRLF	002601	705#							
DSPPLA	= 177570	77#	351#						
DM	= 000400	109#							
DM1	= 174000	138#							
DM2	= 170000	139#							
DR0	= 000000	140#							
DR1	= 000400	141#							
DR2	= 001000	142#							
DR3	= 001400	143#							
DR4	= 002000	144#							
DR5	= 002400	145#							
DR6	= 003000	146#							
DR7	= 003400	147#							
DS	= 000020	103#							
DWN	= 000010	120#							
D0	= 000000	139#							
D1	= 004000	136#							
D2	= 010000	137#							
D2BTYP	001562	430#	599						
ED	= 000010	110#							
EMTVEC	= 000030	60#	296						
ENMM	= 000001	94#							
ERRVEC	= 000004	59#	294	314					
FPVEC	= 000244	64#							
HLT	= 000000	279#	536	539	542	545	548	551	
IC	= 000200	100#							
IGNT	001000	330#	350#	351					
INST1	002314	615	671#						
INST2	002370	601	679#						
IOTVEC	= 000020	58#							
IS	= 000000	104#							
KDE	= 000004	152#	356						
KDPARB	= 172360	259#	389#						
KDPA1	= 172362	260#	392#						
KDPA2	= 172364	261#							
KDPA3	= 172366	262#							
KDPA4	= 172370	263#							



SIPAR5	= 172252	219#												
SIPAR6	= 172254	220#												
SIPAR7	= 172256	221#												
SIPDR0	= 172200	196#	368	376*										
SIPDR1	= 172202	197#	383*											
SIPDR2	= 172204	198#												
SIPDR3	= 172206	199#												
SIPDR4	= 172210	200#												
SIPDR5	= 172212	201#												
SIPDR6	= 172214	202#												
SIPDR7	= 172216	203#												
SLR	= 177774	69#	354*											
SM	= 040000	47#												
SM1	= 000370	130#												
SM2	= 000360	131#												
SM4	= 000340	132#												
SM6	= 000320	133#												
SM8	= 000300	134#												
SP	= X000006	13#	414	415*	424*	433*	434*	435*	436*	457	458	459	460	
SPG	= 000040	106#												
SPTR	= 000700	81#	324											
SR0	= 177572	155#	309*	319*	363*	468*	533*	560*						
SR0T	= 001002	339#												
SR1	= 177574	156#												
SR2	= 177576	157#												
SR3	= 172516	158#	356*											
SSP	= X000006	34#	329*											
START	= 001110	305#	349#											
SWR	= 177570	76#	330	332										
S1	= 000010	125#												
S2	= 000020	126#												
S4	= 000040	127#												
S6	= 000060	128#												
S8	= 000100	129#												
T	= 000020	42#												
TBITVE	= 000014	57#												
TE	= 001000	110#												
TEMP	= 001004	340#												
TKB	= 177562	73#	611*	626*	662*									
TKS	= 177560	72#	612*	627*	661*									
TPA	= 001534	422	426#											
TPB	= 177566	75#	426*	447*										
TPISR	= 001510	420#	584											
TPS	= 177564	74#	412	416*	423*	433	445	460*						
TPVEC	= 000064	62#	584*	585*										
TRAPVE	= 000034	61#												
TIYINT	= 002272	591	661#											
TYPE	= 000004	281#												
UBREAK	= 177770	71#	332*	651*	653*									
UDE	= 000001	150#	356											
UDPAR0	= 177660	187#												
UDPAR1	= 177662	188#	396*											
UDPAR2	= 177664	189#												
UDPAR3	= 177666	190#												

UDPAR4	= 177670	191#												
UDPAR5	= 177672	192#												
UDPAR6	= 177674	193#												
UDPAR7	= 177676	194#												
UDPDR0	= 177620	169#	379*											
UDPDR1	= 177622	170#	386*											
UDPDR2	= 177624	171#												
UDPDR3	= 177626	172#												
UDPDR4	= 177630	173#												
UDPDR5	= 177632	174#												
UDPDR6	= 177634	175#												
UDPDR7	= 177636	176#												
UIPAR0	= 177640	178#												
UIPAR1	= 177642	179#	397*											
UIPAR2	= 177644	180#												
UIPAR3	= 177646	181#												
UIPAR4	= 177650	182#												
UIPAR5	= 177652	183#												
UIPAR6	= 177654	184#												
UIPAR7	= 177656	185#												
UIPDR0	= 177600	160#	364	378*										
UIPDR1	= 177602	161#	385*											
UIPDR2	= 177604	162#												
UIPDR3	= 177606	163#												
UIPDR4	= 177610	164#												
UIPDR5	= 177612	165#												
UIPDR6	= 177614	166#												
UIPDR7	= 177616	167#												
UM	= 140000	48#												
UP	= 000000	119#	374	375	376	377	378	379	380	381	382	383	384	385
		386	593	594										
UPG	= 000140	105#												
UPTR	= 000600	82#	325											
USP	= X000006	35#	327*											
V	= 000002	39#												
VS0	= 000000	95#												
VS1	= 000002	96#												
VS2	= 000004	97#												
VS3	= 000006	98#												
VS4	= 000010	99#												
VS5	= 000012	100#												
VS6	= 000014	101#												
VS7	= 000016	102#												
W	= 000100	122#												
WAJT	= 002310	597	613	628	668#									
Y	= 000006	463#	471	480#	489#	498#	507#	516#	525#					
Z	= 000004	40#												
.	= 002604	293#	294#	296#	299#	304#	307#	336#	340	341#	344#	367	371	446
		535	538	541	544	547	550	595	665					

CAC	284#																			
CFPS	284#																			
CON1	284#	471	480	489	498	507	516													
CPC	284#																			
CPDR	284#																			
CPYR	284#																			
CSPR0	284#																			
CSPR1	284#																			
CSPR2	284#																			
CSTAT	284#																			
KKH	284#																			
KKP	284#																			
KKR	284#																			
KSM	284#																			
KSM P	284#																			
KSR	284#																			
KUM	284#																			
KUP	284#																			
KUR	284#																			
LCKM1	284#																			
LCK0	284#																			
LQDR	284#	373	375	376	377	378	379	380	381	382	383	384	385	386	593					
594	284#																			
LDS0	284#																			
LQD0	284#																			
SETK	284#																			
SETS	284#																			
SETU	284#																			
SGF	284#	318	533																	
SGN	284#	560																		
SSM	284#																			
SSR	284#																			
SUM	284#																			
SUR	284#																			
SVEC	284#																			
UUM	284#																			
UUR	284#																			

ADD	313	415	424	444	598	618														
ASR	328																			
BEO	312	331	535	538	541	544	547	550												
BIC	309	423																		
BIS	416																			
BIT	330	412																		
HNE	413	422	456																	
BPL	446																			
BR	665																			
CLR	319	322	350	355	363	366	370	388	389	441	448	533	592	611	626					
661	662																			
CHP	534	537	540	543	546	549														
DEC	455																			
EMT	280																			
HALT	279	293	380	469	561	638	657													
INC	560																			
LOT	281																			
JMP	305	314	315	418	595															
JSR	680	682	684	685	687	688	618	613	614	616	619	620	622	623	625					
626																				
MOV	320	321	323	324	325	326	351	352	354	356	364	365	368	369	374					
375	376	377	378	379	380	381	382	383	384	385	386	390	392	393						
394	395	396	397	403	404	405	406	407	408	414	420	427	433	434						
435	436	437	446	447	457	458	459	460	466	550	584	585	591	593						
594	597	599	603	612	617	627	651	653	654	655	656									
MOV B	332	426																		
MTPD	327	329																		
NOP	349	362																		
RESET	652																			
RDL	442	443	449	450	451	452	453	454												
RTI	425	429	663																	
RTS	417	461	666	669																
RTY	333																			
SOR	367	371																		
SUB	310	629																		
TST	311																			
TSTB	421	445																		
WAIT	668																			
,ABS	3																			
,ABSCZ	671	679	687	695	705															
,END	706																			
,LIST	2	284	293	480	489	498	507	516	525											
,MACR	284																			
,NLIST	1	284	285	293	480	489	498	507	516	525										
,PAGE	345	464	529	553	576	638	661													
,REPT	293																			
,TITLE	4																			
,WORD	295	297	438																	

ERRORS DETECTED: 0

\*DCKBQ=DCKBQ/SOL/CRF#DCKBQ, SRC  
 RUN TIME: 4 6 2 SECONDS  
 CORE USED: 7K