

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DCKBM-B-D
PRODUCT NAME: TRAPS TEST
DATE CREATED: 12 MAR 1973
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: JOHN ADAMS

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- 1,0 ABSTRACT

THIS PROGRAM TESTS ALL TRAP INSTRUCTIONS AND ERROR TRAPS. (TIMEOUT, ODD ADDRESS AND OVERFLOW) INTERRUPT LOGIC IS ALSO TESTED USING TELETYPE.
- 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, R1 CONTAINS THE PC OF THE LAST TEST SUCCESSFULLY COMPLETED.
 - 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 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,

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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
  
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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,

1
 2

TITLE MAINDEC-11-DCKRM-B PDP11/45 TRAPS TEST;
 .LIST ME
 .NLIST MC:SEQ
 .ABS
 !TEST DCKRM-B-PDP11/45 TRAPS TEST; ALL PROCESSOR TRAPS INCLUDING ERROR TRAPS ARE
 !TESTED IN THIS PROGRAM (KERNEL MODE ONLY);
 !NOTE! THE SEGMENTATION ABORT TRAPS ARE NOT TESTED;

!STARTING PROCEDURE
 ! LOAD ADDRESS 0200
 ! PRESS START
 ! STACK POINTER IS AT 500
 ! BELL WILL RING WHEN TEST IS COMPLETE
 ! TEST WILL TYPE 'NULL' CHARACTERS IN THE FIRST 8, PASSES AND THEN
 ! OMIT TYPING 'NULLS' FOR THE REST OF THE TEST.

000500 STKPTR=0500 INITIAL STACK POINTER

!MACRO CALL
 !MACR SETBIT A
 !MOV #20,-(6) !PUSH IT:BIT ON THE STACK
 !MOV #.6,-(6) !PUSH PC ON THE STACK
 !A !SET IT: BIT
 !ENDM

000000 TAB=X0
 000003 LAST=X3
 000002 FIRST=X2
 010701 SCOPE#010701 !MOV PC TO R1
 000000 HLT=HALT

!TRAP VECTOR ADDRESSES
 ERRVEC#4 !RESERVED INST AND ILLEGAL ADDRESSES
 RESVEC#10 !RESERVED INSTRUCTION TRAP VECTOR
 BPTVEC#14 !BREAK-POINT TRAP VECTOR
 TBITVEC#14 !IT: BIT TRAP VECTOR ADDRESS
 IOTVEC#20 !IOT TRAP VECTOR ADDRESS
 PFWEC#24 !POWER FAIL TRAP VECTOR ADDRESS
 EMYVEC#30 !EMT TRAP VECTOR ADDRESS
 TRAPVEC#34 !TRAP TRAP VECTOR ADDRESS
 TPEVC#64 !ADDRESS OF TELEPRINTER INT VECTOR
 PIRVEC#240 !PROG INT ROST TRAP VECTOR
 FPEVEC#244 !FLOATING POINT TRAP VECTOR

!REGISTER ADDRESSES
 TTYCR#177544
 TRCSR#177540
 SWR#177570
 DISPLAY#177570 !ADDRESS OF DISPLAY REGISTER
 PSW#177776 !ADDRESS OF PROCESSOR STATUS WORD
 PIR#177772 !ADDRESS OF PROG INT ROST REGISTER
 UBR#177770 !ADDRESS OF MICRO BREAK REGISTER
 PIR#10000 !LEVEL 4 REQUEST
 RESINST#76000 !A RESERVED INSTRUCTION

075000	RES=75000	!A RESERVED INSTRUCTION
004700	ILLA#004700	!AN ILLEGAL INSTRUCTION (ISR 7:X0)
001100	ILLB#100	!AN ILLEGAL INSTRUCTION (JMP X0)
000000	AB0	
000000	..+2	
000002	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000002	..+2	
000024	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000006	..+2	
000006	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000010	..+2	
000012	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000014	..+2	
000016	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000016	..+2	
000020	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000022	..+2	
000022	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000024	..+2	
000026	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000026	..+2	
000030	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000032	..+2	
000032	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000034	..+2	
000036	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000036	..+2	
000040	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000042	..+2	
000042	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000044	..+2	
000046	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000046	..+2	
000050	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000052	..+2	
000052	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000054	..+2	
000056	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000056	..+2	
000060	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000062	..+2	
000062	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000064	..+2	
000066	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000066	..+2	
000070	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000072	..+2	
000072	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000074	..+2	
000076	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
000076	..+2	
00100	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00102	..+2	
00102	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00104	..+2	
00106	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00106	..+2	
00110	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00112	..+2	
00112	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00114	..+2	
00116	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00116	..+2	
00120	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00122	..+2	
00122	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00124	..+2	
00126	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00126	..+2	
00130	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00132	..+2	
00132	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00134	..+2	
00136	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00136	..+2	
00140	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION
00142	..+2	
00142	HALT	!ERROR: TRAPPED TO PREVIOUS LOCATION

000144	000146	,+2	
000146	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000150	000152	,+2	
000152	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000154	000156	,+2	
000156	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000160	000162	,+2	
000162	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000164	000166	,+2	
000166	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000170	000172	,+2	
000172	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000174	000176	,+2	
000176	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000200	000202	,+2	
000202	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000204	000206	,+2	
000206	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000210	000212	,+2	
000212	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000214	000216	,+2	
000216	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000220	000222	,+2	
000222	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000224	000226	,+2	
000226	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000230	000232	,+2	
000232	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000234	000236	,+2	
000236	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000240	000242	,+2	
000242	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000244	000246	,+2	
000246	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000250	000252	,+2	
000252	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000254	000256	,+2	
000256	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000260	000262	,+2	
000262	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000264	000266	,+2	
000266	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000270	000272	,+2	
000272	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000274	000276	,+2	
000276	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000300	000302	,+2	
000302	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000304	000306	,+2	
000306	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000310	000312	,+2	
000312	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000314	000316	,+2	
000316	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION

000320	000322	,+2	
000322	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000324	000326	,+2	
000326	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000330	000332	,+2	
000332	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000334	000336	,+2	
000336	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000340	000342	,+2	
000342	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000344	000346	,+2	
000346	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000350	000352	,+2	
000352	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000354	000356	,+2	
000356	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000360	000362	,+2	
000362	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000364	000366	,+2	
000366	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000370	000372	,+2	
000372	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000374	000376	,+2	
000376	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000400	000402	,+2	
000402	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000404	000406	,+2	
000406	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000410	000412	,+2	
000412	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000414	000416	,+2	
000416	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000420	000422	,+2	
000422	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000424	000426	,+2	
000426	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000430	000432	,+2	
000432	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000434	000436	,+2	
000436	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000440	000442	,+2	
000442	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000444	000446	,+2	
000446	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000450	000452	,+2	
000452	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000454	000456	,+2	
000456	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000460	000462	,+2	
000462	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000464	000466	,+2	
000466	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000470	000472	,+2	
000472	000000	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION

000474	000476	.42	
000476	000478	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000500	000502	.42	
000502	000504	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000504	000506	.42	
000506	000508	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000510	000512	.42	
000512	000514	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000514	000516	.42	
000516	000518	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000520	000522	.42	
000522	000524	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000524	000526	.42	
000526	000528	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000530	000532	.42	
000532	000534	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000534	000536	.42	
000536	000538	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000540	000542	.42	
000542	000544	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000544	000546	.42	
000546	000548	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000550	000552	.42	
000552	000554	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000554	000556	.42	
000556	000558	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000560	000562	.42	
000562	000564	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000564	000566	.42	
000566	000568	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000570	000572	.42	
000572	000574	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000574	000576	.42	
000576	000578	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000600	000602	.42	
000602	000604	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000604	000606	.42	
000606	000608	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000610	000612	.42	
000612	000614	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000614	000616	.42	
000616	000618	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000620	000622	.42	
000622	000624	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000624	000626	.42	
000626	000628	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000630	000632	.42	
000632	000634	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000634	000636	.42	
000636	000638	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000640	000642	.42	
000642	000644	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000644	000646	.42	
000646	000648	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION

000650	000652	.42	
000652	000654	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000654	000656	.42	
000656	000658	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000660	000662	.42	
000662	000664	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000664	000666	.42	
000666	000668	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000670	000672	.42	
000672	000674	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000674	000676	.42	
000676	000678	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000680	000682	.42	
000682	000684	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000684	000686	.42	
000686	000688	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000690	000692	.42	
000692	000694	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000694	000696	.42	
000696	000698	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000700	000702	.42	
000702	000704	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000704	000706	.42	
000706	000708	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000710	000712	.42	
000712	000714	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000714	000716	.42	
000716	000718	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000720	000722	.42	
000722	000724	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000724	000726	.42	
000726	000728	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000730	000732	.42	
000732	000734	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000734	000736	.42	
000736	000738	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000740	000742	.42	
000742	000744	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000744	000746	.42	
000746	000748	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000750	000752	.42	
000752	000754	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000754	000756	.42	
000756	000758	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000760	000762	.42	
000762	000764	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000764	000766	.42	
000766	000768	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000770	000772	.42	
000772	000774	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION
000774	000776	.42	
000776	000778	HALT	ERROR: TRAPPED TO PREVIOUS LOCATION

001200	001200	.#0200	
001200	001200	JMP	START
001200	001200	.#260	
001200	001200		
001200	001200	ICNT: 0	ICONTAINS THE PASS COUNT
001200	001200		
001200	001200	START: CLR	ICNT

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001016 012776 000500          REGINI  MOV  #STKPTR,X6      ISET STACK PTR
001012 014737 177762 177570      MOV  #CNT,0#DISPLAY  IDISPLAY TRF PASS COUNT
001020 032737 000400 177570      BIT  #00,0#SWR       ILOAD MICRO BREAK REGISTER
001026 001403                      BEQ  .+10
001030 114737 177570 177770      MOV  #SWR,0#UBREAK  ILOAD MICRO BREAK REG WITH SWR=7
001036 014701                      SCOPE

001040 012737 001056 000010      ICHECK THAT A TRAP OCCURS ON A RESERVED INSTRUCTION (076000)
001046 005037 000012          MOV  #RPTA,0#RESVEC  IRETURN LOCATION
001052 076000                      CLR  #RESVEC+2
001054 000000                      RESINST #RESVEC+2
001056 014701                      HLT  IRESERVED INSTRUCTION (SHOULD TRAP)
                                IRESERVED INSTRUCTION FAILFE TO TRAP
                                ISCOPE STORES PC IN R1

001060 012706 000500          ITEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
001064 012737 001074 000010      MOV  #STKPTR,X6      ISET STACK PTR
001072 076000                      MOV  #RET0,0#RESVEC  IRETURN POINTER
001074 020627 000474      RETBI RESINST #RESVEC+2
001100 001401                      BEQ  .+4
001102 000000                      HLT  ITEST DECREMENT OF X6
001104 010701                      SCOPE  IINOT DECREMENTED TWO WORDS
                                ISCOPE STORES PC IN R1

001106 012706 000500          ITEST THAT PROPER P.C. IS SAVED
001112 012737 001122 000010      MOV  #STKPTR,X6      ISET STACK PTR
001120 076000                      MOV  #RET0,0#RESVEC  IRETURN FROM TRAP POINTER
001122 022737 001122 000474      INSTCI RESINST #RESVEC+2
001130 001401                      RETCI CMP  #,0#STKPTR-4  ITRAP ON THIS INSTRUCTION
001132 000000                      BEQ  .+4
001134 014701                      HLT  ICHECK RETURN PC ON THE STACK
                                IINCORRECT P.C.
                                ISCOPE STORES PC IN R1

001136 014701          ITEST THAT "OLD" PSW AND PRIORITY ARE PLACED ON STACK
001140 012706 000500          SCOPE  ISCOPE STORES PC IN R1
001144 012737 001160 000010      MOV  #STKPTR,X6      ISET STACK PTR
001152 005037 177776      MOV  #RET0,0#RESVEC  ISET UP
001156 076000                      CLR  #PSW          ICLEAR PSW AND PRIORITY
001160 016700 177312      RETDI RESINST #PSW
001164 001401                      MOV  STKPTR+2,X0  ITRAP ON RESERVED INSTRUCTION
001166 000000                      BEQ  .+4
001170 010701                      HLT  IGET SAVED STATUS & TEST FOR ALL 0'S
                                IBRANCH IF 0
                                IERROR! INCORRECT STATUS SAVED ON STACK
                                ISCOPE STORES PC IN R1

001172 012706 000500          MOV  #STKPTR,X6      ISET STACK PTR
001176 012737 001214 000010      MOV  #RETE,0#RESVEC  ISET UP
001204 112737 000357 177776      MOV  #357,0#PSW     IPRF SET THE STATUS WORD
001212 076000                      RESINST #RESVEC+2
001214 016700 177256      RETEI MOV  STKPTR+2,X0
001220 127700 000357      MOV  #357,X0
001224 001401                      BEQ  .+4
001226 000000                      HLT  IRESERVED INSTRUCTION TRAP
                                IGET SAVED STATUS
                                ISAVED STATUS CORRECT?
                                IBRANCH IF CORRECT
                                IERROR! INCORRECT STATUS WAS SAVED
                                ISCOPE STORES PC IN R1

001230 010701          ITEST THAT "NEW" STATUS IS CORRECT
    
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001232 012706 000500          MOV  #STKPTR,X6      INITIALIZE THE STACK POINTER
001236 012737 001260 000010      MOV  #RETF,0#RESVEC  ISET UP VECTOR
001244 005037 000012          CLR  #RESVEC+2
001250 112737 000357 177776      MOV  #357,0#PSW     ICLEAR 'NEW' STATUS WORD
001256 076000                      RESINST #PSW          IPRF SET THE STATUS WORD
001260 013700 177776      RETFI MOV  #PSW,X0
001264 001401                      BEQ  .+4
001266 000000                      HLT  IDO A RESERVED INSTRUCTION
                                IGET & TEST THE 'NEW' STATUS WORD
                                IBRANCH IF ALL 0'S
                                IERROR! 'NEW' STATUS WAS INCORRECT
                                ISCOPE STORES PC IN R1

001270 005037 177776      CLR  #PSW
001274 014701                      SCOPE

001276 012706 000500          MOV  #STKPTR,X6      ISET UP THE STACK POINTER
001302 012737 001324 000010      MOV  #RETC,0#RESVEC
001310 012737 004357 000012      MOV  #4357,0#RESVEC+2
001316 005037 177776      CLR  #PSW          ILOAD THE NEW STATUS WORD
001322 076000                      RESINST #PSW          IPRF SET THE STATUS WORD
                                IDO A RESERVED INSTRUCTION

001324 013700 177776      RETGI *****NOTE! R0 IS UPPER R0 *****
001330 022700 004357      MOV  #PSW,X0
001334 001401                      CMP  #4357,X0
001336 000000                      BEQ  .+4
001340 014701                      HLT  IGET THE 'NEW' STATUS WORD
                                IAS 'NEW' STATUS CORRECTLY LOADED?
                                IBRANCH IF CORRECT
                                IERROR! 'NEW' STATUS WAS INCORRECT
                                ISCOPE STORES PC IN R1

001342 012737 000006 000010      MOV  #6,0#RESVEC
001350 005037 000012          CLR  #RESVEC+2
                                IRESTORE RESERVED INSTRUCTION
                                ITC HALT AT 6
    
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001354 010701          ITEST THAT A TRAP OCCURES FOR A "TRAP" INSTRUCTION
001356 012706 000500      SCOPE          ISCOPE STORES PC IN R1
001362 012737 001400 000034  MOV #STKPTR,X6      ISTACK POINTER SETLP
001370 005037 000036      MOV #RFB1,#ATRAPVEC IRETURN POINTER
001374 104400          CLR #ATRAPVEC+2     IRETURN LOCATION
001376 000000          TRAP              IDO A TRAP INSTRUCTION
001400 010701          HLT
RETA1: SCOPE          ISCOPE STORES PC IN R1

001402 012706 000500      ITEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
001406 012737 001416 000034  MOV #STKPTR,X6      ISTACK POINTER SETLP
001414 104400          MOV #RFB1,#ATRAPVEC IRETURN POINTER
001416 000027 000474      TRAP              IDO A TRAP INSTRUCTION
REFB1: CMP X6,#STKPTR-4  ITEST DECREMENT OF X6
001422 001401          BEQ .+4
001424 000000          HLT
001426 010701          SCOPE          ISCOPE STORES PC IN R1

001430 012706 000500      ITEST THAT PROPER PC IS SAVED
001434 012737 001444 000034  MOV #STKPTR,X6      ISTACK POINTER SETLP
001442 104400          MOV #RFB1,#ATRAPVEC IRETURN FROM TRAP POINTER
001444 000027 001444 170022 REYCI: CMP #STKPTR-4     ITRAP ON THIS INSTRUCTION
001452 001401          BEQ .+4             ICHFK INCREMENTED P.C.
001454 000000          HLT
001456 010701          SCOPE          IINCORRECT P.C.
                                ISCOPE STORES PC IN R1

001460 012706 000500      ITEST THAT "OLD" PSW & PRIORITY ARE PLACED ON STACK
001462 012737 001502 000034  MOV #STKPTR,X6      ISCOPE STORES PC IN R1
001466 012737 001502 000034  MOV #RFB1,#ATRAPVEC ISET UP
001474 005037 177776      CLR #PSW           ICLR PSW AND PRIORITY
001500 104400          TRAP              IDO A TRAP INSTRUCTION
001502 014700 176770      MOV STKPTR-2,X0    IGET & TEST THE SAVED STATUS
001506 001401          BEQ .+4           IBRANCH IF ALL 0'S
001510 000000          HLT               IERROR! SAVED STATUS IS INCORRECT
001512 010701          SCOPE          ISCOPE STORES PC IN R1

001514 012706 000500      ITEST THAT "NEW" STATUS IS CORRECT
001520 012737 001536 000034  MOV #STKPTR,X6      IINITIALIZE THE STACK POINTER
001526 012737 000357 177776  MOV #RFB1,#ATRAPVEC ISET UP
001534 104400          MOV #397,#PSW      IPRE SET THE STATUS WORD
001536 014700 176734      TRAP              IDO A TRAP INSTRUCTION
001542 022700 000357      MOV STKPTR-2,X0    IGET THE SAVED STATUS WORD
001546 001401          CMP #397,X0       IIS CORRECT?
001550 000000          BEQ .+4           IIF WAS CORRECT STATUS SAVED ON THE STACK
001552 010701          HLT               IBRANCH IF CORRECT
                                IERROR! INCORRECT STATUS SAVED ON STACK
                                ISCOPE STORES PC IN R1

001554 012706 000500      ITEST THAT "NEW" STATUS IS CORRECT
001560 012737 001602 000034  MOV #STKPTR,X6      MOV
001566 005037 000036      MOV #RFB1,#ATRAPVEC I
001572 012737 000357 177776  CLR #ATRAPVEC+2     I
001600 104400          MOV #397,#PSW      IPRE SET THE STATUS WORD
                                TRAP
    
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001602 013700 177776      REFB1: MOV #PSW,X0      IGET THE 'NEW' STATUS WORD
001606 001401          BEQ .+4           IBRANCH IF ALL 0'S
001610 000000          HLT               IERROR! INCORRECT 'NEW' STATUS LOADED
001612 005037 177776      CLR #PSW
001616 010701          SCOPE          ISCOPE STORES PC IN R1

001620 012706 000500      ITEST THAT ALL COMBINATION OF "TRAP" WILL CAUSE A TRAP
001624 012737 001646 000034  MOV #STKPTR,X6      IINITIALIZE BASE TRAP INSTRUCTION
001632 012737 004357 000036  MOV #RFB1,#ATRAPVEC IRETURN FROM TRAP TO RA1
001640 005037 177776      MOV #4397,#ATRAPVEC+2 ILOAD 'NEW' STATUS WORD
001644 104400          CLR #PSW         IPRE SET THE STATUS WORD
001646 013700 177776      TRAP              IDO A TRAP INSTRUCTION
001652 022700 004357      REYCI: MOV #PSW,X0      IGET THE 'NEW' STATUS
001656 001401          CMP #4397,X0     IIS IT CORRECT?
001660 000000          BEQ .+4           IIF WAS CORRECT
001662 000037 177776      HLT               IBRANCH IF CORRECT
001666 010701          CLR #PSW         IERROR! 'NEW' STATUS WAS INCORRECT
                                ISCOPE STORES PC IN R1

001670 012767 104400 000012  ITEST THAT ALL COMBINATION OF "TRAP" WILL CAUSE A TRAP
001676 012767 001714 176130  MOV #TRAP,RB1      IINITIALIZE BASE TRAP INSTRUCTION
001704 012706 000500      RB1: MOV #RA1,34     IRETURN FROM TRAP TO RA1
001710 104400          RB1: TRAP #STKPTR,X6 ISET UP STACK POINTER
001712 000000          HLT               ITRAP INST WILL BE MODIFIED TO TRAP+377
001714 005267 177770      RA1: RB1           IPREVIOUS INST FAILED TO TRAP
001720 022767 104777 177762  CMP #104777,RB1    IINCREMENT TRAP INSTRUCTION
001726 103366          BHIS             ITRAP+377 TO UPPER LIMIT
001730 010701          SCOPE          IINAV WE TESTED ALL
                                ISCOPE STORES PC IN R1

001732 012737 000036 000034  MOV #TRAPVEC+2,#ATRAPVEC IRESTORE TRAP VECTOR TO
001740 005037 000036      CLR #ATRAPVEC+2    IHALT AT 36
    
```



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TEST THAT A TRAP OCCURS ON AN "IOT" INSTRUCTION
001744 010701          SCOPE          ISCOPE STORES PC IN R1
001746 010706 000500  MOV          #STKPTR,X6      ISTACK POINTER SETLP
001752 010737 001770  #RPT2;#IOTVEC IRETURN POINTER
001760 005037 000022  CLR          #IOTVEC+2
001764 000004          IOT
001766 000000          HLT
001770 010701          RETA21  SCOPE          ISCOPE STORES PC IN R1

TEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
001772 010706 000500  MOV          #STKPTR,X6      ISTACK POINTER SETLP
001776 010737 002006  #RPT2;#IOTVEC IRETURN POINTER
002004 000004          IOT
002006 020627 000474  RETB21  CMP          X6;#STKPTR-4  ITEST DECREMENT OF X6
002012 001401          BEQ          .+4
002014 000000          HLT
002016 010701          SCOPE          ISCOPE STORES PC IN R1

TEST THAT PROPER P.C. IS SAVED
002020 010706 000500  MOV          #STKPTR,X6      ISTACK POINTER SETLP
002024 010737 002034  #RPT2;#IOTVEC IRETURN FROM TRAP POINTER
002032 000004          IOT
002034 022767 002034 176432  RETC21  CMP          #I;STKPTR-4  ICHECK FOR INCREMENTED P.C.
002042 001401          BEQ          .+4
002044 000000          HLT
002046 010701          SCOPE          IINCORRECT P.C.
                                ISCOPE STORES PC IN R1

TEST THAT "OLD" CC AND PRIORITY ARE PLACED ON STACK
002050 010701          SCOPE          ISCOPE STORES PC IN R1
002052 010706 000500  MOV          #STKPTR,X6      ISET UP
002056 010737 002072  #RPT2;#IOTVEC ISET UP
002064 005037 177776  CLR          #PSW          ICLR CC AND PRIORITY
002070 000004          IOT
002072 010700 176400  RETD21  MOV          STKPTR-2,X0  IGET & TEST SAVED STATUS
002076 001401          BEQ          .+4  IBRANCH IF ALL 0'S
002100 000000          HLT
002102 010701          SCOPE          IERROR! INCORRECT STATUS SAVED ON STACK
                                ISCOPE STORES PC IN R1

002104 010706 000500  MOV          #STKPTR,X6      ISET UP
002110 010737 002126  #RPT2;#IOTVEC ISET UP
002116 010737 000357 177776  MOV          #357;#PSW     IPRE SET STATUS
002124 000004          IOT
002126 010700 176344  RETE21  MOV          STKPTR-2,X0  IGET SAVED STATUS
002132 022700 000357  CMP          #357,X0      ISAVED STATUS CORRECT?
002136 001401          BEQ          .+4  IBRANCH IF CORRECT
002140 000000          HLT
002142 010701          SCOPE          IERROR! INCORRECT STATUS SAVED ON STACK
                                ISCOPE STORES PC IN R1

TEST THAT "NEW" STATUS IS CORRECT
002144 010706 000500  MOV          #STKPTR,X6
002150 010737 002172  #RPT2;#IOTVEC
002156 005037 000022  CLR          #IOTVEC+2
002162 010737 004357 177776  MOV          #4357;#PSW     ICLR FUTURE PSW
002170 000004          IOT
    
```

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002172 013700 177776  RETF21  MOV          #PSW,X0          IGET & TEST 'NEW' STATUS
002176 001401          BEQ          .+4  IBRANCH IF CORRECT
002200 000000          HLT
002202 005037 177776  CLR          #PSW          IERROR! 'NEW' STATUS IS INCORRECT
002206 010701          SCOPE          ISCOPE STORES PC IN R1

002210 010706 000500  MOV          #STKPTR,X6
002214 010737 002236  #RPT2;#IOTVEC
002222 010737 000357 000022  MOV          #357;#IOTVEC+2  ILOAD 'NEW' STATUS
002230 005037 177776  CLR          #PSW          IPRE SET STATUS
002234 000004          IOT
002236 013700 177776  RETG21  MOV          #PSW,X0          IGET THE 'NEW' STATUS
002242 022700 000357  CMP          #357,X0      IIS 'NEW' STATUS CORRECT
002246 001401          BEQ          .+4  IBRANCH IF CORRECT
002250 000000          HLT
002252 010701          SCOPE          IERROR! 'NEW' STATUS IS INCORRECT
                                ISCOPE STORES PC IN R1

002254 010737 000022 000020  MOV          #IOTVEC+2;#IOTVEC  IRESTORE IOT TRAP VECTOR
002262 005037 000022  CLR          #IOTVEC+2  ITO HALT AT 22
    
```

```

ITEST THAT A TRAP OCCURES ON AN EMT INSTRUCTION
002266 012706 000500      MOV      #STKPTR,X6      ISTACK POINTER SETLP
002272 012737 002310 000030  MOV      #RTA3;#EMTVEC  IRETURN LOCATION
002300 005037 000032      CLR      ##EMTVEC+2
002304 104000      EMT
002306 000000      HLT
002310 010701      RETA3: SCOPE           ISCOPE STORES PC IN R1

ITEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
002312 012706 000500      MOV      #STKPTR,X6      ISTACK POINTER SETLP
002316 012737 002326 000030  MOV      #RTB3;#EMTVEC  IRETURN POINTER
002324 104000      EMT
002326 020627 000474      RETB3: CMP      X6;#STKPTR-4      ITEST DECREMENT OF X6
002332 001401      BEQ     ..4
002334 000000      HLT
002336 010701      SCOPE           IINCR DECREMENTED TWO WORDS
                                ISCOPE STORES PC IN R1

ITEST THAT PROPER P.C. IS SAVED
002340 012706 000500      MOV      #STKPTR,X6      ISTACK POINTER SETLP
002344 012737 002354 000030  MOV      #RTC3;#EMTVEC  IRETURN FROM TRAP POINTER
002352 104000      EMT                    ITRAP ON THIS INSTRUCTION
002354 022767 002354 176112  RETC3: CMP      #..;#STKPTR-4      ICMPC FOR INCREMENTED P.C.
002362 001401      BEQ     ..4
002364 000000      HLT
002366 010701      SCOPE           IINCORRECT P.C.
                                ISCOPE STORES PC IN R1

ITEST THAT "OLD" PSW AND PRIORITY ARE PLACED ON STACK
002370 012706 000500      MOV      #STKPTR,X6      ISET UP
002374 012737 002410 000030  MOV      #RTD3;#EMTVEC  ISET UP
002402 005037 177776      CLR      ##PSW          ICLR PSW
002406 104000      EMT                    ITRAP
002410 016700 176062      RETD3: MOV      STKPTR-2,X0      IGET THE SAVED STATUS
002414 001401      BEQ     ..4            IBRANCH IF SAVED STATUS IS CORRECT
002416 000000      HLT                    IERROR! SAVED STATUS IS INCORRECT
002420 010701      SCOPE           ISCOPE STORES PC IN R1

002422 012706 000500      MOV      #STKPTR,X6      ISET UP
002426 012737 002444 000030  MOV      #RETE3;#EMTVEC  ISET UP
002434 012737 000357 177776  MOV      #357;##PSW     IPRF SET STATUS
002442 104000      EMT
002444 016700 176026      RETE3: MOV      STKPTR-2,X0      IGET THE SAVED STATUS
002450 022700 000357      CMP      #357;X0        ISAVED STATUS CORRECT?
002454 001401      BEQ     ..4            IBRANCH IF CORRECT
002456 000000      HLT                    IERROR! SAVED STATUS IS INCORRECT
002460 010701      SCOPE           ISCOPE STORES PC IN R1

ITEST THAT "NEW" STATUS IS CORRECT
002462 012706 000500      MOV      #STKPTR,X6      ISET UP
002466 012737 002510 000030  MOV      #RETF3;#EMTVEC  ISET UP
002474 005037 000032      CLR      ##EMTVEC+2    ICLR FUTURE PSW
002500 012737 000357 177776  MOV      #357;##PSW     IPRF SET THE STATUS WORD
002506 104000      EMT
002510 013700 177776      RETF3: MOV      ##PSW,X0      IGET THE 'NEW' STATUS
002514 001401      BEQ     ..4            IBRANCH IF 'NEW' STATUS IS CORRECT
    
```

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002516 000000      HLT
002520 010701      SCOPE           IERROR! 'NEW' STATUS IS INCORRECT
                                ISCOPE STORES PC IN R1

002522 012706 000500      MOV      #STKPTR,X6      ISET UP
002526 012737 002550 000030  MOV      #RTG3;#EMTVEC  ISET UP
002534 012737 000357 000032  MOV      #357;#EMTVEC+2  ILOAD 'NEW' STATUS
002542 005037 177776      CLR      ##PSW          IPRF SET THE STATUS
002546 104000      EMT
002550 013700 177776      RETG3: MOV      ##PSW,X0      IGET THE 'NEW' STATUS
002554 022700 000357      CMP      #357;X0        IS IT CORRECT?
002560 001401      BEQ     ..4            IBRANCH IF CORRECT
002562 000000      HLT                    IERROR! 'NEW' STATUS IS INCORRECT
002564 010701      SCOPE           ISCOPE STORES PC IN R1

ITEST THAT ALL COMBINATION OF EMT WILL CAUSE A TRAP
002566 010701      SCOPE           ISCOPE STORES PC IN R1
002570 012767 104000 000012  MOV      #EMT;RB        IINITIALIZE BASE EMT INSTRUCTION
002576 012767 002614 175224  MOV      #R1;30         IRETURN FROM TRAP TO RA
002604 012706 000500      RCJ      MOV      #STKPTR,X6      ISET UP STACK POINTER
002610 104000      RBJ      EMT                    ITRAP INST; WILL BE MODIFIED TO EMT+377
002612 000000      RBJ      HLT                    IPREVIOUS INST FAILED TO TRAP
002614 005207 177770      RAJ      INC      RB            IINCREMENT TRAP INSTRUCTION
002620 022767 104377 177762  CMP      #104377;RB     IEMT+377 TO EMT?
002626 103366      BHIS    RC              IHAVE WE TESTED ALL
002630 010701      SCOPE           ISCOPE STORES PC IN R1
002632 012737 000032 000030  MOV      #EMTVEC+2;#EMTVEC  IRESTORE EMT TRAP TO HALT
002640 005037 000032      CLR     ##EMTVEC+2      IAT 32
    
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ITEST THAT A TRAP OCCURS ON AN ILLEGAL INSTRUCTION
003170 012771          SCOPE          ISCOPE STORES PC IN R1
003172 012776 000500 MOV      #STKPTR,X6      ISTACK POINTER SETUP
003176 012737 003214 000010 MOV      #RFPTR,0#RESVEC IRETURN LOCATION
003204 005037 007012 CLR      #RESVEC+2
003210 000100 JMP      X0              IILLEGAL INSTRUCTION, SHOULD TRAP
003212 000000 HLT
003214 010701 RETAS;  SCOPE          ISCOPE STORES PC IN R1

ITEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
003216 012776 000500 MOV      #STKPTR,X6      ISTACK POINTER SETUP
003222 012737 003232 000010 MOV      #RFPTR,0#RESVEC IRETURN POINTER
003230 000101 JMP      X1              IRESERVED INSTRUCTION
003232 020627 000474 RETBS;  CMP      X6,#STKPTR-4 ITEST DECREMENT OF X6
003236 001401 BEQ      .+4
003240 000000 HLT
003242 010701 SCOPE          INOT DECREMENTED TWO WORDS
                    ISCOPE STORES PC IN R1

ITEST THAT PROPER P.C. IS SAVED
003244 012706 000500 MOV      #STKPTR,X6      ISTACK POINTER SETUP
003250 012737 003260 000010 MOV      #RFPTR,0#RESVEC IRETURN FROM TRAP POINTER
003256 000102 JMP      X2              ITRAP ON THIS INSTRUCTION
003260 022767 003260 179206 RETCS;  CMP      #,STKPTR-4 ICHECK FOR INCREMENTED P.C.
003266 001401 BEQ      .+4
003270 000000 HLT
003272 010701 SCOPE          INCORRECT P.C.
                    ISCOPE STORES PC IN R1

ITEST THAT "OLD" PSW IS PLACED ON THE STACK
003274 010701          SCOPE          ISCOPE STORES PC IN R1
003276 012706 000500 MOV      #STKPTR,X6      ISET UP
003302 012737 003316 000010 MOV      #RFPTR,0#RESVEC ISET UP
003310 005037 177776 CLR      #PSW           ICLEAR PSW
003314 000103 JMP      X3              ITRAP
003316 014700 179154 RETDS;  MOV      STKPTR-2,X0 IGET THE SAVED STATUS
003322 001401 BEQ      .+4          IBRANCH IF ALL 0'S
003324 000000 HLT
003326 010701 SCOPE          IERROR! SAVED STATUS IS INCORRECT
                    ISCOPE STORES PC IN R1

003330 012706 000500 MOV      #STKPTR,X6      ISET UP
003334 012737 003352 000010 MOV      #RFPTR,0#RESVEC ISET UP
003342 012737 003357 177776 MOV      #397,0#PSW     IPRE SET STATUS
003350 000104 JMP      X4
003352 014700 179120 RETES;  MOV      STKPTR-2,X0 IGET THE SAVED STATUS
003356 022700 003357 CMP      #397,X0       IIS IT CORRECT
003362 001401 BEQ      .+4          IBRANCH IF SAVED STATUS IS CORRECT
003364 000000 HLT
003366 010701 SCOPE          IERROR! SAVED STATUS IS INCORRECT
                    ISCOPE STORES PC IN R1

ITEST THAT "NEW" STATUS IS CORRECT
003370 012706 000500 MOV      #STKPTR,X6
003374 012737 003416 000010 MOV      #RFPTR,0#RESVEC
003402 005037 000012 CLR      #RESVEC+2
003406 012737 003357 177776 MOV      #397,0#PSW
003414 000105 JMP      X5              IPRE SET STATUS
    
```

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003416 013700 177776 RETFS;  MOV      #PSW,X0          IGET & TEST 'NEW' STATUS
003422 001401 BEQ      .+4
003424 000000 HLT
003426 005037 177776 CLR      #PSW           IERROR! 'NEW' STATUS IS INCORRECT
003432 010701 SCOPE          ISCOPE STORES PC IN R1

003434 012706 000500 MOV      #STKPTR,X6
003440 012737 003462 000010 MOV      #RFPTR,0#RESVEC
003446 012737 003357 000012 MOV      #397,0#RESVEC+2 ILOAD 'NEW' STATUS
003454 005037 177776 CLR      #PSW           IPRE SET STATUS
003460 000106 JMP      X6
003462 013700 177776 RETGS;  MOV      #PSW,X0          IGET THE 'NEW' STATUS
003466 022700 003357 CMP      #397,X0       IIS IT CORRECT
003472 001401 BEQ      .+4          IBRANCH IF CORRECT
003474 000000 HLT
003476 005037 177776 CLR      #PSW
003502 010701 SCOPE          IERROR! 'NEW' STATUS IS INCORRECT
                    ISCOPE STORES PC IN R1
    
```

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003504 012706 000500          ITEST THAT A TRAP OCCURS ON ALL ILLEGAL INSTRUCTION
003510 012737 003526 000010      MOV      #STKPTR,X6      ISTACK POINTER SETUP
003516 005037 000012          MOV      #RPTJ,##RESVEC  IRETURN LOCATION
003522 004000          JSR      ##RESVEC+2     IILLEGAL INSTRUCTION (SHOULD TRAP)
003524 000000          HLT      X0,X0
003526 010701          RETH5:  SCOPE          ISCOPE STORES PC IN R1

003530 012706 000500          ITEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
003534 012737 003544 000010      MOV      #STKPTR,X6      ISTACK POINTER SETUP
003542 004101          MOV      #RPTJ,##RESVEC  IRETURN POINTER
003544 020627 000474      RETJ:   JMP      X1,X1     IRESERVED INSTRUCTION
003550 001401          CMP      X0,#STKPTR-4    ITEST DECREMENT OF X6
003552 000000          BEQ      .+4
003554 010701          HLT      .+4           INOT DECREMENTED TWO WORDS
                                SCOPE          ISCOPE STORES PC IN R1

003556 012706 000500          ITEST THAT PROPER P.C. IS SAVED
003562 012737 003572 000010      MOV      #STKPTR,X6      ISTACK POINTER SETUP
003570 004202          MOV      #RPTK,##RESVEC  IRETURN FROM TRAP POINTER
003572 022767 003572 174674      INSTKI JSR      X2,X2     ITRAP ON THIS INSTRUCTION
003600 001401          RETKI  CMP      #INSTK+2,STKPTR-4 ICHECK FOR INCREMENTED P.C.
003602 000000          BEQ      .+4
003604 010701          HLT      .+4           IINCORRECT P.C.
                                SCOPE          ISCOPE STORES PC IN R1

003606 010701          ITEST THAT "OLD" PSW IS SAVED ON THE STACK
003610 012706 000500          SCOPE          ISCOPE STORES PC IN R1
003614 012737 003630 000010      MOV      #STKPTR,X6      ISET UP
003622 005037 177776      MOV      #RPTL,##RESVEC  ISET UP
003626 004303          CLR      ##PSW          ICLEAR PSW
003630 016700          JSR      X3,X3
003634 001401          RETLI MOV      STKPTR-2,X0    IGET & TEST SAVED STATUS
003636 000000          BEQ      .+4           IBRANCH IF ALL 0'S
003640 010701          HLT      .+4           IERROR! INCORRECT STATUS SAVED ON STACK
                                SCOPE          ISCOPE STORES PC IN R1

003642 012706 000500          MOV      #STKPTR,X6      ISET UP
003646 012737 003664 000010      MOV      #RPTM,##RESVEC  ISET UP
003654 012737 000357 177776      MOV      #357,##PSW     IPRF SET STATUS
003662 004404          JSR      X4,X4
003664 016700          RETMI MOV      STKPTR-2,X0    IGET SAVED STATUS
003670 022700 000357      CMP      #357,X0        IIS IT CORRECT
003674 001401          BEQ      .+4
003676 000000          HLT      .+4           IERROR! INCORRECT STATUS SAVED ON STACK
003700 010701          SCOPE          ISCOPE STORES PC IN R1

003702 012706 000500          ITEST THAT "NEW" STATUS IS CORRECT
003706 012737 003730 000010      MOV      #STKPTR,X6
003714 005037 000012          MOV      #RPTN,##RESVEC
003720 012737 000357 177776      CLR      ##RESVEC+2
003726 004505          MOV      #357,##PSW     IPRF SET STATUS
                                JSR      X5,X5
    
```

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003730 013700 177776      RETNI MOV      ##PSW,X0      IGET & TEST 'NEW' STATUS
003734 001401          BEQ      .+4           IBRANCH IF ALL 0'S
003736 000000          HLT      .+4           IERROR! 'NEW' STATUS IS INCORRECT
003740 005037 177776      CLR      ##PSW
003744 010701          SCOPE          ISCOPE STORES PC IN R1

003746 012706 000500          MOV      #STKPTR,X6
003752 012737 003774 000010      MOV      #RPTO,##RESVEC
003760 012737 000357 000012      MOV      #357,##RESVEC+2 ILOAD 'NEW' STATUS
003766 005037 177776      CLR      ##PSW          IPRF SET STATUS
003772 004404          JSR      X6,X6
003774 013700          RETOI MOV      ##PSW,X0      IGET THE 'NEW' STATUS
004000 022700 000357      CMP      #357,X0        IIS IT CORRECT
004004 001401          BEQ      .+4           IBRANCH IF CORRECT
004006 000000          HLT      .+4           IERROR! 'NEW' STATUS IS INCORRECT
004010 012737 000012 000010      MOV      ##RESVEC+2,##RESVEC
004016 005037 000012      CLR      ##RESVEC+2
004022 010701          SCOPE          ISCOPE STORES PC IN R1
    
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004024 012706 000500          ITEST THAT A TRAP OCCURES ON AN ILLEGAL ADDRESS
004030 012737 004050 000004      MOV #STKPTR,X6          ISTACK POINTER SETUP
004036 005037 000006      MOV #RFP,00ERRVEC    ISET TRAP VECTOR
004042 005767 173733          CLR #PRRVEC+2
004046 000000          TST 1
004050 010701          HLT 1
                                ILL. ADRS. (ODD ADDRESS ON WORD INST.)
                                ILLLEGAL ADDRESS DID NOT TRAP
                                ISCOPE STORES PC IN R1
                                RETPI SCOPE

004052 012706 000500          ITEST DECREMENT OF STACK POINTER ON A TRAP OPERATION
004056 012737 004070 000004      MOV #STKPTR,X6          ISTACK POINTER SETUP
004064 005767 173711          MOV #RFP,00ERRVEC    IRETURN POINTER
004070 020627 000474          TST 1                    IRESERVED INSTRUCTION
004074 001401          RETOI CMP X6:#STKPTR-4  ITEST DECREMENT OF X6
004076 000000          BEQ 0
004100 010701          HLT 0
                                INOT DECREMENTED TWO WORDS
                                ISCOPE STORES PC IN R1
                                SCOPE

004102 012706 000500          ITEST THAT PROPER P.C. IS SAVED
004106 012737 004120 000004      MOV #STKPTR,X6          ISTACK POINTER SETUP
004114 005767 173661          MOV #RFP,00ERRVEC    IRETURN FROM TRAP POINTER
004120 022767 004120 174346      TST 1                    ITRAP ON THIS INSTRUCTION
004126 001401          RETRI CMP #:#STKPTR-4  ICHECK FOR INCREMENTED P.C.
004130 000000          BEQ 0
004132 010701          HLT 0
                                INCORRECT P.C.
                                ISCOPE STORES PC IN R1
                                SCOPE

004134 012706 000500          ITEST THAT "OLD" PSW IS PLACED ON THE STACK
004140 012737 004156 000004      MOV #STKPTR,X6          ISET UP
004146 005037 177776          MOV #RFP,00ERRVEC    ISET UP
004152 005767 173623          CLR #PSW
004156 016700          TST 1
004162 001401          RETSI MOV STKPTR-2,X0      IGET & TEST SAVED STATUS ON STACK
004164 000000          BEQ 0                    IBRANCH IF SAVED STATUS IS CORRECT
004166 010701          HLT 0                    IERROR! SAVED STATUS IS INCORRECT
                                ISCOPE STORES PC IN R1
                                SCOPE

004170 012706 000500          MOV #STKPTR,X6          ISET UP
004174 012737 004214 000004      MOV #RFP,00ERRVEC    ISET UP
004202 012737 000357 177776          MOV #357,00PSW      IPRF SET STATUS
004210 005767 173565          TST 1
004214 016700          RETTI MOV STKPTR-2,X0      IGET THE SAVED STATUS OFF STACK
004220 022700          CMP #357,X0
004224 001401          BEQ 0                    IIS IT CORRECT
004226 000000          HLT 0                    IBRANCH IF CORRECT
004230 010701          SCOPE                    IERROR! SAVED STATUS ON STACK IS INC.
                                ISCOPE STORES PC IN R1

004232 012706 000500          ITEST THAT "NEW" STATUS IS CORRECT
004236 012737 004262 000004      MOV #STKPTR,X6          ISET UP
004244 005067 173536          MOV #RFP,00ERRVEC    ISET UP
004250 012737 000357 177776          CLR ERRVEC+2          ICLEAR FUTURE PSW
004256 005767 173517          MOV #357,00PSW      IPRF SET STATUS
004262 013700          TST 1
                                RETUI MOV #PSW,X0          IGET & TEST THE 'NEW' STATUS
    
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004266 001401          BEQ 0
004270 000000          HLT 0
004272 005037 177776          CLR #PSW
004276 010701          SCOPE                    ISCOPE STORES PC IN R1

004300 012706 000500          MOV #STKPTR,X6
004304 012737 004324 000004      MOV #RFP,00ERRVEC
004312 012737 000357 000006      MOV #357,00ERRVEC+2
004320 005767 173455          TST 1
004324 013700          RETVI MOV #PSW,X0          IGET THE 'NEW' STATUS
004330 022700          CMP #357,X0
004334 001401          BEQ 0                    IIS IT CORRECT
004336 000000          HLT 0                    IBRANCH IF CORRECT
004340 005037 177776          CLR #PSW
004344 010701          SCOPE                    IERROR! 'NEW' STATUS IS INCORRECT
                                ISCOPE STORES PC IN R1

004346 012706 000500          ITEST THAT AN ODDSOURCE INTERMEDIAE ADDRESS CAUSES AN ODD ADDRESS ERROR
004352 012767 004376 173424      MOV #STKPTR,X6          ISET UP STACK POINTER
004360 005067 173422          MOV #0AER0,4          ILOAD ERROR VECTOR
004364 012702 000001          CLR 6
004370 067200          MOV #1,X2
004374 000000          ADD #0(2),X0          ILOAD INDEX REGISTER
004376 010701          HLT 0                    ISRC ADRS [0(2)] IS ODD
                                IERROR! ODD ADRES ERROR FAILED TO TRAP
                                ISCOPE STORES PC IN R1
                                OAERO SCOPE

004400 012706 000500          MOV #STKPTR,X6
004404 012767 004424 173372      MOV #0AER1,4
004412 012703 000477          MOV #STKPTR-1,X3
004416 147300          BICB #0(3),X0
004422 000000          HLT 0                    IDST INT ADRS [0(3)] IS ODD
004424 010701          OAEER1 SCOPE          IERROR! ODD ADRS IN DST FAILED TO TRAP
                                ISCOPE STORES PC IN R1

004426 012706 000500          ITEST THAT AN ODD SOURCE FINAL ADDRESS WILL CAUSE AN ERROR IF A WORD INST.
004432 012767 004456 173344      MOV #STKPTR,X6
004440 012767 000001 173432      MOV #0AER2,4
004446 005004          MOV #1,100
004450 017400          CLR X4
004454 000000          MOV #100(4),X0
004456 010701          HLT 0                    ISRC FINAL ADRS IS ODD
                                IERROR! ODD FINAL SRC ADRS FAILED TO TRAP
                                ISCOPE STORES PC IN R1
                                OAEER2 SCOPE

004442 012706 000500          ITEST THAT AN ODD DEST INTERMEDIATE ADDRESS CAUSPS AN ODD ADRS ERROR
004444 012767 004504 173312      MOV #STKPTR,X6
004472 012775 000001          MOV #0AER3,4
004476 074075 000000          MOV #1,X5
004502 004000          XOR X0,0(5)
004504 010701          HLT 0                    IDST INT ADRS [0(5)] IS ODD
                                IERROR! ODD ADRS ERROR FAILED TO TRAP
                                ISCOPE STORES PC IN R1
                                OAEER3 SCOPE

004506 012706 000500          MOV #STKPTR,X6
004512 012767 004526 173264      MOV #0AER4,4
004520 005000          CLR X0
004522 122000          CMPB (0)+,0(0)+
004524 000000          HLT 0                    IDST INT ADRS IS ODD [(0)+=1]
                                IERROR! ODD ADRES ERROR FAILED TO TRAP
    
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004526 012731 000000 OADR4: SCOPE          ISCOPE STORES PC IN R1
ITEST THAT AN ODD DEST FINAL ADRS WILL CAUSE AN ODD ADRS FRROR TRAP
004530 012746 000500      MOV      #STKPTR,X6
004534 012767 004560 173242      MOV      #OADR5,4
004542 012767 000001 173330      MOV      #1,100
004550 000002      CLR      X2
004552 006772 000100      SXT      #100(2)
004556 000000      HLT
004560 010701 OADR5: SCOPE          IODST FINAL ADRS IS ODD
                                IERROR! DST ODD ADRS ERR FAILED TO TRAP
                                ISCOPE STORES PC IN R1

004562 012706 000500      MOV      #STKPTR,X6
004566 012767 004646 173210      MOV      #OADR6,4
004574 000002      CLR      X2
004576 012767 016065 173174      MOV      #TEMP+1,0
004604 012767 016066 173170      MOV      #TEMP+2,2
004612 012767 123000 011244      MOV      #123000,TEMP
004620 012767 177246 011240      MOV      #177246,TEMP+2
004626 023232      CMPB    #2(2),0(2)+
004630 001401      BEQ     .+4
004632 000000      HLT
004634 022702 000004      CMP     #4,X2
004640 001401      BEQ     .+4
004642 000000      HLT
004644 000401      BR      .+4
004646 000000 OADR6: HLT          IERROR! R1 DID NOT INC. BY +2 TWICE
004650 010701 SCOPE          IERROR! ODD ADDRESS ERROR
                                ISCOPE STORES PC IN R1

ITEST THAT SWAB ODD ADDRESS CAUSES AN ODD ADDRESS ERROR TRAP
004652 012706 000500      MOV      #STKPTR,X6
004656 012767 004672 173120      MOV      #OADR7,4
004664 000367 011175      SWAB    TEMP+1
004670 000000      HLT
004672 010701 OADR7: SCOPE          IODD SWAB USING AN ODD ADDRESS
                                IERROR! FAILED TO TRAP
                                ISCOPE STORES PC IN R1

ITEST TIME OUT TRAP
004674 012706 000500      MOV      #STKPTR,X6
004678 012737 004720 000004      MOV      #TOERR0,#ERRVEC
004706 000277      SCC
004710 013767 177700 011146      MOV      #177700,TEMP
TOERR0: HLT          ISET STACK PTR
TOERR1: CMP          ILOAD ERROR VECTOR
          #STKPTR-4,X6      IPRESET COIS
          BEQ          IADRS 177700 IS NOT A BUS ADDRESS
          HLT          IERROR! TIME OUT FAILED
          .+4          ICHECK STACK PTR
          .+4          IERROR! INCORRECT STACK PTR AFTER TRAP
          CMP          ICHECK PC ON STPCK
          #TOERR0+2,(6)+
          BEQ          .+4
          HLT          IERROR! INCORRECT PC ON STACK
          CMPB         ICHECK SAVED STATUS ON STACK
          #17,(6)
          BEQ          .+4
          HLT          IERROR! INCORRECT STATUS ON STACK
          HLT          ISCOPE STORES PC IN R1
          SCOPE
004752 012706 000500      MOV      #STKPTR,X6
                                ISET STACK PTR
    
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004756 012737 004774 000004      MOV      #TOERR1,#ERRVEC
004764 012767 177777 164006      MOV      #-1173000
004772 000000 TOERR1: HLT          IADRS 173000 IS A TIME OUT ON DATIP
004774 022716 004772 TOERR1: CMP          IERROR! FAILED TO TRAP ON TIME OUT
          #TOERR1,(6)      BEQ          ICHECK PC ON STACK
          BEQ          .+4
          HLT          IERROR! PC NOT ON STACK ON TIME OUT
          SCOPE          ISCOPE STORES PC IN R1

005006 012737 000006 000004      MOV      #ERRVEC+2,#ERRVEC
005014 000037 000006      CLR      #ERRVEC+2

ITEST THAT THE 'I' BIT CANNOT BE DIRECTLY SET
005020 012737 005046 000014      MOV      #NOTBIT,#BITVEC
005026 000037      CLR      #BITVEC+2
005032 012706 000500      MOV      #STKPTR,X6
005036 012737 000020 177776      MOV      #20,#PSW
005044 000402      BR      .+6
005046 000000 NOTBIT: HLT          IERROR! 'I' BIT WAS SET BY MOVE
005050 010701 SCOPE          ISCOPE STORES PC IN R1

ITEST THAT SETTING THE 'I' BIT WILL CAUSE A TRAP TO 14
005052 012706 000500      MOV      #STKPTR,X6
005056 012767 005104 172730      MOV      #RETA1,BPTVEC
005064 000067 172726      CLR      BPTVEC+2
005070 012746 000020      MOV      #20,-(6)
005074 012746 005102      MOV      #+6,-(6)
005100 000002      RTI
005102 000000 RETA1: HLT          IPUSH 'I' BIT ON THE STACK
005104 010701 SCOPE          IPUSH PC ON THE STACK
                                ISET 'I' BIT
                                IERROR! 'I' BIT FAILED TO TRAP
                                ISCOPE STORES PC IN R1

ITEST STACK POINTER DECREMENTS
005106 012706 000500      MOV      #STKPTR,X6
005112 012767 005132 172674      MOV      #RETB1,BPTVEC
005120 012746 000020      MOV      #20,-(6)
005124 012746 005132      MOV      #+6,-(6)
005130 000002      RTI
005132 020627 000474 RETB1: CMP          IPUSH 'I' BIT ON THE STACK
          #6,#STKPTR-4      IPUSH PC ON THE STACK
          BEQ          ISET 'I' BIT
          HLT          .+4
          SCOPE          ISTACK POINTER WAS NOT PUSHED BY TRAP
                                ISCOPE STORES PC IN R1

ITEST FOR PROPER PC ON STACK
005144 012706 000500      MOV      #STKPTR,X6
005150 012747 005172 172636      MOV      #RETC1,BPTVEC
005156 012746 000020      MOV      #20,-(6)
005162 012746 005170      MOV      #+6,-(6)
005166 000002      RTI
005172 000000 HLT          IPUSH 'I' BIT ON THE STACK
                                IPUSH PC ON THE STACK
                                ISET 'I' BIT
                                IERROR! 'I' BIT TRAP NOT ACKNOWLEDGED
                                IBEFORE 1ST INST. AFTER AN RTI

005172 022747 005170 172774 RETC1: CMP          IINCORRECT PC WAS NOT SAVED ON STACK
          #,-2,#STKPTR-4
          BEQ          .+4
          HLT
          SCOPE          ISCOPE STORES PC IN R1
    
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TEST FOR PROPER PC ON THE STACK (RTT)
005216 012706 000500      MOV    #STKPTR,X6      I INITIALIZE THE STACK POINTER
005212 012767 005240 172574  MOV    #RPTCTL,RPTRVEC I SET UP ITI BIT TRAP VECTOR
005220 012746 000020      MOV    #20,-(6)        I PUSH ITI BIT ON THE STACK
005224 012746 005232      MOV    #,06,-(6)      I PUSH PC ON THE STACK
005230 000006      RTT                    I SET ITI BIT
005232 012707 005236      MOV    #,04,X7        I ADVANCE PC TO HIT INSTRUCTION

ITI BIT TRAP SHOULD OCCUR HERE
005236 000000      HLT                    I ERROR! ITI BIT TRAP NOT ACKNOWLEDGED
005240 022767 005236 173226  RPTCTL CMP    #,-2,STKPTR-4 I PROPER PC ON THE STACK
005246 001401      BEQ    #,04           I
005250 000000      HLT                    I ERROR! IMPROPER PC ON THE STACK
005252 010701      SCOPE                 I SCOPE STORES PC IN R1

005254 012737 000016 000014  MOV    #16,00RPTRVEC  I RESTORE ITI TRAP
005262 005037 000016      CLR    #RPTRVEC+2     I TO HALT AT 16

TEST THAT IF FLOATING POINT IS NOT AVAILABLE THAT A TRAP TO 10 (RESVEC)
OCCURS.
005266 012706 001000 000010  FPI    MOV    #1000,X6   I LOAD RESERVED INST TRAP VECTOR
005272 012737 005322      MOV    #FPA,0#RESVEC  I
005300 005002      CLR    X2              I
005302 170127 147157  FPAAI  LDFPS  #147157      I DO A FLOATING POINT INST.
005306 170202      STFPS X2               I GET RESULT
005310 022702 147157      CMP    #147157,X2     I CHECK RESULT
005314 001401      BEQ    #,04           I
005316 000000      HLT                    I ERROR! EITHER FPU IS AVAILABLE AND NOT
WORKING OR IS NOT AVAILABLE AND NOT TRAPPING!!!
005320 000405      BR    FPB              I EXIT TEST
005322 022767 005304 173444  FPAI  CMP    #FPA+2,774  I WAS RETURN PC SAVED ON TRAP
005330 001401      BEQ    #,04           I
005332 000000      HLT                    I ERROR! RETURN PC NOT SAVED ON STACK
005334 012737 000012 000010  FPBI  MOV    #RESVEC+2,0#RESVEC I
005342 010701      SCOPE                 I SCOPE STORES PC IN R1
    
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TEST THAT WHEN A DATI TO A STACK LOCATION LESS THAN 400 DOES NOT CAUSE
AN OVERFLOW TRAP.
005344 012706 000376 000004  MOV    #376,X6        I SET STACK LESS THAN 400
005350 012737 005366      MOV    #TDEC1,0#ERRVEC I
005356 005037 000006      CLR    #ERRVEC+2     I
005362 005716      YST    (6)           I
005364 000401      BR    #,04           I
005366 000000      HLT                    I ERROR! OVERFLOW TRAP
005370 010701      SCOPE                 I SCOPE STORES PC IN R1

TEST THAT A DATIP/DATO TO A STACK LOCATION LESS THAN 400 CAUSES AN OVER-
FLOW TRAP.
005372 012706 000376 000004  MOV    #376,X6        I
005376 012737 005412      MOV    #TDEC2,0#ERRVEC I
005404 005016      CLR    (6)           I
005406 000240      NOP                    I
005410 000000      HLT                    I ERROR! OVERFLOW FAILED TO TRAP
005412 010701      SCOPE                 I SCOPE STORES PC IN R1

TEST THAT A DATIP/DATO(EVEN) CAUSES AN OVERFLOW TRAP.
005414 012706 000376 000004  MOV    #376,X6        I
005420 012737 005434      MOV    #TDEC2A,0#ERRVEC I
005426 152716 177777      BISB  #-1,(6)        I
005432 000000      HLT                    I ERROR! NO OVERFLOW TRAP
005434 010701      SCOPE                 I SCOPE STORES PC IN R1

TEST THAT A SOURCE REFERENCE TO A 'YELLOW' ADDRESS DOES NOT OVERFLOW.
005436 012705 001000 000004  MOV    #1000,X5       I
005442 012706 000376      MOV    #376,X6        I
005446 012737 005460      MOV    #TDEC3,0#ERRVEC I
005454 124645      CMPB  -(6),-(15)     I
005456 000401      BR    #,04           I
005460 000000      HLT                    I ERROR! OVERFLOW TRAP
005462 010701      SCOPE                 I SCOPE STORES PC IN R1

TEST THAT A DESTINATION DATI (USING A BINARY INST.) DOES NOT OVERFLOW
005444 012706 000400 000004  MOV    #400,X6        I
005470 012737 005502      MOV    #TDEC4,0#ERRVEC I
005476 134546      BITB  -(5),-(16)     I
005500 000401      BR    #,04           I
005502 000000      HLT                    I ERROR! OVERFLOW TRAP
005504 010701      SCOPE                 I SCOPE STORES PC IN R1

TEST THAT OVERFLOW TRAP DOES NOT LOSE INFORMATION
005506 012706 000400 000004  MOV    #400,X6        I
005512 005067 172660      CLR    376           I STATUS WORD OF LOC 10
005516 005067 172652      CLR    374           I
005522 012737 005544      MOV    #TDEC5,0#ERRVEC I
005530 012737 000017 177776  MOV    #17,0#PSW      I PRF SET STATUS
005536 005246      INC    -(6)           I
005540 000000      HLT                    I ERROR! TRAP FAILED
005542 000412      BR    TDEC5B         I GO TO SCOPE
    
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005544 022767 000001 172624 TDEC51 CMP #1376 I WAS INC -(6) EXECUTED
005542 001471 HLT *+4
005544 000000 CMP #1374 I ERROR! INC -(6) WAS NOT EXECUTED
005546 022767 000001 172610 I WAS STATUS SAVED NOTE! INC DOES NOT
I AFFECT PC! R1Y IN STATUS.
005544 001471 BEQ *+4
005546 000000 TDEC5B1 SCOPE I ERROR! INCORRECT STATUS SAVED
005570 012771 I SCOPE STORES PC IN R1
,MACR VTRP INST;A;B;DEST
ITEST THAT INST CAUSES AN OVERFLOW TRAP
MOV #1000,X6 ISET UP STACK TO OVERFLOW
MOV #VDEC1B,0#1DEST ISET TRAP VECTOR
MOV #VDEC1A,0#ERRVEC ISET UP OVERFLOW VECTOR
INST I SHOULD OVERFLOW
HLT I NO TRAP OCCURRED
VDEC1B1 HLT I TRAP FLAG OVERFLOW DID NOT OCCUR
VDEC1A11 CMP #VDEC1B-2;4(6) I CHECK RETURN PC ON THE STACK
BEQ *+4
HLT I ERROR! RETURN PC NOT ON THE STACK
CMP #770,X6 I CHECK STACK POINTER
BEQ *+4 I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
HLT I ERROR! INCORRECT STACK PTR
MOV #1DEST+2,0#1DEST I SCOPE STORES PC IN R1
,ENOM
005572 112737 000001 177775 MOVB #1,0#177775 ISET STACK LIMIT =1000
ITEST THAT 75000 CAUSES AN OVERFLOW TRAP
MOV #1000,X6 ISET UP STACK TO OVERFLOW
MOV #VDEC2,0#RESVEC ISET TRAP VECTOR
MOV #VDEC1,0#ERRVEC ISET UP OVERFLOW VECTOR
75000 I SHOULD OVERFLOW
HLT I NO TRAP OCCURRED
VDEC21 HLT I TRAP FLAG OVERFLOW DID NOT OCCUR
VDEC11 CMP #VDEC2-2;4(6) I CHECK RETURN PC ON THE STACK
BEQ *+4
HLT I ERROR! RETURN PC NOT ON THE STACK
CMP #770,X6 I CHECK STACK POINTER
BEQ *+4 I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
HLT I ERROR! INCORRECT STACK PTR
MOV #RESVEC+2,0#RESVEC I SCOPE STORES PC IN R1
ITEST THAT IOT CAUSES AN OVERFLOW TRAP
MOV #1000,X6 ISET UP STACK TO OVERFLOW
MOV #VDEC4,0#IOTVEC ISET TRAP VECTOR
MOV #VDEC3,0#ERRVEC ISET UP OVERFLOW VECTOR
IOT I SHOULD OVERFLOW
HLT I NO TRAP OCCURRED
VDEC41 HLT I TRAP FLAG OVERFLOW DID NOT OCCUR
VDEC31 CMP #VDEC4-2;4(6) I CHECK RETURN PC ON THE STACK
BEQ *+4

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005716 000000 HLT I ERROR! RETURN PC NOT ON THE STACK
005720 022766 000770 CMP #770,X6 I CHECK STACK POINTER
005724 001471 BEQ *+4 I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
005726 000000 HLT I ERROR! INCORRECT STACK PTR
005730 012737 000022 000020 MOV #IOTVEC+2,0#IOTVEC
005736 012701 SCOPE I SCOPE STORES PC IN R1
ITEST THAT EMT CAUSES AN OVERFLOW TRAP
MOV #1000,X6 ISET UP STACK TO OVERFLOW
MOV #VDEC6,0#EMTVEC ISET TRAP VECTOR
MOV #VDEC5,0#ERRVEC ISET UP OVERFLOW VECTOR
EMT I SHOULD OVERFLOW
HLT I NO TRAP OCCURRED
VDEC61 HLT I TRAP FLAG OVERFLOW DID NOT OCCUR
VDEC51 CMP #VDEC6-2;4(6) I CHECK RETURN PC ON THE STACK
BEQ *+4
HLT I ERROR! RETURN PC NOT ON THE STACK
CMP #770,X6 I CHECK STACK POINTER
BEQ *+4 I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
HLT I ERROR! INCORRECT STACK PTR
MOV #EMTVEC+2,0#EMTVEC I SCOPE STORES PC IN R1
ITEST THAT TRAP CAUSES AN OVERFLOW TRAP
MOV #1000,X6 ISET UP STACK TO OVERFLOW
MOV #VDEC8,0#TRAPVEC ISET TRAP VECTOR
MOV #VDEC7,0#ERRVEC ISET UP OVERFLOW VECTOR
TRAP I SHOULD OVERFLOW
HLT I NO TRAP OCCURRED
VDEC81 HLT I TRAP FLAG OVERFLOW DID NOT OCCUR
VDEC71 CMP #VDEC8-2;4(6) I CHECK RETURN PC ON THE STACK
BEQ *+4
HLT I ERROR! RETURN PC NOT ON THE STACK
CMP #770,X6 I CHECK STACK POINTER
BEQ *+4 I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
HLT I ERROR! INCORRECT STACK PTR
MOV #TRAPVEC+2,0#TRAPVEC I SCOPE STORES PC IN R1
ITEST THAT BPT CAUSES AN OVERFLOW TRAP
MOV #1000,X6 ISET UP STACK TO OVERFLOW
MOV #VDEC10,0#BPTVEC ISET TRAP VECTOR
MOV #VDEC9,0#ERRVEC ISET UP OVERFLOW VECTOR
BPT I SHOULD OVERFLOW
HLT I NO TRAP OCCURRED
VDEC101 HLT I TRAP FLAG OVERFLOW DID NOT OCCUR
VDEC91 CMP #VDEC10-2;4(6) I CHECK RETURN PC ON THE STACK
BEQ *+4
HLT I ERROR! RETURN PC NOT ON THE STACK
CMP #770,X6 I CHECK STACK POINTER
BEQ *+4 I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
HLT I ERROR! INCORRECT STACK PTR
MOV #BPTVEC+2,0#BPTVEC I SCOPE STORES PC IN R1

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006160 012706 001000      ITEST THAT ILLA CAUSES AN OVERFLOW TRAP
006164 012737 006204 000010      MOV #1000,X6      ISET UP STACK TO OVERFLOW
006172 012737 006206 000004      MOV #VDEC11,0#RESVEC      ISET TRAP VECTOR
006200 004700      MOV #VDEC12,0#ERRVEC      ISET UP OVERFLOW VECTOR
006202 000000      ILLA              I SHOULD OVERFLOW
006204 000000      HLT              NO TRAP OCCURRED
006206 000000      VDEC11 HLT      I TRAP FLAG OVERFLOW DID NOT OCCUR
006206 022766 006202 000004      VDEC12 CMP #VDEC11-2,4(6)      I CHECK RETURN PC ON THE STACK
006214 001401      BEQ .+4
006216 000000      HLT              I ERROR! RETURN PC NOT ON THE STACK
006220 022706 000770      CMP #772,X6      I CHECK STACK POINTER
006224 001401      BEQ .+4          I 4 PUSHES (2 FOR TRAP & 2 FOR OVERFLOW)
006226 000000      HLT              I ERROR! INCORRECT STACK PTR
006230 012737 000012 000010      MOV #RESVEC+2,0#RESVEC
006236 010701      SCOPE           I SCOPE STORES PC IN R1
    
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```

.MACR VTRP, INST,A
ITEST THAT THE INSTRUCTION ('INST') CAUSES AN OVERFLOW CONDITION.
MOV #1000,X6      ISET STACK POINTER
MOV #VDEC'A,0#ERRVEC      ILOAD ERROR VECTOR
INST              ICAUSE OVERFLOW
HLT              IERROR! OVERFLOW FAILED TO TRAP
VDEC'A CMP #772,X6      I HAS STACK POINTER MOVED BY 6
BEQ .+4          I (2 FOR THE AUTO DECREMENT + 4 FOR
HLT              I THE ERROR TRAP)
SCOPE           I SCOPE STORES PC IN R1
.ENDM
    
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```

I INSTRUCTION EQUATE STATEMENTS
I 4510 =JSR 5,(0)
I 005046 =CLR -(6)
I 010046 =MOV X0,-(6)
I 006746 =SXT -(6)
I 074046 =XOR X0,-(6)
    
```

```

006240 012706 001000      ITEST THAT THE INSTRUCTION (4510) CAUSES AN OVERFLOW CONDITION.
006244 012737 006256 000004      MOV #1000,X6      ISET STACK POINTER
006252 004510      MOV #VDEC15,0#ERRVEC      ILOAD ERROR VECTOR
006254 000000      HLT              ICAUSE OVERFLOW
006256 022706 000772      VDEC15 CMP #772,X6      IERROR! OVERFLOW FAILED TO TRAP
006262 001401      BEQ .+4          I HAS STACK POINTER MOVED BY 6
006264 000000      HLT              I (2 FOR THE AUTO DECREMENT + 4 FOR
006266 010701      SCOPE           I THE ERROR TRAP)
006270 012706 001000      ITEST THAT THE INSTRUCTION (005046) CAUSES AN OVERFLOW CONDITION.
006274 012737 006306 000004      MOV #1000,X6      ISET STACK POINTER
006302 005046      MOV #VDEC16,0#ERRVEC      ILOAD ERROR VECTOR
006304 000000      HLT              ICAUSE OVERFLOW
006306 022706 000772      VDEC16 CMP #772,X6      IERROR! OVERFLOW FAILED TO TRAP
006312 001401      BEQ .+4          I HAS STACK POINTER MOVED BY 6
006314 000000      HLT              I (2 FOR THE AUTO DECREMENT + 4 FOR
006316 010701      SCOPE           I THE ERROR TRAP)
    
```

```

006312 001401      BEQ .+4          I (2 FOR THE AUTO DECREMENT + 4 FOR
006314 000000      HLT              I THE ERROR TRAP)
006316 010701      SCOPE           I SCOPE STORES PC IN R1

006320 012706 001000      ITEST THAT THE INSTRUCTION (010046) CAUSES AN OVERFLOW CONDITION.
006324 012737 006336 000004      MOV #1000,X6      ISET STACK POINTER
006332 010046      MOV #VDEC17,0#ERRVEC      ILOAD ERROR VECTOR
006334 000000      HLT              ICAUSE OVERFLOW
006336 022706 000772      VDEC17 CMP #772,X6      IERROR! OVERFLOW FAILED TO TRAP
006342 001401      BEQ .+4          I HAS STACK POINTER MOVED BY 6
006344 000000      HLT              I (2 FOR THE AUTO DECREMENT + 4 FOR
006346 010701      SCOPE           I THE ERROR TRAP)
    
```

```

006350 012706 001000      ITEST THAT THE INSTRUCTION (006746) CAUSES AN OVERFLOW CONDITION.
006354 012737 006366 000004      MOV #1000,X6      ISET STACK POINTER
006362 006746      MOV #VDEC18,0#ERRVEC      ILOAD ERROR VECTOR
006364 000000      HLT              ICAUSE OVERFLOW
006366 022706 000772      VDEC18 CMP #772,X6      IERROR! OVERFLOW FAILED TO TRAP
006372 001401      BEQ .+4          I HAS STACK POINTER MOVED BY 6
006374 000000      HLT              I (2 FOR THE AUTO DECREMENT + 4 FOR
006376 010701      SCOPE           I THE ERROR TRAP)
    
```

```

006400 012706 001000      ITEST THAT THE INSTRUCTION (074046) CAUSES AN OVERFLOW CONDITION.
006404 012737 006416 000004      MOV #1000,X6      ISET STACK POINTER
006412 074046      MOV #VDEC19,0#ERRVEC      ILOAD ERROR VECTOR
006414 000000      HLT              ICAUSE OVERFLOW
006416 022706 000772      VDEC19 CMP #772,X6      IERROR! OVERFLOW FAILED TO TRAP
006422 001401      BEQ .+4          I HAS STACK POINTER MOVED BY 6
006424 000000      HLT              I (2 FOR THE AUTO DECREMENT + 4 FOR
006426 010701      SCOPE           I THE ERROR TRAP)
    
```

```

006430 012706 001000      ITEST THAT INTERRUPT CAUSES AN OVERFLOW
006434 012737 006472 000004      VDEC20 MOV #1000,X6      ISET STACK PTR
006442 012737 006520 000004      MOV #VDC20,0#ERRVEC      ILOAD OVERFLOW VECTOR
006450 000237      MOV #VDC20B,0#TPVEC      ILOAD TTY PRINTER VECTOR
006452 012737 000100 177564      SPL 7              ILOCK OUT INTERRUPTS
006460 005037 177776      MOV #100,0#TTCSR      ISET IE BIT IN TTY PRINTER
006464 021237      CLR #PSW            IALLOW INTERRUPTS
006466 000000      VDC20A SPL 7      ILOCK OUT INTERRUPTS
006468 000757      HLT              IERROR! NO TTY INTERRUPT
006470 000757      BR VDC20          ILOOP TEST IF NO TTY INTERRUPT

006472 022767 006464 177274      ITEST THE STACK
006474 021401      VDC20B CMP #VDC20A,774      IIS RETURN PC (FROM INT.) ON THE STACK?
006482 000000      BEQ .+4
006484 022767 006520 177256      HLT              IERROR!
006492 001401      CMP #VDC20B,770      IIS RETURN PC (FROM OVERFLOW) ON STACK
006494 022767      BEQ .+4
006496 000000      HLT              IERROR!
006498 000000      BR .+4
006500 000000      VDC20B HLT
006502 005237 177564      CLR #TTCSR        IERROR! NO OVERFLOW
006504 005237      I CLEAR IE BIT
    
```

```

004526 012737 000066 000064 MOV #TPVEC+2,#TPVEC
004534 012737 000066 000064 MOV #ERRVEC+2,#ERRVEC
004542 105037 177775 CLR #177775 ISET STACK LIMIT #400
004546 012721 SCOPE ISCOPE STORFS PC IN R1
    
```

ITEST FOR FALSE OVRFLOW TRAP
 IPROGRAM MAY HAVE RELOADED IF OVRFLOW FAILS

```

004550 012767 006624 171226 MOV #FOVERI,4 ISET UP OVERFLOW POINTER
004556 012726 000402 MOV #402,X6
004562 014626 MOV -(6),(6)+ ISHOULD NOT OVRFLOW
004564 012726 001002 MOV #1002,X6
004570 014626 MOV -(6),(6)+ ISHOULD NOT OVRFLOW
004572 012726 002002 MOV #2002,X6
004576 014626 MOV -(6),(6)+ ISHOULD NOT OVRFLOW
004600 012726 004002 MOV #4002,X6
004604 014626 MOV -(6),(6)+ ISHOULD NOT OVRFLOW
004606 012726 010002 MOV #10002,X6
004612 014626 MOV -(6),(6)+ ISHOULD NOT OVRFLOW
004614 012726 020000 MOV #20000,X6 ISHOULD NOT OVRFLOW
004620 005746 TST -(6)
004622 004011 BR +4
004624 000000 FOVERI HLT IFALSE OVRFLOW OCCURFD
004626 010701 SCOPE ISCOPE STORFS PC IN R1
    
```

IThis test sets the stack in the 'yellow' zone and then does each of
 the trap instructions causing an overflow condition after each.
 What the stack looks like when instruction at 04 is being executed

OVFLW	PC=05,STAT=0	04	342
		4	344
BPT	PC=04,STAT=4	03A	346
		0	350
OVFLW	PC=05,STAT=0	03	352
		3	354
IOI	PC=03,STAT=3	02A	356
		0	360
OVFLW	PC=05,STAT=0	02	362
		2	364
TRAP	PC=02,STAT=2	01A	366
		0	370
OVFLW	PC=05,STAT=0	01	372
		1	374
ENT	PC=01,STAT=1	00A	376
		17	400
			402 INITIAL STACK POINTER

```

004630 012726 000402 MOV #402,X6 IINITIALIZE STACK POINTER
004634 012737 006740 000030 MOV #01,#ENTVEC
004642 012737 000001 000032 MOV #1,#ENTVEC+2
004650 012737 006744 000034 MOV #02,#TRAPVEC
004656 012737 000002 000036 MOV #2,#TRAPVEC+2
004664 012737 006750 000020 MOV #03,#IOIVEC
004672 012737 000003 000022 MOV #3,#IOIVEC+2
004700 012767 006754 171106 MOV #04,#BPTVEC
004706 012767 000004 171102 MOV #4,#BPTVEC+2
    
```

```

004714 012737 007172 000004 MOV #05,#ERRVEC
004722 005037 000006 CLR #ERRVEC+2
004726 012737 000017 177776 MOV #17,#PSW
004734 104000 OBI ENT
004736 000000 OBI HLT IENT NOT EXECUTED
004740 104400 O1I TRAP
004742 000000 O1A HLT ITRAP NOT EXECUTED
004744 000004 O2I IOI
004746 000000 O2A HLT IOI NOT EXECUTED
004750 000003 O3I BPT
004752 000000 O3A HLT IBPT NOT EXECUTED
004754 022726 000342 O4I CMP #342,X6 IIS STACK POINTER
004760 001401 BEQ +4 IPOSITIONED PROPERLY
004762 000000 HLT IERROR! INCORRECT STACK POINTER
004764 012720 000402 MOV #402,X6
004770 022740 000017 CMP #17,-(0)
004774 001401 BEQ +4
004776 000000 HLT ISTACK ERROR
007000 022740 006736 CMP #00A,-(0)
007004 001401 BEQ +4
007006 000000 HLT
007010 022740 000001 CMP #1,-(0)
007014 001401 BEQ +4
007016 000000 HLT
007020 022740 006740 CMP #01,-(0)
007024 001401 BEQ +4
007026 000000 HLT
007030 022740 000000 CMP #0,-(0)
007034 001401 BEQ +4
007036 000000 HLT
007040 022740 006742 CMP #01A,-(0)
007044 001401 BEQ +4
007046 000000 HLT
007050 022740 000002 CMP #2,-(0)
007054 001401 BEQ +4
007056 000000 HLT
007060 022740 006744 CMP #02,-(0)
007064 001401 BEQ +4
007066 000000 HLT
007070 022740 000000 CMP #0,-(0)
007074 001401 BEQ +4
007076 000000 HLT
007100 022740 006746 CMP #02A,-(0)
007104 001401 BEQ +4
007106 000000 HLT
007110 022740 000003 CMP #3,-(0)
007114 001401 BEQ +4
007116 000000 HLT
007120 022740 006750 CMP #03,-(0)
007124 001401 BEQ +4
007126 000000 HLT
007130 022740 000000 CMP #0,-(0)
007134 001401 BEQ +4
007136 000000 HLT
    
```



```

007636 012731          IND2X1 SCOPE          ISCOPE STORES PC IN R1
;THIS TEST IS THE SAME AS ABOVE EXCEPT THAT THE STACK POINTER IS INITI-
;ALLY IN THE YELLOW ZONE.
007640 012736 000376          MOV      #376,X6          ISET UP STACK IN 'YELLOW' AREA
007644 012737 007670 000004          MOV      #IND3,0#ERRVEC  ISET UP ERROR RETURN
007652 004067 170516          CLR      374
007656 005067 170510          CLR      372
007662 005066 177742          CLR      -36(6)          IF FINAL ADDRESS IS 340 ('YELLOW')
007666 000000          HLT      INDS3I          IFAILED TO TRAP
007670 022767 000004 170476 IND3I          CMP      #4,374          ISAVED STATUS CORRECT?
007676 001431          BEQ      .+4
007700 000000          HLT      INDS3I          ISAVED STATUS WAS INCORRECT (2 SFT)
007702 022767 007666 170462 IND3I          CMP      #IND3A,372      ISAVED RETURN ADDRESS CORRECT?
007710 001431          BEQ      .+4
007712 000000          HLT      INDS3I          IERROR! SAVED RETURN ADDRESS INCORRECT
007714 022766 000372          CMP      #372,X6        ISTACK POINTER CORRECT
007720 001431          BEQ      .+4
007722 000000          HLT      INDS3I          IERROR! STACK POINTER INCORRECT
007724 009767 170410          TST     340             IWAS CLEAR INSTRUCTION EXECUTED?
007730 001431          BEQ      .+4
007732 000000          HLT      INDS3I          IERROR! CLEAR NOT EXECUTED
007734 010701          SCOPE          ISCOPE STORES PC IN R1

;TEST THAT AN OVERFLOW OCCURS IF THE ADDRESS IS IN THE 'RED' ZONE AND ALSO
;THAT THE INSTRUCTION (CLRB -442(6)) IS ABORTED.
007736 012736 001000          MOV      #1000,X6        ISET STACK PTR
007742 012737 010010 000004          MOV      #IND4,0#ERRVEC  ISET ERROR TRAP VECTOR
007750 012767 177777 170022          MOV      #-1,0
007756 012767 177777 170016          MOV      #-1,2
007764 004067 174006          CLR      776
007770 005037 177776          CLR      0#05W
007774 012767 177777 170334          MOV      #-1,336        IPRE SET 336
007782 004066 177336          CLR      -442(6)        ICLEAR 'RED' LOCATION (336)
007786 000000          HLT      INDS4I          IERROR! FAILED TO TRAP
007790 009766          TST     X6             ISTACK POINTER CORRECT?
007792 001431          BEQ      .+4
007794 000000          HLT      INDS4I          IERROR! INCORRECT STACK POINTER
007800 022767 177777 170312 IND4I          CMP      #-1,336        IWAS CLEAR INSTRUCTION ABORTED?
007802 001431          BEQ      .+4
007804 000000          HLT      INDS4I          IERROR! CLEAR INSTRUCTION NOT ABORTED
007810 022767 000010 167744          CMP      #10,2          IWAS PROPER STATUS SAVED? (N SET)
007812 001431          BEQ      .+4             IRESULT OF MOV #-1,336
007814 000000          HLT      INDS4I          IERROR! INCORRECT STATUS WAS SAVED
007820 022767 010006 167730          CMP      #IND4A,0       IWAS RETURN PC SAVED?
007822 001431          BEQ      .+4
007824 000000          HLT      INDS4I
007826 009767 170716          TST     776           IWAS NOTHING PUT ON THE OLC STACK?
007828 001431          BEQ      .+4
007830 000000          HLT      INDS4I          IERROR! RED TRAP DID NOT STACK AT 2 & 0
007832 010701          SCOPE          ISCOPE STORES PC IN R1

;TEST THAT INDEX MODE USING R6 IN SOURCE DOES NOT TRAP.
010066 012706 001000          MOV      #1000,X6        ISET UP STACK
    
```

```

010072 012737 010116 000004          MOV      #IND5,0#ERRVEC  ISET UP ERROR TRAP
010100 012767 177777 170242          MOV      #-1,336
010106 016667 177350 009750          MOV      -438(6),TEMP    ISET UP TEMP
010114 004031          BR      .+4
010116 000000          HLT      INDSI          IERROR! TRAPPED
010120 010701          SCOPE          ISCOPE STORES PC IN R1

;THIS TEST IS THE SAME AS ABOVE EXCEPT THAT LOCATION IS 'RED'.
010122 012736 001000          MOV      #1000,X6        ISET UP STACK PTR
010126 012737 010144 000004          MOV      #IND6,0#ERRVEC  ISET ERROR TRAP VECTOR
010134 016667 177336 009722          MOV      -442(6),TEMP    ISET UP TEMP
010142 004031          BR      .+4
010144 000000          HLT      INDSI          IERROR! TRAPPED
010146 010701          SCOPE          ISCOPE STORES PC IN R1

;TEST THAT TRAP DOES NOT OCCUR IF INDEX DEFERRED USING R6 IN DEST IF
;INTERMEDIATE ADDRESS IS 'YELLOW' AND FINAL ADDRESS IS NOT 'YELLOW' OR 'RED'.
010150 012736 001000          MOV      #1000,X6        ISET UP STACK PTR
010154 012737 010176 000004          MOV      #IND7,0#ERRVEC  ISET ERROR TRAP VECTOR
010162 012767 016064 170160          MOV      #TEMP,336
010170 005076 177350          CLR      #-438(6)        ICLEAR TEMP
010174 004031          BR      .+4
010176 000000          HLT      INDSI          IERROR! TRAPPED
010200 010701          SCOPE          ISCOPE STORES PC IN R1

;THIS TEST IS THE SAME AS ABOVE EXCEPT THE INTERMEDIATE ADDRESS IS 'RED'.
010202 012736 001000          MOV      #1000,X6        ISET UP STACK PTR
010206 012737 010232 000004          MOV      #IND10,0#ERRVEC ISET ERROR TRAP VECTOR
010214 012767 016064 170114          MOV      #TEMP,336
010222 012776 177777 179336          MOV      #-1,-442(6)    IMOV #-1 TO TEMP
010230 004031          BR      .+4
010232 000000          HLT      INDS10I        IERROR TRAPPED
010234 010701          SCOPE          ISCOPE STORES PC IN R1

;TEST THAT INDEX DEFERRED DOES NOT OVERFLOW IF THE FINAL ADDRESS IS 'YELLOW'.
010236 012736 000776          MOV      #776,X6
010242 012737 010264 000004          MOV      #IND11,0#ERRVEC ISET UP TEMP
010250 012767 000376 170520          MOV      #376,776
010256 005076 000000          CLR      0(6)           ITHIS INSTRUCTION CLEARS 376
010262 004031          BR      .+4             IADDRESS MODF 7 USING R6 DOES NOT TRAP
010264 000000          HLT      INDS11I        IERROR! TRAPPED
010266 010701          SCOPE          ISCOPE STORES PC IN R1

;THIS TEST IS THE SAME AS ABOVE EXCEPT THAT THE FINAL ADDRESS IS 'RED'.
010270 012736 000776          MOV      #776,X6
010274 012737 010322 000004          MOV      #IND12,0#ERRVEC ISET UP TEMP
010302 012767 000336 170466          MOV      #336,776
010310 005047 170022          CLR      336
010314 005176 000000          COM     0(6)
010322 020431          BR      .+4
010324 020430          HLT      INDS12AI      IADDRESS MODF 9 USING R6 DOES NOT TRAP
010326 010701          SCOPE          ISCOPE STORES PC IN R1

;TEST THAT OVERFLOW OPERATES PROPERLY WHEN THE STACK POINTER IS 'YELLOW'
;AND A 'RED' ADDRESS IS REFERENCED.
    
```

```

019326 012776 000376      MOV    #376,X6      ISET STACK IN 'YELLOW' ZONE
019332 005047 170000      CLR    336
019336 012737 010352 007004      MOV    #IND13,#ERRVEC
019344 005166 177740      COM    -40(6)      IATTEMPT TO COMPLEMENT 336
019350 000000      HLT
019352 022767 010350 167420      IN013A1 CMP    #IND13A,0    IERROR! NO OVERFLOW TRAP
019360 001491      BEQ
019362 000000      HLT
019364 005767 167746      TST   336          I'WAS INST. COM -40(6) ABORTED?
019370 001491      BEQ    +4
019372 000000      HLT
019374 010701      SCOPE
                                IERROR! INSTRUCTION NOT ABORTED
                                ISCOPE STORES PC IN R1

ITEST THAT ADDRESS MODE 3 USING R6 DOES NOT OVERFLOW IF ADDRESS IS 'YELLOW'
019376 012737 010422 000004      MOV    #IND14,#ERRVEC
019404 012706 000776      MOV    #776,X6
019410 012767 000376 170360      MOV    #376,776
019416 005036      CLR    0(6)
019420 000000      BR    +4          ICLEAR LOCATION 376
019422 000000      IN0141 HLT
019424 010701      SCOPE
                                IERROR! ADDRESS MODE 3 CAUSED OVERFLOW TRAP
                                ISCOPE STORES PC IN R1

ITEST THAT ADDRESS MODE 5 DOES NOT OVERFLOW
019426 012737 010452 000004      MOV    #IND15,#ERRVEC
019434 012706 001000      MOV    #1000,X6
019440 012767 000336 170330      MOV    #336,776
019446 005056      CLR    0-16)
019450 000000      BR    +4          ICLEAR LOCATION 336 (A 'RFC' LOCATION)
019452 000000      IN0151 HLT
019454 010701      SCOPE
                                IERROR! TRAPPED
                                ISCOPE STORES PC IN R1

ITEST OVERFLOW WITH STACK POINTER IN THE 'RED' ZONE.
019456 012706 000340      MOV    #340,X6      ISET UP STACK POINTER IN 'RED' AREA
019462 012737 010532 000030      MOV    #RED1,#EMTVEC
019470 005037 000032      CLR    #EMTVEC+2
019474 012737 010534 000004      MOV    #RED1A,#ERRVEC ISET ERROR TRAP VECTOR
019502 005067 167300      CLR    6
019506 005067 167266      CLR    0
019512 012767 136336 167616      MOV    #136336,336 IPRESET 'RED' LOCATION
019520 012767 177777 167254      MOV    #-1,2
019526 104000      EMT
019530 000000      RE01B1 HLT
019532 000000      RE01I HLT
019534 005767 167242      TST   2
019540 001491      BEQ    +4          IDID NOT ABORT EMT
                                I'WAS STATUS SAVED?
                                I(#EMTVEC+2)
019542 000000      HLT
019544 022767 010532 167226      CMP    #RED1,0
019552 001491      BEQ    +4          I'WAS RETURN PC SAVED
                                I(#EMTVEC)
019554 000000      HLT
019556 005706      TST   X6
019560 001491      BEQ    +4          ISTACK POINTER#?
019562 000000      HLT
019564 022767 136336 167544      CMP    #136336,336 I'WAS 'RED' LOCATION UNDISTURBED?
019572 001491      BEQ    +4
  
```

```

019574 000000      HLT
019576 013737 000032 000030      MOV    #EMTVEC+2,#EMTVEC
019604 010701      SCOPE
                                ISCOPE STORES PC IN R1

019606 012706 000200      MOV    #200,X6      ISET UP STACK IN 'RED' AREA
019612 012767 176176 167356      MOV    #176176,176 IPRE SET 'RED' LOCATION
019620 012737 010662 000034      MOV    #RED2,#TRAPVEC
019626 005037 000036      CLR    #TRAPVEC+2
019632 005067 167150      CLR    6
019636 005067 167136      CLR    0
019642 012737 010664 000004      MOV    #RED2A,#ERRVEC
019650 012767 177777 167124      MOV    #-1,2
019656 104000      TRAP
019660 000000      RE02B1 HLT
019662 000000      RE02I HLT
019664 005767 167112      TST   2
019670 001491      BEQ    +4          IERROR! FAILED TO TRAP
                                IDID NOT ABORT TRAP
                                I'WAS STATUS SAVED?
                                I(TRAPVEC+2)
019672 000000      HLT
019674 022767 010662 167076      CMP    #RED2,0
019702 001491      BEQ    +4          I(TRAPVEC)
019704 000000      HLT
019706 005706      TST   X6
019710 001491      BEQ    +4
019712 000000      HLT
019714 022767 176176 167254      CMP    #176176,176 I'WAS 'RED' LOCATION LEFT UNDISTURBED?
019722 001491      BEQ    +4
019724 000000      HLT
019726 012737 000036 000034      MOV    #TRAPVEC+2,#TRAPVEC
019734 010701      SCOPE
                                IERROR! 'RED' LOCATION WAS CHANGED
                                ISCOPE STORES PC IN R1

019736 012706 000100      MOV    #100,X6
019742 012737 011004 000020      MOV    #RED3,#IOTVEC
019750 005037 000022      CLR    #IOTVEC+2
019754 005067 167026      CLR    6
019760 012737 011006 000004      MOV    #RED3A,#ERRVEC
019766 005067 167006      CLR    0
019772 012767 177777 167002      MOV    #-1,2
019802 000000      IOT
019804 000000      RE03B1 HLT
019806 000000      RE03I HLT
019812 005767 166770      TST   2
019814 000000      BEQ    +4          IDID NOT OVERFLOW
                                IDID NOT ABORT IOT
                                I'WAS STATUS SAVED?
                                I(#IOTVEC+2)
019816 022767 011004 164754      CMP    #RED3,0
019824 001491      BEQ    +4          I'WAS NEW PC SAVED?
                                I(#IOTVEC)
019826 000000      HLT
019832 001491      TST   X6
019834 000000      BEQ    +4
019836 011737 000022 000020      MOV    #IOTVEC+2,#IOTVEC
019844 010701      SCOPE
                                ISCOPE STORES PC IN R1

019846 005006      CLR    X6
019850 012767 011112 164736      MOV    #RED4,BPTVEC
  
```

```

011056 005067 166734 CLR RPTVEC+2
011062 005067 166720 CLR 6
011066 012737 011114 000004 MOV #RED4A,#ERRVEC
011074 005067 166720 CLR 0
011100 012767 177777 166674 MOV #-1,2
011106 000000 BPT ITRACE TRAP
011110 000000 RED4B: HLT DID NOT OVERFLOW
011112 000000 RED4: HLT DID NOT ABORT BPT
011114 005767 166662 RED4A: TST 2 ;WAS NEW STATUS SAVED?
011120 001401 BEQ .+4 ;(BPTVEC+2)
011122 000000 HLT
011124 022767 011112 166646 CMP #RPD4,0 ;WAS NEW PC SAVED?
011132 001401 BEQ .+4 ;(BPTVEC)
011134 000000 HLT
011136 005766 TST X6
011140 001401 BEQ .+4
011142 000000 HLT
011144 012767 000016 166642 MOV #BPTVEC+2,BPTVEC
011152 010701 SCOPE ISCOPE STORES PC IN R1

;TEST TRANSITION FROM 'YELLOW' TO 'RED' AREAS, THE TRANSITION OCCURS
;AFTER THE EMT HAS PUSHED ITS RETURN ADDRESS AND STATUS.
011154 012706 000344 MOV #344,X6 ;SET UP STACK TO ALLOW 2 'PUSHES'
011160 012737 011240 000030 MOV #RPD5,#BPTVEC ;LOAD EMT VECTOR
011166 005037 000032 CLR #BPTVEC+2 ;AND STATUS
011172 012737 011244 000004 MOV #RPD5A,#ERRVEC ;LOAD OVERFLOW VECTOR
011200 012767 000001 166600 MOV #1,6 ;AND STATUS
011206 005067 166570 CLR 0
011212 005067 166562 CLR 0
011216 012767 136336 167112 MOV #136336,336 ;PRE SET 'RED' LOCATION
011224 012737 000004 177776 MOV #4,0PSW
011232 104000 EMT
011234 000000 RED5B: HLT
011236 000240 NOP
011240 000000 RED5: HLT
011242 000240 NOP
011244 022767 000004 167070 RED5A: CMP #4,342 ;WAS STATUS SAVED?
011252 001401 BEQ .+4
011254 000000 HLT ;ERROR! EMT DID NOT SAVE STATUS
011256 022767 011234 167054 CMP #RED5B,340 ;WAS RETURN PC SAVED?
011264 001401 BEQ .+4
011266 000000 HLT ;ERROR! RETURN PC NOT SAVED
011270 022767 136336 167040 CMP #136336,336 ;WAS 'RED' LOCATION LEFT UNDISTURBED?
011276 001401 BEQ .+4
011300 000000 HLT ;ERROR! 'RED' AREA WAS CHANGED
011302 022767 000001 166472 CMP #1,2 ;WAS OVERFLOW'S STATUS SAVED?
011310 001401 BEQ .+4
011312 000000 HLT ;ERROR! OVERFLOW'S STATUS (6) NOT SAVED
011314 022767 011244 166456 CMP #RPD5A,0 ;WAS OVERFLOW'S VECTOR SAVED?
011322 001401 BEQ .+4
011324 000000 HLT ;ERROR! OVERFLOW'S VECTOR (4) NOT SAVED
011326 005766 TST X6
011330 001401 BEQ .+4
011332 000000 HLT
    
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011334 010701 SCOPE ISCOPE STORES PC IN R1
011336 013737 000032 000030 MOV #BPTVEC+2,#BPTVEC
011344 005037 000032 CLR #BPTVEC+2

;TEST THAT AN ODD ADDRESS ERROR USING THE STACK POINTER RESULTS IN A 'RED' TRAP
011350 012706 001000 MOV #1000,X6
011354 012737 011374 000004 MOV #RPD6,#ERRVEC
011362 005037 000006 CLR #ERRVEC+2
011366 005066 177777 CLR -1(6) ;-1(6) IS ODD
011372 000000 RED6A: HLT ;ERROR! FAILED TO TRAP
011374 022767 011372 166376 RED6: CMP #RED6A,0 ;CHECK RETURN PC IN ADDRESS 0
011402 001401 BEQ .+4
011404 000000 HLT ;ERROR! 'RED' TRAP DID NOT SAVE PC IN 0
011406 010701 SCOPE ISCOPE STORES PC IN R1

;THIS TEST IS THE SAME AS ABOVE EXCEPT THAT INDEX DEFFERRED MODE IS USED.
;NOTE! A 'RED' TRAP SHOULD NOT OCCUR.
011410 012706 001000 MOV #1000,X6
011414 005067 166360 CLR 0
011420 012767 000777 167350 MOV #777,776
011426 012737 011442 000004 MOV #RPD7,#ERRVEC
011434 005076 177776 CLR 0-2(6)
011440 000000 RED7A: HLT ;ERROR! FAILED TO TRAP
011442 022767 011440 167324 RED7: CMP #RED7A,774 ;RETURN PC IN 774?
011450 001401 BEQ .+4
011452 000000 HLT ;ERROR! RED TRAP FAILED
011454 005767 166320 TST 0 ;TEST THAT RPD TRAP DID NOT OCCUR
011460 001401 BEQ .+4
011462 000000 HLT ;ERROR! 'RED' TRAP ON STACK RELATED REFERENCE
011464 010701 SCOPE ISCOPE STORES PC IN R1

;TEST THAT A 'TIME OUT' WHEN THE STACK POINTER IS USED DOES NOT CAUSE A 'RED' TRAP
;IF MODE 5.
011466 012706 001000 MOV #1000,X6
011472 005067 166302 CLR 0 ;PRE SET ADDRESS 0
011476 012767 177700 167272 MOV #177700,776 ;776 CONTAINS ADDRESS OF RP
011484 012737 011516 000004 RED10A: MOV #RED10,#ERRVEC
011512 005056 CLR 0-(6) ;RD IS NOT A BUS ADDRESS
011514 000000 RED10: HLT ;ERROR! FAILED TO TRAP
011516 005767 166256 RED10: TST 0 ;WAS ADDRESS 0 UNCHANGED?
011522 001401 BEQ .+4
011524 000000 HLT ;ERROR! A 'RED' TRAP OCCURRED
011526 010701 SCOPE ISCOPE STORES PC IN R1

;TEST THAT A 'TIME OUT' CAN CAUSE A 'RED' TRAP IF MODE 6.
011530 012706 001000 MOV #1000,X6
011534 005067 166240 CLR 0 ;PRE SET ADDRESS 0
011540 012737 011554 000004 RED11A: MOV #RED11,#ERRVEC
011546 005056 176700 CLR #176700(6) ;FINAL ADDRESS IS 177700 (RD)
011552 000000 RED11: HLT ;ERROR! NO OVERFLOW TRAP
011554 022767 011552 166216 RED11: CMP #RED11A,0 ;WAS 'RED' TRAP TAKEN?
011562 001401 BEQ .+4
011564 000000 HLT ;ERROR! NO 'RED' TRAP
    
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011566 011701 SCOPE ISCOPE STORES PC IN R1
ICHECK IT' BIT TRAP IN RED ZONE
011570 012737 011634 000004 MOV #RFD12B,0#ERRVEC ILOAD ERROR (OVERFLOW) TRAP VECTOR
011576 012737 011626 000014 MOV #RED12C,0#TBITVEC ILOAD IT' BIT TRAP VECTOR
011674 012706 000334 MOV #334,X6 ISET STACK IN RED ZONE
011610 012705 MOV #6,X5
011612 012725 011630 MOV #RED12A,(5)+ ISET UP TO SFT IT' BIT
011616 012725 000020 MOV #20,(5)+
011622 000006 HLT
011624 000000 HLT ISET IT' BIT & GO TO RFD12A
011626 000000 RED12CI HLT IERROR! TRAP ON BIT
011630 000000 RED12AI CLR IERROR! NO RFD OVERFLOW BEFORE IT' TRAP
011632 000000 HLT IRESULTS IN 'RED' OVERFLOW TRAP
011634 022767 011632 166136 RED12BI CHP #RED12A+2,B IERROR! NO TRAP
011642 001401 BEQ .+4 ICHECK IT' BIT TRAP VECTOR ON STACK
011644 000000 HLT IERROR!
011646 022767 000020 166126 CHP #20,2 ICHECK IT' BIT ON STACK
011654 001401 BEQ .+4
011656 000000 HLT IERROR!
011660 012737 000016 000014 MOV #TBITVEC+2,0#TBITVEC
011666 010701 SCOPE ISCOPE STORES PC IN R1
    
```

ITEST TRANSITION FROM 'YELLOW' TO 'RED' ZONES; THE TRANSITION OCCURS AFTER
 ITHE JSR WAS 'PUSHED' ITS OLD R5.

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011670 012706 000342 MOV #342,X6 ISET UP STACK ON THE 'HAIRY EDGE'
011674 012737 011756 000004 MOV #HAIR1,0#ERRVEC ILOAD OVERFLOW VECTOR
011702 012737 000357 000006 MOV #357,0#ERRVEC+2 IAND OVERFLOW STATUS
011710 000000 CLR #0
011714 000000 CLR #2
011720 000000 CLR #336
011724 000000 CLR #340
011730 012705 000007 MOV #7,X5 IPRE SET R5
011734 012737 000017 177776 MOV #17,0#PSW IPRF SET THE STATUS WORD
011742 004567 000004 JSR 5,HAIR ITHIS SHOULD RAISE SOME HAIR
011746 000000 HLT IERROR! DID NOT TRAP
011750 000240 NOP
011752 000000 HAIRI HLT IERROR! DID NOT TRAP
011754 000240 NOP
011756 022737 000007 000340 HAIRIi CHP #7,0#340 I WAS R5 SAVED ON THE STACK
011764 001401 BEQ .+4
011766 000000 HLT
011770 022705 011746 CHP #HAIR1B,X5 IERROR! R5 NOT SAVED ON THE STACK
011774 001401 BEQ .+4 IDOES R5 CONTAIN RETURN ADDRESS?
011776 000000 HLT IERROR! R5 DID NOT GET RETURN ADRS.
012000 022737 000357 000002 CHP #357,0#2 IDID OVERFLOW SAVE THE STATUS?
012006 001401 BEQ .+4
012010 000000 HLT IOVERFLOW DID NOT SAVE STATUS
012012 022737 011756 000000 CHP #HAIR1,0#0 I WAS RETURN ADDRESS SAVED ON THE STACK
012020 001401 BEQ .+4
012022 000000 HLT IOVERFLOW TRAP DID NOT SAVE RETURN PC
012024 000537 000336 TST #336
012030 001401 BEQ .+4 ICHECK THAT 'RED' LOCATION WAS NOT CHANGED
    
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012032 000000 HLT IERROR! 'RED' LOCATION WAS CHANGED
012034 010701 SCOPE ISCOPE STORES PC IN R1
ITEST IS THE SAME AS ABOVE EXCEPT THAT THE TRANSITION IS AFTER THE  

OVERFLOW PUSHES ONE WORD.
012036 012706 000344 MOV #344,X6
012042 012737 012110 000004 MOV #HAIR2,0#ERRVEC ISET ERROR TRAP VECTOR
012050 000000 CLR #6
012054 000000 CLR #342
012060 012737 136336 000336 MOV #136336,0#336 IPRE SET 'RED' LOCATION
012066 012705 000007 MOV #7,X5 IPRE SET R5
012072 012737 000357 177776 MOV #357,0#PSW IPRF SET STATUS
012100 004567 000002 JSR 5,HAIR2A IHERE WE GO AGAIN
012104 000000 HAIR2BI HLT IERROR! DID NOT TRAP
012106 000000 HAIR2AI HLT IERROR! DID NOT TRAP
012110 022737 000007 000342 HAIR2i CHP #7,0#342 I WAS R5 SAVED
012116 001401 BEQ .+4
012120 000000 HLT IERROR! R5 NOT SAVED ON THE STACK
012122 022705 012104 CHP #HAIR2B,X5 IDOES R5 CONTAIN RETURN PC?
012126 001401 BEQ .+4
012130 000000 HLT IERROR! JSR DID NOT LOAD R5
012132 022737 000357 000340 CHP #357,0#340 I WAS STATUS SAVED?
012140 001401 BEQ .+4
012142 000000 HLT IERROR! STATUS NOT SAVED
012144 000537 000002 TST #2 I WAS STATUS SAVED?
012150 001401 BEQ .+4
012152 000000 HLT IERROR! STATUS NOT SAVED
012154 022737 012110 000000 CHP #HAIR2,0#0 IRETURN PC SAVED?
012162 001401 BEQ .+4
012164 000000 HLT IERROR! RETURN PC NOT SAVED
012166 022737 136336 000336 CHP #136336,0#336 I WAS 'RED' LOCATION UNDISTURBED?
012174 001401 BEQ .+4
012176 000000 HLT IERROR! 'RED' LOCATION WAS CHANGED
012200 010701 SCOPE ISCOPE STORES PC IN R1
    
```

ITEST THAT A TTY INTERRUPT CAUSES AN OVERFLOW TRAP

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012202 012737 000340 177776 MOV #340,0#PSW ILOCK OUT INTERRUPT
012210 012706 000400 MOV #400,X6 ISET UP STACK TO OVERFLOW
012214 012737 012246 000004 MOV #TDEC7,0#ERRVEC ISET UP OVERFLOW TRAP
012222 012737 172244 000064 MOV #TDEC8,0#TPVEC ISET UP INTERRUPT VECTOR
012230 012737 000100 177564 MOV #100,0#TTCR ISET INTERRUPT ENABLE
012236 000000 CLR #PSW IALLOW INTERRUPT TO OCCUR
012242 000000 HLT IAND INTERRUPT OCCURRED
012244 000000 TDEC8i HLT ITRAP FLAG OVERFLOW DID NOT OCCUR
012246 000000 TDEC7i CLR #TTCR I CLEAR INTERRUPT ENABLE
012252 012737 000066 000064 MOV #TPVEC+2,0#TPVEC
012260 012737 000006 000004 MOV #ERRVEC+2,0#ERRVEC
012266 012701 SCOPE ISCOPE STORES PC IN R1
    
```

IDOES THE PROCESSOR TRAP WHEN X7 IS ODD?

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012270 012736 000000 P7RXi MOV #STKPTR,X6 ISET UP STACK POINTER
012274 012737 012312 000004 MOV #R7TR1,0#ERRVEC IRETURN FROM TRAP
012278 012737 000001 MOV #1,X7 IPC EQUALS ONE
    
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012306 000000 HLT
012310 000000 HLT
012312 022767 000003 166154 R7TR11 CMP #3,STKPTR-4
012320 001401 BEQ .+4 ;CORRECT PC WAS NOT SAVED ON STACK
012322 000000 HLT
012324 010701 SCOPE ;SCOPE STORES PC IN R1

012326 012706 000500 MOV #STKPTR,X6 ;STACK POINTER
012332 012737 012346 000004 MOV #R7TR2,#ERRVEC
012340 005207 INC X7 ;PC BECOMES ODD
012342 000000 R7TR2A1 HLT
012344 000000 HLT
012346 022767 012345 166120 R7TR21 CMP #R7TR2A+3,STKPTR-4
012354 001401 BEQ .+4 ;CORRECT PC NOT ON STACK
012356 000000 HLT
012360 010701 SCOPE ;SCOPE STORES PC IN R1

012362 012706 000500 MOV #STKPTR,X6
012366 012737 012400 000004 MOV #R7TR3,#ERRVEC
012374 005307 DEC X7 ;MAKE PC ODD
012376 000000 HLT ;SHOULD VALUE
012400 022767 012377 166066 R7TR31 CMP #,-1,STKPTR-4 ;CHECK TRAP OF PC ON STACK
012406 001401 BEQ .+4 ;WRONG VALUE ON STACK
012410 000000 HLT
012412 010701 SCOPE ;SCOPE STORES PC IN R1

012414 012706 000500 MOV #STKPTR,X6
012420 012737 012436 000004 MOV #R7TR4,#ERRVEC
012426 000261 SEC ;CARRY EQUALS A 1
012430 000107 ROL X7 ;PC BECOMES ODD
012432 000000 TR4A1 HLT
012434 000000 HLT
012436 022767 025067 166030 R7TR41 CMP #TR4A+TR4A+3,STKPTR-4 ;CHECK FOR VALUE ON STACK
012444 001401 BEQ .+4
012446 000000 HLT ;WRONG VALUE ON STACK
012450 012737 000006 000004 MOV #ERRVEC+2,#ERRVEC
012456 010701 SCOPE ;SCOPE STORES PC IN R1
    
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012460 012706 000500 ;TEST THAT THE 'T' BIT WILL CAUSE A TRAP
012464 012737 012514 000014 MOV #STKPTR,X6 ;SET UP STACK POINTER
012472 005037 000016 MOV #TRC1,#TBITVEC ;TRACE TRAP RETURN
012476 012746 000020 CLR #TBITVEC+2
012502 012746 012510 MOV #20,-(6) ;PUSH 'T' BIT ON THE STACK
012506 000006 MOV #,6,-(6) ;PUSH PC ON THE STACK
012510 000240 RPT ;SET 'T' BIT
012512 000000 NOP ;'T' TRAP ACKNOWLEDGED AFTER NOP
012514 036727 165756 000020 TRC11 HLT ;ERROR! 'T' TRAP FAILED TO TRAP
012522 001001 BIT STKPTR+2,#20 ;CHECK FOR T BIT ON STACK
012524 000000 BNE .+4
012526 010701 HLT ;T BIT NOT SAVED ON STACKED
SCOPE ;SCOPE STORES PC IN R1

012530 012706 000500 ;TEST THAT AN RTI POPS THE T BIT
012534 012746 000020 MOV #STKPTR,X6 ;SET UP THE STACK
012540 012746 012554 MOV #20,-(6) ;FUTURE T BIT ON STACK
012544 012737 012560 000014 MOV #TRC2,-(6) ;RTI RETURN
012552 000002 RTI ;TRACE TRAP INTERRUPT POINTER
012554 000000 TRC21 HLT ;TRACE IS SET SHOULD TRAP TO 14
012556 000000 TRC31 HLT ;DID NOT TRACE TRAP
012560 010701 SCOPE ;SCOPE STORES PC IN R1

012562 012706 000500 ;TEST RTI POPS TRIT
012566 012746 000020 MOV #STKPTR,X6
012572 012746 012606 MOV #20,-(6)
012576 012737 012620 000014 MOV #TRC4,-(6)
012604 000006 RTI
012606 000240 TRC41 NOP ;ERROR! 'T' BIT NOT SET
012610 000000 HLT
012612 012737 000016 000014 MOV #TRITVEC+2,#TBITVEC
012620 010701 TRC51 SCOPE ;SCOPE STORES PC IN R1

012622 012706 000500 ;TEST THAT INTERRUPT OCCURS BEFORE TRAP
012626 012737 000340 177776 MOV #STKPTR,X6
012634 012737 000100 177564 MOV #340,#PSW ;HIGHEST PRIORITY LEVEL
012642 012737 012672 000034 MOV #100,#ITCSR ;INTERRUPT FOR TTY PUNCH/PRINTER
012650 012737 012674 000064 MOV #TR1,#TRAPVEC ;ITRAP" VECTOR
012656 012737 000340 000036 MOV #TR2,#TRAPVEC ;TTY VECTOR
012664 005037 177776 CLR #PSW ;IF TRAP TRAPS, MOVE 340 TO PRIORITY
012670 104400 TRAP ;SHOULD TRAP AT INC OF CLR INST
012672 000000 TR11 HLT ;TTY INTERRUPT SHOULD OVERRIDE TRAP
012674 005037 177564 TR21 CLR #ITCSR ;ITRAP OCCUR FIRST
012700 010701 SCOPE ;SCOPE STORES PC IN R1

;WILL INTERRUPTS OCCURE BETWEEN TRAPS
012702 012706 000500 MOV #STKPTR,X6
012706 012737 000340 177776 MOV #340,#PSW
012714 012737 000100 177564 MOV #100,#ITCSR
012722 012737 012760 000034 MOV #TR3,#TRAPVEC ;ITRAP
    
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212730 005037 000036 CLR #STRAPVEC+2
212734 012737 012764 000064 MOV #TR4,#TPVEC ITTY OUTPUT
212742 012737 012762 000020 MOV #TR5,#TIOTVEC IICT
212750 012737 000340 000022 MOV #340,#TIOTVEC+2 IICT_PRIORITY
212756 104400 TRAP I THE ACT OF TRAPPING LOWERS PRIORITY
212760 000034 TRS1 IOT INTERRUPT SHOULD OCCURE INPLACE OF IOT TRAP
212762 000000 TRS1 HLT INC INTERRUPT BETWEEN TRAPS
212764 000037 177564 TR41 CLR #TTCSR
212770 012737 000036 000034 MOV #TRAPVEC+2;#STRAPVEC
212776 012737 000022 000020 MOV #IOTVEC+2;#TIOTVEC
213004 000037 000022 CLR #TIOTVEC+2 ICLR IOT PRIORITY
213010 010701 SCOPE ISCOPE STORES PC IN R1

ITEST THAT ITI BIT TRAP OCCURS AFTER AN INTERRUPT IS ACKNOWLEDGED.
213012 012737 000340 177776 MOV #340;#PPSW ISET_PRIORITY = 7
213020 012737 000100 177564 MOV #100;#TTCSR IENABLE INTERRUPT ON TTY PRINTER
213026 012737 013060 000014 MOV #INT;#TBITVEC ILOAD ITI BIT VECTOR
213034 012737 013062 000064 MOV #INT+2;#TPVEC ILOAD TTY INT VECTOR
213042 012706 000500 MOV #STKPTR,X6 ISET STACK POINTER
213046 012746 000020 MOV #20;-(6) IPUSH ITIBIT ON THE STACK
213052 012746 013060 MOV #06;-(6) IPUSH PC ON THE STACK
213056 000006 RPT ISET ITI BIT
213060 000000 INT1 HLT IERROR! TTY FAILED TO INTERRUPT BEFORE ITI TRAP
213062 000037 177564 CLR #TTCSR IDISABLE TTY INTERRUPT
213066 012737 000016 000014 MOV #TBITVEC+2;#TBITVEC
213074 010701 SCOPE ISCOPE STORES PC IN R1

ITEST THAT "RESET" GOES TO OUTSIDE WORLD
213076 010701 SCOPE ISCOPE STORES PC IN R1
213100 012706 000500 MOV #STKPTR,X6
213104 012737 000340 177776 MOV #340;#PPSW ILOCK OUT INTERRUPTS
213112 012737 013144 000064 MOV #TR6;#TPVEC ILOAD TELFPRINTER VECTOR
213120 012737 000100 177564 MOV #100;#TTCSR ISET INTERRUPT ENABLE
213126 000005 RESET ISHOULD CLEAR INTERRUPT ENABLE
213130 032737 000100 177564 BIT #100;#TTCSR ITEST FOR CLEAR
213136 001401 BEQ .+4
213140 000000 HLT IRESET FAILED TO CLEAR #TTCSR
213142 000402 TR61 TR6X IGO TO SCOPE ISCOPE STORES PC IN R1
213144 000000 TR61 HLT IERROR! TELTYPE INTERRUPTED WHEN
IPROCESSOR WAS AT LEVEL 7
213146 022626 TR6X1 CMP (6);(6)
213150 010701 SCOPE ISCOPE STORES PC IN R1

ITEST THAT RESET DOES NOT HANG THE SYSTEM
213152 012706 000500 MOV #STKPTR,X6 ISET STACK
213156 000037 177776 CLR #PPSW IALLOW INTERRUPT
213162 012737 013176 000064 MOV #RESET1;#TPVEC ITTY INTERRUPT VECTOR
213170 052737 000100 177564 BIS #100;#TTCSR ISET INTERRUPT ENABLE
213176 000005 RESET1 IIF THIS HANGS CHECK SACK
213180 012737 000066 000064 MOV #66;#TPVEC IFOR FALSE INTERRUPT
213186 010701 SCOPE ISCOPE STORES PC IN R1

ITEST RESET WITH TRACE ON
213210 012706 000500 MOV #STKPTR,X6 ISET STACK
    
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213214 012737 013246 000014 MOV #RESET2;#TBITVEC ISET UP TRACE VECTOR
213222 000037 000016 CLR #TBITVEC+2
213226 012746 000020 MOV #20;-(6) IPUSH PC ON THE STACK
213232 012746 013240 MOV #06;-(6) IPUSH PC ON THE STACK
213236 000006 RPT ISET ITI BIT
213240 000005 RESET ISHOULD HAVE NO EFFECT
213242 000005 RESET INO EFFECT
213244 000000 HLT ITRACE TRAP FAILED
213246 012737 000016 000014 RESET21 MOV #TBITVEC+2;#TBITVEC
213254 010701 SCOPE

ITEST THAT WHEN TTY INTERRUPTS IT POPS NEW STATUS
213256 000005 RESET
213260 012706 000500 MOV #STKPTR,X6 ISET UP STACK
213264 012737 013310 000064 MOV #TTY3;#TPVEC INTERRUPT VECTOR
213272 000037 177776 CLR #PPSW IOROP PROCESSOR PRIORITY
213276 012767 000357 164562 COM #357;66 IHIGH PRIORITY ON INTERRUPT
213304 000137 177564 #TTCSR ISHOULD SET INTERRUPT ENABLE & INTERRUPT
213310 013727 177776 TTY31 MOV #PPSW,(7)* ISAVE PROCESSOR STATUS
213314 000000 # WORD IIS SAVED HERE
213316 022767 000357 177770 CMP #357;62
213324 001401 BEQ .+4
213326 000000 HLT INTERRUPT DID NOT POP CORRECT STATUS
213330 000005 RESET ICLR INTERRUPT ENABLE
213332 010701 SCOPE ISCOPE STORES PC IN R1

213334 012706 000500 MOV #STKPTR,X6 ISTACK SET UP
213340 012737 013364 000064 MOV #TTY4;#TPVEC INTERRUPT VECTOR
213346 000067 164514 CLR 66 ICLR NEW STATUS
213352 012737 000137 177776 MOV #137;#PPSW IPROCESSOR STATUS
213360 000137 177564 COM #TTCSR ISET INTERRUPT ENABLE
213364 013727 177776 TTY41 MOV #PPSW,(7)* ISAVE NEW STATUS
213370 000000 # WORD IIS SAVED HERE
213372 005767 177772 # -2
213376 001401 BEQ .+4
213400 000000 HLT INTERRUPT DID NOT POP NEW STATUS
213402 000037 177564 CLR #TTCSR
213406 010701 SCOPE ISCOPE STORES PC IN R1

ITEST THAT A PROGRAMMED INTERRUPT REQUEST IS HONORED BEFORE A BUS
IREQUEST AT THE SAME INTERRUPT LEVEL
213410 030237 SPL 7 ISET PRIORITY LEVEL 7
213412 020005 RESET
213414 012737 013472 000240 MOV #PIRINT;#PIRVEC ISET PIR0 INTERRUPT VECTOR
213422 012737 000340 000242 MOV #340;#PIRVEC+2 IASSUME PRIORITY LEVEL 7 ON INT
213432 012737 013516 000264 MOV #TTY5;#TPVEC ISET TELFPRINTER INT VECTOR
213436 012737 000340 000066 MOV #340;#TPVEC+2 IPRIORITY LEVEL 7 ON TTY INT
213444 000137 177564 COM #TTCSR IENABLE INTERRUPT
213450 000067 020410 CLR TEMP
213454 012737 100000 177772 MOV #PIR4;#PIRQ IBOOK REQUEST AT LEVEL 4
213466 000000 CLR IALLOW INTERRUPTS
213472 000000 HLT IERROR! NO INTERRUPT
213474 000000 HLT IERROR! TTY DID NOT INTERRUPT AFTER PIR0
213476 012737 013526 000064 PIRINT1 MOV #TTY6;#TPVEC IRESET TTY INTERRUPT VECTOR
    
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013520 005267 002360 INC TEMP ;SET INDICATOR
013524 005037 177772 CLR ##PIRQ ;DISABLE REQUEST
013510 062716 000002 ADD #2,(6) ;ADJUST RETURN PC TO SECOND HLT
013514 000072 RTI ;GO HONOR TTY INTERRUPT
013516 000070 TTY5: HLT ;ERROR! DID NOT HONOR PIR
013520 005037 177772 CLR ##PIRQ ;DISABLE REQUEST
013524 000476 RR TTYEX ;EXIT TEST
013526 005347 TTY6: DEC TEMP
013532 009767 002326 TST TEMP
013536 021401 BEQ ;+4
013540 000070 HLT ;ERROR! BOTH INTERRUPTS WERE NOT HONORED
013542 000075 TTYEX: RESET
013544 012737 000242 000240 MOV #PIRVEC+2,##PIRVEC
013542 012736 000500 NOV #STKPTR,X6 ;RESTORE STACK POINTER
013556 014701 SCOPE ;SCOPE STORES PC IN R1

013560 022767 000010 169212 ICHECK THAT 'I' BIT DOES NOT TRAP OUT OF WAIT
013566 003457 CMP #0,ICNT ;DO THIS TEST FIRST 8 PASSES ONLY
013570 000230 BLE TTYEND
013572 012776 000500 SPL 0 ;SET PRIORITY LEVEL 0
013576 012737 013634 000064 NOV #STKPTR,X6 ;SET STACK PTR
013604 012737 013630 000014 NOV #TTY7A,##PTVEC ;LOAD TTY INTERRUPT VECTOR
013612 000002 CLR #TTY7B,##PTVEC ;LOAD 'I' BIT TRAP VECTOR
013614 052737 000100 177564 BJS #100,##TTCSR ;CLEAR INDICATOR
;ALLOW INTERRUPT INTERRUPT OCCURS AFTER
;THIS INSTRUCTION & BEFORE NEXT
;WAIT FOR AN INTERRUPT
;INCREMENT INDICATOR
;ERROR! NO 'I' TRAP AFTER INTERRUPT
;ERROR! 'I' BIT TRAPPED OUT OF WAIT
;EXIT TEST
013622 000001 WAIT: WAIT
013624 009202 INC X2 ;TYPE SPACE CHAR
013626 000000 HLT ;REPOSITION TTY INT VECTOR
013630 000000 TTY7B: HLT ;PUT 'I' BIT IN RETURN STATUS
013632 000424 BR TTY7EX ;RETURN TO WAIT WITH 'I' BIT SET
013634 012737 000040 177566 TTY7A: NOV #40,##177566 ;AND WAIT FOR TTY INTERRUPT WHEN NULL
013642 012737 013660 000064 NOV #TTY7C,##PTVEC ;CHARACTER IS TYPED
013650 012766 000020 000002 RTT #20,(2(6)) ;REPORT 'I' BIT TRAP VECTOR AFTER
;TTY HAS INTERRUPTED
;DISABLE INTERRUPT ENABLE
;RETURN TO INST FOLLOWING WAIT WITH 'I'
;BIT SET
013660 012737 013702 000014 TTY7C: NOV #TTY7D,##PTVEC
013666 000037 177564 CLR ##TTCSR ;I' BIT SET
013672 012737 000015 177566 NOV #15,##177566
013700 000006 RTT

013702 000240 TTY7D: NOP
013704 012737 000016 000014 000014 TTY7EX: NOV #0PTVEC+2,##0PTVEC ;RESTORE VECTORS TO WAIT AT
013712 012737 000066 000064 NOV #66,##PTVEC ;VECTOR +2
013720 005302 DEC X2 ;CHECK INDICATOR
013722 001401 BEQ ;+4
013724 000000 HLT ;ERROR! DID NOT DO INC INST AFTER INTERRUPT
013726 010701 TTYEND: SCOPE ;SCOPE STORES PC IN R1

013730 012706 000500 ICHECK THAT PIRQ WILL INTERRUPT OUT OF WAIT
013734 000237 NOV #STKPTR,X6 ;SET STACK PTR
SPL 7 ;SET PRIORITY LEVEL 7
    
```

```

013736 012737 010000 177772 NOV #PIR4,##PIRQ ;BOOK REQUEST AT LEVEL 4
013744 012737 000340 000242 NOV #340,##PIRVEC+2 ;LEVEL 7 ON INTERRUPT
013752 012737 013766 000240 NOV #PIR0A,##PIRVEC ;GO TO PIR0 ON INTERRUPT
013760 000230 SPL 0 ;SET PRIORITY LEVEL 0
013762 000001 WAIT: WAIT ;PIR0 SHOULD INTERRUPT OUT OF WAIT
;***CAUTION PROGRAM COULD HANG HERE IF TEST FAILS***
013764 000000 I ;ERROR!
013766 000037 177772 PIRQA: CLR ##PIRQ ;CLEAR REQUEST
013772 022716 013764 CMP #WAIT+2,(6) ;CHECK RETURN PC ON STACK
013776 001404 BEQ IS ;
014000 000737 177564 TSTB ##TTCSR
014004 100375 BPL ;-4
014006 000000 HLT ;ERROR! INCORRECT RETURN PC ON STACK AFTER
;PIRQ INTERRUPT
014010 012737 000242 000242 IS: NOV #PIRVEC+2,##PIRVEC+2
014016 000037 000242 CLR ##PIRVEC+2
014022 010701 SCOPE ;SCOPE STORES PC IN R1

;CONTIGUOUS MEMORY ADDRESS TEST
;THIS TEST CHECKS THAT ALL MEMORY (UP TO 20K) IS CONTIGUOUS
014024 012706 000500 MOV #STKPTR,X6 ;SET STACK PTR
014030 012737 014044 000004 NOV #MEMEND,##ERRVEC ;SET TIME OUT TRAP VECTOR
014036 000000 CLR X0 ;SET STARTING ADDRESS FOR TEST
014040 000720 TST (0)+ ;BEGIN
014042 000776 BR ;-2 ;LOOP UNTIL TIMES OUT
014044 022626 MEMEND: CMP (6)+,(6)+ ;RESTORE STACK PTR
014046 022700 160002 CMP #160002,X0 ;AT END OF 20K MEMORY
014052 001402 BEQ MEMEX ;EXIT TEST IF AT END OF 20K
014054 000720 TST (0)+ ;SHOULD TIME OUT
014056 000000 HLT ;ERROR! FAILED TO TIME OUT
014060 012737 000006 000004 MEMEX: NOV #ERRVEC+2,##ERRVEC
014066 000037 000006 CLR ##ERRVEC+2
014072 010701 SCOPE ;SCOPE STORES PC IN R1

014074 000167 000024 JMP R6TST
014100 000000 K1: 0
014102 000000 K2: 0
014104 000000 K3: 0
014106 000000 K4: 0
014110 000000 K5: 0
014112 000000 K6: 0
014114 052525 K7: 052525
014116 052400 K10: 052400
014120 000000 K11: 0
014122 000000 K12: 0

;TEST AUTO INCREMENT AND DECREMENT OF R6 FOR WORD AND BYTES
014124 012706 000500 R6TST: NOV #STKPTR,X6 ;SET UP THE STACK
014130 012667 001730 NOV #6,TEMP ;R6 SHOULD INCREMENT BY TWO
014134 022627 000502 CMP #6,##STKPTR+2
014140 021471 BEQ ;+4
014142 000000 HLT ;R6 DID NOT AUTO INCREMENT BY TWO
014144 010721 SCOPE ;SCOPE STORES PC IN R1

014146 012716 020000 NOV #2000,X6
014152 014627 000000 NOV #-(4),#2 ;SHOULD DECREMENT BY TWO
    
```

014156	020627	017776		CMP	X6;#17776	
014162	001431			BEO	..+4	
014164	000000			HLT		R6 DID NOT AUTO DECREMENT BY 2
014166	017771			SCOPE		ISCOPE STORES PC IN R1
014170	012706	000500		MOV	#STKPTR,X6	
014174	112626			MOV	(6);(6)+	DOUBLE AUTO INCREMENT OF R6
014176	020627	000504		CMP	X6;#STKPTR+4	
014202	001401			BEO	..+4	
014244	000000			HLT		WRONG AUTO INCREMENT OF R6
014206	017701			SCOPE		ISCOPE STORES PC IN R1
014210	012706	000500		MOV	#STKPTR,X6	
014214	000004			CLR	X4	
014216	122624			CMP	(6);(4)+	TEST INCREMENT OF R6
014220	020627	000502		CMP	X6;#STKPTR+2	
014224	001401			BEO	..+4	
014226	000000			HLT		WRONG INCREMENT OF R6
014230	010701			SCOPE		ISCOPE STORES PC IN R1
014232	012706	000500		MOV	#STKPTR,X6	
014236	000004			CLR	X4	
014240	122426			CMP	(4);(6)+	TEST INCREMENT OF R6
014242	020627	000502		CMP	X6;#STKPTR+2	
014246	001401			BEO	..+4	
014250	000000			HLT		WRONG INCREMENT OF R6
014252	010701			SCOPE		ISCOPE STORES PC IN R1
014254	012706	000500		MOV	#STKPTR,X6	
014260	000004			CLR	X4	
014262	122624			CMP	(6);(4)+	TEST INCREMENT OF R4
014264	020427	000001		CMP	X4;#1	
014270	001401			BEO	..+4	
014272	000000			HLT		WRONG INCREMENT OF R4
014274	010701			SCOPE		ISCOPE STORES PC IN R1

014276	012706	000500		MOV	#STKPTR,X6	
014302	000004			CLR	X4	
014304	122446			CMP	(4);-(6)	TEST DECREMENT OF R6
014306	020627	000476		CMP	X6;#STKPTR+2	
014312	001401			BEO	..+4	
014314	000000			HLT		WRONG INCREMENT OF R6
014316	010701			SCOPE		ISCOPE STORES PC IN R1
014320	012706	000500		MOV	#STKPTR,X6	
014324	000004			CLR	X4	
014326	122426			CMP	(4);(6)+	TEST INCREMENT OF R4
014330	020427	000001		CMP	X4;#1	
014334	001401			BEO	..+4	
014336	000000			HLT		WRONG INCREMENT OF R4
014340	010701			SCOPE		ISCOPE STORES PC IN R1
014342	012706	010000		MOV	#10000;X6	
014346	124627	000000		CMP	-(6);#0	TEST DECREMENT OF R6
014352	022706	007776		CMP	#7776;X6	
014356	001401			BEO	..+4	
014360	000000			HLT		WRONG DECREMENT OF R6
014362	010701			SCOPE		ISCOPE STORES PC IN R1
014364	012706	000500		MOV	#STKPTR,X6	INITIAL POSITION OF R6
014370	012767	177777	164100	MOV	#-1;STKPTR=2	HIGH BYTE WILL BE DATA
014376	012767	025252	177474	MOV	#25252;K1	
014404	114667	177471		MOV	-(6);K1+1	MOV TO ODD ADDRESS
014410	022767	177652	177462	CMP	#177652;K1	ODD MOV WORK CORRECTLY
014416	001401			BEO	..+4	
014420	000000			HLT		MOV = (6); ODD FAILED
014422	010701			SCOPE		ISCOPE STORES PC IN R1
014424	012706	000500		MOV	#STKPTR,X6	INITIAL POSITION OF R6
014430	012767	177777	164040	MOV	#-1;STKPTR=2	HIGH BYTE SOURCE DATA
014436	012767	125252	177434	MOV	#125252;K1	INITIAL SET UP OF DESTINATION
014444	114667	177430		MOV	-(6);K1	HIGH BYTE OF STKPTR=2 TO LOW BYTE OF K1
014450	022767	125377	177422	CMP	#125377;K1	TEST RESULTS
014456	001401			BEO	..+4	
014460	000000			HLT		MOV = (6); EVEN FAILED
014462	010701			SCOPE		ISCOPE STORES PC IN R1

ITEST THAT MOV8 XR MOVES ONLY THE LSH OF THE REGISTER.

015076	012767	177777	177014	MOV	#1,K11	
015104	012700	000125		MOV	#129,X0	ILOAD R0
015110	110067	177004		MOV8	X0,K11	
015114	024727	177000	177525	CMP	K11,#177525	IF WAS ONLY LSH MOVED?
015122	001401			BEQ	..+4	
015124	000000			HLT		IF ERROR MOVR XR FAILED
015126	010701			SCOPE		ISCOPE STORES PC IN R1
015130	012700	014120		MOV	#K11,X0	
015134	010067	176760		MOV	X0,K11	
015140	110020			MOV8	X0,(0)*	
015142	022767	014120	176750	CMP	#K11,K11	
015150	001401			BEQ	..+4	
015152	000000			HLT		
015154	010701			SCOPE		ISCOPE STORES PC IN R1
015156	012706	014120		MOV	#K11,X6	
015162	010667	176732		MOV	X6,K11	
015166	110626			MOV8	X6,(6)*	
015170	026727	176724	014120	CMP	K11,#K11	
015176	001401			BEQ	..+4	
015200	000000			HLT		IF FAILED MOVR X6,(6)*
015202	010701			SCOPE		ISCOPE STORES PC IN R1
015204	012706	014120		MOV	#K11,X6	
015210	010626			MOV	X6,(6)*	
015212	026727	176702	014120	CMP	K11,#K11	
015220	001401			BEQ	..+4	
015222	000000			HLT		IF FAILED MOV X6,(6)*
015224	010701			SCOPE		ISCOPE STORES PC IN R1
015226	000277			SCC		IF SET STATUS
015230	000037	177776		CLR	#PPSW	ICLEAR STATUS
015234	103001			RCC	..+4	
015236	000000			HLT		IF C NOT CLEAR
015240	102001			BVC	..+4	
015242	000000			HLT		IF V NOT CLEAR
015244	001001			BNE	..+4	
015246	000000			HLT		IF Z NOT CLEAR
015250	100001			BPL	..+4	
015252	000000			HLT		IF N NOT CLEAR
015254	010701			SCOPE		ISCOPE STORES PC IN R1
015256	000257			CCC		ICLEAR CONDITION CODES
015260	052737	000017	177776	BIS	#17,PPSW	IF SET STATUS TO ONES
015266	103401			BCS	..+4	
015270	000000			HLT		IF C NOT SET
015272	102401			BVS	..+4	
015274	000000			HLT		IF V NOT SET
015276	001401			BEQ	..+4	
015300	000000			HLT		IF Z NOT SET

015302	100401			BNI	..+4	
015304	000000			HLT		IF N NOT SET
015306	010701			SCOPE		ISCOPE STORES PC IN R1
015310	012706	000500		MOV	#STKPTR,X6	IF SET UP STKPTRR POINTER
015314	000067	163162		CLR	STKPTR+2	IF SET UP NEW STATUS
015320	012767	015330	163152	MOV	#+10,STKPTR	IF SET UP, RETURN
015326	000000			RTT		IF RETURN NEXT INSTRUCTION
015330	020627	000504		CMP	X6,#STKPTR+4	IF X6 SHOULD BE PLUS 4
015334	001401			BEQ	..+4	
015336	000000			HLT		IF X6 NOT INCREMENTED
015340	010701			SCOPE		ISCOPE STORES PC IN R1
015342	012767	000357	163132	MOV	#357,STKPTR+2	IF RETURN STATUS ALL ONES
015350	012706	000500		MOV	#STKPTR,X6	IF SET UP STKPTRR POINTER
015354	012767	015366	163116	MOV	#+12,STKPTR	IF SET UP RETURN POINTER
015362	000257			CCC		ICLEAR CONDITION CODES
015364	000000			RTT		IF RETURN
015366	001401			BEQ	..+4	
015370	000000			HLT		IF Z NOT SET
015372	102401			BVS	..+4	
015374	000000			HLT		IF V NOT SET
015376	100401			BNI	..+4	
015400	000000			HLT		IF N NOT SET
015402	103401			BCS	..+4	
015404	000000			HLT		IF C NOT SET
015406	010701			SCOPE		ISCOPE STORES PC IN R1
015410	000067	163066		CLR	STKPTR+2	IF ZERO TO STATUS
015414	012706	000500		MOV	#STKPTR,X6	
015420	012767	015432	163052	MOV	#+12,STKPTR	
015426	000277			SCC		IF SET CONDITION CODES
015430	000000			RTT		IF RETURN
015432	001001			BNE	..+4	
015434	000000			HLT		IF Z NOT CLEARFD
015436	102001			BVC	..+4	
015440	000000			HLT		IF V NOT CLEARFD
015442	100001			BPL	..+4	
015444	000000			HLT		IF N NOT CLEARFD
015446	103001			SCC	..+4	
015450	000000			HLT		IF C NOT CLEARFD
015452	010701			SCOPE		ISCOPE STORES PC IN R1

ITEST THAT ALL RESERVED INSTRUCTIONS TRAP

015454	012720	016020		MOV	#TABLE, TAB	ITABLE POINTER
015460	012022			GIN1:	MOV (TAB)+, FIRST	IFIRST OR CURRENT INSTRUCTION
015462	012023			MOV	(TAB)+, LAST	ILAST INSTRUCTION OR GROUP
015464	020267	000360		CMP	FIRST, FINISH	ITESTED ALL
015470	021440			BEQ	SINSH	IGO TO MULT TRAPS TEST IF FIN
015472	019267	000354		GIN2:	MOV FIRST, INST	IFIRST, INST
015476	012737	015520	000010	MOV	#RET, #RESVEC	IFIRST, INST
015574	012706	000500		MOV	#STKPTR, X6	IFIRST, INST
015510	005037	177776		CLR	#RPSW	ICLEAR PRIORITY
015514	000167	000332		JMP	INST	IFIRST, INST

ITRAPPING SHOULD SEND YOU HERE

015520	020627	000474		RET1:	CMP X6, #STKPTR=4	ITEST DECREMENT OF X6
015504	001401			BEQ	RET1	
015526	000000			HLT		IFIRST, INST
015530	026727	162740	016054	RET1:	CMP STKPTR=4, #INST+2	IFIRST, INST
015536	001401			BEQ	RET2	IFIRST, INST
015540	000000			HLT		IFIRST, INST
015542	003767	162730		RET2:	TST STKPTR=2	IFIRST, INST
015546	001401			BEQ	4	IFIRST, INST
015550	000000			HLT		IFIRST, INST
015552	005267	000274		INC	INST	IFIRST, INST
015556	005202			INC	FIRST	IFIRST, INST
015560	026703	000266		CMP	INST, LAST	IFIRST, INST
015564	001735			BEQ	GIN1	IFIRST, INST
015566	000167	177700		JMP	GIN2	IFIRST, INST

ITHE FOLLOWING TESTS ARE WRITTEN TO CHECK MULTIPLE TRAP CONDITIONS
 ITO TEST THAT TRAPS ARE PROCESSED PROPERLY:

015572	010701			SINSH:	SCOPE	ISCOPE STORES PC IN R1
015574	012737	000012	000010	MOV	#RESVEC+2, #RESVEC	ISCOPE STORES PC IN R1
015602	012706	000500		MOV	#STKPTR, X6	ISCOPE STORES PC IN R1
015606	012767	015652	162200	MOV	#SINSH, #TRIVVEC	ISCOPE STORES PC IN R1
015614	012767	015664	162162	MOV	#SINSH, 4	ISCOPE STORES PC IN R1
015622	012737	015657	000030	MOV	#SINSH+1, #EMTVEC	ISCOPE STORES PC IN R1
015630	005037	000032		CLR	#EMTVEC+2	ISCOPE STORES PC IN R1
015634	000000			CLR	X0	ISCOPE STORES PC IN R1
015636	013746	000020		MOV	#20, -(6)	ISCOPE STORES PC IN R1
015642	012746	015650		MOV	#SINSH, -(6)	ISCOPE STORES PC IN R1
015646	000006			RTT		ISCOPE STORES PC IN R1
015650	000000			SINSH:	EMT	ISCOPE STORES PC IN R1
015652	000000			SINSH:	HLT	ISCOPE STORES PC IN R1
015654	000431			BR	SINSH	ISCOPE STORES PC IN R1
015656	000240			SINSH:	NOP	ISCOPE STORES PC IN R1
015660	000000			HLT		ISCOPE STORES PC IN R1
015662	000426			BR	SINSH	ISCOPE STORES PC IN R1
015664	012747	015700	162576	SINSH:	MOV #SINSH, STKPTR-10	ISCOPE STORES PC IN R1
015672	000006			RTT		ISCOPE STORES PC IN R1
015674	000000			HLT		ISCOPE STORES PC IN R1
015676	000420			BR	SINSH	ISCOPE STORES PC IN R1
015700	012767	015720	162566	SINSH:	MOV #SINSH, STKPTR-4	ISCOPE STORES PC IN R1

015706	012767	015730	162100	MOV	#SINSH, #TRIVVEC	ICCHANGE 'T' RIT VECTOR
015714	000006			RTT		IGO TO SINSH
015716	000000			HLT		
015720	012700	000001		SINSH:	MOV #1, X0	IFIRST, INST
015724	000000			HLT		IFIRST, INST
015726	000404			BR	SINSH	IFIRST, INST
015730	022700	000001		SINSH:	CMP #1, X0	IFIRST, INST
015734	001401			BEQ	SINSH	IFIRST, INST
015736	000000			HLT		IFIRST, INST
015740	017701			SINSH:	SCOPE	IFIRST, INST
015742	005267	163032		END:	INC [CNT	IFIRST, INST
015746	022767	000100	163024	CMP	#100, [CNT	IFIRST, INST
015754	001402			BEQ	DONE	IFIRST, INST
015756	000167	163024		JMP	BEGIN	IFIRST, INST
015762	012737	000007	177566	DONE:	MOV #7, #177566	IFIRST, INST
015770	005737	177564		TSTB	#177564	IFIRST, INST
015774	000375			BPL	4	IFIRST, INST
015776	013702	000042		MOV	#42, X2	IFIRST, INST
016002	001404			BEQ	DONE1	IFIRST, INST
016004	004712			JSR	7, (2)	IFIRST, INST
016006	000240			NOP		IFIRST, INST
016010	000240			NOP		IFIRST, INST
016012	000240			NOP		IFIRST, INST
016014	000167	162762		DONE1:	JMP START	IFIRST, INST
016020	000007			TABLE:	7	IFIRST, INST
016022	000077				77	IFIRST, INST
016024	000210				210	IFIRST, INST
016026	000227				227	IFIRST, INST
016030	007000				7000	IFIRST, INST
016032	007777				7777	IFIRST, INST
016034	075000				75000	IFIRST, INST
016036	076777				76777	IFIRST, INST

714040	124470		106400
014042	104477		106477
714044	104770		106700
014046	107777		107777
016050	016050	FINISH	.
016052	000000	INST1	HALT
016054	000000		HALT
016056	000000		HALT
016060	000000		HALT
016062	000000		HALT
016064	000000	TEMP1	0
	014070		.M,+2
	000001		.END

IEND FLAG
 INST1 CONTAIN RESERVED INST
 SHOULD TRAP TO LOC 10
 LOC 10 SHOULD SEND YOU TO
 IRET

BEGIN	001004	BPTA	007252	BPTA	007256	BPFB	007260
BPTC	007334	BPTD	007370	BPTE	007444	BPFX	007464
BPTF	007450	BPTVEC	= 000014	DISPLA	= 177570	DONE	015762
DONE1	016014	EMTVEC	= 000030	END	015742	ERRVEC	= 000004
FINISH	016050	FIRST	=X000002	FOVER	006624	FP	005266
FPA	005320	FPA	005302	FPB	005334	FPVEC	= 000244
GIN1	015460	GIN2	015472	HAIR	011752	HAIR1	011750
HAIR1B	011744	HAIR2	012110	HAIR2A	012106	HAIR2B	012104
HLT	= 000000	ICNT	001000	ILLA	= 004700	ILLB	= 000100
INDEX	007500	IND1	007526	IND10	010232	IND11	010264
IND10	010322	IND12A	010320	IND13	010352	IND13A	010350
IND14	010420	IND15	010452	IND2	007572	IND2A	007566
IND2X	007634	IND3	007670	IND3A	007666	IND4	010010
IND4A	010004	IND5	010116	IND6	010144	IND7	010176
INST	016050	INSTC	001120	INSTK	003570	INT	013060
IOTVEC	= 000020	K1	014100	K10	014116	K11	014120
K12	014120	K2	014102	K3	014104	K4	014106
K5	014110	K6	014112	K7	014114	LAST	=X000003
MEMEND	014044	MEMEX	014060	NOTBIT	009046	OAER0	004376
OAER1	004424	OAER2	004456	OAER3	004504	OAER4	004526
OAER5	004560	OAER6	004646	OAER7	004672	O0	006734
O0A	006734	O1	006740	O1A	006742	O2	006744
O2A	006744	O3	006750	O3A	006752	O4	006754
O5	007170	O6	007176	PFVEC	= 000024	PIRINT	013472
PIRQ	= 177770	PIRQA	013766	PIRVEC	= 000240	PIR4	= 010000
PSW	= 177774	RA	002614	RA1	001714	RB	002610
RB	001710	RC	002604	RC1	001704	RED0	010532
RED1A	010534	RED10	010530	RED10	011516	RED10A	011514
RED11	011554	RED11A	011552	RED12A	011630	RED12B	011634
RED12C	011624	RED2	010662	RED2A	010664	RED2B	010668
RED3	011004	RED3A	011006	RED3B	011002	RED4	011112
RED4A	011114	RED4B	011110	RED5	011246	RED5A	011244
RED5B	011234	RED6	011374	RED6A	011372	RED7	011442
RED7A	011440	RES	= 075000	RESET1	013176	RESET2	013246
RESINS	= 076000	RESVEC	= 000010	RET	013520	RETA	001056
RETA	005104	RETA1	001400	RETA2	001770	RETA3	002310
RETA4	002664	RETA5	003214	RETB	001074	RETB1	008132
RETB1	001414	RETB2	002006	RETB3	002326	RETB4	002704
RETB5	003030	RETC	001122	RETC1	009172	RETC1	005240
RETC1	001444	RETC2	002034	RETC3	002354	RETC4	002732
RETC5	003060	RETD	001160	RETD1	001502	RETD2	002072
RETD3	002410	RETD4	002770	RETD5	003316	RETE	001214
RETE1	001534	RETE2	002126	RETE3	002444	RETE4	003024
RETE5	003350	RETF	001260	RETF1	001602	RETF2	002172
RETF3	002510	RETF4	003070	RETF5	003416	RETF6	001324
RETF1	001644	RETF2	002236	RETF3	002550	RETF4	003134
RETF5	003460	RETF5	003526	RETF6	003544	RETK	003572
RETL	003630	RETM	003664	RETN	003730	RETO	003774
RETP	004050	RETO	004070	RETR	004120	RETS	004156
RETT	004214	RETV	004262	RETV	004324	RETL	015530
REY2	015540	R6TST	014124	R7TRX	012270	R7TR1	012312
R7TR2	012346	R7TR2A	012342	R7TR3	012400	R7TR4	012436
SCOPE	= 010701	SINS0	015652	SINSDD	013450	SINSE	015664
SINSF	015654	SINS0	015700	SINSH	015720	SINSI	015740

SINSJ	015730	SINS1	015572	START	001002	STKERR	007166
STKPTR	= 000500	SWR	= 177570	TAB	= 000000	TABLE	016020
TBITVE	= 000114	TDEC1	005366	TDEC2	005412	TDEC2A	005434
TDEC3	005460	TDEC4	005502	TDEC5	005544	TDEC5A	005540
TDEC5B	005570	TDEC7	012246	TDEC8	012244	TEMP	016064
TOERR0	004720	TOERRA	004716	TOER1	004774	TOERRA	004772
TRAPVE	= 000064	TRAPVE	= 000034	TRCSR	= 177560	TRC1	012514
TRC2	012554	TRC3	012560	TRC4	012606	TRC5	012620
TR1	012672	TR2	012674	TR3	012760	TR4	012764
TR4A	012430	TR5	012762	TR6	013144	TR6X	013100
TTCSR	= 177564	TTYEND	013726	TTYEX	013542	TTY3	013310
TTY4	013364	TTY5	013516	TTY6	013526	TTY7A	013634
TTY7B	013630	TTY7C	013660	TTY7D	013702	TTY7EX	013704
UBREAK	= 177770	VDC20	006472	VDC20A	006464	VDC20B	006520
VDEC1	005624	VDEC10	006124	VDEC11	006204	VDEC12	006206
VDEC15	006254	VDEC16	006306	VDEC17	006336	VDEC18	006366
VDEC19	006414	VDEC2	005624	VDEC20	006430	VDEC3	005706
VDEC4	005704	VDEC5	005766	VDEC6	005764	VDEC7	006046
VDEC8	006044	VDEC9	006126	WAIT1	013622	WAIT1	013762
:	= 016070						

7 ERRORS DETECTED: 3

*DCKBMB:DCKRMB/SOL:0DCKBMB
 RUN-TIME: 12 24 0 SECONDS
 CORE USED: 4K