

# PDP11

SPL INSTRUCTION TEST  
MD-11-DCKBG-B

EP-DCKBG-B-DL-A  
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NOV 1976  
**digital**  
MADE IN USA

*[Faint vertical text and markings on the left edge of the page, likely bleed-through from the reverse side.]*

.REM

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DCKBG-B-D  
 PRODUCT NAME: SPL INSTRUCTION TEST  
 DATE: JAN 1976  
 MAINTAINER: DIAGNOSTIC GROUP  
 AUTHOR: JOHN ADAMS

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 DIGITAL EQUIPMENT CORPORATION  
 MAYNARD, MASS

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1.0 ABSTRACT

THIS IS A TEST OF THE SPL INSTRUCTION. THE TEST CHECKS THAT ONLY PRIORITY LEVEL BITS IN THE PSW(PSW7-4) ARE EFFECTED BY THE SPL INSTRUCTION.

2.0 REQUIREMENTS

2.1 EQUIPMENT

BASIC 11/45 SYSTEM

2.2 STORAGE

THIS PROGRAM USES 0 THRU 17500

2.3 PRELIMINARY PROGRAMS

UOAA THRU COMA

3.0 LOADING PROCEDURE

LOAD PROGRAM USING ABS LOADER

4.0 STARTING PROCEDURE

LOAD ADDRESS 200. PRESS START. THE PROGRAM WILL LOOP AND RING BELL ON PASS COMPLETION.

5.0 OPERATING PROCEDURE

5.1 SWITCH SETTINGS

NONE

5.2 SUBROUTINE ABSTRACTS

5.2.1 SCOPE

SCOPE IS A MOVE PC,R1 AND STORES THE PC+2 IN R1.

5.2.2 HLT

HLT IS A HALT INSTRUCTION.

6.0 ERRORS

ALL ERRORS WILL CAUSE A HALT TRAP AND INTERRUPT ERRORS WILL CAUSE A HALT AT VECTOR+2.

6.1 ERROR RECOVERY

PRESS CONTINUE TO PROCEED TO NEXT TEST

6.2 ERROR LOOPING

TO LOOP ON AN ERROR, PLACE A BRANCH TO THE PREVIOUS SCOPE INSTRUCTION IN PLACE OF THE HALT INSTRUCTION. NOTE THAT IF THE ERROR IS INTERMITTANT THAT THE TEST WILL DROP THRU THE HALT AND PROCEED TO THE NEXT TEST. THEREFORE, TO LOOP THE TEST CONTINUOUSLY REPLACE THE BEG .+4 INSTRUCTION IMMEDIATELY PRECEEDING THE HALT WITH A BRANCH BACK TO THE PREVIOUS SCOPE.

TO LOOP ON TRAP FAILURES, PATCH IN THE FOLLOWING ROUTINE AT THE ADDRESS OF THE TRAP VECTOR.

TRAPVEC: TRAPVEC+4  
TRAPVEC+2: 0

DCN808.P11

110701  
110702  
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110719  
110720  
110721

TRAPVEC+4: 012716 :MOVE SCOPE ADDRESS TO STACK  
TRAPVEC+6: ADDRESS :ADDRESS OF PREVIOUS SCOPE  
TRAPVEC+10: 000006 ;RETURN TO TEST AT SCOPE

RESTORE ALL LOCATIONS BEFORE PROCEEDING TO NEXT TEST.

7.0 RESTRICTIONS  
NONE

8.0 MISCELLANEOUS  
ON TRAP ERRORS THE STACK POINTER(R6) WILL CONTAIN THE  
ADDRESS WHERE THE TRAP OCCURED.

8.1 EXECUTION TIME  
THIS PROGRAM TAKES ABOUT 1 MINUTE.

8.2 STACK POINTER  
THIS PROGRAM INITIALLY SETS THE STACK POINTER AT 500.

%.  
.TITLE MAINDEC-11-DCKBG-B PDP11/45 SPL INST TEST  
.NLIST MC.MD.SEQ  
.LIST ME  
.ABS

:TEST DCKBG8- SPL INSTRUCTION TEST (KERNEL MODE ONLY). SEE TEST DCKB0A  
:FOR SPL IN SUPERVISORY AND USER MODES.  
:THE SPL INSTRUCTION SETS THE PRIORITY LEVEL AS INDICATED AND DOES NOT  
:AFFECT THE CONDITION CODES.  
:NOTE: THIS TEST WILL ALSO RUN ON THE PDP11/25 WITH THE EIS OPTION.

:STARTING PROCEEDURE  
:LOAD ADDRESS =200  
:PRESS START  
:STACK POINTER IS AT 500  
:BELL WILL RING WHEN TEST IS COMPLETE

:REGISTER ASSIGNMENTS

000000  
000001  
000002  
000003  
000004  
000005  
000006  
000007

R0=%0  
R1=%1  
R2=%2  
R3=%3  
R4=%4  
R5=%5  
SP=%6  
PC=%7

010701  
000000  
177776  
177770  
177564  
177566  
177570  
177570  
000500  
000000

SCOPE=010701  
HLT=HALT  
PSW=177776  
UBREAK=177770  
TPS=177564  
TPB=177566  
SWR=177570  
DISPLAY=177570  
STKPTR=500  
M=0

:MOVE PC TO R1  
:ERROR HALT  
:PROCESSOR STATUS WORD ADDRESS  
:ADDRESS OF PDP11/45 MICRO BREK REGISTER  
:TELEPRINTER CONTROL STATUS AND  
:DATA BUFFER REGISTER ADDRESSES  
:ADDRESS OF CONSOLE SWITCH REGISTER  
:ADDRESS OF CONSOLE DISPLAY REGISTER  
:INITIAL STACK POINTER



000154	000156	.+2
000156	000000	HALT
000160	000162	.+2
000162	000000	HALT
000164	000166	.+2
000166	000000	HALT
000170	000172	.+2
000172	000000	HALT
000174	000176	.+2
000176	000000	HALT
000200	000202	.+2
000202	000000	HALT
000204	000206	.+2
000206	000000	HALT
000210	000212	.+2
000212	000000	HALT
000214	000216	.+2
000216	000000	HALT
000220	000222	.+2
000222	000000	HALT
000224	000226	.+2
000226	000000	HALT
000230	000232	.+2
000232	000000	HALT
000234	000236	.+2
000236	000000	HALT
000240	000242	.+2
000242	000000	HALT
000244	000246	.+2
000246	000000	HALT
000250	000252	.+2
000252	000000	HALT
000254	000256	.+2
000256	000000	HALT
000260	000262	.+2
000262	000000	HALT
000264	000266	.+2
000266	000000	HALT
000270	000272	.+2
000272	000000	HALT
000274	000276	.+2
000276	000000	HALT
000300	000302	.+2
000302	000000	HALT
000304	000306	.+2
000306	000000	HALT
000310	000312	.+2
000312	000000	HALT
000314	000316	.+2
000316	000000	HALT
000320	000322	.+2
000322	000000	HALT
000324	000326	.+2
000326	000000	HALT
000330	000332	.+2
000332	000000	HALT

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000334 000336      .+2
000336 000000      HALT
000340 000342      .+2
000342 000000      HALT
000344 000346      .+2
000346 000000      HALT
000350 000352      .+2
000352 000000      HALT
000354 000356      .+2
000356 000000      HALT
000360 000362      .+2
000362 000000      HALT
000364 000366      .+2
000366 000000      HALT
000370 000372      .+2
000372 000000      HALT
000374 000376      .+2
000376 000000      HALT
000046 000046      .=-46
000046 001466      ENDAD
000052 000052      .=-52
000052 040000      40000
000200 000200      .=-200
000200 C00167 000576      JMP      START
001000 001000      .=-1000
001000 000000      ICNT: 0 ;CONTAINS PASS COUNT
001002 005067 177772      START: CLR ICNT
001006 012706 000500      BEGIN: MOV #STKPTR,SP ;INITIALIZE THE STACK POINTER
001012 016737 177762 177570      MOV ICNT,@#DISPLAY ;DISPLAY PASS COUNT
001020 032737 000400 177570      BIT #400,@#SWR ;LOAD PDP11/45 MICRO BREAK REGISTER?
001026 001403      BEQ .+10
001030 113737 177570 177770      MOVB @#SWR,@#UBREAK ;LOAD MICRO BREAK REG WITH SRO-7

;TEST THAT SPL INSTRUCTION WILL LOAD THE PSW WITH THE PROPER PRIORITY
;LEVEL
001036 010701      SCOPE
001040 005037 177776      CLR @#PSW ;CLEAR STATUS
001044 000230      SPL 0 ;SET PROCESSER PRIORITY = 0
001046 013700 177776      MOV @#PSW,R0 ;GET STATUS WORD
001052 022700 000000      CMP #0,R0 ;PRIORITY LEVEL = 0
001056 001401      BEQ .+4
001060 000000      HLT ;ERROR!

000001      N=N+1
000040      M=M+40
001062 010701      SCOPE
001064 005037 177776      CLR @#PSW ;CLEAR STATUS
001070 000231      SPL 1 ;SET PROCESSER PRIORITY = 1
001072 013700 177776      MOV @#PSW,R0 ;GET STATUS WORD
001076 022700 000040      CMP #40,R0 ;PRIORITY LEVEL = 1
001102 001401      BEQ .+4
001104 000000      HLT ;ERROR!

000002      N=N+1
000100      M=M+40
001106 010701      SCOPE

```

# HO1

MAINDEC-11-DCKBG-B POP11/45 SPL INST TEST  
DCKBGB.P11

MACY11 27(732) 10-SEP-76 10:38 PAGE 7

001110	005037	177776	CLR	2#PSW	;CLEAR STATUS
001114	000232		SPL	2	;SET PROCESSER PRIORITY = 2
001116	013700	177776	MOV	2#PSW,RO	;GET STATUS WORD
001122	022700	000100	CMP	#100,RO	;PRIORITY LEVEL = 2
001126	001401		BEQ	+.4	
001130	000000		HLT		;ERROR!
	0000C3		N=N+1		
	000140		M=M+40		
	010701		SCOPE		
001132	010701		CLR	2#PSW	;CLEAR STATUS
001134	005037	177776	SPL	3	;SET PROCESSER PRIORITY = 3
001140	000233		MOV	2#PSW,RO	;GET STATUS WORD
001142	013700	177776	CMP	#140,RO	;PRIORITY LEVEL = 3
001146	022700	000140	BEQ	+.4	
001152	001401		HLT		;ERROR!
001154	000000				
	000004		N=N+1		
	000200		M=M+40		
	010701		SCOPE		
001156	010701		CLR	2#PSW	;CLEAR STATUS
001160	005037	177776	SPL	4	;SET PROCESSER PRIORITY = 4
001164	000234		MOV	2#PSW,RO	;GET STATUS WORD
001166	013700	177776	CMP	#200,RO	;PRIORITY LEVEL = 4
001172	022700	000200	BEQ	+.4	
001176	001401		HLT		;ERROR!
001200	000000				
	000005		N=N+1		
	000240		M=M+40		
	010701		SCOPE		
001202	010701		CLR	2#PSW	;CLEAR STATUS
001204	005037	177776	SPL	5	;SET PROCESSER PRIORITY = 5
001210	000235		MOV	2#PSW,RO	;GET STATUS WORD
001212	013700	177776	CMP	#240,RO	;PRIORITY LEVEL = 5
001216	022700	000240	BEQ	+.4	
001222	001401		HLT		;ERROR!
001224	000000				
	000006		N=N+1		
	000300		M=M+40		
	010701		SCOPE		
001226	010701		CLR	2#PSW	;CLEAR STATUS
001230	005037	177776	SPL	6	;SET PROCESSER PRIORITY = 6
001234	000236		MOV	2#PSW,RO	;GET STATUS WORD
001236	013700	177776	CMP	#300,RO	;PRIORITY LEVEL = 6
001242	022700	000300	BEQ	+.4	
001246	001401		HLT		;ERROR!
001250	000000				
	000007		N=N+1		
	000340		M=M+40		
	010701		SCOPE		
001252	010701		CLR	2#PSW	;CLEAR STATUS
001254	005037	177776	SPL	7	;SET PROCESSER PRIORITY = 7
001260	000237		MOV	2#PSW,RO	;GET STATUS WORD
001262	013700	177776	CMP	#340,RO	;PRIORITY LEVEL = 7
001266	022700	000340	BEQ	+.4	
001272	001401		HLT		;ERROR!
001274	000000				

```

000010      N=N+1
000400      M=M+40

;TEST THAT ONLY PRIORITY LEVEL BITS ARE AFFECTED BY SPL INSTRUCTION.
001276 010701      SCOPE
001300 012737 034357 177776  MOV    #34357,0#PSW    ;SET ALL BITS EXCEPT USER MODE BIT
001306 000230      SPL      0          ;SET PRIORITY LEVEL 0
001310 013700 177776  MOV    0#PSW,%0      ;GET PSW
001314 022700 034017  CMP    #34017,%0    ;CONDITION CODES STILL SET?
001320 001401      BEQ      .+4
001322 000000      HLT
;ERROR! ALL COND. CODES NOT STILL SET

001324 000257      CCC
001326 000237      SPL      7          ;CLEAR ALL CONDITION CODES
001330 013700 177776  MOV    0#PSW,%0      ;SET PRIORITY LEVEL =7
001334 122700 000340  CMPB  #340,%0        ;GET PSW
001340 001401      BEQ      .+4          ;CONDITION CODES CLEAR?
001342 000000      HLT
;ERROR! CONDITION CODES NOT CLEAR

;TEST THAT THE INSTRUCTION FOLLOWING AN SPL IS EXECUTED IF THE SPL
;SETS THE PRIORITY LEVEL BELOW THE REQUEST LEVEL
001344 010701      SCOPE
001346 012706 000500  MOV    #STKPTR,SP    ;SET STACK POINTER
001352 012737 000340 177776  MOV    #340,0#PSW    ;SET PRIORITY LEVEL 7
001360 005000      CLR      RO          ;PRESET RO
001362 012767 001404 176474  MOV    #TPINT,64     ;LOAD TTY PRINTER VECTOR
001370 012737 000100 177564  MOV    #100,0#TPS    ;ENABLE PRINTER TO INTERRUPT
001376 000230      SPL      0          ;SET PRIORITY LEVEL = 0
001400 005100      COM      RO          ;COMPLIMENT RO
001402 000000      HLT
;ERROR! NO INTERRUPT
001404 005200      TPINT: INC    RO          ;DID RO COMPLIMENT?
001406 001401      BEQ      .+4
001410 000000      HLT
;ERROR! INST. FOLLOWING SPL NOT EXECUTED
001412 012767 000066 176444  MOV    #66,64
001420 005037 177564  CLR    0#TPS
;RESTORE TTY VECTOR
;DISABLE INTERRUPT

001424 005267 177350  END:   INC    ICNT      ;INCREMENT PASS COUNT
001430 026727 177344 020000  CMP    ICNT,#20000   ;20000 PASSES?
001436 001402      BEQ    DONE
001440 000167 177342  JMP    BEGIN
001444 012737 000007 177566  DONE: MOV    #7,0#TPB     ;RING BELL
001452 105737 177564  TSTB  0#TPS         ;WAIT FOR THE
001456 100375      BPL      .-4         ;BELL TO RING
001460 013702 000042  MOV    0#42,%2      ;GET DECTAPE MONITOR RETURN ADDRESS
001464 001404      BEQ    DONE1      ;DO NOT RETURN IF (42)=0
001466 004712      ENDAD: JSR    7,(2)   ;RETURN TO DECTAPE MONITOR
001470 000240      NOP
001472 000240      NOP
001474 000240      NOP
001476 000167 177300  DONE1: JMP    START
;ACT11
;OVERLAY
;AREA
;RESTART TEST

000001      .END

```



K01

MAINDEC-11-DCKBG-B PDP11/45 SPL INST TEST MACY11 27(732) 10-SEP-76 10:38 PAGE 12  
DCKBGB.P11 CROSS REFERENCE TABLE -- MACRO NAMES

SPLA 292# 305 315 325 335 345 355 365 375

BEO	300	310	320	330	340	350	360	370	380	392	399	414	421	427	
BIT	299														
BPL	425														
CCC	395														
CLR	296	306	316	326	336	346	356	366	376	407	417				
OMP	309	319	329	339	349	359	369	379	391	420					
OMP8	398														
COM	411														
HALT	149	161	163	165	167	169	171	173	175	177	179	181	183	185	187
	189	191	193	195	197	199	201	203	205	207	209	211	213	215	217
	219	221	223	225	227	229	231	233	235	237	239	241	243	245	247
	249	251	253	255	257	259	261	263	265	267	269	271	273	275	277
	279	281	283	285	287										
INC	413	419													
JMP	293	422	432												
JSR	428														
MOV	297	298	308	318	328	338	349	358	368	378	388	390	397	405	406
	408	409	416	423	426										
MOV8	301														
NOP	429	430	431												
SPL	307	317	327	337	347	357	367	377	389	396	410				
TST8	424														
.ABS	124														
.END	434														
.LIST	123														
.MACR	292														
.NLIST	122														
.REM	1														
.REPT	160	305													
.TITLE	121														

ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0

\*DCKBGB,DCKBGB.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DCKBGB.P11  
RUN-TIME: 1 2.4 SECONDS  
RUN-TIME RATIO: 15/5=3.0  
CORE USED: 6K (12 PAGES)

