```
0001  * 0180  (016-DECL)          DWG. 70181506000       REV. B          DECL0001
0002  *                                                                 DECL0002
0003  *                                                                 DECL0003
0004  *                                                                 DECL0004
0005  * COMPUTER:  DDP-516, H316                                        DECL0005
0006  *                                                                 DECL0006
0007  *                                                                 DECL0007
0008  * PROGRAM CATEGORY:  ASSEMBLY                                     DECL0008
0009  *                                                                 DECL0009
0010  *                                                                 DECL0010
0011  * PROGRAM TITLE:  016-DECL (DECI, DECC)                           DECL0011
0012  *                 DECIMAL, HEXADECIMAL, AND OCTAL CONVERSION      DECL0012
0013  *                                                                 DECL0013
0014  *                                                                 DECL0014
0015  *                                                                 DECL0015
0016  *                                                                 DECL0016
0017  *                                                                 DECL0017
0018  *                                                                 DECL0018
0019  *                                                                 DECL0019
0020  *                                                                 DECL0020
0021  *                                                                 DECL0021
0022  *                                                                 DECL0022
0023  *                                                                 DECL0023
0024  *                          APPROVAL              DATE             DECL0024
0025  *                                                                 DECL0025
0026  *                                                                 DECL0026
0027  *                                                                 DECL0027
0028  *                          PROG----------------  ----------DECL0028
0029  *                                                                 DECL0029
0030  *                                                                 DECL0030
0031  *                          SUPR----------------  ----------DECL0031
0032  *                                                                 DECL0032
0033  *                                                                 DECL0033
0034  *                          QUAL M.R. Henryman    16 FEB 71 DECL0034
0035  *                                                                 DECL0035
0036  *                                                                 DECL0036
0037  *                                NO. OF PAGES    23       DECL0037
```

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```
0038      EJCT                                                          DECL0038
0039  * REVISIONS:                                                     DECL0039
0040  *                                                                 DECL0040
0041  * REV. B   ECO                                                   DECL0041
0042  * REV. A                        05-04-70                         DECL0042
0043  *                                                                 DECL0043
0044  *                                                                 DECL0044
0045  *                                                                 DECL0045
0046  * AUTHOR                                                          DECL0046
0047  *                                                                 DECL0047
0048  *    HONEYWELL INC., COMPUTER CONTROL DIVISION                    DECL0048
0049  *                                                                 DECL0049
0050  *                                                                 DECL0050
0051  * PURPOSE                                                         DECL0051
0052  *                                                                 DECL0052
0053  *    TO CONVERT AN INPUT STRING OF CHARACTERS TO BINARY.          DECL0053
0054  *                                                                 DECL0054
0055  *                                                                 DECL0055
0056  * RESTRICTIONS                                                    DECL0056
0057  *                                                                 DECL0057
0058  *    THIS ROUTINE IS USED BY THE DAP-16M2 ASSEMBLER               DECL0058
0059  *    DO NOT USE EQUATES TO MAIN ASSEMBLER PROGRAM.                DECL0059
0060  *                                                                 DECL0060
0061  *                                                                 DECL0061
0062  * STORAGE                                                         DECL0062
0063  *                                                                 DECL0063
0064  *    1126 (OCTAL)                                                 DECL0064
0065  *     598 (DECIMAL)                                               DECL0065
0066  *                                                                 DECL0066
0067  *                                                                 DECL0067
0068  * USE                                                             DECL0068
0069  *                                                                 DECL0069
0070  *    CALLING SEQUENCE                                             DECL0070
0071  *                                                                 DECL0071
0072  *    CALL DECI                  INITIALIZE SWITCHES AND COUNTERS. DECL0072
0073  *                               NORMAL RETURN.                    DECL0073
0074  *                                                                 DECL0074
```

```
0075  *     CALL  DECC                CONVERSION ROUTINE.                          DECL0075
0076  *                               NUMERIC RETURN.                              DECL0076
0077  *                               ALPHA RETURN.                                DECL0077
0078  *                               ILLEGAL CHARACTER RETURN.                    DECL0078
0079  *                                                                            DECL0079
0080  *     DECC CONVERTS AN INPUT STRING OF DECIMAL DIGITS AND CONTROL            DECL0080
0081  *          CHARACTERS TO THE CORRESPONDING BINARY REPRESENTATION.            DECL0081
0082  *                                                                            DECL0082
0083  *                                                                            DECL0083
0084  * METHOD                                                                     DECL0084
0085  *                                                                            DECL0085
0086  *     THE BASIC METHOD USED IS AS FOLLOWS:                                   DECL0086
0087  *                                                                            DECL0087
0088  *                                                                            DECL0088
0089  *       (A)  THE MAGNITUDE OF THE NUMBER IS CONVERTED TO A TRIPLE            DECL0089
0090  *            PRECISION BINARY INTEGER BY MULTIPLYING THE PARTIAL             DECL0090
0091  *            SUM BY 10 AND ADDING THE CURRENT DIGIT.                         DECL0091
0092  *                                                                            DECL0092
0093  *       (B)  A COUNT IS MADE OF THE NUMBER OF PLACES THAT                    DECL0093
0094  *            FOLLOW THE DECIMAL POINT.                                       DECL0094
0095  *                                                                            DECL0095
0096  *       (C)  THE E AND B FIELDS ARE ASSEMBLED AS SIGNED SINGLE               DECL0096
0097  *            PRECISION INTEGERS.                                             DECL0097
0098  *                                                                            DECL0098
0099  *       (D)  IF OVERFLOW OCCURS WHILE BUILDING THE TRIPLE PRECISION          DECL0099
0100  *            BINARY INTEGER AFTER THE DECIMAL POINT HAS BEEN DETECTED,       DECL0100
0101  *            THE REMAINING DIGITS OF THE MAGNITUDE FIELD ARE IGNORED.        DECL0101
0102  *                                                                            DECL0102
0103  *       (E)  IF OVERFLOW OCCURS BEFORE THE DECIMAL POINT IS DETECTED,        DECL0103
0104  *            A COUNT IS MAINTAINED OF THE NUMBER OF DIGITS TO THE POINT      DECL0104
0105  *            OR END OF FIELD.                                                DECL0105
0106  *                                                                            DECL0106
0107  *       (F)  THE COUNTS IN (B) AND (E) ARE COMBINED TO GIVE A NET            DECL0107
0108  *            IMPLIED DECIMAL EXPONENT. THESE ARE SUMMED WITH THE             DECL0108
0109  *            E FIELD VALUE TO GIVE A TOTAL DECIMAL EXPONENT.                 DECL0109
0110  *                                                                            DECL0110
0111  *       (G)  A TEST IS MADE FOR INTEGER CONVERSION. IF INTEGER CONVERSION    DECL0111
```

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```
0112  *            IS REQUIRED AN EXIT IS MADE AT THIS POINT.                     DECL0112
0113  *                                                                          DECL0113
0114  *       (H)  THE BINARY INTEGER IS FLOATED AND EITHER A FLOAT MULTIPLY     DECL0114
0115  *            OR FLOAT DIVIDE ROUTINE IS ENTERED IF THE TOTAL DECIMAL       DECL0115
0116  *            EXPONENT IS NON ZERO.                                         DECL0116
0117  *                                                                          DECL0117
0118  *       (I)  IF FLOATING POINT CONVERSION IS REQUIRED, THE NUMBER IS       DECL0118
0119  *            TRUNCATED TO THE PROPER SIZE, COMPLEMENTED IF NEGATIVE,       DECL0119
0120  *            AND PACKED INTO THE PROPER NUMBER OF WORDS.                   DECL0120
0121  *                                                                          DECL0121
0122  *       (J)  IF FIXED POINT CONVERSION IS REQUIRED, THE B FIELD            DECL0122
0123  *            VALUE IS SUBTRACTED FROM THE BINARY EXPONENT TO DETERMINE     DECL0123
0124  *            THE LENGTH OF THE SHIFT. THE ADJUSTED FLOATING POINT          DECL0124
0125  *            NUMBER IS FIXED, TRUNCATED TO THE PROPER SIZE, AND, IF        DECL0125
0126  *            NEGATIVE, COMPLEMENTED.                                       DECL0126
0127  *                                                                          DECL0127
0128  *       (K)  IF THE ASSEMBLER HAS CALLED FOR OCTAL CONVERSION, A SINGLE    DECL0128
0129  *            PRECISION OCTAL INTEGER IS BUILT UP.                          DECL0129
0130  *                                                                          DECL0130
0131  *       (L)  IF THE ASSEMBLER HAS CALLED FOR HEXADECIMAL CONVERSION,       DECL0131
0132  *            A SINGLE PRECISION HEXADECIMAL INTEGER IS BUILT UP.           DECL0132
0133  *                                                                          DECL0133
0134  *       (M)  INFORMATION AS TO DATA SIZE, DATA VALIDITY, AND TERMINAL      DECL0134
0135  *            CHARACTERS ARE PASSED BACK TO THE MAIN BODY OF THE            DECL0135
0136  *            ASSEMBLER IN ADDITION TO THE CONVERTED NUMBER.                DECL0136
0137  *                                                                          DECL0137
0138  *                                                                          DECL0138
0139  *                                                                          DECL0139
0140  ************************************************************************DECL0140
0141  *                                                                          DECL0141
0142        SUBR  DECC,DECC                                                     DECL0142
0143        SUBR  DECI                                                          DECL0143
0144  *                                                                         DECL0144
0145        CF3                     FOR USE ON H316 AND DDP-516                 DECL0145
0146        REL                     THIS PROGRAM IS RELOCATABLE                 DECL0146
0147  *                                                                         DECL0147
0148        EXT   ERD               CONVERSION ERROR FLAG                       DECL0148
```

```
0149                              EXT   WCNT     WORD COUNT                                  DECL0149
0150                              EXT   DOCT     CONVERSION MODE                             DECL0150
0151                              EXT   TERM     CURRENT CHARACTER                           DECL0151
0152                              EXT   NUM      FIRST WORD OF NUMERIC ACCUMULATORS          DECL0152
0153                              EXT   NUM1     SECOND WORD                                 DECL0153
0154                              EXT   NUM2     THIRD WORD                                  DECL0154
0155                              EXT   NUM3                                                 DECL0155
0156                              EXT   SIGN     ARITHMETIC SIGN                             DECL0156
0157                              EXT   ALFA     NON-NUMERIC ITEM FLAG                       DECL0157
0158                              EXT   DECF     DECIMAL FLAG                                DECL0158
0159                              EXT   LITF     LITERAL FLAG                                DECL0159
0160                        *                                                                DECL0160
0161                        *                                                                DECL0161
0162 00000   0 000000   DECC DAC   *-*                                                       DECL0162
0163 00001   0 02 00000       LDA   TERM     FETCH THE INPUT CHARACTER                       DECL0163
0164 00002   0 11 01125       CAS   ='271    DESIGNATE ASCII CODES 272 THRU 300              DECL0164
0165 00003   0 11 01124       CAS   ='301    AS NON-DIGITS                                   DECL0165
0166 00004   0 01 00007       JMP   *+3                                                      DECL0166
0167 00005   100000           SKP                                                            DECL0167
0168 00006   0 01 00032       JMP   LETR     CONSIDER IT A LETTER                            DECL0168
0169 00007   0 07 00037       SUB   K260     TEST FOR POSSIBLE NUMERIC                       DECL0169
0170 00010   100400           SPL                                                            DECL0170
0171 00011   0 01 00067       JMP   SPEC     NOT NUMERIC                                     DECL0171
0172 00012   0 07 00034       SUB   K12      SEE IF DECIMAL DIGIT                            DECL0172
0173 00013   101400           SMI            SKIP IF SO                                      DECL0173
0174 00014   0 07 00041       SUB   Q7       NO...MAYBE HEX DIGIT                            DECL0174
0175 00015   0 06 00034       ADD   K12      RESTORE TO BINARY VALUE                         DECL0175
0176 00016   0 04 00532       STA   CH       SAVE FOR USE IF ITS A DIGIT                     DECL0176
0177 00017   0 35 00000       LDX   DOCT     X6-1 IF DEC MODE, 0 IF OCT, +1 IF HEX           DECL0177
0178 00020   1 11 00035       CAS   RNG,1    SEE IF ITS A DIGIT IN CURRENT MODE              DECL0178
0179 00021   0 01 00024       JMP   *+3      NO                                              DECL0179
0180 00022   100000           SKP            NO                                              DECL0180
0181 00023   1 01 00131       JMP   BNCH,1   YES...GO PROCESS IT                             DECL0181
0182 00024   0 07 01123       SUB   =11      TEST FOR B                                      DECL0182
0183 00025   101040           SNZ                                                            DECL0183
0184 00026   0 01 00043       JMP   B        YES                                             DECL0184
0185 00027   0 07 01122       SUB   =3       MAYBE AN 'E'                                    DECL0185
```

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```
0186 00030   101040           SNZ            SKIP IF NOT                                     DECL0186
0187 00031   0 01 00044       JMP   B+1      YES                                             DECL0187
0188 00032   0 12 00000 LETR  IRS   DECC                                                    DECL0188
0189 00033  -0 01 00000       JMP*  DECC     AND EXIT                                        DECL0189
0190                        *                                                              DECL0190
0191 00034   000012     K12   OCT   12       MAX+1 FOR DEC CONVERSION                        DECL0191
0192 00035   000010     RNG   OCT   10       MAX+1 FOR OCT CONVERSION                        DECL0192
0193 00036   000020           OCT   20       MAX+1 FOR HEX CONVERSION                        DECL0193
0194 00037   000260     K260  OCT   260      CONSTANTS                                       DECL0194
0195 00040   000302     K302  OCT   302      X                                               DECL0195
0196 00041   000007     Q7    OCT   7        X                                               DECL0196
0197                        *                                                              DECL0197
0198 00042   0 02 01121       LDA   =-2      HERE ON DEC DIGIT                               DECL0198
0199 00043   0 06 00557 B     ADD   Q1       B IS +2                                         DECL0199
0200 00044   0 06 00557       ADD   Q1       E IS +1, DIGIT IS +0                            DECL0200
0201 00045   101040           SNZ            ON B AND E TEST OCTAL FLAG                      DECL0201
0202 00046  -0 01 00227       JMP*  SW       DIGIT - ENTER PROCESSOR                         DECL0202
0203 00047   0 04 00532       STA   CH       SAVE THE E OR B FLAG                            DECL0203
0204 00050   0 02 00000       LDA   DOCT     SEE IF DEC OR DBP PSEUDO-OP PROCESSING          DECL0204
0205 00051   101400           SMI                                                            DECL0205
0206 00052   0 01 00032       JMP   LETR     IF NOT SET, CAN'T BE NUMERIC                    DECL0206
0207 00053   0 06 00000       ADD   DECF     DOCT+DECF=-2 IF SO                              DECL0207
0208 00054   141206           AOA                                                            DECL0208
0209 00055   101400           SMI            X                                               DECL0209
0210 00056   0 01 00062       JMP   LTRL     CHECK IF LITERAL                                DECL0210
0211 00057   0 04 00533 RTN1  STA   PNT      CLAIM THERE WAS A POINT.                        DECL0211
0212 00060   0 02 00532 XIT1  LDA   CH       RESTORE THE FLAG                                DECL0212
0213 00061  -0 01 00227       JMP*  SW       AND ENTER THE PROCESSOR                         DECL0213
0214                        *                                                              DECL0214
0215 00062   0 02 00000 LTRL  LDA   LITF     CHECK LITERAL FLAG                              DECL0215
0216 00063   100040           SZE            IF RESET, IT IS A LITERAL                       DECL0216
0217 00064   0 01 00032       JMP   LETR     B AND E ARE LETTERS IF OCTAL                    DECL0217
0218 00065   140401           CMA            FILL REGISTER                                   DECL0218
0219 00066   0 01 00057       JMP   RTN1     CONTINUE PROCESSING                             DECL0219
0220                        *                                                              DECL0220
0221 00067   0 06 00127 SPEC  ADD   Q2       TEST FOR A DECIMAL POINT                        DECL0221
0222 00070   101040           SNZ            X                                               DECL0222
```

```
0223 00071   0 01 00104       JMP   XIT          IT IS DECIMAL POINT                    DECL0223
0224 00072   101400           SMI                TEST FOR A SLASH                       DECL0224
0225 00073   0 01 00032       JMP   LETR         YES - CALL IT A LETTER                 DECL0225
0226 00074   0 06 00127       ADD   Q2           TEST FOR A COMMA                       DECL0226
0227 00075   101040           SNZ                X                                      DECL0227
0228 00076   0 01 00365       JMP   CVRT         IT IS A COMMA                          DECL0228
0229 00077   101400           SMI                TEST FOR MINUS                         DECL0229
0230 00100   0 01 00104       JMP   XIT          IT IS MINUS                            DECL0230
0231 00101   0 04 00532       STA   CH           TEST FOR PLUS                          DECL0231
0232 00102   0 12 00532       IRS   CH           X                                      DECL0232
0233 00103   0 01 00362       JMP   BTST         NOT PLUS - TEST FOR BLANK              DECL0233
0234 00104   0 06 00126 XIT   ADD   M1           FORM THE CODE FOR (+), (-), (.)        DECL0234
0235 00105   0 04 00532       STA   CH           AND SAVE IT                            DECL0235
0236 00106   0 02 00000       LDA   DOCT         TEST CONVERSION MODE                   DECL0236
0237 00107   100400           SPL                X                                      DECL0237
0238 00110   0 01 00060       JMP   XIT1         IT IS DECIMAL                          DECL0238
0239 00111   0 02 00532       LDA   CH           RECOVER THE CODE                       DECL0239
0240 00112   0406 77          ARR   1            TEST FOR DECIMAL POINT                 DECL0240
0241 00113   100400           SPL                X                                      DECL0241
0242 00114   0 01 00032       JMP   LETR         TREAT POINT AS LETTER IF OCTAL         DECL0242
0243 00115   0 02 00000 OCT   LDA   SIGN         TEST FOR COMPLEMENT CYCLE              DECL0243
0244 00116   101400           SMI                X                                      DECL0244
0245 00117   0 01 00123       JMP   OCT1         NOT REQUIRED                           DECL0245
0246 00120   140040           CRA                COMPLEMENT THE WORD                    DECL0246
0247 00121   0 07 00000       SUB   NUM                                                 DECL0247
0248 00122   0 04 00000       STA   NUM                                                 DECL0248
0249 00123   0 02 00557 OCT1  LDA   Q1           SET THE WORD COUNT TO 1                DECL0249
0250 00124   0 04 00000       STA   WCNT         X                                      DECL0250
0251 00125   0 01 00523       JMP   END          AND EXIT                               DECL0251
0252                 *                                                                 DECL0252
0253 00126   100001      M1   OCT   100001       X                                      DECL0253
0254 00127   000002      Q2   OCT   2            X                                      DECL0254
0255                 *                                                                 DECL0255
0256                 *                                                                 DECL0256
0257                 *                                                                 DECL0257
0258 00130   0 01 00042       JMP   B-1          PROCESS DECIMAL DIGIT                  DECL0258
0259 00131   0 01 00137 BNCH  JMP   OCTC         PROCESS OCTAL DIGIT                    DECL0259
```



```
0260                 *                                                                 DECL0260
0261                 *    HERE FOR HEX CONVERSION                                      DECL0261
0262                 *                                                                 DECL0262
0263 00132   0 02 00000       LDA   NUM          FETCH PREVIOUS ACCUMULATION            DECL0263
0264 00133   0416 74          ALR   4            *16, OVERFLOW IN A(13-16)              DECL0264
0265 00134   0 04 00000       STA   NUM          SAVE PARTIAL RESULT                    DECL0265
0266 00135   0 03 01120       ANA   =*17         ISOLATE OVERFLOW BITS                  DECL0266
0267 00136   0 01 00143       JMP   OCTX         JOIN OCTAL PROCESSOR                   DECL0267
0268                 *                                                                 DECL0268
0269                 *    HERE FOR OCTAL CONVERSION                                    DECL0269
0270                 *                                                                 DECL0270
0271 00137   0 02 00000 OCTC  LDA   NUM          FETCH PREVIOUS ACCUMULATION            DECL0271
0272 00140   0416 75          ALR   3            *8, OVERFLOW IN A(14-16)               DECL0272
0273 00141   0 04 00000       STA   NUM          SAVE PARTIAL RESULT                    DECL0273
0274 00142   0 03 00041       ANA   Q7           ISOLATE OVERFLOW BITS                  DECL0274
0275 00143   100040      OCTX SZE               SKIP IF NO OVERFLOW                    DECL0275
0276 00144   0 04 00000       STA   ERD          SET CONVERSION ERROR FLAG              DECL0276
0277 00145   0 05 00000       ERA   NUM          PUT HIGH ORDER BITS BACK IN            DECL0277
0278 00146   0 05 00532       ERA   CH           INSERT THE NEW DIGIT                   DECL0278
0279 00147   0 04 00000       STA   NUM          SAVE RESULT                            DECL0279
0280 00150   -0 01 00000      JMP*  DECC         AND RETURN                             DECL0280
0281                 *                                                                 DECL0281
0282 00151   101040      DEC1 SNZ               TEST FOR DIGIT INPUT                   DECL0282
0283 00152   0 01 00166       JMP   DEC2         IT IS A DIGIT                          DECL0283
0284 00153   101400           SMI                TEST FOR B OR E                        DECL0284
0285 00154   0 01 00207       JMP   DEC3         IT IS B OR E                           DECL0285
0286 00155   0406 77          ARR   1            TEST FOR DECIMAL POINT                 DECL0286
0287 00156   101400           SMI                X                                      DECL0287
0288 00157   0 01 00370       JMP   CVR1         TERMINATE ON PLUS OR MINUS             DECL0288
0289 00160   0 12 00533       IRS   PNT          MARK A DECIMAL POINT                   DECL0289
0290 00161   0 02 00533       LDA   PNT          TEST FOR A SINGLE POINT                DECL0290
0291 00162   0 07 00557       SUB   Q1           X                                      DECL0291
0292 00163   100040           SZE                X                                      DECL0292
0293 00164   0 01 00032       JMP   LETR         TREAT EXTRA POINTS AS LETTERS          DECL0293
0294 00165   -0 01 00000      JMP*  DECC         RETURN                                 DECL0294
0295                 *                                                                 DECL0295
0296 00166   0 02 00534 DEC2  LDA   OA           TEST FOR OVERFLOW                      DECL0296
```

```
0297 00167   100040          SZE                  X                                  DECL0297
0298 00170   0 01 00354       JMP   OA2           PRIOR OVERFLOW                     DECL0298
0299 00171   0 10 01022       JST   M10           MULTIPLY BY TEN                    DECL0299
0300 00172   100040          SZE                  TEST FOR OVERFLOW                  DECL0300
0301 00173   0 01 00346       JMP   OA1           RECORD THE OVERFLOW                DECL0301
0302 00174   0 04 01036       STA   WORK          PREPARE TO ADD                     DECL0302
0303 00175   0 04 01037       STA   WORK+1        THIS DIGIT INTO                    DECL0303
0304 00176   0 02 00532       LDA   CH            THE SUM                            DECL0304
0305 00177   0 04 01040       STA   WORK+2        X                                  DECL0305
0306 00200   0 10 01044       JST   TADD          PERFORM THE TRIPLE ADD             DECL0306
0307 00201   100040          SZE                  TEST FOR OVERFLOW                  DECL0307
0308 00202   0 01 00346       JMP   OA1           ADD CAUSED OVERFLOW                DECL0308
0309 00203   0 02 00533       LDA   PNT           TEST FOR DECIMAL POINT YET         DECL0309
0310 00204   100040          SZE                  X                                  DECL0310
0311 00205   0 12 00535       IRS   PCNT          COUNT THE PLACES AFTER THE POINT   DECL0311
0312 00206   -0 01 00000      JMP*  DECC          AND RETURN                         DECL0312
0313                 *                                                              DECL0313
0314 00207   0406 77    DEC3  ARR   1             TEST FOR E OR B                    DECL0314
0315 00210   101400          SMI                  X                                  DECL0315
0316 00211   0 01 00230       JMP   DEC4          IT IS LETTER B                     DECL0316
0317 00212   0 02 00545 DEC5  LDA   EFLG          TEST FOR PRIOR E                   DECL0317
0318 00213   100040          SZE                  X                                  DECL0318
0319 00214   0 01 00032       JMP   LETR          X                                  DECL0319
0320 00215   0 02 00244       LDA   ESW           SET SWITCH TO E PROCESSOR          DECL0320
0321 00216   0 04 00227       STA   SW            X                                  DECL0321
0322 00217   0 12 00537       IRS   E1S           SET THE E ONE SHOT                 DECL0322
0323 00220   0 12 00545 EXIT  IRS   EFLG          COUNT AN E                         DECL0323
0324 00221   0 02 00545       LDA   EFLG          TEST FOR NO MORE                   DECL0324
0325 00222   0 07 00226       SUB   Q3            THAN TWO E'S                       DECL0325
0326 00223   100400          SPL                                                    DECL0326
0327 00224   -0 01 00000      JMP*  DECC          AND RETURN                         DECL0327
0328 00225   0 01 00032       JMP   LETR                                             DECL0328
0329                 *                                                              DECL0329
0330 00226   000003    Q3    OCT   3             X                                  DECL0330
0331 00227   0 000151  SW    DAC   DEC1          NORMAL POSITION OF SWITCH          DECL0331
0332                 *                                                              DECL0332
0333 00230   0 02 00551 DEC4  LDA   BFLG          TEST FOR A PRIOR B                 DECL0333
```

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```
0334 00231   100040          SZE                  X                                  DECL0334
0335 00232   0 01 00032       JMP   LETR          X                                  DECL0335
0336 00233   0 02 00257       LDA   BSW           SET SWITCH TO B PROCESSOR          DECL0336
0337 00234   0 04 00227       STA   SW            X                                  DECL0337
0338 00235   0 12 00540       IRS   B1S           SET THE B ONE SHOT                 DECL0338
0339 00236   0 12 00551 BXIT  IRS   BFLG          COUNT A B                          DECL0339
0340 00237   0 02 00551       LDA   BFLG          TEST FOR NO MORE                   DECL0340
0341 00240   0 07 00226       SUB   Q3            THAN TWO B'S                       DECL0341
0342 00241   101400          SMI                  X                                  DECL0342
0343 00242   0 01 00032       JMP   LETR          X                                  DECL0343
0344 00243   -0 01 00000      JMP*  DECC          AND RETURN                         DECL0344
0345                 *                                                              DECL0345
0346 00244   0 000245  ESW   DAC   *+1           POINTER FOR SWITCH                 DECL0346
0347 00245   100040          SZE                  TEST FOR NUMERIC                   DECL0347
0348 00246   0 01 00272       JMP   E1            NOT NUMERIC                        DECL0348
0349 00247   0 04 00537       STA   E1S           RESET E ONE SHOT                   DECL0349
0350 00250   0 02 00536       LDA   ECNT          MULTIPLY THE PARTIAL               DECL0350
0351 00251   0414 76          LGL   2             SUM BY UQ                          DECL0351
0352 00252   0 06 00536       ADD   ECNT          X                                  DECL0352
0353 00253   0414 77          LGL   1             X                                  DECL0353
0354 00254   0 06 00532       ADD   CH            ADD IN THE CURRENT DIGIT           DECL0354
0355 00255   0 04 00536       STA   ECNT          SAVE THE NEW PARTIAL SUM           DECL0355
0356 00256   -0 01 00000      JMP*  DECC          AND RETURN                         DECL0356
0357                 *                                                              DECL0357
0358 00257   0 000260  BSW   DAC   *+1           POINTER FOR SWITCH                 DECL0358
0359 00260   100040          SZE                  TEST FOR NUMERIC                   DECL0359
0360 00261   0 01 00320       JMP   B1            NOT NUMERIC                        DECL0360
0361 00262   0 04 00540       STA   B1S           RESET B ONE SHOT                   DECL0361
0362 00263   0 02 00541       LDA   BCNT          MULTIPLY THE PARTIAL               DECL0362
0363 00264   0414 76          LGL   2             SUM BY 10                          DECL0363
0364 00265   0 06 00541       ADD   BCNT          X                                  DECL0364
0365 00266   0414 77          LGL   1                                                DECL0365
0366 00267   0 06 00532       ADD   CH            ADD IN THE CURRENT DIGIT           DECL0366
0367 00270   0 04 00541       STA   BCNT          SAVE THE NEW PARTIAL SUM           DECL0367
0368 00271   -0 01 00000      JMP*  DECC          AND RETURN                         DECL0368
0369                 *                                                              DECL0369
0370 00272   100400    E1    SPL                  TEST FOR B OR E                    DECL0370
```

```
0371 00273   0 01 00303       JMP   E2       IT IS (+), (-), (.)                    DECL0371
0372 00274   0406 77          ARR   1        TEST FOR B                             DECL0372
0373 00275   101400           SMI            X                                      DECL0373
0374 00276   0 01 00230       JMP   DEC4     IT IS B                                DECL0374
0375 00277   0 02 00537       LDA   E1S      IS E ONE SHOT STILL SET                DECL0375
0376 00300   101040           SNZ            X                                      DECL0376
0377 00301   0 01 00032       JMP   LETR     X                                      DECL0377
0378 00302   0 01 00220       JMP   EXIT     RECORD AN E                            DECL0378
0379 00303   0406 77    E2    ARR   1        TEST FOR DECIMAL POINT                 DECL0379
0380 00304   100400           SPL            X                                      DECL0380
0381 00305   0 01 00032       JMP   LETR     DECIMAL POINT - TREAT AS LETTER        DECL0381
0382 00306   0 02 00537       LDA   E1S      IS E ONE SHOT STILL SET                DECL0382
0383 00307   101040           SNZ            X                                      DECL0383
0384 00310   0 01 00370       JMP   CVR1     NO - PLUS OR MINUS TERMINATES          DECL0384
0385 00311   0 02 00532       LDA   CH       RECOVER THE CODE WORD                  DECL0385
0386 00312   0406 76          ARR   2        TEST FOR PLUS OR MINUS                 DECL0386
0387 00313   100400           SPL            X                                      DECL0387
0388 00314   0 04 00542       STA   ESGN     MARK E FIELD MINUS                     DECL0388
0389 00315   140040           CRA            RESET THE E ONE SHOT                   DECL0389
0390 00316   0 04 00537       STA   E1S      X                                      DECL0390
0391 00317  -0 01 00000       JMP*  DECC     AND RETURN                             DECL0391
0392                 *                                                             DECL0392
0393 00320   100400     B1    SPL            TEST FOR E OR B                        DECL0393
0394 00321   0 01 00331       JMP   B2       IT IS (+), (-), OR (.)                 DECL0394
0395 00322   0406 77          ARR   1        X                                      DECL0395
0396 00323   100400           SPL            X                                      DECL0396
0397 00324   0 01 00212       JMP   DEC5     IT IS E                                DECL0397
0398 00325   0 02 00540       LDA   B1S      IS B ONE SHOT STILL ON                 DECL0398
0399 00326   101040           SNZ            X                                      DECL0399
0400 00327   0 01 00032       JMP   LETR     X                                      DECL0400
0401 00330   0 01 00236       JMP   BXIT     RECORD THE B                           DECL0401
0402 00331   0406 77    B2    ARR   1        TEST FOR A DECIMAL POINT               DECL0402
0403 00332   100400           SPL            X                                      DECL0403
0404 00333   0 01 00032       JMP   LETR     TREAT DECIMAL POINT AS LETTER          DECL0404
0405 00334   0 02 00540       LDA   B1S      IS B ONE SHOT ON                       DECL0405
0406 00335   101040           SNZ            X                                      DECL0406
0407 00336   0 01 00370       JMP   CVR1     NO - PLUS OR MINUS TERMINATES          DECL0407
```

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0408 00337   0 02 00532       LDA   CH       RECOVER THE CODE WORD                  DECL0408
0409 00340   0406 76          ARR   2        TEST FOR MINUS                         DECL0409
0410 00341   100400           SPL            X                                      DECL0410
0411 00342   0 04 00543       STA   BSGN     MARK B FIELD NEGATIVE                  DECL0411
0412 00343   140040           CRA            RESET THE B ONE SHOT                   DECL0412
0413 00344   0 04 00540       STA   B1S      X                                      DECL0413
0414 00345  -0 01 00000       JMP*  DECC     AND RETURN                             DECL0414
0415                 *                                                             DECL0415
0416 00346   0 12 00534 OA1   IRS   OA       MARK THE OVERFLOW                      DECL0416
0417 00347   0 35 01117       LDX   =-3      RESTORE THE PARTIAL SUM                DECL0417
0418 00350   1 02 01044       LDA   KEEP+3,1 X                                      DECL0418
0419 00351   1 04 00000       STA   NUM3,1   X                                      DECL0419
0420 00352   0 12 00000       IRS   0        X                                      DECL0420
0421 00353   0 01 00350       JMP   *-3      X                                      DECL0421
0422 00354   0 02 00533 OA2   LDA   PNT      ANY DECIMAL POINT YET                  DECL0422
0423 00355   101040           SNZ            X                                      DECL0423
0424 00356   0 12 00544       IRS   OCNT     NO - COUNT THE OVERFLOWS               DECL0424
0425 00357  -0 01 00000       JMP*  DECC     AND RETURN                             DECL0425
0426                 *                                                             DECL0426
0427 00360   000014     K14   OCT   14       X                                      DECL0427
0428 00361   000255     K255  OCT   255      EXPONENT                               DECL0428
0429                 *                                                             DECL0429
0430 00362   0 06 00360 BTST  ADD   K14      TEST FOR A BLANK                       DECL0430
0431 00363   100040           SZE            X                                      DECL0431
0432 00364   0 01 00032       JMP   LETR     NOT A BLANK                            DECL0432
0433 00365   0 02 00000 CVRT  LDA   DOCT     TEST CONVERSION MODE                   DECL0433
0434 00366   101400           SMI            X                                      DECL0434
0435 00367   0 01 00115       JMP   OCT      CONVERSION MODE IS OCTAL               DECL0435
0436 00370   0 02 00533 CVR1  LDA   PNT      TEST FOR INTEGER                       DECL0436
0437 00371   101040           SNZ            X                                      DECL0437
0438 00372   0 01 00651       JMP   INT      IT IS INTEGER                          DECL0438
0439 00373   0 02 00551       LDA   BFLG     TEST FOR FIXED POINT                   DECL0439
0440 00374   100040           SZE            X                                      DECL0440
0441 00375   0 01 00402       JMP   *+5      IT IS FIXED POINT                      DECL0441
0442 00376   0 02 00545       LDA   EFLG     TEST FOR ASSUMED                       DECL0442
0443 00377   101040           SNZ            FLOATING POINT                         DECL0443
0444 00400   0 02 00557       LDA   Q1       FORCE SINGLE FLOATING POINT            DECL0444
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0445 00401   0 06 00557       ADD   Q1      CORRECT THE WORD COUNT                    DECL0445
0446 00402   0 04 00000       STA   WCNT    SET THE CORRECT WORD COUNT               DECL0446
0447 00403   0 02 00000       LDA   NUM     TEST FOR ZERO                            DECL0447
0448 00404   0 06 00000       ADD   NUM1    X                                        DECL0448
0449 00405   101040           SNZ           X                                        DECL0449
0450 00406   0 06 00000       ADD   NUM2    X                                        DECL0450
0451 00407   101040           SNZ           X                                        DECL0451
0452 00410   0 01 00523       JMP   END     RESULT IS ZERO, CONVERSION DONE          DECL0452
0453 00411   0 10 00753       JST   NRM     NORMALIZE THE REGISTER                   DECL0453
0454 00412   0 02 00361       LDA   K255    FORM A FLOATING POINT                    DECL0454
0455 00413   0 07 00752       SUB   SCNT    QUANTITY                                 DECL0455
0456 00414   0 04 00550       STA   EXP     X                                        DECL0456
0457 00415   0 02 00542       LDA   ESGN    FORM THE CORRECT                         DECL0457
0458 00416   101040           SNZ           DECIMAL EXPONENT                         DECL0458
0459 00417   0 01 00423       JMP   *+4     OK - IT IS POSITIVE                      DECL0459
0460 00420   140040           CRA           IT IS NEGATIVE                           DECL0460
0461 00421   0 07 00536       SUB   ECNT    FORM THE COMPLEMENT                      DECL0461
0462 00422   -0 000000   SKP  DAC*  0       SKP                                      DECL0462
0463 00423   0 02 00536       LDA   ECNT    NOW FORM THE                             DECL0463
0464 00424   0 06 00544       ADD   OCNT    TRUE NET DECIMAL                         DECL0464
0465 00425   0 07 00535       SUB   PCNT    EXPONENT                                 DECL0465
0466 00426   101040           SNZ           TEST IT                                  DECL0466
0467 00427   0 01 00445       JMP   CVT1    NET EXPONENT IS ZERO                     DECL0467
0468 00430   0 04 00536       STA   ECNT    SAVE THE NET EXPONENT                    DECL0468
0469 00431   100400           SPL           TEST FOR MPY OR DVD                      DECL0469
0470 00432   0 01 00725       JMP   DVD     DIVIDE                                   DECL0470
0471 00433   140040           CRA           ASSURE OVERFLOW BITS ZERO                DECL0471
0472 00434   0 04 00546       STA   PROD    X                                        DECL0472
0473 00435   0 07 00536       SUB   ECNT    MAKE A COUNTER OUT                       DECL0473
0474 00436   0 04 00536       STA   ECNT    OF THE EXPONENT VALUE                    DECL0474
0475 00437   0 10 01022       JST   M10     MULTIPLY BY TEN                          DECL0475
0476 00440   0 10 01065       JST   LRS1    NORMALIZE THE RESULT                     DECL0476
0477 00441   100040           SZE           TEST FOR COMPLETION                      DECL0477
0478 00442   0 01 00440       JMP   *-2     NOT YET                                  DECL0478
0479 00443   0 12 00536       IRS   ECNT    ANY MORE MULTIPLIES                      DECL0479
0480 00444   0 01 00437       JMP   *-5     YES                                      DECL0480
0481 00445   0 02 00551  CVT1 LDA   BFLG    TEST FOR FIXED POINT                     DECL0481
```



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0482 00446   100040           SZE           X                                        DECL0482
0483 00447   0 01 00573       JMP   FIX     IT IS FIXED POINT                        DECL0483
0484 00450   0 02 00550       LDA   EXP     FLOATING POINT                           DECL0484
0485 00451   0 03 00554       ANA   MBR8    TEST FOR A                               DECL0485
0486 00452   100040           SZE           VALID EXPONENT                           DECL0486
0487 00453   0 04 00000       STA   ERD     MARK THE ERROR                           DECL0487
0488 00454   0 05 00550       ERA   EXP     X                                        DECL0488
0489 00455   0414 71          LGL   7       X                                        DECL0489
0490 00456   0 04 00550       STA   EXP     SAVE THE EXPONENT                        DECL0490
0491 00457   0 02 00000       LDA   NUM2    TRUNCATE                                 DECL0491
0492 00460   0 03 00556       ANA   KX      LOW SIX                                  DECL0492
0493 00461   0 04 00000       STA   NUM2    BITS                                     DECL0493
0494 00462   0 02 00000       LDA   WCNT    TEST FOR SINGLE PRECISION                DECL0494
0495 00463   0 07 00127       SUB   Q2      X                                        DECL0495
0496 00464   100040           SZE           X                                        DECL0496
0497 00465   0 01 00472       JMP   *+5     IT IS DOUBLE PRECISION                   DECL0497
0498 00466   0 04 00000       STA   NUM2    TRUNCATE TO 23 BITS                      DECL0498
0499 00467   0 02 00000       LDA   NUM1    SO THAT                                  DECL0499
0500 00470   0 03 00553       ANA   MBR7    A+(-A)=0                                 DECL0500
0501 00471   0 04 00000       STA   NUM1    X                                        DECL0501
0502 00472   0 02 00000       LDA   SIGN    TEST THE SIGN                            DECL0502
0503 00473   100040           SZE           IS IT NEGATIVE                           DECL0503
0504 00474   0 10 00700       JST   TCA     COMPLEMENT THE FRACTION                  DECL0504
0505 00475   0 02 00000       LDA   NUM2    MAKE ROOM                                DECL0505
0506 00476   0414 77          LGL   1       FOR THE EXPONENT                         DECL0506
0507 00477   0 04 00000       STA   NUM2    X                                        DECL0507
0508 00500   0 02 00000       LDA   NUM1    X                                        DECL0508
0509 00501   0 05 00000       ERA   NUM2    X                                        DECL0509
0510 00502   0 03 00553       ANA   MBR7    X                                        DECL0510
0511 00503   0 05 00000       ERA   NUM1    X                                        DECL0511
0512 00504   0406 71          ARR   7       X                                        DECL0512
0513 00505   0 04 00000       STA   NUM2    X                                        DECL0513
0514 00506   0 02 00000       LDA   NUM1    X                                        DECL0514
0515 00507   0414 77          LGL   1       X                                        DECL0515
0516 00510   0 04 00000       STA   NUM1    X                                        DECL0516
0517 00511   0 02 00000       LDA   NUM     X                                        DECL0517
0518 00512   0 05 00000       ERA   NUM1    X                                        DECL0518
```

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0519 00513   0 03 00554       ANA   MBR8    X                                  DECL0519
0520 00514   0 05 00000       ERA   NUM     X                                  DECL0520
0521 00515   0406 70          ARR   8       X                                  DECL0521
0522 00516   0 04 00000       STA   NUM1    X                                  DECL0522
0523 00517   0 02 00000       LDA   NUM     X                                  DECL0523
0524 00520   0405 70          ARS   8       SHIFT OVER TO RIGHT POSITION       DECL0524
0525 00521   0 05 00550       ERA   EXP     INSERT THE EXPONENT                DECL0525
0526 00522   0 04 00000       STA   NUM     STORE THE FIRST WORD               DECL0526
0527 00523   0 02 00000 END   LDA   ALFA    CHECK FOR NUMBER                   DECL0527
0528 00524   101040           SNZ                                              DECL0528
0529 00525   0 01 00530       JMP   *+3                                        DECL0529
0530 00526   140040           CRA           CLEAR SIGN                         DECL0530
0531 00527   0 04 00000       STA   SIGN                                       DECL0531
0532 00530   0 12 00000       IRS   DECC    STEP TO TERMINAL RETURN            DECL0532
0533 00531   0 01 00032       JMP   LETR    AND EXIT                           DECL0533
0534                 *                                                        DECL0534
0535 00532   0 000000  CH      DAC   0       WORKING STORAGE                    DECL0535
0536 00533   0 000000  PNT     DAC   0       THESE CELLS MUST BE ZERO ON ENTRY  DECL0536
0537 00534   0 000000  OA      DAC   0       X                                  DECL0537
0538 00535   0 000000  PCNT    DAC   0       X                                  DECL0538
0539 00536   0 000000  ECNT    DAC   0       X                                  DECL0539
0540 00537   0 000000  E1S     DAC   0       X                                  DECL0540
0541 00540   0 000000  B1S     DAC   0       X                                  DECL0541
0542 00541   0 000000  BCNT    DAC   0       X                                  DECL0542
0543 00542   0 000000  ESGN    DAC   0       X                                  DECL0543
0544 00543   0 000000  BSGN    DAC   0       X                                  DECL0544
0545 00544   0 000000  OCNT    DAC   0       X                                  DECL0545
0546 00545   0 000000  EFLG    DAC   0       X                                  DECL0546
0547 00546   0 000000  PROD    DAC   0       X                                  DECL0547
0548 00547   0 000000  CBIT    DAC   0       X                                  DECL0548
0549 00550   0 000000  EXP     DAC   0       X                                  DECL0549
0550 00551   0 000000  BFLG    DAC   0       X                                  DECL0550
0551 00552   177763    M15     OCT   177763                                     DECL0551
0552 00553   177600    MBR7    OCT   177600  X                                  DECL0552
0553 00554   177400    MBR8    OCT   177400  X                                  DECL0553
0554 00555   0 000151  SWX     DAC   DEC1    RESET VALUE FOR SWITCH             DECL0554
0555 00556   077700    KX      OCT   77700   MASK                               DECL0555
```

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```
0556 00557   000001    Q1      OCT   1       X                                  DECL0556
0557                 *                                                        DECL0557
0558 00560   0 000000  DECI    DAC   *-*                                      DECL0558
0559 00561   0 02 00555       LDA   SWX     RESET SWITCH                       DECL0559
0560 00562   0 04 00227       STA   SW      X                                  DECL0560
0561 00563   0 35 01116       LDX   =-15    PREPARE TO CLEAR CRITICAL CELLS    DECL0561
0562 00564   140040           CRA           X                                  DECL0562
0563 00565   0 04 00000       STA   ERD     CLEAR ERROR INDICATOR              DECL0563
0564 00566   1 04 00552       STA   PNT+15,1 CLEAR A CELL                       DECL0564
0565 00567   0 12 00000       IRS   0       BUMP COUNTER                       DECL0565
0566 00570   0 01 00566       JMP   *-2     GO BACK TO CLEAR ANOTHER ONE       DECL0566
0567 00571  -0 01 00560       JMP*  DECI                                       DECL0567
0568                 *                                                        DECL0568
0569 00572   000200    K200    OCT   200     X                                  DECL0569
0570                 *                                                        DECL0570
0571 00573   0 02 00543 FIX   LDA   BSGN    TEST THE B-FIELD SIGN              DECL0571
0572 00574   101040           SNZ           X                                  DECL0572
0573 00575   0 01 00601       JMP   *+4     OK - IT IS POSITIVE                DECL0573
0574 00576   140040           CRA           COMPLEMENT THE                     DECL0574
0575 00577   0 07 00541       SUB   BCNT    SCALE FACTOR                       DECL0575
0576 00600   0 04 00541       STA   BCNT    X                                  DECL0576
0577 00601   0 02 00550       LDA   EXP     FORM THE SCALING SHIFT             DECL0577
0578 00602   0 07 00572       SUB   K200    X                                  DECL0578
0579 00603   0 07 00541       SUB   BCNT    X                                  DECL0579
0580 00604   0 04 00541       STA   BCNT                                       DECL0580
0581 00605   101400           SMI           TEST FOR CORRECT SENSE             DECL0581
0582 00606   0 01 00631       JMP   FIX2    POSSIBLE ERROR                     DECL0582
0583 00607   140040           CRA           CLEAR ANY HIGH ORDER BITS          DECL0583
0584 00610   0 04 00546       STA   PROD    X                                  DECL0584
0585 00611   0 10 01065       JST   LRS1    RIGHT SHIFT 1                      DECL0585
0586 00612   0 12 00541       IRS   BCNT    TEST FOR END                       DECL0586
0587 00613   0 01 00611       JMP   *-2     NOT YET                            DECL0587
0588 00614   0 02 00000 FIX1  LDA   WCNT    TRUNCATE TO CORRECT SIZE           DECL0588
0589 00615   0 07 00557       SUB   Q1      X                                  DECL0589
0590 00616   101040           SNZ           X                                  DECL0590
0591 00617   0 04 00000       STA   NUM1    X                                  DECL0591
0592 00620   140040           CRA           X                                  DECL0592
```

```
0593 00621   0 04 00000      STA   NUM2      X                                DECL0593
0594 00622   0 02 00000      LDA   SIGN      TEST FOR NEGATIVE                DECL0594
0595 00623   100040         SZE              X                                DECL0595
0596 00624   0 10 00700      JST   TCA       COMPLEMENT THE RESULT            DECL0596
0597 00625   0 02 00541      LDA   BCNT      TEST FOR SCALING ERROR           DECL0597
0598 00626   100040         SZE              X                                DECL0598
0599 00627   0 04 00000      STA   ERD       MARK THE ERROR                   DECL0599
0600 00630   0 01 00523      JMP   END       AND EXIT                         DECL0600
0601                        *                                                DECL0601
0602 00631   101040     FIX2 SNZ              TEST FOR ZERO NET SCALE          DECL0602
0603 00632   0 01 00614      JMP   FIX1      OK - ZERO NET SCALE              DECL0603
0604 00633   0 06 00000      ADD   SIGN      TEST FOR -1.0B0                  DECL0604
0605 00634   0 06 00000      ADD   NUM2      X                                DECL0605
0606 00635   101040         SNZ              X                                DECL0606
0607 00636   0 06 00000      ADD   NUM1      X                                DECL0607
0608 00637   100040         SZE              X                                DECL0608
0609 00640   0 01 00614      JMP   FIX1      NOT -1.0 B0                      DECL0609
0610 00641   0 02 00000      LDA   NUM       TEST THE MAGNITUDE               DECL0610
0611 00642   0414 76         LGL   2         FOR A HALF                       DECL0611
0612 00643   100040         SZE              X                                DECL0612
0613 00644   0 01 00614      JMP   FIX1      NOT -1.0B0                       DECL0613
0614 00645   0 04 00541      STA   BCNT      FORCE A VALID SCALE              DECL0614
0615 00646   0 02 00422      LDA   SKP       SET THE                          DECL0615
0616 00647   0 04 00000      STA   NUM       DATA SIGN BIT                    DECL0616
0617 00650   0 01 00614      JMP   FIX1      ENTER THE MAIN PATH              DECL0617
0618                        *                                                DECL0618
0619 00651   0 02 00000 INT  LDA   NUM       TEST FOR A                       DECL0619
0620 00652   0 06 00000      ADD   NUM1      VALID INTEGER                    DECL0620
0621 00653   100040         SZE              X                                DECL0621
0622 00654   0 01 00666      JMP   INTX      TEST FOR -32768 CASE             DECL0622
0623 00655   0 02 00000      LDA   NUM2      MOVE THE LOW BITS                DECL0623
0624 00656   0 04 00000 INTY STA   NUM       TO THE FIRST WORD                DECL0624
0625 00657   140040         CRA              AND CLEAR THE LOW ORDER WORDS    DECL0625
0626 00660   0 04 00000      STA   NUM1      X                                DECL0626
0627 00661   0 04 00000      STA   NUM2      X                                DECL0627
0628 00662   0 02 00000      LDA   SIGN      TEST FOR NEGATIVE RESULT         DECL0628
0629 00663   100040         SZE              X                                DECL0629
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0630 00664   0 10 00700      JST   TCA       COMPLEMENT THE RESULT            DECL0630
0631 00665   0 01 00123      JMP   OCT1      AND EXIT                         DECL0631
0632                        *                                                DECL0632
0633 00666   0 02 00000 INTX LDA   NUM       TEST FOR POSSIBLE                DECL0633
0634 00667   0 06 00000      ADD   NUM2      -32768                           DECL0634
0635 00670   100040         SZE              X                                DECL0635
0636 00671   0 04 00000      STA   ERD       IMPOSSIBLE - MARK THE ERROR      DECL0636
0637 00672   0 06 00000      ADD   SIGN      MAYBE -32768 PERFORM             DECL0637
0638 00673   0 06 00000      ADD   NUM1      FINAL TEST                       DECL0638
0639 00674   100040         SZE              X                                DECL0639
0640 00675   0 04 00000      STA   ERD       NO - MARK THE ERROR              DECL0640
0641 00676   0 02 00422      LDA   SKP       GIVE -32768 ANYWAY               DECL0641
0642 00677   0 01 00656      JMP   INTY      ENTER THE MAIN PATH              DECL0642
0643                        *                                                DECL0643
0644 00700   0 000000   TCA  DAC   *-*       COMPLEMENT THE                   DECL0644
0645 00701   140040         CRA              45 BIT REGISTER                  DECL0645
0646 00702   0 07 00000      SUB   NUM2      X                                DECL0646
0647 00703   100400         SPL              X                                DECL0647
0648 00704   0 12 00000      IRS   NUM1      X                                DECL0648
0649 00705   0 03 00723      ANA   MAG       X                                DECL0649
0650 00706   0 04 00000      STA   NUM2      X                                DECL0650
0651 00707   140040         CRA              X                                DECL0651
0652 00710   0 07 00000      SUB   NUM1      X                                DECL0652
0653 00711   100400         SPL              X                                DECL0653
0654 00712   0 12 00000      IRS   NUM       X                                DECL0654
0655 00713   0 03 00723      ANA   MAG       X                                DECL0655
0656 00714   0 04 00000      STA   NUM1      X                                DECL0656
0657 00715   140040         CRA              X                                DECL0657
0658 00716   0 07 00000      SUB   NUM       X                                DECL0658
0659 00717   0 04 00000      STA   NUM       X                                DECL0659
0660 00720  -0 01 00700      JMP*  TCA       X                                DECL0660
0661                        *                                                DECL0661
0662 00721   000005     Q5   OCT   5         X                                DECL0662
0663 00722   177720     M48  OCT   177720    X                                DECL0663
0664 00723   077777     MAG  OCT   77777                                      DECL0664
0665 00724   0 000000   TEMP DAC   0         X                                DECL0665
0666                        *                                                DECL0666
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0667 00725   140040      DVD  CRA                FLOAT DIVIDE ROUTINE                    DECL0667
0668 00726   0 04 00546        STA  PROD          HIGH DIVIDEND BITS ZERO                 DECL0668
0669 00727   0 02 00722        LDA  M48           SET COUNTER TO GENERATE                 DECL0669
0670 00730   0 04 00532        STA  CH            44 OR 45 BITS OF QUOTIENT               DECL0670
0671 00731   0 10 00765 DVD1   JST  LLS1          SHIFT IN A BIT                          DECL0671
0672 00732   0 07 00721        SUB  Q5            TRIAL SUBTRACT                          DECL0672
0673 00733   101400           SMI                TEST FOR QUOTIENT BIT                   DECL0673
0674 00734   0 12 00547        IRS  CBIT          SET QUOTIENT BIT TO 1                   DECL0674
0675 00735   100400           SPL                TEST FOR VALID SUBTRACT                 DECL0675
0676 00736   0 06 00721        ADD  Q5            RESTORE THE QUOTIENT BITS               DECL0676
0677 00737   0 04 00546        STA  PROD          X                                       DECL0677
0678 00740   0 12 00532        IRS  CH            TEST FOR END OF LOOP                    DECL0678
0679 00741   0 01 00731        JMP  DVD1          NOT YET                                 DECL0679
0680 00742   0 10 00753        JST  NRM           NORMALIZE THE RESULT                    DECL0680
0681 00743   0 02 00550        LDA  EXP           ADJUST THE EXPONENT                     DECL0681
0682 00744   0 07 00752        SUB  SCNT          X                                       DECL0682
0683 00745   0 07 00226        SUB  Q3            X                                       DECL0683
0684 00746   0 04 00550        STA  EXP           X                                       DECL0684
0685 00747   0 12 00536        IRS  ECNT          TEST FOR LAST DIVIDE                    DECL0685
0686 00750   0 01 00725        JMP  DVD           NOT YET                                 DECL0686
0687 00751   0 01 00445        JMP  CVT1          FINISH THE CONVERSION                   DECL0687
0688                  *                                                                  DECL0688
0689 00752   0 000000   SCNT DAC  0             X                                       DECL0689
0690                  *                                                                  DECL0690
0691 00753   0 000000   NRM  DAC  *-*                                                    DECL0691
0692 00754   140040           CRA                RESET THE SHIFT COUNTER                 DECL0692
0693 00755   0 04 00752        STA  SCNT          X                                       DECL0693
0694 00756   0 02 00000 NRM1   LDA  NUM           TEST FOR A NORMAL NUMBER                DECL0694
0695 00757   0414 77          LGL  1             X                                       DECL0695
0696 00760   100400           SPL                X                                       DECL0696
0697 00761  -0 01 00753        JMP* NRM           RESULT IS NORMAL                        DECL0697
0698 00762   0 12 00752        IRS  SCNT          STEP THE SHIFT COUNTER                  DECL0698
0699 00763   0 10 00765        JST  LLS1          LEFT SHIFT 1                            DECL0699
0700 00764   0 01 00756        JMP  NRM1          AND TRY AGAIN                           DECL0700
0701                  *                                                                  DECL0701
0702 00765   0 000000   LLS1 DAC  *-*                                                    DECL0702
0703 00766   0 10 01000        JST  SHFT          THIS ROUTINE LONG LEFT SHIFTS           DECL0703
```



```
0704 00767   0 000000         DAC  NUM2          THE ACCUMULATING REGISTER               DECL0704
0705 00770   0 10 01000       JST  SHFT          ONE POSITION                            DECL0705
0706 00771   0 000000         DAC  NUM1          X                                       DECL0706
0707 00772   0 10 01000       JST  SHFT          X                                       DECL0707
0708 00773   0 000000         DAC  NUM           X                                       DECL0708
0709 00774   0 10 01000       JST  SHFT          X                                       DECL0709
0710 00775   0 000546         DAC  PROD          X                                       DECL0710
0711 00776  -0 01 00765       JMP* LLS1          X                                       DECL0711
0712                  *                                                                  DECL0712
0713 00777   0 00 00000 SWT   PZE                X                                       DECL0713
0714                  *                                                                  DECL0714
0715 01000   0 000000   SHFT DAC  *-*                                                    DECL0715
0716 01001  -0 02 01000       LDA* SHFT          LEFT SHIFT A WORD 1 POSITION            DECL0716
0717 01002   0 04 00777       STA  SWT           AND INSERT CARRY INTO THE               DECL0717
0718 01003  -0 02 00777       LDA* SWT           VACATED LOW BIT                         DECL0718
0719 01004   0414 77          LGL  1             ALSO SAVE THE CARRY                     DECL0719
0720 01005   0 10 01011       JST  CSA           FOR THE NEXT WORD                       DECL0720
0721 01006  -0 04 00777       STA* SWT           X                                       DECL0721
0722 01007   0 12 01000       IRS  SHFT                                                  DECL0722
0723 01010  -0 01 01000       JMP* SHFT          X                                       DECL0723
0724                  *                                                                  DECL0724
0725 01011   0 000000   CSA  DAC  *-*                                                    DECL0725
0726 01012   0 06 00547       ADD  CBIT          INSERT PRIOR CARRY                      DECL0726
0727 01013   0416 77          ALR  1             POSITION THIS CARRY                     DECL0727
0728 01014   0 04 00724       STA  TEMP          SAVE THE WORD                           DECL0728
0729 01015   0 03 00557       ANA  Q1            EXTRACT THE CARRY BIT                   DECL0729
0730 01016   0 04 00547       STA  CBIT          SAVE IT                                 DECL0730
0731 01017   0 05 00724       ERA  TEMP          RECOVER THE 15 DATA BITS                DECL0731
0732 01020   0406 77          ARR  1             POSITION THEM                           DECL0732
0733 01021  -0 01 01011       JMP* CSA           AND RETURN                              DECL0733
0734                  *                                                                  DECL0734
0735 01022   0 000000   M10  DAC  *-*           MULTIPLY BY 10                          DECL0735
0736 01023   0 35 01117       LDX  =-3           MOVE THE ACCUMULATING                   DECL0736
0737 01024   1 02 00000       LDA  NUM3,1        REGISTERS TO WORKING                    DECL0737
0738 01025   1 04 01044       STA  KEEP+3,1      STORE AND TO                            DECL0738
0739 01026   1 04 01041       STA  WORK+3,1      SAVE AREA                               DECL0739
0740 01027   0 12 00000       IRS  0             X                                       DECL0740
```

```
0741 01030   0 01 01024      JMP   *-4          X                          DECL0741
0742 01031   0 10 00765      JST   LLS1         FORM 2X                    DECL0742
0743 01032   0 10 00765      JST   LLS1         FORM 4X                    DECL0743
0744 01033   0 10 01044      JST   TADD         FORM 5X                    DECL0744
0745 01034   0 10 00765      JST   LLS1         FORM 10X                   DECL0745
0746 01035  -0 01 01022      JMP*  M10          AND RETURN                 DECL0746
0747                        *                                             DECL0747
0748 01036   000000       WORK OCT   0,0,0      X                          DECL0748
     01037   000000
     01040   000000
0749 01041   000000       KEEP OCT   0,0,0      X                          DECL0749
     01042   000000
     01043   000000
0750 01044   0 000000     TADD DAC   *-*        TRIPLE ADD ROUTINE         DECL0750
0751 01045   0 02 00000        LDA   NUM2       ADD THE LOWEST TERMS       DECL0751
0752 01046   0 06 01040        ADD   WORK+2     X                          DECL0752
0753 01047   0 10 01011        JST   CSA        FORM THE CARRY             DECL0753
0754 01050   0 04 00000        STA   NUM2       STORE THE LOW ORDER TERM   DECL0754
0755 01051   0 02 00000        LDA   NUM1       PROCESS THE MIDDLE TERM    DECL0755
0756 01052   0 06 01037        ADD   WORK+1     X                          DECL0756
0757 01053   0 10 01011        JST   CSA        X                          DECL0757
0758 01054   0 04 00000        STA   NUM1       X                          DECL0758
0759 01055   0 02 00000        LDA   NUM        PROCESS THE HIGH TERM      DECL0759
0760 01056   0 06 01036        ADD   WORK       X                          DECL0760
0761 01057   0 10 01011        JST   CSA        X                          DECL0761
0762 01060   0 04 00000        STA   NUM        X                          DECL0762
0763 01061   0 02 00546        LDA   PROD       GENERATE AN OVERFLOW       DECL0763
0764 01062   0 10 01011        JST   CSA        BIT IF REQUIRED            DECL0764
0765 01063   0 04 00546        STA   PROD       X                          DECL0765
0766 01064  -0 01 01044        JMP*  TADD       AND RETURN                 DECL0766
0767                        *                                             DECL0767
0768 01065   0 000000     LRS1 DAC   *-*                                   DECL0768
0769 01066   0 02 00000        LDA   NUM1       ISOLATE THE BIT            DECL0769
0770 01067   0 03 00557        ANA   Q1         TO CROSS WORD BOUNDARY     DECL0770
0771 01070   0406 77           ARR   1          POSITION IT                DECL0771
0772 01071   0 05 00000        ERA   NUM2       INSERT INTO LOWER WORD     DECL0772
0773 01072   0404 77           LGR   1          SHIFT RIGHT 1 POSITION     DECL0773
```



```
0774 01073   0 04 00000        STA   NUM2       AND STORE BACK             DECL0774
0775 01074   0 02 00000        LDA   NUM        REPEAT FOR                 DECL0775
0776 01075   0 03 00557        ANA   Q1         THE REST                   DECL0776
0777 01076   0406 77           ARR   1          OF THE                     DECL0777
0778 01077   0 05 00000        ERA   NUM1       DATA WORDS                 DECL0778
0779 01100   0404 77           LGR   1          X                          DECL0779
0780 01101   0 04 00000        STA   NUM1       X                          DECL0780
0781 01102   0 02 00546        LDA   PROD       X                          DECL0781
0782 01103   0 03 00557        ANA   Q1         X                          DECL0782
0783 01104   0406 77           ARR   1          X                          DECL0783
0784 01105   0 05 00000        ERA   NUM        X                          DECL0784
0785 01106   0404 77           LGR   1          X                          DECL0785
0786 01107   0 04 00000        STA   NUM        X                          DECL0786
0787 01110   0 02 00546        LDA   PROD       X                          DECL0787
0788 01111   0404 77           LGR   1          X                          DECL0788
0789 01112   0 04 00546        STA   PROD       X                          DECL0789
0790 01113   0 12 00550        IRS   EXP        X                          DECL0790
0791 01114   101000           NOP              X                          DECL0791
0792 01115  -0 01 01065        JMP*  LRS1       X                          DECL0792
0793 01116   177761           END              THAT'S ALL FOLKS.          DECL0793
     01117   177775
     01120   000017
     01121   177776
     01122   000003
     01123   000013
     01124   000301
     01125   000271
```

ALFA	000000E	B	000043	B1	000320	B1S	000540
B2	000331	BCNT	000541	BFLG	000551	BNCH	000131
BSGN	000543	BSW	000257	BTST	000362	BXIT	000236
CBIT	000547	CH	000532	CSA	001011	CVR1	000370
CVRT	000365	CVT1	000445	DEC1	000151	DEC2	000166
DEC3	000207	DEC4	000230	DEC5	000212	DECC	000000
DECF	000000E	DECI	000560	DOCT	000000E	DVD	000725
DVD1	000731	E1	000272	E1S	000537	E2	000303

ECNT	000536	EFLG	000545	END	000523	ERD	000000E
ESGN	000542	ESW	000244	EXIT	000220	EXP	000550
FIX	000573	FIX1	000614	FIX2	000631	INT	000651
INTX	000666	INTY	000656	K12	000034	K14	000360
K200	000572	K255	000361	K260	000037	K302	000040
KEEP	001041	KX	000556	LETR	000032	LITF	000000E
LLS1	000765	LRS1	001065	LTRL	000062	M1	000126
M10	001022	M15	000552	M48	000722	MAG	000723
MBR7	000553	MBR8	000554	NRM	000753	NRM1	000756
NUM	000000E	NUM1	000000E	NUM2	000000E	NUM3	000000E
OA	000534	OA1	000346	OA2	000354	OCNT	000544
OCT	000115	OCT1	000123	OCTC	000137	OCTX	000143
PCNT	000535	PNT	000533	PROD	000546	Q1	000557
Q2	000127	Q3	000226	Q5	000721	Q7	000041
RNG	000035	RTN1	000057	SCNT	000752	SHFT	001000
SIGN	000000E	SKP	000422	SPEC	000067	SW	000227
SWT	000777	SWX	000555	TADD	001044	TCA	000700
TEMP	000724	TERM	000000E	WCNT	000000E	WORK	001036
XIT	000104	XIT1	000060				

0000 WARNING OR ERROR FLAGS
$DA 41285326-002-03 8.1.71 JDC