

IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D018-D
PRODUCT NAME: BASIC JMP-JMS TEST
DATE CREATED: JUNE 11, 1971
MAINTAINER: DIAGNOSTICS GROUP
AUTHOR: BRUCE HANSEN

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1. ABSTRACT

THIS IS A DIAGNOSTIC PROGRAM FOR TESTING THE JMP AND JMS INSTRUCTIONS OF THE PDP-8E.

2. REQUIREMENTS

2.1 EQUIPMENT

A PDP-8E EQUIPPED WITH TELETYPE.

2.2 STORAGE

THIS PROGRAM USES MOST OF MEMORY. THE BINARY LOADER MUST BE STORED IN THE LAST MEMORY PAGE.

2.3 PRELIMINARY PROGRAMS

MAINDEC-8E-D0A(N) AND MAINDEC-8E-D0B(N)

3. LOADING PROCEDURE

3.1 METHOD

THE STANDARD BINARY LOADER IS USED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS (NONE)

4.2 STARTING ADDRESS

200

4.3 RESTART ADDRESSES

600
704

4.4 OPERATOR ACTION

A. SET SR TO 200 AND PRESS LOAD ADDRESS.

B. PUSH CLEAR AND THEN CONTINUE. THE PROGRAM WILL STORE PARTS OF THE RIM AND BINARY LOADERS THAT WILL BE DESTROYED, AND THEN JMP TO 4200 TO BEGIN TESTING.

5. OPERATING PROCEDURES

5.1 PROGRAM RESTARTS

SINCE THE LOADERS ARE ALREADY STORED, A PROGRAM RESTART SHOULD BEGIN AT 600 NOT 200.

5.2 PROGRAM END

TO RESTORE THE LOADERS AT THE CONCLUSION OF THE TEST, START AT 704. WHEN THE PROGRAM HALTS, RESTORATION IS COMPLETED (PC=736).

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION

SEE SECTION 9.

6.2 ERROR RECOVERY

IN MOST CASES IT IS POSSIBLE TO INSERT A JMP INSTRUCTION IN THE ERROR HALT POSITION TO RETURN THE PROGRAM TO THE FAILING TEST. THIS FORMS A PROGRAM LOOP ON THE FAILING TEST AND ALLOWS THE PROBLEM TO BE INVESTIGATED WITH AN OSCILLOSCOPE. IN CASES WHERE A SCOPE MODE LOOP CANNOT BE MAINTAINED DUE TO THE INSTABILITY OF THE JMP OR JMS INSTRUCTION AND ITS FAILING CONDITION, IT WILL PROBABLY BE ADVANTAGEOUS TO SIMULATE THIS SAME PROBLEM USING THE RANDOM JMP TEST, MAINDEC-8E-D0HC, OR RANDOM JMP-JMS TEST, MAINDEC-8E-D0JC.

7. RESTRICTIONS (NONE)

8. MISCELLANEOUS

8.1 EXECUTION TIME

THREE HUNDRED AND FORTY-FIVE PROGRAM LOOPS PER SECOND. A BELL IS SOUNDED EVERY 10 SECONDS, WHICH EQUALS 3456 PROGRAM LOOPS.

9. PROGRAM DESCRIPTION

THE PROGRAM IS MADE UP OF 82 INDIVIDUAL TESTS FOR JMP AND JMS. AN OCTAL COUNTER LOCATED AT MEMORY LOCATION 0136 ALWAYS HOLDS THE NUMBER OF THE PRESENT TEST. FOR TEST 1 LOCATION, 0136 CONTAINS 0000 AND FOR TEST 82, 0136 CONTAINS 0121. EACH TEST PERFORMS THE FOLLOWING FUNCTIONS:

- A. CHECK LOCATION 0136 FOR PROPER TEST NUMBER.
- B. PERFORMS ADDITIONAL CHECKING SUCH AS VERIFICATION OF THE STORED PC (PROGRAM COUNTER) ON A JMS.
- C. ADVANCES TEST COUNTER.
- D. SETS UP FOR NEXT TEST.
- E. JMP'S OR JMS'S TO THE NEXT TEST. THESE JMP AND JMS INSTRUCTIONS ARE THE ONES BEING TESTED.

IF THE PC DOES NOT ARRIVE AT THE PROPER PLACE AFTER PERFORMING STEPS ABOVE, IT EITHER FALLS INTO THE BACKGROUND FIELD OF HLTS OR INTO ANOTHER AREA OF THE PROGRAM. IF THE FIELD OF HLTS IS ENCOUNTERED, THE PROGRAM HALTS IMMEDIATELY. IF A PROGRAM FIELD IS ENTERED, IT IS MOST LIKELY THAT THE PROGRAM WILL HALT WHEN THE TEST COUNTER CHECK IS MADE (LOCATION 136 EQUALS THE TEST COUNT). IN A FEW REMOTE CASES IT IS POSSIBLE FOR THE TEST COUNTER TO BE ADVANCED BY ONE, FOLLOWING THE ERRONEOUS JMP OR JMS AND BEFORE THE HALT. IT IS ALSO POSSIBLE FOR THE PROGRAM, ON A ERROR CONDITION, TO ENTER THE LOADERS STORED IN THE LAST MEMORY PAGE. ALL OF THESE POSSIBILITIES SHOULD BE KEPT IN MIND WHEN ANALYZING AN ERROR.

TEST 0 THROUGH 19 ARE TESTS FOR SAME PAGE JUMPING USING DIRECT ADDRESSING. TESTS 20 THROUGH 45 TEST THE JMP INSTRUCTION WITH INDIRECT ADDRESSING. IN THESE CASES, THE ADDRESS THAT THE PROGRAM JUMPS TO IS ALWAYS THE COMPLEMENT OF ITS PRESENT ADDRESS. JMS TESTS 1 THROUGH 12 ARE TESTS FOR THE SAME PAGE USING DIRECT ADDRESSING. JMS TESTS 13 THROUGH 35 TEST JMS IN THE SAME MANNER AS JMP IS TESTED IN TEST 20 THROUGH 45.

THE TELETYPE BELL IS SOUNDED EVERY 10 SECONDS (3456 PROGRAM CYCLES).

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0000
0000
0001 5001
0002 0002
0003 0003
0004 0000
0005 0000
0006 7402
0007 7402
0010 7402
0011 7402
0012 7402
0013 7402
0014 7402
0015 7402
0016 7402
0017 7402
0020 7402
0021 7402

```

*0

```

0
JMP 1
2
3
0
0
HLT
HLT
HLT
HLT
HLT
HLT
HLT
HLT
HLT
HLT
HLT

```

```

0022
0000
0023 0001
0024 0002
0025 0004
0026 0010
0027 0020
0030 0040
0031 0100
0032 0200
0033 0400
0034 1000
0035 2000
0036 4000
0037 3777
0042
0042 5777
0043 6777
0044 7377
0045 7577
0046 7677
0047 7737
0050 7757
0051 7767
0052 7773
0053 7775
0054 7776
0055 7777
0056 4620
0057 4640
0060 4660
0061 4700
0062 4720

```

*22

```

K0,
K1,
K2,
K4,
K10,
K20,
K40,
K100,
K200,
K400,
K1000,
K2000,
K4000,
K3777,
*42
K5777,
K6777,
K7377,
K7577,
K7677,
K7737,
K7757,
K7767,
K7773,
K7775,
K7776,
K7777,
K4620,
K4640,
K4660,
K4700,
K4720,

```

0063	4740	K4740,	4740
0064	4760	K4760,	4760
0065	5000	K5000,	5000
0066	5020	K5020,	5020
0067	5040	K5040,	5040
0070	5060	K5060,	5060
0071	5100	K5100,	5100
0072	5120	K5120,	5120
0073	5140	K5140,	5140
0074	5160	K5160,	5160
0075	5200	K5200,	5200
0076	5220	K5220,	5220
	0102	*102	
0102	5240	K5240,	5240
0103	5260	K5260,	5260
0104	5300	K5300,	5300
0105	5320	K5320,	5320
0106	5340	K5340,	5340
0107	5360	K5360,	5360
0110	5400	K5400,	5400
0111	5420	K5420,	5420
0112	5440	K5440,	5440
0113	7777	M1,	-1
0114	7776	M2,	-2
0115	7775	M3,	-3
0116	7774	M4,	-4
0117	7773	M5,	-5
0120	7772	M6,	-6
0121	7771	M7,	-7
0122	7770	M10,	-10
0123	7767	M11,	-11
0124	7766	M12,	-12
0125	7765	M13,	-13
0126	7764	M14,	-14
0127	7763	M15,	-15
0130	7762	M16,	-16
0131	7761	M17,	-17
0132	7760	M20,	-20
0133	7757	M21,	-21
0134	7756	M22,	-22
0135	7755	M23,	-23
0136	0000	PNTCNT,	0
0137	2410	K2410,	2410
0140	2440	K2440,	2440
0141	2470	K2470,	2470
0142	2520	K2520,	2520
0143	2600	K2600,	2600
0144	2630	K2630,	2630
0145	2660	K2660,	2660
0146	2710	K2710,	2710
0147	2740	K2740,	2740
0150	3000	K3000,	3000
0151	3030	K3030,	3030

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/BASIC JMP-JMS TEST

0152 3060 K3060, 3060
0153 3110 K3110, 3110
0154 3140 K3140, 3140
0155 3200 K3200, 3200

0156 3230 K3230, 3230
0157 3260 K3260, 3260
0160 3310 K3310, 3310
0161 3340 K3340, 3340
0162 3400 K3400, 3400
0163 3430 K3430, 3430
0164 3460 K3460, 3460
0165 3510 K3510, 3510
0166 3540 K3540, 3540

0170 0170 *170
0170 0000 DO,
0171 1175 TAD K7402
0172 3410 DCA I 10
0173 1010 TAD 10
0174 5570 JMP I DO
0175 7402 K7402, 7402

0200 0200 *200
0201 5601 JMP I SAVER
0201 0600 SAVER, SAVE

/STORE LOADER INSTRUCTIONS
/THAT WILL BE DESTROYED

0600 0600 *600
0600 7200 SAVE,
0601 1453 CLA
0602 3343 TAD I K7775
0603 1452 DCA STOR
0604 3344 TAD I K7773
0605 1736 DCA STOR+1
0606 3345 TAD I K74
0607 1451 DCA STOR+2
0610 3346 TAD I K7767
0611 1737 DCA STOR+3
0612 3347 TAD I K70
0613 1450 DCA STOR+4
0614 3350 TAD I K7757
0615 1740 DCA STOR+5
0616 3351 TAD I K60
0617 1447 DCA STOR+6
0620 3352 TAD I K7737
0621 1741 DCA STOR+7
0622 3353 TAD I K740
DCA STOR+10

0623	1446	TAD I K7677
0624	3354	DCA STOR+11
0625	1742	TAD I K00
0626	3355	DCA STOR+12
0627	1455	TAD I K7777
0630	3356	DCA STOR+13
0631	7300	CLA CLL
0632	1264	TAD K175
0633	3010	DCA 10
0634	4170	JMS DO
0635	1265	TAD M577
0636	7640	SEA CLA
0637	5234	JMP -3
0640	1266	TAD K756
0641	3010	DCA 10
0642	4170	JMS DO
0643	1267	TAD M1777
0644	7640	SEA CLA
0645	5242	JMP -3
0646	1270	TAD K3572
0647	3010	DCA 10
0650	4170	JMS DO
0651	1271	TAD M4177
0652	7640	SEA CLA
0653	5250	JMP -3
0654	1272	TAD K5451
0655	3010	DCA 10
0656	4170	JMS DO
0657	1273	TAD M7600
0660	7640	SEA CLA
0661	5256	JMP -3
0662	5300	JMP RESTAR
0663	4200	BEGIN
0664	0175	175
0665	7201	M577, -577
0666	0756	756
0667	6001	M1777, -1777
0670	3572	K3572, 3572
0671	3601	M4177, -4177
0672	5451	K5451, 5451
0673	0200	M7600, -7600

/RESTORE LOADER INSTRUCTIONS

0700	0700	*700
0701	1303	RESTAR, TAD RENEW
0702	3200	DCA SAVE
0703	5303	JMP RENEW
0704	5663	RENEW, JMP I HALT4+7
0705	7200	REFILL, CLA
0706	1343	TAD STOR
0707	3453	DCA I K7775
0710	1344	TAD STOR+1
	3452	DCA I K7773

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0711 1345 TAD STOR+2
0712 3736 DCA I K74
0713 1346 TAD STOR+3
0714 3451 DCA I K7767
0715 1347 TAD STOR+4
0716 3737 DCA I K70
0717 1350 TAD STOR+5
0720 3450 DCA I K7757
0721 1351 TAD STOR+6
0722 3740 DCA I K60
0723 1352 TAD STOR+7
0724 3447 DCA I K7737
0725 1353 TAD STOR+10

0726 3741 DCA I K740
0727 1354 TAD STOR+11
0730 3446 DCA I K7677
0731 1355 TAD STOR+12
0732 3742 DCA I K00
0733 1356 TAD STOR+13
0734 3455 DCA I K7777
0735 7402 HLT

```

/CONSTANTS

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0736 7774 K74, 7774
0737 7770 K70, 7770
0740 7760 K60, 7760
0741 7740 K740, 7740
0742 7700 K00, 7700
0743 0000 STOR, 0
0744 0000 0
0745 0000 0
0746 0000 0
0747 1742 -6036
0750 0000 0
0751 0000 0
0752 0000 0
0753 0000 0
0754 0000 0
0755 0000 0
0756 0000 0

STORE LOC 7775
/+1 STORE LOC 7773
/+2 STORE LOC 7774
/+3 STORE LOC 7767
/+4 STORE LOC 7770
/+5 STORE LOC 7757
/+6 STORE LOC 7760
/+7 STORE LOC 7737
/+10 STORE LOC 7740
/+11 STORE LOC 7677
/+12 STORE LOC 7700
/+13 STORE LOC 7777

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```

4200 4200 *4200
4201 7200 BEGIN,
4201 3136 DCA PNTCNT

```

```

4202 5203 /JUMP TEST 0 COUNTER=0
4203 1136 JMP .+1
4204 7440 TAD PNTCNT
4205 7402 SZA
4206 1136 HLT
                     /CHECK COUNTER
                     /JMP COUNTER WRONG

```

```
4207 7001 IAC PNTCNT /ADVANCE COUNTER
4210 3136 DCA PNTCNT

/JUMP TEST 1 COUNTER=1
4211 5213 JMP .+2 /JMP FAILED
4212 7402 HLT
4213 1136 TAD PNTCNT
4214 1113 TAD M1
4215 7440 SZA /CHECK COUNTER
4216 7402 HLT /JMP COUNTER WRONG
4217 1136 TAD PNTCNT /ADVANCE COUNTER
4220 7001 IAC
4221 3136 DCA PNTCNT

/JUMP TEST 2 COUNTER=2
4222 5225 JMP .+3 /JMP FAILED
4223 7402 HLT
4224 7402 HLT
4225 1136 TAD PNTCNT
4226 1114 TAD M2
4227 7440 SZA /CHECK COUNTER
4230 7402 HLT /JMP COUNTER WRONG
4231 1136 TAD PNTCNT
4232 7001 IAC
4233 3136 DCA PNTCNT
```

```
/JUMP TEST 3 COUNTER=3
4234 5240 JMP .+4 /JMP FAILED
4235 7402 HLT
4236 7402 HLT
4237 7402 HLT
4240 1136 TAD PNTCNT
4241 1115 TAD M3
4242 7440 SZA /CHECK COUNTER
4243 7402 HLT /JMP COUNTER WRONG
4244 1136 TAD PNTCNT /ADVANCE COUNTER
4245 7001 IAC
4246 3136 DCA PNTCNT

/JUMP TEST 4 COUNTER=4
4247 5254 JMP .+5 /JMP FAILED
4250 7402 HLT
4251 7402 HLT
4252 7402 HLT
4253 7402 HLT
4254 1136 TAD PNTCNT
4255 1116 TAD M4
4256 7440 SZA /CHECK COUNTER
4257 7402 HLT /JMP COUNTER WRONG
4260 1136 TAD PNTCNT /ADVANCE COUNTER
4261 7001 IAC
4262 3136 DCA PNTCNT
```

```
/JUMP TEST 5 COUNTER=5
```

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4263 5271 JMP .+6
4264 7402 HLT /JMP FAILED
4265 7402 HLT /
4266 7402 HLT /
4267 7402 HLT /
4270 7402 HLT /
4271 1136 TAD PNTCNT
4272 1117 TAD M5
4273 7440 SZA /CHECK COUNTER
4274 7402 HLT /JMP COUNTER WRONG
4275 1136 TAD PNTCNT
4276 7001 IAC /ADVANCE COUNTER
4277 3136 DCA PNTCNT

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/JUMP TEST 6 COUNTER=6
4300 5307 JMP .+7
4301 7402 HLT /JMP FAILED
4302 7402 HLT /
4303 7402 HLT /
4304 7402 HLT /
4305 7402 HLT /
4306 7402 HLT /
4307 1136 TAD PNTCNT
4310 1120 TAD M6
4311 7440 SZA /CHECK COUNTER
4312 7402 HLT /JMP COUNTER WRONG
4313 1136 TAD PNTCNT
4314 7001 IAC /ADVANCE COUNTER
4315 3136 DCA PNTCNT

```

```

/JUMP TEST 7 COUNTER=7
4316 5326 JMP .+10
4317 7402 HLT /JMP FAILED
4320 7402 HLT /
4321 7402 HLT /
4322 7402 HLT /
4323 7402 HLT /
4324 7402 HLT /
4325 7402 HLT /
4326 1136 TAD PNTCNT
4327 1121 TAD M7
4330 7440 SZA /CHECK COUNTER
4331 7402 HLT /JMP COUNTER WRONG
4332 1136 TAD PNTCNT
4333 7001 IAC /ADVANCE COUNTER
4334 3136 DCA PNTCNT

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/JUMP TEST 8 COUNTER=10
4335 5346 JMP .+11
4336 7402 HLT /JMP FAILED
4337 7402 HLT /
4340 7402 HLT /
4341 7402 HLT /
4342 7402 HLT /

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4343 7402 HLT /
4344 7402 HLT /
4345 7402 HLT /
4346 1136 TAD PNTCNT
4347 1122 TAD M10
4350 7440 SZA /CHECK COUNTER
4351 7402 HLT /JMP COUNTER WRONG
4352 1136 TAD PNTCNT /ADVANCE COUNTER
4353 7001 IAC
4354 3136 DCA PNTCNT

```

/JUMP TEST 9 COUNTER=11

```

4355 5367 JMP .+12 /JMP FAILED
4356 7402 HLT /
4357 7402 HLT /
4360 7402 HLT /
4361 7402 HLT /
4362 7402 HLT /
4363 7402 HLT /
4364 7402 HLT /
4365 7402 HLT /
4366 7402 HLT /
4367 1136 TAD PNTCNT
4370 1123 TAD M11
4371 7440 SZA /CHECK COUNTER
4372 7402 HLT /JMP COUNTER WRONG
4373 1136 TAD PNTCNT /ADVANCE COUNTER
4374 7001 IAC
4375 3136 DCA PNTCNT
4376 7000 NOP
4377 7000 NOP

```

*4400 /JUMP TEST 10 COUNTER=12

```

4400 5201 JMP .+1
4401 1136 TAD PNTCNT
4402 1124 TAD M12
4403 7440 SZA /CHECK COUNTER
4404 7402 HLT /JMP COUNTER WRONG
4405 1136 TAD PNTCNT /ADVANCE COUNTER
4406 7001 IAC
4407 3136 DCA PNTCNT

```

/JUMP TEST 11 COUNTER=13

```

4410 5212 JMP .+2 /JMP FAILED
4411 7402 HLT /
4412 1136 TAD PNTCNT
4413 1125 TAD M13
4414 7440 SZA /CHECK COUNTER
4415 7402 HLT /JMP COUNTER WRONG
4416 1136 TAD PNTCNT /ADVANCE COUNTER
4417 7001 IAC
4420 3136 DCA PNTCNT

```

4421 5224 /JUMP TEST 12 COUNTER=14
4422 7402 JMP .+3
4423 7402 HLT /JMP FAILED
4424 1136 TAD PNTCNT /
4425 1126 TAD M14
4426 7440 SZA /CHECK COUNTER
4427 7402 HLT /JMP COUNTER WRONG
4430 1136 TAD PNTCNT /ADVANCE COUNTER
4431 7001 IAC
4432 3136 DCA PNTCNT

4433 5237 /JUMP TEST 13 COUNTER=15
4434 7402 JMP .+4
4435 7402 HLT /JMP FAILED
4436 7402 HLT /
4437 1136 TAD PNTCNT
4440 1127 TAD M15
4441 7440 SZA /CHECK COUNTER
4442 7402 HLT /JMP COUNTER WRONG
4443 1136 TAD PNTCNT /ADVANCE COUNTER
4444 7001 IAC
4445 3136 DCA PNTCNT

4446 5253 /JUMP TEST 14 COUNTER=16
4447 7402 JMP .+5
4450 7402 HLT /JMP FAILED
4451 7402 HLT /
4452 7402 HLT /
4453 1136 TAD PNTCNT
4454 1130 TAD M16
4455 7440 SZA /CHECK COUNTER
4456 7402 HLT /JMP COUNTER WRONG
4457 1136 TAD PNTCNT /ADVANCE COUNTER
4460 7001 IAC
4461 3136 DCA PNTCNT

4462 5270 /JUMP TEST 15 COUNTER=17
4463 7402 JMP .+6
4464 7402 HLT /JMP FAILED
4465 7402 HLT /
4466 7402 HLT /
4467 7402 HLT /
4470 1136 TAD PNTCNT
4471 1131 TAD M17
4472 7440 SZA /CHECK COUNTER
4473 7402 HLT /JMP COUNTER WRONG
4474 1136 TAD PNTCNT /ADVANCE COUNTER
4475 7001 IAC
4476 3136 DCA PNTCNT

```

4477 5306
4500 7402
4501 7402
4502 7402
4503 7402
4504 7402
4505 7402
4506 1136
4507 1132
4510 7440
4511 7402
4512 1136
4513 7001
4514 3136

/JUMP TEST 16  COUNTER =20
JMP .+7
HLT
HLT
HLT
HLT
HLT
HLT
TAD PNTCNT
TAD M20
SEA
HLT
TAD PNTCNT
IAC
DCA PNTCNT

/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

```

```

4515 9325
4516 7402
4517 7402
4520 7402
4521 7402
4522 7402
4523 7402
4524 7402

/JUMP TEST 17  COUNTER=21
JMP .+10
HLT
HLT
HLT
HLT
HLT
HLT
HLT

/JMP FAILED
/

```

```

4525 1136
4526 1133
4527 7440
4530 7402
4531 1136
4532 7001
4533 3136

TAD PNTCNT
TAD M21
SEA
HLT
TAD PNTCNT
IAC
DCA PNTCNT

/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

```

```

4534 9345
4535 7402
4536 7402
4537 7402
4540 7402
4541 7402
4542 7402
4543 7402
4544 7402
4545 1136
4546 1134
4547 7440
4550 7402
4551 1136
4592 7001
4593 3136

/JUMP TEST 18  COUNTER=22
JMP .+11
HLT
HLT
HLT
HLT
HLT
HLT
HLT
TAD PNTCNT
TAD M22
SEA
HLT
TAD PNTCNT
IAC
DCA PNTCNT

/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

```

```

/JMP TEST 19  COUNTER=23

```


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BASIC JMP-JNS TEST PAL10

Address	Instruction	Comments
4584	JMP	412
4585	HLT	/JMP FAILED
4586	HLT	/
4587	HLT	/
4588	HLT	/
4589	HLT	/
4590	HLT	/
4591	HLT	/
4592	HLT	/
4593	HLT	/
4594	HLT	/
4595	HLT	/
4596	TAD PNTCNT	
4597	TAD M23	
4598	SEA	/CHECK COUNTER
4599	HLT	/JMP COUNTER WRONG
4600	TAD PNTCNT	
4601	IAC	/ADVANCE COUNTER
4602	DCA PNTCNT	
4603	NOP	
4604	NOP	
4605	NOP	
4606	/JMP TEST 20	COUNTER=24
4607	TAD PK1	
4608	DCA I K7777	
4609	TAD PK2	
4610	DCA I K8	
4611	JMP I K7777	
4612	JMP I K8	
4613	JMP I K4620	
4614	PK1,	
4615	PK2,	
4616	*4620	
4617	TAD PNTCNT	
4618	TAD M24	
4619	SEA	/CHECK COUNTER
4620	HLT	/JMP COUNTER WRONG
4621	TAD PNTCNT	
4622	IAC	/ADVANCE COUNTER
4623	DCA PNTCNT	
4624	/JMP TEST 21	COUNTER=25
4625	TAD PK3	
4626	DCA I K7776	
4627	TAD PK4	
4628	DCA I K1	
4629	JMP I K7776	
4630	JMP I K1	
4631	JMP I K4640	
4632	-24	
4633	PK3,	
4634	PK4,	
4635	M24,	
4636	*4640	
4637	TAD PNTCNT	
4638	TAD M25	
4639	SEA	/CHECK COUNTER
4640	HLT	/JMP COUNTER WRONG

```
4644 1136 TAD PNTCNT
4645 7001 IAC /ADVANCE COUNTER
4646 3136 DCA PNTCNT

4647 1254 /JMP TEST 22 COUNTER=26
4650 3453 TAD PK5
4651 1255 DCA I K7775
4652 3424 TAD PK6
4653 3453 DCA I K2
4654 5424 JMP I K7775
4655 3660 JMP I K2
4656 7753 JMP I 4660
      PK5,
      PK6,
      M25,
      -25
      *4660

4660 1136 TAD PNTCNT
4661 1276 TAD M26
4662 7440 SEA /CHECK COUNTER
4663 7402 HLT /JMP COUNTER WRONG
4664 1136 TAD PNTCNT /ADVANCE COUNTER
4665 7001 IAC
4666 3136 DCA PNTCNT

/JMP TEST 23 COUNTER=27
4667 1274 TAD PK7
4670 3452 DCA I K7773
4671 1275 TAD PK8
4672 3425 DCA I K4
4673 3452 JMP I K7773
4674 3425 JMP I K4
4675 3461 JMP I K4700
4676 7752 M26,
      PK7,
      PK8,
      M26,
      -26
      *4700

4700 1136 TAD PNTCNT
4701 1316 TAD M27
4702 7440 SEA /CHECK COUNTER
4703 7402 HLT /JMP COUNTER WRONG
4704 1136 TAD PNTCNT /ADVANCE COUNTER
4705 7001 IAC
4706 3136 DCA PNTCNT

/JMP TEST 24 COUNTER=30
4707 1314 TAD PK9
4710 3451 DCA I K7767
4711 1315 TAD PK10
4712 3426 DCA I K10
4713 3451 JMP I K7767
4714 3426 JMP I K10
4715 3462 JMP I K4720
4716 7751 M27,
      PK9,
      PK10,
      M27,
      -27
      *4720

4720 1136 TAD PNTCNT
```

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/BASIC JMP-JMS TEST

```

4721 1336      TAD M30
4722 7440      SEA
4723 7402      HLT
4724 1136      TAD PNTCNT
4725 7001      IAC
4726 3136      DCA PNTCNT

      /JMP TEST 25  COUNTER=31
4727 1334      TAO PK11
4730 3450      DCA I K7757
4731 1335      TAD PK12
4732 3427      DCA I K20
4733 5450      JMP I K7757
4734 5427      JMP I K20
4735 5463      JMP I K4740
4736 7750      -30

```

```

/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

```

```

4740 4740      TAD PNTCNT
4741 1136      TAD M31
4742 1356      SEA
4743 7402      HLT
4744 1136      TAD PNTCNT
4745 7001      IAC
4746 3136      DCA PNTCNT

```

```

/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

```

/JMP TEST 26 COUNTER=32

```

4747 1354      TAD PK13
4750 3447      DCA I K7737
4751 1355      TAD PK14
4752 5430      DCA I K40
4753 5447      JMP I K7737
4754 5430      JMP I K40
4755 5404      JMP I K4760
4756 7747      -31

```

```

4760 4760      TAD PNTCNT
4761 1136      TAD M32
4762 1376      SEA
4763 7402      HLT
4764 1136      TAD PNTCNT
4765 7001      IAC
4766 3136      DCA PNTCNT

```

```

/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

```

/JMP TEST 27 COUNTER=33

```

4767 1374      TAD PK15
4770 3446      DCA I K7677
4771 1375      TAD PK16
4772 3431      DCA I K100
4773 5446      JMP I K7677
4774 5431      JMP I K100
4775 5465      JMP I K5000
4776 7746      -32

```

```

PK15,
PK16,
M32,

```

5000 *5000
5001 1136 TAD PNTCNT
5002 1216 TAD M33
5003 7440 SEA /CHECK COUNTER
5004 7402 HLT /JMP COUNTER WRONG
5005 1136 TAD PNTCNT /ADVANCE COUNTER
5006 7001 IAC
5006 3136 DCA PNTCNT

/JMP TEST 28 COUNTER=34

5007 1214 TAD PK17
5010 3445 DCA I K7577
5011 1215 TAD PK18
5012 3432 DCA I K200
5013 5445 JMP I K7577
5014 5432 JMP I K200
5015 5466 JMP I K5020
5016 7745 M33, -35

PK17,
PK18,
M33,

5020 *5020
5020 1136 TAD PNTCNT
5021 1236 TAD M34
5022 7440 SEA /CHECK COUNTER
5023 7402 HLT /JMP COUNTER WRONG
5024 1136 TAD PNTCNT /ADVANCE COUNTER
5025 7001 IAC
5026 3136 DCA PNTCNT

/JMP TEST 29 COUNTER=35

5027 1234 TAD PK19
5030 3444 DCA I K7377
5031 1235 TAD PK20
5032 3433 DCA I K400
5033 5444 JMP I K7377
5034 5433 JMP I K400
5035 5467 JMP I K5040
5036 7744 M34, -34

PK19,
PK20,
M34,

5040 *5040
5040 1136 TAD PNTCNT
5041 1256 TAD M35
5042 7440 SEA /CHECK COUNTER
5043 7402 HLT /JMP COUNTER WRONG
5044 1136 TAD PNTCNT /ADVANCE COUNTER
5045 7001 IAC
5046 3136 DCA PNTCNT

/JMP TEST 30 COUNTER=36

5047 1254 TAD PK21
5050 3443 DCA I K6777
5051 1255 TAD PK22
5052 3434 DCA I K1000

```
5053 5443      JMP I K6777
5054 5434      PK21,  JMP I K1000
5055 5470      PK22,  JMP I K5060
5056 7743      M35,   -35

5060          *5060
5060 1136      TAD PNTCNT
5061 1276      TAD M36
5062 7440      SEA
5063 7402      HLT
5064 1136      TAD PNTCNT
5065 7001      IAC
5066 3136      DCA PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
          /ADVANCE COUNTER

5067 1274      /JMP TEST 31 COUNTER=37
5070 3442      TAD PK23
5071 1275      DCA I K5777
5072 3435      TAD PK24
5073 3442      DCA I K2000
5074 3435      JMP I K5777
5075 3471      PK23,  JMP I K2000
5076 7742      PK24,  JMP I K5100
          M36,   -36

5100          *5100
5100 1136      TAD PNTCNT
5101 1316      TAD M37
5102 7440      SEA
5103 7402      HLT
5104 1136      TAD PNTCNT
5105 7001      IAC
5106 3136      DCA PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
          /ADVANCE COUNTER

          /JMP TEST 32 COUNTER=40
          TAD PK25
          DCA I K3777
          TAD PK26
          DCA I K4000
          JMP I K3777
          PK25,  JMP I K4000
          PK26,  JMP I K5120
          M37,   -37

5120          *5120
5120 1136      TAD PNTCNT
5121 1336      TAD M40
5122 7440      SEA
5123 7402      HLT
5124 1136      TAD PNTCNT
5125 7001      IAC
5126 3136      DCA PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
          /ADVANCE COUNTER
```

```
5127 1334
5130 3422
5131 1335
5132 3455
5133 5422
5134 5455
5135 5473
5136 7740

          PK27,
          PK28,
          M40,
          *5140

5140
5141 1136
5142 1356
5143 7440
5144 7402
5145 1136
5146 7001
5147 3136

          TAD PNTCNT
          TAD M41
          SEA
          HLT
          TAD PNTCNT
          IAC
          DCA PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
          /ADVANCE COUNTER

          /JMP TEST 33 COUNTER=41
          TAD PK27
          DCA I K0
          TAD PK28
          DCA I K7777
          JMP I K0
          JMP I K7777
          JMP I K5140
          -40

          *5140

5140
5141 1136
5142 1356
5143 7440
5144 7402
5145 1136
5146 7001
5147 3136

          TAD PNTCNT
          TAD M41
          SEA
          HLT
          TAD PNTCNT
          IAC
          DCA PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
          /ADVANCE COUNTER

          /JMP TEST 34 COUNTER=42
          TAD PK29
          DCA I K1
          TAD PK30
          DCA I K7776
          JMP I K1
          JMP I K7776
          JMP I K5160
          -41

          *5160

5160
5161 1136
5162 1376
5163 7440
5164 7402
5165 1136
5166 7001
5167 3136

          TAD PNTCNT
          TAD M42
          SEA
          HLT
          TAD PNTCNT
          IAC
          DCA PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
          /ADVANCE COUNTER

          /JMP TEST 35 COUNTER=43
          TAD PK31
          DCA I K2
          TAD PK32
          DCA I K7775
          JMP I K2
          JMP I K7775
          JMP I K5200
          -42

          PK31,
          PK32,
          M42,
          *5200

5200
5201 1136
5202 1216
5203 7440
5204 7402
5205 1136

          TAD PNTCNT
          TAD M43
          SEA
          HLT
          TAD PNTCNT

          /CHECK COUNTER
          /JMP COUNTER WRONG
```

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/BASIC JMP-JMS TEST

/ADVANCE COUNTER

IAC
DCA PNTCNT5205 7001
5206 3136

/JMP TEST 36 COUNTER=44

TAD PK33
DCA I K4
TAD PK34
DCA I K7773
JMP I K4
JMP I K7773
JMP I K5220
-435207 1214
5210 3425
5211 1215
5212 3452
5213 5425
5214 5452
5215 5476
5216 7735PK33,
PK34,
M43,

*5220

TAD PNTCNT
TAD M44
SEA
HLT
TAD PNTCNT
IAC
DCA PNTCNT5220 1136
5221 1236
5222 7440
5223 7402
5224 1136
5225 7001
5226 3136/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER

/JMP TEST 37 COUNTER=45

TAD PK35
DCA I K10
TAD PK36
DCA I K7767
JMP I K10
JMP I K7767
JMP I K5240
-445227 1234
5230 3426
5231 1235
5232 3451
5233 5426
5234 5491
5235 5502
5236 7734PK35,
PK36,
M44,

*5240

TAD PNTCNT
TAD M45
SEA
HLT
TAD PNTCNT
IAC
DCA PNTCNT/CHECK COUNTER
/JMP COUNTER WRONG
/ADVANCE COUNTER5240 1136
5241 1256
5242 7440
5243 7402
5244 1136
5245 7001
5246 3136

/JMP TEST 3 COUNTER=46

TAD PK37
DCA I K20
TAD PK38
DCA I K7757
JMP I K20
JMP I K7757
JMP I K5260
-455247 1254
5250 3427
5251 1255
5252 3450
5253 5427
5254 5450
5255 5503
5256 7733PK37,
PK38,
M45,

*5260

TAD PNTCNT
TAD M465260 1136
5261 1276

5262 7440 SZA /CHECK COUNTER
5263 7402 HLT /JMP COUNTER WRONG
5264 1136 TAD PNTCNT
5265 7001 IAC /ADVANCE COUNTER
5266 3136 DCA PNTCNT

/JMP TEST 39 COUNTER=47

5267 1274 TAD PK39
5270 3430 DCA I K40
5271 1275 TAD PK40
5272 3447 DCA I K7737
5273 5430 JMP I K40
5274 5447 JMP I K7737
5275 5504 JMP I K5300
5276 7732 M46, -46

PK39,
PK40,
M46,

*5300

5300 1136 TAD PNTCNT
5301 1316 TAD M47
5302 7440 SZA /CHECK COUNTER
5303 7402 HLT /JMP COUNTER WRONG
5304 1136 TAD PNTCNT /ADVANCE COUNTER
5305 7001 IAC
5306 3136 DCA PNTCNT

/JMP TEST 40 COUNTER=50

5307 1314 TAD PK41
5310 3431 DCA I K100
5311 1315 TAD PK42
5312 3446 DCA I K7677
5313 5431 JMP I K100
5314 5446 JMP I K7677
5315 5505 JMP I K5320
5316 7731 M47, -47

PK41,
PK42,
M47,

*5320

5320 1136 TAD PNTCNT
5321 1336 TAD M50
5322 7440 SZA /CHECK COUNTER
5323 7402 HLT /JMP COUNTER WRONG
5324 1136 TAD PNTCNT /ADVANCE COUNTER
5325 7001 IAC
5326 3136 DCA PNTCNT

/JMP TEST 41 COUNTER=51

5327 1334 TAD PK43
5330 3432 DCA I K200
5331 1335 TAD PK44
5332 3445 DCA I K7577
5333 5432 JMP I K200
5334 5445 JMP I K7577
5335 5506 JMP I K5340
5336 7730 M50, -50

PK43,
PK44,
M50,

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/BASIC JMP-JMS TEST

5340 *5340
5340 1136 TAD PNTCNT
5341 1356 TAD M51
5342 7440 SZA /CHECK COUNTER
5343 7402 HLT /JMP COUNTER WRONG
5344 1136 TAD PNTCNT /ADVANCE COUNTER
5345 7001 IAC
5346 3136 DCA PNTCNT

5347 1354 /JMP TEST 42 COUNTER=52
5350 3433 TAD PK45
5351 1355 DCA I K400
5352 3444 TAD PK46
5353 3433 DCA I K7377
5354 5444 JMP I K400
5355 5507 JMP I K7377
5356 7727 JMP I K5360
M51, -51

5360 *5360
5360 1136 TAD PNTCNT
5361 1376 TAD M52
5362 7440 SZA /CHECK COUNTER
5363 7402 HLT /JMP COUNTER WRONG
5364 1136 TAD PNTCNT /ADVANCE COUNTER
5365 7001 IAC
5366 5136 DCA PNTCNT

5367 1374 /JMP TEST 43 COUNTER=53
5370 3434 TAD PK47
5371 1375 DCA I K1000
5372 3443 TAD PK48
5373 3434 DCA I K6777
5374 3443 JMP I K1000
5375 5510 JMP I K6777
5376 7726 JMP I K5400
M52, -52

5400 *5400
5400 1136 TAD PNTCNT
5401 1216 TAD M53
5402 7440 SZA /CHECK COUNTER
5403 7402 HLT /JMP COUNTER WRONG
5404 1136 TAD PNTCNT /ADVANCE COUNTER
5405 7001 IAC
5406 3136 DCA PNTCNT

5407 1214 /JMP TEST 44 COUNTER=54
5410 3435 TAD PK49
5411 1215 DCA I K2000
5412 3442 TAD PK50
5413 3435 DCA I K5777
5414 5442 JMP I K2000
PK49, JMP I K5777

5415	5511	PK50,	JMP I K5420	
5416	7725	M53,	-53	
	5420	*5420		
5420	1136		TAD PNTCNT	
5421	1236		TAD M54	
5422	7440		SZA	/CHECK COUNTER
5423	7402		HLT	/JMP COUNTER WRONG
5424	1136		TAD PNTCNT	
5425	7001		IAC	/ADVANCE COUNTER
5426	3136		DCA PNTCNT	
			/JMP TEST 45 COUNTER=55	
5427	1234		TAD PK51	
5430	3436		DCA I K4000	
5431	1235		TAD PK52	
5432	3437		DCA I K3777	
5433	3436		JMP I K4000	
5434	3437	PK51,	JMP I K3777	
5435	5512	PK52,	JMP I K5440	
5436	7724	M54,	-54	
			/JMS TEST 1 COUNTER=56	
			JMP I AFM	
		M55,	-55	
		AFM,	FRM	
			JMS TO	
			JMP	
			TAD PNTCNT	
			TAD M56	
			SZA	/CHECK COUNTER
			HLT	/JMP COUNTER WRONG
			TAD AFM	
			CIA	
			TAD TO	
			SZA	/CHECK STORED ADDRESS
			HLT	/JMS FAILED
			DCA TO	/CLEAR STORED PC
			TAD PNTCNT	
			IAC	
			DCA PNTCNT	
			SKP	
		M56,	-56	

/BASIC JMP-JMS TEST

TIME	AFM	SKP	FRM+1	TEST	COUNTER	STATUS
2023		7410				
2024	AFM,	2003				
2025		4227		JMS TEST 2	COUNTER=57	
2026	FRM1,	7402	JMS TO1			
2027	TO1,	5227	HLT			
2030		1136	JMP			
2031		1246	TAD PNTCNT			
2032		7440	TAD M57			
2033		7402	SEA		/CHECK COUNTER	
2034		1250	HLT		/JMP COUNTER WRONG	
2035		7041	TAD AFRM1			
2036		1227	CIA			
2037		7440	TAD TO1		/CHECK STORED ADDRESS	
2040		7402	SEA		/JMS FAILED	
2041		3227	HLT TO1		/CLEAR STORED PC	
2042		1136	TAD PNTCNT			
2043		7001	IAC			
2044		3136	DCA PNTCNT			
2045		7410	SKP			
2046		7721				
2047	M57,	7410	-57			
2050	AFRM1,	2026	SKP			
2051		4254	FRM1			
2052		7402		JMS TEST 3	COUNTER=60	
2053	FRM2,	7402	JMS TO2			
2054	TO2,	5254	HLT			
2055		1136	HLT			
2056		1275	JMP			
2057		7440	TAD PNTCNT			
2060		7402	TAD M60			
2061		1273	SEA		/CHECK COUNTER	
2062		7041	HLT		/JMP COUNTER WRONG	
2063		1254	TAD AFRM2			
2064		7440	CIA			
2065		7402	TAD TO2			
2066		3254	SEA		/CHECK STORED ADDRESS	
2067		1136	HLT		/JMS FAILED	
2070		7001	DCA TO2		/CLEAR STORED PC	
2071		3136	TAD PNTCNT			
2072		7410	IAC			
2073		2052	DCA PNTCNT			
2074	AFRM2,	7410	SKP			
2075	M60,	7720	FRM2			
2076		4302	SKP			
2077		7402	-60			
2100		2100		JMS TEST 4	COUNTER=61	
2101		7402	JMS TO3			
	FRM3,		HLT			
			HLT			
			HLT			

```
2102 5302 JMP T03,
2103 1136 TAD PNTCNT
2104 1923 TAD M61
2105 7440 SEA /CHECK COUNTER
2106 7402 HLT /JMP COUNTER WRONG
2107 1921 TAD AFRM3
2110 7041 CIA
2111 1302 TAD T03
2112 7440 SEA /CHECK STORED ADDRESS
2113 7402 HLT /JMS FAILED
2114 3302 DCA T03 /CLEAR STORED PC
2115 1136 TAD PNTCNT
2116 7001 IAC
2117 3136 DCA PNTCNT
2120 7410 SKP
2121 2077 FRM3
2122 7410 SKP
2123 7717 -61
```

/JMS TEST 5 COUNTER=62

```
2124 4330 JMS T04
2125 7402 HLT
2126 7402 HLT
2127 7402 HLT
2130 5330 JMP T04,
2131 1136 TAD PNTCNT
2132 1351 TAD M62
2133 7440 SEA /CHECK COUNTER
2134 7402 HLT /JMP COUNTER WRONG
2135 1347 TAD AFRM4
2136 7041 CIA
2137 1330 TAD T04
2140 7440 SEA /CHECK STORED ADDRESS
2141 7402 HLT /JMS FAILED
2142 3330 DCA T04 /CLEAR STORED PC
2143 1136 TAD PNTCNT
2144 7001 IAC
2145 3136 DCA PNTCNT
2146 7410 SKP
2147 2125 FRM4
2150 7410 SKP
2151 7716 -62
```

/JMS TEST 6 COUNTER=63

```
2152 4356 JMS T05
2153 7402 HLT
2154 7402 HLT
2155 7402 HLT
2156 5356 JMP T05,
2157 1136 TAD PNTCNT
2160 1377 TAD M63
2161 7440 SEA /CHECK COUNTER
```

```

2162 7402 HLT
2163 1375 TAD AFRM5
2164 7041 CIA
2165 1356 TAD T05
2166 7440 SZA
2167 7402 HLT
2170 3356 DCA T05
2171 1136 TAD PNTCNT
2172 7001 IAC PNTCNT
2173 3136 DCA PNTCNT
2174 7410 SKP
2175 2153 AFRM5, FRM5
2176 7410 SKP
2177 7715 M63, -63

```

PAUSE

/TAPE # 2
*2200

```

2200 7000 /JMS TEST 7 COUNTER=64
2201 4202 NOP
2202 5202 JMS T06
2203 1136 JMP
2204 1221 TAD PNTCNT
2205 7440 TAD M64
2206 7402 SZA
2207 1202 HLT
2210 7041 TAD T06
2211 1223 CIA
2212 7440 TAD AT06
2213 7402 SZA
2214 3202 HLT
2215 1136 DCA T06
2216 7001 TAD PNTCNT
2217 3136 IAC PNTCNT
2220 7410 DCA PNTCNT
2221 7714 SKP
2222 7410 -64
2223 2202 SKP
          T06, AT06,

```

```

2224 4226 /JMS TEST 8 COUNTER=65
2225 7402 JMS T07
2226 5226 HLT
2227 1136 JMP
2230 1245 TAD PNTCNT
2231 7440 TAD M65
2232 7402 SZA
2233 1247 HLT
2234 7041 TAD AFRM7
2235 1226 CIA
          TAD T07

```

2236	7440	SEA	/CHECK STORED ADDRESS
2237	7402	HLT	/JMS FAILED
2240	3226	DCA T07	/CLEAR STORED PC
2241	1136	TAD PNTCNT	
2242	7001	IAC	
2243	3136	DCA PNTCNT	
2244	7410	SKP	
2245	7713	-65	
2246	7410	SKP	
2247	2225	AFRM7,	

/JMS TEST 9 COUNTER=66

2250	4253	JMS T08	
2251	7402	HLT	
2252	7402	HLT	
2253	5253	JMP	
2254	1136	TAD PNTCNT	
2255	1274	TAD M66	
2256	7440	SEA	/CHECK COUNTER
2257	7402	HLT	/JMP COUNTER WRONG
2260	1253	TAD T08	
2261	7041	CIA	
2262	1272	TAD AFRM8	
2263	7440	SEA	/CHECK STORED ADDRESS
2264	7402	HLT	/JMS FAILED
2265	3253	DCA T08	/CLEAR STORED PC
2266	1136	TAD PNTCNT	
2267	7001	IAC	
2270	3136	DCA PNTCNT	
2271	7410	SKP	
2272	8251	AFRM8,	
2273	7410	SKP	
2274	7712	M66,	

/JMS TEST 10 COUNTER=67

2275	4301	JMS T09	
2276	7402	HLT	
2277	7402	HLT	
2300	7402	HLT	
2301	5301	JMP	
2302	1136	TAD PNTCNT	
2303	1322	TAD M67	
2304	7440	SEA	/CHECK COUNTER
2305	7402	HLT	/JMP COUNTER WRONG
2306	1301	TAD T09	
2307	7041	CIA	
2310	1320	TAD AFRM9	
2311	7440	SEA	/CHECK STORED ADDRESS
2312	7402	HLT	/JMS FAILED
2313	3301	DCA T09	/CLEAR STORED PC
2314	1136	TAD PNTCNT	
2315	7001	IAC	
2316	3136	DCA PNTCNT	
2317	7410	SKP	

2320	2276	AFRM9,	FRM9		
2321	7410		SKP		
2322	7711	M67,	-67		
/JMS TEST 11 COUNTER =70					
2323	4330		JMS T010		
2324	7402	FRM10,	HLT		
2325	7402		HLT		
2326	7402		HLT		
2327	7402		HLT		
/CHECK COUNTER					
/JMP COUNTER WRONG					
/CHECK STORED ADDRESS					
/JMS FAILED					
/CLEAR STORED PC					
2330	5330	T010,	JMP		
2331	1136		TAD PNTCNT		
2332	1351		TAD M70		
2333	7440		SEA		
2334	7402		HLT		
2335	1330		TAD T010		
2336	7041		CIA		
2337	1347		TAD AFRM10		
2340	7440		SEA		
2341	7402		HLT		
2342	3330		DCA T010		
2343	1136		TAD PNTCNT		
2344	7001		IAC		
2345	3136		DCA PNTCNT		
2346	7410		SKP		
2347	2324	AFRM10,	FRM10		
2350	7410		SKP		
2351	7710	M70,	-70		
/JMS TEST 11 COUNTER=71					
2352	4356		JMS T011		
2353	7402	FRM11,	HLT		
2354	7402		HLT		
2355	7402		HLT		
2356	5356	T011,	JMP		
2357	1136		TAD PNTCNT		
2360	1377		TAD M71		
2361	7440		SEA		
2362	7402		HLT		
2363	1356		TAD T011		
2364	7041		CIA		
2365	1375		TAD AFRM11		
2366	7440		SEA		
2367	7402		HLT		
2370	3356		DCA T011		
2371	1136		TAD PNTCNT		
2372	7001		IAC		
2373	3136		DCA PNTCNT		
2374	7410		SKP		
2375	2353	AFRM11,	FRM11		
2376	7410		SKP		
2377	7707	M71,	-71		
/CHECK COUNTER					
/JMP COUNTER WRONG					
/CHECK STORED ADDRESS					
/JMS FAILED					
/CLEAR STORED PC					

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2400 *2400
      /JMS TEST 12  COUNTER=72
      TAD RK1
      DCA I K7777
      TAD RK2
      DCA I K1
      JMP I K1
      RK1, JMP I K2410
      RK2, JMS I K7776
      *2410
      TAD PNTCNT
      TAD M72
      SEA
      HLT
      TAD I K7776
      TAD K7776
      SEA
      HLT
      DCA I K7776
      TAD PNTCNT
      IAC
      DCA PNTCNT
      /CHECK COUNTER
      /JMP COUNTER WRONG
      /CHECK STORED ADDRESS
      /JMS FAILED
      /CLEAR STORED ADDRESS
      /ADVANCE COUNTER
      /JMS TEST 13  COUNTER=73
      TAD RK3
      DCA I K7776
      TAD RK4
      DCA I K2
      JMP I K2
      RK3, JMP I K2440
      RK4, JMS I K7775
      M72, -72
      *2440
      TAD PNTCNT
      TAD M73
      SEA
      HLT
      TAD I K7775
      TAD K7775
      SEA
      HLT
      DCA I K7775
      TAD PNTCNT
      IAC
      DCA PNTCNT
      /CHECK COUNTER
      /JMP COUNTER WRONG
      /CHECK STORED ADDRESS
      /JMS FAILED
      /CLEAR STORED ADDRESS
      /ADVANCE COUNTER
      /JMS TEST 14  COUNTER=74
      TAD RK5
      *2454
      1261

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2455	3664	DCA I K7774	
2456	1262	TAD RK6	
2457	3425	DCA I K4	
2460	3425	JMP I K4	
2461	5441	JMP I K2470	
2462	4452	JMS I K7773	
2463	7705	-73	
2464	7774	K7774, 7774	
*2470			
2470	1136	TAD PNTCNT	
2471	1313	TAD M74	
2472	7440	SEA	/CHECK COUNTER
2473	7402	HLT	/JMP COUNTER WRONG
2474	1452	TAD I K7773	
2475	1052	TAD K7773	
2476	7440	SEA	/CHECK STORED ADDRESS
2477	7402	HLT	/JMS FAILED
2500	3452	DCA I K7773	/CLEAR STORED ADDRESS
2501	1136	TAD PNTCNT	
2502	7001	IAC	/ADVANCE COUNTER
2503	3136	DCA PNTCNT	
/JMS TEST 15 COUNTER=75			
2504	1311	TAD RK7	
2505	3714	DCA I K7770	
2506	1312	TAD RK8	
2507	3426	DCA I K10	
2510	3426	JMP I K10	
2511	3542	JMP I K2520	
2512	4451	JMS I K7767	
2513	7704	-74	
2514	7770	K7770, 7770	
*2520			
2520	1136	TAD PNTCNT	
2521	1343	TAD M75	
2522	7440	SEA	/CHECK COUNTER
2523	7402	HLT	/JMP COUNTER WRONG
2524	1451	TAD I K7767	
2525	1051	TAD K7767	
2526	7440	SEA	/CHECK STORED ADDRESS
2527	7402	HLT	/JMS FAILED
2530	3451	DCA I K7767	/CLEAR STORED ADDRESS
2531	1136	TAD PNTCNT	
2532	7001	IAC	/ADVANCE COUNTER
2533	3136	DCA PNTCNT	
/JMS TEST 16 COUNTER=76			
2534	1341	TAD RK9	
2535	3744	DCA I K7760	
2536	1342	TAD RK10	
2537	3427	DCA I K20	
2540	3427	JMP I K20	

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2541 5243  RK9,      JMP I K2600
2542 4450  RK10,     JMS I K7757
2543 7703  M75,      -75
2544 7760  K7760,    7760

2600      *2600
2600 1136  TAD PNTCNT
2601 1223  TAD M76
2602 7440  SZA
2603 7402  HLT
2604 1450  TAD I K7757
2605 1050  TAD K7757
2606 7440  SZA
2607 7402  HLT
2610 3450  DCA I K7757
2611 1136  TAD PNTCNT
2612 7001  IAC
2613 3136  DCA PNTCNT

      /JMS TEST 17  COUNTER=77
2614 1221  TAD RK11
2615 3624  DCA I K7740
2616 1222  TAD RK12
2617 3430  DCA I K40
2620 5430  JMP I K40
2621 5544  JMP I K2630
2622 4447  RK11,
2623 7702  RK12,
2624 7740  M76,
      7740

2630      *2630
2630 1136  TAD PNTCNT
2631 1253  TAD M77
2632 7440  SZA
2633 7402  HLT
2634 1447  TAD I K7737
2635 1047  TAD K7737
2636 7440  SZA
2637 7402  HLT
2640 3447  DCA I K7737
2641 1136  TAD PNTCNT
2642 7001  IAC
2643 3136  DCA PNTCNT

      /JMS TEST 18  COUNTER=100
2644 1251  TAD RK13
2645 3654  DCA I K7700
2646 1252  TAD RK14
2647 3431  DCA I K100
2650 5431  JMP I K100
2651 5545  JMP I K2660
2652 4446  RK13,
2653 7701  RK14,
2654 7700  M77,
      7700

      /CHECK COUNTER WRONG
      /JMP COUNTER WRONG

      /CHECK STORED ADDRESS
      /JMS FAILED
      /CLEAR STORED ADDRESS
      /ADVANCE COUNTER
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2660      *2660
2660      TAD PNTCNT
2661      TAD M100
2662      SZA
2663      HLT
2664      TAD I K7677
2665      TAD K7677
2666      SZA
2667      HLT
2670      DCA I K7677
2671      TAD PNTCNT
2672      IAC
2673      DCA PNTCNT

                /CHECK COUNTER
                /JMS COUNTER WRONG

                /CHECK STORED ADDRESS
                /JMS FAILED
                /CLEAR STORED ADDRESS
                /ADVANCE COUNTER

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2674      /JMS TEST 19 COUNTER=101
2675      TAD RK15
2676      DCA I K7600
2677      TAD RK16
2678      DCA I K200
2679      JMP I K200
2701      JMP I K2710
2702      JMS I K7577
2703      -100
2704      K7600, 7600

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2710      *2710
2710      TAD PNTCNT
2711      TAD M101
2712      SZA
2713      HLT
2714      TAD I K7577
2715      TAD K7577
2716      SZA
2717      HLT
2720      DCA I K7577
2721      TAD PNTCNT
2722      IAC
2723      DCA PNTCNT

                /CHECK COUNTER
                /JMP COUNTER WRONG

                /CHECK STORED ADDRESS
                /JMS FAILED
                /CLEAR STORED ADDRESS
                /ADVANCE COUNTER

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2724      /JMS TEST 20 COUNTER=102
2725      TAD RK17
2726      DCA I K7400
2727      TAD RK18
2728      DCA I K400
2729      JMP I K400
2731      JMP I K2740
2732      JMS I K7377
2733      -101
2734      K7400, 7400

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2740      *2740
2740      TAD PNTCNT

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2741	1363	TAD M102	
2742	7440	SEA	/CHECK COUNTER
2743	7402	HLT	/JMP COUNTER WRONG
2744	1444	TAD I K7377	
2745	1044	TAD K7377	
2746	7440	SEA	/CHECK STORED ADDRESS
2747	7402	HLT	/JMS FAILED
2750	3444	DCA I K7377	/CLEAR STORED ADDRESS
2751	1136	TAD PNTCNT	
2752	7001	IAC	/ADVANCE COUNTER
2753	3136	DCA PNTCNT	
2754	1361	/JMS TEST 21	COUNTER=103
2755	3764	TAD RK19	
2756	1362	DCA I K7000	
2757	3434	TAD RK20	
2760	5434	DCA I K1000	
2761	5550	JMP I K1000	
2762	4443	JMP I K3000	
2763	7676	JMS I K6777	
2764	7000	-102	
		K7000,	
3000	3000		
3000	1136	TAD PNTCNT	
3001	1223	TAD M103	
3002	7440	SEA	/CHECK COUNTER
3003	7402	HLT	/JMP COUNTER WRONG
3004	1443	TAD I K6777	
3005	1043	TAD K6777	
3006	7440	SEA	/CHECK STORED ADDRESS
3007	7402	HLT	/JMS FAILED
3010	3443	DCA I K6777	/CLEAR STORED ADDRESS
3011	1136	TAD PNTCNT	
3012	7001	IAC	/ADVANCE COUNTER
3013	3136	DCA PNTCNT	
3014	1221	/JMS TEST 22	COUNTER=104
3015	3624	TAD RK21	
3016	1222	DCA I K6000	
3017	3435	TAD RK22	
3020	5435	DCA I K2000	
3021	5551	JMP I K2000	
3022	4442	JMP I K3030	
3023	7675	JMS I K5777	
3024	6000	-103	
		K6000,	
3030	3030		
3030	1136	TAD PNTCNT	
3031	1253	TAD M104	
3032	7440	SEA	/CHECK COUNTER
3033	7402	HLT	/JMP COUNTER WRONG
3034	1442	TAD I K5777	

3035 1042 TAD K5777
3036 7440 SZA /CHECK STORED ADDRESS
3037 7402 HLT /JMS FAILED
3040 3442 DCA I K5777 /CLEAR STORED ADDRESS
3041 1136 TAD PNTCNT
3042 7001 IAC /ADVANCE COUNTER
3043 3136 DCA PNTCNT

/JMS TEST 23 COUNTER=105

3044 1251 TAD RK23
3045 3054 DCA I K4001
3046 1252 TAD RK24
3047 3437 DCA I K3777
3050 5137 JMP I K3777
3051 5552 JMP I K3060
3052 4436 RK23,
3053 7674 RK24,
3054 4001 M104,
4001 K4001, 4001

*3060

3060 3060 TAD PNTCNT
3061 1136 TAD M105
3062 1303 SZA /CHECK COUNTER
3063 7402 HLT /JMP COUNTER WRONG
3064 1436 TAD I K4000
3065 1036 TAD K4000

3066 7440 SZA /CHECK STORED ADDRESS
3067 7402 HLT /JMS FAILED
3070 3436 DCA I K4000 /CLEAR STORED ADDRESS
3071 1136 TAD PNTCNT
3072 7001 IAC /ADVANCE COUNTER
3073 3136 DCA PNTCNT

/JMS TEST 24 COUNTER=106

3074 1301 TAD RK25
3075 3704 DCA I K2001
3076 1302 TAD RK26
3077 3442 DCA I K5777
3100 0442 JMP I K5777
3101 0553 JMP I K3110
3102 4435 JMS I K2000
3103 7673 -105
3104 2001 K2001, 2001

RK25,
RK26,
M105,
K2001,

*3110

3110 3110 TAD PNTCNT
3111 1136 TAD M106
3112 1333 SZA /CHECK COUNTER
3113 7402 HLT /JMP COUNTER WRONG
3114 1435 TAD I K2000
3115 1035 TAD K2000
3116 7440 SZA /CHECK STORED ADDRESS
3117 7402 HLT /JMS FAILED
3120 3435 DCA I K2000 /CLEAR STORED ADDRESS

3121	1136	TAD PNTCNT	
3122	7001	IAC	/ADVANCE COUNTER
3123	3136	DCA PNTCNT	
/JMS TEST 25 COUNTER=107			
3124	1331	TAD RK27	
3125	3734	DCA I K1001	
3126	1332	TAD RK28	
3127	3443	DCA I K6777	
3130	5443	JMP I K6777	
3131	5554	JMP I K3140	
3132	4434	JMS I K1000	
3133	7672	-106	
3134	1001	1001	
RK27,			
RK28,			
M106,			
K1001,			
*3140			
3140	1136	TAD PNTCNT	
3141	1363	TAD M107	
3142	7440	SZA	/CHECK COUNTER
3143	7402	HLT	/JMP COUNTER WRONG
3144	1434	TAD I K1000	
3145	1034	TAD K1000	
3146	7440	SZA	/CHECK STORED ADDRESS
3147	7402	HLT	/JMS FAILED
3150	3434	DCA I K1000	/CLEAR STORED ADDRESS
3151	1136	TAD PNTCNT	
3152	7001	IAC	/ADVANCE COUNTER
3153	3136	DCA PNTCNT	
/JMS TEST 26 COUNTER=110			
3154	1361	TAD RK29	
3155	3764	DCA I K401	
3156	1362	TAD RK30	
3157	3444	DCA I K7377	
3160	5444	JMP I K7377	
3161	5555	JMP I K3200	
3162	4433	JMS I K400	
3163	7671	-107	
3164	0401	401	
RK29,			
RK30,			
M107,			
K401,			
*3200			
3200	1136	TAD PNTCNT	
3201	1223	TAD M110	
3202	7440	SZA	/CHECK COUNTER
3203	7402	HLT	/JMP COUNTER WRONG
3204	1433	TAD I K400	
3205	1033	TAD K400	
3206	7440	SZA	/CHECK STORED ADDRESS
3207	7402	HLT	/JMS FAILED
3210	3433	DCA I K400	/CLEAR STORED ADDRESS
3211	1136	TAD PNTCNT	
3212	7001	IAC	/ADVANCE COUNTER
3213	3136	DCA PNTCNT	

/JMS TEST 27 COUNTER=111

3214 1221
3215 3624
3216 1222
3217 3445
3220 5445
3221 5556
3222 4432
3223 7670
3224 0201

TAD RK31
DCA I K201
TAD RK32
DCA I K7577
JMP I K7577
JMP I K3230
JMS I K200
-110
201

RK31,
RK32,
M110,
K201,

*3230

3230
3231 1136
3231 1253
3232 7440
3233 7402
3234 1432
3235 1032
3236 7440
3237 7402
3240 3432
3241 1136
3242 7001
3243 3136

TAD PNTCNT
TAD M111
SEA
HLT
TAD I K200
TAD K200
SEA
HLT
DCA I K200
TAD PNTCNT
IAC
DCA PNTCNT

/CHECK COUNTER
/JMP COUNTER WRONG

/CHECK STORED ADDRESS
/JMS FAILED
/CLEAR STORED ADDRESS
/ADVANCE COUNTER

/JMS TEST 28 COUNTER =112

3244 1251
3245 3654
3246 1252
3247 3446
3250 5446
3251 5557
3252 4431
3253 7667
3254 0101

TAD RK33
DCA I K101
TAD RK34
DCA I K7677
JMP I K7677
JMP I K3260
JMS I K100
-111
101

RK33,
RK34,
M111,
K101,

3260
3260 1136
3261 1303
3262 7440
3263 7402
3264 1431
3265 1031
3266 7440
3267 7402
3270 3431
3271 1136
3272 7001
3273 3136

TAD PNTCNT
TAD M112
SEA
HLT
TAD I K100
TAD K100
SEA
HLT
DCA I K100
TAD PNTCNT
IAC
DCA PNTCNT

/CHECK COUNTER
/JMP COUNTER WRONG

/CHECK STORED ADDRESS
/JMS FAILED
/CLEAR STORED ADDRESS
/ADVANCE COUNTER

/JMS TEST 29 COUNTER=113

3274 1301
3275 3704
3276 1302

TAD RK35
DCA I K41
TAD RK36

3277	3447	DCA I K7737	
3300	5447	JMP I K7737	
3301	5560	JMP I K3310	
3302	4430	RK35,	
3303	7666	RK36,	
3304	0041	M112,	
		K41,	
		41	
3310	3310	*3310	
3310	1136	TAD PNTCNT	
3311	1333	TAD M113	
3312	7440	SEA	/CHECK COUNTER
3313	7402	HLT	/JMP COUNTER WRONG
3314	1430	TAD I K40	
3315	1030	TAD K40	
3316	7440	SEA	/CHECK STORED ADDRESS
3317	7402	HLT	/JMS FAILED
3320	3430	DCA I K40	/CLEAR STORED ADDRESS
3321	1136	TAD PNTCNT	
3322	7001	IAC	/ADVANCE COUNTER
3323	3136	DCA PNTCNT	
3324	1331	/JMS TEST 30 COUNTER=114	
3325	3734	TAD RK37	
3326	1332	DCA I K21	
3327	3450	TAD RK38	
3330	5450	DCA I K7757	
3331	5561	JMP I K7757	
3332	4427	JMP I K3340	
3333	7665	JMS I K20	
3334	0021	-113	
		21	
3340	3340	*3340	
3340	1136	TAD PNTCNT	
3341	1363	TAD M114	
3342	7440	SEA	/CHECK COUNTER
3343	7402	HLT	/JMP COUNTER WRONG
3344	1427	TAD I K20	
3345	1027	TAD K20	
3346	7440	SEA	/CHECK STORED ADDRESS
3347	7402	HLT	/JMS FAILED
3350	3427	DCA I K20	/CLEAR STORED ADDRESS
3351	1136	TAD PNTCNT	
3352	7001	IAC	/ADVANCE COUNTER
3353	3136	DCA PNTCNT	
3354	1361	/JMS TEST 31 COUNTER=115	
3355	3764	TAD RK39	
3356	1362	DCA I K11	
3357	3451	TAD RK40	
3360	5451	DCA I K7767	
3361	5562	JMP I K7767	
		JMP I K3400	
		RK39,	

3362	4426	RK40,	JMS I K10	
3363	7664	M114,	-114	
3364	0011	K11,	11	
3400		*3400		
3400	1136		TAD PNTCNT	
3401	1223		TAD M115	
3402	7440		SZA	/CHECK COUNTER
3403	7402		HLT	/JMP COUNTER WRONG
3404	1426		TAD I K10	
3405	1026		TAD K10	
3406	7440		SZA	/CHECK STORED ADDRESS
3407	7402		HLT	/JMS FAILED
3410	3426		DCA I K10	/CLEAR STORED ADDRESS
3411	1136		TAD PNTCNT	
3412	7001		IAC	/ADVANCE COUNTER
3413	3136		DCA PNTCNT	

3414	1221		/JMS TEST 32	COUNTER=116
3415	3624		TAD RK41	
3416	1222		DCA I K5	
3417	3432		TAD RK42	
3420	5432		DCA I K7773	
3421	5563		JMP I K7773	
3422	4425		JMP I K3430	
3423	7663		JMS I K4	
3424	0005		-115	
			5	

3430		*3430		
3430	1136		TAD PNTCNT	
3431	1293		TAD M116	
3432	7440		SZA	/CHECK COUNTER
3433	7402		HLT	/JMP COUNTER WRONG
3434	1425		TAD I K4	
3435	1025		TAD K4	
3436	7440		SZA	/CHECK STORED ADDRESS
3437	7402		HLT	/JMS FAILED
3440	3425		DCA I K4	/CLEAR STORED ADDRESS
3441	1136		TAD PNTCNT	
3442	7001		IAC	/ADVANCE COUNTER
3443	3136		DCA PNTCNT	

3444	1251		/JMS TEST 33	COUNTER=117
3445	3654		TAD RK43	
3446	1252		DCA I K3	
3447	3453		TAD RK44	
3450	5453		DCA I K7775	
3451	5564		JMP I K7775	
3452	4424		JMP I K3460	
3453	7662		JMS I K2	
3454	0003		-116	
			3	

3460	*3460	TAD PNTCNT	
3460		TAD M117	
3461		SZA	/CHECK COUNTER
3462		HLT	/JMP COUNTER WRONG
3463		TAD I K2	
3464		TAD K2	
3465		SZA	/CHECK STORED ADDRESS
3466		HLT	//JMS FAILED
3467		DCA I K2	/CLEAR STORED ADDRESS
3470		TAD PNTCNT	
3471		IAC	/ADVANCE COUNTER
3472		DCA PNTCNT	
3473			
3474		/JMS TEST 34	COUNTER=120
3475		TAD RK45	
3476		DCA I K2	
3477		TAD RK46	
3478		DCA I K7776	
3479		JMP I K7776	
3480		JMP I K3510	
3481		JMS I K1	
3482			-117
3483			
3484			
3485			
3486			
3487			
3488			
3489			
3490			
3491			
3492			
3493			
3494			
3495			
3496			
3497			
3498			
3499			
3500			
3501			
3502			
3503			

3510	*3510	TAD PNTCNT	
3510		TAD M120	
3511		SZA	/CHECK COUNTER
3512		HLT	/JMP COUNTER WRONG
3513		TAD I K1	
3514		TAD K1	
3515		SZA	/CHECK STORED ADDRESS
3516		HLT	/JMS FAILED
3517		DCA I K1	/CLEAR STORED ADDRESS
3520		TAD PNTCNT	
3521		IAC	/ADVANCE COUNTER
3522		DCA PNTCNT	
3523			
3524		/JMS TEST 35	COUNTER=121
3525		TAD RK47	
3526		DCA I K1	
3527		TAD RK48	
3528		DCA I K7777	
3529		JMP I K7777	
3530		JMP I K3540	
3531		JMS I K0	
3532			-120
3533			
3534			
3535			
3536			
3537			
3538			
3539			
3540			
3541			
3542			
3543			

3540	*3540	TAD PNTCNT	
3540		TAD M121	
3541		SZA	/CHECK COUNTER
3542		HLT	/JMP COUNTER WRONG
3543			

3544	1422	TAD I K0	
3545	1022	TAD K0	
3546	7440	SZA	/CHECK STORED ADDRESS
3547	7402	HLT	/JMS FAILED
3550	3422	DCA I K0	/CLEAR STORED ADDRESS
3551	1371	TAD BLCNT	
3552	7001	IAC	
3553	3371	DCA BLCNT	
3554	1371	TAD BLCNT	
3555	1372	TAD LIMIT	
3556	7640	SZA CLA	
3557	8766	JMP I BEL-1	
3560	3371	DCA BLCNT	
3561	1367	TAD BEL	
3562	6046	TL5	
3563	6041	T8F	
3564	8363	JMP :-1	
3565	5766	JMP I .+1	
3566	4200	4200	
3567	0207	207	
3570	7657	-121	
3571	0000	BLCNT, 0	
3572	1200	LIMIT, -6600	

