

IDENTIFICATION

PRODUCT CODE: MAINDEC-11;DCKBG-A1-D
PRODUCT NAME: SPL INTSTRUCTION TEST
DATE CREATED: 15 MAR 1972
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: JOHN ADAMS

COPYRIGHT(c) 1972
DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASS

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

D0AA THRU D0MA

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 BEQ ,+4 INSTRUCTION IMMEDIATELY PRECEDING 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
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 INITIALY SETS THE STACK POINTER AT 500,

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
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
	000200			,#200
000200	000167	000576		JMP START
	001000			,#1000
001000	000000			0
001002	000067	177772		ICNT1 CLR ;CONTAINS PASS COUNT
001006	012706	000500		START1 CLR ;
001012	016737	177762		BEGIN1 MOV #STKPTR,SP ;INITIALIZE THE STACK POINTER
001020	032737	000400	177570	MOV ICNT,#DISPLAY ;DISPLAY PASS COUNT
001026	001403		177570	BIT #400,#SWR ;LOAD PDP11/45 MICRO BREAK REGISTER?
001030	113737	177570	177770	BEQ #10 ;
				MOV #SWR,#SUBBREAK ;LOAD MICRO BREAK REG WITH SW07
				ITEST THAT SPL INSTRUCTION WILL LOAD THE PSW WITH THE PROPER PRIORITY
				LEVEL
001036	010701			SCOPE
001040	000037	177776		CLR #PSW ;CLEAR STATUS
001044	000230			0 ;SET PROCESSOR PRIORITY = 0
001046	013700	177776		MOV #PSW,R0 ;GET STATUS WORD
001052	022700	000000		CMR #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	000037	177776		CLR #PSW ;CLEAR STATUS
001070	000231			1 ;SET PROCESSOR PRIORITY = 1
001072	013700	177776		MOV #PSW,R0 ;GET STATUS WORD
001076	022700	000040		CMR #40,R0 ;PRIORITY LEVEL = 1
001102	001401			BEQ #+4 ;
001104	000000			HLT ;ERROR!
	000002			N=N+1
	000100			M=M+40
001106	010701			SCOPE
001110	000037	177776		CLR #PSW ;CLEAR STATUS
001114	000232			2 ;SET PROCESSOR PRIORITY = 2
001116	013700	177776		MOV #PSW,R0 ;GET STATUS WORD
001122	022700	000100		CMR #100,R0 ;PRIORITY LEVEL = 2
001126	001401			BEQ #+4 ;
001130	000000			HLT ;ERROR!
	000003			N=N+1
	000140			M=M+40
001132	010701			SCOPE
001134	000037	177776		CLR #PSW ;CLEAR STATUS
001140	000233			3 ;SET PROCESSOR PRIORITY = 3
001142	013700	177776		MOV #PSW,R0 ;GET STATUS WORD
001146	022700	000140		CMR #140,R0 ;PRIORITY LEVEL = 3
001152	001401			BEQ #+4 ;

```

001154 000000 HLT IERROR!
          000004 N=N+1
          000200 M=M+40
001156 010701 SCOPE
001160 000037 177776 CLR ##PSW I CLEAR STATUS
001164 000234 SPL 4 I SET PROCESSOR PRIORITY = 4
001166 013700 177776 MOV ##PSW,R0 I GET STATUS WORD
001172 022700 000200 CMP #200,R0 I PRIORITY LEVEL = 4
001176 001401 BEQ ,+4
001200 000000 HLT IERROR!

          000005 N=N+1
          000240 M=M+40
001202 010701 SCOPE
001204 000037 177776 CLR ##PSW I CLEAR STATUS
001210 000235 SPL 5 I SET PROCESSOR PRIORITY = 5
001212 013700 177776 MOV ##PSW,R0 I GET STATUS WORD
001216 022700 000240 CMP #240,R0 I PRIORITY LEVEL = 5
001222 001401 BEQ ,+4
001224 000000 HLT IERROR!

          000006 N=N+1
          000300 M=M+40
001226 010701 SCOPE
001230 000037 177776 CLR ##PSW I CLEAR STATUS
001234 000236 SPL 6 I SET PROCESSOR PRIORITY = 6
001236 013700 177776 MOV ##PSW,R0 I GET STATUS WORD
001242 022700 000300 CMP #300,R0 I PRIORITY LEVEL = 6
001246 001401 BEQ ,+4
001250 000000 HLT IERROR!

          000007 N=N+1
          000340 M=M+40
001252 010701 SCOPE
001254 000037 177776 CLR ##PSW I CLEAR STATUS
001260 000237 SPL 7 I SET PROCESSOR PRIORITY = 7
001262 013700 177776 MOV ##PSW,R0 I GET STATUS WORD
001266 022700 000340 CMP #340,R0 I PRIORITY LEVEL = 7
001272 001401 BEQ ,+4
001274 000000 HLT IERROR!

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

```

ITEST THAT ONLY PRIORITY LEVEL BITS ARE AFFECTED BY SPL INSTRUCTION,

```

001276 010701 SCOPE
001300 012737 034357 177776 MOV #34357,##PSW I SET ALL BITS EXCEPT USER MODE BIT
001306 000230 SPL 0 I SET PRIORITY LEVEL 0
001310 013700 177776 MOV ##PSW,R0 I GET PSW
001314 022700 034017 CMP #34017,R0 I CONDITION CODES STILL SET?
001320 001401 BEQ ,+4
001322 000000 HLT IERROR! ALL COND. CODES NOT STILL SET

```

```

001324 000297 CCC I CLEAR ALL CONDITION CODES
001326 000237 SPL 7 I SET PRIORITY LEVEL = 7
001330 013700 177776 MOV ##PSW,R0 I GET PSW
001334 022700 000340 CMPB #340,R0 I CONDITION CODES CLEAR?
001340 001401 BEQ ,+4
001342 000000 HLT IERROR! CONDITION CODES NOT CLEAR

```

ITEST THAT THE INSTRUCTION FOLLOWING AN SPL IS EXECUTED IF THE SPL
ISETS THE PRIORITY LEVEL BELOW THE REQUEST LEVEL

```

001344 010701 SCOPE
001346 012706 000500 MOV #STKPTR,SP I SET STACK POINTER
001352 012737 000340 177776 MOV #340,##PSW I SET PRIORITY LEVEL 7
001360 000000 CLR R0 I PRESET R0
001362 012767 001404 176474 MOV #TPINT,64 I LOAD TTY PRINTER VECTOR
001370 012737 000100 177564 MOV #100,##TPS I ENABLE PRINTER TO INTERRUPT
001376 000230 SPL 0 I SET PRIORITY LEVEL = 0
001400 000100 COM R0 I COMPLIMENT R0
001402 000000 HLT IERROR! NO INTERRUPT
001404 000200 TPINT: R0 I DID R0 COMPLIMENT?
001406 001401 BEQ ,+4
001410 000000 HLT IERROR! INST. FOLLOWING SPL NOT EXECUTED
001412 012767 000066 176444 MOV #66,64 I RESTORE TTY VECTOR
001420 000037 177564 CLR ##TPS I DISABLE INTERRUPT

001424 000267 177350 END: INC ICNT I INCREMENT PASS COUNT
001430 026727 177344 020000 CMP ICNT,#20000 I 20000 PASSES?
001436 001402 BEQ DONE
001440 000167 177342 BEGIN
001444 012737 000007 177566 DONE: MOV #7,##TPB I RING BELL
001452 100737 177564 TSTB ##TPS I WAIT FOR THE
001456 100375 BPL ,=4 I BELL TO RING
001460 013702 000042 MOV ##42,R2 I GET DECTAPE MONITOR RETURN ADDRESS
001464 001404 BEQ DONE1 I DO NOT RETURN IF (42)=0
001466 004712 JSR 7,(R2) I RETURN TO DECTAPE MONITOR
001470 000240 NOP IACT11
001472 000240 NOP I OVERLAY
001474 000240 NOP I AREA
001476 000167 177300 DONE1: JMP START I RESTART TEST

          000001 ,END

```

BEGIN	001006	DISPLA	= 177570	DONE	001444	DONE1	001476
END	001424	HLT	= 000000	ICNT	001000	M	= 000400
N	= 000010	PC	= X000007	PSW	= 177776	R0	= X000000
R1	= X000001	R2	= X000002	R3	= X000003	R4	= X000004
R5	= X200005	SCOPE	= 010701	SP	= X000006	START	001002
STKPTR	= 000500	SWR	= 177570	TPB	= 177566	TPINT	001404
TPS	= 177564	UBREAK	= 177770	,	= 001502		