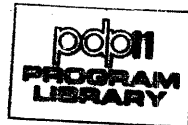


IDENTIFICATION

PRODUCT CODE: MAINDEC-11-D00A  
PRODUCT NAME: T15 COMBINED INSTRUCTION TEST  
DATE CREATED: 20 MARCH 1970  
MAINTAINER: DIAGNOSTIC GROUP  
AUTHOR: JOHN HITTELL



1. ABSTRACT

THIS EXERCISES THE PROCESSOR SECTION, TESTING INSTRUCTIONS UNDER DIFFERENT MODES, IN BOTH SOURCE AND DESTINATION ALSO TRAP AND INTERRUPT LOGIC IS ALSO TESTED

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11/20 STANDARD COMPUTER

2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE ROUTINE USES MEMORY FROM 0000 TO 13000.

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTING

STARTING AT SA 200 ALL SWITCHES SHOULD BE DOWN OR ZERO.

4.2 STARTING ADDRESS OR ADDRESSES

200 IS THE NORMAL STARTING ADDRESS

4.3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY.  
SET SWITCH REGISTER TO STARTING ADDRESS.  
LOAD ADDRESS.  
SET SWITCHES TO INHIBIT NON EXISTANT DEVICES  
PRESS START.  
THE PROGRAM WILL LOOP AND  
BELL WILL RING ONCE PER PASS OF THE PROGRAM

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200 ., THE INSTRUCTION AND LOGIC TEST, WITH ALL SWITCHES DOWN THE PROGRAM WILL TEST ALL DEVICES AND PRINT OUT ON ERRORS AND CONTINUE IN TEST. (BELL WILL RING AT COMPLETION OF A PASS)

5.1.2 SWITCH SETTINGS ARE

SW15 = 1 OR UP ... HALT ON ERROR  
SW14 = 1 OR UP ... SCOPE LOOP  
SW13 = 1 OR UP ... INHIBIT PRINTOUT  
SW12 = 1 OR UP ... INHIBIT TRACE TRAPPING  
SW11 = 1 OR UP ... INHIBIT ITERATION LOOP

5.1.3

5.2. SUBROUTINE ABSTRACTS

5.2.1 BEGIN SA 200

5.2.2 SCOPE

-----  
THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUB-TEST AS IT IS BEING ENTERED, IF A SCOPE LOOP IS REQUESTED, IT WILL JUMP TO THE START OF THE SUBTEST THAT THE SCOPE LOOP IS REQUESTED FOR, IF SCOPE LOOP IS NOT REQUESTED, THERE WILL BE EITHER A FIXED OR RANDOM NUMBER OF ITERATIONS ON THAT SUBTEST BEFORE THE NEXT SUBTEST IS ENTERED. SWITCH 11 ON A 1 INHIBITS ITERATION OF SUBTESTS.

5.2.3 HLT

---  
IS A ROUTINE THAT PRINTS-OUT AN ADDRESS THAT TAGS THE FAILING SUBTEST, AND THE STATUS REGISTER AT THE TIME OF THE FAILURE.

5.2.4 TRTRAP

-----  
THIS ROUTINE WILL ALLOW THE TRACE BIT TRAP TO BE SET AFTER FIRST LOOP OF THE PROGRAM. UNDER NORMAL TESTING THE TRACE BIT WILL BE SET ON ALTERNATE LOOPS OF THE PROGRAM. WHEN SET IT CAUSES A TRAP AFTER EACH INSTRUCTION. THE FIRST INSTRUCTION EXECUTED UPON TRAPPING IS AN "RTI" WHICH RETURNS TO THE INTERRUPTED SEQUENCE OF INSTRUCTION. THIS SECTION IS CONTINUED TILL THE END OF THE PROGRAM LOOP IS REACHED.

(5. OPERATING PROCEDURE CONT'D)

5.2.5 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0, DESIGNED TO DETECT, AND ISOLATE UNEXPECTED TRAPS AND INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

THE PRINCIPAL OF THIS ROUTINE IS: THE VECTOR ENTRANCE ADDRESS POINTS TO THE NEXT SEQUENTIAL WORD WHICH CONTAINS A HALT (00000). (THIS LOCATION IS ALSO THE STATUS FOR THAT VECTOR ENTRANCE, BUT THIS HAS NO EFFECT ON IT ALSO BEING THE NEXT INSTRUCTION).

IF A HALT OCCURS IN THE TRAP OR INTERRUPT VECTOR AREA, REGISTER SIX SHOULD BE EXAMINED TO DETERMINE ITS CONTENTS, THEN USE REGISTER SIX CONTENTS AS AN ADDRESS TO DETERMINE THE LOCATION THE PROGRAM WAS AT, WHEN THE INTERRUPT OR TRAP OCCURRED, (MEMORY AS SPECIFIED BY R6 CONTAINS THE PC OF THE INSTRUCTION FOLLOWING THE INSTRUCTION WHERE THE TRAP OCCURRED).

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 WITH ALL SWITCHES DOWN IS WORSE CASE TESTING. IF AN ERROR IS DETECTED HERE, THERE WILL BE A PRINTOUT. WHEN AN ERROR IS DETECTED AND IT IS NECESSARY TO SCOPE ON IT, PLACE SW13 UP TO HALT ON ERROR, THEN SW14 UP TO LOOP ON ERROR, THEN SW13 UP TO DELETE PRINTOUTS.

6. ERRORS

6.1 ERROR PRINTOUT

ARE IN TWO WORD FORMAT, THE 1ST IS PC+2 OF THE  
DETECTED ERROR, THE 2ND, IS THE STATUS REGISTER.  
REFER TO THE LISTING FOR DETAILED INFORMATION.

6.2 ERROR RECOVERY

RESTART AT 200 OR PRESS CONTINUE

7. RESTRICTIONS

7.1 STARTING RESTRICTION

NONE

7.2 OPERATIONAL RESTRICTION

NONE

6. MISCELLANEOUS

TRACKING DOWN UNUSUAL FAILURES

FAILURES THAT MAY OCCUR BECAUSE OF A FALSE ENTRY INTO A SUBTEST, OR A FAILURE IN A CONTROL ROUTINE RATHER THAN A SUBTEST. DETECTION OF THESE MAY BE ACCOMPLISHED BY SEVERAL PROCEDURES. THERE IS A LOCATION CALLED "SCOPE" THAT RECORDS THE LAST SUCCESSFUL SUBTEST COMPLETED. THERE IS ANOTHER LOCATION CALLED "SCOPEF" THAT SHOWS HOW MANY TIMES THE SUBTEST HAS BEEN EXECUTED. THERE IS ANOTHER LOCATION CALLED "ICOUNT" THAT CONTAINS THE ITERATION COMPARISON VALUE. THE STACK "R6" SHOULD BE EQUAL TO "RUFF" WHEN THE FIRST INSTRUCTION OF THE SUBTEST IS ENTERED. TO REDUCE INSTRUCTION EXECUTION IN CONFUSING SITUATION, THE "SCOPE" LOCATION FOLLOWING THE SUBTEST SHOULD BE CHANGED TO A BRANCH TO THE FIRST INSTRUCTION OF THE SUBTEST (THE FIRST LOCATION FOLLOWING THE PREVIOUS SCOPE LOCATION) AND THE "HLT" LOCATION MAY BE REPLACED WITH A "NOP".

6.1 EXECUTION TIME

ABOUT 1 MINUTE WITH TRACE BIT CLEARED  
ABOUT 1.5 MINUTES WITH TRACE BIT SET

## 9. PROGRAM DESCRIPTION

THE INSTRUCTION EXERCISER IS A STRAIGHT LINE TEST OF INSTRUCTIONS. THE SEQUENCE IN WHICH THEY ARE EXECUTED IS THE SAME SEQUENCE IN WHICH THEY ARE SHOWN IN THE LISTING. EACH AREA OF CODE FROM "SCOPE TO SCOPE" IS AN INDIVIDUAL SUB-TEST, WITH SWITCH 11 UP THE SUB-TEST IS EXECUTED ONE TIME AND THEN THE NEXT SUB-TEST IS EXECUTED, AND SO ON TILL ALL SUB-TESTS ARE EXECUTED. HOWEVER IF SWITCH 11 IS DOWN THE SUB-TEST WILL BE EXECUTED SOME "N" NUMBER OF TIMES BEFORE ENTERING THE NEXT SUB-TEST. IF SWITCH 14 IS UP YOU WILL NEVER LEAVE THE CURRENT SUB-TEST YOU ARE IN. THIS USE IS INTENDED FOR TROUBLE SHOOTING A MALFUNCTION IN A SUB-TEST. THE FIRST GROUP OF SUB-TESTS ARE THE BINARYS AND UNARYS. THOSE INSTRUCTIONS ARE TESTED IN THE INDEX MODE: SOURCE ONLY, DESTINATION ONLY, THEN BOTH SOURCE AND DESTINATION. THE SAME INSTRUCTIONS ARE THEN TESTED USING THE IMMEDIATE MODE INDIRECT. THESE MODES ARE TESTED AGAINST OTHER MODES, WHICH MAY USE A REGISTER OR MEMORY LOCATION. THESE WILL BE SWAPED BETWEEN SOURCE AND DESTINATION.

AFTER THE MODES AND INSTRUCTION HAVE BEEN PROVEN IN THE WORD MODE, THEY ARE THEN TESTED IN THE BYTE MODE. OTHER TESTING IS ALSO DONE WHERE THE "JBR" INSTRUCTION IS TESTED IN NESTED COMBINATIONS. ALL COMBINATIONS OF NUMBERS ARE TESTED USING THE COMPARE, ROTATE, ADD AND COMPLIMENT INSTRUCTIONS. THERE IS ALSO A MINIMUM TEST OF POWER FAIL AND AUTO RECOVERY, WHICH IS NOT ENABLED UNTIL AFTER THE FIRST PASS OF THE PROGRAM. THE PROGRAM REQUIRES TWO BELLS ON THE TTY TO MAKE ONE TRUE PASS OF THE PROGRAM. THE FIRST BELL OCCURS AFTER ONE PASS OF THE INSTRUCTION TEST WITH THE TRACE BIT CLEARED. THE SECOND BELL MARKS THE END OF AN INSTRUCTION TEST PASS WITH THE TRACE BIT SET. THE REASON FOR EXECUTING ALL INSTRUCTIONS WITH THE TRACE BIT SET IS TO TAKE US INTO SERVICE AT THE END OF EACH INSTRUCTION.

## 10. LISTING

## 11. FLOW CHART(S)







PALX11 V003 13-APR-70

14122 PAGE 1-1

000034 010354

SCOPEC

IUSER TRAP

000036 000000

0

000200

. =200

;(R6) IS THE STACK POINTER  
;((R6)) IS THE PC+2 OF LOCATION WHERE THE TRAP ORIGINATED  
;FOR NORMAL OPERATION RUN WITH ALL SWITCHES DOWN  
;SR 15=10R UP---HALT ON ERROR  
;SR 14=10R UP---SCOPE LOOP  
;SR 13=10R UP---INHIBIT PRINT OUT  
;SR 12=10R UP---INHIBIT TRACE TRAPPING  
;SR 11=10R UP---INHIBIT SUB-PROBLEM ITERATION

				IBINARY INSTRUCTIONS	
				;INDEX, AND INDIRECT TEST OF PDDP11	
000200	012706	010730		BEGIN: MOV #FIN,%6	INITIALIZE STACK POINTER FOR TRAPS
000204	012767	000200	010216	MOV #BEGIN,RETURN	IFOR SCOPING
000212	012767	004000	010204	MOV #4000,ICOUNT	
000220	104400			SCOPE	
				;TEST COMPARE INSTRUCTION INDEXED	
000222	012700	177770		MOV #-10,%0	IMINUS 10 TO REG 0
000226	026027	010574	125252	CMP A(0),#125252	!(A INDEX BY MINUS 10) TO #125252
000234	001401			BEQ .+4	
000236	104000			HLT	ICOMPARE WITH INDEX FAILED
000240	104400			SCOPE	
000242	012700	177770		MOV #-10,%0	IFOR INDEX
000246	022760	125252	010574	CMP #125252,A(0)	IA INDEXED
000254	001401			BEQ .+4	
000256	104000			HLT	
000260	104400			SCOPE	
000262	012700	000010		MOV #10,%0	INDEX
000266	026027	010574	052525	CMP A(0),#052525	
000274	001401			BEQ .+4	
000276	104000			HLT	
000300	104400			SCOPE	
000302	012700	000010		MOV #10,%0	
000306	022760	052525	010574	CMP #052525,A(0)	
000314	001401			BEQ .+4	
000316	104000			HLT	
000320	104400			SCOPE	
000322	012700	177770		MOV #-10,%0	
000326	026060	010574	010574	CMP A(0),A(0)	
000334	001401			BEQ .+4	
000336	104000			HLT	
000340	104400			SCOPE	
000342	012700	000010		MOV #+10,%0	
000346	026060	010574	010574	CMP A(0),A(0)	
000354	001401			BEQ .+4	
000356	104000			HLT	
000360	104400			SCOPE	
000362	012700	177770		MOV #-10,%0	
000366	012701	000004		MOV #+4,%1	
000372	026061	010574	010574	CMP A(0),A(1)	
000400	001401			BEQ .+4	
000402	104000			HLT	
000404	104400			SCOPE	
000406	026160	010574	010574	CMP A(1),A(0)	
000414	001401			BEQ .+4	
000416	104000			HLT	
000420	104400			SCOPE	

000422	012700	177774		MOV	#-4,X0
000426	012701	000010		MOV	#+10,X1
000432	026061	010574	010574	CMP	A(0),A(1)
000440	001401			BEQ	.+4
000442	104000			HLT	
000444	104400			SCOPE	
000446	012700	177774		MOV	#-4,X0
000452	012701	000010		MOV	#10,X1
000456	026160	010574	010574	CMP	A(1),A(0)
000464	001401			BEQ	.+4
000466	104000			HLT	
000470	104400			SCOPE	

## ;TEST MOVE INSTRUCTION FOR INDEX

```

000472 012700 177770      MOV      #-10,X0
000476 016067 010574 010112    MOV      A(0),TEMP
000504 026727 010106 125252    CMP      TEMP,#125252
000512 001401      BEQ      ,+4
000514 104000      HLT
000516 104400      SCOPE

000520 012700 000010      MOV      #+10,X0
000524 016067 010574 010064    MOV      A(0),TEMP
000532 026727 010060 052525    CMP      TEMP,#052525
000540 001401      BEQ      ,+4
000542 104000      HLT
000544 104400      SCOPE

000546 012700 177770      MOV      #-10,X0
000552 012760 125252 010616    MOV      #125252,TEMP(0)
000560 026727 010022 125252    CMP      C,#125252
000566 001401      BEQ      ,+4
000570 104000      HLT
000572 104400      SCOPE

000574 012700 000010      MOV      #+10,X0
000600 012760 052525 010616    MOV      #052525,TEMP(0)
000606 026727 010014 052525    CMP      TEMP+10,#052525
000614 001401      BEQ      ,+4
000616 104000      HLT
000620 104400      SCOPE

```

## ;TEST BIC INSTRUCTION FOR INDEXING

```

000622 012767 177777 007766    MOV      #-1,TEMP
000630 012700 177770      MOV      #-10,X0
000634 046067 010574 007754    BIC      A(0),TEMP
000642 026727 007750 052525    CMP      TEMP,#052525
000650 001401      BEQ      ,+4
000652 104000      HLT
000654 104400      SCOPE

000656 012767 177777 007732    MOV      #-1,TEMP
000664 012700 000010      MOV      #10,X0
000670 046067 010574 007720    BIC      A(0),TEMP
000676 026727 007714 125252    CMP      TEMP,#125252
000704 001401      BEQ      ,+4
000706 104000      HLT
000710 104400      SCOPE

000712 012767 177777 007706    MOV      #-1,TEMP+10
000720 012700 000010      MOV      #10,X0
000724 042760 125252 010616    BIC      #125252,TEMP(0)
000732 026727 007670 052525    CMP      TEMP+10,#052525
000740 001401      BEQ      ,+4
000742 104000      HLT
000744 104400      SCOPE

```

000746	012700	177770	MOV	#-10,X0
000752	012767	177777 007626	MOV	#-1,TEMP-10
000760	042767	052525 007620	BIC	#052525,TEMP-10
000766	026727	007614 125252	CMP	TEMP-10,#125252
000774	001401		BEQ	.+4
000776	104000		HLT	
001000	104400		SCOPE	

;TEST SUBTRACT INSTRUCTION FOR INDEXING

001002	012767	125252	007606	MOV	#125252,TEMP
001010	012700	177770		MOV	#-10,%0
001014	166067	010574	007574	SUB	A(0),TEMP
001022	001401			BEQ	,+4
001024	104000			HLT	
001026	104400			SCOPE	
001030	012767	125252	007560	MOV	#125252,TEMP
001036	012700	177770		MOV	#-10,%0
001042	166760	007516	010626	SUB	B,TEMP+10(0)
001050	001401			BEQ	,+4
001052	104000			HLT	
001054	104400			SCOPE	
001056	012767	052525	007532	MOV	#052525,TEMP
001064	012700	000010		MOV	#10,%0
001070	166067	010574	007520	SUB	A(0),TEMP
001076	001401			BEQ	,+4
001100	104000			HLT	
001102	104400			SCOPE	
001104	012767	052525	007504	MOV	#052525,TEMP
001112	012700	000010		MOV	#10,%0
001116	166760	007462	010606	SUB	A+10,C(0)
001124	001401			BEQ	,+4
001126	104000			HLT	
001130	104400			SCOPE	

;TEST UNARYS INDEXED

001132	012767	177777	007456	MOV	#-1,TEMP
001140	012700	177770		MOV	#-10,%0
001144	005060	010626		CLR	D(0)
001150	005767	007442		TST	TEMP
001154	001401			BEQ	,+4
001156	104000			HLT	
001160	104400			SCOPE	
001162	012767	177777	007426	MOV	#-1,TEMP
001170	012700	000010		MOV	#+10,%0
001174	005060	010606		CLR	C(0)
001200	005767	007412		TST	TEMP
001204	001401			BEQ	,+4
001206	104000			HLT	
001210	104400			SCOPE	
001212	012767	177777	007376	MOV	#-1,TEMP
001220	012700	177770		MOV	#-10,%0
001224	005160	010626		COM	D(0)
001230	005767	007362		TST	TEMP
001234	001401			BEQ	,+4
001236	104000			HLT	
001240	104400			SCOPE	

PALX11 V003 13-APR-70 14122 PAGE 4-1

001242	012767	177777	007346	MOV	#-1,TEMP
001250	012700	000010		MOV	#10,X0
001254	005160	010606		COM	C(0)
001260	005767	007332		TST	TEMP
001264	001401			BEQ	.44
001266	104000			HLT	
001270	104400			SCOPE	



001272	012767	177777	007316	MOV	#-1,TEMP
001300	012700	177770		MOV	#-10,X0
001304	005260	010626		INC	D(0)
001310	005767	007302		TST	TEMP
001314	001401			BEQ	.+4
001316	104000			HLT	
001320	104400			SCOPE	
001322	012767	177777	007266	MOV	#-1,TEMP
001330	012700	000010		MOV	#+10,X0
001334	005260	010606		INC	C(0)
001340	005767	007252		TST	TEMP
001344	001401			BEQ	.+4
001346	104000			HLT	
001350	104400			SCOPE	
001352	012767	000001	007236	MOV	#1,TEMP
001360	012700	177770		MOV	#-10,X0
001364	005360	010626		DEC	D(0)
001370	005767	007222		TST	TEMP
001374	001401			BEQ	.+4
001376	104000			HLT	
001400	104400			SCOPE	
001402	012767	000001	007206	MOV	#1,TEMP
001410	012700	000010		MOV	#10,X0
001414	005360	010606		DEC	C(0)
001420	005767	007172		TST	TEMP
001424	001401			BEQ	.+4
001426	104000			HLT	
001430	104400			SCOPE	
001432	012767	000001	007156	MOV	#1,TEMP
001440	012700	177770		MOV	#-10,X0
001444	005460	010626		NEG	D(0)
001450	022767	177777	007140	CMP	#-1,TEMP
001456	001401			BEQ	.+4
001460	104000			HLT	
001462	104400			SCOPE	
001464	012767	000001	007124	MOV	#1,TEMP
001472	012700	000010		MOV	#+10,X0
001476	005460	010606		NEG	C(0)
001502	022767	177777	007106	CMP	#-1,TEMP
001510	001401			BEQ	.+4
001512	104000			HLT	
001514	104400			SCOPE	
001516	012767	177777	007072	MOV	#-1,TEMP
001524	012700	177770		MOV	#-10,X0
001530	000261			SEC	
001532	005560	010626		ADC	D(0)
001536	005767	007054		TST	TEMP
001542	001401			BEQ	.+4

PALX11 V003 13-APR-70 14:22 PAGE 5-1

001544	104000			HLT	
001546	104400			SCOPE	
001550	012767	177777	007040	MOV	#-1,TEMP
001556	012700	000010		MOV	#+10,X0
001562	000261			SEC	
001564	005560	010606		ADC	C(0)
001570	005767	007022		TST	TEMP
001574	001401			BEQ	,+4
001576	104000			HLT	
001600	104400			SCOPE	

```

001602 012767 000001 007006      MOV      #1,TEMP
001610 012700 177770      MOV      #-10,%0
001614 000261      SEC
001616 005660 010626      SBC      D(0)
001622 005767 006770      TST      TEMP
001626 001401      BEQ      ,+4
001630 104000      HLT
001632 104400      SCOPE

```

```

001634 012767 000001 006754      MOV      #1,TEMP
001642 012700 000010      MOV      #+10,%0
001646 000261      SEC
001650 005660 010606      SBC      C(0)
001654 005767 006736      TST      TEMP
001660 001401      BEQ      ,+4
001662 104000      HLT
001664 104400      SCOPE

```

TEST JMP INDEXED

```

001666 012700 000010      MOV      #+10,%0
001672 000160 001666      JMP      RJMP1-10(0)
001676 000240      RJMP1:  NOP
001700 104400      SCOPE

```

```

001702 012700 177770      MOV      #-10,%0
001706 000160 001724      JMP      RJMP2+10(0)
001712 104000      HLT
001714 000240      RJMP2:  NOP
001716 104400      SCOPE

```

## ;TEST INDIRECT ADDRESSING

## ;TEST COMPARE INSTRUCTION

001720	023727	010564	125252	CMP	0#0,#125252
001726	001401			BEQ	.*4
001730	104000			HLT	
001732	104400			SCOPE	
001734	022737	125252	010564	CMP	#125252,0#B
001742	001401			BEQ	.*4
001744	104000			HLT	
001746	104400			SCOPE	
001750	023737	010564	010564	CMP	0#0,0#B
001756	001401			BEQ	.*4
001760	104000			HLT	
001762	104400			SCOPE	

## ;TEST MOVE INSTRUCTIONS

001764	013700	010564		MOV	0#B,X0
001770	022700	125252		CMP	#125252,X0
001774	001401			BEQ	.*4
001776	104000			HLT	
002000	104400			SCOPE	
002002	012737	125252	010610	MOV	#125252,0#TEMP
002010	026767	006550	006600	CMP	B,TEMP
002016	001401			BEQ	.*4
002020	104000			HLT	
002022	104400			SCOPE	
002024	013737	010564	010606	MOV	0#B,0#C
002032	026767	006526	006546	CMP	B,C
002040	001401			BEQ	.*4
002042	104000			HLT	
002044	104400			SCOPE	

## )TEST BIC INSTRUCTION INDIRECT

002046	012700	177777		MOV	#-1,X0
002052	043700	010564		BIC	0#B,X0
002056	020027	052525		CMP	X0,#052525
002062	001401			BEQ	.*4
002064	104000			HLT	
002066	104400			SCOPE	
002070	012767	177777	006520	MOV	#-1,TEMP
002076	042737	125252	010616	BIC	#125252,0#TEMP
002104	022767	052525	006504	CMP	#052525,TEMP
002112	001401			BEQ	.*4
002114	104000			HLT	
002116	104400			SCOPE	
002120	012767	177777	006460	MOV	#-1,C
002126	043737	010564	010606	BIC	0#B,0#C
002134	026727	006446	052525	CMP	C,#52525
002142	001401			BEQ	.*4
002144	104000			HLT	
002146	104400			SCOPE	

## )TEST SUBTRACT INSTRUCTION

002150	012700	125252		MOV	#125252,X0
002154	163700	010564		SUB	0#B,X0
002160	020027	000000		CMP	X0,#0
002164	001401			BEQ	.*4
002166	104000			HLT	
002170	104400			SCOPE	
002172	012767	125252	006416	MOV	#125252,TEMP
002200	166737	006360	010616	SUB	B,0#TEMP
002206	001401			BEQ	.*4
002210	104000			HLT	
002212	104400			SCOPE	
002214	012767	125252	006374	MOV	#125252,TEMP
002222	163767	010564	006366	SUB	0#B,TEMP
002230	005767	006362		TST	TEMP
002234	001401			BEQ	.*4
002236	104000			HLT	
002240	104400			SCOPE	

## ;TEST ADD INDIRECT

002242	005000			CLR	%0
002244	063700	010564		ADD	@#0,%0
002250	022700	125252		CMP	#125252,%0
002254	001401			BEQ	,+4
002256	104000			HLT	
002260	104400			SCOPE	
002262	005067	006330		CLR	TEMP
002266	062737	125252	010616	ADD	#125252,@#TEMP
002274	022767	125252	006314	CMP	#125252,TEMP
002302	001401			BEQ	,+4
002304	104000			HLT	
002306	012767	125252	006302	MOV	#125252,TEMP
002314	067737	006262	010616	ADD	@A+6,@#TEMP
002322	026727	006270	177777	CMP	TEMP,#-1
002330	001401			BEQ	,+4
002332	104000			HLT	
002334	104400			SCOPE	

```

JTEST UNARYS INDIRECT
002336 012767 177777 006252      MOV      #-1,TEMP
002344 005037 010616      CLR      @#TEMP
002350 005767 006242      TST      TEMP
002354 001401      BEQ      ,+4
002356 104000      HLT
002360 104400      SCOPE

002362 012767 125252 006226      MOV      #125252,TEMP
002370 005137 010616      COM      @#TEMP
002374 022767 052525 006214      CMP      #052525,TEMP
002402 001401      BEQ      ,+4
002404 104000      HLT
002406 104400      SCOPE

002410 005067 006202      CLR      TEMP
002414 005237 010616      INC      @#TEMP
002420 022767 000001 006170      CMP      #1,TEMP
002426 001401      BEQ      ,+4
002430 104000      HLT
002432 104400      SCOPE

002434 005067 006156      CLR      TEMP
002440 005377 006134      DEC      @TEMP+2
002444 026727 006146 177777      CMP      TEMP,#-1
002452 001401      BEQ      ,+4
002454 104000      HLT
002456 104400      SCOPE

002460 012767 000001 006130      MOV      #1,TEMP
002466 005437 010616      NEG      @#TEMP
002472 022767 177777 006116      CMP      #-1,TEMP
002500 001401      BEQ      ,+4
002502 104000      HLT
002504 104400      SCOPE

```

JTEST INDIRECT ADDRESSING WITH INDEXING

```

JTEST COMPARE INSTRUCTION
002506 027727 006054 125252      CMP      @B+2,#125252
002514 001401      BEQ      ,+4
002516 104000      HLT
002520 104400      SCOPE

002522 022777 125252 006036      CMP      #125252,@B+2
002530 001401      BEQ      ,+4
002532 104000      HLT
002534 104400      SCOPE

002536 027777 006024 006022      CMP      @B+2,@B+2
002544 001401      BEQ      ,+4
002546 104000      HLT
002550 104400      SCOPE

```

## JTEST MOVE INSTRUCTIONS

002552	017700	006010		MOV	@B+2,X0
002556	022700	125252		CMP	#125252,X0
002562	001401			BEQ	,+4
002564	104000			HLT	
002566	104400			SCOPE	
002570	012777	125252	006022	MOV	#125252,@TEMP+2
002576	026767	005762	006012	CMP	B,TEMP
002604	001401			BEQ	,+4
002606	104000			HLT	
002610	104400			SCOPE	
002612	017777	005750	005770	MOV	@B+2,@C+2
002620	026767	005740	005760	CMP	B,C
002626	001401			BEQ	,+4
002630	104000			HLT	
002632	104400			SCOPE	

## JTEST BIC INSTRUCTION INDIRECT WITH INDEXING

002634	012700	177777		MOV	#-1,X0
002640	047700	005722		BIC	@B+2,X0
002644	020027	052525		CMP	X0,#52525
002650	001401			BEQ	,+4
002652	104000			HLT	
002654	104400			SCOPE	
002656	012767	177777	005732	MOV	#-1,TEMP
002664	042777	125252	005726	BIC	#125252,@TEMP+2
002672	022767	052525	005716	CMP	#52525,TEMP
002700	001401			BEQ	,+4
002702	104000			HLT	
002704	104400			SCOPE	
002706	012767	177777	005672	MOV	#-1,C
002714	047777	005646	005666	BIC	@B+2,@C+2
002722	026767	005656	005656	CMP	A+10,C
002730	001401			BEQ	,+4
002732	104000			HLT	
002734	104400			SCOPE	
002736	012700	125252		MOV	#125252,X0
002742	167700	005620		SUB	@B+2,X0
002746	020027	000000		CMP	X0,#0
002752	001401			BEQ	,+4
002754	104000			HLT	
002756	104400			SCOPE	
002760	012767	125252	005630	MOV	#125252,TEMP
002766	166777	005572	005624	SUB	B,@TEMP+2
002774	001401			BEQ	,+4
002776	104000			HLT	
003000	104400			SCOPE	



PALX11 V003 13-APR-70 14122 PAGE 11-1

003002	012767	125252	005606	MOV	#125252,TEMP
003010	167777	005552	005602	SUB	@B+2,@TEMP+2
003016	005767	005574		TST	TEMP
003022	001401			BEQ	.+4
003024	104000			HLT	
003026	104400			SCOPE	

## )TEST ADD INDIRECT WITH INDEXING

003030	005000			CLR	%0
003032	067700	005530		ADD	@B+2,%0
003036	022700	125252		CMP	#125252,%0
003042	001401			BEQ	.*4
003044	104000			HLT	
003046	104400			SCOPE	
003050	005067	005542		CLR	TEMP
003054	062777	125252	005536	ADD	#125252,@TEMP+2
003062	022767	125252	005526	CMP	#125252,TEMP
003070	001401			BEQ	.*4
003072	104000			HLT	
003074	012767	125252	005514	MOV	#125252,TEMP
003102	067777	005474	005510	ADD	@A+6,@TEMP+2
003110	026727	005502	177777	CMP	TEMP,#-1
003116	001401			BEQ	.*4
003120	104000			HLT	
003122	104400			SCOPE	

## )TEST UNARYS INDIRECT WITH INDEXING

003124	012767	177777	005464	MOV	#-1,TEMP
003132	005077	005462		CLR	@TEMP+2
003136	005767	005454		TST	TEMP
003142	001401			BEQ	.*4
003144	104000			HLT	
003146	104400			SCOPE	
003150	012767	125252	005440	MOV	#125252,TEMP
003156	005177	005436		COM	@TEMP+2
003162	022767	052525	005426	CMP	#052525,TEMP
003170	001401			BEQ	.*4
003172	104000			HLT	
003174	104400			SCOPE	
003176	005067	005414		CLR	TEMP
003202	005277	005412		INC	@TEMP+2
003206	022767	000001	005402	CMP	#1,TEMP
003214	001401			BEQ	.*4
003216	104000			HLT	
003220	104400			SCOPE	
003222	005067	005370		CLR	TEMP
003226	005377	005366		DEC	@TEMP+2
003232	026727	005360	177777	CMP	TEMP,#-1
003240	001401			BEQ	.*4
003242	104000			HLT	
003244	104400			SCOPE	
003246	012767	000001	005342	MOV	#1,TEMP
003254	005477	005340		NEG	@TEMP+2
003260	022767	177777	005330	CMP	#-1,TEMP
003266	001401			BEQ	.*4

PALX11 V003 13-APR-70

14122 PAGE 12-1

003270 104000

HLT

003272 104400

SCOPE

```

003274 012767 177777 005314      MOV      #-1,TEMP
003302 002261                      SEC
003304 005577 005310      ADC      @TEMP+2
003310 005767 005302      TST      TEMP
003314 001401                      BEQ      ,+4
003316 104000                      HLT
003320 104400                      SCOPE

003322 012767 000001 005266      MOV      #1,TEMP
003330 000261                      SEC
003332 005677 005262      SBC      @TEMP+2
003336 005767 005254      TST      TEMP
003342 001401                      BEQ      ,+4
003344 104000                      HLT
003346 104400                      SCOPE

                                ;TEST OF COMBINED INDEXING AND INDIRECT
003350 012700 177772      MOV      #-6,%0
003354 027027 010574 125252      CMP      @A(0),#125252
003362 001401                      BEQ      ,+4
003364 104000                      HLT
003366 104400                      SCOPE

003370 012700 177772      MOV      #-6,%0
003374 022770 125252 010574      CMP      #125252,@A(0)
003402 001401                      BEQ      ,+4
003404 104000                      HLT
003406 104400                      SCOPE

003410 012700 177772      MOV      #-6,%0
003414 012701 000002      MOV      #+2,%1
003420 027071 010574 010574      CMP      @A(0),@A(1)
003426 001401                      BEQ      ,+4
003430 104000                      HLT
003432 104400                      SCOPE

                                ;TEST BIC INSTRUCTION
003434 012700 000006      MOV      #+6,%0
003440 012767 177777 005150      MOV      #-1,TEMP
003446 047067 010574 005142      BIC      @A(0),TEMP
003454 022767 125252 005134      CMP      #125252,TEMP
003462 001401                      BEQ      ,+4
003464 104000                      HLT
003466 104400                      SCOPE

003470 012700 177772      MOV      #-6,%0
003474 012767 177777 005104      MOV      #-1,C
003502 042770 125252 010616      BIC      #125252,@TEMP(0)
003510 026727 005072 052525      CMP      C,#052525
003516 001401                      BEQ      ,+4
003520 104000                      HLT
003522 104400                      SCOPE

```

003750	126160	010574	010574	CMPB	A(1),A(0)
003756	001401			BEQ	,+4
003760	104000			HLT	
003762	104400			SCOPE	
003764	012700	177774		MOV	#-4,X0
003770	012701	000010		MOV	#+10,X1
003774	126061	010574	010574	CMPB	A(0),A(1)
004002	001401			BEQ	,+4
004004	104000			HLT	
004006	012700	177774		MOV	#-4,X0
004012	012701	000010		MOV	#10,X1
004016	126160	010574	010574	CMPB	A(1),A(0)
004024	001401			BEQ	,+4
004026	104000			HLT	
004030	104400			SCOPE	

```

003524 012767 177777 005054 MOV #-1,C
003532 012700 177772 MOV #-6,%0
003536 012701 177772 MOV #-6,%1
003542 047071 010574 010616 BIC @A(0),@TEMP(1)
003550 022767 052525 005030 CMP #052525,C
003556 001401 BEQ .+4
003560 104000 HLT
003562 104400 SCOPE
    
```

;BINARY INSTRUCTIONS  
 ;INDEX, AND INDIRECT TEST OF PDDP11  
 ;TEST COMPARE INSTRUCTION INDEXED

```

003564 012700 177770 MOV #-10,%0
003570 126027 010574 000252 CMPB A(0),#000252
003576 001401 BEQ .+4
003600 104000 HLT
003602 104400 SCOPE
;MINUS 10 TO REG 0
;(A INDEX BY MINUS 10) TO #125252
;COMPARE WITH INDEX FAILED

003604 012700 177770 MOV #-10,%0
003610 122760 000252 010574 CMPB #000252,A(0)
003616 001401 BEQ .+4
003620 104000 HLT
003622 104400 SCOPE
;FOR INDEX
;A INDEXED

003624 012700 000010 MOV #10,%0
003630 126027 010574 000125 CMPB A(0),#000125
003636 001401 BEQ .+4
003640 104000 HLT
003642 104400 SCOPE
;INDEX

003644 012700 000010 MOV #10,%0
003650 122760 000125 010574 CMPB #000125,A(0)
003656 001401 BEQ .+4
003660 104000 HLT
003662 104400 SCOPE

003664 012700 177770 MOV #-10,%0
003670 126060 010574 010574 CMPB A(0),A(0)
003676 001401 BEQ .+4
003700 104000 HLT
003702 104400 SCOPE

003704 012700 000010 MOV #+10,%0
003710 126060 010574 010574 CMPB A(0),A(0)
003716 001401 BEQ .+4
003720 104000 HLT
003722 104400 SCOPE

003724 012700 177770 MOV #-10,%0
003730 012701 000004 MOV #+4,%1
003734 126061 010574 010574 CMPB A(0),A(1)
003742 001401 BEQ .+4
003744 104000 HLT
003746 104400 SCOPE
    
```

## ;TEST MOVE INSTRUCTION FOR INDEX

004032	012700	177770		MOV	#-10,%0
004036	116067	010574	004552	MOVB	A(0),TEMP
004044	126727	004546	000252	CMPB	TEMP,#000252
004052	001401			BEQ	.+4
004054	104000			HLT	
004056	104400			SCOPE	
004060	012700	000010		MOV	#+10,%0
004064	116067	010574	004524	MOVB	A(0),TEMP
004072	126727	004520	000125	CMPB	TEMP,#000125
004100	001401			BEQ	.+4
004102	104000			HLT	
004104	104400			SCOPE	
004106	012700	177770		MOV	#-10,%0
004112	112760	125252	010616	MOVB	#125252,TEMP(0)
004120	126727	004462	125252	CMPB	C,#125252
004126	001401			BEQ	.+4
004130	104000			HLT	
004132	104400			SCOPE	
004134	012700	000010		MOV	#+10,%0
004140	112760	052525	010616	MOVB	#052525,TEMP(0)
004146	126727	004454	052525	CMPB	TEMP+10,#052525
004154	001401			BEQ	.+4
004156	104000			HLT	
004160	104400			SCOPE	

## ;TEST BIC INSTRUCTION FOR INDEXING

004162	012767	177777	004426	MOV	#-1,TEMP
004170	012700	177770		MOV	#-10,%0
004174	146067	010574	004414	BICB	A(0),TEMP
004202	126727	004410	177525	CMPB	TEMP,#177525
004210	001401			BEQ	.+4
004212	104000			HLT	
004214	104400			SCOPE	
004216	012767	177777	004372	MOV	#-1,TEMP
004224	012700	000010		MOV	#10,%0
004230	146067	010574	004360	BICB	A(0),TEMP
004236	126727	004354	007652	CMPB	TEMP,#007652
004244	001401			BEQ	.+4
004246	104000			HLT	
004250	104400			SCOPE	
004252	012767	177777	004346	MOV	#-1,TEMP+10
004260	012700	000010		MOV	#10,%0
004264	142760	125252	010616	BICB	#125252,TEMP(0)
004272	126727	004330	002525	CMPB	TEMP+10,#2525
004300	001401			BEQ	.+4
004302	104000			HLT	
004304	104400			SCOPE	

004306 012700 177770  
004312 012767 177777 004266  
004320 142767 052525 004260  
004326 126727 004254 125252  
004334 001401  
004336 104000  
004340 104400

MOV #-10,X0  
MOV #-1,TEMP=10  
BICB #052525,TEMP=10  
CMPB TEMP=10,#125252  
BEQ .+4  
HLT  
SCOPE



TEST UNARYS INDEXED

004342	012767	177777	004246	MOV	#-1,TEMP
004350	012700	177770		MOV	#-10,X0
004354	105060	010626		CLRB	D(0)
004360	105767	004232		TSTB	TEMP
004364	001401			BEQ	,+4
004366	104000			HLT	
004370	104400			SCOPE	
004372	012767	177777	004216	MOV	#-1,TEMP
004400	012700	177770		MOV	#-10,X0
004404	105060	010626		CLRB	D(0)
004410	026727	004202	177400	CMP	TEMP,#177400
004416	001401			BEQ	,+4
004420	104000			HLT	
004422	104400			SCOPE	
004424	012767	177777	004164	MOV	#-1,TEMP
004432	012700	177771		MOV	#-7,X0
004436	105060	010626		CLRB	D(0)
004442	026727	004150	000377	CMP	TEMP,#000377
004450	001401			BEQ	,+4
004452	104000			HLT	
004454	104400			SCOPE	
004456	012767	177777	004132	MOV	#-1,TEMP
004464	012700	000010		MOV	#+10,X0
004470	105060	010606		CLRB	C(0)
004474	105767	004116		TSTB	TEMP
004500	001401			BEQ	,+4
004502	104000			HLT	
004504	104400			SCOPE	
004506	012767	177777	004102	MOV	#-1,TEMP
004514	012700	177770		MOV	#-10,X0
004520	105160	010626		COMB	D(0)
004524	105767	004066		TSTB	TEMP
004530	001401			BEQ	,+4
004532	104000			HLT	
004534	104400			SCOPE	
004536	012767	177777	004052	MOV	#-1,TEMP
004544	012700	000010		MOV	#10,X0
004550	105160	010606		COMB	C(0)
004554	105767	004036		TSTB	TEMP
004560	001401			BEQ	,+4
004562	104000			HLT	
004564	104400			SCOPE	

004566	012767	177777	004022	MOV	#-1,TEMP
004574	012700	177770		MOV	#-10,%0
004600	105260	010626		INCB	D(0)
004604	105767	004006		TSTB	TEMP
004610	001401			BEQ	.*4
004612	104000			HLT	
004614	026727	003776	177400	CMP	TEMP,#177400
004622	001401			BEQ	.*4
004624	104000			HLT	
004626	104400			SCOPE	
004630	012767	177777	003760	MOV	#-1,TEMP
004636	012700	000010		MOV	#+10,%0
004642	105260	010606		INCB	C(0)
004646	105767	003744		TSTB	TEMP
004652	001401			BEQ	.*4
004654	104000			HLT	
004656	104400			SCOPE	
004660	012767	000001	003730	MOV	#1,TEMP
004666	012700	177770		MOV	#-10,%0
004672	105360	010626		DECB	D(0)
004676	105767	003714		TSTB	TEMP
004702	001401			BEQ	.*4
004704	104000			HLT	
004706	104400			SCOPE	
004710	012767	000001	003700	MOV	#1,TEMP
004716	012700	000010		MOV	#10,%0
004722	105360	010606		DECB	C(0)
004726	105767	003664		TSTB	TEMP
004732	001401			BEQ	.*4
004734	104000			HLT	
004736	104400			SCOPE	
004740	012767	000001	003650	MOV	#1,TEMP
004746	012700	177770		MOV	#-10,%0
004752	105460	010626		NEGB	D(0)
004756	026727	003634	000377	CMP	TEMP,#377
004764	001401			BEQ	.*4
004766	104000			HLT	
004770	104400			SCOPE	
004772	012767	000001	003616	MOV	#1,TEMP
005000	012700	000010		MOV	#+10,%0
005004	105460	010606		NEGB	C(0)
005010	026727	003602	000377	CMP	TEMP,#377
005016	001401			BEQ	.*4
005020	104000			HLT	
005022	104400			SCOPE	
005024	012767	177777	003564	MOV	#-1,TEMP
005032	012700	177770		MOV	#-10,%0
005036	000261			SEC	

005040	105560	010626		ADCB	D(0)
005044	026727	003546	177400	CMP	TEMP,#177400
005052	001401			BEQ	,+4
005054	104000			HLT	
005056	104400			SCOPE	
005060	012767	177777	003530	MOV	#-1,TEMP
005066	012700	000010		MOV	#+10,%0
005072	000261			SEC	
005074	105560	010606		ADCB	C(0)
005100	026727	003512	177400	CMP	TEMP,#177400
005106	001401			BEQ	,+4
005110	104000			HLT	
005112	104400			SCOPE	

005114	012767	000401	003474	MOV	#401,TEMP
005122	012700	177771		MOV	#-7,%0
005126	000261			SEC	
005130	105660	010626		SBCB	D(0)
005134	022767	000001	003454	CMP	#1,TEMP
005142	001401			BEQ	+.4
005144	104000			HLT	
005146	104400			SCOPE	
005150	012767	000001	003440	MOV	#1,TEMP
005156	012700	000010		MOV	#+10,%0
005162	000261			SEC	
005164	105660	010606		SBCB	C(0)
005170	005767	003422		TST	TEMP
005174	001401			BEQ	+.4
005176	104000			HLT	
005200	104400			SCOPE	

## ITEST INDIRECT ADDRESSING

## ITEST COMPARE INSTRUCTION

005202	123727	010564	000252	CMPB	@#B,#000252
005210	001401			BEQ	.,+4
005212	104000			HLT	
005214	104400			SCOPE	
005216	123727	010565	000252	CMPB	@#B+1,#252
005224	001401			BEQ	.,+4
005226	104000			HLT	
005230	104400			SCOPE	
005232	122737	125252	010564	CMPB	#125252,@#B
005240	001401			BEQ	.,+4
005242	104000			HLT	
005244	104400			SCOPE	
005246	123737	010564	010564	CMPB	@#B,@#B
005254	001401			BEQ	.,+4
005256	104000			HLT	
005260	104400			SCOPE	

## ITEST MOVE INSTRUCTIONS

005262	113700	010564		MOVB	@#B,X0
005266	122700	000252		CMPB	#000252,X0
005272	001401			BEQ	.,+4
005274	104000			HLT	
005276	104400			SCOPE	
005300	112737	125252	010616	MOVB	#125252,@#TEMP
005306	126767	003252	003302	CMPB	B,TEMP
005314	001401			BEQ	.,+4
005316	104000			HLT	
005320	104400			SCOPE	
005322	113737	010564	010606	MOVB	@#B,@#C
005330	126767	003230	003250	CMPB	B,C
005336	001401			BEQ	.,+4
005340	104000			HLT	
005342	104400			SCOPE	

## TEST UNARYS INDIRECT

005344	012767	177777	003244	MOV	#-1,TEMP
005352	105037	010616		CLRB	@#TEMP
005356	026727	003234	177400	CMP	TEMP,#177400
005364	001401			BEQ	.*4
005366	104000			HLT	
005370	104400			SCOPE	
005372	012767	125252	003216	MOV	#125252,TEMP
005400	105137	010616		COMB	@#TEMP
005404	022767	125125	003204	CMP	#125125,TEMP
005412	001401			BEQ	.*4
005414	104000			HLT	
005416	104400			SCOPE	
005420	012767	125252	003170	MOV	#125252,TEMP
005426	105137	010617		COMB	@#TEMP+1
005432	022767	052652	003156	CMP	#052652,TEMP
005440	001401			BEQ	.*4
005442	104000			HLT	
005444	104400			SCOPE	
005446	005067	003144		CLR	TEMP
005452	105237	010617		INCB	@#TEMP+1
005456	022767	000400	003132	CMP	#400,TEMP
005464	001401			BEQ	.*4
005466	104000			HLT	
005470	104400			SCOPE	
005472	005067	003120		CLR	TEMP
005476	105377	003116		DECB	@TEMP+2
005502	026727	003110	000377	CMP	TEMP,#377
005510	001401			BEQ	.*4
005512	104000			HLT	
005514	104400			SCOPE	
005516	005067	003074		CLR	TEMP
005522	112767	000001	003067	MOVB	#1,TEMP+1
005530	105437	010617		NEGB	@#TEMP+1
005534	022767	177400	003054	CMP	#177400,TEMP
005542	001401			BEQ	.*4
005544	104000			HLT	
005546	104400			SCOPE	

## TEST INDIRECT ADDRESSING WITH INDEXING

## TEST COMPARE INSTRUCTION

005550	127727	003012	125252	CMPB	@B+2,#125252
005556	001401			BEQ	.*4
005560	104000			HLT	
005562	104400			SCOPE	
005564	122777	125252	002774	CMPB	#125252,@B+2
005572	001401			BEQ	.*4
005574	104000			HLT	
005576	104400			SCOPE	

005600	127777	002762	002760	CMPB	@B+2,@B+2
005606	001401			BEQ	.+4
005610	104000			HLT	
005612	104400			SCOPE	

## ;TEST MOVE INSTRUCTIONS

005614	117700	002746		MOVB	@B+2,%0
005620	122700	125252		CMPB	#125252,%0
005624	001401			BEQ	.,+4
005626	104000			HLT	
005630	104400			SCOPE	
005632	112777	125252	002760	MOVB	#125252,@TEMP+2
005640	126767	002720	002750	CMPB	B,TEMP
005646	001401			BEQ	.,+4
005650	104000			HLT	
005652	104400			SCOPE	
005654	117777	002706	002726	MOVB	@B+2,@C+2
005662	126767	002676	002716	CMPB	B,C
005670	001401			BEQ	.,+4
005672	104000			HLT	
005674	104400			SCOPE	

## ;TEST BIC INSTRUCTION INDIRECT WITH INDEXING

005676	012700	177777		MOV	#-1,%0
005702	147700	002660		BICB	@B+2,%0
005706	120027	052525		CMPB	%0,#52525
005712	001401			BEQ	.,+4
005714	104000			HLT	
005716	104400			SCOPE	
005720	012767	177777	002670	MOV	#-1,TEMP
005726	142777	125252	002664	BICB	#125252,@TEMP+2
005734	122767	052525	002654	CMPB	#52525,TEMP
005742	001401			BEQ	.,+4
005744	104000			HLT	
005746	104400			SCOPE	
005750	012767	177777	002630	MOV	#-1,C
005756	147777	002604	002624	BICB	@B+2,@C+2
005764	126767	002614	002614	CMPB	A+10,C
005772	001401			BEQ	.,+4
005774	104000			HLT	
005776	104400			SCOPE	



## TEST UNARYS INDIRECT WITH INDEXING

006000	012767	177777	002610	MOV	#-1,TEMP
006006	105077	002606		CLRB	@TEMP+2
006012	105767	002600		TSTB	TEMP
006016	001401			BEQ	,+4
006020	104000			HLT	
006022	104400			SCOPE	
006024	012767	125252	002564	MOV	#125252,TEMP
006032	105177	002562		COMB	@TEMP+2
006036	122767	052525	002552	CMPB	#052525,TEMP
006044	001401			BEQ	,+4
006046	104000			HLT	
006050	104400			SCOPE	
006052	005067	002540		CLR	TEMP
006056	105277	002536		INCB	@TEMP+2
006062	122767	000001	002526	CMPB	#1,TEMP
006070	001401			BEQ	,+4
006072	104000			HLT	
006074	104400			SCOPE	
006076	005067	002514		CLR	TEMP
006102	105377	002512		DECB	@TEMP+2
006106	126727	002504	177777	CMPB	TEMP,#-1
006114	001401			BEQ	,+4
006116	104000			HLT	
006120	104400			SCOPE	
006122	012767	000001	002466	MOV	#1,TEMP
006130	105477	002464		NEGB	@TEMP+2
006134	122767	177777	002454	CMPB	#-1,TEMP
006142	001401			BEQ	,+4
006144	104000			HLT	
006146	104400			SCOPE	

```

006150 012767 177777 002440      MOV      #-1,TEMP
006156 000261                SEC
006160 105577 002434                ADCB    @TEMP+2
006164 022767 177400 002424      CMP      #177400,TEMP
006172 001401                BEQ      .+4
006174 104000                HLT
006176 105767 002414                TSTB   TEMP
006202 001401                BEQ      .+4
006204 104000                HLT
006206 104400                SCOPE

```

```

006210 012767 000001 002400      MOV      #1,TEMP
006216 000261                SEC
006220 105377 002374                DECB   @TEMP+2
006224 005767 002366                TST    TEMP
006230 001401                BEQ      .+4
006232 104000                HLT
006234 104400                SCOPE

```

## ;TEST OF COMBINED INDEXING AND INDIRECT

```

006236 012700 177772                MOV      #-6,X0
006242 127027 010574 125252      CMPB    @A(0),#125252
006250 001401                BEQ      .+4
006252 104000                HLT
006254 104400                SCOPE

```

```

006256 012700 177772                MOV      #-6,X0
006262 122770 125252 010574      CMPB    #125252,@A(0)
006270 001401                BEQ      .+4
006272 104000                HLT
006274 104400                SCOPE

```

```

006276 012700 177772                MOV      #-6,X0
006302 012701 000002                MOV      #+2,X1
006306 127071 010574 010574      CMPB    @A(0),@A(1)
006314 001401                BEQ      .+4
006316 104000                HLT
006320 104400                SCOPE

```

## ;TEST BIC INSTRUCTION

```

006322 012700 000006                MOV      #+6,X0
006326 012767 177777 002262      MOV      #-1,TEMP
006334 147067 010574 002254      BICB    @A(0),TEMP
006342 122767 125252 002246      CMPB    #125252,TEMP
006350 001401                BEQ      .+4
006352 104000                HLT
006354 104400                SCOPE

```

```

006356 012700 177772                MOV      #-6,X0
006362 012767 177777 002216      MOV      #-1,C
006370 142770 125252 010616      BICB    #125252,@TEMP(0)
006376 126727 002204 000125      CMPB    C,#000125
006404 001401                BEQ      .+4

```

006406 104000  
 006410 104400

HLT  
 SCOPE

006412 012700 010566

MOV #B+2,X0

ADDRESS OF ADDRESS OF B

006416 023067 002142

CMP @-(0),B

006422 001401

BEQ .+4

006424 104000

HLT

006426 104400

SCOPE

006430 012700 010570

MOV #B+4,X0

006434 025067 002124

CMP @-(0),B

006440 001401

BEQ .+4

006442 104000

HLT

006444 104400

SCOPE

006446 012700 010570

MOV #B+4,X0

006452 125067 002106

CMPB @-(0),B

006456 001401

BEQ .+4

006460 104000

HLT

006462 104400

SCOPE

006464 012700 010612

MOV #C+4,X0

006470 012767 177777 002110

MOV #-1,C

006476 105050

CLRB @-(0)

006500 026727 002102 177400

CMP C,#177400

006506 001401

BEQ .+4

006510 104000

HLT

```

006512 012767 177777 002066      MOV      #-1,C
006520 012700 177772      MOV      #-6,%0
006524 012701 177772      MOV      #-6,%1
006530 147071 010574 010616      BICB    @A(0),@TEMP(1)
006536 022767 177525 002042      CMP      #177525,C
006544 001401      BEQ      .+4
006546 104000      HLT
006550 104400      SCOPE
006552 012700 052525      MOV      #52525,%0
006556 104400      SCOPE

```

ITD BE CHECKED AT END OF PROGRAM

ITEST JSR INSTRUCTION

```

006560 004767 000002      JSR      X7, TJSR2
006564 000405      TJSR1:  BR      TJSR3
006566 021627 006564      TJSR2:  CMP      @X6,#TJSR1
006572 001401      BEQ      .+4
006574 104000      HLT
006576 000207      RTS      X7
006600 104400      TJSR3:  SCOPE

```

IPLACE PC ON STACK  
 IRETURN HERE ON RTS X7  
 ICHECK FOR CORRECT PC ON STACK  
  
 IINCORRECT PC ON STACK  
 IRETURN TO IMST AFTER JSR

ITEST OF JSR AND RTS 5 LEVELS

```

006602 005067 001670      CLR      FLAG
006606 004767 001650      JSR      X7,SUBR5
006612 100401      BMI      .+4
006614 104000      HLT
006616 104400      SCOPE
006620 005067 001652      CLR      FLAG
006624 004767 001640      JSR      X7,SUBR6
006630 005767 001642      TST      FLAG
006634 100401      BMI      .+4
006636 104000      HLT
006640 104400      SCOPE
006642 000257      CCC
006644 005067 001626      CLR      FLAG
006650 004767 001614      JSR      X7,SUBR6
006654 100401      BMI      .+4
006656 104000      HLT
006660 001001      BNE      .+4
006662 104000      HLT
006664 102001      BVC      .+4
006666 104000      HLT
006670 103401      BCS      .+4
006672 104000      HLT
006674 104400      SCOPE
006676 000277      SCC
006700 005067 001572      CLR      FLAG
006704 004767 001560      JSR      X7,SUBR6
006710 100401      BMI      .+4
006712 104000      HLT
006714 001001      BNE      .+4
006716 104000      HLT
006720 102001      BVC      .+4
006722 104000      HLT
006724 103401      BCS      .+4
006726 104000      HLT
006730 104400      SCOPE

```

IJSR OR RTS FOUR  
 IDEEP FAILED

IJSR OR RTS FIVE  
 IDEEP FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

IJSR OR RTS FAILED

TEST OF INTERRUPT AND INTERRUPT PRIORITY  
 TEST FOR INTERRUPT FROM THE TTY KEYBOARD

006732	042767	000357	171036	BIC	#357,CC	ISSET TO LOWEST PRIORITY
006740	012737	006772	000064	MOV	#TINT1,#64	INTERRUPT VECTOR ADDRESS
006746	012706	010730		MOV	#BUFF,X6	SET UP STACK POINTER
006752	042777	000100	001034	BIC	#100,@TCSR	CLEAR INTERRUPT ENABLE
006760	052777	000100	001026	BIS	#100,@TCSR	SET INTERRUPT ENABLE-
006766	000240			NOP		SHOULD INTERRUPT HERE
006770	104000			HLT		NO TTY INTERRUPT OCCURED
006772	104400					

TINT1: SCOPE

## TEST FOR INTERRUPT FROM THE TTY KEYBOARD

006774	042767	000340	170774	BIC	#340,CC	ISSET TO PRIORITY LEVEL 1
007002	052767	000040	170766	BIS	#040,CC	INTERRUPT VECTOR ADDRESS
007010	012737	007042	000064	MOV	#TINT2,#64	SET UP STACK POINTER
007016	012706	010730		MOV	#BUFF,X6	CLEAR INTERRUPT ENABLE
007022	042777	000100	000764	BIC	#100,@TCSR	SET INTERRUPT ENABLE-
007030	052777	000100	000756	BIS	#100,@TCSR	SHOULD INTERRUPT HERE
007036	000240			NOP		NO TTY INTERRUPT OCCURED
007040	104000			HLT		
007042	104400					

TINT2: SCOPE

007044	042767	000340	170724	BIC	#340,CC	ISSET TO PRIORITY LEVEL 2
007052	052767	000100	170716	BIS	#100,CC	INTERRUPT VECTOR ADDRESS
007060	012737	007112	000064	MOV	#TINT3,#64	SET UP STACK POINTER
007066	012706	010730		MOV	#BUFF,X6	CLEAR INTERRUPT ENABLE
007072	042777	000100	000714	BIC	#100,@TCSR	SET INTERRUPT ENABLE-
007100	052777	000100	000706	BIS	#100,@TCSR	SHOULD INTERRUPT HERE
007106	000240			NOP		NO TTY INTERRUPT OCCURED
007110	104000			HLT		
007112	104400					

TINT3: SCOPE

## TEST FOR INTERRUPT FROM THE TTY KEYBOARD

007114	042767	000340	170654	BIC	#340,CC	ISSET TO PRIORITY LEVEL 3
007122	052767	000140	170646	BIS	#140,CC	INTERRUPT VECTOR ADDRESS
007130	012737	007162	000064	MOV	#TINT4,#64	SET UP STACK POINTER
007136	012706	010730		MOV	#BUFF,X6	CLEAR INTERRUPT ENABLE
007142	042777	000100	000644	BIC	#100,@TCSR	SET INTERRUPT ENABLE-
007150	052777	000100	000636	BIS	#100,@TCSR	SHOULD INTERRUPT HERE
007156	000240			NOP		NO TTY INTERRUPT OCCURED
007160	104000			HLT		
007162	104400					

TINT4: SCOPE

## TEST FOR NO INTERRUPT FROM TTY (HIGHEST PROCESSOR PRIORITY)

007164	052767	000340	170604	BIS	#340,CC	RAISE PROCESSOR PRIORITY TO HIGHEST LEVEL
007172	012737	007230	000064	MOV	#TINT5,#64	IN CASE OF INTERRUPT
007200	012706	010730		MOV	#BUFF,X6	SET STACK POINTER
007204	042777	000100	000602	BIC	#100,@TCSR	CLEAR INTERRUPT ENABLE
007212	052777	000100	000574	BIS	#100,@TCSR	SET INTERRUPT ENABLE
007220	042777	000100	000566	BIC	#100,@TCSR	DON'T LEAVE IT SET
007226	000401			BR	.+4	WITH NO INTERRUPT, BRANCH OVER HALT

007230 104000  
 007232 104400  
 007234 042767 000340 170534  
 007242 052767 000200 170526  
 007250 012737 007306 000064  
 007256 012706 010730  
 007262 042777 000100 000524  
 007270 052777 000100 000516  
 007276 042777 000100 000510  
 007304 000401  
 007306 104000  
 007310 104400

TINT5: HLT  
 SCOPE  
 ;TEST FOR NO INTERRUPT FROM TTY  
 BIC #340,CC  
 BIS #200,CC  
 MOV #TINT6,@#64  
 MOV #BUFF,X6  
 BIC #100,@TCSR  
 BIS #100,@TCSR  
 BIC #100,@TCSR  
 BR .+4  
 TINT6: HLT  
 SCOPE

;INTERRUPT OCCURED  
 ;RAISE PROCESSOR PRIORITY TO LEVEL 4  
 ;IN CASE OF INTERRUPT  
 ;SET STACK POINTER  
 ;CLEAR INTERRUPT ENABLE  
 ;SET INTERRUPT ENABLE  
 ;DON'T LEAVE IT SET  
 ;WITH NO INTERRUPT, BRANCH OVER HALT  
 ;INTERRUPT OCCURED

007312 042767 000340 170456  
 007320 052767 000240 170450  
 007326 012737 007364 000064  
 007334 012706 010730  
 007340 042777 000100 000446  
 007346 052777 000100 000440  
 007354 042777 000100 000432  
 007362 000401  
 007364 104000  
 007366 104400

;TEST FOR NO INTERRUPT FROM TTY  
 BIC #340,CC  
 BIS #240,CC  
 MOV #TINT7,@#64  
 MOV #BUFF,X6  
 BIC #100,@TCSR  
 BIS #100,@TCSR  
 BIC #100,@TCSR  
 BR .+4  
 TINT7: HLT  
 SCOPE

;RAISE PROCESSOR PRIORITY TO LEVEL 5  
 ;IN CASE OF INTERRUPT  
 ;SET STACK POINTER  
 ;CLEAR INTERRUPT ENABLE  
 ;SET INTERRUPT ENABLE  
 ;DON'T LEAVE IT SET  
 ;WITH NO INTERRUPT, BRANCH OVER HALT  
 ;INTERRUPT OCCURED

007370 042767 000340 170400  
 007376 052767 000300 170372  
 007404 012737 007442 000064  
 007412 012706 010730  
 007416 042777 000100 000370  
 007424 052777 000100 000362  
 007432 042777 000100 000354  
 007440 000401  
 007442 104000  
 007444 104400  
 007446 020027 052525  
 007452 001401  
 007454 104000

;TEST FOR NO INTERRUPT FROM TTY  
 BIC #340,CC  
 BIS #300,CC  
 MOV #TINT8,@#64  
 MOV #BUFF,X6  
 BIC #100,@TCSR  
 BIS #100,@TCSR  
 BIC #100,@TCSR  
 BR .+4  
 TINT8: HLT  
 SCOPE  
 CMP X0,#52525  
 BEQ .+4  
 HLT

;RAISE PROCESSOR PRIORITY TO LEVEL 6  
 ;IN CASE OF INTERRUPT  
 ;SET STACK POINTER  
 ;CLEAR INTERRUPT ENABLE  
 ;SET INTERRUPT ENABLE  
 ;DON'T LEAVE IT SET  
 ;WITH NO INTERRUPT, BRANCH OVER HALT  
 ;INTERRUPT OCCURED

007456 012767 010500 170340  
 007464 012767 000340 170334

;POWER FAIL SETUP  
 MOV #PFAIL,24  
 MOV #340,26  
 ;WHAT IS REGISTER SIX WHEN POWERING UP

;REGISTER ZERO IS BEING CHANGE REF: TJSR1-10  
 ;SET UP FOR POWER FAIL

```

;BELL ON PASS COMPLETE
007472 012737 000207 177566      MOV      #207,0#177566
007500 105737 177564              TSTB     0#177564
007504 100375              BPL      .-4
;ROUTINE TO CHECK FOR TRACE TRAP TO BE RUN WITH PROGRAM
007506 032767 010000 170054      TRTRAP: BIT      #10000,SR      ;SHOULD WE RUN WITH TRACE TRAP
007514 001417              BEQ      YESTR              ;YES
007516 005767 000100              TST     YESTR1              ;NO HAVE WE RAN WITH TRACE TRAP ON
007522 001411              BEQ      TRPA              ;IF SO RESTORE PREVIOUS CONTENTS
007524 016767 000072 170262      MOV     YESTR1,14
007532 016767 000066 170256      MOV     YESTR2,16
007540 042767 000020 170230      BIC     #20,CC              ;CLEAR TRACE TRAP
007546 000167 170426      TRPA:  JMP     BEGIN        ;START OF TEST WITH TRACE OFF
007552 000000      TRPB:  0
;SAVE OLD CONTENTS, SET UP FOR TRACE TRAP EVERY OTHER TIME
007554 016767 170234 000040      YESTR:  MOV     14,YESTR1      ;SAVE ODT PC
007562 016767 170230 000034      MOV     16,YESTR2      ;SAVE ODT STATUS
007570 012767 007626 170216      MOV     #YESRT,14      ;NEW TRAP VECTOR
007576 005067 170214      CLR     16              ;NEW CONDITION CODES
007602 005167 177744      COM     TRPB
007606 100403      BMI     .+10
007610 052767 000020 170160      BIS     #20,CC              ;SET TRACE TRAP
007616 000167 170356      JMP     BEGIN        ;START OF TEST WITH TRACE ON

007622 000000      YESTR1: 0                  ;STORAGE FOR ODT PC
007624 000000      YESTR2: 0                  ;STORAGE FOR ODT STATUS
007626 000002      YESRT:  RTI                ;RETURN TO PROGRAM FROM TRAP
007630 000000      HALT

;ENTERED WITH SYSTEM TRAP CALL(HLT)
;PRINT OUT THE ERROR PC AND STATUS REGISTER
007632 036727 167732 020000      PRINT:  BIT     SR,#20000      ;TEST FOR INHIBIT PRINT OUT
007640 001401              BEQ     .+4              ;BRANCH TO PRINT
007642 000002              RTI                    ;INHIBIT; RETURN TO MAIN STREAM
007644 012667 000146      MOV     (6)+,SAVPC      ;PC OF FAILING ROUTINE
007650 012667 000144      MOV     (6)+,SAVCC      ;CC OF ERROR CONDITION
007654 024646      CMP     -(6),-(6)      ;REPOSITION THE STACK
007656 012777 000215 000126      MOV     #215,@TDBR      ;CR
007664 105777 000124      TSTB   @TCSR
007670 100375      BPL     .-4
007672 012777 000212 000112      MOV     #212,@TDBR      ;LINE FEED
007700 105777 000110      TSTB   @TCSR
007704 100375      BPL     .-4
007706 010267 000072      MOV     X2,SAVR2        ;SAVE R2
007712 010367 000070      MOV     X3,SAVR3        ;SAVE R3
007716 010467 000066      MOV     X4,SAVR4        ;SAVE R4
007722 016702 000070      MOV     SAVPC,X2
007726 034767 000070      JSR     X7,PRTAB        ;PRINT OCTAL NUMBER
007732 012777 000240 000052      MOV     #240,@TDBR
007740 105777 000050      TSTB   @TCSR            ;SPACE BETWEEN WORDS
007744 100375      BPL     .-4
007746 016702 000046      MOV     SAVCC,X2
007752 004767 000044      JSR     X7,PRTAB        ;PRINT OCTAL NUMBER
007756 016702 000022      MOV     SAVR2

```

PALX11 V003 13-APR-70

14122 PAGE 26-1

007762 016703 000020  
007766 016704 000016  
007772 005767 167572  
007776 100001  
010000 000000  
010002 000002

MOV SAVR3,%3  
MOV SAVR4,%4  
TST SR  
BPL .+4  
HALT  
RTI

!TEST FOR HALT SW

!HALT ON ERROR SET  
!RETURN TO MAIN STREAM



010004 000000  
 010006 000000  
 010010 000000  
 010012 177566  
 010014 177564  
 010016 000000  
 010020 000000  
 010730

SAVR2: 0  
 SAVR3: 0  
 SAVR4: 0  
 TDBR: 177566  
 TCSR: 177564  
 SAVPC: 0  
 SAVCC: 0  
 BUFF=FIN

IDATA  
 ISTATUS

IEND OF PROGRAM-SP AREA

010022 005067 000260  
 010026 005067 000252  
 010032 012704 010312  
 010036 142777 000177 177750  
 010044 012767 000005 000236  
 010052 012767 000007 000220  
 010060 012767 000001 000214  
 010066 105777 177722  
 010072 100375  
 010074 005702  
 010076 100404  
 010100 012777 000260 177704  
 010106 000403  
 010110 012777 000261 177674  
 010116 016703 000156  
 010122 010267 000150  
 010126 005167 000144  
 010132 046703 000140  
 010136 001410  
 010140 066767 000136 000136  
 010146 005267 000134  
 010152 026703 000126  
 010156 001370  
 010160 062767 000260 000120  
 010166 016724 000114  
 010172 066767 000102 000102  
 010200 005067 000100  
 010204 005067 000076  
 010210 005367 000074  
 010214 001410  
 010216 012703 000003  
 010222 066767 000052 000050  
 010230 005303  
 010232 001373  
 010234 000730  
 010236 012767 000005 000044  
 010244 105777 177544  
 010250 100375  
 010252 214477 177534  
 010256 005367 000026  
 010262 001401  
 010264 000767

PRTAB: CLR BINCT  
 CLR WGTCT  
 MOV #LIST,X4  
 BICB #177,\*TCSR  
 MOV #5,ASCNT  
 MOV #7,SEVEN  
 MOV #1,DECHL  
 WAIT1: TSTB \*TCSR  
 BPL WAIT1  
 TST X2  
 BMI MINUS  
 MOV #260,\*TDBR  
 BR START  
 MOV #261,\*TDBR  
 START: MOV SEVEN,X3  
 MOV X2,TOODLE  
 COM TOODLE  
 BIC TOODLE,X3  
 BEQ WRTOC  
 MKNUM: ADD DECML,WGTCT  
 INC BINCT  
 CMP WGTCT,X3  
 BNE MKNUM  
 WRTOC: ADD #260,BINCT  
 MOV BINCT,(4)+  
 ADD SEVEN,DECHL  
 CLR WGTCT  
 CLR BINCT  
 DEC ASCNT  
 BEQ XLIST  
 MOV #3,X3  
 MOADD: ADD SEVEN,SEVEN  
 DEC X3  
 BNE MOADD  
 BR START  
 XLIST: MOV #5,ASCNT  
 WAIT2: TSTB \*TCSR  
 BPL WAIT2  
 MOV -(4),\*TDBR  
 DEC ASCNT  
 BEQ HOFHM  
 BR WAIT2

IGET LIST ADDRESS  
 ICLR INT FLAG

INEG SIGN PRINT 1  
 IPOS SIGN PRINT 0

IPUT MASK IN R3  
 IGET READY TO DOODLE NUMBER IN TOODLE  
 ICOMPENSATES FOR COMPLEMENT DURING BIC  
 IAND IN OCTAL CHARACTER  
 IZERO, WRITE 0 IN LIST  
 ICOUNT UP TO  
 IAND RECORD  
 ISAME BINARY WEIGHT  
 IKEEP COUNTN  
 IADD ASCII PREFIX  
 IWRITE ASCII CHAR IN LIST  
 IEXPAND BINARY WEIGHT

IS CHAR IN LIST  
 ISET X3 FOR ADD LOOP  
 IMAKING SEVENTY BY SEVEN

INX SEVEN SET GET NX OCTAL  
 ISEND 5 CHAR TO TTY

IFINISH PRINTING GET NXT NUM

010266 105777 177522  
 010272 100375  
 010274 000207  
 010276 000000  
 010300 000000  
 010302 000000  
 010304 000000  
 010306 000000  
 010310 000000  
 010312 000000  
 010314 000000  
 010316 000000  
 010320 000000  
 010322 000000

HDFHMI TSTB @TCSR  
 BPL .-4  
 RTS X7  
 TOODLE! 0  
 SEVEN! 0  
 DECML! 0  
 WGTCT! 0  
 BINCT! 0  
 ASCNT! 0  
 LIST! 0  
 0  
 0

IHEAD FOR HOME

010324 032767 040000 167236  
 010332 001003  
 010334 011667 000070  
 010340 000002  
 010342 022606  
 010344 012667 167426  
 010350 000177 000054

ISCOPE LOOP ROUTINE ENTERED BY USER TRAP  
 SCOPEA: BIT #40000,SR  
 BNE SCOPEB  
 MOV @%6,RETURN  
 RTI  
 SCOPEB: CMP (6)+,%6  
 MOV (6)+,CC  
 JMP @RETURN

ISCOPE, BIT IS A ONE  
 INO - SAVE PC FOR NEXT TIME  
 IRETURN IN SEQUENCE  
 IREPOSITION THE STACK  
 ISCOPE RETURN

010354 032767 040000 167206  
 010362 001367  
 010364 032767 004000 167176  
 010372 001007  
 010374 026767 000026 000022  
 010402 001403  
 010404 005267 000016  
 010410 000754  
 010412 005067 000010  
 010416 011667 000006  
 010422 000002  
 010424 004000  
 010426 000000  
 010430 000200  
 010432 000167 167542

ISCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES  
 SCOPECI: BIT #40000,SR  
 BNE SCOPEB  
 BIT #4000,SR  
 BNE SCOPEG  
 CMP SCOPEF,ICOUNT  
 BEQ SCOPEG  
 INC SCOPEF  
 BR SCOPEB  
 SCOPEGI: CLR SCOPEF  
 MOV @%6,RETURN  
 RTI  
 ICOUNT: 4000  
 SCOPEFI: 0  
 RETURN: BEGIN  
 JMP 200

ITEST SR FOR SCOPE  
 IYES SCOPE  
 INO - TEST FOR ITERATION  
 IINHIBIT ITERATION  
 IEXIT - DONE  
 IINCREMENT COUNT  
 ILOOP SOME MORE  
 ICLEAR COUNT  
 ISAVE SCOPE RETURN POINTER  
 IRETURN INLINE-NEXT TEST  
 ICOUNT LOCATION FOR ITERATION LOOP  
 IADDRESS OF LAST TEST

010436 000207  
 010440 005167 000032  
 010444 000207  
 010446 004767 177766  
 010452 000207  
 010454 004767 177766  
 010460 000207  
 010462 004767 177766  
 010466 000207  
 010470 004767 177766  
 010474 000207  
 010476 000000

IGROUP OF NESTED SUBROUTINES  
 SUBR1: RTS X7  
 SUBR2: COM FLAG  
 RTS X7  
 SUBR3: JSR X7,SUBR2  
 RTS X7  
 SUBR4: JSR X7,SUBR3  
 RTS X7  
 SUBR5: JSR X7,SUBR4  
 RTS X7  
 SUBR6: JSR X7,SUBR5  
 RTS X7  
 FLAG: 0

IONE INSTRUCTION  
 IONE DEEP  
 ITWO DEEP  
 ITHREE DEEP  
 IFOUR DEEP  
 IFIVE DEEP

010500 010046  
 010502 010146

IENTER HERE ON POWER DOWN OR POWER FAIL  
 PFAIL: MOV X0,-(6)  
 MOV X1,-(6)

010504	010246		MOV	%2,-(6)	
010506	010346		MOV	%3,-(6)	
010510	010446		MOV	%4,-(6)	
010512	010546		MOV	%5,-(6)	
010514	016746	167304	MOV	24,-(6)	
010520	010667	000010	MOV	%6,SAVR6	ISTORE STACK POSITION
010524	012767	010536 167272	MOV	#RESTART,24	ISET UP FOR POWER RECOVERY
010532	000000		HALT		IHALT ON POWER DOWN
010534	000000		SAVR6I	0	ISAVE STACK HERE
			IENTER HERE ON AUTO RECOVERY OF POWER FAIL		
010536	016706	177772	RESTART:MOV	SAVR6,%6	ISET UP REGISTER SIX
010542	012667	167256	MOV	(6)+,24	IRESTORE REGISTER
010546	012605		MOV	(6)+,%5	
010550	012604		MOV	(6)+,%4	
010552	012603		MOV	(6)+,%3	
010554	012602		MOV	(6)+,%2	
010556	012601		MOV	(6)+,%1	
010560	012600		MOV	(6)+,%0	
010562	000002		RTI		IRETURN TO MAINLINE

010564 125252

B1 125252  
 ;FIXED VALUES FOR USE IN TEST

010566 010564  
 010570 052525

B 052525 ;ADDRESS OF B

010574 177777  
 010576 010600

,=B+10  
 A1 -1  
 A+4

010600 125252  
 010602 010604  
 010604 052525

,=A+4  
 125252 ;ADDRESS OF A+10  
 A+10  
 052525

010606 000000  
 010610 010606

;FOR STORAGE  
 C1 0 ;ADDRESS OF C  
 C

010616 000000  
 010620 010616

,=C+10  
 TEMP: 0 ;ADDRESS OF TEMP  
 TEMP

010624 010626  
 010626 000000

,=TEMP+6  
 TEMP+10 ;ADDRESS OF TEMP+10 OR "0"

010730 000000  
 000001

D1 0 ;BUFFER FOR SP  
 ., +100  
 FIN: 0  
 .END

A	010574	TEMP	010616
ASCNT	010310	TINT1	006772
B	010564	TINT2	007042
REGIN	000200	TINT3	007112
BELL	000240	TINT4	007162
BINCT	010306	TINT5	007230
BUFF	010730	TINT6	007306
C	010606	TINT7	007364
CC	177776	TINT8	007442
D	010626	TJSR1	006564
DECM	010302	TJSR2	006566
FIN	010730	TJSR3	006600
FLAG	010476	TOODLE	010276
HDFHM	010266	TRPA	007546
HLT	104000	TRPB	007552
ICOUNT	010424	TRTRAP	007506
LIST	010312	WAIT1	010066
MINUS	010110	WAIT2	010244
MKNUM	010140	WGCT	010304
MOADD	010222	WRTOC	010160
NOP	000240	XLIST	010236
PFAL	010500	YESRT	007626
PRINT	007632	YESTR	007554
PRTAB	010022	YESTR1	007622
RESTAR	010536	YESTR2	007624
RETURN	010430		
RJMP1	001676		
RJMP2	001714		
SAVCC	010020		
SAVPC	010016		
SAVR2	010004		
SAVR3	010006		
SAVR4	010010		
SAVR6	010534		
SCOPE	104400		
SCOPEA	010324		
SCOPEB	010342		
SCOPEC	010354		
SCOPEF	010426		
SCOPEG	010412		
SEVEN	010300		
SR	177570		
START	010116		
SUBR1	010436		
SUBR2	010440		
SUBR3	010446		
SUBR4	010454		
SUBR5	010462		
SUBR6	010470		
TCSR	010014		
TDBR	010012		
TDSR	010014		

ERRORS DETECTED: 0

RUN-TIME: 15 SECONDS

5K CORE USED