

PDP11/45

CONSOLE TEST
MD-11-DCKBQ-B

EP-DCKBQ-B-DL-A
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1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112

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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

113
114
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- 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 STARTIN 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.

169
170
171
172
173
174
175
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179
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182
183

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.

!

.NLIST SEQ
.LIST ME
.ABS
.TITLE TEST DCKBQ-B CONSOLE TEST
:CONSOLE TEST- THIS TEST CHECKS CONSOLE OPERATIONS WITH MEMORY
:MANAGEMENT

;GENERAL REGISTER ASSIGNMENTS

000000
000001
000002
000003
000004
000005
000006
000007
000008
000009
000010
000011
000012
000013
000014
000015

R0=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
SP=%6
PC=%7
R10=%0
R11=%1
R12=%2
R13=%3
R14=%4
R15=%5

;FLOATING POINT REGISTERS

000000
000001
000002
000003
000004
000005

AC0=%0
AC1=%1
AC2=%2
AC3=%3
AC4=%4
AC5=%5

;STACK POINTER REGISTERS

000006
000006
000006

KSP=%6
SSP=%6
USP=%6

:KERNEL STACK POINTER
:SUPERVISOR STACK POINTER
:USER STACK POINTER

;STATUS REGISTER BIT ASSIGNMENTS

000001
000002
000004
000010
000020
000340
000200
004000
000000
040000
140000
000000
010000
030000
004000

C=1
V=2
Z=4
N=10
T=20
PRTY7=340
PRTY4=200
REG=4000
KM=000000
SM=040000
UM=140000
PKM=000000
PSM=010000
PUM=030000
REG=004000

: 'T' BIT
: PRIORITY LEVEL 7
: PRIORITY LEVEL 4
: SELECTS R10-R15
: KERNEL MODE
: SUPERVISORY MODE
: USER MODE
: PREVIOUS KERNEL MODE
: PREVIOUS SUPERVISORY MODE
: PREVIOUS USER MODE
: SELECT R10-R15

;VECTOR ADDRESSES

000004
000010

ERRVEC=4
RESVEC=10

: ADDRESS OF ERROR VECTOR
: ADDRESS OF RESERVED INST. TRAP VECTOR

000014
000020
000024
000030
000034
000064
000240
000244
000250

TBITVEC=14
IOTVEC=20
PFVEC=24
ENTVEC=30
TRAPVEC=34
TPVEC=64
PIRVEC=240
FPVEC=244
MMVEC=250

:ADDRESS OF 'T' BIT TRAP VECTOR
:ADDRESS OF IOT TRAP VECTOR
:ADDRESS OF POWER FAIL TRAP VECTOR
:ADDRESS OF EMT VECTOR
:ADDRESS OF TRAP VECTOR
:ADDRESS OF TTY PRINTER INTERRUPT VECTOR
:ADDRESS OF PIRQ VECTOR
:ADDRESS OF FLOATING POINT INT. VECTOR
:ADDRESS OF MEMORY MGMT ERROR TRAP VECTOR

;REGISTER ADDRESSES

177776
177774
177772
177770
177560
177562
177564
177566
177570
177570

PSW=177776
SLR=177774
PIRQ=177772
UBREAK=177770
TKS=177560
TKB=177562
TPS=177564
TPB=177566
SWR=177570
DISPLAY=177570

:ADDRESS OF STATUS REGISTER
:ADDRESS OF STACK LIMIT REGISTER
:ADDRESS OF PROGRAM INTERRUPT REQUEST
:ADDRESS OF MICRO BREAK REGISTER
:ADDRESS OF KEYBOARD CSR
:ADDRESS OF KEYBOARD BUFFER
:ADDRESS OF TELEPRINTER CSR
:ADDRESS OF TELEPRINTER BUFFER
:ADDRESS OF CONSOL SWITCH REGISTER
:ADDRESS OF CONSOL DISPLAY REGISTER

;INITIAL STACK POINTER SETTINGS

001060
000700
000600
000740

KPTR=1060
SPTR=700
LPTR=600
REDPTR=740

:BOTTOM OF KERNEL STACK
:SUPERVISORY STACK SETTING
:USER STACK SETTING
:RED STACK PTR

;MISCELLANEOUS BIT ASSIGNMENTS

100000
040000
020000
000400
000100
010000

BIT15=100000
BIT14=40000
BIT13=20000
BIT8=400
BIT6=100
PIR4=10000

;LEVEL 4 PROGRAM INT. RQST.

;MEMORY MANAGEMENT REGISTER SRC BIT ASSIGNMENTS

000001
000000
000002
000004
000006
000010
000012
000014
000016
000020
000000
000140
000040
000000
000200
000400
001000
004000
010000

EMM=1
VSO=0
VS1=2
VS2=4
VS3=6
VS4=10
VS5=12
VS6=14
VS7=16
DS=20
IS=00
LPG=140
SPG=40
KPG=000
IC=200
DM=400
TE=1000
OST=4000
NMT=10000

;ENABLE MEMORY MANAGEMENT

:INSTRUCTION COMPLETE
:DESTINATION MODE
:TRAP ENABLE
:OST ABORT FLAG
:MEMORY MANAGEMENT TRAP

020000
040000
100000

AVA=20000
PLA=40000
NRA=100000

;ACCESS VIOLATION ABORT
;PAGE LENGTH ABORT
;NON-RESIDENT ABORT

000010
000000
000010
000200
000100

;PAGE DESCRIPTOR REGISTER (PDR)

ED=10
UP=0
DN=10
A=200
W=100

BIT ASSIGNMENTS
;EXPANSION DIRECTION BIT IN PDR
;EXPAND UP
;EXPAND DOWN
;'A' BIT IN PDR
;'W' BIT IN PDR

000010
000020
000040
000060
000100
000370
000360
000340
000320
000300
000000
004000
010000
174000
170000
000000
000400
001000
001400
002000
002400
003000
003400

;SR1 BIT ASSIGNMENTS

S1=10
S2=20
S4=40
S6=60
S8=100
S11=370
S12=360
S14=340
S16=320
S18=300
D0=0
D1=4000
D2=10000
D11=174000
D12=170000
DR0=000
DR1=400
DR2=1000
DR3=1400
DR4=2000
DR5=2400
DR6=3000
DR7=3400

000001
000002
000004

;SR3 BIT ASSIGNMENTS

UDE=1
SDE=2
KDE=4

;USER 'D' SPACE ENABLE
;SUPERVISOR 'D' SPACE ENABLE
;KERNEL 'D' SPACE ENABLE

177572
177574
177576
172516

;MEMORY MANAGEMENT REGISTER ADDRESS ASSIGNMENTS

SR0=177572
SR1=177574
SR2=177576
SR3=172516

;ADDRESS OF MEMORY MGMT REGISTER SR0
;SR1
;SR2
;ADDRESS OF MEMORY MGMT REGISTER SR3

177600
177602
177604
177606
177610
177612
177614
177616

UIPDR0=177600
UIPDR1=177602
UIPDR2=177604
UIPDR3=177606
UIPDR4=177610
UIPDR5=177612
UIPDR6=177614
UIPDR7=177616

;ADDRESS OF USER 'I' PDR'S

;ADDRESS 00 USER 'D' PDR'S

177620
177622
177624
177626
177630
177632
177634
177636

UDPDR0=177620
UDPDR1=177622
UDPDR2=177624
UDPDR3=177626
UDPDR4=177630
UDPDR5=177632
UDPDR6=177634
UDPDR7=177636

177640
177642
177644
177646
177650
177652
177654
177656

UIPAR0=177640
UIPAR1=177642
UIPAR2=177644
UIPAR3=177646
UIPAR4=177650
UIPAR5=177652
UIPAR6=177654
UIPAR7=177656

177660
177662
177664
177666
177670
177672
177674
177676

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

172200
172202
172204
172206
172210
172212
172214
172216

SIPDR0=172200
SIPDR1=172202
SIPDR2=172204
SIPDR3=172206
SIPDR4=172210
SIPDR5=172212
SIPDR6=172214
SIPDR7=172216

172220
172222
172224
172226
172230
172232
172234
172236

SDPAR0=172220
SDPAR1=172222
SDPAR2=172224
SDPAR3=172226
SDPAR4=172230
SDPAR5=172232
SDPAR6=172234
SDPAR7=172236

172240
172242
172244
172246
172250
172252
172254
172256

SIPAR0=172240
SIPAR1=172242
SIPAR2=172244
SIPAR3=172246
SIPAR4=172250
SIPAR5=172252
SIPAR6=172254
SIPAR7=172256

172260
172262

SDPAR0=172260
SDPAR1=172262

172264
172266
172270
172272
172274
172276

SDPAR2=172264
SDPAR3=172266
SDPAR4=172270
SDPAR5=172272
SDPAR6=172274
SDPAR7=172276

172300
172302
172304
172306
172310
172312
172314
172316

KIPDR0=172300
KIPDR1=172302
KIPDR2=172304
KIPDR3=172306
KIPDR4=172310
KIPDR5=172312
KIPDR6=172314
KIPDR7=172316

172320
172322
172324
172326
172330
172332
172334
172336

KDPDR0=172320
KDPDR1=172322
KDPDR2=172324
KDPDR3=172326
KDPDR4=172330
KDPDR5=172332
KDPDR6=172334
KDPDR7=172336

172340
172342
172344
172346
172350
172352
172354
172356

KIPAR0=172340
KIPAR1=172342
KIPAR2=172344
KIPAR3=172346
KIPAR4=172350
KIPAR5=172352
KIPAR6=172354
KIPAR7=172356

172360
172362
172364
172366
172370
172372
172374
172376

KOPAR0=172360
KOPAR1=172362
KOPAR2=172364
KOPAR3=172366
KOPAR4=172370
KOPAR5=172372
KOPAR6=172374
KOPAR7=172376

000000
000001
000002
000003
000004
000005
000006
000007

;ACCESS CONTROL FIELD DEFINITIONS (IN PDR)
NR0=0 ;NON-RESIDENT ABORT ALL REFS.
R00T=1 ;TRAP ON READ,ABORT ON WRITE
R00=2 ;READ,ABORT ON WRITE
NR3=3 ;UNUSED ABORT ALL
RWT=4 ;TRAP ON READ & WRITE
RWT=5 ;READ,TRAP ON WRITE
RW=6 ;READ & WRITE
NR7=7 ;ABORT ALL

000000
104000

;INSTRUCTION EQUATES
HLT=HALT
SCOPE=ENT ;SCOPE IS AN ENT TRAP

000004

TYPE=IOT

;TYPE IS AN IOT TRAP

.LIST ME
.NLIST MC,MD,SEQ

;FILL TRAP AND INTERRUPT VECTOR AREA WITH

..+2
:HALT

;UNEXPECTED TRAPS/INTERRUPTS WILL HALT AT VECTOR ADDRESS +2
;AND DISPAY IN THE ADDRESS LIGHTS THE VECTOR ADDRESS +4

.NLIST MC,SEQ

.=ERRVEC
.MCRD SHLT
.=EMTVEC
.WORD SCOPEA

000004 000004
000030 000434

000176 000176
000176 000000

.=176
:HALT

;EXAMINE R1(R11), THE CONTENTS OF WHICH IS THE PC OF THE LAST TEST SUC-
;CESSFULLY COMPLETED. THE TOP WORD ON THE KERNEL STACK CONTAINS THE VIRTUAL
;ADDRESS OF THE HLT INSTRUCTION IN THE TEST THAT FAILED.

;ERROR! TO IDENTIFY WHICH TEST FAILED

000200 000200 000704
000167

.=200
:JMP START

;GO START TEST

000400 000400

.=400

:SUPERVISOR/USER HLT (HALT) TRAP SERVICE ROUTINE

000400 042737 000001 177572
000406 162716 000002
000412 005776 000000
000416 001404
000420 062716 000002
000424 000137 000006
000430 000137 000176

SHLT: BIC #1,@#SR0
SUB #2,(KSP)
TST @ (KSP)
BEQ SHLTA
ADD #2,(KSP)
JMP @#ERRVEC+2
SHLTA: JMP @#176

;TURN MEM MGMT OFF
;POINT PC TO TRAPPING INST.
;WAS IT A HLT (HALT)
;RESTORE PC TO TRAPPING INST.
;GO HALT AT 6
;GO HALT AT ADDRESS 176

:SCOPE (EMT) SERVICE ROUTINE

000434 000434 005037 177572
000440 011601
000442 012706 001060
000446 005046
000450 010146
000452 012746 000700
000456 012746 000600
000462 012737 030000 177776
000470 106606
000472 006237 177776
000476 106606
000500 032737 000400 177570
000506 001403
000510 113737 177570 177770
000516 000006

SCOPEA: CLR @#SR0
MOV (KSP),R1
MOV #KPTR,KSP
CLR -(KSP)
MOV R1,-(KSP)
MOV #SPTR,-(KSP)
MOV #UPTR,-(KSP)
MOV #PUM,@#PSW
MTPD USP
ASR @#PSW
MTPD SSP
BIT #BITB,@#SWR
BEQ SCOPEX
MOV @#SWR,@#UBREAK
SCOPEX: RTT

;DISABLE MEMORY MGMT
;SAVE PC IN R1
;SET KERNEL STACK PTR
;SET UP FOR KERNEL MODE ON RETURN
;RETURN IN LINE
;SUPER STACK PTR ON KERNEL STACK
;USER STACK PTR ON KERNEL STACK
;PREVIOUS USER MODE
;SET USER STACK PTR
;PREV SUPER MODE
;SET SUPER STACK PTR
;LOAD MICRO BREAK REG?
;LOAD SR0-7 INTO MICRO BREAK REG.
;RETURN TO NEXT TEST IN KERNEL MODE
;WITH ALL STACK PTRS SET UP

001000

.=1000

TEST DCKBQ-B CONSOLE TEST
DCKBQA.SRC

MACY11 27(732) 05-MAR-76 13:37 PAGE 12

001000	000000	:TAGS		
001002	000000	ICNT:	0	:CONTAINS PASS COUNT
	001004	SROT:	0	:CONTAINS SRO CONTENTS ON ERROR
	001012		TEMP=.	
			.=.+6	
	001110			
			.=1110	

:START COSOLE TEST
:*****

001110 000240
001112 005067 177662
001116 016737 177656 177570
001124 012706 001060
001130 104000
001132 012737 000400 177774
001140 005037 000252
001144 012737 000007 172516

START: NOP
CLR ICNT ;CLEAR PASS COUNT
BEGIN: MOV ICNT,@DISPLAY ;DISPLAY PASS COUNT
MOV @KPTR,KSP ;SET KERNEL STACK PTR
SCOPE ;SCOPE SETS ALL STACK PTRS
MOV #400,@SLR ;SET STACK LIMIT = 1000
CLR @MMVEC+2 ;KERNEL MODE ON ABORT
MOV @KDE+SDE+UDE,@SR3

:ROUTINE TO CLEAR MEMORY MANAGEMENT REGISTERS.
:*****

001152 000240
001154 005037 177572
001160 012702 177600
001164 012703 000040
001170 005022
001172 077302
001174 012702 172200
001200 012703 000100
001204 005022
001206 077302

MMD: NOP
CLR @SR0 ;DISABLE MEM MGMT
MOV @UIPDR0,R2
MOV #40,R3
CLR (R2)+
SOB R3,-2
MOV @SIPDR0,R2
MOV #100,R3
CLR (R2)+
SOB R3,-2

001210
001210 012737 073006 172300
001216 012737 077406 172320
001224 012737 177406 172200
001232 012737 177406 172220
001240 012737 177406 177600
001246 012737 177406 177620
001254 012737 177406 172336
001262 012737 000006 172322
001270 012737 000006 172302
001276 012737 000006 172202
001304 012737 000006 172222
001312 012737 000006 177602
001320 012737 000006 177622

MWK: MOV #167*256,-400+UP+RW,@KIPDR0 ;SET KIPDR0=RW UP 167 BLOCKS
MOV #200*256,-400+UP+RW,@KDPDR0 ;SET KDPDR0=RW UP 200 BLOCKS
MOV #400*256,-400+UP+RW,@SIPDR0 ;SET SIPDR0=RW UP 400 BLOCKS
MOV #400*256,-400+UP+RW,@SDPDR0 ;SET SDPDR0=RW UP 400 BLOCKS
MOV #400*256,-400+UP+RW,@UIPDR0 ;SET UIPDR0=RW UP 400 BLOCKS
MOV #400*256,-400+UP+RW,@UDPDR0 ;SET UDPDR0=RW UP 400 BLOCKS
MOV #400*256,-400+UP+RW,@KDPDR7 ;SET KDPDR7=RW UP 400 BLOCKS
MOV #1*256,-400+UP+RW,@KDPDR1 ;SET KDPDR1=RW UP 1 BLOCKS
MOV #1*256,-400+UP+RW,@KIPDR1 ;SET KIPDR1=RW UP 1 BLOCKS
MOV #1*256,-400+UP+RW,@SIPDR1 ;SET SIPDR1=RW UP 1 BLOCKS
MOV #1*256,-400+UP+RW,@SDPDR1 ;SET SDPDR1=RW UP 1 BLOCKS
MOV #1*256,-400+UP+RW,@UIPDR1 ;SET UIPDR1=RW UP 1 BLOCKS
MOV #1*256,-400+UP+RW,@UDPDR1 ;SET UDPDR1=RW UP 1 BLOCKS

001326 005037 172340
001332 005037 172360
001336 012767 007600 171032

001344 012737 000167 172362
001352 012737 000170 172342
001360 012737 000171 172262
001366 012737 000172 172242
001374 012737 000173 177662
001402 012737 000174 177642

CLR @KIPARD ;VA=PA=0000-16677
CLR @KDPARD ;VA=PA=0-1077
MOV #7600,KDPAR7 ;VA=16000-177776,PA=76000-77776
;(I/O PAGE)
MOV #167,@KDPAR1 ;PA=16700-16777,VA=20000-20077
MOV #170,@KIPAR1 ;PA=17000-17077,VA=20000-20077
MOV #171,@SDPAR1 ;PA=17100-17177,VA=20000-20077
MOV #172,@SIPAR1 ;PA=17200-17277,VA=20000-20077
MOV #173,@UDPAR1 ;PA=17300-17377,VA=20000-20077
MOV #174,@UIPAR1 ;PA=17400-17477,VA=20000-20077

:LOAD PHYSICAL ADDRESSES INTO MEMORY TO BE EXAMINED

;*****

```

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

001454 000167 000172                JMP      CHK1          ;GO START TEST
: TELEPRINTER MANAGER
001460 032737 000100 177564 PRINT: BIT      #100, @TPS      ;IS TELEPRINTER AVAILABLE
001466 001374                BNE     PRINT
001470 013667 000046                MOV     @SP+, CHARPTR    ;GET START OF MESSAGE ADDRESS
001474 062746 000002                ADD     #2, -(SP)        ;ADJUST RETURN PC
001500 052737 000100 177564        BIS     #100, @TPS      ;SET IE
001506 000207                RTS     PC              ;RETURN

: TELEPRINTER INTERRUPT SERVICE ROUTINE
001510 016700 000026 TPISR: MOV      CHARPTR, RO    ;GET CHARACTER ADDRESS
001514 105710                TSTB   (RO)              ;VALID CHAR?
001516 001006                BNE     TPA
001520 042737 000100 177564        BIC     #100, @TPS      ;DISABLE IE
001526 062716 000002                ADD     #2, (SP)        ;ADJUST RETURN PC
001532 000002                RTI
001534 112037 177566 TPA:   MOV     (RO)+, @TPB    ;LOAD CHARACTER
001540 010027                MOV     RO, (PC)+        ;RESTORE PTR
001542 000000                CHARPTR: 0              ;CONTAINS ADDRESS OF CHAR TO BE PRINTED
001544 000002                RTI

: OCTAL TO ASCII TYPE ROUTINE
001546 013746 177564 02A:  MOV      @TPS, -(SP)    ;SAVE TELEPRINTER STATUS
001552 010246                MOV     R2, -(SP)        ;AND REGISTERS ON THE
001554 010146                MOV     R1, -(SP)        ;STACK
001556 010046                MOV     RO, -(SP)
001560 012700                MOV     (PC)+, RO        ;GET DATA TO BE TYPED
001562 000000                D2BTYP: .WORD 0         ;CONTAINS OCTAL
;VALUE TO BE TYPED
;CHARACTER COUNT
;WORKING REGISTER
;GET FIRST OCTAL DIGIT
; & PUT INTO R2
;FORM ASCII
;WAIT FOR TELEPRINTER

001564 012701 000006                MOV     #6, R1
001570 005002                CLR     R2
001572 006100                ROL     RO
001574 006102                ROL     R2
001576 062702 000260 1S:  ADD     #260, R2        ;TYPE DIGIT
001602 105737 177564        TSTB   @TPS            ;CLEAR WORKING REGISTER
001606 100375                BPL     -4              ;GET NEXT DIGIT
001610 010237 177566        MOV     R2, @TPB
001614 005002                CLR     R2
001616 006100                ROL     RO
001620 006102                ROL     R2
001622 006100                ROL     RO
001624 006102                ROL     R2
001626 006100                ROL     RO
001630 006102                ROL     R2
001632 005301                DEC     R1
001634 001360                BNE     1S
;IS IN R2 NOW
;DECREMENT DIGIT COUNT
;TYPE DIGIT IF NOT DONE

```

001636 012600
001640 012601
001642 012602
001644 012637 177564
001650 000207

000000

MOV (SP)+,R0 ;RESTORE REGISTERS
MOV (SP)+,R1
MOV (SP)+,R2
MOV (SP)+,R3 ;AND TELEPRINTER STATUS
RTS PC ;AND RETURN

Y=0

:CONSOLE DEPOSIT/EXAMINE TEST

001652 012737 000001 177572 CHK1: MOV #1,2#SRD ;ENABLE MEMORY MANAGEMENT
001660 000000 HALT ;PERFORM THE FOLLOWING TESTS

:CONSOLE TEST 0
:SET ADDRESS SELECTOR SWITCH TO KD POSITION
:LOAD ADDRESS 20000
:EXAMINE
:DATA LIGHTS SHOULD DISPLAY 16700
:DEPOSIT 20002

:CONSOLE TEST 1
:SET ADDRESS SELECTOR SWITCH TO KI POSITION
:LOAD ADDRESS 20002
:EXAMINE
:DATA LIGHTS SHOULD DISPLAY 17002
:DEPOSIT 20004

:CONSOLE TEST 2
:SET ADDRESS SELECTOR SWITCH TO SD POSITION
:LOAD ADDRESS 20004
:EXAMINE
:DATA LIGHTS SHOULD DISPLAY 17104
:DEPOSIT 20010

:CONSOLE TEST 3
:SET ADDRESS SELECTOR SWITCH TO SI POSITION
:LOAD ADDRESS 20010
:EXAMINE
:DATA LIGHTS SHOULD DISPLAY 17210
:DEPOSIT 20020

:CONSOLE TEST 4
:SET ADDRESS SELECTOR SWITCH TO UD POSITION
:LOAD ADDRESS 20020
:EXAMINE
:DATA LIGHTS SHOULD DISPLAY 17320
:DEPOSIT 20040

:CONSOLE TEST 5
:SET ADDRESS SELECTOR SWITCH TO UI POSITION
:LOAD ADDRESS 20040

TEST DCKBQ-B CONSOLE TEST
DCKBQA.SRC

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002

```
:EXAMINE  
:DATA LIGHTS SHOULD DISPLAY 17440  
:DEPOSIT 20100  
:*****  
:*****  
:      PRESS CONTIUE  
:*****
```

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

001662	005037	177572		CLR	@SR0	;DISABLE MEMORY MGMT
001666	022737	020002	016700	CMP	@20002,@#16700	
001674	001401			BEQ	+.4	
001676	000000			HLT		;INCORRECT DEPOSIT TEST 0
001700	022737	020004	017002	CMP	@20004,@#17002	
001706	001401			BEQ	+.4	
001710	000000			HLT		;INCORRECT DEPOSIT TEST 1
001712	022737	020010	017104	CMP	@20010,@#17104	
001720	001401			BEQ	+.4	
001722	000000			HLT		;INCORRECT DEPOSIT TEST 2
001724	022737	020020	017210	CMP	@20020,@#17210	
001732	001401			BEQ	+.4	
001734	000000			HLT		;INCORRECT DEPOSIT TEST 3
001736	022737	020040	017320	CMP	@20040,@#17320	
001744	001401			BEQ	+.4	
001746	000000			HLT		;INCORRECT DEPOSIT TEST 4
001750	022737	020100	017440	CMP	@20100,@#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	020100,020100	; ADDRESS 20100 IS OUTSIDE THE
001770	005237	177572		INC	020SR0	; MAPPED AREA (PAGE LENGTH ERROR)
001774	000000			HALT		; ENABLE MEMORY MGMT
						;PERFORM THE FOLLOWING OPERATIONS

:SET ADDRESS SELECT SWITCH TO "USER I" POSITION
:LA=20100
:EXAMINE
:ADDRESS ERROR LIGHT SHOULD LIGHT
:LA=20100
:ADDRESS ERROR LIGHT SHOULD GO OUT
:SET ADDRESS SELECT SWITCH TO CONSOLE PHYSICAL POSITION
:EXAMINE
:DATA LIGHTS SHOULD DISPLAY 20100
:PRESS 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 ;SET TELEPRINTER INTERRUPT VECTOR
002004 012737 000200 000066      MOV      @PRTY4,@TPVEC+2;AND STATUS ON INTERRUPT

:*****
:SETUP KERNEL MEMORY MANAGEMENT REGISTERS
:*****

002012 012737 002272 000060      MOV      @TTYINT,@60 ;SETUP READER INTERRUPT VECTOR
002020 005037 000062                CLR      @62
002024 012737 077406 172304      MOV      @200*256.-400+UP+R4,@KIPDR2 ;SET KIPDR2=RM UP 200 BLOCKS
002032 012737 077406 172324      MOV      @200*256.-400+UP+R4,@KOPDR2 ;SET KOPDR2=RM UP 200 BLOCKS
002040 000167 040000                JMP      .+40004 ;EXECUTES THE FOLLOWING INSTRUCTIONS
:AT VIRTUAL ADDRESS 40000+

002044 012702 002310                MOV      @WAIT,R2 ;GET ADDRESS OF WAIT LOOP
002050 062702 000002                ADD      @2,R2
002054 012703 001562                MOV      @02@TYP,R3
002060 004767 177374                JSR      PC,PRINT ;GO TO PRINT MANAGER
002064 002370                INST2 ;PRINT INSTRUCTIONS
002066 004767 000212                JSR      PC,LOOP ;GO EXECUTE BR
002072 010213                MOV      R2,(R3) ;GET PHYSICAL ADDRESS OF WAIT INSTRUCTION
002074 004767 177446                JSR      PC,@2A ;PRINT PHYSICAL ADDRESS
002100 004767 177354                JSR      PC,PRINT
002104 002444                LIGHTS
002106 004767 000172                JSR      PC,LOOP ;EXECUTE BR . WHILE PRINTING
002112 004767 177342                JSR      PC,PRINT
002116 002521                MES1
002120 004767 000160                JSR      PC,LOOP ;WAIT FOR MESSAGE TO GO OUT
002124 005037 177562                CLR      @TKB ;CLEAR KEYBOARD BUFFER
002130 012737 000100 177560                MOV      @100,@TKS ;ENABLE TELETYPE INTERRUPT
002136 004767 000146                JSR      PC,WAIT ;WAIT FOR TELETYPE INTERRUPT
002142 004767 177312                JSR      PC,PRINT
002146 002314                INST1 ;PRINT INSTRUCTIONS
002150 004767 000130                JSR      PC,LOOP ;EXECUTE BR . WHILE PRINTING
002154 010213                MOV      R2,(R3) ;GET PHYSICAL ADDRESS OF LOOP
002156 062713 040000                ADD      @40000,(R3) ;FORM PROGRAM ADDRESS
002162 004767 177360                JSR      PC,@2A ;TYPE PROGRAM ADDRESS OF LOOP
002166 004767 177266                JSR      PC,PRINT
002172 002444                LIGHTS
002174 004767 000104                JSR      PC,LOOP ;GO EXECUTE BR . WHILE PRINTING
002200 004767 177254                JSR      PC,PRINT
002204 002521                MES1
002206 004767 000072                JSR      PC,LOOP ;WAIT FOR MESSAGE TO GO OUT
002212 005037 177562                CLR      @TKB ;CLEAR THE KEYBOARD BUFFER
002216 012737 000100 177560                MOV      @100,@TKS ;ENABLE TELETYPE INTERRUPT
002224 004767 000060                JSR      PC,WAIT ;WAIT FOR TELETYPE INTERRUPT
002230 162707 040000                SUB      @40000,PC ;RETURN 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.

NOTE: IF FLOATING POINT OPTION DOES NOT EXIST THE CONTENTS
OF THE MICRO-BREAK REGISTER WILL DISPLAY ONLY THE LOWER BYTE.
EXAMPLE- 37374=000374

INSERT THE MAINTENANCE CARD.
ENABLE THE MICRO-BREAK STOP SWITCH ON THE MAINTENANCE CARD.
SWITCHES 2, 3, AND 4 SHOULD BE TO THE LEFT POSITION.
PRESS CONTINUE.
DISPLAY THE MICRO-BREAK REGISTER ON THE CONSOLE.
THE PROCESSOR SHOULD HAVE HALTED WITH 37374 DISPLAYED.
STEP THE MAINT STEP SWITCH THREE TIMES.
37003 SHOULD NOW BE DISPLAYED.
STEP THE MAINT STEP SWITCH ONE MORE TIME.
THE ADDRESS DISPLAYED SHOULD BE OF THE NEXT HALT INSTRUCTION +2.
CLEAR THE MICRO-BREAK SWITCH.
THE PROGRAM IS FINISHED.

002236	012737	000374	177770	MOV	8374,2#UBREAK	;LOAD 374 INTO THE MICRO-BREAK REGISTER
002244	000005			RESET		;PROCESSOR SHOULD STOP DURING THIS INSTRUCTION
002246	012737	000003	177770	MOV	83,2#UBREAK	;LOAD 3 INTO THE MICRO-BREAK REGISTER
002254	012701	004000		MOV	8400,R1	
002260	012737	004004	004000	MOV	84004,2#4000	
002266	010031			MOV	RO,2(R1)+	;PROCESSOR SHOULD HALT DURING THIS INSTRUCTION
002270	000000			HALT		;TEST IS COMPLETE

002272 005037 177560
002276 005037 177562
002302 000002

TTYINT: CLR 00TKS ;CLEAR THE INTERRUPT
CLR 00TKB ;CLEAR KEYBOARD BUFFER
RTI

002304 000777
002306 000207

LOOP: BR
RTS PC

002310 000001
002312 000207

WAIT: WAIT ;WAIT FOR TELETYPE INTERRUPT
RTS PC

002314 042523 020124 042101
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

:MESSAGES
INST1: .ASCIZ 'SET ADRS SEL SWITCH TO CONSOLE PHYS POSIT'<15><12>

002370 042523 020124 042101
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

INST2: .ASCIZ 'SET ADRS SEL SWITCH TO PROGRAM PHYS POSIT'<15><12>

002444 051440 047510 046125
002452 020104 042502 042040
002460 051511 046120 054501
002466 042105 044440 020116
002474 044124 020105 042101
002502 051104 051505 020123
002510 044514 044107 051524
002516 005015 000

LIGHTS: .ASCIZ ' SHOULD BE DISPLAYED IN THE ADDRESS LIGHTS'<15><12>

002521 123 051124 045511
002526 020105 047101 020131
002534 042524 042514 054524
002542 042520 045440 054505
002550 053440 042510 020116
002556 042522 042101 020131
002564 047524 050040 047522
002572 042503 042504 005015
002600 000

MES1: .ASCIZ /STRIKE ANY TELETYPE KEY WHEN READY TO PROCEED/<15><12>

002601 015 000012
000001

CRLF: .ASCIZ <15><12>
.END

A	= 000200	304#							
AC0	= 0000000	208#							
AC1	= 0000001	209#							
AC2	= 0000002	210#							
AC3	= 0000003	211#							
AC4	= 0000004	212#							
AC5	= 0000005	213#							
AVA	= 020000	296#							
BEGIN	001116	534#							
BIT13	= 020000	271#							
BIT14	= 040000	270#							
BIT15	= 100000	269#							
BIT6	= 000100	273#							
BIT8	= 000400	272#	513						
C	= 000001	221#							
CHARPT	001542	597#	603	611#					
CHK1	001652	593	651#						
CRLF	002601	892#							
DISPLA	= 177570	260#	534#						
DM	= 000400	292#							
DM1	= 174000	321#							
DM2	= 170000	322#							
DM3	= 000000	323#							
DM4	= 000400	324#							
DM5	= 001000	325#							
DM6	= 001400	326#							
DM7	= 002000	327#							
DM8	= 002400	328#							
DM9	= 003000	329#							
DM0	= 003400	330#							
DS	= 000020	286#							
DWN	= 000010	303#							
D0	= 000000	318#							
D1	= 004000	319#							
D2	= 010000	320#							
D2BTYP	001562	621#	782						
ED	= 000010	301#							
ENTVEC	= 000030	243#	479						
ENVM	= 000001	277#							
ERRVEC	= 000004	238#	477	497					
FPVEC	= 000244	247#							
HLT	= 000000	462#	719	722	725	728	731	734	
IC	= 000200	291#							
ICNT	001000	521#	533#	534					
INST1	002314	798	858#						
INST2	002370	784	866#						
IOTVEC	= 000020	241#							
IS	= 000000	287#							
KOE	= 000004	335#	539						
KOPAR0	= 172360	442#	572#						
KOPAR1	= 172362	443#	575#						
KOPAR2	= 172364	444#							
KOPAR3	= 172366	445#							
KOPAR4	= 172370	446#							
KOPAR5	= 172372	447#							
KOPAR6	= 172374	448#							

ADD	496	598	607	627	781	801												
ASR	511																	
BEO	495	514	718	721	724	727	730	733										
BIC	492	606																
BIS	599																	
BIT	513	595																
BNE	596	605	639															
BPL	629																	
BR	852																	
CLR	502	505	533	538	546	549	553	571	572	624	631	716	775	794	809			
	848	849																
CMP	717	720	723	726	729	732												
DEC	638																	
ENT	463																	
HALT	462	476	483	652	744	813	844											
INC	743																	
IOT	464																	
JMP	488	497	498	593	778													
JSR	783	785	787	788	790	791	793	796	797	799	802	803	805	806	808			
	811																	
MOV	503	504	506	507	508	509	534	535	537	539	547	548	551	552	557			
	558	559	560	561	562	563	564	565	566	567	568	569	573	575	576			
	577	578	579	580	586	587	588	589	590	591	597	603	610	616	617			
	618	619	620	623	630	640	641	642	643	651	741	767	768	774	776			
	777	780	782	786	795	800	810	838	840	841	842	843						
MOV8	515	609																
MTPD	510	512																
NOP	532	545																
RESET	839																	
ROL	625	626	632	633	634	635	636	637										
RTI	608	612	850															
RTS	600	644	853	856														
RTT	516																	
SOB	550	554																
SUB	493	812																
TST	494																	
TSTB	604	628																
WAIT	855																	
.ABS	186																	
.ASCIZ	858	866	874	882	992													
.END	893																	
.LIST	185	467	476	663	672	681	690	699	708									
.MACR	467																	
.NLIST	184	467	468	476	663	672	681	690	699	708								
.PAGE	528	647	712	736	759	813	848											
.REM	1																	
.REPT	476																	
.TITLE	187																	
.WORD	478	480	621															

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

TEST DCKBQ-B CONSOLE TEST
DCKBQA.SRC

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CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

D03
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* ,DCKBQB/CRF/SOL/PAGNUM:1=DCKBQB.DOC,DCKBQA.SRC
RUN-TIME: 3 4 1 SECONDS
RUN-TIME RATIO: 75/9=7.7
CORE USED: 8K (15 PAGES)

