IDENTIFICATION

Product Code:	MAINDEC 08-D02B-D
Product Name:	PDP-8 Instruction Test Part 2B
Date Created:	January 12, 1968
Maintainer:	Diagnostic Group

1. ABSTRACT

This program is a test of the 2s complement add (TAD) and rotate logic (RAL, RTL, RAR, RTR). Random numbers are used in the Twos Add portion of the test and sequential numbers are used in the Rotate portion. Program control depends on operator manipulation of four switches in the SWITCH REGISTER (bits 0, 1, 2, 3). Error information is normally printed out on the keyboard printer.

2. REQUIREMENTS

Storage

Memory locations 20_8-4177_8.

Subprograms and/or Subroutines

High RIM Loader, High Binary Loader.

Equipment

PDP-8 Processor-Keyboard Reader

3. USAGE

3.1 Loading

If the Binary Loader beginning at 7777_8 is in memory, load the Instruction Test - Part 2b. Otherwise, the RIM Loader beginning at 7756_8 and/or the Binary Loader must be loaded into memory.

PDP-8 Instruction Test - Part 2B (Maindec 801-2B) may now be loaded as follows:

Set 7777_8 in the SWITCH REGISTER.

Press LOAD ADDRESS key.

Place Instruction Test-Part 2B in the keyboard reader.

Press START key on the operator console.

Engage the keyboard reader.

3.2 Switch Settings

When starting at the TAD portion (200_8) of the test, set switches 0 and 2 to the 1 state. This switch configuration allows the program to print any error message and halt on the error condition. After the TAD portion has run for a minimum of 10 minutes, set switch 3 to a 1 to enter the Rotate Test.

When starting at the rotate portion (2000_8) set switches 0 and 2 to the 1 state as above. This switch configuration allows the program to print any error message and halt on the error condition.

Switch 0	Stop on error (406_8 for TAD or 2433_8 for Rotate Test).
Switch 1	Scope mode (repeat loop causing the error).
Switch 2	Print error.
Switch 3	Leave the Twos Add test and start the Rotate Test.

Switch 0 and 1	Scope mode and stop on error.
Switch 0 and 2	Print error and halt.
Switch 1 and 2	Scope and print error.

3.3 Start-Up and/or Entry

The starting address of the TAD portion of the test is 0200_8. The starting address of the Rotate portion of the test is 2000_8. If bit 3 of the SWITCH REGISTER is set, it automatically causes an exit from the Twos Add portion of the test to the Rotate portion of the test.

Set either 0200_8 in the SWITCH REGISTER to start at the Twos Add portion of the test, or set 2000_8 in the SWITCH REGISTER to start at the Rotate portion of the test.

Press the LOAD ADDRESS key.

Press the START key.

3.4 Errors in Usage

The error halt for TAD Test is 406_8.

The error halt for Rotate Test is 2433_8.

Error printouts from both tests would appear as follows:

TWOS ADD ERROR PRINTOUT:

Good	Bad	X ARG	Y ARG
0 000000000001	0 00000000000 0	000000000000	000000000001

Indicating loss of a 1 bit in AC bit 11.

ROTATE ERROR PRINTOUTS:

PAT 0	000000000001	(original pattern)
RAL 0	000000000010	(pattern after RAL inst.)
RAR 0	000000000000	(pattern after RAR inst.)

Indicating loss of a 1 bit in AC bit 11 as a result of an RAR.

PAT 0	000000100000
RTR 0	000000000000
RTL 0	000000000000

Indicating loss of a 1 bit in AC bit 8 as a result of an RTR.

3.5 Recovery from such Errors

The program may be continued after it halts on an error, by pressing the CONTINUE key. The program continues to the next test, unless scope mode (bit 1) is requested.

Set the state of AC switch 1 to 1 to repeat the loop causing the error (scope mode).

Reference 4.3 for other switch variations.

4. RESTRICTIONS

This test should be run only after a successful run of the Instruction Test 2A to provide maximum reliability of the module repair table.

5. DESCRIPTION

5.1 Discussion

The PDP-8 Instruction Test-Part 2B tests the 2s ADD and ROTATE logic.

The 2s ADD logic is tested by the addition of pseudo random numbers. Two pseudo random numbers are generated and 2s added by a logical (simulated) adder. The same two numbers are added by the 2s add logic (TAD). The results are compared, and if an equality exists, two new random numbers are generated and the sequence is re-executed. If an inequality exists, the computer halts and/or types the error condition depending on the switch settings.

5.2 Examples and/or Applications

The error printout will contain the correct answer, the incorrect answer, and the two random numbers used.

Visual inspection of these patterns will determine the cause of the error. A lookup table is provided for rapid repair which will give all of the information shown in section 4.6.

Exit from TAD Test to the Rotate portion is accomplished by setting bit 3 in the SWITCH REGISTER. This switch also causes the program to print "ADD OK."

The Rotate Test generates 8192 patterns to be tested on two pairs of rotate instructions. The first pair of rotate instructions to be tested is RAL and RAR. The test pattern is rotated left once, then the result is rotated right once. The following items are compared:

The result of the RAR should equal the test pattern and original link.

The result of the link after the RAL should equal bit 0 of the test pattern.

If the RAR results and link equals the test pattern and link, the RAL and RAR instructions have operated correctly.

If an error occurs and an error printout is requested, the test pattern and the results of both the RAL and RAR instructions are printed. Visual inspection of these patterns will determine the probable cause of the error.

The second pair of rotate instructions to be tested is RTR and RTL. The test pattern is rotated right twice, then the result is rotated left twice. The following items are compared:

The result of the RTL should equal the test pattern and original link.

The result of the link after the RTR should equal pattern bit 1 of the test pattern.

If the RTL results and link equal the test pattern and link, the RTR and RTL, instructions have operated correctly.

If an error occurs and an error printout is requested, the test pattern and the results of both the RTR and RTL instructions are printed. Visual inspection of these patterns will determine the probable cause of the error.

After a complete pass through the Rotate Test, the computer will print ROT.

A printout of "2B" indicates the completion os a complete pass through the entire set of tests, after which the test begins again.

6. METHODS

See description section 5.

7. EXECUTION TIME

The TAD section takes 1 second for one complete pass; it will cycle continuously unless AC switch 3 is set. The Rotate portion takes 3 seconds for one complete pass.

8. PROGRAM LISTING

```
                        /PDP-8 INSTRUCTION TEST PART 2B ADD-ROTATE
     0000               *0
0000 0000                       0000
0001 5201                       JMP 1
0002 0002                       2
0003 0003                       3

     0020               *0020
0020 0000               PRXLOP, 0                       /PRINT LOOP
0021 6046                       TLS
0022 6041               LPXX,   TSF
0023 5022                       JMP LPXX
0024 7200                       CLA
0025 5420                       JMP I PRXLOP

0026 0000               CRLFLF, 0
0027 7240                       CLA CMA
0030 0104                       AND CR                  /CR
0031 4020                       JMS PRXLOP
0032 7240                       CLA CMA
0033 0103                       AND LF                  /LF
0034 4020                       JMS PRXLOP
0035 7240                       CLA CMA
0036 0103                       AND LF                  /LF
0037 4020                       JMS PRXLOP
0040 5426                       JMP I CRLFLF

0041 0000               CRLF,   0
0042 7240                       CLA CMA
0043 0104                       AND CR                  /CR
0044 4020                       JMS PRXLOP
0045 7240                       CLA CMA
0046 0103                       AND LF                  /LF
0047 4020                       JMS PRXLOP
0050 5441                       JMP I CRLF

0051 0000               PAT,    0                       /GENERATOR PATTERN
0052 0000               RALRTL, 0                       /ROTATE LEFT PATTERNS
0053 0000               LFTLNK, 0                       /ROTATE LEFT LINK PATTERNS
0054 0000               RARRTK, 0                       /ROTATE RIGHT PATTERNS
0055 0000               RITLNK, 0                       /ROTATE RIGHT LINK PATTERNS
0056 0000               TST1,   0                       /TEST FLAG
```

```
0057  0000          PROUT,  0               /PRINT OUT LOCATION
0060  4000          K4000,  4000            /MASK LIST
0061  2000          K2000,  2000
0062  1000          K1000,  1000
0063  0400          K0400,  0400
0064  0200          K0200,  0200
0065  0100          K0100,  0100
0066  0040          K0040,  0040
0067  0020          K0020,  0020
0070  0010          K0010,  0010
0071  0004          K0004,  0004
0072  0002          K0002,  0002
0073  0001          K0001,  0001
0074  0057          XPROUT, PROUT
0075  0322          R,      0322            /R
0076  0301          A,      0301            /A
0077  0314          L,      0314            /L
0100  0324          T,      0324            /T
0101  0320          P,      0320            /P
0102  0240          SP,     0240            /SP
0103  0212          LF,     0212            /LF
0104  0215          CR,     0215            /CR
0105  0060          ZERO,   0060            /ZERO
0106  0061          ONE,    0061            /ONE
0107  0317          O,      0317            /O ALPHA
0110  0313          K,      0313            /K
0111  7764          COUNT,  7764            /MINUS 11
0112  0000          STRCNT, 0
0113  0262          TWO,    0262            /2
0114  0302          B,      0302            /B
0115  0000          WD1,    0
0116  0000          WD2,    0
0117  0000          BW1,    0
0120  0000          CRY,    0
0121  0000          TOTAL,  0
0122  0000          SUM,    0
0123  0000          CNTR,   0
0124  0000          HEADER, 0
0125  0000          BITSTR, 0
0126  7776          SPACOD, 7776            /MINUS 1
0127  0000          SPACST, 0
0130  0307          G,      0307            /G
0131  0304          D,      0304            /D
0132  0330          X,      0330            /X
0133  0331          Y,      0331            /Y
0134  0000          LINK,   0               /LINK
0135  0000          XARG,   0               /XARG
0136  0000          YARG,   0               /YARG
0137  7763          COUNTX, 7763
0140  0000          LNKSTR, 0
0141  7377          K7377,  7377
```

```
0367  1125          TAD TW6
0368  5741          JMP I SLOC
```

```
39<2   0000  Ø
Ø143   7240     CLA CMA
Ø144   Ø140     AND ≠ LNKSTR
Ø145   7440     SZA
Ø146   5150     JMP SL
Ø147   5152     JMP CL
Ø150   7360  SL,          CLA CMA STL
Ø151   5542     JMP I CX
Ø152   7340  CL,          CLL CLA CMA
Ø153   5542     JMP I CX
```

```
                *4000
4000  7200  RAND2,      CLA
4001  1417    TAD I 0017
4002  3135    DCA XARG                  /STORE FIXED PAT
4003  1417    TAD I 0017
4004  3136    DCA YARG                  /STORE FIXED PAT
4005  2216    ISZ RCNT
4006  5647    JMP I XSTRXY          /EXIT TO TEST
4007  1215    TAD LISTX
4010  3017    DCA 0017
4011  1214    TAD M144
4012  3216    DCA RCNT
4013  5647    JMP I XSTRXY          /EXIT TO TEST

4014  7634  M144,       -144
4015  4177  LISTX,      LIST-1
4016  0000  RCNT,       0000
4017  0000  ODEVEN,     0000

4020  7300  RAND,       CLL CLA                 /FIXED PATTERN
4021  2217    ISZ ODEVEN                    /RANDOM PATTERN
4022  7000    NOP
4023  1217    TAD ODEVEN
4024  7010    RAR
4025  7630    SZL CLA
4026  5230    JMP RAND1
4027  5200    JMP RAND2

4030  7604  RAND1,      CLA OSR
4031  0063    AND Z K0400
4032  7000    NOP
4033  7440    SZA
4034  5650    JMP I ADDX                /SW 3 EQUALS A ONE TO EXIT
4035  7240    CLA CMA
4036  0121    AND Z TOTAL
4037  7000  NOP
4040  3135    DCA Z XARG
4041  7040    CMA
4042  0121    AND Z TOTAL
4043  7001    IAC
4044  1410    TAD I Z 10
4045  3136    DCA Z YARG
4046  5647    JMP I XSTRXY
4047  0225  XSTRXY,     STRXY
4050  0312  ADDX,       PADDOK
```

```
          *0017
0017  4177    LIST-1

          *4051
4051  7240  FCOMP,      CLA CMA                 /COMPARE SUM AND TOTAL
4052  0121    AND Z TOTAL
4053  7040    CMA
4054  0122    AND Z SUM
4055  3275    DCA CXM
4056  7240    CLA CMA
4057  0122    AND Z SUM
4060  7040    CMA
4061  0121    AND Z TOTAL
4062  3274    DCA CXN
4063  7240    CLA CMA
4064  0275    AND CXM
4065  7440    SZA
4066  5676    JMP I ERX                       /ERROR
4067  7240    CLA CMA
4070  0274    AND CXN
4071  7440    SZA
4072  5676    JMP I ERX                       /ERROR
4073  5277    JMP LCOMP
4074  0000  CXN,         0
4075  0000  CXM,         0
4076  0400  ERX,         ERROR
4077  7240  LCOMP,      CLA CMA                 /COMPARE CRY AND LINK
4100  0134    AND Z LINK              /LINK BIT IN BIT 11
4101  7040    CMA
4102  0120    AND Z CRY
4103  3322    DCA LRX
4104  7240    CLA CMA
4105  0120    AND Z CRY
4106  7040    CMA
4107  0134    AND Z LINK
4110  3323    DCA LRY
4111  7240    CLA CMA
4112  0322    AND LRX
4113  7440    SZA
4114  5676    JMP I ERX                       /ERROR
4115  7240    CLA CMA
4116  0323    AND LRY
4117  7440    SZA
4120  5676    JMP I ERX                       /ERRROR
4121  5724    JMP I NOERX
4122  0000  LRX,         0
4123  0000  LRY,         0
4124  0407  NOERX,      NOERR
```

```
                *4200

4200  7777  LIST,       7777
4201  7777    7777
4202  7776    7776
4203  7777    7777
4204  7775    7775
4205  7777    7777
4206  7773    7773
4207  7777    7777
4210  7767    7767
4211  7777    7777
4212  7757    7757
4213  7777    7777
4214  7737    7737
4215  7777    7777
4216  7677    7677
4217  7777    7777
4220  7577    7577
4221  7777    7777
4222  7377    7377
4223  7777    7777
4224  6777    6777
4225  7777    7777
4226  5777    5777
4227  7777    7777
4230  3777    3777
4231  7777    7777
4232  7777    7777
4233  7777    7777
4234  7776    7776
4235  7777    7777
4236  7775    7775
4237  7777    7777
4240  7773    7773
4241  7777    7777
4242  7767    7767
4243  7777    7777
4244  7757    7757
4245  7777    7777
4246  7737    7737
4247  7777    7777
4250  7677    7677
4251  7777    7777
4252  7577    7577
4253  7777    7777
4254  7377    7377
4255  6777    6777
4256  7777    7777
4257  5777    5777
4260  7777    7777
4261  3777    3777
4262  7777    7777
4263  0001    0001
4264  7777    7777
4265  0002    0002
4266  7777    7777
4267  0004    0004
4270  7777    7777
4271  0010    0010
4272  7777    7777
4273  0020    0020
4274  7777    7777
4275  0040    0040
4276  7777    7777
4277  0100    0100
4300  7777    7777
4301  0200    0200
4302  7777    7777
4303  0400    0400
4304  7777    7777
4305  1000    1000
4306  7777    7777
4307  2000    2000
4310  7777    7777
4311  4000    4000
4312  0001    0001
4313  7777    7777
4314  0002    0002
4315  7777    7777
4316  0004    0004
4317  7777    7777
4320  0010    0010
4321  7777    7777
4322  0200    0200
4323  7777    7777
4324  0400    0400
4325  7777    7777
4326  0100    0100
4327  7777    7777
4330  0200    0200
4331  7777    7777
4332  0400    0400
4333  7777    7777
4334  1000    1000
4335  7777    7777
4336  2000    2000
4337  7777    7777
4340  4000    4000
4341  7777    7777
```

```
          *0200
0200  7240  ARITHT,     CLA CMA
0201  3124    DCA Z HEADER
0202  7240    CLA CMA
0203  3135    DCA XARG
0204  7240    CLA CMA
0205  3136    DCA YARG
0206  7240    CLA CMA
0207  3121    DCA TOTAL
0210  3134    DCA Z LINK
0211  3115    DCA Z WD1
0212  5223    JMP INCR
0213  3120    DCA Z CRY

0214  7340  ADD,         CLA CMA CLL
0215  0135    AND Z XARG
0216  1136    TAD Z YARG
0217  3122    DCA Z SUM                          /STORE SUM OF REAL ADD
0220  7004    RAL
0221  3134    DCA Z LINK                /STORE LINK OF REAL ADD AT BIT 11
0222  5737    JMP I XFCOMP          /COMPARE SUM AND TOTAL

0223  5624  INCR,       JMP I INCRX
0224  4020  INCRX,      RAND

0225  7240  STRXY,      CLA CMA
0226  0135    AND Z XARG
0227  3115    DCA Z WD1                          /XARG EQUALS WD2
0230  7240    CLA CMA
0231  0136    AND Z YARG
0232  3116    DCA Z WD2                          /YARG EQUALS WD2
0233  4235    JMS ADDISM                /JMS TO FAKE ADD
0234  5214    JMP ADD
```

```
0235  0000  ADDISM,     0                          /FAKE ADD
0236  7300    CLA CLL
0237  3121    DCA Z TOTAL
0240  3120    DCA Z CRY
0241  7040    CMA
0242  0111    AND Z COUNT          /MINUS 11
0243  3123    DCA Z CNTR

0244  7040  AISM,       CMA
0245  0115    AND Z WD1
0246  7010    RAR
0247  3115    DCA Z WD1
0250  7004    RAL
0251  3117    DCA Z BW1
0252  7040    CMA
0253  0116    AND Z WD2
0254  7010    RAR
0255  3116    DCA Z WD2
0256  7040    CMA
0257  0117    AND BW1

0260  7420    SNL
0261  5302    JMP DISM
0262  7450    SNA
0263  5305    JMP CISM
0264  7300    CLL CLA
0265  7040  AXISM,       CMA
0266  0120    AND Z CRY
0267  7010    RAR
0270  7040    CMA
0271  0117    AND Z BW1
0272  3120  BISM,       DCA Z CRY
0273  7040    CMA
0274  0121    AND Z TOTAL
0275  7010    RAR
0276  3121    DCA Z TOTAL
0277  2123    ISZ Z CNTR
0300  5244    JMP AISM
0301  5635    JMP I ADDISM
0302  7450  DISM,       SNA
0303  5265    JMP AXISM
0304  7220    CML CLA
0305  7040  CISM,       CMA
0306  0120    AND Z CRY
0307  7440    SZA
0310  7100    CLL
0311  5272    JMP BISM
```

```
0312  4041  PADDOK,     JMS Z CRLF                /CR LF
0313  7240    CLA CMA
0314  0076    AND Z A                   /A
0315  4020    JMS Z PRXLOP
0316  7240    CLA CMA
0317  0131    AND Z D                   /D
0320  4020    JMS Z PRXLOP
0321  7240    CLA CMA
0322  0131    AND Z D                   /D
0323  4020    JMS Z PRXLOP

0324  7240    CLA CMA
0325  0102    AND Z SP                  /SP
0326  4020    JMS Z PRXLOP
0327  7240    CLA CMA
0330  0107    AND Z O                   /O
0331  4020    JMS Z PRXLOP
0332  7240    CLA CMA
0333  0110    AND Z K                   /K
0334  4020    JMS Z PRXLOP
0335  5736    JMP I ROTATE          /EXIT ADD TEST
0336  2000  ROTATE,     GEN1
0337  4051  XFCOMP,     FCOMP
```

```
                *0400
0400  7604  ERROR,      CLA OSR                  /READ IN SR
0401  7106    CLL RTL
0402  7510    SPA                        /SW2 EQUALS A ONE TO PRINT
0403  4216    JMS PRINT                          /JMS TO PRINT ROUTINE
0404  7604    CLA OSR
0405  7510    SPA                        /SW0 EQUALS A ONE TO HALT
0406  7402    HLT                        /HALT ON ERROR
0407  7604  NOERR,      CLA OSR
0410  7104    CLL RAL
0411  7510    SPA                        /SW1 EQUALS A ONE TO SCOPE MODE
0412  5614    JMP I SXY                          /SCOPE MODE
0413  5615    JMP I INCRT          /CONTINUE MODE
0414  0225  SXY,        STRXY
0415  0223  INCRT,      INCR

0416  0000  PRINT,      0
0417  7240    CLA CMA
0420  0124    AND Z HEADER         /HEADER FLAG
0421  7440    SZA
0422  4321    JMS PRHEAD                 /JMS TO PRINT HEADER ROUTINE
0423  7000  PRERR,      NOP
0424  4041    JMS Z CRLF                 /CR LF
0425  4020    JMS Z PRXLOP
0426  7240    CLA CMA
0427  0120    AND Z CRY
0430  4635    JMS I XONZER         /TEST FAKE LINK FOR SEX AND
                                   /PRINT A ONE OR ZERO

0431  7240    CLA CMA
0432  0102    AND Z SP                   /PRINT SP
0433  4020    JMS Z PRXLOP
0434  5236    JMP PTOTAL                 /PRINT CONTENTS OF FAKE ADD
0435  2637  XONZER,     ONZER
```

```
0436  7240  PTOTAL,     CLA CMA
0437  0121    AND Z TOTAL          /STORE CONTENTS OF FAKE ADD
0440  3125    DCA Z BITSTR
0441  4266    JMS MESSG
0442  7240    CLA CMA
0443  0134    AND Z LINK               /TEST REAL LINK FOR SEX AND
0444  4635    JMS I XONZER         /PRINT A ONE OR ZERO

0445  7240    CLA CMA
0446  0102    AND Z SP                 / PRINT SP
0447  4020    JMS Z PRXLOP
0450  5251    JMP XTOTAL

0451  7240  XTOTAL,     CLA CMA
0452  0122    AND Z SUM
0453  3125    DCA Z BITSTR         /STORE CONTENTS OF REAL ADD
0454  4266    JMS MESSG
0455  7240    CLA CMA
0456  0135    AND Z XARG
0457  3125    DCA Z BITSTR         /STORE XARG
0460  4266    JMS MESSG
0461  7240    CLA CMA
0462  0136    AND Z YARG
0463  3125    DCA Z BITSTR         /STORE Y ARG
0464  4266    JMS MESSG
0465  5616    JMP I PRINT          /EXIT TO SWITCH ROUTINE
```

```
0466  0000  MESSG,      0
0467  7240    CLA CMA
0470  0137    AND Z COUNTX
0471  3112    DCA Z STRCNT
0472  2112  NBIT,       ISZ Z STRCNT
0473  7410    SKP
0474  5312    JMP PRSPAC              /12 COUNTS FINISHED
0475  7240    CLA CMA
0476  0125    AND 7 BITSTR
0477  7100    CLL
0500  7004    RAL
0501  3125    DCA Z BITSTR          /STORE ROTATED WORD
0502  7430    SZL
0503  5306    JMP PRONE
0504  4764  PRZERO,     JMS I XZEROR          /PRINT ZERO
0505  5272    JMP NBIT
0506  7240  PRONE,      CLA CMA
0507  0106    AND Z ONE
0510  4020    JMS Z PRXLOP          /PRINT ONE
0511  5272    JMP NBIT
0512  7240  PRSPAC,     CLA CMA
0513  0102    AND Z SP
0514  4020    JMS Z PRXLOP          /SP
0515  7240    CLA CMA
0516  0102    AND Z SP                    /SP
0517  4020    JMS Z PRXLOP
0520  5666    JMP I MESSG

0521  0000  PRHEAD,     0
0522  7200    CLA
0523  3124    DCA Z HEADER          /CLEAR HEADER FLAG
0524  7240    CLA CMA
0525  0126    AND Z SPACO6
0526  3127    DCA Z SPACST          /STORE SPACE COUNT
0527  4041    JMS Z CRLF                  /PRINT CR LF
```

```
0530  7240  SPA06,      CLA CMA
0531  0102    AND Z SP
0532  4020    JMS Z PRXLOP          /PRINT 6 SPACES
0533  2127    ISZ Z SPACST
0534  5330    JMP SPA06
0535  7240    CLA CMA
0536  0130    AND Z G                     /G
0537  4020    JMS Z PRXLOP
0540  7240    CLA CMA
0541  0107    AND Z O                     /O ALPHA
0542  4020    JMS Z PRXLOP
0543  7240    CLA CMA
0544  0107    AND Z O                     /O ALPHA
0545  4020    JMS Z PRXLOP
0546  7240    CLA CMA
0547  0131    AND Z D                     /D
0550  4020    JMS Z PRXLOP
0551  4762    JMS I MANYSP          /JMP TO PRINT 12 SPACES
0552  7240    CLA CMA
0553  0114    AND Z B                     /B
0554  4020    JMS Z PRXLOP
0555  7240    CLA CMA
0556  0076    AND Z A                     /A
0557  4020    JMS Z PRXLOP
0560  5761    JMP I CONHED
0561  0600  CONHED,     HEDCON
0562  0626  MANYSP,     TWELVE
0563  5721  HEDRJ,      JMP I PRHEAD        /EXIT HEADER ROUTINE
0564  2702  XZEROR,     ZEROR
```

```
                *0600
0600  7240  HEDCON,     CLA CMA
0601  0131    AND Z D                 /D
0602  4020    JMS Z PRXLOP
0603  4226    JMS TWELVE              /12 SPACES
0604  7240    CLA CMA
0605  0132    AND Z X                 /X
0606  4020    JMS Z PRXLOP
0607  7240    CLA CMA
0610  0102    AND Z SP                /SP
0611  4020    JMS Z PRXLOP
0612  4240    JMS ARGXXX              /ARG
0613  4226    JMS TWELVE              /12 SPACES
0614  7240    CLA CMA
0615  0133    AND Z Y                 /Y
0616  4020    JMS Z PRXLOP
0617  7240    CLA CMA
0620  0102    AND Z SP                /SP
0621  4020    JMS Z PRXLOP
0622  4240    JMS ARGXXX              /ARG
0623  4041    JMS Z CRLF              /CR LF
0624  5625    JMP I RJHED           /JUMP TO EXIT HEADER ROUTINE
0625  0563  RJHED,      HEDRJ
0626  0000  TWELVE,     0
0627  7240    CLA CMA
0630  0111    AND Z COUNT
0631  3127    DCA Z SPACST          /STORE MINUS 12
0632  7240  SPA12,      CLA CMA
0633  0102    AND Z SP                /SP
0634  4020    JMS Z PRXLOP          /PRINT 12 SPACES
0635  2127    ISZ Z SPACST
0636  5232    JMP SPA12
0637  5626    JMP I TWELVE

0640  0000  ARGXXX,     0
0641  7240    CLA CMA
0642  0076    AND Z A                 /A
0643  4020    JMS Z PRXLOP
0644  7240    CLA CMA
0645  0075    AND Z R                 /R
0646  4020    JMS Z PRXLOP
0647  7240    CLA CMA
0650  0130    AND Z G                 /G
0651  4020    JMS Z PRXLOP
0652  5640    JMP I ARGXXX
```

```
                *2000
2000  4316  GEN1,       JMS HSEKP
2001  4142  CONT1,      JMS Z CX
2002  0051    AND Z PAT
2003  7001    IAC
2004  3051    DCA Z PAT                          /STORE INCREMENTED PATTERN
2005  7420    SNL
2006  5215    JMP CLRLNK                 /JMP TO CLEAR LNKSTR
2007  1060    TAD K4000
2010  3140    DCA Z LNKSTR          /SET LNKSTR TO 4000
2011  4352  PT1EX,      JMS EX
2012  7440    SZA
2013  5220    JMP ROT1
2014  5274    JMP GEN2                   /EXIT ROT1
2015  7200  CLRLNK,     CLA
2016  3140    DCA Z LNKSTR
2017  5211    JMP PT1EX

2020  7240  ROT1,       CLA CMA
2021  3056    DCA Z TST1                 /SET TST1 FLAG
2022  7340    CLL CLA CMA
2023  0140    AND Z LNKSTR
2024  7440    SZA
2025  5272    JMP SETLNK
2026  7140    CLL CMA                    /CLEAR LINK
2027  0051  REROT1,     AND Z PAT                          /BRING UP PATTERN
2030  7004    RAL
2031  3052    DCA Z RALRTL          /STORE RAL PATTERN
2032  7430    SZL                        /SKIP IF LINK EQUALS A ZERO
2033  1060    TAD Z K4000           /SET RAL LINK STORE
2034  3053    DCA Z LFTLNK          /CLEAR RAL LINK STORE
2035  7240    CLA CMA
2036  0052    AND Z RALRTL
2037  7010    RAR
2040  3054    DCA Z RARRTR          /STORE RAR PATTERN
2041  7430    SZL                        /SKIP IF LINK EQUALS A ZERO
2042  1060    TAD Z K4000           /SET RAR LINK STORE
2043  3055    DCA Z RITLNK          /CLEAR RAR LINK STORE
```

```
2044  7340    CLL CLA CMA
2045  0054    AND Z RARRTR          /RARRTR SHOULD EQUAL PAT
2046  7040    CMA
2047  1051    TAD Z PAT                              /COMPARE RARTR WITH PAT
2050  7040    CMA                          /AC SHOULD EQUAL ZERO
2051  7450    SNA
2052  7430    SZL
2053  5715    JMP I ERSWIX          /JUMP TO ERROR SWITCHES
2054  1060    TAD K4000
2055  0051    AND Z PAT                              /MASK BIT 0 OF PAT
2056  7040    CMA
2057  1053    TAD Z LFTLNK          /COMPARE LFTLNK WITH PAT
2060  7040    CMA                          /BIT 0
2061  7440    SZA
2062  5715    JMP I ERSWIX          /JUMP TO ERROR SWITCHES
2063  1055    TAD Z RITLNK
2064  7040    CMA
2065  1140    TAD Z LNKSTR          /COMPARE PAT LINK WITH RITLNK
2066  7040    CMA
2067  7440    SZA
2070  5715    JMP I ERSWIX
2071  5751    JMP I SXOKX1
2072  7360  SETLNK,     CLA CMA STL          /SET LINK
2073  5227    JMP REROT1
2074  4316  GEN2,       JMS HSEKP
2075  4142  CONT2,      JMS Z CX
2076  0051    AND Z PAT
2077  7001    IAC
2100  3051    DCA Z PAT                              /STORE INCREMENTED PATTERN
2101  7420    SNL
2102  5311    JMP CLLINK                   /JUMP TO CLEAR LNKSTR
2103  1060    TAD K4000
2104  3140    DCA Z LNKSTR          /SET LNKSTR TO 4000
2105  4363  PT1EXX,     JMS EX1
2106  7440    SZA
2107  5714    JMP I ROT2X
2110  5332    JMP ROTOK                              /EXIT ROTATE TESTS
```

```
2111  7200  CLLINK,     CLA
2112  3140    DCA Z LNKSTR
2113  5305    JMP PT1EXX

2114  2200  ROT2X,      ROT2
2115  2400  ERSWIX,     ERRSW1
2116  0000  HSEKP,      0
2117  7300    CLA CLL
2120  3051    DCA Z PAT
2121  3052    DCA Z RALRTL
2122  3054    DCA Z RARRTR
2123  3053    DCA Z LFTLNK
2124  3055    DCA Z RITLNK
2125  3140    DCA Z LNKSTR
2126  7000    NOP
2127  7000    NOP
2130  7000    NOP
2131  5716    JMP I HSEKP
2132  7200  ROTOK,      CLA
2133  4041    JMS Z CRLF              /CRLF
2134  1075    TAD Z R                 /R
2135  4020    JMS Z PRXLOP
2136  1107    TAD Z O                 /O
2137  4020    JMS Z PRXLOP
2140  1100    TAD Z T                 /T
2141  4020    JMS Z PRXLOP
2142  4041    JMS Z CRLF              /CRLF
2143  1113    TAD Z TWO                       /2
2144  4020    JMS Z PRXLOP
2145  1114    TAD Z B                 /B
2146  4020    JMS Z PRXLOP
2147  5750    JMP I ARITH
2150  0200  ARITH,      ARITHT
2151  2521  SXOKX1,     SWOKX1
2152  0000  EX,         0
2153  1140    TAD Z LNKSTR
2154  7440    SZA
2155  7410    SKP
2156  5220    JMP ROT1
2157  7240    CLA CMA
2160  0051    AND Z PAT
2161  7040    CMA
2162  5752    JMP I EX
2163  0000  EX1,        0
2164  1140    TAD Z LNKSTR
2165  7440    SZA
2166  7410    SKP
2167  5714    JMP I ROT2X
2170  7240    CLA CMA
2171  0051    AND Z PAT
2172  7040    CMA
2173  5763    JMP I EX1
```

```
                *2200

2200   7300  ROT2,       CLA CLL
2201   3056    DCA Z TST1                /CLEAR TEST FLAG
2202   7340    CLL CLA CMA
2203   0140    AND Z LNKSTR
2204   7440    SZA
2205   5250    JMP STLNK
2206   7140    CLL CMA
2207   0051  REROT2,     AND Z PAT                              /BRING UP PATTERN
2210   7012    RTR
2211   3054    DCA Z RARRTR          /STORE RTR PATTERN
2212   7430    SZL                        /SKIP IF LINK EQUALS A ZERO
2213   1072    TAD Z K0002           /SET RTR LINK STORE
2214   3055    DCA Z RITLNK          /CLEAR RTR LINK STORE
2215   1054    TAD Z RARRTR
2216   7006    RTL
2217   3052    DCA Z RALRTL          /STORE RTL PATTERN
2220   7430    SZL
2221   1060    TAD Z K4000           /SET RTL LINK STORE
2222   3053    DCA Z LFTLNK          /CLEAR RTL LINK STORE
2223   7100    CLL
2224   1052    TAD Z RALRTL          /RALRTL SHOULD EQUAL PAT
2225   7040    CMA
2226   1051    TAD Z PAT                          /COMPARE RALRTL WITH PAT
2227   7040    CMA
2230   7440    SZA
2231   5652    JMP I ERSW2X          /JMP TO ERROR SWITCHES
2232   1072    TAD Z K0002           /COMPARE ROTLNK WITH PAT BIT 10
2233   0051    AND Z PAT                          /MASK BIT 10 OF PAT
2234   7040    CMA
2235   1055    TAD Z RITLNK
2236   7040    CMA
2237   7440    SZA
2240   5652    JMP I ERSW2X
2241   1053    TAD Z LFTLNK          /LFT LINK SHOULD EQUAL LNKSTR
2242   7040    CMA
2243   1140    TAD Z LNKSTR          /COMPARE LFTLNK WITH LNKSTR
2244   7040    CMA
2245   7440    SZA
2246   5652    JMP I ERSW2X          /JUMP TO ERROR SWITCHES
2247   5653    JMP I SXOKX2

2250   7360  STLNK,      CLA CMA STL
2251   5207    JMP REROT2

2252   2406  ERSW2X,     ERRSW2
2253   2525  SXOKX2,     SWOKX2
```

```
          *2400
2400  7200  ERRSW1,     CLA
2401  1244    TAD ROTX1
2402  3215    DCA ERIN                  /SCOPE MODE RJMP ADDRESS
2403  1245    TAD CONTX1
2404  3214    DCA CONTX                           /CONTINUE MODE RJMP ADDRESS
2405  5216    JMP ERSW
2406  7200  ERRSW2,     CLA
2407  1250    TAD ROTX2
2410  3215    DCA ERIN                  /SCOPE MODE RJMP ADDRESS
2411  1251    TAD CONTX2
2412  3214    DCA CONTX                           /CONTINUE MODE RJMP ADDRESS
2413  5216    JMP ERSW

2414  0000  CONTX,      0
2415  0000  ERIN,       0
2416  7604  ERSW,       CLA OSR                   /READ IN SWITCHES
2417  0062    AND Z K1000          /MASK BIT 2
2420  7040    CMA
2421  1062    TAD Z K1000
2422  7040    CMA
2423  7450    SNA                       /TEST BIT 2 SWITCH
2424  4255    JMS ROPR
2425  7604    CLA OSR
2426  0060    AND Z K4000          /MASK BIT 0
2427  7040    CMA
2430  1060    TAD Z K4000
2431  7040    CMA
2432  7450    SNA                       /TEST BIT 0 SWITCH
2433  7402    HLT                       /ERROR HALT
2434  7604  SWOK,       CLA OSR
2435  0061    AND Z K2000          /MASK BIT 1
2436  7040    CMA
2437  1061    TAD Z K2000
2440  7040    CMA
2441  7450    SNA                       /TEST BIT 1 SWITCH
2442  5615    JMP I ERIN                /JMP TO SCOPE MOD
2443  5614    JMP I CONTX          /JMP TO CONTINUE MODE
```

```
2444  2020  ROTX1,      ROT1
2445  2001  CONTX1,     CONT1
2446  2000  GEN1X1,     GEN1
2447  2074  GEN2X2,     GEN2
2450  2200  ROTX2,      ROT2
2451  2075  CONTX2,     CONT2
2452  2104  TWOROX,     TWORO
2453  2665  FINPRX,     FINPR
2454  2650  RARPRX,     RARPR

2455  0000  ROPR,       0                          /RJMP TO SWITCH ROUTINE
2456  4026    JMS Z CRLFLF          /PRINT CR LF LF
2457  4714    JMS I PATPRX          /PRINT PAT
2460  7200    CLA
2461  1056    TAD Z TST1
2462  7440    SZA
2463  5266    JMP ROT1PR                  /PRINT ROTATE ONE PATTERN
2464  4715  TWORO,      JMS I ROT2PX        /PRINT ROTATE TWO PATTERN
2465  5655  FINPR,      JMP I ROPR
2466  7200  ROT1PR,     CLA
2467  1254    TAD RARPRX
2470  3214    DCA I PATPRX
2471  4021    JMS Z CRLF                  /PRINT CR LF
2472  7200    CLA
2473  1075    TAD Z R                     /R
2474  4020    JMS Z PRXLOP
2475  1076    TAD Z A                     /A
2476  4020    JMS Z PRXLOP
2477  1077    TAD Z L                     /L
2500  4020    JMS Z PRXLOP
2501  1102    TAD Z SP                    /SP
2502  4020    JMS Z PRXLOP
2503  1053    TAD Z LFTLNK
2504  7440    SZA
2505  5716    JMP I LNONER          /LEFT LINK PRINT ONE
2506  4717    JMS I ZERORX          /LEFT LINK PRINT ZERO
2507  1102  RO1X,       TAD Z SP
2510  4020    JMS Z PRXLOP          /SP
2511  1052    TAD Z RALRTL
2512  3057    DCA Z PROUT
2513  5720    JMP I COUNXX          /PRINT RALRTL CONTENTS

2514  2600  PATPRX,     PATPR
2515  2732  ROT2PX,     ROT2PR
2516  2676  LNONER,     LNONE
2517  2702  ZERORX,     ZEROR
2520  2616  COUNXX,     COUNPR
2521  7200  SWOKX1,     CLA
2522  1245    TAD CONTX1
2523  3214    DCA CONTX
2524  5234    JMP SWOK
2525  7200  SWOKX2,     CLA
2526  1251    TAD CONTX2
2527  3214    DCA CONTX
2530  5234    JMP SWOK
```

```
          *2600
2600  0000  PATPR,      0
2601  1101    TAD Z P                 /P
2602  4020    JMS Z PRXLOP
2603  1076    TAD Z A                 /A
2604  4020    JMS Z PRXLOP
2605  1100    TAD Z T                 /T
2606  4020    JMS Z PRXLOP
2607  1102    TAD Z SP                /SP
2610  4020    JMS Z PRXLOP
2611  4361    JMS PLINK
2612  1102    TAD Z SP
2613  4020    JMS Z PRXLOP        /SP
2614  1051    TAD Z PAT
2615  3057    DCA Z PROUT         /STORE GENERATED PATTERN

2616  4231  COUNPR,     JMS MINDEX              /JMS TO MASK INDEX ROUTINE
2617  0137    AND Z COUNTX
2620  3112    DCA Z STRCNT
2621  2112  LSTBIT,     ISZ Z STRCNT
2622  7410    SKP
2623  5600    JMP I PATPR         /12 COUNTS FINISHED
2624  7200    CLA
2625  1057    TAD Z PROUT
2626  0410    AND I Z 10
2627  4237    JMS ONZER
2630  5221    JMP LSTBIT

2631  0000  MINDEX,     0
2632  7200    CLA
2633  1074    TAD Z XPROUT        /INDEX STARTING ADDRESS
2634  3010    DCA Z 10                /STORE INDEX ADDRESS
2635  7240    CLA CMA
2636  5631    JMP I MINDEX
```

```
2637  0000  ONZER,      0
2640  7440    SZA
2641  5244    JMP ONEP                    /JMP TO PRINT ONE
2642  4302    JMS ZEROR
2643  5637    JMP I ONZER
2644  7240  ONEP,       CLA CMA
2645  0106    AND Z ONE
2646  4020    JMS Z PRXLOP          /PRINT ONE
2647  5637    JMP I ONZER

2650  7200  RARPR,      CLA
2651  1273    TAD FINPRN
2652  3200    DCA PATPR
2653  4041    JMS Z CRLF                  /CR LF
2654  7200    CLA
2655  1075    TAD Z R                     /R
2656  4020    JMS Z PRXLOP
2657  1076    TAD Z A                     /A
2660  4020    JMS Z PRXLOP
2661  4323    JMS RSPACE                  /R SP
2662  1055    TAD Z RITLNK
2663  7440    SZA
2664  5307    JMP LNONEX                  /RIT LINK EQUALS A ONE
2665  4302    JMS ZEROR
2666  1102  R01XX,      TAD Z SP                    /SP
2667  4020    JMS Z PRXLOP
2670  1054    TAD Z RARRTR
2671  3057    DCA Z PROUT
2672  5216    JMP COUNPR                  /PRINT RARR TR CONTENTS

2673  2465  FINPRN,     FINPR
2674  2507  R01XR,      R01X
2675  2744  RTLPRX,     RTLPR
```

```
2676  7240  LNONE,      CLA CMA
2677  0106    AND Z ONE
2700  4020    JMS Z PRXLOP          /PRINT LINK
2701  5674    JMP I RO1XR

2702  0000  ZEROR,      0
2703  7240    CLA CMA
2704  0105    AND Z ZERO
2705  4020    JMS Z PRXLOP          /PRINT 0 LINK
2706  5702    JMP I ZEROR

2707  7200  LNONEX,     CLA
2710  1106    TAD Z ONE
2711  4020    JMS Z PRXLOP
2712  5266    JMP RO1XX

2713  0000  RTCRLF,     0
2714  7200    CLA
2715  4041    JMS Z CRLF                  /CR LF
2716  1075    TAD Z R                     /R
2717  4020    JMS Z PRXLOP
2720  1100    TAD Z T                     /T
2721  4020    JMS Z PRXLOP
2722  5713    JMP I RTCRLF

2723  0000  RSPACE,     0
2724  7200    CLA
2725  1075    TAD Z R                     /R
2726  4020    JMS Z PRXLOP
2727  1102    TAD Z SP                    /SP
2730  4020    JMS Z PRXLOP
2731  5723    JMP I RSPACE
```

```
2732  7200  ROT2PR,     CLA
2733  1275    TAD RTLPRX
2734  3200    DCA PATPR
2735  4313    JMS RTCRLF                /CR LF RT
2736  4323    JMS RSPACE                /R SP
2737  1055    TAD / RITLNK
2740  7440    SZA
2741  5307    JMP LNONEX                /RIGHT LINK EQUALS A ONE
2742  4302    JMS ZEROR                           /PRINT 0 LINK
2743  5266    JMP RO1XX                           /PRINT SP AND RARRTR CONTENTS

2744  7200  RTLPR,      CLA
2745  1273    TAD FINPRN
2746  3200    DCA PATPR
2747  4313    JMS RTCRLF                /CR LF RT
2750  1077    TAD Z L                   /L
2751  4020    JMS Z PRXLOP
2752  1102    TAD Z SP                  /SP
2753  4020    JMS Z PRXLOP
2754  1053    TAD Z LFTLNK
2755  7440    SZA
2756  5276    JMP LNONE                           /PRINT 1 LINK
2757  4302    JMS ZEROR                           /PRINT 0 LINK
2760  5674    JMP I RO1XR

2761  0000  PLINK,      0
2762  1140    TAD Z LNKSTR        /PRINT PAT LINK
2763  4237    JMS ONZER
2764  5761    JMP I PLINK
```

```
@A      0076
ADD     0214
ADDISM  0235
ADDX    4050
AISM    0244
ARGXXX  0640
ARITH   2150
ARITHT  0200
AXISM   0265
B       0114
BISM    0272
BITSTR  0125
BW1     0117
CISM    0305
CL      0152
CLLINK  2111
CLRLNK  2015
CNTR    0123
CONHFD  0561
CONTX   2414
CONTX1  2445
CONTX2  2451
CONT1   2001
CONT2   2075
COUNPR  2616
COUNT   0111
COUNTX  0137
COUNXX  2520
CR      0104
CRLF    0041
CRLFLF  0026
CRY     0120
CX      0142

CXM     4075
CXN     4074
D       0131
DISM    0302
ERIN    2415
ERROR   0400
ERRSW1  2400
ERRSW2  2406
ERSW    2416
ERSWIX  2115
ERSW2X  2252
ERX     4076
EX      2152
EX1     2163
FCOMP   4051
FINPR   2465
FINPRN  2673
FINPRX  2453
G       0130
GEN1    2000
GEN1X1  2446
GEN2    2074
GEN2X2  2447
HEADFR  0124
HEDCON  0600
HEDRJ   0563
HSEKP   2116
INCR    0223
INCRT   0415
INCRX   0224
K       0110
K0001   0073
K0002   0072
K0004   0071
K0010   0070
K0020   0067
K0040   0066
K0100   0065
K0200   0064
K0400   0063
K1000   0062
K2000   0061
K4000   0060
K7377   0141
L       0077
LCOMP   4077
LF      0103
LFTLNK  0053
LINK    0134
LIST    4200
LISTX   4015
LNKSTR  0140
LNONF   2676
LNONFR  2516
LNONFX  2707
LPXX    0022
LRX     4122
LRY     4123
LSTBIT  2621
MANYSP  0562
MESSG   0466
MINDFX  2631
M144    4014
NBIT    0472
NOERR   0407

NOERX   4124
O       0107
ODEVFN  4017
ONE     0106
ONEP    2644
ONZER   2637
P       0101
PADDOK  0312
PAT     0051
PATPR   2600
PATPRX  2514
PLINK   2761
PRERR   0423
PRHEAD  0521
PRINT   0416
PRONF   0506
PROUT   0057
PRSPAC  0512
PRXLOP  0020
PRZERO  0504
PTOTAL  0436
PT1EX   2011
PT1EXX  2105
R       0075
RALRTL  0052
RAND    4020
RAND1   4030
RAND2   4000
```

```
RARPR   2650
RARPRX  2454
RARRTR  0054
RCNT    4016
REROT1  2027
REROT2  2207
RITLNK  0055
RJHED   0625
ROPR    2455
ROTATE  0336
ROTOK   2132
ROTX1   2444
ROTX2   2450
ROT1    2020
ROT1PR  2466
ROT2    2200
ROT2PR  2732
ROT2PX  2515
ROT2X   2114
RO1X    2507
RO1XR   2674
RO1XX   2666
RSPACE  2723
RTCRLF  2713
RTLPR   2744
RTLPRX  2675
SETLNK  2072
SL      0150
SP      0102
SPACO6  0126
SPACST  0127
SPA06   0530
SPA12   0632
STLNK   2250
STRCNT  0112
STRXY   0225
SUM     0122
SWOK    2434
SWOKX1  2521
SWOKX2  2525
SXOKX1  2151
SXOKX2  2253
SXY     0414
T       0100
TOTAL   0121
TST1    0056
TWELVE  0626
TWO     0113
TWORO   2464
TWOROX  2452
WD1     0115
WD2     0116
X       0132
XARG    0135
XFCOMP  0337
XONZER  0435
XPROUT  0074
XSTRXY  4047
XTOTAL  0451
XZEROR  0564
Y       0133
YARG    0136
ZERO    0105
ZEROR   2702
ZERORX  2517
```

```
0062  7441            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
```

```
0172  0000  ŻERO,  0
0173  7240        CLA CMA
0174  0142        AND ŻERO              /ŻERO
0175  4045        JMS PRXLOP
0176  5472        JMP I ŻEROR

0177  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 ŻEROR
0116  5103        JMP .-13

0117  7240  PRONE, CLA CMA
0120  0141        AND ONE               /ONE
0121  4046        JMS PRXLOP
0122  5123        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  ŻERO,  0260                  /0
0143  0000  LINK,  0
0144  0255  TO,    0255                  /DASH
0145  7763  COUNTX, 7763
0146  0000  STRCNT, 0
0147  0000  BITSTR, 0
0150  1203  XMQAT2, MQAT2
0151  1403  XMQAT3, MQAT3
0152  0326  INCOR, 0326                  /V
0153  1600  XSCAT, STEST
0154  0263  THREE, 0263                  /3
```

```
 35  0202
0156  0000
0157  7240
0160  5536
```

```
TWO,    0202
SETL,   0
        CLA CMA
        JMP I SETL
```

```
0101  0000          PRGUN,  0
0102  0000          LFTAC,  0
0103  0000          RITAC,  0
0164  0000          RITMQ,  0
0165  0000          LFTMQ,  0
0166  7764          K7764,  7764
0167  4000          XX400,  4000
0170  5401          TSCLX,  TSCL
```

```
0010                *0010
0010 0000 ACIND,    0
0011 0000 MQIND,    0
0012 0000 XACNMI,   0
0013 0000 XMQNMI,   0
0200                *0200
0200 4570           JMS I TSCLX     /TEST SCL
0201 5247 MQLT,     JMP HSE         /HOUSE KEEPING
0202 4020           JMS Z GEN
0203 7360           STL CLA CMA     /SET LINK
0204 0125           AND Z GENX
0205 3123           DCA Z ACP       /STORE AC PATTERN
0206 7240           CLA CMA
0207 3124           DCA Z LXP       /STORE LINK TO A ONE.
0210 7040           CMA
0211 0123           AND Z ACP       /LOAD AC
0212 7421           MQL
0213 3127           DCA Z BACP      /STORE AC RESULT
0214 7620           CLA SNL
0215 5367           JMP XPACP+5     /STORE LINK RESULT 0000
0216 4156           JMS Z SETL
0217 3126           DCA Z BLXP      /STORE LINK RESULT 7777
0220 7040           CMA
0221 0127           AND Z BACP
0222 7440           SZA
0223 5231           JMP .+6         /AC NOT EQUAL TO 0000
0224 7240           CLA CMA
0225 0126           AND BLXP
0226 7450           SNA
0227 5231           JMP .+2         /LINK NOT EQUAL TO A ONE
0230 5242           JMP .+12                /CONTINUE TEST MQLT

0231 7604           CLA OSR         /TEST SW2
0232 7106           RTL CLL
0233 7004           RAL
0234 7430           SZL
0235 4260           JMS PMQLT       /PRINT ERROR
0236 7704           CLL CLA OSR     /TEST SW 0
0237 7004           RAL
0240 7430           SZL
0241 7402           HLT             /HALT MQLT ERROR
0242 7604           CLA OSR
0243 7106           RTL CLL         /TEST SW1
0244 7430           SZL
0245 5203           JMP MQLT+2      /PROGRAM LOOP
0246 5202           JMP MQLT+1      /CONTINUE PROGRAM
```

```
0247  7300      HSF,    CLA CLL
0250  5125              DCA Z GENX
0251  1366              TAD XPACP+4
0252  3331              DCA Z BACK
0253  1333              TAD Z XMQLT1
0254  3332              DCA Z NEXT
0255  7000              NOP
0256  7000              NOP
0257  5202              JMP MQLT+1

0260  0000      PMQLT,  0               /PRINT ROUTINE
0261  4236              JMS Z CRLF
0262  4335              JMS MQ
0263  4315              JMS L
0264  4322              JMS T.

0265  4236      CP,     JMS Z CRLF
0266  4327              JMS SP2
0267  4337              JMS AC
0270  4327              JMS SP2
0271  4354              JMS PLXP
0272  4347              JMS SP1
0273  4762              JMS I XPACP
0274  4236              JMS Z CRLF
0275  4272              JMS Z ERROR
0276  4763              JMS I XPACP+1   /RIGHT ARROW
0277  4337              JMS AC
0300  4327              JMS SP2
0301  4764              JMS I XPACP+2
0302  4347              JMS SP1
0303  4765              JMS I XPACP+3
0304  5660              JMP I PMQLT     /RETURN TO SWITCH ROUTINE

0305  0000      MQ,     0
0306  7240              CLA CMA
0307  0132              AND Z M         /M
0310  4046              JMS Z PRXLOP
0311  7240              CLA CMA
0312  0133              AND Z Q         /Q
0313  4046              JMS Z PRXLOP
0314  5705              JMP I MQ

0315  0000      L,      0
0316  7240              CLA CMA
0317  0134              AND Z LL                /L
0320  4046              JMS Z PRXLOP
0321  5715              JMP I L

0322  0000      T,      0
0323  7240              CLA CMA
0324  0135              AND Z TT                /T
0325  4046              JMS Z PRXLOP
0326  5722              JMP I T
```

```
0327  0000          SP2,    0
0330  7240                  CLA CMA
0331  0136                  AND Z SP                /SP
0332  4046                  JMS Z PRXLOP
0333  7240                  CLA CMA
0334  0136                  AND Z SP                /SP
0335  4046                  JMS Z PRXLOP
0336  5727                  JMP I SP2

0337  0000          AC,     0
0340  7240                  CLA CMA
0341  0137                  AND Z A           /A
0342  4046                  JMS Z PRXLOP
0343  7240                  CLA CMA
0344  0140                  AND Z C           /C
0345  4046                  JMS Z PRXLOP
0346  5737                  JMP I AC

0347  0000          SP1,    0
0350  7240                  CLA CMA
0351  0136                  AND Z SP                /SP
0352  4046                  JMS Z PRXLOP
0353  5747                  JMP I SP1

0354  0000          PLXP,   0
0355  7240                  CLA CMA
0356  0124                  AND Z LXP               /GOOD LINK
0357  3143                  DCA Z LINK
0360  4054                  JMS Z PLINK
0361  5754                  JMP I PLXP

0362  0413          XPACP,  PACP
0363  0406                  PTU
0364  0400                  PBLXP
0365  0421                  PBACP
0366  0201                  MQLT
0367  3126                  DCA Z BLXP
0370  5220                  JMP MQLT+17
```

```
0400            *400
0400  0000  PBLXP,  0
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,    0
0407  7240          CLA CMA
0410  0144          AND TO          /RIGHT ARROW
0411  4046          JMS Z PRXLOP
0412  5606          JMP I PTO

0413  0000  PACP,   0
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

0421  0000  PBACP,  0
0422  7240          CLA CMA
0423  0127          AND Z BACP      /BACP
0424  3147          DCA Z BITSTR
0425  4077          JMS 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 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  5274          JMP .+14                /LINK NOT EQUAL TO A ZERO
0455  5301          JMP MQ1+4               /CONTINUE TEST MQLT1
```

```
0456  7300          HSF1,   CLA CLL
0457  3125                  DCA Z GENX
0460  1033                  TAD Z XMQLT1
0461  3431                  DCA Z BACK
0462  1034                  TAD Z XMQAT
0463  3432                  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
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  0265          XCP,    CP
0521  0305                  MQ
0522  0315                  L
0523  0322                  T

0524  0000          XONE,   0
0525  7240                  CLA CMA
0526  3141                  AND Z ONE               /ONE
0527  4046                  JMS PRXLOP
0530  5724                  JMP I XONE
0531  0260                  PMQLT
0532  3126                  DCA Z BLXP
0533  5245                  JMP MQLT1+16
```

```
0600            *0600
0600 5235   MQAT, JMP HSE2
0601 4420       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 3524       DCA I LXP               /STORE LINK TO A ONE
0607 7040       CMA
0610 0123       AND Z ACP               /LOAD AC
0611 7421       MQL                 /LOAD MQ FROM AC
0612 7501       MQA                 /LOAD AC FROM MP
0613 3127       DCA Z BACP          /STORE RESULT OF MQL, 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
```

```
0002  7624
0003  7126
0004  7430
0005  5222
0006  5221

CLA OSR          /TEST SW1
SZL CLL
SZL
JMP MQAT+2       /PROGRAM LOOP
JMP MQAT+1       /CONTINUE PROGRAM
```

```
0667  0000          PMQAT,  0
0670  4036                  JMS Z CRLF
0671  4720                  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  0327          YSP2,   SP2
0722  0337                  AC
0723  0354                  PLXP
0724  0347                  SP1
0725  0413                  PACP
0726  0305                  MQ
0727  0315                  L
0730  0400                  PBLXP
0731  0421                  PBACP

0732  0000          AT,     0
0733  7240                  CLA CMA
0734  0137                  AND Z A         /A
0735  4046                  JMS PRXLOP
0736  7240                  CLA CMA
0737  0135                  AND Z TT                /T
0740  4046                  JMS Z PRXLOP
0741  5732                  JMP I AT

0742  0000          YA,     0
0743  7240                  CLA CMA
0744  0137                  AND Z A         /A
0745  4046                  JMS Z PRXLOP
0746  5742                  JMP I YA
0747  3126                  DCA Z RLXP
```

075 522M JMP RL2

```
                *1000
1000  4234      MQAT1,  JMS HSE3
1001  4020              JMS GEN
1002  7540              CLL CLA CMA       /CLEAR LINK
1003  3125              DCA Z GENX
1004  3123              DCA Z ACP         /STORE AC PATTERN
1005  3124              DCA Z LXP                 /STORE LINK TO A ZERO
1006  7040              CMA
1007  3123              AND Z ACP                 /LOAD AC
1010  7421              MQL               /LOAD MQ FROM AC
1011  7501              MQA               /LOAD AC FROM MQ
1012  3127              DCA Z BACP        /STORE RESULT OF MQL, 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  5240              JMP MQAER1        /MQ DID NOT EQUAL AC
1027  7240              CLA CMA
1030  0126              AND Z BLXP
1031  7440              SZA
1032  5246              JMP MQAER1        /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
```

```
1046  7604  MQAER1, CLA OSR          /TEST SW2
1047  7106          RTL CLL
1050  7004          RAL
1051  7420          SNL
1052  5250          JMP NOPR
1053  4667          JMS I NOPR+11    /PRINT ERROR
1054  4672          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  0067          PMQAT
1070  0524          XOVE
1071  0074          MQA1
1072  3120          DCA Z BLXP
1073  5217          JMP MQAT1+17.
```

```
1200                *1200
1200  5235  M,AT2,  JMP HSE4
1201  4421          JMS GEN
1202  7560          STL CLA CMA     /SET LINK
1203  3125          AND Z GENX
1204  7040          CMA             /COMPLEMENT GENX PATTERN
1205  3123          DCA Z ACP               /STORE AC PATTERN
1206  7041          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  4150          JMS Z SETL
1222  3126          DCA Z BLXP      /STORE LINK RESULT 7777

1223  7244  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
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          JPR2,   CLA OSR         /TEST SW0
1257  7104                  RAL CLL
1260  7450                  SZL
1261  7402                  HLT
1262  7604                  CLA OSR         /TEST SW1
1263  7104                  RTL CLL
1264  7430                  SZL
1265  5202                  JMP MQAT2+2     /PROGRAM LOOP
1266  5201                  JMP MQAT2+1     /CONTINUE PROGRAM

1267  6667          XPMQAT, PMQAT

1270  0000          EMQAT2, 0
1271  4342                  JMS PTWO

1272  4036          ATS,    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  4733                  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  2125                  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  0347          XSP1,   SP1
1326  0327                  SP2
1327  0337                  AC
1330  0354                  PLXP
1331  0413                  PACP
1332  0335                  MQ
1333  0420                  PBLXP
1334  0421                  PBACP

1335  0000          VOR,    0               /PRINT INCLUSIVE OR
```

```
1336  7240      CLA CMA
1337  3152      AND @ INCOR
1340  4345      JMS @ PRALOP
1341  5736      JMP I VOR
```

```
1542  [illegible]
1543  7240
1544  6155
1545  6046
1546  5742

1547  5124
1550  5223

PI.O,   .
        CLA CMA          /PRINT 2
        AND Z TWO
        JMS Z PRXLOP
        JMP I PIWO

CLRL4,  JCA Z BLXP
        JMP RL4
```

```
      1400              *1400
1400  5234    MQAT3,    JMP HSE5
1401  4020              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 LXP         /STORE LINK TO A ZERO
1407  7040              CMA
1410  0125              AND Z GENX
1411  7421              MQL             /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

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  7624          NOPR3,  CLA OSR          /TEST SW0
1456  7104                  RAL CLL
1457  7431                  SZL
1460  7402                  HLT
1461  7624                  CLA OSR          /TEST SW1
1462  7104                  RTL CLL
1463  7431                  SZL
1464  5202                  JMP MQAT3+2      /PROGRAM LOOP
1465  5201                  JMP MQAT3+1      /CONTINUE PROGRAM

1466  1667          APMQAT, PMQAT
1467  1455                  NOPR3
1470  1270                  EMQAT2

1471  4277          AMQAT3, JMS PTHREE
1472  7242                  CLA CMA
1473  0267                  AND APMQAT+1
1474  3672                  DCA I APMQAT+2
1475  5676                  JMP I XAT3

1476  1272          XAT3,   AT3

1477  0000          PTHREE, 0
1500  7242                  CLA CMA
1501  0154          AND Z THREE
1502  4046                  JMS Z PRXLOP
1503  5677                  JMP I PTHREE
```

```
      1600            *1600
1600  4320  STEST,    JMS KP1          /HOUSE KEEPING

1601  4020  SHLLSR,   JMS I GEN                /NUMBER GENERATOR
1602  7360            STL CLA CMA      /SET LINK (NO SHIFT GUARD)
1603  0125            AND I GENX
1604  7421            MQL              /LOAD MQ
1605  7413            SHL              /SHIFT LEFT

1606  0000  LEFTS,    0                /NUMBER OF SHIFTS
1607  3162            DCA I 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 I LFTMQ      /STORE MQ SHIFTED LEFT
1615  7040            CMA
1616  0162            AND I LFTAC      /RESTORE AC
1617  7417            LSR              /SHIFT RIGHT

1620  0000  RIGHTS,   0
1621  3163            DCA I 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 I 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
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 I RITAC
1641  7440            SZA
1642  5255            JMP SHERR                /RITAC SHOULD EQUAL 0000
1643  7040            CMA
1644  0125            AND I GENX
1645  7140            CLL CMA
1646  1164            TAD I 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       /CLEAR 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 PRTAA
1722  3754                  DCA I PRTAA+1
1723  5700                  JMP I KP1

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  7342          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  7340          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  2085          PRTAA,  PRTW
1754  2154                  PRT
```

```
        2000            *2000
2000    0000    PRINTS, 0
2001    4036            JMS Z CRLF
2002    4741            JMS I Z12+15
2003    4643            JMS I SHLX+3
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+3
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 TENSP
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 TENSP
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
2034    4036            JMS Z CRLF
2035    5600            JMP I PRINTS

2036    2221    SHLX,   SHLP
2037    2212            RPAR
2040    0337            AC
2041    1477            PTHREE
2042    1342            PTWO
2043    0347            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  2205            LPAR
2140  0305            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
2200  0000    PC,       0
2201  7240              CLA CMA
2202  0140              AND 40
2203  4046              JMS 46 PRXLOP
2204  5600              JMP I PC

2205  0000    LPAR,     0
2206  7240              CLA CMA
2207  0217              AND LPAREN
2210  4046              JMS 46 PRXLOP
2211  5605              JMP I LPAR

2212  0000    RPAR,     0
2213  7240              CLA CMA
2214  0220              AND RPAREN
2215  4046              JMS 46 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 46 PRXLOP
2225  7040              CMA
2226  0304              AND HX
2227  4046              JMS 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 61 ONZER
2235  4706              JMS I LX+3
2236  7240              CLA CMA
2237  0162              AND 62 LFTAC
2240  3147              DCA 47 BITSTR
2241  4077              JMS 77 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  5021          JMP I SHLP

2303  0315    LX,   L
2304  0310    HX,   0310
2305  0323    SX,   0323
2306  0347          SP1
2307  1747          LFTINK

2310  0322    RX,   0322
2311  1750          RITINK
```

```
      2400              *2400
2400  4327    ST+ST1,   JMS KP1XX           /HOUSE KEEPING

2401  7240    T13,      CLA CMA
2402  0352              AND T14X
2403  3351              DCA NTST            /STORE NEXT TEST ADDRESS
2404  4303              JMS GENN            /GENERATOR JUMP

2405  4772    SCP13,    JMS I TXXX
2406  5205              JMP SCP13

2407  4767    T14,      JMS I KKKNU
2410  0353              AND T14X+1
2411  3351              DCA NTST
2412  4303              JMS GENN

2413  4772    SCP14,    JMS I TXXX
2414  5613              JMP I 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              T27,    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,   0
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   KP1XX,  0
2530  7240           CLA CMA
2531  2365           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  3772           DCA I KX12+2
2540  1345           TAD PPPNUM
2541  3161           DCA Z PRNUM      /PRINT NUMBERS 13 TO 23
2542  1373           TAD PRTTA
2543  3774           DCA I PRZTA
2544  5727           JMP I KP1XX

2545  3004   PPPNUM, PPNUM

2546  0000   KKK,    0
2547  0000   NGEN,   0
2550  0000   ELEVEN, 0
2551  0000   NTST,   0
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  2620   KKKNU,  KKKN
2570  2631           RITXXX
2571  2617           LFTXXX
2572  2610   TXXX,   TXXXX
2573  2005   PRTTA,  PRTW
2574  3060   PRZTA,  PRTT
```

```
      2600              *2600
2600  0000  KKKN,      0
2601  7340              CLL CLA CMA       /COMPARE CONSTANTS FOR TESTS
2602  1607              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,      0                 /SCOPE MODE RETURN INDIRECT
2611  7240              CLA CMA
2612  0700              AND I NGENX
2613  7421              MQL               /LOAD MQ
2614  7040              CMA
2615  0301              AND K2525                 /LOAD AC 2525 (OCTAL)
2616  7413              SHL               /SHIFT LEFT

2617  0000  LFTXXX,     0
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              MQA 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,     0
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              MQA 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  0704              AND I NGENX
2656  7140              CLL CMA
2657  1164              TAD Z RITMQ
2660  7240              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          NNFG,   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 3
     3000               *3400
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, 0               /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,   0
```

3061 1342 TWOTWO, PTWO

```
3062  0000    SHIFT,  0
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  5062            JMP I SHIFT

3103  0323    SS,     0323
3104  0310            0310
3105  0311            0311
3106  0306            0306
```

```
        3200            *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  3410                  AND I Z ACIND   /AC AUTO INDEX PATTERN COMPARE
3250  3273                  DCA ACCOMP
3251  7040                  CMA
3252  3411                  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          SSINK,  CMA
3271  3577                  DCA I LLLLNK    /STORE LINK
3272  5216                  JMP ASRSHF+7


3273  0000          ACCOMP, 0
3274  0020          MQCOMP, 0
3275  0000          ASREX,  0
3276  7750          ASREXX, 7750
3277  1747          LLLLNK, LFTINK
3300  4000          SSTEST, STEST3
3301  3502          MQAUT,  MQAUTX
3302  3516          ACAUT,  ACAUTX
3303  3001          STPR,   ASRPNU+1
3304  3400                  TYPE
3305  2154                  PRT
3306  3060                  PRIT
3307  3405                  TYPRE
3310  3546                  TYPE2
3311  3414                  TYPEA
```

```
3312  0000  HSKK,   0
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 TSSW0
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
```

```
      3400              *3400
3400  0000    TYPE,     0
3401  4036              JMS Z CRLF
3402  4666              JMS I ASHIFT
3403  4667              JMS I ASHIFT+1
3404  5661              JMP I 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 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
```

```
   32  3147          DCA Z BITSTR
3463  4077          JMS Z MESSG
3464  4036          JMS Z CRLF
3465  5614          JMP I TYPEA
```

```
3466  3062              ASHIFT, SHIFT
3467  0347                      SP1
3470  2277                      PC
3471  2225              TYLPAR, LPAR
3472  0337                      AC
3473  2212              TYRPAR, RPAR
3474  2142                      TENSP
3475  0325                      MQ
3476  0323              TYS,    0323
3477  0322              TYR,    0322
3500  1747              TYLI,   LFIINK
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
```

```
3546  0000          TYPE2,  0
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,  0
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
```

```
      3600              *3600
3600  0000              AS=PNU, 0
3601  5630                      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,    ⌀1
3631  2065                      ⌀2
3632  2067                      ⌀3
3633  2071                      ⌀4
3634  2074                      ⌀5
3635  2077                      ⌀6
3636  2102                      ⌀7
3637  2105                      ⌀8
3640  2110                      ⌀9
3641  2113                      ⌀10
3642  2117                      ⌀11
3643  2124                      ⌀12
3644  3013                      ⌀13
3645  3015                      ⌀14
3646  3017                      ⌀15
3647  3021                      ⌀16
3650  3023                      ⌀17
3651  3025                      ⌀18
3652  3027                      ⌀19
3653  3031                      ⌀20
3654  3035                      ⌀21
3655  3040                      ⌀22
3656  3043                      ⌀23
```

```
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
4000  4336  STEST3, JMS HKEEP
4001  4313         JMS GNNN
4002  7360         CLA CMA STL      /SET LINK
4003  7421         MQL
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  4721                  JMS I ,+12
4070  4720                  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                  PRTT
4107  3673                  ACCLC

4110  7750                  7750
4111  3001                  ASRPNU+1
4112  3657                  MQCLC
4113  0000          GNNN,   0
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,  0
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,  0
      4200  *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  7240          CMA
4206  0313          AND ACNMIX      /LOAD 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  1312          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  7624          CLA OSR
4263  7106          RTL CLL
```

```
4264  7430          SZL                 /TEST SW1
4265  5202          JMP  NORMT+2
4266  5201          JMP  NORMT+1
```

```
4267  7240          HSENMI, CLA CMA
4270  0336                  AND ANCMIQ
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 JSR         /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          ANCMIQ, 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          *4400
4437  0000  PRAMI,  0                    /PRINT ROUTINE
4401  4036          JMS Z CRLF
4402  4712          JMS I SPR2+16
4403  4674          JMS I SPR2
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 4724 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  4236                    JMS Z CRLF
4473  5600                    JMP I PRNMI

4474  0327            SPR2,   SP2
4475  2200                    PC
4476  2205                    LPAR
4477  0337                    AC
4500  2212                    RPAR
4501  2142                    TENSP
4502  0305                    MQ
4503  4313                    ACNMIX
4504  0347                    SP1
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                    0

4517  0000            ACNMI,  0
4520  7777                    7777    /SC22
4521  7777                    7777    /SC21
4522  7777                    7777    /SC20
4523  7777                    7777    /SC19
4524  7777                    7777    /SC18
4525  7777                    7777    /SC17
4526  7777                    7777    /SC16
4527  7777                    7777    /SC15
4530  7777                    7777    /SC14
4531  7777                    7777    /SC13
4532  7777                    7777    /SC12
```

4465 4784

JMS I SPR2+10

```
4465  7240                CLA CMA
4466  0711                AND I SPR2+15
4467  3147                DCA Z BITSTR
4470  4077                JMS Z MESSG
4471  4036                JMS Z CRLF
4472  5600                JMP I PRNMI

4473  0327          SPR2, SP2
4474  2200                PC
4475  2205                LPAR
4476  0337                AC
4477  2212                RPAR
4500  2142                TENSP
4501  0305                MQ
4502  4313                ACNMIX
4503  0347                SP1
4504  4314                MQNMIX
4505  4316                ACNMIN
4506  4315                MQNMIN
4507  4312                SCASTX
4510  4307                SCAST
4511  4600                NMITPR
4512  4624                NMIXX
4513  4627                SCATXX
4514  4633                SCAXX
4515  0000                0

4516  0000          ACNMI, 0
4517  7777                ////    /SC22
4520  7777                ////    /SC21
4521  7777                ////    /SC20
4522  7777                ////    /SC19
4523  7777                ////    /SC18
4524  7777                ////    /SC17
4525  7777                ////    /SC16
4526  7777                ////    /SC15
4527  7777                ////    /SC14
4530  7777                ////    /SC13
4531  7777                ////    /SC12
4532  7777                ////    /SC12
```

```
4533  7777
4534  7777
4535  7776
4536  7774
4537  7770
4540  7760
4541  7740
4542  7700
4543  7600
4544  7400
4545  7000
4546  6000
4547  4000
4550  0000
4551  0000
4552  0000
4553  0000
4554  0000
4555  0000
4556  0000
4557  0000
4560  0000
4561  0000
4562  0000
4563  0000
4564  0000
```

```
MQSMI,  /777    /SC11
        7777    /SC10
        777o    /SC9
        7774    /SC8
        7770    /SC7
        7760    /SC6
        7740    /SC5
        7700    /SC4
        7600    /SC3
        7400    /SC2
        7000    /SC1
        6000    /SC0
        4000
        0000
        0000
        0000
        0
        0
        0
        0
        0
        0
        0
        0
        0
        0
        0
```

```
      4600              *4600
4600  0000    NMITPR,   0
4601  4204              JMS PNORM
4602  4217              JMS XNORMT
4603  5600              JMP I NMITPR
4604  0000    PNORM,    0
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,   0

4620  7240              CLA CMA
4621  0261              AND N+3
4622  4046              JMS Z PRXLOP
4623  5617              JMP I XNORMT

4624  0000    NMIXX,    0
4625  4204              JMS PNORM
4626  5624              JMP I NMIXX

4627  0000    SCATXX,   0
4630  4236              JMS PSTEP
4631  4251              JMS PSTEPT
4632  5627              JMP I SCATXX

4633  0000    SCAXX,    0
4634  4236              JMS PSTEP
4635  5633              JMP I SCAXX

4636  0000    PSTEP,    0
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 PSTEP

4651  0000    PSTEPT,   0
4652  7240              CLA CMA
4653  0261              AND N+3
4654  4046              JMS Z PRXLOP
4655  5651              JMP I PSTEPT
```

```
4654  0316          N,    0316    /N
4655  0315                0315    /M
4656  0311                0311    /I
4661  0324                0324    /T
4662  0323                0323    /S
4663  0303                0303    /C
4664  0301                0301    /A
```

```
                5000            *5000
5000  5261      NORMT1, JMP HSENM
5001  4272              JMS GENNMI
5002  7240              CLA CMA
5003  1715              AND I TST25+1    /LOAD MQ PATTERN
5004  7421              MQL
5005  7240              CLA CMA
5006  1716              AND I TST25+2    /LOAD AC PATTERN
5007  7411              NMI
5010  3724              DCA I TST25+10   /STORE NORMALIZED AC
5011  7501              MQA
5012  3725              DCA I TST25+11   /STORE NORMALIZED MQ
5013  7441              SCA
5014  3726              DCA I TST25+12   /STORE SCA COUNT
5015  7240              CLA CMA
5016  1724              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  1725              AND I TST25+11
5030  7440              SZA
5031  5332              JMP NMERR                /MQ DID NOT EQUAL 0000
5032  7240              CLA CMA
5033  1726              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      HSENM,  CLA
5062  3314              DCA TST25                /CLEAR TEST COUNTER
5063  7000              NOP
```

```
5764  7040
5765  0322
5766  3321
5767  1350
5770  3727
5771  5221

CMA
ANU NM7776
DCA NMFLG
TAU DEC12
DCA I TST25+13
JMP NORMT1+1
```

```
5072  0000          GENNMI, 0
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          PA2525, 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                  DCA I TST25+2   /AC PATTERN 7777
5113  5672                  JMP I GENNMI

5114  0000          TST25,  0
5115  4314                  MQNMIX
5116  4313                  ACNMIX
5117  2525          NM2525, 2525
5120  5252          NM5252, 5252
5121  0000          NMFLG,  0
5122  7776          NM7776, 7776

5123  5200          NEXNMI, NORMT2
5124  4316                  ACNMIN
5125  4315                  MQNMIN
5126  4307                  SCAST
5127  4312                  SCASTX
5130  0014          DEC12,  0014
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

5200    5307    NORMT2, JMP  KE         /HOUSE KEEPING
5201    4255            JMS GEX         /PATTERN GENERATOR
5202    7621            CAM
5203    7040            CIA
5204    0734            AND I PAT01
5205    7421            MQL             /MQ PATTERN
5206    7140            CLL CMA         /AC PATTERN
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,    0
5256  7240                  CLA CMA
5257  0346                  AND TPFLAG
5260  7440                  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
5341  0000
5342  4512
5343  4307
5344  0001
5345  0100

CHKAC,  2
CHKMQ,  0
CHKSCA, SCAST
SCANM,  SCAST
        700
AGAIN,  4
```

```
5346  0000          TPFLAG, 0
5347  0020                  0020
5350  2000                  2000
5351  7776                  7776
5352  4400                  PRNMI
5353  5516                  ESA
5354  2346          PATCH,  ISZ TPFLAG
5355  5201                  JMP NORMI2+1
5356  5326                  JMP NMTS3
```

```
5400                *5400
5400 0000   TSCL,   0               /SCL TESTS
5401 7200   SCL1,   CLA             /TEST SCL=0
5402 7423           /40.            /SCL
5403 7737           ///.            /SC=0
5404 7441           SC
5405 7640           CLA SZA
5406 7402   ESCL1,  HLT             /ERROR; SC NOT=0
5407 7403   SCL2,   /403            /TEST SCL=01
5410 7776           ///6            /SC=1
5411 7441           SCA
5412 1210           TAD .-2
5413 7040           CMA
5414 7640           CLA SZA
5415 7402           ESCL2,  HLT             /ERROR; SC NOT=01
5416 7403   SCL3,   /403            /TEST SCL=02
5417 7775           ///5            /SC=2
5420 7441           SCA
5421 1217           TAD .-2
5422 7040           CMA
5423 7640           CLA SZA
5424 7402   ESCL3,  HLT             /ERROR; SC NOT=02
5425 7403   SCL4,   /403            /TEST SCL=04
5426 7773           ///3            /SC=4
5427 7441           SCA
5430 1226           TAD .-2
5431 7040           CMA
5432 7640           CLA SZA
5433 7402   ESCL4,  HLT             /ERROR; SC NOT = 04
5434 7403   SCL5,   /403            /TEST SCL=10
5435 7767           ///7            /SC=10
5436 7441           SCA
5437 1235           TAD .-2
5440 7040           CMA
5441 7640           CLA SZA
5442 7402   ESCL5,  HLT             /ERROR; SC NOT=10
5443 7403   SCL6,   /403            /TEST SCL=20
5444 7757           ///7            /SC=20
5445 7441           SCA
5446 1244           TAD .-2
5447 7040           CMA
5450 7640           CLA SZA
5451 7402   ESCL6,  HLT             /ERROR; SC NOT=20
```

```
5452  7403          SCL7,   /403            /TEST SCL=12
5453  7765                  /765            /SC=12
5454  7441                  SCA
5455  1253                  TAD .-2
5456  7040                  CMA
5457  7640                  CLA SZA
5460  7402          ESCL7,  HLT             /ERROR; SC NOT=12
5461  7403          SCL8,   /403            /TEST SCL=25
5462  7752                  /752
5463  7441                  SCA
5464  1262                  TAD .-2
5465  7040                  CMA
5466  7640                  CLA SZA
5467  7402          ESCL8,  HLT             /ERROR; SC NOT=25
5470  7403          SCL9,   /403            /TEST SCL=0
5471  0077                  0077            /SC=0
5472  7441                  SCA
5473  7640                  CLA SZA
5474  7402          ESCL9,  HLT             /ERROR; SC NOT=0
5475  7403          SCL10,  7403            /TEST SCL=37
5476  7700                  /700
5477  7441                  SCA
5500  1321                  TAD K7740
5501  7040                  CMA
5502  7640                  CLA SZA
5503  7402          ESCL10, HLT             /ERROR; SC NOT 37
5504  2307                  ISZ .+3
5505  5201                  JMP TSCL+1
5506  5600                  JMP I TSCL
5507  0000                  0
5510  4036          E3A,    JMS Z CRLF
5511  7240                  CLA CMA
5512  0154                  AND Z THREE     /3
5513  4046                  JMS Z PRXLOP
5514  7040                  CMA
5515  0137                  AND Z A         /A
5516  4046                  JMS Z PRXLOP
5517  5720                  JMP I .+1
5520  0201          BIGL,   MQLT
5521  7740          K7740,  7740
              $
```

THERE ARE NO ERRORS

SYMBOL TABLE

A	0137
AASREX	4050
AC	0337
ACADT	3302
ACADTX	3510
ACCHK	4075
ACCLC	3673
ACCOMP	3273
ACIND	0010
ACNMI	4517
ACNMIN	4310
ACNMIX	4313
ACP	0125
AGAIN	5345
AMQAT3	1471
ANCMIQ	4330
APMQAT	1465
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	5520
BITSTR	0147
BLXP	0120
C	0140
CAM	7621
CHKAC	5340
CHKMQ	5341
CHKSCA	5342
CLLI	2600
CLLINK	1733
CLRINK	1747
CLRL4	1347
CONTIN	2504
COUNTX	0145
CP	0265
CR	0130
CRLF	0036
CRLI	2673
CXSA	4710
DLC12	5130
EIGHT	2134
ELEVEN	2550

SYMBOL VALUE

EMD,T2 1270
FSCL1 5436
ESCL10 5513
FSCL2 5415
ESCL3 5424
ESCL4 5433
ESCL5 5442
ESCL6 5451
ESCL7 5460
FSCL8 5467
ESCL9 5474
EXEN 4340
EXINMI 4371
ESA 5516
FIVE 2131
FOUR 2130
GEN 4020
GENN 2543
GENNMI 5472
GENRR 3245
GENX 3125
GEX 5255
GNNN 4113
GXEN 4321
HKE 5327
HNFEP 4136
HSF 3247
HSENM 5201
HSENMI 4267
HSE1 2456
HSE2 2635
HSE3 1034
HSE4 1235
HSE5 1434
HSKN 3312
HX 2324
INCOR 2152
INCSUB 1724
KA3777 3501
KKK 2546
KKKN 2600
KKKOU 2567
KP1 1700
KP1XX 2527
KX12 2566
K2525 2701
K4000 2565
K7740 5521
K7764 6160
L 2315
LEFTS 1640
LF 2131
LFTAC 6102

SYMBOL TABLE

LFTINX	1747
LFTJ	1[illegible]
LFTXXX	2617
LITRA	4142
LINK	7145
LL	2154
LLIN	2742
LLLLNK	3277
L.PR2	1255
LPAR	2205
LPAREN	2217
LSR	7417
LX	2303
LXP	7124
M	0132
MESSG	0277
MQ	0305
MQA	7501
MQAER1	1246
MQAER2	1247
MQAER3	1446
MQAT	0600
MQAT1	1000
MQAT2	1200
MQAT3	1400
MQAUT	3301
MQAUTX	3512
MQA1	1674
MQCHK	4074
MQCLC	3057
MQCOMP	3274
MQIND	2011
MQL	7421
MQLT	7201
MQLT1	7427
MQNMI	4533
MQNMIN	4315
MQNMIQ	4337
MQNMIX	4314
MQ1	0475
MT2ER	5314
N	4656
NCOMP	2505
NEXNMI	5123
NEXT	2032
NGEN	2547
NGENX	2700
NINE	2135
NMERR	5132
NMFLG	5121
NMI	7411
NMIERR	4252
NMIOOO	4511

SYMBOL TABLE

NAIPR	4513
NMIXX	4624
NMTS1	5250
NMTS3	5326
NM2525	5117
NM5252	5123
NM7776	5122
NNEG	2774
NOPR	1550
NOPR3	1455
NORMT	4223
NORMT1	5027
NORMT2	5230
NSUB	1746
NTST	2551
ONE	0141
ONEONE	3045
ONEP	0060
ONZLR	0001
PACP	0413
PATCH	5354
PAT00	5335
PAT01	5334
PA2525	5101
PBACP	0421
PBLXP	0430
PC	2250
PLIMA	1054
PLXP	0354
PMOAT	0667
PMOLT	0260
PNORM	4624
PPNUM	3010
PPPNUM	2545
PRET	2360
PRINT	1677
PRINTS	2000
PRNMI	4400
PRNUM	0161
PROVE	0117
PRT	2154
PRTAA	1753
PRTT	3060
PRTTA	2573
PRTW	2005
PRTZ	3051
PRXLOP	0046
PRZTA	2574
PSTEP	4636
PSTEPT	4651
PTHREE	1477
PTO	0406
PTWO	1342

SYMBOL TABLE

Q	3133
REFE	3363
REEEE	4164
RIGHTS	1620
RITAC	0163
RITINA	1750
RITMQ	0164
RITXXX	2631
RLIN	2743
RL2	3620
RL4	1223
RPAR	2212
RPAREN	2220
RSUB	1745
RX	2310
SCA	7441
SCANM	5343
SCAST	4307
SCASTX	4312
SCATXX	4627
SCAXX	4633
SCC23	4311
SCL1	5401
SCL10	5475
SCL2	5407
SCL3	5416
SCL4	5425
SCL5	5434
SCL6	5443
SCL7	5452
SCL8	5461
SCL9	5470
SCP13	2405
SCP14	2413
SCP15	2421
SCP16	2427
SCP17	2435
SCP18	2443
SCP19	2451
SCP20	2457
SCP21	2465
SCP22	2473
SCP23	2501
SETL	0156
SEVEN	2133
SHERR	1655
SHERRX	2707
SHIFT	3062
SHL	7413
SHLLSR	1671
SHLP	2221
SHLX	2036
SIX	2132

SYMBOL VALUE

SNUM 1752
SP 0136
SPACST 2153
SPAT00 5330
SPAT01 5337
SPR2 4474
SP1 0347
SP2 0327
SS 3103
SSINK 3270
SSTEST 3370
STEST 1670
STEST1 2470
STEST2 3270
STEST3 4070
STLINK 1735
STPR 3303
STRCNT 0146
STRINK 1742
SX 2305
SXLINK 4245
T 0322
TCOUNT 2152
TENSP 2142
TEST4 4076
THREE 0154
TINUE 2726
TNUM 2044
TO 0144
TPFLAG 5346
TSCL 5403
TSCLX 2170
TSSW0 3352
TST25 5114
TT 0135
TWELVE 1751
TWO 0155
TWOTWO 3061
TXXX 2572
TXXXX 2610
TYLI 3500
TYLPAR 3471
TYPE 3400
TYPEA 3414
TYPE2 3546
TYPE3 3557
TYPRE 3405
TYR 3477
TYRPAR 3473
TYS 3470
TY1 3630
T13 2421
T14 2407

SYMBOL TABLE

T14X	2552
T15	2415
T16	2423
T17	2431
T18	2437
T19	2445
T20	2453
T21	2461
T22	2467
T23	2475
VOR	1335
XACVMI	0012
XAT3	1476
XCP	0520
X<400	0167
XMQAT	0034
XMQAT1	0035
XMQAT2	0150
XMQAT3	0151
XMQLT1	0033
XMQVMI	0013
XMQ1	0576
XNORMT	4617
XONE	0524
XPACP	0362
XPMQAT	1267
XSCAT	0153
XSP1	1325
YA	0742
YSP2	0721
ZERO	0142
ZEROR	0072
Z1	2062
Z10	2113
Z11	2117
Z12	2124
Z13	3013
Z14	3015
Z15	3017
Z16	3021
Z17	3023
Z18	3025
Z19	3027
Z2	2065
Z20	3031
Z21	3035
Z22	3040
Z23	3043
Z3	2067
Z4	2071
Z5	2074
Z6	2077
Z7	2102

SYMBOL TABLE

78 21A5
79 211A

SYMBOL TABLE

ACINT	0010
MDINT	0011
XACNMI	0012
XMQNMI	0013
GEN	0029
BACK	0031
NEXT	0032
XMQLT1	0033
XMQAT	0034
XMQAT1	0035
CRLF	0036
PRXLOP	0046
PLINK	0054
ONEER	0061
ONEP	0066
ZERUR	0072
MESSG	0077
PRONE	0117
ACP	0123
LXP	0124
GENX	0125
BLXP	0126
BACP	0127
CR	0130
LF	0131
M	0132
Q	0133
LL	0134
TT	0135
SP	0136
A	0137
C	0140
ONE	0141
ZERO	0142
LINK	0143
TJ	0144
COUNTX	0145
STRCNT	0146
BITSTR	0147
XMQAT2	0150
XMQAT3	0151
INCOR	0152
XSCAT	0153
THREE	0154
TWO	0155
SETL	0156
PRNUM	0161
LFTAC	0162
RITAC	0163
RITMQ	0164
LFTMQ	0165
K7764	0166
XX4J2	0167

SYMBOL TABLE

TSCLX	0170
MQLT	0201
HSE	0247
PMQLT	0260
CP	0265
MQ	0305
L	0315
T	0322
SP2	0327
AC	0337
SP1	0347
PLXP	0354
XPACP	0362
PBLXP	0400
PTO	0406
PACP	0413
PBACP	0421
MQLT1	0427
HSE1	0456
MQ1	0475
XMQ1	0506
XCP	0520
XONE	0524
MQAT	0600
RL2	0620
HSE2	0635
PMQAT	0667
MQA1	0674
YSP2	0721
AT	0732
YA	0742
MQAT1	1000
HSE3	1034
MQAER1	1046
NOPR	1056
MQAT2	1200
RL4	1223
HSE4	1235
MQAER2	1247
LNPR2	1256
XPMQAT	1267
EMQAT2	1270
AT3	1272
XSP1	1325
VOR	1335
PTWO	1342
CLRL4	1347
MQAT3	1400
HSE5	1434
MQAER3	1446
NOPR3	1455
APMQAT	1466
AMQAT3	1471

SYMBOL TABLE

XAT3	1476
PTHREE	1477
STEST	1600
SHLLSR	1601
LEFTS	1610
RIGHTS	1620
SHERR	1655
PRINT	1677
KP1	1700
INCSUB	1724
CLLINK	1733
STLINK	1735
CLRINK	1740
STRINK	1742
RSUB	1745
NSUB	1746
LFTINK	1747
RITINK	1750
TWELVE	1751
SNUM	1752
PRTAA	1753
PRINTS	2000
PRTW	2005
SHLX	2036
TNUM	2044
PRET	2060
Z1	2062
Z2	2065
Z3	2067
Z4	2071
Z5	2074
Z6	2077
Z7	2102
Z8	2105
Z9	2110
Z10	2113
Z11	2117
Z12	2124
FOUR	2130
FIVE	2131
SIX	2132
SEVEN	2133
EIGHT	2134
NINE	2135
TENSP	2142
TCOUNT	2152
SPACST	2153
PRT	2154
PC	2200
LPAR	2205
RPAR	2212
LPAREN	2217
RPAREN	2220

SYMBOL TABLE

SHLP	2221
LX	2303
HX	2304
SX	2305
RX	2310
ST,ST1	2400
T13	2401
SCP13	2405
T14	2407
SCP14	2413
T15	2415
SCP15	2421
T16	2423
SCP16	2427
T17	2431
SCP17	2435
T18	2437
SCP18	2443
T19	2445
SCP19	2451
T20	2453
SCP20	2457
T21	2461
SCP21	2465
T22	2467
SCP22	2473
T23	2475
SCP23	2501
GENN	2503
CONTIN	2504
NCOMP	2506
KP1XX	2527
PPPNUM	2545
KKK	2546
NGEN	2547
ELE.,EN	2550
NTST	2551
T14X	2552
K4000	2565
KX12	2566
KKKN$_U$	2567
TXXX	2572
PRTTA	2573
PRZTA	2574
KKKN	2600
T$_{XXXX}$	2610
LFTXXX	2617
RITXXX	2631
CLLI	2666
CRLI	2673
NGENX	2700
K2525	2701
LLIN	2702

SYMBOL TABLE

RLIN	2733
NNEG	2734
TINUE	2746
SHERRX	2767
PPNUM	3000
Ž13	3013
Ž14	3015
Ž15	3017
Ž16	3021
Ž17	3023
Ž18	3025
Ž19	3027
Ž20	3031
Ž21	3035
Ž22	3040
Ž23	3043
ONEONE	3045
PRT3	3051
PRTT	3060
TWOTWO	3061
SHIFT	3062
SS	3103
STEST2	3200
ASRSHF	3207
GENRR	3245
SSINK	3270
ACCOMP	3273
MQCOMP	3274
ASREX	3275
ASREXX	3276
LLLLNK	3277
SSTEST	3300
MQAUT	3301
ACAUT	3302
STPR	3303
HSKK	3312
ASRERR	3342
TSSW0	3352
REEE	3363
TYPE	3400
TYPRE	3405
TYPEA	3414
ASHIFT	3466
TYLPAR	3471
TYRPAR	3473
TYS	3476
TYR	3477
TYLI	3500
KA3777	3501
MQAUTX	3502
ACAUTX	3516
TYPE2	3546
TYPE3	3557

SYMBOL TABLE

ASRPNU	3640
TY1	3630
MQCLC	3657
ACCLC	3673
STEST3	4000
ASR3	4007
CXSX	4016
SXLINK	4045
AASREX	4050
AS3PR	4066
ACCHK	4073
MQCHK	4074
ASREXT	4075
TEST4	4076
LIINK	4102
GNNN	4113
HKEEP	4136
RLEEE	4164
NORMT	4200
NMIERR	4250
HSENMI	4267
EXINMI	4301
SCAST	4307
NMIOOO	4310
SCC23	4311
SCASTX	4312
ACNMIX	4313
MQNMIX	4314
MQNMIN	4315
ACNMIN	4316
GXEN	4321
ANCMIQ	4336
MQNMIQ	4337
EXEN	4340
PRNMI	4400
SPR2	4474
ACNMI	4517
MQNMI	4533
NMITPR	4600
PNORM	4604
XNORMT	4617
NMIXX	4624
SCATXX	4627
SCAXX	4633
PSTEP	4636
PSTEPT	4651
N	4656
NORMT1	5000
HSENM	5061
GENNMI	5072
PA2525	5101
TST25	5114
NM2525	5117

SYMBOL TABLE

NMS252	5120
NMFLG	5121
NM7776	5122
NEXNMI	5123
DEC12	5130
NMERR	5132
NORMT2	5200
NITS1	5250
GEX	5255
HAF	5307
MT2ER	5314
NITS3	5326
PATN1	5334
PAT00	5335
SPAT00	5336
SPAT01	5337
CHKAC	5340
CHKMQ	5341
CHKSCA	5342
SCANM	5343
AGAIN	5345
TPFLAG	5346
PATCH	5354
TSCL	5400
SCL1	5401
ESCL1	5406
SCL2	5407
ESCL2	5415
SCL3	5416
ESCL3	5424
SCL4	5425
ESCL4	5433
SCL5	5434
ESCL5	5442
SCL6	5443
ESCL6	5451
SCL7	5452
ESCL7	5460
SCL8	5461
ESCL8	5467
SCL9	5470
ESCL9	5474
SCL10	5475
ESCL10	5503
ESA	5510
BIGL	5520
K7740	5521
NMI	7411
SHL	7413
ASR	7415
LSR	7417
MQL	7421
SCA	7441