

1. IDENTIFICATION
2. Maindec-8I-D0AA
3. PDP-8/I Instruction Test (EAE) - Part 3A
4. March 13, 1968

The document (Maindec-8i-d0aa-d) that should be here is missing. What we do have is the document for Maindec-801-3a, which will be appended to this PDF. Instructions for running the diagnostic have not changed.

Thanks to the work of Doug Ingraham, who retyped the source code for Maindec-801-3a from the PDF, we know the differences between the two diagnostics at a level closer to the source level than just diffing the binary.

I have created what I hope is a high quality dis-assembly of Maindec-8i-d0aa. The differences lie in an additional block of code to test the SCL instruction, and no less than three bugs being introduced due to bitrot of the old code. In addition, code to trap stray interrupts was added in low memory.

The first bug is that in location 0606, a "DCA LXP" became "DCA I LXP".

The second is that at location 1000, "JMP HSE3" became "JMS HSE3".

The third is that at location 2414, "JMP SCP14" became "JMP I SCP14".

The SCL test routine ("TSTSCL") is inserted, starting at 5400.

Surprisingly, the errors do not compromise the operation of the diagnostic, at least in the common case where the EAE is mostly working.

The errors are retained for historical accuracy, as they appear in all the known copies of the binary paper tape.

This page was prepended by Vincent R. Slyngstad.



1. IDENTIFICATION
- 1.1 Maindec 801-3A
- 1.2 PDP-8 Instruction Test (EAE Type 182)—Part 3A
- 1.3 July 19, 1965

2. ABSTRACT

This program is a test of the Extended Arithmetic Element Type 182. The following instructions are tested:

MQL, MQA, SHL, LSR, ASR, NMI, SCA

An attempt is made to detect and isolate errors to its most basic fault and to the minimum number of logic cards. Multiply and divide are tested Maindec 801-3B.

3. REQUIREMENTS

3.1 Storage

Memory Locations  $10_8 - 5410_8$

3.2 Subprograms and/or Subroutines

High RIM Loader, High Binary Loader

3.3 Equipment

PDP-8, EAE Type 182, keyboard reader and teleprinter.

4. USAGE

4.1 Loading

4.1.1 If the Binary Loader beginning at  $7777_8$  is in memory, go to paragraph 4.1.2; otherwise the RIM Loader beginning at  $7756_8$  and/or the Binary Loader must be loaded into memory.

The PDP-8 Instruction Test Part 3A, may now be loaded as follows:

4.1.2 Set  $7777_8$  in the SWITCH REGISTER.

4.1.3 Press LOAD ADDRESS key.

4.1.4 Place Instruction Test Part 3A in the keyboard reader.

4.1.5 Press START key on the operator console.

4.1.6 Engage the keyboard reader.

4.2 Calling Sequence (Not Applicable)

4.3 Switch Settings

Set the SWITCH REGISTER keys to  $5000_8$  before starting the program.

4.4 Startup and/or Entry

4.4.1 The starting address of the PDP-8 Part 3A Instruction Test is  $0200_8$ .

4.4.2 Set  $0200_8$  in the SWITCH REGISTER keys and press the LOAD ADDRESS key.

4.4.3 Set 5000<sub>g</sub> in the SWITCH REGISTER keys and press the START key.

These initial switch settings will cause the program to print error messages and halt on an error. See paragraph 4.6 for other switch options.

#### 4.5 Errors in Usage

Errors detected by the program cause the following:

- Print error information
- Halt on error

The following are typical examples of error print information:

4.5.1	NMIT	C(AC)	C(MQ)
		000000000000	010101010101
	NMI	010101010100	000000000000
	SCAT	000000001100	
	SCA	000000001100	

NMIT = Normalize and step counter test. Original C(AC) and C(MQ).

NMI = C(AC) and C(MQ) after the NMI instruction was executed.

SCAT = The correct count of the step counter after the normalize instruction was executed.

SCA = The actual count in the step counter as read into the AC by the SCA instruction after the normalize instruction was executed.

Note that Bit 11 of AC in error. C(AC) should equal 2525<sub>g</sub>.

4.5.2	SHIFT	11	
	C(MQ)	001111001011	
		C(AC)	C(MQ)
	SHLO	000011100101	100000000000
	LSRO	000000000000	000111001011

SHIFT 11 = Number of shifts to be executed.

C(MQ) = Original C(MQ). (The original C(AC) equal all 0's.)

SHL = C(L), C(AC), and C(MQ) after the SHL instruction was executed.

LSR = C(L), C(AC), and C(MQ) after the results of the SHL instructions were acted upon by the LSR instruction.

Note that Bit 3 of AC after a SHL instruction is in error. C(AC) should equal 0745<sub>g</sub>.

4.5.3	SHIFT 2		
	C(AC) 1	011111111111	
		C(AC)	C(MQ)
	ASR 1	111111111111	000000000000

SHIFT 2 = Number of shifts to be executed.

C(AC) = Original C(AC) and C(L). (The original C(MQ) equal to all 0's.)

ASR = C(AC), C(L), and C(MQ) after the ASR instruction was executed.

Note that C(L) should equal a 0, C(AC) should equal  $0777_8$ , C(MQ) should equal  $6000_8$  after the ASR instruction was executed.

4.5.4 MQLT  
AC 1 00000000011  
0-AC 1 00000000001

MQLT = MQL instruction test with a link set to a 1.

AC = The original C(AC) and C(L).

0-AC = C(AC) and C(L) after the MQL instruction was executed.

Note that bit 11 of AC should equal 0.

4.5.5 MQLT1  
AC 0 00000000001  
0-AC 0 00000000001

MQLT1 = MQL instruction test with a link cleared to a 0.

AC = The original C(AC) and C(L).

0-AC = C(AC) and C(L) after the MQL instruction was executed.

Note that bit 11 of AC should equal 0.

4.5.6 MQAT  
AC 1 00000000001  
MQL)  
MQA) 1 00000000000

MQAT = MQA, MQL instructions test with a link set to a 1.

AC = Original C(AC) and C(L).

MQL MQA = The C(AC) and C(L) after the execution of an MQL instruction.

Note that bit 11 of AC should equal a 1.

4.5.7 MQAT1  
AC 0 10000000000  
MQL)  
MQA) 0 01111111111

MQAT1 = MQA, MQL instructions test with a link set to a 1.

AC = Original C(AC) and C(L).

MQL MQA = The C(AC) and C(L) after the execution of an MQL instruction followed by an MQA instruction.

Note that C(AC) should equal  $4000_8$ .

4.5.8      MQAT2  
             AC    1    11111111110  
             MQ       00000000001  
             MQVAC 1   00000000000

MQAT2 = MQA instruction test.

AC = Original C(AC) and C(L).

MQ = Original C(MQ).

MQVAC = The C(AC) and C(L) after the execution of an MQA instruction.

Note that C(AC) should equal 7777<sub>8</sub>.

4.5.9      MQAT3  
             AC    0    11111111110  
             MQ       00000000001  
             MQVAC 0   00000000000

MQAT3 = MQA instruction test.

AC = Original C(L) and C(AC).

MQ = Original C(MQ).

MQVAC = The C(AC) and the C(L) after the execution of an MQA instruction.

Note that C(AC) should equal 7777<sub>8</sub>.

4.5.10      The following table contains the test mnemonic, starting address, error halt address, and instructions tested.

<u>Mnemonic</u>	<u>Instructions</u>	<u>Starting Address</u>	<u>Error Halt</u>
MQLT	MQL	0200	0240
MQLT1	MQL	0427	0500
MQAT	MQL, MQA	0600	0661
MQAT1	MQL, MQA	1000	1061
MQAT2	MQA	1200	1261
MQAT3	MQA	1400	1460
STEST	SHL, LSR	1600	1671
STEST1	SHL, LSR	2400	2723
STEST2	ASR	3200	3355
STEST3	ASR	4000	4060
NORMT	NMI, SCA	4200	4261
NORMT1	NMI, SCA	5000	5143
NORMT2	NMI	5200	5324

The module table (see paragraph 11.4) should be used after a visual check of the program error printout.

4.5.11      Table 1 should be used on testing MQAT, MQAT1, etc, after determining which bit of the AC and/or MQ is in error.

4.5.12 Table 1 should also be used on testing STEST1, STEST2, etc. After determining which two bits may be in error in the AC and/or MQ, reference Table 1 for the module identification of the two bits in question.

4.5.13 Table 2 should be used in conjunction with Table 1 when a step count error may exist.

4.6 Recovery from such Errors

Press CONTINUE or set up one of the following switch register controls followed by pressing the CONTINUE key.

4.6.1 SWITCH REGISTER keys 0, 1, 2, 3 are used for error recovery as follows:

Switch 0 = Halt on error.

Switch 1 = Scope mode (repeat pattern and/or test).

Switch 2 = Print error information.

Switch 3 = Inhibit exiting current test.

4.6.2 Multiple switch settings are as follows:

Switches 0, 2 = Print error information and halt at error stop.

Switches 1, 2 = Scope mode and print error information.

Switches 0, 2, 3 = Inhibit exiting current test, print error information and halt at error stop.

Switches 0, 1, 2 = Scope mode, print error information, and halt at error stop.

5. RESTRICTIONS

Before running this test, all basic PDP-8 processor tests should have been run successfully.

6. DESCRIPTION

6.1 Discussion

The PDP-8 Instruction Test—Part 3A tests the following extended arithmetic element instructions:

MQL, MQA, SHL, LSR, SCA, ASR, NMI

The extended arithmetic element is tested using patterns necessary to detect and isolate errors to the basic cause and minimum logic card involved. If a failure does occur, the test will stop at a predetermined error halt.

Two look-up tables are provided for error repair methods containing the following information:

AC, MQ, and SC bit numbers  
Processor logic drawing number  
Logic board type  
Logic board location

The program starts at memory address 0200<sub>8</sub> and will print "3A" at the completion of the test and jump back to location 0200 to repeat the entire test. The test is assembled in binary format.

7. METHODS (Not Applicable)



8. FORMAT (Not Applicable)

9. EXECUTION TIME

35 sec.

10. PROGRAM

10.4 Program Listing

/EAE PART 3A OF INSTRUCTION TEST

CAM=7621  
SCA=7441  
NMI=7411  
ASR=7415  
MQL=7421  
MQA=7501  
LSR=7417  
SHL=7413

\*0020

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0020 0000 GEN, 0
0021 2125 ISZ Z GENX
0022 5420 JMP I GEN
0023 7604 CLA OSR /TEST SW 3
0024 7106 RTL CLL
0025 7006 RTL
0026 7430 SZL
0027 5431 JMP I BACK
0030 5432 JMP I NEXT
0031 0000 BACK, 0000
0032 0000 NEXT, 0000
0033 0427 XMQLT1, MQLT1
0034 0600 XMQAT, MQAT
0035 1000 XMQAT1, MQAT1

0036 0000 CRLF, 0
0037 7240 CLA CMA
0040 0130 AND CR /CR
0041 4046 JMS PRXLOP
0042 7240 CLA CMA
0043 0131 AND LF /LF
0044 4046 JMS PRXLOP
0045 5436 JMP I CRLF

0046 0000 PRXLOP, 0
0047 6046 TLS /PRINT LOOP
0050 6041 ISF
0051 5050 JMP .-1
0052 7200 CLA
0053 5446 JMP I PRXLOP

0054 0000 PLINK, 0
0055 7240 CLA CMA
0056 0143 AND LINK /LINK
0057 4061 JMS ONZER
0060 5454 JMP I PLINK

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0061	0000	ONZER, 0	
0062	7440	SZA	
0063	5066	JMP ONEP	/PRINT ONE
0064	4072	JMS ZEROR	/PRINT ZERO
0065	5461	JMP I ONZER	
0066	7240	ONEP, CLA CMA	/ONE
0067	0141	AND ONE	
0070	4046	JMS PRXLOP	
0071	5461	JMP I ONZER	
0072	0000	ZEROR, 0	
0073	7240	CLA CMA	
0074	0142	AND ZERO	/ZERO
0075	4046	JMS PRXLOP	
0076	5472	JMP I ZEROR	
0077	0000	MESSG, 0	
0100	7240	CLA CMA	
0101	0145	AND COUNTX	
0102	3146	DCA STRCNT	
0103	2146	ISZ STRCNT	
0104	7410	SKP	
0105	5477	JMP I MESSG	
0106	7240	CLA CMA	
0107	0147	AND BITSTR	
0110	7100	CLL	
0111	7004	RAL	
0112	3147	DCA BITSTR	
0113	7430	SZL	
0114	5117	JMP PRONE	
0115	4072	JMS ZEROR	
0116	5103	JMP .-13	
0117	7240	PRONE, CLA CMA	
0120	0141	AND ONE	/ONE
0121	4046	JMS PRXLOP	
0122	5103	JMP MESSG+4	
0123	0000	ACP, 0	/GOOD AC
0124	0000	LXP, 0	/GOOD LINK
0125	0000	GENX, 0	
0126	0000	BLXP, 0	/BAD LINK
0127	0000	BACP, 0	/BAD AC
0130	0215	CR, 0215	/CARRIAGE RETURN
0131	0212	LF, 0212	/LINE FEED
0132	0315	M, 0315	/M
0133	0321	Q, 0321	/Q
0134	0314	LL, 0314	/L
0135	0324	TT, 0324	/T
0136	0240	SP, 0240	/SPACE
0137	0301	A, 0301	/A
0140	0303	C, 0303	/C
0141	0261	ONE, 0261	/1
0142	0260	ZERO, 0260	/0
0143	0000	LINK, 0	
0144	0255	IO, 0255	/DASH
0145	7763	COUNTX, 7763	
0146	0000	STRCNT, 0	
0147	0000	BITSTR, 0	
0150	1200	XMQAT2, 1200	
0151	1400	XMQAT3, 1400	

0152	0326	INCOR, 0326	/V
0153	1600	XSCAT, STEST	
0154	0263	THREE, 0263	/3
0155	0262	TWO, 0262	
0156	0000	SETL, 0	
0157	7240	CLA CMA	
0160	5556	JMP I SETL	
0161	0000	PRNUM, 0	
0162	0000	LFTAC, 0	
0163	0000	RITAC, 0	
0164	0000	RITMQ, 0	
0165	0000	LFTMQ, 0	
0166	7764	K7764, 7764	
0167	4000	XK400, 4000	
		*0010	
0010	0000	ACIND, 0	
0011	0000	MQIND, 0	
0012	0000	XACNMI, 0	
0013	0000	XMQNMI, 0	
		*0200	
0200	5246	MQLT, JMP HSE	/HOUSE KEEPING
0201	4020	JMS Z GEN	
0202	7360	STL CLA CMA	/SET LINK
0203	0125	AND Z GENX	
0204	3123	DCA Z ACP	/STORE AC PATTERN
0205	7240	CLA CMA	
0206	3124	DCA Z LXP	/STORE LINK TO A ONE
0207	7040	CMA	
0210	0123	AND Z ACP	/LOAD AC
0211	7421	SQL	
0212	3127	DCA Z BACP	/STORE AC RESULT
0213	7620	CLA SNL	
0214	5366	JMP XPACP+5	/STORE LINK RESULT 0000
0215	4156	JMS Z SETL	
0216	3126	DCA Z BLXP	/STORE LINK RESULT 7777
0217	7040	CMA	
0220	0127	AND Z BACP	
0221	7440	SZA	
0222	5230	JMP .+6	/AC NOT EQUAL TO 0000
0223	7240	CLA CMA	
0224	0126	AND BLXP	
0225	7450	SNA	
0226	5230	JMP .+2	/LINK NOT EQUAL TO A ONE
0227	5241	JMP .+12	/CONTINUE TEST MQLT
0230	7604	CLA OSR	/TEST SW2
0231	7106	RTL CLL	
0232	7004	RAL	
0233	7430	SZL	
0234	4257	JMS PMQLT	/PRINT ERROR
0235	7704	CLL CLA OSR	/TEST SW 0
0236	7004	RAL	
0237	7430	SZL	
0240	7402	HLT	/HALT MQLT ERROR
0241	7604	CLA OSR	

0242	7106		RTL CLL	/TEST SW1
0243	7430		SZL	
0244	5202		JMP MQLT+2	/PROGRAM LOOP
0245	5201		JMP MQLT+1	/CONTINUE PROGRAM
0246	7300	HSE,	CLA CLL	
0247	3125		DCA Z GENX	
0250	1365		TAD XPACP+4	
0251	3031		DCA Z BACK	
0252	1033		TAD Z XMQLT1	
0253	3032		DCA Z NEXT	
0254	7000		NOP	
0255	7000		NOP	
0256	5201		JMP MQLT+1	
0257	0000	PMQLT, 0		/PRINT ROUTINE
0260	4036		JMS Z CRLF	
0261	4304		JMS MQ	
0262	4314		JMS L	
0263	4321		JMS T	
0264	4036	CP,	JMS Z CRLF	
0265	4326		JMS SP2	
0266	4336		JMS AC	
0267	4326		JMS SP2	
0270	4353		JMS PLXP	
0271	4346		JMS SP1	
0272	4761		JMS I XPACP	
0273	4036		JMS Z CRLF	
0274	4072		JMS Z ZEROR	
0275	4762		JMS I XPACP+1	/RIGHT ARROW
0276	4336		JMS AC	
0277	4326		JMS SP2	
0300	4763		JMS I XPACP+2	
0301	4346		JMS SP1	
0302	4764		JMS I XPACP+3	
0303	5657		JMP I PMQLT	/RETURN TO SWITCH ROUTINE
0304	0000	MQ,	0	
0305	7240		CLA CMA	
0306	0132		AND Z M	/M
0307	4046		JMS Z PRXLOP	
0310	7240		CLA CMA	
0311	0133		AND Z Q	/Q
0312	4046		JMS Z PRXLOP	
0313	5704		JMP I MQ	
0314	0000	L,	0	
0315	7240		CLA CMA	
0316	0134		AND Z LL	/L
0317	4046		JMS Z PRXLOP	
0320	5714		JMP I L	
0321	0000	T,	0	
0322	7240		CLA CMA	/T
0323	0135		AND Z TT	
0324	4046		JMS Z PRXLOP	
0325	5721		JMP I T	

0326	0000	SP2,	Ø	
0327	7240		CLA CMA	
0330	0136		AND Z SP	/SP
0331	4046		JMS Z PRXLOP	
0332	7240		CLA CMA	
0333	0136		AND Z SP	/SP
0334	4046		JMS Z PRXLOP	
0335	5726		JMP I SP2	
0336	0000	AC,	Ø	
0337	7240		CLA CMA	
0340	0137		AND Z A	/A
0341	4046		JMS Z PRXLOP	
0342	7240		CLA CMA	
0343	0140		AND Z C	/C
0344	4046		JMS Z PRXLOP	
0345	5736		JMP I AC	
0346	0000	SPI,	Ø	
0347	7240		CLA CMA	
0350	0136		AND Z SP	/SP
0351	4046		JMS Z PRXLOP	
0352	5746		JMP I SPI	
0353	0000	PLXP,	Ø	
0354	7240		CLA CMA	
0355	0124		AND Z LXP	/GOOD LINK
0356	3143		DCA Z LINK	
0357	4054		JMS Z PLINK	
0360	5753		JMP I PLXP	
0361	0413	XPACP,	PACP	
0362	0406		PTO	
0363	0400		PBLXP	
0364	0421		PBACP	
0365	0200		MQLT	
0366	3126		DCA Z BLXP	
0367	5217		JMP MQLT+17	
		*400		
0400	0000	PBLXP,	Ø	
0401	7240		CLA CMA	
0402	0126		AND Z BLXP	/BAD LINK
0403	3143		DCA Z LINK	
0404	4054		JMS Z PLINK	
0405	5600		JMP I PBLXP	
0406	0000	PTO,	Ø	
0407	7240		CLA CMA	
0410	0144		AND IO	/RIGHT ARROW
0411	4046		JMS Z PRXLOP	
0412	5606		JMP I PTO	
0413	0000	PACP,	Ø	
0414	7240		CLA CMA	
0415	0123		AND Z ACP	/ACP
0416	3147		DCA Z BITSTR	
0417	4077		JMS Z MESSG	
0420	5613		JMP I PACP	

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0421 0000 PBACP, 0
0422 7240 CLA CMA
0423 0127 AND Z BACP /BACP
0424 3147 DCA Z BITSTR
0425 4077 JMS Z MESSG
0426 5621 JMP I PBACP

0427 5256 MQLT1, JMP HSE1
0430 4020 JMS GEN
0431 7340 CLL CLA CMA /CLEAR LINK
0432 0125 AND Z GENX
0433 3123 DCA Z ACP /STORE AC PATTERN
0434 3124 DCA Z LXP /STORE LINK TO A ZERO
0435 7040 CMA
0436 0123 AND Z ACP /LOAD AC
0437 7421 MQL
0440 3127 DCA Z BACP /STORE AC RESULT
0441 7620 CLA SNL
0442 5332 JMP XONE+6 /STORE LINK RESULT 0000
0443 4156 JMS Z SETL
0444 3126 DCA Z BLXP /STORE LINK RESULT 7777
0445 7040 CMA
0446 0127 AND Z BACP
0447 7440 SZA
0450 5270 JMP .+20 /AC NOT EQUAL TO 0000
0451 7240 CLA CMA
0452 0126 AND Z BLXP
0453 7440 SZA
0454 5270 JMP .+14 /LINK NOT EQUAL TO A ZERO
0455 5301 JMP MQ1+4 /CONTINUE TEST MQLT1

0456 7300 HSE1, CLA CLL
0457 3125 DCA Z GENX
0460 1033 TAD Z XMQLT1
0461 3031 DCA Z BACK
0462 1034 TAD Z XMQAT
0463 3032 DCA Z NEXT
0464 7000 NOP
0465 7000 NOP
0466 7000 NOP
0467 5230 JMP MQLT1+1

0470 7604 CLA OSR /TEST SW2
0471 7106 RTL CLL
0472 7004 RAL
0473 7430 SZL
0474 5307 JMP XMQ1+1 /PRINT ERROR
0475 7604 MQ1, CLA OSR /TEST SW0
0476 7104 RAL CLL
0477 7430 SZL
0500 7402 HLT
0501 7604 CLA OSR
0502 7106 RTL CLL
0503 7430 SZL
0504 5231 JMP MQLT1+2 /PROGRAM LOOP!
0505 5230 JMP MQLT1+1 /CONTINUE PROGRAM
0506 0475 XMQ1, MQ1

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0507	7240		CLA CMA	
0510	0306		AND XMQ1	
0511	3731		DCA I XONE+5	
0512	4036		JMS Z CRLF	
0513	4721		JMS I XCP+1	
0514	4722		JMS I XCP+2	
0515	4723		JMS I XCP+3	
0516	4324		JMS XONE	
0517	5720		JMP I XCP	
0520	0264	XCP,	CP	
0521	0304		MQ	
0522	0314		L	
0523	0321		T	
0524	0000	XONE,	Ø	
0525	7240		CLA CMA	/ONE
0526	0141		AND Z ONE	
0527	4046		JMS Z PRXLOP	
0530	5724		JMP I XONE	
0531	0257		PMQLT	
0532	3126		DCA Z BLXP	
0533	5245		JMP MQLTI+16	
0600	5235	*600	JMP HSE2	
0601	4020	MQAT,	JMS GEN	
0602	7360		STL CLA CMA	/SET LINK
0603	0125		AND Z GENX	
0604	3123		DCA Z ACP	/STORE AC PATTERN
0605	7240		CLA CMA	
0606	3124		DCA Z LXP	/STORE LINK TO A ONE
0607	7040		CMA	
0610	0123		AND Z ACP	/LOAD AC
0611	7421		SQL	/LOAD MQ FROM AC
0612	7501		MQA	/LOAD AC FROM MP
0613	3127		DCA Z BACP	/STORE RESULT OF SQL, MQA
0614	7620		CLA SNL	
0615	5347		JMP YA+5	/STORE LINK RESULT 0000
0616	4156		JMS Z SETL	
0617	3126		DCA BLXP	/STORE LINK RESULT 7777
0620	7040	RL2,	CMA	
0621	0123		AND Z ACP	/COMPARE ACP WITH BACP
0622	7140		CLL CMA	
0623	1127		TAD Z BACP	
0624	7040		CMA	
0625	7450		SNA	
0626	7430		SZL	
0627	5247		JMP HSE2+12	/MQ DID NOT EQUAL AC
0630	7240		CLA CMA	
0631	0126		AND Z BLXP	
0632	7450		SNA	
0633	5247		JMP HSE2+12	/LINK DID NOT EQUAL A ONE
0634	5262		JMP PMQAT-5	
0635	7300	HSE2,	CLA CLL	
0636	3125		DCA Z GENX	
0637	1034		TAD Z XMQAT	
0640	3031		DCA Z BACK	
0641	1035		TAD Z XMQAT1	

0642	3032	DCA Z NEXT	
0643	7000	NOP	
0644	7000	NOP	
0645	7000	NOP	
0646	5201	JMP MQAT+1	
0647	7604	CLA OSR	/TEST SW2
0650	7106	RTL CLL	
0651	7004	RAL	
0652	7420	SNL	
0653	5256	JMP .+3	
0654	4267	JMS PMQAT	/PRINT ERROR
0655	4274	JMS MQA1	
0656	7604	CLA OSR	/TEST SW0
0657	7104	RAL CLL	
0660	7430	SZL	
0661	7402	HLT	
0662	7604	CLA OSR	/TEST SW1
0663	7106	RTL CLL	
0664	7430	SZL	
0665	5202	JMP MQAT+2	/PROGRAM LOOP
0666	5201	JMP MQAT+1	/CONTINUE PROGRAM
0667	0000	PMQAT, 0	
0670	4036	JMS Z CRLF	
0671	4726	JMS I YSP2+5	
0672	4332	JMS AT	
0673	5667	JMP I PMQAT	
0674	0000	MQA1, 0	
0675	4036	JMS Z CRLF	
0676	4724	JMS I YSP2+3	
0677	4721	JMS I YSP2	
0700	4721	JMS I YSP2	
0701	4722	JMS I YSP2+1	
0702	4721	JMS I YSP2	
0703	4723	JMS I YSP2+2	
0704	4724	JMS I YSP2+3	
0705	4725	JMS I YSP2+4	
0706	4036	JMS Z CRLF	
0707	4726	JMS I YSP2+5	
0710	4727	JMS I YSP2+6	
0711	4724	JMS I YSP2+3	
0712	4726	JMS I YSP2+5	
0713	4342	JMS YA	
0714	4721	JMS I YSP2	
0715	4730	JMS I YSP2+7	
0716	4724	JMS I YSP2+3	
0717	4731	JMS I YSP2+10	
0720	5674	JMP I MQA1	
0721	0326	YSP2, SP2	
0722	0336	AC	
0723	0353	PLXP	
0724	0346	SP1	
0725	0413	PACP	
0726	0304	MQ	
0727	0314	L	
0730	0400	PBLXP	
0731	0421	PBACP	



0732	0000	AT,	Ø	
0733	7240		CLA CMA	
0734	0137		AND Z A	/A
0735	4046		JMS Z PRXLOP	
0736	7240		CLA CMA	
0737	0135		AND Z TI	/I
0740	4046		JMS Z PRXLOP	
0741	5732		JMP I AT	
0742	0000	YA,	Ø	
0743	7240		CLA CMA	
0744	0137		AND Z A	/A
0745	4046		JMS Z PRXLOP	
0746	5742		JMP I YA	
0747	3126		DCA Z BLXP	
0750	5220		JMP RL2	
1000	5234	*1000	JMP HSE3	
1001	4020	MQAT1,	JMS GEN	
1002	7340		CLL CLA CMA	/CLEAR LINK
1003	0125		AND Z GENX	
1004	3123		DCA Z ACP	/STORE AC PATTERN
1005	3124		DCA Z LXP	/STORE LINK TO A ZERO
1006	7040		CMA	
1007	0123		AND Z ACP	/LOAD AC
1010	7421		MWL	/LOAD MQ FROM AC
1011	7501		MQA	/LOAD AC FROM MQ
1012	3127		DCA Z BACP	/STORE RESULT OF MWL, MQA
1013	7620		CLA SNL	
1014	5272		JMP NOPR+14	
1015	4156		JMS Z SETL	
1016	3126		DCA Z BLXP	/STORE LINK RESULT 7777
1017	7040		CMA	
1020	0123		AND Z ACP	/COMPARE ACP WITH BACP
1021	7140		CLL CMA	
1022	1127		TAD Z BACP	
1023	7040		CMA	
1024	7450		SNA	
1025	7430		SZL	
1026	5246		JMP MQAERI	/MQ DID NOT EQUAL AC
1027	7240		CLA CMA	
1030	0126		AND Z BLXP	
1031	7440		SZA	
1032	5246		JMP MQAERI	/LINK DID NOT EQUAL A ZERO
1033	5262		JMP NOPR+4	
1034	7300	HSE3,	CLA CLL	
1035	3125		DCA Z GENX	
1036	1035		TAD Z XMQAT1	
1037	3031		DCA Z BACK	
1040	1150		TAD Z XMQAT2	
1041	3032		DCA Z NEXT	
1042	7000		NOP	
1043	7000		NOP	
1044	7000		NOP	
1045	5201		JMP MQAT1+1	

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1046 7604 MQAER1,          CLA OSR          /TEST SW2
1047 7106                RTL CLL
1050 7004                RAL
1051 7420                SNL
1052 5256                JMP NOPR
1053 4667                JMS I NOPR+11      /PRINT ERROR
1054 4670                JMS I NOPR+12
1055 4671                JMS I NOPR+13
1056 7604 NOPR,          CLA OSR          /TEST SW0
1057 7104                RAL CLL
1060 7430                SZL
1061 7402                HLT
1062 7604                CLA OSR          /TEST SW1
1063 7106                RTL CLL
1064 7430                SZL
1065 5202                JMP MQAT1+2        /PROGRAM LOOP
1066 5201                JMP MQAT1+1        /CONTINUE PROGRAM
1067 0667                PMQAT
1070 0524                XONE
1071 0674                MQA1
1072 3126                DCA Z BLXP
1073 5217                JMP MQAT1+17

*1200
1200 5235 MQAT2,          JMP HSE4
1201 4020                JMS GEN
1202 7360                STL CLA CMA        /SET LINK
1203 0125                AND Z GENX
1204 7040                CMA                /COMPLEMENT GENX PATTERN
1205 3123                DCA Z ACP          /STORE AC PATTERN
1206 7040                CMA
1207 3124                DCA Z LXP          /STORE LINK TO A ONE
1210 7040                CMA
1211 0125                AND Z GENX
1212 7421                MQL                /LOAD MQ
1213 7240                CLA CMA
1214 0123                AND Z ACP          /LOAD AC WITH COMPLEMENTED GENX
1215 7501                MQA
1216 3127                DCA Z BACP        /STORE RESULT OF MQA
1217 7620                CLA SNL
1220 5347                JMP CLRL4          /STORE LINK RESULT 0000
1221 4156                JMS Z SETL
1222 3126                DCA Z BLXP        /STORE LINK RESULT 7777
1223 7240 RL4,          CLA CMA
1224 0127                AND Z BACP        /AC SHOULD EQUAL 7777
1225 7040                CMA
1226 7440                SZA
1227 5247                JMP MQAER2        /MQ DID NOT INCLUSIVE OR WITH AC
1230 7040                CMA
1231 0126                AND Z BLXP
1232 7450                SNA
1233 5247                JMP MQAER2        /LINK DID NOT EQUAL A ONE
1234 5262                JMP LNPR2+4

1235 7300 HSE4,          CLA CLL
1236 3125                DCA Z GENX
1237 1150                TAD Z XMQAT2
1240 3031                DCA Z BACK
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1241 1151      TAD Z XMQAT3
1242 3032      DCA Z NEXT
1243 7000      NOP
1244 7000      NOP
1245 7000      NOP
1246 5201      JMP MQAT2+1

1247 7604      MQAER2,      CLA OSR      /TEST SW2
1250 7106      RTL CLL
1251 7004      RAL
1252 7420      SNL
1253 5256      JMP LNPR2      /PRINT ERROR
1254 4667      JMS I XPMQAT
1255 4270      JMS EMQAT2

1256 7604      LNPR2, CLA OSR      /TEST SW0
1257 7104      RAL CLL
1260 7430      SZL
1261 7402      HLT
1262 7604      CLA OSR      /TEST SW1
1263 7106      RTL CLL
1264 7430      SZL
1265 5202      JMP MQAT2+2    /PROGRAM LOOP
1266 5201      JMP MQAT2+1    /CONTINUE PROGRAM
1267 0667      XPMQAT,      PMQAT

1270 0000      EMQAT2,      0
1271 4342      JMS PIWO
1272 4036      AI3,      JMS Z CRLF
1273 4726      JMS I XSP1+1
1274 4725      JMS I XSP1
1275 4727      JMS I XSP1+2
1276 4726      JMS I XSP1+1
1277 4730      JMS I XSP1+3
1300 4725      JMS I XSP1
1301 4731      JMS I XSP1+4
1302 4036      JMS Z CRLF
1303 4726      JMS I XSP1+1
1304 4725      JMS I XSP1
1305 4732      JMS I XSP1+5
1306 4726      JMS I XSP1+1
1307 4726      JMS I XSP1+1
1310 7240      CLA CMA
1311 0125      AND Z GENX
1312 3123      DCA Z ACP
1313 4731      JMS I XSP1+4
1314 4036      JMS Z CRLF
1315 4732      JMS I XSP1+5
1316 4335      JMS VOR
1317 4727      JMS I XSP1+2
1320 4726      JMS I XSP1+1
1321 4733      JMS I XSP1+6
1322 4725      JMS I XSP1
1323 4734      JMS I XSP1+7
1324 5670      JMP I EMQAT2

1325 0346      XSP1,      SP1
1326 0326      SP2
1327 0336      AC

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1330	0353		PLXP	
1331	0413		PACP	
1332	0304		MQ	
1333	0400		PBLXP	
1334	0421		PBACP	
1335	0000	VOR,	Ø	/PRINT INCLUSIVE OR
1336	7240		CLA CMA	
1337	0152		AND Z INCOR	
1340	4046		JMS Z PRXLOP	
1341	5735		JMP I VOR	
1342	0000	PTWO,	Ø	/PRINT 2
1343	7240		CLA CMA	
1344	0155		AND Z TWO	
1345	4046		JMS Z PRXLOP	
1346	5742		JMP I PTWO	
1347	3126	CLRL4,	DCA Z BLXP	
1350	5223		JMP RL4	
1400	5234	*1400	JMP HSE5	
1401	4020	MQAT3,	JMS GEN	
1402	7340		CLL CLA CMA	/CLEAR LINK
1403	0125		AND Z GENX	
1404	7040		CMA	/COMPLEMENT GENX PATTERN
1405	3123		DCA Z ACP	/STORE AC PATTERN
1406	3124		DCA Z LXP	/STORE LINK TO A ZERO
1407	7040		CMA	
1410	0125		AND Z GENX	
1411	7421		SQL	/LOAD MQ
1412	7240		CLA CMA	
1413	0123		AND Z ACP	/LOAD AC WITH COMPLEMENTED GENX
1414	7501		MQA	
1415	3127		DCA Z BACP	/STORE RESULT OF MQA
1416	7620		CLA SNL	
1417	7410		SKP	
1420	4156		JMS Z SETL	
1421	3126		DCA Z BLXP	/STORE LINK RESULT 7777
1422	7240		CLA CMA	
1423	0127		AND Z BACP	/AC SHOULD EQUAL 7777
1424	7040		CMA	
1425	7440		SZA	
1426	5246		JMP MQAER3	/MQ DID NOT INCLUSIVE OR WITH AC
1427	7040		CMA	
1430	0126		AND Z BLXP	
1431	7440		SZA	
1432	5246		JMP MQAER3	/LINK DID NOT EQUAL A ZERO
1433	5261		JMP NOPR3+4	
1434	7300	HSE5,	CLA CLL	
1435	3125		DCA Z GENX	
1436	1151		TAD Z XMQAT3	
1437	3031		DCA Z BACK	
1440	1153		TAD Z XSCAT	
1441	3032		DCA Z NEXT	
1442	7000		NOP	
1443	7000		NOP	
1444	7000		NOP	
1445	5201		JMP MQAT3+1	

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1446 7604 MQAER3,          CLA OSR          /TEST SW2
1447 7106          RTL CLL
1450 7004          RAL
1451 7420          SNL
1452 5255          JMP NOPR3          /PRINT ERROR
1453 4666          JMS I APMQAT
1454 5271          JMP AMQAT3

1455 7604 NOPR3, CLA OSR          /TEST SW0
1456 7104          RAL CLL
1457 7430          SZL
1460 7402          HLT
1461 7604          CLA OSR          /TEST SW1
1462 7106          RTL CLL
1463 7430          SZL
1464 5202          JMP MQAT3+2        /PROGRAM LOOP
1465 5201          JMP MQAT3+1        /CONTINUE PROGRAM
1466 0667 APMQAT,          PMQAT
1467 1455          NOPR3
1470 1270          EMQAT2
1471 4277 AMQAT3,          JMS PTHREE
1472 7240          CLA CMA
1473 0267          AND APMQAT+1
1474 3670          DCA I APMQAT+2
1475 5676          JMP I XAT3
1476 1272 XAT3, AT3
1477 0000 PTHREE,          0
1500 7240          CLA CMA
1501 0154          AND Z THREE
1502 4046          JMS Z PRXLOP
1503 5677          JMP I PTHREE

*1600
1600 4300 STEST, JMS KP1          /HOUSE KEEPING
1601 4020 SHLLSR,          JMS Z GEN          /NUMBER GENERATOR
1602 7360          STL CLA CMA          /SET LINK (NO SHIFT GUARD)
1603 0125          AND Z GENX
1604 7421          MQL          /LOAD MQ
1605 7413          SHL          /SHIFT LEFT
1606 0000 LEFTS, 0          /NUMBER OF SHIFTS
1607 3162          DCA Z LFTAC          /STORE AC SHIFTED LEFT
1610 7420          SNL
1611 5333          JMP CLLINK          /CLEAR AND STORE LINK LFTAC
1612 5335          JMP STLINK          /SET AND STORE LINK LFTAC

1613 7701          MQA CLA
1614 3165          DCA Z LFTMQ          /STORE MQ SHIFTED LEFT
1615 7040          CMA
1616 0162          AND Z LFTAC          /RESTORE AC
1617 7417          LSR          /SHIFT RIGHT
1620 0000 RIGHTS, 0
1621 3163          DCA Z RITAC          /STORE AC SHIFTED RIGHT
1622 7420          SNL
1623 5340          JMP CLRINK          /CLEAR AND STORE LINK RITAC
1624 5342          JMP STRINK          /SET AND STORE LINK RITAC
1625 7701          MQA CLA
1626 3164          DCA Z RITMQ          /STORE MQ SHIFTED RIGHT
1627 7040          CMA
1630 0347          AND LFTINK
1631 7440          SZA
1632 5255          JMP SHERR          /LINK EQUALS A ONE IN ERROR

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1633	7040	CMA	
1634	0350	AND RITINK	
1635	7440	SZA	
1636	5255	JMP SHERR	/LINK EQUALS A ONE IN ERROR
1637	7040	CMA	
1640	0163	AND Z RITAC	
1641	7440	SZA	
1642	5255	JMP SHERR	/RITAC SHOULD EQUAL 0000
1643	7040	CMA	
1644	0125	AND Z GENX	
1645	7140	CLL CMA	
1646	1164	TAD Z RITMQ	
1647	7040	CMA	
1650	7440	SZA	
1651	5255	JMP SHERR	/RITMQ DID NOT EQUAL GENX
1652	7430	SZL	
1653	5255	JMP SHERR	/RITMQ DID NOT EQUAL GENX
1654	5272	JMP SHERR+15	
1655	7604	SHERR, CLA OSR	/TEST SW2
1656	7106	RTL CLL	
1657	7004	RAL	
1660	7420	SNL	
1661	5266	JMP SHERR+11	
1662	4677	JMS I PRINT	
1663	7000	NOP	
1664	7000	NOP	
1665	7000	NOP	
1666	7604	CLA OSR	/TEST SW0
1667	7104	RAL CLL	
1670	7430	SZL	
1671	7402	HLT	
1672	7604	CLA OSR	/TEST SW1
1673	7106	RTL CLL	
1674	7430	SZL	
1675	5202	JMP STEST+2	/PROGRAM LOOP
1676	5201	JMP SHLLSR	/CONTINUE TEST
1677	2000	PRINT, PRINTS	
1700	0000	KP1, 0	
1701	7240	CLA CMA	
1702	0166	AND Z K7764	/MINUS 12
1703	3351	DCA TWELVE	/STORE 12 COUNT FOR EXIT
1704	3125	DCA Z GENX	/DEAR GENX
1705	3206	DCA LEFTS	/CLEAR SHIFT COUNT STORE LEFT
1706	7040	CMA	
1707	0352	AND SNUM	
1710	3161	DCA Z PRNUM	/STORE SHIFT #
1711	7040	CMA	
1712	0345	AND RSUB	
1713	3031	DCA Z BACK	/SW3 REPEAT SUB TEST
1714	7040	CMA	
1715	0346	AND NSUB	
1716	3032	DCA Z NEXT	/SW3 NEXT TEST
1717	3220	DCA RIGHTS	
1720	7040	CMA	
1721	0353	AND PR1AA	
1722	3754	DCA I PR1AA+1	
1723	5700	JMP I KP1	

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1724 2206 INCSUB,          ISZ LEFTS          /INCREMENT SHIFT COUNT LEFT
1725 2220          ISZ RIGHTS          /INCREMENT SHIFT COUNT RIGHT
1726 2161          ISZ Z PRNUM          /INCREMENT SHIFT # TO PRINT
1727 2351          ISZ TWELVE          /TWELVE SHIFT TESTS
1730 5201          JMP SHLLSR          /CONTINUE PROGRAM
1731 5732          JMP I INCSUB+6      /JMP TO NEXT SHIFT TEST
1732 2400          STEST1

1733 3347 CLLINK,          DCA LFTINK          /CLEAR LFTAC LINK
1734 5213          JMP LEFTS+5
1735 7040 STLINK,          CMA
1736 3347          DCA LFTINK          /SET LFTAC LINK
1737 5213          JMP LEFTS+5
1740 3350 CLRINK,          DCA RITINK          /CLEAR RITAC LINK
1741 5225          JMP RIGHTS+5

1742 7040 STRINK,          CMA          /SET RITAC LINK
1743 3350          DCA RITINK
1744 5225          JMP RIGHTS+5

1745 1601 RSUB,  SHLLSR
1746 1724 NSUB,  INCSUB

1747 0000 LFTINK,          0
1750 0000 RITINK,          0
1751 0000 TWELVE,          0
1752 2044 SNUM,  TNUM
1753 2005 PRTAA, PRTW
1754 2154          PRT

*2000
2000 0000 PRINTS,          0
2001 4036          JMS Z CRLF
2002 4741          JMS I Z12+15
2003 4643          JMS I SHLX+5
2004 5561          JMP I Z PRNUM
2005 4036 PRTW,  JMS Z CRLF
2006 4736          JMS I Z12+12
2007 4737          JMS I Z12+13
2010 4740          JMS I Z12+14
2011 4637          JMS I SHLX+1
2012 4643          JMS I SHLX+5
2013 7040          CMA
2014 0125          AND Z GENX
2015 3147          DCA Z BITSTR
2016 4077          JMS Z MESSG
2017 4036          JMS Z CRLF
2020 4342          JMS TENSF
2021 4736          JMS I Z12+12
2022 4737          JMS I Z12+13
2023 4640          JMS I SHLX+2
2024 4637          JMS I SHLX+1
2025 4342          JMS TENSF
2026 4736          JMS I Z12+12
2027 4737          JMS I Z12+13
2030 4740          JMS I Z12+14
2031 4637          JMS I SHLX+1
2032 4036          JMS Z CRLF
2033 4636          JMS I SHLX

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2034	4036		JMS Z CRLF	
2035	5600		JMP I PRINTS	
2036	2221	SHLX,	SHLP	
2037	2212		RPAR	
2040	0336		AC	
2041	1477		PTHREE	
2042	1342		PTWO	
2043	0346		SP1	
2044	5262	TNUM,	JMP Z1	
2045	5265		JMP Z2	
2046	5267		JMP Z3	
2047	5271		JMP Z4	
2050	5274		JMP Z5	
2051	5277		JMP Z6	
2052	5302		JMP Z7	
2053	5305		JMP Z8	
2054	5310		JMP Z9	
2055	5313		JMP Z10	
2056	5317		JMP Z11	
2057	5324		JMP Z12	
2060	4046	PRET,	JMS Z PRXLOP	
2061	5754		JMP I PRT	
2062	7040	Z1,	CMA	
2063	4061		JMS Z ONZER	/1
2064	5754		JMP I PRT	
2065	4642	Z2,	JMS I SHLX+4	/2
2066	5754		JMP I PRT	
2067	4641	Z3,	JMS I SHLX+3	/3
2070	5754		JMP I PRT	
2071	7240	Z4,	CLA CMA	
2072	0330		AND FOUR	/4
2073	5260		JMP PRET	
2074	7240	Z5,	CLA CMA	
2075	0331		AND FIVE	/5
2076	5260		JMP PRET	
2077	7240	Z6,	CLA CMA	
2100	0332		AND SIX	/6
2101	5260		JMP PRET	
2102	7240	Z7,	CLA CMA	
2103	0333		AND SEVEN	/7
2104	5260		JMP PRET	
2105	7240	Z8,	CLA CMA	
2106	0334		AND EIGHT	/8
2107	5260		JMP PRET	
2110	7240	Z9,	CLA CMA	
2111	0335		AND NINE	/9
2112	5260		JMP PRET	
2113	7040	Z10,	CMA	
2114	4061		JMS Z ONZER	/10
2115	4061		JMS Z ONZER	
2116	5754		JMP I PRT	
2117	7040	Z11,	CMA	
2120	4061		JMS Z ONZER	/11
2121	7040		CMA	



2122	4061		JMS Z ONZER	
2123	5754		JMP I PRT	
2124	7040	Z12,	CMA	
2125	4061		JMS Z ONZER	/12
2126	4642		JMS I SHLX+4	
2127	5754		JMP I PRT	
2130	0264	FOUR,	0264	
2131	0265	FIVE,	0265	
2132	0266	SIX,	0266	
2133	0267	SEVEN,	0267	
2134	0270	EIGHT,	0270	
2135	0271	NINE,	0271	
2136	2200		PC	
2137	2705		LPAR	
2140	0304		MQ	
2141	3062		SHIFT	
2142	0000	TENSP,	0	
2143	7240		CLA CMA	
2144	0352		AND TCOUNT	
2145	3353		DCA SPACST /STORE MINUS TEN	
2146	4643		JMS I SHLX+5	/PRINT 10 SPACES
2147	2353		ISZ SPACST	
2150	5346		JMP TENSP+4	
2151	5742		JMP I TENSP	
2152	7765	TCOUNT,	7765	
2153	0000	SPACST,	0	
2154	0000	PRT,	0	
		+2200		
2200	0000	PC,	0	
2201	7240		CLA CMA	
2202	0140		AND Z C	
2203	4046		JMS Z PRXLOP	
2204	5600		JMP I PC	
2205	0000	LPAR,	0	
2206	7240		CLA CMA	
2207	0217		AND LPAREN	
2210	4046		JMS Z PRXLOP	
2211	5605		JMP I LPAR	
2212	0000	RPAR,	0	
2213	7240		CLA CMA	
2214	0220		AND RPAREN	
2215	4046		JMS Z PRXLOP	
2216	5612		JMP I RPAR	
2217	0250	LPAREN,	0250	
2220	0251	RPAREN,	0251	
2221	0000	SHLP,	0	
2222	7240		CLA CMA	
2223	0305		AND SX	
2224	4046		JMS Z PRXLOP	
2225	7040		CMA	
2226	0304		AND HX	
2227	4046		JMS Z PRXLOP	
2230	4703		JMS I LX	
2231	4706		JMS I LX+3	

2232	7240		CLA CMA
2233	0707		AND I LX+4
2234	4061		JMS Z ONZER
2235	4706		JMS I LX+3
2236	7240		CLA CMA
2237	0162		AND Z LFTAC
2240	3147		DCA Z BITSTR
2241	4077		JMS Z MESSG
2242	4706		JMS I LX+3
2243	4706		JMS I LX+3
2244	4706		JMS I LX+3
2245	7240		CLA CMA
2246	0165		AND Z LFTMQ
2247	3147		DCA Z BITSTR
2250	4077		JMS Z MESSG
2251	4036		JMS Z CRLF
2252	4703		JMS I LX
2253	7240		CLA CMA
2254	0305		AND SX
2255	4046		JMS Z PRXLOP
2256	7240		CLA CMA
2257	0310		AND RX
2260	4046		JMS Z PRXLOP
2261	4706		JMS I LX+3
2262	7240		CLA CMA
2263	0711		AND I LX+6
2264	4061		JMS Z ONZER
2265	4706		JMS I LX+3
2266	7240		CLA CMA
2267	0163		AND Z RITAC
2270	3147		DCA Z BITSTR
2271	4077		JMS Z MESSG
2272	4706		JMS I LX+3
2273	4706		JMS I LX+3
2274	4706		JMS I LX+3
2275	7240		CLA CMA
2276	0164		AND Z RITMQ
2277	3147		DCA Z BITSTR
2300	4077		JMS Z MESSG
2301	4036		JMS Z CRLF
2302	5621		JMP I SHLP
2303	0314	LX,	L
2304	0310	HX,	0310
2305	0323	SX,	0323
2306	0346		SP1
2307	1747		LFTINK
2310	0322	RX,	0322
2311	1750		RITINK
		*2400	
2400	4327	STEST1,	JMS KP1XX
2401	7240	T13,	CLA CMA
2402	0352		AND T14X
2403	3351		DCA NTST
2404	4303		JMS GENN
2405	4772	SCP13,	JMS I TXXX
2406	5205		JMP SCP13
2407	4767	T14,	JMS I KKKNU
2410	0353		AND T14X+1

/HOUSE KEEPING

/STORE NEXT TEST ADDRESS  
/GENERATOR JUMP

2411	3351		DCA NTST
2412	4303		JMS GENN
2413	4772	SCP14,	JMS I TXXX
2414	5213		JMP SCP14
2415	4767	T15,	JMS I KKKNU
2416	0354		AND T14X+2
2417	3351		DCA NTST
2420	4303		JMS GENN
2421	4772	SCP15,	JMS I TXXX
2422	5221		JMP SCP15
2423	4767	T16,	JMS I KKKNU
2424	0355		AND T14X+3
2425	3351		DCA NTST
2426	4303		JMS GENN
2427	4772	SCP16,	JMS I TXXX
2430	5227		JMP SCP16
2431	4767	T17,	JMS I KKKNU
2432	0356		AND T14X+4
2433	3351		DCA NTST
2434	4303		JMS GENN
2435	4772	SCP17,	JMS I TXXX
2436	5235		JMP SCP17
2437	4767	T18,	JMS I KKKNU
2440	0357		AND T14X+5
2441	3351		DCA NTST
2442	4303		JMS GENN
2443	4772	SCP18,	JMS I TXXX
2444	5243		JMP SCP18
2445	4767	T19,	JMS I KKKNU
2446	0360		AND T14X+6
2447	3351		DCA NTST
2450	4303		JMS GENN
2451	4772	SCP19,	JMS I TXXX
2452	5251		JMP SCP19
2453	4767	T20,	JMS I KKKNU
2454	0361		AND T14X+7
2455	3351		DCA NTST
2456	4303		JMS GENN
2457	4772	SCP20,	JMS I TXXX
2460	5257		JMP SCP20
2461	4767	T21,	JMS I KKKNU
2462	0362		AND T14X+10
2463	3351		DCA NTST
2464	4303		JMS GENN
2465	4772	SCP21,	JMS I TXXX
2466	5265		JMP SCP21
2467	4767	T22,	JMS I KKKNU
2470	0363		AND T14X+11
2471	3351		DCA NTST
2472	4303		JMS GENN
2473	4772	SCP22,	JMS I TXXX
2474	5273		JMP SCP22
2475	4767	T23,	JMS I KKKNU
2476	0364		AND T14X+12
2477	3351		DCA NTST
2500	4303		JMS GENN
2501	4772	SCP23,	JMS I TXXX
2502	5301		JMP SCP23

2503	0000	GENN,	Ø	
2504	2347	CONTIN,	ISZ NGEN	/CONTINUE CURRENT TEST
2505	7240		CLA CMA	
2506	0346	NCOMP,	AND KKK	
2507	7040		CMA	
2510	1347		TAD NGEN	
2511	7040		CMA	
2512	7450		SNA	
2513	7410		SKP	
2514	5703		JMP I GENN	
2515	3347		DCA NGEN	
2516	7604		CLA OSR	/TST SW3
2517	7106		RTL CLL	
2520	7006		RTL	
2521	7430		SZL	
2522	5703		JMP I GENN	
2523	2771		ISZ I KX12+3	/INCREMENT SHIFT COUNTER LEFT
2524	2770		ISZ I KX12+2	/INCREMENT SHIFT COUNTER RIGHT
2525	2161		ISZ Z PRNUM	/INCREMENT SHIFT NUMBER TO PRINT
2526	5751		JMP I NTST	
2527	0000	KPIXX,	Ø	
2530	7240		CLA CMA	
2531	0365		AND K4000	
2532	3346		DCA KKK	
2533	3347		DCA NGEN	
2534	1366		TAD KX12	
2535	3771		DCA I KX12+3	
2536	1366		TAD KX12	
2537	3770		DCA I KX12+2	
2540	1345		TAD PPPNUM	
2541	3161		DCA Z PRNUM	/PRINT NUMBERS 13 TO 23
2542	1373		TAD PRITA	
2543	3774		DCA I PRZTA	
2544	5727		JMP I KPIXX	
2545	3000	PPPNUM,	PPNUM	
2546	0000	KKK,	Ø	
2547	0000	NGEN,	Ø	
2550	0000	ELEVEN,	Ø	
2551	0000	NTST,	Ø	
2552	2407	T14X,	T14	
2553	2415		T15	
2554	2423		T16	
2555	2431		T17	
2556	2437		T18	
2557	2445		T19	
2560	2453		T20	
2561	2461		T21	
2562	2467		T22	
2563	2475		T23	
2564	3200		STEST2	
2565	4000	K4000,	4000	
2566	0014	KX12,	0014	
2567	2600	KKKNU,	KKKN	
2570	2631		RITXXX	
2571	2617		LFTXXX	
2572	2610	TXXX,	TXXX	

2573	2005	PRTTA,	PRTW	
2574	3060	PRZIA,	PRTT	
		*2600		
2600	0000	KKKN,	Ø	
2601	7340		CLL CLA CMA	/COMPARE CONSTANTS FOR TESTS
2602	0607		AND I KKKN+7	
2603	7010		RAR	
2604	3607		DCA I KKKN+7	
2605	7040		CMA	
2606	5600		JMP I KKKN	
2607	2546		KKK	
2610	0000	TXXXX,	Ø	/SCOPE MODE RETURN INDIRECT
2611	7240		CLA CMA	
2612	0700		AND I NGENX	
2613	7421		MLL	/LOAD MQ
2614	7040		CMA	
2615	0301		AND K2525	/LOAD AC 2525 (OCTAL)
2616	7413		SHL	/SHIFT LEFT
2617	0000	LFTXXX,	Ø	
2620	3162		DCA Z LFTAC	/STORE AC SHIFTED LEFT
2621	7420		SNL	
2622	5266		JMP CLLI	/CLEAR AND STORE LEFT LINK
2623	5270		JMP CLLI+2	/SET AND STORE LEFT LINK
2624	7701		MLL CLA	
2625	3165		DCA Z LFTMQ	/STORE MQ SHIFTED LEFT
2626	7040		CMA	
2627	0162		AND Z LFTAC	/RESTORE AC
2630	7417		LSR	/SHIFT RIGHT
2631	0000	RITXXX,	Ø	
2632	3163		DCA Z RITAC	/STORE AC SHIFTED RIGHT
2633	7420		SNL	
2634	5273		JMP CRLI	/CLEAR AND STORE RIGHT LINK
2635	5275		JMP CRLI+2	/SET AND STORE RIGHT LINK
2636	7701		MLL CLA	
2637	3164		DCA Z RITMQ	/STORE MQ SHIFTED RIGHT
2640	7040		CMA	
2641	0702		AND I LLIN	
2642	7440		SZA	
2643	5307		JMP SHERRX	/LINK EQUALS A ONE IN ERROR
2644	7040		CMA	
2645	0703		AND I RLIN	
2646	7440		SZA	
2647	5307		JMP SHERRX	/LINK EQUALS A ONE IN ERROR
2650	7040		CMA	
2651	0163		AND Z RITAC	
2652	7440		SZA	
2653	5307		JMP SHERRX	/RITAC SHOULD EQUAL 0000
2654	7040		CMA	
2655	0700		AND I NGENX	
2656	7140		CLL CMA	
2657	1164		TAD Z RITMQ	
2660	7040		CMA	
2661	7440		SZA	
2662	5307		JMP SHERRX	/RITMQ DID NOT EQUAL NGEN
2663	7430		SZL	
2664	5307		JMP SHERRX	/RITMQ DID NOT EQUAL NGEN
2665	5324		JMP SHERRX+15	

2666	3702	CLLI,	DCA I LLIN /CLEAR LEFT LINK STORE	
2667	5224		JMP LFTXXX+5	
2670	7040		CMA	
2671	3702		DCA I LLIN /SET LEFT LINK STORE	
2672	5224		JMP LFTXXX+5	
2673	3703	CRLI,	DCA I RLIN /CLEAR RIGHT LINK STORE	
2674	5236		JMP RITXXX+5	
2675	7040		CMA	/SET RIGHT LINK STORE
2676	3703		DCA I RLIN	
2677	5236		JMP RITXXX+5	
2700	2547	NGENX,	NGEN	
2701	2525	K2525,	2525	
2702	1747	LLIN,	LFTINK	
2703	1750	RLIN,	RITINK	
2704	2503	NNEG,	GENN	
2705	2000		PRINTS	
2706	2504	TINUE,	CONTIN	
2707	7604	SHERRX,	CLA OSR	/TEST SW2
2710	7106		RTL CLL	
2711	7004		RAL	
2712	7420		SNL	
2713	5320		JMP SHERRX+11	
2714	7240		CLA CMA	
2715	0700		AND I NGENX	
2716	3125		DCA Z GENX	
2717	4705		JMS I TINUE-1	
2720	7604		CLA OSR	/TEST SW0
2721	7104		RAL CLL	
2722	7430		SZL	
2723	7402		HLT	
2724	7604		CLA OSR	/TEST SW1
2725	7106		RTL CLL	
2726	7430		SZL	
2727	5610		JMP I TXXXX	/SCOPE MODE
2730	5706		JMP I TINUE	/CONTINUE MODE

PAUSE

/EAE PART 3A OF INSTRUCTION TEST - TAPE 2

3000	5213	PPNUM,	JMP Z13	
3001	5215		JMP Z14	
3002	5217		JMP Z15	
3003	5221		JMP Z16	
3004	5223		JMP Z17	
3005	5225		JMP Z18	
3006	5227		JMP Z19	
3007	5231		JMP Z20	
3010	5235		JMP Z21	
3011	5240		JMP Z22	
3012	5243		JMP Z23	
3013	4245	Z13,	JMS ONEONE /1	
3014	5651		JMP I PRT3 /3	
3015	4245	Z14,	JMS ONEONE /1	
3016	5652		JMP I PRT3+1	/4
3017	4245	Z15,	JMS ONEONE /1	

3020	5653		JMP I PRT3+2	/5
3021	4245	Z16,	JMS ONEONE /1	
3022	5654		JMP I PRT3+3	/6
3023	4245	Z17,	JMS ONEONE /1	
3024	5655		JMP I PRT3+4	/7
3025	4245	Z18,	JMS ONEONE /1	
3026	5656		JMP I PRT3+5	/8
3027	4245	Z19,	JMS ONEONE /1	
3030	5657		JMP I PRT3+6	/9
3031	4661	Z20,	JMS I TWOTWO	/2
3032	7040		CMA	
3033	4245		JMS ONEONE /0	
3034	5660		JMP I PRTT	
3035	4661	Z21,	JMS I TWOTWO	/2
3036	4245		JMS ONEONE /1	
3037	5660		JMP I PRTT	
3040	4661	Z22,	JMS I TWOTWO	/2
3041	4661		JMS I TWOTWO	/2
3042	5660		JMP I PRTT	
3043	4661	Z23,	JMS I TWOTWO	/2
3044	5651		JMP I PRT3 /3	
3045	0000	ONEONE,	Ø	/PRINT ONE
3046	7040		CMA	
3047	4061		JMS Z ONZER	
3050	5645		JMP I ONEONE	
3051	2067	PRT3,	Z3	
3052	2071		Z4	
3053	2074		Z5	
3054	2077		Z6	
3055	2102		Z7	
3056	2105		Z8	
3057	2110		Z9	
3060	0000	PRTT,	Ø	
3061	1342	TWOTWO,	PTWO	
3062	0000	SHIFT,	Ø	
3063	7040		CMA	
3064	0303		AND SS	/S
3065	4046		JMS Z PRXLOP	
3066	7040		CMA	
3067	0304		AND SS+1	/H
3070	4046		JMS Z PRXLOP	
3071	7040		CMA	
3072	0305		AND SS+2	/I
3073	4046		JMS Z PRXLOP	
3074	7040		CMA	
3075	0306		AND SS+3	/F
3076	4046		JMS Z PRXLOP	
3077	7040		CMA	
3100	0135		AND Z TT	/T
3101	4046		JMS Z PRXLOP	
3102	5662		JMP I SHIFT	
3103	0323	SS,	0323	
3104	0310		0310	
3105	0311		0311	
3106	0306		0306	

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*3200
3200 4312 STEST2, JMS HSKK
3201 4245 JMS GENRR
3202 7300 CLA CLL /CLEAR LINK
3203 7421 MQL /CLEAR AC AND MQ
3204 7040 CMA
3205 0167 AND Z XK400 /SET BIT 0
3206 7415 ASR
3207 0000 ASRSHF, 0 /SHIFT # OF PLACES
3210 3162 DCA Z LFTAC /STORE AC
3211 7501 MQA
3212 3165 DCA Z LFTMQ /STORE MQ
3213 7420 SNL
3214 5271 JMP SSINK+1 /CLEAR AND STORE LINK
3215 5270 JMP SSINK /SET AND STORE LINK
3216 7240 CLA CMA
3217 0162 AND Z LFTAC /AC CONTENTS
3220 7140 CLL CMA
3221 1273 TAD ACCOMP /AC COMPARE CONSTANTS
3222 7040 CMA
3223 7440 SZA
3224 5342 JMP ASRERR /ASR ERROR (AC IN ERROR)
3225 7430 SZL
3226 5342 JMP ASRERR /ASR ERROR (AC IN ERROR)
3227 7040 CMA
3230 0165 AND Z LFTMQ /MQ CONTENTS
3231 7140 CMA CLL
3232 1274 TAD MQCOMP /MQ COMPARE CONSTANTS
3233 7040 CMA
3234 7440 SZA
3235 5342 JMP ASRERR /ASR ERROR (MQ IN ERROR)
3236 7430 SZL
3237 5342 JMP ASRERR /ASR ERROR (MQ IN ERROR)
3240 7240 CLA CMA
3241 0677 AND I LLLLNK /AC LINK
3242 7450 SNA
3243 5342 JMP ASRERR /LINK ERROR (DID NOT EQUAL A ONE)
3244 5356 JMP TSSW0+4

3245 0000 GENRR, 0
3246 7240 CLA CMA
3247 0410 AND I Z ACIND /AC AUTO INDEX PATTERN COMPARE
3250 3273 DCA ACCOMP
3251 7040 CMA
3252 0411 AND I Z MQIND /MQ AUTO INDEX PATTERN COMPARE
3253 3274 DCA MQCOMP
3254 2207 ISZ ASRSHF /INCREMENT SHIFT #
3255 2161 ISZ Z PRNUM /INCREMENT ASR PRINT #
3256 2275 ISZ ASREX /INCREMENT TEST COUNT
3257 5645 JMP I GENRR
3260 2363 ISZ REEE
3261 5200 JMP STEST2
3262 7604 CLA OSR /TEST SW3
3263 7106 RTL CLL
3264 7006 RTL
3265 7430 SZL
3266 5200 JMP STEST2 /REPEAT TEST
3267 5700 JMP I SSTEST /EXIT TO NEXT PROGRAM
3270 7040

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3271	3677	SINK,	CMA	
3272	5216		DCA I LLLLNK	/STORE LINK
			JMP ASRSHF+7	
3273	0000	ACCOMP,	Ø	
3274	0000	MQCOMP,	Ø	
3275	0000	ASREX,	Ø	
3276	7750	ASREXX,	7750	
3277	1747	LLLLNK,	LFTINK.	
3300	4000	SSTEST,	STEST3	
3301	3502	MQAUT,	MQAUTX	
3302	3516	ACAUT,	ACAUTX	
3303	3601	STPR,	ASRPNU+1	
3304	3400		TYPE	
3305	2154		PRT	
3306	3060		PRTT	
3307	3405		TYPRE	
3310	3546		TYPE2	
3311	3414		TYPEA	
3312	0000	HSKK,	Ø	
3313	7240		CLA CMA	
3314	0307		AND ASREXX+11	
3315	3705		DCA I ASREXX+7	
3316	7040		CMA	
3317	0307		AND ASREXX+11	
3320	3706		DCA I ASREXX+10	
3321	7040		CMA	
3322	0302		AND ACAUT	
3323	3010		DCA Z ACIND	
3324	7040		CMA	
3325	0301		AND MQAUT	
3326	3011		DCA Z MQIND	
3327	7040		CMA	
3330	3207		DCA ASRSHF	
3331	7040		CMA	
3332	0303		AND STPR	
3333	3161		DCA Z PRNUM	
3334	7040		CMA	
3335	0276		AND ASREXX	
3336	3275		DCA ASREX	
3337	7000		NOP	
3340	7000		NOP	
3341	5712		JMP I HSKK	
3342	7604	ASRERR,	CLA OSR	
3343	7106		RTL CLL	/TEST SW2
3344	7004		RAL	
3345	7420		SNL	
3346	5352		JMP ISSWØ	
3347	4704		JMS I ASREXX+6	/PRINT ERROR
3350	4710		JMS I ASREXX+12	
3351	4711		JMS I ASREXX+13	

3352	7604	TSSW0,	CLA OSR	
3353	7104		RAL CLL	/TEST SW0
3354	7430		SZL	
3355	7402		HLT	/ERROR HALT STEST2
3356	7604		CLA OSR	/TEST SW1
3357	7106		RTL CLL	
3360	7430		SZL	
3361	5202		JMP STEST2+2	/SCOPE MODE
3362	5201		JMP STEST2+1	/CONTINUE MODE
3363	0000	REEE,	0	
		400		
3400	0000	TYPE,	0	
3401	4036		JMS Z CRLF	
3402	4666		JMS I ASHIFT	
3403	4667		JMS I ASHIFT+1	
3404	5561		JMP I Z PRNUM	
3405	4036	TYPRE,	JMS Z CRLF	
3406	4670		JMS I ASHIFT+2	
3407	4671		JMS I TYLPAR	
3410	4672		JMS I ASHIFT+4	
3411	4673		JMS I TYRPAR	
3412	4667		JMS I ASHIFT+1	
3413	5600		JMP I TYPE	
3414	0000	TYPEA,	0	
3415	4036		JMS Z CRLF	
3416	4674		JMS I ASHIFT+6	
3417	4670		JMS I ASHIFT+2	
3420	4671		JMS I TYLPAR	
3421	4672		JMS I ASHIFT+4	
3422	4673		JMS I TYRPAR	
3423	4674		JMS I ASHIFT+6	
3424	4670		JMS I ASHIFT+2	
3425	4671		JMS I TYLPAR	
3426	4675		JMS I ASHIFT+7	
3427	4673		JMS I TYRPAR	
3430	4036		JMS Z CRLF	
3431	7240		CLA CMA	
3432	0137		AND Z A	
3433	4046		JMS Z PRXLOP	
3434	7240		CLA CMA	
3435	0276		AND TYS	
3436	4046		JMS Z PRXLOP	
3437	7240		CLA CMA	
3440	0277		AND TYR	
3441	4046		JMS Z PRXLOP	
3442	4667		JMS I ASHIFT+1	
3443	4667		JMS I ASHIFT+1	
3444	4667		JMS I ASHIFT+1	
3445	7240		CLA CMA	
3446	0700		AND I TYLI	
3447	4061		JMS Z ONZER	
3450	4667		JMS I ASHIFT+1	
3451	7240		CLA CMA	
3452	0162		AND Z LFTAC	
3453	3147		DCA Z BITSTR	
3454	4077		JMS Z MESSG	

3455	4667		JMS I ASHIFT+1
3456	4667		JMS I ASHIFT+1
3457	4667		JMS I ASHIFT+1
3460	7240		CLA CMA
3461	0165		AND Z LFTMQ
3462	3147		DCA Z BITSTR
3463	4077		JMS Z MESSG
3464	4036		JMS Z CRLF
3465	5614		JMP I TYPEA
3466	3062	ASHIFT,	SHIFT
3467	0346		SPI
3470	2200		PC
3471	2205	TYLPAR,	LPAR
3472	0336		AC
3473	2212	TYRPAR,	RPAR
3474	2142		TENSP
3475	0304		MQ
3476	0323	TYS,	0323
3477	0322	TYR,	0322
3500	1747	TYLI,	LFTINK
3501	3777	KA3777,	3777
3502	0000	MQAUTX,	0
3503	0000		0
3504	0000		0
3505	0000		0
3506	0000		0
3507	0000		0
3510	0000		0
3511	0000		0
3512	0000		0
3513	0000		0
3514	0000		0
3515	0000		0
3516	4000	ACAUTX,	4000
3517	6000		6000
3520	7000		7000
3521	7400		7400
3522	7600		7600
3523	7700		7700
3524	7740		7740
3525	7760		7760
3526	7770		7770
3527	7774		7774
3530	7776		7776
3531	7777		7777
3532	7777		7777
3533	7777		7777
3534	7777		7777
3535	7777		7777
3536	7777		7777
3537	7777		7777
3540	7777		7777
3541	7777		7777
3542	7777		7777
3543	7777		7777
3544	7777		7777
3545	7777		7777

3600	0000	*3600	Ø
3601	5630	ASRPNU,	JMP I TY1
3602	5631		JMP I TY1+1
3603	5632		JMP I TY1+2
3604	5633		JMP I TY1+3
3605	5634		JMP I TY1+4
3606	5635		JMP I TY1+5
3607	5636		JMP I TY1+6
3610	5637		JMP I TY1+7
3611	5640		JMP I TY1+10
3612	5641		JMP I TY1+11
3613	5642		JMP I TY1+12
3614	5643		JMP I TY1+13
3615	5644		JMP I TY1+14
3616	5645		JMP I TY1+15
3617	5646		JMP I TY1+16
3620	5647		JMP I TY1+17
3621	5650		JMP I TY1+20
3622	5651		JMP I TY1+21
3623	5652		JMP I TY1+22
3624	5653		JMP I TY1+23
3625	5654		JMP I TY1+24
3626	5655		JMP I TY1+25
3627	5656		JMP I TY1+26
3630	2062	TY1,	Z1
3631	2065		Z2
3632	2067		Z3
3633	2071		Z4
3634	2074		Z5
3635	2077		Z6
3636	2102		Z7
3637	2105		Z8
3640	2110		Z9
3641	2113		Z10
3642	2117		Z11
3643	2124		Z12
3644	3013		Z13
3645	3015		Z14
3546	0000	TYPE2,	Ø
3547	7200		CLA
3550	4061		JMS Z ONZER
3551	4667		JMS I ASHIFT+1
3552	7240		CLA CMA
3553	0316		AND ACAUTX
3554	3147		DCA Z BITSTR
3555	4077		JMS Z MESSG
3556	5746		JMP I TYPE2
3557	0000	TYPE3,	Ø
3560	7240		CLA CMA
3561	4061		JMS Z ONZER
3562	4667		JMS I ASHIFT+1
3563	7240		CLA CMA
3564	0301		AND KA3777
3565	3147		DCA Z BITSTR
3566	4077		JMS Z MESSG
3567	5757		JMP I TYPE3

3646	3017		Z15	
3647	3021		Z16	
3650	3023		Z17	
3651	3025		Z18	
3652	3027		Z19	
3653	3031		Z20	
3654	3035		Z21	
3655	3040		Z22	
3656	3043		Z23	
3657	0000	MQCLC,	0	
3660	7777		7777	
3661	7777		7777	
3662	7777		7777	
3663	7777		7777	
3664	7777		7777	
3665	7777		7777	
3666	7777		7777	
3667	7777		7777	
3670	7777		7777	
3671	7777		7777	
3672	7777		7777	
3673	3777	ACCLC,	3777	
3674	1777		1777	
3675	0777		0777	
3676	0377		0377	
3677	0177		0177	
3700	0077		0077	
3701	0037		0037	
3702	0017		0017	
3703	0007		0007	
3704	0003		0003	
3705	0001		0001	
3706	0000		0000	
3707	0000		0000	
3710	0000		0000	
3711	0000		0000	
3712	0000		0000	
3713	0000		0000	
3714	0000		0000	
3715	0000		0000	
3716	0000		0000	
3717	0000		0000	
3720	0000		0000	
3721	0000		0000	
3722	0000		0000	
		*4000		
4000	4336	STEST3,	JMS HKEEP	
4001	4313		JMS GNNN	
4002	7360		CLA CMA STL	/SET LINK
4003	7421		SQL	
4004	7040		CMA	
4005	0303		AND TEST4+5	/AC TEST PATTERN
4006	7415		ASR	
4007	0000	ASR3,	0	
4010	3162		DCA Z LFTAC	/STORE AC
4011	7501		MQA	
4012	3165		DCA Z LFTMQ	/STORE MQ
4013	7420		SNL	

4014	5246		JMP SXLINK+1	/CLEAR AND STORE LINK
4015	5245		JMP SXLINK	/SET AND STORE LINK
4016	7240	CXSX,	CLA CMA	
4017	0162		AND Z LFTAC	/AC CONTENTS
4020	7140		CLL CMA	
4021	1273		TAD ACCHK	/AC COMPARE CONSTANTS
4022	7040		CMA	
4023	7440		SZA	
4024	5250		JMP AASREX	/ASR ERROR (AC IN ERROR)
4025	7430		SZL	
4026	5250		JMP AASREX	/ASR ERROR (AC IN ERROR)
4027	7040		CMA	
4030	0165		AND Z LFTMQ	/MQ CONTENTS
4031	7140		CLL CMA	
4032	1274		TAD MQCHK	/MQ COMPARE CONSTANTS
4033	7040		CMA	
4034	7440		SZA	
4035	5250		JMP AASREX	/ASR ERROR (MQ IN ERROR)
4036	7430		SZL	
4037	5250		JMP AASREX	/ASR ERROR (MQ IN ERROR)
4040	7240		CLA CMA	
4041	0702		AND I LIINK	/AC LINK
4042	7440		SZA	
4043	5250		JMP AASREX	/LINK ERROR (DID NOT EQUAL ZERO)
4044	5261		JMP AS3PR-5	
4045	7040	SXLINK,	CMA	
4046	3702		DCA I LIINK	
4047	5216		JMP CXSX	
4050	7604	AASREX,	CLA OSR	/TEST SW2
4051	7106		RTL CLL	
4052	7004		RAL	
4053	7430		SZL	
4054	4266		JMS AS3PR	/PRINT ERROR
4055	7604		CLA OSR	/TEST SW0
4056	7104		RAL CLL	
4057	7430		SZL	
4060	7402		HLT	/ERROR HALT STEST3
4061	7604		CLA OSR	/TEST SW1
4062	7106		RTL CLL	
4063	7430		SZL	
4064	5202		JMP STEST3+2	/SCOPE MODE
4065	5201		JMP STEST3+1	/CONTINUE MODE
4066	0000	AS3PR,	0	
4067	4701		JMS I .+12	
4070	4700		JMS I .+10	
4071	4677		JMS I .+6	
4072	5666		JMP I .-4	
4073	0000	ACCHK,	0	
4074	0000	MQCHK,	0	
4075	0000	ASREXT,	0	
4076	4200	TEST4,	NORMT	/NORMALIZE TEST
4077	3414		TYPEA	
4100	3557		TYPE3	
4101	3400		TYPE	
4102	1747	LIINK,	LFTINK	

4103	3777		3777	
4104	3405		TYPRE	
4105	2154		PRT	
4106	3060		PRIT	
4107	3673		ACCLC	
4110	7750		7750	
4111	3601		ASRPNU+1	
4112	3657		MQCLC	
4113	0000	GNNN,	Ø	
4114	7240		CLA CMA	
4115	0410		AND I Z ACIND	/AC AUTO INDEX PATTERN COMPARE
4116	3273		DCA ACCHK	
4117	7040		CMA	
4120	0411		AND I Z MQIND	/MQ AUTO INDEX PATTERN COMPARE
4121	3274		DCA MQCHK	
4122	2207		ISZ ASR3	/INCREMENT SHIFT #
4123	2161		ISZ Z PRNUM	/INCREMENT ASR PRINT #
4124	2275		ISZ ASREXT	/INCREMENT TEST COUNT
4125	5713		JMP I GNNN	
4126	2364		ISZ REEEE	
4127	5200		JMP STEST3	
4130	7604		CLA OSR	/TEST SW3
4131	7106		RTL CLL	
4132	7006		RTL	
4133	7430		SZL	
4134	5200		JMP STEST3	/REPEAT TEST
4135	5676		JMP I TEST4	
4136	0000	HKEEP,	Ø	
4137	7240		CLA CMA	
4140	0304		AND TEST4+6	
4141	3705		DCA I TEST4+7	
4142	7040		CMA	
4143	0304		AND TEST4+6	
4144	3706		DCA I TEST4+10	
4145	7040		CMA	
4146	0307		AND TEST4+11	
4147	3010		DCA Z ACIND	
4150	7040		CMA	
4151	0312		AND TEST4+14	
4152	3011		DCA Z MQIND	
4153	7040		CMA	
4154	3207		DCA ASR3	
4155	7040		CMA	
4156	0311		AND TEST4+13	
4157	3161		DCA Z PRNUM	
4160	7040		CMA	
4161	0310		AND TEST4+12	
4162	3275		DCA ASREXT	
4163	5736		JMP I HKEEP	
4164	0000	REEEE,	Ø	

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*4200
4200 5267 NORMT, JMP HSENMI
4201 4321 JMS GXEN
4202 7240 CLA CMA
4203 0314 AND MQNMIX
4204 7421 MQL /LOAD MQ INDEXED PATTERN
4205 7040 CMA
4206 0313 AND ACNMIX /LOAC AC INDEXED PATTERN
4207 7411 NMI
4210 3316 DCA ACNMIN /STORE AC
4211 7501 MQA
4212 3315 DCA MQNMIN /STORE MQ
4213 7441 SCA
4214 3307 DCA SCAST /STORE SCA COUNT
4215 7040 CMA
4216 0316 AND ACNMIN
4217 7140 CLL CMA
4220 1310 TAD NMIODD /6000
4221 7040 CMA
4222 7440 SZA
4223 5250 JMP NMIERR /AC DID NOT EQUAL 6000
4224 7430 SZL
4225 5250 JMP NMIERR /AC DID NOT EQUAL 6000
4226 7240 CLA CMA
4227 0315 AND MQNMIN
4230 7440 SZA
4231 5250 JMP NMIERR /MQ DID NOT EQUAL 0000
4232 7040 CMA
4233 0307 AND SCAST
4234 7140 CLL CMA
4235 1312 TAD SCASTX /INDEXED STEP COUNT #
4236 7040 CMA
4237 7440 SZA
4240 5250 JMP NMIERR /SC IN ERROR
4241 7430 SZL
4242 5250 JMP NMIERR /SC IN ERROR
4243 7240 CLA CMA
4244 0312 AND SCASTX /TEST SCA COUNT FOR 0
4245 7440 SZA /TO EXIT
4246 5262 JMP NMIERR+12 /CONTINUE TEST
4247 5301 JMP EXINMI
4250 7604 NMIERR, CLA OSR /TEST SW2
4251 7106 RTL CLL
4252 7004 RAL
4253 7420 SNL
4254 7410 SKP
4255 4720 JMS I SCAST+11 /JUMP TO PRINT ROUTINE
4256 7604 CLA OSR
4257 7104 RAL CLL
4260 7430 SZL /TEST SW0
4261 7402 HLT
4262 7604 CLA OSR
4263 7106 RTL CLL
4264 7430 SZL /TEST SW1
4265 5202 JMP NORMI+2
4266 5201 JMP NORMI+1
4267 7240 HSENMI, CLA CMA
4270 0336 AND ACNMIQ

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4271	3012		DCA XACNMI /AC AUTO START ADDRESS
4272	7040		CMA
4273	0337		AND MQNMIQ
4274	3013		DCA XMQNMI /MQ AUTO START ADDRESS
4275	7040		CMA
4276	0311		AND SCC23 /SC 23
4277	3312		DCA SCASTX /STORE DECIMAL 23
4300	5201		JMP NORMT+1
4301	7604	EXINMI,	CLA OSR /TEST SW3
4302	7106		RTL CLL
4303	7006		RTL
4304	7430		SZL
4305	5200		JMP NORMT /REPEAT ENTIRE TEST
4306	5717		JMP I SCAST+10 /JMP TO NEXT NMI TEST
4307	0000	SCAST,	0
4310	6000	NMIODD,	6000
4311	0027	SCC23,	0027 /23 DECIMAL
4312	0000	SCASTX,	0
4313	0000	ACNMIX,	0
4314	0000	MQNMIX,	0
4315	0000	MQNMIN,	0
4316	0000	ACNMIN,	0
4317	5000		NORMT1
4320	4400		PRNMI
4321	0000	GXEN,	0
4322	7240		CLA CMA
4323	0412		AND I Z XACNMI
4324	3313		DCA ACNMIX /STORE AC PATTERN
4325	7040		CMA
4326	0413		AND I Z XMQNMI
4327	3314		DCA MQNMIX /STORE MQ PATTERN
4330	7040		CMA
4331	0312		AND SCASTX /SUBTRACT ONE FROM SCA COUNT
4332	7041		CIA
4333	7040		CMA
4334	3312		DCA SCASTX /STORE DECREMENTED SCA COUNT
4335	5340		JMP EXEN
4336	4517	ACNMIQ,	ACNMI
4337	4533	MQNMIQ,	MQNMI
4340	7240	EXEN,	CLA CMA
4341	0312		AND SCASTX
4342	7440		SZA
4343	5721		JMP I GXEN
4344	5301		JMP EXINMI
4400	0000	*4400	0
4401	4036	PRNMI,	0 /PRINT ROUTINE
4402	4712		JMS Z CRLF
4403	4674		JMS I SPR2+16
4404	4674		JMS I SPR2
4405	4674		JMS I SPR2
4406	4675		JMS I SPR2+1
4407	4676		JMS I SPR2+2
4410	4677		JMS I SPR2+3
4411	4700		JMS I SPR2+4
4412	4701		JMS I SPR2+5
4413	4675		JMS I SPR2+1
4414	4676		JMS I SPR2+2

4415	4702	JMS	I	SPR2+6
4416	4700	JMS	I	SPR2+4
4417	4036	JMS	Z	CRLF
4420	4674	JMS	I	SPR2
4421	4674	JMS	I	SPR2
4422	4674	JMS	I	SPR2
4423	7240	CLA	CMA	
4424	0703	AND	I	SPR2+7
4425	3147	DCA	Z	BITSTR
4426	4077	JMS	Z	MESSG
4427	4674	JMS	I	SPR2
4430	4704	JMS	I	SPR2+10
4431	7240	CLA	CMA	
4432	0705	AND	I	SPR2+11
4433	3147	DCA	Z	BITSTR
4434	4077	JMS	Z	MESSG
4435	4036	JMS	Z	CRLF
4436	4713	JMS	I	SPR2+17
4437	4674	JMS	I	SPR2
4440	4704	JMS	I	SPR2+10
4441	7240	CLA	CMA	
4442	0706	AND	I	SPR2+12
4443	3147	DCA	Z	BITSTR
4444	4077	JMS	Z	MESSG
4445	4674	JMS	I	SPR2
4446	4704	JMS	I	SPR2+10
4447	7240	CLA	CMA	
4450	0707	AND	I	SPR2+13
4451	3147	DCA	Z	BITSTR
4452	4077	JMS	Z	MESSG
4453	4036	JMS	Z	CRLF
4454	4714	JMS	I	SPR2+20
4455	4674	JMS	I	SPR2
4456	7240	CLA	CMA	
4457	0710	AND	I	SPR2+14
4460	3147	DCA	Z	BITSTR
4461	4077	JMS	Z	MESSG
4462	4036	JMS	Z	CRLF
4463	4715	JMS	I	SPR2+21
4464	4674	JMS	I	SPR2
4465	4704	JMS	I	SPR2+10
4466	7240	CLA	CMA	
4467	0711	AND	I	SPR2+15
4470	3147	DCA	Z	BITSTR
4471	4077	JMS	Z	MESSG
4472	4036	JMS	Z	CRLF
4473	5600	JMP	I	PRNMI
4474	0326	SPR2,	SP2	
4475	2200	PC		
4476	2205	LPAR		
4477	0336	AC		
4500	2212	RPAR		
4501	2142	TENSP		
4502	0304	MQ		
4503	4313	ACNMIX		
4504	0346	SPI		
4505	4314	MQNMIX		
4506	4316	ACNMIN		

4507	4315		MQNMIN	
4510	4312		SCASTX	
4511	4307		SCAST	
4512	4600		NMITPR	
4513	4624		NMIXX	
4514	4627		SCATXX	
4515	4633		SCAXX	
4516	0000		Ø	
4517	0000	ACNMI,	Ø	
4520	7777		7777	/SC22
4521	7777		7777	/SC21
4522	7777		7777	/SC 20
4523	7777		7777	/SC 19
4524	7777		7777	/SC 18
4525	7777		7777	/SC 17
4526	7777		7777	/SC 16
4527	7777		7777	/SC 15
4530	7777		7777	/SC 14
4531	7777		7777	/SC 13
4532	7777		7777	/SC 12
4533	7777	MQNMI,	7777	/SC 11
4534	7777		7777	/SC 10
4535	7776		77*&	/SC 9
4536	7774		7774	/SC 8
4537	7770		7770	/SC 7
4540	7760		7760	/SC 6
4541	7740		7740	/SC 5
4542	7700		7700	/SC 4
4543	7600		7600	/SC 3
4544	7400		7400	/SC 2
4545	7000		7000	/SC 1
4546	6000		6000	/SC 0
4547	4000		4000	
4550	0000		0000	
4551	0000		0000	
4552	0000		0000	
4553	0000		Ø	
4554	0000		Ø	
4555	0000		Ø	
4556	0000		Ø	
4557	0000		Ø	
4560	0000		Ø	
4561	0000		Ø	
4562	0000		Ø	
4563	0000		Ø	
4564	0000		Ø	
			*4600	
4600	0000	NMITPR,	Ø	
4601	4204		JMS PNORM	
4602	4217		JMS XNORMI	
4603	5600		JMP I NMITPR	
4604	0000	PNORM,	Ø	
4605	7240		CLA CMA	
4606	0256		AND N	
4607	4046		JMS Z PRXLOP	
4610	7240		CLA CMA	

4611	0257		AND N+1		
4612	4046		JMS Z PRXLOP		
4613	7240		CLA CMA		
4614	0260		AND N+2		
4615	4046		JMS Z PRXLOP		
4616	5604		JMP I PNORM		
4617	0000	XNORMT,	Ø		
4620	7240		CLA CMA		
4621	0261		AND N+3		
4622	4046		JMS Z PRXLOP		
4623	5617		JMP I XNORMT		
4624	0000	NMIXX,	Ø		
4625	4204		JMS PNORM		
4626	5624		JMP I NMIXX		
4627	0000	SCATXX,	Ø		
4630	4236		JMS PSTEP		
4631	4251		JMS PSTEPT		
4632	5627		JMP I SCATXX		
4633	0000	SCAXX,	Ø		
4634	4236		JMS PSTEP		
4635	5633		JMP I SCAXX		
4636	0000	PSTEP,	Ø		
4637	7240		CLA CMA		
4640	0262		AND N+4		
4641	4046		JMS Z PRXLOP		
4642	7240		CLA CMA		
4643	0263		AND N+5		
4644	4046		JMS Z PRXLOP		
4645	7240		CLA CMA		
4646	0264		AND N+6		
4647	4046		JMS Z PRXLOP		
4650	5636		JMP I PSTEPT		
4651	0000	PSTEPT,	Ø		
4652	7240		CLA CMA		
4653	0261		AND N+3		
4654	4046		JMS Z PRXLOP		
4655	5651		JMP I PSTEPT		
4656	0316	N,	Ø316	/N	
4657	0315		Ø315		/M
4660	0311		Ø311	/I	
4661	0324		Ø324	/T	
4662	0323		Ø323	/S	
4663	0303		Ø303	/C	
4664	0301		Ø301	/A	
		*5000			
5000	5261	NORMT1,	JMP HSENM		
5001	4272		JMS GENNMI		
5002	7240		CLA CMA		
5003	0715		AND I IST25+1	/LOAD MQ PATTERN	
5004	7421		SQL		
5005	7240		CLA CMA		
5006	0716		AND I IST25+2	/LOAD AC PATTERN	
5007	7411		NMI		
5010	3724		DCA I IST25+10	/STORE NORMALIZED AC	
5011	7501		MQA		
5012	3725		DCA I IST25+11	/STORE NORMALIZED MQ	
5013	7441		SCA		

5014	3726	DCA I TST25+12	/STORE SCA COUNT
5015	7240	CLA CMA	
5016	0724	AND I TST25+10	
5017	7140	CLL CMA	
5020	1715	TAD I TST25+1	
5021	7040	CMA	
5022	7440	SZA	
5023	5332	JMP NMERR	/AC DID NOT EQUAL 2525
5024	7430	SZL	
5025	5332	JMP NMERR	/AC DID NOT EQUAL 2525
5026	7240	CLA CMA	
5027	0725	AND I TST25+11	
5030	7440	SZA	
5031	5332	JMP NMERR	/MQ DID NOT EQUAL 0000
5032	7240	CLA CMA	
5033	0726	AND I TST25+12	
5034	7140	CLL CMA	
5035	1330	TAD DEC12	/DECIMAL 12
5036	7040	CMA	
5037	7440	SZA	
5040	5332	JMP NMERR	/SC DID NOT EQUAL 12
5041	7430	SZL	
5042	5332	JMP NMERR	/SC DID NOT EQUAL 12
5043	2314	ISZ TST25	/REPEAT CURRENT TEST PATTERN
5044	5202	JMP NORMT1+2	
5045	7604	CLA OSR	/TEST SW1
5046	7106	RTL CLL	
5047	7430	SZL	
5050	5202	JMP NORMT1+2	
5051	2321	ISZ NMFLG	
5052	5201	JMP NORMT1+1	
5053	7604	CLA OSR	/TEST SW3
5054	7106	RTL CLL	
5055	7006	RTL	
5056	7430	SZL	
5057	5200	JMP NORMT1	
5060	5723	JMP I NEXNMI	
5061	7200	CLA	
5062	3314	DCA TST25	/CLEAR TEST COUNTER
5063	7000	NOP	
5064	7040	CMA	
5065	0322	AND NM7776	
5066	3321	DCA NMFLG	
5067	1330	TAD DEC12	
5070	3727	DCA I TST25+13	
5071	5201	JMP NORMT1+1	
5072	0000	Ø	
5073	7240	CLA CMA	
5074	0321	AND NMFLG	
5075	7040	CMA	
5076	7440	SZA	
5077	5301	JMP PA2525 /GENERATE 2525	
5100	5306	JMP PA2525+5	/GENERATE 5252
5101	7240	CLA CMA	
5102	0317	AND NM2525 /MQ PATTERN 2525	
5103	3715	DCA I TST25+1	
5104	3716	DCA I TST25+2	/AC PATTERN 0000
5105	5672	JMP I GENNMI	

5106	7240		CLA CMA	
5107	0320		AND NM5252 /MQ PATTERN 5252	
5110	3715		DCA I TST25+1	
5111	7040		CMA	
5112	3716		DGA I TST25+2	/AC PATTERN 7777
5113	5672		JMP I GENNMI	
5114	0000	TST25,	Ø	
5115	4314		MQNMIX	
5116	4313		ACNMIX	
5117	2525	NM2525,	2525	
5120	5252	NM5252,	5252	
5121	0000	NMFLG,	Ø	
5122	7776	NM7776,	7776	
5123	5200	NEXNMI,	NORMT2	
5124	4316		ACNMIN	
5125	4315		MQNMIN	
5126	4307		SCAST	
5127	4312		SCASTX	
5130	0014	DEC12,	ØØ14	
5131	4400		PRNMI	
5132	7604	NMERR,	CLA OSR	/TEST SW2
5133	7106		RTL CLL	
5134	7004		RAL	
5135	7420		SNL	
5136	7410		SKP	
5137	4731		JMS I DEC12+1	
5140	7604		CLA OSR	
5141	7104		RAL CLL	
5142	7430		SZL	/TEST SW0
5143	7402		HLT	
5144	7604		CLA OSR	/TEST SW1
5145	7106		RTL CLL	
5146	7420		SNL	
5147	5202		JMP NORMT1+2	/CONTINUE
5150	7200		CLA	
5151	3314		DCA TST25	/CLEAR CURRENT TEST COUNTER
5152	5202		JMP NORMT1+2	/SCOPE
		*5200		
5200	5307	NORMT2,	JMP HKE	/HOUSE KEEPING
5201	4255		JMS GEX	/PATTERN GENERATOR
5202	7621		CAM	
5203	7040		CMA	
5204	0734		AND I PAT01	
5205	7421		SQL	/MQ PATTERN
5206	7140		CLL CMA	
5207	0735		AND I PAT00	/AC PATTERN
5210	7411		NMI	
5211	3736		DCA I SPAT00	/STORE AC NORMALIZED PATTERN
5212	7501		MQA	
5213	3737		DCA I SPAT01	/STORE MQ NORMALIZED PATTERN
5214	7441		SCA	
5215	3743		DCA I SCANM	/STORE SCA COUNT
5216	7040		CMA	
5217	0736		AND I SPAT00	/AC PATTERN
5220	7040		CMA	
5221	1340		TAD CHKAC	/CHECK PATTERN AC

5222	7040		CMA	
5223	7440		SZA	/TEST AC BITS
5224	5314		JMP MT2ER	/SPAT00 NOT EQUAL TO CHKAC
5225	7430		SZL	
5226	5314		JMP MT2ER	/SPAT00 NOT EQUAL TO CHKAC
5227	7040		CMA	
5230	0737		AND I SPAT01	/MQ PATTERN
5231	7040		CMA	
5232	1341		TAD CHKMQ	/CHECK PATTERN MQ
5233	7040		CMA	
5234	7440		SZA	/TEST MQ BITS
5235	5314		JMP MT2ER	/SPAT01 NOT EQUAL TO CHKMQ
5236	7430		SZL	
5237	5314		JMP MT2ER	/SPAT01 NOT EQUAL TO CHKMQ
5240	7040		CMA	
5241	0743		AND I SCANM	/SCA COUNT PATTERN
5242	7041		CIA	
5243	1742		TAD I CHKSCA	/CHECK PATTERN SCA
5244	7420		SNL	
5245	5314		JMP MT2ER	/SCANM NOT EQUAL TO CHKSCA
5246	2345		ISZ AGAIN	/4096 REPEATS CURRENT TEST
5247	5202		JMP NORMT2+2	
5250	7604	NMTS1,	CLA OSR	/TEST SW1
5251	7106		RTL CLL	
5252	7430		SZL	
5253	5202		JMP NORMT2+2	
5254	5354		JMP PATCH	/JUMP TO SW3
5255	0000	GEX,	Ø	
5256	7240		CLA CMA	
5257	0346		AND TPFLAG	
5260	7040		CMA	
5261	7440		SZA	
5262	5264		JMP .+2	/GENERATE 0000 MQ PATTERN
5263	5273		JMP .+10	/GENERATE 0001 MQ PATTERN
5264	7200		CLA	
5265	3735		DCA I PAT00	/STORE AC PATTERN
5266	3734		DCA I PAT01	/STORE MQ PATTERN
5267	3340		DCA CHKAC	/STORE AC CHECK
5270	3341		DCA CHKMQ	/STORE MQ CHECK
5271	3742		DCA I CHKSCA	/STORE SCA CHECK
5272	5655		JMP I GEX	
5273	7240		CLA CMA	
5274	0344		AND SCANM+1	/MQ PATTERN (0001)
5275	3734		DCA I PAT01	/STORE MQ PATTERN
5276	7040		CMA	
5277	0347		AND TPFLAG+1	/22 DECIMAL PLACES (0030)
5300	3742		DCA I CHKSCA	
5301	3735		DCA I PAT00	/STORE AC PATTERN
5302	3341		DCA CHKMQ	/STORE MQ CHECK
5303	7040		CMA	
5304	0350		AND TPFLAG+2	/20000
5305	3340		DCA CHKAC	/STORE AC CHECK
5306	5655		JMP I GEX	
5307	7240	HKE,	CLA CMA	/HOUSE KEEPING
5310	0351		AND TPFLAG+3	/7776
5311	3346		DCA TPFLAG	/LOAD FLAG
5312	3345		DCA AGAIN	/CHECK TEST COUNTER
5313	5201		JMP NORMT2+1	

5314	7604	MT2ER,	CLA OSR	/TEST SW2
5315	7106		RTL CLL	
5316	7004		RAL	
5317	7430		SZL	
5320	4752		JMS I TPFLAG+4	/PRINT ROUTINE
5321	7604		CLA OSR	/TEST SW0
5322	7104		RAL CLL	
5323	7430		SZL	
5324	7402		HLT	
5325	5250		JMP NMTS1	
5326	7604	NMTS3,	CLA OSR	/TEST SW3
5327	7106		RTL CLL	
5330	7006		RTL	
5331	7430		SZL	
5332	5200		JMP NORMT2	/CONTINUE
5333	5753		JMP I TPFLAG+5	
5334	4314	PAT01,	MQNMIX	
5335	4313	PAT00,	ACNMIX	
5336	4316	SPAT00,	ACNMIN	
5337	4315	SPAT01,	MQNMIN	
5340	0000	CHKAC,	0	
5341	0000	CHKMQ,	0	
5342	4312	CHKSCA,	SCASTX	
5343	4307	SCANM,	SCAST	
5344	0001		0001	
5345	0000	AGAIN,	0	
5346	0000	TPFLAG,	0	
5347	0026		0026	
5350	2000		2000	
5351	7776		7776	
5352	4400		PRNMI	
5353	5400		E3A	
5354	2346	PATCH,	ISZ TPFLAG	
5355	5201		JMP NORMT2+1	
5356	5326		JMP NMTS3	

\*5400

5400	4036	E3A,	JMS Z CRLF	
5401	7240		CLA CMA	
5402	0154		AND Z THREE	/3
5403	4046		JMS Z PRXLOP	
5404	7040		CMA	
5405	0137		AND Z A	/A
5406	4046		JMS Z PRXLOP	
5407	5610		JMP I .+1	

5410	0200	BIGL,	MQLT	
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A	0137
AASREX	4050
AC	0336
ACAUT	3302
ACAUTX	3516
ACCHK	4073
ACCLC	3673
ACCOMP	3273
ACIND	0010
ACNMI	4517



ACNMIN 4316  
 ACNMIQ 4336  
 ACNMIX 4313  
 ACP 0123  
 AGAIN 5345  
 AMQAT3 1471  
 APMQAT 1466  
 ASHIFT 3466  
 ASR 7415  
 ASRERR 3342  
 ASREX 3275  
 ASREXT 4075  
 ASREXX 3276  
 ASRPNU 3600  
 ASRSHF 3207  
 ASR3 4007  
 AS3PR 4066  
 AT 0732  
 AT3 1272  
 BACK 0031  
 BACP 0127  
 BIGL 5410  
 BITS TR 0147  
 BLXP 0126  
 C 0140  
 CHKAC 5340  
 CHKMQ 5341  
 CHKSCA 5342  
 CLLI 2666  
 CLLINK 1733  
 CLRINK 1740  
 CLRL4 1347  
 CONTIN 2504  
 COUNTX 0145  
 CP 0264  
 CR 0130  
 CRLF 0036  
 CRLI 2673  
 CXSX 4016  
 DEC12 5130  
 EIGHT 2134  
 ELEVEN 2550  
 EMQAT2 1270  
 EXEN 4340  
 EXINMI 4301  
 E3A 5400  
 FIVE 2131  
 FOUR 2130  
 GEN 0020  
 GENN 2503  
 GENNMI 5072  
 GENRR 3245  
 GENX 0125  
 GEX 5255  
 GNNN 4113  
 GXEN 4321  
 HKE 5307

HKEEP 4136  
 HSE 0246  
 HSENM 5061  
 HSENM1 4267  
 HSE1 0456  
 HSE2 0635  
 HSE3 1034  
 HSE4 1235  
 HSE5 1434  
 HSKK 3312  
 HX 2304  
 INCOR 0152  
 INCSUB 1724  
 KA3777 3501  
 KKK 2546  
 KKKN 2600  
 KKKNU 2567  
 KP1 1700  
 KP1XX 2527  
 KX12 2566  
 K2525 2701  
 K4000 2565  
 K7764 0166  
 L 0314  
 LEFTS 1606  
 LF 0131  
 LFTAC 0162  
 LFTINK 1747  
 LFTMQ 0165  
 LFTXXX 2617  
 LIINK 4102  
 LINK 0143  
 LL 0134  
 LLIN 2702  
 LLLLNK 3277  
 LNPR2 1256  
 LPAR 2205  
 LPAREN 2217  
 LSR 7417  
 LX 2303  
 LXP 0124  
 M 0132  
 MESSG 0077  
 MQ 0304  
 MQA 7501  
 MQAER1 1046  
 MQAER2 1247  
 MQAER3 1446  
 MQAT 0600  
 MQAT1 1000  
 MQAT2 1200  
 MQAT3 1400  
 MQAUT 3301  
 MQAUTX 3502  
 MQA1 0674  
 MQCHK 4074  
 MQCLC 3657

MQCOMP 3274  
 MQIND 0011  
 MQL 7421  
 MQLT 0200  
 MQLT1 0427  
 MQNMI 4533  
 MQNMIN 4315  
 MQNMIQ 4337  
 MQNMI X 4314  
 MQ1 0475  
 MT2ER 5314  
 N 4656  
 NCOMP 2506  
 NEXNMI 5123  
 NEX T 0032  
 NGEN 2547  
 NGENX 2700  
 NINE 2135  
 NMERR 5132  
 NMFLG 5121  
 NMI 7411  
 NMIERR 4250  
 NMIODD 4310  
 NMITPR 4600  
 NMIXX 4624  
 NMTS1 5250  
 NMTS3 5326  
 NM2525 5117  
 NM5252 5120  
 NM7776 5122  
 NNEG 2704  
 NOPR 1056  
 NOPR3 1455  
 NORMT 4200  
 NORMT1 5000  
 NORMT2 5200  
 NSUB 1746  
 NTST 2551  
 ONE 0141  
 ONEONE 3045  
 ONEP 0066  
 ONZER 0061  
 PACP 0413  
 PATCH 5354  
 PAI00 5335  
 PAT01 5334  
 PA2525 5101  
 PBACP 0421  
 PBLXP 0400  
 PC 2200  
 PLINK 0054  
 PLXP 0353  
 PMQAT 0667  
 PMQLT 0257  
 PNORM 4604  
 PPNUM 3000  
 PPPNUM 2545

PRET	2060	SHL	7413	T15	2415
PRINT	1677	SHLLSR	1601	T16	2423
PRINTS	2000	SHLP	2221	T17	2431
PRNMI	4400	SHLX	2036	T18	2437
PRNUM	0161	SIX	2132	T19	2445
PRONE	0117	SNUM	1752	T20	2453
PRT	2154	SP	0136	T21	2461
PRTAA	1753	SPACST	2153	T22	2467
PRTT	3060	SPAT00	5336	T23	2475
PRTTA	2573	SPAT01	5337	VOR	1335
PRTW	2005	SPR2	4474	XACNMI	0012
PRT3	3051	SP1	0346	XAT3	1476
PRXLOP	0046	SP2	0326	XCP	0520
PRZTA	2574	SS	3103	XK400	0167
PSTEP	4636	SSINK	3270	XMQAT	0034
PSTEPT	4651	SSTEST	3300	XMQAT1	0035
PTHREE	1477	STEST	1600	XMQAT2	0150
PTO	0406	STEST1	2400	XMQAT3	0151
PTWO	1342	STEST2	3200	XMQLT1	0033
Q	0133	STEST3	4000	XMQNMI	0013
REEE	3363	STLINK	1735	XMQ1	0506
REEEE	4164	STPR	3303	XNORMT	4617
RIGHTS	1620	STRCNT	0146	XONE	0524
RI TAC	0163	STRINK	1742	XPACP	0361
RITINK	1750	SX	2305	XPMQAT	1267
RITMQ	0164	SXLINK	4045	XSCAT	0153
RITXXX	2631	T	0321	XSP1	1325
RLIN	2703	TCOUNT	2152	YA	0742
RL2	0620	TENSP	2142	YSP2	0721
RL4	1223	TEST4	4076	ZERO	0142
RPAR	2212	THREE	0154	ZEROR	0072
RPAREN	2220	TINUE	2706	Z1	2062
RSUB	1745	TNUM	2044	Z10	2113
RX	2310	TO	0144	Z11	2117
SCA	7441	TPFLAG	5346	Z12	2124
SCANM	5343	TSSW0	3352	Z13	3013
SCAST	4307	TST25	5114	Z14	3015
SCASTX	4312	TT	0135	Z15	3017
SCATXX	4627	TWELVE	1751	Z16	3021
SCAXX	4633	TWO	0155	Z17	3023
SCC23	4311	TWOTWO	3061	Z18	3025
SCP13	2405	TXXX	2572	Z19	3027
SCP14	2413	TXXX	2610	Z2	2065
SCP15	2421	TYLI	3500	Z20	3031
SCP16	2427	TYLPAR	3471	Z21	3035
SCP17	2435	TYPE	3400	Z22	3040
SCP18	2443	TYPEA	3414	Z23	3043
SCP19	2451	TYPE2	3546	Z3	2067
SCP20	2457	TYPE3	3557	Z4	2071
SCP21	2465	TYPRE	3405	Z5	2074
SCP22	2473	TYR	3477	Z6	2077
SCP23	2501	TYRPAR	3473	Z7	2102
SETL	0156	TYS	3476	Z8	2105
SEVEN	2133	TY1	3630	Z9	2110
SHERR	1655	T13	2401		
SHERRX	2707	T14	2407		
SHIFT	3062	T14X	2552		

11. DIAGRAMS  
 11.4 Error Graphs for Functions  
 11.4.1 Table Number 1

AC, MQ	R212	R210	R111	R111 (Module Type)
Bit 11	PF22	PA18 PB18	PE21	PE20 (Module Position)
	D182-0-2	D802	D182-0-2	D182-0-2 (Drawing No.)
Bit 10	PF22	PA17 PB17	PE21	PE20
	D182-0-2	D802	D182-0-2	D182-0-2
Bit 9	PF21	PA16 PB16	PE21	PE20
	D182-0-2	D802	D182-0-2	D182-0-2
Bit 8	PF21	PA15 PB15	PE19	
	D182-0-2	D802	D182-0-2	
Bit 7	PF20	PA14 PB14	PE18	PE19
	D182-0-2	D802	D182-0-2	D182-0-2
Bit 6	PF20	PA13 PB13	PE18	
	D182-0-2	D802	D182-0-2	
Bit 5	PF19	PA12 PB12	PE18	
	D182-0-2	D802	D182-0-2	

Bit 4	R212 PF19  D182-0-2	R210 PA11 PB11  D802	R111 PE17  D182-0-2
Bit 3	R212 PF18  D182-0-2	R210 PA10 PB10  D802	
Bit 2	R212 PF18  D182-0-2	R210 PA09 PB09  D802	
Bit 1	R212 PF17  D182-0-2	R210 PA08 PB08  D802	
Bit 0	R212 PF17  D182-0-2	R210 PA07 PB07  D802	R111 PE17  D182-0-2
AC, Link	R210 PA06 PB06  D802		

11.4.2 Table Number 2

SC		
Bit 0	R205 PF25 D182-0-2	R111 PE19 D182-0-2
Bit 1	R205 PF25 D182-0-2	R111 PE19 D182-0-2

Bit 2	R205	R111
	PF27	PE20
	D182-0-2	D182-0-2
Bit 3	R205	R111
	PF27	PE20
	D182-0-2	D182-0-2
Bit 4	R205	R111
	PF27	PE20
	D182-0-2	D182-0-2

100

2

100