

IDENTIFICATION

-----  
PRODUCT CODE: MAINDEC-8E-D0FC-D  
PRODUCT NAME: RANDOM ISE TEST  
DATE CREATED: JUNE 11, 1971  
MAINTAINER: DIAGNOSTIC GROUP  
AUTHOR: BRUCE HANSEN

COPYRIGHT © 1971  
DIGITAL EQUIPMENT CORPORATION

1. ABSTRACT

-----

THIS PROGRAM IS WRITTEN TO TEST THE ISZ INSTRUCTION OF THE PDP-8E. AN ISZ INSTRUCTION IS PLACED IN A FROM LOCATION, AND A TO LOCATION CONTAINS THE OPERAND. PART 1 OF THE PROGRAM SELECTS FROM, TO, AND OPERAND FROM A RANDOM NUMBER GENERATOR, WITH THE OPTION OF HOLDING ANY OR ALL CONSTANT. PART 2 USES A FIXED SET OF FROM, TO, AND OPERAND NUMBERS.

2. REQUIREMENTS

-----

2.1 EQUIPMENT

-----

ONE PDP-8E EQUIPPED WITH TELETYPE.

2.2 STORAGE

-----

THIS PROGRAM USES LOCATIONS 0000-7600(8). THE BINARY LOADER MUST BE STORED IN THE LAST MEMORY PAGE.

2.3 PRELIMINARY PROGRAM

-----

MAINDEC-8E-D0A(N), AND MAINDEC-8E-D0B(N) MUST HAVE RUN SUCCESSFULLY.

3. LOADING PROCEDURE

-----

THE STANDARD BINARY LOADER IS USED.

4. STARTING PROCEDURE

-----

4.1 SWITCH SETTINGS

-----

SR0(0) = HALT ON ERROR  
SR1(1) = ELIMINATE ERROR PRINTOUTS  
SR3 = FIXED FROMS (1)  
RANDOM FROMS (0)  
SR4 = FIXED TOS (1)  
RANDOM TOS (0)  
SR5 = FIXED OPERAND (1)  
RANDOM OPERAND (0)  
SR9(0) = DO ONE ISZ ONLY  
SR11(1) = DO TEST PART 2 SR3, 4, 5, MUST BE 0'S  
SR11(0) = DO TEST PART 1

4.2 STARTING ADDRESS

-----

4,3

OPERATOR ACTION

- A. SET SR (SWITCH REGISTER) TO 0200 AND PRESS LOAD ADDRESS.
- B. SET SR TO DESIRED MODE OF OPERATION; FOR MOST RUNS, SR=0 ALLOWS THE MOST TESTING IN THE LEAST AMOUNT OF TIME.

FOR FIXED FROM, TO, OR OPERAND USAGE, THE FIXED NUMBER MAY BE SELECTED AND ENTERED INTO THE MEMORY LOCATIONS SHOWN BELOW:

FROM           =0002  
 TO             =0021  
 OPERAND       =0022

C. PRESS, CLEAR AND THEN CONTINUE.

5. OPERATING PROCEDURE

-----

SAME AS PARAGRAPH 4.

6. ERRORS

-----

6.1 ERROR HALTS AND DESCRIPTION

-----

C(PC)	CAUSE
0002	PERIPHERAL INTERRUPT
0254	HALT ON ERROR, SR=0

6.2 ERROR PRINTOUTS

-----

F	XXXX	T	YYYY				
0	ZZZZ	F	MMMM	R	NNNN	NS	

6.2.1 PRINTOUT EXPLANATION

-----

(FROM)	F XXXX	-THE ISZ INSTRUCTION IN LOCATION XXXX FAILED.
(TO)	T YYYY	-THE OPERAND ADDRESS OF THE ISZ INSTRUCTION WAS YYYY.
(OPERAND)	0 ZZZZ	-THE STARTING COUNT IN THE ISZ LOOP WAS ZZZZ.
(FAILED)	F MMMM	-THE FAILURE OCCURRED TRYING TO ISZ THE NUMBER MMMM.
(RESULT)	R NNNN	-THE RESULT OF THIS ISZ WAS NNNN.
	NS	-NO SKIP OCCURRED
	S.	-INDICATES A SKIP.

## 6.2.2 EXAMPLES

A. THE FOLLOWING IS A TYPICAL ERROR PRINTOUT.

```
F 3003 T 5470
0 3705 F 4777 R 5000 S
```

LINE 1 OF THE PRINTOUT IS A STATEMENT OF THE PROBLEM. IT SAYS THAT LOCATED AT 3003 IS AN ISZ INSTRUCTION INCREMENTING AN OPERAND STORED IN LOCATION 5470. LINE 2 OF THE PRINTOUT GIVES INFORMATION FOR ERROR ANALYSIS. 3705 WAS THE INITIAL OPERAND, 4777 WAS THE OPERAND BEING INCREMENTED WHEN THE ERROR OCCURRED, AND 5000 IS THE OPERAND FOLLOWING THE FAILING INCREMENT. THE S INDICATES THAT THE INCREMENT RESULTED IN A SKIP. THE ERROR HERE IS OBVIOUSLY THAT THE SKIP SHOULD NOT HAVE OCCURRED.

B. THE FOLLOWING IS ANOTHER TYPICAL ERROR PRINTOUT.

```
F 3003 T 5470
0 3705 F 4777 R 5020 NS
```

THIS IS IDENTICAL TO EXAMPLE (A) EXCEPT THAT A DIFFERENT TYPE OF ERROR HAS OCCURRED. THE RESULT OF INCREMENTING 4777 SHOULD BE 5000, NOT 5020.

## 6.3 ERROR RECOVERY

THE PROGRAM CONTINUES ON, FOLLOWING AN ERROR PRINTOUT UNLESS SR0=0. AFTER A HALT ON ERROR, PUSH CONTINUE TO RESUME TESTING. WHEN ERRORS EXIST, A FAILING CONDITION CHOSEN FROM THOSE TYPED OUT MUST BE USED WITH THE SCOPE MODE. FOR THE SCOPE MODE, PERFORM THE FOLLOWING STEPS:

- A. STOP THE PROGRAM.
- B. INSERT CHOSEN FROM INTO LOCATION 0002.
- C. INSERT CHOSEN TO INTO LOCATION 0021.
- D. INSERT CHOSEN FAILING OPERAND INTO LOCATION 0022
- E. RESTART PROGRAM WITH CONTROL SWITCHES 1,3,4,5. SET TO 1 AND 9 SET TO A 0.

NOTE! BY SETTING SR0 TO A 0, THE PROGRAM HALTS FOLLOWING THE ERROR PRINTOUT. THE OPERATOR MAY AT THIS TIME SET SWITCHES 1, 3, 4, 5, TO A 1 AND 9 TO A 0 AND PUSH CONTINUE. THE PROGRAM ENTERS A SCOPE MODE USING THE FAILING CONDITIONS JUST PRINTED.

7. RESTRICTIONS  
-----

7.1 STARTING RESTRICTIONS  
-----

NONE.

7.2 OPERATING RESTRICTIONS  
-----

THE INTERRUPT IS ENABLED DURING PROGRAM OPERATION. ANY ATTACHED  
DEVICE WHICH MIGHT CAUSE SPURIOUS INTERRUPTS, MUST BE DISABLED.

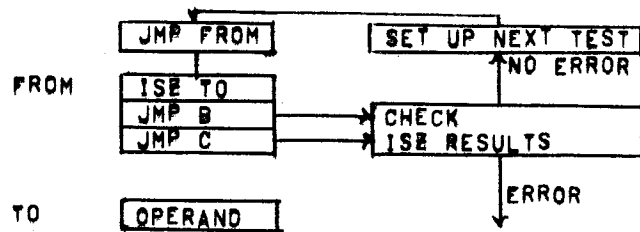
8. MISCELLANEOUS  
-----

8.1 EXECUTION TIME  
-----

SR9 = 1. 11,000 ISZ OPERATIONS/SECOND.  
SR9 = 0. 3,500 ISZ OPERATIONS/SECOND.

## PROGRAM DESCRIPTION

-----  
 THE TEST LOOP IS SHOWN BELOW:



PART 1 OF THE PROGRAM USES A RANDOM NUMBER GENERATOR TO SELECT THE FROM, TO, AND OPERAND NUMBERS. ONCE SELECTED, THE OPERAND IS INCREMENTED UNTIL IT REACHES ZERO. EACH ISZ IS CHECKED BY DUPLICATING ISZ WITH TAD, IAC, DCA. EACH ITERATION IS ALSO CHECKED FOR THE PROPER SKIP OR NO-SKIP CONDITION.

PART 2 OF THE PROGRAM IS ACTUALLY PART 1, WITH THE RANDOM NUMBER GENERATED REPLACED BY A FIXED NUMBER GENERATOR. SEQUENCING OF EVENTS IS AS FOLLOWS:

(NOTE: 621(8)<MEMORY TEST AREA<7600(8)):

- A. FROM = 621 TO = 624 TEST A SET OF 24 SELECTED OPERANDS. TO SAVE TIME IT IS SUGGESTED THAT SR9 = 0, SO THAT THE ISZ IS PERFORMED ON EACH OPERAND ONLY ONCE INSTEAD OF INCREMENTING IT UNTIL THE ISZ INSTRUCTION SKIPS.
- B. FROM = 621 TO =625 REPEAT THE SET OF OPERANDS USED IN (A) ABOVE.

THIS SEQUENCE CONTINUES UNTIL TO REACHES THE UPPER LIMIT OF THE MEMORY TEST AREA. FROM IS THEN INCREMENTED BY 1 AND THE PROCESS IS REPEATED. WHEN FROM REACHES THE UPPER LIMIT OF THE MEMORY TEST AREA, THE TEST IS COMPLETE.

IDEALLY, IT IS DESIRABLE TO ISZ EVERY LOCATION FROM EVERY OTHER LOCATION IN THE TEST AREA AND, IN DOING SO, USE ALL 24 OF THE SELECTED WORST CASE OPERANDS FOR EACH SET OF ADDRESSES. THIS IS WHAT PART 2 DOES, BUT IT TAKES MANY DAYS TO COMPLETE THE TEST. IT IS FOR THIS REASON THAT THE PROGRAM USES THE RANDOM NUMBER GENERATOR SYSTEM OF PART 1. PART 2 IS AN ADDITIONAL FEATURE OF THE PROGRAM WITH VERY LIMITED USE.

A FC IS PRINTED AFTER EACH GROUP OF 32,000 TESTS.

/PDP-8E ISZ TEST  
 /COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754  
 /

/CONSTANTS AND VARIABLES

```

0000 0000 *0
0000 0000 0
0001 5001 JMP 1 /PERIPHERAL INTERRUPT
0002 0002 FRMLOC, 2 /ISZ TEST INSTRUCTION LOCATION
0003 0003 LIMLO, 3 /LOW LIMIT TEST AREA
0004 0000 0
0005 0000 0
0006 0202 LIMHI, -7576 /HIGH LIMIT TEST AREA
0007 0547 ASUC, SUC
0010 0007 MSK7, 0007 /OCTAL CONVERSION MASK
0011 0000 WORK, 0 /IR0
0012 0000 WORK1, 0 /IR1
0013 7401 M377, -377
0014 3607 NUM, 3607 /THE RANDOM NUMBER LOCATION
0015 0003 THREE, 3

0016 2421 ISZ1, ISZ I TOLOC /MOVING ISZ
0017 5116 JMP1, JMP BACK /TEST INSTRUCTION
0020 5141 JMP2, JMP BAKBRN /GROUP.
0021 0000 TOLOC, 0 /LOCATION TO BE ISZ'D
0022 0000 PATRN, 0 /STARTING ISZ PATTERN
0023 0000 BEFOR, 0 /FAILING PATTERN BEFORE FAILING ISZ
0024 0000 AFTER, 0 /PREDICTED RESULTS OF EACH ISZ
0025 0004 K4, 4 /SWITCH REGISTER MASKS
0026 0400 K0400, 0400
0027 0200 K0200, 0200
0030 0100 K0100, 0100
0031 0000 NOTE, 0
0032 0257 PRINT, INF1-1 /7'S=ERROR WITH NO SKIP
0033 0201 AERR1, ERR1 /0'S=ERROR WITH SKIP
0034 0206 AERR2, ERR2
0035 0413 APDR, PDR
0036 1014 ITADNM, TAD NUM
0037 0600 ATFCLF, TFCLF

```

/SR0(0)=HALT AFTER ERROR PRINTOUT

/SR1(1)=NO PRINTOUTS

/SR3(1) = HOLD FROM CONSTANT

/SR4(1) = HOLD TO CONSTANT

/SR5(1) = HOLD PATTERN CONSTANT

/SR9(0) = DO ONE ISZ ONLY

/SR11(1) = DO TEST PART 2

/

/

/PROGRAM START

```

0040 4441 START, JMS I .+1 /ION
0041 0614 PATCH /LAS
0042 0015 AND THREE

```

0043	7640	SEA CLA	/SKIP IF PART 1
0044	5426	JMP I K0400	/GO TO PART 2
0045	1036	TAD ITADNM	
0046	3165	DCA RANUM+1	
		/CHECK FOR FIXED PATTERN	
0047	7604	CHEK1, LAS	
0050	0030	AND K0100	
0051	7440	SEA	
0052	5055	JMP CHEK2	
		/SELECT THE PATTERN	
0053	4164	SELPAT, JMS RANUM	
0054	3022	DCA PATRN	
		/CHECK FOR FIXED TO	
0055	7604	CHEK2, LAS	
0056	0027	AND K0200	
0057	7640	SEA CLA	
0060	5065	JMP CHEK3	
		/SELECT THE TO LOCATION	
0061	4164	SELTO, JMS RANUM	
0062	3021	DCA TOLOC	
0063	1021	TAD TOLOC	
0064	4151	JMS LINTST	
		/CHECK FOR FIXED FROM	
0065	7604	CHEK3, LAS	
0066	0026	AND K0400	
0067	7640	SEA CLA	
0070	5075	JMP PLCINT	
		/SELECT THE FROM LOCATION	
0071	4164	SELFRM, JMS RANUM	
0072	3002	DCA FRMLOC	
0073	1002	TAD FRMLOC	
0074	4151	JMS LINTST	
		/PLACE FROM INSTRUCTIONS	
0075	7240	PLCINT, CLA CMA	
0076	1002	TAD FRMLOC	
0077	3011	DCA WORK	
0100	1010	TAD ISZ1	
0101	3411	DCA I WORK	
0102	1017	TAD JMP1	
0103	3411	DCA I WORK	
0104	1020	TAD JMP2	
0105	3411	DCA I WORK	
		/DEPOSIT PATTERN IN TO LOCATION	
0106	1022	TAD PATRN	
0107	3421	DCA I TOLOC	



```

                                /STORE PREDICTED ISZ RESULT
0110 1022                                TAD PATRN
0111 3023                                DCA BEFOR
LUP1, 0112 1023                                TAD BEFOR
                                IAC
0113 7001                                DCA AFTER
0114 3024                                JMP I ASUC
0115 5407

                                /RETURN FOR NO SKIP CONDITION
0116 7604                                BACK, LAS
0117 7004                                RAL
0120 7710                                SPA CLA
0121 5132                                JMP LAS1
0122 1421                                TAD I TOLOC
0123 7041                                CIA
0124 1024                                TAD AFTER
0125 7640                                SZA CLA
0126 5433                                JMP I AERR1 /ERROR IN ISZ OPERATION
0127 1421                                TAD I TOLOC
0130 7650                                SNA CLA
0131 5433                                JMP I AERR1 /ERROR IN ISZ SKIP DETECTION
LAS1, 0132 7604                                LAS
0133 0025                                AND K4
0134 7650                                SNA CLA /SKIP IF NOT ONE ISZ (SR9)
0135 5047                                JMP CHEK1
0136 7001                                IAC
0137 1023                                TAD BEFOR
0140 5111                                JMP LUP1-1

                                /RETURN FOR SKIP CONDITION
0141 7604                                BAKBRN, LAS
0142 7004                                RAL
0143 7710                                SPA CLA
0144 5047                                JMP CHEK1
0145 1421                                TAD I TOLOC
0146 7640                                SZA CLA /SKIP IF TO LOCATION OK
0147 5434                                JMP I AERR2 /ERROR IN ISZ LOCATION
0150 5047                                JMP CHEK1

                                /TEST HIGH-LOW LIMITS
0151 0000                                LIMITST, 0
0152 7510                                SPA
0153 5160                                JMP .+5
0154 1003                                TAD LIMLO
0155 7700                                SMA CLA
0156 5551                                JMP I LIMITST
0157 5165                                JMP RANUM+1
0160 1006                                TAD LIMHI
0161 7700                                SMA CLA
0162 5165                                JMP RANUM+1
0163 5551                                JMP I LIMITST

```

```

                                /RANDOM NUMBER GENERATOR
0164 0000 RANUM, 0
0165 1014 TAD NUM
0166 7104 RAL CLL
0167 7430 SEL
0170 1015 TAD THREE
0171 3014 DCA NUM
0172 1014 TAD NUM /AC=NEW RANDOM NUMBER
0173 5564 JMP I RANUM

0174 1000 K1000, 1000
0175 0000 KP, 0

                                *200
0200 5040 JMP START
                                /ERROR ROUTINE 1
0201 1340 ERR1, TAD SKPDAT+6
0202 3332 DCA SKPDAT
0203 7040 CMA
0204 3031 DCA NOTE
0205 9210 JMP KPGO

                                /ERROR ROUTINE 2
0206 1331 ERR2, TAD SKPDAT-1
0207 3332 DCA SKPDAT
0210 1002 KPGO, TAD FRMLOC
0211 3011 DCA WORK
0212 1370 TAD A3
0213 4342 JMS SETUP

0214 1021 TAD TOLOC
0215 3011 DCA WORK
0216 1371 TAD A4
0217 4342 JMS SETUP

0220 1022 TAD PATRN
0221 3011 DCA WORK
0222 1372 TAD A5
0223 4342 JMS SETUP
0224 1023 TAD BEFOR
0225 3011 DCA WORK
0226 1373 TAD A6
0227 4342 JMS SETUP

0230 1421 TAD I TOLOC
0231 3011 DCA WORK
0232 1374 TAD A7
0233 4342 JMS SETUP

                                /TTY PRINT ROUTINE
0234 6002 TTY, IOF
0235 1032 TAD PRINT
0236 3011 DCA WORK
0237 1411 TAD I WORK

```

```

0240 6046      TLS
0241 6041      TSF
0242 5241      JMP .-1
0243 1013      TAD M377
0244 7640      SZA CLA
0245 5237      JMP TTY+3
0246 6042      TCF
0247 6001      ION
0250 7604      LAS
0251 7700      SMA CLA
0252 7402      HLT

```

/HALT AFTER ERROR (SR0)

```

0253 1031      TAD NOTE
0254 7650      SNA CLA
0255 5047      JMP CHEK1
0256 3031      DCA NOTE
0257 5132      JMP LAS1

```

/RETURN TO NO SKIP ROUTINE

```

0260 0306      /ERROR PRINT OUT LINE 1
0261 0240      INF1, 306 /F FROM (INSTRUCTION LOCATION)
0262 0000      240 /SPACE
0263 0000      INDATA, 0 /X LOCATION
0264 0000      0 /X
0265 0000      0 /X
0266 0240      0 /X
0267 0240      240 /SPACE
0270 0324      240 /SPACE
0271 0240      324 /T TO (OPERAND ADDRESS)
0272 0000      240 /SPACE
0273 0000      ONDATA, 0 /X ADDRESS
0274 0000      0 /X
0275 0000      0 /X
0276 0215      0 /X
0277 0212      215 /CR
0300 0215      212 /LF
0301 0215      215 /CR
0301 0215      215 /CR

```

```

0302 0317      /ERROR PRINTOUT LINE 2
0303 0240      317 /O OPERAND (STARTING COUNT)
0304 0000      240 /SPACE
0305 0000      STDATA, 0 /X PATTERN
0306 0000      0 /X
0307 0000      0 /X
0310 0240      0 /X
0311 0240      240 /SPACE
0312 0306      240 /SPACE
0313 0240      306 /F FAILING COUNT
0314 0000      240 /SPACE
0315 0000      FLDATA, 0 /X PATTERN BEFORE FAILING ISZ
0316 0000      0 /X
0317 0000      0 /X
0320 0240      0 /X
0320 0240      240 /SPACE

```

0321	0240	240	/SPACE	
0322	0322	322	/R	RESULT AFTER FAILURE
0323	0240	240	/SPACE	

0324	0000	RSDATA, 0	/X	PATTERN AFTER FAILING ISZ
0325	0000	0	/X	
0326	0000	0	/X	
0327	0000	0	/X	
0330	0240	240	/SPACE	
0331	0240	240	/SPACE	
0332	0316	SKPDAT, 316	/N	NO
0333	0323	323	/S	SKIP
0334	0215	215	/CR	
0335	0212	212	/LF	
0336	0212	212	/LF	
0337	0377	377	/RUBOUT	
0340	0316	316	/N	
0341	0323	323	/S	

0342	0000	SETUP, 0		
0343	3012	DCA WORK1		
0344	1011	TAD WORK		
0345	7006	RTL		
0346	7006	RTL		
0347	4362	JMS MORSU		
0350	7012	RTR		
0351	7012	RTR		
0352	7012	RTR		
0353	4362	JMS MORSU		
0354	7012	RTR		
0355	7010	RAR		
0356	4362	JMS MORSU		
0357	4362	JMS MORSU		
0360	7200	CLA		
0361	5742	JMP I SETUP		
0362	0000	MORSU, 0		
0363	0010	AND MSK7		
0364	1375	TAD TW6		
0365	3412	DCA I WORK1		
0366	1011	TAD WORK		
0367	5762	JMP I MORSU		

0370	0261	A3,	/PAGE 1 CONSTANTS	
0371	0271	A4,	INDATA-1	
0372	0303	A5,	ONDATA-1	
0373	0313	A6,	STDATA-1	
0374	0323	A7,	FLDATA-1	
0375	0260	TW6,	RSDATA-1	
			0260	

0400	1003		/PART 2 INITIALIZATION ROUTINE	
			*400	
			TAD LIMLO	

0401	7041		CIA	
0402	3310		DCA FROM	/LOW LIMIT TO FROM
0403	1003		TAD LIMLO	
0404	7040		CMA	
0405	3311		DCA TO	
0406	1346		TAD A0	
0407	3313		DCA PATCYC	
0410	1314		TAD INST1	
0411	3165		DCA RANUM+1	
0412	5047		JMP CHEK1	/GO TO PAGE 0 START
0413	1164	PDR,	/PATH DECISION ROUTINE	
0414	7041		TAD RANUM	
0415	1305		CIA	
0416	7650		TAD GFROM	
0417	5303		SNA CLA	/SKIP IF NOT REQUESTING FROM
			JMP FRUT	/GO TO FROM ADDRESS ROUTINE
0420	1164		TAD RANUM	
0421	7041		CIA	
0422	1306		TAD GTO	
0423	7650		SNA CLA	/SKIP IF NOT REQUESTING TO
0424	5301		JMP TORUT	/GO TO TO ADDRESS ROUTINE
0425	5226		JMP PRUT	/GO TO PATTERN ROUTINE
0426	1713	PRUT,	/SELECT PATTERN AND OTHER THINGS	
0427	3312		TAD I PATCYC	
0430	1312		DCA PATT	
0431	7450		TAD PATT	
0432	5240		SNA	/NO SKIP IF END OF PATTERN TABLE
0433	7201		JMP .+6	/END PATTERN TABLE LOOK AROUND
0434	1313		CLA IAC	
0435	3313		TAD PATCYC	
0436	1312		DCA PATCYC	
0437	5564		TAD PATT	
			JMP I RANUM	/RETURN, AC=NEW PATTERN
			/	
0440	1345		TAD AK7776	
0441	3313		DCA PATCYC	/RESTOR START ADDRESS OF PATT. TABLE
0442	7001		IAC	
0443	1311		TAD TO	
0444	3311		DCA TO	/INCREMENT TO
0445	1311		TAD TO	
0446	7041		CIA	
0447	1310		TAD FROM	
0450	7640		SZA CLA	/SKIP IF TO = FROM
0451	5255		JMP .+4	
0452	1311		TAD TO	
0453	1015		TAD THREE	
0454	3311		DCA TO	/SKIP AROUND FROM
0455	1311		TAD TO	
0456	7500		SMA	
0457	5276		JMP GOUT	

0460	1006		TAD LIMHI	
0461	7710		SPA CLA	/SKIP IF END TEST AREA
0462	5276		JMP GOUT	
0463	7201		CLA IAC	
0464	1310		TAD FROM	
0465	3310		DCA FROM	/ADVANCE FROM
0466	1003		TAD LIMLO	
0467	7041		CIA	
0470	3311		DCA TO	/RESET TO ADDRESS
0471	1310		TAD FROM	
0472	1006		TAD LIMHI	
0473	7710		SPA CLA	
0474	5276		JMP GOUT	
0475	5200		JMP 400	
0476	7200	GOUT,	CLA	
0477	1312		TAD PATT	
0500	5564		JMP I RANUM	
			/SELECT TO ROUTINE	
0501	1311	TORUT,	TAD TO	
0502	5564		JMP I RANUM	
			/SELECT FROM ROUTINE	
0503	1310	FRUT,	TAD FROM	
0504	5564		JMP I RANUM	
			/PAGE 3 CONSTANTS	
0505	0072	GFROM,	SELFRM+1	/STORED RETURN ADDRESS WHEN
				/RANDOM FROM IS REQUESTED
0506	0062	GTO,	SELTO+1	/STORED RETURN ADDRESS WHEN
				/RANDOM TO IS REQUESTED
0507	0054	GPAT,	SELPAT+1	/STORED RETURN ADDRESS WHEN
				/RANDOM PATTERN IS REQUESTED
0510	0000	FROM,	0	/CURRENT FROM ADDRESS
0511	0000	TO,	0	/CURRENT TO ADDRESS
0512	0000	PATT,	0	/CURRENT PATTERN
0513	0000	PATCYC,	0	/CURRENT PATTERN ADDRESS
0514	5435	INST1,	JMP I APDR	
0515	7776	K7776,	7776	
0516	7775		7775	
0517	7773		7773	
0520	7767		7767	
0521	7757		7757	
0522	7737		7737	
0523	7677		7677	
0524	7577		7577	
0525	7377		7377	
0526	6777		6777	
0527	5777		5777	
0530	3777		3777	
0531	0001		0001	
0532	0003		0003	
0533	0007		0007	
0534	0017		0017	

0535	0037		0037
0536	0077		0077
0537	0177		0177
0540	0377		0377
0541	0777		0777
0542	1777		1777
0543	3777	K3777,	3777
0544	0000		0
0545	0515	AK7776,	K7776
0546	0544	A0,	K3777+1

0547	1375	SUC,	TAD CT
0550	7001		IAC
0551	3375		DCA CT
0552	1375		TAD CT
0553	7640		SZA CLA
0554	5437		JMP I ATFCLF
0555	1175		TAD KP
0556	1174		TAD K1000
0557	3175		DCA KP
0560	1175		TAD KP
0561	7640		SZA CLA
0562	5437		JMP I ATFCLF
0563	6002		IOF
0564	1376		TAD INF2
0565	3011		DCA WORK
0566	5767		JMP I .+1
0567	7602		7602
0570	0215		215
0571	0212		212
0572	0306		306
0573	0303		303
0574	0377		377
0575	0000	CT,	0
0576	0567	INF2,	567

0600 \*600

/CHECK FOR TO=FROM CONFLICT

0600	1021	TFCLF,	TAD TOLOC
0601	7041		CIA
0602	1002		TAD FRMLOC
0603	7450		SNA
0604	5055		JMP CHEK2
0605	7001		IAC
0606	7450		SNA
0607	5055		JMP CHEK2
0610	7001		IAC
0611	7650		SNA CLA
0612	5055		JMP CHEK2

0613	5402		JMP I FRMLDC
0614	0000	PATCH,	0 /RESTORE THEN GO AWAY
0615	3000		DCA 0
0616	1232		TAD X
0617	3001		DCA 1
0620	1233		TAD X1
0621	3002		DCA 2
0622	1234		TAD X2
0623	3003		DCA 3
0624	1235		TAD X3
0625	3040		DCA START
0626	1236		TAD X4
0627	3041		DCA START+1
0630	6001		ION
0631	5614		JMP I PATCH
0632	7402	X,	7402
0633	0000	X1,	0
0634	7157	X2,	7157
0635	6001	X3,	ION
0636	7604	X4,	LAS
	7602	*7602	
7602	1411		TAD I WORK
7603	6046		TLS
7604	6041		TSF
7605	5204		JMP ,-1
7606	1013		TAD M377
7607	7640		SZA CLA
7610	5202		JMP ,-6
7611	5217		JMP OVR
	7617	*7617	
7617	6042	OVR,	TCF
7620	6001		ION
7621	5437		JMP I ATFCLF

S