

PDP11/45

MFPD/I W/MEMORY MANAGEMENT
MD-11-DCKTE-B

EP DCKTE B DL-A

OCT 1976

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FICHE 1 OF 1

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POP11 45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 1
DCKTEB.P11

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.REM X
.SPACING 1
.LEFT MARGIN 8
.RIGHT MARGIN 70
.FIGURE 12
.CENTER
IDENTIFICATION
.BLANK 2
.TAB STOPS 32
PRODUCT CODE: MAINDEC-11-DCKTE-B-D
.BLANK 1
PRODUCT NAME: MFPD/I WITH MEMORY MANAGEMENT
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DATE CREATED: 15 MARCH 1972
.BLANK 1
MAINTAINER: DIAGNOSTIC GROUP
.BLANK 1
AUTHOR: JOHN ADAMS
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 .TAB STOPS 8
 .INDENT -8
 1.0 ABSTRACT
 .BLANK 1
 PROGRAM DCKTE TESTS THE MFPO AND MFPI INSTRUCTIONS WITH MEMORY
 MANAGEMENT ENABLED. (SEE PROG DCKBO FOR TESTS OF THESE INSTRUCTIONS
 WITHOUT MEM MGMT. THESE INSTRUCTIONS ARE EXECUTED IN ALL
 COMBINATIONS OF CURRENT MODES AND EQUAL OR LOWER HIERARCHY PREVIOUS
 MODES.
 .BLANK 1
 .INDENT -8
 2.0 REQUIREMENTS
 .BLANK 1
 .INDENT -8
 2.1 EQUIPMENT
 .BLANK 1
 POP-11/45 WITH KT11-C (MEM. MGMT) OPTION INSTALLED
 .BLANK 1
 .INDENT -8
 2.2 STORAGE
 .BLANK 1
 PROGRAM STORAGE - THE ROUTINE USES MEMORY 0-17777
 .BLANK 1
 .INDENT -8
 3.0 LOADING AND STARTING PROCEDURE
 .BLANK 1
 LOAD PROGRAM INTO MEMORY USING ABS LOADER
 .BREAK
 LOAD ADDRESS 200
 .BREAK
 PRESS START.
 .BREAK
 THE PROGRAM WILL LOOP AND RING BELL ON COMPLETION.
 .BREAK
 PASS COUNT MAY BE MONITORED IN THE DISPLAY REGISTER.
 .BLANK 1
 .INDENT -8
 4.0 SWITCH SETTINGS
 .BLANK 1
 .LEFT MARGIN 16
 SW8 = 1 OR UP LOAD POP11/45 MICRO BREAK REGISTER
 .BREAK
 SW7-SW0 VALUE TO BE LOADED
 .LEFT MARGIN 8
 .INDENT -8
 5.0 SUBROUTINE ABSTRACTS
 .BLANK 1
 .INDENT -8
 5.1 HLT
 .BLANK 1
 THE HLT (HALT) INSTRUCTION IS EXECUTED WHEN AN ERROR IS DETECTED.
 THE HLT (HALT) INSTRUCTION TRAPS TO LOC 4 IN SUPERVISORY/USER MODE.
 IF A HLT (HALT) INSTRUCTION IS EXECUTED IN THESE MODES THE TRAP IS
 TAKEN AND THE PROGRAM RETURNS TO THE HLT IN KERNEL MODE AND HALTS.
 PRESSING CONTINUE RESTARTS THE TEST.

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POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 3
DCKTEB.P11

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.BREAK

NOTE: THE SUPERVISORY/USER STACK POINTERS ARE NOT AFFECTED.
FURTHER TESTING SHOULD NOT BE CONTINUED (BY PRESSING CONTINUE).
THE PROGRAM SHOULD BE RESTARTED EITHER AT THE PREVIOUS SCOPE
OR AT 200.

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 .INDENT -8
 5.2 SCOPE
 .BLANK 1
 THE SCOPE (ENT) SERVICE ROUTINE STORES IN R1 THE PC OF THE LAST TEST SUCCESSFULLY EXECUTED AND MAY BE USED AS AN AID IN DEBUGGING IF THE PROGRAM 'BOMBS' BECAUSE OF A HARDWARE FAILURE. A BRANCH INSTRUCTION MAY BE INSERTED AT THE SCOPE LOCATION TO THE PREVIOUS SCOPE (ENT) INSTRUCTION TO CONTINUOUSLY LOOP A TEST. ADDITIONALLY THE SCOPE ROUTINE SETS ALL STACK POINTERS TO THEIR INITIAL SETTINGS (SEE SEC 8.2) AND ENTERS EACH TEST IN KERNEL MODE, PREVIOUS KERNEL MODE. THE SCOPE ROUTINE ALSO CONTAINS INSTRUCTIONS TO LOAD THE MICRO BREAK REGISTER (SEE SEC 4.0 FOR SWITCH SETTINGS). ALL TESTS MAY BE RESTARTED AT THE PREVIOUS SCOPE.
 .BLANK 1
 .INDENT -8
 6.0 ERRORS
 .BLANK 1
 THE TEST HALTS WHEN AN ERROR IS DETECTED AND DISPLAYS THE PC+2 OF THE HLT (HALT) INSTRUCTION IN THE ADDRESS LIGHTS.
 .BLANK 1
 .INDENT -8
 6.1 ERROR RECOVERY
 .BLANK 1
 PRESS CONTINUE OR RESTART AT 200 OR PREVIOUS SCOPE.
 .BLANK 1
 .INDENT -8
 6.2 ERROR LOOPING
 .BLANK 1
 TO LOOP ON AN ERROR REPLACE THE HLT INSTRUCTION WITH A BRANCH BACK TO THE PREVIOUS SCOPE. NOTE: IF THE ERROR IS INTERMITTENT THE TEST WILL DROP THROUGH THE HLT AND CONTINUE TO THE NEXT TEST.
 .BLANK 1
 .INDENT -8
 6.3 MEMORY MANAGEMENT ABORT ERRORS
 .BLANK 1
 IF AN ABORT OCCURS (EXCEPT WHEN A TEST EXPECTS AN ABORT) THE PROGRAM WILL TRAP. THE TRAP SERVICE ROUTINE SAVES THE CONTENTS OF SRC IN LOCATION SSR0T, CLEARS SR0, JUMPS TO LOCATION 252 AND HALTS. TO DETERMINE WHICH TEST CAUSED THE ABORT EITHER EXAMINE THE KERNEL STACK OR EXAMINE R1 (R1 CONTAINS THE PC OF THE FIRST INSTRUCTION IN THE TEST), OR EXAMINE SR2 WHICH CONTAINS THE ADDRESS OF THE INSTRUCTION THAT CAUSED THE ABORT.
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129 .BLANK 1
130 .INDENT -8
131 7.0 RESTRICTIONS
132 .BLANK 1
133 .INDENT -8
134 7.1 STARTING RESTRICTION
135 .BLANK 1
136 NONE
137 .BLANK 1
138 .INDENT -8
139 7.2 OPERATIONAL RESTRICTION
140 .BLANK 1
141 NONE
142 .BLANK 1
143 .INDENT -8
144 8.0 MISCELLANEOUS
145 .BLANK 1
146 IF THE PROGRAM HALTS IN THE TRAP/INTERRUPT VECTOR AREA (0-100),
147 EXAMINE REGISTER 6 (THE KERNEL STACK PTR). R6 CONTAINS THE ADDRESS
148 WHERE THE PC OF THE INSTRUCTION THAT CAUSED THE TRAP/ABORT IS STORED.
149 SEE ALSO R1 TO DETERMINE THE PC OF THE LAST TEST SUCCESSFULLY
150 COMPLETED.
151 .BLANK 1
152 8.1 NOTE THAT THE PROGRAM TAGS EACH MFPD/I INSTRUCTION UNDER TEST.
153 THE TAG DENOTES CURRENT SPACE, 'PREVIOUS' SPACE AND WHETHER
154 MFPD/I. FOR EXAMPLE:
155 .BLANK 1
156 .LEFT MARGIN 12
157 .INDENT -4
158 1) KU14:
159 .INDENT -4
160 2) SS17:
161 .BLANK 1
162 .INDENT -4
163 DENOTE:
164 .BLANK 1
165 .INDENT -4
166 1) 'CURRENT' KERNEL MODE, 'PREVIOUS' USER MODE, MFPD
167 .INDENT -4
168 2) 'CURRENT' SUPERVISOR MODE, 'PREVIOUS' SUPERVISOR MODE, MFPI
169 .BLANK 1
170 .LEFT MARGIN 8
171 NOTE ALSO THAT MEM. MGMT IS ENABLED ONLY WHEN THE MFPD/I
172 INSTRUCTION BEING TESTED IS EXECUTED AND IS OFF AT ALL OTHER
173 TIMES.
174 .BREAK
175 FINAL DATA IS STORED IN 'PREVIOUS' 'I' OR 'D' ADDRESS SPACE.
176 .PAGE

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.BLANK 1
.INDENT -8
8.2 STACK POINTER
.BLANK 1
THE STACK POINTERS ARE INITIALLY SET TO THE FOLLOWING VALUES
.LEFT MARGIN 16
KERNEL = 1060
.BREAK
SUPERVISOR = 700
.BREAK
USER = F600
.BLANK 1
.LEFT MARGIN 8
AND ARE RESET TO THESE VALUES AT THE START OF EACH SUBTEST (BY SCOPE).
.BLANK 1
.LEFT MARGIN 8
.INDENT -8
8.3 PASS COUNT
.BLANK 1
1000(8) PASSES ARE REQUIRED FOR COMPLETION OF THIS PROGRAM; AT
WHICH TIME THE BELL WILL RING AT THE TTY. THE PASS COUNT MAY BE
OBSERVED BY TURNING THE SWITCH TO THE DISPLAY POSITION. THE PASS
COUNT SHOULD BE MONITORED IN THE EVENT THAT THE PROGRAM ENTERS
AN UNDEFINED LOOP.
.BLANK 1
.INDENT -8
8.4 DEBUGGING TIPS
.BLANK 1
WHEN THE FAILING SUBTEST HAS BEEN ISOLATED, REPLACE THE FIRST
WORD OF THE MFPD/I INSTRUCTION WITH A BR SELF (000777), AND
START THE SUBTEST AT THE PREVIOUS SCOPE. STOP THE PROGRAM
(SINGLE INSTRUCTION) AND RESTORE THE REPLACED INSTRUCTION;
USING THE MAINTENANCE CARD SINGLE STEP THE FAILING INSTRUCTION
THROUGH EACH MICRO STATE OBSERVING THE FLOW IN THE DATA/ADDRESS
LIGHTS. THIS PRACTICE HAS BEEN FOUND TO BE SUCCESSFUL IN
FINDING MOST MEMORY MANAGEMENT ERRORS.
IN THE BREAD BOARD.
.BLANK 1
.INDENT -8
8.5 MEMORY MANAGEMENT MEMORY MAP
.BLANK 1
THE MAPPING OF THE MEM MGMT REGISTERS IS DONE AT THE
BEGINNING OF THE PROGRAM BEFORE ANY TESTING IS STARTED. THIS
MAP IS CHANGED TWICE, WHEN THE PROGRAM BEGINS TESTS IN SUPER-
VISORY MODE, AND AGAIN WHEN THE PROGRAM BEGINS TESTS AT USER
MODE. THE USER SHOULD ACQUAINT HIMSELF WITH THE MEM. MGMT
MAP BEFORE USING THIS PROGRAM.
.PAGE
.FIGURE 15
.PAGE
.BREAK
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229

X

.NLIST SEQ

.LIST ME

.ABS

.TITLE POP11/45 MEMORY MANAGEMENT TEST DCKTE-B

;COPYRIGHT 1972. DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS.

;MEMORY MANAGEMENT TEST-DKTEA. THIS TEST TESTS THE MFPI AND MFPO INST-
;RUCTIONS IN ALL COMBINATIONS OF CURRENT MODE AND EQUAL OR LOWER HEIRARCHY
;PREVIOUS MODES WITH MEMORY MANAGEMENT ENABLED.

;GENERAL REGISTER ASSIGNMENTS

000000
000001
000002
000003
000004
000005
000007
000000
000001
000002
000003
000004
000005

R0=%0

R1=%1

R2=%2

R3=%3

R4=%4

R5=%5

PC=%7

R10=%0

R11=%1

R12=%2

R13=%3

R14=%4

R15=%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
000014
000020
000030
000034
000064
000240
000250

ERRVEC=4

TBITVEC=14

IOTVEC=20

EMTVEC=30

TRAPVEC=34

TPVEC=64

PIRVEC=240

MMVEC=250

;ADDRESS OF ERROR VECTOR

;ADDRESS OF 'T' BIT TRAP VECTOR

;ADDRESS OF IOT VECTOR

;ADDRESS OF EMT VECTOR

;ADDRESS OF TRAP VECTOR

;ADDRESS OF TTY PRINTER INTERRUPT VECTOR

;ADDRESS OF PIRQ VECTOR

;ADDRESS OF MEM MGMT ERROR TRAP


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;REGISTER ADDRESSES
177776 PSW=177776 ;ADDRESS OF STATUS REGISTER
177774 SLR=177774 ;ADDRESS OF STACK LIMIT REGISTER
177772 PIRQ=177772 ;ADDRESS OF PROGRAM INTERRUPT REQUEST
177770 LBREAK=177770 ;ADDRESS OF MICRO BREAK REGISTER
177560 TKS=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 SWR=177570 ;ADDRESS OF CONSOL SWITCH REGISTER
177570 LIGHTS=177570 ;ADDRESS OF CONSOL LIGHT REGISTER

;INITIAL STACK POINTER SETTINGS
001060 KPTR=1060 ;BOTTOM OF KERNEL STACK
000700 SPTR=700 ;SUPERVISORY STACK SETTING
000600 UPTR=600 ;USER STACK SETTING

;*****NOTE*****
;THE KERNEL SUPERVISOR & USER STACK POINTER ARE AT PHYSICAL 1060, 0700 & 0600
;*****

;MISCELLANEOUS BIT ASSIGNMENTS
100000 BIT15=100000
040600 BIT14=40000
020000 BIT13=20000
000400 BIT8=400
000100 BIT6=100
010000 PIR4=10000 ;LEVEL 4 PROGRAM INT. ROST.

;MEMORY MANAGEMENT REGISTER SRO BIT ASSIGNMENTS
000001 ENMM=1 ;ENABLE MEMORY MANAGEMENT
000000 VP0=0 ;VIRTUAL PAGE 0
000002 VP1=2 ;ETC
000004 VP2=4
000006 VP3=6
000010 VP4=10
000012 VP5=12
000014 VP6=14
000016 VP7=16
000020 DS=20 ;'D' SPACE
000000 IS=00 ;'I' SPACE
000140 UPG=140 ;USER PAGE
000040 SPG=40 ;SUPERVISOR PAGE
000000 KPG=000 ;KERNEL PAGE
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 AVA=20000 ;ACCESS VIOLATION ABORT
040000 PLA=40000 ;PAGE LENGTH ABORT
100000 NRA=100000 ;NON-RESIDENT ABORT

;SEGMENT DESCRIPTOR REGISTER (PDR) BIT ASSSIGNMENTS
000010 ED=10 ;EXPANSION DIRECTION BIT IN PDR
000000 UP=0 ;EXPAND UP

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000010
000200
000100DWN=10
ABIT=200
MBIT=100;EXPAND DOWN
; 'A' BIT IN PDR
; 'W' BIT IN PDR

;SR1 BIT ASSIGNMENTS

000010
000020
000370
000360
000000
000400
001000
001400
002000
002400
003000
003400INC1=10
INC2=20
DEC1=370
DEC2=360
DR0=000
DR1=400
DR2=1000
DR3=1400
DR4=2000
DR5=2400
DR6=3000
DR7=3400

;SR3 BIT ASSIGNMENTS

000001
000002
000004UDE=1
SDE=2
KDE=4;USER 'D' SPACE ENABLE
;SUPERVISOR 'D' SPACE ENABLE
;KERNEL 'D' SPACE ENABLE

;SEGMENTATION REGISTER ADDRESS ASSIGNMENTS

177572
177574
177576
172516SR0=177572
SR1=177574
SR2=177576
SR3=172516;ADDRESS OF SEGMENTATION REGISTER SR0
; " " " " SR1
; " " " " SR2
; " " " " SR3177600
177602
177604
177606
177610
177612
177614
177616UIPOR0=177600
UIPOR1=177602
UIPOR2=177604
UIPOR3=177606
UIPOR4=177610
UIPOR5=177612
UIPOR6=177614
UIPOR7=177616177620
177622
177624
177626
177630
177632
177634
177636UDPOR0=177620
UDPOR1=177622
UDPOR2=177624
UDPOR3=177626
UDPOR4=177630
UDPOR5=177632
UDPOR6=177634
UDPOR7=177636177640
177642
177644
177646
177650
177652
177654
177656UIPAR0=177640
UIPAR1=177642
UIPAR2=177644
UIPAR3=177646
UIPAR4=177650
UIPAR5=177652
UIPAR6=177654
UIPAR7=177656

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PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 10
DCKTEB.P11177660
177662
177664
177666
177670
177672
177674
177676UDPAR0=177660
UDPAR1=177662
UDPAR2=177664
UDPAR3=177666
UDPAR4=177670
UDPAR5=177672
UDPAR6=177674
UDPAR7=177676172200
172202
172204
172206
172210
172212
172214
172216SIPDR0=172200
SIPDR1=172202
SIPDR2=172204
SIPDR3=172206
SIPDR4=172210
SIPDR5=172212
SIPDR6=172214
SIPDR7=172216172220
172222
172224
172226
172230
172232
172234
172236SDPOR0=172220
SDPOR1=172222
SDPOR2=172224
SDPOR3=172226
SDPOR4=172230
SDPOR5=172232
SDPOR6=172234
SDPOR7=172236172240
172242
172244
172246
172250
172252
172254
172256SIPAR0=172240
SIPAR1=172242
SIPAR2=172244
SIPAR3=172246
SIPAR4=172250
SIPAR5=172252
SIPAR6=172254
SIPAR7=172256172260
172262
172264
172266
172270
172272
172274
172276SDPAR0=172260
SDPAR1=172262
SDPAR2=172264
SDPAR3=172266
SDPAR4=172270
SDPAR5=172272
SDPAR6=172274
SDPAR7=172276172300
172302
172304
172306
172310
172312
172314
172316KIPDR0=172300
KIPDR1=172302
KIPDR2=172304
KIPDR3=172306
KIPDR4=172310
KIPDR5=172312
KIPDR6=172314
KIPDR7=172316

172320

KDPR0=172320

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

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

172360	KDPAR0=172360
172362	KDPAR1=172362
172364	KDPAR2=172364
172366	KDPAR3=172366
172370	KDPAR4=172370
172372	KDPAR5=172372
172374	KDPAR6=172374
172376	KDPAR7=172376

177600	UIPDR=177600
177620	UDPDR=177620
177640	UIPAR=177640
177660	UDPAR=177660
172200	SIPDR=172200
172220	SDPDR=172220
172240	SIPAR=172240
172260	SDPAR=172260
172300	KIPDR=172300
172320	KDPDR=172320
172340	KIPAR=172340
172360	KDPAR=172360

000000	;ACCESS CONTROL FIELD DEFINITIONS (IN PDR)	
000001	NR0=0	;NON-RESIDENT ABORT ALL REFS.
000002	RDOT=1	;TRAP ON READ,ABORT ON WRITE
000003	RDO=2	;READ,ABORT ON WRITE
000004	NR3=3	;UNUSED ABORT ALL
000005	RWT=4	;TRAP ON READ & WRITE
000006	RWTW=5	;READ,TRAP ON WRITE
000007	PW=6	;READ & WRITE
	NR7=7	;ABORT ALL

000240	;INSTUCTION EQUATES	
000000	NOP=240	
104000	HLT=HALT	
	SCOPE=EMT	;SCOPE IS AN EMT INSTRUCTION

;LOAD TRAP/INTERRUPT VECTOR AREA 0-1000 WITH

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PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 12
DCKTEB.P11

;
+2
HALT
;CAUSES UNEXPECTED TRAPS/INTERRUPTS TO HALT AT VECTOR ADDRESS +2
;NOTE: LISTING DOES NOT REFLECT THIS LOAD

000004	000004			.NLIST MC,MD,SEQ	
	000400			.LIST ME	
	000030			.=ERRVEC	
	000440			.WORD SHLT	
	000046			.=EMTVEC	
000030	000440			.WORD SCOPEA	
	000046			.=46	
000046	015332			SENDAD	
	000052			.=52	
000052	040000			40000	
	000250			.=MMVEC	
000250	000520			.WORD MMERR	
	000200			.=200	
000200	000167	000664		JMP START	;GO START TEST
	000400			.=400	
				;ROUTINE TO CATCH HLT (HALT) TRAP (IN SUPER & USER MODES) AND RETURN PRO-	
				;GRAM TO HLT INSTRUCTION IN KERNEL MODE.	
000400	042737	000001	177572	SHLT: BIC	#1,2(SRO)
000406	162716	000002		SUB	-2,(KSP)
000412	005776	000000		TSZ	-2(KSP)
000416	001404			BEG	SHLTA
000420	062716	000002		ADD	2,(KSP)
000424	000137	000006		JMP	206
000430	042766	140000	000002	SHLTA: BIC	#UM,2(KSP)
000436	000006			RTT	
				;NO	
				;GO HALT AT 6	
				;SET UP TO RETURN IN KERNEL MODE	
				;RETURN IN KERNEL MODE	
				;SCOPE (EMT) TRAP SERVICE	
000440	011601			SCOPEA: MOV	(KSP),R1
000442	012706	001060		MOV	#KPTR,KSP
000446	005046			CLR	-(KSP)
000450	010146			MOV	R1, -(KSP)
000452	012746	000700		MOV	#SPTR, -(KSP)
000456	012746	000600		MOV	#UPTR, -(KSP)
000462	012767	030000	177306	MOV	#PUM,PSW
000470	106606			MTPD	USP
000472	006267	177300		ASR	PSW
000476	106606			MTPD	SSP
000500	032767	000400	177062	BIT	#BIT8,SWR
000506	001403			BEG	SCOPEX
000510	116767	177054	177252	MOVB	SWR,UBREAK
000516	000006			SCOPEX: RTT	
				;MOV SR 0-7 INTO MICRO BREAK REG.	
				;RETURN IN KERNEL MODE	
				;MEMORY MANAGEMENT ERROR TRAP SERVICE	
000520	013767	177572	000254	MMERR: MOV	2(SRO),SROT
000526	042737	177776	177572	BIC	#177776,2(SRO)
000534	000137	000252		JMP	2(MMVEC)+2
				;GO HALT AT 252	
	001000			.=1000	
				;TAGS	
001000	000000			ICNT:	0
001002	000000			SROT:	0
				;CONTAINS PASS COUNT	
				;CONTAINS SRO CONTENTS ON ERROR	

NO1

POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 13
DCKTEB.P11

001004
001012
001070

TEMP=.
.=.+6
.=1070


```

: START MEMORY MANAGEMENT TEST
001070 000240
001072 005067 177702      START:  NOP
                                CLR      ICNT      ; CLEAR PASS COUNT

001076 016737 177676 177570 BEGIN:  MOV      ICNT, 2*LIGHTS      ; DISPLAY PASS COUNT
001104 012706 001060      MOV      KKPTR, KSP      ; SET KERNEL STACK PTR
001110 104000      SCOPE
001112 012737 000520 000250      MOV      KMMERR, 2*MMVEC
001120 012737 000400 177774      MOV      #400, 2*SLR      ; SET STACK LIMIT = 1000
001126 012737 000007 172516      MOV      KUDE+SOE+KDE, 2*SR3

: ROUTINE TO CLEAR MEMORY MANAGEMENT REGISTERS.
001134 000240      SEGO:  NOP
001136 005037 177572      CLR      2*SR0
001142 012702 177600      MOV      KUIPDR0, R2
001146 012703 000040      MOV      #40, R3
001152 005022      CLR      (R2)+
001154 077302      SOB      R3, -2
001156 012702 172200      MOV      KSIIPDR0, R2
001162 012703 000100      MOV      #100, R3
001166 005022      CLR      (R2)+
001170 077302      SOB      R3, -2

: ROUTINE TO SET UP MEMORY MANAGEMENT REGISTERS FOR TESTS
001172
001172 012737 073006 172300      MOV      #167*256, -400+UP+RW, 2*KIPDR0      ; LOAD KIPDR0 RW UP 167 BLOCKS
001200 012737 004006 172320      MOV      #11*256, -400+UP+RW, 2*KKPDR0      ; LOAD KKPDR0 RW UP 11 BLOCKS
001206 012737 000006 172334      MOV      #1*256, -400+UP+RW, 2*KKPDR6      ; LOAD KKPDR6 RW UP 1 BLOCKS
001214 012737 077406 172336      MOV      #128*256, -400+UP+RW, 2*KKPDR7      ; LOAD KKPDR7 RW UP 128 BLOCKS
001222 012737 000006 172222      MOV      #1*256, -400+UP+RW, 2*KSOPDR1      ; LOAD SOPDR1 RW UP 1 BLOCKS
001230 012737 000006 172204      MOV      #1*256, -400+UP+RW, 2*KSIPDR2      ; LOAD SIPDR2 RW UP 1 BLOCKS
001236 012737 000006 177630      MOV      #1*256, -400+UP+RW, 2*KUOPDR4      ; LOAD UOPDR4 RW UP 1 BLOCKS
001244 012737 000006 177612      MOV      #1*256, -400+UP+RW, 2*KUIPDR5      ; LOAD UIPDR5 RW UP 1 BLOCKS
001252 005067 171062      CLP      KIPAR0      ; VA=PA=0000-12077
001256 005067 171076      CLP      KKPDR0      ; VA=PA=0-1077
001262 012767 000167 171104      MOV      #167, KDPAR6      ; VA=140000-140077; PA=16700-16777
001270 012767 007600 171100      MOV      #7600, KDPAR7      ; VA=160000-177776; PA=760000-777776
                                ; (I/O PAGE)
001276 012767 000170 170740      MOV      #170, SIPAR2      ; VA=40000-40077/PA=17000-17077 (SUPER I SPACE)
001304 012767 000171 170750      MOV      #171, SOPAR1      ; VA=20000-20077/PA=17100-17177 (SUPER D SPACE)

001312 012767 000172 176332      MOV      #172, UIPARS      ; VA=120000-120077/PA=17200-17277 (USER I SPACE)
001320 012767 000173 176342      MOV      #173, UOPAR4      ; VA=100000-100077/PA=17300-17377 (USER D SPACE)
001326 000400      BR      KKOA      ; GO START TEST

```

140000
016700;TEST MFPD INSTRUCTION KERNEL MODE PREVIOUS KERNEL MODE.
VIRT=140000 ;KERNEL VIRTUAL 'D' ADDRESS FOR THESE TESTS
PHYS=16700 ;CORRESPONDING KERNEL PHYSICAL 'D' ADDRESS

;TEST THAT MFPD CAN GET DATA FROM A GENERAL REGISTER (R3)

001330
001330 012767 000340 176440
001336 005066 177776
001342 012703 177777
001346 005237 177572
001352 106503
001354 016702 176416
001360 005037 177572
001364 122702 000350
001370 001401
001372 000000
001374 022706 001056
001400 001401
001402 000000
001404 005216
001406 001401
001410 000000
001412 104000

KK0A: MOV @PRTY7,PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!
CLR -2(KSP)
MOV @-1,R3 ;PRESET GENERAL REGISTER
INC @SRO ;ENABLE SEG
MFPD R3 ;--(KSP)+R3
MOV PSW,R2 ;SAVE CC'S
CLR @SRO ;DISABLE SEG
CMPB @PRTY7+N,R2 ;CHECK CC'S
BEQ .+4
HLT ;ERROR! INCORRECT CC'S AFTER MFPD
CMP @KPTR-2,KSP ;CHECK THAT STACK WAS PUSHED
BEQ .+4
HLT ;ERROR! INCORRECT STACK PTR
INC (KSP) ;CHECK RESULT
BEQ .+4
HLT ;ERROR! INCORRECT RESULT
SCOPE

;TEST THAT MFPD CAN GET DATA FROM A KERNEL VIRTUAL 'D' ADDRESS
;DM=1

001414 005067 176356
001420 005066 177776
001424 012702 140000
001430 012737 177777 016700
001436 005237 177572
001442 000277
001444 106512
001446 016703 176324
001452 005037 177572
001456 122703 000011
001462 001401
001464 000000
001466 022706 001056
001472 001401
001474 000000
001476 005216
001500 001401
001502 000000
001504 104000

KK1: CLR PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!
CLR -2(KSP)
MOV @VIRT,R2 ;R2=VIRTUAL ADDRESS
MOV @-1,@PHYS ;PRESET PHYSICAL ADDRESS
INC @SRO ;ENABLE SEG
SCC ;PRESET CC'S
MFPD (R2) ;--(KSP)+(R2)
MOV PSW,R3 ;SAVE CC'S
CLR @SRO ;DISABLE SEG
CMPB @N+C,R3 ;CHECK CC'S
BEQ .+4
HLT ;ERROR! INCORRECT CC'S
CMP @KPTR-2,KSP ;CHECK THAT STACK WAS PUSHED
BEQ .+4
HLT ;ERROR! INCORRECT STACK PTR
INC (KSP) ;CHECK RESULT
BEQ .+4
HLT ;ERROR! INCORRECT RESULT
SCOPE

;DM=2

001506 012767 004000 176262
001514 012766 177777 177776
001522 012702 140000
001526 005037 016700
001532 005237 177572
001536 106522
001540 005037 177572
001544 005716
001546 001401

KK2: MOV @REG,PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!
MOV @-1,-2(KSP)
MOV @VIRT,R12 ;R12=VIRTUAL ADDRESS
CLR @PHYS ;PRESET PHYSICAL ADDRESS
INC @SRO ;ENABLE SEG
MFPD (R12)+ ;--(KSP)+VIRT
CLR @SRO ;DISABLE SEG
TST (KSP) ;CHECK RESULT
BEQ .+4

001550	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
001552	022702	140002		CMP	#VIRT+2,R12	;CHECK AUTO INCREMENT
001556	001401			BEQ	.+4	
001560	000000			HLT		;ERROR! AUTO INCREMENT FAILED
001562	005067	176210		CLR	PSW	
001566	104000			SCOPE		
;DM=3						
001570	005067	176202		CLR	PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
001574	005066	177776		CLR	-2(KSP)	
001600	012702	140000		MOV	#VIRT,R2	;LOAD INDIRECT ADDRESS
001604	012737	140002	016700	MOV	#VIRT+2,2#PHYS	;LOAD ADDRESS
001612	012737	177777	016702	MOV	#-1,2#PHYS+2	;PRESET DATA
001620	005237	177572		INC	2#SR0	;ENABLE SEG
001624	106532			MFPD	2(R2)+	;- (KSP)+VIRT
001626	005037	177572		CLR	2#SR0	;DISABLE SEG
001632	005216			INC	(KSP)	;CHECK RESULT
001634	001401			BEQ	.+4	
001636	000000			HLT		;ERROR! INCORRECT RESULT
001640	104000			SCOPE		
;DM=4						
001642	005067	176130		CLR	PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
001646	012766	177777	177776	MOV	#-1,-2(KSP)	
001654	012704	140002		MOV	#VIRT+2,R4	;R4=VIRTUAL ADDRESS 2
001660	005037	016700		CLR	2#PHYS	;PRESET PHYSICAL ADDRESS DATA
001664	005237	177572		INC	2#SR0	;ENABLE SEG
001670	106544			MFPD	-(R4)	;- (KSP)+VIRT
001672	005037	177572		CLR	2#SR0	;DISABLE SEG
001676	022704	140000		CMP	#VIRT,R4	;CHECK AUTO-DECREMENT
001702	001401			BEQ	.+4	
001704	000000			HLT		;ERROR! AUTO-DECREMENT FAILED
001706	005716			TST	(KSP)	;CHECK RESULT
001710	001401			BEQ	.+4	
001712	000000			HLT		;ERROR! INCORRECT RESULT
;DM=5						
001714	012767	004000	176054	MOV	#REG,PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
001722	005066	177776		CLR	-2(KSP)	
001726	012700	140002		MOV	#VIRT+2,R10	;R10=INDIRECT ADDRESS
001732	012737	140004	016700	MOV	#VIRT+4,2#PHYS	;LOAD ADDRESS
001740	012737	177777	016704	MOV	#-1,2#PHYS+4	;PRESET PHYSICAL ADDRESS DATA
001746	005237	177572		INC	2#SR0	;ENABLE SEG
001752	106550			MFPD	2-(R10)	;- (KSP)+VIRT+4
001754	005037	177572		CLR	2#SR0	;DISABLE SEG
001760	005216			INC	(KSP)	;CHECK RESULT
001762	001401			BEQ	.+4	
001764	000000			HLT		
001766	005067	176004		CLR	PSW	
001772	104000			SCOPE		
;DM=6						
001774	012767	004000	175774	MOV	#REG,PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
002002	012766	177777	177776	MOV	#-1,-2(KSP)	
002010	012702	000002		MOV	#2,R12	;LOAD INDEX REGISTER
002014	005037	016702		CLR	2#PHYS+2	;PRESET PHYSICAL ADDRESS DATA

002020	005237	177572		INC	2#SRO	;ENABLE SEG
002024	106562	140000		MFPD	VIRT(R12)	;- (KSP)+VIRT-2
002030	005037	177572		CLR	2#SRO	;DISABLE SEG
002034	022706	001056		CMP	8KPTR-2,KSP	;CHECK STACK PTR
002040	001401			BEQ	.+4	
002042	000000			HLT		;ERROR! INCORRECT STACK PTR
002044	005716			TST	(KSP)	;CHECK RESULT
002046	001401			BEQ	.+4	
002050	000000			HLT		;ERROR! INCORRECT RESULT
002052	005067	175720		CLR	PSW	
002056	104000			SCOPE		
;DM=7						
002060	005067	175712		CLR	PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
002064	005066	177776		CLR	-2(KSP)	
002070	012702	000004		MOV	84,R2	;LOAD INDEX REGISTER
002074	012737	140000	016704	MOV	8VIRT,2#PHYS+4	;LOAD ADDRESS
002102	012737	177777	016700	MOV	8-1,2#PHYS	;CLEAR PHYSICAL ADDRESS DATA
002110	005237	177572		INC	2#SRO	;ENABLE SEG
002114	106572	140000		MFPD	2VIRT(R2)	;- (KSP)+VIRT
002120	005037	177572		CLR	2#SRO	;DISABLE SEG
002124	005216			INC	(KSP)	;CHECK RESULT
002126	001401			BEQ	.+4	
002130	000000			HLT		;ERROR! INCORRECT RESULT
002132	104000			SCOPE		
;TEST THAT MFPD OPERATES PROPERLY WITH PC USED IN DESTINATION						
;DM=0,PC						
002134	005067	175636		CLR	PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
002140	012706	001060		MOV	8KPTR,KSP	;SET KERNEL STACK PTR
002144	005066	177776		CLR	-2(KSP)	
002150	005237	177572		INC	2#SRO	;ENABLE SEG
002154	000277			SCC		
002156	106507			MFPD	PC	;- (KSP)+PC
002160	016702	175612		MOV	PSW,R2	;SAVE CC'S
002164	005037	177572		CLR	2#SRO	;DISABLE SEG
002170	122702	000001		CMPB	8C,R2	;CHECK CC'S
002174	001401			BEQ	.+4	
002176	000000			HLT		
002200	022706	001056		CMP	8KPTR-2,KSP	;CHECK STACK PTR
002204	001401			BEQ	.+4	
002206	000000			HLT		;ERROR! STACK NOT PUSHED
002210	022716	002160		CMP	8KK10+2,(KSP)	;CHECK THAT PS WAS PUSHED ON THE STACK
002214	001401			BEQ	.+4	
002216	000000			HLT		;ERROR! PC NOT PUSHED ON THE STACK
002220	104000			SCOPE		
;DM=3						
002222	012767	004000	175546	MOV	8REG,PSW	;KERNEL MODE!!!,PREV KERNEL MODE!!
002230	005066	177776		CLR	-2(KSP)	
002234	012737	177777	016700	MOV	8-1,2#PHYS	
002242	005237	177572		INC	2#SRO	;ENABLE SEG
002246	106537	140000		MFPD	2#VIRT	;- (KSP)+VIRT
002252	005037	177572		CLR	2#SRO	;DISABLE SEG

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002256 005216      INC      (KSP)      ;CHECK RESULT
002260 001401      BEQ      .+4
002262 000000      HLT
002264 104000      SCOPE      ;ERROR! INCORRECT RESULT

;DM=6,PC
002266 012767 000340 175502      MOV      @PRTY7,PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
002274 012766 177777 177776      MOV      @-1,-2(KSP)
002302 005037 016700      CLR      @#PHYS      ;PRESET PHYSICAL ADDRESS DATA
002306 005237 177572      INC      @#SRO      ;ENABLE SEG
002312 106567 135462      KK12: MFPD      VIRT      ;-(KSP)+VIRT
002316 005037 177572      CLR      @#SRO      ;DISABLE SEG
002322 005716      TST      (KSP)      ;CHECK RESULT
002324 001401      BEQ      .+4
002326 000000      HLT      ;ERROR! INCORRECT RESULT
002330 104000      SCOPE

;DM=7,PC
002332 005067 175440      CLR      PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
002336 005066 177776      CLR      -2(KSP)
002342 012737 140004 016702      MOV      @VIRT+4,@#PHYS+2 ;LOAD ADDRESS
002350 012737 177777 016704      MOV      @-1,@#PHYS+4 ;PRESET DATA
002356 005237 177572      INC      @#SRO      ;ENABLE SEG
002362 000277      SCC
002364 106577 135412      KK13: MFPD      @VIRT+2      ;-(KSP)+VIRT+4
002370 016702 175402      MOV      PSW,R2      ;SAVE CC'S
002374 005037 177572      CLR      @#SRO      ;DISABLE SEG
002400 122702 000011      CMPB      @N+C,R2      ;CHECK CC'S
002404 001401      BEQ      .+4
002406 000000      HLT      ;ERROR! INCORRECT CC'S
002410 005216      INC      (KSP)      ;CHECK RESULT
002412 001401      BEQ      .+4
002414 000000      HLT      ;ERROR! INCORRECT RESULT ON STACK
002416 104000      SCOPE

;DM=4,PC
002420 012737 002442 000250      MOV      @#K14A,@#MMVEC ;SET MEM MGMT ABORT TRAP VECTOR
002426 005066 177776      CLR      -2(KSP)
002432 005237 177572      INC      @#SRO      ;ENABLE SEG
002436 106547      KK14: MFPD      -(PC)      ;SHOULD ABORT
002440 000000      HLT      ;ERROR! FAILED TO ABORT & PC FAILED TO
                                ;AUTO DECREMENT
002442 022737 040021 177572      KK14A: CMP      @PLA+DS+VPO+1,@#SRO ;CHECK ABORT CONDITIONS
002450 001401      BEQ      .+4
002452 000000      HLT      ;ERROR! INCORRECT ABORT CONDITIONS
002454 005037 177572      CLR      @#SRO      ;DISABLE SEG
002460 012737 000520 000250      MOV      @#MERR,@#MMVEC
002466 104000      SCOPE

;TEST MFPD INSTRUCTION KERNEL MODE PREVIOUS SUPERVISOR MODE
                                VIRT=20000      ;SUPER VIRTUAL 'I' ADDRESS FOR THESE TESTS
                                PHYS=17100      ;CORRESPONDING SUPER PHYSICAL 'I' ADDRESS

;TEST THAT MFPD CAN GET DATA FROM A GENERAL REGISTER (R10)
002470 012767 014000 175300      MOV      @PSM+REG,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
002476 012766 177777 177776      MOV      @-1,-2(KSP)

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002504	005000			CLR	R10	; PRESET REGISTER
002506	005237	177572		INC	2#SR0	; ENABLE SEG
002512	000277			SCC		; PRESET CC'S
002514	106500		KS0:	MFPD	R10	; -(KSP)+(R10)
002516	016704	175254		MOV	PSW,R14	; SAVE CC'S
002522	005037	177572		CLR	2#SR0	; DISABLE SEG
002524	122704	000005		CMPB	8Z+C,R14	; CHECK CC'S
002532	001401			BEQ	.+4	
002534	000000			HLT		; ERROR! INCORRECT CC'S
002536	022706	001056		CMP	#KPTR-2,KSP	; CHECK THAT STACK PTR WAS PUSHED
002542	001401			BEQ	.+4	
002544	000000			HLT		; ERROR! INCORRECT STACK PTR
002546	005716			TST	(KSP)	; CHECK RESULT
002550	001401			BEQ	.+4	
002552	000000			HLT		; ERROR! INCORRECT RESULT
002554	005067	175216		CLR	PSW	
002560	104000			SCOPE		
; TEST THAT MFPD CAN GET DATA FROM A SUPERVISOR VIRTUAL 'I' ADDRESS						
; DM=1						
002562	012767	010000	175206	MOV	#KM+PSW,PSW	; KERNEL MODE!!!, PREV SUPER MODE!!
002570	005066	177776		CLR	-2(KSP)	
002574	012702	020000		MOV	#VIRT,R2	; R2=VIRTUAL ADDRESS
002600	012737	177777	017100	MOV	8-1,2#PHYS	; PRESET PHYSICAL ADDRESS
002606	005237	177572		INC	2#SR0	; ENABLE SEG
002612	000277			SCC		; PRESET CC'S
002614	106512		KS1:	MFPD	(R2)	; -(KSP)+(R2)
002616	016703	175154		MOV	PSW,R3	; SAVE CC'S
002622	005037	177572		CLR	2#SR0	; DISABLE SEG
002626	122703	000011		CMPB	8N+C,R3	; CHECK CC'S
002632	001401			BEQ	.+4	
002634	000000			HLT		; ERROR! INCORRECT CC'S
002636	022706	001056		CMP	#KPTR-2,KSP	; CHECK THAT STACK WAS PUSHED
002642	001401			BEQ	.+4	
002644	000000			HLT		; ERROR! INCORRECT STACK PTR
002646	005216			INC	(KSP)	; CHECK RESULT
002650	001401			BEQ	.+4	
002652	000000			HLT		; ERROR! INCORRECT RESULT
002654	104000			SCOPE		
; DM=2						
002656	012767	014000	175112	MOV	#PSW+REG,PSW	; KERNEL MODE!!!, PREV SUPER MODE!!
002664	012766	177777	177776	MOV	8-1,-2(KSP)	
002672	012702	020000		MOV	#VIRT,R12	; R12=VIRTUAL ADDRESS
002676	005037	017100		CLR	2#PHYS	; PRESET PHYSICAL ADDRESS
002702	005237	177572		INC	2#SR0	; ENABLE SEG
002706	106522		KS2:	MFPD	(R12)+	; -(KSP)+VIRT
002710	005037	177572		CLR	2#SR0	; DISABLE SEG
002714	005716			TST	(KSP)	; CHECK RESULT
002716	001401			BEQ	.+4	
002720	000000			HLT		; ERROR! INCORRECT RESULT ON STACK
002722	022702	020002		CMP	#VIRT+2,R12	; CHECK AUTO INCREMENT
002726	001401			BEQ	.+4	
002730	000000			HLT		; ERROR! AUTO INCREMENT FAILED
002732	005067	175040		CLR	PSW	
002736	104000			SCOPE		


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;DM=3
002740 012767 010000 175030 MOV #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
002746 005066 177776 CLR -2(KSP)
002752 012702 001004 MOV #TEMP,R2 ;LOAD INDIRECT ADDRESS
002756 012737 020002 001004 MOV #VIRT+2,#TEMP ;LOAD ADDRESS
002764 012737 177777 017102 MOV #-1,#PHYS+2 ;PRESET DATA
002772 005237 177572 INC #SRO ;ENABLE SEG
002776 106532 KS3: MFPD #R2+ ;-(KSP)+VIRT+2
003000 005037 177572 CLR #SRO ;DISABLE SEG
003004 005216 INC (KSP) ;CHECK RESULT
003006 001401 BEQ .+4
003010 000000 HLT
003012 104000 SCOPE ;ERROR! INCORRECT RESULT

;DM=4
003014 012767 010000 174754 MOV #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003022 012766 177777 177776 MOV #-1,-2(KSP)
003030 012704 020002 MOV #VIRT+2,R4 ;R4=VIRTUAL ADDRESS+2
003034 005037 017100 CLR #PHYS ;PRESET PHYSICAL ADDRESS DATA
003040 005237 177572 INC #SRO ;ENABLE SEG
003044 106544 KS4: MFPD -(R4) ;-(KSP)+VIRT
003046 005037 177572 CLR #SRC ;DISABLE SEG
003052 022704 020000 CMP #VIRT,R4 ;CHECK AUTO-DECREMENT
003056 001401 BEQ .+4
003060 000000 HLT ;ERROR! AUTO-DECREMENT FAILED
003062 005716 TST (KSP) ;CHECK RESULT
003064 001401 BEQ .+4
003066 000000 HLT ;ERROR! INCORRECT RESULT
003070 104000 SCOPE

;DM=5
003072 012767 014000 174676 MOV #PSM+REG,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003100 005066 177776 CLR -2(KSP)
003104 012700 001006 MOV #TEMP+2,R10 ;R10=INDIRECT ADDRESS
003110 012737 020004 001004 MOV #VIRT+4,#TEMP ;LOAD ADDRESS
003116 012737 177777 017104 MOV #-1,#PHYS+4 ;PRESET PHYSICAL ADDRESS DATA
003124 005237 177572 INC #SRO ;ENABLE SEG
003130 106550 KS5: MFPD #-(R10) ;-(KSP)+VIRT+4
003132 005037 177572 CLR #SRO ;DISABLE SEG
003136 005216 INC (KSP) ;CHECK RESULT
003140 001401 BEQ .+4
003142 000000 HLT
003144 005067 174626 CLR PSW
003150 104000 SCOPE

;DM=6
003152 012767 014000 174616 MOV #PSM+REG,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003160 012766 177777 177776 MOV #-1,-2(KSP)
003166 012702 000002 MOV #2,R12 ;LOAD INDEX REGISTER
003172 005037 017102 CLR #PHYS+2 ;PRESET PHYSICAL ADDRESS DATA
003176 005237 177572 INC #SRO ;ENABLE SEG
003202 106562 KS6: MFPD VIRT(R12) ;-(KSP)+VIRT-2
003206 005037 177572 CLR #SRO ;DISABLE SEG
003212 022706 001056 CMP #KPTR-2,KSP ;CHECK STACK PTR
003216 001401 BEQ .+4

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003220 000000          HLT          ;ERROR! INCORRECT STACK PTR
003222 005716          TST          (KSP) ;CHECK RESULT
003224 001401          BEQ          .+4
003226 000000          HLT          ;ERROR! INCORRECT RESULT
003230 005057 174542   CLR          PSW
003234 104000          SCOPE

;DM=7
003236 012767 010000 174532 MOV      #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003244 005066 177776      CLR      -2(KSP)
003250 012702 177774      MOV      #4,R2 ;LOAD INDEX REGISTER
003254 012737 020000 001004 MOV      @VIRT,2@TEMP ;LOAD ADDRESS
003262 012737 177777 017100 MOV      #1,2@PHYS ;CLEAR PHYSICAL ADDRESS DATA
003270 005237 177572      INC      2@SR0 ;ENABLE SEG
003274 106572 001010 KS7: MFPD      2TEMP+4(R2) ;-(KSP)+VIRT
003300 005037 177572      CLR      2@SR0 ;DISABLE SEG
003304 005216          INC      (KSP) ;CHECK RESULT
003306 001401          BEQ          .+4
003310 000000          HLT          ;ERROR! INCORRECT RESULT
003312 104000          SCOPE

;TEST THAT MFPD OPERATES PROPERLY JS PC IN DESTINATION
;CM=0,PC
003314 012767 010000 174454 MOV      #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003322 005066 177776      CLR      -2(KSP)
003326 005237 177572      INC      2@SR0 ;ENABLE SEG
003332 000277          SCC
003334 106507          MFPD      PC ;-(KSP)+PC
003336 016702 174434 KS10: MOV      PSW,R2 ;SAVE CC'S
003342 005037 177572      CLR      2@SR0 ;DISABLE SEG
003346 122702 000001      CMPB     #C,R2 ;CHECK CC'S
003352 001401          BEQ          .+4
003354 000000          HLT
003356 022706 001056      CMP      #KPTR-2,KSP ;CHECK STACK PTR
003362 001401          BEQ          .+4
003364 000000          HLT ;ERROR! STACK NOT PUSHED
003366 022716 003336      CMP      #KS10+2,(KSP) ;CHECK THAT PS WAS PUSHED ON THE STACK
003372 001401          BEQ          .+4
003374 000000          HLT ;ERROR! PC NOT PUSHED ON THE STACK
003376 104000          SCOPE

;DM=3
003400 012767 014000 174370 MOV      #PSM+REG,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003406 005066 177776      CLR      -2(KSP)
003412 012737 177777 017100 MOV      #1,2@PHYS
003420 005237 177572      INC      2@SR0 ;ENABLE SEG
003424 106537 020000 KS11: MFPD      2@VIRT ;-(KSP)+VIRT
003430 005037 177572      CLR      2@SR0 ;DISABLE SEG
003434 005216          INC      (KSP) ;CHECK RESULT
003436 001401          BEQ          .+4
003440 000000          HLT ;ERROR! INCORRECT RESULT
003442 104000          SCOPE

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;DM=6,PC


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003444 012767 010340 174324      MOV      #PSM+PRTY7,PSW ;KERNEL MODE!!!, PREV SUPER MODE!!
003452 012766 177777 177776      MOV      #-1,-2(KSP)
003460 005037 017100                CLR      @#PHYS ;PRESET PHYSICAL ADDRESS DATA
003464 005237 177572                INC      @#SRO ;ENABLE SEG
003470 106567 014304      KS12:  MFPD    VIRT ;-(KSP)+VIRT
003474 005037 177572                CLR      @#SRO ;DISABLE SEG
003500 005716                TST      (KSP) ;CHECK RESULT
003502 001401                BEQ      .+4
003504 000000                HLT
003506 104000                SCOPE ;ERROR! INCORRECT RESULT

;DM=7,PC
003510 012767 010000 174260      MOV      #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003516 005066 177776      CLR      -2(KSP)
003522 012737 020004 001004      MOV      @VIRT+4,@#TEMP ;LOAD ADDRESS
003530 012737 177777 017104      MOV      #-1,@#PHYS+4 ;PRESET DATA
003536 005237 177572                INC      @#SRO ;ENABLE SEG
003542 000277                SCC
003544 106577 175234      KS13:  MFPD    @TEMP' ;-(KSP)+VIRT+4
003550 016702 174222      MOV      PSW,R2 ;SAVE CC'S
003554 005037 177572      CLR      @#SRO ;DISABLE SEG
003560 122702 000011      CMPB   #N+C,R2 ;CHECK CC'S
003564 001401                BEQ      .+4
003566 000000                HLT ;ERROR! INCORRECT CC'S
003570 005216                INC      (KSP) ;CHECK RESULT
003572 001401                BEQ      .+4
003574 000000                HLT ;ERROR! INCORRECT RESULT ON STACK
003576 104000                SCOPE

;TEST THAT MFPD CAN PUSH SUPERVISOR STACK PTR ONTO KERNEL STACK
003600 012767 010000 174170      MOV      #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
003606 005016      CLR      (KSP) ;PUT #0 ON KERNEL STACK
003610 106606      MFPD    SSP ;SET SUPER STACK PTR
003612 012716 177777      MOV      #-1,(KSP) ;PUT #-1 ON KERNEL STACK
003616 005237 177572      INC      @#SRO ;ENABLE SEG
003622 106506      KS14:  MFPD    SSP ;-(KSP)+SSP
003624 005037 177572      CLR      @#SRO ;DISABLE SEG
003630 005716      TST      (KSP) ;CHECK THAT SUPER STACK PTR WAS PUSHED
003632 001401                BEQ      .+4 ;ONTO KERNEL STACK
003634 000000                HLT ;ERROR! MFPD FAILED
003636 104000                SCOPE

;TEST MFPD INSTRUCTION KERNEL MODE PREVIOUS USER MODE
100000      VIRT=100000 ;USER VIRTUAL 'I' ADDRESS FOR THESE TESTS
017300      PHYS=17300 ;CORRESPONDING USER PHYSICAL 'I' ADDRESS

;TEST THAT MFPD CAN GET DATA FROM A GENERAL REGISTER (R10).
003640 012767 034000 174130      MOV      #PUM+REG,PSW ;KERNEL MODE!!!,PREV USER MODE!!
003646 012766 177777 177776      MOV      #-1,-2(KSP)
003654 005000      CLR      R10 ;PRESET REGISTER
003656 005237 177572      INC      @#SRO ;ENABLE SEG
003662 000277      SCC ;PRESET CC'S
003664 106500      KUO:  MFPD    R10 ;-(KSP)+(R10)
003666 016704 174104      MOV      PSW,R14 ;SAVE CC'S
003672 005037 177572      CLR      @#SRO ;DISABLE SEG

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003676	122704	000005		CMPB	#Z+C,R14	;CHECK CC'S
003702	001401			BEQ	.+4	
003704	000000			HLT		;ERROR! INCORRECT CC'S
003706	022706	001056		CMP	#KPTR-2,KSP	;CHECK THAT STACK PTR WAS PUSHED
003712	001401			BEQ	.+4	
003714	000000			HLT		;ERROR! INCORRECT STACK PTR
003716	005716			TST	(KSP)	;CHECK RESULT
003720	001401			BEQ	.+4	
003722	000000			HLT		;ERROR! INCORRECT RESULT
003724	005067	174046		CLR	PSW	
003730	104000			SCOPE		

;TEST THAT MFPD CAN GET DATA FROM A KERNEL VIRTUAL 'I' ADDRESS
;DM=1

003732	012767	030000	174036	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
003740	005066	177776		CLR	-2(KSP)	
003744	012702	100000		MOV	#VIRT,R2	;R2=VIRTUAL ADDRESS
003750	012737	177777	017300	MOV	#-1,2#PHYS	;PRESET PHYSICAL ADDRESS
003756	005237	177572		INC	2#SRO	;ENABLE SEG
003762	000277			SCC		;PRESET CC'S
003764	106512		KU1:	MFPD	(R2)	-(KSP)+(R2)
003766	016703	174004		MOV	PSW,R3	;SAVE CC'S
003772	005037	177572		CLR	2#SRO	;DISABLE SEG
003776	122703	000011		CMPB	#N+C,R3	;CHECK CC'S
004002	001401			BEQ	.+4	
004004	000000			HLT		;ERROR! INCORRECT CC'S
004006	022706	001056		CMP	#KPTR-2,KSP	;CHECK THAT STACK WAS PUSHED
004012	001401			BEQ	.+4	
004014	000000			HLT		;ERROR! INCORRECT STACK PTR
004016	005216			INC	(KSP)	;CHECK RESULT
004020	001401			BEQ	.+4	
004022	000000			HLT		;ERROR! INCORRECT RESULT
004024	104000			SCOPE		

;DM=2

004026	012767	034000	173742	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
004034	012766	177777	177776	MOV	#-1,-2(KSP)	
004042	012702	100000		MOV	#VIRT,R12	;R12=VIRTUAL ADDRESS
004046	005037	017300		CLR	2#PHYS	;PRESET PHYSICAL ADDRESS
004052	005237	177572		INC	2#SRO	;ENABLE SEG
004056	106522		KU2:	MFPD	(R12)+	-(KSP)+VIRT
004060	005037	177572		CLR	2#SRO	;DISABLE SEG
004064	005716			TST	(KSP)	;CHECK RESULT
004066	001401			BEQ	.+4	
004070	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
004072	022702	100002		CMP	#VIRT+2,R12	;CHECK AUTO INCREMENT
004076	001401			BEQ	.+4	
004100	000000			HLT		;ERROR! AUTO INCREMENT FAILED
004102	005067	173670		CLR	PSW	
004106	104000			SCOPE		

;DM=3

004110	012767	030000	173660	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
004116	005066	177776		CLR	-2(KSP)	
004122	012702	001004		MOV	#TEMP,R2	;LOAD INDIRECT ADDRESS
004126	012737	100002	001004	MOV	#VIRT+2,2#TEMP	;LOAD ADDRESS

004134	012737	177777	017302	MOV	#-1,2#PHYS+2	;PRESET DATA
004142	005237	177572		INC	2#SRO	;ENABLE SEG
004146	106532		KU3:	MFPD	2(R2)+	;(KSP)+VIRT+2
004150	005037	177572		CLR	2#SRO	;DISABLE SEG
004154	005216			INC	(KSP)	;CHECK RESULT
004156	001401			BEQ	.+4	
004160	000000			HLT		;ERROR! INCORRECT RESULT
004162	104000			SCOPE		
;DM=4						
004164	012767	030000	173604	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
004172	012766	177777	177776	MOV	#-1,-2(KSP)	
004200	012704	100002		MOV	#VIRT+2,R4	;R4=VIRTUAL ADDRESS+2
004204	005037	017300		CLR	2#PHYS	;PRESET PHYSICAL ADDRESS DATA
004210	005237	177572		INC	2#SRO	;ENABLE SEG
004214	106544		KU4:	MFPD	-(R4)	;(KSP)+VIRT
004216	005037	177572		CLR	2#SRO	;DISABLE SEG
004222	022704	100000		CMP	#VIRT,R4	;CHECK AUTO-DECREMENT
004226	001401			BEQ	.+4	
004230	000000			HLT		;ERROR! AUTO-DECREMENT FAILED
004232	005716			TST	(KSP)	;CHECK RESULT
004234	001401			BEQ	.+4	
004236	000000			HLT		;ERROR! INCORRECT RESULT
;DM=5						
004240	012767	034000	173530	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
004246	005066	177776		CLR	-2(KSP)	
004252	012700	001006		MOV	#TEMP+2,R10	;R10=INDIRECT ADDRESS
004256	012737	100004	001004	MOV	#VIRT+4,2#TEMP	;LOAD ADDRESS
004264	012737	177777	017304	MOV	#-1,2#PHYS+4	;PRESET PHYSICAL ADDRESS DATA
004272	005237	177572		INC	2#SRO	;ENABLE SEG
004276	106550		KU5:	MFPD	2-(R10)	;(KSP)+VIRT+4
004300	005037	177572		CLR	2#SRO	;DISABLE SEG
004304	005216			INC	(KSP)	;CHECK RESULT
004306	001401			BEQ	.+4	
004310	000000			HLT		
004312	005067	173460		CLR	PSW	
004316	104000			SCOPE		
;DM=6						
004320	012767	034000	173450	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
004326	012766	177777	177776	MOV	#-1,-2(KSP)	
004334	012702	000002		MOV	#2,R12	;LOAD INDEX REGISTER
004340	005037	017302		CLR	2#PHYS+2	;PRESET PHYSICAL ADDRESS DATA
004344	005237	177572		INC	2#SRO	;ENABLE SEG
004350	106562	100000	KU6:	MFPD	VIRT(R12)	;(KSP)+VIRT-2
004354	005037	177572		CLR	2#SRO	;DISABLE SEG
004360	022706	001056		CMP	#KPTR-2,KSP	;CHECK STACK PTR
004364	001401			BEQ	.+4	
004366	000000			HLT		;ERROR! INCORRECT STACK PTR
004370	005716			TST	(KSP)	;CHECK RESULT
004372	001401			BEQ	.+4	
004374	003000			HLT		;ERROR! INCORRECT RESULT
004376	005067	173374		CLR	PSW	
004402	104000			SCOPE		

M02

POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 25
DCKTEB.P11

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;DM=7
004404 012767 030000 173364 MOV      #KM+PUM,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
004412 005066 177776          CLR      -2(KSP)
004416 012702 177774          MOV      #4,R2
004422 012737 100000 001004 MOV      #VIRT,2#TEMP      ;LOAD INDEX REGISTER
004430 012737 177777 017303 MOV      #1,2#PHYS        ;LOAD INDIRECT ADDRESS
004436 005237 177572          INC      2#SRO          ;CLEAR PHYSICAL ADDRESS DATA
004442 106572 001010 KU7: MFPD      2#TEMP+4(R2)      ;ENABLE SEG
004446 005037 177572          CLR      2#SRO          ;-(KSP)+VIRT
004452 005216          INC      (KSP)                ;DISABLE SEG
004454 001401          BEQ      .+4                  ;CHECK RESULT
004456 000000          HLT
004460 104000          SCOPE                          ;ERROR! INCORRECT RESULT

;TEST THAT MFPD OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC
004462 012767 030000 173306 MOV      #KM+PUM,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
004470 005066 177776          CLR      -2(KSP)
004474 005237 177572          INC      2#SRO          ;ENABLE SEG
004500 000277          SCC
004502 106507          MFPD      PC                    ;-(KSP)+PC
004504 016702 173266          MOV      PSW,R2          ;SAVE CC'S
004510 005037 177572          CLR      2#SRO          ;DISABLE SEG
004514 122702 000001          CMPB     #C,R2          ;CHECK CC'S
004520 001401          BEQ      .+4
004522 000000          HLT
004524 022706 001056          CMP      #KPTR-2,KSP      ;CHECK STACK PTR
004530 001401          BEQ      .+4
004532 000000          HLT
004534 022716 004504          CMP      #KU10+2,(KSP)      ;ERROR! STACK NOT PUSHED
004540 001401          BEQ      .+4                  ;CHECK THAT PS WAS PUSHED ON THE STACK
004542 000000          HLT
004544 104000          SCOPE                          ;ERROR! PC NOT PUSHED ON THE STACK

;DM=3,PC
004546 012767 034000 173222 MOV      #PUM+REG,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
004554 005066 177776          CLR      -2(KSP)
004560 012737 177777 017300 MOV      #1,2#PHYS
004566 005237 177572          INC      2#SRO          ;ENABLE SEG
004572 106537 100000 KU11: MFPD      2#VIRT          ;-(KSP)+VIRT
004576 005037 177572          CLR      2#SRO          ;DISABLE SEG
004602 005216          INC      (KSP)                ;CHECK RESULT
004604 001401          BEQ      .+4
004606 000000          HLT
004610 104000          SCOPE                          ;ERROR! INCORRECT RESULT

;DM=6,PC
004612 012767 030340 173156 MOV      #PUM+PTY7,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
004620 012766 177777 177776 MOV      #1,-2(KSP)
004626 005037 017300          CLR      2#PHYS        ;PRESET PHYSICAL ADDRESS DATA
004632 005237 177572          INC      2#SRO          ;ENABLE SEG
004636 106567 073136 KU12: MFPD      VIRT          ;-(KSP)+VIRT
004642 005037 177572          CLR      2#SRO          ;DISABLE SEG
004646 005716          TST      (KSP)                ;CHECK RESULT

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004550 001401      BEQ      .+4
004652 000000      HLT
004654 104000      SCOPE
                                ;ERROR! INCORRECT RESULT

004656 012767 030000 173112 ;DM=7,PC
004664 005066 177776      MOV    #KM+PUM,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
004670 012737 100004 001004 CLR    -2(KSP)
004676 012737 177777 017304 MOV    #VIRT+4,#TEMP      ;LOAD ADDRESS
004704 005237 177572      MOV    #-1,#PHYS+4      ;PRESET DATA
004710 000277      INC    #SRO      ;ENABLE SEG
004712 106577 174066      SCC
004716 016702 173054      MFPD    #TEMP      ;-(KSP)+VIRT+4
004722 005037 177572      MOV    PSW,R2      ;SAVE CC'S
004726 122702 000011      CLR    #SRO      ;DISABLE SEG
004732 001401      CMPB    #N+C,R2      ;CHECK CC'S
004734 000000      BEQ      .+4
004736 005216      HLT
004740 001401      INC    (KSP)      ;ERROR! INCORRECT CC'S
004742 000000      BEQ      .+4      ;CHECK RESULT
004744 104000      HLT
                                ;ERROR! INCORRECT RESULT ON STACK
                                SCOPE

004746 012767 030000 173022 ;TEST THAT MFPD CAN PUSH USER STACK PTR ONTO KERNEL STACK
004754 012716 177777      MOV    #KM+PUM,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
004760 106606      MOV    #-1,(KSP)      ;PUT #-1 ON KERNEL STACK
004762 005016      MTPD    USP
004764 005237 177572      CLR    (KSP)      ;PUT #0 ON KERNEL STACK
004770 106506      INC    #SRO      ;ENABLE SEG
004772 005037 177572      MFPD    USP      ;-(KSP)+USP
004776 005216      CLR    #SRO      ;DISABLE SEG
005000 001401      INC    (KSP)      ;CHECK THAT USER STACK PTR WAS PUSHED
005002 000000      BEQ      .+4      ;ONTO KERNEL STACK
005004 104000      HLT      ;ERROR! MFPD FAILED
                                SCOPE

                                ;TEST MFPI INSTRUCTION KERNEL MODE PREVIOUS KERNEL MODE.
                                VIRT=16600      ;KERNEL VIRTUAL 'I' ADDRESS FOR THESE TESTS
                                PHYS=16600      ;CORRESPONDING KERNEL PHYSICAL 'I' ADDRESS

                                ;TEST THAT MFPI CAN GET DATA FROM A GENERAL REGISTER (R3)
                                KKIOA:
005006 012767 000340 172762 MOV    #PTY7,PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
005014 005066 177776      CLR    -2(KSP)
005020 012703 177777      MOV    #-1,R3      ;PRESET GENERAL REGISTER
005024 005237 177572      INC    #SRO      ;ENABLE SEG
005030 006503      MFPD    R3      ;-(KSP)+R3
005032 016702 172740      MOV    PSW,R2      ;SAVE CC'S
005036 005037 177572      CLR    #SRO      ;DISABLE SEG
005042 122702 000350      CMPB    #PTY7+N,R2      ;CHECK CC'S
005046 001401      BEQ      .+4
005050 000000      HLT
005052 022706 001056      CMP    #KPTH-2,KSP      ;ERROR! INCORRECT CC'S AFTER MFP
005056 001401      BEQ      .+4      ;CHECK THAT STACK WAS PUSHED
005060 000000      HLT
005062 005216      INC    (KSP)      ;ERROR! INCORRECT STACK PTR
                                ;CHECK RESULT

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005064 001401      BEQ      .+4
005066 000000      HLT
005070 104000      SCOPE      ;ERROR! INCORRECT RESULT

;TEST THAT MFPI CAN GET DATA FROM A KERNEL VIRTUAL 'I' ADDRESS
;DM=1
005072 005067 172700      CLR      PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
005076 005066 177776      CLR      -2(KSP)
005102 012702 016600      MOV      @VIRT,R2      ;R2=VIRTUAL ADDRESS
005106 012737 177777 016600      MOV      @-1,@@PHYS      ;PRESET PHYSICAL ADDRESS
005114 005237 177572      INC      @@SRO      ;ENABLE SEG
005120 000277      SCC      ;PRESET CC'S
005122 006512      MFPI      (R2)      ;-(KSP)+(R2)
005124 016703 172646      MOV      PSW,R3      ;SAVE CC'S
005130 005037 177572      CLR      @@SRO      ;DISABLE SEG
005134 122703 000011      CMPB      @N+C,R3      ;CHECK CC'S
005140 001401      BEQ      .+4
005142 000000      HLT      ;ERROR! INCORRECT CC'S
005144 022706 001056      CMP      @KPTR-2,KSP      ;CHECK THAT STACK WAS PUSHED
005150 001401      BEQ      .+4
005152 000000      HLT      ;ERROR! INCORRECT STACK PTR
005154 005216      INC      (KSP)      ;CHECK RESULT
005156 001401      BEQ      .+4
005160 000000      HLT      ;ERROR! INCORRECT RESULT
005162 104000      SCOPE

;DM=2
005164 012767 004000 172604      MOV      @REG,PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
005172 012766 177777 177776      MOV      @-1,-2(KSP)
005200 012702 016600      MOV      @VIRT,R12      ;R12=VIRTUAL ADDRESS
005204 005037 016600      CLR      @@PHYS      ;PRESET PHYSICAL ADDRESS
005210 005237 177572      INC      @@SRO      ;ENABLE SEG
005214 006522      MFPI      (R12)+      ;-(KSP)+VIRT
005216 005037 177572      CLR      @@SRO      ;DISABLE SEG
005222 005716      TST      (KSP)      ;CHECK RESULT
005224 001401      BEQ      .+4
005226 000000      HLT      ;ERROR! INCORRECT RESULT ON STACK
005230 022702 016602      CMP      @VIRT+2,R12      ;CHECK AUTO INCREMENT
005234 001401      BEQ      .+4
005236 000000      HLT      ;ERROR! AUTO INCREMENT FAILED
005240 005067 172532      CLR      PSW
005244 104000      SCOPE

;DM=3
005246 005067 172524      CLR      PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
005252 005066 177776      CLR      -2(KSP)
005256 012702 001004      MOV      @TEMP,R2      ;LOAD INDIRECT ADDRESS
005262 012737 016602 001004      MOV      @VIRT+2,@TEMP      ;LOAD ADDRESS
005270 012737 177777 016602      MOV      @-1,@@PHYS+2      ;PRESET DATA
005276 005237 177572      INC      @@SRO      ;ENABLE SEG
005302 006532      MFPI      @ (R2)+      ;-(KSP)+VIRT+2
005304 005037 177572      CLR      @@SRO      ;DISABLE SEG
005310 005216      INC      (KSP)      ;CHECK RESULT
005312 001401      BEQ      .+4
005314 000000      HLT      ;ERROR! INCORRECT RESULT
005316 104000      SCOPE

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;DM=4
005320 005067 172452          CLR      PSW          ;KERNEL MODE!!!,PREV KERNEL MODE!!
005324 012766 177777 177776 MOV      @-1,-2(KSP)
005332 012704 016602          MOV      @VIRT+2,R4      ;R4=VIRTUAL ADDRESS+2
005336 005037 016600          CLR      @@PHYS        ;PRESET PHYSICAL ADDRESS DATA
005342 005237 177572          INC      @@SRO        ;ENABLE SEG
005346 006544          KK14: MFPI      -(R4)          ;-(KSP)+VIRT
005350 005037 177572          CLR      @@SRO        ;DISABLE SEG
005354 022704 016600          CMP      @VIRT,R4      ;CHECK AUTO-DECREMENT
005360 001401          BEQ      .+4
005362 000000          HLT
005364 005716          TST      (KSP)
005366 001401          BEQ      .+4
005370 000000          HLT
005372 104000          SCOPE      ;ERROR! AUTO-DECREMENT FAILED
                                ;CHECK RESULT
                                ;ERROR! INCORRECT RESULT

;DM=5
005374 012767 004000 172374 MOV      @REG,PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
005402 005066 177776          CLR      -2(KSP)
005406 012700 001006          MOV      @TEMP+2,R10      ;R10=INDIRECT ADDRESS
005412 012737 016604 001004 MOV      @VIRT+4,@TEMP      ;LOAD ADDRESS
005420 012737 177777 016604 MOV      @-1,@@PHYS+4      ;PRESET PHYSICAL ADDRESS DATA
005426 005237 177572          INC      @@SRO        ;ENABLE SEG
005432 006550          KK15: MFPI      @-(R10)          ;-(KSP)+VIRT+4
005434 005037 177572          CLR      @@SRO        ;DISABLE SEG
005440 005216          INC      (KSP)
005442 001401          BEQ      .+4
005444 000000          HLT
005446 005067 172324          CLR      PSW
005452 104000          SCOPE      ;CHECK RESULT

;DM=6
005454 012767 004000 172314 MOV      @REG,PSW      ;KERNEL MODE!!!,PREV KERNEL MODE!!
005462 012766 177777 177776 MOV      @-1,-2(KSP)
005470 012702 000002          MOV      @2,R12      ;LOAD INDEX REGISTER
005474 005037 016602          CLR      @@PHYS+2      ;PRESET PHYSICAL ADDRESS DATA
005500 005237 177572          INC      @@SRO        ;ENABLE SEG
005504 005562 016600          KK16: MFPI      VIRT(R12)          ;-(KSP)+VIRT-2
005510 005037 177572          CLR      @@SRO        ;DISABLE SEG
005514 022706 001056          CMP      @KPTR-2,KSP      ;CHECK STACK PTR
005520 001401          BEQ      .+4
005522 000000          HLT
005524 005716          TST      (KSP)
005526 001401          BEQ      .+4
005530 000000          HLT
005532 005067 172240          CLR      PSW
005536 104000          SCOPE      ;ERROR! INCORRECT STACK PTR
                                ;CHECK RESULT
                                ;ERROR! INCORRECT RESULT

;DM=7
005540 005067 172232          CLR      PSW          ;KERNEL MODE!!!,PREV KERNEL MODE!!
005544 005066 177776          CLR      -2(KSP)
005550 012702 177774          MOV      @-4,R2      ;LOAD INDEX REGISTER
005554 012737 016600 001004 MOV      @VIRT,@TEMP      ;LOAD ADDRESS
005562 012737 177777 016600 MOV      @-1,@@PHYS      ;CLEAR PHYSICAL ADDRESS DATA
005570 005237 177572          INC      @@SRO        ;ENABLE SEG

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005574 006572 001010
005600 005037 177572
005604 005216
005606 001401
005610 000000
005612 104000

KKI7: MFPI 3TEMP+4(R2) ;-(KSP)+VIRT
CLR 3#SRO ;DISABLE SEG
INC (KSP) ;CHECK RESULT
BEQ .+4
HLT ;ERROR! INCORRECT RESULT
SCOPE

;TEST THAT MFPI OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC

005614 005067 172156
005620 012706 001060
005624 005066 177776
005630 01237 177572
005634 01277
005636 00507
005640 016702 172132
005644 005037 177572
005650 122702 000001
005654 001401
005656 000000
005660 022706 001056
005664 001401
005666 000000
005670 022716 005640
005674 001401
005676 000000
005700 104000

KKI10: CLR PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!
MOV 3KPTR,KSP ;SET KERNEL STACK PTR
CLR -2(KSP)
INC 3#SRO ;ENABLE SEG
SCC
MFPI PC ;-(KSP)+PC
MOV PSW,R2 ;SAVE CC'S
CLR 3#SRO ;DISABLE SEG
CMPB 3C,R2 ;CHECK CC'S
BEQ .+4
HLT
CMP 3KPTR-2,KSP ;CHECK STACK PTR
BEQ .+4
HLT ;ERROR! STACK NOT PUSHED
CMP 3KKI10+2,(KSP) ;CHECK THAT PS WAS PUSHED ON THE STACK
BEQ .+4
HLT ;ERROR! PC NOT PUSHED ON THE STACK
SCOPE

005702 012767 004000 172066
005710 005066 177776
005714 012737 016600
005722 005237 177572
005726 006537 016600
005732 005037 177572
005736 005216
005740 001401
005742 000000
005744 104000

;DM=3,PC
MOV 3REG,PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!
CLR -2(KSP)
MOV 3-1,3#PHYS
INC 3#SRO ;ENABLE SEG
MFPI 3#VIRT ;-(KSP)+VIRT
CLR 3#SRO ;DISABLE SEG
INC (KSP) ;CHECK RESULT
BEQ .+4
HLT ;ERROR! INCORRECT RESULT
SCOPE

005746 012767 000340 172022
005754 012766 177776
005762 005037 016600
005766 005237 177572
005772 006567 010602
005776 005037 177572
006002 005716
006004 001401
006006 000000
006010 104000

;DM=6,PC
MOV 3PTY7,PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!
MOV 3-1,-2(KSP)
CLR 3#PHYS ;PRESET PHYSICAL ADDRESS DATA
INC 3#SRO ;ENABLE SEG
MFPI VIRT ;-(KSP)+VIRT
CLR 3#SRO ;DISABLE SEG
TST (KSP) ;CHECK RESULT
BEQ .+4
HLT ;ERROR! INCORRECT RESULT
SCOPE

006012 005067 171760

;DM=7,PC
CLR PSW ;KERNEL MODE!!!,PREV KERNEL MODE!!

006016	005066	177776		CLR	-2(KSP)	
006022	012737	016604	001004	MOV	@VIRT+4,@TEMP	;LOAD ADDRESS
006030	012737	177777	016604	MOV	@-1,@PHYS+4	;PRESET DATA
006036	005237	177572		INC	@SA0	;ENABLE SEG
006042	000277			SCC		
006044	006577	172734	KKI13:	MFPI	@TEMP	;-(KSP)+VIRT+4
006050	016702	171722		MOV	PSW,R2	;SAVE CC'S
006054	005037	177572		CLR	@SA0	;DISABLE SEG
006060	122702	000011		CMPB	@N+C,R2	;CHECK CC'S
006064	001401			BEQ	.+4	
006066	000000			HLT		;ERROR! INCORRECT CC'S
006070	005216			INC	(KSP)	;CHECK RESULT
006072	001401			BEQ	.+4	
006074	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
006076	104000			SCOPE		
006100	012766	177777	177776			;UM=1,PC
006106	005237	177572		MOV	@-1,-2(KSP)	
006112	006517		KKI14:	INC	@SA0	;ENABLE SEG
006114	000400		KKI14A:	MFPI	(PC)	;PUSH NEXT WORD ON THE STACK
006116	005037	177572		BR	.+2	;THIS DATA GOES ONTO THE STACK
006122	023716	006114		CLR	@SR0	;DISABLE SEG
006126	001401			CMP	@KKI14A,(KSP)	;CHECK DATA ON THE STACK
006130	000000			BEQ	.+4	
006132	104000			HLT		;ERROR! INCORRECT DATA ON STACK
				SCOPE		

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                                ;TEST MFPI INSTRUCTION KERNEL MODE PREVIOUS SUPERVISOR MODE
                                VIRT=40000                                ;SUPER VIRTUAL 'I' ADDRESS FOR THESE TESTS
                                PHYS=17000                               ;CORRESPONDING SUPER PHYSICAL 'I' ADDRESS

                                ;TEST THAT MFPI CAN GET DATA FROM A GENERAL REGISTER (R10)
                                ;KERNEL MODE!!!,PREV SUPER MODE!!
006134 012767 014000 171634    MOV      #PSM+REG,PSW
006142 012766 177777 177776    MOV      #-1,-2(KSP)
006150 005000                                CLR      R10                                ;PRESET REGISTER
006152 005237 177572                                INC      @#SRO                                ;ENABLE SEG
006156 000277                                SCC                                ;PRESET CC'S
006160 000500                                MFPI     R10                                ;-(KSP)+(R10)
006162 016704 171610    MOV      PSW,R14                                ;SAVE CC'S
006166 005037 177572                                CLR      @#SRO                                ;DISABLE SEG
006172 122704 000005    CMPB     #2+C,R14                                ;CHECK CC'S
006176 001401                                BEQ      .+4
006200 000000                                HLT
006202 022706 001056    CMP      #KPTR-2,KSP                                ;ERROR! INCORRECT CC'S
006206 001401                                BEQ      .+4                                ;CHECK THAT STACK PTR WAS PUSHED
006210 000000                                HLT
006212 005716                                TST      (KSP)                                ;ERROR! INCORRECT STACK PTR
006214 001401                                BEQ      .+4                                ;CHECK RESULT
006216 000000                                HLT
006220 005067 171552    CLR      PSW                                ;ERROR! INCORRECT RESULT
006224 104000                                SCOPE

                                ;TEST THAT MFPI CAN GET DATA FROM A SUPERVISOR VIRTUAL 'I' ADDRESS
                                ;DM=1
006226 012767 010000 171542    MOV      #KM+PSM,PSW                                ;KERNEL MODE!!!,PREV SUPER MODE!!
006234 005066 177776                                CLR      -2(KSP)
006240 012702 040000                                MOV      #VIRT,R2                                ;R2=VIRTUAL ADDRESS
006244 012737 177777 017000    MOV      #-1,@#PHYS                                ;PRESET PHYSICAL ADDRESS
006252 005237 177572                                INC      @#SRO                                ;ENABLE SEG
006256 000277                                SCC                                ;PRESET CC'S
006260 006512                                MFPI     (R2)                                ;-(KSP)+(R2)
006262 016703 171510    MOV      PSW,R3                                ;SAVE CC'S
006266 005037 177572                                CLR      @#SRO                                ;DISABLE SEG
006272 122703 000011    CMPB     #N+C,R3                                ;CHECK CC'S
006276 001401                                BEQ      .+4
006300 000000                                HLT
006302 022706 001056    CMP      #KPTR-2,KSP                                ;ERROR! INCORRECT CC'S
006306 001401                                BEQ      .+4                                ;CHECK THAT STACK WAS PUSHED
006310 000000                                HLT
006312 005216                                INC      (KSP)                                ;ERROR! INCORRECT STACK PTR
006314 001401                                BEQ      .+4                                ;CHECK RESULT
006316 000000                                HLT
006320 104000                                SCOPE

                                ;DM=2
006322 012767 014000 171446    MOV      #PSM+REG,PSW                                ;KERNEL MODE!!!,PREV SUPER MODE!!
006330 012766 177777 177776    MOV      #-1,-2(KSP)
006336 012702 040000                                MOV      #VIRT,R12                                ;R12=VIRTUAL ADDRESS
006342 005037 017000                                CLR      @#PHYS                                ;PRESET PHYSICAL ADDRESS
006346 005237 177572                                INC      @#SRO                                ;ENABLE SEG
006352 006522                                MFPI     (R12)+                                ;-(KSP)+VIRT

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006354	005037	177572		CLR	2#SR0	;DISABLE SEG
006360	005716			TST	(KSP)	;CHECK RESULT
006362	001401			BEQ	.+4	
006364	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
006366	022702	040002		CMP	#VIRT+2,R12	;CHECK AUTO INCREMENT
006372	001401			BEQ	.+4	
006374	000000			HLT		;ERROR! AUTO INCREMENT FAILED
006376	005067	171374		CLR	PSW	
006402	104000			SCOPE		

006404	012767	010000	171364		MOV	#KM+PSW,PSW	;KERNEL MODE!!!,PREV SUPER MODE!!
006412	005066	177776		CLR	-2(KSP)		
006416	012702	001004		MOV	#TEMP,R2	;LOAD INDIRECT ADDRESS	
006422	012737	040002	001004	MOV	#VIRT+2,2#TEMP	;LOAD ADDRESS	
006430	012737	177777	017002	MOV	#-1,2#PHYS+2	;PRESET DATA	
006436	005237	177572		INC	2#SR0	;ENABLE SEG	
006442	006532			MFPI	2(R2)+	;- (KSP)+VIRT+2	
006444	005037	177572		CLR	2#SR0	;DISABLE SEG	
006450	005216			INC	(KSP)	;CHECK RESULT	
006452	001401			BEQ	.+4		
006454	000000			HLT		;ERROR! INCORRECT RESULT	
006456	104000			SCOPE			

006460	012767	010000	171310		MOV	#KM+PSW,PSW	;KERNEL MODE!!!,PREV SUPER MODE!!
006466	012766	177777	177776		MOV	#-1,-2(KSP)	
006474	012704	040002		MOV	#VIRT+2,R4	;R4=VIRTUAL ADDRESS+2	
006500	005037	017000		CLR	2#PHYS	;PRESET PHYSICAL ADDRESS DATA	
006504	005237	177572		INC	2#SR0	;ENABLE SEG	
006510	006544			MFPI	-(R4)	;- (KSP)+VIRT	
006512	005037	177572		CLR	2#SR0	;DISABLE SEG	
006516	022704	040000		CMP	#VIRT,R4	;CHECK AUTO-DECREMENT	
006522	001401			BEQ	.+4		
006524	000000			HLT		;ERROR! AUTO-DECREMENT FAILED	
006526	005716			TST	(KSP)	;CHECK RESULT	
006530	001401			BEQ	.+4		
006532	000000			HLT		;ERROR! INCORRECT RESULT	
006534	104000			SCOPE			

006536	012767	014000	171232		MOV	#PSW+REG,PSW	;KERNEL MODE!!!,PREV SUPER MODE!!
006544	005066	177776		CLP	-2(KSP)		
006550	012700	001006		MOV	#TEMP+2,R10	;R10=INDIRECT ADDRESS	
006554	012737	040004	001004	MOV	#VIRT+4,2#TEMP	;LOAD ADDRESS	
006562	012737	177777	017004	MOV	#-1,2#PHYS+4	;PRESET PHYSICAL ADDRESS DATA	
006570	005237	177572		INC	2#SR0	;ENABLE SEG	
006574	006550			MFPI	2-(R10)	;- (KSP)+VIRT+4	
006576	005037	177572		CLR	2#SR0	;DISABLE SEG	
006602	005216			INC	(KSP)	;CHECK RESULT	
006604	001401			BEQ	.+4		
006606	000000			HLT			
006610	005067	171162		CLR	PSW		
006614	104000			SCOPE			

;DM=6

H03

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 33
DCKTEB.P11

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006616 012767 014000 171152      MOV      #PSM+REG,PSW      ;KERNEL MODE!!!,PREV SUPER MODE!!
006624 012766 177777 177776      MOV      #-1,-2(KSP)
006632 012702 000002              MOV      #2,R12          ;LOAD INDEX REGISTER
006636 005037 017002              CLR      @#PHYS+2        ;PRESET PHYSICAL ADDRESS DATA
006642 005237 177572              INC      @#SRO          ;ENABLE SEG
006646 006562 040000      KSI6:  MFPI      VIRT(R12)        ;-(KSP)+VIRT-2
006652 005037 177572              CLR      @#SRO          ;DISABLE SEG
006656 022706 001056              CMP      #KPTR-2,KSP    ;CHECK STACK PTR
006662 001401              BEQ      .+4
006664 000000              HLT
006666 005716              TST      (KSP)          ;ERROR! INCORRECT STACK PTR
006670 001401              BEQ      .+4          ;CHECK RESULT
006672 000000              HLT
006674 005067 171076              CLR      PSW          ;ERROR! INCORRECT RESULT
006700 104000              SCOPE

;DM=7
006702 012767 010000 171066      MOV      #KM+PSM,PSW    ;KERNEL MODE!!!,PREV SUPER MODE!!
006710 005066 177776              CLR      -2(KSP)
006714 012702 177774              MOV      #-4,R2
006720 012737 040000 001004      MOV      #VIRT,@#TEMP   ;LOAD INDEX REGISTER
006726 012737 177777 017000      MOV      #-1,@#PHYS    ;LOAD ADDRESS
006734 005237 177572              INC      @#SRO          ;CLEAR PHYSICAL ADDRESS DATA
                                ;ENABLE SEG
006740 006572 001010      KSI7:  MFPI      @TEMP+4(R2) ;-(KSP)+VIRT
006744 005037 177572              CLR      @#SRO          ;DISABLE SEG
006750 005216              INC      (KSP)          ;CHECK RESULT
006752 001401              BEQ      .+4
006754 000000              HLT
006756 104000              SCOPE          ;ERROR! INCORRECT RESULT

;TEST THAT MFPI OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC
006760 012767 010000 171010      MOV      #KM+PSM,PSW    ;KERNEL MODE!!!,PREV SUPER MODE!!
006766 005066 177776              CLR      -2(KSP)
006772 005237 177572              INC      @#SRO          ;ENABLE SEG
006776 000277              SCC
007000 006507      KSI10:  MFPI      PC          ;-(KSP)+PC
007002 016702 170770              MOV      PSW,R2        ;SAVE CC'S
007006 005037 177572              CLR      @#SRO          ;DISABLE SEG
007012 122702 000001              CMPB     #C,R2          ;CHECK CC'S
007016 001401              BEQ      .+4
007020 000000              HLT
007022 022706 001056              CMP      #KPTR-2,KSP    ;CHECK STACK PTR
007026 001401              BEQ      .+4
007030 000000              HLT
007032 022716 007002              CMP      #KSI10+2,(KSP) ;ERROR! STACK NOT PUSHED
007036 001401              BEQ      .+4          ;CHECK THAT PC WAS PUSHED ON THE STACK
007040 000000              HLT
007042 104000              SCOPE          ;ERROR! PC NOT PUSHED ON THE STACK

;DM=3,PC
007044 012767 014000 170724      MOV      #PSM+REG,PSW    ;KERNEL MODE!!!,PREV SUPER MODE!!
007052 005066 177776              CLR      -2(KSP)

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007056 012737 177777 017000      MOV      8-1,2#PHYS
007064 005237 177572      INC      2#SRO      ;ENABLE SEG
007070 006537 040000      KSI11: MFPI    2#VIRT    ;-(KSP)+VIRT
007074 005037 177572      CLR      2#SRO      ;DISABLE SEG
007100 005216      INC      (KSP)    ;CHECK RESULT
007102 001401      BEQ      .+4
007104 000000      HLT
007106 104000      SCOPE      ;ERROR! INCORRECT RESULT

;DM=6,PC
007110 012767 010340 170660      MOV      #PSM+PRTY7,PSW ;KERNEL MODE!!!, PREV SUPER MODE!!
007116 012766 177777 177776      MOV      8-1,-2(KSP)
007124 005037 017000      CLR      2#PHYS      ;PRESET PHYSICAL ADDRESS DATA
007130 005237 177572      INC      2#SRO      ;ENABLE SEG
007134 006567 030640      KSI12: MFPI    VIRT    ;-(KSP)+VIRT
007140 005037 177572      CLR      2#SRO      ;DISABLE SEG
007144 005716      TST      (KSP)    ;CHECK RESULT
007146 001401      BEQ      .+4
007150 000000      HLT
007152 104000      SCOPE      ;ERROR! INCORRECT RESULT

;DM=7,PC
007154 012767 010000 170614      MOV      #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
007162 005066 177776      CLR      -2(KSP)
007166 012737 040004 001004      MOV      #VIRT+4,2#TEMP ;LOAD ADDRESS
007174 012737 177777 017004      MOV      8-1,2#PHYS+4 ;PRESET DATA
007202 005237 177572      INC      2#SRO      ;ENABLE SEG
007206 000277      SCC
007210 006577 171570      KSI13: MFPI    2#TEMP    ;-(KSP)+VIRT+4
007214 016702 170556      MOV      PSW,R2      ;SAVE CC'S
007220 005037 177572      CLR      2#SRO      ;DISABLE SEG
007224 122702 000011      CMPB     #N+C,R2    ;CHECK CC'S
007230 001401      BEQ      .+4
007232 000000      HLT
007234 005216      INC      (KSP)    ;ERROR! INCORRECT CC'S
007236 001401      BEQ      .+4      ;CHECK RESULT
007240 000000      HLT
007242 104000      SCOPE      ;ERROR! INCORRECT RESULT ON STACK

007244 012767 010000 170524      MOV      #KM+PSM,PSW ;KERNEL MODE!!!,PREV SUPER MODE!!
007252 012716 040000      MOV      #VIRT,(KSP)
007256 005037 017000      CLR      2#PHYS
007262 005237 177572      INC      2#SRO      ;ENABLE SEG
007266 006536      KSI14: MFPI    2(KSP)+ ;-(KSP)+VIRT
007270 005037 177572      CLR      2#SRO      ;DISABLE SEG
007274 005737 001060      TST      2#KPTR      ;CHECK DATA ON THE STACK
007300 001401      BEQ      .+4
007302 000000      HLT
007304 104000      SCOPE      ;ERROR! INCORRECT DATA ON THE STACK

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120000
017 30

;TEST MFPI INSTRUCTION KERNEL MODE PREVIOUS USER MODE
VIRT=120000 ;USER VIRTUAL 'I' ADDRESS FOR THESE TESTS
PHYS=17200 ;CORRESPONDING USER PHYSICAL 'I' ADDRESS

;TEST THAT MFPI CAN GET DATA FROM A GENERAL REGISTER (R10).

007306	012767	034000	170462	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007314	012766	177777	177776	MOV	#-1,-2(KSP)	
007322	005000			CLR	R10	;PRESET REGISTER
007324	005237	177572		INC	@#SRO	;ENABLE SEG
007330	000277			SCC		;PRESET CC'S
007332	006500			MFPI	R10	;-(KSP)+(R10)
007334	016704	170436		MOV	PSW,R14	;SAVE CC'S
007340	005037	177572		CLR	@#SRO	;DISABLE SEG
007344	122704	000005		CMPB	#Z+C,R14	;CHECK CC'S
007350	001401			BEQ	.+4	
007352	000000			HLT		;ERROR! INCORRECT CC'S
007354	022706	001056		CMP	#KPTR-2,KSP	;CHECK THAT STACK PTR WAS PUSHED
007360	001401			BEQ	.+4	
007362	000000			HLT		;ERROR! INCORRECT STACK PTR
007364	005716			TST	(KSP)	;CHECK RESULT
007366	001401			BEQ	.+4	
007370	000000			HLT		;ERROR! INCORRECT RESULT
007372	005067	170400		CLR	PSW	
007376	104000			SCOPE		

;TEST THAT MFPI CAN GET DATA FROM A KERNEL VIRTUAL 'I' ADDRESS
;DM=1

007400	012767	030000	170370	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007406	005066	177776		CLR	-2(KSP)	
007412	012702	120000		MOV	#VIRT,R2	;R2=VIRTUAL ADDRESS
007416	012737	177777	017200	MOV	#-1,@#PHYS	;PRESET PHYSICAL ADDRESS
007424	005237	177572		INC	@#SRO	;ENABLE SEG
007430	000277			SCC		;PRESET CC'S
007432	0065'2			MFPI	(R2)	;-(KSP)+(R2)
007434	016703	170336		MOV	PSW,R3	;SAVE CC'S
007440	005037	177572		CLR	@#SRO	;DISABLE SEG
007444	122703	000011		CMPB	#N+C,R3	;CHECK CC'S
007450	001401			BEQ	.+4	
007452	000000			HLT		;ERROR! INCORRECT CC'S
007454	022706	001056		CMP	#KPTR-2,KSP	;CHECK THAT STACK WAS PUSHED
007460	001401			BEQ	.+4	
007462	000000			HLT		;ERROR! INCORRECT STACK PTR
007464	005216			INC	(KSP)	;CHECK RESULT
007466	001401			BEQ	.+4	
007470	000000			HLT		;ERROR! INCORRECT RESULT
007472	104000			SCOPE		

;DM=2

007474	012767	034000	170274	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007502	012766	177777	177776	MOV	#-1,-2(KSP)	
007510	012702	120000		MOV	#VIRT,R12	;R12=VIRTUAL ADDRESS
007514	005037	017200		CLR	@#PHYS	;PRESET PHYSICAL ADDRESS
007520	005237	177572		INC	@#SRO	;ENABLE SEG
007524	006522			MFPI	(R12)+	;-(KSP)+VIRT
007526	005037	177572		CLR	@#SRO	;DISABLE SEG
007532	005716			TST	(KSP)	;CHECK RESULT
007534	001401			BEQ	.+4	
007536	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
007540	022702	120002		CMP	#VIRT+2,R12	;CHECK AUTO INCREMENT
007544	001401			BEQ	.+4	
007546	000000			HLT		;ERROR! AUTO INCREMENT FAILED

K03

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 36
DCKTEB.P11

007550	005067	170222		CLR	PSW	
007554	104000			SCOPE		
;DM=3						
007556	012767	030000	170212	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007564	005066	177776		CLR	-2(KSP)	
007570	012702	001004		MOV	#TEMP,R2	;LOAD INDIRECT ADDRESS
007574	012737	120002	001004	MOV	#VIRT+2,#TEMP	;LOAD ADDRESS
007602	012737	177777	017202	MOV	#-1,#PHYS+2	;PRESET DATA
007610	005237	177572		INC	#SRO	;ENABLE SEG
007614	006532			MFPI	2(R2)+	;(KSP)+VIRT+2
007616	005037	177572		CLR	#SRO	;DISABLE SEG
007622	005216			INC	(KSP)	;CHECK RESULT
007624	001401			BEQ	.+4	
007626	000000			HLT		;ERROR! INCORRECT RESULT
007630	104000			SCOPE		
;DM=4						
007632	012767	030000	170136	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007640	012766	177777	177776	MOV	#-1,-2(KSP)	
007646	012704	120002		MOV	#VIRT+2,R4	;R4=VIRTUAL ADDRESS+2
007652	005037	017200		CLR	#PHYS	;PRESET PHYSICAL ADDRESS DATA
007656	005237	177572		INC	#SRO	;ENABLE SEG
007662	006544			MFPI	-(R4)	;(KSP)+VIRT
007664	005037	177572		CLR	#SRO	;DISABLE SEG
007670	022704	120000		CMP	#VIRT,R4	;CHECK AUTO-DECREMENT
007674	001401			BEQ	.+4	
007676	000000			HLT		;ERROR! AUTO-DECREMENT FAILED
007700	005716			TST	(KSP)	;CHECK RESULT
007702	001401			BEQ	.+4	
007704	000000			HLT		;ERROR! INCORRECT RESULT
007706	104000			SCOPE		
;DM=5						
007710	012767	034000	170060	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007716	005066	177776		CLR	-2(KSP)	
007722	012700	001006		MOV	#TEMP+2,R10	;R10=INDIRECT ADDRESS
007726	012737	120004	001004	MOV	#VIRT+4,#TEMP	;LOAD ADDRESS
007734	012737	177777	017204	MOV	#-1,#PHYS+4	;PRESET PHYSICAL ADDRESS DATA
007742	005237	177572		INC	#SRO	;ENABLE SEG
007746	006550			MFPI	2-(R10)	;(KSP)+VIRT+4
007750	005037	177572		CLR	#SRO	;DISABLE SEG
007754	005216			INC	(KSP)	;CHECK RESULT
007756	001401			BEQ	.+4	
007760	000000			HLT		
007762	005067	170010		CLR	PSW	
007766	104000			SCOPE		
;DM=6						
007770	012767	034000	170000	MOV	#PUM+REG,PSW	;KERNEL MODE!!!,PREV USER MODE!!
007776	012766	177777	177776	MOV	#-1,-2(KSP)	
010004	012702	000002		MOV	#2,R12	;LOAD INDEX REGISTER
010010	005037	017202		CLR	#PHYS+2	;PRESET PHYSICAL ADDRESS DATA
010014	005237	177572		INC	#SRO	;ENABLE SEG
010020	006562	120000		MFPI	VIRT(R12)	;(KSP)+VIRT-2
010024	005037	177572		CLR	#SRO	;DISABLE SEG

```

010030 022706 001056      CMP      #KPTR-2,KSP      ;CHECK STACK PTR
010034 001401              BEQ      .+4
010036 000000              HLT
010040 005716              TST      (KSP)      ;ERROR! INCORRECT STACK PTR
010042 001401              BEQ      .+4      ;CHECK RESULT
010044 000000              HLT
010046 005067 167724      CLR      PSW      ;ERROR! INCORRECT RESULT
010052 104000              SCOPE

;DM=7
010054 012767 030000 167714  MOV      #KM+PUM,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
010062 005066 177776      CLR      -2(KSP)
010066 012702 177774      MOV      #-4,R2      ;LOAD INDEX REGISTER
010072 012737 120000 001004  MOV      #VIRT,2#TEMP      ;LOAD ADDRESS
010100 012737 177777 017200  MOV      #-1,2#PHYS      ;CLEAR PHYSICAL ADDRESS DATA
010106 005237 177572      INC      2#SRO      ;ENABLE SEG
010112 006572 001010      MFPI      2#TEMP+4(R2)      ;-(KSP)+VIRT
010116 005037 177572      CLR      2#SRO      ;DISABLE SEG
010122 005216              INC      (KSP)      ;CHECK RESULT
010124 001401              BEQ      .+4
010126 000000              HLT      ;ERROR! INCORRECT RESULT
010130 104000              SCOPE

;TEST THAT MFPI OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC
010132 012767 030000 167636  MOV      #KM+PUM,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
010140 005066 177776      CLR      -2(KSP)
010144 005237 177572      INC      2#SRO      ;ENABLE SEG
010150 000277              SCC
010152 006507      KUI10:  MFPI      PC      ;-(KSP)+PC
010154 016702 167616      MOV      PSW,R2      ;SAVE CC'S
010160 005037 177572      CLR      2#SRO      ;DISABLE SEG
010164 122702 000001      CMPB     #C,R2      ;CHECK CC'S
010170 001401              BEQ      .+4
010172 000000              HLT
010174 022706 001056      CMP      #KPTR-2,KSP      ;CHECK STACK PTR
010200 001401              BEQ      .+4
010202 000000              HLT      ;ERROR! STACK NOT PUSHED
010204 022716 010154      CMP      #KUI10+2,(KSP)      ;CHECK THAT PC WAS PUSHED ON THE STACK
010210 001401              BEQ      .+4
010212 000000              HLT      ;ERROR! PC NOT PUSHED ON THE STACK
010214 104000              SCOPE

;DM=3,PC
010216 012767 034000 167552  MOV      #PUM+REG,PSW      ;KERNEL MODE!!!,PREV USER MODE!!
010224 005066 177776      CLR      -2(KSP)
010230 012737 177777 017200  MOV      #-1,2#PHYS
010236 005237 177572      INC      2#SRO      ;ENABLE SEG
010242 006537 120000      MFPI      2#VIRT      ;-(KSP)+VIRT
010246 005037 177572      CLR      2#SRO      ;DISABLE SEG
010252 005216              INC      (KSP)      ;CHECK RESULT
010254 001401              BEQ      .+4
010256 000000              HLT      ;ERROR! INCORRECT RESULT
010260 104000              SCOPE

;DM=6,PC

```


M03

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 38
DCKTEB.P11

010262	012767	030340	167506	MOV	#PUM+PRTY7,PSW	;KERNEL MODE!!!, PREV USER MODE!!
010270	012766	177777	177776	MOV	#-1,-2(KSP)	
010276	005037	017200		CLR	@#PHYS	;PRESET PHYSICAL ADDRESS DATA
010302	005237	177572		INC	@#SRO	;ENABLE SEG
010306	006567	107466	KUI12:	MFPI	VIRT	;-(KSP)+VIRT
010312	005037	177572		CLR	@#SRO	;DISABLE SEG
010316	005716			TST	(KSP)	;CHECK RESULT
010320	001401			BEQ	.+4	
010322	000000			HLT		;ERROR! INCORRECT RESULT
010324	104000			SCOPE		
;DM=7,PC						
010326	012767	030000	167442	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
010334	005066	177776		CLR	-2(KSP)	
010340	012737	120004	001004	MOV	#VIP,+4,@#TEMP	;LOAD ADDRESS
010346	012737	177777	017204	MOV	#-1,@#PHYS+4	;PRESET DATA
010354	005237	177572		INC	@#SRO	;ENABLE SEG
010360	000277			SCC		
010362	006577	170416	KUI13:	MFPI	@TEMP	;-(KSP)+VIRT+4
010366	016702	167404		MOV	PSW,R2	;SAVE CC'S
010372	005037	177572		CLR	@#SRO	;DISABLE SEG
010376	122702	000011		CMPB	#N+C,R2	;CHECK CC'S
010402	001401			BEQ	.+4	
010404	000000			HLT		;ERROR! INCORRECT CC'S
010406	005216			INC	(KSP)	;CHECK RESULT
010410	001401			BEQ	.+4	
010412	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
010414	104000			SCOPE		
;DM=7,PC						
010416	012767	030000	167352	MOV	#KM+PUM,PSW	;KERNEL MODE!!!,PREV USER MODE!!
010424	012716	120000		MOV	#VIRT,(KSP)	
010430	005037	017200		CLR	@#PHYS	
010434	005237	177572		INC	@#SRO	;ENABLE SEG
010440	006576	000000	KUI14:	MFPI	@(KSP)	;-(KSP)+VIRT
010444	005037	177572		CLR	@#SRO	;DISABLE SEG
010450	005737	001056		TST	@#KPTR-2	;CHECK DATA ON THE STACK
010454	001401			BEQ	.+4	
010456	000000			HLT		;ERROR! INCORRECT DATA ON THE STACK
010460	104000			SCOPE		

```
;BEGIN TESTING IN SUPERVISORY MODE
;NOTE: ALL HLT (HALT) INSTRUCTIONS WILL TRAP TO LOC 4. THE PROGRAM WILL
;ALLOW THE TRAP, ADJUST THE PC AND RETURN TO THE HLT IN KERNEL MODE. THE
;SUPERVISORY STACK POINTER IS NOT AFFECTED BY THIS TRAP. THE SUPERVISORY
;STACK POINTER IS AT PHYSICAL 0700
```

```
;START TESTS IN SUPERVISORY MODE
;LOAD SUPERVISORY MEM MGMT REGISTERS AS REQUIRED FOR TESTS.
```

010462	012737	041416	172200	MOV	#104*256.-400+DWN+RW,2#SIPDR0	;LOAD SIPDR0 RW DWN 104 BLOCKS
010470	012737	004006	172220	MOV	#11*256.-400+UP+RW,2#SDPDR0	;LOAD SDPDR0 RW UP 11 BLOCKS
010476	012737	077406	172236	MOV	#200*256.-400+UP+RW,2#SDPDR7	;LOAD SDPDR7 RW UP 200 BLOCKS
010504	012767	007600	161564	MOV	#7600,SDPAR7	;I/O PAGE

```
;TEST MFPD INSTRUCTION SUPER MODE PREVIOUS SUPER MODE.
```

```
VIRT=20000
PHYS=17100
```

```
;SUPER VIRTUAL 'D' ADDRESS FOR THESE TESTS
;CORRESPONDING SUPER PHYSICAL 'D' ADDRESS
```

010512	012737	050340	177776	MOV	#SM+PSM+PRTY7,2#PSW	;SUPER MODE!!! PREV SUPER MODE!!
010520	005066	177776		CLR	-2(SSP)	
010524	012703	177777		MOV	#-1,R3	;PRESET GENERAL REGISTER
010530	005237	177572		INC	2#SRO	;ENABLE SEG
010534	106503		SS0:	MFPD	R3	;-(SSP)+R3
010536	016702	167234		MOV	PSW,R2	;SAVE CC'S
010542	005037	177572		CLR	2#SRO	;DISABLE SEG
010546	122702	000350		CMPB	#PRTY7+N,R2	;CHECK CC'S
010552	001401			BEQ	.+4	
010554	000000			HLT		;ERROR! INCORRECT CC'S AFTER MFPD
010556	022706	000676		CMP	#SPTR-2,SSP	;CHECK THAT STACK WAS PUSHED
010562	001401			BEQ	.+4	
010564	000000			HLT		;ERROR! INCORRECT STACK PTR
010566	005216			INC	(KSP)	;CHECK RESULT
010570	001401			BEQ	.+4	
010572	000000			HLT		;ERROR! INCORRECT RESULT
010574	104000			SCOPE		

```
;DM=2
```

010576	012767	054000	167172	MOV	#SM+PSM+REG,PSW	;SUPER MODE!!!,PREV SUPER MODE!!
010604	012766	177777	177776	MOV	#-1,-2(SSP)	
010612	012702	020000		MOV	#VIRT,R12	;R12=VIRTUAL ADDRESS
010616	005037	017100		CLR	2#PHYS	;PRESET PHYSICAL ADDRESS
010622	005237	177572		INC	2#SRO	;ENABLE SEG
010626	106522		SS2:	MFPD	(R12)+	;-(SSP)+VIRT
010630	005037	177572		CLR	2#SRO	;DISABLE SEG
010634	005716			TST	(SSP)	;CHECK RESULT
010636	001401			BEQ	.+4	
010640	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
010642	022702	020002		CMP	#VIRT+2,R12	;CHECK AUTO INCREMENT
010646	001401			BEQ	.+4	
010650	000000			HLT		;ERROR! AUTO INCREMENT FAILED
010652	005067	167120		CLR	PSW	
010656	104000			SCOPE		

```
;DM=4
```

010660	012767	050000	167110	MOV	#SM+PSM,PSW	;SUPER MODE!!!,PREV SUPER MODE!!
010666	012766	177777	177776	MOV	#-1,-2(SSP)	
010674	012704	020002		MOV	#VIRT+2,R4	;R4=VIRTUAL ADDRESS+2

```

010700 005037 017100          CLR      2#PHYS      ;PRESET PHYSICAL ADDRESS DATA
010704 005237 177572          INC      2#SRO      ;ENABLE SEG
010710 106544          MFPD      -(R4)          ;-(SSP)+VIRT
010712 005037 177572          CLR      2#SRO      ;DISABLE SEG
010716 022704 020000          CMP      2#VIRT,R4 ;CHECK AUTO-DECREMENT
010722 001401          BEQ      .+4
010724 000000          HLT
010726 005716          TST      (SSP)          ;ERROR! AUTO-DECREMENT FAILED
010730 001401          BEQ      .+4          ;CHECK RESULT
010732 000000          HLT
010734 104000          SCOPE          ;ERROR! INCORRECT RESULT

```

```

;DM=6
010736 012767 054000 167032 MOV      2#SM+PSH+REG,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
010744 012766 177777 177776 MOV      2#-1,-2(SSP)
010752 012702 000002          MOV      2#R12      ;LOAD INDEX REGISTER
010756 005037 017102          CLR      2#PHYS+2    ;PRESET PHYSICAL ADDRESS DATA
010762 005237 177572          INC      2#SRO      ;ENABLE SEG
010766 106562 020000          MFPD      VIRT(R12)  ;-(SSP)+VIRT-2
010772 005037 177572          CLR      2#SRO      ;DISABLE SEG
010776 022706 000676          CMP      2#SPTR-2,SSP ;CHECK STACK PTR
011002 001401          BEQ      .+4
011004 000000          HLT          ;ERROR! INCORRECT STACK PTR
011006 005716          TST      (SSP)          ;CHECK RESULT
011010 001401          BEQ      .+4
011012 000000          HLT          ;ERROR! INCORRECT RESULT
011014 005067 166756          CLR      PSH
011020 104000          SCOPE

```

```

;TEST THAT MFPD OPERATES PROPERLY USING PC IN DESTINATION
;DM=3,PC
011022 012767 054000 166746 MOV      2#SM+PSH+REG,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
011030 005066 177776          CLR      -2(SSP)
011034 012737 177777 017100 MOV      2#-1,2#PHYS
011042 005237 177572          INC      2#SRO      ;ENABLE SEG
011046 106537 020000          MFPD      2#VIRT    ;-(SSP)+VIRT
011052 005037 177572          CLR      2#SRO      ;DISABLE SEG
011056 005216          INC      (SSP)          ;CHECK RESULT
011060 001401          BEQ      .+4
011062 000000          HLT          ;ERROR! INCORRECT RESULT
011064 104000          SCOPE

```

```

;DM=6,PC
011066 012737 050340 177776 MOV      2#SM+PSH+PRTY7,2#PSW ;SUPER MODE!!! PREV SUPER MODE!!
011074 012766 177777 177776 MOV      2#-1,-2(SSP)
011102 005037 017100          CLR      2#PHYS      ;PRESET PHYSICAL ADDRESS DATA
011106 005237 177572          INC      2#SRO      ;ENABLE SEG
011112 106567 006662          MFPD      VIRT      ;-(SSP)+VIRT
011116 005037 177572          CLR      2#SRO      ;DISABLE SEG
011122 005716          TST      (SSP)          ;CHECK RESULT
011124 001401          BEQ      .+4
011126 000000          HLT          ;ERROR! INCORRECT RESULT
011130 104000          SCOPE

```

```

;DM=7,PC
011132 012767 050000 166636 MOV      2#SM+PSH,PSW ;SUPER MODE!!!,PREV SUPER MODE!!

```

C04

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 41
DCKTEB.P11

011140	005066	177776		CLR	-2(SSP)	
011144	012737	020004	017102	MOV	#VIRT+4, 2#PHYS+2	: LOAD ADDRESS
011152	012737	177777	017104	MOV	8-1, 2#PHYS+4	: PRESET DATA
011160	005237	177572		INC	2#SAD	: ENABLE SEG
011164	000277			SCC		
011166	106577	006610	SS13:	HF PD	2#VIRT+2	: -(SSP)+VIRT+4
011172	016702	166600		MOV	PSW, R2	: SAVE CC'S
011176	005037	177572		CLR	2#SAD	: DISABLE SEG
011202	122702	000011		CMPS	#N+C, R2	: CHECK CC'S
011206	001401			BEQ	.+4	
011210	000000			HLT		: ERROR! INCORRECT CC'S
011212	005216			INC	(SSP)	: CHECK RESULT
011214	001401			BEQ	.+4	
011216	000000			HLT		: ERROR! INCORRECT RESULT ON STACK
011220	104000			SCOPE		

```

;TEST MFPD INSTRUCTION SUPER MODE PREVIOUS USER MODE.
;VIRT=100000 ;USER VIRTUAL 'D' ADDRESS FOR THESE TESTS
;PHYS=17300 ;CORRESPONDING USER PHYSICAL ADDRESS

100000
017300

;TEST THAT MFPD CAN GET DATA FROM A GENERAL REGISTER (R10)
;SUPER MODE!!!,PREV USER MODE!!
SU0:
011222 012767 074000 166546 MOV #SM+PLM+REG,PSW ;PRESET REGISTER
011230 012766 177777 177776 MOV #1,-2(SSP) ;ENABLE SEG
011236 005000 CLR R10 ;PRESET CC'S
011240 005237 177572 INC @#SR0 ;-(SSP)+(R10)
011244 000277 SCC ;SAVE CC'S
011246 106500 MFPD R10 ;DISABLE SEG
011250 016704 166522 MOV PSW,R14 ;CHECK CC'S
011254 005037 177572 CLR @#SR0 ;ERROR! INCORRECT CC'S
011260 122704 000005 CMPB #Z+C,R14 ;CHECK THAT STACK PTR WAS PUSHED
011264 001401 BEQ .+4 ;ERROR! INCORRECT STACK PTR
011266 000000 HLT ;CHECK RESULT
011270 022706 000676 CMP #SPTR-2,SSP ;ERROR! INCORRECT RESULT
011274 001401 BEQ .+4
011276 000000 HLT
011300 005716 TST (SSP)
011302 001401 BEQ .+4
011304 000000 HLT
011306 005067 166464 CLR PSW
011312 104000 SCOPE

;TEST THAT MFPD CAN GET DATA FROM A USER VIRTUAL 'D' ADDRESS
;DM=1
SU1:
011314 012767 070000 166454 MOV #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
011322 005066 177776 CLR -2(SSP) ;R2=VIRTUAL ADDRESS
011326 012702 100000 017300 MOV #VIRT,R2 ;PRESET PHYSICAL ADDRESS
011332 012737 177777 INC @#PHYS ;ENABLE SEG
011340 005237 177572 INC @#SR0 ;PRESET CC'S
011344 000277 SCC ;-(SSP)+(R2)
011346 106512 MFPD (R2) ;SAVE CC'S
011350 016703 166422 MOV PSW,R3 ;DISABLE SEG
011354 005037 177572 CLR @#SR0 ;CHECK CC'S
011360 122703 000011 CMPB #N+C,R3 ;ERROR! INCORRECT CC'S
011364 001401 BEQ .+4 ;CHECK THAT STACK WAS PUSHED
011366 000000 HLT ;ERROR! INCORRECT STACK PTR
011370 022706 000676 CMP #SPTR-2,SSP ;CHECK RESULT
011374 001401 BEQ .+4 ;ERROR! INCORRECT RESULT
011376 000000 HLT
011400 005216 INC (SSP)
011402 001401 BEQ .+4
011404 000000 HLT
011406 104000 SCOPE

;DM=3
SU3:
011410 012767 070000 166360 MOV #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
011416 005066 177776 CLR -2(SSP) ;LOAD INDIRECT ADDRESS
011422 012702 001004 001004 MOV #TEMP,R2 ;LOAD ADDRESS
011426 012737 100002 017302 MOV #VIRT+2,@#TEMP ;PRESET DATA
011434 012737 177777 INC @#PHYS+2 ;ENABLE SEG
011442 005237 177572 INC @#SR0 ;-(SSP)+VIRT+2
011446 106532 MFPD @#R2+ ;DISABLE SEG
011450 005037 177572 CLR @#SR0

```

```

011454 005216          INC      (SSP)          ;CHECK RESULT
011456 001401          BEQ      .+4
011460 000000          HLT
011462 104000          SCOPE                    ;ERROR! INCORRECT RESULT

;DM=5
011464 012767 074000 166304 MOV     #SM+PUM+REG,PSW ;SUPER MODE!!!,PREV USER MODE!!
011472 005066 177776      CLR     -2(SSP)
011476 012700 001006      MOV     #TEMP+2,R10 ;R10=INDIRECT ADDRESS
011502 012737 100004 001004 MOV     #VIRT+4,#TEMP ;LOAD ADDRESS
011510 012737 177777 017304 MOV     #1,#PHYS+4 ;PRESET PHYSICAL ADDRESS DATA
011516 005237 177572      INC     #SRO ;ENABLE SEG
011522 106550          MFPO    2-(R10) ;-(SSP)+VIRT+4
011524 005037 177572      CLR     #SRO ;DISABLE SEG
011530 005216          INC     (SSP) ;CHECK RESULT
011532 001401          BEQ      .+4
011534 000000          HLT
011536 005067 166234      CLR     PSW
011542 104000          SCOPE

;DM=6
011544 012767 074000 166224 MOV     #SM+PUM+REG,PSW ;SUPER MODE!!!,PREV USER MODE!!
011552 012766 177777 177776 MOV     #1,-2(SSP)
011560 012702 000002      MOV     #2,R12 ;LOAD INDEX REGISTER
011564 005037 017302      CLR     #PHYS+2 ;PRESET PHYSICAL ADDRESS DATA
011570 005037 177572      INC     #SRO ;ENABLE SEG
011574 106562 100000      MFPO    VIRT(R12) ;-(SSP)+VIRT-2
011600 005037 177572      CLR     #SRO ;DISABLE SEG
011604 022706 000676      CMP     #SPTR-2,SSP ;CHECK STACK PTR
011610 001401          BEQ      .+4
011612 000000          HLT ;ERROR! INCORRECT STACK PTR
011614 005716          TST     (SSP) ;CHECK RESULT
011616 001401          BEQ      .+4
011620 000000          HLT ;ERROR! INCORRECT RESULT
011622 005067 166150      CLR     PSW
011626 104000          SCOPE

;DM=7
011630 012767 070000 166140 MOV     #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
011636 005066 177776      CLR     -2(SSP)
011642 012702 177774      MOV     #4,R2 ;LOAD INDEX REGISTER
011646 012737 100000 001004 MOV     #VIRT,#TEMP ;LOAD ADDRESS
011654 012737 177777 017300 MOV     #1,#PHYS ;CLEAR PHYSICAL ADDRESS DATA
011662 005237 177572      INC     #SRO ;ENABLE SEG
011666 106572 001010      MFPO    #TEMP+4(R2) ;-(SSP)+VIRT
011672 005037 177572      CLR     #SRO ;DISABLE SEG
011676 005216          INC     (SSP) ;CHECK RESULT
011700 001401          BEQ      .+4
011702 000000          HLT ;ERROR! INCORRECT RESULT
011704 104000          SCOPE

;TEST THAT MFPO OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC
011706 012767 070000 166062 MOV     #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
011714 005066 177776      CLR     -2(SSP)
011720 005237 177572      INC     #SRO ;ENABLE SEG

```


F04

POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 44
DCKTEB.P11

011724	000277			SU10:	SCC			
011726	1C6507				MFPD	PC	;(SSP)+PC	
011730	016702	166042			MOV	PSW, R2	;SAVE CC'S	
011734	005037	177572			CLR	@SR0	;DISABLE SEG	
011740	122702	000001			CMPB	PC, R2	;CHECK CC'S	
011744	001401				BEQ	.+4		
011746	000000				HLT			
011750	022706	000676			CMP	@SPTR-2, SSP	;CHECK STACK PTR	
011754	001401				BEQ	.+4		
011756	000000				HLT		;ERROR! STACK NOT PUSHED	
011760	022716	011730			CMP	@SU10+2, (SSP)	;CHECK THAT PS WAS PUSHED ON THE STACK	
011764	001401				BEQ	.+4		
011766	000000				HLT		;ERROR! PC NOT PUSHED ON THE STACK	
011770	104000				SCOPE			
;DM=3, PC								
011772	012767	074000	165776		MOV	@SM+PUM+REG, PSW	;SUPER MODE!!!, PREV USER MODE!!	
012000	005066	177776			CLR	-2(SSP)		
012004	012737	177777	017300		MOV	@-1, @PHYS		
012012	005237	177572			INC	@SR0	;ENABLE SEG	
012016	1C6537	100000		SU11:	MFPD	@VIRT	;(SSP)+VIRT	
012022	005037	177572			CLR	@SR0	;DISABLE SEG	
012026	005216				INC	(SSP)	;CHECK RESULT	
012030	001401				BEQ	.+4		
012032	000000				HLT		;ERROR! INCORRECT RESULT	
012034	104000				SCOPE			
;DM=6, PC								
012036	012737	070340	177776		MOV	@SM+PUM+PTY7, @PSW	;SUPER MODE!!! PREV USER MODE!!	
012044	012766	177777	177776		MOV	@-1, -2(SSP)		
012052	005037	017300			CLR	@PHYS	;PRESET PHYSICAL ADDRESS DATA	
012056	005237	177572			INC	@SR0	;ENABLE SEG	
012062	1C6567	065712		SU12:	MFPD	VIRT	;(SSP)+VIRT	
012066	005037	177572			CLR	@SR0	;DISABLE SEG	
012072	005716				TST	(SSP)	;CHECK RESULT	
012074	001401				BEQ	.+4		
012076	000000				HLT		;ERROR! INCORRECT RESULT	
012100	104000				SCOPE			
;DM=6, PC								
012102	012767	070000	165666		MOV	@SM+PUM, PSW	;SUPER MODE!!!, PREV USER MODE!!	
012110	012766	177777	177776		MOV	@-1, -2(SSP)	;PRESET DATA ON STACK	
012116	012726	100000			MOV	@VIRT, (SSP)+		
012122	005037	017300			CLR	@PHYS		
012126	005237	177572			INC	@SR0	;ENABLE SEG	
012132	106556			SU14:	MFPD	@-1, (SSP)	;(SSP)+VIRT	
012134	005037	177572			CLR	@SR0	;DISABLE SEG	
012140	005737	000676			TST	@SPTR-2	;CHECK DATA ON THE STACK	
012144	001401				BEQ	.+4		
012146	000000				HLT		;ERROR! INCORRECT DATA ON THE STACK	
012150	104000				SCOPE			

```

;TEST MFPI INSTRUCTION SUPER MODE PREVIOUS SUPER MODE.
                                VIRT=40000 ;SUPER VIRTUAL 'I' ADDRESS FOR THESE TESTS
                                PHYS=17000 ;CORRESPONDING SUPER PHYSICAL 'I' ADDRESS

012152 012767 054000 165616      MOV    #SM+PSM+REG,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
012160 005066 177776              CLR    -2(SSP)
012164 012703 177777              MOV    #1,R13 ;PRESET GENERAL REGISTER
012170 005237 177572              INC    @#SRO ;ENABLE SEG
012174 006503 165574              MFPI   R13 ;-(SSP)+R13
012176 016702 177572              MOV    PSW,R12 ;SAVE CC'S
012202 005037 177572              CLR    @#SRO ;DISABLE SEG
012206 022702 054010              CMP    #SM+PSM+REG+N,R12 ;CHECK STATUS AFTER MFPI
012212 001401 .+4
012214 000000 HLT
012216 022706 000676              CMP    #SPTR-2,SSP ;ERROR! INCORRECT CC'S AFTER MFPI
012222 001401 .+4 ;CHECK THAT STACK WAS PUSHED
012224 000000 HLT ;ERROR! INCORRECT STACK PTR
012226 005216 INC (KSP) ;CHECK RESULT
012230 001401 BEQ .+4
012232 000000 HLT ;ERROR! INCORRECT RESULT
012234 104000 SCOPE

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;TEST THAT MFPI CAN GET DATA FROM A SUPERVISOR VIRTUAL 'I' ADDRESS
;DM=1

012236 012767 050000 165532      MOV    #SM+PSM,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
012244 005066 177776              CLR    -2(SSP)
012250 012702 040000              MOV    #VIRT,R2 ;R2=VIRTUAL ADDRESS
012254 012737 177777 017000      MOV    #1,@#PHYS ;PRESET PHYSICAL ADDRESS
012262 005237 177572              INC    @#SRO ;ENABLE SEG
012266 000277 SCC ;PRESET CC'S
012270 006512 MFPI (R2) ;-(SSP)+R2
012272 016703 165500              MOV    PSW,R3 ;SAVE CC'S
012276 005037 177572              CLR    @#SRO ;DISABLE SEG
012302 122703 000011              CMPB  #N+C,R3 ;CHECK CC'S
012306 001401 BEQ .+4
012310 000000 HLT ;ERROR! INCORRECT CC'S
012312 022706 000676              CMP    #SPTR-2,SSP ;CHECK THAT STACK WAS PUSHED
012316 001401 BEQ .+4
012320 000000 HLT ;ERROR! INCORRECT STACK PTR
012322 005216 INC (SSP) ;CHECK RESULT
012324 001401 BEQ .+4
012326 000000 HLT ;ERROR! INCORRECT RESULT
012330 104000 SCOPE

```

```

;DM=3

012332 012767 050000 165436      MOV    #SM+PSM,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
012340 005066 177776              CLR    -2(SSP)
012344 012702 001004              MOV    #TEMP,R2 ;LOAD INDIRECT ADDRESS
012350 012737 040002 001004      MOV    #VIRT+2,@#TEMP ;LOAD ADDRESS
012356 012737 177777 017002      MOV    #1,@#PHYS+2 ;PRESET DATA
012364 005237 177572              INC    @#SRO ;ENABLE SEG
012370 006532 MFPI @R2+ ;-(SSP)+VIRT+2
012372 005037 177572              CLR    @#SRO ;DISABLE SEG
012376 005216 INC (SSP) ;CHECK RESULT
012400 001401 BEQ .+4
012402 000000 HLT ;ERROR! INCORRECT RESULT

```


012404 104000

SCOPE

```

;DM=5
012406 012767 054000 165362 MOV #SM+PSM+REG,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
012414 005066 177776 CLR -2(SSP)
012420 012700 001006 MOV #TEMP+2,R10 ;R10=INDIRECT ADDRESS
012424 012737 040004 001004 MOV #VIRT+4,#TEMP ;LOAD ADDRESS
012432 012737 177777 017004 MOV #1,#PHYS+4 ;PRESET PHYSICAL ADDRESS DATA
012440 005237 177572 INC @#SRO ;ENABLE SEG
012444 006550 SS15: MFPI @-(R10) ;-(SSP)+VIRT+4
012446 005037 177572 CLR @#SRO ;DISABLE SEG
012452 005216 INC (SSP) ;CHECK RESULT
012454 001401 BEQ .+4
012456 000000 HLT
012460 005067 165312 CLR PSW
012464 104000 SCOPE

```

```

;DM=7
012466 012767 050000 165302 MOV #SM+PSM,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
012474 005066 177776 CLR -2(SSP)
012500 012702 177774 MOV #4,R2 ;LOAD INDEX REGISTER
012504 012737 040000 001004 MOV #VIRT,#TEMP ;LOAD ADDRESS
012512 012737 177777 017000 MOV #1,#PHYS ;CLEAR PHYSICAL ADDRESS DATA
012520 005237 177572 INC @#SRO ;ENABLE SEG
012524 006572 001010 SS17: MFPI @TEMP+4(R2) ;-(SSP)+VIRT
012530 005037 177572 CLR @#SRO ;DISABLE SEG
012534 005216 INC (SSP) ;CHECK RESULT
012536 001401 BEQ .+4
012540 000000 HLT ;ERROR! INCORRECT RESULT
012542 104000 SCOPE

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```

;TEST THAT MFPI OPERATES PROPERLY USING PC IN DESTINATION
;DM=0,PC

```

```

012544 012767 050000 165224 MOV #SM+PSM,PSW ;SUPER MODE!!!,PREV SUPER MODE!!
012552 005066 177776 CLR -2(SSP)
012556 005237 177572 INC @#SRO ;ENABLE SEG
012562 000277 SCC
012564 006507 SS110: MFPI PC ;-(SSP)+PC
012566 016702 165204 MOV PSW,R2 ;SAVE CC'S
012572 005037 177572 CLR @#SRO ;DISABLE SEG
012576 122702 000001 CMPB #C,R2 ;CHECK CC'S
012602 001401 BEQ .+4
012604 000000 HLT
012606 022706 000676 CMP #SPTR-2,SSP ;CHECK STACK FTR
012612 001401 BEQ .+4
012614 000000 HLT ;ERROR! STACK NOT PUSHED
012616 022716 012566 CMP #SS110+2,(SSP) ;CHECK THAT PS WAS PUSHED ON THE STACK
012622 001401 BEQ .+4
012624 000000 HLT ;ERROR! PC NOT PUSHED ON THE STACK
012626 104000 SCOPE

```

```

;DM=6,PC
012630 012737 050340 177776 MOV #SM+PSM+PRTY7,@#PSW ;SUPER MODE!!! PREV SUPER MODE!!
012636 012766 177777 177776 MOV #-1,-2(SSP)

```

012644	005037	017000		CLR	2#PHYS	; PRESET PHYSICAL ADDRESS DATA
012650	005237	177572		INC	2#SR0	; ENABLE SEG
012654	006567	025120		MFPI	VIRT	; -(SSP)+VIRT
012660	005037	177572	SSI12:	CLR	2#SR0	; DISABLE SEG
012664	005716			TST	(SSP)	; CHECK RESULT
012666	001401			BEQ	.+4	
012670	000000			HLT		; ERROR! INCORRECT RESULT
012672	104000			SCOPE		
; DM=7, PC;						
012674	012767	050000	165074	MOV	2#SM+PSM, PSW	; SUPER MODE!!!, PREV SUPER MODE!!
012702	005066	177776		CLR	-2(SSP)	
012706	012737	040004	001004	MOV	2#VIRT+4, 2#TEMP	; LOAD ADDRESS
012714	012737	177777	017004	MOV	2#-1, 2#PHYS+4	; PRESET DATA
012722	005237	177572		INC	2#SR0	; ENABLE SEG
012726	000277			SCC		
012730	006577	166050		SSI13:	2#TEMP	; -(SSP)+VIRT+4
012734	016702	165036		MOV	PSW, R2	; SAVE CC'S
012740	005037	177572		CLR	2#SR0	; DISABLE SEG
012744	122702	000011		CMPB	2#N+C, R2	; CHECK CC'S
012750	001401			BEQ	.+4	
012752	000000			HLT		; ERROR! INCORRECT CC'S
012754	005216			INC	(SSP)	; CHECK RESULT
012756	001401			BEQ	.+4	
012760	000000			HLT		; ERROR! INCORRECT RESULT ON STACK
012762	104000			SCOPE		
; DM=2, PC;						
012764	012767	050000	165004	MOV	2#SM+PSM, PSW	; SUPER MODE!!!, PREV SUPER MODE!!
012772	012766	177777	177776	MOV	2#-1, -2(SSP)	
013000	005237	177572		INC	2#SR0	; ENABLE SEG
013004	006527			SSI14:	(PC)+	; PUSH NEXT WORD ON THE STACK
013006	000000			HLT		; THIS IS THE DATA, IF PROG HALTS
						; HERE THEN AUTO-INC PC FAILED
013010	005716			TST	(SSP)	; CHECK DATA ON THE STACK
013012	001401			BEQ	.+4	
013014	000000			HLT		; ERROR! INCORRECT DATA ON THE STACK.
013016	005037	177572		CLR	2#SR0	; DISABLE SEG
013022	104000			SCOPE		

```

;TEST MFPI INSTRUCTION SUPER MODE PREVIOUS USER MODE.
;VIRT=120000 ;USER VIRTUAL 'I' ADDRESS FOR THESE TESTS
;PHYS=17200 ;CORRESPONDING USER PHYSICAL ADDRESS

120000
017200

;TEST THAT MFPI CAN GET DATA FROM A GENERAL REGISTER (R10)
;TEST THAT MFPI CAN GET DATA FROM A USER VIRTUAL ADDRESS
;DM=2

013024 012767 074000 164744 ;MOV #SM+PUM+REG,PSW ;SUPER MODE!!!,PREV USER MODE!!
013032 012766 177777 177776 ;MOV #1,-2(SSP)
013040 012702 120000 ;MOV #VIRT,R12 ;R12=VIRTUAL ADDRESS
013044 005037 017200 ;CLR #PHYS ;PRESET PHYSICAL ADDRESS
013050 005237 177572 ;INC #SRO ;ENABLE SEG
013054 005522 ;MFPI (R12)+ ;-(SSP)+VIRT
013056 005037 177572 ;CLR #SRO ;DISABLE SEG
013062 005716 ;TST (SSP) ;CHECK RESULT
013064 001401 ;BEQ .+4
013066 000000 ;HLT ;ERROR! INCORRECT RESULT ON STACK
013070 022702 120002 ;CMP #VIRT+2,R12 ;CHECK AUTO INCREMENT
013074 001401 ;BEQ .+4
013076 000000 ;HLT ;ERROR! AUTO INCREMENT FAILED
013100 005067 164672 ;CLR PSW
013104 104000 ;SCOPE

;DM=3

013106 012767 070000 164662 ;MOV #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
013114 005066 177776 ;CLR -2(SSP)
013120 012702 001004 ;MOV #TEMP,R2 ;LOAD INDIRECT ADDRESS
013124 012737 120002 001004 ;MOV #VIRT+2,#TEMP ;LOAD ADDRESS
013132 012737 177777 017202 ;MOV #1,#PHYS+2 ;PRESET DATA
013140 005237 177572 ;INC #SRO ;ENABLE SEG
013144 006532 ;MFPI (R2)+ ;-(SSP)+VIRT+2
013146 005037 177572 ;CLR #SRO ;DISABLE SEG
013152 005216 ;INC (SSP) ;CHECK RESULT
013154 001401 ;BEQ .+4
013156 000000 ;HLT ;ERROR! INCORRECT RESULT
013160 104000 ;SCOPE

;DM=4

013162 012767 070000 164606 ;MOV #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
013170 012766 177777 177776 ;MOV #1,-2(SSP)
013176 012704 120002 ;MOV #VIRT+2,R4 ;R4=VIRTUAL ADDRESS+2
013202 005037 017200 ;CLR #PHYS ;PRESET PHYSICAL ADDRESS DATA
013206 005237 177572 ;INC #SRO ;ENABLE SEG
013212 006544 ;MFPI -(R4) ;-(SSP)+VIRT
013214 005037 177572 ;CLR #SRO ;DISABLE SEG
013220 022704 120000 ;CMP #VIRT,R4 ;CHECK AUTO-DECREMENT
013224 001401 ;BEQ .+4
013226 000000 ;HLT ;ERROR! AUTO-DECREMENT FAILED
013230 005716 ;TST (SSP) ;CHECK RESULT
013232 001401 ;BEQ .+4
013234 000000 ;HLT ;ERROR! INCORRECT RESULT
013236 104000 ;SCOPE

;DM=5

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K04

POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 49
DCKTEB.P11

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013240 012767 074000 164530      MOV      #SM+PUM+REG,PSW ;SUPER MODE!!!,PREV USER MODE!!
013246 005066 177776              CLR      -2(SSP)
013252 012700 001006              MOV      #TEMP+2,R10 ;R10=INDIRECT ADDRESS
013256 012737 120004 001004      MOV      #VIRT+4,#TEMP ;LOAD ADDRESS
013264 012737 177777 017204      MOV      #-1,#PHYS+4 ;PRESET PHYSICAL ADDRESS DATA
013272 005237 177572              INC      #SRO ;ENABLE SEG
013276 006550              SUI5: MFPI    2-(R10) ;-(SSP)+VIRT+4
013300 005037 177572              CLR      #SRO ;DISABLE SEG
013304 005216              INC      (SSP) ;CHECK RESULT
013306 001401              BEQ      .+4
013310 000000              HLT
013312 005067 164460              CLR      PSW
013316 104000              SCOPE

;DM=6
013320 012767 074000 164450      MOV      #SM+PUM+REG,PSW ;SUPER MODE!!!,PREV USER MODE!!
013326 012766 177777 177776      MOV      #-1,-2(SSP)
013334 012702 000002              MOV      #2,R12 ;LOAD INDEX REGISTER
013340 005037 017202              CLR      #PHYS+2 ;PRESET PHYSICAL ADDRESS DATA
013344 005237 177572              INC      #SRO ;ENABLE SEG
013350 006562 120000              SUI6: MFPI    VIRT(R12) ;-(SSP)+VIRT-2
013354 005037 177572              CLR      #SRO ;DISABLE SEG
013360 022706 000676              CMP      #SPTR-2,SSP ;CHECK STACK PTR
013364 001401              BEQ      .+4
013366 000000              HLT ;ERROR! INCORRECT STACK PTR
013370 005716              TST      (SSP) ;CHECK RESULT
013372 001401              BEQ      .+4
013374 000000              HLT ;ERROR! INCORRECT RESULT
013376 005067 164374              CLR      PSW
013402 104000              SCOPE

;DM=7
013404 012767 070000 164364      MOV      #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
013412 005066 177776              CLR      -2(SSP)
013416 012702 177774              MOV      #-4,R2 ;LOAD INDEX REGISTER
013422 012737 120000 001004      MOV      #VIRT,#TEMP ;LOAD ADDRESS
013430 012737 177777 017200      MOV      #-1,#PHYS ;CLEAR PHYSICAL ADDRESS DATA
013436 005237 177572              INC      #SRO ;ENABLE SEG
013442 006572 001010              SUI7: MFPI    #TEMP+4(R2) ;-(SSP)+VIRT
013446 005037 177572              CLR      #SRO ;DISABLE SEG
013452 005216              INC      (SSP) ;CHECK RESULT
013454 001401              BEQ      .+4
013456 000000              HLT ;ERROR! INCORRECT RESULT
013460 104000              SCOPE

;TEST THAT MFPI OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC
013462 012767 070000 164306      MOV      #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
013470 005066 177776              CLR      -2(SSP)
013474 005237 177572              INC      #SRO ;ENABLE SEG
013500 000277              SCC
013502 006507              SUI10: MFPI    PC ;-(SSP)+PC
013504 016702 164266              MOV      PSW,R2 ;SAVE CC'S
013510 005037 177572              CLR      #SRO ;DISABLE SEG
013514 122702 000001              CMPB    #C,R2 ;CHECK CC'S
013520 001401              BEQ      .+4

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013522 000000          HLT
013524 022706 000676  CMP      #SPTR-2,SSP      ;CHECK STACK PTR
013530 001401          BEQ      .+4
013532 000000          HLT
013534 022716 013504  CMP      #SUI10+2,(SSP) ;ERROR! STACK NOT PUSHED
                                ;CHECK THAT PC WAS PUSHED ON THE STACK
013540 001401          BEQ      .+4
013542 000000          HLT
013544 104000          SCOPE      ;ERROR! PC NOT PUSHED ON THE STACK

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```

                                ;DM=3,PC
013546 012767 074000 164222 MOV      #SM+PUM+REG,PSW ;SUPER MODE!!!,PREV USER MODE!!
013554 005066 177776          CLR      -2(SSP)
013560 012737 177777 017200 MOV      #-1,2#PHYS
013566 005237 177572          INC      2#SR0      ;ENABLE SEG
013572 006537 120000          MFPI    2#VIRT      ;--(SSP)+VIRT
013576 005037 177572          CLR      2#SR0      ;DISABLE SEG
013602 005216          INC      (SSP)      ;CHECK RESULT
013604 001401          BEQ      .+4
013606 000000          HLT
013610 104000          SCOPE      ;ERROR! INCORRECT RESULT

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```

                                ;DM=6,PC
013612 012737 070340 177776 MOV      #SM+PUM+PRTY7,2#PSW ;SUPER MODE!!! PREV USER MODE!!
013620 012766 177777 177776 MOV      #-1,-2(SSP)
013626 005037 017200          CLR      2#PHYS      ;PRESET PHYSICAL ADDRESS DATA
013632 005237 177572          INC      2#SR0      ;ENABLE SEG
013636 006567 104136          MFPI    VIRT      ;--(SSP)+VIRT
013642 005037 177572          CLR      2#SR0      ;DISABLE SEG
013646 005716          TST      (SSP)      ;CHECK RESULT
013650 001401          BEQ      .+4
013652 000000          HLT
013654 104000          SCOPE      ;ERROR! INCORRECT RESULT

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```

                                ;DM=7,PC
013656 012767 070000 164112 MOV      #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
013664 005066 177776          CLR      -2(SSP)
013670 012737 120004 001004 MOV      #VIRT+4,2#TEMP ;LOAD ADDRESS
013676 012737 177777 017204 MOV      #-1,2#PHYS+4 ;PRESET DATA
013704 005237 177572          INC      2#SR0      ;ENABLE SEG
013710 000277          SCC
013712 006577 165066          MFPI    2#TEMP      ;--(SSP)+VIRT+4
013716 016702 164054          MOV      PSW,R2      ;SAVE CC'S
013722 005037 177572          CLR      2#SR0      ;DISABLE SEG
013726 122702 000011          CMPB    #N+C,R2      ;CHECK CC'S
013732 001401          BEQ      .+4
013734 000000          HLT
013736 005216          INC      (SSP)      ;ERROR! INCORRECT CC'S
013740 001401          BEQ      .+4      ;CHECK RESULT
013742 000000          HLT
013744 104000          SCOPE      ;ERROR! INCORRECT RESULT ON STACK

```

```

                                ;DM=2,PC
013746 012767 070000 16402~ MOV      #SM+PUM,PSW ;SUPER MODE!!!,PREV USER MODE!!
013754 012766 177777 177776 MOV      #-1,-2(SSP)
013762 012737 014006 000250 MOV      #SUI14A,2#MMVEC
013770 012737 040000 000252 MOV      #SM,2#MMVEC+2 ;WILL BE IN SUPER MODE ON ABORT

```

M04

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 51
DCKTEB.P11

013776	005237	177572		INC	2#SR0	;ENABLE SEG
014002	006517		SUI14:	MFPI	(PC)	;ABORTS WHEN NEXT WORD IS PUSHED
014004	000000			HLT		;ERROR! FAILED TO ABORT
014006	042737	000001	177572	SUI14A:	BIC	2#SR0
014014	022737	140140	177572	CMP	#NRA+PLA+UPG+IS+VPO,2#SR0	;CHECK ABORT CONDITIONS
014022	001401			BEQ	.+4	
014024	000000			HLT		;ERROR! INCORRECT ABORT CONDITIONS
014026	022737	014002	177576	CMP	2#SUI14,2#SR2	;CHECK PC OF ABORTED INST
014034	001401			BEQ	.+4	
014036	000000			HLT		;INCORRECT PC STORED IN SR2
014040	005037	177572		CLR	2#SR0	;DISABLE SEG
014044	022706	000674		CMP	2#SPTR-4,SSP	;CHECK STACK PTR
014050	001401			BEQ	.+4	
014052	000000			HLT		;ERROR! INCORRECT STACK PTR
014054	012737	000520	000250	MOV	2#MMERR,2#MMVEC	
014062	005037	000252		CLR	2#MMVEC+2	
014066	104000			SCOPE		

;BEGIN TESTING IN USER MODE
;NOTE: ALL HLT (HALT) INSTRUCTIONS WILL TRAP TO LOC 4. THE PROGRAM WILL
;ALLOW THE TRAP, ADJUST THE PC AND RETURN TO THE HLT IN KERNEL MODE. THE
;USER STACK POINTER IS NOT AFFECTED BY THIS TRAP. THE USER STACK POINTER
;IS AT PHYSICAL 0600.

;SETUP USER MEM MGMT REGISTERS FOR THE TEST.

014070	012737	057016	177600	MOV	#137*256.-400+DWN+RW,2#UIPDRO	;LOAD UIPDRO RW DWN 137 BLOCKS
014076	012737	00400F	177620	MOV	#11*256.-400+UP+RW,2#UPDRO	;LOAD UPDRO RW UP 11 BLOCKS
014104	012737	077406	177636	MOV	#200*256.-400+UP+RW,2#UPDR7	;LOAD UPDR7 RW UP 200 BLOCKS
014112	012767	007600	163556	MOV	#7600,UPAR7	
	100000			VIRT=100000		;USER VIRTUAL 'D' ADDRESS FOR THESE TESTS
	017300			PHYS=17300		;CORRESPONDING USER PHYSICAL ADDRESS

;TEST THAT MFPD CAN GET DATA FROM A USER VIRTUAL 'D' ADDRESS

;DM=1

014120	012767	170000	163650	MOV	#UM+PUM,PSW	;USER MODE!!!,PREV USER MODE!!
014126	005066	177776		CLR	-2(USP)	
014132	012702	100000		MOV	#VIRT,R2	;R2=VIRTUAL ADDRESS
014136	012737	177777	017300	MOV	#-1,2#PHYS	;PRESET PHYSICAL ADDRESS
014144	005237	177572		INC	2#SRO	;ENABLE SEG
014150	000277			SCC		;PRESET CC'S
014152	106512			UUI:	MFPD (R2)	;-(USP)+(R2)
014154	016703	163616		MOV	PSW,R3	;SAVE CC'S
014160	005037	177572		CLR	2#SRO	;DISABLE SEG
014164	122703	000011		CMPB	#N+C,R3	;CHECK CC'S
014170	001401			BEQ	.+4	
014172	000000			HLT		;ERROR! INCORRECT CC'S
014174	022706	000576		CMP	#UPTR-2,USP	;CHECK THAT STACK WAS PUSHED
014200	001401			BEQ	.+4	
014202	000000			HLT		;ERROR! INCORRECT STACK PTR
014204	005216			INC	(USP)	;CHECK RESULT
014206	001401			BEQ	.+4	
014210	000000			HLT		;ERROR! INCORRECT RESULT
014212	104000			SCOPE		

;DM=3

014214	012767	170000	163554	MOV	#UM+PUM,PSW	;USER MODE!!!,PREV USER MODE!!
014222	005066	177776		CLR	-2(USP)	
014226	012702	100000		MOV	#VIRT,R2	;LOAD INDIRECT ADDRESS
014232	012737	100002	017300	MOV	#VIRT+2,2#PHYS	;LOAD ADDRESS
014240	012737	177777	017302	MOV	#-1,2#PHYS+2	;PRESET DATA
014246	005237	177572		INC	2#SRO	;ENABLE SEG
014252	106532			UUI:	MFPD 2(R2)+	;-(USP)+VIRT
014254	005037	177572		CLR	2#SRO	;DISABLE SEG
014260	005216			INC	(USP)	;CHECK RESULT
014262	001401			BEQ	.+4	
014264	000000			HLT		;ERROR! INCORRECT RESULT
014266	104000			SCOPE		

```

014270 012767 174000 163500 ;DM=5      MOV      SUM+PUM+REG,PSW ;USER MODE!!!,PREV USER MODE!!
014276 005066 177776      CLR      -2(USP)
014302 012700 100002      MOV      @VIRT+2,R10 ;R10=INDIRECT ADDRESS
014306 012737 100004 017300      MOV      @VIRT+4,@PHYS ;LOAD ADDRESS
014314 012737 177777 017304      MOV      @-1,@PHYS+4 ;PRESET PHYSICAL ADDRESS DATA
014322 005237 177572      INC      @SRO ;ENABLE SEG
014326 106550      MFPD      @-(R10) ;-(USP)+VIRT+4
014330 005037 177572      CLR      @SRO ;DISABLE SEG
014334 005216      INC      (USP) ;CHECK RESULT
014336 001401      BEQ      .+4
014340 000000      HLT
014342 005067 163430      CLR      PSW
014346 104000      SCOPE

014350 012767 170000 163420 ;DM=7      MOV      SUM+PUM,PSW ;USER MODE!!!,PREV USER MODE!!
014356 005066 177776      CLR      -2(USP)
014362 012702 000004      MOV      @4,R2 ;LOAD INDEX REGISTER
014366 012737 100000 017304      MOV      @VIRT,@PHYS+4 ;LOAD ADDRESS
014374 012737 177777 017300      MOV      @-1,@PHYS ;CLEAR PHYSICAL ADDRESS DATA
014402 005237 177572      INC      @SRO ;ENABLE SEG

014406 106572 100000      MFPD      @VIRT(R2) ;-(USP)+VIRT
014412 005037 177572      CLR      @SRO ;DISABLE SEG
014416 005216      INC      (USP) ;CHECK RESULT
014420 001401      BEQ      .+4
014422 000000      HLT ;ERROR! INCORRECT RESULT
014424 104000      SCOPE

;TEST THAT MFPD OPERATES PROPERLY US PC IN DESTINATION
;DM=0,PC
014426 012767 170000 163342      MOV      SUM+PUM,PSW ;USER MODE!!!,PREV USER MODE!!
014434 005066 177776      CLR      -2(USP)
014440 005237 177572      INC      @SRO ;ENABLE SEG
014444 000277      SCC
014446 106507      MFPD      PC ;-(USP)+PC
014450 016702 163322      MOV      PSW,R2 ;SAVE CC'S
014454 005037 177572      CLR      @SRO ;DISABLE SEG
014460 122702 000001      CMPB      @C,R2 ;CHECK CC'S
014464 001401      BEQ      .+4
014466 000000      HLT
014470 022706 000576      CMP      @PTR-2,USP ;CHECK STACK PTR
014474 001401      BEQ      .+4
014476 000000      HLT ;ERROR! STACK NOT PUSHED
014500 022716 014450      CMP      @UU10+2,(USP) ;CHECK THAT PS WAS PUSHED ON THE STACK
014504 001401      BEQ      .+4
014506 000000      HLT ;ERROR! PC NOT PUSHED ON THE STACK
014510 104000      SCOPE

014512 012767 174000 163256 ;DM=3,PC      MOV      SUM+PUM+REG,PSW ;USER MODE!!!,PREV USER MODE!!
014520 005066 177776      CLR      -2(USP)

```


014524	012737	177777	017300	MOV	0-1, 2@PHYS	
014532	005237	177572		INC	2@SRO	;ENABLE SEG
014536	106537	100000		MFPD	2@VIRT	:- (USP)+VIRT
014542	005037	177572	UU11:	CLR	2@SRO	;DISABLE SEG
014546	005216			INC	(USP)	;CHECK RESULT
014550	001401			BEQ	.+4	
014552	000000			HLT		;ERROR! INCORRECT RESULT
014554	104000			SCOPE		
014556	012767	170000	163212	MOV	0UM+PUM, PSW	;USER MODE!!!, PREV USER MODE!!
014564	005066	177776		CLR	-2 (USP)	
014570	012737	100004	017302	MOV	0VIRT+4, 2@PHYS+2	;LOAD ADDRESS
014576	012737	177777	017304	MOV	0-1, 2@PHYS+4	;PRESET DATA
014604	005237	177572		INC	2@SRO	;ENABLE SEG
014610	000277			SCC		
014612	106577	063164		MFPD	2VIRT+2	:- (USP)+VIRT+4
014616	016702	163154	UU13:	MOV	PSW, R2	;SAVE CC'S
014622	005037	177572		CLR	2@SRO	;DISABLE SEG
014626	122702	000011		CMPB	0N+C, R2	;CHECK CC'S
014632	001401			BEQ	.+4	
014634	000000			HLT		;ERROR! INCORRECT CC'S
014636	005216			INC	(USP)	;CHECK RESULT
014640	001401			BEQ	.+4	
014642	000000			HLT		;ERROR! INCORRECT RESULT ON STACK
014644	104000			SCOPE		

;TEST MFPI INSTRUCTION USER MODE PREVIOUS USER MODE
;NOTE: MFPI IN USER MODE, PREVIOUS USER MODE OPERATES AS A MFPI INSTRUCTION
VIRT=100000 ;USER VIRTUAL 'D' ADDRESS FOR THESE TESTS
PHYS=17300 ;CORRESPONDING USER PHYSICAL ADDRESS

	100000				
	017300				
014646	012767	174000	163122	MOV	#UM+PUM+REG,PSW ;USER MODE!!!,PREV USER MODE!!
014654	005066	177776		CLR	-2(SSP)
014660	012703	177777		MOV	#-1,R13 ;PRESET GENERAL REGISTER
014664	005237	177572		INC	#SRO ;ENABLE SEG
014670	006503		UI10:	MFPI	R13 ;-(USP)+R13
014672	016702	163100		MOV	PSW,R12 ;SAVE STATUS AFTER MFPI
014676	005037	177572		CLR	#SRO ;DISABLE SEG
014702	022702	174010		CMP	#UM+PUM+REG+N,R12 ;CHECK STATUS AFTER MFPI
014706	001401			BEQ	.+4
014710	000000			HLT	;ERROR! INCORRECT STATUS AFTER MFPI
014712	022706	000576		CMP	#UPTR-2,USP ;CHECK THAT STACK WAS PUSHED
014716	001401			BEQ	.+4
014720	000000			HLT	;ERROR! INCORRECT STACK PTR
014722	005216			INC	(USP) ;CHECK RESULT
014724	001401			BEQ	.+4
014726	000000			HLT	;ERROR! INCORRECT RESULT
014730	104000			SCOPE	

;TEST THAT MFPI CAN GET DATA FROM A USER VIRTUAL 'D' ADDRESS
;DM=2

014732	012767	174000	163036	MOV	#UM+PUM+REG,PSW ;USER MODE!!!,PREV USER MODE!!
014740	012766	177777	177776	MOV	#-1,-2(USP)
014746	012702	100000		MOV	#VIRT,R12 ;R12=VIRTUAL ADDRESS
014752	005037	017300		CLR	#PHYS ;PRESET PHYSICAL ADDRESS
014756	005237	177572		INC	#SRO ;ENABLE SEG
014762	006522		UI12:	MFPI	(R12)+ ;-(USP)+VIRT
014764	005037	177572		CLR	#SRO ;DISABLE SEG
014770	005716			TST	(USP) ;CHECK RESULT
014772	001401			BEQ	.+4
014774	000000			HLT	;ERROR! INCORRECT RESULT ON STACK
014776	022702	100002		CMP	#VIRT+2,R12 ;CHECK AUTO INCREMENT
015002	001401			BEQ	.+4
015004	000000			HLT	;ERROR! AUTO INCREMENT FAILED
015006	005067	162764		CLR	PSW
015012	104000			SCOPE	

;DM=4

015014	012767	170000	162754	MOV	#UM+PUM,PSW ;USER MODE!!!,PREV USER MODE!!
015022	012766	177777	177776	MOV	#-1,-2(USP)
015030	012704	100002		MOV	#VIRT+2,R4 ;R4=VIRTUAL ADDRESS+2
015034	005037	017300		CLR	#PHYS ;PRESET PHYSICAL ADDRESS DATA
015040	005237	177572		INC	#SRO ;ENABLE SEG
015044	006544		UI14:	MFPI	-(R4) ;-(USP)+VIRT
015046	005037	177572		CLR	#SRO ;DISABLE SEG
015052	022704	100000		CMP	#VIRT,R4 ;CHECK AUTO-DECREMENT
015056	001401			BEQ	.+4
015060	000000			HLT	;ERROR! AUTO-DECREMENT FAILED
015062	005716			TST	(USP) ;CHECK RESULT
015064	001401			BEQ	.+4
015066	000000			HLT	;ERROR! INCORRECT RESULT

015070 104000

SCOPE

```

;DM=6
015072 012767 174000 162676 MOV      #UM+PUM+REG,PSW ;USER MODE!!!,PREV USER MODE!!
015100 012766 177777 177776 MOV      #1,-2(USP)
015106 012702 000002 MOV      #2,R12 ;LOAD INDEX REGISTER
015112 005037 017302 CLR      #PHYS+2 ;PRESET PHYSICAL ADDRESS DATA
015116 005237 177572 INC      #SRO ;ENABLE SEG
015122 006562 100000 UUI6: MFPI  VIRT(R12) ;-(USP)+VIRT-2
015126 005037 177572 CLR      #SRO ;DISABLE SEG
015132 022706 000576 CMP      #PTR-2,USP ;CHECK STACK PTR
015136 001401 BEQ      .+4
015140 000000 HLT
015142 005716 TST      (USP) ;ERROR! INCORRECT STACK PTR
015144 001401 BEQ      .+4 ;CHECK RESULT
015146 000000 HLT ;ERROR! INCORRECT RESULT
015150 005067 162622 CLR      PSW
015154 104000 SCOPE

```

```

;TEST THAT MFPI OPERATES PROPERLY US PC IN DESTINATION
;DM=3,PC

```

```

015156 012767 174000 162612 MOV      #UM+PUM+REG,PSW ;USER MODE!!!,PREV USER MODE!!
015164 005066 177776 CLR      -2(USP)
015170 012737 177777 017300 MOV      #1,#PHYS
015176 005237 177572 INC      #SRO ;ENABLE SEG
015202 006537 100000 UUI11: MFPI  #VIRT ;-(USP)+VIRT
015206 005037 177572 CLR      #SRO ;DISABLE SEG
015212 005216 INC      (USP) ;CHECK RESULT
015214 001401 BEQ      .+4
015216 000000 HLT ;ERROR! INCORRECT RESULT
015220 104000 SCOPE

```

;DM=6,PC

```

015222 012767 170340 162546 MOV      #UM+PUM+PRTY7,PSW ;USER MODE!!! PREV USER MODE!!
015230 012766 177777 177776 MOV      #1,-2(USP)
015236 005037 017300 CLR      #PHYS ;PRESET PHYSICAL ADDRESS DATA
015242 005237 177572 INC      #SRO ;ENABLE SEG
015246 006567 062526 UUI12: MFPI  VIRT ;-(USP)+VIRT
015252 005037 177572 CLR      #SRO ;DISABLE SEG
015256 005716 TST      (USP) ;CHECK RESULT
015260 001401 BEQ      .+4
015262 000000 HLT ;ERROR! INCORRECT RESULT
015264 104000 SCOPE

```

```

;*****IMPORTANT NOTE*****
;NO CODE ALLOWED BETWEEN 16600-177776

```

```

015266 005267 163506 005000 END: INC      ICNT ;INC PASS COUNT
015272 026727 163502 CMP      ICNT,#5000
015300 001402 BEQ      DONE
015302 000167 163570 JMP      BEGIN ;RESTART TEST
015306 012767 000007 162252 DONE: MOV      #7,TPB ;RING BELL
015314 105767 162244 TSTB     TPS ;WAIT FOR BELL
015320 100375 BPL      .-4 ;TO RING
015322 013700 000042 MOV      #42,R0 ;RETURN TO
015326 001405 BEQ      HERE ;MONITOR

```

F05

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 57
DCKTEB.P11

015330 000005
015332 010700
015334 000240
015336 000240
015340 000240
015342 000167 163522
000001

SENDAD: RESET
MOV PC, R0
NOP
NOP
NOP
HERE: JMP START ;RESTART TEST
.END

[illegible]

KDPA0 = 172360	490#	
KDPA00 = 172360	470#	604#
KDPA01 = 172362	471#	
KDPA02 = 172364	472#	
KDPA03 = 172366	473#	
KDPA04 = 172370	474#	
KDPA05 = 172372	475#	
KDPA06 = 172374	476#	605#
KDPA07 = 172376	477#	606#
KDPA08 = 172320	488#	
KDPA09 = 172320	452#	596#
KDPA10 = 172322	453#	
KDPA11 = 172324	454#	
KDPA12 = 172326	455#	
KDPA13 = 172330	456#	
KDPA14 = 172332	457#	
KDPA15 = 172334	458#	597#
KDPA16 = 172336	459#	598#
KDPA17 = 172340	489#	
KDPA18 = 172340	461#	603#
KDPA19 = 172342	462#	
KDPA20 = 172344	463#	
KDPA21 = 172346	464#	
KDPA22 = 172350	465#	
KDPA23 = 172352	466#	
KDPA24 = 172354	467#	
KDPA25 = 172356	468#	
KDPA26 = 172300	487#	
KDPA27 = 172300	443#	595#
KDPA28 = 172302	444#	
KDPA29 = 172304	445#	
KDPA30 = 172306	446#	
KDPA31 = 172310	447#	
KDPA32 = 172312	448#	
KDPA33 = 172314	449#	
KDPA34 = 172316	450#	
KKI0 = 005030	1276#	
KKI0A = 005006	1271#	
KKI1 = 005122	1298#	
KKI10 = 005636	1412#	1421
KKI11 = 005726	1433#	
KKI12 = 005772	1445#	
KKI13 = 006044	1459#	
KKI14 = 006112	1473#	
KKI14A = 006114	1474#	1476
KKI2 = 005214	1318#	
KKI3 = 005302	1336#	
KKI4 = 005346	1349#	
KKI5 = 005432	1366#	
KKI6 = 005504	1380#	
KKI7 = 005574	1398#	
KKO = 001352	624#	
KKOA = 001330	613#	619#
KK1 = 001444	646#	
KK10 = 002156	759#	768
KK11 = 002246	780#	

[illegible]

[illegible]

K05

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 63
 DCKTEB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

PIR4 = 010000	312*												
PKM = 000000	271*												
PLA = 040000	335*	824	2524										
PRTY4 = 000200	266*												
PRTY7 = 000340	265*	620	627	788	1006	1223	1272	1279	1441	1658	1872	1929	1936
	2011	2179	2311	2486	2761								
PSM = 010000	272*	836	858	879	896	910	926	941	958	973	994	1006	1018
	1036	1487	1509	1530	1547	1561	1577	1592	1609	1625	1646	1658	1670
	1687	1929	1948	1965	1981	1999	2011	2023	2205	2212	2225	2246	2260
	2275	2290	2311	2323	2341								
PSM = 177776	287*	547*	549*	620*	625	640*	647	661*	674*	678*	692*	707*	718*
	722*	735*	739*	754*	760	776*	789*	800*	807	836*	842	853*	858*
	865	879*	892*	896*	910*	926*	937*	941*	954*	958*	973*	978	994*
	1006*	1018*	1025	1036*	1054*	1060	1071*	1076*	1083	1097*	1110*	1114*	1128*
	1143*	1154*	1158*	1171*	1175*	1190*	1195	1211*	1223*	1235*	1242	1252*	1272*
	1277	1292*	1299	1313*	1326*	1330*	1344*	1360*	1371*	1375*	1388*	1392*	1407*
	1413	1429*	1441*	1453*	1460	1487*	1493	1504*	1509*	1516	1530*	1543*	1547*
	1561*	1577*	1588*	1592*	1605*	1609*	1625*	1630	1646*	1658*	1670*	1677	1687*
	1704*	1710	1721*	1726*	1733	1747*	1760*	1764*	1778*	1794*	1805*	1809*	1822*
	1826*	1841*	1846	1860*	1872*	1884*	1891	1901*	1929*	1934	1948*	1961*	1965*
	1981*	1994*	1999*	2011*	2023*	2030	2044*	2050	2061*	2066*	2073	2087*	2101*
	2112*	2116*	2129*	2133*	2148*	2153	2167*	2179*	2190*	2205*	2210	2225*	2232
	2246*	2260*	2271*	2275*	2290*	2295	2311*	2323*	2330	2341*	2361*	2374*	2378*
	2392*	2408*	2419*	2423*	2436*	2440*	2455*	2460	2474*	2486*	2498*	2505	2516*
	2556*	2563	2577*	2591*	2602*	2606*	2622*	2627	2643*	2655*	2662	2678*	2683
	2698*	2711*	2715*	2731*	2744*	2749*	2761*						
PUM = 030000	273*	547	1054	1076	1097	1114	1128	1143	1158	1175	1190	1211	1223
	1235	1252	1704	1726	1747	1764	1778	1794	1809	1826	1841	1860	1872
	1884	1901	2044	2066	2087	2101	2116	2133	2148	2167	2179	2190	2361
	2378	2392	2408	2423	2440	2455	2474	2486	2498	2516	2556	2577	2591
	2606	2622	2643	2655	2678	2685	2698	2715	2731	2749	2761		
R00 = 000002	495*												
R00T = 000001	494*												
REG = 004000	267*	274*	661	707	722	776	836	879	926	941	994	1054	1097
	1143	1158	1211	1313	1360	1375	1429	1487	1530	1577	1592	1646	1704
	1747	1794	1809	1860	1948	1981	1999	2044	2101	2116	2167	2205	2212
	2260	2361	2408	2423	2474	2591	2643	2678	2685	2698	2731	2749	
RW = 000006	499*	595	596	597	598	599	600	601	602	1921	1922	1923	2547
	2548	2549											
RWT = 000004	497*												
RWTH = 000005	498*												
R0 = %000000	241*	2782*	2785*										
R1 = %000001	242*	541*	544										
R10 = %000000	248*	709*	713	838*	841	928*	932	1056*	1059	1145*	1149	1362*	1366
	1489*	1492	1579*	1583	1706*	1709	1796*	1800	2046*	2049	2103*	2107	2262*
	2266	2410*	2414	2593*	2597								
R11 = %000001	249*												
R12 = %000002	250*	663*	666	671	724*	727	881*	884	889	943*	946	1099*	1102
	1107	1160*	1163	1315*	1318	1323	1377*	1380	1532*	1535	1540	1594*	1597
	1749*	1752	1757	1811*	1814	1950*	1953	1958	1983*	1986	2118*	2121	2210*
	2212	2363*	2366	2371	2425*	2428	2683*	2685	2700*	2703	2708	2733*	2736
	251*	2207*	2209	2680*	2682								
R13 = %000003	252*	842*	844	1060*	1062	1493*	1495	1710*	1712	2050*	2052		
R14 = %000004	253*												
R15 = %000005	243*	584*	586*	588*	590*	625*	627	642*	646	680*	684	741*	745
R2 = %000002	760*	762	807*	809	860*	864	898*	902	960*	964	978*	980	1025*

		1027	1078*	1082	1116*	1120	1177*	1181	1195*	1197	1242*	1244	1277*	1279
		1294*	1298	1332*	1336	1394*	1398	1413*	1415	1460*	1462	1511*	1515	1549*
		1553	1611*	1616	1630*	1632	1677*	1679	1728*	1732	1766*	1770	1828*	1832
		1846*	1848	1891*	1893	1934*	1936	2030*	2032	2068*	2072	2089*	2093	2135*
		2139	2153*	2155	2227*	2231	2248*	2252	2277*	2281	2295*	2297	2330*	2332
		2380*	2384	2442*	2446	2460*	2462	2505*	2507	2558*	2562	2579*	2583	2608*
		2613	2627*	2629	2662*	2664								
R3	=%000003	244#	585*	587*	589*	591*	622*	624	647*	649	865*	867	1083*	1085
		1274*	1276	1299*	1301	1516*	1518	1733*	1735	1931*	1933	2073*	2075	2232*
		2234	2563*	2565										
R4	=%000004	245#	694*	697	699	912*	915	917	1130*	1133	1135	1346*	1349	1351
		1563*	1566	1568	1780*	1783	1785	1967*	1970	1972	2394*	2397	2399	2717*
		2720	2722											
RS	=%000005	246#												
SCOPE	= 104000	505#	576	636	658	675	689	719	736	750	771	785	797	815
		829	854	876	893	907	923	938	955	969	989	1003	1015	1033
		1046	1072	1094	1111	1125	1155	1172	1186	1206	1220	1232	1250	1262
		1288	1310	1327	1341	1357	1372	1389	1403	1424	1438	1450	1468	1479
		1505	1527	1544	1558	1574	1589	1606	1621	1641	1655	1667	1685	1696
		1722	1744	1761	1775	1791	1806	1823	1837	1857	1869	1881	1899	1910
		1945	1962	1978	1995	2008	2020	2038	2062	2084	2098	2113	2130	2144
		2164	2176	2188	2200	2221	2243	2257	2272	2286	2306	2320	2338	2351
		2375	2389	2405	2420	2437	2451	2471	2483	2495	2513	2536	2574	2588
		2603	2618	2638	2652	2670	2694	2712	2728	2745	2758	2770		
SCOPEA	000440	519	541#											
SCOPEX	000516	552	554#											
SOE	= 070002	361#	579											
SOPAR	= 172260	486#												
SOPAR0	= 172260	434#												
SOPAR1	= 172262	435#	609*											
SOPAR2	= 172264	436#												
SOPAR3	= 172266	437#												
SOPAR4	= 172270	438#												
SOPAR5	= 172272	439#												
SOPAR6	= 172274	440#												
SOPAR7	= 172276	441#	1924*											
SOPDR	= 172220	484#												
SOPDR0	= 172220	416#	1922*											
SOPDR1	= 172222	417#	599*											

MOS

PDP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) C9-SEP-76 16:53 PAGE 65
DCKTEB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

SIPAR7=	172256	432*												
SIPDR =	172200	483*												
SIPDR0=	172200	407*	588	1921*										
SIPDR1=	172202	408*												
SIPDR2=	172204	409*	600*											
SIPDR3=	172206	410*												
SIPDR4=	172210	411*												
SIPDR5=	172212	412*												
SIPDR6=	172214	413*												
SIPDR7=	172216	414*												
SLR =	177774	288*	578*											
SM =	040000	269*	1929	1948	1965	1981	1999	2011	2023	2044	2066	2087	2101	2116
		2133	2148	2167	2179	2190	2205	2212	2225	2246	2260	2275	2290	2311
		2323	2341	2361	2378	2392	2408	2423	2440	2455	2474	2486	2498	2516
		2519												
SPG =	000040	327*												
SPTR =	000760	300*	545	1939	1988	2055	2078	2123	2158	2197	2215	2237	2300	2430
		2465	2531											
SRO =	177572	365*	531*	557	558*	583*	623*	626*	644*	648*	665*	667*	683*	685*
		696*	698*	712*	714*	726*	728*	744*	746*	757*	761*	779*	781*	791*
		793*	804*	808*	820*	824	827*	839*	843*	862*	866*	883*	885*	901*
		903*	914*	916*	931*	933*	945*	947*	963*	965*	975*	979*	997*	999*
		1009*	1011*	1022*	1026*	1040*	1042*	1057*	1061*	1080*	1084*	1101*	1103*	1119*
		1121*	1132*	1134*	1148*	1150*	1162*	1164*	1180*	1182*	1192*	1196*	1214*	1216*
		1226*	1228*	1239*	1243*	1256*	1258*	1275*	1278*	1296*	1300*	1317*	1319*	1335*
		1337*	1348*	1350*	1365*	1367*	1379*	1381*	1397*	1399*	1410*	1414*	1432*	1434*
		1444*	1446*	1457*	1461*	1472*	1475*	1490*	1494*	1513*	1517*	1534*	1536*	1552*
		1554*	1565*	1567*	1582*	1584*	1596*	1598*	1614*	1617*	1627*	1631*	1649*	1651*
		1661*	1663*	1674*	1678*	1690*	1692*	1707*	1711*	1730*	1734*	1751*	1753*	1769*
		1771*	1782*	1784*	1799*	1801*	1813*	1815*	1831*	1833*	1843*	1847*	1863*	1865*
		1875*	1877*	1888*	1892*	1904*	1906*	1932*	1935*	1952*	1954*	1969*	1971*	1985*
		1987*	2002*	2004*	2014*	2016*	2027*	2031*	2047*	2051*	2070*	2074*	2092*	2094*
		2106*	2108*	2120*	2122*	2138*	2140*	2150*	2154*	2170*	2172*	2182*	2184*	2194*
		2196*	2208*	2211*	2229*	2233*	2251*	2253*	2265*	2267*	2280*	2282*	2292*	2296*
		2314*	2316*	2327*	2331*	2343*	2350*	2365*	2367*	2383*	2385*	2396*	2398*	2413*
		2415*	2427*	2429*	2445*	2447*	2457*	2461*	2477*	2479*	2489*	2491*	2502*	2506*
		2520*	2523*	2524	2530*	2560*	2564*	2582*	2584*	2596*	2598*	2611*	2614*	2624*
		2628*	2646*	2648*	2659*	2663*	2681*	2684*	2702*	2704*	2719*	2721*	2735*	2737*
		2752*	2754*	2764*	2766*									
		557*	564*											
SROT	001002	366*												
SR1 =	177574	367*	2527											
SR2 =	177576	368*	579*											
SR3 =	172516													
SSI0	012174	2209*												
SSI1	012270	2231*												
SSI10	012564	2294*	2303											
SSI12	012654	2315*												
SSI13	012730	2329*												
SSI14	013004	2344*												
SSI3	012370	2252*												
SSI5	012444	2266*												
SSI7	012524	2281*												
SSP =	%000006	256*	550*	1038*	1041	1930*	1939	1949*	1955	1966*	1975	1982*	1988	1991
		2000*	2005*	2012*	2017	2024*	2035*	2045*	2055	2058	2067*	2078	2081*	2088*
		2095*	2102*	2109*	2117*	2123	2126	2134*	2141*	2149*	2158	2161	2168*	2173*
		2180*	2185	2191*	2192*	2195	2206*	2215	2226*	2237	2240*	2247*	2254*	2261*

[illegible]

[illegible]

VP0 = 000000
 VP1 = 000002
 VP2 = 000004
 VP3 = 000006
 VP4 = 000010
 VP5 = 000012
 VP6 = 000014
 VP7 = 000016
 MBIT = 000100
 Z = 000004
 SENDAO = 015332
 = 015346

1395	1433	1445	1455	1483	1511	1532	1540	1550	1562	1568	1580	1597
1612	1650	1662	1672	1688	1700	1728	1749	1757	1767	1780	1785	1797
1814	1829	1864	1876	1886	1902	1926	1950	1958	1967	1972	1986	2003
2015	2025	2029	2040	2068	2090	2104	2121	2136	2171	2183	2192	2202
2227	2249	2263	2278	2315	2325	2355	2363	2371	2381	2394	2399	2411
2428	2443	2478	2490	2500	2551	2558	2579	2580	2593	2594	2609	2613
2647	2657	2661	2675	2700	2708	2717	2722	2736	2753	2765		
316	824	2524										
317												
318												
319												
320												
321												
322												
323												
343												
262	844	1062	1495	1712	2052							
521	2785											
514	516	518	520	522	524	526	528	561	565	566	567	587
591	628	631	634	650	653	656	669	672	687	700	703	716
730	733	748	763	766	769	783	795	810	813	825	845	848
851	868	871	874	887	890	905	918	921	935	949	952	967
981	984	987	1001	1013	1028	1031	1044	1063	1066	1069	1086	1089
1092	1105	1108	1123	1136	1139	1152	1166	1169	1184	1198	1201	1204
1218	1230	1245	1248	1260	1280	1283	1286	1302	1305	1308	1321	1324
1339	1352	1355	1369	1383	1386	1401	1416	1419	1422	1436	1449	1463
1466	1474	1477	1496	1499	1502	1519	1522	1525	1538	1541	1556	1569
1572	1586	1600	1603	1619	1633	1636	1639	1653	1665	1680	1683	1694
1713	1716	1719	1736	1739	1742	1755	1758	1773	1786	1789	1803	1817
1820	1835	1849	1852	1855	1857	1879	1894	1897	1908	1937	1940	1943
1956	1959	1973	1976	1989	1992	2006	2018	2033	2036	2053	2056	2059
2076	2079	2082	2096	2110	2124	2127	2142	2156	2159	2162	2174	2186
2198	2213	2216	2219	2235	2238	2241	2255	2269	2284	2298	2301	2304
2318	2333	2336	2348	2369	2372	2387	2400	2403	2417	2431	2434	2449
2463	2466	2469	2481	2493	2508	2511	2525	2528	2532	2566	2569	2572
2586	2600	2616	2630	2633	2636	2650	2665	2668	2686	2689	2692	2706
2709	2723	2726	2739	2742	2756	2768	2781					

KKM	508#	640	678	692	739	754	800	1292	1330	1344	1392	1407	1453		
KKP	508#	619	788	1271	1441										
KKR	508#	661	707	722	776	1313	1360	1375	1429						
KSH	508#	858	896	910	958	973	1018	1036	1509	1547	1561	1609	1625	1670	1687
KSHP	508#	1006	1658												
KSR	508#	836	879	926	941	994	1487	1530	1577	1592	1646				
KUH	508#	1076	1114	1128	1175	1190	1235	1252	1726	1764	1778	1826	1841	1884	1901
KUP	508#	1223	1872												
KUR	508#	1054	1097	1143	1158	1211	1704	1747	1794	1809	1860				
LCKM1	508#	1039	1253												
LCKO	508#	1037	1255												
LDPDR	508#	594	596	597	598	599	600	601	602	1921	1922	1923	2547	2548	2549
PSHKM1	508#	662	693	723	789	837	880	911	942	1007	1055	1098	1129	1159	1224
PSHKO	508#	1314	1345	1376	1442	1471	1488	1531	1562	1593	1659	1705	1748	1779	1810
	508#	621	641	679	708	740	756	777	801	819	859	897	927	959	974
	995	1019	1077	1115	1144	1176	1191	1212	1236	1273	1293	1331	1361	1393	1409
	1430	1454	1510	1548	1578	1610	1626	1647	1671	1727	1765	1795	1827	1842	1861
	1885														
PSHSM1	508#	1949	1956	1982	2012	2045	2117	2180	2312	2342	2362	2393	2424	2487	2517
PSHSO	508#	1930	2000	2024	2067	2088	2102	2134	2149	2168	2206	2226	2247	2261	2276
	2291	2324	2379	2409	2441	2456	2475	2499	2679						
PSHUM1	508#	2699	2716	2732	2762										
PSHUO	508#	2557	2578	2592	2607	2623	2644	2656	2750						
SETK	508#	575	755	1408											
SETS	508#														
SETU	508#														
SGF	508#	626	648	667	685	698	714	728	746	761	781	793	808	827	843
	866	825	903	916	933	947	965	979	999	1011	1026	1042	1061	1084	1103
	1121	1134	1150	1164	1182	1196	1216	1228	1243	1258	1278	1300	1319	1337	1350
	1367	1381	1399	1414	1434	1446	1461	1475	1494	1517	1536	1554	1567	1584	1598
	1617	1631	1651	1663	1678	1692	1711	1734	1753	1771	1784	1801	1815	1833	1847
	1865	1877	1892	1906	1935	1954	1971	1987	2004	2016	2031	2051	2074	2094	2108
	2122	2140	2154	2172	2184	2196	2211	2233	2253	2267	2282	2296	2316	2331	2350
	2367	2385	2398	2415	2429	2447	2461	2479	2491	2506	2530	2564	2584	2598	2614
	2628	2648	2663	2684	2704	2721	2737	2754	2766						
SGN	508#	623	644	665	683	696	712	726	744	757	779	791	804	820	839
	862	883	901	914	931	945	963	975	997	1009	1022	1040	1057	1080	1101
	1119	1132	1148	1162	1180	1192	1214	1226	1239	1256	1275	1296	1317	1335	1348
	1365	1379	1397	1410	1432	1444	1457	1472	1490	1513	1534	1552	1565	1582	1596
	1614	1627	1649	1661	1674	1690	1707	1730	1751	1769	1782	1799	1813	1831	1843
	1867	1875	1888	1904	1932	1952	1969	1985	2002	2014	2027	2047	2070	2092	2106
	2120	2138	2150	2170	2182	2194	2208	2229	2251	2265	2280	2292	2314	2327	2343
	2365	2383	2396	2413	2427	2445	2457	2477	2489	2502	2520	2560	2582	2596	2611
	2624	2646	2659	2681	2702	2719	2735	2752	2764						
SSM	508#	1965	2023	2225	2246	2275	2290	2323	2341						
SSHP	508#	1929	2011	2311											
SSR	508#	1948	1981	1999	2205	2260									
SUM	508#	2066	2087	2133	2148	2190	2378	2392	2440	2455	2498	2516			
SUP	508#	2179	2486												
SUR	508#	2044	2101	2116	2167	2361	2408	2423	2474						
UUM	508#	2556	2577	2606	2622	2655	2715								
UUP	508#	2761													
UUR	508#	2591	2643	2678	2698	2731	2749								

ROO	535														
RSR	549														
BEQ	534	552	628	631	634	650	653	656	669	672	687	700	703	716	730
	733	748	763	766	769	783	785	810	813	825	845	848	851	868	871
	874	887	890	905	918	921	935	949	952	967	981	984	987	1001	1013
	1028	1031	1044	1063	1066	1069	1086	1089	1092	1105	1108	1123	1136	1139	1152
	1166	1169	1184	1198	1201	1204	1218	1230	1233	1248	1260	1280	1283	1286	1302
	1305	1308	1321	1324	1339	1352	1355	1369	1372	1386	1401	1416	1419	1422	1436
	1448	1463	1466	1477	1496	1499	1502	1519	1522	1536	1538	1541	1556	1569	1572
	1586	1600	1603	1619	1633	1636	1639	1653	1656	1660	1683	1694	1713	1716	1719
	1736	1739	1742	1755	1758	1773	1786	1789	1803	1817	1820	1835	1849	1852	1855
	1867	1879	1894	1897	1908	1937	1940	1943	1956	1959	1973	1976	1989	1992	2006
	2018	2033	2036	2053	2056	2059	2076	2079	2082	2096	2110	2124	2127	2142	2156
	2159	2162	2174	2186	2198	2213	2216	2219	2232	2238	2241	2255	2269	2284	2298
	2301	2304	2318	2333	2336	2348	2369	2372	2387	2400	2403	2417	2431	2434	2449
	2463	2466	2469	2491	2493	2508	2511	2525	2528	2532	2566	2569	2572	2586	2600
	2616	2630	2633	2636	2650	2665	2668	2686	2689	2692	2706	2709	2723	2726	2739
	2742	2756	2768	2777	2783										
	531	537	558	2523											
BIC	551														
BIT	2781														
BR	613	1474													
CLR	543	572	583	586	590	603	604	621	626	640	641	648	664	667	674
	678	679	685	692	695	698	708	714	718	725	728	735	739	740	746
	754	756	761	777	781	790	793	800	801	808	819	827	838	843	853
	859	866	832	835	892	897	903	913	916	927	933	937	944	947	954
	959	965	974	979	995	999	1008	1011	1019	1026	1037	1042	1056	1061	1071
	1077	1084	1100	1103	1110	1115	1121	1131	1134	1144	1150	1154	1161	1164	1171
	1176	1182	1191	1196	1212	1216	1225	1228	1236	1243	1255	1258	1273	1278	1292
	1293	1300	1316	1319	1326	1330	1331	1337	1344	1347	1350	1361	1367	1371	1378
	1381	1389	1392	1393	1399	1407	1409	1414	1430	1434	1443	1446	1453	1454	1461
	1475	1489	1494	1504	1510	1517	1533	1536	1543	1548	1554	1564	1567	1578	1584
	1588	1595	1598	1605	1610	1617	1626	1631	1647	1651	1660	1663	1671	1678	1689
	1692	1706	1711	1721	1727	1734	1750	1753	1760	1765	1771	1781	1784	1795	1801
	1805	1812	1815	1822	1827	1833	1842	1847	1861	1865	1874	1877	1885	1892	1903
	1906	1930	1935	1951	1954	1961	1969	1971	1984	1987	1994	2000	2004	2013	2016
	2024	2031	2046	2051	2061	2067	2074	2088	2094	2102	2108	2112	2119	2122	2129
	2134	2140	2149	2154	2168	2172	2181	2184	2193	2196	2206	2211	2236	2233	2247
	2253	2261	2267	2271	2276	2282	2291	2296	2313	2316	2324	2331	2350	2364	2367
	2374	2379	2385	2393	2398	2409	2415	2419	2426	2429	2436	2441	2447	2456	2461
	2475	2479	2483	2491	2499	2506	2510	2515	2527	2564	2578	2584	2592	2598	2602
	2607	2614	2619	2623	2644	2648	2656	2663	2679	2684	2701	2704	2711	2718	2721
	2734	2737	2744	2752	2754	2763	2766	2776							
CMF	630	652	671	699	729	765	768	824	847	870	889	917	948	983	986
	1065	1088	1107	1135	1165	1200	1203	1282	1304	1323	1351	1382	1418	1421	1476
	1498	1521	1540	1558	1599	1635	1638	1715	1738	1757	1785	1816	1851	1854	1939
	1953	1972	1988	2005	2078	2123	2158	2161	2212	2215	2237	2300	2303	2371	2399
	2430	2465	2468	2524	2527	2531	2568	2632	2635	2685	2688	2708	2722	2738	2776
CMFB	627	649	762	809	844	867	980	1027	1062	1085	1197	1244	1279	1301	1415
	1462	1495	1518	1632	1679	1712	1735	1848	1893	1936	2032	2052	2075	2155	2234
	2297	2332	2462	2507	2565	2629	2664								
EMT	505														
HALT	504	514													
INC	623	633	644	655	665	683	686	696	712	715	726	744	747	757	779
	782	791	804	812	820	839	862	873	883	901	904	914	931	934	945
	963	966	975	997	1000	1009	1022	1030	1040	1057	1080	1091	1101	1119	1122

F06

POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 73
DCKTEB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

JMP	1132	1148	1151	1162	1180	1183	1192	1214	1217	1226	1239	1247	1256	1259	1275
MFPD	1285	1296	1307	1317	1335	1338	1343	1365	1368	1379	1397	1400	1410	1432	1435
	1444	1457	1465	1472	1490	1513	1524	1534	1532	1555	1565	1582	1585	1586	1614
	1618	1627	1649	1652	1661	1674	1682	1690	1707	1730	1741	1751	1769	1772	1782
	1799	1832	1813	1831	1834	1843	1853	1855	1875	1878	1896	1904	1932	1942	1952
	1969	1985	2003	2005	2014	2027	2035	2037	2070	2071	2082	2095	2106	2109	2120
	2138	2141	2150	2170	2173	2182	2194	2208	2218	2239	2240	2251	2254	2265	2268
	2280	2283	2293	2314	2327	2335	2343	2355	2383	2386	2396	2413	2416	2427	2445
	2448	2457	2477	2480	2489	2502	2510	2520	2530	2571	2572	2575	2596	2599	2611
	2615	2624	2646	2649	2659	2667	2681	2691	2702	2719	2735	2732	2755	2764	2775
	527	536	559	2778	2789										
	624	646	666	684	697	713	727	745	759	780	792	806	821	841	864
	884	902	915	932	946	964	977	993	1010	1024	1041	1059	1082	1102	1120
	1133	1149	1163	1181	1194	1215	1227	1241	1257	1271	1283	1295	1303	1303	2015
	2029	2049	2072	2093	2107	2121	2139	2152	2171	2183	2195	2562	2563	2537	2613
MFP1	2626	2647	2661												
	1276	1298	1318	1336	1349	1366	1380	1399	1412	1433	1445	1459	1473	1492	1515
	1535	1553	1566	1583	1597	1616	1629	1650	1662	1676	1691	1709	1732	1752	1770
	1783	1800	1814	1832	1845	1864	1876	1890	1905	2209	2231	2252	2256	2281	2294
	2315	2329	2344	2366	2384	2397	2414	2426	2446	2459	2478	2490	2504	2521	2682
	2703	2720	2736	2753	2765										
MOV	541	542	544	545	546	547	557	574	575	577	578	579	584	585	588
	589	595	596	597	598	599	600	601	602	605	606	608	609	611	612
	620	622	625	642	643	647	661	662	663	660	681	682	693	694	707
	709	710	711	722	723	724	741	742	743	755	760	776	778	798	789
	802	803	807	818	828	836	837	842	858	860	861	865	879	890	881
	876	888	899	900	910	911	912	926	938	939	930	941	942	943	958
	960	961	962	973	978	994	996	1006	1007	1018	1020	1021	1025	1036	1039
	1054	1055	1060	1076	1078	1079	1083	1097	1098	1099	1114	1116	1117	1118	1128
	1129	1130	1143	1145	1146	1147	1158	1159	1160	1175	1177	1178	1179	1190	1195
	1211	1213	1223	1224	1235	1237	1238	1242	1252	1253	1272	1274	1277	1294	1295
	1299	1313	1314	1315	1332	1333	1334	1345	1346	1360	1362	1363	1364	1375	1376
	1377	1394	1395	1396	1408	1413	1429	1431	1441	1442	1455	1456	1460	1471	1487
	1488	1493	1509	1511	1512	1516	1530	1531	1532	1547	1549	1550	1551	1561	1562
	1563	1577	1579	1580	1581	1592	1593	1594	1609	1611	1612	1613	1625	1630	1646
	1648	1658	1659	1670	1672	1673	1677	1687	1688	1704	1705	1710	1726	1728	1729
	1733	1747	1748	1749	1764	1766	1767	1768	1778	1779	1780	1794	1796	1797	1798
	1809	1810	1811	1826	1828	1829	1830	1841	1846	1860	1862	1872	1873	1894	1886
	1887	1891	1901	1902	1921	1922	1923	1924	1929	1931	1934	1948	1949	1950	1965
	1966	1967	1981	1982	1933	1999	2001	2011	2012	2023	2025	2026	2030	2044	2045
	2050	2066	2068	2069	2073	2087	2089	2090	2091	2101	2103	2104	2105	2116	2117
	2118	2133	2135	2136	2137	2148	2153	2167	2169	2179	2180	2190	2191	2192	2205
	2207	2210	2225	2227	2228	2232	2246	2248	2249	2250	2260	2262	2263	2264	2275
	2277	2278	2279	2290	2295	2311	2312	2323	2325	2326	2330	2341	2342	2361	2362
	2363	2378	2380	2381	2382	2392	2393	2394	2408	2410	2411	2412	2423	2424	2425
	2440	2442	2443	2444	2455	2460	2474	2476	2486	2487	2498	2500	2501	2505	2516
	2517	2518	2519	2534	2547	2548	2549	2550	2556	2558	2559	2563	2577	2579	2580
	2581	2591	2593	2594	2595	2606	2608	2609	2610	2622	2627	2643	2645	2655	2657
	2658	2662	2678	2680	2683	2698	2699	2700	2715	2716	2717	2731	2732	2733	2749
	2751	2761	2762	2779	2782	2785									
MOVB	553														
MTPD	548	550	1038	1254											
NOP	571	582	2786	2787	2788										
RESET	2784														
RTT	538	554													
SCC	645	758	805	840	863	976	1023	1058	1081	1193	1240	1297	1411	1458	1491

G06

POP11/45 MEMORY MANAGEMENT TEST DCKTE-B MACY11 27(732) 09-SEP-76 16:53 PAGE 74
 DCKTEB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

	1514	1628	1675	1708	1731	1844	1889	2028	2048	2071	2151	2230	2293	2328	2458
S08	2503	2561	2625	2660											
SUB	587	591													
TST	532														
	533	668	702	732	794	850	886	920	951	1012	1043	1068	1104	1138	1168
	1229	1320	1354	1385	1447	1501	1537	1571	1602	1664	1693	1718	1754	1788	1819
	1878	1907	1955	1975	1991	2017	2058	2126	2185	2197	2317	2347	2368	2402	2433
	2492	2705	2725	2741	2767										
TSTB	2780														
.A.3	232														
.END	2791														
.LIST	231	508	514	515											
.MACR	508														
.MLIST	230	508	514												
.REM	1														
.REPT	514														
.TITLE	233														
.WORD	517	519	525												

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

*DCKTEB.DCKTEB.SEO/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DCKTEB.P11
 RUN-TIME: 9 17 5 SECONDS
 RUN-TIME RATIO: 116/33=3.4
 CORE USED: 11K (21 PAGES)

[illegible]