IBM POUGHKEEPSIE

Diagnostic Engineering Publication

Dept. B59, Bldg. 965
Date 11/15/63

1410/7010

Subject: Diagnostic Program — CC01A - 1410/7010 Limited CPU Instruction Test

Sequence Number 001

Replaces New Program

This Program uses no System or Channel Control Cards

This Program should be run only from tape.

Enclosures: 44 Pages
Card Deck for CARD ONLY SYSTEMS (as punched by UP51)
8 Cards - Card Loader (1-7) and 1 Core Clear
160 Cards No. 001-160 Data Cards
1 Card Execute Card

Distribution:
X 1410
X 7010
Other

CC01A

11/15/1963

1410/7010 LIMITED CPU INSTRUCTION TEST

CONTENTS OF CC01 WRITE UP AND LISTING

2.xx.00.0 TEST DESCRIPTION

2.xx.00.1 MODIFICATIONS

CC01A is the first release version of this program and it does not obselete any program.

2.xx.00.2 DESCRIPTION

CC01 was taken directly from C021 to test enough of the basic instruction set to read in and operate the Tape Control Program. It does not contain any Error Typeouts, Loops, Tad Controls or Options to repeat, it is strictly a special purpose test that runs prior to the Tape Control Program and halts for any error.

The Load Program utilizes a few instructions to Load CC01 and they are: BCE, MRCW, MLCS, BA1, RT, BEX1 , MLCWA and a Branch instruction.

This test will only be used in conjunction with the Tape Control Program operating from tape.

2.xx.00.3 EQUIPMENT REQUIRED

Minimum Storage
One tape Unit on any channel
Console Printer

2.xx.00.4 CARD DECK

7	Cards	L1 Loader
1	Card	Core Clear
160	Cards	Program Cards
1	Card	Execute (Branch to 1972) to operate TC50

2.xx.00.5 ENGINEERING LEVEL

CC01 will operate on any 1410/7010 system unless an Engineering Change modifies the operations of the standard Instruction set.

2.xx.01.0 LOADING PROCEDURES

2.xx.01.1 1410 TAPE INPUT

A. Display and Alter Locations 00000-00011 as follows:

1. RL%B000011$. If tape unit on E channel
2. XL¤B000011$. If tape unit on F channel

B. Set Mode switch to RUN, Computer Reset and Start.

2.xx.01.2 7010 TAPE INPUT

A. If tape unit is on E channel, use 7010 Load Key and disregard steps (B) and (C)

B. If tape unit is not on E channel, Display and Alter Locations 00000-00011 as follows:

1. XL¤B000011$. If tape unit on F channel
2. 3L?B000011$. If tape unit on G channel
3. 1L!B000011$. If tape unit on H channel

C. Set MODE switch to Run, Computer Reset and Start.

2.xx.02.0 OPERATING PROCEDURES

No special instructions are necessary to run this program. The test is ONE, QUICK check of a portion of the basic instruction set and unless there is an error it immediately reads in TC50 and begins to operate TC50

2.xx.03.0 OPERATING HINTS AND COMMENTS

If there is an error the program will stop. The CE must then consult the listing to find out which instruction failed and determine if he can continue. It is possible to continue to the next instruction by pushing the Start Key. If a number of errors occur it would not be possible for TC50 to operate. If there are a few errors it may be possible that TC50 will work and be able to bring into Core C020 or C021 to completely check out CPU instructions and give the CE the benefit of different Loops and Options.

At Location 01000-01100 is a pattern of characters to be looked at only by the C. E to determine if there are any Information Transfer errors between TAU and CPU.

2.xx.04.0 PROGRAM STOPS

All stops are Error Stops

2.xx.05.0 TYPEOUTS

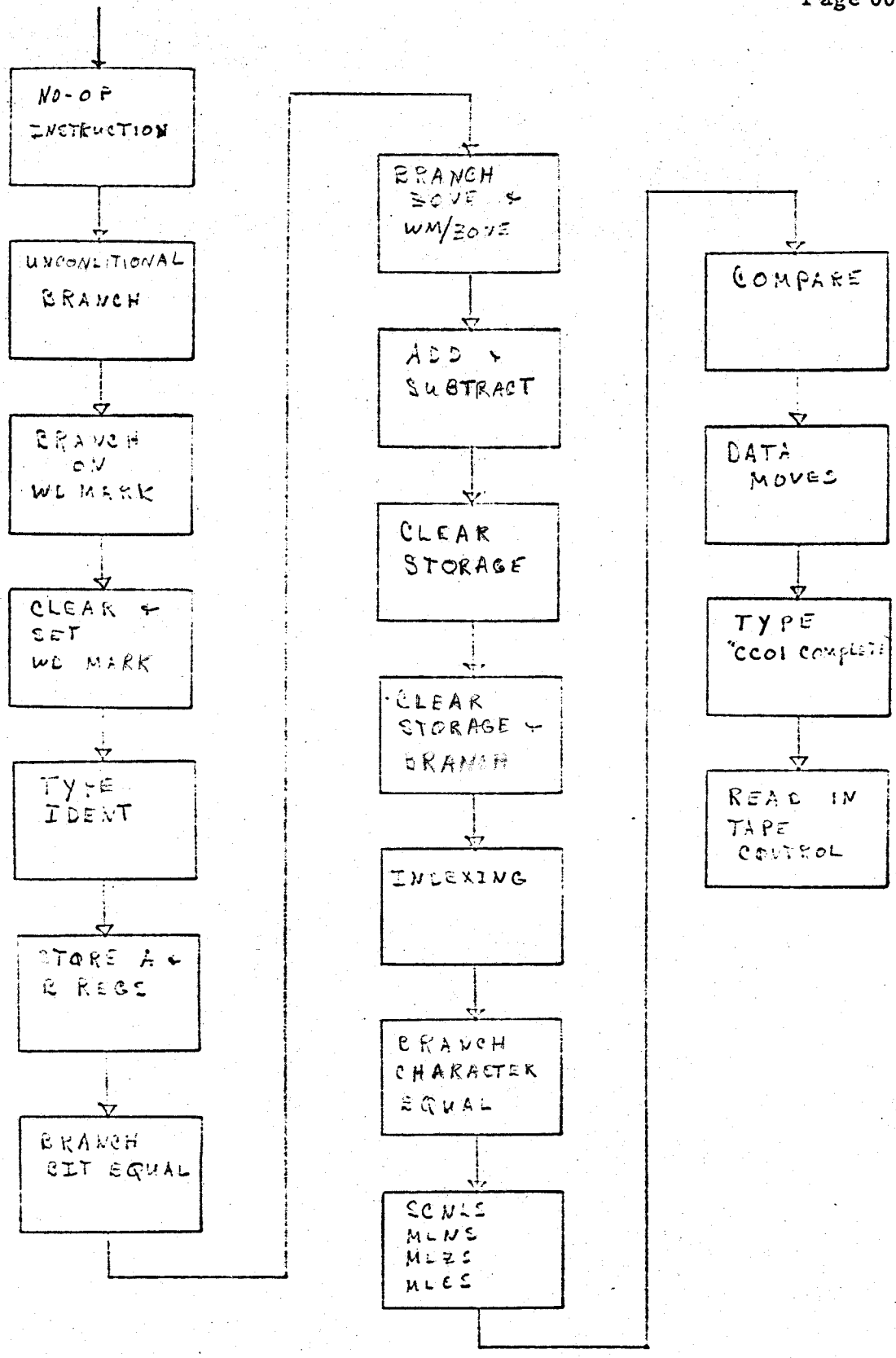
2.xx.05.1 NORMAL

"CC01A" Test Ident.
"CC01 COMPLETE" Indicate End of Test.

2.xx.05.2 ERROR

None.

FLOW CHART


NO-OP INSTRUCTION
UNCONDITIONAL BRANCH
BRANCH ON WL MARK
CLEAR & SET WL MARK
TYPE IDENT
STORE A & B REGS
BRANCH BIT EQUAL
BRANCH MOVE & WM/MOVE
ADD & SUBTRACT
CLEAR STORAGE
CLEAR STORAGE & BRANCH
INDEXING
BRANCH CHARACTER EQUAL
SCNLS MLNS MLZS MLCS
COMPARE
DATA MOVES
TYPE "CC01 COMPLETE"
READ IN TAPE CONTROL

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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1002                CTL    2
1003                LOAD
1004      CTLIND    EQU    1245
1005      IDENT     EQU    1250
1006      START     EQU    2000
1007      *
1008                ORG    CTLIND                                       01245
1009                DC     @0010R@          SEQUENCE AND MEM SIZE       5  01249
1010      *
1011                ORG    IDENT                                        01250
1012      *
1013                DCW    @CC01A@,G        PROGRAM IDENT               5  01254
1014      *
1015                ORG    1000                                         01000
1016      *
1017                DCW    @1122334455667788990OAABBCCDDEEFFGG@         34 01033
1018                       @HHIIJJKKLLMMNNOOPPQQRRSSTTUUVVWWXX@         34 01067
1019                       @YYZZ  .□BTM&$*B,L-/,%SSMY#@.TMM @,G         32 01099
                                  LLG   R.D   WBS   .GTQ
1020      *
1021                ORG    1800                                         01800
1022      *
1023                SBR    *&9              COMMON TYPE ROUTINE         7  01800  G 01815 B
1024                WCP    0                                            10 01807  M %TO 00000 W
1025                SBR    *&20                                         7  01817  G 01843 B
1026                BCB1   *-23                                         7  01824  R 01807 2
1027                BA1    *&1                                          7  01831  R 01838 M
                                                                                  G
1028                B      0                                            7  01838  J 00000
1029      *
1030      *
1031                SBR    *&61             INTERNAL ADDRESS ALTER ROUTINE 7 01845  G 01912 B
1032                RCP    *&26                                         10 01852  M %TO 01887 R
                                                                                  T
1033                BEX1   *-16,M                                       7  01862  R 01852 M
1034                BNT1   *&32                                         7  01869  R 01907 S
                                                                                  B
1035                BA1    *&1                                          7  01876  R 01883 M
                                                                                  G
1036                RCPW   0                                            10 01883  L %TO 00000 R
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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1037                BEX1   *-16,S                                           7  01893  R 01883 S
                                 M                                                    M
1038                BA1    *&1                                              7  01900  R 01907 G
                                                                                     M
1039                B      0                                                7  01907  J 00000
1040      *
1041                ORG    START              PROGRAM BEGINS HERE                02000
1042      ********************************************************************
1043      *
1044      * ROUTINE 01.00    CHECK LONG NO-OP INSTRUCTION
1045      *
1046                NOP                                                      1  02000  N
1047                DC     @ 12345678900#@.GTSTMB/STUVWXYZ#,%WBSSSM@       32  02032
1048                       @-JKLMNOPQR.$*B,L&ABCDEFGHIM.¤RDQBTLLGM@         32  02064
1049      ********************************************************************
1050      *
1051      * ROUTINE 02.00    CHECK UNCOND BR INST.  THIS ROUTINE ASSUMES THAT
1052      *                  WM-BL WILL GIVE INSTRUCTION CK IF BRANCH FAILS
1053      *
1054                B      *&1                SET AND STEP IAR TO SAME ADDRESS  7  02065  J 02072
1055                B      *&2                SHOULD SKIP FOLWNG INVALID OPCODE 7  02072  J 02080
1056                DCW    @ @                                                  1  02079
1057      ********************************************************************
1058      *
1059      * ROUTINE 03.00    CHECK BRANCH ON WORD MARK INSTRUCTION
1060      AC        BW     AD,AD              SHOULD NOT BR, INST CK IF IT DOES 12  02080  V 02105 02105 1
1061                BW     AE,*&1             SHOULD BRANCH, INST CK IF NO BR   12  02092  V 02106 02104 1
1062                DCW    @ @                                                  1  02104
1063      AD        DC     @G@                                                  1  02105
1064      ********************************************************************
1065      *
1066      * ROUTINE 04.00    CHECK CLEAR AND SET WORD MARK INSTRUCTIONS
1067      *
1068      AE        CW     AC,AE              TRY TO CLEAR WMS AT TWO PLACES    11  02106  ¤ 02080 02106
1069                BW     AF-1,AC            SHOULD NOT BR, INST CK IF IT DOES 12  02117  V 02165 02080 1
1070                BW     AF,AE              DITTO                             12  02129  V 02166 02106 1
1071                SW     AE,AC              RESTORE WMS PREVIOUSLY CLEARED    11  02141  , 02106 02080
1072                BW     *&4,AE             TEST AE FOR WORD MARK             12  02152  V 02167 02106 1
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PGLIN   LABEL   OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1073    AF      DCW    @ 12@              INSTRUCTION CK IF NO WM AT AE  3  02166
1074            BW     *&2,AC             TEST AC FOR WORD MARK        12  02167  V 02180 02080 1
1075            DCW    @ @                INSTRUCTION CK IF NO WM AT AC 1  02179
1076    ********************************************************************
1077    *
1078    * ROUTINE 05.00  TYPE IDENT, CK TYPEWR BUSY, HALT, HALT/BR.
1079    *                THESE OPS PERFORMED ONLY FIRST TIME THROUGH
1080    *
1081            NOPWM                                                    1  02180  N
1082            B      AJ                 THIS BR NOT TAKEN FIRST TIME THRU 7  02181  J 02226
1083            SW     *-12                                             6  02188  , 02181
1084    AG      WCP    IDENT              TYPE PROGRAM IDENTIFICATION  10  02194  M %TO 01250 W
1085            BCB1   *-16               BRANCH IF BUSY                7  02204  R 02194 2
1086            BA1    *&1                RESET I/O INTERLOCK           7  02211  R 02218 M
1087            ORG    *                  CREATE NEW CARD                  02218
1088    AH      NOP                                                      1  02218  N
1089            B      AJ                 PUT WM HERE FOR NONSTOP OPERATION 7  02219  J 02226
1090            ORG    *                  CREATE NEW CARD                  02226
1091    ********************************************************************
1092    *
1093    * ROUTINE 06.00  CHECK OPERATION OF SAR AND SBR INSTRUCTIONS
1094    *
1095    AJ      B      AK                 I-ADDR MODIFIED WITHIN ROUTINE    7  02226  J 02233
1096    AK      NOPWM            NOTE. BR TO 00000 INDICATES SBR FAILURE   1  02233  N
1097            B      AL              . BR TO 00001 INDICATES SAR FAILURE  7  02234  J 02286
1098            SW     AK&1                                             6  02241  , 02234
1099            CW     1,AN&1             SET UP A & B ADDR REGISTERS  11  02247  ¤ 00001 02288
1100            SBR    AJ&5                                             7  02258  G 02231 B
1101            SAR    AJ&5                                             7  02265  G 02231 A
1102            SBR    AJ&5                                             7  02272  G 02231 B
1103            B      AJ                                               7  02279  J 02226
1104    AL      H                                                       1  02286  .
1105    AN      CW     AO&1,2             SET UP A & B ADDR REGISTERS  11  02287  ¤ 02327 00002
1106            SAR    AJ&5                                             7  02298  G 02231 A
1107            SBR    AJ&5                                             7  02305  G 02231 B
1108            SAR    AJ&5                                             7  02312  G 02231 A
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PGLIN   LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1109              B      AJ                                                7  02319  J 02226
1110    AO        CW     AK&1                 RESET NOP/BR SWITCH          6  02326  ¤ 02234
1111              SAR    AJ&5                 RESTORE I-ADDR OF AJ         7  02332  G 02231 A
1112              SW     1                    SET WM BACK IN LOC 00001     6  02339  , 00001
1113    ************************************************************
1114    *
1115    * ROUTINE 07.00   CHECK OPERATION OF BRANCH BIT EQUAL INSTRUCTION
1116    *
1117    * SUB-RTN 07.01
1118              BBE    AP,*,1               SHOULD BRANCH               12  02345  W 02358 02356 1
1119              H                                                         1  02357  .
1120    *                                TO LOOP.  FIX BEFORE PROCEEDING.
1121    * SUB-RTN 07.02
1122    AP        BBE    *&8,AQ&11,1          SHOULD NOT BRANCH           12  02358  W 02377 02389 1
1123              B      AQ                                                7  02370  J 02378
1124              H                                                         1  02377  .
1125    * SUB-RTN 07.03
1126    AQ        BBE    *&8,AP&11,L          SHOULD NOT BRANCH           12  02378  W 02397 02369 L
1127              B      AR                                                7  02390  J 02398
1128              H                                                         1  02397  .
1129    * SUB-RTN 07.04
1130    AR        BBE    AU,*,2               SHOULD BRANCH               12  02398  W 02411 02409 2
1131              H                                                         1  02410  .
1132    * SUB-RTN 07.05
1133    AU        BBE    *&8,AX&11,2          SHOULD NOT BRANCH           12  02411  W 02430 02442 2
1134              B      AX                                                7  02423  J 02431
1135    AW        H                                                        1  02430  .
1136    * SUB-RTN 07.06
1137    AX        BBE    *&8,AU&11,L          SHOULD NOT BRANCH           12  02431  W 02450 02422 L
1138              B      BA                                                7  02443  J 02451
1139    AZ        H                                                        1  02450  .
1140    * SUB-RTN 07.07
1141    BA        BBE    BD,*,4               SHOULD BRANCH               12  02451  W 02464 02462 4
1142    BC        H                                                        1  02463  .
1143    * SUB-RTN 07.08
1144    BD        BBE    *&8,BG&11,4          SHOULD NOT BRANCH           12  02464  W 02483 02495 4
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PGLIN  LABEL      OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1145              B      BG                                7  02476  J 02484
1146   BF         H                                        1  02483  .
1147   * SUB-RTN 07.09
1148   BG         BBE    *&8,BD&11,.   SHOULD NOT BRANCH  12  02484  W 02503 02475 .
1149              B      BJ                                7  02496  J 02504
1150   BI         H                                        1  02503  .
1151   * SUB-RTN 07.10
1152   BJ         BBE    BM,*,8        CHOULD BRANCH      12  02504  W 02517 02515 8
1153   BL         H                                        1  02516  .
1154   * SUB-RTN 07.11
1155   BM         BBE    *&8,BP&11,8   SHOULD NOT BRANCH  12  02517  W 02536 02548 8
1156              B      BP                                7  02529  J 02537
1157   BO         H                                        1  02536  .
1158   * SUB-RTN 07.12
1159   BP         BBE    *&8,BM&11,G   SHOULD NOT BRANCH  12  02537  W 02556 02528 G
1160              B      BS                                7  02549  J 02557
1161   BR         H                                        1  02556  .
1162   * SUB-RTN 07.13
1163   BS         BBE    BV,*,#        SHOULD BRANCH      12  02557  W 02570 02568 #
1164   BU         H                                        1  02569  .
1165   * SUB-RTN 07.14
1166   BV         BBE    *&8,BY&11,8S  SHOULD NOT BRANCH  12  02570  W 02589 02601 8S
1167              B      BY                                7  02582  J 02590
1168   BX         H                                        1  02589  .
1169   * SUB-RTN 07.15
1170   BY         BBE    *&8,BV&11,LD  SHOULD NOT BRANCH  12  02590  W 02609 02581 LD
1171              B      CB                                7  02602  J 02610
1172   CA         H                                        1  02609  .
1173   * SUB-RTN 07.16
1174   CB         BBE    CE,*,-        SHOULD BRANCH      12  02610  W 02623 02621 -
1175   CD         H                                        1  02622  .
1176   * SUB-RTN 07.17
1177   CE         BBE    *&8,CH&11,-   SHOULD NOT BRANCH  12  02623  W 02642 02654 -
1178              B      CH                                7  02635  J 02643
1179   CG         H                                        1  02642  .
1180   * SUB-RTN 07.18
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1181      CH         BBE    *&8,CE&11,SM             SHOULD NOT BRANCH 12  02643  W 02662 02634 SM
1182                 B      CK                                        7  02655  J 02663
1183      CJ         H                                                1  02662  .
1184      * SUB-RTN 07.19
1185      CK         BBE    *&8,*,                   SHOULD NOT BRANCH 12  02663  W 02682 02674
1186                 B      CN                                        7  02675  J 02683
1187      CM         H                                                1  02682  .
1188      * SUB-RTN 07.20
1189      CN         BBE    *&8,CQ&11,               SHOULD NOT BRANCH 12  02683  W 02702 02714
1190                 B      CQ                                        7  02695  J 02703
1191      CP         H                                                1  02702  .
1192      * SUB-RTN 07.21
1193      CQ         BBE    *&8,CN&11,CM             SHOULD NOT BRANCH 12  02703  W 02722 02694 GM
1194                 B      CA                                        7  02715  J 02723
1195      CS         H                                                1  02722  .
1196      ****************************************************************
1197      *
1198      * ROUTINE 08.00   CHECK OPERATION OF BRANCH ZONE & BRANCH WM/ZONE
1199      *
1200      * SUB-RTN 08.01
1201      CA         BZN    DD,TPMK,                 SHOULD BRANCH     12  02723  V 02736 09017 2
1202      CC         H                                                1  02735  .
1203      * SUB-RTN 08.02
1204      CD         BZN    *&8,QUOT,                SHOULD NOT BRANCH 12  02736  V 02755 09032 2
1205                 B      DG                                        7  02748  J 02756
1206      CF         H                                                1  02755  .
1207      * SUB-RTN 08.03
1208      CG         BZN    *&8,DELT,                SHOULD NOT BRANCH 12  02756  V 02775 09048 2
1209                 B      CJ                                        7  02768  J 02776
1210      CI         H                                                1  02775  .
1211      * SUB-RTN 08.04
1212      CJ         BZN    *&8,GPMK,                SHOULD NOT BRANCH 12  02776  V 02795 09064 2
1213                 B      CM                                        7  02788  J 02796
1214      CL         H                                                1  02795  .
1215      * SUB-RTN 08.05
1216      CM         BZN    CP,QUOT,*                SHOULD BRANCH     12  02796  V 02809 09032 S
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PGLIN     LABEL     CC01 OPCOD  CPU TEST OPERAND                                  CT  ADDRS  CC01 INSTRUCTION
1217      CO        H                                                             1  02808  .
1218      * SUB-RTN 08.06
1219      CP        BZN         *&8,TPMK,*        SHOULD NOT BRANCH               12  02809  V 02828 09017 S
1220                B           DS                                                7  02821  J 02829
1221      CR        H                                                             1  02828  .
1222      * SUB-RTN 08.07
1223      DS        BZN         *&8,DELT,*        SHOULD NOT BRANCH               12  02829  V 02848 09048 S
1224                B           DV                                                7  02841  J 02849
1225      DU        H                                                             1  02848  .
1226      * SUB-RTN 08.08
1227      DV        BZN         *&8,GPMK,*        SHOULD NOT BRANCH               12  02849  V 02868 09064 S
1228                B           DY                                                7  02861  J 02869
1229      DX        H                                                             1  02868  .
1230      * SUB-RTN 08.09
1231      DY        BZN         EB,DELT,-         SHOULD BRANCH                   12  02869  V 02882 09048 K
1232      EA        H                                                             1  02881  .
1233      * SUB-RTN 08.10
1234      EB        BZN         *&8,TPMK,-        SHOULD NOT BRANCH               12  02882  V 02901 09017 K
1235                B           EE                                                7  02894  J 02902
1236      ED        H                                                             1  02901  .
1237      * SUB-RTN 08.11
1238      EE        BZN         *&8,QUOT,-        SHOULD NOT BRANCH               12  02902  V 02921 09032 K
1239                B           EH                                                7  02914  J 02922
1240      EG        H                                                             1  02921  .
1241      * SUB-RTN 08.12
1242      EH        BZN         *&8,GPMK,-        SHOULD NOT BRANCH               12  02922  V 02941 09064 K
1243                B           EK                                                7  02934  J 02942
1244      EJ        H                                                             1  02941  .
1245      * SUB-RTN 08.13
1246      EK        BZN         EN,GPMK,&         SHOULD BRANCH                   12  02942  V 02955 09064 B
1247      EM        H                                                             1  02954  .
1248      * SUB-RTN 08.14
1249      EN        BZN         *&8,TPMK,&        SHOULD NOT BRANCH               12  02955  V 02974 09017 B
1250                B           EQ                                                7  02967  J 02975
1251      EP        H                                                             1  02974  .
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PGLIN     LABEL      OPCOD  OPERAND                                                CT  ADDRS  INSTRUCTION
1252      * SUB-RTN 08.15
1253      EQ         BZN    *&8,QUOT,&          SHOULD NOT BRANCH                  12  02975  V 02994 09032 B
1254                 B      ET                                                      7  02987  J 02995
1255      ES         H                                                              1  02994  .
1256      * SUB-RTN 08.16
1257      ET         BZN    *&8,DELT,&          SHOULD NOT BRANCH                  12  02995  V 03014 09048 B
1258                 B      EW                                                      7  03007  J 03015
1259      EV         H                                                              1  03014  .
1260      * SUB-RTN 08.17
1261      EW         BWZ    *&8,GPMK,           SHOULD NOT BRANCH                  12  03015  V 03034 09064 3
1262                 B      EZ                                                      7  03027  J 03035
1263      EY         H                                                              1  03034  .
1264      * SUB-RTN 08.18
1265      EZ         BWZ                        OPCODE     . SHOULD                1  03035  V
1266                 DC     FB                  I-ADDRESS  . NOT                   5  03040  03054
1267                        GMbM                B-ADDRESS  . BRANCH                5  03045  09071
1268                        ▫▫▫                 D-MODIFIER .                       1  03046
1269                 B      *&2                 SHOULD BRANCH                      7  03047  J 03055
1270      FB         H                                                              1  03054  .
1271      *
1272      * SUB-RTN 10.12   LONG ADD & SUBTRACT USING ALL DIGITS
1273      HO         ZS     &54321,WORK4-5      WORK4 SHOULD BE  5432J.....  NOW   11  03055  , 09542 09166
1274                 ZS     WORK4-5,WORK4       WORK4 SHOULD BE  000005432A  NOW   11  03066  , 09166 09171
1275                 A      &9876,WORK4-5       WORK4 SHOULD BE  098765432A  NOW   11  03077  A 09546 09166
1276                 A      &123,WORK4-5        WORK4 SHOULD BE  099995432A  NOW   11  03088  A 09549 09166
1277                 A      &45679,WORK4        WORK4 SHOULD BE  100000006&  NOW   11  03099  A 09554 09171
1278                 BZ     HP                  SHOULD NOT BRANCH                  7   03110  J 03219 V
1279                 SW     WORK4-8                                                6   03117  , 09163
1280                 ZS     WORK4               TEST LOWER 9 POS OF WORK4 FOR ZRO  6   03123  , 09171
1281                 CW     WORK4-8                                                6   03129  ▫ 09163
1282                 BZ     *&8                 SHOULD BRANCH                      7   03135  J 03149 V
1283                 B      HP                                                     7   03142  J 03219
1284                 S      &123,WORK4-5        WORK4 SHOULD BE  098770000-  NOW   11  03149  S 09549 09166
1285                 S      -45679,WORK4        WORK4 SHOULD BE  098765432J  NOW   11  03160  S 09559 09171
1286                 S      &9876,WORK4-5       WORK4 SHOULD BE  000005432J  NOW   11  03171  S 09546 09166
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PGLIN     LABEL        OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1287                   S      -54321,WORK4       WORK4 SHOULD BE  000000000- NOW  11  03182  S 09564 09171
1288                   BZ     *&8                SHOULD BRANCH                    7  03193  J 03207 V
1289                   B      HP                                                  7  03200  J 03219
1290                   BZN    HQ,WORK4,-         WILL BRANCH IF ZONED CORRECTLY  12  03207  V 03220 09171 K
1291      HP           H                                                          1  03219  .
1292      * SUB-RTN 10.13  CK B-FIELD ZONE RETENTION & SIGN CHANGE
1293      HQ           SW     WORK5              PROTECT HI-ORDER FIELD OF WORK5  6  03220  ; 09175
1294                   ZA     -1,WORK5           INSURE ZONED NEGATIVELY         11  03226  M 09565 09175
1295                   CW     WORK5              REMOVE WM                        6  03237  u 09175
1296                   S      WORK5              ZERO OUT WORK5 FIELD             6  03243  S 09175
1297                   BZN    *&8,WORK5,-        . INSURE                        12  03249  V 03268 09175 K
1298                   B      HR                 . THAT                           7  03261  J 03435
1299                   BZN    *&8,WORK5-1,*      . ZONES                         12  03268  V 03287 09174 S
1300                   B      HR                 . ARE                            7  03280  J 03435
1301                   BZN    *&8,WORK5-2,       . RETAINED                      12  03287  V 03306 09173 2
1302                   B      HR                 . FOLLOWING                      7  03299  J 03435
1303                   BZN    *&8,WORK5-3,&      . SINGLE-FIELD                  12  03306  V 03325 09172 B
1304                   B      HR                 . SUBTRACT                       7  03318  J 03435
1305                   A      @9RIY@,WORK5                                       11  03325  A 09569 09175
1306                   BZN    *&8,WORK5,&        . CHECK                         12  03336  V 03355 09175 B
1307                   B      HR                 . SIGN                           7  03348  J 03435
1308                   BZN    *&8,WORK5-1,*      . CHANGE                        12  03355  V 03374 09174 S
1309                   B      HR                 . AND                            7  03367  J 03435
1310                   BZN    *&8,WORK5-2,       . ZONE                          12  03374  V 03393 09173 2
1311                   B      HR                 . RETENTION                      7  03386  J 03435
1312                   BZN    *&8,WORK5-3,&      . FOLLOWING                     12  03393  V 03412 09172 B
1313                   B      HR                 . ADD                            7  03405  J 03435
1314                   S      FIVE9S-1,WORK5     SHOULD CHANGE SIGN BACK TO MINUS 11  03412  S 09252 09175
1315                   BZN    *&2,WORK5,-        SHOULD BRANCH                   12  03423  V 03436 09175 K
1316      HR           H                                                          1  03435  .
1317      ************************************************************************
1318      *
1319      * ROUTINE 11.00  CHECK OPERATION CLEAR STORAGE
1320      *
1321      * SUB-RTN 11.01  CK CS 0000C FOR NO ERR & PROPER SETTINGS AAR, BAR
```

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PGLIN     LABEL      OPCOD  OPERANC                                    CT  ADDRS  INSTRUCTION
1322      HW         CS     0                                           6  03436  / 00000
1323                 SBR    HOLDB1-1                                    7  03442  G 09185 B
1324                 SAR    HOLDA1                                      7  03449  G 09181 A
1325                 A      &0,HOLDA1          CHECK SETTING OF AAR    11  03456  A 09570 09181
1326                 BZ     *&8                SHOULD BRANCH            7  03467  J 03481 V
1327                 B      HX                                          7  03474  J 03499
1328                 S      FIVE9S,HOLDB1-1    CHECK SETTING BAR       11  03481  S 09253 09185
1329                 BZ     HY                 SHOULD BRANCH            7  03492  J 03500 V
1330      HX         H                                                  1  03499  .
1331      * SUB-RTN 11.02   CHECK PROPER OPERATION CLEAR STORAGE
1332      HY         SW     HZ&9               . INITIALIZE B-FIELD     6  03500  , 03671
1333                 S      HZ&10              . OF BBE INSTRUCTION     6  03506  S 03672
1334                 A      FIVE9S-3,HZ&10     . WHICH FOLLOWS         11  03512  A 09250 03672
1335                 CW     HZ&9               .                        6  03523  ¤ 03671
1336                 SW     201,251                                    11  03529  , 00201 00251
1337                 CS     299                TRY TO CLEAR 00299 - 00200  6  03540  / 00299
1338                 BW     JA,251             SHOULD NOT BRANCH       12  03546  V 03711 00251 1
1339                 BW     JA,201             SHOULD NOT BRANCH       12  03558  V 03711 00201 1
1340                 SW     201,301            PLACE TWO WMS           11  03570  , 00201 00301
1341                 ZA     &7,201             PUT B-A-4-2-1 BITS IN LOC 00201  11  03581  QM 09571 00201
1342                 ZA     &8,301                                     11  03592  QM 09572 00301
1343                 CW     301,300                                    11  03603  ¤ 00301 00300
1344                 ZA     301,300            FILL 00201 - 00299 WITH EIGHTS  11  03614  QM 00301 00300
1345                 BBE    JA,201,G           SHOULD NOT BRANCH       12  03625  W 03711 00201 G
1346                 BBE    *&8,201,8          SHOULD BRANCH           12  03637  W 03656 00201 8
1347                 B      JA                                          7  03649  J 03711
1348                 CS     299                TRY TO CLEAR THE EIGHTS  6  03656  / 00299
1349      HZ         BBE    JA,299,GM          BRANCH IF ANY BITS AT ALL  12  03662  W 03711 00299 GM
1350                 SW     HZ&9                                        6  03674  , 03671
1351                 S      &1,HZ&10                                   11  03680  S 09573 03672
1352                 CW     HZ&9                                        6  03691  ¤ 03671
1353                 BZ     JB                 LEAVE ROUTINE IF NO ERROR  7  03697  J 03712 V
1354                 B      HZ                                          7  03704  J 03662
1355      JA         H                                                  1  03711  .
1356      *
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

1357      * SUB-RTN 11.03   CHECK CLEAR STORAGE & BRANCH
1358      *
1359      JB         SW     100              . PUT SOME DATA          6  03712  , 00100
1360                 ZA     &7,100           . IN LOC 00100          11  03718  QM 09571 00100
1361                 CS     JD,100           CLEAR LOC 00100, SKIP NEXT INSTR 11  03729  / 03747 00100
1362      JC         B      JE                                        7  03740  J 03816
1363      JD         SAR    HOLDA1                                    7  03747  G 09181 A
1364                 SBR    HOLDB1                                    7  03754  G 09186 B
1365                 BBE    JE,100,M         SHOULD NOT BRANCH       12  03761  W 03816 00100 GM
1366                 S      &JC,HOLDA1                               11  03773  S 09578 09181
1367                 BZ     *&8              SHOULD BRANCH            7  03784  J 03798 V
1368                 B      JE                                        7  03791  J 03816
1369                 S      &JC,HOLDB1                               11  03798  S 09583 09186
1370                 BZ     JF               SHOULD EXIT HERE         7  03809  J 03817 V
1371      JE         H                                                1  03816  .
1372      ************************************************************
1373      *
1374      * ROUTINE 12.00   INITIALIZE PASS COUNT WORK AREA & LOCATION 00001
1375      *
1376      JF         NOPWM                                            1  03817  N
1377                 B      *&18             SKIP NEXT TWO INSTRS WHEN SET  7  03818  J 03842
1378                 SW     *-12                                      6  03825  , 03818
1379                 ZA     PCC,PCCWK                                11  03831  QM 09191 09196
1380                 CS     99                                        6  03842  / 00099
1381                 SW     1,8                                      11  03848  , 00001 00008
1382                 A      &RESET,6                                 11  03859  A 09588 00006
1383                 S      &1,1                                     11  03870  S 09573 00001
1384      ************************************************************
1385      *
1386      * ROUTINE 13.00   CHECK ADDRESSING BY INDEXING
1387      *
1388      * SUB-RTN 13.01
1389      JG         SW     X1-4             WM OVER HI-ORDER DIGIT IX REG 1  6  03881  , 00025
1390                 ZA     *,X1                                     11  03887  QM 03897 00029
1391                 S      X1,0&X1          B-ADDR INDEXED BY IX REG 1  11  03898  S 00029 000#0
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PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND		CT	ADDRS	CC01 INSTRUCTION
1392		BZ	JH&X1	SHOULD BRANCH	7	03909	J 039?7 V
1393		H			1	03916	.
1394	* SUB-RTN 13.02						
1395	JH	SW	X2-4		6	03917	; 00030
1396		ZA	*,X2		11	03923	M 03933 00034
1397		S	X2,0&X2		11	03934	S 00034 000.0
1398		BZ	JI&X2	SHOULD BRANCH	7	03945	J 039N3 V
1399		H			1	03952	.
1400	* SUB-RTN 13.03						
1401	JI	SW	X3-4		6	03953	; 00035
1402		ZA	*,X3		11	03959	M 03969 00039
1403		S	X3,0&X3		11	03970	S 00039 000M0
1404		BZ	JJ&X3	SHOULD BRANCH	7	03981	J 039H9 V
1405		H			1	03988	.
1406	* SUB-RTN 13.04						
1407	JJ	SW	X4-4		6	03989	; 00040
1408		ZA	*,X4		11	03995	M 04005 00044
1409		S	X4,0&X4		11	04006	S 00044 00*00
1410		BZ	JK&X4	SHOULD BRANCH	7	04017	J 04*25 V
1411		H			1	04024	.
1412	* SUB-RTN 13.05						
1413	JK	SW	X5-4		6	04025	; 00045
1414		ZA	*,X5		11	04031	M 04041 00049
1415		S	X5,0&X5		11	04042	S 00049 00**0
1416		BZ	JL&X5	SHOULD BRANCH	7	04053	J 04*W1 V
1417		H			1	04060	.
1418	* SUB-RTN 13.06						
1419	JL	SW	X6-4		6	04061	; 00050
1420		ZA	*,X6		11	04067	M 04077 00054
1421		S	X6,0&X6		11	04078	S 00054 00*.0
1422		BZ	JM&X6	SHOULD BRANCH	7	04089	J 04*R7 V
1423		H			1	04096	.
1424	* SUB-RTN 13.07						
1425	JM	SW	X7-4		6	04097	; 00055
1426		ZA	*,X7		11	04103	M 04113 00059

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                    CC01  CPU TEST                                                    CC01
PGLIN     LABEL     OPCOD OPERAND                                    CT  ADDRS  INSTRUCTION
1427                S     X7,0&X7                                    11  04114  S 00059 00‡MQ0
1428                BZ    JN&X7          SHOULD BRANCH                7  04125  J 04/C3 V
1429                H                                                 1  04132  .
1430      * SUB-RTN 13.08
1431      JN        SW    X8-4                                        6  04133  ,Q 00060
1432                ZA    *,X8                                       11  04139  M 04149 00064
1433                S     X8,0&X8                                    11  04150  S 00064 00'.00
1434                BZ    JP&X8          SHOULD BRANCH                7  04161  J 04J69 V
1435                H                                                 1  04168  .
1436      * SUB-RTN 13.09
1437      JP        SW    X9-4                                        6  04169  ,Q 00065
1438                ZA    *,X9                                       11  04175  M 04185 00069
1439                S     X9,0&X9                                    11  04186  S 00069 00'.‡0
1440                BZ    JQ&X9          SHOULD BRANCH                7  04197  J 04K‡5 V
1441                H                                                 1  04204  .
1442      * SUB-RTN 13.10
1443      JQ        SW    X1C-4                                       6  04205  ,Q 00070
1444                ZA    *,X10                                      11  04211  M 04221 00074
1445                S     X1C,0&X1C                                  11  04222  S 00074 00''.0
1446                BZ    JR&X10         SHOULD BRANCH                7  04233  J 04KM1 V
1447                H                                                 1  04240  .
1448      * SUB-RTN 13.11
1449      JR        SW    X11-4                                       6  04241  ,Q 00075
1450                ZA    *,X11                                      11  04247  M 04257 00079
1451                S     X11,0&X11                                  11  04258  S 00079 00'Q.M0
1452                BZ    JS&X11         SHOULD BRANCH                7  04269  J 04KG7 V
1453                H                                                 1  04276  .
1454      * SUB-RTN 13.12
1455      JS        SW    X12-4                                       6  04277  ,Q 00080
1456                ZA    *,X12                                      11  04283  M 04293 00084
1457                S     X12,0&X12                                  11  04294  S 00084 00MQ00
1458                BZ    JT&X12         SHOULD BRANCH                7  04305  J 04C13 V
1459                H                                                 1  04312  .
1460      * SUB-RTN 13.13
1461      JT        SW    X13-4                                       6  04313  ,Q 00085
1462                ZA    *,X13                                      11  04319  M 04329 00089
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1463                 S      X13,0&X13                                        11  04330  S 00089 00M*0
1464                 BZ     JU&X13              SHOULD BRANCH                 7  04341  J 04CU9 V
1465                 H                                                        1  04348  .
1466      * SUB-RTN 13.14
1467      JU         SW     X14-4                                            6  04349  , 00090
1468                 ZA     *,X14                                           11  04355  M 04365 00094
1469                 S      X14,0&X14                                       11  04366  S 00094 00M.0
1470                 BZ     JV&X14              SHOULD BRANCH                 7  04377  J 04CQ5 V
1471                 H                                                        1  04384  .
1472      * SUB-RTN 13.15
1473      JV         SW     X15-4                                            6  04385  , 00095
1474                 ZA     *,X15                                           11  04391  M 04401 00099
1475                 S      X15,0&X15                                       11  04402  S 00099 00MM0
1476                 BZ     KF01&X15            SHOULD BRANCH                 7  04413  J 04DB1 V
1477                 H                                                        1  04420  .
1478      ************************************************************************
1479      *
1480      * ROUTINE 15.00   CHECK OPERATION OF BRANCH CHARACTER EQUAL
1481      *
1482      * SUB-RTN 15.01   COMPARE D-MOD 9 WITH B-FLD @ FOR LO COMPARE
1483      *                 ANC NO BRANCH.  CHECK AAR & BAR SETTINGS
1484      KF01       BCE    KF02,ATSIGN,9       SHOULD NOT BRANCH            12  04421  B 04504 09087 9
1485                 SAR    HOLDA2                                           7  04433  G 09181 A
1486                 SBR    HOLDB2                                           7  04440  G 09186 B
1487                 BL     *&8                 SHOULD BRANCH                7  04447  J 04461 T
1488                 B      KF02                                             7  04454  J 04504
1489                 S      &KF02,HOLDA2                                    11  04461  S 09593 09181
1490                 BZ     *&8                 SHOULD BRANCH                7  04472  J 04486 V
1491                 B      KF02                                             7  04479  J 04504
1492                 S      &POUND,HOLDB2       ADDR OF POUND IS ADDR OF ATSIGN-1 11 04486 S 09598 09186
1493                 BZ     KF03                SHOULD BRANCH                7  04497  J 04505 V
1494      KF02       H                                                        1  04504  .
1495      * SUB-RTN 15.02   COMPARE D-MOD AT SIGN WITH B-FLD NINE
1496      *                 FOR HI COMPARE AND NO BRANCH.
1497      KF03       BCE    KF04,NINE,@         SHOULD NOT BRANCH            12  04505  B 04538 09129 @
1498                 BH     *&8                 SHOULD BRANCH                7  04517  J 04531 U
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1499                 B      *&8                                       7  04524  J 04538
1500                 BF     KFC5                SHOULD BRANCH         7  04531  J 04539 U
1501      KF04       H                                                1  04538  .
1502      * SUB-RTN 15.03   COMPARE D-MOD AMPERSAND W/B-FLD AMPERSAND FOR
1503      *                 EQ COMPARE AND BRANCH.  CHECK AAR & BAR SETTINGS
1504      KF05       BCE    KF07,AMPSND,&       SHOULD BRANCH        12  04539  B 04558 09072 &
1505      KF06       B      KF08                                      7  04551  J 04636
1506      KF07       SAR    HOLDA2                                    7  04558  G 09181 A
1507                 SBR    HOLDB2                                    7  04565  G 09186 B
1508                 BU     KF08                SHOULD NOT BRANCH     7  04572  J 04636 /
1509                 BE     *&8                 SHOULD BRANCH         7  04579  J 04593 S
1510                 B      KFC8                                      7  04586  J 04636
1511                 S      &KF07,HOLDA2                             11  04593  S 09603 09181
1512                 BZ     *&8                                       7  04604  J 04618 V
1513                 B      KFC8                                      7  04611  J 04636
1514                 S      &KF06,HOLDB2                             11  04618  S 09608 09186
1515                 BZ     KG                  SHOULD BRANCH & EXIT  7  04629  J 04637 V
1516      KF08       H                                                1  04636  .
1517      ************************************************************************
1518      *
1519      * ROUTINE 16.00   CHECK CERTAIN MOVE OPCODES PREPARATORY TO COMPARE
1520      *
1521      * SUB-RTN 16.01   CHECK SCNLS FOR STEPPING AAR, BAR ONE POSITION
1522      KG         CS     103                                       6  04637  / 00103
1523                 SCNLS  102,103                                  12  04643  D 00102 00103
1524                 SAR    HOLDA2                                    7  04655  G 09181 A
1525                 SBR    HOLDB2                                    7  04662  G 09186 B
1526                 S      @0C101@,HOLDA2                           11  04669  S 09613 09181
1527                 BZ     *&8                 SHOULD BRANCH         7  04680  J 04694 V
1528                 B      KH                                        7  04687  J 04712
1529                 S      @0C102@,HOLDB2                           11  04694  S 09618 09186
1530                 BZ     KI                  SHOULD BRANCH         7  04705  J 04713 V
1531      KH         H                                                1  04712  .
1532      * SUB-RTN 16.02   CHECK MLNS FOR CORRECT OPERATION
1533      KI         CS     101                                       6  04713  / 00101
1534                 SW     10C                                       6  04719  , 00100
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PGLIN    LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1535                ZA     MINUS7,101        PUT 8-4-2-1 BITS IN LOC 00101  11  04725  M 09108 00101
1536                MLNS   WYE,101                                  12  04736  D 09118 00101 1
1537                BBE    KJ,101,X          SHOULD NOT BRANCH      12  04748  W 04803 00101 X
1538                BW     KJ,101            SHOULD NOT BRANCH      12  04760  V 04803 00101 1
1539                BBE    *&8,101,-         SHOULD BRANCH          12  04772  W 04791 00101 -
1540                B      KJ                                        7  04784  J 04803
1541                BBE    KK,101,8          EXIT HERE              12  04791  W 04804 00101 8
1542     KJ         H                                                1  04803  .
1543     * SUB-RTN 16.03   CHECK MLZS FOR CORRECT OPERATION
1544     KK         CS     101                                       6  04804  / 00101
1545                SW     100                                       6  04810  , 00100
1546                ZA     MINUS8,101        PUT 8-8 BITS IN LOC 00101  11  04816  M 09109 00101
1547                MLZS   EKS,101                                  12  04827  D 09117 00101 2
1548                BBE    KL,101,P          SHOULD NOT BRANCH      12  04839  W 04894 00101 P
1549                BW     KL,101            SHOULD NOT BRANCH      12  04851  V 04894 00101 1
1550                BBE    *&8,101,8         SHOULD BRANCH          12  04863  W 04882 00101 8
1551                B      KL                                        7  04875  J 04894
1552                BBE    KM,101,*                                 12  04882  W 04895 00101 *
1553     KL         H                                                1  04894  .
1554     * SUB-RTN 16.04   CHECK MLCS FOR CORRECT OPERATION
1555     KM         CS     101                                       6  04895  / 00101
1556                SW     100                                       6  04901  , 00100
1557                ZA     MINUS0,101        PUT 8-8-2 BITS IN LOC 00101  11  04907  M 09101 00101
1558                MLCS   VEE,101                                  12  04918  D 09115 00101 3
1559                BW     KN,101            SHOULD NOT BRANCH      12  04930  V 05004 00101 1
1560                BBE    KN,101,.          SHOULD NOT BRANCH      12  04942  W 05004 00101 .
1561                BBE    *&8,101,1         SHOULD BRANCH          12  04954  W 04973 00101 1
1562                B      KN                                        7  04966  J 05004
1563                BBE    *&8,101,4         SHOULD BRANCH          12  04973  W 04992 00101 4
1564                B      KN                                        7  04985  J 05004
1565                BBE    KR,101,*          SHOULD EXIT HERE       12  04992  W 05005 00101 *
1566     KN         H                                                1  05004  .
1567     **********************************************************************
1568     *
1569     * ROUTINE 17.00   CHECK COMPARE OPCOD USING SINGLE CHARACTERS
1570     *
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1571      *                 THIS ROUTINE COMPARES ALL SIXTY-FOUR LEGITIMATE
1572      *                 CHARACTERS WITH ONE ANOTHER AND INSURES THAT ALL
1573      *                 IDENTICAL CHARACTERS COMPARE EQUAL, THAT NO
1574      *                 CHARACTER COMPARES EQUAL TO ANY CHARACTER EXCEPT
1575      *                 ITSELF, AND THAT THE COLLATING SEQUENCE IS PROPER
1576      *
1577      *                 BEGIN BY USING SIMPLEST COMPARISONS TO VERIFY
1578      *                 CORRECT OPERATION OF BRANCH HI, LO, EQ, UNEQUAL
1579      *
1580      * SUB-RTN 17.01   COMPARE A-FLD 9 WITH B-FLD @ FOR LO COMPARE
1581      KR          C     NINE,ATSIGN                                      11  05005  C 09129 09087
1582                  BE    KS                  SHOULD NOT BRANCH             7  05016  J 05051 S
1583                  BU    *&8                 SHOULD BRANCH                 7  05023  J 05037 /
1584                  B     KS                                                7  05030  J 05051
1585                  BH    *&8                 SHOULD NOT BRANCH             7  05037  J 05051 U
1586                  BL    KT                  SHOULD BRANCH                 7  05044  J 05052 T
1587      KS          H                                                       1  05051  *
1588      * SUB-RTN 17.02   COMPARE A-FLD @ WITH B-FLD 9 FOR HI COMPARE
1589      KT          C     ATSIGN,NINE                                      11  05052  C 09087 09129
1590                  BE    KU                  SHOULD NOT BRANCH             7  05063  J 05098 S
1591                  BU    *&8                 SHOULD BRANCH                 7  05070  J 05084 /
1592                  B     KU                                                7  05077  J 05098
1593                  BL    KU                  SHOULD NOT BRANCH             7  05084  J 05098 T
1594                  BH    KV                  SHOULD BRANCH                 7  05091  J 05099 U
1595      KU          H                                                       1  05098  *
1596      * SUB-RTN 17.03   COMPARE AMPERSAND WITH AMPERSAND FOR EQ COMPARE
1597      KV          C     AMPSND,AMPSND                                    11  05099  C 09072 09072
1598                  BU    KW                  SHOULD                        7  05110  J 05138 /
1599                  BH    KW                   NOT                          7  05117  J 05138 U
1600                  BL    KW                     BRANCH                     7  05124  J 05138 T
1601                  BE    *&2                 SHOULD BRANCH                 7  05131  J 05139 S
1602      KW          H                                                       1  05138  *
1603      ************************************************************************
1604      * ROUTINE 19.00   CHECK OPERATION OF DATA MOVE INSTRUCTION
1605      *
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PGLIN     LABEL      OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION

1606      * SUB-RTN 19.01   CHECK SCNLS FOR MOVE NO DATA
1607      LK         MLCS   NWM63,WORK6                                12  05139  D 09064 09176 3
1608                 SW     WORK6                                      6  05151  , 09176
1609                 SCNLS  NWM00,WORK6                                12  05157  D 09002 09176
1610                 C      ALLBIT,WORK6                               11  05169  C 09071 09176
1611                 BE     LL                 SHOULD BRANCH           7  05180  J 05188 S
1612                 H                                                 1  05187  .
1613      * SUB-RTN 19.02   CHECK MLNS FOR MOVE NUMERIC, NO ZONES, NO WM
1614      LL         MLCS   NWM62,WORK6                                12  05188  D 09063 09176 3
1615                 SW     WORK6                                      6  05200  , 09176
1616                 MLNS   NWM01,WORK6                                12  05206  D 09003 09176 1
1617                 C      AYE,WORK6                                  11  05218  C 09092 09176
1618                 BE     LM                 SHOULD BRANCH           7  05229  J 05237 S
1619                 H                                                 1  05236  .
1620      * SUB-RTN 19.03   CHECK MLZS FOR MOVE ZONES, NO NUMERIC, NO WM
1621      LM         MLCS   NWM31,WORK6                                12  05237  D 09032 09176 3
1622                 SW     WORK6                                      6  05249  , 09176
1623                 MLZS   NWM32,WORK6                                12  05255  D 09033 09176 2
1624                 C      DELTA,WORK6                                11  05267  C 09077 09176
1625                 BE     LN                 SHOULD BRANCH           7  05278  J 05286 S
1626                 H                                                 1  05285  .
1627      * SUB-RTN 19.04   CHECK MLCS FOR MOVE NUMERIC, ZONE, NO WM
1628      LN         MLNS   NWM25,WORK6                                12  05286  D 09027 09176 1
1629                 MLZS   NWM25,WORK6                                12  05298  D 09027 09176 2
1630                 SW     WORK6                                      6  05310  , 09176
1631                 MLCS   NWM38,WORK6                                12  05316  D 09039 09176 3
1632                 C      OH,WORK6                                   11  05328  C 09107 09176
1633                 BE     LP                 SHOULD BRANCH           7  05339  J 05347 S
1634                 H                                                 1  05346  .
1635      * SUB-RTN 19.05   CHECK MLWS FOR MOVE WM, NO ZONE, NO NUMERIC
1636      LP         MLCS   NWM63,WORK6                                12  05347  D 09064 09176 3
1637                 CW     WORK6                                      6  05359  ¤ 09176
1638                 MLWS   BLANK,WORK6                                12  05365  D 09066 09176 4
1639                 C      ALLBIT,WORK6                               11  05377  C 09071 09176
1640                 BE     LQ                 SHOULD BRANCH           7  05388  J 05396 S
1641                 H                                                 1  05395  .
1642      * SUB-RTN 19.06   CHECK MLNWS FOR MOVE NUMERIC, WM, NO ZONE
1643      LQ         MLCS   NWM54 WORK6                                12  05396  D 09056 09176 3
1644                 A      WORK6                                      6  0 08   A 0917
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1645                MLNWS   NINE,WORK6                                      12  05414  D 09129 09176 5
1646                C       EYE,WORK6                                       11  05426  C 09100 09176
1647                BE      LR                  SHOULD BRANCH                7  05437  J 05445 S
1648                H                                                        1  05444  .
1649      * SUB-RTN 19.07   CHECK MLZWS FOR MOVE ZONE, WM, NO NUMERIC
1650      LR        MLCS    NWM31,WORK6                                     12  05445  D 09032 09176 3
1651                CW      WORK6                                            6  05457  ¤ 09176
1652                MLZWS   DASH,WORK6                                      12  05463  D 09078 09176 6
1653                C       DELTA,WORK6                                     11  05475  C 09077 09176
1654                BE      LS                  SHOULD BRANCH                7  05486  J 05494 S
1655                H                                                        1  05493  .
1656      * SUB-RTN 19.08   CHECK MLCWS FOR MOVE CHARACTER AND WORD MARK
1657      LS        MLCS    NWM00,WORK6                                     12  05494  D 09002 09176 3
1658                CW      WORK6                                            6  05506  ¤ 09176
1659                MLCWS   ALLBIT,WORK6                                    12  05512  D 09071 09176 7
1660                C       ALLBIT,WORK6                                    11  05524  C 09071 09176
1661                BE      LT                  SHOULD BRANCH                7  05535  J 05543 S
1662                H                                                        1  05542  .
1663      * SUB-RTN 19.09   CHECK SCNR FOR MOVE NO DATA, PROPER ADDR REG STEP
1664      LT        MLCWS   NWM63,100                                       12  05543  D 09064 00100 7
1665                MLCWS   BLANK,101                                       12  05555  D 09066 00101 7
1666                SCNR    100,101                                         12  05567  D 00100 00101 8
1667                SAR     HOLDA2                                           7  05579  G 09181 A
1668                SBR     HOLDB2                                           7  05586  G 09186 B
1669                C       HOLDA2,@00101@      CK AAR FOR PROPER STEPPING   11  05593  C 09181 09613
1670                BU      LU                  SHOULD NOT BRANCH            7  05604  J 05709 /
1671                C       HOLDB2,@00102@      CK BAR FOR PROPER STEPPING   11  05611  C 09186 09618
1672                BU      LU                  SHOULD NOT BRANCH            7  05622  J 05709 /
1673                C       BLANK,101           TEST LOC 00101 FOR WM-BLANK  11  05629  C 09066 00101
1674                BU      LU                  SHOULD NOT BRANCH            7  05640  J 05709 /
1675                SCNR    101,100                                         12  05647  D 00101 00100 8
1676                SAR     HOLDA2                                           7  05659  G 09181 A
1677                SBR     HOLDB2                                           7  05666  G 09186 B
1678                C       HOLDA2,@00102@      CK AAR FOR PROPER STEPPING   11  05673  C 09181 09618
1679                BU      LU                  SHOULD NOT BRANCH            7  05684  J 05709 /
1680                C       HOLDB2,@00101@      CK BAR FOR PROPER STEPPING   11  05691  C 09186 09613
1681                BE      LV                  SHOULD BRANCH & EXIT         7  05702  J 05710 S
1682      LU        H                                                        1  05709  .
1683      * SUB-RTN 19.10   CHECK MRN SIMILAR TO MLNS
1684      LV        MLCWS   NWM50,WORK6                                     12  05710  D 09051 09176 7
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PGLIN	LABEL	CC01 OPCOD	OPERAND		CT	ADDRS	CC01 INSTRUCTION
1685		MRN	COLON,WORK6		12	05722	D 09088 09176 9
1686		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05734	V 05758 09176 1
1687		BCE	LW,WORK6,B		12	05746	B 05759 09176 B
1688		H			1	05758	.
1689	* SUB-RTN 19.11		CHECK MRZ				
1690	LW	MLCWS	NWM47,WORK6		12	05759	D 09048 09176 7
1691		MRZ	SUBLNK,WORK6		12	05771	D 09085 09176 0
1692		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05783	V 05807 09176 1
1693		BCE	LX,WORK6,M		12	05795	B 05808 09176 M
1694		H			1	05807	.
1695	* SUB-RTN 19.12		CHECK MRC				
1696	LX	MLCWS	NWM12,WORK6		12	05808	D 09014 09176 7
1697		MRC	SEE,WORK6		12	05820	D 09094 09176 #
1698		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05832	V 05856 09176 1
1699		BCE	LY,WORK6,C	SHOULD BRANCH	12	05844	B 05857 09176 C
1700		H			1	05856	.
1701	* SUB-RTN 19.13		CHECK MRW				
1702	LY	MLCWS	ALLBIT,WORK6		12	05857	D 09071 09176 7
1703		MRW	NWM00,WORK6		12	05869	D 09002 09176 @
1704		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05881	V 05905 09176 1
1705		BCE	LZ,WORK6,M		12	05893	B 05906 09176 M
1706		H			1	05905	.
1707	* SUB-RTN 19.14		CHECK MRNW				
1708	LZ	MLCWS	QUESTN,WORK6		12	05906	D 09091 09176 7
1709		MRNW	NWM05,WORK6		12	05918	D 09007 09176 .
1710		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05930	V 05954 09176 1
1711		BCE	MA,WORK6,E	SHOULD BRANCH	12	05942	B 05955 09176 E
1712		H			1	05954	.
1713	* SUB-RTN 19.15		CHECK MRZW				
1714	MA	MLCWS	TPMARK,WORK6		12	05955	D 09090 09176 7
1715		MRZW	NWM48,WORK6		12	05967	D 09049 09176 T
1716		BW	*&13,WORK6	SHOULD NOT BRANCH	12	05979	V 06003 09176 1
1717		BCE	MB,WORK6,M		12	05991	B 06004 09176 M
1718		H			1	06003	.
1719	* SUB-RTN 19.16		CHECK MRCW				

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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1720      MB         MLCWS  EMM,WORK6                                        12  06004  D 09105 09176 7
1721                 MRCW   NWM27,WORK6                                     12  06016  D 09028 09176 M
1722                 BW     *&13,WORK6          SHOULD NOT BRANCH            12  06028  V 06052 09176 1
1723                 BCE    MC,WORK6,,          SHOULD BRANCH                12  06040  B 06053 09176 ,
1724                 H                                                        1  06052  .
1725      * SUB-RTN 19.17    CHECK SCNLA FOR MOVE NO DATA, PROPER ADDR REG STP
1726      MC         MLCWS  LBRAKT,102                                       12  06053  D 09069 00102 7
1727                 MLCWS  NWM02,103                                        12  06065  D 09004 00103 7
1728                 MLCWS  LBRAKT,104                                       12  06077  D 09069 00104 7
1729                 SCNLA  103,104                                          12  06089  D 00103 00104 S
1730                 SAR    HOLDA2                                            7  06101  G 09181 A
1731                 SBR    HOLDB2                                            7  06108  G 09186 B
1732                 C      HOLDA2,@001018      CHECK AAR FOR PROPER STEPPING 11  06115  C 09181 09613
1733                 BU     MD                  SHOULD NOT BRANCH             7  06126  J 06169 /
1734                 C      HOLDB2,@001028      CHECK BAR FOR PROPER STEPPING 11  06133  C 09186 09618
1735                 BU     MD                  SHOULD NOT BRANCH             7  06144  J 06169 /
1736                 C      NWM61,104           TEST THAT NO DATA WERE MOVED  11  06151  C 09062 00104
1737                 BE     ME                  SHOULD BRANCH & EXIT          7  06162  J 06170 S
1738      MD         H                                                        1  06169  .
1739      * SUB-RTN 19.18    CHECK MLNA
1740      ME         MLCWS  DELTA,102                                        12  06170  D 09077 00102 7
1741                 MLCWS  NWM16,103                                        12  06182  D 09018 00103 7
1742                 MLCWS  DELTA,104                                        12  06194  D 09077 00104 7
1743                 MLNA   103,104                                          12  06206  D 00103 00104 /
1744                 C      NWM32,104                                        11  06218  C 09033 00104
1745                 BE     MF                  SHOULD BRANCH & EXIT          7  06229  J 06237 S
1746                 H                                                        1  06236  .
1747      * SUB-RTN 19.19    CHECK MLZA
1748      MF         MLCWS  PERCNT,102                                       12  06237  D 09081 00102 7
1749                 MLCWS  NWM35,103                                        12  06249  D 09036 00103 7
1750                 MLCWS  PERCNT,104                                       12  06261  D 09081 00104 7
1751                 MLZA   103,104                                          12  06273  D 00103 00104 S
1752                 C      NWM44,104                                        11  06285  C 09045 00104
1753                 BE     MG                  SHOULD BRANCH & EXIT          7  06296  J 06304 S
1754                 H                                                        1  06303  .
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PGLIN     LABEL      OPCOD  OPERAND                                        CT  ADDRS  INSTRUCTION
1755      * SUB-RTN 19.20   CHECK MLCA
1756      MG         MLCWS  NWM63,WORK6                                    12  06304  D 09064 09176 7
1757                 MLCA   BLANK,WORK6                                    12  06316  D 09066 09176 T
1758                 BW     *&13,WORK6          SHOULD NOT BRANCH          12  06328  V 06352 09176 1
1759                 BCE    MH,WORK6,           SHOULD BRANCH              12  06340  B 06353 09176
1760                 H                                                     1  06352  .
1761      * SUB-RTN 19.21   CHECK MLWA
1762      MH         MLCWS  NWM53,WORK6                                    12  06353  D 09054 09176 7
1763                 MLWA   NAUGHT,WORK6                                   12  06365  D 09120 09176 U
1764                 C      NWM53,WORK6                                   11  06377  C 09054 09176
1765                 BE     MI                  SHOULD BRANCH              7  06388  J 06396 S
1766                 H                                                     1  06395  .
1767      * SUB-RTN 19.22   CHECK MLNWA
1768      MI         MLCWS  NWM47,WORK6                                    12  06396  D 09048 09176 7
1769                 MLNWA  SUBLNK,WORK6                                   12  06408  D 09085 09176 V
1770                 C      NWM32,WORK6                                   11  06420  C 09033 09176
1771                 BE     MJ                  SHOULD BRANCH              7  06431  J 06439 S
1772                 H                                                     1  06438  .
1773      * SUB-RTN 19.23   CHECK MLZWA
1774      MJ         MLCWS  NWM03,WORK6                                    12  06439  D 09005 09176 7
1775                 MLZWA  LOZNGE,WORK6                                   12  06451  D 09068 09176 W
1776                 C      NWM51,WORK6                                   11  06463  C 09052 09176
1777                 BE     MK                  SHOULD BRANCH              7  06474  J 06482 S
1778                 H                                                     1  06481  .
1779      * SUB-RTN 19.24   CHECK MLCWA
1780      MK         MLCWS  ALLBIT,102                                     12  06482  D 09071 00102 7
1781                 MLCWS  NWM00,103                                      12  06494  D 09002 00103 7
1782                 MLCWS  ALLBIT,104                                     12  06506  D 09071 00104 7
1783                 MLCWA  103,104                                        12  06518  D 00103 00104 X
1784                 BW     *&13,104            SHOULD NOT BRANCH          12  06530  V 06554 00104 1
1785                 BCE    ML,104,             SHOULD BRANCH              12  06542  B 06555 00104
1786                 H                                                     1  06554  .
1787      * SUB-RTN 19.25   CHECK SCNRR FOR MOVE NO DATA, PROPER ADDR REG STP
1788      ML         MLCWA  NWM26,101                                      12  06555  D 09065 00101 X
1789                 MLCWS  GREATR,37                                      12  06567  D 09089 00037 7
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
1790		MLCWS	NWM49,36		12	06579	D 09050 00036 7
1791		SCNRR	37,36		12	06591	D 00037 00036 Y
1792		SAR	HOLDA2		7	06603	G 09181 A
1793		S8R	HOLDB2		7	06610	G 09186 B
1794		C	HOLDA2,@001020	CHECK AAR FOR PROPER STEPPING	11	06617	C 09181 09618
1795		BU	MM	SHOULD NOT BRANCH	7	06628	J 06677 /
1796		C	HOLDB2,@001010	CHECK BAR FOR PROPER STEPPING	11	06635	C 09186 09613
1797		BU	MM	SHOULD NOT BRANCH	7	06646	J 06677 /
1798		SW	38		6	06653	, 00038
1799		C	NWM26,101	TEST THAT NO DATA WERE MOVED	11	06659	C 09065 00101
1800		BE	MN	SHOULD BRANCH & EXIT	7	06670	J 06678 S
1801	MM	H			1	06677	.
1802	* SUB-RTN 19.26		CHECK MRNR				
1803	MN	CW	100		6	06678	¤ 00100
1804		MRCW	K01,100		12	06684	D 09130 00100 T M
1805		MRNR	K02,100		12	06696	D 09132 00100 Z
1806		BW	MP,100	SHOULD NOT BRANCH	12	06708	V 06770 00100 1
1807		BW	*&8,101	SHOULD BRANCH	12	06720	V 06739 00101 1
1808		B	MP		7	06732	J 06770
1809		BCE	*&8,100,	SHOULD BRANCH	12	06739	B 06758 00100
1810		B	MP		7	06751	J 06770
1811		BCE	MQ,101,!		12	06758	B 06771 00101 !
1812	MP	H			1	06770	.
1813	* SUB-RTN 19.27		CHECK MRZR				
1814	MQ	CW	100		6	06771	¤ 00100
1815		MRCW	K03,100		12	06777	D 09134 00100 T M
1816		MRZR	K04,100		12	06789	D 09136 00100 #
1817		BW	MR,100	SHOULD NOT BRANCH	12	06801	V 06863 00100 1
1818		BW	*&8,101	SHOULD BRANCH	12	06813	V 06832 00101 1
1819		B	MR		7	06825	J 06863
1820		BCE	*&8,100,-	SHOULD BRANCH	12	06832	B 06851 00100 -
1821		B	MR		7	06844	J 06863
1822		BCE	MS,101,V	SHOULD BRANCH & EXIT	12	06851	B 06864 00101 V
1823	MR	H			1	06863	.
1824	* SUB-RTN 19.28		CHECK MRCR				

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
1825	MS	MLCWA	K05,101		12	06864	D 09139 00101 X
1826		MRCR	K06,100		12	06876	D 09140 00100 ,
1827		BW	*&8,100	SHOULD BRANCH	12	06888	V 06907 00100 1
1828		B	MT		7	06900	J 06925
1829		C	101,K14&1		11	06907	C 00101 09157
1830		BE	MU	SHOULD BRANCH & EXIT	7	06918	J 06926 S
1831	MT	H			1	06925	.
1832	* SUB-RTN 19.29		CHECK MRWR				
1833	MU	MLCWA	K07,101		12	06926	D 09143 00101 X
1834		MRWR	K08,100		12	06938	D 09144 00100 %
1835		BW	MV,100	SHOULD NOT BRANCH	12	06950	V 07012 00100 1
1836		BW	*&8,101	SHOULD BRANCH	12	06962	V 06981 00101 1
1837		B	MV		7	06974	J 07012
1838		BCE	*&8,100,I	SHOULD BRANCH	12	06981	B 07000 00100 I
1839		B	MV		7	06993	J 07012
1840		BCE	MW,101,N	SHOULD BRANCH & EXIT	12	07000	B 07013 00101 N
1841	MV	H			1	07012	.
1842	* SUB-RTN 19.30		CHECK MRNWR				
1843	MW	MLCWA	K09,101		12	07013	D 09147 00101 X
1844		MRNWR	K1C,100		12	07025	D 09148 00100 W S
1845		BW	MX,100	SHOULD NOT BRANCH	12	07037	V 07099 00100 1
1846		BW	*&8,101	SHOULD BRANCH	12	07049	V 07068 00101 1
1847		B	MX		7	07061	J 07099
1848		BCE	*&8,100,B S	SHOULD BRANCH	12	07068	B 07087 00100 S B
1849		B	MX		7	07080	J 07099
1850		BCE	MY,101,. '		12	07087	B 07100 00101 ' .
1851	MX	H			1	07099	.
1852	* SUB-RTN 19.31		CHECK MRZWR				
1853	MY	MLCWA	K11,101		12	07100	D 09151 00101 X
1854		MRZWR	K12,100		12	07112	D 09152 00100 B S
1855		BW	MZ,100	SHOULD NOT BRANCH	12	07124	V 07186 00100 1
1856		BW	*&8,101	SHOULD BRANCH	12	07136	V 07155 00101 1
1857		B	MZ		7	07148	J 07186
1858		BCE	*&8,100,X	SHOULD BRANCH	12	07155	B 07174 00100 X
1859		B	MZ		7	07167	J 07186

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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1860                 BCE    NA,101,V          SHOULD BRANCH & EXIT   12  07174  B 07187 00101 V
1861      PZ         H                                                 1  07186  .
1862      * SUB-RTN 19.32   CHECK MRCWR
1863      NA         CW     100                                        6  07187  ¤ 00100
1864                 MRCW   K13,100                                   12  07193  D 09154 00100 T
1865                 MRCWR  K14,100                                   12  07205  D 09156 00100 M
1866                 BW     *&8,100           SHOULD BRANCH          12  07217  V 07236 00100 1
1867                 B      NB                                         7  07229  J 07254
1868                 C      101,K14&1                                 11  07236  C 00101 09157
1869                 BE     NC                SHOULD BRANCH & EXIT    7  07247  J 07255 S
1870      NB         H                                                 1  07254  .
1871      * SUB-RTN 19.33   CHECK SCNLB FOR MOVE NO DATA, PROPER ADDR REG STP
1872      NC         MLCWS  TPMARK,1C2                                12  07255  D 09090 00102 7
1873                 MLCWS  NWM48,103                                 12  07267  D 09049 00103 7
1874                 MLCWS  AMPSND,104                                12  07279  D 09072 00104 7
1875                 SCNLB  104,103                                   12  07291  D 00104 00103 -
1876                 SAR    HOLDA2                                     7  07303  G 09181 A
1877                 SBR    HOLDB2                                     7  07310  G 09186 B
1878                 C      HOLDA2,a00102a                            11  07317  C 09181 09618
1879                 BU     ND                SHOULD NOT BRANCH        7  07328  J 07371 /
1880                 C      HOLDB2,a00101a                            11  07335  C 09186 09613
1881                 BU     ND                SHOULD NOT BRANCH        7  07346  J 07371 /
1882                 C      NWM15,102         TEST THAT NO DATA WERE MOVED  11  07353  C 09017 00102
1883                 BE     NE                SHOULD BRANCH & EXIT     7  07364  J 07372 S
1884      ND         H                                                 1  07371  .
1885      * SUB-RTN 19.34   CHECK MLNB
1886      NE         MLCWS  BKSLSH,WORK6                              12  07372  D 09083 09176 7
1887                 MLNB   NWM33,WORK6                               12  07384  D 09034 09176 J
1888                 C      NWM17,WORK6                               11  07396  C 09019 09176
1889                 BE     NF                SHOULD BRANCH            7  07407  J 07415 S
1890                 H                                                 1  07414  .
1891      * SUB-RTN 19.35   CHECK MLZB
1892      NF         SW     10C                                        6  07415  , 00100
1893                 MLCWS  NWM63,101                                 12  07421  D 09064 00101 7
1894                 MLZB   BLANK,101                                 12  07433  D 09066 00101 K
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PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND		CT	ADDRS	INSTRUCTION
1895		BW	*&13,101	SHOULD NOT BRANCH	12	07445	V 07469 00101 1
1896		BCE	NG,101,M		12	07457	B 07470 00101 M
1897		H			1	07469	.
1898	* SUB-RTN	19.36	CHECK MLCB				
1899	NG	SW	10C		6	07470	, 00100
1900		MLCWS	NWM52,101		12	07476	D 09053 00101 7
1901		MLCB	POUND,101		12	07488	D 09086 00101 L
1902		BW	*&13,101	SHOULD NOT BRANCH	12	07500	V 07524 00101 1
1903		BCE	NH,101,#		12	07512	B 07525 00101 #
1904		H			1	07524	.
1905	* SUB-RTN	19.37	CHECK MLWB				
1906	NH	SW	10C		6	07525	, 00100
1907		MLCWS	NWM15,101		12	07531	D 09017 00101 7
1908		MLWB	AMPSND,101		12	07543	D 09072 00101 M
1909		C	NWM15,101		11	07555	C 09017 00101
1910		BE	NI	SHOULD BRANCH	7	07566	J 07574 S
1911		H			1	07573	.
1912	*SUB-RTN	19.38	CHECK MLNWB				
1913	NI	SW	10C		6	07574	, 00100
1914		MLCWS	NWM06,101		12	07580	D 09008 00101 7
1915		MLNWB	EYE,101		12	07592	D 09100 00101 N
1916		C	NWM09,101		11	07604	C 09011 00101
1917		BE	NJ	SHOULD BRANCH	7	07615	J 07623 S
1918		H			1	07622	.
1919	* SUB-RTN	19.39	CHECK MLZWB				
1920	NJ	MLCWS	ALLBIT,WORK6		12	07623	D 09071 09176 7
1921		MLZWB	NWM00,WORK6		12	07635	D 09002 09176 0
1922		BW	*&13,WORK6	SHOULD NOT BRANCH	12	07647	V 07671 09176 1
1923		BCE	NK,WORK6,M		12	07659	B 07672 09176 M
1924		H			1	07671	.
1925	* SUB-RTN	19.40	CHECK MLCWB				
1926	NK	MLCWS	LOZNGE,WORK6		12	07672	D 09068 09176 7
1927		MLCWB	NWM03,WORK6		12	07684	D 09005 09176 P
1928		BW	*&13,WORK6	SHOULD NOT BRANCH	12	07696	V 07720 09176 1
1929		BCE	NL,WORK6,3	SHOULD BRANCH	12	07708	B 07721 09176 3

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
1930		H			1	07720	.
1931	* SUB-RTN 19.41		CHECK SCNRG FOR MOVE NO DATA, PROPER ADDR REG STP				
1932	NL	CS	164	INSURE 00100-00164 BLANK	6	07721	/ 00164
1933		MLCWS	ALLBIT,101	PUT TERMINAL CHARACTER IN 00101	12	07727	D 09071 00101 7
1934		MLWA	164,100	INSURE NO WMS 00038-00100	12	07739	D 00164 00100 U
1935		MLCWB	NINE,100	MOVE 64 CHARACTERS TO 00037-00100	12	07751	D 09129 00100 P
1936		CW	42	REMOVE WM FROM GROUP MARK	6	07763	¤ 00042
1937		SCNRG	37,36	TRY THE SCAN	12	07769	D 00037 00036 Q
1938		SAR	HOLDA2		7	07781	G 09181 A
1939		SBR	HOLDB2		7	07788	G 09186 B
1940		C	HOLDA2,a00102a	CHECK AAR FOR PROPER SETTING	11	07795	C 09181 09618
1941		BU	NM	SHOULD NOT BRANCH	7	07806	J 07885 /
1942		C	HOLDB2,a00101a	CHECK BAR FOR PROPER SETTING	11	07813	C 09186 09613
1943		BU	NM	SHOULD NOT BRANCH	7	07824	J 07885 /
1944		BW	NM,42	SHOULD NOT BRANCH	12	07831	V 07885 00042 1
1945		MLWA	164,100	REMOVE ALL WMS FROM 00038-00100	12	07843	D 00164 00100 U
1946		MLCB	NINE,164	MOVE 64 CHARACTERS TO 00101-00164	12	07855	D 09129 00164 L
1947		C	100,164	CHECK THAT SCAN MOVED NO DATA	11	07867	C 00100 00164
1948		BE	NN	SHOULD BRANCH	7	07878	J 07886 S
1949	NM	H			1	07885	.
1950	* SUB-RTN 19.42		CHECK MRNG				
1951	NN	MLCWS	NWM19,101		12	07886	D 09021 00101 7
1952		MLCWS	SPLAT,102		12	07898	D 09074 00102 7
1953		MLCWS	ALLBIT,103		12	07910	D 09071 00103 7
1954		MRNG	102,101		12	07922	D 00102 00101 R
1955		BW	*&13,101	SHOULD NOT BRANCH	12	07934	V 07958 00101 1
1956		BCE	NP,101,%		12	07946	B 07959 00101 %
1957		H			1	07958	.
1958	* SUB-RTN 19.43		CHECK MRZG				
1959	NP	MLCWS	ALLBIT,101		12	07959	D 09071 00101 7
1960		MLCWS	NWM00,102		12	07971	D 09002 00102 7
1961		MLCWS	ALLBIT,103		12	07983	D 09071 00103 7
1962		MRZG	102,101		12	07995	D 00102 00101 !
1963		C	NWM15,101		11	08007	C 09017 00101
1964		BE	NQ	SHOULD BRANCH	7	08018	J 08026 S

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PGLIN    LABEL        OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1965                  H                                        1  08025  .
1966     * SUB-RTN 19.44   CHECK MRCG
1967     NQ           MLCWS  AITCH,101                        12  08026  D 09099 00101 7
1968                  MLCWS  NWM07,102                       12  08038  D 09009 00102 7
1969                  MLCWS  ALLBIT,103                      12  08050  D 09071 00103 7
1970                  MRCG   102,101                         12  08062  D 00102 00101 $
1971                  C      NWM07,101                       11  08074  C 09009 00101
1972                  BE     NR              SHOULD BRANCH    7  08085  J 08093 S
1973                  H                                        1  08092  .
1974     * SUB-RTN 19.45   CHECK MRWG
1975     NR           MLCWS  DELTA,101                       12  08093  D 09077 00101 7
1976                  MLCWS  NWM16,102                       12  08105  D 09018 00102 7
1977                  MLCWS  ALLBIT,103                      12  08117  D 09071 00103 7
1978                  MRWG   102,101                         12  08129  D 00102 00101 *
1979                  BW     *&13,101        SHOULD NOT BRANCH 12  08141  V 08165 00101 1
1980                  BCE    NS,101,L                        12  08153  B 08166 00101 L
1981                  H                                        1  08165  .
1982     * SUB-RTN 19.46   CHECK MRNWG
1983     NS           MLCWS  EXCLAM,101                      12  08166  D 09101 00101 7
1984                  MLCWS  NWM21,102                       12  08178  D 09023 00102 7
1985                  MLCWS  ALLBIT,103                      12  08190  D 09071 00103 7
1986                  MRNWG  102,101                         12  08202  D 00102 00101 B
1987                  BW     *&13,101        SHOULD NOT BRANCH 12  08214  V 08238 00101 1
1988                  BCE    NT,101,N        SHOULD BRANCH    12  08226  B 08239 00101 N
1989                  H                                        1  08238  .
1990     * SUB-RTN 19.47   CHECK MRZWG
1991     NT           MLCWS  NWM63,101                       12  08239  D 09064 00101 7
1992                  MLCWS  BLANK,102                       12  08251  D 09066 00102 7
1993                  MLCWS  ALLBIT,103                      12  08263  D 09071 00103 7
1994                  MRZWG  102,101                         12  08275  D 00102 00101 ;
1995                  C      NWM15,101                       11  08287  C 09017 00101
1996                  BE     NU              SHOULD BRANCH    7  08298  J 08306 S
1997                  H                                        1  08305  .
1998     * SUB-RTN 19.48   CHECK MRCWG
1999     NU           MLCWS  NWM48,101                       12  08306  D 09049 00101 7
```

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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2000                 MLCWS  TPMARK,102                               12  08318  D 09090 00102 7
2001                 MLCWS  ALLBIT,103                               12  08330  D 09071 00103 7
2002                 MRCWG  102,101                                  12  08342  D 00102 00101 L
2003                 C      NWM15,101                                11  08354  C 09017 00101
2004                 BE     NV                 SHOULD BRANCH          7  08365  J 08373 S
2005                 H                                                 1  08372  .
2006      * SUB-RTN 19.49    CHECK SCNL FOR MOVE NO DATA, PROPER ADDR REG STEP
2007      NV         MLCWS  JAY,102                                  12  08373  D 09102 00102 7
2008                 MLCWS  NWM30,103                                12  08385  D 09031 00103 7
2009                 SCNL   102,103            TEST STOP ON A-FIELD WM  12  08397  D 00102 00103 &
2010                 SAR    HOLDA2                                    7  08409  G 09181 A
2011                 SBR    HOLDB2                                    7  08416  G 09186 B
2012                 C      HOLDA2,@00101@     CHECK AAR FOR PROPER STEPPING  11  08423  C 09181 09613
2013                 BU     NW                 SHOULD NOT BRANCH      7  08434  J 08552 /
2014                 C      HOLDB2,@00102@     CHECK BAR FOR PROPER STEPPING  11  08441  C 09186 09618
2015                 BU     NW                 SHOULD NOT BRANCH      7  08452  J 08552 /
2016                 BW     NW,103             SHOULD NOT BRANCH WORD MARK  12  08459  V 08552 00103 1
2017                 BCE    *&8,103,S(B)       SHOULD BRANCH          12  08471  B 08490 00103 S(B)
2018                 B      NW                                        7  08483  J 08552
2019                 SCNL   103,102            TEST STOP ON B-FIELD WM  12  08490  D 00103 00102 &
2020                 SAR    HOLDA2                                    7  08502  G 09181 A
2021                 SBR    HOLDB2                                    7  08509  G 09186 B
2022                 C      HOLDA2,@00102@                           11  08516  C 09181 09618
2023                 BU     NW                 SHOULD NOT BRANCH      7  08527  J 08552 /
2024                 C      HOLDB2,@00101@                           11  08534  C 09186 09613
2025                 BE     NX                 SHOULD BRANCH & EXIT   7  08545  J 08553 S
2026      NW         H                                                 1  08552  .
2027      * SUB-RTN 19.50    CHECK MLN
2028      NX         MLCWS  NWM63,WORK6                              12  08553  D 09064 09176 7
2029                 MLN    BLANK,WORK6                              12  08565  D 09066 09176 A
2030                 BW     *&13,WORK6         SHOULD NOT BRANCH     12  08577  V 08601 09176 1
2031                 BCE    NY,WORK6,&         SHOULD BRANCH         12  08589  B 08602 09176 &
2032                 H                                                 1  08601  .
2033      * SUB-RTN 19.51    CHECK MLZ
2034      NY         MLCWS  NWM51,WORK6                              12  08602  D 09052 09176 7
```

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PGLIN     LABEL       OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
2035                  MLZ    ATSIGN,WORK6                     12  08614  D 09087 09176 8
2036                  BW     *&13,WORK6        SHOULD NOT BRANCH 12  08626  V 08650 09176 1
2037                  BCE    NZ,WORK6,3        SHOULD BRANCH    12  08638  B 08651 09176 3
2038                  H                                        1  08650  .
2039      * SUB-RTN 19.52   CHECK MLC
2040      NZ          MLCWS  NWM31,WORK6                       12  08651  D 09032 09176 7
2041                  MLC    DASH,WORK6                       12  08663  D 09078 09176 C
2042                  BW     *&13,WORK6        SHOULD NOT BRANCH 12  08675  V 08699 09176 1
2043                  BCE    PA,WORK6,-        SHOULD BRANCH    12  08687  B 08700 09176 -
2044                  H                                        1  08699  .
2045      * SUB-RTN 19.53   CHECK MLW
2046      PA          MLCWS  NWM09,WORK6                       12  08700  D 09011 09176 7
2047                  MLW    EFF,WORK6                        12  08712  D 09097 09176 D
2048                  C      NWM09,WORK6                      11  08724  C 09011 09176
2049                  BE     PB                SHOULD BRANCH     7  08735  J 08743 S
2050                  H                                        1  08742  .
2051      * SUB-RTN 19.54   CHECK MLNW
2052      PB          MLCWS  ALLBIT,WORK6                     12  08743  D 09071 09176 7
2053                  MLNW   NWM00,WORK6                      12  08755  D 09002 09176 E
2054                  BW     *&13,WORK6        SHOULD NOT BRANCH 12  08767  V 08791 09176 1
2055                  BCE    PC,WORK6,&        SHOULD BRANCH    12  08779  B 08792 09176 &
2056                  H                                        1  08791  .
2057      * SUB-RTN 19.55   CHECK MLZW
2058      PC          MLCWS  PERIOD,WORK6                     12  08792  D 09067 09176 7
2059                  MLZW   NWM04,WORK6                      12  08804  D 09006 09176 F
2060                  BW     *&13,WORK6        SHOULD NOT BRANCH 12  08816  V 08840 09176 1
2061                  BCE    PD,WORK6,#                      12  08828  B 08841 09176 #
2062                  H                                        1  08840  .
2063      * SUB-RTN 19.56   CHECK MLCW
2064      PD          MLCWS  DELTA,WORK6                      12  08841  D 09077 09176 7
2065                  MLCW   NWM16,WORK6                      12  08853  D 09018 09176 G
2066                  BW     *&13,WORK6        SHOULD NOT BRANCH 12  08865  V 08889 09176 1
2067                  BCE    *&2,WORK6,$B                    12  08877  B 08890 09176 $B
2068                  H                                        1  08889  .
2069                  WCP    PASS                            10  08890  M %TO 08921 W
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2070                BCB1   *-16                                      7  08900  R 08890 2
                                                                                 G
2071                BA1    *&1                                       7  08907  R 08914 M
2072                B      QV                                        7  08914  J 08935
2073      PASS      DCW    @CC01 COMPLETE@,G                        13  08921
                                                                                      D
2074      QV        MRCWG  RTC&1,333                                 12  08935  D 08967 00333 L
2075                MLCS   332,339                                  12  08947  D 00332 00339 3
2076                B      322                                       7  08959  J 00322
2077      RTC       BCB1   322                                       7  08966  R 00322 2
                                                                                 G
2078                BA1    346                                       7  08973  R 00346 M
2079                B      1972                                      7  08980  J 01972
                           G
2080                DCW    @M@                                       1  08987
2081      *
2082      RESET     CW     JF&1                                      6  08988  ¤ 03818
2083                B      START                                     7  08994  J 02000
2084                H                        DEFINE PRECEDING BRANCH LENGTH   1  09001  .
2085      *
2086      *                CONSTANTS AND WORK AREAS
2087      *
2088      *
2089      NWM00     DC     @ @                                       1  09002
2090      NWM01              @1@                                     1  09003
2091      NWM02              @2@                                     1  09004
2092      NWM03              @3@                                     1  09005
2093      NWM04              @4@                                     1  09006
2094      NWM05              @5@                                     1  09007
2095      NWM06              @6@                                     1  09008
2096      NWM07              @7@                                     1  09009
2097      NWM08              @8@                                     1  09010
2098      NWM09              @9@                                     1  09011
2099      NWM10              @0@                                     1  09012
2100      NWM11              @#@                                     1  09013
2101      NWM12              @@@                                     1  09014
                             .
2102      NWM13              @.@                                     1  09015
                           G
2103      NWM14              @T@                                     1  09016
                           T
2104      NWM15              @M@                                     1  09017
```

PGLIN	LABEL	CC01 OPCOD	CPU TEST OPERAND	CT	ADDRS	INSTRUCTION
2105	NWM16		@B@ (S)	1	09018	
2106	NWM17		@/@	1	09019	
2107	NWM18		@S@	1	09020	
2108	NWM19		@T@	1	09021	
2109	NWM20		@U@	1	09022	
2110	NWM21		@V@	1	09023	
2111	NWM22		@W@	1	09024	
2112	NWM23		@X@	1	09025	
2113	NWM24		@Y@	1	09026	
2114	NWM25		@Z@	1	09027	
2115	NWM27		@,@	1	09028	
2116	NWM28		@%@	1	09029	
2117	NWM29		@S@ (W)	1	09030	
2118	NWM30		@S@ (B)	1	09031	
2119	NWM31		@M@ (S)	1	09032	
2120	NWM32		@-@	1	09033	
2121	NWM33		@J@	1	09034	
2122	NWM34		@K@	1	09035	
2123	NWM35		@L@	1	09036	
2124	NWM36		@M@	1	09037	
2125	NWM37		@N@	1	09038	
2126	NWM38		@O@	1	09039	
2127	NWM39		@P@	1	09040	
2128	NWM40		@Q@	1	09041	
2129	NWM41		@R@	1	09042	
2130	NWM42		@.@	1	09043	
2131	NWM43		@$@	1	09044	
2132	NWM44		@*@	1	09045	
2133	NWM45		@B@ (R)	1	09046	
2134	NWM46		@,@	1	09047	
2135	NWM47		@L@ (D)	1	09048	
2136	NWM48		@&@	1	09049	
2137	NWM49		@A@	1	09050	
2138	NWM50		@B@	1	09051	
2139	NWM51		@C@	1	09052	
2140	NWM52		@D@	1	09053	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
2141	NWM53		@E@	1	09054	
2142	NWM54		@F@	1	09055	
2143	NWM55		@G@	1	09056	
2144	NWM56		@H@	1	09057	
2145	NWM57		@I@	1	09058	
2146	NWM58		@M@ (Q)	1	09059	
2147	NWM59		@.@	1	09060	
2148	NWM60		@□@	1	09061	
2149	NWM61		@B@ (L)	1	09062	
2150	NWM62		@T@ (L)	1	09063	
2151	NWM63		@M@ (G)	1	09064	
2152	NWM26		@+@	1	09065	
2153	*					
2154	TABLE	DCW	@ @	1	09066	
2155	PERICD		@.@	1	09067	
2156	LOZNGE		@□@ (L)	1	09068	
2157	LBRAKT		@U@ (L)	1	09069	
2158	LESS		@T@ (G)	1	09070	
2159	ALLBIT		@M@	1	09071	
2160	AMPSND		@&@	1	09072	
2161			@$@	1	09073	
2162	SPLAT		@*@ (R)	1	09074	
2163	RBRAKT		@B@ (•)	1	09075	
2164			@,@ (D)	1	09076	
2165	DELTA		@L@	1	09077	
2166	DASH		@-@	1	09078	
2167			@/@	1	09079	
2168	COMMA		@,@	1	09080	
2169	PERCNT		@%@	1	09081	
2170	WDSEP	DC	@S@ (W)	1	09082	
2171	BKSLSH	DCW	@S@ (B)	1	09083	
2172	SEGMRK		@M@ (S)	1	09084	
2173	SUBLNK		@B@ (S)	1	09085	
2174	POUND		@#@	1	09086	
2175	ATSIGN		@@@	1	09087	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
2176	CCLCN		@.@	1	09088	
2177	GREATR		@G@	1	09089	
2178	TPMARK		@T@	1	09090	
2179	QUESTN		@M@	1	09091	
2180	AYE		@Q@	1	09092	
2181	BEE		@A@	1	09093	
2182	SEE		@B@	1	09094	
2183	DEE		@C@	1	09095	
2184	EEE		@D@	1	09096	
2185	EFF		@E@	1	09097	
2186	GEE		@F@	1	09098	
2187	AITCH		@G@	1	09099	
2188	EYE		@H@	1	09100	
2189	EXCLAM		@I@	1	09101	
2190	JAY		@.@	1	09102	
2191			@J@	1	09103	
2192	ELL		@K@	1	09104	
2193	EMM		@L@	1	09105	
2194			@M@	1	09106	
2195	OH		@N@	1	09107	
2196	PEA		@O@	1	09108	
2197	QUEUE		@P@	1	09109	
2198	ARE		@Q@	1	09110	
2199	RCDMRK		@R@	1	09111	
2200	ESS		@#@	1	09112	
2201	TEA		@S@	1	09113	
2202			@T@	1	09114	
2203	VEE		@U@	1	09115	
2204	DBLYOU		@V@	1	09116	
2205	EKS		@W@	1	09117	
2206	WYE		@X@	1	09118	
2207	ZEE		@Y@	1	09119	
2208	NAUGHT		@Z@	1	09120	
2209	ONE		@0@	1	09121	
2210	TWO		@1@	1	09122	
2211	THREE		@2@	1	09123	
			@3@			

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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2212      FOUR             @4@                                      1  09124
2213      FIVE             @5@                                      1  09125
2214      SIX              @6@                                      1  09126
2215      SEVEN            @7@                                      1  09127
2216      EIGHT            @8@                                      1  09128
2217      NINE             @9@                                      1  09129
2218      *
2219      K01       DC     @M@                                      1  09130
2220                DCW    @N@                                      1  09131
2221       K02             @&+@                                     2  09132
2222      K03       DC     @B@                                      1  09134
2223                DCW    @N@                                      1  09135
2224       K04             @L+@                                     2  09136
2225      K05              @MN@                                     2  09139
2226      K06       DC     @ @                                      1  09140
2227                DCW    @+@                                      1  09141
2228      K07              @IN@                                     2  09143
2229      K08       DC     @6@                                      1  09144
2230                DCW    @+@                                      1  09145
2231      K09              @MN@                                     2  09147
2232      K10       DC     @-@                                      1  09148
2233                DCW    @+@                                      1  09149
2234      K11              @PN@                                     2  09151
2235      K12       DC     @Y@                                      1  09152
2236                DCW    @+@                                      1  09153
2237      K13       DC     @M@                                      1  09154
2238                DCW    @N@                                      1  09155
2239       K14             @ +@                                     2  09156
2240      *
2241      WORK1     DCW    @ @                                      1  09158
2242      WORK2            @ @                                      1  09159
2243      WORK3            @  @                                     2  09161
2244      WORK4            @              @                        10  09171
2245      WORK5            @& B-@                                   4  09175
2246      WORK6            @ @                                      1  09176
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2247      *
2248      *
2249      *                OTHER CONSTANTS AND WORK AREAS
2250      *
2251      HOLDA     DCW    @      @                                  5  09181
2252      HOLDB            @      @                                  5  09186
2253      PCC              &00100              LOOP COUNT CONSTANT    5  09191
2254      PCCWK            @      @            LOOP COUNT WORK AREA  5  09196
2255      P1               @   @                                     3  09199
2256      P2               @   @                                     3  09202
2257      TACHLD           @           @                             9  09211
2258      SPECL1           @&.¤BTM@                                  6  09217
2259      SPECL2           @B,%SSM@                                  6  09223
2260      SPECL3           @ #@.TM@                                  6  09229
2261      SPECL4           @-$*B,L@                                  6  09235
2262      ALPHA            &123                                      3  09238
2263      ALFACD           ALPHA-2                                   5  09243  09236
2264      BETACD           WORK3-2                                   5  09248  09159
2265      FIVE9S           &99999                                    5  09253
2266      AADDR1           FIELD1-3                                  5  09258  09274
2267      BADDR1           FIELD2-3                                  5  09263  09277
2268      AADDR2           FIELD3-3                                  5  09268  09280
2269      BADDR2           FIELD4-3                                  5  09273  09284
2270      FIELD1           @9M8G@                                    4  09277
2271      FIELD2           @¤9G@                                     3  09280
2272      FIELD3           @,IG@                                     3  09283
2273      FIELD4           @ /.G@                                    4  09287
2274      LIMIT            @    @                                    4  09291
2275      HISTRT           @  @                                      2  09293
2276      LOSTRT           @  @                                      2  09295
2277      HICNT            @  @                                      2  09297
2278      LOCNT            @  @                                      2  09299
2279      FIVE4S           @54EDNMVU.&S%B*B¤@                       16  09315
2280      MANY9S           @9999999999999991@                       16  09331
2281      PRODCT           @0545454545454545345454545454545454F@    33  09364
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PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
2282	BIGANS		@ @	33	09397	
2283	MPYTBL		@ GLL Q D.R MTBU.MIHGFEDCBA&L,B*$.RQPONMLKJ-@	33	09398	
2284			@MSS%,+ZYXWVUTS/BMT.@#0987654321 @ SEW STG.	32	09462	
2285	*					
2286		DCW	@-+0&&+0&-+0&-+0&-+0&-+0&+@	25	09487	
2287		DC	@+C&-00&-+&&-+0+-+0&0+0&-&@	25	09512	
2288	TRASH		@0&-+++&-+00-+0&&+0&-+0&-+0@	25	09537	
2289	*					
2290	LOADER	EQU	40C			
2291	TAC0	EQU	10C0			
2292	TAC1	EQU	10C1			
2293	TAC2	EQU	10C2			
2294	TAC3	EQU	10C3			
2295	TAC4	EQU	10C4			
2296	CPU	EQU	1256			
2297	MEMSIZ	EQU	1257			
2298	TYPE	EQU	18C0			
2299	TYPCK	EQU	1845			
2300	AA	EQU	1931			
2301	BLANK	EQU	TABLE			
2302	CBIT	EQU	NWM00			
2303	MINUS7	EQU	PEA			
2304	MINUS8	EQU	QUEUE			
2305	MINUS0	EQU	EXCLAM			
2306	DIVSOR	EQU	WORK7			
2307	DIVOND	EQU	WORK8			
2308	QUOREM	EQU	P1			
2309	QUOTNT	EQU	WORK10			
2310	XR0	EQU	24			
2311	TPMK	EQU	NWM15			
2312	QUOT	EQU	NWM31			
2313	DELT	EQU	NWM47			
2314	GPMK	EQU	NWM63			
2315	GMWM	EQU	ALLBIT			
2316	HOLDA1	EQU	HOLDA			
2317	HOLDA2	EQU	HOLDA			

```
PGLIN     LABEL     OPCOD  OPERAND          CT  ADDRS  INSTRUCTION
2318      HOLDA3    EQU    HOLDA
2319      HOLDA4    EQU    HOLDA
2320      HOLDB1    EQU    HOLDB
2321      HOLDB2    EQU    HOLDB
2322      HOLDB3    EQU    HOLDB
2323      HOLDB4    EQU    HOLDB
2324                LTORG  *                      09538
2324                       &54321             5  09542
2324                       &9876              4  09546
2324                       &123               3  09549
2324                       &45679             5  09554
2324                       -45679             5  09559
2324                       -54321             5  09564
2324                       -1                 1  09565
2324                       @9RIY@             4  09569
2324                       &0                 1  09570
2324                       &7                 1  09571
2324                       &8                 1  09572
2324                       &1                 1  09573
2324                       JD                 5  09578  03747
2324                       JC                 5  09583  03740
2324                       RESET              5  09588  08988
2324                       KFC2               5  09593  04504
2324                       POUND              5  09598  09086
2324                       KFC7               5  09603  04558
2324                       KFC6               5  09608  04551
2324                       @0C101@            5  09613
2324                       @0C102@            5  09618
2325                END    2000                      J02000

                          END OF ASSEMBLY
```