```
SEQ PG LIN  LABEL  OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

101                JOB   FORTRAN COMPILER -- VARIABLES PHASE 4 -- 16
102                CTL   6611
103         *
104         * THE COMPILER FIRST SCANS INPUT-OUTPUT LISTS AND THE LEFT
105         * SIDE OF EQUAL SIGNS FOR SIMPLE VARIABLES.  EACH UNIQUE
106         * VARIABLE IS PLACED IN A TABLE WITH ITS OBJECT-TIME ADDRESS.
107         * IN THE SECOND SCAN OF THIS PHASE, ALL VARIABLES ARE MATCHED
108         * AGAINST THE TABLE.  WHEN AN ENTRY IS FOUND, THE OBJECT-TIME
109         * ADDRESS IS SUBSTITUTED IN THE STATEMENT FOR THE VARIABLE
110         * NAME.  VARIABLE NAMES NOT PRESENT IN THE TABLE ARE UNDEFINED.
111         *
112         * ON ENTRY, 83 IS TOPCOR-2, X1 IS THE PREFIX OF THE FIRST
113         * (TOPMOST) STATEMENT, X2 IS X1&1, TOPCD9 (840) IS TOP OF
114         * CODE & X00 - 1, DIFF (845) IS TOPCOR-1 - TOPCD9, AND
115         * BNDRY (848) IS TOPCD9 + 0.3 * DIFF
116         *
117         * ON EXIT, TOPCOR IS THE TOP OF THE SCALAR SYMBOLS TABLE,
118         * 83 IS THE BOTTOM, 86 IS THE CODE SIZE, AND X1 IS THE TOP OF
119         * THE TRANSFORMED CODE
120         *
121         * EACH ELEMENT OF THE SCALAR SYMBOLS TABLE CONSISTS OF THE
122         * THREE-CHARACTER RUN-TIME ADDRESS, WITH A WORD MARK UNDER
123         * THE FIRST CHARACTER, A GROUP MARK, WITH A WORD MARK UNDER
124         * IT IF THE VARIABLE IS NOT REFERENCED, AND THE VARIABLE, WITH
125         * CHARACTERS REVERSED.
126         *
127         X1     EQU   89                                                0089
128         X2     EQU   94                                                0094
129         X3     EQU   99                                                0099
130         *
131         * STUFF IN THE RESIDENT AREA
132         *
133         GLOBER EQU   184  GLOBAL ERROR FLAG -- WM MEANS ERROR          0184
134         IMOD   EQU   690  INTEGER MODULUS -- NUMBER OF DIGITS          0690
135         MANTIS EQU   692  FLOATING POINT MANTISSA DIGITS               0692
136         *
137                EXT00   SNAPSH, LOADNX, CDOVLY                                        MACRO
138         SNAPSH EQU   333                                               0333          GEN
139         PHASLD EQU   381                                               0381          GEN
140         SNAPEX EQU   564                                               0564          GEN
141         LOADNX EQU   700   CARD OVERLAY UNLESS NOP                    0700          GEN
142         CDOVLY EQU   700   1 IF LOADING FROM CARDS, N IF FROM TAPE     0700          GEN
143         TPREAD EQU   704   LOAD OVERLAY FROM TAPE                      0704          GEN
144         TPERR  EQU   728                                               0728          GEN
145         *
146                EXT14   STUFF IN PHASE 14                                              MACRO
147         TOPCD9 EQU   840   TOP OF CODE & X00 - 1 IS BOTTOM OF HASH     0840          GEN
148         DIFF   EQU   845   DIFF = TOPCOR-1 - TOPCD9 IS SIZE OF HASH    0845          GEN
149         BNDRY  EQU   848   TOP OF HASH TABLE                           0848          GEN
150         BEGN14 EQU   849                                               0849          GEN
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SEQ PG LIN  LABEL   OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

151         EXT15   STUFF IN PHASE 15                                                                MACRO
152         CODSIZ  EQU   853   CODE SIZE, 84-86, IN DECIMAL                      0853              GEN
153         TOPCOD  EQU   856   TOP OF CODE & 1                                  0856              GEN
154         BEGN15  EQU   857                                                    0857              GEN
155         EXT18   STUFF IN PHASE 18                                                               MACRO
156         FREBOT  EQU   2599                                                   2599              GEN
157         *
158         110     DCW   @VARBL QUAD@                                    10    0110                    1
159         *
160         PHAS16  LDPH  VARBL QUAD,LOADAD,BEGN16,,,16                                             MACRO
            * PHAZ   LDPH [PHASID],LOADAD,ENTAD[,SKIPFG,SKIP],[NUMBER][,HALT]                      GEN
            *       XFR  PHASZ     PROHIBITED IN A MACRO                                          GEN
            *                                                                                     GEN
            * LOAD A BLOCK                                                                        GEN
            *                                                                                     GEN
161         )6J005  EQU   110  PHASE ID                                         0110              GEN
162         )6K005  EQU   700  LOAD NEXT PHASE                                  0700              GEN
163         )6L005  EQU   704  TAPE READ INSTRUCTION                            0704              GEN
164         )6M005  EQU   728  TAPE ERROR HANDLER                               0728              GEN
            *                                                                                     GEN
165         ORG   201                                                                0201
166         PHAS16  BSS   )8J005,G                                          5    0201  B 257 G     GEN      2   257
167         NOP     TO PATCH IN TRAPS FOR DEBUGGING                         1    0206  N           GEN      2
168         )0J005  EQU   *&1                                                    0207              GEN
169         LCA   )9J005,)6J005                                             7    0207  L 282 110   GEN      2   282     110
170         BCE   )1J005,)6K005,1    Q: LOADING FROM CARDS?                 8    0214  B 250 700 1 GEN      2   250     700
171         BCE   )1J005,)6L005&4,0  Q: LOADING FROM AUTOCODER TAPE?         8    0222  B 250 708 0 GEN      2   250     708
172         RTW   1,LOADAD           READ THE BLOCK                         8    0230  L %U1 857 R GEN      2   %U1     857
173         BER   )6M005             Q: TAPE ERROR?                         5    0238  B 728 L     GEN      3   728
174         CS    BEGN16,)9R005      ENTER THE BLOCK                        7    0243  / 857 286   GEN      3   857     286
175         )1J005  CS    )6K005,)9R005      LOAD CARDS OR AUTOCODER TAPE    7    0250  / 700 286   GEN      3   700     286
176         )8J005  SW    )9R005                                            4    0257  , 286       GEN      3   286
177         MU    %T0,)8K005,W                                              8    0261  M %T0 273 W GEN      3   %T0     273
178         H     )0J005                                                    4    0269  . 207       GEN      3   207
179         )8K005  EQU   *&1                                                    0273              GEN
180         )9J005  DCW   @VARBL QUAD@          PHASE ID                    10   0282              GEN      4
181         DCW   #1                                                        1    0283              GEN      4
182         DC    @16@          PHASE NUMBER                              2    0285              GEN      4
183         )9R005  DCW   @}@                                              1    0286              GEN      4
184         XFR   PHAS16                                                           B 201               4   201
185         *
186         ORG   BEGN15  ABOVE THE TABLE IN PHASE 15                              0857
187         LOADAD  EQU   *&1          LOAD ADDRESS                              0857
188    857  BEGN16  MCW   TOPCD9,GETTOP&3                                   7    0857  M 840 /89           5   840    1189
189    864  MZ    X1TAG,GETTOP&2  X1 ZONE TAG                               7    0864  Y K59 /88           5  2259    1188
190    871  SW    GM                                                        4    0871  , M61               5  2461
191    875  CW    FLAG                                                      4    0875  ) K87               5  2287
192    879  LOOP1   BCE   BOTTOM,0&X1,  BOTTOM (END) OF THE CODE?          8    0879  B !57 0|0           5  2057     000+1
193    887  MCW   0&X1,SEQCOD                                               7    0887  M 0|0 K63           5   000+1  2263
194    894  LCA   0&X1,PREFIX                                              7    0894  L 0|0 K73           6   000+1  2273
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SEQ PG LIN  LABEL   OP    OPERANDS                                  SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

195    901          SAR   X1  X1 AND X3 ARE NOW ONE BELOW THE          4  0901  Q 089              6   089
196    905          SBR   X3    GM THAT SEPARATES PREFIX FROM BODY     4  0905  H 099              6   099
197    909          LCA   PREFIX,0&X2  MOVE UP PREFIX                 7  0909  L K73 0!0          6  2273     000+2
198    916          SBR   X2                                         4  0916  H 094              6   094
199    920          BCE   SKIPIT,SEQCOD-3,/  END STATEMENT?         8  0920  B J40 K60 /        6  2140    2260
200    928          BCE   SKIPIT,SEQCOD-3,F  FORMAT STATEMENT?       8  0928  B J40 K60 F        7  2140    2260
201    936          MCW   K01,W2                                     7  0936  M K75 K77          7  2275    2277
202    943  SWREAD  B     TESTRD                                     4  0943  B W71              7  1671
203    947  FNDVAR  BCE   GOTVAR,0&X1,_  VARIABLE NAME FOLLOWS?      8  0947  B 981 0|0 _        7   981     000+1
204    955          CHAIN 5                                                                    MACRO
205                 BCE                                              1  0955  B          GEN     7
206                 BCE                                              1  0956  B          GEN     7
207                 BCE                                              1  0957  B          GEN     7
208                 BCE                                              1  0958  B          GEN     8
209                 BCE                                              1  0959  B          GEN     8
210    960          BCE   SKIPIT,0&X1,}  BOTTOM OF STATEMENT (GM)?   8  0960  B J40 0|0 } GMARK   8  2140     000+1
211    968          CHAIN 5                                                                    MACRO
212                 BCE                                              1  0968  B          GEN     8
213                 BCE                                              1  0969  B          GEN     8
214                 BCE                                              1  0970  B          GEN     8
215                 BCE                                              1  0971  B          GEN     8
216                 BCE                                              1  0972  B          GEN     9
217    973          SBR   X1                                         4  0973  H 089              9   089
218    977          B     FNDVAR                                     4  0977  B 947              9   947
219         *
220         * X1 GOT TO WITHIN SIX OF A VARIABLE NAME.  GET DOWN TO
221         * IT EXACTLY.
222         *
223    981  GOTVAR  BCE   GOTVR2,0&X1,_                              8  0981  B 997 0|0 _        9   997     000+1
224    989          SBR   X1                                         4  0989  H 089              9   089
225    993          B     GOTVAR                                     4  0993  B 981              9   981
226    997  GOTVR2  SW    1&X1         ONE ABOVE THE UNDERSCORE      4  0997  , 0|1              9   001+1
227  1 001          CW                                               1  1001  )                 10
228  1 002          CW                                               1  1002  )                 10
229  1 003          CW                                               1  1003  )                 10
230  1 004          SAR   X1                                         4  1004  Q 089             10   089
231  1 008          BCE   TOPASG,4&X1,}  AT TOP (LHS) OF ASG STMT IF GM 8  1008  B |31 0|4 } GMARK  10  1031     004+1
232  1 016          LCA   0&X3,0&X2    MOVE UP                      7  1016  L 0?0 0!0          10   000+3   000+2
233  1 023          SBR   X2                                         4  1023  H 094             10   094
234  1 027          CW    1&X2                                       4  1027  ) 0!1             11   001+2
235  1 031  TOPASG  SBR   X3,2&X1      TOP OF VARIABLE               7  1031  H 099 0|2          11   099     002+1
236         *
237         * GET DOWN TO PUNCTUATION
238         *
239  1 038  PUNLP   MCW   0&X1,CH                                     7  1038  M 0|0 K78          11   000+1  2278
240  1 045          SAR   X1                                         4  1045  Q 089              11   089
241  1 049          MCW   CH,*&8                                     7  1049  M K78 |63          11  2278    1063
242  1 056          BCE   GOTPUN,PUNCT,0                            8  1056  B |75 K86 0        11  1075    2286
243  1 064          CHAIN 7                                                                    MACRO
244                 BCE                                              1  1064  B          GEN    11
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SEQ PG LIN  LABEL   OP    OPERANDS                                  SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

245                 BCE                                               1  1065  B           GEN     12
246                 BCE                                               1  1066  B           GEN     12
247                 BCE                                               1  1067  B           GEN     12
248                 BCE                                               1  1068  B           GEN     12
249                 BCE                                               1  1069  B           GEN     12
250                 BCE                                               1  1070  B           GEN     12
251  1 071          B     PUNLP                                       4  1071  B |38             12  1038
252  1 075  GOTPUN  BCE   ASGRHS,CH,#                                  8  1075  B Y06 K78 #       13  1806    2278
253  1 083          BCE   BRACK,2&X1,]                                8  1083  B |95 0|2 ]       13  1095     002+1
254  1 091          B     NOBRAK                                      4  1091  B |99             13  1099
255  1 095  BRACK   SW    FLAG                                        4  1095  , K87             13  2287
256  1 099  NOBRAK  NOP   NOTRD       BRANCH IF NOT DEFINITION        4  1099  N J70             13  2170
257  1 103  AFBRAK  SW    2&X1                                        4  1103  , 0|2             13   002+1
258  1 107          ZA    0&X3,W4     HASHING?                        7  1107  ? 0?0 K91         13   000+3  2291
259  1 114          A     4&X1,W4                                     7  1114  A 0|4 K91         14   004+1  2291
260  1 121          MZ    KBNZ3,W4                                    7  1121  Y K95 K91         14  2295    2291
261  1 128          MZ                                                1  1128  Y                 14
262  1 129          MZ                                                1  1129  Y                 14
263  1 130          MCW                                               1  1130  M                 14
264  1 131  POS     S     DIFF-1,W4   SUBTRACT DIFF/10                7  1131  S 844 K91         14   844    2291
265  1 138          BWZ   POS,W4,B      UNTIL IT'S NEGATIVE           8  1138  V /31 K91 B       14  1131    2291
266  1 146          A     DIFF-1,W4   NOW ADD BACK DIFF/10             7  1146  A 844 K91         15   844    2291
267  1 153          MZ    KNZ,W4                                      7  1153  Y K96 K91         15  2296    2291
268  1 160          MCW   X2,SX1X2                                    7  1160  M 094 L04         15   094    2304
269  1 167          MCW                                               1  1167  M                 15
270  1 168          MCW   W4,X1       TRIPLE                          7  1168  M K91 089         15  2291     089
271  1 175          A     X1            W4                            4  1175  A 089             15   089
272  1 179          A     W4,X1            TO X1                      7  1179  A K91 089         16  2291     089
273  1 186  GETTOP  NOP   0-0         TOPCD9 WITH X1 ZONE TAG STORED HERE 4  1186  N 000         16   000
274  1 190          SAR   X1          TOPCD9 & 3 * W4 RO X1           4  1190  Q 089             16   089
275  1 194          MCW   NOP,SWBIG   TURN OFF ,BEEN AROUND HASH' FLAG 7  1194  M L05 Z73         16  2305    1973
276          *
277          * NOT IN HASH TABLE YET IF BLANK, ELSE CHECK SYMBOL
278          *
279  1 201  SWUN    BCE   ENTER,0&X1,   SWITCHES TO BCE UNDEF....     8  1201  B T02 0|0         16  1302     000+1
280  1 209          BCE   SWBIG,0&X1,<                                8  1209  B Z73 0|0 <       16  1973     000+1
281  1 217          MCW   0&X1,X2    GET SYMBOL TABLE ENTRY ADDRESS    7  1217  M 0|0 094         17   000+1   094
282  1 224          SAR   X1                                          4  1224  Q 089             17   089
283  1 228          C     0&X3,0&X2  COMPARE SYMBOL TO TABLE           7  1228  C 0?0 0!0         17   000+3   000+2
284  1 235          BU    SWUN                                        5  1235  B S01 /           17  1201
285  1 240          C     0&X2,0&X3                                   7  1240  C 0!0 0?0         17   000+2   000+3
286  1 247          SAR   CWSW&3                                     4  1247  Q S59             17  1259
287  1 251          BU    SWUN                                        5  1251  B S01 /           17  1201
288          *
289          * FOUND SYMBOL IN SYMBOL TABLE
290          *
291  1 256  CWSW    MN    0           CW IN PASS 2 TO SAY *REFERENCED*  4  1256  D 000             18   000
292  1 260          SAR   GETADR&3                                    4  1260  Q S75             18  1275
293  1 264  REX1X2  MCW   SX1X2,X2    MEMORIZE X1 AND X2              7  1264  M L04 094         18  2304     094
294  1 271          MCW                                               1  1271  M                 18
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SEQ  PG LIN  LABEL   OP    OPERANDS                                        SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

295   1 272  GETADR LCA   0,0&X2     ADDR FROM SYM TAB REPLACES SYM IN CODE      7  1272  L 000 0!0           18   000     000+2
296   1 279         SBR   X2                                                    4  1279  H 094               18   094
297   1 283         CW    1&X2                                                  4  1283  ) 0!1               18   001+2
298   1 287         SBR   X3,1&X1                                              7  1287  H 099 0|1           19   099     001+1
299   1 294         SBR   X1                                                    4  1294  H 089               19   089
300   1 298  GETSW  B     GETPUN                                                4  1298  B X23               19  1723
301          *
302          * ENTER VARIABLE IN HASH TABLE AND SYMBOL TABLE
303          *
304   1 302  ENTER  MCW   83,X2     BOTTOM OF SYMBOL TABLE TO X2                7  1302  M 083 094           19   083     094
305   1 309         MCW   83,0&X1     AND HASH TABLE                          7  1309  M 083 0|0           19   083     000+1
306   1 316         MCW   0&X3,0&X2   SYMBOL TO SYMBOL TABLE                   7  1316  M 0?0 0!0           19   000+3   000+2
307   1 323         SBR   X2                                                    4  1323  H 094               20   094
308   1 327         BCE   TOOBIG,0&X2,<                                       8  1327  B J88 0!0 <         20  2188     000+2
309   1 335         CHAIN 4                                                                 MACRO
310                 BCE                                                       1  1335  B           GEN     20
311                 BCE                                                       1  1336  B           GEN     20
312                 BCE                                                       1  1337  B           GEN     20
313                 BCE                                                       1  1338  B           GEN     20
314          *
315          * CHECK TYPE OF VARIABLE
316          *
317   1 339         SW    0&X3      AT FIRST CHARACTER OF VARIABLE            4  1339  , 0?0               20   000+3
318   1 343         MCW   0&X3,*&8                                             7  1343  M 0?0 T57           21   000+3  1357
319   1 350         BCE   INTVAR,IJKLMN,0                                      8  1350  B !31 L11 0         21  2031    2311
320   1 358         CHAIN 5                                                                 MACRO
321                 BCE                                                       1  1358  B           GEN     21
322                 BCE                                                       1  1359  B           GEN     21
323                 BCE                                                       1  1360  B           GEN     21
324                 BCE                                                       1  1361  B           GEN     21
325                 BCE                                                       1  1362  B           GEN     21
326          *
327          * FLOATING-POINT VARIABLE
328          *
329   1 363         MZ    ABZONE,TYPTAG  FLOATING POINT TYPE TAG              7  1363  Y L12 L13           22  2312    2313
330   1 370         BW    SETBRK,FLAG                                         8  1370  V W49 K87 1         22  1649    2287
331   1 378         A     MANTIS,CODSIZ                                       7  1378  A 692 853           22   692     853
332   1 385  VAR    C     CODSIZ,KP16K   COMPARE CODSIZ TO 16K                7  1385  C 853 L18           22   853    2318
333   1 392         BH    OKSIZE                                              5  1392  B U25 U             22  1425
334   1 397         BW    OKSIZE,SIZFLG  PRINTED MESSAGE ALREADY?             8  1397  V U25 K25 1         23  1425    2225
335   1 405         CS    332                                                 4  1405  / 332               23   332
336   1 409         CS                                                        1  1409  /                   23
337   1 410         MCW   ERR2A,270                                           7  1410  M L54 270           23  2354     270
338   1 417         W                                                         1  1417  2                   23
339   1 418         SW    GLOBER,SIZFLG     DONT PRINT MESSAGE TWICE          7  1418  , 184 K25           23   184    2225
340          *
341          * CONVERT CODSIZ TO MACHINE ADDRESS
342          *
343   1 425  OKSIZE MCW   CODSIZ,W5                                           7  1425  M 853 L59           23   853    2359
344   1 432         MCW   X3,SX2X3                                            7  1432  M 099 L67           24   099    2367
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SEQ PG LIN  LABEL   OP    OPERANDS                                  SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR
345  1 439          MCW                                                1  1439  M                   24
346  1 440          MN    W5,86                                        7  1440  D L59 086           24  2359     086
347  1 447          MN                                                 1  1447  D                   24
348  1 448          MN                                                 1  1448  D                   24
349  1 449          SAR   *&4            WHY NOT JUST W5-3 IN NEXT A FIELD?  4  1449  Q U56             24  1456
350  1 453          MCW   0,X2           THOUSANDS TO X2               7  1453  M 000 094           24   000     094
351  1 460          MCW   KZ1              AND A ZERO                  4  1460  M L68               25  2368
352  1 464          A     X2             DOUBLE IT                     4  1464  A 094               25   094
353  1 468          MZ    ZONES&1&X2,86                                7  1468  Y KK8 086           25  2228+2   086
354  1 475          CW                                                 1  1475  )                   25
355  1 476          SBR   *&7            WHY NOT JUST 84 IN NEXT B FIELD?  4  1476  H U86             25  1486
356  1 480          MZ    ZONES&X2,0                                   7  1480  Y KK7 000           25  2227+2   000
357  1 487          MCW   86,W3                                        7  1487  M 086 L71           25   086    2371
358  1 494  BRKSET  CW    0&X3                                         4  1494  ) 0?0               26   000+3
359  1 498          CS    299                                          4  1498  / 299               26   299
360  1 502          MN    201                                          4  1502  D 201               26   201
361  1 506          MN                                                 1  1506  D                   26
362  1 507          SAR   X2             WHY NOT JUST SBR X2,199?      4  1507  Q 094               26   094
363  1 511          SBR   X3,0&X3        WHY?                         7  1511  H 099 0?0           26   099     000+3
364  1 518  MVLP    MCW   0&X3,CH2       MOVE                         7  1518  M 0?0 L72           26   000+3  2372
365  1 525          SAR   X3               VARIABLE TO                4  1525  Q 099               27   099
366  1 529          MCW   CH2,2&X2          201... WHILE               7  1529  M L72 0!2           27  2372     002+2
367  1 536          SBR   X2                 REVERSING TO               4  1536  H 094               27   094
368  1 540          BW    *&5,1&X3             CORRECT ORDER            8  1540  V V52 0?1 1         27  1552     001+3
369  1 548          B     MVLP                                         4  1548  B V18               27  1518
370  1 552          MCW   SX2X3,X3                                     7  1552  M L67 099           27  2367     099
371  1 559          MCW                                                1  1559  M                   27
372  1 560          MCW   86,227                                       7  1560  M 086 227           28   086     227
373  1 567          MCS   CODSIZ,219                                   7  1567  Z 853 219           28   853     219
374  1 574          BW    NOVFL1,FLAG                                  8  1574  V V94 K87 1         28  1594    2287
375  1 582          W                                                  1  1582  2                   28
376  1 583          BCV   *&5                                         5  1583  B V92 @             28  1592
377  1 588          B     *&3                                          4  1588  B V94               28  1594
378  1 592          CC    1                                            2  1592  F 1                 28
379  1 594  NOVFL1  SW    1&X2           WM BELOW VARIABLE IN SYMBOL TABLE  4  1594  , 0!1             29   001+2
380  1 598          LCA   GM               AND GMWM BELOW THAT        4  1598  L M61               29  2461
381  1 602          SBR   GETADR&3       STORE SYMBOL TABLE ADDRESS    4  1602  H S75               29  1275
382  1 606          LCA   W3             STORE VARIABLE ADDRESS IN SYM TAB  4  1606  L L71           29  2371
383  1 610          SBR   83             STORE BOTTOM OF SYMBOL TABLE  4  1610  H 083               29   083
384  1 614          SBR   X2               AND IN X2                  4  1614  H 094               29   094
385  1 618          BCE   *&5,SEQCOD-3,D  DO STATEMENT?                8  1618  B W30 K60 D         29  1630    2260
386  1 626          B     *&5                                          4  1626  B W34               30  1634
387  1 630          CW    4&X2           MARK IT REFERENCED            4  1630  ) 0!4               30   004+2
388  1 634          MZ    TYPTAG,2&X2    MOVE TYPE TAG TO SYMBOL TABLE  7  1634  Y L13 0!2           30  2313     002+2
389  1 641          CW    FLAG                                         4  1641  ) K87               30  2287
390  1 645          B     REX1X2                                       4  1645  B S64               30  1264
391            *
392  1 649  SETBRK  MCW   W2,W3                                       7  1649  M K77 L71           30  2277    2371
393  1 656          MCW   KBRACK                                       4  1656  M L73               30  2373
394  1 660          A     KP1,W2                                       7  1660  A L74 K77           31  2374    2277
```

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SEQ PG LIN  LABEL  OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

395  1 667         B     BRKSET                                             4  1667  B U94              31  1494
396         *
397         * TEST FOR A READ STATEMENT (WHICH DEFINES VARIABLES)
398         *
399  1 671  TESTRD BCE   RDSTMT,SEQCOD-3,1  READ TAPE STATEMENT?            8  1671  B X63 K60 1        31  1763    2260
400  1 679         BCE   RDSTMT,SEQCOD-3,5  READ INPUT TAPE STATEMENT?     8  1679  B X63 K60 5        31  1763    2260
401  1 687         BCE   RDSTMT,SEQCOD-3,L  READ STATEMENT?               8  1687  B X63 K60 L        31  1763    2260
402  1 695         MCW   BRANCH,NOBRAK                                     7  1695  M L75 |99          32  2375    1099
403  1 702         MCW   NOP,SWPAR                                         7  1702  M L05 X31          32  2305    1731
404  1 709         MCW   NOP,ASGRHS                                        7  1709  M L05 Y06          32  2305    1806
405  1 716         MCW   NOP,SWDOLR                                       7  1716  M L05 X39          32  2305    1739
406         *
407         * GET X1 DOWN TO UNDERSCORE (VARIABLE) ), $ (SUBSCRIPT) OR GM
408         *
409  1 723  GETPUN BCE   GOTVR2,0&X1,_  VARIABLE?                          8  1723  B 997 0|0 _        32   997     000+1
410  1 731  SWPAR  NOP   UNBRAK,0&X1,)  NOP IF NOT DEFINITION              8  1731  N X95 0|0 )        33  1795     000+1
411  1 739  SWDOLR NOP   SUB,0&X1,$     SUBSCRIPT  NOP IF NOT DEFINITION   8  1739  N Z95 0|0 $        33  1995     000+1
412  1 747  GMTEST BCE   SKIPIT,0&X1,}                                     8  1747  B J40 0|0 } GMARK  33  2140     000+1
413  1 755         SBR   X1                                                4  1755  H 089              33   089
414  1 759         B     GETPUN                                             4  1759  B X23              33  1723
415         *
416         * READ (INPUT) (TAPE) STATEMENT
417         *
418  1 763  RDSTMT MCW   NOP,NOBRAK                                        7  1763  M L05 |99          33  2305    1099
419  1 770         MCW   BRANCH,SWPAR                                      7  1770  M L75 X31          34  2375    1731
420  1 777         MCW   MOVE,ASGRHS                                       7  1777  M L76 Y06          34  2376    1806
421  1 784         MCW   BRANCH,SWDOLR                                     7  1784  M L75 X39          34  2375    1739
422  1 791         B     GETPUN                                             4  1791  B X23              34  1723
423         *
424  1 795  UNBRAK MCW   NOP,NOBRAK                                        7  1795  M L05 |99          34  2305    1099
425  1 802         B     GMTEST                                             4  1802  B X47              34  1747
426  1 806  ASGRHS NOP   BRANCH,SWPAR  NOP IF NOT DEFINITION               7  1806  N L75 X31          35  2375    1731
427  1 813         MCW   BRANCH,NOBRAK                                     7  1813  M L75 |99          35  2375    1099
428  1 820         B     AFBRAK                                             4  1820  B /03              35  1103
429         *
430         * UNDEFINED VARIABLE
431         *
432  1 824  UNDEF  CS    299                                                4  1824  / 299              35   299
433  1 828         SW    GLOBER                                             4  1828  , 184              35   184
434  1 832         MCW   ERR10,230                                          7  1832  M M06 230          35  2406     230
435  1 839         MN    231                                                4  1839  D 231              35   231
436  1 843         MN                                                       1  1843  D                  36
437  1 844         SAR   X1                                                4  1844  Q 089              36   089
438  1 848         SBR   X3,0&X3                                           7  1848  H 099 0?0          36   099     000+3
439         *
440         * MOVE THE VARIABLE TO THE PRINT LINE, REVERSING THE TEXT
441         * BACK TO THE CORRECT ORDER
442         *
443  1 855  VARLP  MCW   0&X3,CHVAR                                         7  1855  M 0?0 M07          36   000+3  2407
444  1 862         SAR   X3                                                 4  1862  Q 099              36   099
```

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SEQ PG LIN  LABEL   OP    OPERANDS                                        SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

445  1 866          MCW   CHVAR,2&X1                                        7  1866  M M07 0|2           36  2407     002+1
446  1 873          SBR   X1                                                4  1873  H 089               36   089
447  1 877          BW    VARLPX,1&X3                                       8  1877  V Y89 0?1 1         37  1889     001+3
448  1 885          B     VARLP                                             4  1885  B Y55               37  1855
449  1 889  VARLPX  MN    SEQCOD,255                                        7  1889  D K63 255           37  2263     255
450  1 896          MN                                                      1  1896  D                   37
451  1 897          MN                                                      1  1897  D                   37
452  1 898          MCW   STMT  @STATEMENT @                               4  1898  M M17               37  2417
453  1 902          W                                                       1  1902  2                   37
454  1 903          BCV   OVFL2                                            5  1903  B Z12 @             38  1912
455  1 908          B     NOVFL2                                            4  1908  B Z14               38  1914
456  1 912  OVFL2   CC    1                                                 2  1912  F 1                 38
457  1 914  NOVFL2  SBR   GETADR&3,KZ3                                     7  1914  H S75 K24           38  1275    2224
458  1 921          BM    TOPQR,231                                         8  1921  V Z40 231 K         38  1940     231
459  1 929  ISOPQR  MZ    ABZONE,KZ3-1  SET X3 TAG                          7  1929  Y L12 K23           38  2312    2223
460  1 936          B     REX1X2                                            4  1936  B S64               38  1264
461          *
462  1 940  TOPQR   SW    231                                               4  1940  , 231               39   231
463  1 944          MCW   231,*&8                                           7  1944  M 231 Z58           39   231    1958
464  1 951          BCE   ISOPQR,OPQR,                                     8  1951  B Z29 M21           39  1929    2421
465  1 959          B                                                       1  1959  B                   39
466  1 960          B                                                       1  1960  B                   39
467  1 961          B                                                       1  1961  B                   39
468  1 962          MZ    X2TAG,KZ3-1  SET X2 TAG                           7  1962  Y M22 K23           39  2422    2223
469  1 969          B     REX1X2                                            4  1969  B S64               40  1264
470          *
471          * GOT TO BOTTOM OF HASH TABLE
472          *
473  1 973  SWBIG   NOP   TOOBIG        BRANCH IF ALREADY BEEN AROUND      4  1973  N J88               40  2188
474  1 977          MCW   BRANCH,SWBIG  NOTE WE'VE BEEN AROUND             7  1977  M L75 Z73           40  2375    1973
475  1 984          MCW   BNDRY,X1      BACK TO TOP OF HASH TABLE          7  1984  M 848 089           40   848     089
476  1 991          B     SWUN          GO LOOK SOME MORE                  4  1991  B S01               40  1201
477          *
478          * SUBSCRIPT
479          *
480  1 995  SUB     SBR   SWDOLR&3,SUB2                                    7  1995  H X42 !13           40  1742    2013
481  2 002          MCW   BRANCH,NOBRAK                                    7  2002  M L75 |99           41  2375    1099
482  2 009          B     GMTEST                                            4  2009  B X47               41  1747
483  2 013  SUB2    SBR   SWDOLR&3,SUB                                     7  2013  H X42 Z95           41  1742    1995
484  2 020          MCW   NOP,NOBRAK                                        7  2020  M L05 |99           41  2305    1099
485  2 027          B     GMTEST                                            4  2027  B X47               41  1747
486          *
487          * INTEGER VARIABLE
488          *
489  2 031  INTVAR  MZ    BZONE,TYPTAG  SET INTEGER VARIABLE ADDRESS TAG    7  2031  Y M23 L13           41  2423    2313
490  2 038          BW    SETBRK,FLAG                                       8  2038  V W49 K87 1         42  1649    2287
491  2 046          A     IMOD,CODSIZ   INCREASE CODSIZ BY INT VAR SIZE     7  2046  A 690 853           42   690     853
492  2 053          B     VAR                                               4  2053  B T85               42  1385
493          *
494          * HIT THE BOTTOM OF THE CODE.  EITHER SET UP FOR PASS 2
```

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SEQ PG LIN  LABEL  OP    OPERANDS                                    SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

495         * OR QUIT.
496         *
497  2 057  BOTTOM MCW   TOPCOD,X1                                     7  2057  M 856 089           42   856     089
498  2 064         CS    0&X2                                          4  2064  / 0!0               42   000+2
499  2 068         CS                                                  1  2068  /                   42
500  2 069  *           SBR  CLEARL&3,GMWM
501  2 076  SWDONE NOP   DONE                                          4  2069  N 700               42   700
502  2 080         SW    GM                                            4  2073  , M61               43  2461
503  2 084         MCW   BRANCH,SWDONE  EXIT NEXT TIME AROUND         7  2077  M L75 !69           43  2375    2069
504  2 091         MCW   CW,CWSW                                       7  2084  M M24 S56           43  2424    1256
505  2 098         MCW   NOP,SWREAD                                    7  2091  M L05 943           43  2305     943
506  2 105         MCW   NOP,NOBRAK                                    7  2098  M L05 |99           43  2305    1099
507  2 112         SBR   SWUN&3,UNDEF                                  7  2105  H S04 Y24           43  1204    1824
508  2 119         SBR   GETSW&3,FNDVAR                                7  2112  H T01 947           44  1301     947
509  2 126         CS    0&X2                                          4  2119  / 0!0               44   000+2
510  2 130         SBR   X2,1&X1                                       7  2123  H 094 0|1           44   094     001+1
511  2 137         SBR   TOPCOD                                        4  2130  H 856               44   856
512  2 141         CC    J                                             2  2134  F J                 44
513  2 143         B     LOOP1  GO DO PASS 2                           4  2136  B 879               44   879
514         *
515         * DONE
516         *
517  2 147  DONE   EQU   LOADNX  LOAD NEXT PHASE                          0700
518         *
519         * STATEMENT HAS NO (MORE) VARIABLES -- SKIP IT
520         *
521  2 163  SKIPIT LCA   0&X3,0&X2                                     7  2140  L 0?0 0!0           44   000+3   000+2
522  2 170         SAR   X3                                            4  2147  Q 099               45   099
523  2 174         C     0&X2  DOWN TO                                 4  2151  C 0!0               45   000+2
524  2 178         SAR   X2      NEXT WM IN TARGET                     4  2155  Q 094               45   094
525  2 182         MCW   X3,X1                                         7  2159  M 099 089           45   099     089
526  2 189         B     LOOP1                                         4  2166  B 879               45   879
527         *
528  2 193  NOTRD  SBR   X1,1&X1                                      7  2170  H 089 0|1           45   089     001+1
529  2 200         SBR   X3,1&X3                                      7  2177  H 099 0?1           45   099     001+3
530  2 207         B     GETPUN                                        4  2184  B X23               46  1723
531         *
532         * PROGRAM IS TOO BIG
533         *
534  2 211  TOOBIG CS    332                                           4  2188  / 332               46   332
535  2 215         CS                                                  1  2192  /                   46
536  2 216         CC    1                                             2  2193  F 1                 46
537  2 218         MCW   ERROR2,270                                    7  2195  M M60 270           46  2460     270
538  2 225         W                                                   1  2202  2                   46
539  2 226         CC    1                                             2  2203  F 1                 46
540  2 228         BCE   HALT,CDOVLY,1                                8  2205  B K18 700 1         47  2218     700
541  2 236         RWD   1                                             5  2213  U %U1 R             47   %U1
542  2 241  HALT   H     HALT                                          4  2218  . K18               47  2218
543         *
544         * DATA
```

```
SEQ PG LIN  LABEL  OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

545         *
546  2 247  KZ3    DCW   000                                                 3  2224                      47
547  2 248  SIZFLG DC    #1  SET WHEN SIZE MESSAGE PRINTED                   1  2225                      47
548  2 250  ZONES  DCW   @ 9@                                               2  2227                      47
549  2 281         DCW   @9Z9R9I99ZZZRZIZ9RZRRRIR9IZIRIII@                31  2258                      48
550  2 282  X1TAG  DCW   @S@                                                 1  2259                      48
551  2 286  SEQCOD DCW   #4        SEQUENCE NUMBER AND STATEMENT CODE         4  2263                      48
552  2 296  PREFIX DCW   #10       STATEMENT PREFIX                         10  2273                      49
553  2 298  K01    DCW   01                                                  2  2275                      49
554  2 300  W2     DCW   #2                                                  2  2277                      49
555  2 301  CH     DCW   #1                                                  1  2278                      49
556  2 309  PUNCT  DCW   @@}#*-&),@                                          8  2286                      49
557  2 310  FLAG   DCW   #1                                                  1  2287                      49
558  2 314  W4     DCW   #4                                                  4  2291                      49
559  2 318  KBNZ3  DCW   #4        USED TO GET A BLANK AND THREE "NO ZONE"    4  2295                      50
560  2 319  KNZ    DCW   #1        USED TO GET "NO ZONE"                     1  2296                      50
561  2 327  SX1X2  DCW   #8        SAVE X1 AND X2                            8  2304                      50
562  2 328  NOP    NOP                                                       1  2305  N                   50
563  2 334  IJKLMN DCW   @IJKLMN@                                            6  2311                      50
564  2 335  ABZONE DCW   @A@       X3 TAG, FLOATING POINT TYPE TAG           1  2312                      50
565  2 336  TYPTAG DCW   #1        VARIABLE TYPE TAG                         1  2313                      50
566  2 341  KP16K  DCW   &16000                                              5  2318                      51
567  2 377  ERR2A  DCW   @MESSAGE 2 - OBJECT PROGRAM TOO LARGE@             36  2354                      52
568  2 382  W5     DCW   #5                                                  5  2359                      53
569  2 390  SX2X3  DCW   #8                                                  8  2367                      53
570  2 391  KZ1    DCW   0                                                   1  2368                      53
571  2 394  W3     DCW   #3                                                  3  2371                      53
572  2 395  CH2    DCW   #1                                                  1  2372                      53
573  2 396  KBRACK DCW   @]@                                                 1  2373                      53
574  2 397  KP1    DCW   &1                                                  1  2374                      53
575  2 398  BRANCH B                                                        1  2375  B                   54
576  2 399  MOVE   MCW                                                      1  2376  M                   54
577  2 429  ERR10  DCW   @ERROR 10 - UNDEFINED VARIABLE @                  30  2406                      54
578  2 430  CHVAR  DCW   #1  USED FOR REVERSING VARIABLE TEXT               1  2407                      54
579  2 440  STMT   DCW   @STATEMENT @                                      10  2417                      55
580  2 444  OPQR   DCW   @OPQR@                                              4  2421                      55
581  2 445  X2TAG  DCW   @K@                                                 1  2422                      55
582  2 446  BZONE  DCW   @J@       INTEGER VARIABLE ADDRESS TAG              1  2423                      55
583  2 447  CW     CW                                                        1  2424  )                   55
584  2 492  ERROR2 DCW   @MESSAGE 2 - OBJECT PROGRAM TOO LARGE@             36  2460                      56
585  2 493  GM     DC    @}@                                                 1  2461            GMARK   56
586  2 498         DC    #5                                                  5  2466                      57
587  2 499  GMWM   DCW   @}@                                                 1  2467            GMARK   57
588                XFR   BEGN16                                                   B 857                 57   857
589         CLRME  CLRA  BEGN16,FREBOT,D                                                    MACRO
            *      CLRA  CLRBOT,CLRTOP[,SS,HERE,GWMAD]                                      GEN
            *                                                                               GEN
            * CLEAR CORE AFTER A PHASE USING THE CLRTOP ADDRESS                              GEN
            *                                                                               GEN
590                ORG   201                                                       0201
```

```
SEQ PG LIN  LABEL   OP    OPERANDS                                    SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR
            *                                                                                 GEN
            * CLEAR DOWN TO CLRBOT & X00 THE EASY WAY                                         GEN
            *                                                                                 GEN
591         CLRME   EQU   *&1                                              0201               GEN
592                 BSS   SNAPSH,D                                      5  0201  B 333 D      GEN     58   333
593         )0J006  CS    FREBOT         CLEAR FROM CLRTOP              4  0206  / N99        GEN     58  2599
594                 SBR   )0J006&3                                      4  0210  H 209        GEN     58   209
595                 SBR   )0L006&6                                      4  0214  H 255        GEN     58   255
596                 C     )0J006&3,)0M006   DOWN TO CLRBOT & X00?       7  0218  C 209 266    GEN     58   209     266
597                 BU    )0J006                                        5  0225  B 206 /      GEN     58   206
            *                                                                                 GEN
            * NOW CLEAR DOWN TO CLRBOT THE HARD WAY                                          GEN
            *                                                                                 GEN
598         )0K006  C     )0L006&6,)0N006                               7  0230  C 255 269    GEN     58   255     269
599                 BU    )0L006                                        5  0237  B 249 /      GEN     59   249
600                 CS    LOADNX,)0Q006  LOAD THE NEXT BLOCK AT 1       7  0242  / 700 276    GEN     59   700     276
601         )0L006  LCA   )0P006,0-0     CLEAR WITH BLANK AND WORD MARK 7  0249  L 270 000    GEN     59   270     000
602                 SBR   )0L006&6                                      4  0256  H 255        GEN     59   255
603                 B     )0K006                                        4  0260  B 230        GEN     59   230
604         )0M006  DSA   )0R006         CLRBOT & X00 - 1              3  0266  899          GEN     59   899
605         )0N006  DSA   BEGN16         CLRBOT                        3  0269  857          GEN     59   857
606         )0P006  DCW   #1                                           1  0270               GEN     60
607                 DC    @CLRA @     IDENTIFY IN A DECK, TAPE, OR DUMP 5  0275               GEN     60
608         )0Q006  DCW   @}@                                          1  0276               GEN     60
609                 ORG   BEGN16&X00                                           0900
610         )0R006  EQU   *           CLRBOT & X00 - 1                    0899               GEN
611                 XFR   CLRME                                                 B 201                60   201
```

SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS
)0J005	0207: 0	)0J006	0206: 0	)0K006	0230: 0	)0L006	0249: 0	)0M006	0266: 0	)0N006	0269: 0
)0P006	0270: 0	)0Q006	0276: 0	)0R006	0899: 0	)1J005	0250: 0	)6J005	0110: 0	)6K005	0700: 0
)6L005	0704: 0	)6M005	0728: 0	)8J005	0257: 0	)8K005	0273: 0	)9J005	0282: 0	)9R005	0286: 0
ABZONE	2312: 0	AFBRAK	1103: 0	ASGRHS	1806: 0	BEGN14	0849: 0	BEGN15	0857: 0	BEGN16	0857: 0
BNDRY	0848: 0	BOTTOM	2057: 0	BRACK	1095: 0	BRANCH	2375: 0	BRKSET	1494: 0	BZONE	2423: 0
CDOVLY	0700: 0	CH	2278: 0	CH2	2372: 0	CHVAR	2407: 0	CLRME	0201: 0	CODSIZ	0853: 0
CW	2424: 0	CWSW	1256: 0	DIFF	0845: 0	DONE	0700: 0	ENTER	1302: 0	ERR10	2406: 0
ERR2A	2354: 0	ERROR2	2460: 0	FLAG	2287: 0	FNDVAR	0947: 0	FREBOT	2599: 0	GETADR	1272: 0
GETPUN	1723: 0	GETSW	1298: 0	GETTOP	1186: 0	GLOBER	0184: 0	GM	2461: 0	GMTEST	1747: 0
GMWM	2467: 0	GOTPUN	1075: 0	GOTVAR	0981: 0	GOTVR2	0997: 0	HALT	2218: 0	IJKLMN	2311: 0
IMOD	0690: 0	INTVAR	2031: 0	ISOPQR	1929: 0	K01	2275: 0	KBNZ3	2295: 0	KBRACK	2373: 0
KNZ	2296: 0	KP1	2374: 0	KP16K	2318: 0	KZ1	2368: 0	KZ3	2224: 0	LOADAD	0857: 0
LOADNX	0700: 0	LOOP1	0879: 0	MANTIS	0692: 0	MOVE	2376: 0	MVLP	1518: 0	NOBRAK	1099: 0
NOP	2305: 0	NOTRD	2170: 0	NOVFL1	1594: 0	NOVFL2	1914: 0	OKSIZE	1425: 0	OPQR	2421: 0
OVFL2	1912: 0	PHAS16	0201: 0	PHASLD	0381: 0	POS	1131: 0	PREFIX	2273: 0	PUNCT	2286: 0
PUNLP	1038: 0	RDSTMT	1763: 0	REX1X2	1264: 0	SEQCOD	2263: 0	SETBRK	1649: 0	SIZFLG	2225: 0
SKIPIT	2140: 0	SNAPEX	0564: 0	SNAPSH	0333: 0	STMT	2417: 0	SUB	1995: 0	SUB2	2013: 0
SWBIG	1973: 0	SWDOLR	1739: 0	SWDONE	2069: 0	SWPAR	1731: 0	SWREAD	0943: 0	SWUN	1201: 0
SX1X2	2304: 0	SX2X3	2367: 0	TESTRD	1671: 0	TOOBIG	2188: 0	TOPASG	1031: 0	TOPCD9	0840: 0
TOPCOD	0856: 0	TOPQR	1940: 0	TPERR	0728: 0	TPREAD	0704: 0	TYPTAG	2313: 0	UNBRAK	1795: 0
UNDEF	1824: 0	VAR	1385: 0	VARLP	1855: 0	VARLPX	1889: 0	W2	2277: 0	W3	2371: 0
W4	2291: 0	W5	2359: 0	X1	0089: 0	X1TAG	2259: 0	X2	0094: 0	X2TAG	2422: 0
X3	0099: 0	ZONES	2227: 0								

UNREFERENCED SYMBOLS

BEGN14 GMWM PHASLD SNAPEX TPERR TPREAD