```
0000:          LST  ON
               ***************************************************
0000:          * P-LISP   VERSION 3.2
0000:          * COPYRIGHT 1981, 1982, 1983 BY STEVEN CHERRY
0000:          * ALL RIGHTS RESERVED
               ***************************************************
0000:          DSECT
0000:  BASE0   EQU  $0
0001:  BASE1   EQU  $1
0021:  WWIDTH  EQU  $21
0033:  PROMPT  EQU  $33
0036:  OUTVEC  EQU  $36
0040:  DOSPTR  EQU  $40
004C:  HIMEM   EQU  $4C
0050:  RES     EQU  $50
0054:  ARG1    EQU  $54
0056:  ARCT    EQU  $56
0056:  NEWBUF  EQU  $56
0058:  MSIGN   EQU  $58
005A:  CELPTR  EQU  $5A
005C:  ATMPTR  EQU  $5C
005F:  CHAR    EQU  $5F
0060:  TMP1    EQU  $60
0067:  LINNUM  EQU  $67
0069:  ATMTST  EQU  $69
006A:  RDPTR   EQU  $6A
006C:  RESPTR  EQU  $6C
006E:  STKCEL  EQU  $6E
0070:  NIL     EQU  $70
0074:  PLUSHI  EQU  $74
0074:  BUFPTR  EQU  $74
0076:  DOSFLG  EQU  $76
0077:  TMPOUT  EQU  $77
007B:  OBLSTPTR EQU $7B
007D:  STKPTR  EQU  $7D
007F:  SIGN    EQU  $7F
0080:  FREPTR  EQU  $80
0082:  INDENT  EQU  $82
009D:  FAC     EQU  $9D
009D:  SUB     EQU  $9D
00A5:  ARG     EQU  $A5
00B0:  CHRGET2 EQU  $B0
00B8:  TXTPTR  EQU  $B8
00CE:  WK1     EQU  $CE
00D6:  EVLPTR  EQU  $D6
00D8:  ERRFLG  EQU  $D8
00DE:  FPERR   EQU  $DE
00E7:  SCALEVAL EQU $E7
00E8:  SHAPINDX EQU $E8
00EB:  CARPTR  EQU  $EB
00ED:  ARGPTR  EQU  $ED
00EF:  PRINTFLG EQU $EF
00F0:  WINDWIDTH EQU $F0
00F1:  SPEED   EQU  $F1
00F2:  FPTRCE  EQU  $F2
00F3:  OUTMASK EQU  $F3
00F4:  ERRPTR  EQU  $F4
00F6:  ERRLIN  EQU  $F6
```

```
00F9:          60 ROTVAL  EQU  $F9
00FB:          61 ENVPTR  EQU  $FB
00FD:          62 FREEFLG EQU  $FD
00FE:          63 ONERRFLG EQU $FE
0100:          64 STACK   EQU  $100
0200:          65 INBUF   EQU  $200
3100:          66 OBSTART EQU  $3100
3A00:          67 IO2START EQU $3A00
FD67:          68 INPUT   EQU  $FD67
DD7B:          69 FRMEVL  EQU  $DD7B
EBF2:          70 QINT    EQU  $EBF2
E000:          71 BASIC   EQU  $E000
FD8E:          72 SCROLLA EQU  $FD8E
FDED:          73 COUTA   EQU  $FDED
ED24:          74 FPPRT   EQU  $ED24
ED2E:          75 FPPRINT EQU  $ED2E
F10A:          76 CHRGET  EQU  $F10A
A5B2:          77 BASICROM EQU $A5B2
C000:          78 KEYBOARD EQU $C000
C010:          79 KEYSTROBE EQU $C010
E2F2:          80 GIVAYF  EQU  $E2F2
EB63:          81 MOVAF   EQU  $EB63
E7C1:          82 FADDT   EQU  $E7C1
E7AA:          83 FSUBT   EQU  $E7AA
E982:          84 FMULTT  EQU  $E982
EA69:          85 FIDVT   EQU  $EA69
FB5B:          86 TABV    EQU  $FB5B
FB40:          87 SETGR   EQU  $FB40
F864:          88 SETCOL  EQU  $F864
F800:          89 PLOT1   EQU  $F800
F3D8:          90 AHGR2   EQU  $F3D8
F6EC:          91 SETHCOL EQU  $F6EC
F457:          92 HPLOT1  EQU  $F457
F53A:          93 HTO1    EQU  $F53A
F601:          94 ADRAW   EQU  $F601
F65D:          95 AXDRAW  EQU  $F65D
03E3:          96 LOCRPL  EQU  $3E3
03D9:          97 RWTS    EQU  $3D9
B5F0:          98 NEWSEC  EQU  $B5F0
B5F1:          99 NEWTRK  EQU  $B5F1
B7E9:         100 SLOT    EQU  $B7E9
B7EA:         101 DRIVE   EQU  $B7EA
B7EB:         102 VOL     EQU  $B7EB
B7EC:         103 TRACK   EQU  $B7EC
B7ED:         104 SECTOR  EQU  $B7ED
B7F0:         105 BUFFER  EQU  $B7F0
B7F4:         106 CC      EQU  $B7F4
B7F5:         107 ERRCODE EQU  $B7F5
AA64:         108 KEYINDX EQU  $AA64
AA66:         109 KEYVOL  EQU  $AA66
AA68:         110 KEYDR   EQU  $AA68
AA6A:         111 KEYSLOT EQU  $AA6A
A940:         112 KEYNAM  EQU  $A940
A94A:         113 KEYTAB  EQU  $A94A
B1C9:         114 LOCFILE EQU  $B1C9
B5C3:         115 FILPTR  EQU  $B5C3
B4C6:         116 DIRBUF  EQU  $B4C6
9700:         117 TSBUF   EQU  $9700
```

```
[illegible]00:          118 MAPBUF   EQU  $9600
[illegible]44:          119 ALLOCATE EQU  $B244
B045:                   120 DIRSET   EQU  $B045
B5F7:                   121 FMSLOT   EQU  $B5F7
B5F8:                   122 FMDR     EQU  $B5F8
B5F9:                   123 FMVOL    EQU  $B5F9
B39B:                   124 SSAVE    EQU  $B39B
B39C:                   125 DIRINDX  EQU  $B39C
B397:                   126 DIRTRK   EQU  $B397
B398:                   127 DIRSEC   EQU  $B398
B5C5:                   128 DERRCD   EQU  $B5C5
A702:                   129 DOSMES   EQU  $A702
A851:                   130 DOSSET   EQU  $A851
9D5A:                   131 ERRVEC   EQU  $9D5A
9D5E:                   132 WRMVEC   EQU  $9D5E
03F8:                   133 USRY     EQU  $03F8
FB39:                   134 SETTXT   EQU  $FB39
AAB6:                   135 BASFLG   EQU  $AAB6
FC58:                   136 HOME     EQU  $FC58
A6DD:                   137 DOSPTCH  EQU  $A6DD
A6D5:                   138 DOSERR1  EQU  $A6D5
B2C3:                   139 DEALLOC  EQU  $B2C3
9D20:                   140 LOADADDR EQU  $9D20
9D22:                   141 SAVEADDR EQU  $9D22
9ED1:                   142 IOSET    EQU  $9ED1
AA75:                   143 FILNAMBUF EQU $AA75
[illegible]3:           144 COPYNAM  EQU  $A743
A74E:                   145 COPYPTRS EQU  $A74E
A316:                   146 CLOSEFILS EQU $A316
A263:                   147 DELETEFILE EQU $A263
AA5C:                   148 DOSCODE  EQU  $AA5C
EC23:                   149 FPINT    EQU  $EC23
B378:                   150 DOSPTCH2 EQU  $B378
C081:                   151 ROMSEL   EQU  $C081
C08B:                   152 RAMSEL   EQU  $C08B
0000:                   153          DEND
0000:                   154          CHN  INIT.SRC
----- NEXT OBJECT FILE NAME IS LISP
0800:                     1          ORG  $0800
0800:4C 45 08             2 BEGIN    JMP  START      ;SKIP APLSFT ENTRY PT
0803:                     3 * ENTRY POINT FOR APPLESOFT ERROR
0803:A2 01                4          LDX  #1         ;OVERFLOW ERROR
0805:AC 8A 09             5          LDY  LEXERRSAV  ;FCN THAT CAUSED IT
0808:4C EA 24             6          JMP  ERROR
                          7 ***********************************************
080B:                     8 * MEMORY MAP
                          9 ***********************************************
080B:                    10 OBLINK   DS   2
080D:00 3B               11 STKBEG   DFB  $0,$3B
080F:00 40               12 STKEND   DFB  $0,$40
0811:00 40               13 FREESPC  DFB  $0,$40
[illegible]13:80 00      14 MEMTAB   DFB  $80,0
[illegible]5:00 00       15          DFB  0,0
0817:00 00               16          DFB  0,0
0819:7F E0               17          DFB  $7F,$E0
081B:FF FF               18          DFB  $FF,$FF
081D:FF FF               19          DFB  $FF,$FF
081F:FF FF               20          DFB  $FF,$FF
```

```
0821:FF FF        21          DFB  $FF,$FF
0823:FF FF        22          DFB  $FF,$FF
0825:FC 00        23          DFB  $FC,0
0827:00 00        24          DFB  0,0
0829:00 00        25          DFB  0,0
082B:00 00        26          DFB  0,0
082D:00 00        27          DFB  0,0
082F:00 00        28          DFB  0,0
0831:00 00        29          DFB  0,0
0833:4C 31 11     30          JMP  PLP
0836:4C 4B 11     31          JMP  PRP
                  32 ************************************************
0839:             33 * INITIALIZATION OF LISP
                  34 ************************************************
0839:18 0C 1A     35 MTAB     DFB  24,12,26,14,23,9,22,13,21,13,20,16
083C:0E 17 09
083F:16 0D 15
0842:0D 14 10
0845:20 F2 09     36 START    JSR  APLCHK     ;CHECK TYPE
0848:F0 08        37          BEQ  STARTA
084A:A9 01        38          LDA  #1         ;APPLESOFT REQUIRED ERROR
084C:20 FA 2E     39          JSR  DERRR
084F:6C BF 9D     40          JMP  ($9DBF)    ;GOTO COLDSTART ENTRY PT
0852:A9 FF        41 STARTA   LDA  #$FF       ;SET SOME POINTERS
0854:85 74        42          STA  BUFPTR
0856:8D D6 23     43          STA  TRACEFLG
0859:85 EF        44          STA  PRINTFLG
085B:A5 21        45          LDA  WWIDTH
085D:85 F0        46          STA  WINDWIDTH
085F:D8           47          CLD
0860:20 A1 10     48          JSR  OUTSAVE
0863:AD 81 C0     49          LDA  ROMSEL
0866:20 58 FC     50          JSR  HOME       ;CLEAR SCREEN
0869:20 0A 0A     51          JSR  SCROLL
086C:A0 0B        52          LDY  #11        ;PRINT HEADER MESSAGE
086E:BE 39 08     53 MESLOOP  LDX  MTAB,Y
0871:20 0A 11     54          JSR  TABIT
0874:88           55          DEY
0875:BE 39 08     56          LDX  MTAB,Y
0878:98           57          TYA
0879:48           58          PHA
087A:20 72 26     59          JSR  MESPRT
087D:68           60          PLA
087E:A8           61          TAY
087F:88           62          DEY
0880:10 EC        63          BPL  MESLOOP
0882:A9 00        64          LDA  #0
0884:85 4B        65          STA  HIMEM-1
0886:8D 1E 3A     66          STA  ENDOBJ
0889:85 FE        67          STA  ONERRFLG
088B:8D 28 29     68          STA  GCFLG
088E:8D E7 24     69          STA  ONERRPTR+1
0891:8D E9 24     70          STA  OLDEVLPTR+1
0894:85 82        71          STA  INDENT
0896:8D 30 0F     72          STA  CTR
0899:20 DA 2F     73          JSR  STKSTOR
089C:A9 00        74          LDA  #OBJBEG
089E:85 7B        75          STA  OBLSTPTR
```

```
08A0:A9 31      76          LDA  #<OBJBEG
08A2:85 7C      77          STA  OBLSTPTR+1
08A4:AD 8B C0   78          LDA  RAMSEL     ;SELECT RAM
08A7:AD 8B C0   79          LDA  RAMSEL
08AA:A0 00      80          LDY  #0
08AC:84 70      81          STY  NIL
08AE:84 F2      82          STY  FPTRCE
08B0:84 FD      83          STY  FREEFLG
08B2:A9 72      84          LDA  #NIL+2
08B4:85 71      85          STA  NIL+1
08B6:A9 31      86          LDA  #<NILAT
08B8:85 72      87          STA  NIL+2
08BA:A9 04      88          LDA  #NILAT
08BC:85 73      89          STA  NIL+3
08BE:20 8C 09   90          JSR  INITLST    ;INIT FREE LIST
08C1:A9 02      91          LDA  #2
08C3:85 69      92          STA  ATMTST
08C5:A5 74      93          LDA  PLUSHI     ;MOVE HIMEM PTR
08C7:85 4C      94          STA  HIMEM
08C9:A9 09      95          LDA  #>LOAD-1   ;SET LOAD & SAVE VECTORS
08CB:8D 20 9D   96          STA  LOADADDR
08CE:A9 2F      97          LDA  #<LOAD-1
08D0:8D 21 9D   98          STA  LOADADDR+1
08D3:A9 E7      99          LDA  #>SAVE-1
08D5:8D 22 9D  100          STA  SAVEADDR
08D8:A9 2F     101          LDA  #<SAVE-1
08DA:8D 23 9D  102          STA  SAVEADDR+1
08DD:A9 14     103          LDA  #20
08DF:8D B6 AA  104          STA  BASFLG
08E2:8D D5 23  105          STA  TRINDX
08E5:A2 00     106 START2   LDX  #0         ;SET SCALE & ROTATION
08E7:86 F9     107          STX  ROTVAL
08E9:86 F6     108          STX  ERRLIN
08EB:86 F7     109          STX  ERRLIN+1
08ED:86 F3     110          STX  OUTMASK    ;SET OUTPUT MASK
08EF:86 FC     111          STX  ENVPTR+1
08F1:E8        112          INX              ;SET SPEED
08F2:86 F1     113          STX  SPEED
08F4:86 E7     114          STX  SCALEVAL
08F6:A9 80     115          LDA  #$80       ;PUT 'ONERR' ON FOR APPLESOFT
08F8:85 D8     116          STA  ERRFLG
08FA:A9 09     117          LDA  #<LINP1
08FC:85 F5     118          STA  ERRPTR+1
08FE:A9 7C     119          LDA  #LINP1
0900:85 F4     120          STA  ERRPTR
0902:A9 76     121          LDA  #LIN0      ;SET LINE # FOR APLSFT
0904:85 67     122          STA  LINNUM
0906:A9 09     123          LDA  #<LIN0
0908:85 68     124          STA  LINNUM+1
090A:A9 91     125          LDA  #DOSERR    ;DOS ERROR HANDLER
090C:8D 5A 9D  126          STA  ERRVEC
090F:A9 3A     127          LDA  #<DOSERR
0911:8D 5B 9D  128          STA  ERRVEC+1
0914:A9 AF     129          LDA  #BREAKMODE ;WARMSTART ENTRY PT
0916:8D 5E 9D  130          STA  WRMVEC
0919:8D F9 03  131          STA  USRY+1
091C:A9 25     132          LDA  #<BREAKMODE
091E:8D 5F 9D  133          STA  WRMVEC+1
```

```
0921:8D FA 03   134          STA  USRY+2
0924:A9 AD      135          LDA  #$AD
0926:8D D8 A6   136          STA  DOSERR1+3
0929:A9 81      137          LDA  #$81
092B:8D D9 A6   138          STA  DOSERR1+4
092E:A9 C0      139          LDA  #$C0
0930:8D DA A6   140          STA  DOSERR1+5
0933:A9 A9      141          LDA  #$A9
0935:8D DB A6   142          STA  DOSERR1+6
0938:CA         143          DEX
0939:8E DC A6   144          STX  DOSERR1+7
093C:A9 4C      145          LDA  #$4C
093E:8D F8 03   146          STA  USRY
                147 ************************************************
0941:           148 * READ-PRINT LOOP
                149 ************************************************
0941:A9 BA      150 LISPLOOP LDA #':
0943:85 33      151          STA  PROMPT
0945:20 51 A8   152          JSR  DOSSET
0948:20 12 26   153          JSR  DOSON      ;IMM. DOS ON
094B:20 FD 0D   154          JSR  READ
094E:A5 6A      155 LISP1    LDA  RDPTR      ;MOVE PTR
0950:85 D6      156          STA  EVLPTR
0952:A5 6B      157          LDA  RDPTR+1
0954:85 D7      158          STA  EVLPTR+1
0956:20 26 26   159 LISP2    JSR  DOSOFF     ;IMM. DOS OFF
0959:20 A6 0E   160          JSR  SETRET
095C:4C 62 11   161          JMP  EVAL       ;EVAL THE SEXPR
095F:20 12 26   162 LISPRET  JSR  DOSON      ;DOS BACK ON
0962:A5 6C      163          LDA  RESPTR     ;MOVE PTR
0964:85 CE      164          STA  WK1
0966:A5 6D      165          LDA  RESPTR+1
0968:85 CF      166          STA  WK1+1
096A:20 0A 0A   167          JSR  SCROLL
096D:20 31 0F   168          JSR  PRINT      ;PRINT
0970:20 0A 0A   169          JSR  SCROLL
0973:4C 41 09   170          JMP  LISPLOOP
                171 ************************************************
0976:           172 * APPLESOFT LINES IN CASE OF ERROR
                173 ************************************************
0976:7E 09      174 LIN0     DW   LIN1
0978:00 00 A5   175          DFB  0,0,$A5,$AB ;'ONERR GOTO '
097B:AB
097C:31 00      176 LINP1    DFB  $31,0      ;' 1'
097E:88 09      177 LIN1     DW   LIN2
0980:01 00 8C   178          DFB  1,0,$8C,$32,$30,$35,$31,0 ;'CALL 2051'
0983:32 30 35
0986:31 00
0988:00 00      179 LIN2     DFB  0,0        ;END MARKER
098A:           180 LEXERRSAV DS 1           ;FOR ERROR CODE
098B:           181 OLDBUFPTR DS 1
                182 ************************************************
098C:           183 * ROUTINE TO SET UP FREE-SPACE LIST
098C:           184 * USING MEMORY BIT MAP
                185 ************************************************
098C:AD 12 08   186 INITLST LDA  FREESPC+1 ;START AT TOP
098F:85 5B      187          STA  CELPTR+1  ;  OF FREE SPACE
0991:A9 00      188          LDA  #0        ;INIT PTR TO NIL
```

```
0993:85 5A      189          STA  CELPTR
0995:85 81      190          STA  FREPTR+1
0997:85 80      191          STA  FREPTR
0999:85 CF      192          STA  WK1+1
099B:85 CE      193          STA  WK1
099D:A9 00      194 PAGELP   LDA  #0
099F:85 5A      195          STA  CELPTR
09A1:20 D5 09   196          JSR  PAGCHK     ;CHECK IF PAGE IS FREE
09A4:90 28      197          BCC  NXTPAG
09A6:A0 00      198 NXTCL    LDY  #0         ;YES - SET UP LIST IN PAGE
09A8:20 A5 0C   199          JSR  NILCEL
09AB:A0 02      200          LDY  #2
09AD:A5 5B      201          LDA  CELPTR+1
09AF:91 5A      202          STA  (CELPTR),Y ;LINK CDR TO NEXT CELL
09B1:C8         203          INY
09B2:A5 5A      204          LDA  CELPTR
09B4:18         205          CLC
09B5:69 04      206          ADC  #4
09B7:91 5A      207          STA  (CELPTR),Y
09B9:85 5A      208          STA  CELPTR
09BB:D0 E9      209          BNE  NXTCL      ;CHECK IF PAGE FINISHED
09BD:38         210          SEC
09BE:E9 04      211          SBC  #4
09C0:85 5A      212          STA  CELPTR
09C2:A0 02      213          LDY  #2         ;LINK THIS PAGE TO LAST
09C4:A5 CF      214          LDA  WK1+1
09C6:91 5A      215          STA  (CELPTR),Y
09C8:A5 5B      216          LDA  CELPTR+1   ;SET NEW PTRS
09CA:85 81      217          STA  FREPTR+1
09CC:85 CF      218          STA  WK1+1
09CE:E6 5B      219 NXTPAG   INC  CELPTR+1
09D0:A5 5B      220          LDA  CELPTR+1
09D2:D0 C9      221          BNE  PAGELP     ;CHECK FOR END
09D4:60         222          RTS
                223 ************************************************
09D5:           224 * ROUTINE TO CHECK IF A PAGE CAN BE USED
                225 ************************************************
09D5:A5 5B      226 PAGCHK   LDA  CELPTR+1
09D7:48         227 PAGCHK2  PHA              ;GET HI-BYTE OF PAGE ADDR.
09D8:4A         228          LSR  A
09D9:4A         229          LSR  A
09DA:4A         230          LSR  A
09DB:4A         231          LSR  A
09DC:0A         232          ASL  A
09DD:AA         233          TAX              ;X=OFFSET INTO TABLE
09DE:68         234          PLA
09DF:29 0F      235          AND  #$0F
09E1:C9 08      236          CMP  #8
09E3:90 03      237          BCC  LESS8      ;CHECK WHICH BYTE TO USE
09E5:E8         238          INX
09E6:E9 08      239          SBC  #8
09E8:A8         240 LESS8    TAY              ;Y=BIT NUMBER
09E9:C8         241          INY
09EA:BD 13 08   242          LDA  MEMTAB,X
09ED:0A         243 BITLP    ASL  A
09EE:88         244          DEY
09EF:D0 FC      245          BNE  BITLP      ;BIT RETURNED IN CARRY
09F1:60         246          RTS
```

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                  247 ************************************************
09F2:             248 * ROUTINE TO CHECK APPLE TYPE
                  249 ************************************************
09F2:20 02 0A     250 APLCHK  JSR  FPSEL      ;CHECK FOR II+
09F5:D0 0A        251         BNE  APPLEFIN
09F7:A2 1C        252 APPLESET LDX #$1C       ;PUT FP CHARGET ROUTINE
09F9:BD 0A F1     253 CHRLOOP LDA  CHRGET,X   ;  IN PAGE 0
09FC:95 B0        254         STA  CHRGET2,X
09FE:CA           255         DEX
09FF:D0 F8        256         BNE  CHRLOOP
0A01:60           257 APPLEFIN RTS             ;RETURN Z FLAG SET
0A02:AD 80 C0     258 FPSEL   LDA  $C080      ;SELECT FP
0A05:A9 4C        259         LDA  #$4C
0A07:4C B2 A5     260         JMP  BASICROM
0A0A:A9 8D        261 SCROLL  LDA  #$8D
0A0C:8D 81 C0     262 COUT    STA  ROMSEL
0A0F:8D 9A 0F     263         STA  LASTCHR
0A12:C9 8D        264         CMP  #$8D
0A14:D0 07        265         BNE  NOTACR
0A16:A9 FF        266         LDA  #$FF
0A18:8D 30 0F     267         STA  CTR
0A1B:A9 8D        268         LDA  #$8D
0A1D:EE 30 0F     269 NOTACR  INC  CTR
0A20:48           270         PHA
0A21:AD 30 0F     271         LDA  CTR
0A24:C5 F0        272         CMP  WINDWIDTH
0A26:90 05        273         BCC  COUTIT
0A28:A9 00        274         LDA  #0
0A2A:8D 30 0F     275         STA  CTR
0A2D:68           276 COUTIT  PLA
0A2E:20 ED FD     277         JSR  COUTA      ;PRINT A CHAR
0A31:AD 8B C0     278         LDA  RAMSEL     ;SELECT RAM
0A34:AD 8B C0     279         LDA  RAMSEL
0A37:60           280         RTS
0A38:             281         CHN  LEXAN.SRC
                    1 ************************************************
0A38:               2 *   LEXICAL ANALYZER
                    3 ************************************************
0A38:20 D2 0D       4 LEXAN   JSR  INITREG
0A3B:A6 74          5         LDX  BUFPTR     ;CHECK FOR END OF INPUT BUFFER
0A3D:E0 FF          6         CPX  #$FF
0A3F:D0 23          7         BNE  FSTCHR
0A41:A2 FF          8 GETAG   LDX  #$FF       ;RESET PTR
0A43:86 74          9         STX  BUFPTR
0A45:AD 81 C0      10         LDA  ROMSEL
0A48:20 67 FD      11         JSR  INPUT      ;GET LINE OF INPUT
0A4B:CA            12 GETAG3  DEX              ;TRIM TRAILING BLANKS
0A4C:30 0E         13         BMI  GETAG2
0A4E:BD 00 02      14         LDA  INBUF,X
0A51:C9 A0         15         CMP  #'         '
0A53:D0 02         16         BNE  GETF
0A55:F0 F4         17         BEQ  GETAG3
0A57:A9 8D         18 GETF    LDA  #$8D
0A59:9D 01 02      19         STA  INBUF+1,X
0A5C:AD 8B C0      20 GETAG2  LDA  RAMSEL
0A5F:AD 8B C0      21         LDA  RAMSEL
0A62:E6 74         22         INC  BUFPTR
0A64:20 25 0C      23 FSTCHR  JSR  GETCHR     ;GET A CHAR
```

```
0A67:8C 8B 09   24          STY  OLDBUFPTR
0A6A:84 56      25          STY  NEWBUF
0A6C:A0 00      26          LDY  #0          ;INIT Y FOR TOKEN TYPE
0A6E:8A         27          TXA               ;MULT TYPE BY 2
0A6F:0A         28          ASL  A
0A70:AA         29          TAX
0A71:BD 7B 0A   30          LDA  BRTAB1+1,X
0A74:48         31          PHA
0A75:BD 7A 0A   32          LDA  BRTAB1,X
0A78:48         33          PHA
0A79:60         34          RTS               ;BRANCH TO ROUTINE
0A7A:91 0A      35 BRTAB1   DW   LEFTPR-1
0A7C:92 0A      36          DW   RIGHTPR-1
0A7E:63 0A      37          DW   FSTCHR-1
0A80:8F 0A      38          DW   QUOTCHR-1
0A82:A8 0A      39          DW   DBLQUOCHR-1
0A84:40 0A      40          DW   GETAG-1
0A86:F1 0A      41          DW   NUMAT-1
0A88:D6 0A      42          DW   SIGNSET-1
0A8A:F1 0A      43          DW   NUMAT-1
0A8C:9C 0A      44          DW   LITAT2-1
0A8E:40 0A      45          DW   GETAG-1
0A90:A0 02      46 QUOTCHR  LDY  #2          ;'-- TYPE=2
0A92:60         47 LEFTPR   RTS               ;( -- TYPE=0
0A93:20 25 0C   48 RIGHTPR  JSR  GETCHR
0A96:C6 74      49          DEC  BUFPTR
0A98:A0 01      50          LDY  #1
0A9A:60         51          RTS
0A9B:           52 ;
0A9B:           53 ;  LITERAL ATOM --
0A9B:           54 ;
0A9B:E6 56      55 LITAT    INC  NEWBUF
0A9D:20 25 0C   56 LITAT2   JSR  GETCHR      ;KEEP READING UNTIL DELIMITER
0AA0:E0 06      57          CPX  #6
0AA2:B0 F7      58          BCS  LITAT
0AA4:C6 74      59 FINRD    DEC  BUFPTR      ;PULL BACK PTRS
0AA6:4C CB 0C   60 FINRD2   JMP  ATMSTOR     ;PUT ATOM IN OBLIST
0AA9:           61 ;
0AA9:           62 ; QUOTED LITERAL ATOM
0AA9:           63 ;
0AA9:EE 8B 09   64 DBLQUOCHR INC OLDBUFPTR
0AAC:20 25 0C   65 DBLQUOCHR2 JSR GETCHR     ;READ UNTIL ANOTHER " OR CR
0AAF:E0 04      66          CPX  #4
0AB1:F0 0B      67          BEQ  LENCHK1
0AB3:E0 05      68          CPX  #5
0AB5:F0 05      69          BEQ  LENCHK2
0AB7:E6 56      70          INC  NEWBUF
0AB9:4C AC 0A   71          JMP  DBLQUOCHR2
0ABC:C6 74      72 LENCHK2  DEC  BUFPTR
0ABE:20 25 0C   73 LENCHK1  JSR  GETCHR
0AC1:C6 74      74          DEC  BUFPTR
0AC3:A5 56      75          LDA  NEWBUF      ;WATCH FOR NULL STRING
0AC5:CD 8B 09   76          CMP  OLDBUFPTR
0AC8:B0 0A      77          BCS  STRNGST
0ACA:AE 8B 09   78 NULLSTRG LDX  OLDBUFPTR
0ACD:A9 00      79          LDA  #0
0ACF:9D 00 02   80          STA  INBUF,X
0AD2:86 56      81          STX  NEWBUF
```

```
0AD4:4C 6A 0D   82 STRNGST JMP  STRSTORE
0AD7:           83 ;
0AD7:           84 ; - SIGN
0AD7:           85 ;
0AD7:A9 F0      86 SIGNSET LDA  #$F0       ;SET SIGN TO NEGATIVE
0AD9:85 7F      87         STA  SIGN
0ADB:20 25 0C   88         JSR  GETCHR     ;MAKE SURE NEXT CHAR IS
0ADE:E0 09      89         CPX  #9
0AE0:B0 B9      90         BCS  LITAT
0AE2:E0 06      91         CPX  #6
0AE4:90 BE      92         BCC  FINRD
0AE6:F0 04      93         BEQ  NUMATDP
0AE8:E0 07      94         CPX  #7
0AEA:F0 AF      95         BEQ  LITAT
0AEC:A4 74      96 NUMATDP LDY  BUFPTR
0AEE:88         97         DEY
0AEF:8C 8B 09   98         STY  OLDBUFPTR
0AF2:           99 ;
0AF2:          100 ; READ AN FP NUMBER
0AF2:          101 ;
0AF2:06 5F     102 NUMAT   ASL  CHAR       ;CLEAR HI BIT
0AF4:46 5F     103         LSR  CHAR
0AF6:A4 74     104         LDY  BUFPTR     ;RESTORE CHAR.
0AF8:A5 5F     105         LDA  CHAR
0AFA:99 FF 01  106         STA  INBUF-1,Y
0AFD:20 25 0C  107         JSR  GETCHR
0B00:E0 06     108         CPX  #6
0B02:B0 EE     109         BCS  NUMAT
0B04:A5 5F     110         LDA  CHAR       ;SAVE DELIMITER
0B06:48        111         PHA
0B07:C6 74     112         DEC  BUFPTR
0B09:A6 74     113         LDX  BUFPTR
0B0B:A9 8D     114         LDA  #$8D       ;DELIMIT NUMBER WITH CR
0B0D:9D 00 02  115         STA  INBUF,X
0B10:AD 8B 09  116         LDA  OLDBUFPTR ;SET PTR FOR APLSFT
0B13:85 B8     117         STA  TXTPTR
0B15:A9 02     118         LDA  #<INBUF
0B17:85 B9     119         STA  TXTPTR+1
0B19:20 02 0A  120         JSR  FPSEL
0B1C:20 7B DD  121         JSR  FRMEVL     ;CONVERT FORMULA TO FP
0B1F:AD 8B C0  122         LDA  RAMSEL
0B22:AD 8B C0  123         LDA  RAMSEL
0B25:A5 7F     124         LDA  SIGN
0B27:85 A2     125         STA  FAC+5
0B29:68        126         PLA              ;PUT DELIMITER BACK
0B2A:85 5F     127         STA  CHAR
0B2C:A6 74     128         LDX  BUFPTR
0B2E:9D 00 02  129         STA  INBUF,X
0B31:20 37 0B  130         JSR  NEWNUMAT   ;GEN NEW NUMBER
0B34:A0 03     131 NUMRET  LDY  #3         ;RETURN TYPE=3 TO READ
0B36:60        132         RTS
               133 ***********************************************
0B37:          134 * ROUTINE TO GEN A NEW NUMERIC ATOM
               135 ***********************************************
0B37:A5 9D     136 NEWNUMAT LDA FAC        ;CHECK IF < 32767
0B39:F0 0D     137         BEQ  ZERONUM
0B3B:C9 90     138         CMP  #$90
0B3D:B0 3B     139         BCS  NEWREAL
```

```
0B3F:C9 81      140          CMP  #$81
0B41:90 37      141          BCC  NEWREAL
0B43:20 98 0B   142          JSR  FRACCHK    ;CHECK FOR FRACTIONAL PART
0B46:D0 32      143          BNE  NEWREAL
0B48:20 F2 EB   144 ZERONUM  JSR  ~~QINT~~
0B4B:AD 8B C0   145          LDA  RAMSEL
0B4E:AD 8B C0   146          LDA  RAMSEL
0B51:A5 A0      147          LDA  FAC+3
0B53:85 51      148          STA  RES+1
0B55:A5 A1      149          LDA  FAC+4
0B57:85 50      150          STA  RES
0B59:4C 65 0B   151          JMP  NEWINT2    ;SIGN ALREADY TAKEN CARE OF
0B5C:A5 7F      152 NEWINT   LDA  SIGN       ;TAKE TWOS COMP IF - SIGN
0B5E:10 05      153          BPL  NEWINT2
0B60:A2 50      154          LDX  #RES
0B62:20 B8 0B   155          JSR  TWOS2
0B65:20 D0 0B   156 NEWINT2  JSR  NEWNUM     ;GEN A NEW NUMBER
0B68:A0 00      157 NEWINT3  LDY  #0
0B6A:A5 51      158          LDA  RES+1
0B6C:91 5A      159          STA  (CELPTR),Y
0B6E:C8         160          INY
0B6F:A5 50      161          LDA  RES
0B71:91 5A      162          STA  (CELPTR),Y
0B73:A9 00      163 CELDEL   LDA  #0
0B75:85 5B      164          STA  CELPTR+1
0B77:85 5A      165          STA  CELPTR
0B79:60         166          RTS
0B7A:20 D0 0B   167 NEWREAL  JSR  NEWNUM     ;GEN A NEW REAL
0B7D:A0 00      168          LDY  #0
0B7F:A5 9D      169          LDA  FAC
0B81:91 5A      170          STA  (CELPTR),Y
0B83:C8         171          INY
0B84:A5 9E      172          LDA  FAC+1
0B86:91 5A      173          STA  (CELPTR),Y ;PUT EXPO AND M1 IN CAR
0B88:20 C8 0B   174          JSR  CDRLINK    ;GET ANOTHER AND LINK
0B8B:A0 03      175          LDY  #3
0B8D:B9 9F 00   176 NEWRLP   LDA  FAC+2,Y    ;PUT REMAINING MANTISSA IN CELL
0B90:91 5A      177          STA  (CELPTR),Y
0B92:88         178          DEY
0B93:10 F8      179          BPL  NEWRLP
0B95:4C 73 0B   180          JMP  CELDEL
                181 ***************************************************
0B98:           182 * ROUTINE TO CHECK FOR FRACTIONAL
0B98:           183 * PART OF REAL #
                184 ***************************************************
0B98:E9 80      185 FRACCHK  SBC  #$80       ;MOVE 1ST 2 BYTES TO SCRATCH
0B9A:AA         186          TAX
0B9B:A5 9E      187          LDA  FAC+1
0B9D:85 50      188          STA  RES
0B9F:A5 9F      189          LDA  FAC+2
0BA1:85 51      190          STA  RES+1
0BA3:18         191 FRACLP   CLC
0BA4:26 51      192          ROL  RES+1
0BA6:26 50      193          ROL  RES
0BA8:CA         194          DEX
0BA9:D0 F8      195          BNE  FRACLP
0BAB:A5 50      196          LDA  RES        ;NOW CHECK FOR FRAC. PARTS
0BAD:05 51      197          ORA  RES+1
```

```
0BAF:05 A0      198          ORA  FAC+3
0BB1:05 A1      199          ORA  FAC+4
0BB3:60         200          RTS
                201 ************************************************
0BB4:           202 * ROUTINE TO TAKE 2S COMP. OF NUMBER
                203 ************************************************
0BB4:B5 01      204 TWOSCOMP LDA BASE1,X    ;TAKE TWOS COMP IF NEGATIVE
0BB6:10 0F      205          BPL  NOTMIN
0BB8:A9 00      206 TWOS2    LDA  #0
0BBA:38         207          SEC
0BBB:F5 00      208          SBC  BASE0,X
0BBD:95 00      209          STA  BASE0,X
0BBF:A9 00      210          LDA  #0
0BC1:F5 01      211          SBC  BASE1,X
0BC3:95 01      212          STA  BASE1,X
0BC5:E6 58      213          INC  MSIGN
0BC7:60         214 NOTMIN   RTS
                215 ************************************************
0BC8:           216 * ROUTINE TO GET NEW CELL AND LINK
0BC8:           217 * TO CDR OF OLD
                218 ************************************************
0BC8:20 79 0C   219 CDRLINK JSR  GETCEL
0BCB:A0 02      220 CDRLINK2 LDY #2
0BCD:4C C1 0C   221          JMP  LINK
                222 ************************************************
0BD0:           223 * ROUTINE TO CREATE NEW NUMERIC ATOM
                224 ************************************************
0BD0:A9 00      225 NEWNUM   LDA  #0
0BD2:85 CF      226          STA  WK1+1
0BD4:85 EE      227          STA  ARGPTR+1
0BD6:A2 03      228          LDX  #3        ;CHECK FOR ENOUGH ROOM
0BD8:20 02 0C   229          JSR  RMCHK
0BDB:F0 06      230          BEQ  NEWNUM2
0BDD:20 80 0C   231          JSR  GETCEL2
0BE0:4C D0 0B   232          JMP  NEWNUM
0BE3:20 F4 0B   233 NEWNUM2 JSR  NEWATOM
0BE6:20 79 0C   234          JSR  GETCEL
0BE9:4C EF 0B   235          JMP  CARLINK2
0BEC:20 79 0C   236 CARLINK JSR  GETCEL    ;GET A NEW CELL
0BEF:A0 00      237 CARLINK2 LDY #0        ;LINK TO CAR OF OLD
0BF1:4C C1 0C   238          JMP  LINK
                239 ************************************************
0BF4:           240 * ROUTINE TO GEN A NEW ATOM CELL
                241 ************************************************
0BF4:20 79 0C   242 NEWATOM JSR  GETCEL    ;GET A CELL
0BF7:A5 5A      243          LDA  CELPTR   ;STORE PTR
0BF9:09 02      244          ORA  #2       ;SET ATOM BIT
0BFB:85 5C      245          STA  ATMPTR
0BFD:A5 5B      246          LDA  CELPTR+1
0BFF:85 5D      247          STA  ATMPTR+1
0C01:60         248          RTS
0C02:86 60      249 RMCHK    STX  TMP1     ;CHECK FOR ENOUGH CELLS FOR ATOM
0C04:20 0B 0F   250          JSR  WK1PUSH
0C07:A5 80      251          LDA  FREPTR
0C09:85 CE      252          STA  WK1
0C0B:A5 81      253          LDA  FREPTR+1
0C0D:85 CF      254          STA  WK1+1
0C0F:A5 CF      255 RMLP     LDA  WK1+1
```

```
0C11:F0 0A      256          BEQ  RMFIN
0C13:C6 60      257          DEC  TMP1
0C15:F0 08      258          BEQ  RMOK
0C17:20 C0 0D   259          JSR  WK1CDR
0C1A:4C 0F 0C   260          JMP  RMLP
0C1D:A5 60      261 RMFIN    LDA  TMP1
0C1F:08         262 RMOK     PHP
0C20:20 12 0F   263          JSR  WK1POP
0C23:28         264          PLP
0C24:60         265          RTS
                266 ************************************************
0C25:           267 * ROUTINE TO GET A CHAR. AND SET TYPE
                268 ************************************************
0C25:A2 00      269 GETCHR   LDX  #0          ;INIT TYPE
0C27:A4 FD      270          LDY  FREEFLG     ;CHECK FOR FREEFORM READ
0C29:08         271          PHP
0C2A:A4 74      272          LDY  BUFPTR
0C2C:B9 00 02   273          LDA  INBUF,Y
0C2F:E6 74      274          INC  BUFPTR
0C31:85 5F      275          STA  CHAR        ;SET TYPE OF CHAR
0C33:28         276          PLP
0C34:10 0A      277          BPL  GETCHRII
0C36:C9 A0      278          CMP  #'          '
0C38:F0 3C      279          BEQ  SPACE
0C3A:C9 8D      280          CMP  #$8D
0C3C:F0 35      281          BEQ  CRET
0C3E:D0 2F      282          BNE  LITCHR
0C40:C9 A8      283 GETCHRII CMP #'(
0C42:F0 34      284          BEQ  LEFTP
0C44:C9 A9      285          CMP  #')
0C46:F0 2F      286          BEQ  RIGHTP
0C48:C9 A0      287          CMP  #'          '
0C4A:F0 2A      288          BEQ  SPACE
0C4C:C9 A7      289          CMP  #''
0C4E:F0 25      290          BEQ  SINQUOTE
0C50:C9 A2      291          CMP  #'"
0C52:F0 20      292          BEQ  DBLQUOTE
0C54:C9 8D      293          CMP  #$8D
0C56:F0 1B      294          BEQ  CRET
0C58:C9 AE      295          CMP  #'.
0C5A:F0 16      296          BEQ  DECPT
0C5C:C9 AD      297          CMP  #'-
0C5E:F0 11      298          BEQ  ARSIGN
0C60:C9 B0      299          CMP  #'0
0C62:90 0B      300          BCC  LITCHR
0C64:C9 B9      301          CMP  #'9
0C66:90 08      302          BCC  NUMCHR
0C68:F0 06      303          BEQ  NUMCHR
0C6A:C9 BB      304          CMP  #';
0C6C:D0 01      305          BNE  LITCHR
0C6E:E8         306 SEMICOLON INX
0C6F:E8         307 LITCHR   INX
0C70:E8         308 NUMCHR   INX
0C71:E8         309 ARSIGN   INX
0C72:E8         310 DECPT    INX
0C73:E8         311 CRET     INX
0C74:E8         312 DBLQUOTE INX
0C75:E8         313 SINQUOTE INX
```

```
0C76:E8          SPACE   INX
0C77:E8          RIGHTP  INX
0C78:60          LEFTP   RTS
                 ***************************************************
0C79:            * ROUTINE TO GET A FREE CELL
                 ***************************************************
0C79:20 AF 0C    GETCEL  JSR  CELMOV     ;MOVE CELPTR TO WK1
0C7C:A5 81               LDA  FREPTR+1
0C7E:D0 11               BNE  NOGC
0C80:20 FC 0E    GETCEL2 JSR  RESPUSH
0C83:20 89 13            JSR  ARGPUSH
0C86:20 B3 28            JSR  GC3        ;GC IF NO CELLS LEFT
0C89:20 90 13            JSR  ARGPOP
0C8C:20 03 0F            JSR  RESPOP
0C8F:A5 81               LDA  FREPTR+1
0C91:85 5B       NOGC    STA  CELPTR+1
0C93:A5 80               LDA  FREPTR
0C95:85 5A               STA  CELPTR
0C97:A0 02               LDY  #2         ;REMOVE CELL FROM LIST
0C99:B1 80               LDA  (FREPTR),Y
0C9B:AA                  TAX
0C9C:C8                  INY
0C9D:B1 80               LDA  (FREPTR),Y
0C9F:85 80               STA  FREPTR
0CA1:86 81               STX  FREPTR+1
0CA3:A0 02               LDY  #2         ;PUT NIL IN CDR
0CA5:A9 00       NILCEL  LDA  #0
0CA7:91 5A               STA  (CELPTR),Y
0CA9:C8                  INY
0CAA:A9 72               LDA  #NIL+2
0CAC:91 5A               STA  (CELPTR),Y
0CAE:60                  RTS
                 ***************************************************
0CAF:            * ROUTINE TO MOVE CELPTR TO WK1
                 ***************************************************
0CAF:A5 5A       CELMOV  LDA  CELPTR
0CB1:85 CE               STA  WK1
0CB3:A5 5B               LDA  CELPTR+1
0CB5:85 CF               STA  WK1+1
0CB7:60                  RTS
                 ***************************************************
0CB8:            * ROUTINE TO MOVE WK1 TO CELPTR
                 ***************************************************
0CB8:A5 CE       WK1MOV  LDA  WK1
0CBA:85 5A               STA  CELPTR
0CBC:A5 CF               LDA  WK1+1
0CBE:85 5B               STA  CELPTR+1
0CC0:60                  RTS
                 ***************************************************
0CC1:            * ROUTINE TO LINK CELL TO WK1
                 ***************************************************
0CC1:A5 5B       LINK    LDA  CELPTR+1
0CC3:91 CE               STA  (WK1),Y
0CC5:C8                  INY
0CC6:A5 5A               LDA  CELPTR
0CC8:91 CE               STA  (WK1),Y
0CCA:60                  RTS
                 ***************************************************
```

```
0CCB:                 * ROUTINE TO SEARCH OBLIST FOR ATOM
0CCB:                 * AND STORE IT IF NOT THERE
                      ***********************************************
0CCB:20 E0 0D         ATMSTOR JSR  OBTOWK1
0CCE:20 0B 0F         OBLOOP  JSR  WK1PUSH    ;SAVE PTR
0CD1:A0 00                    LDY  #0         ;GET CAR, CLEAR ATOM BIT
0CD3:B1 CE                    LDA  (WK1),Y
0CD5:85 5D                    STA  ATMPTR+1
0CD7:AA                       TAX
0CD8:C8                       INY
0CD9:B1 CE                    LDA  (WK1),Y
0CDB:85 5C                    STA  ATMPTR
0CDD:29 FC                    AND  #$FC
0CDF:85 CE                    STA  WK1
0CE1:86 CF                    STX  WK1+1
0CE3:20 C0 0D                 JSR  WK1CDR     ;GET CDR
0CE6:20 CE 0D                 JSR  WK1CAR     ;GET CAR
0CE9:AE 8B 09                 LDX  OLDBUFPTR  ;COMPARE PNAMES
0CEC:CA                       DEX
0CED:A0 00            NAMLP   LDY  #0
0CEF:E8                       INX
0CF0:B1 CE                    LDA  (WK1),Y
0CF2:DD 00 02                 CMP  INBUF,X
0CF5:D0 2D                    BNE  NEXAT
0CF7:E4 56                    CPX  NEWBUF     ;CHECK FOR END OF NEW ATOM
0CF9:F0 24                    BEQ  ENDPCHK
0CFB:C8                       INY              ;NO-CHECK FOR END OF OLD ATOM
0CFC:B1 CE                    LDA  (WK1),Y
0CFE:F0 24                    BEQ  NEXAT
0D00:E8                       INX              ;OK-COMPARE NEXT CHAR.
0D01:DD 00 02                 CMP  INBUF,X
0D04:D0 1E                    BNE  NEXAT
0D06:C8                       INY              ;EQUAL --
0D07:B1 CE                    LDA  (WK1),Y    ;IF NO CHARS LEFT, AND LENGTHS EQUAL,
0D09:D0 0A                    BNE  MORCHR     ;  THEN RETURN PTR
0D0B:E4 56                    CPX  NEWBUF
0D0D:D0 15                    BNE  NEXAT
0D0F:20 12 0F         FOUND   JSR  WK1POP
0D12:A0 03                    LDY  #3         ;SET TYPE FOR READ
0D14:60                       RTS
0D15:E4 56            MORCHR  CPX  NEWBUF     ;ELSE CHECK FOR MORE CHARS.
0D17:F0 0B                    BEQ  NEXAT
0D19:20 C0 0D                 JSR  WK1CDR     ;YES-REPEAT
0D1C:4C ED 0C                 JMP  NAMLP
0D1F:C8               ENDPCHK INY              ;CHECK FOR ODD # OF CHARS
0D20:B1 CE                    LDA  (WK1),Y
0D22:F0 EB                    BEQ  FOUND
0D24:20 12 0F         NEXAT   JSR  WK1POP     ;TRY NEXT ATOM IF NO MATCH
0D27:A0 02                    LDY  #2
0D29:B1 CE                    LDA  (WK1),Y    ;WATCH FOR END OF OBLIST
0D2B:F0 06                    BEQ  ADDAT
0D2D:20 C0 0D                 JSR  WK1CDR
0D30:4C CE 0C                 JMP  OBLOOP
0D33:20 AA 0D         ADDAT   JSR  CHKROOM    ;CHECK FOR ROOM FOR ATOM
0D36:20 0B 0F                 JSR  WK1PUSH
0D39:20 79 0C                 JSR  GETCEL     ;GET OBLIST CELL BUT DONT LINK
0D3C:20 ED 0E                 JSR  CELPUSH
0D3F:20 F4 0B                 JSR  NEWATOM    ;GET ATOM CELL
```

```
0D42:A0 00      430          LDY  #0          ;STOR ATOM PTR
0D44:91 CE      431          STA  (WK1),Y
0D46:C8         432          INY
0D47:A5 5C      433          LDA  ATMPTR
0D49:91 CE      434          STA  (WK1),Y
0D4B:A9 00      435          LDA  #0          ;ZERO VALUE
0D4D:91 5A      436          STA  (CELPTR),Y
0D4F:20 E9 0D   437          JSR  GETCELA     ;GET ANOTHER & LINK
0D52:20 CB 0B   438          JSR  CDRLINK2
0D55:20 E9 0D   439          JSR  GETCELA     ;ANOTHER FOR PNAME
0D58:20 EF 0B   440          JSR  CARLINK2
0D5B:20 7F 0D   441          JSR  NAMSTORE    ;STORE PNAME
0D5E:20 F4 0E   442          JSR  CELPOP
0D61:20 12 0F   443          JSR  WK1POP      ;LINK ATOM TO OBLIST
0D64:20 CB 0B   444          JSR  CDRLINK2
0D67:A0 03      445          LDY  #3          ;RETURN TYPE TO READ
0D69:60         446          RTS
                447 ***************************************************
0D6A:           448 * ROUTINE TO HANDLE STRING ATOMS
                449 ***************************************************
0D6A:20 AA 0D   450 STRSTORE JSR CHKROOM     ;CHECK IF A GC IS NEEDED
0D6D:20 F4 0B   451          JSR  NEWATOM
0D70:A0 03      452          LDY  #3          ;PUT 0 IN CDR OF ATOM CELL
0D72:A9 00      453          LDA  #0
0D74:91 5A      454          STA  (CELPTR),Y
0D76:20 EC 0B   455          JSR  CARLINK
0D79:20 7F 0D   456          JSR  NAMSTORE    ;STORE THE PNAME
0D7C:A0 03      457          LDY  #3          ;  AND RETURN
0D7E:60         458          RTS
                459 ***************************************************
0D7F:           460 * ROUTINE TO STORE AN ATOM'S PNAME
                461 ***************************************************
0D7F:AE 8B 09   462 NAMSTORE LDX OLDBUFPTR
0D82:A0 00      463 NAMELP   LDY  #0
0D84:BD 00 02   464          LDA  INBUF,X
0D87:91 5A      465          STA  (CELPTR),Y
0D89:C8         466          INY
0D8A:E4 56      467          CPX  NEWBUF      ;CHECK IF FINISHED
0D8C:F0 17      468          BEQ  NAMEFIN
0D8E:E8         469          INX
0D8F:BD 00 02   470          LDA  INBUF,X
0D92:91 5A      471          STA  (CELPTR),Y
0D94:E4 56      472          CPX  NEWBUF
0D96:F0 11      473          BEQ  NAMEFIN2
0D98:E8         474          INX
0D99:86 60      475          STX  TMP1
0D9B:20 E9 0D   476          JSR  GETCELA     ;GET ANOTHER CELL & LINK
0D9E:20 CB 0B   477          JSR  CDRLINK2
0DA1:A6 60      478          LDX  TMP1
0DA3:D0 DD      479          BNE  NAMELP
0DA5:A9 00      480 NAMEFIN  LDA  #0
0DA7:91 5A      481          STA  (CELPTR),Y
0DA9:60         482 NAMEFIN2 RTS
                483 ***************************************************
0DAA:           484 * ROUTINE TO CHECK FREE LIST FOR ENOUGH CELLS
0DAA:           485 * FOR PNAME. A GC IS DONE IF THERE ARE
0DAA:           486 * NOT ENOUGH CELLS
                487 ***************************************************
```

```
0DAA:A5 56      488 CHKROOM LDA  NEWBUF
0DAC:38         489         SEC
0DAD:ED 8B 09   490         SBC  OLDBUFPTR
0DB0:18         491         CLC
0DB1:69 01      492         ADC  #1
0DB3:4A         493         LSR  A
0DB4:69 04      494         ADC  #4
0DB6:AA         495         TAX
0DB7:20 02 0C   496         JSR  RMCHK
0DBA:F0 03      497         BEQ  ROOMOK
0DBC:20 80 0C   498         JSR  GETCEL2
0DBF:60         499 ROOMOK  RTS
                500 ************************************************
0DC0:           501 * ROUTINES TO REPLACE WK1 W/CAR OR CDR
                502 ************************************************
0DC0:A0 02      503 WK1CDR  LDY  #2
0DC2:B1 CE      504 WK1CD   LDA  (WK1),Y
0DC4:48         505         PHA
0DC5:C8         506         INY
0DC6:B1 CE      507         LDA  (WK1),Y
0DC8:85 CE      508         STA  WK1
0DCA:68         509         PLA
0DCB:85 CF      510         STA  WK1+1
0DCD:60         511         RTS
0DCE:A0 00      512 WK1CAR  LDY  #0
0DD0:F0 F0      513         BEQ  WK1CD
                514 ************************************************
0DD2:           515 * ROUTINE TO CLEAR REGISTERS FOR APPLESOFT
                516 ************************************************
0DD2:A9 00      517 INITREG LDA  #0
0DD4:85 7F      518         STA  SIGN
0DD6:85 A4      519         STA  FAC+7
0DD8:A2 04      520         LDX  #4
0DDA:95 50      521 REGLP   STA  RES,X
0DDC:CA         522         DEX
0DDD:10 FB      523         BPL  REGLP
0DDF:60         524         RTS
0DE0:A5 7B      525 OBTOWK1 LDA  OBLSTPTR
0DE2:85 CE      526         STA  WK1
0DE4:A5 7C      527         LDA  OBLSTPTR+1
0DE6:85 CF      528         STA  WK1+1
0DE8:60         529         RTS
0DE9:A5 5A      530 GETCELA LDA  CELPTR
0DEB:48         531         PHA
0DEC:A5 5B      532         LDA  CELPTR+1
0DEE:48         533         PHA
0DEF:A9 00      534         LDA  #0
0DF1:85 5B      535         STA  CELPTR+1
0DF3:20 79 0C   536         JSR  GETCEL
0DF6:68         537         PLA
0DF7:85 CF      538         STA  WK1+1
0DF9:68         539         PLA
0DFA:85 CE      540         STA  WK1
0DFC:60         541         RTS
0DFD:           542         CHN  READ.SRC
                  1 ************************************************
0DFD:             2 * READ ROUTINE
                  3 ************************************************
```

```
0FD:A9 B3        4 READ    LDA  #128+51
0FF:8D 8A 09     5          STA  LEXERRSAV ;ERROR CODE IN CASE OF LEXAN ERR
0E02:20 38 0A    6          JSR  LEXAN     ;GET FIRST TOKEN
0E05:84 60       7          STY  TMP1
0E07:C0 01       8          CPY  #1        ;IGNORE IF )
0E09:F0 F2       9          BEQ  READ
0E0B:20 A6 0E   10          JSR  SETRET    ;ELSE SET RETURN ADDR
0E0E:4C 1A 0E   11          JMP  READ2
0E11:A5 6C      12          LDA  RESPTR
0E13:85 6A      13          STA  RDPTR
0E15:A5 6D      14          LDA  RESPTR+1
0E17:85 6B      15          STA  RDPTR+1
0E19:60         16          RTS
0E1A:A4 60      17 READ2    LDY  TMP1
0E1C:C0 00      18          CPY  #0        ;IS IT A (?
0E1E:D0 2A      19          BNE  NOTLP
0E20:20 38 0A   20 READ3    JSR  LEXAN     ;CHECK FOR ()
0E23:84 60      21          STY  TMP1
0E25:C0 01      22          CPY  #1
0E27:F0 4C      23          BEQ  RNILRET
0E29:20 A6 0E   24          JSR  SETRET    ;NO-CALL READHD RECURSIVELY
0E2C:4C 1A 0E   25          JMP  READ2
0E2F:20 79 0C   26          JSR  GETCEL    ;GET A FREE CELL
0E32:20 7B 0E   27          JSR  CARPUT    ;PUT RESULT OF READHD IN CAR
0E35:20 ED 0E   28 READ4    JSR  CELPUSH   ;SAVE CELL AGAIN
0E38:20 A6 0E   29          JSR  SETRET
0E3B:4C 20 0E   30          JMP  READ3     ;RECURSIVELY READ REST OF INPUT
0E3E:20 F4 0E   31 READ5    JSR  CELPOP
0E41:20 87 0E   32          JSR  CDRPUT    ;PUT RESULT IN CDR
0E44:20 94 0E   33          JSR  CELRES    ;PUT CELPTR IN RESPTR
0E47:4C DF 0E   34          JMP  RET       ;FINISHED!
0E4A:C0 03      35 NOTLP    CPY  #3        ;ELSE IS IT AN ATOM?
0E4C:D0 06      36          BNE  NOTAT
0E4E:20 8B 0E   37          JSR  ATMRES    ;YES--SET PTR TO ATOM .
0E51:4C DF 0E   38          JMP  RET       ;  AND RETURN
0E54:C0 02      39 NOTAT    CPY  #2        ;CHECK FOR QUOTE
0E56:D0 1D      40          BNE  RNILRET
0E58:20 E7 3A   41          JSR  QUOTPUT   ;ELSE MUST BE A QUOTE--GET CELL & QUOT
E IT
0E5B:20 ED 0E   42          JSR  CELPUSH   ;SAVE THE CELL
0E5E:20 38 0A   43          JSR  LEXAN     ;GET NEXT TOKEN
0E61:84 60      44          STY  TMP1
0E63:20 A6 0E   45          JSR  SETRET
0E66:4C 1A 0E   46          JMP  READ2     ;CALL READ2 RECURSIVELY
0E69:20 79 0C   47          JSR  GETCEL
0E6C:20 7B 0E   48          JSR  CARPUT    ;PUT RESULT IN CAR
0E6F:20 94 0E   49          JSR  CELRES
0E72:4C 3E 0E   50          JMP  READ5     ;LINK TO QUOTE CELL AND RETURN
0E75:20 9D 0E   51 RNILRET  JSR  NILRET    ;RETURN NIL ON A )
0E78:4C DF 0E   52          JMP  RET
                53 ************************************************
0E7B:           54 * ROUTINE TO PUT RESPTR IN CAR OF CELL
                55 ************************************************
0E7B:A0 00      56 CARPUT   LDY  #0
0E7D:A5 6D      57 CELPUT   LDA  RESPTR+1
0E7F:91 5A      58          STA  (CELPTR),Y
0E81:C8         59          INY
0E82:A5 6C      60          LDA  RESPTR
0E84:91 5A      61          STA  (CELPTR),Y
```

```
0E86:60          62          RTS
                 63 ***********************************************
0E87:            64 * ROUTINE TO DO SAME FOR CDR
                 65 ***********************************************
0E87:A0 02       66 CDRPUT  LDY  #2
0E89:D0 F2       67          BNE  CELPUT
                 68 ***********************************************
0E8B:            69 * ROUTINE TO RETURN ATOM PTR IN RESPTR
                 70 ***********************************************
0E8B:A5 5C       71 ATMRES  LDA  ATMPTR
0E8D:85 6C       72          STA  RESPTR
0E8F:A5 5D       73          LDA  ATMPTR+1
0E91:85 6D       74          STA  RESPTR+1
0E93:60          75          RTS
                 76 ***********************************************
0E94:            77 * ROUTINE TO MOVE CELPTR TO RESPTR
                 78 ***********************************************
0E94:A5 5A       79 CELRES  LDA  CELPTR
0E96:85 6C       80          STA  RESPTR
0E98:A5 5B       81          LDA  CELPTR+1
0E9A:85 6D       82          STA  RESPTR+1
0E9C:60          83          RTS
                 84 ***********************************************
0E9D:            85 * ROUTINE TO RETURN NIL
                 86 ***********************************************
0E9D:A9 00       87 NILRET  LDA  #0          ;MOVE NIL TO RESPTR
  9F:85 6D       88          STA  RESPTR+1
  A1:A9 72       89          LDA  #NIL+2
0EA3:85 6C       90          STA  RESPTR
0EA5:60          91          RTS
                 92 ***********************************************
0EA6:            93 * ROUTINE TO SAVE RETURN ADDRESS
0EA6:            94 * ON RECURSION STACK
                 95 ***********************************************
0EA6:BA          96 SETRET  TSX              ;GET RETURN ADDR FROM STACK
0EA7:BD 01 01    97          LDA  STACK+1,X
0EAA:18          98          CLC
0EAB:69 03       99          ADC  #3         ;ADD 3
0EAD:BC 02 01   100          LDY  STACK+2,X
0EB0:90 01      101          BCC  RETSTORE
0EB2:C8         102          INY
0EB3:AA         103 RETSTORE TAX
                104 ***********************************************
0EB4:           105 * ROUTINE TO PUSH PTR ON STACK
                106 ***********************************************
0EB4:A5 7D      107 PUSH    LDA  STKPTR     ;UPDATE STACK PTR
0EB6:18         108          CLC
0EB7:69 02      109          ADC  #2
0EB9:85 7D      110          STA  STKPTR
0EBB:A5 7E      111          LDA  STKPTR+1
0EBD:69 00      112          ADC  #0
0EBF:CD 10 08   113          CMP  STKEND+1   ;CHECK FOR STACK OVERFLOW
  C2:F0 0C      114          BEQ  STKERR
0EC4:85 7E      115          STA  STKPTR+1
0EC6:98         116          TYA             ;STACK THE POINTER
0EC7:A0 01      117          LDY  #1
0EC9:91 7D      118          STA  (STKPTR),Y
0ECB:88         119          DEY
```

```
0ECC:8A          120          TXA
0ECD:91 7D       121          STA  (STKPTR),Y
0ECF:60          122          RTS
0ED0:AD 28 29    123 STKERR   LDA  GCFLG      ;IF GCING, SWEEP FIRST
0ED3:10 03       124          BPL  STKERR2
0ED5:20 49 2A    125          JSR  SWEEP
0ED8:A2 02       126 STKERR2  LDX  #2         ;STACK OVFLO ERROR
0EDA:A0 FF       127          LDY  #$FF
0EDC:4C EA 24    128          JMP  ERROR
                 129 ************************************************
0EDF:            130 * ROUTINE TO GET RETURN ADDRESS FROM STACK
                 131 ************************************************
0EDF:86 60       132 RET      STX  TMP1       ;SAVE X AND P
0EE1:08          133          PHP
0EE2:20 1A 0F    134          JSR  POP        ;POP STACK
0EE5:28          135          PLP
0EE6:98          136          TYA
0EE7:48          137          PHA              ;PUSH RETURN ADDRESS
0EE8:8A          138          TXA
0EE9:48          139          PHA
0EEA:A6 60       140          LDX  TMP1       ;RESTORE X
0EEC:60          141          RTS
                 142 ************************************************
0EED:            143 * ROUTINE TO SAVE/RESTORE CELPTR
                 144 ************************************************
0EED:A6 5A       145 CELPUSH  LDX  CELPTR
0EEF:A4 5B       146          LDY  CELPTR+1
0EF1:4C B4 0E    147          JMP  PUSH
0EF4:20 1A 0F    148 CELPOP   JSR  POP
0EF7:86 5A       149          STX  CELPTR
0EF9:84 5B       150          STY  CELPTR+1
0EFB:60          151          RTS
                 152 ************************************************
0EFC:            153 * ROUTINE TO SAVE/RESTORE RESPTR
                 154 ************************************************
0EFC:A6 6C       155 RESPUSH  LDX  RESPTR
0EFE:A4 6D       156          LDY  RESPTR+1
0F00:4C B4 0E    157          JMP  PUSH
0F03:20 1A 0F    158 RESPOP   JSR  POP
0F06:86 6C       159          STX  RESPTR
0F08:84 6D       160          STY  RESPTR+1
0F0A:60          161          RTS
                 162 ************************************************
0F0B:            163 * ROUTINE TO SAVE/RESTORE WK1
                 164 ************************************************
0F0B:A6 CE       165 WK1PUSH  LDX  WK1
0F0D:A4 CF       166          LDY  WK1+1
0F0F:4C B4 0E    167          JMP  PUSH
0F12:20 1A 0F    168 WK1POP   JSR  POP
0F15:86 CE       169          STX  WK1
0F17:84 CF       170          STY  WK1+1
0F19:60          171          RTS
                 172 ************************************************
0F1A:            173 * ROUTINE TO POP RECURSION STACK
                 174 ************************************************
0F1A:A0 00       175 POP      LDY  #0         ;REMOVE PTR FROM STACK
0F1C:B1 7D       176          LDA  (STKPTR),Y
0F1E:AA          177          TAX
```

```
0F1F:C8          178          INY
  20:B1 7D       179          LDA  (STKPTR),Y
0F22:A8          180          TAY
0F23:A5 7D       181          LDA  STKPTR     ;UPDATE STACK PTR
0F25:38          182          SEC
0F26:E9 02       183          SBC  #2
0F28:85 7D       184          STA  STKPTR
0F2A:B0 02       185          BCS  POPFN
0F2C:C6 7E       186          DEC  STKPTR+1
0F2E:60          187 POPFN    RTS
0F2F:            188          CHN  PRINT.SRC
                   1 ************************************************
0F2F:              2 * PRINT ROUTINE
0F2F:              3 *
0F2F:              4 * ARGUMENT IN WK1
                   5 ************************************************
0F2F:              6 PPTMP    DS   1
0F30:              7 CTR      DS   1
0F31:20 A6 0E      8 PRINT    JSR  SETRET
0F34:4C 38 0F      9          JMP  PRINT2
0F37:60           10          RTS
0F38:20 5D 11     11 PRINT2   JSR  ADDRCHK    ;CHECK ADDR BOUNDS
0F3B:B0 06        12          BCS  NOTSTAR
0F3D:20 8F 0F     13          JSR  PRTSTAR    ;PRINT * IF PTR -> INVALID PAGE
0F40:4C DF 0E     14          JMP  RET
0F43:20 53 11     15 NOTSTAR  JSR  ATMCHK     ;CHECK FOR ATOM
  46:B0 53        16          BCS  PATOM       ;YES-PRINT IT
  48:20 31 11     17          JSR  PLP        ;ELSE PRINT A (
0F4B:20 0B 0F     18 PRTCAR   JSR  WK1PUSH    ;SAVE PTR
0F4E:20 CE 0D     19          JSR  WK1CAR     ;REPLACE W/CAR
0F51:20 A6 0E     20          JSR  SETRET     ;RECURSIVELY CALL PRINT
0F54:4C 38 0F     21          JMP  PRINT2
0F57:20 12 0F     22          JSR  WK1POP     ;RESTORE PTR
0F5A:20 C0 0D     23          JSR  WK1CDR     ;GET CDR
0F5D:A5 CF        24          LDA  WK1+1      ;CHECK IF FINISHED
0F5F:F0 0B        25          BEQ  PNIL
0F61:20 5D 11     26          JSR  ADDRCHK    ;CHECK FOR * VALUE
0F64:B0 0C        27          BCS  NOTSTAR2
0F66:20 83 0F     28          JSR  DOTP       ;PRINT A . AND STAR
0F69:20 8F 0F     29          JSR  PRTSTAR
0F6C:20 4B 11     30 PNIL     JSR  PRP        ;PRINT A )
0F6F:4C DF 0E     31          JMP  RET        ;  AND RETURN
0F72:20 53 11     32 NOTSTAR2 JSR  ATMCHK     ;CHECK FOR ATOM
0F75:90 D4        33          BCC  PRTCAR     ;NO-PRINT REST OF LIST
0F77:20 83 0F     34          JSR  DOTP       ;ELSE PRINT DOTTED PAIR
0F7A:20 A6 0E     35          JSR  SETRET
0F7D:4C 9B 0F     36          JMP  PATOM
0F80:4C 6C 0F     37          JMP  PNIL
                  38 ************************************************
0F83:             39 * ROUTINES TO PRINT CHARACTERS
                  40 ************************************************
0F83:20 8B 0F     41 DOTP     JSR  SPCPRT
  86:A9 AE        42          LDA  #'.        ;PRINT A DOT
0F88:4C 0C 0A     43 OUTC     JMP  COUT
0F8B:A9 A0        44 SPCPRT   LDA  #'         ' ;PRINT A SPACE
0F8D:D0 F9        45          BNE  OUTC
0F8F:20 8B 0F     46 PRTSTAR  JSR  SPCPRT
0F92:A9 AA        47          LDA  #'*        ;PRINT A STAR
```

```
0F94:D0 F2          48          BNE  OUTC
0F96:A9 A2          49 QUOTPRT  LDA  #'"
0F98:D0 EE          50          BNE  OUTC
                    51 ***********************************************
0F9A:               52 * ROUTINE TO PRINT AN ATOM
                    53 ***********************************************
0F9A:A8             54 LASTCHR  DFB  '('
0F9B:20 A1 0F       55 PATOM    JSR  PATOM2
0F9E:4C DF 0E       56          JMP  RET
0FA1:A2 00          57 PATOM2   LDX  #0
0FA3:AD 9A 0F       58          LDA  LASTCHR    ;NO SPACE IF LAST CHAR
0FA6:C9 A8          59          CMP  #'(        ; WAS A (
0FA8:F0 09          60          BEQ  NOPSPC
0FAA:C9 8D          61          CMP  #$8D
0FAC:F0 05          62          BEQ  NOPSPC
0FAE:C9 A0          63          CMP  #'         '
0FB0:F0 01          64          BEQ  NOPSPC
0FB2:E8             65          INX
0FB3:86 6E          66 NOPSPC   STX  STKCEL
0FB5:8E 2F 0F       67          STX  PPTMP
0FB8:A5 CE          68          LDA  WK1        ;CLEAR ATOM BIT
0FBA:29 FC          69          AND  #$FC
0FBC:85 CE          70          STA  WK1
0FBE:A0 02          71          LDY  #2         ;CHECK ATOM TYPE
0FC0:B1 CE          72          LDA  (WK1),Y
0FC2:F0 56          73          BEQ  PCONST
0FC4:A9 FF          74          LDA  #$FF
0FC6:85 6F          75          STA  STKCEL+1
0FC8:20 C0 0D       76          JSR  WK1CDR     ;LITERAL--GET PNAME
0FCB:20 CE 0D       77 PSTR     JSR  WK1CAR
0FCE:20 B8 0C       78          JSR  WK1MOV     ;SAVE WK1 IN CELPTR
0FD1:E6 6E          79 PLNSTLP  INC  STKCEL
0FD3:E6 6E          80          INC  STKCEL
0FD5:20 C0 0D       81          JSR  WK1CDR
0FD8:A5 CF          82          LDA  WK1+1
0FDA:D0 F5          83          BNE  PLNSTLP
0FDC:A5 6F          84          LDA  STKCEL+1   ;CHECK FOR QUOTES
0FDE:49 FF          85          EOR  #$FF
0FE0:25 EF          86          AND  PRINTFLG
0FE2:F0 04          87          BEQ  PLNST2
0FE4:E6 6E          88          INC  STKCEL
0FE6:E6 6E          89          INC  STKCEL
0FE8:20 EB 10       90 PLNST2   JSR  SCRLCHK    ;SCROLL IF NO ROOM
0FEB:20 AF 0C       91          JSR  CELMOV     ;RESTORE WK1
0FEE:20 87 10       92          JSR  SPCCHK     ;PRINT SPACE IF NEEDED
0FF1:A5 6F          93          LDA  STKCEL+1   ;CHECK FOR QUOTES
0FF3:49 FF          94          EOR  #$FF
0FF5:25 EF          95          AND  PRINTFLG
0FF7:F0 09          96          BEQ  PNAM
0FF9:20 96 0F       97          JSR  QUOTPRT
0FFC:20 02 10       98          JSR  PNAM
0FFF:4C 96 0F       99          JMP  QUOTPRT
1002:A0 00         100 PNAM     LDY  #0         ;PRINT PNAME
1004:B1 CE         101          LDA  (WK1),Y
1006:20 0C 0A      102          JSR  COUT
1009:A0 01         103          LDY  #1
100B:B1 CE         104          LDA  (WK1),Y
100D:F0 0A         105          BEQ  PATOMFIN
```

```
1012:20 0C 0A  106          JSR  COUT
1015:20 C0 0D  107          JSR  WK1CDR
1015:A5 CF     108          LDA  WK1+1
1017:D0 E9     109          BNE  PNAM       ;CHECK IF FINISHED
1019:60        110 PATOMFIN RTS
101A:C8        111 PCONST   INY              ;CHECK FOR STRING OR NUMERIC
101B:B1 CE     112          LDA  (WK1),Y
101D:85 6F     113          STA  STKCEL+1
101F:F0 AA     114          BEQ  PSTR
               115 ***********************************************
1021:          116 * ROUTINE TO PRINT NUMERIC ATOM
               117 ***********************************************
1021:20 D2 0D  118 PNUM     JSR  INITREG
1024:20 CE 0D  119          JSR  WK1CAR     ;GET THE NUMBER
1027:A0 02     120          LDY  #2         ;CHECK FOR INTEGER OR FP
1029:B1 CE     121          LDA  (WK1),Y
102B:D0 2C     122          BNE  FLOATNUM
102D:20 BC 10  123          JSR  INTGET     ;INTEGER--GET IT
1030:A2 50     124          LDX  #RES
1032:A9 00     125          LDA  #0
1034:85 58     126          STA  MSIGN
1036:20 B4 0B  127          JSR  TWOSCOMP   ;TAKE 2S COMP IF NEG
1039:20 A1 10  128          JSR  OUTSAVE    ;SAVE OUTPUT VECTOR
103C:20 AA 10  129          JSR  OUTCOUNT   ;SET NEW VECTOR
103F:AD 30 0F  130          LDA  CTR
1042:48        131          PHA
1043:20 D1 10  132          JSR  INTPRINT   ;"PRINT" NUMBER TO CALC. LENGTH
1046:68        133          PLA
1047:8D 30 0F  134          STA  CTR
104A:20 B3 10  135          JSR  OUTLOAD    ;RESTORE OUTPUT VEC
104D:20 EB 10  136          JSR  SCRLCHK    ;SCROLL IF NECESSARY
1050:20 87 10  137          JSR  SPCCHK     ;PRINT SPACE IF NEC.
1053:20 97 10  138          JSR  INCCTR
1056:4C D1 10  139          JMP  INTPRINT   ;PRINT IT AGAIN
1059:20 B8 0C  140 FLOATNUM JSR WK1MOV      ;SAVE WK1
105C:20 14 11  141          JSR  FACGET     ;PUT NUMBER IN FAC
105F:20 A1 10  142          JSR  OUTSAVE    ;SAVE OUTPUT VECTOR
1062:20 AA 10  143          JSR  OUTCOUNT   ;SET NEW VECTOR
1065:20 7A 10  144          JSR  FPPRINTA   ;"PRINT" THE NUMBER
1068:20 B3 10  145          JSR  OUTLOAD    ;RESTORE VECTOR
106B:20 EB 10  146          JSR  SCRLCHK    ;SCROLL IF NECESSARY
106E:20 87 10  147          JSR  SPCCHK     ;PRINT SPACE IF NEC.
1071:20 97 10  148          JSR  INCCTR
1074:20 AF 0C  149          JSR  CELMOV     ;RESTORE WK1
1077:20 14 11  150          JSR  FACGET     ;GET NUMBER AGAIN
107A:20 02 0A  151 FPPRINTA JSR FPSEL
107D:20 2E ED  152          JSR  FPPRINT
1080:AD 8B C0  153          LDA  RAMSEL
1083:AD 8B C0  154          LDA  RAMSEL
1086:60        155          RTS
1087:AD 2F 0F  156 SPCCHK   LDA  PPTMP
108A:F0 05     157          BEQ  NOSPACEP
108C:20 8B 0F  158          JSR  SPCPRT
108F:C6 6E     159          DEC  STKCEL
1091:A2 01     160 NOSPACEP LDX #1
1093:8E 9A 0F  161          STX  LASTCHR
1096:60        162          RTS
1097:AD 30 0F  163 INCCTR   LDA  CTR
```

```
109A:18          164          CLC
  9B:65 6E       165          ADC  STKCEL
109D:8D 30 0F    166          STA  CTR
10A0:60          167          RTS
                 168 ************************************************
10A1:            169 * ROUTINE TO SAVE OUTPUT VECTOR
                 170 ************************************************
10A1:A5 36       171 OUTSAVE LDA  OUTVEC     ;SAVE OUTVEC IN TMPOUT
10A3:85 77       172          STA  TMPOUT
10A5:A5 37       173          LDA  OUTVEC+1
10A7:85 78       174          STA  TMPOUT+1
10A9:60          175          RTS
                 176 ************************************************
10AA:            177 * ROUTINE TO SET NEW VECTOR
                 178 ************************************************
10AA:A9 CE       179 OUTCOUNT LDA #COUNTCHR
10AC:85 36       180          STA  OUTVEC
10AE:A9 10       181          LDA  #(COUNTCHR
10B0:85 37       182          STA  OUTVEC+1
10B2:60          183          RTS
                 184 ************************************************
10B3:            185 * ROUTINE TO RESTORE OUTPUT VECTOR
                 186 ************************************************
10B3:A5 77       187 OUTLOAD LDA  TMPOUT     ;PUT TMPOUT IN OUTVEC
10B5:85 36       188          STA  OUTVEC
10B7:A5 78       189          LDA  TMPOUT+1
  B9:85 37       190          STA  OUTVEC+1
  BB:60          191          RTS
                 192 ************************************************
10BC:            193 * ROUTINE TO PUT INTEGER IN INT ACC
                 194 ************************************************
10BC:A0 00       195 INTGET  LDY  #0
10BE:84 58       196          STY  MSIGN
10C0:B1 CE       197          LDA  (WK1),Y
10C2:85 51       198          STA  RES+1
10C4:C8          199          INY
10C5:B1 CE       200          LDA  (WK1),Y
10C7:85 50       201          STA  RES
10C9:A9 00       202          LDA  #0
10CB:85 CF       203          STA  WK1+1
10CD:60          204          RTS
                 205 ************************************************
10CE:            206 * ROUTINE TO COUNT CHARS.
                 207 ************************************************
10CE:E6 6E       208 COUNTCHR INC STKCEL
10D0:60          209          RTS
                 210 ************************************************
10D1:            211 * ROUTINE TO PRINT AN INTEGER
                 212 ************************************************
10D1:A5 58       213 INTPRINT LDA MSIGN      ;PRINT A - IF NEG
10D3:F0 05       214          BEQ  NOMINPRT
10D5:A9 AD       215          LDA  #'-
  )7:20 0C 0A    216          JSR  COUT
10DA:20 02 0A    217 NOMINPRT JSR FPSEL
10DD:A5 51       218          LDA  RES+1     ;LOAD NUMBER
10DF:A6 50       219          LDX  RES
10E1:20 24 ED    220          JSR  FPPRT
10E4:AD 8B C0    221          LDA  RAMSEL    ;BACK TO RAM
```

```
  E7:AD 8B C0   222          LDA  RAMSEL
  2A:60         223          RTS
                224 ***********************************************
10EB:           225 * ROUTINE TO SCROLL IF NO ROOM
                226 ***********************************************
10EB:A5 F0      227 SCRLCHK LDA  WINDWIDTH
10ED:38         228          SEC
10EE:ED 30 0F   229          SBC  CTR
10F1:C5 6E      230          CMP  STKCEL
10F3:F0 02      231          BEQ  YESSCROLL
10F5:B0 08      232          BCS  NOSCROLL
10F7:20 0A 0A   233 YESSCROLL JSR SCROLL    ;SCROLL IF NO ROOM
10FA:A2 00      234          LDX  #0
10FC:8E 2F 0F   235          STX  PPTMP
10FF:A5 82      236 NOSCROLL LDA INDENT
1101:38         237          SEC
1102:ED 30 0F   238          SBC  CTR
1105:30 0C      239          BMI  NOSCROLL2
1107:F0 0A      240          BEQ  NOSCROLL2
1109:AA         241          TAX
110A:CA         242 TABIT    DEX
110B:F0 06      243          BEQ  NOSCROLL2
110D:20 8B 0F   244 TABIT2   JSR  SPCPRT
1110:4C 0A 11   245          JMP  TABIT
1113:60         246 NOSCROLL2 RTS
                247 ***********************************************
  14:           248 * ROUTINE TO PUT FP NUMBER IN FAC
                249 ***********************************************
1114:A0 00      250 FACGET   LDY  #0
1116:B1 CE      251          LDA  (WK1),Y
1118:85 9D      252          STA  FAC
111A:C8         253          INY
111B:B1 CE      254          LDA  (WK1),Y
111D:85 9E      255          STA  FAC+1
111F:20 C0 0D   256          JSR  WK1CDR
1122:A0 03      257          LDY  #3
1124:B1 CE      258 FACGLP   LDA  (WK1),Y
1126:99 9F 00   259          STA  FAC+2,Y
1129:88         260          DEY
112A:10 F8      261          BPL  FACGLP
112C:A9 00      262          LDA  #0
112E:85 CF      263          STA  WK1+1
1130:60         264          RTS
                265 ***********************************************
1131:           266 * ROUTINE TO PRINT A LEFT PAREN
                267 ***********************************************
1131:AD 9A 0F   268 PLP      LDA  LASTCHR    ;SPACE FIRST IF LAST CHAR
1134:C9 A8      269          CMP  #'(        ;  NOT A (
1136:F0 0B      270          BEQ  PLP2
1138:C9 8D      271          CMP  #$8D
113A:F0 07      272          BEQ  PLP2
  3C:C9 A0      273          CMP  #'         '
  3E:F0 03      274          BEQ  PLP2
1140:20 8B 0F   275          JSR  SPCPRT
1143:20 FF 10   276 PLP2     JSR  NOSCROLL
1146:A9 A8      277          LDA  #'(
1148:4C 0C 0A   278          JMP  COUT
                279 ***********************************************
```

```
114B:           280 * ROUTINE TO PRINT A RIGHT PAREN
                281 ***********************************************
114B:20 FF 10   282 PRP     JSR  NOSCROLL
114E:A9 A9      283         LDA  #')
1150:4C 0C 0A   284         JMP  COUT       ;PRINT A )
                285 ***********************************************
1153:           286 * ROUTINE TO CHECK FOR ATOM
                287 ***********************************************
1153:A5 CE      288 ATMCHK  LDA  WK1
1155:24 69      289         BIT  ATMTST
1157:D0 02      290         BNE  ISATOM
1159:18         291         CLC
115A:60         292         RTS
115B:38         293 ISATOM  SEC
115C:60         294         RTS
                295 ***********************************************
115D:           296 * ROUTINE TO CHECK IF PTR IS IN
115D:           297 * A VALID RANGE
                298 ***********************************************
115D:A5 CF      299 ADDRCHK LDA  WK1+1
115F:4C D7 09   300         JMP  PAGCHK2
1162:           301         CHN  EVAL.SRC
                  1 ***********************************************
1162:             2 * EVAL ROUTINE
                  3 ***********************************************
1162:AD 00 C0     4 EVAL    LDA  KEYBOARD  ;STOP ON CTRL-C
1165:10 19        5         BPL  EVAL2
1167:8D 10 C0     6         STA  KEYSTROBE
116A:C9 83        7         CMP  #$83
116C:F0 32        8         BEQ  STOPEV
116E:C9 93        9         CMP  #$93      ;SUSPEND ON CTRL-S
1170:D0 0E       10         BNE  EVAL2
1172:AD 00 C0    11 DELAY   LDA  KEYBOARD  ;WAIT FOR ANOTHER CTRL-S TO CONTINUE
1175:C9 83       12         CMP  #$83      ;STOP IF CTRL-C
1177:8D 10 C0    13         STA  KEYSTROBE
117A:F0 24       14         BEQ  STOPEV
117C:C9 93       15         CMP  #$93
117E:D0 F2       16         BNE  DELAY
1180:A5 D6       17 EVAL2   LDA  EVLPTR    ;CHECK FOR ATOMIC ARG
1182:24 69       18         BIT  ATMTST
1184:F0 1D       19         BEQ  ENOTAT
1186:29 FC       20         AND  #$FC      ;IF SO, RETURN VALUE
1188:85 EB       21         STA  CARPTR
118A:A5 D7       22         LDA  EVLPTR+1
118C:85 EC       23         STA  CARPTR+1
118E:20 92 12    24         JSR  ATEVAL
1191:90 0A       25         BCC  EVLRET
1193:20 9B 13    26 EVLERR  JSR  EVLSAVE
1196:A2 03       27         LDX  #3        ;ERROR IF NO VALUE
1198:A0 10       28         LDY  #16
119A:4C EA 24    29         JMP  ERROR
119D:4C DF 0E    30 EVLRET  JMP  RET       ;RETURN RESULT
11A0:4C AF 25    31 STOPEV  JMP  BREAKMODE ;STOP EVALING
11A3:20 43 12    32 ENOTAT  JSR  GETCAR    ;GET CAR OF SEXPR
11A6:20 53 12    33 ENOTAT2 JSR  EVLPUSH
11A9:A5 EB       34 ENOTAT3 LDA  CARPTR
11AB:24 69       35         BIT  ATMTST
11AD:F0 28       36         BEQ  LAMBCHK
```

```
 9F:20 D7 23   37          JSR  TRACEIN    ;TRACE IN IF TRACE IS ON
..82:90 09     38          BCC  ENOTAT4
11B4:20 5A 12  39          JSR  EVLPOP
11B7:20 53 12  40          JSR  EVLPUSH
11BA:20 43 12  41          JSR  GETCAR
11BD:A2 EB     42 ENOTAT4  LDX  #CARPTR    ;GET EXPR PROPERTY
11BF:A0 31     43          LDY  #<EXPRATM
11C1:A9 44     44          LDA  #EXPRATM
11C3:20 62 12  45          JSR  GETPROP
11C6:A5 6D     46          LDA  RESPTR+1   ;CHECK IF RESULT=NIL
11C8:F0 2F     47          BEQ  SUBRTRY
11CA:A5 EB     48 CONSGO   LDA  CARPTR     ;SAVE FCN NAME IN CASE OF ERROR
11CC:8D 9B 28  49          STA  ERRFCN
11CF:A5 EC     50          LDA  CARPTR+1
11D1:8D 9C 28  51          STA  ERRFCN+1
11D4:4C 34 12  52          JMP  CARNOTAT2
11D7:A0 00     53 LAMBCHK  LDY  #0         ;CHECK IF CAR OF CAR IS LAMBDA
11D9:B1 EB     54          LDA  (CARPTR),Y
11DB:C9 35     55          CMP  #<LAMBDATM
11DD:D0 41     56          BNE  CARNOTAT
11DF:C8        57          INY
11E0:B1 EB     58          LDA  (CARPTR),Y
11E2:C9 16     59          CMP  #LAMBDATM+2
11E4:D0 03     60          BNE  FLAMCHK
11E6:4C 7F 1A  61          JMP  LAMBDA     ;YES--GOTO SUBR
11E9:C9 36     62 FLAMCHK  CMP  #FLAMATM+2 ;CHECK FOR FLAMBDA
  :B:D0 33     63          BNE  CARNOTAT
11ED:4C 41 1B  64          JMP  FLAMBDA    ;YES--GO TO SUBR
11F0:20 5A 12  65 EVALRET  JSR  EVLPOP
11F3:20 18 24  66          JSR  TRACEOUT   ;TRACE OUT IF TRACE ON
11F6:4C DF 0E  67          JMP  RET
11F9:A2 EB     68 SUBRTRY  LDX  #CARPTR    ;ELSE TRY SUBR PROP.
11FB:A0 31     69          LDY  #<SUBRATM
11FD:A9 58     70          LDA  #SUBRATM
11FF:20 62 12  71          JSR  GETPROP
1202:A5 6D     72          LDA  RESPTR+1
1204:F0 0C     73          BEQ  VALTRY
1206:85 9E     74          STA  SUB+1      ;GOT IT--USE VALUE AS ADDRESS
1208:A5 6C     75          LDA  RESPTR
120A:85 9D     76          STA  SUB
120C:20 80 12  77          JSR  EVLCDR     ;GET CDR OF ARGLIST
120F:6C 9D 00  78          JMP  (SUB)      ;EVAL SUBR
1212:A5 EB     79 VALTRY   LDA  CARPTR     ;ELSE EVAL THE ATOM
1214:29 FC     80          AND  #$FC       ;  CLEAR ATOM BIT
1216:85 EB     81          STA  CARPTR     ;  USE VALUE FOR FCN
1218:20 92 12  82          JSR  ATEVAL
121B:90 17     83          BCC  CARNOTAT2
121D:4C 93 11  84          JMP  EVLERR
1220:A5 EB     85 CARNOTAT LDA CARPTR      ;CAR NOT ATOMIC--EVAL IT
1222:85 D6     86          STA  EVLPTR
1224:A5 EC     87          LDA  CARPTR+1
 26:85 D7      88          STA  EVLPTR+1
 28:20 A6 0E   89          JSR  SETRET
122B:4C 62 11  90          JMP  EVAL
122E:20 5A 12  91          JSR  EVLPOP
1231:20 53 12  92          JSR  EVLPUSH
1234:A5 6D     93 CARNOTAT2 LDA RESPTR+1
 236:85 EC     94          STA  CARPTR+1
```

```
1238:A5 6C        95          LDA  RESPTR
123A:85 EB        96          STA  CARPTR
123C:24 69        97          BIT  ATMTST
123E:F0 97        98          BEQ  LAMBCHK
1240:4C BD 11     99          JMP  ENDTAT4
                 100 ************************************************
1243:            101 * ROUTINE TO GET CAR OF SEXPR
                 102 ************************************************
1243:A0 00       103 GETCAR  LDY  #0
1245:B1 D6       104         LDA  (EVLPTR),Y
1247:85 EC       105         STA  CARPTR+1
1249:85 6D       106         STA  RESPTR+1
124B:C8          107         INY
124C:B1 D6       108         LDA  (EVLPTR),Y
124E:85 EB       109         STA  CARPTR
1250:85 6C       110         STA  RESPTR
1252:60          111         RTS
                 112 ************************************************
1253:            113 * ROUTINES TO SAVE/RESTORE EVLPTR
                 114 ************************************************
1253:A6 D6       115 EVLPUSH LDX  EVLPTR
1255:A4 D7       116         LDY  EVLPTR+1
1257:4C B4 0E    117         JMP  PUSH
125A:20 1A 0F    118 EVLPOP  JSR  POP
125D:86 D6       119         STX  EVLPTR
125F:84 D7       120         STY  EVLPTR+1
1261:60          121         RTS
                 122 ************************************************
1262:            123 * ROUTINE TO SET ARGS FOR GET
                 124 ************************************************
1262:84 EE       125 GETPROP STY  ARGPTR+1
1264:85 ED       126         STA  ARGPTR
1266:B5 00       127         LDA  BASE0,X
1268:29 FC       128         AND  #$FC       ;CLEAR ATOM BIT
126A:85 CE       129         STA  WK1
126C:B5 01       130         LDA  BASE1,X
126E:85 CF       131         STA  WK1+1
1270:A0 02       132         LDY  #2         ;ERROR IF ATOM IS NUMERIC
1272:B1 CE       133         LDA  (WK1),Y
1274:F0 03       134         BEQ  GETERR
1276:4C 12 16    135         JMP  GETLP      ;GET THE PROPERTY
1279:A2 04       136 GETERR  LDX  #4         ;BAD ATOMIC ARG ERROR
127B:A0 10       137         LDY  #16
127D:4C EA 24    138         JMP  ERROR
                 139 ************************************************
1280:            140 * ROUTINES TO REPLACE EVLPTR W/CAR OR CDR
                 141 ************************************************
1280:A0 02       142 EVLCDR  LDY  #2
1282:B1 D6       143 EVLCD   LDA  (EVLPTR),Y
1284:48          144         PHA
1285:C8          145         INY
1286:B1 D6       146         LDA  (EVLPTR),Y
1288:85 D6       147         STA  EVLPTR
128A:68          148         PLA
128B:85 D7       149         STA  EVLPTR+1
128D:60          150         RTS
128E:A0 00       151 EVLCAR  LDY  #0
1290:F0 F0       152         BEQ  EVLCD
```

```
                 153 ************************************************
1292:            154 * ROUTINE TO EVALUATE AN ATOM
                 155 ************************************************
1292:A0 02       156 ATEVAL  LDY  #2          ;RETURN ATOM IF NUMERIC
1294:B1 EB       157         LDA  (CARPTR),Y
1296:D0 0C       158         BNE  ELIT
1298:A5 EB       159         LDA  CARPTR
129A:09 02       160         ORA  #2
129C:85 6C       161         STA  RESPTR
129E:A5 EC       162         LDA  CARPTR+1
12A0:85 6D       163         STA  RESPTR+1
12A2:18          164         CLC
12A3:60          165         RTS
12A4:A5 FC       166 ELIT    LDA  ENVPTR+1    ;ELSE SEARCH ENV. CHAIN
12A6:F0 38       167         BEQ  OBLSCH
12A8:85 CF       168         STA  WK1+1
12AA:A5 FB       169         LDA  ENVPTR
12AC:85 CE       170         STA  WK1
12AE:A0 00       171 ELOOP   LDY  #0
12B0:B1 CE       172         LDA  (WK1),Y
12B2:F0 26       173         BEQ  NXTENV
12B4:C5 EC       174         CMP  CARPTR+1    ;COMPARE ENTRY TO ATOM
12B6:D0 19       175         BNE  ASKIP
12B8:C8          176         INY
12B9:B1 CE       177         LDA  (WK1),Y
12BB:29 FC       178         AND  #$FC
12BD:C5 EB       179         CMP  CARPTR
12BF:D0 10       180         BNE  ASKIP       ;FOUND IT--RETURN VALUE
12C1:20 C0 0D    181         JSR  WK1CDR
12C4:A0 00       182         LDY  #0
12C6:B1 CE       183         LDA  (WK1),Y
12C8:85 6D       184         STA  RESPTR+1
12CA:C8          185         INY
12CB:B1 CE       186         LDA  (WK1),Y
12CD:85 6C       187         STA  RESPTR
12CF:18          188         CLC
12D0:60          189         RTS
12D1:20 C0 0D    190 ASKIP   JSR  WK1CDR      ;TRY NEXT ATOM
12D4:20 C0 0D    191 NXENV2  JSR  WK1CDR
12D7:4C AE 12    192         JMP  ELOOP
12DA:A0 02       193 NXTENV  LDY  #2          ;TRY NEXT ENV. IF ANY
12DC:B1 CE       194         LDA  (WK1),Y
12DE:D0 F4       195         BNE  NXENV2
12E0:A0 00       196 OBLSCH  LDY  #0          ;ELSE TRY OBLIST
12E2:18          197         CLC
12E3:B1 EB       198         LDA  (CARPTR),Y
12E5:85 6D       199         STA  RESPTR+1
12E7:C8          200         INY
12E8:B1 EB       201         LDA  (CARPTR),Y
12EA:85 6C       202         STA  RESPTR
12EC:05 6D       203         ORA  RESPTR+1    ;ERROR IF BOTH BYTES 0
12EE:48          204         PHA
12EF:A5 EB       205         LDA  CARPTR
12F1:85 CE       206         STA  WK1
12F3:A5 EC       207         LDA  CARPTR+1
12F5:85 CF       208         STA  WK1+1
12F7:68          209         PLA
12F8:D0 03       210         BNE  NOVALERR    ;DONT SET FLAG IF NO ERROR
```

```
12FA:A2 03      211 VALERR  LDX  #3          ;SET ERROR CODE--UNDEFINED ATOM
12FC:38         212         SEC               ;SET ERROR FLAG
12FD:60         213 NOVALERR RTS
12FE:           214         CHN  EVAL2.SRC
                  1 ************************************************
12FE:             2 * ROUTINE TO EVALUATE LIST OF ARGS
12FE:             3 * AND CREATE LIST OF THEIR VALUES
                  4 ************************************************
12FE:A9 00        5 EVLARGS LDA  #0          ;SET LIST TO NIL
1300:85 EE        6         STA  ARGPTR+1
1302:85 CF        7         STA  WK1+1
1304:85 5B        8         STA  CELPTR+1
1306:A9 72        9         LDA  #NIL+2
1308:85 ED       10         STA  ARGPTR
130A:85 CE       11         STA  WK1
130C:85 5A       12         STA  CELPTR
130E:20 53 12    13         JSR  EVLPUSH
1311:A5 D7       14 EVLARLP LDA  EVLPTR+1   ;CHECK IF FINISHED
1313:F0 46       15         BEQ  ARGRET
1315:A0 00       16         LDY  #0
1317:B1 D6       17         LDA  (EVLPTR),Y
1319:85 6D       18         STA  RESPTR+1
131B:C8          19         INY
131C:B1 D6       20         LDA  (EVLPTR),Y
131E:85 6C       21         STA  RESPTR
1320:20 53 12    22         JSR  EVLPUSH    ;ELSE SAVE EVERYTHING
1323:20 89 13    23         JSR  ARGPUSH
1326:20 ED 0E    24         JSR  CELPUSH
1329:20 8E 12    25         JSR  EVLCAR     ;GET CAR
132C:20 A6 0E    26         JSR  SETRET
132F:4C 62 11    27         JMP  EVAL       ;EVAL IT
1332:20 F4 0E    28         JSR  CELPOP     ;RESTORE REGISTERS
1335:20 90 13    29         JSR  ARGPOP
1338:20 5A 12    30         JSR  EVLPOP
133B:20 79 0C    31 EVLSKIP JSR  GETCEL     ;GET A CELL
133E:20 7B 0E    32         JSR  CARPUT     ;PUT RESULT IN CAR
1341:A5 EE       33         LDA  ARGPTR+1
1343:D0 0B       34         BNE  NOARSET    ;SET ARGPTR IF NECESSARY
1345:A5 5A       35         LDA  CELPTR
1347:85 ED       36         STA  ARGPTR
1349:A5 5B       37         LDA  CELPTR+1
134B:85 EE       38         STA  ARGPTR+1
134D:4C 55 13    39         JMP  NOSET2
1350:A0 02       40 NOARSET LDY  #2
1352:20 C1 0C    41         JSR  LINK       ;LINK TO PREVIOUS CELL
1355:20 80 12    42 NOSET2  JSR  EVLCDR
1358:4C 11 13    43         JMP  EVLARLP    ;LOOP UNTIL FINISHED
135B:20 89 13    44 ARGRET  JSR  ARGPUSH    ;SET LENGTH OF ARGLIST
135E:A9 00       45         LDA  #0
1360:85 56       46         STA  ARCT
1362:A5 EE       47 COUNTARG LDA ARGPTR+1
1364:F0 08       48         BEQ  ARGRET2
1366:20 85 13    49         JSR  ARGCDR
1369:E6 56       50         INC  ARCT
136B:4C 62 13    51         JMP  COUNTARG
136E:20 90 13    52 ARGRET2 JSR  ARGPOP     ;RETURN
1371:20 98 13    53         JSR  OLDEVLPOP
1374:4C DF 0E    54         JMP  RET
```

```
                 ***************************************************
1377:            * ROUTINES TO REPLACE ARGPTR W/CAR OR CDR
                 ***************************************************
1377:A0 00       ARGCAR  LDY  #0
1379:B1 ED       ARGCD   LDA  (ARGPTR),Y
137B:48                  PHA
137C:C8                  INY
137D:B1 ED               LDA  (ARGPTR),Y
137F:85 ED               STA  ARGPTR
1381:68                  PLA
1382:85 EE               STA  ARGPTR+1
1384:60                  RTS
1385:A0 02       ARGCDR  LDY  #2
1387:D0 F0               BNE  ARGCD
                 ***************************************************
1389:            * ROUTINES TO SAVE/RESTORE ARGPTR
                 ***************************************************
1389:A6 ED       ARGPUSH LDX  ARGPTR
138B:A4 EE               LDY  ARGPTR+1
138D:4C B4 0E            JMP  PUSH
1390:20 1A 0F    ARGPOP  JSR  POP
1393:86 ED               STX  ARGPTR
1395:84 EE               STY  ARGPTR+1
1397:60                  RTS
                 ***************************************************
1398:            * ROUTINE TO SAVE EVLPTR IN CASE OF ERROR
                 ***************************************************
1398:20 5A 12    OLDEVLPOP JSR EVLPOP
139B:A5 D6       EVLSAVE LDA  EVLPTR
139D:8D E8 24            STA  OLDEVLPTR
13A0:A5 D7               LDA  EVLPTR+1
13A2:8D E9 24            STA  OLDEVLPTR+1
13A5:60                  RTS
                 ***************************************************
13A6:            * ROUTINE TO PULL AN ARG AND NOT EVAL IT
13A6:            * CARRY SET IF NO ARG RETURNED
                 ***************************************************
13A6:20 9B 13    GETM    JSR  EVLSAVE
13A9:A5 D7               LDA  EVLPTR+1
13AB:F0 0F               BEQ  NOARG
13AD:A0 00               LDY  #0
13AF:B1 D6               LDA  (EVLPTR),Y
13B1:85 EE               STA  ARGPTR+1
13B3:C8                  INY
13B4:B1 D6               LDA  (EVLPTR),Y
13B6:85 ED               STA  ARGPTR
13B8:18                  CLC
13B9:4C 80 12            JMP  EVLCDR     ;REPLACE EVLPTR W/CDR
13BC:38          NOARG   SEC              ;CS IF NO ARG
13BD:60                  RTS
                 ***************************************************
13BE:            * ROUTINE TO GET A SINGLE ARG--
13BE:            * RETURN CS AND ERROR CODE IN X IF ERROR OCCURS
                 ***************************************************
13BE:20 9B 13    GET1    JSR  EVLSAVE
13C1:A5 D7               LDA  EVLPTR+1
13C3:F0 21               BEQ  GET1FEW
13C5:20 53 12            JSR  EVLPUSH
```

```
13C8:20 8E 12  113          JSR  EVLCAR     ;GET CAR
13CB:20 A6 0E  114          JSR  SETRET
13CE:4C 62 11  115          JMP  EVAL       ;EVAL THE ARG
13D1:20 5A 12  116          JSR  EVLPOP
13D4:A0 02     117          LDY  #2         ;CHECK FOR MORE
13D6:B1 D6     118          LDA  (EVLPTR),Y
13D8:D0 12     119          BNE  GET1MANY
13DA:A5 6C     120          LDA  RESPTR
13DC:85 ED     121          STA  ARGPTR
13DE:A5 6D     122          LDA  RESPTR+1
13E0:85 EE     123          STA  ARGPTR+1
13E2:18        124          CLC
13E3:4C DF 0E  125          JMP  RET        ;RETURN
13E6:A2 06     126 GET1FEW  LDX  #6         ;TOO FEW ARGS CODE
13E8:38        127          SEC
13E9:4C DF 0E  128          JMP  RET
13EC:A2 05     129 GET1MANY LDX #5          ;TOO MANY ARGS CODE
13EE:38        130          SEC
13EF:4C DF 0E  131          JMP  RET
               132 ***************************************************
13F2:          133 * ROUTINE TO GET AN ARG & EVAL IT
13F2:          134 * RETURNS CS IF NO ARG
               135 ***************************************************
13F2:A5 D7     136 GETARG   LDA  EVLPTR+1
13F4:F0 21     137          BEQ  NOARG2
13F6:20 53 12  138          JSR  EVLPUSH
13F9:20 8E 12  139          JSR  EVLCAR     ;GET CAR
13FC:20 A6 0E  140          JSR  SETRET
13FF:4C 62 11  141          JMP  EVAL       ;EVAL THE ARG
1402:20 5A 12  142          JSR  EVLPOP
1405:20 9B 13  143          JSR  EVLSAVE
1408:20 80 12  144          JSR  EVLCDR     ;REPLACE EVLPTR W/CDR
140B:A5 6C     145          LDA  RESPTR
140D:85 ED     146          STA  ARGPTR
140F:A5 6D     147          LDA  RESPTR+1
1411:85 EE     148          STA  ARGPTR+1
1413:18        149          CLC
1414:4C DF 0E  150          JMP  RET        ;RETURN
1417:38        151 NOARG2   SEC              ;CS IF NO ARG
1418:4C DF 0E  152          JMP  RET
               153 ***************************************************
141B:          154 * ROUTINE TO CHECK FOR LITERAL ATOM
141B:          155 * CS AND X SET IF NOT LITERAL
               156 ***************************************************
141B:A5 ED     157 LITCHK   LDA  ARGPTR     ;CHECK FOR ATOM
141D:24 69     158          BIT  ATMTST
141F:F0 0C     159          BEQ  NOTLIT
1421:29 FC     160          AND  #$FC       ;CLEAR ATOM BIT
1423:85 ED     161          STA  ARGPTR
1425:A0 02     162          LDY  #2
1427:B1 ED     163          LDA  (ARGPTR),Y
1429:F0 02     164          BEQ  NOTLIT
142B:18        165          CLC
142C:60        166          RTS
142D:A2 04     167 NOTLIT   LDX  #4
142F:38        168          SEC
1430:60        169          RTS
1431:          170 *
```

```
                  171 ************************************************
1431:             172 * LISP SUBRS
                  173 ************************************************
1431:             174 *
1431:             175 *
                  176 ************************************************
1431:             177 * QUOTE
                  178 ************************************************
1431:20 A6 13     179 QUOTE1  JSR  GETM       ;GET ARG
1434:A0 00        180         LDY  #0
1436:90 03        181         BCC  QOK
1438:4C 4A 14     182         JMP  TOOFEW     ;TOO FEW ARGS
143B:A5 D7        183 QOK     LDA  EVLPTR+1   ;MAKE SURE NO MORE THAN ONE
143D:D0 10        184         BNE  TOOMANY
143F:A5 ED        185 RETARG  LDA  ARGPTR     ;RETURN ARGPTR
1441:85 6C        186         STA  RESPTR
1443:A5 EE        187         LDA  ARGPTR+1
1445:85 6D        188         STA  RESPTR+1
1447:4C F0 11     189         JMP  EVALRET
144A:A2 06        190 TOOFEW  LDX  #6         ;TOO FEW ARGS ERROR
144C:4C EA 24     191         JMP  ERROR
144F:A2 05        192 TOOMANY LDX  #5         ;TOO MANY ARGS ERROR
1451:4C EA 24     193         JMP  ERROR
                  194 ************************************************
1454:             195 * CAR
                  196 ************************************************
1454:20 A6 0E     197 CAR     JSR  SETRET     ;GET ARG
1457:4C BE 13     198         JMP  GET1
145A:B0 1A        199         BCS  CARERR
145C:A5 EE        200         LDA  ARGPTR+1
145E:F0 11        201         BEQ  CARRETT
1460:A5 ED        202         LDA  ARGPTR     ;IF ARG A LIST, RETURN CAR
1462:24 69        203         BIT  ATMTST
1464:D0 0E        204         BNE  CARER2
1466:A0 00        205         LDY  #0
1468:B1 ED        206 CARCDR  LDA  (ARGPTR),Y
146A:85 6D        207         STA  RESPTR+1
146C:C8           208         INY
146D:B1 ED        209         LDA  (ARGPTR),Y
146F:85 6C        210         STA  RESPTR
1471:4C F0 11     211 CARRETT JMP  EVALRET
1474:A2 08        212 CARER2  LDX  #8
1476:A0 01        213 CARERR  LDY  #1
1478:4C EA 24     214         JMP  ERROR
                  215 ************************************************
147B:             216 * CDR
                  217 ************************************************
147B:20 A6 0E     218 CDR     JSR  SETRET     ;GET 1 ARG
147E:4C BE 13     219         JMP  GET1
1481:B0 18        220         BCS  CDRERR
1483:A5 ED        221         LDA  ARGPTR     ;CHECK FOR LIST
1485:24 69        222         BIT  ATMTST
1487:D0 04        223         BNE  CDRAT
1489:A0 02        224         LDY  #2
148B:D0 DB        225         BNE  CARCDR     ;RETURN CDR IF LIST
148D:20 1B 14     226 CDRAT   JSR  LITCHK     ;ELSE CHECK FOR LITERAL ATOM
1490:B0 09        227         BCS  CDRERR
1492:20 85 13     228         JSR  ARGCDR     ;RETURN PLIST
```

```
  75:20 85 13  229          JSR  ARGCDR
1 98:4C 3F 14  230          JMP  RETARG
149B:A0 02     231 CDRERR   LDY  #2
149D:4C EA 24  232          JMP  ERROR
               233 ***********************************************
14A0:          234 * CONS
               235 ***********************************************
14A0:20 A6 0E  236 CONS     JSR  SETRET
14A3:4C FE 12  237          JMP  EVLARGS    ;EVAL THE ARGS
14A6:A5 56     238          LDA  ARCT
14A8:A0 03     239          LDY  #3
14AA:C9 02     240          CMP  #2         ;CHECK FOR 2 ARGUMENTS
14AC:F0 04     241          BEQ  CONSOK
14AE:90 1F     242          BCC  CONSFEW
14B0:B0 20     243          BCS  CONSMANY
14B2:A5 ED     244 CONSOK   LDA  ARGPTR     ;PUT ARGPTR IN RESPTR
14B4:85 6C     245          STA  RESPTR
14B6:A5 EE     246          LDA  ARGPTR+1
14B8:85 6D     247          STA  RESPTR+1
14BA:20 85 13  248          JSR  ARGCDR
14BD:A0 00     249          LDY  #0         ;PUT NEXT ARG IN CDR
14BF:B1 ED     250          LDA  (ARGPTR),Y
14C1:C8        251          INY
14C2:C8        252          INY
14C3:91 6C     253          STA  (RESPTR),Y
14C5:88        254          DEY
  C6:B1 ED     255          LDA  (ARGPTR),Y
14C8:C8        256          INY
14C9:C8        257          INY
14CA:91 6C     258          STA  (RESPTR),Y
14CC:4C F0 11  259          JMP  EVALRET    ;FINISHED
14CF:4C 4A 14  260 CONSFEW  JMP  TOOFEW
14D2:4C 4F 14  261 CONSMANY JMP  TOOMANY
14D5:          262          CHN  EVAL3.SRC
                 1 ***********************************************
14D5:            2 * ATOM
                 3 ***********************************************
14D5:20 A6 0E    4 ATOM     JSR  SETRET
14D8:4C BE 13    5          JMP  GET1       ;GET ARG
14DB:B0 11       6          BCS  ATOMERR
14DD:A5 ED       7          LDA  ARGPTR
14DF:24 69       8          BIT  ATMTST     ;TEST FOR ATOM
14E1:D0 06       9          BNE  TRETURN    ;RETURN T IF ATOMIC
14E3:20 9D 0E   10 NILRETURN JSR NILRET    ;ELSE RETURN NIL
14E6:4C F0 11   11 ATOMRT   JMP  EVALRET
14E9:20 F3 14   12 TRETURN  JSR  TRET
14EC:D0 F8      13          BNE  ATOMRT
14EE:A0 04      14 ATOMERR  LDY  #4
14F0:4C EA 24   15          JMP  ERROR
14F3:A9 16      16 TRET     LDA  #T+2
14F5:85 6C      17          STA  RESPTR
 F7:A9 31       18          LDA  #<T
 F9:85 6D       19          STA  RESPTR+1
 4FB:60         20          RTS
                21 ***********************************************
 FC:            22 * NUMBER
                23 ***********************************************
  C:20 A6 0E    24 NUMBER   JSR  SETRET
```

```
1FF:4C BE 13   25          JMP  GET1       ;GET ARG
1502:B0 07     26          BCS  NUMBERERR
1504:20 10 15  27          JSR  NUMCHK     ;CHECK FOR NUMERIC ARG
1507:B0 DA     28          BCS  NILRETURN ;RETURN NIL IF NOT
1509:90 DE     29          BCC  TRETURN    ;ELSE RETURN T
150B:A0 05     30 NUMBERERR LDY #5
150D:4C EA 24  31          JMP  ERROR
               32 ***********************************************
1510:          33 * ROUTINE TO TEST FOR NUMERIC ARG
               34 ***********************************************
1510:A5 ED     35 NUMCHK  LDA  ARGPTR     ;FIRST CHECK FOR ATOM
1512:24 69     36          BIT  ATMTST
1514:F0 11     37          BEQ  NOTNUMB
1516:29 FC     38          AND  #$FC
1518:85 ED     39          STA  ARGPTR
151A:A0 02     40          LDY  #2
151C:B1 ED     41          LDA  (ARGPTR),Y ;NOW CHECK FOR NUMERIC
151E:D0 07     42          BNE  NOTNUMB
1520:C8        43          INY
1521:B1 ED     44          LDA  (ARGPTR),Y
1523:F0 02     45          BEQ  NOTNUMB
1525:18        46          CLC              ;RETURN CC IF NUMERIC
1526:60        47          RTS
1527:A2 07     48 NOTNUMB LDX  #7
1529:38        49          SEC
152A:60        50          RTS
               51 ***********************************************
152B:          52 * LIST
               53 ***********************************************
152B:20 A6 0E  54 LIST    JSR  SETRET
152E:4C FE 12  55          JMP  EVLARGS    ;GET LIST OF ARGS
1531:4C 3F 14  56          JMP  RETARG     ;ELSE RETURN LIST
               57 ***********************************************
1534:          58 * NULL
               59 ***********************************************
1534:20 A6 0E  60 NULL    JSR  SETRET
1537:4C BE 13  61          JMP  GET1       ;GET ARG
153A:B0 0A     62          BCS  NULLERR
153C:A5 EE     63 NULL2   LDA  ARGPTR+1   ;RETURN T IF NIL
153E:F0 03     64          BEQ  NULLT
1540:4C E3 14  65          JMP  NILRETURN
1543:4C E9 14  66 NULLT   JMP  TRETURN
1546:A0 07     67 NULLERR LDY  #7
1548:4C EA 24  68          JMP  ERROR
               69 ***********************************************
154B:          70 * NOT -- SAME AS NULL
               71 ***********************************************
154B:20 A6 0E  72 NOT     JSR  SETRET
154E:4C BE 13  73          JMP  GET1
1551:90 E9     74          BCC  NULL2
1553:A0 08     75          LDY  #8
1555:4C EA 24  76          JMP  ERROR
               77 ***********************************************
1558:          78 * SETQ
               79 ***********************************************
1558:20 A6 13  80 SETQ    JSR  GETM       ;GET ARG, DONT EVAL IT
155B:B0 0E     81          BCS  SETQERR
155D:20 A6 0E  82 SQLP    JSR  SETRET
```

```
1560:4C 72 15   83          JMP  SETSUB     ;SET TO NEXT ARGS VALUE
1563:20 A6 13   84          JSR  GETM       ;REPEAT UNTIL FINISHED
1566:90 F5      85          BCC  SQLP
1568:4C F0 11   86          JMP  EVALRET
156B:A2 06      87 SETQERR  LDX  #6         ;TOO FEW ARGS ERROR
156D:A0 09      88 SERRR    LDY  #9
156F:4C EA 24   89          JMP  ERROR
1572:20 1B 14   90 SETSUB   JSR  LITCHK     ;CHECK FOR LITERAL ATOM
1575:B0 F6      91          BCS  SERRR
1577:A5 EE      92          LDA  ARGPTR+1
1579:D0 04      93          BNE  SATOK
157B:A2 04      94          LDX  #4
157D:D0 EE      95          BNE  SERRR      ;ARG CANT BE NIL
157F:85 EC      96 SATOK    STA  CARPTR+1
1581:A5 ED      97          LDA  ARGPTR
1583:85 EB      98          STA  CARPTR
1585:20 92 12   99          JSR  ATEVAL
1588:20 0B 0F  100          JSR  WK1PUSH    ;SAVE ATOM CELL
158B:20 A6 0E  101          JSR  SETRET
158E:4C F2 13  102          JMP  GETARG     ;EVAL THE VALUE
1591:B0 D8     103          BCS  SETQERR
1593:20 12 0F  104          JSR  WK1POP
1596:A0 00     105          LDY  #0         ;PUT VALUE IN CAR OF ATOM CELL
1598:A5 EE     106          LDA  ARGPTR+1
159A:91 CE     107          STA  (WK1),Y
159C:C8        108          INY
159D:A5 ED     109          LDA  ARGPTR
159F:91 CE     110          STA  (WK1),Y
15A1:4C DF 0E  111          JMP  RET
               112 ***************************************************
15A4:          113 * SET -- SAME AS SETQ, BUT EVAL FIRST ARG
               114 ***************************************************
15A4:20 A6 0E  115 SET      JSR  SETRET
15A7:4C F2 13  116          JMP  GETARG     ;EVAL FIRST ARG
15AA:B0 11     117          BCS  SETERR
15AC:20 A6 0E  118 SETLP    JSR  SETRET
15AF:4C 72 15  119          JMP  SETSUB
15B2:20 A6 0E  120          JSR  SETRET
15B5:4C F2 13  121          JMP  GETARG
15B8:90 F2     122          BCC  SETLP
15BA:4C F0 11  123          JMP  EVALRET
15BD:A2 06     124 SETERR   LDX  #6         ;TOO FEW ARGS ERROR
15BF:A0 0A     125          LDY  #10
15C1:4C EA 24  126          JMP  ERROR
               127 ***************************************************
15C4:          128 * OBLIST
               129 ***************************************************
15C4:A5 7B     130 OBLIST   LDA  OBLSTPTR
15C6:85 6C     131          STA  RESPTR
15C8:A5 7C     132          LDA  OBLSTPTR+1
15CA:85 6D     133          STA  RESPTR+1
15CC:4C F0 11  134          JMP  EVALRET
               135 ***************************************************
15CF:          136 * AND
               137 ***************************************************
15CF:20 9D 0E  138 AND      JSR  NILRET
15D2:20 A6 0E  139 ANDLP    JSR  SETRET     ;EVAL AN ARG
15D5:4C F2 13  140          JMP  GETARG
```

```
15D8:B0 06      141          BCS  ORT
15DA:A5 EE      142          LDA  ARGPTR+1
15DC:F0 02      143          BEQ  ORT        ;RETURN IF NIL
15DE:D0 F2      144          BNE  ANDLP      ;ELSE REPEAT
15E0:4C F0 11   145 ORT      JMP  EVALRET    ;RETURN LAST VALUE
                146 ************************************************
15E3:           147 * OR
                148 ************************************************
15E3:20 9D 0E   149 OR       JSR  NILRET
15E6:20 A6 0E   150 ORLP     JSR  SETRET     ;EVAL AN ARG
15E9:4C F2 13   151          JMP  GETARG
15EC:B0 F2      152          BCS  ORT
15EE:A5 EE      153          LDA  ARGPTR+1   ;RETURN IF NOT NIL
15F0:D0 EE      154          BNE  ORT
15F2:F0 F2      155          BEQ  ORLP       ;ELSE REPEAT
15F4:           156          CHN  EVAL4.SRC
                  1 ************************************************
15F4:             2 * GET
                  3 ************************************************
15F4:20 A6 0E     4 GET      JSR  SETRET
15F7:4C FE 12     5          JMP  EVLARGS    ;EVAL ARG LIST
15FA:A5 56        6          LDA  ARCT       ;CHECK FOR 2 ARGS
15FC:A0 0D        7          LDY  #13
15FE:C9 02        8          CMP  #2
1600:F0 04        9          BEQ  GETOK
1602:90 08       10          BCC  GETFEW
1604:B0 09       11          BCS  GETMANY
1606:20 54 16    12 GETOK    JSR  PSUB       ;GET THE ARGS & SCAN PLIST
1609:4C F0 11    13          JMP  EVALRET    ;RETURN RESULT
160C:4C 4A 14    14 GETFEW   JMP  TOOFEW     ;TOO FEW ERROR
160F:4C 4F 14    15 GETMANY  JMP  TOOMANY    ;TOO MANY ERROR
                 16 ************************************************
1612:            17 * PLIST SCANNER ROUTINE
                 18 ************************************************
1612:20 C0 0D    19 GETLP    JSR  WK1CDR
1615:20 0B 0F    20          JSR  WK1PUSH    ;SAVE LAST CELL
1618:20 C0 0D    21          JSR  WK1CDR
161B:A5 CF       22          LDA  WK1+1      ;CHECK IF END REACHED
161D:F0 2D       23          BEQ  GETNIL
161F:A0 00       24          LDY  #0
1621:B1 CE       25          LDA  (WK1),Y
1623:C5 EE       26          CMP  ARGPTR+1   ;COMPARE PROPERTIES
1625:D0 1C       27          BNE  GETLP2
1627:C8          28          INY
1628:B1 CE       29          LDA  (WK1),Y
162A:29 FC       30          AND  #$FC
162C:C5 ED       31          CMP  ARGPTR
162E:D0 13       32          BNE  GETLP2
1630:20 C0 0D    33          JSR  WK1CDR     ;EQUAL--RETURN VALUE
1633:A0 00       34          LDY  #0
1635:B1 CE       35          LDA  (WK1),Y
1637:85 6D       36          STA  RESPTR+1
1639:C8          37          INY
163A:B1 CE       38          LDA  (WK1),Y
163C:85 6C       39          STA  RESPTR
163E:20 F4 0E    40          JSR  CELPOP     ;RESTORE LAST CELL
1641:18          41          CLC
1642:60          42          RTS
```

```
1643:20 12 0F   GETLP2  JSR  WK1POP
1646:20 C0 0D           JSR  WK1CDR
1649:4C 12 16           JMP  GETLP
164C:20 12 0F   GETNIL  JSR  WK1POP     ;RETURN CS IF PROP. NOT THERE
164F:20 9D 0E           JSR  NILRET
1652:38                 SEC
1653:60                 RTS
                ***************************************************
1654:           * ROUTINE TO GET PLIST ARGS AND CHECK VALIDITY
                ***************************************************
1654:98         PSUB    TYA              ;SAVE FCN #
1655:48                 PHA
1656:20 7D 16           JSR  PSUBA
1659:B0 1B              BCS  PERRR
165B:20 90 13           JSR  ARGPOP
165E:20 85 13           JSR  ARGCDR     ;GET NEXT ARG
1661:20 89 13           JSR  ARGPUSH
1664:20 77 13           JSR  ARGCAR
1667:20 1B 14           JSR  LITCHK     ;CHECK FOR LITERAL
166A:B0 0A              BCS  PERRR
166C:20 12 16           JSR  GETLP      ;SCAN PLIST
166F:08                 PHP
1670:20 90 13           JSR  ARGPOP
1673:28                 PLP
1674:68                 PLA
1675:60                 RTS
1676:68         PERRR   PLA
1677:A8                 TAY
1678:A2 04              LDX  #4         ;BAD ATOMIC ARG ERROR
167A:4C EA 24           JMP  ERROR
                ***************************************************
167D:           * PLIST SUBROUTINE
                ***************************************************
167D:20 89 13   PSUBA   JSR  ARGPUSH
1680:20 77 13           JSR  ARGCAR     ;GET 1ST ARG
1683:20 1B 14           JSR  LITCHK     ;CHECK FOR LITERAL
1686:4C 34 21           JMP  ARGTOWK1
                ***************************************************
1689:           * PUT
                ***************************************************
1689:20 A6 0E   PUT     JSR  SETRET
168C:4C FE 12           JMP  EVLARGS    ;EVAL ARGS
168F:A5 56              LDA  ARCT       ;CHECK FOR 2 OR 3 ARGS
1691:A0 0E              LDY  #14
1693:C9 03              CMP  #3
1695:F0 04              BEQ  PUTOK
1697:90 3C              BCC  PUTFEW
1699:B0 3D              BCS  PUTMANY
169B:20 54 16   PUTOK   JSR  PSUB       ;CALL PSUB TO GET PROP. CELLS
169E:B0 21              BCS  ADDPROP    ;ADD PROP IF NOT THERE
16A0:20 A6 0E           JSR  SETRET
16A3:4C A9 16           JMP  PUTPROP
16A6:4C F0 11           JMP  EVALRET
16A9:20 85 13   PUTPROP JSR  ARGCDR
16AC:20 77 13           JSR  ARGCAR
16AF:A5 EE              LDA  ARGPTR+1
16B1:85 6D              STA  RESPTR+1   ;PUT PVAL IN CELL
16B3:A0 00              LDY  #0
```

```
16B5:91 CE      101          STA  (WK1),Y
16B7:C8         102          INY
16B8:A5 ED      103          LDA  ARGPTR
16BA:91 CE      104          STA  (WK1),Y
16BC:85 6C      105          STA  RESPTR
16BE:4C DF 0E   106          JMP  RET
16C1:A0 02      107 ADDPROP  LDY  #2          ;ADD PROP & VAL TO END OF LIST
16C3:A5 EE      108          LDA  ARGPTR+1
16C5:91 CE      109          STA  (WK1),Y
16C7:C8         110          INY
16C8:A5 ED      111          LDA  ARGPTR
16CA:91 CE      112          STA  (WK1),Y
16CC:20 85 13   113          JSR  ARGCDR      ;RETURN PVAL
16CF:20 77 13   114          JSR  ARGCAR
16D2:4C 3F 14   115          JMP  RETARG
16D5:4C 4A 14   116 PUTFEW   JMP  TOOFEW
16D8:4C 4F 14   117 PUTMANY  JMP  TOOMANY
                118 ************************************************
16DB:           119 * REM
                120 ************************************************
16DB:20 A6 0E   121 REM      JSR  SETRET
16DE:4C FE 12   122          JMP  EVLARGS     ;EVAL ARGS
16E1:A0 0F      123          LDY  #15
16E3:A5 56      124          LDA  ARCT        ;CHECK FOR 2 ARGS
16E5:C9 02      125          CMP  #2
16E7:F0 04      126          BEQ  REMOK
16E9:90 15      127          BCC  REMFEW
16EB:B0 16      128          BCS  REMMANY
16ED:20 54 16   129 REMOK    JSR  PSUB
16F0:B0 0B      130          BCS  REMRET      ;RETURN IF PROP NOT THERE
16F2:A0 02      131          LDY  #2
16F4:B1 CE      132          LDA  (WK1),Y     ;ELSE REMOVE PROP & VALUE
16F6:91 5A      133          STA  (CELPTR),Y
16F8:C8         134          INY
16F9:B1 CE      135          LDA  (WK1),Y
16FB:91 5A      136          STA  (CELPTR),Y
16FD:4C E3 14   137 REMRET   JMP  NILRETURN
1700:4C 4A 14   138 REMFEW   JMP  TOOFEW
1703:4C 4F 14   139 REMMANY  JMP  TOOMANY
1706:           140          CHN  EVAL5.SRC
                  1 ************************************************
1706:             2 * EVAL
                  3 ************************************************
1706:A5 ED        4 ARGTOEVL LDA ARGPTR
1708:85 D6        5          STA  EVLPTR
170A:A5 EE        6          LDA  ARGPTR+1
170C:85 D7        7          STA  EVLPTR+1
170E:60           8          RTS
170F:20 A6 0E     9 EVAL1    JSR  SETRET      ;EVAL THE ARG
1712:4C BE 13    10          JMP  GET1
1715:B0 12       11          BCS  EVALERR1
1717:20 53 12    12          JSR  EVLPUSH
171A:20 06 17    13          JSR  ARGTOEVL
171D:20 A6 0E    14 EVAL2A   JSR  SETRET
1720:4C 62 11    15          JMP  EVAL        ;EVAL THE VALUE
1723:20 5A 12    16          JSR  EVLPOP      ;RESTORE EVLPTR
1726:4C F0 11    17          JMP  EVALRET
1729:A0 10       18 EVALERR1 LDY #16           ;ARGUMENT ERROR
```

```
172B:4C EA 24          JMP  ERROR
                 ***************************************************
172E:            * DEFINE
                 ***************************************************
172E:20 A6 13    DEFINE JSR  GETM       ;GET FCN DEF
1731:B0 61             BCS  DEFERR
1733:A5 ED             LDA  ARGPTR
1735:24 69             BIT  ATMTST     ;ERROR IF NOT A LIST
1737:D0 62             BNE  DEFERR2
1739:A0 02             LDY  #2
173B:B1 ED             LDA  (ARGPTR),Y
173D:F0 5C             BEQ  DEFERR2
173F:20 89 13          JSR  ARGPUSH
1742:20 7D 16          JSR  PSUBA      ;FCN NAME MUST BE LITERAL
1745:A9 31             LDA  #(EXPRATM
1747:85 EE             STA  ARGPTR+1
1749:A9 44             LDA  #EXPRATM
174B:85 ED             STA  ARGPTR
174D:20 12 16          JSR  GETLP      ;SCAN PLIST FOR EXPR PROP.
1750:B0 0C             BCS  ADDDEF
1752:20 90 13          JSR  ARGPOP     ;FOUND IT--REPLACE DEF
1755:20 A6 0E          JSR  SETRET
1758:4C A9 16          JMP  PUTPROP
175B:4C 8B 17          JMP  RETDEF
175E:20 90 13    ADDDEF JSR  ARGPOP     ;DIDNT FIND IT--ADD NEW CELL
1761:20 B8 0C          JSR  WK1MOV
1764:20 C8 0B          JSR  CDRLINK
1767:A0 00             LDY  #0
1769:A9 31             LDA  #(EXPRATM ;PUT EXPR IN CAR
176B:91 5A             STA  (CELPTR),Y
176D:C8                INY
176E:A9 46             LDA  #EXPRATM+2
1770:91 5A             STA  (CELPTR),Y
1772:A0 02             LDY  #2         ;ATTACH FUNCTION DEF.
1774:B1 ED             LDA  (ARGPTR),Y
1776:91 5A             STA  (CELPTR),Y
1778:C8                INY
1779:B1 ED             LDA  (ARGPTR),Y
177B:91 5A             STA  (CELPTR),Y
177D:20 85 13          JSR  ARGCDR     ;CLEAR CDR OF CELL
1780:A0 02             LDY  #2
1782:A9 00             LDA  #0
1784:91 ED             STA  (ARGPTR),Y
1786:C8                INY
1787:A9 72             LDA  #NIL+2
1789:91 ED             STA  (ARGPTR),Y
178B:20 90 13    RETDEF JSR  ARGPOP     ;RETURN FCN NAME
178E:20 77 13          JSR  ARGCAR
1791:4C 3F 14          JMP  RETARG
1794:A2 06       DEFERR LDX  #6         ;TOO FEW ARGS ERROR
1796:A0 12       DEFERR3 LDY #18
1798:4C EA 24          JMP  ERROR
179B:A2 08       DEFERR2 LDX #8         ;BAD LIST ARG ERROR
179D:D0 F7             BNE  DEFERR3
                 ***************************************************
179F:            * COND
                 ***************************************************
179F:20 A6 13    COND   JSR  GETM       ;GET FIRST COND PAIR
```

```
17A2:B0 3C          BCS  CONDERR
17A4:A5 ED  CONDLP  LDA  ARGPTR     ;ERROR IF ATOMIC
17A6:24 69          BIT  ATMTST
17A8:D0 3D          BNE  CONDERR2
17AA:20 53 12       JSR  EVLPUSH
17AD:20 89 13       JSR  ARGPUSH
17B0:20 77 13       JSR  ARGCAR     ;GET CAR
17B3:20 06 17       JSR  ARGTOEVL
17B6:20 A6 0E       JSR  SETRET
17B9:4C 62 11       JMP  EVAL       ;EVAL IT
17BC:20 90 13       JSR  ARGPOP
17BF:A5 6D          LDA  RESPTR+1   ;CHECK IF RESULT NIL
17C1:F0 12          BEQ  NXTCND     ;DO NEXT PAIR IF NIL
17C3:20 85 13       JSR  ARGCDR
17C6:20 06 17       JSR  ARGTOEVL
17C9:20 A6 0E       JSR  SETRET     ;ELSE EVAL REMAINING SEXPRS
17CC:4C FE 12       JMP  EVLARGS
17CF:20 5A 12       JSR  EVLPOP
17D2:4C F0 11       JMP  EVALRET    ;RETURN LAST VALUE
17D5:20 5A 12  NXTCND JSR  EVLPOP
17D8:20 A6 13       JSR  GETM       ;TRY NEXT PAIR
17DB:90 C7          BCC  CONDLP     ;RETURN NIL IF NONE LEFT
17DD:4C F0 11       JMP  EVALRET
17E0:A2 06     CONDERR LDX  #6      ;MISSING ARGS ERROR
17E2:A0 13     CONDERR3 LDY #19
17E4:4C EA 24       JMP  ERROR
17E7:A2 08     CONDERR2 LDX #8      ;BAD LIST ARG ERROR
17E9:D0 F7          BNE  CONDERR3
                ***********************************************
17EB:           * RPLACA & RPLACD
                ***********************************************
17EB:A9 14     RPLACA  LDA  #20
17ED:48             PHA              ;SAVE FCN # IN CASE OF ERROR
17EE:A9 00          LDA  #0
17F0:48        RPLAC1  PHA
17F1:20 A6 0E       JSR  SETRET
17F4:4C FE 12       JMP  EVLARGS    ;EVAL THE ARGS
17F7:A5 56          LDA  ARCT       ;CHECK FOR 2
17F9:C9 02          CMP  #2
17FB:90 28          BCC  RPLFEW
17FD:F0 02          BEQ  RPLOK
17FF:B0 2A          BCS  RPLMANY
1801:20 89 13  RPLOK JSR  ARGPUSH   ;CHECK FOR ATOM OR LIST
1804:20 77 13       JSR  ARGCAR
1807:A5 ED          LDA  ARGPTR
1809:24 69          BIT  ATMTST
180B:D0 24          BNE  RPLERR
180D:20 12 0F       JSR  WK1POP
1810:20 C0 0D       JSR  WK1CDR     ;GET THING TO REPLACE WITH
1813:20 CE 0D       JSR  WK1CAR
1816:68             PLA
1817:A8             TAY
1818:A5 CF          LDA  WK1+1
181A:91 ED          STA  (ARGPTR),Y
181C:C8             INY
181D:A5 CE          LDA  WK1
181F:91 ED          STA  (ARGPTR),Y
1821:68             PLA
```

```
1822:4C 3F 14   135          JMP  RETARG
1825:68         136 RPLFEW   PLA
1826:68         137          PLA
1827:A8         138          TAY
1828:4C 4A 14   139          JMP  TOOFEW
182B:68         140 RPLMANY  PLA
182C:68         141          PLA
182D:A8         142          TAY
182E:4C 4F 14   143          JMP  TOOMANY
1831:68         144 RPLERR   PLA
1832:68         145          PLA
1833:A8         146          TAY
1834:A2 08      147          LDX  #8         ;BAD LIST ARG
1836:4C EA 24   148          JMP  ERROR
1839:A9 15      149 RPLACD   LDA  #21
183B:48         150          PHA
183C:A9 02      151          LDA  #2
183E:D0 B0      152          BNE  RPLAC1
1840:           153          CHN  EVAL6.SRC
                  1 ************************************************
1840:             2 * LENGTH
                  3 ************************************************
1840:20 A6 0E     4 LENGTH  JSR  SETRET     ;GET THE ARG
1843:4C BE 13     5         JMP  GET1
1846:B0 23        6         BCS  LENERR
1848:20 D2 0D     7         JSR  INITREG    ;INIT REGISTERS
184B:A5 EE        8         LDA  ARGPTR+1   ;RESULT=0 IF NIL
184D:F0 13        9         BEQ  LENFIN
184F:A5 ED       10         LDA  ARGPTR     ;MAKE SURE ITS A LIST
1851:24 69       11         BIT  ATMTST
1853:D0 1B       12         BNE  LENERR2
1855:20 85 13    13 LENGLP  JSR  ARGCDR
1858:E6 50       14         INC  RES        ;COUNT LENGTH OF LIST
185A:D0 02       15         BNE  NXTLEN
185C:E6 51       16         INC  RES+1
185E:A5 EE       17 NXTLEN  LDA  ARGPTR+1   ;KEEP GOING TO END
1860:D0 F3       18         BNE  LENGLP
1862:20 5C 0B    19 LENFIN  JSR  NEWINT     ;GEN NEW NUMERIC ATOM
1865:20 8B 0E    20         JSR  ATMRES
1868:4C F0 11    21         JMP  EVALRET    ;AND RETURN
186B:A0 16       22 LENERR  LDY  #22        ;TOO FEW ARGS ERROR
186D:4C EA 24    23         JMP  ERROR
1870:A2 08       24 LENERR2 LDX  #8         ;BAD LIST ARG ERROR
1872:D0 F7       25         BNE  LENERR
                 26 ************************************************
1874:            27 * READ
                 28 ************************************************
1874:A9 BF       29 READ1   LDA  #'?        ;SET PROMPT
1876:85 33       30         STA  PROMPT
1878:20 FD 0D    31         JSR  READ       ;READ SOMETHING
187B:A0 00       32         LDY  #0
187D:84 FD       33         STY  FREEFLG
187F:4C F0 11    34         JMP  EVALRET
                 35 ************************************************
1882:            36 * READLINE
                 37 ************************************************
1882:20 9D 0E    38 READL   JSR  NILRET
1885:A9 BF       39         LDA  #'?
```

```
1887:85 33      40          STA  PROMPT
1889:20 FC 0E   41 RLLP1    JSR  RESPUSH    ;SAVE PTR TO RESULT
188C:20 ED 0E   42          JSR  CELPUSH
188F:20 FD 0D   43          JSR  READ       ;DO A READ
1892:20 F4 0E   44          JSR  CELPOP
1895:20 03 0F   45          JSR  RESPOP
1898:A5 6D      46          LDA  RESPTR+1
189A:D0 09      47          BNE  RL1
189C:20 79 0C   48          JSR  GETCEL
189F:20 94 0E   49          JSR  CELRES     ;SET PTR TO FIRST CELL
18A2:4C A8 18   50          JMP  RL2
18A5:20 C8 0B   51 RL1      JSR  CDRLINK
18A8:A0 00      52 RL2      LDY  #0
18AA:A5 6B      53          LDA  RDPTR+1
18AC:91 5A      54          STA  (CELPTR),Y
18AE:C8         55          INY
18AF:A5 6A      56          LDA  RDPTR
18B1:91 5A      57          STA  (CELPTR),Y
18B3:A5 5F      58          LDA  CHAR       ;CHECK IF FINISHED
18B5:C9 8D      59          CMP  #$8D
18B7:D0 D0      60          BNE  RLLP1
18B9:4C F0 11   61 RDLFIN   JMP  EVALRET    ;RETURN RESULT
                62 ************************************************
18BC:           63 * PRIN1
                64 ************************************************
18BC:20 A6 0E   65 PRIN1    JSR  SETRET     ;GET ARG
18BF:4C C5 18   66          JMP  PRIN1SUB
18C2:4C F0 11   67          JMP  EVALRET
18C5:20 9D 0E   68 PRIN1SUB JSR  NILRET     ;INIT RESULT
18C8:20 A6 0E   69          JSR  SETRET
18CB:4C BE 13   70          JMP  GET1
18CE:90 09      71          BCC  PRIN1OK
18D0:E0 06      72          CPX  #6         ;NO ARG MEANS A CR
18D2:F0 16      73          BEQ  PLINSKP
18D4:A0 41      74          LDY  #65
18D6:4C EA 24   75          JMP  ERROR      ;TOO MANY ARGS ERROR
18D9:20 34 21   76 PRIN1OK  JSR  ARGTOWK1
18DC:20 31 0F   77          JSR  PRINT      ;PRINT THE ARG
18DF:A5 ED      78          LDA  ARGPTR
18E1:85 6C      79          STA  RESPTR
18E3:A5 EE      80          LDA  ARGPTR+1
18E5:85 6D      81          STA  RESPTR+1
18E7:4C DF 0E   82          JMP  RET
18EA:20 F0 18   83 PLINSKP  JSR  LINSKP
18ED:4C DF 0E   84          JMP  RET
18F0:20 0A 0A   85 LINSKP   JSR  SCROLL     ;SCROLL
18F3:60         86 LINSFIN  RTS
                87 ************************************************
18F4:           88 * PRINT
                89 ************************************************
18F4:20 A6 0E   90 PRINT1   JSR  SETRET     ;DO A PRIN1
18F7:4C C5 18   91          JMP  PRIN1SUB
18FA:20 F0 18   92          JSR  LINSKP     ;AND A CR
18FD:4C F0 11   93          JMP  EVALRET
                94 ************************************************
1900:           95 * PROGN
                96 ************************************************
1900:20 9D 0E   97 PROGN    JSR  NILRET     ;INIT RESULT TO NIL
```

```
1903:20 A6 0E   98          JSR  SETRET
1906:4C 0C 19   99          JMP  PROGN2
1909:4C F0 11  100          JMP  EVALRET
190C:A5 D7     101 PROGN2   LDA  EVLPTR+1
190E:F0 15     102          BEQ  PROGNEND
1910:20 53 12  103          JSR  EVLPUSH
1913:20 8E 12  104          JSR  EVLCAR
1916:20 A6 0E  105          JSR  SETRET
1919:4C 62 11  106          JMP  EVAL       ;EVAL NEXT SEXPR
191C:20 5A 12  107          JSR  EVLPOP
191F:20 80 12  108          JSR  EVLCDR
1922:4C 0C 19  109          JMP  PROGN2
1925:4C DF 0E  110 PROGNEND JMP RET         ;RETURN LAST VALUE
               111 ************************************************
1928:          112 * COPY
               113 ************************************************
1928:20 A6 0E  114 COPY     JSR  SETRET
192B:4C BE 13  115          JMP  GET1       ;EVAL 1 ARG
192E:B0 47     116          BCS  COPYERR
1930:20 A6 0E  117          JSR  SETRET
1933:4C 39 19  118          JMP  COPY2
1936:4C F0 11  119          JMP  EVALRET
1939:A5 ED     120 COPY2    LDA  ARGPTR     ;RETURN ARG IF ATOMIC
193B:24 69     121          BIT  ATMTST
193D:D0 2D     122          BNE  COPYRET
193F:20 89 13  123          JSR  ARGPUSH    ;ELSE COPY THE CAR
1942:20 77 13  124          JSR  ARGCAR
1945:20 A6 0E  125          JSR  SETRET
1948:4C 39 19  126          JMP  COPY2
194B:20 90 13  127          JSR  ARGPOP
194E:20 79 0C  128          JSR  GETCEL     ;GET A FREE CELL
1951:20 7B 0E  129          JSR  CARPUT     ;PUT RESULT IN CAR
1954:20 85 13  130          JSR  ARGCDR
1957:20 ED 0E  131          JSR  CELPUSH
195A:20 A6 0E  132          JSR  SETRET     ;NOW COPY CDR
195D:4C 39 19  133          JMP  COPY2
1960:20 F4 0E  134          JSR  CELPOP
1963:20 87 0E  135          JSR  CDRPUT     ;AND PUT RESULT IN CDR
1966:20 94 0E  136          JSR  CELRES     ;SET RESULT PTR
1969:4C DF 0E  137          JMP  RET
196C:A5 ED     138 COPYRET  LDA  ARGPTR     ;RETURN ARGPTR
196E:85 6C     139          STA  RESPTR
1970:A5 EE     140          LDA  ARGPTR+1
1972:85 6D     141          STA  RESPTR+1
1974:4C DF 0E  142          JMP  RET
1977:A0 17     143 COPYERR  LDY  #23
1979:4C EA 24  144          JMP  ERROR
               145 ************************************************
197C:          146 * APPEND
               147 ************************************************
197C:20 A6 0E  148 APPEND   JSR  SETRET     ;GET ARGS, COPY FIRST
197F:4C A5 19  149          JMP  APPINIT
1982:B0 1C     150          BCS  APPERR     ;ERROR IF CS
1984:A5 6D     151          LDA  RESPTR+1   ;IF FIRST ARG NIL, IGNORE
1986:F0 0F     152          BEQ  APPNIL
1988:20 ED 19  153          JSR  ARGEND     ;ELSE FIND END OF ARG
198B:B1 CE     154          LDA  (WK1),Y    ;PUT REMAINING ARGLIST IN CDR
198D:91 ED     155          STA  (ARGPTR),Y
```

```
1991:C8          156          INY
1992:B1 CE       157          LDA  (WK1),Y
1994:91 ED       158          STA  (ARGPTR),Y
1997:4C F0 11    159          JMP  EVALRET
199A:20 C0 0D    160 APPNIL   JSR  WK1CDR     ;RETURN REMAINING ARGS IF 1ST NIL
199D:20 FA 19    161          JSR  WK1ARG
19A0:4C 3F 14    162          JMP  RETARG
19A2:A0 18       163 APPERR   LDY  #24
19A4:4C EA 24    164          JMP  ERROR
                 165 ***********************************************
19A5:            166 * ROUTINE TO GET ARGS AND COPY FIRST
                 167 ***********************************************
19A5:20 A6 0E    168 APPINIT  JSR  SETRET
19A8:4C FE 12    169          JMP  EVLARGS
19AB:A5 56       170          LDA  ARCT       ;ERROR IF NO ARGS
19AD:F0 34       171          BEQ  APPERR1
19AF:20 34 21    172          JSR  ARGTOWK1   ;PUT PTR IN WK1
19B2:20 77 13    173 APPINIT2 JSR  ARGCAR     ;GET 1ST ARG
19B5:A5 EE       174          LDA  ARGPTR+1   ;IGNORE IF NIL
19B7:F0 1E       175          BEQ  IGNORE
19B9:A5 ED       176          LDA  ARGPTR     ;ERROR IF ATOMIC
19BB:24 69       177          BIT  ATMTST
19BD:D0 28       178          BNE  APPERR2
19BF:20 0B 0F    179          JSR  WK1PUSH
19C2:20 A6 0E    180          JSR  SETRET     ;COPY THE ARG
19C5:4C 39 19    181          JMP  COPY2
19C8:20 12 0F    182          JSR  WK1POP
19CB:A5 6C       183          LDA  RESPTR
19CD:85 ED       184          STA  ARGPTR
19CF:A5 6D       185          LDA  RESPTR+1
19D1:85 EE       186          STA  ARGPTR+1
19D3:18          187          CLC
19D4:4C DF 0E    188          JMP  RET
19D7:18          189 IGNORE   CLC
19D8:A5 ED       190          LDA  ARGPTR
19DA:85 6C       191          STA  RESPTR
19DC:A5 EE       192          LDA  ARGPTR+1
19DE:85 6D       193          STA  RESPTR+1
19E0:4C DF 0E    194          JMP  RET
19E3:A2 06       195 APPERR1  LDX  #6         ;TOO FEW ARGS ERROR
19E5:D0 03       196          BNE  APPERR3
19E7:A2 08       197 APPERR2  LDX  #8
19E9:38          198          SEC
19EA:4C DF 0E    199 APPERR3  JMP  RET
                 200 ***********************************************
19ED:            201 * ROUTINE TO FIND END OF LIST
                 202 ***********************************************
19ED:A0 02       203 ARGEND   LDY  #2
19EF:B1 ED       204          LDA  (ARGPTR),Y
19F1:F0 06       205          BEQ  AGFIN
19F3:20 85 13    206          JSR  ARGCDR
19F6:4C ED 19    207          JMP  ARGEND
19F9:60          208 AGFIN    RTS
                 209 ***********************************************
19FA:            210 * ROUTINE TO MOVE WK1 TO ARGPTR
                 211 ***********************************************
19FA:A5 CE       212 WK1ARG   LDA  WK1
19FC:85 ED       213          STA  ARGPTR
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```
1A7E:A5 CF      214          LDA  WK1+1
1A80:85 EE      215          STA  ARGPTR+1
1A02:60         216          RTS
                217 ***********************************************
1A03:           218 * CONC
                219 ***********************************************
1A03:20 A6 0E   220 CONC     JSR  SETRET     ;GET ARGS, COPY FIRST
1A06:4C A5 19   221          JMP  APPINIT
1A09:B0 4D      222          BCS  CONCERR
1A0B:A5 6D      223 CONCD    LDA  RESPTR+1   ;IGNORE FIRST IF NIL
1A0D:F0 5B      224          BEQ  CONCNILA
1A0F:20 FC 0E   225          JSR  RESPUSH
1A12:A5 ED      226 CONC2    LDA  ARGPTR     ;CHECK FOR ATOM
1A14:24 69      227          BIT  ATMTST
1A16:D0 45      228          BNE  CONCERR2
1A18:20 ED 19   229          JSR  ARGEND     ;FIND END OF LIST
1A1B:20 C0 0D   230          JSR  WK1CDR     ;GET NEXT ARG
1A1E:A5 CF      231          LDA  WK1+1
1A20:F0 30      232          BEQ  CONCFIN    ;CHECK IF FINISHED
1A22:20 0B 0F   233          JSR  WK1PUSH
1A25:20 89 13   234          JSR  ARGPUSH
1A28:20 FA 19   235          JSR  WK1ARG
1A2B:20 77 13   236          JSR  ARGCAR
1A2E:A5 EE      237          LDA  ARGPTR+1
1A30:F0 2F      238          BEQ  CONCNIL
1A32:A5 ED      239          LDA  ARGPTR     ;ERROR IF NEXT ARG ATOMIC
1A34:24 69      240          BIT  ATMTST
1A36:D0 25      241          BNE  CONCERR2
1A38:20 A6 0E   242          JSR  SETRET     ;COPY IT
1A3B:4C 39 19   243          JMP  COPY2
1A3E:20 F4 0E   244          JSR  CELPOP
1A41:20 12 0F   245          JSR  WK1POP
1A44:20 87 0E   246          JSR  CDRPUT     ;PUT IN CDR OF LAST ARG
1A47:A5 5A      247          LDA  CELPTR
1A49:85 ED      248          STA  ARGPTR
1A4B:A5 5B      249          LDA  CELPTR+1
1A4D:85 EE      250          STA  ARGPTR+1
1A4F:4C 12 1A   251          JMP  CONC2      ;REPEAT
1A52:20 03 0F   252 CONCFIN JSR  RESPOP
1A55:4C F0 11   253 CONCFIN2 JMP EVALRET
1A58:A0 19      254 CONCERR LDY  #25
1A5A:4C EA 24   255          JMP  ERROR
1A5D:A2 08      256 CONCERR2 LDX #8          ;BAD LIST ARG ERROR
1A5F:D0 F7      257          BNE  CONCERR
1A61:20 90 13   258 CONCNIL JSR  ARGPOP
1A64:20 12 0F   259          JSR  WK1POP
1A67:4C 12 1A   260          JMP  CONC2
1A6A:20 C0 0D   261 CONCNILA JSR WK1CDR     ;IGNORE 1ST ARG IF NIL
1A6D:A5 CF      262          LDA  WK1+1
1A6F:F0 E4      263          BEQ  CONCFIN2
1A71:20 FA 19   264          JSR  WK1ARG
1A74:20 A6 0E   265          JSR  SETRET
1A77:4C B2 19   266          JMP  APPINIT2
1A7A:B0 E1      267          BCS  CONCERR2
1A7C:4C 0B 1A   268          JMP  CONCD
1A7F:           269          CHN  EVAL7.SRC
                  1 ***********************************************
1A7F:             2 * LAMBDA
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```
                 3 ***********************************************
1..7F:20 FC 0E   4 LAMBDA  JSR  RESPUSH
1A82:20 80 12    5         JSR  EVLCDR
1A85:20 A6 0E    6         JSR  SETRET     ;EVAL ARGUMENTS
1A88:4C FE 12    7         JMP  EVLARGS
1A8B:20 5A 12    8         JSR  EVLPOP     ;RESTORE FCN BODY
1A8E:20 80 12    9         JSR  EVLCDR
1A91:A5 D7      10         LDA  EVLPTR+1   ;MAKE SURE AN FP IS THERE
1A93:D0 03      11         BNE  LAMB2
1A95:4C 22 1B   12         JMP  LAMER3
1A98:20 53 12   13 LAMB2   JSR  EVLPUSH
1A9B:20 8E 12   14         JSR  EVLCAR     ;GET FP LIST
1A9E:20 79 0C   15 LOK     JSR  GETCEL     ;OK-GET A CELL
1AA1:20 94 0E   16         JSR  CELRES     ;SAVE ITS ADDR
1AA4:A5 D7      17 LAMLP   LDA  EVLPTR+1
1AA6:F0 2F      18         BEQ  LAMFIN
1AA8:A5 D6      19         LDA  EVLPTR     ;MUST BE A LIST
1AAA:24 69      20         BIT  ATMTST
1AAC:D0 66      21         BNE  LAMERR
1AAE:A5 EE      22         LDA  ARGPTR+1   ;CHECK FOR TOO FEW ARGS
1AB0:F0 6C      23         BEQ  LTOOFEW
1AB2:A0 00      24         LDY  #0         ;ELSE BIND FP TO CAR OF CELL
1AB4:B1 D6      25         LDA  (EVLPTR),Y
1AB6:91 5A      26         STA  (CELPTR),Y
1AB8:C8         27         INY
1AB9:B1 D6      28         LDA  (EVLPTR),Y
   )B:91 5A     29         STA  (CELPTR),Y
1ABD:20 80 12   30         JSR  EVLCDR
1AC0:20 C8 0B   31         JSR  CDRLINK    ;GET ANOTHER CELL AND LINK
1AC3:A0 00      32         LDY  #0         ;PUT ARG IN CAR
1AC5:B1 ED      33         LDA  (ARGPTR),Y
1AC7:91 5A      34         STA  (CELPTR),Y
1AC9:C8         35         INY
1ACA:B1 ED      36         LDA  (ARGPTR),Y
1ACC:91 5A      37         STA  (CELPTR),Y
1ACE:20 85 13   38         JSR  ARGCDR
1AD1:20 C8 0B   39         JSR  CDRLINK    ;GET ANOTHER AND LINK
1AD4:4C A4 1A   40         JMP  LAMLP
1AD7:A5 EE      41 LAMFIN  LDA  ARGPTR+1   ;CHECK FOR TOO MANY ARGS
1AD9:D0 4B      42         BNE  LTOOMANY
1ADB:20 5A 12   43         JSR  EVLPOP     ;GET FCN BODY
1ADE:20 2D 1B   44 LAMFIN2 JSR  ENVCHN     ;ADD TO ENV. CHAIN
1AE1:20 80 12   45         JSR  EVLCDR
1AE4:20 9D 0E   46         JSR  NILRET
1AE7:20 A6 0E   47         JSR  SETRET
1AEA:4C 0C 19   48         JMP  PROGN2     ;EVAL EACH SEXPR
1AED:A5 FC      49 ENVPOP  LDA  ENVPTR+1   ;NOW POP ENVIRONMENT
1AEF:F0 17      50         BEQ  NOENVP
1AF1:85 CF      51         STA  WK1+1
1AF3:A5 FB      52         LDA  ENVPTR
1AF5:85 CE      53         STA  WK1
..F7:A0 00      54 EVFLP   LDY  #0
..F9:B1 CE      55         LDA  (WK1),Y    ;KEEP GOING UNTIL NIL REACHED
1AFB:D0 0E      56         BNE  NXTECL
1AFD:A0 02      57         LDY  #2
1AFF:B1 CE      58         LDA  (WK1),Y
1B01:85 FC      59         STA  ENVPTR+1
1B03:C8         60         INY
```

```
1B04:B1 CE          LDA  (WK1),Y
1B06:85 FB          STA  ENVPTR
1B08:4C F0 11 NOENVP JMP  EVALRET    ;RETURN
1B0B:20 C0 0D NXTECL JSR  WK1CDR
1B0E:20 C0 0D       JSR  WK1CDR
1B11:4C F7 1A       JMP  EVFLP
1B14:A2 08    LAMERR LDX  #8         ;BAD LIST ARG ERROR
1B16:A0 1D    LAMER2 LDY  #29
1B18:20 9B 13       JSR  EVLSAVE
1B1B:4C EA 24       JMP  ERROR
1B1E:A2 06    LTOOFEW LDX #6
1B20:D0 06          BNE  LAMER1
1B22:A2 06    LAMER3 LDX  #6
1B24:D0 F0          BNE  LAMER2
1B26:A2 05    LTOOMANY LDX #5
1B28:A0 42    LAMER1 LDY  #ERRFCN-FCNTAB/2
1B2A:4C EA 24       JMP  ERROR
                    ***********************************************
1B2D:               * ROUTINE TO LINK NEW ENV. TO CHAIN
                    ***********************************************
1B2D:A0 02    ENVCHN LDY  #2
1B2F:A5 FC          LDA  ENVPTR+1  ;LINK ENV CHAIN TO CDR OF LAST CELL
1B31:91 5A          STA  (CELPTR),Y
1B33:C8             INY
1B34:A5 FB          LDA  ENVPTR
1B36:91 5A          STA  (CELPTR),Y
1B38:A5 6C          LDA  RESPTR    ;SET NEW ENV PTR
1B3A:85 FB          STA  ENVPTR
1B3C:A5 6D          LDA  RESPTR+1
1B3E:85 FC          STA  ENVPTR+1
1B40:60             RTS
                    ***********************************************
1B41:               * FLAMBDA
                    ***********************************************
1B41:20 53 12 FLAMBDA JSR EVLPUSH    ;SAVE IT
1B44:A5 6C          LDA  RESPTR    ;GET FCN BODY
1B46:85 D6          STA  EVLPTR
1B48:A5 6D          LDA  RESPTR+1
1B4A:85 D7          STA  EVLPTR+1
1B4C:20 80 12       JSR  EVLCDR
1B4F:A5 D7          LDA  EVLPTR+1  ;MAKE SURE FP IS THERE
1B51:F0 48          BEQ  FLAMER2
1B53:20 53 12       JSR  EVLPUSH
1B56:20 8E 12       JSR  EVLCAR
1B59:A5 D7          LDA  EVLPTR+1
1B5B:F0 3A          BEQ  FLAMERR   ;ERROR IF NIL
1B5D:A5 D6          LDA  EVLPTR    ;MAKE SURE ITS A LIST
1B5F:24 69          BIT  ATMTST
1B61:D0 34          BNE  FLAMERR
1B63:A0 02          LDY  #2        ;CHECK FOR TOO MANY
1B65:B1 D6          LDA  (EVLPTR),Y
1B67:D0 2E          BNE  FLAMERR
1B69:20 79 0C       JSR  GETCEL    ;GET A CELL
1B6C:20 94 0E       JSR  CELRES    ;SAVE ADDR
1B6F:A0 00          LDY  #0        ;PUT FP IN CAR
1B71:B1 D6          LDA  (EVLPTR),Y
1B73:91 5A          STA  (CELPTR),Y
1B75:C8             INY
```

```
1B76:B1 D6          LDA  (EVLPTR),Y
1B78:91 5A          STA  (CELPTR),Y
1B7A:20 C8 0B       JSR  CDRLINK    ;GET ANOTHER CELL AND LINK
1B7D:20 5A 12       JSR  EVLPOP     ;POP FUNCTION BODY
1B80:20 90 13       JSR  ARGPOP     ;POP SEXPR W/ARGS
1B83:20 85 13       JSR  ARGCDR
1B86:A0 00          LDY  #0         ;PUT ARGLIST IN CAR
1B88:A5 EE          LDA  ARGPTR+1
1B8A:91 5A          STA  (CELPTR),Y
1B8C:C8             INY
1B8D:A5 ED          LDA  ARGPTR
1B8F:91 5A          STA  (CELPTR),Y
1B91:20 C8 0B       JSR  CDRLINK    ;ADD END-OF-ENV. CELL
1B94:4C DE 1A       JMP  LAMFIN2    ;EVAL THE FCN
1B97:A2 08          LDX  #8         ;BAD LIST ARG ERROR
1B99:D0 02          BNE  FLAMER3
1B9B:A2 06          LDX  #6         ;MISSING FCN BODY
1B9D:A0 1E          LDY  #30
1B9F:20 9B 13       JSR  EVLSAVE
1BA2:4C EA 24       JMP  ERROR
1BA5:               CHN  EVAL8.SRC
                    ***************************************************
1BA5:               * PROG
                    ***************************************************
1BA5:A6 D6          PROG LDX  EVLPTR    ;SAVE PTR TO PROG
1BA7:A4 D7          LDY  EVLPTR+1
1BA9:20 B4 0E       JSR  PUSH
1BAC:A2 00          LDX  #0         ;PUSH PROG MARKER
1BAE:A0 08          LDY  #$8
1BB0:20 B4 0E       JSR  PUSH
1BB3:20 79 0C       JSR  GETCEL     ;GET A CELL
1BB6:20 94 0E       JSR  CELRES     ;SAVE ADDR
1BB9:A5 D7          LDA  EVLPTR+1   ;ERROR IF NO PROG BODY
1BBB:D0 03          BNE  NOPRGERR
1BBD:4C 28 1C       JMP  PROGERR3
1BC0:20 53 12       NOPRGERR JSR EVLPUSH  ;SAVE PTR
1BC3:20 8E 12       JSR  EVLCAR     ;GET LOCAL ATOMS
1BC6:A5 D7          PROGLP1 LDA  EVLPTR+1  ;EXITIF FINISHED
1BC8:F0 1D          BEQ  PROG2
1BCA:A5 D6          LDA  EVLPTR     ;MUST BE A LIST
1BCC:24 69          BIT  ATMTST
1BCE:D0 50          BNE  PROGERR2
1BD0:A0 00          LDY  #0         ;ELSE PUT ATOM IN CAR OF CELL
1BD2:B1 D6          LDA  (EVLPTR),Y
1BD4:91 5A          STA  (CELPTR),Y
1BD6:C8             INY
1BD7:B1 D6          LDA  (EVLPTR),Y
1BD9:91 5A          STA  (CELPTR),Y
1BDB:20 C8 0B       JSR  CDRLINK    ;GET ANOTHER CELL AND LINK
1BDE:20 C8 0B       JSR  CDRLINK    ;AGAIN AND REPEAT
1BE1:20 80 12       JSR  EVLCDR
1BE4:4C C6 1B       JMP  PROGLP1
1BE7:20 2D 1B       PROG2 JSR  ENVCHN    ;ADD TO ENV. CHAIN
1BEA:20 5A 12       JSR  EVLPOP     ;POP FCN BODY
1BED:20 80 12       JSR  EVLCDR
1BF0:20 9D 0E       JSR  NILRET
1BF3:A5 D7          PROGLP2 LDA  EVLPTR+1  ;CHECK IF FINISHED
1BF5:F0 1B          BEQ  PROGEND
```

```
 7:20 53 12   38          JSR  EVLPUSH    ;EVAL NEXT SEXPR
FA:20 8E 12   39          JSR  EVLCAR
1BFD:A5 D6    40          LDA  EVLPTR     ;IGNORE IF AN ATOM
1BFF:24 69    41          BIT  ATMTST
1C01:D0 06    42          BNE  IGNOREAT
1C03:20 A6 0E 43          JSR  SETRET     ;ELSE EVAL IT
1C06:4C 62 11 44          JMP  EVAL
1C09:20 5A 12 45 IGNOREAT JSR EVLPOP
1C0C:20 80 12 46          JSR  EVLCDR
1C0F:4C F3 1B 47          JMP  PROGLP2    ;REPEAT
1C12:20 1A 0F 48 PROGEND JSR  POP         ;POP MARKER
1C15:20 1A 0F 49 PROGEND2 JSR POP         ;POP PROG PTR
1C18:4C ED 1A 50          JMP  ENVPOP
1C1B:A0 1A    51 PRGERR  LDY  #26
1C1D:4C EA 24 52          JMP  ERROR
1C20:A2 08    53 PROGERR2 LDX #8
1C22:20 9B 13 54 PROGERA JSR  EVLSAVE
1C25:4C 1B 1C 55          JMP  PRGERR
1C28:A2 06    56 PROGERR3 LDX #6          ;MISSING FP LIST ERROR
1C2A:D0 F6    57          BNE  PROGERA
              58 ***********************************************
1C2C:         59 * RETURN
              60 ***********************************************
1C2C:20 A6 0E 61 RETURN  JSR  SETRET     ;EVAL THING TO RETURN
1C2F:4C BE 13 62          JMP  GET1
1C32:B0 0A    63          BCS  RETERR2
 4:20 8F 1C   64          JSR  MARKLOOK   ;LOOK FOR PROG MARKER
1C37:90 03    65          BCC  RETERR
1C39:4C 15 1C 66          JMP  PROGEND2
1C3C:A2 09    67 RETERR  LDX  #9          ;NO DOMINATING PROG ERROR
1C3E:A0 1B    68 RETERR2 LDY  #27
1C40:4C EA 24 69          JMP  ERROR
              70 ***********************************************
1C43:         71 * GO
              72 ***********************************************
1C43:20 A6 13 73 GO      JSR  GETM        ;GET THE LABEL
1C46:A2 04    74          LDX  #4
1C48:90 0B    75          BCC  GOOK
1C4A:A2 06    76          LDX  #6
1C4C:A0 1C    77 GOERR   LDY  #28
1C4E:4C EA 24 78          JMP  ERROR
1C51:A2 09    79 GOERR1  LDX  #9          ;NO DOMINATING PROG ERROR
1C53:D0 F7    80          BNE  GOERR
1C55:A5 ED    81 GOOK    LDA  ARGPTR      ;CHECK IF ITS AN ATOM
1C57:24 69    82          BIT  ATMTST
1C59:F0 F1    83          BEQ  GOERR
1C5B:20 8F 1C 84 OKLAB   JSR  MARKLOOK    ;LOOK FOR PROG IN STACK
1C5E:90 F1    85          BCC  GOERR1
1C60:20 1A 0F 86          JSR  POP
1C63:86 D6    87          STX  EVLPTR     ;GET PTR TO PROG
1C65:84 D7    88          STY  EVLPTR+1
 57:20 B4 0E  89          JSR  PUSH       ;RE-PUSH
 6A:A2 00     90          LDX  #0         ;AND PUSH MARKER
1C6C:A0 08    91          LDY  #$8
1C6E:20 B4 0E 92          JSR  PUSH
1C71:20 80 12 93 GOLP    JSR  EVLCDR      ;LOOK FOR LABEL
1C74:A5 D7    94          LDA  EVLPTR+1
1C76:F0 12    95          BEQ  GOERR2     ;ERROR IF NOT FOUND
```

```
  78:A0 00        96          LDY  #0
..7A:B1 D6        97          LDA  (EVLPTR),Y
1C7C:C5 EE        98          CMP  ARGPTR+1   ;COMPARE SEXPRS
1C7E:D0 F1        99          BNE  GOLP
1C80:C8          100          INY
1C81:B1 D6       101          LDA  (EVLPTR),Y
1C83:C5 ED       102          CMP  ARGPTR
1C85:D0 EA       103          BNE  GOLP
1C87:4C F3 1B    104          JMP  PROGLP2    ;FOUND IT--GO TO PROG
1C8A:A2 0A       105 GOERR2   LDX  #10        ;MISSING LABEL ERROR
1C8C:4C 4C 1C    106          JMP  GOERR
1C8F:A5 7D       107 MARKLOOK LDA  STKPTR     ;CHECK FOR END OF STACK
1C91:CD 0D 08    108          CMP  STKBEG
1C94:D0 09       109          BNE  OKM
1C96:A5 7E       110          LDA  STKPTR+1
1C98:CD 0E 08    111          CMP  STKBEG+1
1C9B:D0 02       112          BNE  OKM
1C9D:18          113          CLC
1C9E:60          114          RTS
1C9F:20 1A 0F    115 OKM      JSR  POP        ;CHECK FOR MARKER
1CA2:E0 00       116          CPX  #0
1CA4:D0 E9       117          BNE  MARKLOOK
1CA6:C0 08       118          CPY  #$8
1CA8:D0 E5       119          BNE  MARKLOOK
1CAA:38          120          SEC
1CAB:60          121          RTS
  )C:            122          CHN  EVAL9.SRC
                   1 ***********************************************
1CAC:              2 * ROUTINE TO LOAD TWO NUMERIC ARGS
                   3 ***********************************************
1CAC:8C 8A 09      4 LOADNMS STY  LEXERRSAV ;SAVE FCN CODE
1CAF:20 89 13      5          JSR  ARGPUSH  ;SAVE PTR TO ARGLIST
1CB2:20 77 13      6          JSR  ARGCAR   ;GET 1ST
1CB5:20 10 15      7          JSR  NUMCHK   ;CHECK FOR NUMERIC
1CB8:B0 4B         8          BCS  NMERR
1CBA:20 77 13      9          JSR  ARGCAR
1CBD:A0 02        10          LDY  #2       ;CHECK FOR INTEGER OR FP
1CBF:B1 ED        11          LDA  (ARGPTR),Y
1CC1:D0 28        12          BNE  FLTLD1
1CC3:20 2B 1D     13          JSR  INTALD   ;INTEGER--FLOAT & PUT IN ARG
1CC6:20 90 13     14 LNXTNM   JSR  ARGPOP
1CC9:20 85 13     15          JSR  ARGCDR   ;GET NEXT NUMBER
1CCC:20 77 13     16          JSR  ARGCAR
1CCF:20 10 15     17          JSR  NUMCHK   ;CHECK FOR NUMERIC
1CD2:B0 31        18          BCS  NMERR
1CD4:20 77 13     19          JSR  ARGCAR
1CD7:A0 02        20          LDY  #2       ;CHECK FOR INTEGER OR FP AGAIN
1CD9:B1 ED        21          LDA  (ARGPTR),Y
1CDB:D0 14        22          BNE  FLTLD2
1CDD:20 3B 1D     23          JSR  INTFLD   ;INTEGER--FLOAT & PUT IN FAC
1CE0:A5 A2        24 SGNSET   LDA  FAC+5    ;SET RESULT SIGN
 ..E2:45 AA       25          EOR  ARG+5
 ..E4:85 AB       26          STA  ARG+6
1CE6:A9 00        27 CLEARARG LDA #0
1CE8:85 EE        28          STA  ARGPTR+1
1CEA:60           29          RTS
1CEB:20 0D 1D     30 FLTLD1   JSR  ARGLD    ;ELSE 1ST ARG FP--LOAD INTO ARG
1CEE:4C C6 1C     31          JMP  LNXTNM
```

```
1CF1:20 11 1D   32 FLTLD2  JSR  FACLD      ;LOAD 2ND ARG IN FAC
1CF4:4C E0 1C   33         JMP  SGNSET
1CF7:A0 00      34 INTLOAD LDY  #0         ;LOAD INTEGER INTO REGISTER
1CF9:B1 ED      35         LDA  (ARGPTR),Y
1CFB:95 01      36         STA  BASE1,X
1CFD:C8         37         INY
1CFE:B1 ED      38         LDA  (ARGPTR),Y
1D00:95 00      39         STA  BASE0,X
1D02:4C E6 1C   40         JMP  CLEARARG
1D05:AC 8A 09   41 NMERR   LDY  LEXERRSAV ;FCN NUMBER
1D08:A2 07      42         LDX  #7         ;BAD NUMERIC ARG ERROR
1D0A:4C EA 24   43         JMP  ERROR
                44 ***********************************************
1D0D:           45 * ROUTINES TO LOAD FP #
                46 ***********************************************
1D0D:A2 A5      47 ARGLD   LDX  #ARG
1D0F:D0 02      48         BNE  FPLOAD
1D11:A2 9D      49 FACLD   LDX  #FAC
1D13:A0 01      50 FPLOAD  LDY  #1         ;LOAD CAR OF FP
1D15:20 22 1D   51         JSR  LOADNM
1D18:20 85 13   52         JSR  ARGCDR
1D1B:8A         53         TXA
1D1C:18         54         CLC
1D1D:69 06      55         ADC  #6
1D1F:AA         56         TAX
1D20:A0 03      57         LDY  #3         ;NOW LOAD CDR
1D22:B1 ED      58 LOADNM  LDA  (ARGPTR),Y
1D24:95 01      59         STA  BASE1,X
1D26:CA         60         DEX
1D27:88         61         DEY
1D28:10 F8      62         BPL  LOADNM
1D2A:60         63         RTS
                64 ***********************************************
1D2B:           65 * ROUTINES TO FLOAT & LOAD INTEGER #
                66 ***********************************************
1D2B:20 3B 1D   67 INTALD  JSR  INTFLD     ;FLOAT INTEGER
1D2E:20 02 0A   68         JSR  FPSEL
1D31:20 63 EB   69         JSR  MOVAF
1D34:AD 8B C0   70 INTALDRT LDA RAMSEL
1D37:AD 8B C0   71         LDA  RAMSEL
1D3A:60         72         RTS
1D3B:A0 00      73 INTFLD  LDY  #0
1D3D:B1 ED      74         LDA  (ARGPTR),Y ;FLOAT INTEGER
1D3F:48         75         PHA
1D40:C8         76         INY
1D41:B1 ED      77         LDA  (ARGPTR),Y
1D43:48         78         PHA
1D44:20 02 0A   79         JSR  FPSEL
1D47:68         80         PLA
1D48:A8         81         TAY
1D49:68         82         PLA
1D4A:20 F2 E2   83         JSR  GIVAYF
1D4D:AD 8B C0   84         LDA  RAMSEL
1D50:AD 8B C0   85         LDA  RAMSEL
1D53:60         86         RTS
                87 ***********************************************
1D54:           88 * ADD
                89 ***********************************************
```

```
1D54:20 A6 0E   90 ADD      JSR  SETRET     ;EVAL THE ARGS
1D57:4C FE 12   91          JMP  EVLARGS
1D5A:A0 1F      92          LDY  #31
1D5C:A5 56      93          LDA  ARCT       ;MAKE SURE THERE ARE 2
1D5E:C9 02      94          CMP  #2
1D60:F0 04      95          BEQ  ADDOK
1D62:90 1C      96          BCC  ADDFEW
1D64:B0 1D      97          BCS  ADDMANY
1D66:20 AC 1C   98 ADDOK    JSR  LOADNMS    ;LOAD THE NUMBERS
1D69:20 02 0A   99          JSR  FPSEL
1D6C:A5 9D     100          LDA  FAC        ;SET A & Z FOR APPLESOFT
1D6E:20 C1 E7  101          JSR  FADDT      ;CALL APLSFT TO ADD THEM
1D71:AD 8B C0  102 NEWRESFP LDA  RAMSEL
1D74:AD 8B C0  103          LDA  RAMSEL
1D77:20 37 0B  104          JSR  NEWNUMAT   ;CREATE NEW ATOM FOR RESULT
1D7A:20 8B 0E  105 NEWRES   JSR  ATMRES     ;RETURN IT
1D7D:4C F0 11  106          JMP  EVALRET
1D80:4C 4A 14  107 ADDFEW   JMP  TOOFEW
1D83:4C 4F 14  108 ADDMANY  JMP  TOOMANY    ;TOO MANY ARGS ERROR
               109 ************************************************
1D86:          110 * SUB
               111 ************************************************
1D86:20 A6 0E  112 SUBA     JSR  SETRET     ;GET THE ARGS
1D89:4C FE 12  113          JMP  EVLARGS
1D8C:A0 20     114          LDY  #32
1D8E:A5 56     115          LDA  ARCT       ;CHECK FOR 2
1D90:C9 02     116          CMP  #2
1D92:F0 04     117          BEQ  SUBOK
1D94:90 10     118          BCC  SUBFEW
1D96:B0 11     119          BCS  SUBMANY
1D98:20 AC 1C  120 SUBOK    JSR  LOADNMS    ;LOAD THEM
1D9B:20 02 0A  121          JSR  FPSEL
1D9E:A5 9D     122          LDA  FAC        ;SET A & Z
1DA0:20 AA E7  123          JSR  FSUBT      ;SUBTRACT THEM
1DA3:4C 71 1D  124          JMP  NEWRESFP   ;RETURN RESULT
1DA6:4C 4A 14  125 SUBFEW   JMP  TOOFEW
1DA9:4C 4F 14  126 SUBMANY  JMP  TOOMANY
               127 ************************************************
1DAC:          128 * MULT
               129 ************************************************
1DAC:20 A6 0E  130 MULTA    JSR  SETRET     ;EVAL ARGS
1DAF:4C FE 12  131          JMP  EVLARGS
1DB2:A0 21     132          LDY  #33
1DB4:A5 56     133          LDA  ARCT       ;CHECK FOR 2
1DB6:C9 02     134          CMP  #2
1DB8:F0 04     135          BEQ  MULTOK
1DBA:90 10     136          BCC  MULTFEW
1DBC:B0 11     137          BCS  MULTMANY
1DBE:20 AC 1C  138 MULTOK   JSR  LOADNMS    ;LOAD THE ARGS
1DC1:20 02 0A  139          JSR  FPSEL
1DC4:A5 9D     140          LDA  FAC        ;FP MULT
1DC6:20 82 E9  141          JSR  FMULTT
1DC9:4C 71 1D  142          JMP  NEWRESFP   ;RETURN RESULT
1DCC:4C 4A 14  143 MULTFEW  JMP  TOOFEW
1DCF:4C 4F 14  144 MULTMANY JMP  TOOMANY
               145 ************************************************
1DD2:          146 * DIV
               147 ************************************************
```

```
1DD2:20 A6 0E   148 DIV      JSR  SETRET     ;GET THE ARGS
1DD5:4C FE 12   149          JMP  EVLARGS
1DD8:A0 22      150          LDY  #34
1DDA:A5 56      151          LDA  ARCT
1DDC:C9 02      152          CMP  #2         ;CHECK FOR 2
1DDE:F0 04      153          BEQ  DIVOK
1DE0:90 10      154          BCC  DIVFEW
1DE2:B0 11      155          BCS  DIVMANY
1DE4:20 AC 1C   156 DIVOK    JSR  LOADNMS    ;LOAD THE ARGS
1DE7:20 02 0A   157          JSR  FPSEL
1DEA:A5 9D      158          LDA  FAC
1DEC:20 69 EA   159          JSR  FIDVT      ;DIVIDE FAC INTO ARG
1DEF:4C 71 1D   160          JMP  NEWRESFP   ;RETURN RESULT
1DF2:4C 4A 14   161 DIVFEW   JMP  TOOFEW
1DF5:4C 4F 14   162 DIVMANY  JMP  TOOMANY
1DF8:           163          CHN  EVAL10.SRC
                  1 ************************************************
1DF8:             2 * INT
                  3 ************************************************
1DF8:20 A6 0E     4 INT      JSR  SETRET     ;GET ARG
1DFB:4C BE 13     5          JMP  GET1
1DFE:B0 29        6          BCS  INTERR2
1E00:20 10 15     7          JSR  NUMCHK     ;MAKE SURE ITS NUMERIC
1E03:B0 22        8          BCS  INTERR
1E05:20 77 13     9          JSR  ARGCAR     ;GET PTR TO VALUE
1E08:A0 02       10          LDY  #2         ;RETURN IF ALREADY INTEGER
1E0A:B1 ED       11          LDA  (ARGPTR),Y
1E0C:F0 16       12          BEQ  INTARET
1E0E:20 11 1D    13          JSR  FACLD      ;ELSE LOAD INTO FAC
1E11:20 02 0A    14          JSR  FPSEL
1E14:20 23 EC    15          JSR  FPINT
1E17:AD 8B C0    16          LDA  RAMSEL
1E1A:AD 8B C0    17          LDA  RAMSEL
1E1D:A9 00       18          LDA  #0
1E1F:85 EE       19          STA  ARGPTR+1
1E21:4C 71 1D    20          JMP  NEWRESFP
1E24:4C F0 11    21 INTARET  JMP  EVALRET
1E27:A2 07       22 INTERR   LDX  #7         ;BAD NUMERIC ARG ERROR
1E29:A0 23       23 INTERR2  LDY  #35
1E2B:4C EA 24    24          JMP  ERROR
                 25 ************************************************
1E2E:            26 * ROUTINE TO CHECK FOR INTEGER ARGUMENT,
1E2E:            27 * LOAD INTO RES REGISTER
                 28 ************************************************
1E2E:20 10 15    29 GETINT   JSR  NUMCHK     ;CHECK FOR NUMBER
1E31:B0 10       30          BCS  BADNM1
1E33:20 77 13    31          JSR  ARGCAR
1E36:A0 02       32          LDY  #2         ;CHECK FOR INTEGER
1E38:B1 ED       33          LDA  (ARGPTR),Y
1E3A:D0 07       34          BNE  BADNM1
1E3C:A2 50       35          LDX  #RES       ;YES-LOAD IT
1E3E:20 F7 1C    36          JSR  INTLOAD
1E41:18          37          CLC              ;RETURN CC IF OK
1E42:60          38          RTS
1E43:20 E6 1C    39 BADNM1   JSR  CLEARARG
1E46:38          40          SEC
1E47:60          41          RTS
                 42 ************************************************
```

```
1E48:                 * CALL
                      ************************************************
1E48:20 A6 0E         CALL     JSR  SETRET     ;GET THE ARG
1E4B:4C BE 13                  JMP  GET1
1E4E:B0 1A                     BCS  CALLERR2
1E50:20 2E 1E                  JSR  GETINT     ;LOAD INTEGER ARG
1E53:B0 13                     BCS  CALLERR
1E55:AD 81 C0                  LDA  ROMSEL
1E58:A9 4C                     LDA  #$4C       ;JUMP INSTR
1E5A:85 4F                     STA  RES-1
1E5C:20 4F 00                  JSR  RES-1      ; CALL (RES)
1E5F:AD 8B C0                  LDA  RAMSEL
1E62:AD 8B C0                  LDA  RAMSEL
1E65:4C F0 11                  JMP  EVALRET    ;AND RETURN
1E68:A2 07            CALLERR LDX  #7          ;BAD NUMERIC ARG ERROR
1E6A:A0 24            CALLERR2 LDY #36
1E6C:4C EA 24                  JMP  ERROR
                      ************************************************
1E6F:                 * PEEK
                      ************************************************
1E6F:20 A6 0E         PEEK     JSR  SETRET     ;GET THE ARG
1E72:4C BE 13                  JMP  GET1
1E75:B0 18                     BCS  PEEKERR2
1E77:20 2E 1E                  JSR  GETINT     ;LOAD INTEGER
1E7A:B0 11                     BCS  PEEKERR
1E7C:A0 00                     LDY  #0         ;PEEK THE LOCATION
  'E:B1 50                     LDA  (RES),Y
1E80:85 50                     STA  RES
1E82:84 51                     STY  RES+1
1E84:20 65 0B                  JSR  NEWINT2    ;RETURN PEEKED VALUE
1E87:20 8B 0E                  JSR  ATMRES
1E8A:4C F0 11                  JMP  EVALRET
1E8D:A2 07            PEEKERR LDX  #7
1E8F:A0 25            PEEKERR2 LDY #37
1E91:4C EA 24                  JMP  ERROR
                      ************************************************
1E94:                 * POKE
                      ************************************************
1E94:20 A6 0E         POKE     JSR  SETRET     ;EVAL 2 ARGS
1E97:4C FE 12                  JMP  EVLARGS
1E9A:A0 26                     LDY  #38
1E9C:A5 56                     LDA  ARCT       ;MAKE SURE THERE ARE 2
1E9E:C9 02                     CMP  #2
1EA0:F0 04                     BEQ  POKEOK
1EA2:90 42                     BCC  POKEFEW
1EA4:B0 43                     BCS  POKEMANY
1EA6:20 89 13         POKEOK   JSR  ARGPUSH    ;GET ADDR TO POKE
1EA9:20 77 13                  JSR  ARGCAR
1EAC:20 2E 1E                  JSR  GETINT
1EAF:B0 2E                     BCS  POKERR
1EB1:A5 50                     LDA  RES        ;SAVE THE ADDR
1EB3:85 52                     STA  RES+2
  B5:A5 51                     LDA  RES+1
1EB7:85 53                     STA  RES+3
1EB9:20 90 13                  JSR  ARGPOP
1EBC:20 85 13                  JSR  ARGCDR
1EBF:20 77 13                  JSR  ARGCAR     ;GET VALUE TO POKE
1EC2:A5 ED                     LDA  ARGPTR
```

```
1EC4:85 6C      101          STA  RESPTR
1EC6:A5 EE      102          LDA  ARGPTR+1
1EC8:85 6D      103          STA  RESPTR+1
1ECA:20 2E 1E   104          JSR  GETINT
1ECD:B0 10      105          BCS  POKERR
1ECF:A5 51      106          LDA  RES+1      ;CHECK VALUE TO POKE ((255)
1ED1:D0 0C      107          BNE  POKERR
1ED3:A0 00      108          LDY  #0
1ED5:A5 50      109          LDA  RES        ;POKE THE VALUE
1ED7:91 52      110          STA  (RES+2),Y
1ED9:20 D2 0D   111          JSR  INITREG    ;CLEAR REGS. FOR APLSFT
1EDC:4C F0 11   112          JMP  EVALRET    ;RETURN
1EDF:A2 07      113 POKERR   LDX  #7
1EE1:A0 26      114          LDY  #38
1EE3:4C EA 24   115          JMP  ERROR
1EE6:4C 4A 14   116 POKEFEW  JMP  TOOFEW
1EE9:4C 4F 14   117 POKEMANY JMP  TOOMANY
                118 ***********************************************
1EEC:           119 * ZERO
                120 ***********************************************
1EEC:20 A6 0E   121 ZERO     JSR  SETRET     ;GET ARG
1EEF:4C BE 13   122          JMP  GET1
1EF2:B0 2D      123          BCS  ZERERR2
1EF4:20 10 15   124          JSR  NUMCHK     ;MAKE SURE ITS NUMERIC
1EF7:B0 26      125          BCS  ZERERR
1EF9:20 77 13   126          JSR  ARGCAR
1EFC:A0 02      127          LDY  #2         ;CHECK FOR INTEGER
1EFE:B1 ED      128          LDA  (ARGPTR),Y
1F00:D0 15      129          BNE  ZERFP
1F02:A0 00      130          LDY  #0         ;YES--CHECK VALUE
1F04:B1 ED      131          LDA  (ARGPTR),Y
1F06:C8         132          INY
1F07:11 ED      133          ORA  (ARGPTR),Y
1F09:F0 06      134          BEQ  ZERT
1F0B:20 E6 1C   135 ZERNIL   JSR  CLEARARG
1F0E:4C E3 14   136          JMP  NILRETURN
1F11:20 E6 1C   137 ZERT     JSR  CLEARARG
1F14:4C E9 14   138          JMP  TRETURN
1F17:A0 00      139 ZERFP    LDY  #0         ;FOR FP, EXPONENT MUST BE 0
1F19:B1 ED      140          LDA  (ARGPTR),Y
1F1B:F0 F4      141          BEQ  ZERT
1F1D:D0 EC      142          BNE  ZERNIL
1F1F:A2 07      143 ZERERR   LDX  #7
1F21:A0 27      144 ZERERR2  LDY  #39
1F23:4C EA 24   145          JMP  ERROR
                146 ***********************************************
1F26:           147 * HTAB
                148 ***********************************************
1F26:20 A6 0E   149 HTAB     JSR  SETRET     ;GET ARG
1F29:4C BE 13   150          JMP  GET1
1F2C:B0 22      151          BCS  HTABERR
1F2E:20 2E 1E   152          JSR  GETINT     ;MUST BE INTEGER
1F31:B0 1B      153          BCS  HTABERR2
1F33:A5 50      154          LDA  RES
1F35:CD 30 0F   155          CMP  CTR
1F38:B0 03      156          BCS  NOHSCROLL
1F3A:20 0A 0A   157          JSR  SCROLL
1F3D:A5 50      158 NOHSCROLL LDA RES
```

```
1F3F:38          159          SEC
1F40:ED 30 0F    160          SBC  CTR
1F43:30 06       161          BMI  HTABRET
1F45:F0 04       162          BEQ  HTABRET
1F47:AA          163          TAX
1F48:20 0A 11    164          JSR  TABIT
1F4B:4C F0 11    165 HTABRET  JMP  EVALRET
1F4E:A2 07       166 HTABERR2 LDX  #7
1F50:A0 28       167 HTABERR  LDY  #40
1F52:4C EA 24    168          JMP  ERROR
                 169 ************************************************
1F55:            170 * VTAB
                 171 ************************************************
1F55:20 A6 0E    172 VTAB     JSR  SETRET
1F58:4C BE 13    173          JMP  GET1       ;GET THE ARG
1F5B:B0 18       174          BCS  VTABERR
1F5D:20 2E 1E    175          JSR  GETINT
1F60:B0 11       176          BCS  VTABERR2
1F62:A5 50       177          LDA  RES
1F64:AE 81 C0    178          LDX  ROMSEL
1F67:20 5B FB    179          JSR  TABV       ;SET VERTICAL TAB
1F6A:AD 8B C0    180          LDA  RAMSEL
1F6D:AD 8B C0    181          LDA  RAMSEL
1F70:4C F0 11    182          JMP  EVALRET
1F73:A2 07       183 VTABERR2 LDX  #7
1F75:A0 29       184 VTABERR  LDY  #41
1F77:4C EA 24    185          JMP  ERROR
1F7A:            186          CHN  EVAL11.SRC
                   1 ************************************************
1F7A:              2 * ROUTINE TO LOAD ARGS FOR COMPARE
                   3 ************************************************
1F7A:20 89 13      4 EQSUB    JSR  ARGPUSH
1F7D:20 77 13      5          JSR  ARGCAR     ;PUT FIRST ARG IN ARGPTR
1F80:20 12 0F      6          JSR  WK1POP
1F83:20 C0 0D      7          JSR  WK1CDR     ;PUT 2ND IN WK1
1F86:4C CE 0D      8          JMP  WK1CAR
                   9 ************************************************
1F89:             10 * ROUTINE TO COMPARE PTRS
                  11 ************************************************
1F89:A5 ED        12 EQPTRS   LDA  ARGPTR     ;COMPARE ARGPTR & WK1
1F8B:C5 CE        13          CMP  WK1
1F8D:D0 07        14          BNE  EQPNIL
1F8F:A5 EE        15          LDA  ARGPTR+1
1F91:C5 CF        16          CMP  WK1+1
1F93:D0 01        17          BNE  EQPNIL
1F95:60           18          RTS              ;RETURN CS IF EQUAL
1F96:18           19 EQPNIL   CLC
1F97:60           20          RTS
                  21 ************************************************
1F98:             22 * ROUTINE TO COMPARE 2 NUMERIC ATOMS
                  23 ************************************************
1F98:A5 ED        24 EQNUM    LDA  ARGPTR     ;CLEAR ATOM BITS
1F9A:29 FC        25          AND  #$FC
1F9C:85 ED        26          STA  ARGPTR
1F9E:A5 CE        27          LDA  WK1
1FA0:29 FC        28          AND  #$FC
1FA2:85 CE        29          STA  WK1
1FA4:A0 02        30          LDY  #2         ;CHECK TYPES
```

```
 16:B1 ED        31          LDA  (ARGPTR),Y
 A8:11 CE        32          ORA  (WK1),Y
1FAA:D0 36       33          BNE  EQNUMNIL
1FAC:C8          34          INY                ;BOTH CONSTANTS
1FAD:B1 ED       35          LDA  (ARGPTR),Y
1FAF:11 CE       36          ORA  (WK1),Y
1FB1:48          37          PHA
1FB2:20 CE 0D    38          JSR  WK1CAR
1FB5:20 77 13    39          JSR  ARGCAR
1FB8:68          40          PLA
1FB9:F0 35       41          BEQ  EQSTR      ;BOTH NUMERIC--
1FBB:A0 02       42          LDY  #2
1FBD:B1 ED       43          LDA  (ARGPTR),Y
1FBF:D0 23       44          BNE  EQFLTLD1   ;LOAD CORRECT REGISTERS
1FC1:20 2B 1D    45          JSR  INTALD
1FC4:20 FA 19    46 EQNXTNM  JSR  WK1ARG     ;MOVE WK1 TO ARG
1FC7:A0 02       47          LDY  #2
1FC9:B1 ED       48          LDA  (ARGPTR),Y
1FCB:D0 1D       49          BNE  EQFLTLD2
1FCD:20 3B 1D    50          JSR  INTFLD
1FD0:20 02 0A    51 EQNUM2   JSR  FPSEL      ;SUBTRACT ARGS
1FD3:20 AA E7    52          JSR  FSUBT
1FD6:AD 8B C0    53          LDA  RAMSEL
1FD9:AD 8B C0    54          LDA  RAMSEL
1FDC:A5 9D       55          LDA  FAC        ;RETURN T IF RESULT 0
1FDE:D0 02       56          BNE  EQNUMNIL
 0:38            57 EQNUMT   SEC
1FE1:60          58          RTS
1FE2:18          59 EQNUMNIL CLC
1FE3:60          60          RTS
1FE4:20 0D 1D    61 EQFLTLD1 JSR ARGLD
1FE7:4C C4 1F    62          JMP  EQNXTNM
1FEA:20 11 1D    63 EQFLTLD2 JSR FACLD
1FED:4C D0 1F    64          JMP  EQNUM2
1FF0:A0 00       65 EQSTR    LDY  #0         ;COMPARE STRINGS
1FF2:B1 CE       66          LDA  (WK1),Y
1FF4:D1 ED       67          CMP  (ARGPTR),Y
1FF6:D0 EA       68          BNE  EQNUMNIL
1FF8:C8          69          INY
1FF9:B1 CE       70          LDA  (WK1),Y
1FFB:D1 ED       71          CMP  (ARGPTR),Y
1FFD:D0 E3       72          BNE  EQNUMNIL
1FFF:20 C0 0D    73          JSR  WK1CDR
2002:20 85 13    74          JSR  ARGCDR
2005:A5 CF       75          LDA  WK1+1
2007:05 EE       76          ORA  ARGPTR+1
2009:F0 D5       77          BEQ  EQNUMT
200B:A5 CF       78          LDA  WK1+1
200D:25 EE       79          AND  ARGPTR+1
200F:D0 DF       80          BNE  EQSTR
2011:F0 CF       81          BEQ  EQNUMNIL
                 82 ***************************************************
 13:             83 * EQUAL
                 84 ***************************************************
2013:20 A6 0E    85 EQUAL    JSR  SETRET
2016:4C FE 12    86          JMP  EVLARGS    ;GET 2 ARGS
2019:A0 2B       87          LDY  #43
201B:A5 56       88          LDA  ARCT
```

```
[illegible]D:C9 02        89          CMP  #2
[illegible]1F:F0 04       90          BEQ  EQUALOK
2021:90 59        91          BCC  EQUALFEW
2023:B0 5A        92          BCS  EQUALMANY
2025:20 A6 0E     93 EQUALOK  JSR  SETRET
2028:4C 2E 20     94          JMP  EQUALA
202B:4C F0 11     95          JMP  EVALRET
202E:20 7A 1F     96 EQUALA   JSR  EQSUB      ;LOAD THE ARGS
2031:A5 ED        97 EQUALOK2 LDA  ARGPTR     ;CHECK IF BOTH ATOMIC
2033:25 CE        98          AND  WK1
2035:24 69        99          BIT  ATMTST
2037:F0 16       100          BEQ  NOTATMS
2039:20 89 1F    101          JSR  EQPTRS     ;YES-COMPARE PTRS
203C:B0 0B       102          BCS  EQUALT
203E:20 98 1F    103          JSR  EQNUM      ;NOT EQUAL--TRY NUMERIC COMPARE
2041:B0 06       104          BCS  EQUALT
2043:20 9D 0E    105 EQUALNIL JSR  NILRET     ;NO-RETURN NIL
2046:4C DF 0E    106          JMP  RET
2049:20 F3 14    107 EQUALT   JSR  TRET       ;ELSE RETURN T
204C:4C DF 0E    108          JMP  RET
204F:A5 ED       109 NOTATMS  LDA  ARGPTR     ;NIL IF EITHER IS ATOMIC
2051:05 CE       110          ORA  WK1
2053:24 69       111          BIT  ATMTST
2055:D0 EC       112          BNE  EQUALNIL
2057:20 89 13    113          JSR  ARGPUSH    ;ELSE EQUAL THE CARS
205A:20 77 13    114          JSR  ARGCAR
[illegible]D:20 0B 0F    115          JSR  WK1PUSH
2060:20 CE 0D    116          JSR  WK1CAR
2063:20 A6 0E    117          JSR  SETRET
2066:4C 31 20    118          JMP  EQUALOK2
2069:20 12 0F    119          JSR  WK1POP
206C:20 90 13    120          JSR  ARGPOP
206F:A5 6D       121          LDA  RESPTR+1   ;NIL IF RESULT NIL
2071:F0 D0       122          BEQ  EQUALNIL
2073:20 C0 0D    123          JSR  WK1CDR
2076:20 85 13    124          JSR  ARGCDR
2079:4C 31 20    125          JMP  EQUALOK2   ;ELSE DO CDRS
207C:4C 4A 14    126 EQUALFEW JMP  TOOFEW
207F:4C 4F 14    127 EQUALMANY JMP TOOMANY
                 128 ***************************************************
2082:            129 * EXPLODE
                 130 ***************************************************
2082:20 A6 0E    131 EXPLODE JSR  SETRET     ;GET 1 ARG
2085:4C BE 13    132          JMP  GET1
2088:B0 2D       133          BCS  EXPLERR2
208A:A5 ED       134          LDA  ARGPTR     ;MUST BE ATOMIC
208C:24 69       135          BIT  ATMTST
208E:F0 25       136          BEQ  EXPLERR1
2090:20 A1 10    137          JSR  OUTSAVE    ;SAVE OUTPUT VECTOR
2093:20 9D 0E    138          JSR  NILRET     ;SET RESPTR TO NIL
2096:20 34 21    139          JSR  ARGTOWK1
[illegible]99:A9 BD      140          LDA  #EXPLOUT   ;SET NEW OUTPUT VECTOR
[illegible]JB:85 36      141          STA  OUTVEC
209D:A9 20       142          LDA  #<EXPLOUT
209F:85 37       143          STA  OUTVEC+1
20A1:AD 30 0F    144          LDA  CTR
20A4:48          145          PHA
20A5:20 BB 21    146          JSR  EXPLIMPSUB
```

```
[illegible]8:68          147          PLA
[illegible]A9:8D 30 0F   148          STA  CTR
20AC:20 1A 0F            149          JSR  POP
20AF:20 B3 10            150          JSR  OUTLOAD     ;RESTORE VECTOR
20B2:4C 9C 21            151          JMP  EXPIMPEND   ;RETURN RESULT
20B5:A2 04               152 EXPLERR1 LDX #4           ;BAD ATOMIC ARG ERROR
20B7:A0 2C               153 EXPLERR2 LDY #44
20B9:4C EA 24            154          JMP  ERROR
20BC:                    155 CHARTMP DS   1
20BD:8D BC 20            156 EXPLOUT STA  CHARTMP     ;SAVE CHAR
20C0:A5 CE               157          LDA  WK1        ;SAVE WK1 FOR PRINT
20C2:48                  158          PHA
20C3:A5 CF               159          LDA  WK1+1
20C5:48                  160          PHA
20C6:8A                  161          TXA
20C7:48                  162          PHA
20C8:98                  163          TYA
20C9:48                  164          PHA
20CA:AD 8B C0            165          LDA  RAMSEL
20CD:AD 8B C0            166          LDA  RAMSEL
20D0:AD BC 20            167          LDA  CHARTMP
20D3:C9 B0               168          CMP  #$B0       ;CHECK FOR NUMERIC CHAR.
20D5:90 12               169          BCC  EXPLNOTNM
20D7:C9 BA               170          CMP  #$BA
20D9:B0 0E               171          BCS  EXPLNOTNM
20DB:29 0F               172          AND  #$0F       ;YES-MAKE NEW NUMERIC ATOM
[illegible]D:85 50       173          STA  RES
20DF:A9 00               174          LDA  #0
20E1:85 51               175          STA  RES+1
20E3:20 65 0B            176          JSR  NEWINT2
20E6:4C F6 20            177          JMP  ADDNEWAT
20E9:8D 00 02            178 EXPLNOTNM STA INBUF      ;ELSE STORE IN BUFFER
20EC:A2 00               179          LDX  #0
20EE:86 56               180          STX  NEWBUF
20F0:8E 8B 09            181          STX  OLDBUFPTR
20F3:20 CB 0C            182          JSR  ATMSTOR    ;CREATE NEW ATOM
20F6:20 00 22            183 ADDNEWAT JSR ATMPUSH     ;SAVE ATM PTR IN CASE OF GC
20F9:A5 6D               184          LDA  RESPTR+1   ;CHECK IF RESPTR SET
20FB:F0 2E               185          BEQ  RESSET
20FD:20 07 22            186          JSR  ATMPOP
2100:20 F4 0E            187          JSR  CELPOP     ;YES--LINK NEW CELL TO OLD
2103:20 00 22            188          JSR  ATMPUSH
2106:20 C8 0B            189          JSR  CDRLINK
2109:20 07 22            190 EXPL2    JSR  ATMPOP
210C:A0 00               191          LDY  #0         ;PUT NEW ATOM IN CAR
210E:A5 5D               192          LDA  ATMPTR+1
2110:91 5A               193          STA  (CELPTR),Y
2112:C8                  194          INY
2113:A5 5C               195          LDA  ATMPTR
2115:91 5A               196          STA  (CELPTR),Y
2117:20 ED 0E            197          JSR  CELPUSH    ;SAVE CELL AND RETURN
[illegible]A:20 02 0A    198 SELFP    JSR  FPSEL
[illegible]D:68          199 EXPLOUT2 PLA
211E:A8                  200          TAY
211F:68                  201          PLA
2120:AA                  202          TAX
2121:68                  203          PLA              ;RESTORE WK1
2122:85 CF               204          STA  WK1+1
```

```
2124:68          205          PLA
2125:85 CE       206          STA  WK1
2127:AD BC 20    207          LDA  CHARTMP
212A:60          208          RTS
212B:20 79 0C    209 RESSET   JSR  GETCEL     ;SET RESPTR TO FIRST CELL
212E:20 94 0E    210          JSR  CELRES
2131:4C 09 21    211          JMP  EXPL2
                 212 ***********************************************
2134:            213 * ROUTINE TO PUT ARGPTR IN WK1
                 214 ***********************************************
2134:A5 ED       215 ARGTOWK1 LDA ARGPTR
2136:85 CE       216          STA  WK1
2138:A5 EE       217          LDA  ARGPTR+1
213A:85 CF       218          STA  WK1+1
213C:60          219          RTS
                 220 ***********************************************
213D:            221 * IMPLODE
                 222 ***********************************************
213D:20 A6 0E    223 IMPLODE JSR  SETRET     ;GET 1 ARG
2140:4C BE 13    224          JMP  GET1
2143:B0 63       225          BCS  IMPLERR1
2145:A5 ED       226          LDA  ARGPTR     ;MUST BE A LIST
2147:24 69       227          BIT  ATMTST
2149:D0 58       228          BNE  IMPLERR2
214B:A0 00       229          LDY  #0         ;INIT PTRS
214D:84 74       230          STY  BUFPTR
214F:84 56       231          STY  NEWBUF
2151:20 A1 10    232          JSR  OUTSAVE    ;SAVE OUTPUT VECTOR
2154:A9 AD       233          LDA  #IMPLOUT   ;SET NEW VECTOR
2156:85 36       234          STA  OUTVEC
2158:A9 21       235          LDA  #(IMPLOUT
215A:85 37       236          STA  OUTVEC+1
215C:20 34 21    237          JSR  ARGTOWK1
215F:20 0B 0F    238 IMPLP    JSR  WK1PUSH    ;GET LIST ELEMENT
2162:20 CE 0D    239          JSR  WK1CAR
2165:A5 CE       240          LDA  WK1        ;MAKE SURE ITS AN ATOM
2167:24 69       241          BIT  ATMTST
2169:F0 38       242          BEQ  IMPLERR2
216B:AD 30 0F    243          LDA  CTR
216E:48          244          PHA
216F:20 BB 21    245          JSR  EXPLIMPSUB ;"PRINT" THE ATOM
2172:68          246          PLA
2173:8D 30 0F    247          STA  CTR
2176:20 12 0F    248          JSR  WK1POP
2179:20 C0 0D    249          JSR  WK1CDR
217C:A5 CF       250          LDA  WK1+1
217E:D0 DF       251          BNE  IMPLP      ;REPEAT TO END OF LIST
2180:A4 56       252          LDY  NEWBUF     ;DELIMIT WITH SPACE
2182:A9 8D       253          LDA  #$8D
2184:99 00 02    254          STA  INBUF,Y
2187:A9 AD       255          LDA  #173       ;SAVE FCN # IN CASE OF ERROR
2199:8D 8A 09    256          STA  LEXERRSAV
219C:A0 00       257          LDY  #0
218E:84 56       258          STY  NEWBUF
2190:20 D2 0D    259          JSR  INITREG
2193:20 B3 10    260          JSR  OUTLOAD    ;RESTORE OUTPUT VECTOR
2196:20 64 0A    261          JSR  FSTCHR     ;CREATE NEW ATOM
2199:20 8B 0E    262          JSR  ATMRES
```

```
21BC:A2 FF      263 EXPIMPEND LDX #$FF      ;CLEAR BUFFER
21BE:86 74      264           STX  BUFPTR
21A0:4C F0 11   265           JMP  EVALRET
21A3:20 B3 10   266 IMPLERR2 JSR OUTLOAD
21A6:A2 08      267           LDX  #8       ;BAD LIST ARG ERROR
21A8:A0 2D      268 IMPLERR1 LDY #45
21AA:4C EA 24   269           JMP  ERROR
21AD:8C BC 20   270 IMPLOUT STY  CHARTMP    ;SAVE Y
21B0:A4 56      271           LDY  NEWBUF
21B2:99 00 02   272           STA  INBUF,Y
21B5:E6 56      273           INC  NEWBUF
21B7:AC BC 20   274           LDY  CHARTMP
21BA:60         275           RTS
                276 ***********************************************
21BB:           277 * ROUTINE TO "PRINT" ATOM FOR EXPLODE
21BB:           278 * OR IMPLODE
                279 ***********************************************
21BB:20 D2 0D   280 EXPLIMPSUB JSR INITREG ;CLEAR REG. FOR APLSFT
21BE:A5 CE      281           LDA  WK1      ;CLEAR ATOM BIT
21C0:29 FC      282           AND  #$FC
21C2:85 CE      283           STA  WK1
21C4:A0 02      284           LDY  #2       ;CHECK ATOM TYPE
21C6:B1 CE      285           LDA  (WK1),Y
21C8:F0 09      286           BEQ  EXPLCONST
21CA:20 C0 0D   287           JSR  WK1CDR
21CD:20 CE 0D   288 EXPLNAM JSR  WK1CAR
21D0:4C 02 10   289           JMP  PNAM
21D3:C8         290 EXPLCONST INY           ;CHECK FOR STRING
21D4:B1 CE      291           LDA  (WK1),Y
21D6:F0 F5      292           BEQ  EXPLNAM
21D8:20 CE 0D   293 EXPLNUM JSR  WK1CAR     ;ELSE CHECK NUMBER TYPE
21DB:A0 02      294           LDY  #2
21DD:B1 CE      295           LDA  (WK1),Y
21DF:D0 19      296           BNE  EXPLUS
21E1:20 BC 10   297           JSR  INTGET   ;INTEGER--
21E4:A2 50      298           LDX  #RES
21E6:A9 00      299           LDA  #0
21E8:85 58      300           STA  MSIGN
21EA:20 B4 0B   301           JSR  TWOSCOMP ;TAKE 2S COMP. IF NEG.
21ED:20 02 0A   302           JSR  FPSEL
21F0:20 D1 10   303           JSR  INTPRINT ;PRINT IT
21F3:AD 8B C0   304           LDA  RAMSEL
21F6:AD 8B C0   305           LDA  RAMSEL
21F9:60         306           RTS
21FA:20 14 11   307 EXPLUS  JSR  FACGET     ;ELSE LOAD NUMBER
21FD:4C 7A 10   308           JMP  FPPRINTA ;AND PRINT IT
                309 ***********************************************
2200:           310 * SAVE/RESTORE ATMPTR
                311 ***********************************************
2200:A6 5C      312 ATMPUSH LDX  ATMPTR
2202:A4 5D      313           LDY  ATMPTR+1
2204:4C B4 0E   314           JMP  PUSH
2207:20 1A 0F   315 ATMPOP  JSR  POP
220A:86 5C      316           STX  ATMPTR
220C:84 5D      317           STY  ATMPTR+1
220E:60         318           RTS
220F:           319           CHN  EVAL12.SRC
                  1 ***********************************************
```

```
F:                  * GREATER
                    ************************************************
220F:20 A6 0E       GREATER JSR  SETRET     ;GET 2 ARGS
2212:4C FE 12               JMP  EVLARGS
2215:A0 2E                  LDY  #46
2217:A5 56                  LDA  ARCT
2219:C9 02                  CMP  #2
221B:F0 04                  BEQ  GREATOK
221D:90 24                  BCC  GREATFEW
221F:B0 25                  BCS  GREATMANY
2221:8C 8A 09       GREATOK STY  LEXERRSAV
2224:20 AC 1C               JSR  LOADNMS    ;LOAD THE NUMBERS
2227:20 02 0A               JSR  FPSEL
222A:A5 9D                  LDA  FAC        ;SUBTRACT THE ARGS
222C:20 AA E7               JSR  FSUBT
222F:AD 8B C0               LDA  RAMSEL
2232:AD 8B C0               LDA  RAMSEL
2235:A5 9D                  LDA  FAC        ;CHECK RESULT
2237:F0 07                  BEQ  GRNIL
2239:A5 A2                  LDA  FAC+5
223B:30 03                  BMI  GRNIL
223D:4C E9 14               JMP  TRETURN    ;RETURN NIL IF NEGATIVE
2240:4C E3 14       GRNIL   JMP  NILRETURN
2243:4C 4A 14       GREATFEW JMP TOOFEW
2246:4C 4F 14       GREATMANY JMP TOOMANY
                    ************************************************
9:                  * ROUTINE TO SEARCH LIST IN WK1 FOR ARGPTR
                    ************************************************
2249:A5 CF          MEMBSUB LDA  WK1+1
224B:F0 1E                  BEQ  NOTMEMB    ;CHECK IF FINISHED
224D:20 FC 0E               JSR  RESPUSH
2250:20 89 13               JSR  ARGPUSH
2253:20 0B 0F               JSR  WK1PUSH
2256:20 CE 0D               JSR  WK1CAR
2259:20 A6 0E               JSR  SETRET     ;CALL EQUAL SUBR
225C:4C 31 20               JMP  EQUALOK2
225F:20 12 0F               JSR  WK1POP
2262:20 90 13               JSR  ARGPOP
2265:A5 6D                  LDA  RESPTR+1   ;RETURN IF EQUAL
2267:F0 04                  BEQ  MEMNEXT    ;ELSE KEEP SEARCHING
2269:38                     SEC
226A:60                     RTS
226B:18             NOTMEMB CLC
226C:60                     RTS
226D:20 1A 0F       MEMNEXT JSR  POP
2270:A5 CE                  LDA  WK1
2272:85 6C                  STA  RESPTR
2274:A5 CF                  LDA  WK1+1
2276:85 6D                  STA  RESPTR+1
2278:20 C0 0D               JSR  WK1CDR
227B:4C 49 22               JMP  MEMBSUB
                    ************************************************
/E:                 * MEMBER
                    ************************************************
227E:20 A6 0E       MEMBER  JSR  SETRET     ;GET ARGS
2281:4C FE 12               JMP  EVLARGS
2284:A0 3F                  LDY  #63
2286:20 12 23               JSR  DELMEM     ;CHECK ARGS
```

```
[illegible]9:20 9D 0E   60          JSR  NILRET     ;INIT RESULT
[illegible]C:20 49 22   61          JSR  MEMBSUB    ;SEARCH LIST FOR STUFF
228F:90 06              62          BCC  NOTMEMBB
2291:20 1A 0F           63          JSR  POP
2294:4C E9 14           64          JMP  TRETURN    ;RETURN RESULT
2297:4C E3 14           65 NOTMEMBB JMP NILRETURN
                        66 ************************************************
229A:                   67 * DELETE SUBROUTINE
229A:                   68 * THING TO DELETE IN ARGPTR, LIST IN WK1
                        69 ************************************************
229A:20 9D 0E           70 DELETESUB JSR NILRET     ;INIT RESULT
229D:20 0B 0F           71          JSR  WK1PUSH
22A0:20 49 22           72 DELLOOP JSR  MEMBSUB     ;SEARCH LIST FOR THING
22A3:90 24              73          BCC  DELEND
22A5:20 03 0F           74          JSR  RESPOP
22A8:A5 6D              75          LDA  RESPTR+1   ;FOUND IT--CHECK IF ITS FIRST
22AA:F0 11              76          BEQ  DELFIRST
22AC:A0 02              77          LDY  #2         ;NO--JUST DELETE IT
22AE:B1 CE              78          LDA  (WK1),Y
22B0:91 6C              79          STA  (RESPTR),Y
22B2:C8                 80          INY
22B3:B1 CE              81          LDA  (WK1),Y
22B5:91 6C              82          STA  (RESPTR),Y
22B7:20 C0 0D           83          JSR  WK1CDR
22BA:4C A0 22           84          JMP  DELLOOP
22BD:20 1A 0F           85 DELFIRST JSR POP         ;POP PTR TO RESULT
[illegible]0:20 C0 0D   86          JSR  WK1CDR     ;RESET IT
22C3:20 0B 0F           87          JSR  WK1PUSH
22C6:4C A0 22           88          JMP  DELLOOP
22C9:4C 03 0F           89 DELEND  JMP  RESPOP      ;RETURN RESULT WHEN FINISHED
                        90 ************************************************
22CC:                   91 * REMOB
                        92 ************************************************
22CC:20 A6 0E           93 REMOB   JSR  SETRET      ;GET ATOM TO REMOB
22CF:4C BE 13           94          JMP  GET1
22D2:B0 11              95          BCS  REMOBER2
22D4:A5 ED              96          LDA  ARGPTR     ;MAKE SURE ARG IS ATOMIC
22D6:24 69              97          BIT  ATMTST
22D8:F0 09              98          BEQ  REMOBERR
22DA:20 E0 0D           99          JSR  OBTOWK1
22DD:20 9A 22          100          JSR  DELETESUB
22E0:4C E3 14          101          JMP  NILRETURN
22E3:A2 04             102 REMOBERR LDX #4          ;BAD ATOMIC ARG ERROR
22E5:A0 37             103 REMOBER2 LDY #55
22E7:4C EA 24          104          JMP  ERROR
                       105 ************************************************
22EA:                  106 * DELETE
                       107 ************************************************
22EA:20 A6 0E          108 DELETE  JSR  SETRET      ;GET 2 ARGS
22ED:4C FE 12          109          JMP  EVLARGS
22F0:A0 3D             110          LDY  #61
[illegible]2:20 12 23  111          JSR  DELMEM
[illegible]5:20 89 13  112          JSR  ARGPUSH    ;MOVE WK1 TO ARG FOR COPY
22F8:20 FA 19          113          JSR  WK1ARG
22FB:20 A6 0E          114          JSR  SETRET
22FE:4C 39 19          115          JMP  COPY2      ;COPY IT
2301:A5 6C             116          LDA  RESPTR
2303:85 CE             117          STA  WK1
```

```
2305:A5 6D      118          LDA  RESPTR+1
2307:85 CF      119          STA  WK1+1
2309:20 90 13   120          JSR  ARGPOP     ;GET ATOM
230C:20 9A 22   121          JSR  DELETESUB  ;DELETE IT
230F:4C F0 11   122          JMP  EVALRET
                123 ************************************************
2312:           124 * FOR DELETE AND MEMBER--ROUTINE TO
2312:           125 * GET INPUT
                126 ************************************************
2312:A5 56      127 DELMEM   LDA  ARCT       ;CHECK FOR 2 ARGS
2314:8C 8A 09   128          STY  LEXERRSAV
2317:C9 02      129          CMP  #2
2319:F0 04      130          BEQ  DELMOK
231B:90 15      131          BCC  DELMFEW
231D:B0 16      132          BCS  DELMMANY
231F:20 34 21   133 DELMOK   JSR  ARGTOWK1   ;MOVE ARGLIST
2322:20 77 13   134          JSR  ARGCAR     ;ARGPTR = STUFF TO LOOK FOR
2325:20 C0 0D   135          JSR  WK1CDR
2328:20 CE 0D   136          JSR  WK1CAR     ;WK1 = LIST TO SEARCH
232B:A5 CE      137          LDA  WK1        ;2ND ARG MUST BE LIST
232D:24 69      138          BIT  ATMTST
232F:D0 07      139          BNE  DELMERR
2331:60         140          RTS
2332:4C 4A 14   141 DELMFEW  JMP  TOOFEW
2335:4C 4F 14   142 DELMMANY JMP  TOOMANY
2338:A2 08      143 DELMERR  LDX  #8         ;BAD LIST ARG
233A:AC 8A 09   144          LDY  LEXERRSAV
233D:4C EA 24   145          JMP  ERROR
                146 ************************************************
2340:           147 * CHR
                148 ************************************************
2340:20 A6 0E   149 CHR      JSR  SETRET     ;GET NUMERIC ARG
2343:4C BE 13   150          JMP  GET1
2346:B0 1E      151          BCS  CHRERR1
2348:20 2E 1E   152          JSR  GETINT
234B:B0 17      153          BCS  CHRERR2
234D:A5 50      154          LDA  RES        ;CREATE ASCII CHAR.
234F:09 80      155          ORA  #$80
2351:8D 00 02   156 GETCHR2  STA  INBUF
2354:A2 00      157          LDX  #0
2356:86 56      158          STX  NEWBUF
2358:8E 8B 09   159          STX  OLDBUFPTR
235B:20 6A 0D   160          JSR  STRSTORE   ;CREATE STRING ATOM
235E:20 8B 0E   161          JSR  ATMRES
2361:4C F0 11   162          JMP  EVALRET
2364:A2 07      163 CHRERR2  LDX  #7         ;BAD NUMERIC ARG ERROR
2366:A0 2F      164 CHRERR1  LDY  #47
2368:4C EA 24   165          JMP  ERROR
                166 ************************************************
236B:           167 * GETCHR
                168 ************************************************
236B:AD 00 C0   169 GETCHRA  LDA  $C000      ;READ KEYBOARD
236E:10 FB      170          BPL  GETCHRA
2370:8D 10 C0   171          STA  $C010
2373:C9 BA      172          CMP  #$BA       ;CHECK FOR DIGIT
2375:B0 DA      173          BCS  GETCHR2
2377:C9 B0      174          CMP  #$B0
2379:90 D6      175          BCC  GETCHR2
```

```
237B:29 0F      176          AND  #$0F       ;DIGIT-CREATE NUMERIC ATOM
237D:85 50      177          STA  RES
237F:A9 00      178          LDA  #0
2381:85 51      179          STA  RES+1
2383:20 65 0B   180          JSR  NEWINT2
2386:20 7A 1D   181          JSR  NEWRES
2389:4C F0 11   182          JMP  EVALRET
                183 ************************************************
238C:           184 * ASC
                185 ************************************************
238C:20 A6 0E   186 ASC      JSR  SETRET     ;GET ARG
238F:4C BE 13   187          JMP  GET1
2392:B0 27      188          BCS  ASCERR
2394:20 1B 14   189          JSR  LITCHK     ;MUST BE LITERAL
2397:B1 ED      190          LDA  (ARGPTR),Y
2399:D0 07      191          BNE  ASC2
239B:C8         192          INY
239C:B1 ED      193          LDA  (ARGPTR),Y
239E:D0 1B      194          BNE  ASCERR
23A0:F0 03      195          BEQ  ASC3
23A2:20 85 13   196 ASC2     JSR  ARGCDR     ;GET 1ST PNAME CELL
23A5:20 77 13   197 ASC3     JSR  ARGCAR
23A8:A0 00      198          LDY  #0
23AA:B1 ED      199          LDA  (ARGPTR),Y ;1ST CHAR OF PNAME
23AC:29 7F      200          AND  #$7F       ;CLEAR HI BIT
23AE:84 51      201          STY  RES+1
23B0:85 50      202          STA  RES
23B2:20 65 0B   203          JSR  NEWINT2    ;MAKE VALUE OF CHAR AN ATOM
23B5:20 8B 0E   204          JSR  ATMRES
23B8:4C F0 11   205          JMP  EVALRET
23BB:A0 40      206 ASCERR   LDY  #64
23BD:4C EA 24   207          JMP  ERROR
23C0:           208          CHN  TRACE.SRC
                  1 ************************************************
23C0:             2 * TRACE ROUTINES
                  3 ************************************************
23C0:             4 *
                  5 ************************************************
23C0:             6 * TRACE STORAGE
                  7 ************************************************
23C0:             8 TRTBL    DS   21
23D5:             9 TRINDX   DS   1
23D6:            10 TRACEFLG DS   1
                 11 ************************************************
23D7:            12 * TRACE IN
                 13 ************************************************
23D7:AD D6 23    14 TRACEIN LDA   TRACEFLG  ;CHECK TRACE FLAG
23DA:F0 24       15          BEQ   TRACEND
23DC:20 AE 24    16          JSR   TRACCHK  ;CHECK TABLE FOR FCN
23DF:90 1F       17          BCC   TRACEND
23E1:EE D6 23    18          INC   TRACEFLG ;ELSE TURN OFF TRACE FLAG
23E4:A2 0F       19          LDX   #15
23E6:20 02 24    20          JSR   TRCSUB
23E9:20 80 12    21          JSR   EVLCDR
23EC:20 A6 0E    22          JSR   SETRET
23EF:4C FE 12    23          JMP   EVLARGS  ;EVAL THE ARGS
23F2:20 34 21    24          JSR   ARGTOWK1
23F5:20 31 0F    25          JSR   PRINT
```

```
23F8:CE D6 23   26          DEC  TRACEFLG   ;TURN TRACE BACK ON
23FB:20 0A 0A   27 TRACENDA JSR SCROLL
23FE:38         28          SEC
23FF:60         29          RTS
2400:18         30 TRACEND CLC
2401:60         31          RTS
                32 ***********************************************
2402:           33 * ROUTINE TO PRINT ARROWS & FCN NAME
                34 ***********************************************
2402:20 72 26   35 TRCSUB   JSR  MESPRT
2405:A5 EB      36          LDA  CARPTR
2407:85 CE      37          STA  WK1
2409:A5 EC      38          LDA  CARPTR+1
240B:85 CF      39          STA  WK1+1
240D:20 A6 0E   40          JSR  SETRET
2410:4C 9B 0F   41          JMP  PATOM      ;PRINT FCN NAME
2413:A2 0E      42          LDX  #14        ;PRINT COLONS & SPACE
2415:4C 72 26   43          JMP  MESPRT
                44 ***********************************************
2418:           45 * TRACE OUT
                46 ***********************************************
2418:20 8E 12   47 TRACEOUT JSR EVLCAR      ;GET FCN NAME
241B:A5 D6      48          LDA  EVLPTR
241D:85 EB      49          STA  CARPTR
241F:A5 D7      50          LDA  EVLPTR+1
2421:85 EC      51          STA  CARPTR+1
2423:20 AE 24   52          JSR  TRACCHK    ;CHECK TABLE
2426:90 18      53          BCC  NOOUT
2428:AD D6 23   54          LDA  TRACEFLG   ;DO NOTHING IF FLAG OFF
242B:F0 13      55          BEQ  NOOUT
242D:A2 10      56          LDX  #16
242F:20 02 24   57          JSR  TRCSUB     ;PRINT ARROWS & FCN NAME
2432:A5 6C      58          LDA  RESPTR
2434:85 CE      59          STA  WK1
2436:A5 6D      60          LDA  RESPTR+1
2438:85 CF      61          STA  WK1+1
243A:20 31 0F   62          JSR  PRINT      ;PRINT RESULT
243D:20 FB 23   63          JSR  TRACENDA
2440:60         64 NOOUT    RTS
                65 ***********************************************
2441:           66 * TRACE
                67 ***********************************************
2441:20 A6 13   68 TRACE    JSR  GETM       ;GET FCN TO TRACE
2444:B0 1B      69          BCS  TRCFN
2446:A5 ED      70          LDA  ARGPTR
2448:24 69      71          BIT  ATMTST
244A:F0 18      72          BEQ  TRACERR2   ;MAKE SURE ITS ATOMIC
244C:AE D5 23   73          LDX  TRINDX
244F:F0 10      74          BEQ  TRCFN
2451:9D C0 23   75          STA  TRTBL,X    ;STORE IN TABLE IF THERE'S ROOM
2454:CA         76          DEX
2455:A5 EE      77          LDA  ARGPTR+1
2457:9D C0 23   78          STA  TRTBL,X
245A:CA         79          DEX
245B:8E D5 23   80          STX  TRINDX
245E:4C 41 24   81          JMP  TRACE      ;REPEAT FOR NEXT FCN
2461:4C E9 14   82 TRCFN    JMP  TRETURN    ;RETURN T WHEN FINISHED
2464:A0 31      83 TRACERR2 LDY #49
```

```
246A:A2 04        84 TRACERR LDX  #4
246C:4C EA 24     85         JMP  ERROR
                  86 ************************************************
246B:             87 * UNTRACE
                  88 ************************************************
246B:20 A6 13     89 UNTRACE JSR  GETM       ;GET FCN NAME
246E:B0 37        90         BCS  UNTALL
2470:A5 ED        91 UNTLP   LDA  ARGPTR     ;MAKE SURE ITS ATOMIC
2472:A0 32        92         LDY  #50
2474:24 69        93         BIT  ATMTST
2476:F0 EE        94         BEQ  TRACERR
2478:85 EB        95 UNTNXT  STA  CARPTR
247A:A5 EE        96         LDA  ARGPTR+1
247C:85 EC        97         STA  CARPTR+1
247E:20 AE 24     98         JSR  TRACCHK
2481:90 1C        99         BCC  UTRNXT
2483:CA          100 UTRLP   DEX              ;FOUND IT-REMOVE FROM TABLE
2484:CA          101         DEX
2485:EC D5 23    102         CPX  TRINDX
2488:F0 0F       103         BEQ  UNTFN
248A:BD C0 23    104         LDA  TRTBL,X
248D:9D C2 23    105         STA  TRTBL+2,X
2490:BD BF 23    106         LDA  TRTBL-1,X
2493:9D C1 23    107         STA  TRTBL+1,X
2496:4C 83 24    108         JMP  UTRLP
2499:EE D5 23    109 UNTFN   INC  TRINDX    ;UPDATE PTR
249C:EE D5 23    110         INC  TRINDX
249F:20 A6 13    111 UTRNXT  JSR  GETM      ;REPEAT FOR REMAINING ARGS
24A2:90 CC       112         BCC  UNTLP
24A4:4C E3 14    113 UNTRFN  JMP  NILRETURN ;RETURN NIL WHEN FINISHED
24A7:A2 14       114 UNTALL  LDX  #20       ;REMOVE ALL ENTRIES IF NO ARGS
24A9:8E D5 23    115         STX  TRINDX
24AC:D0 F6       116         BNE  UNTRFN
24AE:AE D5 23    117 TRACCHK LDX  TRINDX    ;SEARCH TRACE TABLE FOR FCN
24B1:E0 14       118 TRCTBLP CPX  #20
24B3:F0 12       119         BEQ  TRCCHKFN
24B5:E8          120         INX
24B6:BD C0 23    121         LDA  TRTBL,X
24B9:E8          122         INX
24BA:C5 EC       123         CMP  CARPTR+1
24BC:D0 F3       124         BNE  TRCTBLP
24BE:BD C0 23    125         LDA  TRTBL,X
24C1:C5 EB       126         CMP  CARPTR
24C3:D0 EC       127         BNE  TRCTBLP
24C5:38          128         SEC
24C6:60          129         RTS
24C7:18          130 TRCCHKFN CLC
24C8:60          131         RTS
24C9:            132         CHN  ERROR.SRC
                   1 ************************************************
24C9:              2 * ONERR
                   3 ************************************************
24C9:20 A6 13      4 ONERR    JSR  GETM
24CC:B0 11         5          BCS  ERRFLGOFF ;TURN OFF FLAG IF NO ARG
24CE:A5 ED         6          LDA  ARGPTR    ;ELSE SAVE ARGPTR
24D0:8D E6 24      7          STA  ONERRPTR
24D3:A5 EE         8          LDA  ARGPTR+1
24D5:8D E7 24      9          STA  ONERRPTR+1
```

```
08:A9 FF        10          LDA  #$FF
DA:85 FE        11          STA  ONERRFLG
24DC:4C E9 14   12          JMP  TRETURN     ;RETURN T
24DF:A9 00      13 ERRFLGOFF LDA #0
24E1:85 FE      14          STA  ONERRFLG
24E3:4C E3 14   15          JMP  NILRETURN
24E6:00 00      16 ONERRPTR DFB $0,$0
24E8:00 00      17 OLDEVLPTR DFB $0,$0
                18 ************************************************
24EA:           19 * ERROR HANDLER
                20 ************************************************
24EA:A9 FF      21 ERROR    LDA  #$FF        ;CLEAR INPUT BUFFER
24EC:85 74      22          STA  BUFPTR
24EE:8D D6 23   23          STA  TRACEFLG
24F1:8D 8C 25   24          STA  CONTINUEFLG
24F4:84 60      25          STY  TMP1
24F6:A0 00      26          LDY  #0          ;IF FILE IS OPEN, PRINT CTRL-D
24F8:84 FD      27          STY  FREEFLG
24FA:84 82      28          STY  INDENT
24FC:B1 40      29          LDA  (DOSPTR),Y
24FE:F0 0A      30          BEQ  NOFILEOPEN
2500:A9 84      31          LDA  #$84
2502:20 0C 0A   32          JSR  COUT
2505:A9 8D      33          LDA  #$8D
2507:20 0C 0A   34          JSR  COUT
250A:A4 60      35 NOFILEOPEN LDY TMP1
C:A5 FE         36          LDA  ONERRFLG    ;CHECK ONERR FLAG
250E:30 5C      37          BMI  ONERRGO     ;OFF-PRINT MESSAGE
2510:8A         38          TXA               ;CHECK FOR DOS ERROR
2511:10 0B      39          BPL  NODOSERR
2513:C9 FF      40          CMP  #$FF
2515:F0 07      41          BEQ  NODOSERR
2517:C9 90      42          CMP  #$90
2519:B0 03      43          BCS  NODOSERR
251B:4C AF 25   44          JMP  BREAKMODE
251E:98         45 NODOSERR TYA
251F:48         46          PHA
2520:8A         47          TXA
2521:48         48          PHA
2522:20 0A 0A   49          JSR  SCROLL
2525:A2 0C      50          LDX  #12         ;PRINT "** ERROR::"
2527:20 72 26   51          JSR  MESPRT
252A:68         52          PLA
252B:AA         53          TAX
252C:20 72 26   54          JSR  MESPRT      ;PRINT THE MESSAGE
252F:A2 0D      55          LDX  #13
2531:20 72 26   56          JSR  MESPRT      ;PRINT SPACE & SCROLL
2534:68         57          PLA               ;GET FCN #
2535:C9 FF      58          CMP  #$FF        ;$FF=NO FCN NAME (EG RECURSION CHECK)
2537:F0 14      59          BEQ  NOERRFCN
2539:C9 80      60          CMP  #$80        ;$80=LEXAN ERROR
3B:B0 16        61          BCS  LEXERR
3D:20 5B 26     62          JSR  FCNPRT      ;PRINT FCN NAME
2540:AD E8 24   63          LDA  OLDEVLPTR ;PRINT STUFF IN EVLPTR
543:85 CE       64          STA  WK1
45:AD E9 24     65          LDA  OLDEVLPTR+1
9:85 CF         66          STA  WK1+1
:20 31 0F       67          JSR  PRINT
```

```
[illegible]D:20 0A 0A   68 NOERRFCN JSR SCROLL
[illegible]0:4C AF 25   69          JMP  BREAKMODE ;GO TO BREAKMODE
2553:29 7F              70 LEXERR   AND  #$7F      ;LEXAN ERROR-PRINT FCN (READ OR IMPLOD
E)
2555:20 5B 26           71          JSR  FCNPRT
2558:AE 8B 09           72          LDX  OLDBUFPTR
255B:BD 00 02           73 LEXERRLP LDA INBUF,X    ;PRINT REMAINDER OF INPUT BUFFER
255E:09 80              74          ORA  #$80
2560:C9 8D              75          CMP  #$8D
2562:F0 E9              76          BEQ  NOERRFCN
2564:20 0C 0A           77          JSR  COUT
2567:E8                 78          INX
2568:D0 F1              79          BNE  LEXERRLP
256A:F0 E1              80          BEQ  NOERRFCN
                        81 ************************************************
256C:                   82 * ONERRGO--GO HERE IF ONERR FLAG SET
                        83 ************************************************
256C:8A                 84 ONERRGO TXA
256D:10 05              85          BPL  NOTDOSERR
256F:29 0F              86          AND  #$0F      ;DOS ERROR!
2571:4C 77 25           87          JMP  ERRSTOR
2574:18                 88 NOTDOSERR CLC
2575:69 10              89          ADC  #16       ;ADD 16 BECAUSE OF DOS ERROR CODES
2577:85 DE              90 ERRSTOR STA  FPERR      ;SAVE IN APLSFT ERROR LOC
2579:AD E6 24           91          LDA  ONERRPTR  ;SET EVLPTR
257C:85 D6              92          STA  EVLPTR
[illegible]E:AD E7 24   93          LDA  ONERRPTR+1
2581:85 D7              94          STA  EVLPTR+1
2583:AD 8B C0           95          LDA  RAMSEL
2586:AD 8B C0           96          LDA  RAMSEL
2589:4C F2 25           97          JMP  BREAK5
                        98 ************************************************
258C:                   99 * BREAKMODE-CLEAR STACK, SET NEW PROMPT
                       100 ************************************************
258C:FF                101 CONTINUEFLG DFB $FF
258D:AD E0 36          102 BREAKEX LDA  BREAKATM  ;DO NOTHING IF BREAK DISABLED
2590:D0 03             103         BNE  BREAKEX2
2592:4C F0 11          104         JMP  EVALRET
2595:A2 00             105 BREAKEX2 LDX #0
2597:8E 8C 25          106         STX  CONTINUEFLG
259A:86 82             107         STX  INDENT
259C:A2 19             108         LDX  #25
259E:20 72 26          109         JSR  MESPRT    ;PRINT BRK MSG
25A1:20 A6 13          110         JSR  GETM
25A4:B0 06             111         BCS  NOBPR
25A6:20 34 21          112         JSR  ARGTOWK1
25A9:20 31 0F          113         JSR  PRINT
25AC:20 0A 0A          114 NOBPR   JSR  SCROLL
25AF:A2 FF             115 BREAKMODE LDX #$FF
25B1:86 74             116         STX  BUFPTR
25B3:E8                117         INX
[illegible]4:86 FD     118         STX  FREEFLG
[illegible]6:86 82     119         STX  INDENT
25B8:A5 21             120         LDA  WWIDTH
[illegible]5BA:85 F0   121         STA  WINDWIDTH
[illegible]BC:A2 AB    122 BREAKMODE2 LDX #'+
[illegible]E:86 33     123         STX  PROMPT
[illegible]:20 51 A8   124         JSR  DOSSET
[illegible]:20 12 26   125         JSR  DOSON     ;TURN IMM. DOS ON
```

```
25C6:20 FD 0D   126          JSR  READ       ;IF A 'GO' READ, KEEP EVALING
25C9:A6 6B      127          LDX  RDPTR+1
25CB:D0 08      128          BNE  BREAK2
25CD:86 FC      129          STX  ENVPTR+1
25CF:20 4C 26   130          JSR  STKCLEAR
25D2:4C 4E 09   131          JMP  LISP1
25D5:E0 35      132 BREAK2   CPX  #<GOATM
25D7:D0 11      133          BNE  BREAK4
25D9:A6 6A      134          LDX  RDPTR
25DB:E0 96      135          CPX  #GOATM+2
25DD:D0 0B      136          BNE  BREAK4
25DF:AD 8C 25   137          LDA  CONTINUEFLG
25E2:30 06      138          BMI  BREAK4
25E4:CE 8C 25   139          DEC  CONTINUEFLG
25E7:4C F0 11   140          JMP  EVALRET
25EA:A5 6A      141 BREAK4   LDA  RDPTR
25EC:85 D6      142          STA  EVLPTR
25EE:A5 6B      143          LDA  RDPTR+1
25F0:85 D7      144          STA  EVLPTR+1
25F2:20 26 26   145 BREAK5   JSR  DOSOFF     ;IMM. DOS OFF
25F5:20 A6 0E   146          JSR  SETRET
25F8:4C 62 11   147          JMP  EVAL
25FB:20 12 26   148          JSR  DOSON      ;DOS BACK ON
25FE:A5 6C      149          LDA  RESPTR
2600:85 CE      150          STA  WK1
2602:A5 6D      151          LDA  RESPTR+1
2604:85 CF      152          STA  WK1+1
2606:20 0A 0A   153          JSR  SCROLL
2609:20 31 0F   154          JSR  PRINT
260C:20 0A 0A   155          JSR  SCROLL
260F:4C BC 25   156          JMP  BREAKMODE2
                157 ***********************************************
2612:           158 * DOS ON/OFF ROUTINES
                159 ***********************************************
2612:A9 FF      160 DOSON    LDA  #$FF
2614:8D D6 23   161          STA  TRACEFLG
2617:85 76      162          STA  DOSFLG
2619:A9 7F      163          LDA  #$7F
261B:85 D9      164          STA  ERRFLG+1
261D:A9 EA      165          LDA  #$EA       ;PATCH DOS
261F:8D DD A6   166          STA  DOSPTCH
2622:8D DE A6   167          STA  DOSPTCH+1
2625:60         168          RTS
2626:A2 00      169 DOSOFF   LDX  #0
2628:86 76      170          STX  DOSFLG
262A:CA         171          DEX
262B:86 D9      172          STX  ERRFLG+1
262D:A9 A5      173          LDA  #$A5       ;PATCH DOS ERROR ROUTINE
262F:8D DD A6   174          STA  DOSPTCH
2632:A9 FE      175          LDA  #ONERRFLG
2634:8D DE A6   176          STA  DOSPTCH+1
2637:A9 48      177          LDA  #EVALATM
2639:8D 9B 28   178          STA  ERRFCN
263C:A9 33      179          LDA  #<EVALATM
263E:8D 9C 28   180          STA  ERRFCN+1
2641:A9 00      181          LDA  #0
2643:8D E9 24   182          STA  OLDEVLPTR+1
2646:A9 72      183          LDA  #NIL+2
```

```
[illegible]8:8D E8 24  184          STA  OLDEVLPTR
[illegible]4B:60       185          RTS
264C:AD 0D 08  186 STKCLEAR LDA STKBEG     ;RESET STACK PTR
264F:85 7D     187          STA  STKPTR
2651:AD 0E 08  188          LDA  STKBEG+1
2654:85 7E     189          STA  STKPTR+1
2656:A9 FF     190          LDA  #$FF
2658:85 74     191          STA  BUFPTR
265A:60        192          RTS
               193 ***********************************************
265B:          194 * ROUTINE TO PRINT FCN NAME FROM CODE
               195 ***********************************************
265B:0A        196 FCNPRT  ASL  A
265C:AA        197          TAX
265D:BD 17 28  198          LDA  FCNTAB,X   ;GET PTR TO FCN
2660:85 CE     199          STA  WK1
2662:BD 18 28  200          LDA  FCNTAB+1,X
2665:85 CF     201          STA  WK1+1
2667:20 A6 0E  202          JSR  SETRET
266A:4C 9B 0F  203          JMP  PATOM      ;PRINT IT
266D:A2 0E     204          LDX  #14
266F:4C 72 26  205          JMP  MESPRT     ;PRINT COLONS & SPACE
               206 ***********************************************
2672:          207 * ROUTINE TO PRINT MESSAGES
               208 ***********************************************
2672:8A        209 MESPRT  TXA
[illegible]3:0A        210          ASL  A
2674:AA        211          TAX
2675:BD 90 26  212          LDA  MESTAB,X   ;GET MESSAGE ADDR
2678:85 CE     213          STA  WK1
267A:BD 91 26  214          LDA  MESTAB+1,X
267D:85 CF     215          STA  WK1+1
267F:A0 00     216          LDY  #0
2681:B1 CE     217 MESPRTLP LDA (WK1),Y    ;GET CHAR
2683:30 08     218          BMI  LASTCC
2685:09 80     219          ORA  #$80
2687:20 0C 0A  220          JSR  COUT       ;PRINT IT
268A:C8        221          INY
268B:D0 F4     222          BNE  MESPRTLP
268D:4C 0C 0A  223 LASTCC   JMP  COUT       ;PRINT LAST CHAR
2690:          224          MSB  OFF
2690:1A 27     225 MESTAB   DW   MES7
2692:C6 26     226          DW   MES1
2694:D6 26     227          DW   MES2
2696:E5 26     228          DW   MES3
2698:F3 26     229          DW   MES4
269A:01 27     230          DW   MES5
269C:0E 27     231          DW   MES6
269E:1A 27     232          DW   MES7
26A0:29 27     233          DW   MES8
26A2:35 27     234          DW   MES9
[illegible]4:47 27     235          DW   MES10
[illegible]6:54 27     236          DW   MES11
26A8:5C 27     237          DW   MES12
26AA:67 27     238          DW   MES13
26AC:6B 27     239          DW   MES14
26AE:6E 27     240          DW   MES15
26B0:71 27     241          DW   MES16
```

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[illegible]2:74 27      242          DW   MES17
[illegible]4:8D 27      243          DW   MES18
26B6:95 27      244          DW   MES19
26B8:9C 27      245          DW   MES20
26BA:A8 27      246          DW   MES21
26BC:BA 27      247          DW   MES22
26BE:CD 27      248          DW   MES23
26C0:E8 27      249          DW   MES24
26C2:FD 27      250          DW   MES25
26C4:06 28      251          DW   MES26
26C6:4E 55 4D   252 MES1     DCI  'NUMERIC  OVERFLOW'
26C9:45 52 49
26CC:43 20 4F
26CF:56 45 52
26D2:46 4C 4F
26D5:D7
26D6:52 45 43   253 MES2     DCI  'RECURSION CHECK'
26D9:55 52 53
26DC:49 4F 4E
26DF:20 43 48
26E2:45 43 CB
26E5:55 4E 44   254 MES3     DCI  'UNDEFINED ATOM'
26E8:45 46 49
26EB:4E 45 44
26EE:20 41 54
26F1:4F CD
[illegible]3:42 41 44   255 MES4     DCI  'BAD      ATOMIC ARG'
26F6:20 41 54
26F9:4F 4D 49
26FC:43 20 41
26FF:52 C7
2701:54 4F 4F   256 MES5     DCI  'TOO      MANY ARGS'
2704:20 4D 41
2707:4E 59 20
270A:41 52 47
270D:D3
270E:54 4F 4F   257 MES6     DCI  'TOO      FEW ARGS'
2711:20 46 45
2714:57 20 41
2717:52 47 D3
271A:42 41 44   258 MES7     DCI  'BAD      NUMERIC ARG'
271D:20 4E 55
2720:4D 45 52
2723:49 43 20
2726:41 52 C7
2729:42 41 44   259 MES8     DCI  'BAD      LIST ARG'
272C:20 4C 49
272F:53 54 20
2732:41 52 C7
2735:4E 4F 20   260 MES9     DCI  'NO       DOMINATING PROG'
2738:44 4F 4D
[illegible]3B:49 4E 41
[illegible]3E:54 49 4E
2741:47 20 50
2744:52 4F C7
2747:4D 49 53   261 MES10    DCI  'MISSING  LABEL'
274A:53 49 4E
274D:47 20 4C
```

```
2750:41 42 45
2753:CC
2754:4E 4F 20   262 MES11   DCI  'NO        SPACE'
2757:53 50 41
275A:43 C5
275C:07         263 MES12   DFB  7
275D:2A 2A 20   264         DCI  '**        ERROR: '
2760:45 52 52
2763:4F 52 3A
2766:A0
2767:20 2A 2A   265 MES13   ASC  '           **'
276A:8D         266         DFB  $8D
276B:20 3A BA   267 MES14   DCI  '           ::'
276E:2D 3E BE   268 MES15   DCI  '->>'
2771:3C 3C AD   269 MES16   DCI  '<<-'
2774:0D         270 MES17   DFB  $D
2775:2A 2A 20   271         DCI  '**        GARBAGE COLLECTION **'
2778:47 41 52
277B:42 41 47
277E:45 20 43
2781:4F 4C 4C
2784:45 43 54
2787:49 4F 4E
278A:20 2A AA
278D:20 43 45   272 MES18   ASC  '           CELLS'
2790:4C 4C 53
2793:0D 8D      273         DFB  $D,$8D
2795:04         274 MES19   DFB  $04        ;CTRL-D
2796:44 45 4C   275         DCI  'DELETE'
2799:45 54 C5
279C:47 4E 4F   276 MES20   ASC  'GNOSIS    INC.'
279F:53 49 53
27A2:20 49 4E
27A5:43 2E
27A7:8D         277         DFB  $8D
27A8:50 2D 4C   278 MES21   ASC  'P-LISP      VER. 3.2'
27AB:49 53 50
27AE:20 20 20
27B1:56 45 52
27B4:2E 20 33
27B7:2E 32
27B9:8D         279         DFB  $8D
27BA:2D 2D 2D   280 MES22   ASC  '--------------------'
27BD:2D 2D 2D
27C0:2D 2D 2D
27C3:2D 2D 2D
27C6:2D 2D 2D
27C9:2D 2D
27CB:0D 8D      281         DFB  $D,$8D
27CD:43 4F 50   282 MES23   ASC  'COPYRIGHT 1981, 1982, 1983'
27D0:59 52 49
27D3:47 48 54
27D6:20 31 39
27D9:38 31 2C
27DC:20 31 39
27DF:38 32 2C
27E2:20 31 39
27E5:38 33
```

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27E7:8D          283          DFB  $8D
27E8:41 4C 4C    284 MES24    ASC  'ALL       RIGHTS RESERVED'
27EB:20 52 49
27EE:47 48 54
27F1:53 20 52
27F4:45 53 45
27F7:52 56 45
27FA:44
27FB:0D 8D       285          DFB  $D,$8D
27FD:0D 07       286 MES25    DFB  $D,7
27FF:3E 3E 42    287          DCI  '>>BRK:   '
2802:52 4B 3A
2805:A0
2806:42 59 20    288 MES26    ASC  'BY        STEVEN CHERRY'
2809:53 54 45
280C:56 45 4E
280F:20 43 48
2812:45 52 52
2815:59
2816:8D          289          DFB  $8D
2817:            290          MSB  ON
                 291 ************************************************
2817:            292 * FUNCTION TABLE
                 293 ************************************************
2817:24 31       294 FCNTAB   DW   QUOTATM
2819:6C 31       295          DW   CARATM
281B:88 31       296          DW   CDRATM
281D:BC 31       297          DW   CONSATM
281F:D8 31       298          DW   ATOMATM
2821:F4 31       299          DW   NUMBRATM
2823:14 32       300          DW   LISTATM
2825:30 32       301          DW   NULLATM
2827:4C 32       302          DW   NOTATM
2829:68 32       303          DW   SETQATM
282B:84 32       304          DW   SETATM
282D:C0 32       305          DW   ANDATM
282F:DC 32       306          DW   ORATM
2831:F4 32       307          DW   GETATM
2833:10 33       308          DW   PUTATM
2835:2C 33       309          DW   REMATM
2837:48 33       310          DW   EVALATM
2839:64 33       311          DW   APPLYATM
283B:84 33       312          DW   DEFINATM
283D:A4 33       313          DW   CONDATM
283F:C0 33       314          DW   RPLCAATM
2841:E0 33       315          DW   RPLCDATM
2843:00 34       316          DW   LENATM
2845:9C 34       317          DW   COPYATM
2847:B8 34       318          DW   APPATM
2849:D8 34       319          DW   CONCATM
284B:58 35       320          DW   PROGATM
284D:74 35       321          DW   RETATM
284F:94 35       322          DW   GOATM
2851:14 35       323          DW   LAMBDATM
2853:34 35       324          DW   FLAMATM
2855:AC 35       325          DW   ADDATM
2857:C8 35       326          DW   SUBATM
2859:E4 35       327          DW   MULTATM
```

```
285B:00 36      328          DW   DIVATM
285D:1C 36      329          DW   INTATM
285F:38 36      330          DW   CALLATM
2861:54 36      331          DW   PEEKATM
2863:70 36      332          DW   POKEATM
2865:8C 36      333          DW   ZEROATM
2867:A8 36      334          DW   HTABATM
2869:C4 36      335          DW   VTABATM
286B:A8 39      336          DW   ARRATM
286D:F8 36      337          DW   EQUALATM
286F:18 37      338          DW   EXPLATM
2871:3C 37      339          DW   IMPLATM
2873:60 37      340          DW   GREATATM
2875:A4 37      341          DW   CHRATM
2877:C0 37      342          DW   GETCATM
2879:E0 37      343          DW   TRACEATM
287B:00 38      344          DW   UNTRACATM
287D:20 34      345          DW   READATM
287F:5C 38      346          DW   MAPCARATM
2881:B0 38      347          DW   COLORATM
2883:D0 38      348          DW   PLOTATM
2885:84 37      349          DW   REMOBATM
2887:08 39      350          DW   HCOLATM
2889:28 39      351          DW   HPLOTATM
288B:48 39      352          DW   HTOATM
288D:64 39      353          DW   DRAWATM
288F:80 39      354          DW   XDRAWATM
2891:C8 39      355          DW   DELATM
2893:           356          DS   2
2895:00 3A      357          DW   MEMBATM
2897:A4 31      358          DW   ASCATM
2899:5C 34      359          DW   PRIN1ATM
289B:           360 ERRFCN   DS   2
289D:           361          CHN  GC.SRC
                  1 ***********************************************
289D:             2 * GARBAGE COLLECTOR
                  3 ***********************************************
289D:20 A6 0E     4 GC       JSR  SETRET     ;CHECK FOR AN ARG
28A0:4C BE 13     5          JMP  GET1
28A3:B0 08        6          BCS  GC2
28A5:A5 EE        7          LDA  ARGPTR+1   ;USE ARG TO SET MESSAGE SWITCH
28A7:8D 27 29     8          STA  GCSWITCH
28AA:4C 3F 14     9          JMP  RETARG     ;AND RETURN
28AD:20 B3 28    10 GC2      JSR  GC3
28B0:4C F0 11    11          JMP  EVALRET
28B3:A9 FF       12 GC3      LDA  #$FF
28B5:8D 28 29    13          STA  GCFLG
28B8:20 0B 0F    14          JSR  WK1PUSH
28BB:A2 05       15          LDX  #5         ;SAVE FAC
28BD:B5 9D       16 FACSAV   LDA  FAC,X
28BF:48          17          PHA
28C0:CA          18          DEX
28C1:10 FA       19          BPL  FACSAV
28C3:A5 50       20          LDA  RES        ;SAVE RES
28C5:48          21          PHA
28C6:A5 51       22          LDA  RES+1
28C8:48          23          PHA
28C9:A5 36       24          LDA  OUTVEC     ;SAVE OUTVEC
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28CB:48          25          PHA
28CC:A5 37       26          LDA  OUTVEC+1
28CE:48          27          PHA
28CF:20 B3 10    28          JSR  OUTLOAD
28D2:A9 00       29          LDA  #0          ;CLEAR RES FOR CELL COUNT
28D4:85 81       30          STA  FREPTR+1
28D6:AD 27 29    31          LDA  GCSWITCH    ;PRINT MESSAGE IF SWITCH ON
28D9:F0 05       32          BEQ  GCNOMES
28DB:A2 11       33          LDX  #17
28DD:20 72 26    34          JSR  MESPRT
28E0:20 29 29    35 GCNOMES  JSR  MARK        ;MARK ACTIVE CELLS
28E3:20 49 2A    36          JSR  SWEEP       ;COLLECT UNMARKED ONES
28E6:20 65 0B    37          JSR  NEWINT2     ;NEW ATOM FOR # OF CELLS
28E9:20 8B 0E    38          JSR  ATMRES
28EC:AD 27 29    39          LDA  GCSWITCH    ;PRINT # CELLS IF SWITCH ON
28EF:F0 10       40          BEQ  KEYCHK
28F1:20 A6 0E    41          JSR  SETRET
28F4:4C 9B 0F    42          JMP  PATOM
28F7:A2 12       43          LDX  #18
28F9:20 72 26    44          JSR  MESPRT
28FC:A9 00       45          LDA  #0
28FE:8D 30 0F    46          STA  CTR
2901:AD 00 C0    47 KEYCHK   LDA  KEYBOARD    ;STOP ON CTRL-C
2904:10 0A       48          BPL  GCNOMES2
2906:8D 10 C0    49          STA  KEYSTROBE
2909:C9 83       50          CMP  #$83
290B:D0 03       51          BNE  GCNOMES2
290D:4C AF 25    52          JMP  BREAKMODE
2910:68          53 GCNOMES2 PLA              ;RESTORE REGISTERS
2911:85 37       54          STA  OUTVEC+1
2913:68          55          PLA
2914:85 36       56          STA  OUTVEC
2916:68          57          PLA
2917:85 51       58          STA  RES+1
2919:68          59          PLA
291A:85 50       60          STA  RES
291C:A2 FA       61          LDX  #$FA
291E:68          62 FACREST  PLA
291F:95 A3       63          STA  FAC+6,X
2921:E8          64          INX
2922:D0 FA       65          BNE  FACREST
2924:4C 12 0F    66          JMP  WK1POP
2927:            67 GCSWITCH DS   1
2928:            68 GCFLG    DS   1
                 69 ***************************************************
2929:            70 * MARK PHASE
                 71 ***************************************************
2929:20 AC 29    72 MARK     JSR  OBMARK      ;MARK OBLIST
292C:AD E6 24    73          LDA  ONERRPTR    ;MARK ERROR STUFF
292F:85 CE       74          STA  WK1
2931:AD E7 24    75          LDA  ONERRPTR+1
2934:85 CF       76          STA  WK1+1
2936:20 A6 0E    77          JSR  SETRET
2939:4C F5 29    78          JMP  LISTMARK
293C:AD E8 24    79          LDA  OLDEVLPTR
293F:85 CE       80          STA  WK1
2941:AD E9 24    81          LDA  OLDEVLPTR+1
2944:85 CF       82          STA  WK1+1
```

```
2946:20 A6 0E   83          JSR  SETRET
2949:4C F5 29   84          JMP  LISTMARK
294C:A5 FB      85          LDA  ENVPTR
294E:85 CE      86          STA  WK1
2950:A5 FC      87          LDA  ENVPTR+1
2952:85 CF      88          STA  WK1+1
2954:20 A6 0E   89          JSR  SETRET
2957:4C F5 29   90          JMP  LISTMARK   ;MARK ENVIRONMENT CHAIN
295A:A5 7D      91          LDA  STKPTR     ;MARK STACK ELEMENTS
295C:85 50      92          STA  RES
295E:A5 7E      93          LDA  STKPTR+1
2960:85 51      94          STA  RES+1
2962:A5 51      95 MSTACKLP LDA  RES+1
2964:CD 0E 08   96          CMP  STKBEG+1
2967:D0 07      97          BNE  NXTSTK
2969:A5 50      98          LDA  RES
296B:CD 0D 08   99          CMP  STKBEG
296E:F0 28     100          BEQ  MSTACKFIN
2970:A0 00     101 NXTSTK   LDY  #0         ;PULL THING FROM STACK
2972:B1 50     102          LDA  (RES),Y
2974:85 CE     103          STA  WK1
2976:C8        104          INY
2977:B1 50     105          LDA  (RES),Y
2979:85 CF     106          STA  WK1+1
297B:A5 50     107          LDA  RES
297D:38        108          SEC
297E:E9 02     109          SBC  #2
2980:85 50     110          STA  RES
2982:B0 02     111          BCS  CHKMARK
2984:C6 51     112          DEC  RES+1
2986:A5 CF     113 CHKMARK  LDA  WK1+1      ;CHECK IF IN A VALID PAGE
2988:F0 D8     114          BEQ  MSTACKLP
298A:20 D7 09  115          JSR  PAGCHK2
298D:90 D3     116          BCC  MSTACKLP
298F:20 A6 0E  117          JSR  SETRET     ;YES--MARK IT
2992:4C F5 29  118          JMP  LISTMARK
2995:4C 62 29  119          JMP  MSTACKLP
2998:60        120 MSTACKFIN RTS
               121 ***********************************************
2999:          122 * ROUTINE TO MARK A CELL & REPLACE
2999:          123 * WITH CDR
               124 ***********************************************
2999:A0 02     125 MARKCELL LDY #2
299B:B1 CE     126          LDA  (WK1),Y
299D:AA        127          TAX
299E:C8        128          INY
299F:B1 CE     129          LDA  (WK1),Y
29A1:09 01     130          ORA  #1
29A3:91 CE     131          STA  (WK1),Y
29A5:29 FE     132          AND  #$FE
29A7:85 CE     133          STA  WK1
29A9:86 CF     134          STX  WK1+1
29AB:60        135          RTS
               136 ***********************************************
29AC:          137 * ROUTINE TO MARK OBLIST
               138 ***********************************************
29AC:20 E0 0D  139 OBMARK   JSR  OBTOWK1
29AF:20 0B 0F  140 MARKOBLP JSR WK1PUSH     ;DO THE ATOM CELL
```

```
29B2:20 CE 0D  141          JSR  WK1CAR
29B5:A5 CE     142          LDA  WK1
29B7:29 FC     143          AND  #$FC
29B9:85 CE     144          STA  WK1
29BB:20 0B 0F  145          JSR  WK1PUSH    ;PUSH CELL
29BE:20 CE 0D  146          JSR  WK1CAR     ;GET VALUE
29C1:20 A6 0E  147          JSR  SETRET     ;MARK IT
29C4:4C F5 29  148          JMP  LISTMARK
29C7:20 12 0F  149          JSR  WK1POP
29CA:20 99 29  150          JSR  MARKCELL
29CD:20 0B 0F  151          JSR  WK1PUSH    ;DO PNAME LIST
29D0:20 EA 29  152          JSR  MARKPNAM
29D3:20 12 0F  153          JSR  WK1POP
29D6:20 99 29  154          JSR  MARKCELL
29D9:20 A6 0E  155          JSR  SETRET     ;MARK PLIST
29DC:4C F5 29  156          JMP  LISTMARK
29DF:20 12 0F  157          JSR  WK1POP
29E2:20 99 29  158          JSR  MARKCELL
29E5:A5 CF     159          LDA  WK1+1      ;CONTINUE TO END OF OBLIST
29E7:D0 C6     160          BNE  MARKOBLP
29E9:60        161          RTS
29EA:20 CE 0D  162 MARKPNAM JSR WK1CAR
29ED:20 99 29  163 MARKPN2  JSR  MARKCELL
29F0:A5 CF     164          LDA  WK1+1
29F2:D0 F9     165          BNE  MARKPN2
29F4:60        166          RTS
               167 ***********************************************
29F5:          168 * ROUTINE TO MARK A LIST
               169 ***********************************************
29F5:A5 CF     170 LISTMARK LDA WK1+1      ;DON'T MARK IF OUT OF BOUNDS
29F7:F0 47     171          BEQ  LISTMKRET
29F9:20 D7 09  172          JSR  PAGCHK2
29FC:90 42     173          BCC  LISTMKRET
29FE:A5 CE     174 LISTMLP  LDA  WK1        ;CHECK FOR AN ATOM
2A00:24 69     175          BIT  ATMTST
2A02:D0 18     176          BNE  ATOMMARK
2A04:20 0B 0F  177          JSR  WK1PUSH    ;NO--MARK CAR AND CDR
2A07:20 CE 0D  178          JSR  WK1CAR
2A0A:20 A6 0E  179          JSR  SETRET
2A0D:4C F5 29  180          JMP  LISTMARK
2A10:20 12 0F  181          JSR  WK1POP
2A13:20 99 29  182 LISTMLP2 JSR MARKCELL
2A16:A5 CF     183          LDA  WK1+1
2A18:D0 E4     184          BNE  LISTMLP
2A1A:F0 24     185          BEQ  LISTMKRET
2A1C:A5 CE     186 ATOMMARK LDA WK1        ;ATOM--CHECK FOR CONSTANT ATOM
2A1E:29 FC     187          AND  #$FC
2A20:85 CE     188          STA  WK1
2A22:A0 02     189          LDY  #2
2A24:B1 CE     190          LDA  (WK1),Y
2A26:D0 18     191          BNE  LISTMKRET ;NO--DO NOTHING
2A28:C8        192          INY
2A29:B1 CE     193          LDA  (WK1),Y
2A2B:09 01     194          ORA  #1         ;ELSE MARK IT
2A2D:91 CE     195          STA  (WK1),Y
2A2F:29 FE     196          AND  #$FE       ;CHECK FOR STRING
2A31:F0 10     197          BEQ  STRMARK
2A33:20 CE 0D  198          JSR  WK1CAR
```

```
36:20 99 29  199          JSR  MARKCELL
..39:A5 CF   200          LDA  WK1+1
2A3B:F0 03   201          BEQ  LISTMKRET
2A3D:20 99 29 202         JSR  MARKCELL
2A40:4C DF 0E 203 LISTMKRET JMP RET
2A43:20 EA 29 204 STRMARK JSR  MARKPNAM
2A46:4C DF 0E 205         JMP  RET
              206 ***********************************************
2A49:         207 * SWEEP PHASE
              208 ***********************************************
2A49:A9 00    209 SWEEP   LDA  #0
2A4B:85 50    210         STA  RES        ;INIT CELL COUNT
2A4D:85 51    211         STA  RES+1
2A4F:20 E0 0D 212         JSR  OBTOWK1    ;GET OBLIST PTR
2A52:A0 03    213 SWPLP   LDY  #3
2A54:B1 CE    214         LDA  (WK1),Y    ;CHECK IF CELL MARKED
2A56:4A       215         LSR  A
2A57:B0 53    216         BCS  UNMARK
2A59:A5 80    217         LDA  FREPTR     ;NO--ADD TO FREESPACE LIST
2A5B:91 CE    218         STA  (WK1),Y
2A5D:88       219         DEY
2A5E:A5 81    220         LDA  FREPTR+1
2A60:91 CE    221         STA  (WK1),Y
2A62:88       222         DEY
2A63:A9 72    223         LDA  #NIL+2     ;PUT NIL IN CAR
2A65:91 CE    224         STA  (WK1),Y
  67:88       225         DEY
2A68:98       226         TYA
2A69:91 CE    227         STA  (WK1),Y
2A6B:A5 CE    228         LDA  WK1
2A6D:85 80    229         STA  FREPTR
2A6F:A5 CF    230         LDA  WK1+1
2A71:85 81    231         STA  FREPTR+1
2A73:E6 50    232         INC  RES        ;INCREMENT CELL COUNT
2A75:D0 02    233         BNE  SWNXT
2A77:E6 51    234         INC  RES+1
2A79:A5 CE    235 SWNXT   LDA  WK1        ;CALC ADDR OF NEXT CELL
2A7B:18       236         CLC
2A7C:69 04    237         ADC  #4
2A7E:85 CE    238         STA  WK1
2A80:A5 CF    239         LDA  WK1+1
2A82:69 00    240         ADC  #0
2A84:85 CF    241         STA  WK1+1
2A86:F0 2A    242         BEQ  SWEEPFIN
2A88:C9 3A    243         CMP  #<ENDOBJ2 ;CHECK FOR END OF SYSTEM OBLIST
2A8A:90 C6    244         BCC  SWPLP
2A8C:D0 10    245         BNE  ENDCHK
2A8E:A5 CE    246         LDA  WK1
2A90:C9 3C    247         CMP  #ENDOBJ2
2A92:90 BE    248         BCC  SWPLP
2A94:AD 11 08 249         LDA  FREESPC    ;YES--START AT FREESPACE LIST
  97:85 CE    250         STA  WK1
  99:AD 12 08 251         LDA  FREESPC+1
2A9C:85 CF    252         STA  WK1+1
2A9E:A5 CF    253 ENDCHK  LDA  WK1+1      ;CHECK FOR END OF FREESPACE
2AA0:F0 10    254         BEQ  SWEEPFIN
2AA2:20 D7 09 255         JSR  PAGCHK2    ;ELSE CHECK IF PAGE IS VALID
2AA5:B0 AB    256         BCS  SWPLP
```

```
)7:E6 CF      257          INC  WK1+1      ;NO-TRY NEXT PAGE
..A9:4C 9E 2A 258          JMP  ENDCHK
2AAC:0A       259 UNMARK   ASL  A          ;UNMARK MARKED CELL
2AAD:91 CE    260          STA  (WK1),Y
2AAF:4C 79 2A 261          JMP  SWNXT
2AB2:A5 73    262 SWEEPFIN LDA  NIL+3      ;UNMARK NIL
2AB4:29 FE    263          AND  #$FE
2AB6:85 73    264          STA  NIL+3
2AB8:EE 28 29 265          INC  GCFLG
2ABB:A5 51    266          LDA  RES+1      ;NO SPACE IF < 8 CELLS
2ABD:D0 0D    267          BNE  SWEEPFIN2
2ABF:A5 50    268          LDA  RES
2AC1:C9 08    269          CMP  #8
2AC3:B0 07    270          BCS  SWEEPFIN2
2AC5:A2 0B    271          LDX  #11
2AC7:A0 FF    272          LDY  #$FF
2AC9:4C EA 24 273          JMP  ERROR
2ACC:60       274 SWEEPFIN2 RTS
2ACD:         275          CHN  EVAL13.SRC
                1 ***********************************************
2ACD:           2 * APPLY
                3 ***********************************************
2ACD:20 A6 0E   4 APPLY    JSR  SETRET     ;EVAL ARGS
2AD0:4C FE 12   5          JMP  EVLARGS
2AD3:A5 56      6          LDA  ARCT
2AD5:A0 11      7          LDY  #17
)7:C9 02        8          CMP  #2
2AD9:F0 04      9          BEQ  AP1OK
2ADB:90 42     10          BCC  AP1FEW     ;CHECK # OF ARGS
2ADD:B0 43     11          BCS  AP1MANY
2ADF:20 79 0C  12 AP1OK    JSR  GETCEL     ;GET CELL FOR FCN
2AE2:20 25 2B  13          JSR  ARGSTORE
2AE5:20 ED 0E  14          JSR  CELPUSH    ;SAVE IT
2AE8:20 85 13  15          JSR  ARGCDR     ;GET PTR TO ARGS
2AEB:20 77 13  16          JSR  ARGCAR
2AEE:20 ED 0E  17 APPLYLP  JSR  CELPUSH
2AF1:20 79 0C  18          JSR  GETCEL     ;CELL FOR ARG
2AF4:20 ED 0E  19          JSR  CELPUSH
2AF7:20 EC 0B  20          JSR  CARLINK
2AFA:20 EA 3A  21          JSR  QUOTCELL2  ;QUOTE CELL
2AFD:20 C8 0B  22          JSR  CDRLINK
2B00:20 25 2B  23          JSR  ARGSTORE   ;PUT IN ARG
2B03:20 85 13  24          JSR  ARGCDR
2B06:20 F4 0E  25          JSR  CELPOP
2B09:20 12 0F  26          JSR  WK1POP
2B0C:20 CB 0B  27          JSR  CDRLINK2
2B0F:A5 EE     28          LDA  ARGPTR+1
2B11:D0 DB     29          BNE  APPLYLP
2B13:20 5A 12  30          JSR  EVLPOP     ;FINISHED-EVAL RESULT
2B16:20 A6 0E  31          JSR  SETRET
2B19:4C 62 11  32          JMP  EVAL
..1C:4C F0 11  33          JMP  EVALRET
..1F:4C 4A 14  34 AP1FEW   JMP  TOOFEW
2B22:4C 4F 14  35 AP1MANY  JMP  TOOMANY
2B25:A0 00     36 ARGSTORE LDY #0
2B27:B1 ED     37          LDA  (ARGPTR),Y
2B29:91 5A     38          STA  (CELPTR),Y
2B2B:C8        39          INY
```

```
2B2C:B1 ED        40          LDA  (ARGPTR),Y
2B2E:91 5A        41          STA  (CELPTR),Y
2B30:60           42          RTS
                  43 ***********************************************
2B31:             44 * MAPCAR
                  45 ***********************************************
2B31:A2 08        46 MAPERR   LDX  #8
2B33:A0 34        47          LDY  #52
2B35:4C EA 24     48          JMP  ERROR
2B38:20 A6 0E     49 MAPCAR   JSR  SETRET
2B3B:4C FE 12     50          JMP  EVLARGS    ;EVAL ARGS
2B3E:A0 34        51          LDY  #52
2B40:A5 56        52          LDA  ARCT       ;CHECK FOR 2
2B42:C9 02        53          CMP  #2
2B44:90 D9        54          BCC  AP1FEW
2B46:C9 04        55          CMP  #4         ;CHECK FOR TOO MANY
2B48:B0 D8        56          BCS  AP1MANY
2B4A:20 A6 0E     57          JSR  SETRET     ;COPY THE ARGS
2B4D:4C 39 19     58          JMP  COPY2
2B50:A5 6C        59          LDA  RESPTR
2B52:85 ED        60          STA  ARGPTR
2B54:A5 6D        61          LDA  RESPTR+1
2B56:85 EE        62          STA  ARGPTR+1
2B58:20 06 17     63          JSR  ARGTOEVL
2B5B:20 85 13     64          JSR  ARGCDR
2B5E:20 9D 0E     65          JSR  NILRET     ;INIT RESULT TO NIL
2B61:20 34 21     66          JSR  ARGTOWK1
2B64:A0 01        67          LDY  #1         ;MAKE SURE ARG ISNT ATOMIC
2B66:B1 ED        68          LDA  (ARGPTR),Y
2B68:24 69        69          BIT  ATMTST
2B6A:D0 C5        70          BNE  MAPERR
2B6C:20 F3 2B     71          JSR  MAPSUB1    ;SET UP 1ST ARG
2B6F:20 89 13     72          JSR  ARGPUSH
2B72:20 C0 0D     73          JSR  WK1CDR
2B75:A5 CF        74          LDA  WK1+1      ;CHECK FOR A 2ND
2B77:F0 11        75          BEQ  MAPCAR2
2B79:20 FA 19     76          JSR  WK1ARG     ;YES-CHECK IF NIL
2B7C:A0 01        77          LDY  #1
2B7E:B1 ED        78          LDA  (ARGPTR),Y
2B80:24 69        79          BIT  ATMTST
2B82:D0 AD        80          BNE  MAPERR
2B84:20 F3 2B     81          JSR  MAPSUB1    ;SET UP 2ND ARG
2B87:20 34 21     82          JSR  ARGTOWK1
2B8A:20 0B 0F     83 MAPCAR2  JSR  WK1PUSH    ;SAVE STUFF
2B8D:20 53 12     84          JSR  EVLPUSH
2B90:20 FC 0E     85          JSR  RESPUSH
2B93:20 A6 0E     86          JSR  SETRET
2B96:4C 62 11     87          JMP  EVAL       ;EVAL THE SEXPR
2B99:20 12 0F     88          JSR  WK1POP     ;POP RESULT CELL
2B9C:A5 CF        89          LDA  WK1+1
2B9E:F0 4A        90          BEQ  MRESSET
2BA0:20 0B 0F     91          JSR  WK1PUSH
2BA3:A0 02        92 MAPLP1   LDY  #2         ;LOOK FOR END
2BA5:B1 CE        93          LDA  (WK1),Y
2BA7:F0 06        94          BEQ  FOUNDEND
2BA9:20 C0 0D     95          JSR  WK1CDR
2BAC:4C A3 2B     96          JMP  MAPLP1
2BAF:20 B8 0C     97 FOUNDEND JSR  WK1MOV     ;ADD A CELL
```

```
2B32:20 C8 0B   98          JSR  CDRLINK
2B35:20 7B 0E   99 MAPCAR4  JSR  CARPUT     ;PUT RESULT IN CAR
2BB8:20 03 0F  100          JSR  RESPOP     ;RESTORE RESULT PTR
2BBB:20 90 13  101          JSR  ARGPOP     ;RETRIEVE PTRS
2BBE:20 06 17  102          JSR  ARGTOEVL
2BC1:20 85 13  103          JSR  ARGCDR
2BC4:20 12 0F  104          JSR  WK1POP
2BC7:20 F4 0E  105          JSR  CELPOP
2BCA:A5 5B     106          LDA  CELPTR+1   ;CHECK IF NO ARGS LEFT
2BCC:F0 19     107          BEQ  MAPFIN
2BCE:20 0B 0F  108          JSR  WK1PUSH
2BD1:20 26 2C  109          JSR  MAPSUB2    ;SET UP NEXT ARG
2BD4:20 F4 0E  110          JSR  CELPOP
2BD7:20 0B 0F  111          JSR  WK1PUSH
2BDA:20 85 13  112          JSR  ARGCDR     ;CHECK FOR A 2ND
2BDD:A5 EE     113          LDA  ARGPTR+1
2BDF:F0 A9     114          BEQ  MAPCAR2
2BE1:20 26 2C  115          JSR  MAPSUB2    ;YES--SET IT UP
2BE4:4C 8A 2B  116          JMP  MAPCAR2
2BE7:4C F0 11  117 MAPFIN   JMP  EVALRET    ;RETURN WHEN FINISHED
2BEA:20 79 0C  118 MRESSET  JSR  GETCEL     ;GET 1ST CELL FOR RESULT LIST
2BED:20 ED 0E  119          JSR  CELPUSH
2BF0:4C B5 2B  120          JMP  MAPCAR4
2BF3:20 B8 0C  121 MAPSUB1  JSR  WK1MOV     ;SET UP 1ST MAPCAR ARG--
2BF6:20 E7 3A  122          JSR  QUOTPUT    ;GET A CELL & QUOTE IT
2BF9:A0 00     123          LDY  #0         ;ATTACH THE ARG
2BFB:B1 ED     124          LDA  (ARGPTR),
2BFD:C8        125          INY
2BFE:C8        126          INY
2BFF:91 5A     127          STA  (CELPTR),Y
2C01:88        128          DEY
2C02:B1 ED     129          LDA  (ARGPTR),Y
2C04:C8        130          INY
2C05:C8        131          INY
2C06:91 5A     132          STA  (CELPTR),Y
2C08:20 EF 0B  133          JSR  CARLINK2   ;LINK TO SEXPR
2C0B:20 77 13  134          JSR  ARGCAR
2C0E:20 85 13  135          JSR  ARGCDR
2C11:A0 02     136          LDY  #2         ;SAVE PTR
2C13:B1 ED     137          LDA  (ARGPTR),Y
2C15:48        138          PHA
2C16:C8        139          INY
2C17:B1 ED     140          LDA  (ARGPTR),Y
2C19:48        141          PHA
2C1A:88        142          DEY             ;NIL CDR OF CELL
2C1B:A9 00     143          LDA  #0
2C1D:91 ED     144          STA  (ARGPTR),Y
2C1F:68        145          PLA             ;RESTORE PTR
2C20:85 ED     146          STA  ARGPTR
2C22:68        147          PLA
2C23:85 EE     148          STA  ARGPTR+1
2C25:60        149          RTS
2C26:20 34 21  150 MAPSUB2  JSR  ARGTOWK1   ;SIMILAR ROUTINE FOR REMAINING ARGS
2C29:20 CE 0D  151          JSR  WK1CAR
2C2C:20 CB 0B  152          JSR  CDRLINK2
2C2F:20 C0 0D  153          JSR  WK1CDR
2C32:A0 02     154          LDY  #2
2C34:B1 CE     155          LDA  (WK1),Y
```

```
2C36:48          156          PHA
2C37:C8          157          INY
2C38:B1 CE       158          LDA  (WK1),Y
2C3A:48          159          PHA
2C3B:88          160          DEY
2C3C:A9 00       161          LDA  #0
2C3E:91 CE       162          STA  (WK1),Y
2C40:68          163          PLA
2C41:85 CE       164          STA  WK1
2C43:68          165          PLA
2C44:85 CF       166          STA  WK1+1
2C46:60          167          RTS
                 168 ***********************************************
2C47:            169 * LORES GRAPHICS
                 170 ***********************************************
2C47:AD 81 C0    171 GR       LDA  ROMSEL
2C4A:AD 54 C0    172          LDA  $C054
2C4D:AD 56 C0    173          LDA  $C056
2C50:20 40 FB    174          JSR  SETGR      ;SET GRAPHICS MODE
2C53:AD 8B C0    175          LDA  RAMSEL
2C56:AD 8B C0    176          LDA  RAMSEL
2C59:4C E3 14    177          JMP  NILRETURN
2C5C:AD 54 C0    178 TEXT     LDA  $C054      ;SET TEXT MODE
2C5F:AD 81 C0    179          LDA  ROMSEL
2C62:20 39 FB    180          JSR  SETTXT
2C65:AD 8B C0    181          LDA  RAMSEL
2C68:AD 8B C0    182          LDA  RAMSEL
2C6B:4C E9 14    183          JMP  TRETURN
2C6E:20 A6 0E    184 COLOR    JSR  SETRET     ;GET NUMERIC ARG
2C71:4C BE 13    185          JMP  GET1
2C74:B0 18       186          BCS  COLERR1
2C76:20 2E 1E    187          JSR  GETINT
2C79:B0 11       188          BCS  COLERR2
2C7B:A5 50       189          LDA  RES
2C7D:AE 81 C0    190          LDX  ROMSEL
2C80:20 64 F8    191          JSR  SETCOL     ;SET COLOR
2C83:AD 8B C0    192          LDA  RAMSEL
2C86:AD 8B C0    193          LDA  RAMSEL
2C89:4C F0 11    194          JMP  EVALRET
2C8C:A2 07       195 COLERR2  LDX  #7         ;BAD NUMERIC ARG ERROR
2C8E:A0 35       196 COLERR1  LDY  #53
2C90:4C EA 24    197          JMP  ERROR
2C93:20 A6 0E    198 PLOT     JSR  SETRET
2C96:4C FE 12    199          JMP  EVLARGS    ;GET 2 NUMERIC ARGS
2C99:A0 36       200          LDY  #54
2C9B:A5 56       201          LDA  ARCT
2C9D:C9 02       202          CMP  #2
2C9F:F0 04       203          BEQ  PLOTOK
2CA1:90 32       204          BCC  PLOTFEW
2CA3:B0 33       205          BCS  PLOTMANY
2CA5:20 89 13    206 PLOTOK   JSR  ARGPUSH
2CA8:20 77 13    207          JSR  ARGCAR
2CAB:20 2E 1E    208          JSR  GETINT     ;GET 1ST ARG
2CAE:B0 2B       209          BCS  DATERR
2CB0:20 90 13    210          JSR  ARGPOP
2CB3:20 85 13    211          JSR  ARGCDR
2CB6:20 77 13    212          JSR  ARGCAR     ;GET NEXT ARG
2CB9:A5 50       213          LDA  RES
```

```
2CCB:85 52      214          STA  RES+2
2CCD:20 2E 1E   215          JSR  GETINT
2CC0:B0 19      216          BCS  DATERR
2CC2:A5 50      217          LDA  RES
2CC4:A4 52      218          LDY  RES+2
2CC6:AE 81 C0   219          LDX  ROMSEL
2CC9:20 00 F8   220          JSR  PLOT1      ;PLOT THE SQUARE
2CCC:AD 8B C0   221          LDA  RAMSEL
2CCF:AD 8B C0   222          LDA  RAMSEL
2CD2:4C E9 14   223          JMP  TRETURN    ;RETURN T
2CD5:4C 4A 14   224 PLOTFEW  JMP  TOOFEW
2CD8:4C 4F 14   225 PLOTMANY JMP  TOOMANY
2CDB:A2 07      226 DATERR   LDX  #7         ;BAD NUMERIC ARG ERROR
2CDD:A0 36      227          LDY  #54
2CDF:4C EA 24   228          JMP  ERROR
                229 ************************************************
2CE2:           230 * ARRAY FCN
                231 ************************************************
2CE2:4C 4A 14   232 ARRER1   JMP  TOOFEW
2CE5:4C 4F 14   233 ARRER6   JMP  TOOMANY
2CE8:20 A6 0E   234 ARRAY    JSR  SETRET     ;GET ARGS
2CEB:4C FE 12   235          JMP  EVLARGS
2CEE:A5 56      236          LDA  ARCT       ;MUST BE MIN OF 2
2CF0:A0 2A      237          LDY  #42
2CF2:C9 02      238          CMP  #2
2CF4:F0 04      239          BEQ  ARROK
2CF6:90 EA      240          BCC  ARRER1
2CF8:B0 EB      241          BCS  ARRER6
2CFA:20 34 21   242 ARROK    JSR  ARGTOWK1
2CFD:20 77 13   243          JSR  ARGCAR
2D00:A5 EE      244          LDA  ARGPTR+1
2D02:F0 71      245          BEQ  ARRAYRET
2D04:A5 ED      246          LDA  ARGPTR
2D06:24 69      247          BIT  ATMTST     ;ERROR IF 1ST AN ATOM .
2D08:D0 6E      248          BNE  ARRER2
2D0A:20 0B 0F   249          JSR  WK1PUSH    ;EVAL LIST OF INDICES
2D0D:20 06 17   250          JSR  ARGTOEVL
2D10:20 A6 0E   251          JSR  SETRET
2D13:4C FE 12   252          JMP  EVLARGS
2D16:20 12 0F   253          JSR  WK1POP
2D19:20 C0 0D   254          JSR  WK1CDR
2D1C:20 CE 0D   255          JSR  WK1CAR
2D1F:20 9D 0E   256          JSR  NILRET
2D22:A5 CE      257 ARRLOOP2 LDA  WK1
2D24:24 69      258          BIT  ATMTST
2D26:D0 4D      259          BNE  ARRAYRET
2D28:20 89 13   260          JSR  ARGPUSH
2D2B:20 77 13   261          JSR  ARGCAR
2D2E:20 2E 1E   262          JSR  GETINT
2D31:B0 49      263          BCS  ARRER3     ;MUST BE INTEGER
2D33:20 9D 0E   264          JSR  NILRET     ;RETURN NIL IF 0
2D36:A5 50      265          LDA  RES
2D38:05 51      266          ORA  RES+1
2D3A:D0 06      267          BNE  ARRLOOP
2D3C:20 1A 0F   268          JSR  POP
2D3F:4C F0 11   269          JMP  EVALRET
2D42:A5 50      270 ARRLOOP  LDA  RES
2D44:38         271          SEC
```

```
2D45:E9 01      272          SBC  #1
2D47:85 50      273          STA  RES
2D49:B0 02      274          BCS  ARR3
2D4B:C6 51      275          DEC  RES+1
2D4D:A5 50      276 ARR3     LDA  RES        ;FINISHED IF 0
2D4F:05 51      277          ORA  RES+1
2D51:F0 0D      278          BEQ  ARRAYRET1
2D53:20 C0 0D   279          JSR  WK1CDR     ;CHECK FOR MORE ARGS
2D56:A5 CF      280          LDA  WK1+1
2D58:D0 E8      281          BNE  ARRLOOP
2D5A:20 1A 0F   282          JSR  POP
2D5D:4C E3 14   283          JMP  NILRETURN ;NIL IF LIST TOO SHORT
2D60:20 CE 0D   284 ARRAYRET1 JSR WK1CAR    ;DO NEXT ARG
2D63:20 90 13   285          JSR  ARGPOP
2D66:20 85 13   286          JSR  ARGCDR
2D69:A5 EE      287          LDA  ARGPTR+1
2D6B:D0 B5      288          BNE  ARRLOOP2
2D6D:A5 CE      289 ARRET2   LDA  WK1
2D6F:85 6C      290          STA  RESPTR
2D71:A5 CF      291          LDA  WK1+1
2D73:85 6D      292          STA  RESPTR+1
2D75:4C F0 11   293 ARRAYRET JMP EVALRET
2D78:A2 08      294 ARRER2   LDX  #8         ;BAD LIST ARG
2D7A:D0 02      295          BNE  ARRER4
2D7C:A2 07      296 ARRER3   LDX  #7         ;BAD NUM. ARG
2D7E:A0 2A      297 ARRER4   LDY  #42
2D80:4C EA 24   298          JMP  ERROR
                299 ************************************************
2D83:           300 * QP -- FOR DBL-QUOTED ATOMS
                301 ************************************************
2D83:20 A6 0E   302 QP       JSR  SETRET
2D86:4C 98 2D   303          JMP  QPSUB
2D89:4C F0 11   304          JMP  EVALRET
2D8C:20 A6 0E   305 QPT      JSR  SETRET
2D8F:4C 98 2D   306          JMP  QPSUB
2D92:20 F0 18   307          JSR  LINSKP
2D95:4C F0 11   308          JMP  EVALRET
2D98:A9 00      309 QPSUB    LDA  #0
2D9A:85 EF      310          STA  PRINTFLG   ;TURN QUOTING OFF
2D9C:20 A6 0E   311          JSR  SETRET
2D9F:4C C5 18   312          JMP  PRIN1SUB
2DA2:C6 EF      313          DEC  PRINTFLG
2DA4:4C DF 0E   314          JMP  RET
2DA7:           315          CHN  HIRES.SRC
                  1 ************************************************
2DA7:             2 * HIRES GRAPHICS ROUTINES
                  3 ************************************************
2DA7:             4 *
                  5 ************************************************
2DA7:             6 * HGR2
                  7 ************************************************
2DA7:20 02 0A     8 HGR2     JSR  FPSEL      ;CHECK FOR A II+
2DAA:20 D8 F3     9          JSR  AHGR2      ;INIT & CLEAR PAGE 2
2DAD:AD 8B C0    10          LDA  RAMSEL
2DB0:AD 8B C0    11          LDA  RAMSEL
2DB3:4C E3 14    12          JMP  NILRETURN
                 13 ************************************************
2DB6:            14 * HCOLOR
```

```
                  ***************************************************
2DB6:20 A6 0E     HCOLOR  JSR  SETRET     ;GET THE ARG
2DB9:4C BE 13             JMP  GET1
2DBC:B0 18                BCS  HCOLERR1
2DBE:20 2E 1E             JSR  GETINT
2DC1:B0 11                BCS  HCOLERR2
2DC3:20 02 0A             JSR  FPSEL      ;SELECT APPLESOFT
2DC6:A6 50                LDX  RES
2DC8:20 EC F6             JSR  SETHCOL    ;SET THE COLOR
2DCB:AD 8B C0             LDA  RAMSEL
2DCE:AD 8B C0             LDA  RAMSEL
2DD1:4C F0 11             JMP  EVALRET
2DD4:A2 07        HCOLERR2 LDX #7
2DD6:A0 38        HCOLERR1 LDY #56
2DD8:4C EA 24             JMP  ERROR
                  ***************************************************
2DDB:             * HPLOT
                  ***************************************************
2DDB:A0 39        HPLOT   LDY  #57        ;FCN #
2DDD:A9 3B                LDA  #AHPLOT    ;LOAD ADDR OF PLOT ROUTINE
2DDF:A2 2E                LDX  #<AHPLOT
2DE1:8C 8A 09     HSUBTO  STY  LEXERRSAV
2DE4:8D 22 2E             STA  HSTOR+1    ;STORE IN THE CODE
2DE7:8E 23 2E             STX  HSTOR+2
2DEA:20 A6 0E     HPLSUB  JSR  SETRET
2DED:4C FE 12             JMP  EVLARGS    ;GET THE ARGS
2DF0:AC 8A 09             LDY  LEXERRSAV
2DF3:A5 56                LDA  ARCT       ;CHECK FOR 2
2DF5:C9 02                CMP  #2
2DF7:F0 04                BEQ  HPLOK
2DF9:90 32                BCC  HPLFEW
2DFB:B0 33                BCS  HPLMANY
2DFD:20 89 13     HPLOK   JSR  ARGPUSH    ;LOAD THE ARGS
2E00:20 77 13             JSR  ARGCAR
2E03:20 2E 1E             JSR  GETINT
2E06:B0 2B                BCS  HPLERR1
2E08:A5 50                LDA  RES        ;SAVE 1ST COORDINATE
2E0A:85 52                STA  RES+2
2E0C:A5 51                LDA  RES+1
2E0E:85 53                STA  RES+3
2E10:20 90 13             JSR  ARGPOP
2E13:20 85 13             JSR  ARGCDR
2E16:20 77 13             JSR  ARGCAR     ;GET THE NEXT
2E19:20 2E 1E             JSR  GETINT
2E1C:B0 15                BCS  HPLERR1
2E1E:20 02 0A             JSR  FPSEL      ;SELECT APPLESOFT
2E21:20 3B 2E     HSTOR   JSR  AHPLOT     ;JUMP TO CORRECT ROUTINE
2E24:AD 8B C0             LDA  RAMSEL
2E27:AD 8B C0             LDA  RAMSEL
2E2A:4C E9 14             JMP  TRETURN
2E2D:4C 4A 14     HPLFEW  JMP  TOOFEW
2E30:4C 4F 14     HPLMANY JMP  TOOMANY
2E33:A2 07        HPLERR1 LDX  #7
2E35:AC 8A 09             LDY  LEXERRSAV
2E38:4C EA 24             JMP  ERROR
2E3B:A4 53        AHPLOT  LDY  RES+3      ;LOAD REGS FOR A PLOT
2E3D:A6 52                LDX  RES+2
2E3F:A5 50                LDA  RES
```

```
[illegible]1:4C 57 F4   73          JMP  HPLOT1     ;CALL APLSFT ROUTINE
                        74 ***********************************************
2E44:                   75 * HTO
                        76 ***********************************************
2E44:A0 3A              77 HTO      LDY  #58        ;HPLOT A LINE
2E46:A9 4D              78          LDA  #AHLIN
2E48:A2 2E              79          LDX  #(AHLIN
2E4A:4C E1 2D           80          JMP  HSUBTO
2E4D:A6 53              81 AHLIN    LDX  RES+3      ;LOAD REGS FOR A LINE DRAW
2E4F:A5 52              82          LDA  RES+2
2E51:A4 50              83          LDY  RES
2E53:20 3A F5           84          JSR  HTO1
2E56:AD 8B C0           85          LDA  RAMSEL
2E59:AD 8B C0           86          LDA  RAMSEL
2E5C:60                 87          RTS
                        88 ***********************************************
2E5D:                   89 * DRAW
                        90 ***********************************************
2E5D:A0 3B              91 DRAW     LDY  #59
2E5F:A2 01              92          LDX  #ADRAW
2E61:A9 F6              93          LDA  #(ADRAW
2E63:8C 8A 09           94 DRAWSUB  STY  LEXERRSAV ;STORE ADDR
2E66:8E 9B 2E           95          STX  DRAWGO+1
2E69:8D 9C 2E           96          STA  DRAWGO+2
2E6C:20 A6 0E           97          JSR  SETRET     ;GET SHAPE #
2E6F:4C BE 13           98          JMP  GET1
[illegible]2:B0 34      99          BCS  DRAWERR1
2E74:20 2E 1E          100          JSR  GETINT     ;LOAD IT
2E77:B0 2D             101          BCS  DRAWERR2
2E79:A5 51             102          LDA  RES+1
2E7B:D0 29             103          BNE  DRAWERR2
2E7D:A0 00             104          LDY  #0         ;CHECK IF VALID #
2E7F:A5 50             105          LDA  RES
2E81:D1 E8             106          CMP  (SHAPINDX),Y
2E83:F0 02             107          BEQ  DRAWOK
2E85:B0 1F             108          BCS  DRAWERR2
2E87:0A                109 DRAWOK   ASL  A
2E88:A8                110          TAY             ;GET SHAPE ADDR
2E89:B1 E8             111          LDA  (SHAPINDX),Y
2E8B:18                112          CLC
2E8C:65 E8             113          ADC  SHAPINDX
2E8E:AA                114          TAX
2E8F:C8                115          INY
2E90:B1 E8             116          LDA  (SHAPINDX),Y
2E92:65 E9             117          ADC  SHAPINDX+1
2E94:A8                118          TAY
2E95:20 02 0A          119          JSR  FPSEL
2E98:A5 F9             120          LDA  ROTVAL
2E9A:20 01 F6          121 DRAWGO   JSR  ADRAW      ;DRAW THE SHAPE
2E9D:AD 8B C0          122          LDA  RAMSEL
2EA0:AD 8B C0          123          LDA  RAMSEL
[illegible]93:4C E9 14 124          JMP  TRETURN
[illegible]A6:A2 07    125 DRAWERR2 LDX  #7         ;BAD NUMERIC ARG ERROR
2EA8:AC 8A 09          126 DRAWERR1 LDY  LEXERRSAV
2EAB:4C EA 24          127          JMP  ERROR
                       128 ***********************************************
2EAE:                  129 * XDRAW
                       130 ***********************************************
```

```
2EAE:A0 3C      XDRAW   LDY  #60
2EB0:A2 5D              LDX  #AXDRAW
2EB2:A9 F6              LDA  #<AXDRAW
2EB4:D0 AD              BNE  DRAWSUB
2EB6:                   CHN  IO.SRC
                ***************************************
2EB6:           * DISK I/O FCNS
                ***************************************
2EB6:           *
2EB6:20 16 A3   IOSUB   JSR  CLOSEFILS ;CLOSE OPEN FILES
2EB9:20 43 A7           JSR  COPYNAM   ;COPY FILNAM TO BUFFER
2EBC:20 4E A7           JSR  COPYPTRS
2EBF:AD 6A AA           LDA  KEYSLOT   ;SET PARMS
2EC2:0A                 ASL  A
2EC3:0A                 ASL  A
2EC4:0A                 ASL  A
2EC5:0A                 ASL  A
2EC6:8D F7 B5           STA  FMSLOT
2EC9:AD 68 AA           LDA  KEYDR
2ECC:8D F8 B5           STA  FMDR
2ECF:AD 66 AA           LDA  KEYVOL
2ED2:49 FF              EOR  #$FF
2ED4:8D F9 B5           STA  FMVOL
2ED7:A9 75              LDA  #FILNAMBUF
2ED9:8D C3 B5           STA  FILPTR
2EDC:A9 AA              LDA  #<FILNAMBUF
2EDE:8D C4 B5           STA  FILPTR+1
2EE1:AD 81 C0           LDA  ROMSEL
2EE4:20 EA 2E           JSR  FILFIND   ;LOCATE FILE ENTRY
2EE7:4C E2 3A           JMP  IOERR3    ;I/O ERROR IF RETURNED HERE
2EEA:BA         FILFIND TSX
2EEB:8E 9B B3           STX  SSAVE
2EEE:20 C9 B1           JSR  LOCFILE
2EF1:68                 PLA
2EF2:68                 PLA
2EF3:60                 RTS
2EF4:A9 0D      IOERR4  LDA  #13
2EF6:D0 02              BNE  DERRR
                ***************************************
2EF8:           * LOAD
                ***************************************
2EF8:A9 06      LOADERR LDA  #6        ;FILE NOT FOUND ERR
2EFA:8D C5 B5   DERRR   STA  DERRCD
2EFD:48                 PHA
2EFE:A0 00              LDY  #0        ;CLOSE THE BUFFER
2F00:98                 TYA
2F01:91 40              STA  (DOSPTR),Y
2F03:68                 PLA
2F04:20 D1 9E           JSR  IOSET     ;SET CORRECT I/O HANDLERS
2F07:4C D5 A6           JMP  DOSERR1
2F0A:20 B6 2E   LOAD    JSR  IOSUB
2F0D:B0 E9              BCS  LOADERR   ;ERROR IF NOT THERE
2F0F:BD C8 B4           LDA  DIRBUF+2,X
2F12:29 0F              AND  #$0F
2F14:C9 08              CMP  #8
2F16:F0 03              BEQ  LOADOK
2F18:4C F4 2E           JMP  IOERR4
2F1B:BD C6 B4   LOADOK  LDA  DIRBUF,X  ;GET T/S LIST
```

```
[illegible]1E:8D EC B7   54          STA  TRACK
[illegible]21:BD C7 B4   55          LDA  DIRBUF+1,X
2F24:8D ED B7   56          STA  SECTOR
2F27:20 AA 3A   57          JSR  TSSET
2F2A:A9 01      58          LDA  #1          ;CC=READ
2F2C:8D F4 B7   59          STA  CC
2F2F:20 CD 3A   60          JSR  RWTS2       ;READ THE SECTOR
2F32:A2 0D      61          LDX  #$D
2F34:8E 8B 3A   62          STX  TSPTR
2F37:AD 0C 97   63          LDA  TSBUF+$C    ;GET MAP SECTOR
2F3A:8D EC B7   64          STA  TRACK
2F3D:AD 0D 97   65          LDA  TSBUF+$D
2F40:8D ED B7   66          STA  SECTOR
2F43:20 B5 3A   67          JSR  MAPSET
2F46:20 CD 3A   68          JSR  RWTS2       ;READ MAP
2F49:A0 28      69          LDY  #40         ;STORE MAP IN INTERPRETER
2F4B:A2 0B      70          LDX  #11
2F4D:BD 00 96   71 LOADM    LDA  MAPBUF,X
2F50:9D 00 08   72          STA  BEGIN,X
2F53:E8         73          INX
2F54:88         74          DEY
2F55:D0 F6      75          BNE  LOADM
2F57:20 C0 3A   76          JSR  FREESET     ;START AT FREESPC
2F5A:AD F1 B7   77 LOADLP1  LDA  BUFFER+1
2F5D:F0 48      78          BEQ  LOADFIN
2F5F:20 D7 09   79          JSR  PAGCHK2     ;CHECK IF PAGE SHOULD BE LOADED
[illegible]2:90 19      80          BCC  LNXTPAG
2F64:AE 8B 3A   81 LOADLP2  LDX  TSPTR       ;YES-GET SECTOR ADDR
2F67:E8         82          INX
2F68:F0 19      83          BEQ  NXTTS
2F6A:BD 00 97   84          LDA  TSBUF,X
2F6D:8D EC B7   85          STA  TRACK
2F70:E8         86          INX
2F71:BD 00 97   87          LDA  TSBUF,X
2F74:8D ED B7   88          STA  SECTOR
2F77:8E 8B 3A   89          STX  TSPTR
2F7A:20 CD 3A   90          JSR  RWTS2       ;READ IT
2F7D:EE F1 B7   91 LNXTPAG  INC  BUFFER+1
2F80:4C 5A 2F   92          JMP  LOADLP1
2F83:AD 01 97   93 NXTTS    LDA  TSBUF+1     ;CHECK IF MORE T/S
2F86:F0 5D      94          BEQ  UNEXEOF
2F88:8D EC B7   95          STA  TRACK
2F8B:AD 02 97   96          LDA  TSBUF+2
2F8E:8D ED B7   97          STA  SECTOR
2F91:AD F1 B7   98          LDA  BUFFER+1
2F94:48         99          PHA
2F95:20 AA 3A  100          JSR  TSSET
2F98:20 CD 3A  101          JSR  RWTS2       ;READ IT
2F9B:68        102          PLA
2F9C:8D F1 B7  103          STA  BUFFER+1
2F9F:A2 0B     104          LDX  #$B
[illegible]A1:8E 8B 3A  105          STX  TSPTR
[illegible]A4:4C 64 2F  106          JMP  LOADLP2
2FA7:A9 00     107 LOADFIN  LDA  #0          ;SET FREPTR TO 0
2FA9:85 81     108          STA  FREPTR+1
2FAB:8D E7 24  109          STA  ONERRPTR+1
2FAE:8D E9 24  110          STA  OLDEVLPTR+1
2FB1:85 FE     111          STA  ONERRFLG
```

```
[illegible]3:A9 72      112          LDA  #NIL+2
[illegible]85:85 80     113          STA  FREPTR
2FB7:AD 0B 08   114          LDA  OBLINK     ;SET OBLIST LINK
2FBA:8D 1E 3A   115          STA  ENDOBJ
2FBD:AD 0C 08   116          LDA  OBLINK+1
2FC0:8D 1F 3A   117          STA  ENDOBJ+1
2FC3:20 DA 2F   118          JSR  STKSTOR    ;SET NEW STACK
2FC6:20 51 A8   119          JSR  DOSSET     ;RECONNECT DOS
2FC9:20 29 29   120          JSR  MARK       ;CREATE NEW FREE-SPACE LIST
2FCC:20 49 2A   121          JSR  SWEEP
2FCF:20 F3 14   122 IOFIN    JSR  TRET       ;GO BACK TO LISP
2FD2:A0 00      123          LDY  #0         ;CLOSE BUFFER
2FD4:98         124          TYA
2FD5:91 40      125          STA  (DOSPTR),Y
2FD7:4C 5F 09   126          JMP  LISPRET    ;(IN CASE STACK WAS MOVED)
2FDA:AD 0D 08   127 STKSTOR  LDA  STKBEG
2FDD:85 7D      128          STA  STKPTR
2FDF:AD 0E 08   129          LDA  STKBEG+1
2FE2:85 7E      130          STA  STKPTR+1
2FE4:60         131          RTS
2FE5:4C E2 3A   132 UNEXEOF  JMP  IOERR3     ;I/O ERROR (EOF)
                133 ************************************************
2FE8:           134 * SAVE
                135 ************************************************
2FE8:20 B6 2E   136 SAVE     JSR  IOSUB
2FEB:B0 03      137          BCS  NODELFIL   ;DELETE FILE IF THERE
[illegible]D:4C 75 30   138          JMP  DELFIL
2FF0:8A         139 NODELFIL TXA
2FF1:48         140          PHA
2FF2:A9 00      141          LDA  #0
2FF4:8D 8C 3A   142          STA  TSTRK
2FF7:20 64 3A   143          JSR  FREEFIND   ;FREE SECTOR FOR T/S
2FFA:68         144          PLA
2FFB:AA         145          TAX
2FFC:AD F1 B5   146          LDA  NEWTRK
2FFF:9D C6 B4   147          STA  DIRBUF,X
3002:8D 8C 3A   148          STA  TSTRK
3005:AD F0 B5   149          LDA  NEWSEC
3008:9D C7 B4   150          STA  DIRBUF+1,X
300B:8D 8D 3A   151          STA  TSSEC
300E:A9 08      152          LDA  #8         ;TYPE=S
3010:9D C8 B4   153          STA  DIRBUF+2,X
3013:A9 01      154          LDA  #1         ;SEC CT=1
3015:9D E7 B4   155          STA  DIRBUF+$21,X
3018:20 40 3A   156          JSR  ZERTSEC    ;ZERO T/S LIST
301B:20 4F 3A   157          JSR  TSWRITE
301E:AD 1E 3A   158          LDA  ENDOBJ     ;SAVE OBLIST LINK
3021:8D 0B 08   159          STA  OBLINK
3024:AD 1F 3A   160          LDA  ENDOBJ+1
3027:8D 0C 08   161          STA  OBLINK+1
302A:20 B5 3A   162          JSR  MAPSET
[illegible]2D:A0 28     163          LDY  #40        ;PUT MAP IN BUFFER
[illegible]2F:A2 0B     164          LDX  #11
3031:BD 00 08   165 SAVEM    LDA  BEGIN,X
3034:9D 00 96   166          STA  MAPBUF,X
3037:E8         167          INX
3038:88         168          DEY
3039:D0 F6      169          BNE  SAVEM
```

```
3B:20 87 30  170          JSR  SECWRITE  ;WRITE MAP
3E:20 C0 3A  171          JSR  FREESET
3041:AD F1 B7  172 SAVLP2  LDA  BUFFER+1  ;FINISHED?
3044:F0 0E   173          BEQ  SAVFIN
3046:20 D7 09  174        JSR  PAGCHK2   ;PAGE USED?
3049:90 03   175          BCC  SAVNXT
304B:20 87 30  176        JSR  SECWRITE  ;YES-WRITE IT
304E:EE F1 B7  177 SAVNXT  INC  BUFFER+1
3051:4C 41 30  178        JMP  SAVLP2
3054:20 4F 3A  179 SAVFIN  JSR  TSWRITE   ;WRITE LAST T/S
3057:20 5D 30  180        JSR  SAVFIN2
305A:4C CF 2F  181        JMP  IOFIN
305D:AD 97 B3  182 SAVFIN2 LDA  DIRTRK    ;WRITE DIR SECTOR
3060:8D EC B7  183        STA  TRACK
3063:AD 98 B3  184        LDA  DIRSEC
3066:8D ED B7  185        STA  SECTOR
3069:20 45 B0  186        JSR  DIRSET
306C:20 F2 30  187        JSR  WRITESEC
306F:20 C3 B2  188        JSR  DEALLOC   ;DEALLOCATE UNUSED SECTORS
3072:4C 51 A8  189        JMP  DOSSET    ;RECONNECT DOS
3075:BD C8 B4  190 DELFIL  LDA  DIRBUF+2,X
3078:29 0F   191          AND  #$0F
307A:C9 08   192          CMP  #8
307C:F0 03   193          BEQ  DELFIL2
307E:4C F4 2E  194        JMP  IOERR4
3081:20 63 A2  195 DELFIL2 JSR  DELETEFILE
4:4C E8 2F   196          JMP  SAVE
             197 ***********************************************
3087:        198 * I/O STUFF PART 2
             199 ***********************************************
3087:AD F1 B7  200 SECWRITE LDA BUFFER+1
308A:48      201          PHA
308B:AD F0 B7  202        LDA  BUFFER
308E:48      203          PHA
308F:AE 8B 3A  204 SECWRITE2 LDX TSPTR    ;CHECK FOR END OF T/S
3092:F0 34   205          BEQ  NEWTS
3094:20 64 3A  206        JSR  FREEFIND  ;ADD NEW SECTOR TO T/S
3097:AD F1 B5  207        LDA  NEWTRK
309A:AE 8B 3A  208        LDX  TSPTR
309D:9D 00 97  209        STA  TSBUF,X
30A0:E8      210          INX
30A1:AD F0 B5  211        LDA  NEWSEC
30A4:9D 00 97  212        STA  TSBUF,X
30A7:E8      213          INX
30A8:8E 8B 3A  214        STX  TSPTR
30AB:AD F1 B5  215        LDA  NEWTRK
30AE:8D EC B7  216        STA  TRACK
30B1:AD F0 B5  217        LDA  NEWSEC
30B4:8D ED B7  218        STA  SECTOR
30B7:68      219          PLA
30B8:8D F0 B7  220        STA  BUFFER
B:68         221          PLA
C:8D F1 B7   222          STA  BUFFER+1
30BF:AE 9C B3  223        LDX  DIRINDX
30C2:FE E7 B4  224        INC  DIRBUF+$21,X
30C5:4C F2 30  225        JMP  WRITESEC  ;WRITE PAGE
30C8:20 64 3A  226 NEWTS   JSR  FREEFIND  ;ADD NEW T/S SECTOR
30CB:AD F1 B5  227        LDA  NEWTRK
```

```
30CE:8D 01 97  228          STA  TSBUF+1
30D1:AD F0 B5  229          LDA  NEWSEC
30D4:8D 02 97  230          STA  TSBUF+2
30D7:20 4F 3A  231          JSR  TSWRITE
30DA:20 40 3A  232          JSR  ZERTSEC
30DD:AE 9C B3  233          LDX  DIRINDX
30E0:FE E7 B4  234          INC  DIRBUF+$21,X
30E3:AD F1 B5  235          LDA  NEWTRK
30E6:8D 8C 3A  236          STA  TSTRK
30E9:AD F0 B5  237          LDA  NEWSEC
30EC:8D 8D 3A  238          STA  TSSEC
30EF:4C 8F 30  239          JMP  SECWRITE2
30F2:A9 02     240 WRITESEC LDA  #2
30F4:8D F4 B7  241 RWSEC    STA  CC
30F7:4C CD 3A  242          JMP  RWTS2
30FA:A9 01     243 READSEC  LDA  #1
30FC:D0 F6     244          BNE  RWSEC
30FE:          245          CHN  OBLIST.SRC
                 1 ***********************************************
30FE:            2 * OBJECT LIST
                 3 ***********************************************
----- NEXT OBJECT FILE NAME IS LISQ
3100:            4          ORG  OBSTART
3100:00 72       5 OBJBEG   DDB  NIL+2
3102:31 10       6          DDB  AT2
3104:31 08       7 NILAT    DDB  NILNAM
3106:00 72       8          DDB  NIL+2
3108:CE C9       9 NILNAM   ASC  'NI'
310A:31 0C      10          DDB  NILNAM2
310C:CC         11 NILNAM2  ASC  'L'
310D:00         12          DFB  0
310E:00 72      13          DDB  NIL+2
3110:31 16      14 AT2      DDB  T+2
3112:31 20      15          DDB  AT2A
3114:31 16      16 T        DDB  T+2
3116:31 18      17          DDB  T2
3118:31 1C      18 T2       DDB  TNAM
311A:00 72      19          DDB  NIL+2
311C:D4         20 TNAM     ASC  'T'
311D:00         21          DFB  0
311E:00 72      22          DDB  NIL+2
3120:31 26      23 AT2A     DDB  QUOTATM+2
3122:31 40      24          DDB  AT3
3124:00 00      25 QUOTATM  DFB  0,0
3126:31 28      26          DDB  QUOT2
3128:31 2C      27 QUOT2    DDB  QUOTNAM
312A:31 38      28          DDB  QUOTPL
312C:D1 D5      29 QUOTNAM  ASC  'QU'
312E:31 30      30          DDB  QUOT3
3130:CF D4      31 QUOT3    ASC  'OT'
3132:31 34      32          DDB  QUOT4
3134:C5         33 QUOT4    ASC  'E'
3135:00         34          DFB  0
3136:00 72      35          DDB  NIL+2
3138:31 5A      36 QUOTPL   DDB  SUBRATM+2
313A:31 3C      37          DDB  QUOTPL2
313C:14 31      38 QUOTPL2  DDB  QUOTE1
313E:00 72      39          DDB  NIL+2
```

```
3140:31 46      40 AT3      DDB  EXPRATM+2
3142:31 54      41          DDB  AT4
3144:00 00      42 EXPRATM  DFB  0,0
3146:31 48      43          DDB  EXPR2
3148:31 4C      44 EXPR2    DDB  EXPRNAM
314A:00 72      45          DDB  NIL+2
314C:C5 D8      46 EXPRNAM  ASC  'EX'
314E:31 50      47          DDB  EXPR3
3150:D0 D2      48 EXPR3    ASC  'PR'
3152:00 72      49          DDB  NIL+2
3154:31 5A      50 AT4      DDB  SUBRATM+2
3156:31 68      51          DDB  AT5
3158:00 00      52 SUBRATM  DFB  0,0
315A:31 5C      53          DDB  SUBR2
315C:31 60      54 SUBR2    DDB  SUBRNAM
315E:00 72      55          DDB  NIL+2
3160:D3 D5      56 SUBRNAM  ASC  'SU'
3162:31 64      57          DDB  SUBR3
3164:C2 D2      58 SUBR3    ASC  'BR'
3166:00 72      59          DDB  NIL+2
3168:31 6E      60 AT5      DDB  CARATM+2
316A:31 84      61          DDB  AT6
316C:00 00      62 CARATM   DFB  0,0
316E:31 70      63          DDB  CAR2
3170:31 74      64 CAR2     DDB  CARNAM
3172:31 7C      65          DDB  CARPL
3174:C3 C1      66 CARNAM   ASC  'CA'
3176:31 78      67          DDB  CAR3
3178:D2         68 CAR3     ASC  'R'
3179:00         69          DFB  0
317A:00 72      70          DDB  NIL+2
317C:31 5A      71 CARPL    DDB  SUBRATM+2
317E:31 80      72          DDB  CAR4
3180:14 54      73 CAR4     DDB  CAR
3182:00 72      74          DDB  NIL+2
3184:31 8A      75 AT6      DDB  CDRATM+2
3186:31 A0      76          DDB  AT7
3188:00 00      77 CDRATM   DFB  0,0
318A:31 8C      78          DDB  CDR2
318C:31 90      79 CDR2     DDB  CDRNAM
318E:31 98      80          DDB  CDRPL
3190:C3 C4      81 CDRNAM   ASC  'CD'
3192:31 94      82          DDB  CDR3
3194:D2         83 CDR3     ASC  'R'
3195:00         84          DFB  0
3196:00 72      85          DDB  NIL+2
3198:31 5A      86 CDRPL    DDB  SUBRATM+2
319A:31 9C      87          DDB  CDR4
319C:14 7B      88 CDR4     DDB  CDR
319E:00 72      89          DDB  NIL+2
31A0:31 A6      90 AT7      DDB  ASCATM+2
31A2:31 B8      91          DDB  AT8
31A4:00 00      92 ASCATM   DFB  0,0
31A6:31 A8      93          DDB  ASC2A
31A8:31 AC      94 ASC2A    DDB  ASCNAM
31AA:31 B4      95          DDB  ASCPL
31AC:C1 D3      96 ASCNAM   ASC  'AS'
31AE:31 B0      97          DDB  ASC3A
```

```
31B0:C3          98 ASC3A    ASC  'C'
31B1:00          99          DFB  0
31B2:00 72      100          DDB  NIL+2
31B4:31 5A      101 ASCPL    DDB  SUBRATM+2
31B6:3A 0C      102          DDB  ASC4
31B8:31 BE      103 AT8      DDB  CONSATM+2
31BA:31 D4      104          DDB  AT9
31BC:00 00      105 CONSATM  DFB  0,0
31BE:31 C0      106          DDB  CONS2
31C0:31 C4      107 CONS2    DDB  CONSNAM
31C2:31 CC      108          DDB  CONSPL
31C4:C3 CF      109 CONSNAM  ASC  'CO'
31C6:31 C8      110          DDB  CONS3
31C8:CE D3      111 CONS3    ASC  'NS'
31CA:00 72      112          DDB  NIL+2
31CC:31 5A      113 CONSPL   DDB  SUBRATM+2
31CE:31 D0      114          DDB  CONS4
31D0:14 A0      115 CONS4    DDB  CONS
31D2:00 72      116          DDB  NIL+2
31D4:31 DA      117 AT9      DDB  ATOMATM+2
31D6:31 F0      118          DDB  AT10
31D8:00 00      119 ATOMATM  DFB  0,0
31DA:31 DC      120          DDB  ATOM2
31DC:31 E0      121 ATOM2    DDB  ATOMNAM
31DE:31 E8      122          DDB  ATOMPL
31E0:C1 D4      123 ATOMNAM  ASC  'AT'
31E2:31 E4      124          DDB  ATOM3
31E4:CF CD      125 ATOM3    ASC  'OM'
31E6:00 72      126          DDB  NIL+2
31E8:31 5A      127 ATOMPL   DDB  SUBRATM+2
31EA:31 EC      128          DDB  ATOM4
31EC:14 D5      129 ATOM4    DDB  ATOM
31EE:00 72      130          DDB  NIL+2
31F0:31 F6      131 AT10     DDB  NUMBRATM+2
31F2:32 10      132          DDB  AT11
31F4:00 00      133 NUMBRATM DFB  0,0
31F6:31 F8      134          DDB  NUMBER2
31F8:31 FC      135 NUMBER2  DDB  NUMBRNAM
31FA:32 08      136          DDB  NUMBRPL
31FC:CE D5      137 NUMBRNAM ASC  'NU'
31FE:32 00      138          DDB  NUMBER3
3200:CD C2      139 NUMBER3  ASC  'MB'
3202:32 04      140          DDB  NUMBER4
3204:C5 D2      141 NUMBER4  ASC  'ER'
3206:00 72      142          DDB  NIL+2
3208:31 5A      143 NUMBRPL  DDB  SUBRATM+2
320A:32 0C      144          DDB  NUMBER5
320C:14 FC      145 NUMBER5  DDB  NUMBER
320E:00 72      146          DDB  NIL+2
3210:32 16      147 AT11     DDB  LISTATM+2
3212:32 2C      148          DDB  AT12
3214:00 00      149 LISTATM  DFB  0,0
3216:32 18      150          DDB  LIST2
3218:32 1C      151 LIST2    DDB  LISTNAM
321A:32 24      152          DDB  LISTPL
321C:CC C9      153 LISTNAM  ASC  'LI'
321E:32 20      154          DDB  LIST3
3220:D3 D4      155 LIST3    ASC  'ST'
```

```
3222:00 72      156          DDB  NIL+2
  24:31 5A      157 LISTPL   DDB  SUBRATM+2
3226:32 28      158          DDB  LIST4
3228:15 2B      159 LIST4    DDB  LIST
322A:00 72      160          DDB  NIL+2
322C:32 32      161 AT12     DDB  NULLATM+2
322E:32 48      162          DDB  AT13
3230:00 00      163 NULLATM  DFB  0,0
3232:32 34      164          DDB  NULLAT2
3234:32 38      165 NULLAT2  DDB  NULLNAM
3236:32 40      166          DDB  NULLPL
3238:CE D5      167 NULLNAM  ASC  'NU'
323A:32 3C      168          DDB  NULLAT3
323C:CC CC      169 NULLAT3  ASC  'LL'
323E:00 72      170          DDB  NIL+2
3240:31 5A      171 NULLPL   DDB  SUBRATM+2
3242:32 44      172          DDB  NULLAT4
3244:15 34      173 NULLAT4  DDB  NULL
3246:00 72      174          DDB  NIL+2
3248:32 4E      175 AT13     DDB  NOTATM+2
324A:32 64      176          DDB  AT14
324C:00 00      177 NOTATM   DFB  0,0
324E:32 50      178          DDB  NOTAT2
3250:32 54      179 NOTAT2   DDB  NOTNAM
3252:32 5C      180          DDB  NOTPL
3254:CE CF      181 NOTNAM   ASC  'NO'
  56:32 58      182          DDB  NOTAT3
  58:D4         183 NOTAT3   ASC  'T'
3259:00         184          DFB  0
325A:00 72      185          DDB  NIL+2
325C:31 5A      186 NOTPL    DDB  SUBRATM+2
325E:32 60      187          DDB  NOTAT4
3260:15 4B      188 NOTAT4   DDB  NOT
3262:00 72      189          DDB  NIL+2
3264:32 6A      190 AT14     DDB  SETQATM+2
3266:32 80      191          DDB  AT15
3268:00 00      192 SETQATM  DFB  0,0
326A:32 6C      193          DDB  SETQAT2
326C:32 70      194 SETQAT2  DDB  SETQNAM
326E:32 78      195          DDB  SETQPL
3270:D3 C5      196 SETQNAM  ASC  'SE'
3272:32 74      197          DDB  SETQAT3
3274:D4 D1      198 SETQAT3  ASC  'TQ'
3276:00 72      199          DDB  NIL+2
3278:31 5A      200 SETQPL   DDB  SUBRATM+2
327A:32 7C      201          DDB  SETQAT4
327C:15 58      202 SETQAT4  DDB  SETQ
327E:00 72      203          DDB  NIL+2
3280:32 86      204 AT15     DDB  SETATM+2
3282:32 9C      205          DDB  AT16
3284:00 00      206 SETATM   DFB  0,0
3286:32 88      207          DDB  SET2A
  88:32 8C      208 SET2A    DDB  SETNAM
328A:32 94      209          DDB  SETPL
328C:D3 C5      210 SETNAM   ASC  'SE'
328E:32 90      211          DDB  SET2
3290:D4         212 SET2     ASC  'T'
3291:00         213          DFB  0
```

```
3292:00 72      214          DDB  NIL+2
3294:31 5A      215 SETPL    DDB  SUBRATM+2
3296:32 98      216          DDB  SET3
3298:15 A4      217 SET3     DDB  SET
329A:00 72      218          DDB  NIL+2
329C:32 A2      219 AT16     DDB  OBLSTATM+2
329E:32 BC      220          DDB  AT17
32A0:00 00      221 OBLSTATM DFB  0,0
32A2:32 A4      222          DDB  OBLST2
32A4:32 A8      223 OBLST2   DDB  OBLSTNAM
32A6:32 B4      224          DDB  OBLSTPL
32A8:CF C2      225 OBLSTNAM ASC  'OB'
32AA:32 AC      226          DDB  OBLST3
32AC:CC C9      227 OBLST3   ASC  'LI'
32AE:32 B0      228          DDB  OBLST4
32B0:D3 D4      229 OBLST4   ASC  'ST'
32B2:00 72      230          DDB  NIL+2
32B4:31 5A      231 OBLSTPL  DDB  SUBRATM+2
32B6:32 B8      232          DDB  OBLST5
32B8:15 C4      233 OBLST5   DDB  OBLIST
32BA:00 72      234          DDB  NIL+2
32BC:32 C2      235 AT17     DDB  ANDATM+2
32BE:32 D8      236          DDB  AT18
32C0:00 00      237 ANDATM   DFB  0,0
32C2:32 C4      238          DDB  AND2
32C4:32 C8      239 AND2     DDB  ANDNAM
32C6:32 D0      240          DDB  ANDPL
32C8:C1 CE      241 ANDNAM   ASC  'AN'
32CA:32 CC      242          DDB  AND3
32CC:C4         243 AND3     ASC  'D'
32CD:00         244          DFB  0
32CE:00 72      245          DDB  NIL+2
32D0:31 5A      246 ANDPL    DDB  SUBRATM+2
32D2:32 D4      247          DDB  AND4
32D4:15 CF      248 AND4     DDB  AND
32D6:00 72      249          DDB  NIL+2
32D8:32 DE      250 AT18     DDB  ORATM+2
32DA:32 F0      251          DDB  AT19
32DC:00 00      252 ORATM    DFB  0,0
32DE:32 E0      253          DDB  OR2
32E0:32 E4      254 OR2      DDB  ORNAM
32E2:32 E8      255          DDB  ORPL
32E4:CF D2      256 ORNAM    ASC  'OR'
32E6:00 72      257          DDB  NIL+2
32E8:31 5A      258 ORPL     DDB  SUBRATM+2
32EA:32 EC      259          DDB  OR3
32EC:15 E3      260 OR3      DDB  OR
32EE:00 72      261          DDB  NIL+2
32F0:32 F6      262 AT19     DDB  GETATM+2
32F2:33 0C      263          DDB  AT20
32F4:00 00      264 GETATM   DFB  0,0
32F6:32 F8      265          DDB  GET2
32F8:32 FC      266 GET2     DDB  GETNAM
32FA:33 04      267          DDB  GETPL
32FC:C7 C5      268 GETNAM   ASC  'GE'
32FE:33 00      269          DDB  GET3
3300:D4         270 GET3     ASC  'T'
3301:00         271          DFB  0
```

```
3302:00 72      272          DDB  NIL+2
3304:31 5A      273 GETPL    DDB  SUBRATM+2
3306:33 08      274          DDB  GET4
3308:15 F4      275 GET4     DDB  GET
330A:00 72      276          DDB  NIL+2
330C:33 12      277 AT20     DDB  PUTATM+2
330E:33 28      278          DDB  AT21
3310:00 00      279 PUTATM   DFB  0,0
3312:33 14      280          DDB  PUT2
3314:33 18      281 PUT2     DDB  PUTNAM
3316:33 20      282          DDB  PUTPL
3318:D0 D5      283 PUTNAM   ASC  'PU'
331A:33 1C      284          DDB  PUT3
331C:D4         285 PUT3     ASC  'T'
331D:00         286          DFB  0
331E:00 72      287          DDB  NIL+2
3320:31 5A      288 PUTPL    DDB  SUBRATM+2
3322:33 24      289          DDB  PUT4
3324:16 89      290 PUT4     DDB  PUT
3326:00 72      291          DDB  NIL+2
3328:33 2E      292 AT21     DDB  REMATM+2
332A:33 44      293          DDB  AT22
332C:00 00      294 REMATM   DFB  0,0
332E:33 30      295          DDB  REM2
3330:33 34      296 REM2     DDB  REMNAM
3332:33 3C      297          DDB  REMPL
3334:D2 C5      298 REMNAM   ASC  'RE'
3336:33 38      299          DDB  REM3
3338:CD         300 REM3     ASC  'M'
3339:00         301          DFB  0
333A:00 72      302          DDB  NIL+2
333C:31 5A      303 REMPL    DDB  SUBRATM+2
333E:33 40      304          DDB  REM4
3340:16 DB      305 REM4     DDB  REM
3342:00 72      306          DDB  NIL+2
3344:           307          CHN  OBLIST2.SRC
3344:33 4A        1 AT22     DDB  EVALATM+2
3346:33 60        2          DDB  AT23
3348:00 00        3 EVALATM  DFB  0,0
334A:33 4C        4          DDB  EVALAT2
334C:33 50        5 EVALAT2  DDB  EVALNAM
334E:33 58        6          DDB  EVALPL
3350:C5 D6        7 EVALNAM  ASC  'EV'
3352:33 54        8          DDB  EVALAT3
3354:C1 CC        9 EVALAT3  ASC  'AL'
3356:00 72       10          DDB  NIL+2
3358:31 5A       11 EVALPL   DDB  SUBRATM+2
335A:33 5C       12          DDB  EVALAT4
335C:17 0F       13 EVALAT4  DDB  EVAL1
335E:00 72       14          DDB  NIL+2
3360:33 66       15 AT23     DDB  APPLYATM+2
3362:33 80       16          DDB  AT24
3364:00 00       17 APPLYATM DFB  0,0
3366:33 68       18          DDB  APPLY2
3368:33 6C       19 APPLY2   DDB  APPLYNAM
336A:33 78       20          DDB  APPLYPL
336C:C1 D0       21 APPLYNAM ASC  'AP'
336E:33 70       22          DDB  APPLY3
```

```
3370:D0 CC      23 APPLY3  ASC  'PL'
3372:33 74      24         DDB  APPLY4
3374:D9         25 APPLY4  ASC  'Y'
3375:00         26         DFB  0
3376:00 72      27         DDB  NIL+2
3378:31 5A      28 APPLYPL DDB  SUBRATM+2
337A:33 7C      29         DDB  APPLY5
337C:2A CD      30 APPLY5  DDB  APPLY
337E:00 72      31         DDB  NIL+2
3380:33 86      32 AT24    DDB  DEFINATM+2
3382:33 A0      33         DDB  AT25
3384:00 00      34 DEFINATM DFB 0,0
3386:33 88      35         DDB  DEFINE2
3388:33 8C      36 DEFINE2 DDB  DEFINENAM
338A:33 98      37         DDB  DEFINEPL
338C:C4 C5      38 DEFINENAM ASC 'DE'
338E:33 90      39         DDB  DEFINE3
3390:C6 C9      40 DEFINE3 ASC  'FI'
3392:33 94      41         DDB  DEFINE4
3394:CE C5      42 DEFINE4 ASC  'NE'
3396:00 72      43         DDB  NIL+2
3398:31 5A      44 DEFINEPL DDB SUBRATM+2
339A:33 9C      45         DDB  DEFINE5
339C:17 2E      46 DEFINE5 DDB  DEFINE
339E:00 72      47         DDB  NIL+2
33A0:33 A6      48 AT25    DDB  CONDATM+2
33A2:33 BC      49         DDB  AT26
33A4:00 00      50 CONDATM DFB  0,0
33A6:33 A8      51         DDB  COND2
33A8:33 AC      52 COND2   DDB  CONDNAM
33AA:33 B4      53         DDB  CONDPL
33AC:C3 CF      54 CONDNAM ASC  'CO'
33AE:33 B0      55         DDB  COND3
33B0:CE C4      56 COND3   ASC  'ND'
33B2:00 72      57         DDB  NIL+2
33B4:31 5A      58 CONDPL  DDB  SUBRATM+2
33B6:33 B8      59         DDB  COND4
33B8:17 9F      60 COND4   DDB  COND
33BA:00 72      61         DDB  NIL+2
33BC:33 C2      62 AT26    DDB  RPLCAATM+2
33BE:33 DC      63         DDB  AT27
33C0:00 00      64 RPLCAATM DFB 0,0
33C2:33 C4      65         DDB  RPLCA2
33C4:33 C8      66 RPLCA2  DDB  RPLCANAM
33C6:33 D4      67         DDB  RPLCAPL
33C8:D2 D0      68 RPLCANAM ASC 'RP'
33CA:33 CC      69         DDB  RPLCA3
33CC:CC C1      70 RPLCA3  ASC  'LA'
33CE:33 D0      71         DDB  RPLCA4
33D0:C3 C1      72 RPLCA4  ASC  'CA'
33D2:00 72      73         DDB  NIL+2
33D4:31 5A      74 RPLCAPL DDB  SUBRATM+2
33D6:33 D8      75         DDB  RPLCA5
33D8:17 EB      76 RPLCA5  DDB  RPLACA
33DA:00 72      77         DDB  NIL+2
33DC:33 E2      78 AT27    DDB  RPLCDATM+2
33DE:33 FC      79         DDB  AT28
33E0:00 00      80 RPLCDATM DFB 0,0
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33E2:33 E4        81          DDB  RPLCD2
33E4:33 E8        82 RPLCD2   DDB  RPLCDNAM
33E6:33 F4        83          DDB  RPLCDPL
33E8:D2 D0        84 RPLCDNAM ASC  'RP'
33EA:33 EC        85          DDB  RPLCD3
33EC:CC C1        86 RPLCD3   ASC  'LA'
33EE:33 F0        87          DDB  RPLCD4
33F0:C3 C4        88 RPLCD4   ASC  'CD'
33F2:00 72        89          DDB  NIL+2
33F4:31 5A        90 RPLCDPL  DDB  SUBRATM+2
33F6:33 F8        91          DDB  RPLCD5
33F8:18 39        92 RPLCD5   DDB  RPLACD
33FA:00 72        93          DDB  NIL+2
33FC:34 02        94 AT28     DDB  LENATM+2
33FE:34 1C        95          DDB  AT29
3400:00 00        96 LENATM   DFB  0,0
3402:34 04        97          DDB  LENAT2
3404:34 08        98 LENAT2   DDB  LENNAM
3406:34 14        99          DDB  LENPL
3408:CC C5       100 LENNAM   ASC  'LE'
340A:34 0C       101          DDB  LENAT3
340C:CE C7       102 LENAT3   ASC  'NG'
340E:34 10       103          DDB  LENAT4
3410:D4 C8       104 LENAT4   ASC  'TH'
3412:00 72       105          DDB  NIL+2
3414:31 5A       106 LENPL    DDB  SUBRATM+2
3416:34 18       107          DDB  LENAT5
3418:18 40       108 LENAT5   DDB  LENGTH
341A:00 72       109          DDB  NIL+2
341C:34 22       110 AT29     DDB  READATM+2
341E:34 38       111          DDB  AT29A
3420:00 00       112 READATM  DFB  0,0
3422:34 24       113          DDB  READAT2
3424:34 28       114 READAT2  DDB  READNAM
3426:34 30       115          DDB  READPL
3428:D2 C5       116 READNAM  ASC  'RE'
342A:34 2C       117          DDB  READAT3
342C:C1 C4       118 READAT3  ASC  'AD'
342E:00 72       119          DDB  NIL+2
3430:31 5A       120 READPL   DDB  SUBRATM+2
3432:34 34       121          DDB  READAT4
3434:18 74       122 READAT4  DDB  READ1
3436:00 72       123          DDB  NIL+2
3438:34 3E       124 AT29A    DDB  READLATM+2
343A:34 58       125          DDB  AT30
343C:00 00       126 READLATM DFB  0,0
343E:34 40       127          DDB  READLAT2
3440:34 44       128 READLAT2 DDB  READLNM
3442:34 50       129          DDB  READLPL
3444:D2 C5       130 READLNM  ASC  'RE'
3446:34 48       131          DDB  READLAT3
3448:C1 C4       132 READLAT3 ASC  'AD'
344A:34 4C       133          DDB  READLAT4
344C:CC C9       134 READLAT4 ASC  'LI'
344E:3A 10       135          DDB  READL6
3450:31 5A       136 READLPL  DDB  SUBRATM+2
3452:34 54       137          DDB  READLAT5
3454:18 82       138 READLAT5 DDB  READL
```

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3456:00 72      139          DDB  NIL+2
3458:34 5E      140 AT30     DDB  PRIN1ATM+2
345A:34 78      141          DDB  AT31
345C:00 00      142 PRIN1ATM DFB  0,0
345E:34 60      143          DDB  PRIN1A
3460:34 64      144 PRIN1A   DDB  PRIN1NAM
3462:34 70      145          DDB  PRIN1PL
3464:D0 D2      146 PRIN1NAM ASC  'PR'
3466:34 68      147          DDB  PRIN1B
3468:C9 CE      148 PRIN1B   ASC  'IN'
346A:34 6C      149          DDB  PRIN1C
346C:B1         150 PRIN1C   ASC  '1'
346D:00         151          DFB  0
346E:00 72      152          DDB  NIL+2
3470:31 5A      153 PRIN1PL  DDB  SUBRATM+2
3472:34 74      154          DDB  PRIN1D
3474:18 BC      155 PRIN1D   DDB  PRIN1
3476:00 72      156          DDB  NIL+2
3478:34 7E      157 AT31     DDB  PRINTATM+2
347A:34 98      158          DDB  AT32
347C:00 00      159 PRINTATM DFB  0,0
347E:34 80      160          DDB  PRINTAT2
3480:34 84      161 PRINTAT2 DDB  PRINTNAM
3482:34 90      162          DDB  PRINTPL
3484:D0 D2      163 PRINTNAM ASC  'PR'
3486:34 88      164          DDB  PRINTAT3
3488:C9 CE      165 PRINTAT3 ASC  'IN'
348A:34 8C      166          DDB  PRINTAT4
348C:D4         167 PRINTAT4 ASC  'T'
348D:00         168          DFB  0
348E:00 72      169          DDB  NIL+2
3490:31 5A      170 PRINTPL  DDB  SUBRATM+2
3492:34 94      171          DDB  PRINTAT5
3494:18 F4      172 PRINTAT5 DDB  PRINT1
3496:00 72      173          DDB  NIL+2
3498:34 9E      174 AT32     DDB  COPYATM+2
349A:34 B4      175          DDB  AT33
349C:00 00      176 COPYATM  DFB  0,0
349E:34 A0      177          DDB  COPYAT2
34A0:34 A4      178 COPYAT2  DDB  COPYANAM
34A2:34 AC      179          DDB  COPYPL
34A4:C3 CF      180 COPYANAM ASC  'CO'
34A6:34 A8      181          DDB  COPYAT3
34A8:D0 D9      182 COPYAT3  ASC  'PY'
34AA:00 72      183          DDB  NIL+2
34AC:31 5A      184 COPYPL   DDB  SUBRATM+2
34AE:34 B0      185          DDB  COPYAT4
34B0:19 28      186 COPYAT4  DDB  COPY
34B2:00 72      187          DDB  NIL+2
34B4:34 BA      188 AT33     DDB  APPATM+2
34B6:34 D4      189          DDB  AT34
34B8:00 00      190 APPATM   DFB  0,0
34BA:34 BC      191          DDB  APPAT2
34BC:34 C0      192 APPAT2   DDB  APPNAM
34BE:34 CC      193          DDB  APPPL
34C0:C1 D0      194 APPNAM   ASC  'AP'
34C2:34 C4      195          DDB  APPAT3
34C4:D0 C5      196 APPAT3   ASC  'PE'
```

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34C6:34 C8      197          DDB  APPAT4
34C8:CE C4      198 APPAT4   ASC  'ND'
34CA:00 72      199          DDB  NIL+2
34CC:31 5A      200 APPPL    DDB  SUBRATM+2
34CE:34 D0      201          DDB  APPAT5
34D0:19 7C      202 APPAT5   DDB  APPEND
34D2:00 72      203          DDB  NIL+2
34D4:34 DA      204 AT34     DDB  CONCATM+2
34D6:34 F0      205          DDB  AT35
34D8:00 00      206 CONCATM  DFB  0,0
34DA:34 DC      207          DDB  CONCAT2
34DC:34 E0      208 CONCAT2  DDB  CONCNAM
34DE:34 E8      209          DDB  CONCPL
34E0:C3 CF      210 CONCNAM  ASC  'CO'
34E2:34 E4      211          DDB  CONCAT3
34E4:CE C3      212 CONCAT3  ASC  'NC'
34E6:00 72      213          DDB  NIL+2
34E8:31 5A      214 CONCPL   DDB  SUBRATM+2
34EA:34 EC      215          DDB  CONCAT4
34EC:1A 03      216 CONCAT4  DDB  CONC
34EE:00 72      217          DDB  NIL+2
34F0:34 F6      218 AT35     DDB  PROGNATM+2
34F2:35 10      219          DDB  AT36
34F4:00 00      220 PROGNATM DFB  0,0
34F6:34 F8      221          DDB  PROGNAT2
34F8:34 FC      222 PROGNAT2 DDB  PROGNNAM
34FA:35 08      223          DDB  PROGNPL
34FC:D0 D2      224 PROGNNAM ASC  'PR'
34FE:35 00      225          DDB  PROGNAT3
3500:CF C7      226 PROGNAT3 ASC  'OG'
3502:35 04      227          DDB  PROGNAT4
3504:CE         228 PROGNAT4 ASC  'N'
3505:00         229          DFB  0
3506:00 72      230          DDB  NIL+2
3508:31 5A      231 PROGNPL  DDB  SUBRATM+2
350A:35 0C      232          DDB  PROGNAT5
350C:19 00      233 PROGNAT5 DDB  PROGN
350E:00 72      234          DDB  NIL+2
3510:35 16      235 AT36     DDB  LAMBDATM+2
3512:35 30      236          DDB  AT37
3514:00 00      237 LAMBDATM DFB  0,0
3516:35 18      238          DDB  LAMBDA2
3518:35 1C      239 LAMBDA2  DDB  LAMBNAM
351A:00 72      240          DDB  NIL+2
351C:CC C1      241 LAMBNAM  ASC  'LA'
351E:35 20      242          DDB  LAMBDA3
3520:CD C2      243 LAMBDA3  ASC  'MB'
3522:35 24      244          DDB  LAMBDA4
3524:C4 C1      245 LAMBDA4  ASC  'DA'
3526:00 72      246          DDB  NIL+2
3528:CD C5      247 MEMBNAM  ASC  'ME'
352A:35 2C      248          DDB  MEM3
352C:CD C2      249 MEM3     ASC  'MB'
352E:35 4C      250          DDB  MEM4
3530:35 36      251 AT37     DDB  FLAMATM+2
3532:35 54      252          DDB  AT38
3534:00 00      253 FLAMATM  DFB  0,0
3536:35 38      254          DDB  FLAM2
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3538:35 3C      255 FLAM2    DDB  FLAMNAM
353A:00 72      256          DDB  NIL+2
353C:C6 CC      257 FLAMNAM  ASC  'FL'
353E:35 40      258          DDB  FLAM3
3540:C1 CD      259 FLAM3    ASC  'AM'
3542:35 44      260          DDB  FLAM4
3544:C2 C4      261 FLAM4    ASC  'BD'
3546:35 48      262          DDB  FLAM5
3548:C1         263 FLAM5    ASC  'A'
3549:00         264          DFB  0
354A:00 72      265          DDB  NIL+2
354C:C5 D2      266 MEM4     ASC  'ER'
354E:00 72      267          DDB  NIL+2
3550:31 5A      268 MEMBPL   DDB  SUBRATM+2
3552:3A 08      269          DDB  MEM5
3554:           270          CHN  OBLIST3.SRC
3554:35 5A        1 AT38     DDB  PROGATM+2
3556:35 70        2          DDB  AT39
3558:00 00        3 PROGATM  DFB  0,0
355A:35 5C        4          DDB  PROGAT2
355C:35 60        5 PROGAT2  DDB  PROGNAM
355E:35 68        6          DDB  PROGPL
3560:D0 D2        7 PROGNAM  ASC  'PR'
3562:35 64        8          DDB  PROGAT3
3564:CF C7        9 PROGAT3  ASC  'OG'
3566:00 72       10          DDB  NIL+2
3568:31 5A       11 PROGPL   DDB  SUBRATM+2
356A:35 6C       12          DDB  PROGAT4
356C:1B A5       13 PROGAT4  DDB  PROG
356E:00 72       14          DDB  NIL+2
3570:35 76       15 AT39     DDB  RETATM+2
3572:35 90       16          DDB  AT40
3574:00 00       17 RETATM   DFB  0,0
3576:35 78       18          DDB  RETAT2
3578:35 7C       19 RETAT2   DDB  RETNAM
357A:35 88       20          DDB  RETPL
357C:D2 C5       21 RETNAM   ASC  'RE'
357E:35 80       22          DDB  RETAT3
3580:D4 D5       23 RETAT3   ASC  'TU'
3582:35 84       24          DDB  RETAT4
3584:D2 CE       25 RETAT4   ASC  'RN'
3586:00 72       26          DDB  NIL+2
3588:31 5A       27 RETPL    DDB  SUBRATM+2
358A:35 8C       28          DDB  RETAT5
358C:1C 2C       29 RETAT5   DDB  RETURN
358E:00 72       30          DDB  NIL+2
3590:35 96       31 AT40     DDB  GOATM+2
3592:35 A8       32          DDB  AT41
3594:00 00       33 GOATM    DFB  0,0
3596:35 98       34          DDB  GOAT2
3598:35 9C       35 GOAT2    DDB  GONAM
359A:35 A0       36          DDB  GOPL
359C:C7 CF       37 GONAM    ASC  'GO'
359E:00 72       38          DDB  NIL+2
35A0:31 5A       39 GOPL     DDB  SUBRATM+2
35A2:35 A4       40          DDB  GOAT3
35A4:1C 43       41 GOAT3    DDB  GO
35A6:00 72       42          DDB  NIL+2
```

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35A8:35 AE      43 AT41     DDB  ADDATM+2
35AA:35 C4      44          DDB  AT42
35AC:00 00      45 ADDATM   DFB  0,0
35AE:35 B0      46          DDB  ADD2
35B0:35 B4      47 ADD2     DDB  ADDNAM
35B2:35 BC      48          DDB  ADDPL
35B4:C1 C4      49 ADDNAM   ASC  'AD'
35B6:35 B8      50          DDB  ADD3
35B8:C4         51 ADD3     ASC  'D'
35B9:00         52          DFB  0
35BA:00 72      53          DDB  NIL+2
35BC:31 5A      54 ADDPL    DDB  SUBRATM+2
35BE:35 C0      55          DDB  ADD4
35C0:1D 54      56 ADD4     DDB  ADD
35C2:00 72      57          DDB  NIL+2
35C4:35 CA      58 AT42     DDB  SUBATM+2
35C6:35 E0      59          DDB  AT43
35C8:00 00      60 SUBATM   DFB  0,0
35CA:35 CC      61          DDB  SUB2
35CC:35 D0      62 SUB2     DDB  SUBNAM
35CE:35 D8      63          DDB  SUBPL
35D0:D3 D5      64 SUBNAM   ASC  'SU'
35D2:35 D4      65          DDB  SUB3
35D4:C2         66 SUB3     ASC  'B'
35D5:00         67          DFB  0
35D6:00 72      68          DDB  NIL+2
35D8:31 5A      69 SUBPL    DDB  SUBRATM+2
35DA:35 DC      70          DDB  SUB4
35DC:1D 86      71 SUB4     DDB  SUBA
35DE:00 72      72          DDB  NIL+2
35E0:35 E6      73 AT43     DDB  MULTATM+2
35E2:35 FC      74          DDB  AT44
35E4:00 00      75 MULTATM  DFB  0,0
35E6:35 E8      76          DDB  MULTAT2
35E8:35 EC      77 MULTAT2  DDB  MULTNAM
35EA:35 F4      78          DDB  MULTPL
35EC:CD D5      79 MULTNAM  ASC  'MU'
35EE:35 F0      80          DDB  MULTAT3
35F0:CC D4      81 MULTAT3  ASC  'LT'
35F2:00 72      82          DDB  NIL+2
35F4:31 5A      83 MULTPL   DDB  SUBRATM+2
35F6:35 F8      84          DDB  MULTAT4
35F8:1D AC      85 MULTAT4  DDB  MULTA
35FA:00 72      86          DDB  NIL+2
35FC:36 02      87 AT44     DDB  DIVATM+2
35FE:36 18      88          DDB  AT45
3600:00 00      89 DIVATM   DFB  0,0
3602:36 04      90          DDB  DIV2
3604:36 08      91 DIV2     DDB  DIVNAM
3606:36 10      92          DDB  DIVPL
3608:C4 C9      93 DIVNAM   ASC  'DI'
360A:36 0C      94          DDB  DIV3
360C:D6         95 DIV3     ASC  'V'
360D:00         96          DFB  0
360E:00 72      97          DDB  NIL+2
3610:31 5A      98 DIVPL    DDB  SUBRATM+2
3612:36 14      99          DDB  DIV4
3614:1D D2     100 DIV4     DDB  DIV
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3616:00 72      101          DDB  NIL+2
3618:36 1E      102 AT45     DDB  INTATM+2
361A:36 34      103          DDB  AT46
361C:00 00      104 INTATM   DFB  0,0
361E:36 20      105          DDB  INTAT2
3620:36 24      106 INTAT2   DDB  INTNAM
3622:36 2C      107          DDB  INTPL
3624:C9 CE      108 INTNAM   ASC  'IN'
3626:36 28      109          DDB  INTAT3
3628:D4         110 INTAT3   ASC  'T'
3629:00         111          DFB  0
362A:00 72      112          DDB  NIL+2
362C:31 5A      113 INTPL    DDB  SUBRATM+2
362E:36 30      114          DDB  INTAT4
3630:1D F8      115 INTAT4   DDB  INT
3632:00 72      116          DDB  NIL+2
3634:36 3A      117 AT46     DDB  CALLATM+2
3636:36 50      118          DDB  AT47
3638:00 00      119 CALLATM  DFB  0,0
363A:36 3C      120          DDB  CALLAT2
363C:36 40      121 CALLAT2  DDB  CALLNAM
363E:36 48      122          DDB  CALLPL
3640:C3 C1      123 CALLNAM  ASC  'CA'
3642:36 44      124          DDB  CALLAT3
3644:CC CC      125 CALLAT3  ASC  'LL'
3646:00 72      126          DDB  NIL+2
3648:31 5A      127 CALLPL   DDB  SUBRATM+2
364A:36 4C      128          DDB  CALLAT4
364C:1E 48      129 CALLAT4  DDB  CALL
364E:00 72      130          DDB  NIL+2
3650:36 56      131 AT47     DDB  PEEKATM+2
3652:36 6C      132          DDB  AT48
3654:00 00      133 PEEKATM  DFB  0,0
3656:36 58      134          DDB  PEEKAT2
3658:36 5C      135 PEEKAT2  DDB  PEEKNAM
365A:36 64      136          DDB  PEEKPL
365C:D0 C5      137 PEEKNAM  ASC  'PE'
365E:36 60      138          DDB  PEEKAT3
3660:C5 CB      139 PEEKAT3  ASC  'EK'
3662:00 72      140          DDB  NIL+2
3664:31 5A      141 PEEKPL   DDB  SUBRATM+2
3666:36 68      142          DDB  PEEKAT4
3668:1E 6F      143 PEEKAT4  DDB  PEEK
366A:00 72      144          DDB  NIL+2
366C:36 72      145 AT48     DDB  POKEATM+2
366E:36 88      146          DDB  AT49
3670:00 00      147 POKEATM  DFB  0,0
3672:36 74      148          DDB  POKEAT2
3674:36 78      149 POKEAT2  DDB  POKENAM
3676:36 80      150          DDB  POKEPL
3678:D0 CF      151 POKENAM  ASC  'PO'
367A:36 7C      152          DDB  POKEAT3
367C:CB C5      153 POKEAT3  ASC  'KE'
367E:00 72      154          DDB  NIL+2
3680:31 5A      155 POKEPL   DDB  SUBRATM+2
3682:36 84      156          DDB  POKEAT4
3684:1E 94      157 POKEAT4  DDB  POKE
3686:00 72      158          DDB  NIL+2
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368:36 8E      159 AT49     DDB  ZEROATM+2
36A:36 A4      160          DDB  AT50
368C:00 00     161 ZEROATM DFB  0,0
368E:36 90     162          DDB  ZEROAT2
3690:36 94     163 ZEROAT2 DDB  ZERONAM
3692:36 9C     164          DDB  ZEROPL
3694:DA C5     165 ZERONAM ASC  'ZE'
3696:36 98     166          DDB  ZEROAT3
3698:D2 CF     167 ZEROAT3 ASC  'RO'
369A:00 72     168          DDB  NIL+2
369C:31 5A     169 ZEROPL  DDB  SUBRATM+2
369E:36 A0     170          DDB  ZEROAT4
36A0:1E EC     171 ZEROAT4 DDB  ZERO
36A2:00 72     172          DDB  NIL+2
36A4:36 AA     173 AT50     DDB  HTABATM+2
36A6:36 C0     174          DDB  AT51
36A8:00 00     175 HTABATM DFB  0,0
36AA:36 AC     176          DDB  HTABAT2
36AC:36 B0     177 HTABAT2 DDB  HTABNAM
36AE:36 B8     178          DDB  HTABPL
36B0:C8 D4     179 HTABNAM ASC  'HT'
36B2:36 B4     180          DDB  HTABAT3
36B4:C1 C2     181 HTABAT3 ASC  'AB'
36B6:00 72     182          DDB  NIL+2
36B8:31 5A     183 HTABPL  DDB  SUBRATM+2
36BA:36 BC     184          DDB  HTABAT4
  C:1F 26      185 HTABAT4 DDB  HTAB
36BE:00 72     186          DDB  NIL+2
36C0:36 C6     187 AT51     DDB  VTABATM+2
36C2:36 DC     188          DDB  AT52
36C4:00 00     189 VTABATM DFB  0,0
36C6:36 C8     190          DDB  VTABAT2
36C8:36 CC     191 VTABAT2 DDB  VTABNAM
36CA:36 D4     192          DDB  VTABPL
36CC:D6 D4     193 VTABNAM ASC  'VT'
36CE:36 D0     194          DDB  VTABAT3
36D0:C1 C2     195 VTABAT3 ASC  'AB'
36D2:00 72     196          DDB  NIL+2
36D4:31 5A     197 VTABPL  DDB  SUBRATM+2
36D6:36 D8     198          DDB  VTABAT4
36D8:1F 55     199 VTABAT4 DDB  VTAB
36DA:00 72     200          DDB  NIL+2
36DC:36 E2     201 AT52     DDB  BREAKATM+2
36DE:36 F4     202          DDB  AT53
36E0:31 16     203 BREAKATM DDB T+2
36E2:36 E4     204          DDB  BREAKAT2
36E4:36 E8     205 BREAKAT2 DDB BREAKNAM
36E6:36 EC     206          DDB  BREAKPL
36E8:C2 D2     207 BREAKNAM ASC 'BR'
36EA:39 9C     208          DDB  BREAKNAM2
36EC:31 5A     209 BREAKPL DDB  SUBRATM+2
  E:36 F0      210          DDB  BREAKAT3
  0:25 8D      211 BREAKAT3 DDB BREAKEX
36F2:00 72     212          DDB  NIL+2
36F4:36 FA     213 AT53     DDB  EQUALATM+2
36F6:37 14     214          DDB  AT54
36F8:00 00     215 EQUALATM DFB 0,0
36FA:36 FC     216          DDB  EQUALAT2
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FC:37 00      217 EQUALAT2 DDB EQUALNAM
FE:37 0C      218          DDB  EQUALPL
3700:C5 D1    219 EQUALNAM ASC 'EQ'
3702:37 04    220          DDB  EQUALAT3
3704:D5 C1    221 EQUALAT3 ASC 'UA'
3706:37 08    222          DDB  EQUALAT4
3708:CC       223 EQUALAT4 ASC 'L'
3709:00       224          DFB  0
370A:00 72    225          DDB  NIL+2
370C:31 5A    226 EQUALPL  DDB  SUBRATM+2
370E:37 10    227          DDB  EQUALAT5
3710:20 13    228 EQUALAT5 DDB EQUAL
3712:00 72    229          DDB  NIL+2
3714:         230          CHN  OBLIST4.SRC
3714:37 1A      1 AT54     DDB  EXPLATM+2
3716:37 38      2          DDB  AT55
3718:00 00      3 EXPLATM  DFB  0,0
371A:37 1C      4          DDB  EXPLAT2
371C:37 20      5 EXPLAT2  DDB  EXPNAM
371E:37 30      6          DDB  EXPLPL
3720:C5 D8      7 EXPNAM   ASC  'EX'
3722:37 24      8          DDB  EXPLAT3
3724:D0 CC      9 EXPLAT3  ASC  'PL'
3726:37 28     10          DDB  EXPLAT4
3728:CF C4     11 EXPLAT4  ASC  'OD'
372A:37 2C     12          DDB  EXPLAT5
2C:C5          13 EXPLAT5  ASC  'E'
372D:00        14          DFB  0
372E:00 72     15          DDB  NIL+2
3730:31 5A     16 EXPLPL   DDB  SUBRATM+2
3732:37 34     17          DDB  EXPLAT6
3734:20 82     18 EXPLAT6  DDB  EXPLODE
3736:00 72     19          DDB  NIL+2
3738:37 3E     20 AT55     DDB  IMPLATM+2
373A:37 5C     21          DDB  AT56
373C:00 00     22 IMPLATM  DFB  0,0
373E:37 40     23          DDB  IMPLAT2
3740:37 44     24 IMPLAT2  DDB  IMPLNAM
3742:37 54     25          DDB  IMPLPL
3744:C9 CD     26 IMPLNAM  ASC  'IM'
3746:37 48     27          DDB  IMPLAT3
3748:D0 CC     28 IMPLAT3  ASC  'PL'
374A:37 4C     29          DDB  IMPLAT4
374C:CF C4     30 IMPLAT4  ASC  'OD'
374E:37 50     31          DDB  IMPLAT5
3750:C5        32 IMPLAT5  ASC  'E'
3751:00        33          DFB  0
3752:00 72     34          DDB  NIL+2
3754:31 5A     35 IMPLPL   DDB  SUBRATM+2
3756:37 58     36          DDB  IMPLAT6
3758:21 3D     37 IMPLAT6  DDB  IMPLODE
375A:00 72     38          DDB  NIL+2
3C:37 62       39 AT56     DDB  GREATATM+2
375E:37 80     40          DDB  AT57
3760:00 00     41 GREATATM DFB 0,0
3762:37 64     42          DDB  GREATAT2
3764:37 68     43 GREATAT2 DDB GREATNAM
3766:37 78     44          DDB  GREATPL
```

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3768:C7 D2      45 GREATNAM ASC 'GR'
376A:37 6C      46          DDB  GREATAT3
376C:C5 C1      47 GREATAT3 ASC 'EA'
376E:37 70      48          DDB  GREATAT4
3770:D4 C5      49 GREATAT4 ASC 'TE'
3772:37 74      50          DDB  GREATAT5
3774:D2         51 GREATAT5 ASC 'R'
3775:00         52          DFB  0
3776:00 72      53          DDB  NIL+2
3778:31 5A      54 GREATPL  DDB  SUBRATM+2
377A:37 7C      55          DDB  GREATAT6
377C:22 0F      56 GREATAT6 DDB GREATER
377E:00 72      57          DDB  NIL+2
3780:37 86      58 AT57     DDB  REMOBATM+2
3782:37 A0      59          DDB  AT58
3784:00 00      60 REMOBATM DFB 0,0
3786:37 88      61          DDB  REMOBAT2
3788:37 8C      62 REMOBAT2 DDB REMOBNAM
378A:37 98      63          DDB  REMOBPL
378C:D2 C5      64 REMOBNAM ASC 'RE'
378E:37 90      65          DDB  REMOBAT3
3790:CD CF      66 REMOBAT3 ASC 'MO'
3792:37 94      67          DDB  REMOBAT4
3794:C2         68 REMOBAT4 ASC 'B'
3795:00         69          DFB  0
3796:00 72      70          DDB  NIL+2
3798:31 5A      71 REMOBPL  DDB  SUBRATM+2
379A:37 9C      72          DDB  REMOBAT5
379C:22 CC      73 REMOBAT5 DDB REMOB
379E:00 72      74          DDB  NIL+2
37A0:37 A6      75 AT58     DDB  CHRATM+2
37A2:37 BC      76          DDB  AT59
37A4:00 00      77 CHRATM   DFB  0,0
37A6:37 A8      78          DDB  CHRAT2
37A8:37 AC      79 CHRAT2   DDB  CHRNAM
37AA:37 B4      80          DDB  CHRPL
37AC:C3 C8      81 CHRNAM   ASC  'CH'
37AE:37 B0      82          DDB  CHRAT3
37B0:D2         83 CHRAT3   ASC  'R'
37B1:00         84          DFB  0
37B2:00 72      85          DDB  NIL+2
37B4:31 5A      86 CHRPL    DDB  SUBRATM+2
37B6:37 B8      87          DDB  CHRAT4
37B8:23 40      88 CHRAT4   DDB  CHR
37BA:00 72      89          DDB  NIL+2
37BC:37 C2      90 AT59     DDB  GETCATM+2
37BE:37 DC      91          DDB  AT60
37C0:00 00      92 GETCATM  DFB  0,0
37C2:37 C4      93          DDB  GETCAT2
37C4:37 C8      94 GETCAT2  DDB  GETCNAM
37C6:37 D4      95          DDB  GETCPL
37C8:C7 C5      96 GETCNAM  ASC  'GE'
37CA:37 CC      97          DDB  GETCAT3
37CC:D4 C3      98 GETCAT3  ASC  'TC'
37CE:37 D0      99          DDB  GETCAT4
37D0:C8 D2     100 GETCAT4  ASC  'HR'
37D2:00 72     101          DDB  NIL+2
37D4:31 5A     102 GETCPL   DDB  SUBRATM+2
```

```
37D6:37 D8      103          DDB  GETCAT5
37D8:23 6B      104 GETCAT5  DDB  GETCHRA
37DA:00 72      105          DDB  NIL+2
37DC:37 E2      106 AT60     DDB  TRACEATM+2
37DE:37 FC      107          DDB  AT61
37E0:00 00      108 TRACEATM DFB  0,0
37E2:37 E4      109          DDB  TRACAT2
37E4:37 E8      110 TRACAT2  DDB  TRACNAM
37E6:37 F4      111          DDB  TRACPL
37E8:D4 D2      112 TRACNAM  ASC  'TR'
37EA:37 EC      113          DDB  TRACAT3
37EC:C1 C3      114 TRACAT3  ASC  'AC'
37EE:37 F0      115          DDB  TRACAT4
37F0:C5         116 TRACAT4  ASC  'E'
37F1:00         117          DFB  0
37F2:00 72      118          DDB  NIL+2
37F4:31 5A      119 TRACPL   DDB  SUBRATM+2
37F6:37 F8      120          DDB  TRACAT5
37F8:24 41      121 TRACAT5  DDB  TRACE
37FA:00 72      122          DDB  NIL+2
37FC:38 02      123 AT61     DDB  UNTRACATM+2
37FE:38 20      124          DDB  AT62
3800:00 00      125 UNTRACATM DFB 0,0
3802:38 04      126          DDB  UNTRACAT2
3804:38 08      127 UNTRACAT2 DDB UNTRACNAM
3806:38 18      128          DDB  UNTRACPL
3808:D5 CE      129 UNTRACNAM ASC 'UN'
380A:38 0C      130          DDB  UNTRACAT3
380C:D4 D2      131 UNTRACAT3 ASC 'TR'
380E:38 10      132          DDB  UNTRACAT4
3810:C1 C3      133 UNTRACAT4 ASC 'AC'
3812:38 14      134          DDB  UNTRACAT5
3814:C5         135 UNTRACAT5 ASC 'E'
3815:00         136          DFB  0
3816:00 72      137          DDB  NIL+2
3818:31 5A      138 UNTRACPL DDB SUBRATM+2
381A:38 1C      139          DDB  UNTRACAT6
381C:24 6B      140 UNTRACAT6 DDB UNTRACE
381E:00 72      141          DDB  NIL+2
3820:38 26      142 AT62     DDB  ONERRATM+2
3822:38 40      143          DDB  AT63
3824:00 00      144 ONERRATM DFB 0,0
3826:38 28      145          DDB  ONERRAT2
3828:38 2C      146 ONERRAT2 DDB ONERRNAM
382A:38 38      147          DDB  ONERRPL
382C:CF CE      148 ONERRNAM ASC 'ON'
382E:38 30      149          DDB  ONERRAT3
3830:C5 D2      150 ONERRAT3 ASC 'ER'
3832:38 34      151          DDB  ONERRAT4
3834:D2         152 ONERRAT4 ASC 'R'
3835:00         153          DFB  0
3836:00 72      154          DDB  NIL+2
3838:31 5A      155 ONERRPL  DDB  SUBRATM+2
383A:38 3C      156          DDB  ONERRAT5
383C:24 C9      157 ONERRAT5 DDB ONERR
383E:00 72      158          DDB  NIL+2
3840:38 46      159 AT63     DDB  GCATM+2
3842:38 58      160          DDB  AT64
```

```
3844:00 00      161 GCATM    DFB  0,0
3846:38 48      162          DDB  GCAT2
3848:38 4C      163 GCAT2    DDB  GCNAM
384A:38 50      164          DDB  GCPL
384C:C7 C3      165 GCNAM    ASC  'GC'
384E:00 72      166          DDB  NIL+2
3850:31 5A      167 GCPL     DDB  SUBRATM+2
3852:38 54      168          DDB  GCAT3
3854:28 9D      169 GCAT3    DDB  GC
3856:00 72      170          DDB  NIL+2
3858:38 5E      171 AT64     DDB  MAPCARATM+2
385A:38 78      172          DDB  AT65
385C:00 00      173 MAPCARATM DFB 0,0
385E:38 60      174          DDB  MAPAT2
3860:38 64      175 MAPAT2   DDB  MAPNAM
3862:38 70      176          DDB  MAPPL
3864:CD C1      177 MAPNAM   ASC  'MA'
3866:38 68      178          DDB  MAPAT3
3868:D0 C3      179 MAPAT3   ASC  'PC'
386A:38 6C      180          DDB  MAPAT4
386C:C1 D2      181 MAPAT4   ASC  'AR'
386E:00 72      182          DDB  NIL+2
3870:31 5A      183 MAPPL    DDB  SUBRATM+2
3872:38 74      184          DDB  MAPAT5
3874:2B 38      185 MAPAT5   DDB  MAPCAR
3876:00 72      186          DDB  NIL+2
3878:38 7E      187 AT65     DDB  GRATM+2
387A:38 90      188          DDB  AT66
387C:00 00      189 GRATM    DFB  0,0
387E:38 80      190          DDB  GRAT2
3880:38 84      191 GRAT2    DDB  GRNAM
3882:38 88      192          DDB  GRPL
3884:C7 D2      193 GRNAM    ASC  'GR'
3886:00 72      194          DDB  NIL+2
3888:31 5A      195 GRPL     DDB  SUBRATM+2
388A:38 8C      196          DDB  GRAT3
388C:2C 47      197 GRAT3    DDB  GR
388E:00 72      198          DDB  NIL+2
3890:38 96      199 AT66     DDB  TEXTATM+2
3892:38 AC      200          DDB  AT67
3894:00 00      201 TEXTATM  DFB  0,0
3896:38 98      202          DDB  TEXTAT2
3898:38 9C      203 TEXTAT2  DDB  TEXTNAM
389A:38 A4      204          DDB  TEXTPL
389C:D4 C5      205 TEXTNAM  ASC  'TE'
389E:38 A0      206          DDB  TEXTAT3
38A0:D8 D4      207 TEXTAT3  ASC  'XT'
38A2:00 72      208          DDB  NIL+2
38A4:31 5A      209 TEXTPL   DDB  SUBRATM+2
38A6:38 A8      210          DDB  TEXTAT4
38A8:2C 5C      211 TEXTAT4  DDB  TEXT
38AA:00 72      212          DDB  NIL+2
38AC:38 B2      213 AT67     DDB  COLORATM+2
38AE:38 CC      214          DDB  AT68
38B0:00 00      215 COLORATM DFB 0,0
38B2:38 B4      216          DDB  COLAT2
38B4:38 B8      217 COLAT2   DDB  COLNAM
38B6:38 C4      218          DDB  COLPL
```

```
38:C3 CF     219 COLNAM   ASC   'CO'
38A:38 BC    220          DDB   COLAT3
38BC:CC CF   221 COLAT3   ASC   'LO'
38BE:38 C0   222          DDB   COLAT4
38C0:D2      223 COLAT4   ASC   'R'
38C1:00      224          DFB   0
38C2:00 72   225          DDB   NIL+2
38C4:31 5A   226 COLPL    DDB   SUBRATM+2
38C6:38 C8   227          DDB   COLAT5
38C8:2C 6E   228 COLAT5   DDB   COLOR
38CA:00 72   229          DDB   NIL+2
38CC:38 D2   230 AT68     DDB   PLOTATM+2
38CE:38 E8   231          DDB   AT69
38D0:00 00   232 PLOTATM  DFB   0,0
38D2:38 D4   233          DDB   PLOTAT2
38D4:38 D8   234 PLOTAT2  DDB   PLOTNAM
38D6:38 E0   235          DDB   PLOTPL
38D8:D0 CC   236 PLOTNAM  ASC   'PL'
38DA:38 DC   237          DDB   PLOTAT3
38DC:CF D4   238 PLOTAT3  ASC   'OT'
38DE:00 72   239          DDB   NIL+2
38E0:31 5A   240 PLOTPL   DDB   SUBRATM+2
38E2:38 E4   241          DDB   PLOTAT4
38E4:2C 93   242 PLOTAT4  DDB   PLOT
38E6:00 72   243          DDB   NIL+2
38E8:        244          CHN   OBLIST5.SRC
8:38 EE        1 AT69     DDB   HGRATM+2
38EA:39 04     2          DDB   AT70
38EC:00 00     3 HGRATM   DFB   0,0
38EE:38 F0     4          DDB   HGRAT2
38F0:38 F4     5 HGRAT2   DDB   HGRNAM
38F2:38 FC     6          DDB   HGRPL
38F4:C8 C7     7 HGRNAM   ASC   'HG'
38F6:38 F8     8          DDB   HGRAT3
38F8:D2 B2     9 HGRAT3   ASC   'R2'
38FA:00 72    10          DDB   NIL+2
38FC:31 5A    11 HGRPL    DDB   SUBRATM+2
38FE:39 00    12          DDB   HGRAT4
3900:2D A7    13 HGRAT4   DDB   HGR2
3902:00 72    14          DDB   NIL+2
3904:39 0A    15 AT70     DDB   HCOLATM+2
3906:39 24    16          DDB   AT71
3908:00 00    17 HCOLATM  DFB   0,0
390A:39 0C    18          DDB   HCOLAT2
390C:39 10    19 HCOLAT2  DDB   HCOLNAM
390E:39 1C    20          DDB   HCOLPL
3910:C8 C3    21 HCOLNAM  ASC   'HC'
3912:39 14    22          DDB   HCOLAT3
3914:CF CC    23 HCOLAT3  ASC   'OL'
3916:39 18    24          DDB   HCOLAT4
3918:CF D2    25 HCOLAT4  ASC   'OR'
A:00 72       26          DDB   NIL+2
C:31 5A       27 HCOLPL   DDB   SUBRATM+2
391E:39 20    28          DDB   HCOLAT5
3920:2D B6    29 HCOLAT5  DDB   HCOLOR
3922:00 72    30          DDB   NIL+2
3924:39 2A    31 AT71     DDB   HPLOTATM+2
3926:39 44    32          DDB   AT72
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[illegible]8:00 00   33 HPLOTATM DFB 0,0
[illegible]2A:39 2C  34          DDB  HPLAT2
392C:39 30           35 HPLAT2   DDB  HPLNAM
392E:39 3C           36          DDB  HPLPL
3930:C8 D0           37 HPLNAM   ASC  'HP'
3932:39 34           38          DDB  HPLAT3
3934:CC CF           39 HPLAT3   ASC  'LO'
3936:39 38           40          DDB  HPLAT4
3938:D4              41 HPLAT4   ASC  'T'
3939:00              42          DFB  0
393A:00 72           43          DDB  NIL+2
393C:31 5A           44 HPLPL    DDB  SUBRATM+2
393E:39 40           45          DDB  HPLAT5
3940:2D DB           46 HPLAT5   DDB  HPLOT
3942:00 72           47          DDB  NIL+2
3944:39 4A           48 AT72     DDB  HTOATM+2
3946:39 60           49          DDB  AT73
3948:00 00           50 HTOATM   DFB  0,0
394A:39 4C           51          DDB  HTOAT2
394C:39 50           52 HTOAT2   DDB  HTONAM
394E:39 58           53          DDB  HTOPL
3950:C8 D4           54 HTONAM   ASC  'HT'
3952:39 54           55          DDB  HTOAT3
3954:CF              56 HTOAT3   ASC  'O'
3955:00              57          DFB  0
3956:00 72           58          DDB  NIL+2
[illegible]8:31 5A   59 HTOPL    DDB  SUBRATM+2
395A:39 5C           60          DDB  HTOAT4
395C:2E 44           61 HTOAT4   DDB  HTO
395E:00 72           62          DDB  NIL+2
3960:39 66           63 AT73     DDB  DRAWATM+2
3962:39 7C           64          DDB  AT74
3964:00 00           65 DRAWATM  DFB  0,0
3966:39 68           66          DDB  DRAWAT2
3968:39 6C           67 DRAWAT2  DDB  DRAWNAM
396A:39 74           68          DDB  DRAWPL
396C:C4 D2           69 DRAWNAM  ASC  'DR'
396E:39 70           70          DDB  DRAWAT3
3970:C1 D7           71 DRAWAT3  ASC  'AW'
3972:00 72           72          DDB  NIL+2
3974:31 5A           73 DRAWPL   DDB  SUBRATM+2
3976:39 78           74          DDB  DRAWAT4
3978:2E 5D           75 DRAWAT4  DDB  DRAW
397A:00 72           76          DDB  NIL+2
397C:39 82           77 AT74     DDB  XDRAWATM+2
397E:39 A4           78          DDB  AT77
3980:00 00           79 XDRAWATM DFB  0,0
3982:39 84           80          DDB  XDRAWAT2
3984:39 88           81 XDRAWAT2 DDB  XDRAWNAM
3986:39 94           82          DDB  XDRAWPL
3988:D8 C4           83 XDRAWNAM ASC  'XD'
[illegible]9A:39 8C  84          DDB  XDRAWAT3
[illegible]3C:D2 C1  85 XDRAWAT3 ASC  'RA'
398E:39 90           86          DDB  XDRAWAT4
3990:D7              87 XDRAWAT4 ASC  'W'
3991:00              88          DFB  0
3992:00 72           89          DDB  NIL+2
3994:31 5A           90 XDRAWPL  DDB  SUBRATM+2
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[illegible]96:39 98      91          DDB  XDRAWAT5
[illegible]98:2E AE      92 XDRAWAT5 DDB  XDRAW
399A:00 72               93          DDB  NIL+2
399C:C5 C1               94 BREAKNAM2 ASC 'EA'
399E:39 A0               95          DDB  BREAKNAM3
39A0:CB                  96 BREAKNAM3 ASC 'K'
39A1:00                  97          DFB  0
39A2:00 72               98          DDB  NIL+2
39A4:39 AA               99 AT77     DDB  ARRATM+2
39A6:39 C4              100          DDB  AT78
39A8:00 00              101 ARRATM   DFB  0,0
39AA:39 AC              102          DDB  ARRAT2
39AC:39 B0              103 ARRAT2   DDB  ARRNAM
39AE:39 BC              104          DDB  ARRPL
39B0:C1 D2              105 ARRNAM   ASC  'AR'
39B2:39 B4              106          DDB  ARRAT3
39B4:D2 C1              107 ARRAT3   ASC  'RA'
39B6:39 B8              108          DDB  ARRAT4
39B8:D9                 109 ARRAT4   ASC  'Y'
39B9:00                 110          DFB  0
39BA:00 72              111          DDB  NIL+2
39BC:31 5A              112 ARRPL    DDB  SUBRATM+2
39BE:39 C0              113          DDB  ARRAT5
39C0:2C E8              114 ARRAT5   DDB  ARRAY
39C2:00 72              115          DDB  NIL+2
39C4:39 CA              116 AT78     DDB  DELATM+2
[illegible]C6:39 FC     117          DDB  AT81
39C8:00 00              118 DELATM   DFB  0,0
39CA:39 CC              119          DDB  DELAT2
39CC:39 D0              120 DELAT2   DDB  DELNAM
39CE:39 DC              121          DDB  DELPL
39D0:C4 C5              122 DELNAM   ASC  'DE'
39D2:39 D4              123          DDB  DELAT3
39D4:CC C5              124 DELAT3   ASC  'LE'
39D6:39 D8              125          DDB  DELAT4
39D8:D4 C5              126 DELAT4   ASC  'TE'
39DA:00 72              127          DDB  NIL+2
39DC:31 5A              128 DELPL    DDB  SUBRATM+2
39DE:39 E0              129          DDB  DELAT5
39E0:22 EA              130 DELAT5   DDB  DELETE
39E2:00 72              131          DDB  NIL+2
39E4:39 EA              132 AT79     DDB  QPATM+2
39E6:3A 1C              133          DDB  AT82
39E8:00 00              134 QPATM    DFB  0,0
39EA:39 EC              135          DDB  QPAT2
39EC:39 F0              136 QPAT2    DDB  QPNAM
39EE:39 F4              137          DDB  QPPL
39F0:D1 D0              138 QPNAM    ASC  'QP'
39F2:3A 14              139          DDB  QPAT3
39F4:31 5A              140 QPPL     DDB  SUBRATM+2
39F6:39 F8              141          DDB  QPAT5
[illegible]F8:2D 83     142 QPAT5    DDB  QP
[illegible]FA:00 72     143          DDB  NIL+2
39FC:3A 02              144 AT81     DDB  MEMBATM+2
[illegible]9FE:39 E4    145          DDB  AT79
[illegible]00:00 00     146 MEMBATM  DFB  0,0
[illegible]02:3A 04     147          DDB  MEMB2
[illegible]04:35 28     148 MEMB2    DDB  MEMBNAM
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3A06:35 50      149          DDB  MEMBPL
3A08:22 7E      150 MEM5     DDB  MEMBER
3A0A:00 72      151          DDB  NIL+2
3A0C:23 8C      152 ASC4     DDB  ASC
3A0E:00 72      153          DDB  NIL+2
3A10:CE C5      154 READL6   ASC  'NE'
3A12:00 72      155          DDB  NIL+2
3A14:D2 C9      156 QPAT3    ASC  'RI'
3A16:3A 1B      157          DDB  QPAT4
3A18:CE B1      158 QPAT4    ASC  'N1'
3A1A:00 72      159          DDB  NIL+2
3A1C:3A 22      160 AT82     DDB  QPTATM+2
3A1E:00 72      161 ENDOBJ   DDB  NIL+2
3A20:00 00      162 QPTATM   DFB  0,0
3A22:3A 24      163          DDB  QPTAT2
3A24:3A 28      164 QPTAT2   DDB  QPTNAM
3A26:3A 34      165          DDB  QPTPL
3A28:D1 D0      166 QPTNAM   ASC  'QP'
3A2A:3A 2C      167          DDB  QPTAT3
3A2C:D2 C9      168 QPTAT3   ASC  'RI'
3A2E:3A 30      169          DDB  QPTAT4
3A30:CE D4      170 QPTAT4   ASC  'NT'
3A32:00 72      171          DDB  NIL+2
3A34:31 5A      172 QPTPL    DDB  SUBRATM+2
3A36:3A 38      173          DDB  QPTAT5
3A38:2D 8C      174 QPTAT5   DDB  QPT
3A3A:00 72      175          DDB  NIL+2
3A3C:           176 ENDOBJ2  DS   2
3A3E:           177          CHN  IO2.SRC
------ NEXT OBJECT FILE NAME IS LISR
3A40:             1          ORG  $3A40
                  2 ***********************************************
3A40:             3 * ROUTINE TO ZERO T/S
                  4 ***********************************************
3A40:A2 00        5 ZERTSEC LDX  #0
3A42:8A           6          TXA
3A43:9D 00 97     7 ZERTLP  STA  TSBUF,X
3A46:CA           8          DEX
3A47:D0 FA        9          BNE  ZERTLP
3A49:A2 0C       10          LDX  #$C
3A4B:8E 8B 3A    11          STX  TSPTR
3A4E:60          12          RTS
                 13 ***********************************************
3A4F:            14 * ROUTINE TO WRITE T/S
                 15 ***********************************************
3A4F:AD 8C 3A    16 TSWRITE LDA  TSTRK
3A52:F0 0F       17          BEQ  NOTSWR
3A54:8D EC B7    18          STA  TRACK
3A57:AD 8D 3A    19          LDA  TSSEC
3A5A:8D ED B7    20          STA  SECTOR
3A5D:20 AA 3A    21 TSWRITE2 JSR TSSET
3A60:4C F2 30    22          JMP  WRITESEC
3A63:60          23 NOTSWR  RTS
                 24 ***********************************************
3A64:            25 * ROUTINE TO FIND FREE SECTOR
                 26 ***********************************************
3A64:A9 FB       27 FREEFIND LDA #$FB       ;PATCH DOS
3A66:8D 78 B3    28          STA  DOSPTCH2
```

```
3A69:20 82 3A   29          JSR  ALLOCSEC
3A6C:B0 01      30          BCS  FREERR
3A6E:60         31          RTS
3A6F:AD C5 B5   32 FREERR   LDA  DERRCD     ;CHECK FOR DISK FULL ERR
3A72:C9 09      33          CMP  #9
3A74:D0 18      34          BNE  DOSERRA
3A76:20 4F 3A   35          JSR  TSWRITE    ;WRITE LAST T/S
3A79:20 5D 30   36          JSR  SAVFIN2    ;WRITE DIR SECTOR
3A7C:AD C5 B5   37          LDA  DERRCD
3A7F:4C 8E 3A   38          JMP  DOSERRA
3A82:BA         39 ALLOCSEC TSX
3A83:8E 9B B3   40          STX  SSAVE
3A86:20 44 B2   41          JSR  ALLOCATE   ;ALLOCATE A SECTOR
3A89:18         42          CLC              ;CLEAR ERROR FLAG
3A8A:60         43          RTS
                44 ************************************************
3A8B:           45 * DATA AREA
                46 ************************************************
3A8B:           47 TSPTR    DS   1
3A8C:           48 TSTRK    DS   1
3A8D:           49 TSSEC    DS   1
3A8E:4C FA 2E   50 DOSERRA  JMP  DERRR
3A91:AD 5C AA   51 DOSERR   LDA  $AA5C      ;GET DOS ERROR CODE
3A94:09 80      52          ORA  #$80
3A96:AA         53          TAX
3A97:4C EA 24   54          JMP  ERROR
                55 ************************************************
3A9A:A5 50      56 MULTPATCH LDA RES
3A9C:05 51      57          ORA  RES+1
3A9E:F0 03      58          BEQ  ZERORES
3AA0:4C B8 0B   59          JMP  TWOS2
3AA3:85 58      60 ZERORES  STA  MSIGN
3AA5:68         61          PLA
3AA6:68         62          PLA
3AA7:68         63          PLA
3AA8:18         64          CLC
3AA9:60         65          RTS
                66 ************************************************
3AAA:           67 * ROUTINES TO SET BUFFERS
                68 ************************************************
3AAA:A9 00      69 TSSET    LDA  #TSBUF
3AAC:8D F0 B7   70          STA  BUFFER
3AAF:A9 97      71          LDA  #(TSBUF
3AB1:8D F1 B7   72          STA  BUFFER+1
3AB4:60         73          RTS
3AB5:A9 00      74 MAPSET   LDA  #MAPBUF
3AB7:8D F0 B7   75          STA  BUFFER
3ABA:A9 96      76          LDA  #(MAPBUF
3ABC:8D F1 B7   77          STA  BUFFER+1
3ABF:60         78          RTS
3AC0:AD 11 08   79 FREESET  LDA  FREESPC
3AC3:8D F0 B7   80          STA  BUFFER
3AC6:AD 12 08   81          LDA  FREESPC+1
3AC9:8D F1 B7   82          STA  BUFFER+1
3ACC:60         83          RTS
                84 ************************************************
3ACD:           85 * RWTS ROUTINE
                86 ************************************************
```

```
3ACD:A9 00        87 RWTS2   LDA  #0
3ACF:8D EB B7     88         STA  VOL
3AD2:AD 8B C0     89         LDA  RAMSEL
3AD5:AD 8B C0     90         LDA  RAMSEL
3AD8:20 E3 03     91         JSR  LOCRPL     ;GET PTR TO PARMS
3ADB:20 D9 03     92         JSR  RWTS       ;CALL DOS RWTS
3ADE:D8           93         CLD
3ADF:B0 01        94         BCS  IOERR3
3AE1:60           95         RTS
3AE2:A9 08        96 IOERR3  LDA  #$8        ;I/O ERROR
3AE4:4C FA 2E     97         JMP  DERRR
                  98 ************************************************
3AE7:             99 * ROUTINE TO GET A CELL & QUOTE IT
                 100 ************************************************
3AE7:20 79 0C    101 QUOTPUT JSR  GETCEL
3AEA:A0 00       102 QUOTCELL2 LDY #0
3AEC:A9 31       103         LDA  #(QUOTATM
3AEE:91 5A       104         STA  (CELPTR),Y
3AF0:C8          105         INY
3AF1:A9 26       106         LDA  #QUOTATM+2
3AF3:91 5A       107         STA  (CELPTR),Y
3AF5:60          108         RTS
```

*** SUCCESSFUL ASSEMBLY: NO ERRORS

~~3AF6: 20 02 0A JSR FPSEL~~
~~3AF9: 4C F2 EB JMP QINT~~

A9 0: LDA #0
85 AC

```
3AF6: 20 02 0A   JSR FPSEL
3AF9: A9 00      LDA #0
3AFB: 85 AC      STA $AC
3AFD: 4C F2 EB   JMP QINT
```

```
0B48: 20 F6 3A   JSR QPATCH
```