

IDENTIFICATION

Product Code: MAINDEC-08-DO7B-D

Product Name: Random ISZ Test

Date Created: March 25, 1968

Maintainer: Diagnostic Group

Author: R. Green

1. ABSTRACT

This program is written to test the ISZ instruction of the PDP-8. 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-8 equipped with Teletype.

2.2 Storage

This program uses locations 0000 - 7600₈. The Binary Loader must be stored in the last memory page.

2.3 Preliminary Programs

MAINDEC-08-D01(n), MAINDEC-08-D02(n), and MAINDEC-08-D03(n)

3. LOADING PROCEDURE

The standard Binary Loader is used.

4. STARTING PROCEDURE

4.1 Switch Settings

SR0 = Halt on error *N*

SR1 = Eliminate error printouts *N*

SR3 = Fixed FROMS (1)
Random FROMS (0) *Y*

SR4 = Fixed TOS (1)
Random TOS (0) *Y*

SR5 = Fixed OPERAND (1)
Random OPERAND (0)

SR9 = Do one ISZ only

SR11 = Do part 2 (1) → SR3, 4, 5 must be 0s.
Do part 1 (0)

4.2 Starting Address

37

4.3 Operator Action

- a. Set SR (SWITCH REGISTER) to 0037 and press LOAD ADDRESS.
- b. Set SR to desired mode of operation; for most runs, SR9 = 1 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 = 0020

OPERAND = 0021

- c. Push START.

5. OPERATING PROCEDURE

Same as paragraph 4.

6. ERRORS

6.1 Error Halts and Description

<u>C (PC)</u>	<u>Cause</u>
0002	Peripheral interrupt
0254	Halt on error. SR0 = 1

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

O 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

O 3705 F 4777 R 5020 NS

This is identical to example (a) except that a different type 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 = 1. 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 0020
- d. Insert chosen failing OPERAND into location 0021
- e. Restart program with control switches 1, 3, 4, 5, and 9 set to 1.

NOTE: By setting SR0 the program halts following the error printout. The operator may at this time set switches 1, 3, 4, 5 and 9 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

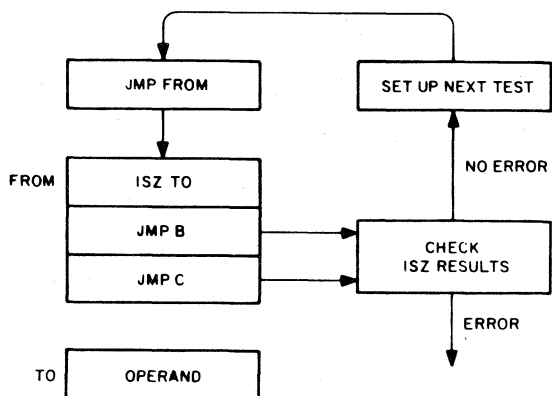
8.1 Execution Time

SR9 = 0. 11,000 ISZ operations/second.

SR9 = 1. 3,500 ISZ operations/second

9. 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 generator replaced by a fixed number generator. Sequencing of events is as follows, (note: $621_8 < \text{MEMORY TEST AREA} < 7600_8$):

- a. FROM = 621 TO = 624 Test a set of 24 selected OPERANDS.

To save time it is suggested that SR9 = 1, 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 07 is printed after each group of 32,000 tests.

```

/PJP-05 ISZ TEST
/
/CONSTANTS AND VARIABLES
*0
0000 0000
0001 5001      0      JMP 1      /PERIPHERAL INTERRUPT
0002 0002      FRML0C, 2      /ISZ TEST INSTRUCTION LOCATION
0003 0003      LIMLO, 3      /LOW LIMIT TEST AREA
0004 0200      LIMHI, -7600    /HIGH LIMIT TEST AREA
0005 0547      ASUC, SUC
0006 7771      M7, -7
0007 0007      MSK7, 0007      /OCTAL CONVERSION MASK
0010 0000      WORK, 0      /IR0
0011 0000      WORK1, 0      /IR1
0012 7401      M377, -377
0013 3607      NUM, 3607      /THE RANDOM NUMBER LOCATION
0014 0003      THREE, 3

0015 2420      ISZ1, ISZ I TOLOC      /MOVING ISZ
0016 5115      JMP1, JMP BACK      /TEST INSTRUCTION
0017 5140      JMP2, JMP BAKBRN      /GROUP,
0020 0000      TO, UC, 0      /LOCATION TO BE ISZ'D
0021 0000      PATRN, 0      /STARTING ISZ PATTERN
0022 0000      BEFOR, 0      /FAILING PATTERN BEFORE FAILING ISZ
0023 0000      AFTER, 0      /PREDICTED RESULTS OF EACH ISZ
0024 0004      K4, 4      /SWITCH REGISTER MASKS
0025 0400      K0400, 0400
0026 0200      K0200, 0200
0027 0100      K0100, 0100
0030 0000      NOTE, 0      //S'ERROR WITH NO SKIP
0031 0260      PRINT, INF1-1      /0'S'ERROR WITH SKIP
0032 0200      AERR1, ERR1
0033 0205      AERR2, ERR2
0034 0413      APDR, PDR
0035 1013      ITAUNM, TAD NUM
0036 0600      ATFCLF, TFCLF

```



```

/SR0=MALT AFTER ERROR PRINTOUT
/SR1=NO PRINTOUTS
/SR3 = HOLD FROM CONSTANT
/SR4 = HOLD TO CONSTANT
/SR5 = HOLD PATTERN CONSTANT
/SR9 = DO ONE ISZ ONLY
/SR11 = DO PART 2
/
/

```

```

0037 4440
0040 0614
0041 0014
0042 7640
0043 5425
0044 1035
0045 3164

0046 7604
0047 0027
0050 7440
0051 5054

```

```

/PROGRAM START
START,  JMS I ,+1      /ION
        PATCH         /LAS
        AND THREE
        SZA CLA       /SKIP IF PART 1
        JMP I K0400    /GO TO PART 2
        TAD ITAUNM
        DCA RANUM+1
        /CHECK FOR FIXED PATTERN
CHEK1,  LAS
        AND K0100
        SZA
        JMP CHEK2

```

```

0052 4163      /SELECT THE PATTERN
0053 3021      SELPAT, JMS RANUM
                   DCA PATRN

                   /CHECK FOR FIXED TO
0054 7604      CHEK2, LAS
0055 0026      AND K0200
0056 7640      SEA CLA
0057 5064      JMP CHEK3

                   /SELECT THE TO LOCATION
0060 4163      SELTO, JMS RANUM
0061 3020      DCA TOLOC
0062 1020      TAD TOLOC
0063 4150      JMS LIMTST

                   /CHECK FOR FIXED FROM
0064 7604      CHEK3, LAS
0065 0025      AND K0400
0066 7640      SEA CLA
0067 5074      JMP PLCINT

                   /SELECT THE FROM LOCATION
0070 4163      SELFRM, JMS RANUM
0071 3002      DCA FRMLOC
0072 1002      TAD FRMLOC
0073 4150      JMS LIMTST

                   /PLACE FROM INSTRUCTIONS
0074 7240      PLCINT, CLA CMA
0075 1002      TAD FRMLOC
0076 3010      DCA WORK
0077 1015      TAD ISZ1
0100 3410      DCA I WORK
0101 1016      TAD JMP1
0102 3410      DCA I WORK
0103 1017      TAD JMP2
0104 3410      DCA I WORK

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0105 1021      /DEPOSIT PATTERN IN TO LOCATION
0106 3420      TAD PATRN
                DCA I TOLOC

                /STORE PREDICTED ISZ RESULT
0107 1021      TAD PATRN
0110 3022      DCA BEFOR
0111 1022      LUP1, TAD BEFOR
0112 7001      IAC
0113 3023      DCA AFTER
0114 5405      JMP I ASUC

                /RETURN FOR NO SKIP CONDITION
0115 7604      BACK, LAS
0116 7004      RAL
0117 7710      SPA CLA
0120 5131      JMP LAS1
0121 1420      TAD I TOLOC
0122 7041      CIA
0123 1023      TAD AFTER
0124 7640      SZA CLA
0125 5432      JMP I AERR1      /ERROR IN ISZ OPERATION
0126 1420      TAD I TOLOC
0127 7650      SNA CLA
0130 5432      JMP I AERR1      /ERROR IN ISZ SKIP DETECTION
0131 7604      LAS1, LAS
0132 0024      AND K4
0133 7440      SZA      /SKIP IF NOT ONE ISZ (SR9)
0134 5046      JMP CHEK1
0135 7001      IAC
0136 1022      TAD BEFOR
0137 5110      JMP LUP1=1

                /RETURN FOR SKIP CONDITION
0140 7604      BAKRN, LAS
0141 7004      RAL
0142 7710      SPA CLA
0143 5046      JMP CHEK1
0144 1420      TAD I TOLOC
0145 7640      SZA CLA      /SKIP IF TO LOCATION OK
0146 5433      JMP I AERR2      /ERROR IN ISZ LOCATION
0147 5046      JMP CHEK1

                /TEST HIGH-LOW LIMITS
0150 0000      LIMITST, 0
0151 7510      SPA
0152 5157      JMP ,+5
0153 1003      TAD LIMLO
0154 7700      SMA CLA
0155 5550      JMP I LIMITST
0156 5164      JMP RANUM+1
0157 1004      TAD LIMHI
0160 7700      SMA CLA

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0161 5164
0162 5550

JMP RANUM+1
JMP I LIMITSI

0163	0000		/RANDOM NUMBER GENERATOR
0164	1013	RANUM,	0
0165	7104		TAD RAN
0166	7430		RAL CLL
0167	1014		SZL
0170	3013		TAD THREE
0171	1013		DCA NUM
0172	5563		TAD NUM /AC=NEW RANDOM NUMBER
			JMP I RANUM
0173	0333	A1,	SKPDAT
0174	0334	A2,	SKPDAT+1
0175	1000	K1000,	1000
0176	0000	KP,	0
0177	0000	CT,	0

0200	1541	*200	/ERROR ROUTINE 1
0201	3333	ERR1,	TAD SKPUAT+6
0202	7040		DCA SKPUAT
0203	3030		CMA
0204	5207		DCA NOTE
			JMP KPGO
0205	1332		/ERROR ROUTINE 2
0206	3333	ERR2,	TAD SKPUAT-1
0207	1342		DCA SKPUAT
0210	3334	KPGO,	TAD SKPUAT+7
0211	1002		DCA SKPUAT+1
0212	3010		TAD FRML0C
0213	1371		DCA WORK
0214	4343		TAD A3
			JMS SETUP
0215	1020		TAD TOL0C
0216	3010		DCA WORK
0217	1372		TAD A4
0220	4343		JMS SETUP
0221	1021		TAD PATRN
0222	3010		DCA WORK
0223	1373		TAD A5
0224	4343		JMS SETUP
0225	1022		TAD BEFOR
0226	3010		DCA WORK
0227	1374		TAD A6
0230	4343		JMS SETUP
0231	1420		TAD I TOL0C
0232	3010		DCA WORK
0233	1375		TAD A7
0234	4343		JMS SETUP
0235	6002	TTY,	/TTY PRINT ROUTINE
0236	1031		IOF
0237	3010		TAD PRINT
0240	1410		DCA WORK
0241	6046		TAD I WORK
0242	6041		TLS
0243	5242		TSF
0244	1012		JMP ,=1
0245	7640		TAD M377
0246	5240		SEA CLA
0247	6042		JMP TTY+3
0250	6001		TCF
0251	7604		ION
0252	7710		LAS
0253	7402		SPA CLA
			HLT

/HALT AFTER ERROR (SR0)

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0254 1030
0255 7650
0256 5046
0257 3030
0260 5131

TAD NOTE
SNA CLA
JMP CHEK1
DCA NOTE
JMP LAS1

/RETURN TO NO SKIP ROUTINE

```

0261 0306
0262 0240
0263 0000
0264 0000
0265 0000
0266 0000
0267 0240
0270 0240
0271 0324
0272 0240
0273 0000
0274 0000
0275 0000
0276 0000
0277 0215
0300 0212
0301 0215
0302 0215

/ERROR PRINT OUT LINE 1
INF1, 306 /F FROM (INSTRUCTION LOCATION)
      240 /SPACE
INDATA, 0 /X LOCATION
        0 /X
        0 /X
        0 /X
      240 /SPACE
      240 /SPACE
      324 /T TO (OPERAND ADDRESS)
      240 /SPACE
ONDATA, 0 /X ADDRESS
        0 /X
        0 /X
        0 /X
      215 /CR
      212 /LF
      215 /CR
      215 /CR

/ERROR PRINTOUT LINE 2
0303 0317
0304 0240
0305 0000
0306 0000
0307 0000
0310 0000
0311 0240
0312 0240
0313 0306
0314 0240
0315 0000
0316 0000
0317 0000
0320 0000
0321 0240
0322 0240
0323 0322
0324 0240

/ERROR PRINTOUT LINE 2
      317 /O OPERAND (STARTING COUNT)
      240 /SPACE
STDATA, 0 /X PATTERN
        0 /X
        0 /X
        0 /X
      240 /SPACE
      240 /SPACE
      306 /F FAILING COUNT
      240 /SPACE
FLDATA, 0 /X PATTERN BEFORE FAILING ISZ
        0 /X
        0 /X
        0 /X
      240 /SPACE
      240 /SPACE
      322 /R RESULT AFTER FAILURE
      240 /SPACE

```


0325	0202	RSDATA, 0	/X	PATTERN AFTER FAILING ISZ
0326	0000	0	/X	
0327	0000	0	/X	
0330	0000	0	/X	
0331	0240	240	/SPACE	
0332	0240	240	/SPACE	
0333	0316	SA PUAL, 316	/N	NO
0334	0323	323	/S	SKIP
0335	0215	215	/CR	
0336	0212	212	/LF	
0337	0212	212	/LF	
0340	0377	377	/RUBOUT	
0341	0316	316	/N	
0342	0323	323	/S	
0343	0000	SETUP, 0		
0344	3011	DCA WORK1		
0345	1010	TAD WORK		
0346	7006	RTL		
0347	7006	RTL		
0350	4363	JMS MORSU		
0351	7012	RTR		
0352	7012	RTR		
0353	7012	RTR		
0354	4363	JMS MORSU		
0355	7012	RTR		
0356	7010	RAR		
0357	4363	JMS MORSU		
0360	4363	JMS MORSU		
0361	7200	CLA		
0362	5743	JMP I SETUP		
0363	0000	MORSU, 0		
0364	0007	AND MSK/		
0365	1376	TAD TW6		
0366	3411	DCA I WORK1		
0367	1010	TAD WORK		
0370	5763	JMP I MORSU		
0371	0262	/PAGE 1 CONSTANTS		
0372	0272	A3, INDATA=1		
0373	0304	A4, ONDATA=1		
0374	0314	A5, STDATA=1		
0375	0324	A6, FLDATA=1		
0376	0260	A7, RSDATA=1		
		TW6, 0260		

/PART 2 INITIALIZATION ROUTINE
*400

0400	0400		
0400	1003	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	3164	DCA RANUM+1	
0412	5046	JMP CHEK1	/GO TO PAGE 0 START
0413	1163	/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	1163	TAD RANUM	
0421	7041	CIA	
0422	1306	TAD GTO	
0423	7650	SNA CLA	/SKIP IF NOT REQUESTING TO
0424	5301	JMP TURUT	/GO TO TO ADDRESS ROUTINE
0425	5226	JMP PRUT	/GO TO PATTERN ROUTINE

PUR,

0426	1713	PRJT,	/SELECT PATTERN AND OTHER THINGS
0427	3312		TAD I PATCYC
0430	1312		DCA PATT
0431	7450		TAD PATT
0432	5240		SNA
0433	7201		JMP ,*6
0434	1313		CLA IAC
0435	3313		TAD PATCYC
0436	1312		DCA PATCYC
0437	5563		TAD PATT
			JMP I RANUM
			/
0440	1345		TAD AK776
0441	3313		DCA PATCYC
0442	7001		IAC
0443	1311		TAD TO
0444	3311		DCA TO
0445	1311		TAD TO
0446	7041		CIA
0447	1310		TAD FROM
0450	7640		SZA CLA
0451	5255		JMP ,*4
0452	1311		TAD TO
0453	1014		TAD THREE
0454	3311		DCA TO
0455	1311		TAD TO
0456	7500		SMA
0457	5276		JMP GOUT
0460	1004		TAD LIMHI
0461	7710		SPA CLA
0462	5276		JMP GOUT
0463	7201		CLA IAC
0464	1310		TAD FROM
0465	3310		DCA FROM
0466	1003		TAD LIMLO
0467	7041		CIA
0470	3311		DCA TO
0471	1310		TAD FROM
0472	1004		TAD LIMHI
0473	7640		SZA CLA
0474	5276		JMP GOUT
0475	5200		JMP 400
0476	7200	GOUT,	CLA
0477	1312		TAD PATT
0500	5563		JMP I RANUM

0501	1311	TO RUT,	/SELECT TO ROUTINE	
0502	5563		TAD TO	
			JMP I RANUM	
0503	1312	FRUT,	/SELECT FROM ROUTINE	
0504	5563		TAD FROM	
			JMP I RANUM	
0505	0071	GERUM,	/PAGE 3 CONSTANTS	
			SELF RM+1	/STORED RETURN ADDRESS WHEN
0506	0061	GTO,	SEL TO+1	/RANDOM FROM IS REQUESTED
				/STORED RETURN ADDRESS WHEN
0507	0053	GPAT,	SEL PAT+1	/RANDOM TO IS REQUESTED
				/STORED RETURN ADDRESS WHEN
0510	0000	FROM,	0	/RANDOM PATTERN IS REQUESTED
0511	0000	TO,	0	/CURRENT FROM ADDRESS
0512	0000	PATT,	0	/CURRENT TO ADDRESS
0513	0000	PATCYC,	0	/CURRENT PATTERN
0514	5434	INST1,	JMP I APDR	/CURRENT PATTERN ADDRESS
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	1177	SUB,	TAD CI
0550	7001		IAC
0551	3177		DCA CI
0552	1177		TAD CI
0553	7640		SZA CLA
0554	5436		JMP I ATFULF
0555	1176		TAD KP
0556	1175		TAD K1000
0557	3176		DCA KP
0560	1176		TAD KP
0561	7640		SZA CLA
0562	5436		JMP I ATFULF
0563	6002		IOP
0564	1375		TAD ZERO
0565	3573		DCA I A1
0566	1376		TAD SVN
0567	3574		DCA I A2
0570	1374		TAD INF2
0571	3010		DCA WORK
0572	5773		JMP I ,+1
0573	7602		7602
0574	0332	INF2,	SKPUAT-1
0575	0260	ZERO,	260
0576	0267	SVN,	267

```

0600      *600
/CHECK FOR TO=FROM CONFLICT

0600 1020      TFCLF, TAD TULOC
0601 7041      CIA
0602 1002      TAD FRMLUC
0603 7450      SNA
0604 5054      JMP CHEK2
0605 7001      IAC
0606 7450      SNA
0607 5054      JMP CHEK2
0610 7001      IAC
0611 7650      SNA CLA
0612 5054      JMP CHEK2
0613 5402      JMP I FRMLUC

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 3037      DCA START
0626 1236      TAD X4
0627 3040      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 1410      TAD I WORK
7603 6046      TLS
7604 6041      TSF
7605 5204      JMP ,=1
7606 1012      TAD M377
7607 7640      SZA CLA
7610 5202      JMP ,=6
7611 5217      JMP OVR

      *7617
7617 6042      OVR, TCF
7620 6001      ION
7621 5436      JMP I ATFCLF

```

S

SYMBOL TABLE

AERR1	0032
AERR2	0033
AFTER	0023
AK776	0545
APDR	0034
ASUC	0005
ATFCLF	0036
A0	0546
A1	0173
A2	0174
A3	0371
A4	0372
A5	0373
A6	0374
A/	0375
BACK	0115
BAKBRN	0140
BLFOR	0022
CHEK1	0046
CHEK2	0054
CHEK3	0064
C1	0177
ERR1	0200
ERR2	0205
FLODATA	0315
FRMLOC	0002
FROM	0510
FRUT	0503
GFROM	0505
GUUT	0476
GPAT	0507
GTO	0506
INDATA	0263
INF1	0261
INF2	0574
INST1	0514
ISZ1	0015
ITAUNM	0035
JMP1	0016
JMP2	0017
KP	0176
KPG0	0207
K0100	0027
K0200	0026
K0400	0025
K1000	0175
K3777	0543
K4	0024
K7776	0515
LAS1	0131
LIMHI	0004
LIMLO	0003
LIMTST	0150

SYMBOL TABLE

LUP1	0111
MURSU	0363
MSK7	0007
MS77	0012
M7	0006
NOTE	0030
NUM	0013
ONDATA	0273
OVR	7617
PATCH	0614
PATCYC	0513
PATRN	0021
PATT	0512
PUR	0413
PLCINT	0074
PRINT	0031
PRUT	0426
RANUM	0163
RSDATA	0325
SELFIRM	0070
SELPAT	0052
SELTO	0060
SETUP	0343
SKPDAT	0333
START	0037
SIDATA	0305
SUC	0547
SVN	0576
TFCLEF	0600
THREE	0014
TU	0511
TULOC	0020
TURUT	0501
TIY	0235
Tw6	0376
WORK	0010
WORK1	0011
X	0632
X1	0633
X2	0634
X3	0635
X4	0636
ZERU	0575

SYMBOL TABLE

FMLOC	0002
LIMLO	0003
LIMHI	0004
ASUC	0005
M/	0006
MSK7	0007
WORK	0010
WORK1	0011
MS77	0012
NUM	0013
THREE	0014
ISZ1	0015
JMP1	0016
JMP2	0017
TULOC	0020
PATHN	0021
BLFOR	0022
AFTER	0023
K4	0024
K0400	0025
K0200	0026
K0100	0027
NOTE	0030
PRINT	0031
AERR1	0032
AERR2	0033
APDR	0034
ITADNM	0035
ATFCLF	0036
START	0037
CHEK1	0046
SELPAT	0052
CHEK2	0054
SELTO	0060
CHEK3	0064
SELFRM	0070
PLCINT	0074
LUP1	0111
BACK	0115
LAS1	0131
BAKURN	0140
LIMTST	0150
RANUM	0163
A1	0173
A2	0174
K1000	0175
KP	0176
CT	0177
EHR1	0200
EHR2	0205
KPGU	0207
TTY	0235
INF1	0261

SYMBOL TABLE

INDATA	0263
ONDATA	0273
STDATA	0305
FLDATA	0315
RSDATA	0325
SKPDAT	0333
SETUP	0343
MURSU	0363
A3	0371
A4	0372
A5	0373
A6	0374
A7	0375
Tw6	0376
PUR	0413
PRUT	0426
GOUT	0476
TURUT	0501
FRUT	0503
GFROM	0505
GTO	0506
GPAT	0507
FROM	0510
TU	0511
PATT	0512
PATCYC	0513
INST1	0514
K/776	0515
K5777	0543
AK7776	0545
A0	0546
SUC	0547
INF2	0574
ZERU	0575
SVN	0576
TFCLF	0600
PATCH	0614
X	0632
X1	0633
X2	0634
X3	0635
X4	0636
OVR	7617

THERE ARE NO ERRORS

