CARD	=	LOC	CODE	CARD	
1		0000			*=$0000
2					
3					
4					
5					
6				LEN	=17
7				XY	=$01
8				XZ	=$02
9				XM	=$03
10				XN	=$04
11				YX	=$10
12				YZ	=$12
13				YM	=$13
14				YN	=$14
15				ZX	=$20
16				ZY	=$21
17				ZM	=$23
18				ZN	=$24
19				MX	=$30
20				MY	=$31
21				MZ	=$32
22				MN	=$34
23				NX	=$40
24				NY	=$41
25				NZ	=$42
26				NM	=$43
27		0000		N	*=*+1
28		0001		NKON	*=*+1
29		0002		J	*=*+1
30		0003		CNT	*=*+1
31		0004		LENGTH	*=*
32		0004		CNTA	*=*+1
33		0005		DEG	*=*+1
34		0006		ARGXL	*=*+1
35		0007		ARGXH	*=*+1
36		0008		ARGYL	*=*+1
37		0009		ARGYH	*=*+1
38		000A		RES	*=*+2
39		000C		PTR	*=*+2
40		000E		KON	*=*+1
41		000F		KONH	*=*+1
42		0010		PREC	*=*+1
43		0011		EXTRA	*=*+1
44		0012		TEMP	*=*+1
45		0013		TEMP1	*=*+1
46		0014		OVERR	*=*+1
47		0015		TMPX	*=*+1
48		0016		TMPY	*=*+1
49		0017			*=$0200
50		0200		RA	*=*+LEN+1
51		0212		RB	*=*+LEN+1
52		0224		RQ	*=*+LEN

```
CARD =  LOC        CODE         CARD
  53   0235                   RX        *=*
  54   0235        .          SX        *=*+LEN
  55   0246                   EX        *=*+1
  56   0247                   RY        *=*
  57   0247                   SY        *=*+LEN
  58   0258                   EY        *=*+1
  59   0259                   RZ        *=*+0
  60   0259                   SZ        *=*+LEN
  61   026A                   EZ        *=*+1
  62   026B                   RM        *=*+LEN+1
  63   027D                   RN        *=*+LEN+1
  64   028F                   RAMCOD    *=*+3
  65   0292                   RAMA      *=*+3
  66   0295                   RAMB      *=*+5
  67   029A                             *=$F800
  68
  69                 FLOATING POINT ADD-SUBTRACT ROUTINE.
  70
  71   F800   AD 47 02   SUB      LDA SY
  72   F803   49 80   02          EOR =$80
  73   F805   8D 47 02            STA SY
  74   F808   AD 35 02   ADD      LDA SX
  75   F80B   4D 47 02            EOR SY
  76   F80E   85 12               STA TEMP
  77   F810   F8                  SED
  78
  79                 CLEAR WORKING STORAGE.
  80
  81   F811   20 B8 FB            JSR CLEAR
  82
  83                 TEST RX FOR ZERO.
  84
  85   F814   20 A6 FC            JSR XZTST
  86
  87                 TEST RY FOR ZERO.
  88
  89   F817   F0 0E               BEQ ADD2
  90   F819   20 B3 FC            JSR YZTST
  91   F81C   F0 0C               BEQ ADD3
  92   F81E   24 12               BIT TEMP
  93   F820   50 70               BVC ADD6
  94
  95                 IF THE SIGNS OF THE EXPONENTS
  96                 DIFFER THEN SWAP RX AND RY.
  97
  98   F822   2C 35 02   ADD1     BIT SX
  99   F825   50 03               BVC ADD3
 100   F827   20 6F FC   ADD2     JSR XSY
 101   F82A   F8         ADD3     SEC
 102   F82B   24 12               BIT TEMP
 103   F82D   70 03               BVS ADD31
 104   F82F   4C AC F8            JMP ADD9
```

Handwritten annotations:
- Lines 71–73: `} CHANGE SIGN OF Y MANTISSA`
- Lines 75–76: `(TEMP = 0   IF all SGNS ARE SAME)`
- Line 81: `029A-02A4 RA, Rb, R0`
- Line 89: `(IF X=0)`
- Line 91: `(IF Y=0)`

```
ARD =  LOC        CODE         CARD
 105   F832    AD 46 02    ADD31    LDA  EX
 106   F835    18     .             CLC
 107   F836    6D 58 02             ADC  EY
 108   F839    B0 12               BCS  ADD5
 109   F83B    85 03       ADD4     STA  CNT
 110
 111                       COMPUTE THE HEX VALUE OF THE
 112                       BCD DIFFERENCE OF THE EXPONENTS.
 113
 114   F83D    20 C3 FB             JSR  DECHEX
 115   F840    C5 00               CMP  N
 116   F842    B0 09               BCS  ADD5
 117
 118                       MOVE RY TO RB.
 119
 120   F844    20 1C FC             JSR  RBERY
 121
 122                       ALIGN DECIMAL POINTS.
 123
 124   F847    20 EE FB             JSR  RSBCNT
 125
 126                       ROUND RB OFF.
 127
 128   F84A    20 07 FC             JSR  RBOFF
 129   F84D    AD 46 02    ADD5     LDA  EX
 130   F850    8D 6A 02             STA  EZ
 131
 132                       MOVE RX TO RA.
 133
 134   F853    20 29 FC             JSR  RAERX
 135   F856    24 12               BIT  TEMP
 136   F858    30 6A               BMI  ADD13
 137
 138                       ADD RB TO RA.
 139   F85A    20 5C FC             JSR  RAPRB
 140   F85D    AD 00 02             LDA  RA
 141   F860    F0 1B               BEQ  ADD120
 142   F862    20 A6 FB             JSR  RSRA
 143
 144                       CORRECT SIGN AND EXPONENT.
 145
 146   F865    AD 46 02             LDA  EX
 147   F868    38                  SEC
 148   F869    2C 35 02             BIT  SX
 149   F86C    50 19               BVC  ADD110
 150   F86E    E9 01               SBC  =1
 151   F870    8D 6A 02             STA  EZ
 152   F873    D0 08               BNE  ADD120
 153   F875    A9 BF               LDA  =$BF
 154   F877    2D 35 02             AND  SX
 155   F87A    4C 80 F8             JMP  ADD12
 156   F87D    AD 35 02    ADD120   LDA  SX
```

```
CARD = LOC      CODE        CARD
   57   F880  8D 59 02   ADD12   STA SZ
   158                       .
   159                       MOVE RA TO RZ.
   160
   161   F883  20 4F FC   ADD121  JSR RZERA
   162   F886  60                 RTS
   163   F887  69 00      ADD110  ADC =0
   164   F889  8D 6A 02           STA EZ
   165   F88C  90 EF              BCC ADD120
   166
   167                       SET RZ=9.9...9E99
   168
   169   F88E  20 D2 FC           JSR INFIN
   170   F891  60                 RTS
   171
   172                       COMPARE ABS(RX) TO ABS(RY).
   173
   174   F892  20 82 FC   ADD6    JSR COMPXY
   175   F895  A5 04              LDA CNTA     Ø for x>Y, 1 for x<Y
   176   F897  F0 03              BEQ ADD8
   177
   178                       SWAP RX AND RY,
   179                       SO THAT RX HAS THE
   180                       LARGEST ABS. VALUE.
   181
   182   F899  20 BF FC   ADD7    JSR XSY
   183   F89C  AD 46 02   ADD8    LDA EX
   184   F89F  CD 58 02           CMP EY
   185   F8A2  F0 05              BEQ ADD81
   186   F8A4  90 F3              BCC ADD7
   187   F8A6  4C 22 F8           JMP ADD1
   188   F8A9  4C 2A F8   ADD81   JMP ADD3
   189
   190                       COMPUTE THE ABSOLUTE VALUE
   191                       OF THE SIGNED DIFFERENCE OF
   192                       THE EXPONENTS.
   193
   194   F8AC  38         ADD9    SEC
   195   F8AD  2C 35 02           BIT SX
   196   F8B0  70 09              BVS ADD10
   197   F8B2  AD 46 02           LDA EX
   198   F8B5  ED 58 02           SBC EY
   199   F8B8  4C 3B F8           JMP ADD4
   200   F8BB  AD 58 02   ADD10   LDA EY
   201   F8BE  ED 46 02           SBC EX
   202   F8C1  4C 3B F8           JMP ADD4
   203
   204                       SUBTRACT RB FROM RA.
   205
   206   F8C4  20 70 FC   ADD13   JSR RAMRB
   207   F8C7  AD 46 02           LDA EX
   208   F8CA  8D 6A 02           STA EZ
```

```
\RD =  LOC       CODE         CARD
 209   F8CD   AD 35 02              LDA SX
 210   F8D0   8D 59 02             STA SZ
 211
 212                     TEST RA FOR ZERO.
 213
 214   F8D3   20 99 FC             JSR AZTST
 215   F8D6   F0 18                BEQ ADD18
 216   F8D8   AD 01 02    ADD15    LDA RA+1
 217   F8DB   D0 A6                BNE ADD121
 218
 219                     IF RA+1 IS ZERO THEN
 220                     LEFT SHIFT RA ONE DIGIT.
 221
 222   F8DD   20 91 FB             JSR LSRA
 223   F8E0   2C 59 02    ADD17    BIT SZ
 224   F8E3   38                   SEC
 225   F8E4   AD 6A 02             LDA EZ
 226   F8E7   50 0B                BVC ADD20
 227   F8E9   69 00                ADC =0
 228   F8EB   8D 6A 02             STA EZ
 229   F8EE   90 E8                BCC ADD15
 230
 231                     SET RZ EQUAL TO ZERO.
 232
 233   F8F0   20 87 FD    ADD18    JSR CLRZ
 234   F8F3   60          ADD19    RTS
 235
 236                     ADJUST SIGN AND EXPONENT
 237                     OF THE ANSWER.
 238
 239   F8F4   E9 01       ADD20    SBC =1
 240   F8F6   8D 6A 02             STA EZ
 241   F8F9   B0 DD                BCS ADD15
 242   F8FB   A9 01                LDA =1
 243   F8FD   8D 6A 02             STA EZ
 244   F900   A9 40                LDA =$40
 245   F902   0D 59 02             ORA SZ
 246   F905   8D 59 02             STA SZ
 247   F908   4C D8 F8             JMP ADD15
 248
 249                     FLOATING POINT PRODUCT ROUTINE.
 250
 251   F90B   F8          MLTPLY   SED
 252
 253                     CLEAR WORKING STORAGE.
 254
 255   F90C   20 B8 FB             JSR CLEAR
 256   F90F   A9 00                LDA =0
 257   F911   85 03                STA CNT
 258   F913   85 13                STA TEMP1
 259
 260                     TEST RA FOR ZERO.
```

```
 CARD =  LOC      CODE         CARD
  261
  262   F915    20 A6 FC              JSR XZTST
  263   F918    F0 05                 BEQ MULT1
  264
  265                        TEST RY FOR ZERO.
  266
  267   F91A    20 B3 FC              JSR YZTST
  268   F91D    D0 08                 BNE MULT3
  269
  270                        SET RZ EQUAL TO ZERO.
  271
  272   F91F    20 87 FD     MULT1    JSR CLRZ
  273   F922    60                    RTS
  274
  275                        MOVE RA TO RZ.
  276
  277   F923    20 4F FC     MULT2    JSR RZERA
  278   F926    60                    RTS
  279
  280                        MOVE RY TO RB.
  281
  282   F927    20 1C FC     MULT3    JSR RBERY
  283
  284                        MOVE RX TO RQ.
  285
  286   F92A    20 36 FC              JSR RQERX
  287
  288                        FORM PRODUCT OF MANTISSAS.
  289
  290   F92D    20 53 FA              JSR MLT
  291
  292                        FIGURE THE SIGN AND EXPONENT OF
  293                        OF THE ANSWER FOR THE MULTIPLY
  294                        AND DIVIDE ROUTINES.
  295
  296   F930    AD 47 02     MULT4    LDA SY
  297   F933.   4D 35 02              EOR SX
  298   F936    85 12                 STA TEMP
  299   F938    24 12                 BIT TEMP
  300   F93A    AD 46 02              LDA EX
  301   F93D    70 1E                 BVS MD100
  302   F93F    18           MD1      CLC
  303   F940    6D 58 02              ADC EY
  304   F943    90 2B                 BCC MD2
  305   F945    D0 61                 BNE MD59
  306   F947    A5 13                 LDA TEMP1
  307   F949    F0 15                 BEQ MDOV2
  308   F94B    2C 35 02              BIT SX
  309   F94E    70 67                 BVS MD7
  310   F950    A5 04                 LDA CNTA
  311   F952    F0 5F                 BEQ MD61
  312   F954    A9 00                 LDA =0
```

```
CARD = LOC      CODE        CARD
313    F956    85 04              STA  CNTA
314    F958    A9 99 ·     MDOV1  LDA  =$99
315    F95A    4C 70 F9           JMP  MD2
316    F95D    4C C3 F9    MD100  JMP  MD10
317    F960    2C 35 02    MDOV2  BIT  SX
318    F963    50 4E              BVC  MD61
319    F965    AD 00 02           LDA  RA
320    F968    F0 EE              BEQ  MDOV1
321    F96A    20 A6 FB           JSR  RSRA
322    F96D    4C 58 F9           JMP  MDOV1
323    F970    8D 6A 02    MD2    STA  EZ
324    F973    D0 64              BNE  MD11
325    F975    AD 35 02           LDA  SX
326    F978    29 BF              AND  =$BF
327    F97A    8D 59 02    MD3    STA  SZ
328    F97D    A5 12       MD4    LDA  TEMP
329    F97F    30 3A              BMI  MD8
330    F981    A9 7F              LDA  =$7F
331    F983    2D 59 02           AND  SZ
332    F986    8D 59 02    MD5    STA  SZ
333    F989    A5 13              LDA  TEMP1
334    F98B    D0 52              BNE  DIVEXT
335    F98D    AD 00 02           LDA  RA
336    F990    F0 13              BEQ  MD51
337    F992    20 A6 FB           JSR  RSRA
338    F995    AD 6A 02           LDA  EZ
339    F998    2C 59 02           BIT  SZ
340    F99B    70 6B              BVS  MD9
341    F99D    18                 CLC
342    F99E    69 01              ADC  =1
343    F9A0    F0 0C              BEQ  MD6
344    F9A2    8D 6A 02           STA  EZ
345    F9A5    4C 23 F9    MD51   JMP  MULT2
346    F9A8    AD 35 02    MD59   LDA  SX
347    F9AB    8D 59 02           STA  SZ
348    F9AE    2C 59 02    MD6    BIT  SZ
349    F9B1    70 04              BVS  MD7
350    F9B3    20 02 FC    MD61   JSR  INFIN
351    F9B6    60                 RTS
352    F9B7    20 87 FD    MD7    JSR  CLRZ
353    F9BA    60                 RTS
354    F9BB    A9 80       MD8    LDA  =$80
355    F9BD    0D 59 02           ORA  SZ
356    F9C0    4C 86 F9           JMP  MD5
357    F9C3    38          MD10   SEC
358    F9C4    ED 58 02           SBC  EY
359    F9C7    B0 A7              BCS  MD2
360    F9C9    38                 SEC
361    F9CA    AD 58 02           LDA  EY
362    F9CD    ED 46 02           SBC  EX
363    F9D0    8D 6A 02           STA  EZ
364    F9D3    AD 47 02           LDA  SY
```

```
D = LOC        CODE          CARD
 365  F9D6    4C 7A F9              JMP  MD3
 366  F9D9    AD 35 02     MD11     LDA  SX
 367  F9DC    4C 7A F9              JMP  MD3
 368  F9DF    A5 04        DIVEXT   LDA  CNTA
 369  F9E1    F0 C2                 BEQ  MD51
 370  F9E3    2C 59 02     DVEXTO   BIT  SZ
 371  F9E6    AD 6A 02              LDA  EZ
 372  F9E9    38                    SEC
 373  F9EA    50 0A                 BVC  DVEXT2
 374  F9EC    69 00                 ADC  =0
 375  F9EE    F0 BE                 BEQ  MD6
 376  F9F0    8D 6A 02     DVEXT1   STA  EZ
 377  F9F3    4C 23 F9              JMP  MULT2
 378  F9F6    F0 05        DVEXT2   BEQ  DVEXT3
 379  F9F8    E9 01                 SBC  =1
 380  F9FA    4C F0 F9              JMP  DVEXT1
 381  F9FD    AD 59 02     DVEXT3   LDA  SZ
 382  FA00    09 40                 ORA  =$40
 383  FA02    8D 59 02              STA  SZ
 384  FA05    4C E3 F9              JMP  DVEXTO
 385  FA08    38           MD9      SEC
 386  FA09    E9 01                 SBC  =1
 387  FA0B    F0 06                 BEQ  MD22
 388  FA0D    8D 6A 02              STA  EZ
 389  FA10    4C 23 F9              JMP  MULT2
 390  FA13    4C 70 F9     MD22     JMP  MD2
 391
 392                       FLOATING POINT DIVIDE ROUTINE.
 393
 394  FA16    F8           DIVIDE   SED
 395
 396                       TEST RY FOR ZERO.
 397
 398  FA17    20 B3 FC              JSR  YZTST
 399  FA1A    F0 97                 BEQ  MD61
 400
 401                       TEST RX FOR ZERO.
 402
 403  FA1C    20 A6 FC              JSR  XZTST
 404  FA1F    F0 96                 BEQ  MD7
 405
 406                       CLEAR WORKING STORAGE.
 407
 408  FA21    20 B8 FB              JSR  CLEAR
 409
 410                       MOVE RX TO RA.
 411
 412  FA24    20 29 FC              JSR  RAERX
 413
 414                       MOVE RY TO RB.
 415
 416  FA27    20 1C FC              JSR  RBERY
```

```
\RD =  LOC       CODE        CARD
 417                         COMPARE RX TO RY.
 418                .
 419
 420   FA2A   20 82 FC       \      JSR COMPXY
 421
 422                         FORM QUOTIENT.
 423
 424   FA2D   20 75 FA              JSR DIV
 425
 426                         COMPUTE SIGN AND EXPONENT OF
 427                         ANSWER.
 428
 429   FA30   A9 01      DIV6     LDA =1
 430   FA32   85 13               STA TEMP1
 431   FA34   AD 47 02            LDA SY
 432   FA37   49 40               EOR =$40
 433   FA39   8D 47 02            STA SY
 434   FA3C   20 43 FC            JSR RAERQ
 435   FA3F   AD 01 02            LDA RA+1
 436   FA42   D0 03               BNE DIV7
 437   FA44   20 91 FB            JSR LSRA
 438   FA47   20 30 F9   DIV7     JSR MULT4
 439   FA4A   AD 47 02            LDA SY
 440   FA4D   49 40               EOR =$40
 441   FA4F   8D 47 02            STA SY
 442   FA52   60                  RTS
 443
 444                         THIS ROUTINE COMPUTES THE
 445                         PRODUCT OF THE MANTISSAS
 446                         OF THE ARGUMENTS BY REPEATED
 447                         ADDITION. THE RESULT IS BUILT
 448                         IN RA.
 449
 450   FA53   A5 00      MLT      LDA N
 451   FA55   85 02               STA J
 452   FA57   C6 02               DEC J
 453   FA59   A6 02      MLT0     LDX J
 454   FA5B   BD 24 02            LDA RQ,X
 455   FA5E   85 03               STA CNT
 456   FA60   C6 03      MLT1     DEC CNT
 457   FA62   30 06               BMI MLT2
 458   FA64   20 5C FC            JSR RAPRB
 459   FA67   4C 60 FA            JMP MLT1
 460   FA6A   20 A6 FB   MLT2     JSR RSRA
 461   FA6D   C6 02               DEC J
 462   FA6F   10 E8               BPL MLT0
 463   FA71   20 91 FB            JSR LSRA
 464   FA74   60                  RTS
 465
 466                         THIS ROUTINE COMPUTES THE
 467                         QUOTIENT OF RA AND RB BY
 468                         REPEATED SUBTRACTION. THE
```

```
RC = LOC      CODE        CARD
469                             RESULT IS BUILT IN RQ.
470
471   FA75   A9 00      DIV    LDA  =0
472   FA77   85 02             STA  J
473   FA79   A9 00      DIV0   LDA  =0
474   FA7B   85 03             STA  CNT
475   FA7D   20 70 FC   DIV1   JSR  RAMRB
476   FA80   90 04             BCC  DIV2
477   FA82   E6 03             INC  CNT
478   FA84   D0 F7             BNE  DIV1
479   FA86   20 5C FC   DIV2   JSR  RAPRB
480   FA89   20 91 F8          JSR  LSRA
481   FA8C   A6 02             LDX  J
482   FA8E   A5 03             LDA  CNT
483   FA90   9D 24 02          STA  RQ,X
484   FA93   E6 02             INC  J
485   FA95   A5 02             LDA  J
486   FA97   C5 00             CMP  N
487   FA99   F0 DE             BEQ  DIV0
488   FA9B   90 DC             BCC  DIV0
489   FA9D   60                RTS
490
491                            THIS ROUTINE COMPUTES THE
492                            SQUARE ROOT OF A FLOATING POINT
493                            NUMBER BETWEEN 1 AND 100 BY
494                            HERONS METHOD.
495
496   FA9E   A9 07      SQRT   LDA  =7
497   FAA0   85 01             STA  NKON
498   FAA2   20 F8 FC          JSR  MVXN
499   FAA5   20 87 FD          JSR  CLRZ
500   FAA8   A9 07             LDA  =7
501   FAAA   8D 5A 02          STA  R7+1
502   FAAD   A9 08             LDA  =8
503   FAAF   8D 5B 02          STA  RZ+2
504   FAB2   20 14 FD          JSR  MVZM
505   FAB5   20 20 FD   SQRT0  JSR  MVMY
506   FAB8   20 2C FD          JSR  MVNX
507   FABB   20 16 FA          JSR  DIVIDE
508   FABE   20 10 FD          JSR  MVZY
509   FAC1   20 1C FD          JSR  MVMX
510   FAC4   20 08 F8          JSR  ADD
511   FAC7   20 0C FD          JSR  MVZX
512   FACA   20 7C FD          JSR  CLRY
513   FACD   A9 40             LDA  =$40
514   FACF   8D 47 02          STA  RY
515   FAD2   A9 05             LDA  =5
516   FAD4   8D 48 02          STA  RY+1
517   FAD7   A9 01             LDA  =1
518   FAD9   8D 58 02          STA  EY
519   FADC   20 08 F9          JSR  MLTPLY
520   FADF   20 14 FD          JSR  MVZM
```

```
'RD =  LOC        CODE.        CARD
 521   FAE2    C6 01                   DEC  NKON
 522   FAE4    10 CF .                 BPL  SQRTO
 523   FAE6    60                      RTS
 524
 525                         THIS ROUTINE COMPUTES THE
 526                         COMMON LOG OF A FLOATING POINT
 527                         NUMBER BETWEEN SQRT(.1)AND SQRT(10).
 528
 529   FAE7    A9 0E           LOG     LDA  =14
 530   FAE9    85 00                   STA  N
 531   FAEB    20 FC FE                JSR  SETKON
 532   FAEE    20 F8 FC                JSR  MVXN
 533   FAF1    20 7C FD                JSR  CLRY
 534   FAF4    A9 01                   LDA  =1
 535   FAF6    8D 48 02                STA  RY+1
 536   FAF9    20 00 F8                JSR  SUB
 537   FAFC    20 2C FD                JSR  MVNX
 538   FAFF    20 7C FD                JSR  CLRY
 539   FB02    A9 01                   LDA  =1
 540   FB04    8D 48 02                STA  RY+1
 541   FB07    20 18 FD                JSR  MVZN
 542   FB0A    20 08 F8                JSR  ADD
 543   FB0D    20 10 FD                JSR  MVZY
 544   FB10    20 2C FD                JSR  MVNX
 545   FB13    20 16 FA                JSR  DIVIDE
 546   FB16    20 18 FD                JSR  MVZN
 547   FB19    20 0C FD                JSR  MVZX
 548   FB1C    20 10 FD                JSR  MVZY
 549   FB1F    20 0B F9                JSR  MLTPLY
 550   FB22    A9 04                   LDA  =4
 551   FB24    85 05                   STA  DEG
 552   FB26    A9 00                   LDA  =0
 553   FB28    85 01           LOGEND  STA  NKON
 554   FB2A    20 C1 FD                JSR  POLY
 555   FB2D    20 30 FD                JSR  MVNY
 556   FB30    20 0C FD        LGNDO   JSR  MVZX
 557   FB33    20 0B F9                JSR  MLTPLY
 558   FB36    A9 00           CHCP    LDA  =0
 559   FB38    A2 07                   LDX  =LEN/2-1
 560   FB3A    9D 62 02        CHOPO   STA  RZ+9,X
 561   FB3D    CA                      DEX
 562   FB3E    10 FA                   BPL  CHOPO
 563   FB40    60                      RTS
 564
 565                         THIS ROUTINE CCMPUTES THE
 566                         CCMMON ANTI-LOG OF A FLOATING
 567                         POINT NUMBER BETWEEN 0 AND 1.
 568
 569   FB41    A9 0C           TENX    LDA  =12
 570   FB43    85 00                   STA  N
 571   FB45    20 FC FE                JSR  SETKON
 572   FB48    20 F0 FC                JSR  MVXZ
```

```
CARD  =  LOC         CODE          CARD
      3   FB4B    A9  06                    LDA  =6
     ,4   FB4D    85  05      .             STA  DEG
     75   FB4F    A9  2E                    LDA  =46
    J76   FB51    85  01                    STA  NKON
    577   FB53    20  C1  FD                JSR  POLY
    578   FB56    20  10  FD                JSR  MVZY
    579   FB59    4C  30  FB                JMP  LGNDO
    580
    581                        THIS ROUTINE COMPUTES THE
    582                        TANGENT OF A FLOATING POINT NUMBER
    583                        BETWEEN 0 AND PI/4.
    584
    585   FB5C    A9  0E       TANX    LDA  =14
    586   FB5E    85  00               STA  N
    587   FB60    20  FC  FE            JSR  SETKON
    588   FB63    20  F8  FC            JSR  MVXN
    589   FB66    20  EC  FC            JSR  MVXY
    590   FB69    20  0B  F9            JSR  MLTPLY
    591   FB6C    20  36  FB            JSR  CHOP
    592   FB6F    A9  05               LDA  =5
    593   FB71    85  05               STA  DEG
    594   FB73    A9  64               LDA  =100
    595   FB75    4C  28  FB            JMP  LOGEND
    596
    597                        THIS ROUTINE COMPUTES THE
    598                        ARCTANGENT OF A FLOATING POINT NUMBER
    599                        BETWEEN 0 AND 1.
    600
    601   FB78    A9  0E       ATANX   LDA  =14
    602   FB7A    85  00               STA  N
    603   FB7C    20  FC  FE            JSR  SETKON
    604   FB7F    20  F8  FC            JSR  MVXN
    605   FB82    20  EC  FC            JSR  MVXY
    ^6    FB85    20  0B  F9            JSR  MLTPLY
     7    FB88    A9  07               LDA  =7
    ~U8   FB8A    85  05               STA  DEG
     09   FB8C    A9  9C               LDA  =156
    o10   FB8E    4C  28  FB            JMP  LOGEND
    611
    612                        LEFT SHIFT RA ONE DIGIT.
    613
    614   FB91    A2  00       LSRA    LDX  =0
    615   FB93    BD  01  02   LSRA0   LDA  RA+1,X
    616   FB96    9D  00  02           STA  RA,X
    617   FB99    E8                   INX
    618   FB9A    E4  00               CPX  N
    619   FB9C    90  F5               BCC  LSRA0
    620   FB9E    F0  F3               BEQ  LSRA0
    621   FBA0    A9  00               LDA  =0
    622   FBA2    9D  00  02           STA  RA,X
    623   FBA5    60                   RTS
    624
```

```
'D = LOC        CODE        CARD
325                         RIGHT SHIFT RA ONE DIGIT.
626
627   FBA6   A6 00        RSRA    LDX  N
628   FBA8   CA                   DEX
629   FBA9   BD 00 02     RSRAO   LDA  RA,X
630   FBAC   9D 01 02             STA  RA+1,X
631   FBAF   CA                   DEX
632   FBB0   10 F7                BPL  RSRAO
633   FBB2   A9 00                LDA  =0
634   FBB4   8D 00 02             STA  RA
635   FBB7   60                   RTS
636
637                       CLEAR WORKING STORAGE.
638
639   FBB8   A2 34        CLEAR   LDX  =LEN*3+1
640   FBBA   A9 00                LDA  =0
641   FBBC   9D 00 02     AZO     STA  RA,X
642   FBBF   CA                   DEX
643   FBC0   10 FA                BPL  AZO
644   FBC2   60                   RTS
645
646                       CONVERT THE CONTENTS OF CNT
647                       FROM BCD TO HEX AND STORE THE
648                       RESULT IN CNT.
649
650   FBC3   F8           DECHEX  SED
651   FBC4   A2 00                LDX  =0
652   FBC6   38                   SEC
653   FBC7   A5 03        DHCNV1  LDA  CNT
654   FBC9   E9 16                SBC  =$16
655   FBCB   90 06                BCC  DHCNV2
656   FBCD   85 03                STA  CNT
657   FBCF   E8                   INX
658   FBD0   4C C7 FB             JMP  DHCNV1
659   FBD3   D8           DHCNV2  CLD
660   FBD4   A5 03                LDA  CNT
661   FBD6   C9 0A                CMP  =$0A
662   FBD8   90 04                BCC  DHCNV3
663   FBDA   29 0F                AND  =$0F
664   FBDC   69 09                ADC  =$09
665   FBDE   86 03        DHCNV3  STX  CNT
666   FBE0   06 03                ASL  CNT
667   FBE2   06 03                ASL  CNT
668   FBE4   06 03                ASL  CNT
669   FBE6   06 03                ASL  CNT
670   FBE8   05 03                ORA  CNT
671   FBEA   85 03                STA  CNT
672   FBEC   F8                   SED
673   FBED   60           DHCNVE  RTS
674
675                       RIGHT SHIFT RB CNT TIMES.
676
```

```
C  "D = LOC        CODE        CARD
   77   FBEE   A5 03        RSBCNT LDA  CNT
  678   FBF0   F0 29    .          BEQ  RBOFE
  679   FBF2   A6 00               LDX  N
  680   FBF4   BD 12 02     RSBC   LDA  RB,X
  681   FBF7   9D 13 02            STA  RB+1,X
  682   FBFA   CA                  DEX
  683   FBFB   10 F7               BPL  RSBC
  684   FBFD   A9 00               LDA  =0
  685   FBFF   8D 12 02            STA  RB
  686   FC02   C6 03               DEC  CNT
  687   FC04   D0 E8               BNE  RSBCNT
  688   FC06   60                  RTS
  689
  690                      ROUND RB OFF.
  691
  692   FC07   A6 00        RBOFF  LDX  N
  693   FC09   BD 13 02            LDA  RB+1,X
  694   FC0C   C9 05               CMP  =5
  695   FC0E   BD 12 02     RBOF   LDA  RB,X
  696   FC11   69 90               ADC  =$90
  697   FC13   29 0F               AND  =$0F
  698   FC15   9D 12 02            STA  RB,X
  699   FC18   CA                  DEX
  700   FC19   10 F3               BPL  RBOF
  701   FC1B   60           RBOFE  RTS
  702
  703                      MOVE RY TO RB.
  704
  705   FC1C   A6 00        RBERY  LDX  N
  706   FC1E   CA                  DEX
  707   FC1F   BD 48 02     RBRY   LDA  RY+1,X
  708   FC22   9D 13 02            STA  RB+1,X
  709   FC25   CA                  DEX
  10   FC26   10 F7               BPL  RBRY
  11   FC28   60                  RTS
  712
  713                      MOVE RX TO RA.
  714
  715   FC29   A6 00        RAERX  LDX  N
  716   FC2B   CA                  DEX
  717   FC2C   BD 36 02     RARXO  LDA  RX+1,X
  718   FC2F   9D 01 02            STA  RA+1,X
  719   FC32   CA                  DEX
  720   FC33   10 F7               BPL  RARXO
  721   FC35   60           RARXE  RTS
  722
  723                      MOVE RX TO RQ.
  724
  725   FC36   A6 00        RQERX  LDX  N
  726   FC38   CA                  DEX
  727   FC39   BD 36 02     RQRX   LDA  RX+1,X
  728   FC3C   9D 24 02            STA  RQ,X
```

```
ARD = LOC        CODE        CARD
 729   FC3F   CA                    DEX
 730   FC40   10 F7·                BPL  RQRX
 731   FC42   60                    RTS
 732
 733                     MOVE RQ TO RA.
 734
 735   FC43   A6 00      RAERQ      LDX  N
 736   FC45   BD 24 02   RARQ       LDA  RQ,X
 737   FC48   9D 01 02              STA  RA+1,X
 738   FC4B   CA                    DEX
 739   FC4C   10 F7                 BPL  RARQ
 740   FC4E   60                    RTS
 741
 742                     MOVE RA TO RZ.
 743
 744   FC4F   A6 00      RZERA      LDX  N
 745   FC51   CA                    DEX
 746   FC52   BD 01 02   RZRAO      LDA  RA+1,X
 747   FC55   9D 5A 02              STA  RZ+1,X
 748   FC58   CA                    DEX
 749   FC59   10 F7                 BPL  RZRAO
 750   FC5B   60         RZRAE      RTS
 751
 752                     ADD RB TO RA.
 753
·754   FC5C   A6 00      RAPRB      LDX  N
 755   FC5E   18                    CLC
 756   FC5F   BD 00 02   APB        LDA  RA,X
 757   FC62   7D 12 02              ADC  RB,X
 758   FC65   69 90                 ADC  =$90
 759   FC67   29 0F                 AND  =$0F
 760   FC69   9D 00 02              STA  RA,X
 761   FC6C   CA                    DEX
 762   FC6D   10 F0                 BPL  APB
 763   FC6F   60                    RTS
 764
 765                     SUBTRACT RB FROM RA.
 766
 767   FC70   A6 00      RAMRB      LDX  N
 768   FC72   38                    SEC
 769   FC73   BD 00 02   AMB        LDA  RA,X
 770   FC76   FD 12 02              SBC  RB,X
 771   FC79   29 0F                 AND  =$0F
 772   FC7B   9D 00 02              STA  RA,X
 773   FC7E   CA                    DEX
 774   FC7F   10 F2                 BPL  AMB
 775   FC81   60                    RTS
 776
 777                     COMPARE RX TO RY.
 778
 779   FC82   A9 00      COMPXY     LDA  =0
 780   FC84   85 04                 STA  CNTA
```

```
CARD =  LOC       CODE        CARD
    81  FC86   A6 00              LDX  N
    82  FC88   CA                 DEX
    83  FC89   38                 SEC
    84  FC8A   BD 36 02    COM1   LDA  RX+1,X
   785  FC8D   FD 48 02           SBC  RY+1,X
   786  FC90   CA                 DEX
   787  FC91   10 F7              BPL  COM1
   788  FC93   90 01              BCC  COM2
   789  FC95   60                 RTS
   790  FC96   E6 04       COM2   INC  CNTA
   791  FC98   60                 RTS
   792
   793              TEST RA FOR ZERO.
   794
   795  FC99   A6 00       AZTST  LDX  N
   796  FC9B   E8                 INX
   797  FC9C   BD 00 02    AZTST0 LDA  RA,X
   798  FC9F   D0 11              BNE  XZTST1
   799  FCA1   CA                 DEX
   800  FCA2   10 F8              BPL  AZTST0
   801  FCA4   30 0A              BMI  XZTST2
   802
   803              TEST RX FOR ZERO.
   804
   805  FCA6   A6 00       XZTST  LDX  N
   806  FCA8   BD 35 02    XZTST0 LDA  RX,X
   807  FCAB   D0 05              BNE  XZTST1
   808  FCAD   CA                 DEX
   809  FCAE   10 F8              BPL  XZTST0
   810  FCB0   A9 00       XZTST2 LDA  =0
   811  FCB2   60          XZTST1 RTS
   812
   813              TEST RY FOR ZERO.
   814
   815  FCB3   A6 00       YZTST  LDX  N
   816  FCB5   BD 47 02    YZTST0 LDA  RY,X
   817  FCB8   D0 F8              BNE  XZTST1
   818  FCBA   CA                 DEX
   819  FCBB   10 F8              BPL  YZTST0
   820  FCBD   30 F1              BMI  XZTST2
   821
   822              SWAP RX AND RY.
   823
   824  FCBF   A2 11       XSY    LDX  =LEN
   825  FCC1   BD 35 02    XSY1   LDA  RX,X
   826  FCC4   BC 47 02           LDY  RY,X
   827  FCC7   9D 47 02           STA  RY,X
   828  FCCA   98                 TYA
   829  FCCB   9D 35 02           STA  RX,X
   830  FCCE   CA                 DEX
   831  FCCF   10 F0              BPL  XSY1
   832  FCD1   60                 RTS
```

RD =	LOC	CODE		CARD		
833						
834			.	SET RZ=9.9...9E99 AND OVERR=1.		
835						
836	FCD2	A6	00	INFIN	LDX	N
837	FCD4	CA			DEX	
838	FCD5	A9	09		LDA	=9
839	FCD7	9D	5A	02	INFO	STA	RZ+1,X
840	FCDA	CA			DEX	
841	FCDB	10	FA		BPL	INFO
842	FCDD	A9	99		LDA	=$99
843	FCDF	8D	6A	02	STA	EZ
844	FCE2	A9	00		LDA	=0
845	FCE4	8D	59	02	STA	SZ
846	FCE7	A9	01		LDA	=1
847	FCE9	85	14		STA	OVERR
848	FCEB	60			RTS	
849						
850				THE FOLLOWING ROUTINES ARE USED		
851				TO MOVE THE CONTENTS FROM ONE		
852				REGISTER TO ANOTHER. THE NAMES ARE		
853				OF THE FORM MVSD, WHERE S STANDS		
854				FOR SOURCE AND D FOR DESTINATION.		
855						
856	FCEC	A9	01	MVXY	LDA	=XY
857	FCEE	D0	4A		BNE	MVTR
858	FCF0	A9	02	MVXZ	LDA	=XZ
859	FCF2	D0	46		BNE	MVTR
860	FCF4	A9	03	MVXM	LDA	=XM
861	FCF6	D0	42		BNE	MVTR
862	FCF8	A9	04	MVXN	LDA	=XN
863	FCFA	D0	3E		BNE	MVTR
864	FCFC	A9	10	MVYX	LDA	=YX
865	FCFE	D0	3A		BNE	MVTR
866	FD00	A9	12	MVYZ	LDA	=YZ
867	FD02	D0	36		BNE	MVTR
868	FD04	A9	13	MVYM	LDA	=YM
869	FD06	D0	32		BNE	MVTR
870	FD08	A9	14	MVYN	LDA	=YN
871	FD0A	D0	2E		BNE	MVTR
872	FD0C	A9	20	MVZX	LDA	=ZX
873	FD0E	D0	2A		BNE	MVTR
874	FD10	A9	21	MVZY	LDA	=ZY
875	FD12	D0	26		BNE	MVTR
876	FD14	A9	23	MVZM	LDA	=ZM
877	FD16	D0	22		BNE	MVTR
878	FD18	A9	24	MVZN	LDA	=ZN
879	FD1A	D0	1E		BNE	MVTR
880	FD1C	A9	30	MVMX	LDA	=MX
881	FD1E	D0	1A		BNE	MVTR
882	FD20	A9	31	MVMY	LDA	=MY
883	FD22	D0	16		BNE	MVTR
884	FD24	A9	32	MVMZ	LDA	=MZ

```
CARD = LOC        CODE        CARD
    5   FD26   DO 12              BNE  MVTR
  886   FD28   A9 34       .  MVMN   LDA  =MN
  887   FD2A   DO OE              BNE  MVTR
  888   FD2C   A9 40          MVNX   LDA  =NX
  889   FD2E   DO OA              BNE  MVTR
  890   FD30   A9 41          MVNY   LDA  =NY
  891   FD32   DO 06              BNE  MVTR
  892   FD34   A9 42          MVNZ   LDA  =NZ
  893   FD36   DO 02              BNE  MVTR
  894   FD38   A9 43          MVNM   LDA  =NM
  895   FD3A   48             MVTR   PHA
  896   FD3B   A2 OB              LDX  =11
  897   FD3D   BD 65 FD      MVTRO   LDA  MOVR,X
  898   FD40   9D 8F 02           STA  RAMCOD,X
  899   FD43   CA                 DEX
  900   FD44   10 F7              BPL  MVTRO
  901   FD46   68                 PLA  .
  902   FD47   48                 PHA
  903   FD48   29 OF              AND  =$OF
  904   FD4A   AA                 TAX
  905   FD4B   BD 60 FD           LDA  TAB,X
  906   FD4E   8D 95 02           STA  RAMB
  907   FD51   68                 PLA
  908   FD52   4A                 LSR  A
  909   FD53   4A                 LSR  A
  910   FD54   4A                 LSR  A
  911   FD55   4A                 LSR  A
  912   FD56   AA                 TAX
  913   FD57   BD 60 FD           LDA  TAB,X
  914   FD5A   8D 92 02           STA  RAMA
  915   FD5D   4C 8F 02           JMP  RAMCOD
  916   FD60   35           TAB    .BYTE $35,$47,$59,$6B,$7D
  916   FD61   47
    6   FD62   59
    6   FD63   6B
  916   FD64   7D
   17   FD65   A2 11         MOVR    LDX  =LEN
  918   FD67   BD 35 02      MOVRO   LDA  RX,X
  919   FD6A   9D 47 02           STA  RY,X
  920   FD6D   CA                 DEX
  921   FD6E   10 F7              BPL  MOVRO
  922   FD70   60  .              RTS
  923
  924                     SET RX EQUAL TO ZERO.
  925
  926   FD71   A2 11         CLRX    LDX  =LEN
  927   FD73   A9 00              LDA  =0
  928   FD75   9D 35 02      CLRXO   STA  RX,X
  929   FD78   CA                 DEX
  930   FD79   10 FA              BPL  CLRXO
  931   FD7B   60                 RTS
  932
```

```
·RD = LOC        CODE        CARD
933                          SET RY EQUAL TO ZERO.
934
935   FD7C   A2 11      CLRY    LDX  =LEN
936   FD7E   A9 00              LDA  =0
937   FD80   9D 47 02   CLRYO   STA  RY,X
938   FD83   CA                 DEX
939   FD84   10 FA              BPL  CLRYO
940   FD86   60                 RTS
941
942                          SET RZ EQUAL TO ZERO.
943
944   FD87   A2 11      CLRZ    LDX  =LEN
945   FD89   A9 00              LDA  =0
946   FD8B   9D 59 02   CLRZO   STA  RZ,X
947   FD8E   CA                 DEX
948   FD8F   10 FA              BPL  CLRZO
949   FD91   60                 RTS
950
951                          THIS ROUTINE IS USED TO LOOK UP
952                          THE COEFFICIENTS OF THE POLY-
953                          NOMIALS USED IN THE APPROXIMATIONS
954                          OF THE TRANSCENDENTAL FUNCTIONS.
955
956   FD92   20 7C FD   LOOKUP  JSR  CLRY
957   FD95   A2 00              LDX  =0
958   FD97   A4 01              LDY  NKON
959   FD99   B1 0E              LDA  (KON),Y
960   FD9B   8D 47 02           STA  SY
961   FD9E   C8         LKPO    INY
962   FD9F   B1 0E              LDA  (KON),Y
963   FDA1   C9 F0              CMP  =$F0
964   FDA3   B0 13              BCS  LKP1
965   FDA5   48                 PHA
966   FDA6   29 0F              AND  =$0F
967   FDA8   9D 49 02           STA  RY+2,X
968   FDAB   68                 PLA
969   FDAC   4A                 LSR  A
970   FDAD   4A                 LSR  A
971   FDAE   4A                 LSR  A
972   FDAF   4A                 LSR  A
973   FDB0   9D 48 02           STA  RY+1,X
974   FDB3   E8                 INX
975   FDB4   E8                 INX
976   FDB5   4C 9E FD           JMP  LKPO
977   FDB8   29 0F      LKP1    AND  =$0F
978   FDBA   8D 58 02           STA  EY
979   FDBD   C8                 INY
980   FDBE   84 01              STY  NKON
981   FDC0   60                 RTS
982
983                          THIS ROUTINE EVALUATES POLYNOMIALS
984                          BY MEANS OF THE NESTED MULTIPLICATION
```

```
C  0 = LOC        CODE         CARD
   15                          ALGORITHM.
   86                   .
   87    FDC1    20 14 FD    POLY    JSR  MVZM
   988   FDC4    20 0C FD            JSR  MVZX
   989   FDC7    20 92 FD            JSR  LOOKUP
   990   FDCA    20 06 F9    POLYO   JSR  MLTPLY
   991   FDCD    20 92 FD            JSR  LOOKUP
   992   FDD0    20 0C FD            JSR  MVZX
   993   FDD3    20 08 F8            JSR  ADD
   994   FDD6    20 1C FD            JSR  MVMX
   995   FDD9    20 10 FD            JSR  MVZY
   996   FDDC    C6 05               DEC  DEG
   997   FDDE    10 EA               BPL  POLYO
   998   FDE0    60                  RTS
   999
  1000                       THIS ROUTINE UNPACKS AN ARGUMENT
  1001                       AND STORES THE RESULT IN RZ.
  1002
  1003   FDE1    A2 00       PGTARG  LDX  =0
  1004   FDE3    A0 00               LDY  =0
  1005   FDE5    B1 0C               LDA  (PTR),Y
  1006   FDE7    8D 59 02            STA  SZ
  1007   FDEA    C8          PGTRGO  INY
  1008   FDEB    C4 04               CPY  LENGTH
  1009   FDED    F0 15               BEQ  PGTRG1
  1010   FDEF    B1 0C               LDA  (PTR),Y
  1011   FDF1    48                  PHA
  1012   FDF2    29 0F               AND  =$0F
  1013   FDF4    9D 5B 02            STA  RZ+2,X
  1014   FDF7    68                  PLA
  1015   FDF8    4A                  LSR  A
  1016   FDF9    4A                  LSR  A
  1017   FDFA    4A                  LSR  A
   18    FDFB    4A                  LSR  A
   19    FDFC    9D 5A 02            STA  RZ+1,X
   20    FDFF    E8                  INX
   21    FE00    E8                  INX
  1022   FE01    4C EA FD            JMP  PGTRGO
  1023   FE04    B1 0C       PGTRG1  LDA  (PTR),Y
  1024   FE06    8D 6A 02            STA  EZ
  1025   FE09    60                  RTS
  1026
  1027                       THIS ROUTINE UNPACKS AN ARGUMENT
  1028                       LOCATED AT (ARGXL,ARGXH) AND STORES
  1029                       THE RESULTS IN RZ AND RX.
  1030
  1031   FE0A    A5 06       PLOADX  LDA  ARGXL
  1032   FE0C    85 0C               STA  PTR
  1033   FE0E    A5 07               LDA  ARGXH
  1034   FE10    85 0D               STA  PTR+1
  1035   FE12    A5 10               LDA  PREC
  1036   FE14    4A                  LSR  A
```

```
\RD = LOC        CODE        CARD
.037   FE15   69 01              ADC  =1
1038   FE17   85 04·             STA  LENGTH
1039   FE19   20 87 FD           JSR  CLRZ
1040   FE1C   20 E1 FD           JSR  PGTARG
1041   FE1F   20 OC FD           JSR  MVZX
1042   FE22   60                 RTS
1043
1044                     THIS ROUTINE UNPACKS AN ARGUMENT
1045                     LOCATED AT (ARGYL,ARGYH) AND STORES
1046                     THE RESULT IN RY AND RZ.
1047
1048   FE23   A5 08      PLOADY LDA  ARGYL
1049   FE25   85 OC             STA  PTR
1050   FE27   A5 09             LDA  ARGYH
1051   FE29   85 OD             STA  PTR+1
1052   FE2B   A5 10             LDA  PREC
1053   FE2D   4A                LSR  A
1054   FE2E   69 01             ADC  =1
1055   FE30   85 04             STA  LENGTH
1056   FE32   20 87 FD          JSR  CLRZ
1057   FE35   20 E1 FD          JSR  PGTARG
1058   FE38   20 10 FD          JSR  MVZY
1059   FE3B   60                RTS
1060
1061                     THIS ROUTINE PACKS THE CONTENTS
1062                     OF RZ INTO THE LOCATIONS STARTING
1063                     WITH ADDRESS (RES,RES+1).
1064
1065   FE3C   A2 00      PSTRES LDX  =0
1066   FE3E   AO 00             LDY  =0
1067   FE40   AD 59 02          LDA  SZ
1068   FE43   91 OA             STA  (RES),Y
1069   FE45   C8                INY
1070   FE46   BD 5A 02   PTRES  LDA  RZ+1,X
1071   FE49   0A                ASL  A
1072   FE4A   0A                ASL  A
1073   FE4B   0A                ASL  A
1074   FE4C   0A                ASL  A
1075   FE4D   1D 5B 02          ORA  RZ+2,X
1076   FE50   91 OA             STA  (RES),Y
1077   FE52   C8                INY
1078   FE53   E8                INX
1079   FE54   E8                INX
1080   FE55   E4 10             CPX  PREC
1081   FE57   90 ED             BCC  PTRES
1082   FE59   AD 6A 02          LDA  EZ
1083   FE5C   91 OA             STA  (RES),Y
1084   FE5E   60                RTS
1085
1086                     THIS ROUTINE CONVERTS AN ARGUMENT
1087                     FROM ASCII FORMAT TO COMPUTATIONAL
1088                     FORMAT AND STORES THE RESULT IN RZ.
```

```
CARD = LOC         CODE           CARD
     89
     90   FE5F    A0  00   .   UGTARG  LDY  =0
(    091   FE61    B1  0C           LDA  (PTR),Y
    .092   FE63    8D  59  02       STA  SZ
    1093   FE66    C8       UGTAR0  INY
    1094   FE67    C4  04           CPY  LENGTH
    1095   FE69    F0  0A           BEQ  UGTAR1
    1096   FE6B    B1  0C           LDA  (PTR),Y
    1097   FE6D    29  0F           AND  =$0F
    1098   FE6F    99  59  02       STA  RZ,Y
    1099   FE72    4C  66  FE       JMP  UGTAR0
    1100   FE75    B1  0C   UGTAR1  LDA  (PTR),Y
    1101   FE77    0A               ASL  A
    1102   FE78    0A               ASL  A
    1103   FE79    0A               ASL  A
    1104   FE7A    0A               ASL  A
    1105   FE7B    8D  6A  02       STA  EZ
    1106   FE7E    C8               INY
    1107   FE7F    B1  0C           LDA  (PTR),Y
    1108   FE81    29  0F           AND  =$0F
    1109   FE83    0D  6A  02       ORA  EZ
    1110   FE86    8D  6A  02       STA  EZ
    1111   FE89    60               RTS
    1112
    1113                    THIS ROUTINE CONVERTS AN ARGUMENT
    1114                    FROM ASCII FORMAT TO COMP. FORMAT.
    1115                    THE ADDRESS OF THE ARG. IS FOUND IN
    1116                    (ARGXL,ARGXH) AND THE RESULT IS STORED
    1117                    IN RZ AND RX.
    1118
    1119   FE8A    A5  06   ULOADX  LDA  ARGXL      06
    1120   FE8C    85  0C           STA  PTR        0C
    1121   FE8E    A5  07           LDA  ARGXH      07
    1 22   FE90    85  0D           STA  PTR+1      0D
      3    FE92    A5  10           LDA  PREC       10
     24    FE94    85  04           STA  LENGTH     04
(    25    FE96    E6  04           INC  LENGTH     04
    1126   FE98    20  87  FD       JSR  CLRZ       FD87
    1127   FE9B    20  5F  FE       JSR  UGTARG     FE5F
    1128   FE9E    20  0C  FD       JSR  MVZX       FD0C
    1129   FEA1    60               RTS
    1130
    1131                    THIS ROUTINE CONVERTS AN ARGUMENT
    1132                    FROM ASCII FORMAT TO COMP. FORMAT.
    1133                    THE ADDRESS OF THE ARG. IS FOUND IN
    1134                    (ARGYL,ARGYH) AND THE RESULT IS
    1135                    STORED IN RZ AND RY.
    1136
    1137   FEA2    A5  08   ULOADY  LDA  ARGYL      08
    1138   FEA4    85  0C           STA  PTR        0C
    1139   FEA6    A5  09           LDA  ARGYH      09
    1140   FEA8    85  0D           STA  PTR+1      0D
```

```
CARD =   LOC      CODE        CARD
  1141   FEAA   A5 10             LDA  PREC
  1142   FEAC   85 04             STA  LENGTH
  1143   FEAE   E6 04             INC  LENGTH
  1144   FEB0   20 87 FD          JSR  CLRZ
  1145   FEB3   20 5F FE          JSR  UGTARG
  1146   FEB6   20 10 FD          JSR  MVZY
  1147   FEB9   60                RTS
  1148
  1149                      THIS ROUTINE CONVERTS THE CONTENTS
  1150                      OF RZ TO ASCII FORMAT WHILE MOVING
  1151                      THEM TO THE ADDRESS SPECIFIED BY
  1152                      (RES,RES+1).
  1153
  1154   FEBA   A0 00      USTRES  LDY  =0
  1155   FEBC   AD 59 02           LDA  SZ
  1156   FEBF   91 0A             STA  (RES),Y
  1157   FEC1   C8         USTRS0  INY
  1158   FEC2   C4 10             CPY  PREC
  1159   FEC4   F0 02             BEQ  USTRS1
  1160   FEC6   B0 09             BCS  USTRS2
  1161   FEC8   B9 59 02   USTRS1  LDA  RZ,Y
  1162   FECB   09 30             ORA  =$30
  1163   FECD   91 0A             STA  (RES),Y
  1164   FECF   D0 F0             BNE  USTRS0
  1165   FED1   C8         USTRS2  INY
  1166   FED2   AD 6A 02           LDA  EZ
  1167   FED5   4A                LSR  A
  1168   FED6   4A                LSR  A
  1169   FED7   4A                LSR  A
  1170   FED8   4A                LSR  A
  1171   FED9   09 30             ORA  =$30
  1172   FEDB   91 0A             STA  (RES),Y
  1173   FEDD   C8                INY
  1174   FEDE   AD 6A 02           LDA  EZ
  1175   FEE1   29 0F             AND  =$0F
  1176   FEE3   09 30             ORA  =$30
  1177   FEE5   91 0A             STA  (RES),Y
  1178   FEE7   60                RTS
  1179
  1180                      THIS ROUTINE COMPUTES THE
  1181                      INTERNAL PRECISION N FROM
  1182                      PREC AND EXTRA. THE ADD IS
  1183                      A BINARY ADD (UNSIGNED).
  1184
  1185   FEE8   18         IPREC   CLC
  1186   FEE9   A5 10             LDA  PREC
  1187   FEEB   65 11             ADC  EXTRA
  1188   FEED   85 00             STA  N
  1189   FEEF   60                RTS
  1190
  1191                      SAVE THE PROCESSOR INDEX REGISTERS.
  1192
```

```
CARD =  LOC       CODE         CARD
  193   FEF0    86 15     SAVXY  STX TMPX
  194   FEF2    84 16  .         STY TMPY
  195   FEF4    60                RTS
 1196
 1197                    RECALL THE PROCESSOR INDEX REGISTERS.
 1198
 1199   FEF5    A6 15     RCLXY  LDX TMPX
 1200   FEF7    A4 16            LDY TMPY
 1201   FEF9    60                RTS
 1202   FEFA    07 FF     KADDR  .WORD KONST
 1203   FEFC    AD FA FE  SETKON LDA KADDR
 1204   FEFF    85 0E            STA KON
 1205   FF01    AD FB FE         LDA KADDR+1
 1206   FF04    85 0F            STA KONH
 1207   FF06    60                RTS
 1208
 1209                    THESE ARE THE COEFFICIENTS USED
 1210                    IN THE EVALUATION OF THE TRANSCENDENTAL
 1211                    FUNCTIONS.        HART: LOG10, 2284  p.186
 1212
 1213   FF07    40       KONST  .BYTE $40,$18,$20,$91,$29,$97,$F1
 1213   FF08    18
 1213   FF09    20
 1213   FF0A    91
 1213   FF0B    29
 1213   FF0C    97
 1213   FF0D    F1
 1214   FF0E    40              .BYTE $40,$55,$34,$27,$38,$70,$F2
 1214   FF0F    55
 1214   FF10    34
 1214   FF11    27
 1214   FF12    38
 1214   FF13    70
 214    FF14    F2
 215    FF15    40              .BYTE $40,$13,$13,$69,$01,$12,$10,$F1
 1215   FF16    13
 1215   FF17    13
 1215   FF18    69
 1215   FF19    01
 1215   FF1A    12
 1215   FF1B    10
 1215   FF1C    F1
 1216   FF1D    40              .BYTE $40,$17,$31,$09,$55,$17,$F1
 1216   FF1E    17
 1216   FF1F    31
 1216   FF20    09
 1216   FF21    55
 1216   FF22    17
 1216   FF23    F1
 1217   FF24    40              .BYTE $40,$28,$95,$51,$13,$02,$67,$F1
 1217   FF25    28
 1217   FF26    95
```

```
RD =  LOC       CODE      CARD
 217  FF27   51
1217  FF28   13
1217  FF29   02
1217  FF2A   67
1217  FF2B   F1
1218  FF2C   40              .BYTE $40,$86,$85,$88,$74,$83,$40,$50,$F1
1218  FF2D   86
1218  FF2E   85
1218  FF2F   88
1218  FF30   74
1218  FF31   83
1218  FF32   40
1218  FF33   50
1218  FF34   F1
1219  FF35   40              .BYTE $40,$93,$26,$42,$67,$F4
1219  FF36   93
1219  FF37   26
1219  FF38   42
1219  FF39   67
1219  FF3A   F4
1220  FF3B   40              .BYTE $40,$25,$54,$91,$79,$60,$F3
1220  FF3C   25
1220  FF3D   54
1220  FF3E   91
1220  FF3F   79
1220  FF40   60
1220  FF41   F3
1221  FF42   40              .BYTE $40,$17,$42,$11,$19,$88,$F2
1221  FF43   17
1221  FF44   42
1221  FF45   11
1221  FF46   19
1221  FF47   88
'221  FF48   F2
 222  FF49   40              .BYTE $40,$72,$95,$17,$36,$66,$F2
1222  FF4A   72
1222  FF4B   95
1222  FF4C   17
1222  FF4D   36
1222  FF4E   66
1222  FF4F   F2
1223  FF50   40              .BYTE $40,$25,$43,$93,$57,$48,$40,$F1
1223  FF51   25
1223  FF52   43
1223  FF53   93
1223  FF54   57
1223  FF55   48
1223  FF56   40
1223  FF57   F1
1224  FF58   40              .BYTE $40,$66,$27,$30,$88,$42,$90,$F1
1224  FF59   66
1224  FF5A   27
```

```
CARD  =  LOC        CODE       CARD
        4   FF5B     30
   1.24    FF5C     88
   ( 24    FF5D     42
   .224    FF5E     90
   1224    FF5F     F1
   1225    FF60     00              .BYTE $00,$11,$51,$29,$27,$76,$03,$F0
   1225    FF61     11
   1225    FF62     51
   1225    FF63     29
   1225    FF64     27
   1225    FF65     76
   1225    FF66     03
   1225    FF67     F0
   1226    FF68     00              .BYTE $00,$10,$F0
   1226    FF69     10
   1226    FF6A     F0
   1227    FF6B     40              .BYTE $40,$41,$09,$74,$19,$48,$F4
   1227    FF6C     41
   1227    FF6D     09
   1227    FF6E     74
   1227    FF6F     19
   1227    FF70     48
   1227    FF71     F4
   1228    FF72     40              .BYTE $40,$20,$31,$17,$10,$84,$F4
   1228    FF73     20
   1228.   FF74     31
   1228    FF75     17
   1228    FF76     10
   1228    FF77     84
   1228    FF78     F4
   1229    FF79     40              .BYTE $40,$27,$97,$43,$35,$03,$70,$F3
   1229    FF7A     27
   1229    FF7B     97
    .  9   FF7C     43
    . .9   FF7D     35
   . 29    FF7E     03
    . 29   FF7F     70
   1229    FF80     F3
   1230    FF81     40              .BYTE $40,$98,$34,$59,$45,$39,$30,$F3
   1230    FF82     98
   1230    FF83     34
   1230    FF84     59
   1230    FF85     45
   1230    FF86     39
   1230    FF87     30
   1230    FF88     F3
   1231    FF89     40              .BYTE $40,$39,$86,$59,$10,$47,$05,$F2
   1231    FF8A     39
   1231    FF8B     86
   1231    FF8C     59
   1231    FF8D     10
   1231    FF8E     47
```

```
CARD =  LOC      CODE      CARD
 1231   FF8F     05
 1231   FF90     F2        .
 1232   FF91     40                    .BYTE $40,$16,$14,$89,$77,$76,$17,$40,$F1
 1232   FF92     16
 1232   FF93     14
 1232   FF94     89
 1232   FF95     77
 1232   FF96     76
 1232   FF97     17
 1232   FF98     40
 1232   FF99     F1
 1233   FF9A     40                    .BYTE $40,$78,$53,$98,$17,$62,$29,$10,$F1
 1233   FF9B     78
 1233   FF9C     53
 1233   FF9D     98
 1233   FF9E     17
 1233   FF9F     62
 1233   FFA0     29
 1233   FFA1     10
 1233   FFA2     F1
 1234   FFA3     40                    .BYTE $40,$28,$49,$88,$96,$20,$80,$F3
 1234   FFA4     28
 1234   FFA5     49
 1234   FFA6     88
 1234   FFA7     96
 1234   FFA8     20
 1234   FFA9     80
 1234   FFAA     F3
 1235   FFAB     C0                    .BYTE $C0,$16,$06,$86,$28,$96,$04,$F2
 1235   FFAC     16
 1235   FFAD     06
 1235   FFAE     86
 1235   FFAF     28
 1235   FFB0     96
 1235   FFB1     04
 1235   FFB2     F2
 1236   FFB3     40                    .BYTE $40,$42,$69,$15,$19,$27,$11,$F2
 1236   FFB4     42
 1236   FFB5     69
 1236   FFB6     15
 1236   FFB7     19
 1236   FFB8     27
 1236   FFB9     11
 1236   FFBA     F2
 1237   FFBB     C0                    .BYTE $C0,$75,$04,$29,$45,$38,$89,$F2
 1237   FFBC     75
 1237   FFBD     04
 1237   FFBE     29
 1237   FFBF     45
 1237   FFC0     38
 1237   FFC1     89
 1237   FFC2     F2
```

```
CARD = LUC        CODE      CARD
     8    FFC3    40          .BYTE $40,$10,$64,$09,$34,$02,$53,$F1
     8    FFC4    10
   38    FFC5    64
   38    FFC6    09
 1238    FFC7    34
 1238    FFC8    02
 1238    FFC9    53
 1238    FFCA    F1
 1239    FFCB    C0          .BYTE $C0,$14,$20,$36,$44,$46,$65,$20,$F1
 1239    FFCC    14
 1239    FFCD    20
 1239    FFCE    36
 1239    FFCF    44
 1239    FFD0    46
 1239    FFD1    65
 1239    FFD2    20
 1239    FFD3    F1
 1240    FFD4    40          .BYTE $40,$19,$99,$26,$19,$39,$16,$60,$F1
 1240    FFD5    19
 1240    FFD6    99
 1240    FFD7    26
 1240    FFD8    19
 1240    FFD9    39
 1240    FFDA    16
 1240    FFDB    60
 1240    FFDC    F1
 1241    FFDD    C0          .BYTE $C0,$33,$33,$30,$73,$34,$50,$50,$F1
 1241    FFDE    33
 1241    FFDF    33
 1241    FFE0    30
 1241    FFE1    73
 1241    FFE2    34
 1241    FFE3    50
 1241    FFE4    50
    1    FFE5    F1
  +2    FFE6    40          .BYTE $40,$99,$99,$99,$98,$47,$65,$70,$F1
  +2    FFE7    99
 1242    FFE8    99
 1242    FFE9    99
 1242    FFEA    98
 1242    FFEB    47
 1242    FFEC    65
 1242    FFED    70
 1242    FFEE    F1
 1243                        .END
```

END OF MOS/TECHNOLOGY 650X ASSEMBLY VERSION 4
NUMBER OF ERRORS =   0,   NUMBER OF WARNINGS =   0

SYMBOL TABLE

SYMBOL	VALUE	LINE	DEFINED	CROSS-REFERENCES							
ADD	F808	74	510	542	993						
ADD1	F822	98	187								
ADD10	F8BB	200	196								
ADD110	F887	163	149								
ADD12	F880	157	155								
ADD120	F87D	156	141	152	165						
ADD121	F883	161	217								
ADD13	F8C4	206	136								
ADD15	F8D8	216	229	241	247						
ADD17	F8E0	223	****								
ADD18	F8F0	233	215								
ADD19	F8F3	234	****								
ADD2	F827	100	89								
ADD20	F8F4	239	226								
ADD3	F82A	101	91	99	188						
ADD31	F832	105	103								
ADD4	F83B	109	199	202							
ADD5	F84D	129	108	116							
ADD6	F892	174	93								
ADD7	F899	182	186								
ADD8	F89C	183	176								
ADD81	F8A9	188	185								
ADD9	F8AC	194	104								
AMB	FC73	769	774								
APB	FC5F	756	762								
ARGXH	0007	35	1033	1121							
ARGXL	0006	34	1031	1119							
ARGYH	0009	37	1050	1139							
ARGYL	0008	36	1048	1137							
ATANX	FB78	601	****								
AZTST	FC99	795	214								
AZTST0	FC9C	797	800								
AZ0	FBBC	641	643								
CHOP	FB36	558	591								
CHOP0	FB3A	560	562								
CLEAR	FBB8	639	81	255	408						
CLRX	FD71	926	****								
CLRX0	FD75	928	930								
CLRY	FD7C	935	512	533	538	956					
CLRY0	FD80	937	939								
CLRZ	FD87	944	233	272	352	499	1039	1056	1126	1144	
CLRZ0	FD8B	946	948								
CNT	0003	30	109	257	455	456	474	477	482	653	656	660
			665	666	667	668	669	670	671	677	686
CNTA	0004	32	175	310	313	368	780	790			
COMPXY	FC82	779	174	420							
COM1	FC8A	784	787								
COM2	FC96	790	788								
DECHEX	FBC3	650	114								
DEG	0005	33	551	574	593	608	996				
DHCNVE	FBED	673	****								
DHCNV1	FBC7	653	658								

```
SYMBOL    VALUE   LINE DEFINED          CROSS-REFERENCES

L  VV2    FBD3       659   655
DHCNV3    FBDE      .665   662
(   /     FA75       471   424
L.VEXT    F9DF       368   334
UIVIDE    FA16       394   507   545
UIVO      FA79       473   487   488
DIV1      FA7D       475   478
UIV2      FA86       479   476
UIV6      FA30       429   ****
CIV7      FA47       438   436
DVEXT0    F9E3       370   384
DVEXT1    F9F0       376   380
DVEXT2    F9F6       378   373
DVEXT3    F9FD       381   378
EX        0246        55   105   129   146   183   197   201   207   300   362
EXTRA     0011        43  1187
EY        0258        58   107   184   198   200   303   358   361   518   978
EZ        026A        61   130   151   164   208   225   228   240   243   323   338
                           344   363   371   376   388   843  1024  1082  1105  1109
                          1110  1166  1174
INFIN     FCD2       836   169   350
INFO      FCD7       839   841
IPREC     FEE8      1185   ****
J         0002        29   451   452   453   461   472   481   484   485
KADDR     FEFA      1202  1203  1205
KCN       000E        40   959   962  1204
KONH      000F        41  1206
KONST     FF07      1213  1202
LEN       0011         6    50    51    52    54    57    60    62    63   559   639
                           824   917   926   935   944
LENGTH    0004        31  1008  1038  1055  1094  1124  1125  1142  1143
LGNDO     FB30       556   579
LKPO      FD9E       961   976
L   `I    FDB8       977   964
L   ,     FAE7       529   ****
}  ~GEND  FB28       553   595   610
(  JKUP   FD92       956   989   991
LSRA      FB91       614   222   437   463   480
LSRAO     FB93       615   619   620
MDOV1     F958       314   320   322
MDUV2     F960       317   307
MD1       F93F       302   ****
MD10      F9C3       357   316
MD100     F95D       316   301
MD11      F9D9       366   324
MD2       F970       323   304   315   359   390
MD22      FA13       390   387
MD3       F97A       327   365   367
MD4       F97D       328   ****
MD5       F986       332   356
MD51      F9A5       345   336   369
MD59      F9A8       346   305
MD6       F9AE       348   343   375
MD61      F9B3       350   311   318   399
MD7       F9B7       352   309   349   404
MD8       F9BB       354   329
MD9       FA08       385   340
```

SYMBOL	VALUE	LINE DEFINED	CROSS-REFERENCES
MLT	FA53	450	290
MLTPLY	F90B .	251	519 549 557 590 606 990
MLT0	FA59	453	462
MLT1	FA60	456	459
MLT2	FA6A	460	457
MN	0034	22	886
MOVR	FD65	917	897
MOVR0	FD67	918	921
MULT1	F91F	272	263
MULT2	F923	277	345 377 389
MULT3	F927	282	268
MULT4	F930	296	438
MVMN	FD28	886	****
MVMX	FD1C	880	509 994
MVMY	FD20	882	505
MVMZ	FD24	884	****
MVNM	FD38	894	****
MVNX	FD2C	888	506 537 544
MVNY	FD30	890	555
MVNZ	FD34	892	****
MVTR	FD3A	895	857 859 861 863 865 867 869 871 873 875 877 879 881 883 885 887 889 891 893
MVTR0	FD3D	897	900
MVXM	FCF4	860	****
MVXN	FCF8	862	498 532 588 604
MVXY	FCEC	856	589 605
MVXZ	FCF0	858	572
MVYM	FD04	868	****
MVYN	FD08	870	****
MVYX	FCFC	864	****
MVYZ	FD00	866	****
MVZM	FD14	876	504 520 987
MVZN	FD18	878	541 546
MVZX	FD0C	872	511 547 556 988 992 1041 1128
MVZY	FD10	874	508 543 548 578 995 1058 1146
MX	0030	19	880
MY	0031	20	882
MZ	0032	21	884
N	0000	27	115 450 486 530 570 586 602 618 627 679 692 705 715 725 735 744 754 767 781 795 805 815 836 1188
NKON	0001	28	497 521 553 576 958 980
NM	0043	26	894
NX	0040	23	888
NY	0041	24	890
NZ	0042	25	892
OVERR	0014	46	847
PGTARG	FDE1	1003	1040 1057
PGTRG0	FDEA	1007	1022
PGTRG1	FE04	1023	1009
PLOADX	FE0A	1031	****
PLOADY	FE23	1048	****
POLY	FDC1	987	554 577
POLY0	FDCA	990	997
PREC	0010	42	1035 1052 1080 1123 1141 1158 1186
PSTRES	FE3C	1065	****
PTR	000C	39	1005 1010 1023 1032 1034 1049 1051 1091 1096 1100 1107 1120 1122 1138 1140

SYMBOL	VALUE	LINE	DEFINED	CROSS-REFERENCES								
?ES	FE46	1070	1081									
?...	0200	50	140	216	319	335	435	615	616	622	629	630
			634	641	718	737	746	756	760	769	772	797
?AERQ	FC43	735	434									
RAERX	FC29	715	134	412								
RAMA	0292	65	914									
RAMB	0295	66	906									
RAMCOD	028F	64	898	915								
RAMRB	FC70	767	206	475								
RAPRB	FC5C	754	139	458	479							
RARQ	FC45	736	739									
RARXE	FC35	721	****									
RARXO	FC2C	717	720									
RC	0212	51	680	681	685	693	695	698	708	757	770	
RBERY	FC1C	705	120	282	416							
RBCF	FC0E	695	700									
RBOFE	FC1B	701	678									
RBOFF	FC07	692	128									
RBRY	FC1F	707	710									
RCLXY	FEF5	1199	****									
RES	000A	38	1068	1076	1083	1156	1163	1172	1177			
RM	026B	62	****									
RN	027D	63	****									
RC	0224	52	454	483	728	736						
RQERX	FC36	725	286									
RCRX	FC39	727	730									
RSBC	FBF4	680	683									
RSBCNT	FBEE	677	124	687								
RSRA	FBA6	627	142	321	337	460						
RSRAC	FBA9	629	632									
RX	0235	53	717	727	784	806	825	829	918	928		
RY	0247	56	514	516	535	540	707	785	816	826	827	919
			937	967	973							
??	0259	59	501	503	560	747	839	946	1013	1019	1070	1075
			1098	1161								
?ERA	FC4F	744	161	277								
?RAE	FC5B	750	****									
?ZRAQ	FC52	746	749									
SAVXY	FEF0	1193	****									
SETKON	FEFC	1203	531	571	587	603						
SQRT	FA9E	496	****									
SQRTO	FAB5	505	522									
SUB	F800	71	536									
SX	0235	54	74	98	148	154	156	195	209	297	308	317
			325	346	366							
SY	0247	57	71	73	75	296	364	431	433	439	441	960
SZ	0259	60	157	210	223	245	246	327	331	332	339	347
			348	355	370	381	383	845	1006	1067	1092	1155
TAB	FD60	916	905	913								
TANX	FB5C	585	****									
TEMP	0012	44	76	92	102	135	298	299	328			
TEMP1	0013	45	258	306	333	430						
TENX	FB41	569	****									
TMPX	0015	47	1193	1199								
TMPY	0016	48	1194	1200								
UGTARG	FE5F	1090	1127	1145								
UGTARO	FE66	1093	1099									
UGTAR1	FE75	1100	1095									
ULOADX	FE8A	1119	****									

SYMBOL	VALUE	LINE DEFINED		CROSS-REFERENCES		
UADY	FEA2	1137	****			
STRES	FEBA	1154	****			
STRS0	FEC1	1157	1164			
USTRS1	FEC8	1161	1159			
USTRS2	FED1	1165	1160			
XM	0003	9	860			
XN	0004	10	862			
XSY	FCBF	824	100	182		
XSY1	FCC1	825	831			
XY	0001	7	856			
XZ	0002	8	858			
XZTST	FCA6	805	85	262	403	
XZTST0	FCA8	806	809			
XZTST1	FCB2	811	798	807	817	
XZTST2	FCB0	810	801	820		
YM	0013	13	868			
YN	0014	14	870			
YX	0010	11	864			
YZ	0012	12	866			
YZTST	FCB3	815	90	267	398	
YZTST0	FCB5	816	819			
ZM	0023	17	876			
ZN	0024	18	878			
ZX	0020	15	872			
ZY	0021	16	874			

```
INSTRUCTION   COUNT

         ADC            13
         AND            14
         ASL            12
         BCC            11
         BCS             6
         BEQ            24
         BIT            13
         BMI             5
         BNE            32
         BPL            26
         BRK             0
         BVC             6
         BVS             6
         CLC             5
         CLD             1
         CLI             0
         CLV             0
         CMP             6
         CPX             2
         CPY             3
         DEC             6
         DEX            30
         DEY             0
         EOR             5
         INC             5
         INX             9
         INY            10
         JMP            28
         JSR           114
         LDA           159
         LDX            31
         LDY             7
         LSR            18
         NOP             0
         ORA             9
         PHA             4
         PHP             0
         PLA             4
         PLP             0
         ROL             0
         RTI             0
         RTS            48
         SBC            11
         SEC            10
         SED             6
         SEI             0
         STA           118
         STX             2
         STY             2
         TAX             2
         TAY             0
         TSX             0
         TXA             0
         TXS             0
         TYA             1
```

= SYMBOLS =   238 (LIMIT =   800)   = BYTES = 2032 (LIMIT = 4096)
= LINES = 1449 (LIMIT = 4000)   = XREFS =   743 (LIMIT = 1800)