```
                         .TITLE  SHEP,'APPLE DOS'
                *        6.3     10-6-78
                *        8 BIT ASSEMBLER
                         .M6502
                *
                ********************************************************************************
                *        (C)  COPYRIGHT 1978  APPLE COMPUTER, INC
                ********************************************************************************
                *
       1B00     ORG1     EQU     $1B00
       3600     ORG2     EQU     $3600
       3D00     DISKIO   EQU     $3D00
       3800     ASC1     EQU     $3800
       3ABF     AEC1     EQU     $3ABF
       3D00     ASC2     EQU     $3D00
       3FFF     AEC2     EQU     $3FFF
       4000     EDOS     EQU     $4000

```

```
                            PAGE
         0000               ORG     ORG1
    1B00 4C7E1D    BEGIN    JMP     DBINIT
                   ;
                   DOSREL
                   ;
                   ;        GET RELOCATION PARMS
                   ;
                   DR0
         0026      LOC1     EQU     $26
    1B03 A9BF               LDA     #$BF            ; START AT BF00
    1B05 8D4100             STA     ZPGWRK+1        ; TO LOOK FOR
    1B08 A200               LDX     #0              ; HIGH RAM
    1B0A 8E4000             STX     ZPGWRK
    1B0D A000               LDY     #0              ;APPLE TEST
                   DR1B
    1B0F A140               LDA     (ZPGWRK,X)
    1B11 8526               STA     LOC1
    1B13 98        DR1      TYA
    1B14 4526               EOR     LOC1
    1B16 8526               STA     LOC1
    1B18 98                 TYA
    1B19 4140               EOR     (ZPGWRK,X)
    1B1B 8140               STA     (ZPGWRK,X)
    1B1D C526               CMP     LOC1
    1B1F D005               BNE     DR1A
    1B21 C8                 INY
    1B22 D0EB               BNE     DR1B
    1B24 F005               BEQ     DR2             ; BR IF TOOK
                   DR1A
    1B26 CE4100             DEC     ZPGWRK+1        ; NOT RAM
    1B29 D0E8               BNE     DR1             ; TRY NEXT PAGE
                   ;
                   DR2
                   ;
    1B2B AC4100             LDY     ZPGWRK+1
    1B2E C8                 INY                     ; NEW END OF DOS
    1B2F 8C6A1C             STY     NEPAGE
    1B32 38                 SEC
    1B33 98                 TYA
    1B34 ED6B1C             SBC     DOSLNG          ; MINUS DOS LENGTH
    1B37 8D691C             STA     NSPAGE          ; IS NEW START OF DOS
    1B3A 38                 SEC
    1B3B ED671C             SBC     RSPAGE          ;MINUS OLD DOS START
    1B3E F0C0               BEQ     BEGIN           ; (BREIF NO DELTA)
    1B40 8D6C1C             STA     DELTA           ; IS DELTA
```

```
                                PAGE
1B43 AD671C                     LDA     RSPAGE          ; RESET START PAGE TO NORMAL
1B46 8D0D1D                     STA     ASTART+1
                     ;
1B49 A91D                       LDA     #DBINIT/256     ;RESET PI RTN TO NORMAL
1B4B 8D4937                     STA     DI3+2
1B4E A97E                       LDA     #DBINIT&255
1B50 8D4837                     STA     DI3+1
                     ;
                     ;
```

```
                       PAGE
               ;
               ;
               ;       RELOCATE ADR TABLES
               ;
1B53 A200              LDX     #0
1B55 8E4000            STX     ZPGWRK
               DR3
1B58 BD1A1C            LDA     ADRTAB+1, X
1B5B A8                TAY
1B5C BD1B1C            LDA     ADRTAB+2, X
1B5F 8D4100            STA     ZPGWRK+1
1B62 4C731B            JMP     DR5
               ;
               DR4
1B65 18                CLC
1B66 B140              LDA     (ZPGWRK), Y
1B68 6D6C1C            ADC     DELTA
1B6B 9140              STA     (ZPGWRK), Y
1B6D C8                INY
1B6E D003              BNE     DR5
1B70 EE4100            INC     ZPGWRK+1
1B73 C8        DR5     INY
1B74 D003              BNE     DR6
1B76 EE4100            INC     ZPGWRK+1
               ;
               DR6
1B79 AD4100            LDA     ZPGWRK+1
1B7C DD1D1C            CMP     ADRTAB+4, X
1B7F 90E4              BCC     DR4
1B81 98                TYA
1B82 DD1C1C            CMP     ADRTAB+3, X
1B85 90DE              BCC     DR4
               ;
1B87 8A                TXA
1B88 18                CLC
1B89 6904              ADC     #4
1B8B AA                TAX
1B8C EC191C            CPX     ADRTAB
1B8F 90C7              BCC     DR3
```

```
                           PAGE
                   ;
                   ;       RELOCATE CODE
                   ;
1B91 A200                  LDX     #0
1B93 8E0B33   DR7          STX     TEMP1
                   ;
1B96 BD4B1C                LDA     CDETAB+1,X       ; GET A START OF CODE ADR
1B99 8D4000                STA     ZPGWRK           ; PUT IN ZPG
1B9C BD4C1C                LDA     CDETAB+2,X
1B9F 8D4100                STA     ZPGWRK+1
                   ;
1BA2 A200     DR8          LDX     #0
1BA4 A140                  LDA     (ZPGWRK,X)       ; GET OP CODE
1BA6 208EF8                JSR     INSDS2           ; GO FIND OUT HOW LONG
                   ;
1BA9 AC2F00                LDY     LENGTH           ; GET HOW LONG
1BAC C002                  CPY     #2               ; IF IT AIN'T
1BAE D011                  BNE     DR9              ; 3 THEN DON'T RELOC
1BB0 B140                  LDA     (ZPGWRK),Y       ; GET PAGE FROM INST
1BB2 CD671C                CMP     RSPAGE           ; IF PAGE < REL START
1BB5 900A                  BCC     DR9              ; THEN IGNOR
1BB7 CD681C                CMP     REPAGE           ; IF PAGE >= REL END
1BBA B005                  BCS     DR9              ; THEN IGNORE
1BBC 6D6C1C                ADC     DELTA            ; ELSE ADD DELTA
1BBF 9140                  STA     (ZPGWRK),Y       ; TO RELOCATE
                   ;
1BC1 38       DR9          SEC
1BC2 AD2F00                LDA     LENGTH           ; ADD LENGTH
1BC5 6D4000                ADC     ZPGWRK           ; TO PC
1BC8 8D4000                STA     ZPGWRK
1BCB A900                  LDA     #0
1BCD 6D4100                ADC     ZPGWRK+1
1BD0 8D4100                STA     ZPGWRK+1
                   ;
1BD3 AE0B33                LDX     TEMP1            ; CHECK FOR END
1BD6 DD4E1C                CMP     CDETAB+4,X       ; OF CODE SEGMENT
1BD9 90C7                  BCC     DR8              ; BR NOT END
1BDB AD4000                LDA     ZPGWRK
1BDE DD4D1C                CMP     CDETAB+3,X
1BE1 90BF                  BCC     DR8              ; BR NOT END
                   ;
1BE3 8A                    TXA
1BE4 18                    CLC
1BE5 6904                  ADC     #4               ; INCREMENT TABLE INDEX
1BE7 AA                    TAX
1BE8 EC4A1C                CPX     CDETAB           ; DONE
1BEB 90A6                  BCC     DR7              ; BR IF NOT
                   ;
```

```
                       PAGE
               ;
               ;       MOVE TO RELOCATED CODE
               ;
1BED A93F              LDA     #DEPAGE-1
1BEF 8D4100            STA     ZPGWRK+1         ; ZPGWRK=FROM
1BF2 AC6A1C            LDY     NEPAGE
1BF5 88                DEY
1BF6 8C4300            STY     ZPGFCB+1         ; ZPGFCB = TOO
1BF9 A900              LDA     #0
1BFB 8D4000            STA     ZPGWRK
1BFE 8D4200            STA     ZPGFCB
1C01 A8                TAY
               ;
1C02 B140      DR10    LDA     (ZPGWRK),Y       ; BYTE FROM
1C04 9142              STA     (ZPGFCB),Y       ; BYTE TO
1C06 C8                INY                      ; INCREMENT
1C07 D0F9              BNE     DR10             ; BR NOT FULL PAGE
1C09 CE6D1C            DEC     DPGCNT           ; DECREMENT PAGE CNT
1C0C F008              BEQ     DR11             ; BR IF DONE
1C0E CE4100            DEC     ZPGWRK+1         ; INC FROM PAGE
1C11 CE4300            DEC     ZPGFCB+1         ; INC TOO PAGE
1C14 D0EC              BNE     DR10             ; MOVE PAGE
               ;
1C16 4C471E    DR11    JMP     DBVECT+3         ; DONE

```

```
                                   PAGE
 189        0040        DEPAGE  EQU     EDOS/256
 190        001D        DSPAGE  EQU     START/256
 191        F88E        INSDS2  EQU     $F88E
 192        002F        LENGTH  EQU     $2F
 193  1C19  24          ADRTAB  DB      9*4
 194  1C1A  001D                DB      @@SAT1,@@EAT1
      1C1C  561D
 195  1C1E  581D                DB      @@RUN,@@RUN+2
      1C20  5A1D
 196  1C22  621D                DB      @@IBVT+2,@@IBVT+4
      1C24  641D
 197  1C26  6A1D                DB      @@AS1VT,@@AS1VT+4
      1C28  6E1D
 198  1C2A  741D                DB      @@AS2VT,@@AS2VT+4
      1C2C  781D
 199  1C2E  7A1D                DB      @@AS2VT+6,@@AS2VT+8
      1C30  7C1D
 200  1C32  3A2A                DB      @@SAT2,@@EAT2
      1C34  762A
 201  1C36  E437                DB      @@BAIOB,@@ADOSLD+2
      1C38  E837
 202  1C3A  EE37                DB      @@IBDCTP,@@IBDCTP+2
      1C3C  F037
 203  1C3E  0000                DB      @0,@0
      1C40  0000
 204  1C42  0000                DB      @0,@0
      1C44  0000
 205  1C46  0000                DB      @0,@0
      1C48  0000
 206                    CDETAB
 207  1C4A  18                  DB      6*4
 208  1C4B  7E1D                DB      @@SC1,@@EC1
      1C4D  1728
 209  1C4F  762A                DB      @@SC2,@@EC2
      1C51  0633
 210  1C53  0037                DB      @@SC3,@@EC3
      1C55  E037
 211  1C57  6935                DB      @@SDP1,@@EDP1
      1C59  FE35
 212  1C5B  0038                DB      @@ASC1,@@AEC1
      1C5D  8F3A
 213  1C5F  003D                DB      @@ASC2,@@AEC2
      1C61  FF3F
 214  1C63  0000                DB      @0,@0
      1C65  0000
 215                    ;
 216  1C67  1D          RSPAGE  DB      DSPAGE
 217  1C68  40          REPAGE  DB      DEPAGE
 218                    ;
 219  1C69  00          NSPAGE  DB      0
 220  1C6A  00          NEPAGE  DB      0
 221                    ;
 222  1C6B  23          DOSLNG  DB      DEPAGE-DSPAGE
 223                    ;
```

```
  224 1C6C 00           DELTA   DB      0
  225 1C6D 23           DPGCNT  DB      DEPAGE-DSPAGE
  226
```

```
                                PAGE
                                BOUND   256
                        ;
                        ;       RELOCATION TABLES
                        ;
                        START
                        SAT1
1D00 D31C               FTAB    DB      @@*-45          ;START OF FTABS
1D02 5E1E               CINA    DB      @@CHRIN         ;CHAR IN ADR
1D04 8F1E               COUTA   DB      @@CHROUT        ;CHAR OUT ADR
1D06 EF29               FN1ADR  DB      @@FNAME1
1D08 0D2A               FN2ADR  DB      @@FNAME2
1D0A DA29               SVBLA   DB      @@SVBL
1D0C 001B               ASTART  DB      @@BEGIN          ; CHANGED TO START BY RELOCATE
1D0E 2635               CCBADR  DB      @@CCB
                        ;
                        OUTSVT                          ;CHAR OUTPUT STATE VECTOR TABLE
1D10 B61E                       DB      @@COS0-1
1D12 D51E                       DB      @@COS1-1
1D14 E61E                       DB      @@COS2-1
1D16 F21E                       DB      @@COS3-1
1D18 0D1F                       DB      @@COS4-1
1D1A 1C1F                       DB      @@COS5-1
1D1C 2C1F                       DB      @@COS6-1
                        ;                               COMMAND EXECUTION TABLE
                        CMDETB
1D1E 0325                       DB      @@EINIT-1
1D20 C123                       DB      @@ELOAD-1
1D22 4C23                       DB      @@ESAVE-1
1D24 9224                       DB      @@ERUN-1
1D26 A924                       DB      @@ECHAIN-1
1D28 0322                       DB      @@EDEL-1
1D2A 1122                       DB      @@ELOCK-1
1D2C 1522                       DB      @@EUNLK-1
1D2E 9022                       DB      @@ECLOSE-1
1D30 CF24                       DB      @@EREAD-1
1D32 6E25                       DB      @@EEXEC-1
1D34 C124                       DB      @@EWRITE-1
1D36 8825                       DB      @@EPOS-1
1D38 4E22                       DB      @@EOPEN-1
1D3A 3B22                       DB      @@EAPND-1
1D3C 2422                       DB      @@EREN-1
1D3E 2025                       DB      @@ECAT-1
1D40 D321                       DB      @@EMON-1
1D42 DD21                       DB      @@ENOMON-1
1D44 C921                       DB      @@EPR-1
1D46 CE21                       DB      @@EIN-1
1D48 F121                       DB      @@EMAXF-1
1D4A 2C25                       DB      @@EAS-1
1D4C 5025                       DB      @@EINT-1
1D4E D822                       DB      @@EBSV-1
1D50 0423                       DB      @@EBLD-1
1D52 3823                       DB      @@EBRUN-1
1D54 2022                       DB      @@EVAR-1
                        EAT1
```

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  281
```

```
                              PAGE
 282                   ;
 283                   ;      NON-RELOCATING ADRS
 284                   ;
 285                   IBASVT
 286 1D56 36E8         CHAIN   DB       @@IBCHN
 287 1D58 9F24         RUN     DB       @@IBRUN
 288 1D5A E3E3         BREAK   DB       @@IBBRK
 289 1D5C 00E0         GO      DB       @@IBGO
 290 1D5E 03E0         CONT    DB       @@IBCONT        ;BASIC CONT ENTRY POINT
 291 1D60 36E8         IBVT    DB       @@IBCHN,@@IBRUN,@@IBBRK
     1D62 9F24
     1D64 E3E3
 292 1D66 00E0                 DB       @@IBGO,@@IBCONT
     1D68 03E0
 293      000A         IBVTL   EQU      *-IBVT
 294                   ;
 295 1D6A B624         AS1VT   DB       @@ASRUN1,@@ASRUN1,@@ASBRK1
     1D6C B624
     1D6E 65D8
 296 1D70 00E0                 DB       @@IBGO,@@0
     1D72 0000
 297      000A         AS1VTL  EQU      *-AS1VT
 298                   ;
 299 1D74 BC24         AS2VT   DB       @@ASRUN2,@@ASRUN2,@@ASBRK2
     1D76 BC24
     1D78 6710
 300 1D7A 7E1D                 DB       @@DBINIT,@@0
     1D7C 0000
 301      000A         AS2VTL  EQU      *-AS2VT
 302
```

```
                PAGE
        ;
        ;       EQUATES REQD TO FIND THINGS IN APPLE II
        ;
FE93    SETVID  EQU    $FE93
FE89    SETKBD  EQU    $FE89
0033    PROMPT  EQU    $33             ; PROMPT CHAR
0036    OUTSW   EQU    $36             ;OUTPUT VECTOR SWITCH
0038    INSW    EQU    $38             ;INPUT VECTOR SWITCH
0040    ZPGWRK  EQU    $40             ;ZERO PAGE WORK CELL
0044    CNUM    EQU    $44             ;CONVERTED NUMERIC
0200    LBUFF   EQU    $200            ;LINE BUFFER
FB63    MULT    EQU    $FB63           ;MULT ROUTINE
FE8B    INPRT   EQU    $FE8B           ;SET IN PORT
FE95    OUTPRT  EQU    $FE95           ; SET OUT PORT
E836    IBCHN   EQU    $E836           ;BASIC RUN
004A    IBLMEM  EQU    $4A             ;BASIC LOW MEM
004C    IBHMEM  EQU    $4C             ;INTEGER BASIC HIMEM
00CA    IBSOP   EQU    $CA             ;INTEGER BASIC START OF CGM
E3E3    IBBRK   EQU    $E3E3           ;  BASIC BREAK
E000    IBGO    EQU    $E000           ;  BASIC ENTRY POINT
E003    IBCONT  EQU    $E003           ;  BASIC CONTINUE ENTRY POINT
00CC    IBSOV   EQU    $CC             ;  BASIC START OF VARIABLES
0067    ASSOP   EQU    $67             ;  AS START OF PROGRAM
00AF    ASEOP   EQU    $AF             ;  AS END OF PROGRAM
0069    ASEOP2  EQU    $69             ;AS END-OF PGM 2
0073    ASHM1   EQU    $73             ;  AS HIGH MEM 1
006F    ASHM2   EQU    $6F             ;  AS HIGH MEM 2
0067    ASLMEM  EQU    ASSOP           ;  AS LOW MEM
D865    ASBRK1  EQU    $D865           ;  AS ROM BREAK
1067    ASBRK2  EQU    $1067           ;  AS RAM BREAK
E000    AITSTL  EQU    $E000           ;  AS 1 IB TEST LOC
004C    ATSTV   EQU    $4C             ;  AS TEST VALUE
0020    ITSTV   EQU    $20             ;  IB TEST VALUE
002E    BOOTSL  EQU    $2E             ;BOOT FROM SLOT
0042    ZPGFCB  EQU    $42             ;ZERO PAGE WORK CELL
FC58    HOME    EQU    $FC58
FDED    PRINT   EQU    $FDED
FD0C    GETKEY  EQU    $FD0C
```

```
                                  PAGE
                    ;
                    ;             DOS BASIC INTERPRETER - INITIAL ENTRY
                    ;
                    SC1
                    DBINIT
1D7E ADE937                       LDA     IBSLOT              ;GET BOOT SLOT
1D81 4A                           LSRA
1D82 4A                           LSRA
1D83 4A                           LSRA
1D84 4A                           LSRA
1D85 8DE429                       STA     CS                  ;SET AS CUURENT SLOT
1D88 ADEA37                       LDA     IBDRVN              ;GET BOOT DRIVE NUMBER
1D8B 8DE229                       STA     CD                  ;SET AS CURRENT DRIVE
1D8E AD00E0                       LDA     AITSTL              ; GET APPLESOFT/IB TEST
1D91 4920                         EOR     #ITSTV              ; IF AS THEN
1D93 D011                         BNE     IAS1                ; GO TO AS INIT
                    ;                                         ; ELSE INIT FOR IB
1D95 8D302A                       STA     ASIBSW              ; SET SW FOR IB
1D98 A20A                         LDX     #IBVTL              ; GET IB VT LENGTH
1D9A BD5F1D         IIB1          LDA     IBVT-1,X            ; MOVE IB ADDR
1D9D 9D551D                       STA     IBASVT-1,X
1DA0 CA                           DEX
1DA1 D0F7                         BNE                 IIB1
1DA3 4CB61D                       JMP     INITAA
                    ;
                    IAS1
1DA6 A940                         LDA     #$40                ; INDICATE ROM APPLESOFT
1DA8 8D302A                       STA     ASIBSW
1DAB A20A                         LDX     #AS1VTL
1DAD BD691D         IAS1A         LDA     AS1VT-1,X           ; MOVE ROM AS ADRS
1DB0 9D551D                       STA     IBASVT-1,X
1DB3 CA                           DEX
1DB4 D0F7                         BNE     IAS1A
                    ;
                    INITAA
1DB6 38                           SEC                         ; INDICATE INIT
1DB7 B012                         BCS     INITA
                    DBRST
1DB9 AD302A                       LDA     ASIBSW              ; GET AS/IB FLAG
1DBC D004                         BNE     INITA1              ; BR IF NOT IB
1DBE A920                         LDA     #ITSTV              ; GET IB TEST VALUE
1DC0 D000                         BNE     INIT2A              ; GO SET IB
ERROR UNDEFINED   ************************@
1DC2 0A             INITA1        ASLA                        ; TST ROM AS
1DC3 1005                         BPL     INITA3              ; BR IF NOT ROM
1DC5 A94C                         LDA     #ATSTV              ; GET AS ROM TEST VALUE
1DC7 205B25         INITA2        JSR     SWTST               ; GO SET
                    INITA3
1DCA 18                           CLC                         ; INDICATE RESET
                    ;
                    INITA
1DCB 08                           PHP                         ; SAVE INIT/RESET
1DCC 20E427                       JSR     MVCSW               ; GO MOVE CHAR SWITCH
1DCF A970                         LDA     #MC+MI+MO           ; SET MONITOR MODES
```

```
1DD1 8DD829            STA     MONMOD
               ;
1DD4 A900              LDA     #0
1DD6 8DCC29            STA     OSTATE          ; CLEAR OUTSTATE AND EXECUTE STATE
1DD9 28                PLP                     ; GET INIT/RESET
1DDA 6A                RORA    ;SHIFT CARRY TO MSB
1DDB 8DCB29            STA     ISTATE          ; SAVE INSTATE
1DDE 3003              BMI     INITB           ; BR IF INIT
1DE0 6C5E1D            JMP     (CONT)          ;GO TO CONTINUE ENTRY
1DE3 6C5C1D    INITB   JMP     (GO)            ; GO TO GO ENTRY
```

```
                                PAGE
406                    INITC
407 1DE6 0A                     ASLA                        ; OF ISTATE NOT ON
408 1DE7 1019                   BPL       INITD             ; THEN NOT RAM AS
409 1DE9 8D302A                 STA       ASIBSW            ; SET RAM AS
410 1DEC A20A                   LDX       #AS2VTL
411 1DEE BD731D        IAS2A    LDA       AS2VT-1,X         ; MOVE RAM AS ADRS
412 1DF1 9D551D                 STA       IBASVT-1,X
413 1DF4 CA                     DEX
414 1DF5 D0F7                   BNE       IAS2A
415 1DF7 A21D                   LDX       #29
416 1DF9 BD0D2A        IAS2B    LDA       FNAME2,X
417 1DFC 9DEF29                 STA       FNAME1,X
418 1DFF CA                     DEX
419 1E00 10F7                   BPL       IAS2B
420                    ;
421                    INITD
422 1E02 AD2B2A                 LDA       DFNFTS            ; GO BUILD FILE TABS
423 1E05 8DD129                 STA       CNFTBS            ; AND SET MEM BOUNDS
424 1E08 206727                 JSR       BLDFTB
425 1E0B AD2D2A                 LDA       ESTATE            ;GET EXEC STATE
426 1E0E F009                   BEQ       INITZ             ; BR IF NOT EXECUTE
427 1E10 48                     PHA                         ;SVE CHAR
428 1E11 202E26                 JSR       MVEFTA            ;GO MOVE EX FILE TAB ADR TO ZP
429 1E14 68                     PLA                         ;GET SAVED CHAR
430 1E15 A000                   LDY       #0
431 1E17 9140                   STA       (ZPGWRK),Y        ;
432                    INITZ
433 1E19 20EE26                 JSR       CLRSTS            ; SET IN AND OUT STATES TO ZERO
434 1E1C A227                   LDX       #IFBL
435 1E1E BD441E        INITE    LDA       DBVECT,X          ;MOVE RESTART VECTORS
436 1E21 9DD003                 STA       $3D0,X
437 1E24 CA                     DEX
438 1E25 10F7                   BPL       INITE
439 1E27 ADD929                 LDA       CMDNO             ; IF NOT BOOT
440 1E2A D00A                   BNE       INITF             ; THEN DONE
441 1E2C ADEF29                 LDA       FNAME1            ; IF FN1
442 1E2F 49A0                   EOR       #$A0              ; NOT GIVEN
443 1E31 F003                   BEQ       INITF             ; THEN DONE
444 1E33 4C9324                 JMP       ERUN              ; ELSE RUN
445                    ;
446                    IFB
447                    INITF
448 1E36 ADDC29                 LDA       SVCMD
449 1E39 F006                   BEQ       INITG
450 1E3B 8DD929                 STA       CMDNO
451 1E3E 4C1521                 JMP       CMDGO
452                    INITG
453 1E41 4C691F                 JMP       ORTN
454                    ;
455 1E44 4CB91D        DBVECT   JMP       DBRST
456 1E47 4C7E1D                 JMP       DBINIT
457 1E4A 4C762A                 JMP       DOSENT
458 1E4D 4C003D                 JMP       DISKIO
459                    CCBLDR
```

```
  460 1E50 AD0F1D              LDA      CCBADR+1
  461 1E53 AC0E1D              LDY      CCBADR
  462 1E56 60                  RTS
  463                 IOBLDR
  464 1E57 AD3B2A              LDA      AIOB+1
  465 1E5A AC3A2A              LDY      AIOB
  466 1E5D 60                  RTS
  467      0027       IFBL     EQU      *-IFB-1
  468
```

```
                        PAGE
              ;
              ;         CHRIN - CHAR RCVD VIA IN SWITCH
              ;
              CHRIN
1E5E 20A31E             JSR     SVREGS
1E61 ADCB29             LDA     ISTATE            ; IF NOT DISKIN
1E64 F00D               BEQ     CHIN1             ; THEN BRANCH, ELSE
1E66 1003               BPL     CHIN0
1E68 4CE61D             JMP     INITC
              CHIN0
1E6B ADD629             LDA     SVA
1E6E 9128               STA     ($28),Y
1E70 4CD525             JMP     ICFD              ; AND GET CHAR FROM DISK
              CHIN1
1E73 AD2D2A             LDA     ESTATE
1E76 F003               BEQ     CHIN2
1E78 4C1326             JMP     NXTEXC
              CHIN2
1E7B A903               LDA     #3                ; SET OUT CHAR
1E7D 8DCC29             STA     OSTATE            ; STATE TO INPUT ECHO
1E80 206C1F             JSR     LDREGS
1E83 208C1E             JSR     GETIN
1E86 8DD629             STA     SVA
1E89 4C691F             JMP     ORTN
              ;
1E8C 6C3800   GETIN     JMP     (INSW)
              ;
              ;         CHROUT - CHAR RCVD VIA OUTPUT SWITCH
              ;
              CHROUT
1E8F 20A31E             JSR     SVREGS            ; SAVE REGS
              ;
1E92 ADCC29             LDA     OSTATE            ; GET OUT SPARE
1E95 0A                 ASLA
1E96 AA                 TAX
1E97 BD111D             LDA     OUTSVT+1,X        ; GET ROUTINE ADR
1E9A 48                 PHA
1E9B BD101D             LDA     OUTSVT,X
1E9E 48                 PHA
1E9F ADD629             LDA     SVA
1EA2 60                 RTS                       ; GO TO ROUTINE
              ;
              ;         SVREGS - SAVE REGS WHILE PROCESSING CHARS
              ;
              SVREGS
1EA3 8DD629             STA     SVA               ; SAVE ACU
              SVRGSA
1EA6 8ED429             STX     SVX               ; SAVE X
1EA9 8CD529             STY     SVY               ; SAVE Y
1EAC A203               LDX     #3                ; SET FOR FOUR BYTE  MOVE
1EAE BDCD29   SVRB      LDA     SVOUTS,X          ; MOVE SAVED OUT  AND IN SW
1EB1 9536               STA     OUTSW,X           ; TO APPLE OUT/IN SW
1EB3 CA                 DEX
1EB4 10F8               BPL     SVRB
```

```
  523 1EB6 60                   RTS                         ; DONE
  524 '
```

```
                          PAGE
                ;
                ;         COS0 - 1ST CHAR OF PRINTED OUTPUT LINE
                ;                CHECK FOR CNTL-D
                ;
                COS0
1EB7 AECB29               LDX    ISTATE           ;  IS IN STATE NOT ZERO
1EBA F008                 BEQ    COS01
1EBC C9BF                 CMP    #'?+$80          ;THEN IS THIS ?
1EBE F06D                 BEQ    COS6             ;THEN PRINT ONLY IF MONITOR
1EC0 C533                 CMP    PROMPT
1EC2 F069                 BEQ    COS6
                COS01
1EC4 A202                 LDX    #2
1EC6 8ECC29               STX    OSTATE
1EC9 CD2C2A               CMP    CCHAR            ;IF NOT CNTL-D
1ECC D019                 BNE    COS2             ;  THEN GO TO STATE 2
1ECE CA                   DEX
1ECF 8ECC29               STX    OSTATE           ;ELSE STATE = 1
1ED2 CA                   DEX
1ED3 8ED729               STX    LBUFD            ;AND LBUFD=0
                ;
                ;         COS1 - ACCUMULATE CMD FROM PRINTED OUTPUT
                ;
                COS1
1ED6 AED729               LDX    LBUFD            ;GET LINE BUFF DISPL
1ED9 9D0002     COS1A     STA    LBUFF,X          ;PUT CHAR IN BUFF
1EDC E8                   INX                     ;INCR PTR
1EDD 8ED729               STX    LBUFD            ;SAVE PTR
1EE0 C98D                 CMP    #$8D             ;WAS THIS A CR
1EE2 D067                 BNE    CMDRTN           ;IF NOT THEN PR CHAR
                ;
1EE4 4C851F               JMP    SCNCMD           ;GO SCAN COMMAND
                ;
                ;         COS2 - PRINTED OUTPUT, NOT FIRST CHAR
                ;
                COS2
1EE7 C98D                 CMP    #$8D             ;IS IT A CR
1EE9 D06F                 BNE    PRRTN            ;BR IF NOT
1EEB A200                 LDX    #0               ;SET FOR POSSIBLE C-D NEXT
1EED 8ECC29               STX    OSTATE           ;NEXT STATE
1EF0 4C5A1F               JMP    PRRTN            ;GO PRINT CHAR
```

```
                               PAGE
 567                 ;
 568                 ;         COS3 - KEY IN ECHO PRINT
 569                 ;
 570                 COS3
 571 1EF3 A200                 LDX      #0
 572 1EF5 8ECC29               STX      OSTATE           ;RESET OUT STATE
 573 1EF8 C98D                 CMP      #$8D             ;IS IT CR
 574 1EFA F007                 BEQ      COS3A            ; IF CR THEN CMD CHECK
 575                 COS3B
 576 1EFC AD2D2A               LDA      ESTATE           ;ELSE: IF NOT EXECUTE
 577 1EFF F059                 BEQ      PRRTN            ; THEN PRINT CHAR
 578 1F01 D050                 BNE      DRTNI            ; ELSE: PRINT IF MON INPUT
 579                 COS3A
 580                 ;
 581 1F03 20F925               JSR      TSTRUN
 582 1F06 B0F4                 BCS      COS3B
 583 1F08 AED429               LDX      SVX              ;GET LINE INDEX
 584 1F0B 4CD91E               JMP      COS1A
 585                 ;
 586                 ;         COS4 - DISK OUTPUT MODE
 587                 ;
 588                 COS4
 589 1F0E C98D                 CMP      #$8D             ;IS IT CR
 590 1F10 D005                 BNE      COS4A            ;BR IF NOT CR
 591 1F12 A905                 LDA      #5               ;SET STATE FOR CNTL-D
 592 1F14 8DCC29               STA      OSTATE           ;EXAMINE
 593 1F17 20BD25     COS4A     JSR      OCTD             ;GO OUTPUT CJHAR TO DISK
 594 1F1A 4C4F1F               JMP      DRTNO            ;GO TO DATA RETURN (OUT)
 595                 ;
 596                 ;         COS5 - DISK OUTPUT MODE - 1ST CHAR OF A LINE
 597                 ;
 598                 COS5
 599 1F1D CD2C2A               CMP      CCHAR            ; IS IT CNTL D
 600 1F20 F095                 BEQ      COS0             ;BR IF CNTL- D
 601 1F22 C98A                 CMP      #$8A             ; LINE FEED?
 602 1F24 F0F1                 BEQ      COS4A
 603 1F26 A204                 LDX      #4
 604 1F28 8ECC29               STX      OSTATE           ;SET NEW OUT STATE
 605 1F2B D0E1                 BNE      COS4             ;BR IF NOT CNTL D
 606                 ;
 607                 ;         COS6 - DISK INPUT ECHO
 608                 ;
 609 1F2D A900       COS6      LDA      #0
 610 1F2F 8DCC29               STA      OSTATE           ;RESET OUT STATE = 0
 611 1F32 F01F                 BEQ      DRTNI            ;GO TO DATA IN RETURN
 612
```

```
                            PAGE
                  ;
                  ;         PRRTN - PRINT CHAR RETURN
                  ;
                  ;
                  ;         CMDRTN - PRINT CHAR IF MONITOR CMBS MODE
                  ;         DRTNO - PRINT CHAR IF MONITOR DATA OUT
                  ;         DRTNI - PRINT CHAR IF MONITOR DATA IN
                  ;
                  CERTN
1F34 AD0002                 LDA     LBUFF            ; CHECK FOR  PRINTED COMMAND
1F37 CD2C2A                 CMP     CCHAR
1F3A FOOF                   BEQ     CMDRTN           ; IF PC THEN NO RESET X REG
1F3C A9A0                   LDA     #$A0             ;BLANK
1F3E 8D0002                 STA     LBUFF
1F41 A98D                   LDA     #$8D             ;PLUS CR
1F43 8D0102                 STA     LBUFF+1          ; TO OUT BUFFER
1F46 A200                   LDX     #0               ;RESET TO SOL
1F48 8ED429                 STX     SVX
1F4B A940         CMDRTN    LDA     #MC
1F4D D006                   BNE     MODECK
1F4F A910         DRTNO     LDA     #MO
1F51 D002                   BNE     MODECK
1F53 A920         DRTNI     LDA     #MI
                  ;
                  MODECK
1F55 2DD829                 AND     MONMOD           ;AND WITH MODE
1F58 FOOF                   BEQ     ORTN             ;BR IF NOT PRINT
1F5A 206C1F       PRRTN     JSR     LDREGS
1F5D 20771F                 JSR     ORTN1
1F60 8DD629                 STA     SVA
1F63 8CD529                 STY     SVY
1F66 8ED429                 STX     SVX
                  ;
                  ORTN
1F69 20E427                 JSR     MVCSW            ;GO MOVE CHAR I/O SWITCH
                  LDREGS
1F6C ADD629                 LDA     SVA              ;ACU
1F6F ACD529                 LDY     SVY              ;Y
1F72 AED429                 LDX     SVX              ;X
1F75 38                     SEC
1F76 60                     RTS                      ;BY PASS PRINT
                  ;
1F77 6C3600       ORTN1     JMP     (OUTSW)
                  ;
                  ;         PRCRIF - PRINT CR IF MON CMDS
                  ;
                  PRCRIF
1F7A 2CD829                 BIT     MONMOD           ; IF NOT MON CMDS
1F7D 5005                   BVC     PRCIFR           ; THEN RETURN
1F7F A98D                   LDA     #$8D             ; ELSE PRINT CR
1F81 20771F                 JSR     ORTN1
1F84 60           PRCIFR    RTS
```

```
                        PAGE
                ;
                ;       SCNCMD - SCAN A COMMAND
                ;
                SCNCMD
1F85 A0FF               LDY    #$FF
1F87 8CD929             STY    CMDNO          ;RESET COMMAND NUMBER
1F8A C8                 INY                   ;INCR TABLE INDEX
1F8B 8CDC29             STY    SVCMD
                SCO
1F8E EED929             INC    CMDNO          ;INCR CMD NO
1F91 A200               LDX    #0             ;RESET LINE INDEX TO 0
1F93 08                 PHP                   ; SAVE EQ STATUS
1F94 BD0002             LDA    LBUFF,X        ;GET 1ST LINE CHAR
1F97 CD2C2A             CMP    CCHAR          ; IS IT CONTROL D
1F9A D001               BNE    SCOA           ; BR /IF NOT
1F9C E8                 INX                   ;INCR OVER CNTLD
1F9D 8ED729     SCOA    STX    LBUFD
                ;
                SC1X
1FA0 203F21             JSR    GNBC           ; GET NON BLANK INPUT CHAR
1FA3 297F               AND    #$7F           ; MSB OF CHAR OFF
1FA5 591728             EOR    CMDNTB,Y       ; EOR WITH INPUT
1FA8 C8                 INY                   ; INCREMENT TABLE INDEX
1FA9 0A                 ASLA                  ; IF MSB OF EOR RESULT ON
1FAA F002               BEQ    SC1A           ; IF RESULT NOT NOW ZERO
1FAC 68                 PLA                   ; THEN INPUT DOES NOT
1FAD 08                 PHP                   ; EQUAL ENTRY
1FAE 90F0       SC1A    BCC    SC1X           ; LOOP FOR END OF ENTRY
                ;
1FB0 28                 PLP                   ; IF INPUT EQUALS END
1FB1 F020               BEQ    SYNTAX         ; THEN GO SYNTAX
                ;
1FB3 B91728             LDA    CMDNTB,Y       ; IF NEXT TABLE CHAR NOT ZERO
1FB6 D0D6               BNE    SCO            ; THENSCANTHE NEXT TABLE ENTRY
                CNF                           ;COMMAND NOT FOUND
1FB8 AD0002             LDA    LBUFF          ;LINE IS A CNOTROL-D
1FBB CD2C2A             CMP    CCHAR          ; THEN THIS IS A
1FBE F003               BEQ    CNF1           ;POSSIBLE SYNTAX ERROR, ELSE
1FC0 4C5A1F             JMP    PRRTN          ;ITS A BASIC INPUT LINE
                CNF1
1FC3 AD0102             LDA    LBUFF+1        ;GET NEXT CHAR
1FC6 C98D               CMP    #$8D           ;IS IT A CR
1FC8 D006               BNE    CSERR          ;BR IF CR
1FCA 20EE26             JSR    CLRSTS         ; CLEAR THE STATES
1FCD 4C4B1F             JMP    CMDRTN         ;CNTL-D ONLY
                ;
1FD0 4C5926     CSERR   JMP    ESYNTX
```

```
                             PAGE
                     ;
                     ;       SYNTAX - FIGURE OUT WHAT WE GOT HERE
                     ;
                     SYNTAX
1FD3 ADD929                  LDA     CMDNO           ;CMDNO=CMDNO*2
1FD6 0A                      ASLA
1FD7 8DD929                  STA     CMDNO
                     ;
1FDA A8                      TAY
1FDB A920                    LDA     #FN1
1FDD 399C28                  AND     CMDSTB,Y        ;IS FN1 REQD
1FE0 F063                    BEQ     SN10            ;BR IF NOT
1FE2 203820                  JSR     CLRFNS
1FE5 08                      PHP                     ; SAVE EQ STATUS
                     ;
                     SN2
1FE6 203F21                  JSR     GNBC            ;GET NON BLANK CHAR
1FE9 F01E                    BEQ     SN6             ;BR IF CR OR COMMA
1FEB 0A                      ASLA                    ; TEST FOR ALPHA
1FEC 9005                    BCC     SN2A            ; BR IF ALPHA
1FEE 3003                    BMI     SN2A            ; BR IF APLHA
1FF0 4CB81F                  JMP     CNF             ; LURCH IF NOT ALPHA
1FF3 6A              SN2A    RORA                    ;RESTORE BITS
1FF4 4CFC1F                  JMP     SN4             ;AWAY WE GO
1FF7 202E21          SN3     JSR     GNXTC           ;GO GET NEXT CHAR
1FFA F00D                    BEQ     SN6             ;BR IF COMMA OR CR
1FFC 99EF29          SN4     STA     FNAME1,Y        ;PUT INTO FILENAME
1FFF C8                      INY                     ;INC FN INDEX
2000 C03C                    CPY     #60             ; ATFN CHAR LIMIT
2002 90F3                    BCC     SN3             ;BR IF NOT
2004 202E21          SN5     JSR     GNXTC           ;LOOP UNTIL CR OR COMMA
2007 F0FB                    BEQ     SN5
                     ;
2009 28              SN6     PLP     ; WAS THIS FN2 L 00
200A D00F                    BNE     SN7             ;BR IF IT WAS
                     ;
200C ACD929                  LDY     CMDNO
200F A910                    LDA     #FN2
2011 399C28                  AND     CMDSTB,Y        ;IF FN2 NOT REQD THEN
2014 F00C                    BEQ     SN8             ;BRANCH
                     ;
2016 A01E                    LDY     #30             ; SET FN2 INDEX
2018 08                      PHP                     ; INDICATE FN2 SEEK
2019 D0CB                    BNE     SN2             ;GO LOOK FOR FN2
                     ;
201B AD0D2A          SN7     LDA     FNAME2          ;IF 1ST CHAR OF
201E C9A0                    CMP     #$A0            ;FN2 IS BLANK THEN
2020 F013                    BEQ     SERR1           ;SYNTAX ERROR
                     ;
2022 ADEF29          SN8     LDA     FNAME1          ;IF 1ST CHAR OF
2025 C9A0                    CMP     #$A0            ;FN1 IS NOT BLANK
2027 D045                    BNE     SOPTS           ;THEN GO LOOK FOR OPTIONS
                     ;
2029 ACD929                  LDY     CMDNO
```

```
2O2C A9C0                 LDA     #NPB+NPE        ;IF CMD MUST HAVE FILENAME
202E 399C28               AND     CMDSTB,Y        ;THEN
2031 F002                 BEQ     SERR1           ;THIS IS ERROR, ELSE
                 ;
2033 1039                 BPL     SOPTS           ;  ITS EXCUTABLE WITHOUT
                 ;
2035 4CB81F      SERR1    JMP     CNF
                 ;
                 CLRFNS
2038 A900                 LDA     #0
203A A03C                 LDY     #60
                 CLRFNA
203C A9A0                 LDA     #$A0
203E 99EE29      SN1      STA     FNAME1-1,Y      ;CLEAR FN1, FN2
2041 88                   DEY
2042 D0FA                 BNE     SN1
2044 60                   RTS
```

```
                            PAGE
                  SN10                                 ;FILE NAMES NOT REQD
2045 8DEF29                 STA      FNAME1
2048 A90C                   LDA      #NUM1+NUM2        ;IF NEITHER NUM1
204A 399C28                 AND      CMDSTB,Y          ;OR NUM2 IS REQD
204D F01F                   BEQ      SOPTS             ;THEN GO LOOK AT OPTIONS
                  ;
204F 205421                 JSR      GETNUM            ;GO GET NUMERICS
2052 BOE1                   BCS      SERR1
                  ;
2054 A8                     TAY                        ; IF HIGH DIGIT NOT
2055 DODE                   BNE      SERR1             ;ZERO THEN BAD
                  ;
2057 E011                   CPX      #17               ;IF LOW DIGIT GT 16
2059 BODA                   BCS      SERR1             ;THEN BAD
                  ;
205B ACD929                 LDY      CMDNO
205E A908                   LDA      #NUM1
2060 399C28                 AND      CMDSTB,Y          ;IF WE WANT NUM2
2063 F006                   BEQ      SN11
                  ;
2065 E008                   CPX      #8                ;IF NUM2>1
2067 BOCC                   BCS      SERR1             ;THEN ERROR, ELSE
2069 9003                   BCC      SOPTS             ;GO SCAN OPTIONS
                  ;
                  SN11
206B 8A                     TXA                        ;IF NUM1=0
206C FOC7                   BEQ      SERR1             ;THEN ERROR, ELSE
                  ;
```

```
                                  PAGE
 815                    ;
 816                    ;         SOPTS - LOOK FOR SYNTAX OPTIONS
 817                    ;
 818                    SOPTS
 819 206E A900                    LDA     #0
 820 2070 8DDF29                  STA     INOPTS          ;CLEAR INPUT OPTIONS
 821 2073 8DEE29                  STA     IMBITS
 822 2076 8DE629                  STA     CL
 823 2079 8DE729                  STA     CL+1
 824 207C ADD729                  LDA     LBUFD           ;SET PASS 1
 825 207F 8DDD29                  STA     TEMP1A
 826                    ;
 827 2082 203F21        SP1       JSR     GNBC            ;GO GET NON-BLANK CHAR
 828 2085 D01F                    BNE     SP2             ;BR IF NOT COMMA OR CR
 829 2087 C98D                    CMP     #$8D            ;IF CHAR IS COMMA
 830 2089 D0F7                    BNE     SP1             ;THEN GO GET CHAR
 831                    ;
 832 208B AED929                  LDX     CMDNO           ;OPTIONS INPUT = I
 833 208E ADDF29                  LDA     INOPTS          ;ALLOW OPTS = A
 834 2091 1D9D28                  ORA     CMDSTB+1,X      ;IF (A OR I)
 835 2094 5D9D28                  EOR     CMDSTB+1,X      XOR A NOT = 0 THEN
 836 2097 D09C                    BNE     SERR1           ;WE HAVE UNALLOWED OPTIONS
 837                    ;
 838 2099 AEDD29                  LDX     TEMP1A          ;IF THIS IS PASS 2
 839 209C F077                    BEQ     CMDGO           ;THEN DONE,
 840 209E 8DDD29                  STA     TEMP1A          ;ELSE SET PASS
 841 20A1 8ED729                  STX     LBUFD           ;RESTORE LBUFD AND
 842 20A4 D0DC                    BNE     SP1             ;GO DO PASS 2
 843                    ;
 844 20A6 A20A          SP2       LDX     #OPT1L          ;COMPARE CHAR HAVE WITH
 845 20A8 DDD328        SP3       CMP     OPTAB1-1,X      ;CHARS IN OPT TABLE
 846 20AB F005                    BEQ     SP4             ;IF FOUND CONTINUE,
 847 20AD CA                      DEX
 848 20AE D0F8                    BNE     SP3             ;IF NOT FOUND
 849 20B0 F060                    BEQ     SERR2           ;THEN SYNTAX ERROR
 850                    ;
 851 20B2 BDDD28        SP4       LDA     OPTAB2-1,X      ;IF CORRESPONDING OP TAB 2 IS
 852 20B5 3047                    BMI     SP8             ;MINUS THEN IT MONITOR BITS
 853 20B7 0DDF29                  ORA     INOPTS
 854 20BA 8DDF29                  STA     INOPTS
 855 20BD CA                      DEX
 856                    ;
 857 20BE 8EDE29                  STX     TEMP2A          ;ELSE A NUMERIC MUST FOLLOW
 858 20C1 205421                  JSR     GETNUM          ;FOLLOW
 859 20C4 B04C                    BCS     SERR2
 860                    ;
 861 20C6 ADDE29                  LDA     TEMP2A          ; GET IOTION NUMBER
 862 20C9 0A                      ASLA                    ;MULT BY 4
 863 20CA 0A                      ASLA
 864 20CB A8                      TAY
 865                    ;
 866 20CC A545                    LDA     CNUM+1          ;IF RESULT NUM HI IS
 867 20CE D009                    BNE     SP5             ;GT 0, THEN GT LOW RANGE
 868 20D0 A544                    LDA     CNUM            ;TEST RESULT LOW
 868 20D0 A544              LDA     CNUM            ;TEST RESULT LOW
```

```
 869 20D2 D9E828            CMP     OPTAB3,Y        ;WITH LOW RANGE (LOW)
 870 20D5 903B              BCC     SERR2           ;BR IF RESULT < LR
 871 20D7 A545              LDA     CNUM+1
 872 20D9 D9EB28    SP5     CMP     OPTAB3+3,Y
 873 20DC 900B              BCC     SP6             ;BR IF LESS
 874 20DE D032              BNE     SERR2           ;BR IF GRREATER
 875 20E0 A544              LDA     CNUM
 876 20E2 D9EA28            CMP     OPTAB3+2,Y
 877 20E5 9002              BCC     SP6             ;BR IF LESS
 878 20E7 D029              BNE     SERR2           ;BR IF GREATER
 879                ;
 880 20E9 ADDD29    SP6     LDA     TEMP1A          ;IF PASS 1, THEN
 881 20EC D094              BNE     SP1             ;DONT STORE RESULT
 882 20EE 98                TYA
 883 20EF 4A                LSRA
 884 20F0 A8                TAY
 885                ;
 886 20F1 A545              LDA     CNUM+1          ;STORE THE RESULT
 887 20F3 99E129            STA     CUROPT+1,Y
 888 20F6 A544              LDA     CNUM
 889 20F8 99E029            STA     CUROPT,Y
 890 20FB 4C8220    SP7     JMP     SP1             ;GO FOR NEXT OPT
 891                ;
 892                SP8                             ;MONITOR REQ
 893 20FE 48                PHA                     ;SAVE TYPE REQ
 894 20FF A980              LDA     #CIO            ;SET OPTION OF CIO
 895 2101 0DDF29            ORA     INOPTS
 896 2104 8DDF29            STA     INOPTS
 897 2107 68                PLA                     ;RESTOERE REQ
 898 2108 297F              AND     #$7F            ;CLEAR CIO
 899 210A 0DEE29            ORA     IMBITS          ;OR WITH PREV IMBITS
 900 210D 8DEE29            STA     IMBITS
 901 2110 D0E9              BNE     SP7             ;GO FOR NEXT
 902                ;
 903 2112 4CB81F    SERR2   JMP     CNF
 904
```

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                          PAGE
                  ;
                  ;       CMDGO - EXECUTE COMMAND
                  ;
                  CMDGO
2115 20EE26               JSR     CLRSTS
2118 204921               JSR     CLRCCB            ;GO CLEAR CCB
211B 202121               JSR     ECMD              ;GO EXECUTE
211E 4C341F               JMP     CERTN
                  ECMD
2121 ADD929               LDA     CMDNO             ;COMMAND NO
2124 AA                   TAX                       ;IS CMD EXEC TAB INDEX
2125 BD1F1D               LDA     CMDETB+1,X        ;GET CMD ADR
2128 48                   PHA                       ;ONTO STACK
2129 BD1E1D               LDA     CMDETB,X
212C 48                   PHA
212D 60                   RTS                       ;AND GOTO COMMAND
                  ;
                  ;       GNXTC - GET NEXT CHAR
                  ;
                  GNXTC
212E AED729               LDX     LBUFD
2131 BD0002               LDA     LBUFF,X           ;GET NEXT CHAR AND IF
2134 C98D                 CMP     #$8D              ;IT IS A CR
2136 F006                 BEQ     GNXTCR            ;THEN RETURN WITHOUT
2138 E8                   INX                       ;INCR TO NEXT CHAR
2139 8ED729               STX     LBUFD
213C C9AC                 CMP     #',+$80           ;TEST FOR COMMA
213E 60           GNXTCR  RTS
                  ;
                  ;       GNBC - GET NON BLANK CHAR
                  ;
                  GNBC
213F 202E21               JSR     GNXTC             ;GO GET NEXT CHAR
2142 F0FA                 BEQ     GNXTCR            ;BR IF COMMA OR CR
2144 C9A0                 CMP     #$A0              ;IS IT BLANK
2146 F0F7                 BEQ     GNBC              ;BR IF BLANK
2148 60                   RTS                       ;DONE
                  ;
                  ;       CLRCCB  - CLEAR CCB
                  ;
                  CLRCCB
2149 A900                 LDA     #0
214B A016                 LDY     #CCBLEN           ;CCBLENGTH
214D 992535       CLC1    STA     CCB-1,Y           ;CLEAR BYTE
2150 88                   DEY
2151 D0FA                 BNE     CLC1
2153 60                   RTS
```

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                            PAGE
                    ;
                    ;       GETNUM - CONVERT ASCII INPUT TO NUMERIC
                    ;
                    GETNUM
2154 A900                   LDA     #0              ;CLEAR WORK AREA
2156 8544                   STA     CNUM
2158 8545                   STA     CNUM+1
215A 203F21                 JSR     GNBC
215D 08                     PHP
215E C9A4                   CMP     #$A4
2160 F03E                   BEQ     HEXNUM
2162 28                     PLP
2163 4C6921                 JMP     GN2A
                    ;
2166 203F21         GN2     JSR     GNBC            ;GET NEXT NON BLANK
                    GN2A
2169 D006                   BNE     GN3             ;BR NOT COMMA OR CR
216B A644                   LDX     CNUM            ;X=RESULT LOW
216D A545                   LDA     CNUM+1          ;Y=RESULT HI
216F 18                     CLC
2170 60                     RTS                     ;DONE
                    ;
2171 38             GN3     SEC
2172 E9B0                   SBC     #$B0            ;SUBTRACT ASCII 0
2174 3021                   BMI     GN4             ;BR IF NOT NUM
2176 C90A                   CMP     #10
2178 B01D                   BCS     GN4             ;BR IF NOT NUM
217A 209921                 JSR     GN5             ;OLD*2
217D 6544                   ADC     CNUM            ;PLUS NEW
217F AA                     TAX
2180 A900                   LDA     #0
2182 6545                   ADC     CNUM+1
2184 A8                     TAY
2185 209921                 JSR     GN5             ;OLD*4
2188 209921                 JSR     GN5             ;OLD*8
218B 8A                     TXA                     ;OLD*8 + OLD*2 + NEW
218C 6544                   ADC     CNUM
218E 8544                   STA     CNUM            ;=OLD*10 + NEW
2190 98                     TYA
2191 6545                   ADC     CNUM+1
2193 8545                   STA     CNUM+1
2195 90CF                   BCC     GN2
                    ;
                    GN4
2197 38                     SEC
2198 60                     RTS                     ;DONE
                    GN5
2199 0644                   ASL     CNUM            ;CNUM * 2
219B 2645                   ROL     CNUM+1
219D B0F8                   BCS     GN4
219F 60                     RTS
```

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                             PAGE
                    ;
                    HEXNUM
21A0 28                      PLP
                    HNO
21A1 203F21                  JSR      GNBC           ; GO GET CHAR
21A4 F0C3                    BEQ      GN2A           ; BR IF CR OR COMMA
                    ;
21A6 38                      SEC
21A7 E9B0                    SBC      #$B0           ; CHAR - ASCII0
21A9 30EC                    BMI      GN4            ; BR IF LT0
21AB C90A                    CMP      #10            ; IS IT LT10
21AD 9008                    BCC      HN1            ; BR IF LT
21AF E907                    SBC      #$7            ; SUB 7 FOR ASCII A
21B1 30E4                    BMI      GN4            ; BR IF LT A
21B3 C910                    CMP      #16            ; TEST GT 15
21B5 B0E0                    BCS      GN4            ; BR GT 15
21B7 209921         HN1      JSR      GN5            ; OLD*2
21BA 209921                  JSR      GN5            ; OLD*4
21BD 209921                  JSR      GN5            ; OLD*8
21C0 209921                  JSR      GN5            ; OLD*16
21C3 0544                    ORA      CNUM           ; OR IN NEW
21C5 8544                    STA      CNUM           ; SAVE NEW
21C7 4CA121                  JMP      HN0            ; GO FOR NEXT CHAR
```

```
                       PAGE
               ;
               ;       EPR - EXECUTE PR#
               ;
               EPR
21CA A544              LDA     CNUM            ;GET PORT
21CC 4C95FE            JMP     OUTPRT          ;GO DO IT
               ;
               ;       EIN - EXECUTE IN#
               ;
               EIN
21CF A544              LDA     CNUM            ;GET PORT
21D1 4C8BFE            JMP     INPRT           ; GO DO IT
               ;
               ;       EMON - EXECUTE MONITOR CMD
               ;
               EMON
21D4 ADD829            LDA     MONMOD          ;GET CURRENT BITS
21D7 0DEE29            ORA     IMBITS          ;OR IN NEW BITS
21DA 8DD829            STA     MONMOD          ;SET NEW MODE
21DD 60                RTS
               ;
               ;       ENONON - EXECUTE NO MONITOR CMD
               ;
               ENOMON
21DE 2CEE29            BIT     IMBITS
21E1 5003              BVC     ENM1
21E3 207A1F            JSR     PRCRIF
               ENM1
21E6 A970              LDA     #$70
21E8 4DEE29            EOR     IMBITS          ;INVERT INPUT BITS
21EB 2DD829            AND     MONMOD          ;AND WITH CURRENT
21EE 8DD829            STA     MONMOD          ;SET NEW MODE
21F1 60                RTS
```

```
                                   PAGE
 1063                     ;
 1064                     ;        EMAXF - EXECUTE MAX FILES
 1065                     ;
 1066                     EMAXF
 1067 21F2 A900                    LDA     #0              ; RESET EXECUTE
 1068 21F4 8D2D2A                  STA     ESTATE
 1069 21F7 A544                    LDA     CNUM            ;SAVE NEW NO FILES
 1070 21F9 48                      PHA
 1071 21FA 20BE22                  JSR     CLALL           ;GO CLOSE ALL FILES
 1072 21FD 68                      PLA
 1073 21FE 8DD129                  STA     CNFTBS          ;SET NEW NO FILE TBLS
 1074 2201 4C6727                  JMP     BLDFTB          ; GO BUILD NEW ONES
 1075                     ;
 1076                     ;        EDEL - DELETE A FILE
 1077                     ;
 1078                     EDEL
 1079 2204 A905                    LDA     #CRQDEL         ;DELETE REQUEST
 1080 2206 205122                  JSR     OPEN            ;GO OPEN
 1081 2209 20F726                  JSR     FILSRC          ;FIND FILE
 1082 220C A000                    LDY     #0
 1083 220E 98                      TYA
 1084 220F 9140                    STA     (ZPGWRK),Y      ;RESET FN
 1085 2211 60                      RTS
 1086                     ;
 1087                     ;        ELOCK - LOCK A FILE
 1088                     ;
 1089                     ELOCK
 1090 2212 A907                    LDA     #CRQLCK         ;SET LOCK
 1091 2214 D002                    BNE     ELGO
 1092                     ;
 1093                     ;        EUNLK - UNLOCK A FILE
 1094                     ;
 1095                     EUNLK
 1096 2216 A908                    LDA     #CRQUNL         ;SET UNLOCK
 1097                     ELGO
 1098 2218 205122                  JSR     OPEN            ;OPEN FILE & UNLOCK
 1099 221B 204223                  JSR     TSTFNF
 1100 221E 4C9122                  JMP     ECLOSE          ; CLOSE IT
 1101                     ;
 1102                     ;        EVAR - VERIFY A FILE
 1103                     ;
 1104                     EVAR
 1105 2221 A90C                    LDA     #CRQVAR         ; SET VARIFY
 1106 2223 D0F3                    BNE     ELGO
 1107
```

```
                                PAGE
1108                    ;
1109                    ;       EREN - RENAME A FILE
1110                    ;
1111                    EREN
1112 2225 AD081D                LDA     FN2ADR          ;MOVE FILE NAME2
1113 2228 8D2835                STA     CCBFN2
1114 222B AD091D                LDA     FN2ADR+1
1115 222E 8D2935                STA     CCBFN2+1
1116 2231 A909                  LDA     #CRQRNM
1117 2233 8DDD29                STA     TEMP1A          ;SET RENAME
1118 2236 206F22                JSR     EO3             ;GO OPEN AND RENAME
1119 2239 4C9122                JMP     ECLOSE          ; GO CLOSE
1120                    ;
1121                    ;       EAPND - OPEN FILE FOR APPEND
1122                    ;
1123                    EAPND
1124 223C 204F22                JSR     EOPEN           ; GO OPEN
1125 223F A906                  LDA     #CREFNF
1126 2241 CD3035                CMP     CCBSTA          ; IF FILE CREATED
1127 2244 D001                  BNE     AP1
1128 2246 60                    RTS
1129                    AP1
1130 2247 201D26                JSR     RBYTE           ; READ A BYTE
1131 224A D0FB                  BNE     AP1             ; BR IF NOT ZERO
1132                    ;
1133 224C 4CF824                JMP     RWP3            ;GO RE-POSITION
1134
```

```
                         PAGE
               ;
               ;         EOPEN - OPEN A FILE
               ;
               EOPEN
224F A901                LDA     #CRQOPN
               OPEN
2251 8DDD29              STA     TEMP1A
2254 ADE629              LDA     CL             ;IF NO LENGTH ENTERED
2257 D00A                BNE     EO1            ;THEN SET DEFAULT OF 1
2259 ADE729              LDA     CL+1
225C D005                BNE     EO1
225E A901                LDA     #1
2260 8DE629              STA     CL
               EO1
2263 ADE629              LDA     CL             ;MOVE REC LENGTH
2266 8D2835              STA     CCBRLN
2269 ADE729              LDA     CL+1
226C 8D2935              STA     CCBRLN+1
               EO3
226F 209122              JSR     ECLOSE         ;GO CLOSE IF OPEN
               EO4
2272 A545                LDA     CNUM+1         ;GET AVALL ENTRY
2274 D003                BNE     EO5            ;BR IF ONE AVAIL
2276 4C5D26              JMP     ENFA           ;DONE - NO FILES AVAIL
               EO5
2279 8541                STA     ZPGWRK+1       ;MOVE AVAIL SLOT TO ZPG
227B A544                LDA     CNUM
227D 8540                STA     ZPGWRK
               EO6
227F 20D626              JSR     MVFN1          ;GO MOVE FILE NAME
2282 20E126              JSR     MVBUFP         ;GO MOVE BUF PTRS
2285 20AD26              JSR     OPNSUP         ;GO SET UP OPEN
2288 ADDD29              LDA     TEMP1A         ;SET OPEN REQ
228B 8D2635              STA     CCBREQ
228E 4C3926              JMP     DOSGO          ; GO OPEN

```

```
                         PAGE
                 ;
                 ;       ECLOSE - EXECUTE CLOSE FILE COMMAND
                 ;
                 ECLOSE
2291 ADEF29              LDA      FNAME1
2294 C9A0                CMP      #$A0
2296 F026                BEQ      CLALL
2298 20F726              JSR      FILSRC          ;GO FIND FILE
229B B006                BCS      ECL1            ; BR IF NOT FOUND
229D 20A422              JSR      CLOSE           ;GO CLOSE
22A0 4C9122              JMP      ECLOSE          ;GO SEE IF ANY MORE OPEN
22A3 60          ECL1    RTS
                 ;
                 ;       CLOSE - CLOSE A FILE
                 ;
                 CLOSE
22A4 204227              JSR      TSTEXC
22A7 D005                BNE      CLX
22A9 A900                LDA      #0
22AB 8D2D2A              STA      ESTATE
                 CLX
22AE A000                LDY      #0              ;CLEAR 1ST FN
22B0 98                  TYA                      ;CHAR TO ZERO
22B1 9140                STA      (ZPGWRK),Y
22B3 20E126              JSR      MVBUFP          ;MOVE BUFFER PTRS
22B6 A902                LDA      #CRQCLS         ;SET CLOSE
22B8 8D2635              STA      CCBREQ
22BB 4C3926              JMP      DOSGO           ;GO CLOSE
                 ;
                 ;       CLALL - CLOSE ALL FILES
                 ;
                 CLALL
22BE 202527              JSR      TSINIT          ;GO INIT FILE SEARCH
22C1 D005                BNE      CL1
                 CL0
22C3 202D27              JSR      TSNXT           ;NEXT ENTRY
22C6 F010                BEQ      CL2             ;BR IF NO MORE
                 CL1
22C8 204227              JSR      TSTEXC
22CB F0F6                BEQ      CL0
22CD 203D27              JSR      TSTOPN          ;GO TEST OPEN
22D0 F0F1                BEQ      CL0             ;BR NOT OPEN
22D2 20A422              JSR      CLOSE           ;GO CLOSE
22D5 4CBE22              JMP      CLALL           ;START OVER
22D8 60          CL2     RTS                      ;DONE
```

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                                PAGE
1217                  ;
1218                  ;         EBSV - EXECUTE BINARY SAVE
1219                  ;
1220                  EBSV
1221 22D9 A909                  LDA    #A+L          ; IF A&L
1222 22DB 2DDF29                AND    INOPTS        ; NOT GIVEN
1223 22DE C909                  CMP    #A+L
1224 22E0 F003                  BEQ    EBSV1
1225 22E2 4CB81F                JMP    CNF           ;THEN ERROR
1226                  EBSV1
1227 22E5 A904                  LDA    #4            ; SET BINARY FILE
1228 22E7 208423                JSR    SV1           ; GO OPEN & TEST
1229 22EA ADED29                LDA    CA+1          ; OUTPUT ADR OF BLOCK
1230 22ED ACEC29                LDY    CA
1231 22F0 208F23                JSR    SV2
1232 22F3 ADE729                LDA    CL+1          ; GO OPEN AND TEST
1233 22F6 ACE629                LDY    CL
1234 22F9 208F23                JSR    SV2           ; OUTPUT LENGTH
1235 22FC ADED29                LDA    CA+1          ; GET ADR GIVEN
1236 22FF ACEC29                LDY    CA
1237 2302 4CAE23                JMP    SV3           ; OUTPUT BLOCK
1238                  ;
1239                  ;         EBLD - EXECUTE BINARY LOAD
1240                  ;
1241                  EBLD
1242 2305 204F22                JSR    EOPEN
1243 2308 204223                JSR    TSTFNF
1244                  EBLD2
1245 230B A97F                  LDA    #$7F
1246 230D 2D2D35                AND    CCBFUC
1247 2310 C904                  CMP    #4
1248 2312 F003                  BEQ    EBLD3
1249 2314 4C6926                JMP    ENBF
1250                  EBLD3
1251 2317 A904                  LDA    #4            ; SET BINARY FILE
1252 2319 208423                JSR    SV1           ; GO OPEN & TEST
1253 231C 203024                JSR    LD2           ; GO GET ADR
1254 231F AA                    TAX
1255 2320 ADDF29                LDA    INOPTS
1256 2323 2901                  AND    #A            ; IF ADR NOT GIVEN
1257 2325 D006                  BNE    EBLD1
1258 2327 8EEC29                STX    CA            ; THEN USE ADR FROM FILE
1259 232A 8CED29                STY    CA+1
1260                  EBLD1
1261 232D 203024                JSR    LD2           ; GET LENGTH
1262 2330 AEEC29                LDX    CA            ; GET GIVEN ADR
1263 2333 ACED29                LDY    CA+1
1264 2336 4C6124                JMP    LD3           ; GO GET BLOCK
1265                  ;
1266                  ;         EBRUN - EXECUTE BINARY RUN
1267                  ;
1268                  EBRUN
1269 2339 200523                JSR    EBLD          ; GO LOAD FILE
1270 233C 20E427                JSR    MVCSW         ;GO RESTORE  CHAR I/O SW
```

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1271 233F 6CEC29                 JMP     (CA)            ; GO EXEC THE STUFF
1272 2342 A906       TSTFNF      LDA     #CREFNF         ; FILE NOT FOUND ERROR CODE
1273 2344 CD3035                 CMP     CCBSTA          ; TEST FILE NOT FOUND
1274 2347 F001                   BEQ     FNF             ; BR IF FILE NOT FOUND
1275 2349 60                     RTS                     ; FILE FOUNT, RETURN
1276 234A 4CCF23     FNF         JMP     KLUTZ           ; GO FIX THINGS
1277
```

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                           PAGE
                  ;
                  ;        ESAVE - EXECUTE SAVE REQUEST
                  ;
                  ESAVE
2340 AD302A                LDA     ASIBSW          ; IF IB THEN
2350 F019                  BEQ     EIBSV           ; GO TO IB SAVE
2352 A902                  LDA     #2              ; GET APPLESOFT PGM
2354 208423                JSR     SV1             ; GO OPEN AND TEST
                  ;
2357 38                    SEC                     ; BLOCK LENGTH
2358 A5AF                  LDA     ASEOP           ; =EOP-SOP
235A E567                  SBC     ASSOP
235C A8                    TAY
235D A5B0                  LDA     ASEOP+1
235F E568                  SBC     ASSOP+1
2361 208F23                JSR     SV2             ; GO OUTPUT LENGTH
                  ;
2364 A568                  LDA     ASSOP+1         ; BLOCK ADR
2366 A467                  LDY     ASSOP           ; =SOP
2368 4CAE23                JMP     SV3             ; GO OUTPUT BLOCK
                  ;
                  EIBSV
236B A901                  LDA     #1              ; SET IB PGM
236D 208423                JSR     SV1             ; GO OPEN AND TEST
                  ;
2370 38                    SEC                     ; BLOCK LENGTH
2371 A54C                  LDA     IBHMEM          ; =HIMEM-SOP
2373 E5CA                  SBC     IBSOP
2375 A8                    TAY
2376 A54D                  LDA     IBHMEM+1
2378 E5CB                  SBC     IBSOP+1
237A 208F23                JSR     SV2             ; GO OUTPUT LENGTH
                  ;
237D A5CB                  LDA     IBSOP+1         ; BLOCK ADR
237F A4CA                  LDY     IBSOP           ; =SOP
2381 4CAE23                JMP     SV3             ; GO OUTPUT BLOCK
                  ;
                  SV1
                  SV1A
2384 8D2D35                STA     CCBFUC          ; SET PGM TYPE
2387 48                    PHA                     ; SAVE PGM TYPE
2388 204F22                JSR     EOPEN           ; GO OPEN FILE
238B 68                    PLA                     ; GET SAVE TYPE
238C 4C5727                JMP     TSTFUC          ; GO CHECK
                  ;
                  SV2
238F 8C2C35                STY     CCBBLN          ; SET BLOCK LENGTH
2392 8C2E35                STY     CCBDAT          ; AND DATA BYTE
2395 8D2D35                STA     CCBBLN+1
2398 A904                  LDA     #CRQWR          ; INDICATE WRITE
239A 8D2635                STA     CCBREQ
239D A901                  LDA     #CRMNBT         ; NEXT BYTE
239F 8D2735                STA     CCBRQM
23A2 203926                JSR     DOSGO           ; GO WRITE
```

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 1332 23A5 AD2D35              LDA     CCBBLN+1        ; OTHER BYTE TOO
 1333 23A8 8D2E35              STA     CCBDAT
 1334 23AB 4C3926              JMP     DOSGO
 1335                  ;
 1336 23AE 8C2E35      SV3     STY     CCBBBA          ; SET BLOCK ADR
 1337 23B1 8D2F35              STA     CCBBBA+1
 1338 23B4 A902                LDA     #CRMNBL         ; INDICATE BLOCK I/O
 1339 23B6 8D2735              STA     CCBRQM
 1340 23B9 203926              JSR     DOSGO           ; GO DO IT
 1341 23BC 4C9122              JMP     ECLOSE          ; CLOSE FILE
 1342
```

```
                                PAGE
 1343 23BF 4C6526      NBPER    JMP     ERNU1
 1344                  ;
 1345                  ;        ELOAD - EXECUTE LOAD REQUEST
 1346                  ;
 1347                  ELOAD
 1348 23C2 20BE22               JSR     CLALL              ;GO CLOSE ALL
 1349 23C5 204F22               JSR     EOPEN              ; OPEN FILE
 1350 23C8 A906                 LDA     #CREFNF
 1351 23CA CD3035               CMP     CCBSTA             ; WAS FILE FOUND
 1352 23CD D008                 BNE     ELD1               ; BR IF FOUND
 1353                  ;
 1354 23CF 200422      KLUTZ    JSR     EDEL               ; DELETE NEW FILE
 1355 23D2 A906                 LDA     #CREFNF            ; FILE NOT FOUND MSG
 1356 23D4 4C6B26               JMP     ERROR              ; GO
 1357                  ;
 1358                  ELD1
 1359 23D7 A97F                 LDA     #$7F               ; MASK PROTECT BIT
 1360 23D9 2D2D35               AND     CCBFUC             ; OUT OF FUC
 1361 23DC F0E1                 BEQ     NBPER              ; BR IF ERROR
 1362 23DE 2903                 AND     #$03               ; ISOLOLATE IB & AS
 1363 23E0 F0DD                 BEQ     NBPER              ; BR IF ERROR
 1364 23E2 8D2D35               STA     CCBFUC             ; SAVE IB/AS ONLY
 1365 23E5 AD302A               LDA     ASIBSW             ; IF IB THEN
 1366 23E8 F022                 BEQ     EIBL               ; GO TO IB LOAD
 1367 23EA A902                 LDA     #2
 1368 23EC 207324               JSR     LD1                ; GO OPEN AND TEST
 1369                  ;
 1370 23EF 203024               JSR     LD2                ; GO GET BLOCK LENGTH
 1371                  ;
 1372 23F2 18                   CLC
 1373 23F3 6567                 ADC     ASSOP              ; ADD BLOCK LENGTH TO SOP
 1374 23F5 AA                   TAX
 1375 23F6 98                   TYA
 1376 23F7 6568                 ADC     ASSOP+1
 1377                  ;
 1378 23F9 C574                 CMP     ASHM1+1            ; IF BL+SOP >= HMEM
 1379 23FB B070                 BCS     MFULL              ; THEN WON'T FIT
 1380                  ;
 1381                  EASL1
 1382 23FD 85B0                 STA     ASEOP+1            ; SET NEW EOP ADR
 1383 23FF 856A                 STA     ASEOP2+1
 1384 2401 86AF                 STX     ASEOP
 1385 2403 8669                 STX     ASEOP2
 1386 2405 A667                 LDX     ASSOP              ; GET ADR WHERE TO LOAD
 1387 2407 A468                 LDY     ASSOP+1
 1388 2409 4C6124               JMP     LD3                ; GO LOAD
 1389                  ;
 1390                  EIBL
 1391 240C A901                 LDA     #1                 ; SET IB PGM
 1392 240E 207324               JSR     LD1                ; GO OPEN AND TEST
 1393                  ;
 1394 2411 203024               JSR     LD2                ; GO GET BLOCK LENGTH
 1395                  ;
 1396 2414 38                   SEC                        ; HMEM - BLOCK LENGTH
```

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2415 A54C               LDA     IBHMEM          ; IS NEW SOP
2417 EDDA29             SBC     SVBL
241A AA                 TAX
241B A54D               LDA     IBHMEM+1
241D EDDB29             SBC     SVBL+1
2420 904B               BCC     MFULL
2422 A8                 TAY
                ;
2423 C44B               CPY     IBLMEM+1        ; IF NEW SOP <= LMEM
2425 9046               BCC     MFULL
2427 F044               BEQ     MFULL
2429 84CB               STY     IBSOP+1         ; SET NEW SOP
242B 86CA               STX     IBSOP
242D 4C6124             JMP     LD3
                ;
                LD2
2430 AD0A1D             LDA     SVBLA           ; MOVE ADR OF WHERE
2433 8D2E35             STA     CCBBBA          ; TO PUT DATA TO
2436 AD0B1D             LDA     SVBLA+1         ; CCBN
2439 8D2F35             STA     CCBBBA+1
243C A900               LDA     #0
243E 8D2D35             STA     CCBBLN+1        ; READ INTO
2441 A902               LDA     #2
2443 8D2C35             STA     CCBBLN
2446 A903               LDA     #CRQRD          ; READ
2448 8D2635             STA     CCBREQ
244B A902               LDA     #CRMNBL         ; BLOCK
244D 8D2735             STA     CCBRQM
2450 203926             JSR     DOSGO
2453 ADDB29             LDA     SVBL+1
2456 8D2D35             STA     CCBBLN+1
2459 A8                 TAY
245A ADDA29             LDA     SVBL
245D 8D2C35             STA     CCBBLN
2460 60                 RTS
                ;
                LD3
2461 8E2E35             STX     CCBBBA          ; SET BLOCK ADR
2464 8C2F35             STY     CCBBBA+1
2467 203926             JSR     DOSGO           ; GET BLOCK
246A 4C9122             JMP     ECLOSE          ; GO CLOSE FILE
                ;
                MFULL
246D 209122             JSR     ECLOSE          ; GO CLOSE FILE
2470 4C6126             JMP     MFERR           ; AND GIVE ERR MSG
                LD1
2473 CD2D35             CMP     CCBFUC          ; TEST TYPE
2476 F01A               BEQ     LD1C            ; BR IF MATCH
2478 AED929             LDX     CMDNO
247B 8EDC29             STX     SVCMD
247E 4A                 LSRA
247F F003               BEQ     LD1A            ; BR IF PGM IS AS
2481 4C5125             JMP     EINT            ; GO FOR INTG BASIC
                ;
                LD1A
```

```
1452 2484 A21D                LDX     #29               ; SAVE FILE NAME
1453 2486 BDEF29     LD1B     LDA     FNAME1,X          ; INCASE IS RAM APPLESOFT
1454 2489 9D0D2A              STA     FNAME2,X
1455 248C CA                  DEX
1456 248D 10F7                BPL     LD1B
1457 248F 4C2D25              JMP     EAS               ; GO FOR AS
1458                 ;
1459 2492 60         LD1C     RTS
1460
```

```
                      PAGE
             ;
             ;        ERUN - EXECUTE RUN REQUEST
             ;
             ERUN
2493 20C223           JSR     ELOAD           ;LOAD PGM
2496 207A1F           JSR     PRCRIF
2499 20E427           JSR     MVCSW           ;GO RESTORE  CHAR I/O SW
249C 6C581D           JMP     (RUN)
             ;
             ;        IBRUN - INT BASIC RUN
             ;
             IBRUN
249F A54A             LDA     IBLMEM          ;RESET START OF VARS
24A1 85CC             STA IBSOV
24A3 A54B             LDA     IBLMEM+1
24A5 85CD             STA     IBSOV+1
24A7 6C561D           JMP     (CHAIN)
             ;
             ;        EHCAIN - EXECUTE CHAIN REQUEST
             ;
             ECHAIN
24AA 20C223           JSR     ELOAD           ;LOAD PGM
24AD 207A1F           JSR     PRCRIF
24B0 20E427           JSR     MVCSW           ;GO RESTORE  CHAR I/O SW
24B3 6C561D           JMP     (CHAIN)
24B6 2065D6  ASRUN1   JSR     $D665           ;ROM
24B9 4CD2D7           JMP     $D7D2
24BC 20650E  ASRUN2   JSR     $E65            ;  RAM
24BF 4CD40F           JMP     $FD4
```

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                       PAGE
               ;
               ;       EWRITE - WRITE CMD EXECUTE
               ;
               EWRITE
24C2 20DB24            JSR     RWPOSN           ;GO POSITION FILE IF REQD
24C5 204223            JSR     TSTFNF
24C8 A905              LDA     #5
24CA 8DCC29            STA     OSTATE           ;SET OSTATE=5
24CD 4C341F            JMP     CERTN            ;DONE
               ;
               ;       EREAD - READ COMD EXECUTE
               ;
               EREAD
24D0 20DB24            JSR     RWPOSN           ;GO POSITION FILE IF REQD
24D3 A901              LDA     #1
24D5 8DCB29            STA     ISTATE           ;SET I STATE = DISK INPUT
24D8 4C341F            JMP     CERTN            ;DONE
               ;
               ;       RWPOSN - POSTION FOR READ/ WRITE
               ;
               RWPOSN
24DB 20F726            JSR     FILSRC           ;FIND THE FILE
24DE 9006              BCC     RWP1             ;BR IF FILE FOUND
24E0 204F22            JSR     EOPEN            ;GO OPEN FOR KLUTZ
24E3 4CE924            JMP     RWP2             ;THEN SKIP NEXT LINE
               RWP1
24E6 20E126            JSR     MVBUFP           ;MOVE BUFF POINTERS
               RWP2
24E9 ADDF29            LDA     INOPTS           ;GET IN OPTIONS
24EC 2906              AND     #R+B             ;WAS IT B OR R
24EE F013              BEQ     RWPR             ;BR IF NOT
24F0 A203              LDX     #3
24F2 BDE829    RWP2A   LDA     CR,X             ;MOVE REL REC
24F5 9D2835            STA     CCBRRN,X         ;AND REL BYTE
24F8 CA                DEX
24F9 10F7              BPL     RWP2A
               RWP3
24FB A90A              LDA     #CRQPOS          ;INDICATE POISTION REQUEST
24FD 8D2635            STA     CCBREQ
2500 203926            JSR     DOSGO
2503 60        RWPR    RTS                      ;DONE

```

```
                              PAGE
                        ;
                        ;
                        ;     EINIT - EXECUTE INIT COMMAND
                        ;
                        EINIT
 2504 A940                    LDA     #V                 ; MUST HAVE
 2506 2DDF29                  AND     INOPTS             ; VOL OPTION
 2509 F013                    BEQ     INER
 250B ADE029                  LDA     CV                 ; AND VOL MUST
 250E F00E                    BEQ     INER               ; BE GT 0
 2510 AD0D1D                  LDA     ASTART+1
 2513 8D2735                  STA     CCBBSA
 2516 A90B                    LDA     #CRQFMT
 2518 205122                  JSR     OPEN
 251B 4C4D23                  JMP     ESAVE
                        ;
 251E 4CB81F            INER  JMP     CNF
                        ;
                        ;     ECAT    - PRINT CATALOG
                        ;
                        ECAT
 2521 A906                    LDA     #CRQDIR
 2523 205122                  JSR     OPEN               ;GO PRETEND OPEN
 2526 AD2A35                  LDA     CCBVOL
 2529 8DE029                  STA     CV
 252C 60                      RTS
```

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                              PAGE
                        ;
                        ;     EAS - EXECUTE APPLESOFT REQUEST
                        ;
                        EAS
2520 A94C                     LDA    #ATSTV          ; GET APPLESOFT TEST VALUE
252F 205B25                   JSR    SWTST           ; GO SWITCH AND TEST
2532 F024                     BEQ    GOINIT          ; BR IF APPLESOFT
2534 A900                     LDA    #0
2536 8D302A                   STA    ASIBSW
                        ;
                        EAS0
2539 A01E                     LDY    #30
253B 203C20                   JSR    CLRFNA
253E A209                     LDX    #FASBL
2540 BD302A             EAS1  LDA    FASB-1,X        ; MOVE SYSTEM FILE NAME
2543 9DEE29                   STA    FNAME1-1,X
2546 CA                       DEX
2547 D0F7                     BNE    EAS1
                        ;
                        EAS2
2549 A9C0                     LDA    #$C0
254B 8DCB29                   STA    ISTATE          ; FOR RAM APPLESOFT
254E 4C9324                   JMP    ERUN            ; GO LOAD AND RUN
                        ;
                        ;     EINT - EXECUTE INTEGER REQUEST
                        ;
                        EINT
2551 A920                     LDA    #ITSTV          ; GET IB TEST VALUE
2553 205B25                   JSR    SWTST           ; GO SWITCH AND TEST
2556 D0D5                     BNE    EAS             ; BR IF NOT IB
                        GOINIT
2558 4C7E1D                   JMP    DBINIT          ; GO INIT DOS
                        SWTST
255B CD00E0                   CMP    AITSTL          ; TEST CURRENT VALUE
255E F00E                     BEQ    SWTR
2560 8D80C0                   STA    $C080           ; TRY SWITCH 1
2563 CD00E0                   CMP    AITSTL          ; TEST AGAIN
2566 F006                     BEQ    SWTR            ; BR IF NOW SAME
2568 8D81C0                   STA    $C081           ; TRY SWITCH 2
256B CD00E0                   CMP    AITSTL          ; TEST AND
256E 60                 SWTR  RTS                    ; RETURN
                        ;
```

```
                                PAGE
 1603                     ;
 1604                     ;     EEXEC - EXECUTE EXEC CMD
 1605                     ;
 1606                     EEXEC
 1607 256F 204F22               JSR     EOPEN              ; OPEN FILE
 1608 2572 204223               JSR     TSTFNF
 1609 2575 ADC929               LDA     CFTABA             ; MOVE TABLE POINTERS
 1610 2578 8D2E2A               STA     EFTABA
 1611 257B ADCA29               LDA     CFTABA+1
 1612 257E 8D2F2A               STA     EFTABA+1
 1613 2581 ADEF29               LDA     FNAME1             ;USE FILNAME
 1614 2584 8D2D2A               STA     ESTATE             ; SET EX STATE NON ZERO
 1615 2587 D011                 BNE     EXP2
 1616                     ;
 1617                     ;
 1618                     ;     EPOS - EXECUTE POSITION
 1619                     ;
 1620                     EPOS
 1621 2589 20F726               JSR     FILSRC
 1622 258C 9009                 BCC     EXP1
 1623 258E 204F22               JSR     EOPEN
 1624 2591 204223               JSR     TSTFNF
 1625 2594 4C9A25               JMP     EXP2
 1626 2597 20E126         EXP1  JSR     MVBUFP
 1627                     EXP2
 1628 259A ADDF29               LDA     INOPTS             ; GET OPTIONS
 1629 259D 2904                 AND     #R                 ; TEST R
 1630 259F F01B                 BEQ     EX2                ; BR NOT R
 1631                     ;
 1632 25A1 ADE829         EXO   LDA     CR                 ; IF CR NOT ZERO
 1633 25A4 D008                 BNE     EX1A               ; THEN DECREMENT
 1634 25A6 AEE929               LDX     CR+1
 1635 25A9 F011                 BEQ     EX2
 1636 25AB CEE929               DEC     CR+1
 1637 25AE CEE829         EX1A  DEC     CR
 1638 25B1 201D26         EX1   JSR     RBYTE              ; AND READ A RCORD
 1639 25B4 F038                 BEQ     ICFD4
 1640 25B6 C98D                 CMP     #$8D               ; UNTIL CR
 1641 25B8 D0F7                 BNE     EX1
 1642 25BA F0E5                 BEQ     EXO                ; THEN TEST CR AGAIN
 1643                     ;
 1644 25BC 60             EX2   RTS                        ; DONE
 1645
```

```
                                   PAGE
 1646                       ;
 1647                       ;      OCTD - OUTPUT A CHAR TO DISK
 1648                       ;
 1649                       OCTD
 1650 25BD 20F925                  JSR     TSTRUN          ;GO TEST RUN
 1651 25C0 B048                    BCS     ICFDB
 1652 25C2 ADD629                  LDA     SVA             ;CHAR IN SAVED ACU
 1653 25C5 8D2E35                  STA     CCBDAT          ;PUT INTO CCBDATA AREA
 1654 25C8 A904                    LDA     #CRQWR          ;SET WRITE
 1655 25CA 8D2635                  STA     CCBREQ
 1656 25CD A901                    LDA     #CRMNBT         ;SET NEXT BYTE
 1657 25CF 8D2735                  STA     CCBRQM
 1658 25D2 4C3926                  JMP     DOSGO           ; GO WRITE BYTE
 1659                       ;
 1660                       ;      INCFD   - INPUT A CHAR FROM DISK
 1661                       ;
 1662                       ICFD
 1663 25D5 20F925                  JSR     TSTRUN          ;GO TEST RUN
 1664 25D8 B030                    BCS     ICFDB
 1665 25DA A906                    LDA     #6              ;SET OUT STE = 6
 1666                       ICFD3
 1667 25DC 8DCC29                  STA     OSTATE          ;TO CATCH ECHO
 1668 25DF 201D26                  JSR     RBYTE
 1669 25E2 D00F                    BNE     ICFD1           ;BR IF NOT ZERO CHAR
 1670                       ICFD2
 1671 25E4 20A422                  JSR     CLOSE
 1672 25E7 A903                    LDA     #3
 1673 25E9 CDCC29                  CMP     OSTATE
 1674 25EC F008                    BEQ     ICFDO
 1675                       ICFD4
 1676 25EE A905                    LDA     #CREEOF
 1677 25F0 4C6B26                  JMP     ERROR           ;GO TO ERROR
 1678                       ICFD1
 1679 25F3 8DD629                  STA     SVA             ;PUT INTO SAVED ACU
 1680                       ICFDO
 1681 25F6 4C691F                  JMP     ORTN            ;GO RESTORE REGS AND RTS
 1682                       ;
 1683                       TSTRUN
 1684 25F9 AD302A                  LDA     ASIBSW          ;GET AS/INT BASIC SWITCH
 1685 25FC F006                    BEQ     TR1             ; BR IF INT
 1686 25FE A676                    LDX     $76             ;TEST AS RUN
 1687 2600 D006                    BNE     NOTRUN          ; BR IF NOT RUN
 1688 2602 18               TRO    CLC
 1689 2603 60                      RTS
 1690                       TR1
 1691 2604 A5D9                    LDA     $D9             ;GET INT RUN FLAG
 1692 2606 30FA                    BMI     TRO             ; BR IF RUN
 1693 2608 38               NOTRUN SEC
 1694 2609 60                      RTS
 1695                       ICFDB                          ; NOT RUN MODE
 1696 260A 20A422                  JSR     CLOSE           ;GO CLOSE FILE
 1697 260D 20EE26                  JSR     CLRSTS          ;GO CLEAR STATES
 1698 2610 4C691F                  JMP     ORTN
 1699
```

```
                       PAGE
               ;
               ;       NXTEXC - NEXT EXECUTE CHAR
               ;
               NXTEXC
2613 202E26            JSR     MVEFTA
2616 20E126            JSR     MVBUFP          ;  GO MOVE PTRS
2619 A903              LDA     #3
261B D0BF              BNE     ICFD3
               ;
               ;       RBYTE - READ NEXT BYTE
               ;
               RBYTE
261D A903              LDA     #CRQRD          ;SET READ
261F 8D2635            STA     CCBREQ
2622 A901              LDA     #CRMNBT         ;SET NEXT BYTE
2624 8D2735            STA     CCBRQM
2627 203926            JSR     DOSGO           ;GO TO DOS
262A AD2E35            LDA     CCBDAT          ;GET THE DATA BYTE
262D 60                RTS
               MVEFTA
262E AD2F2A            LDA     EFTABA+1        ;  MOVE TABLE ADR
2631 8541              STA     ZPGWRK+1        ;  NO ZPG
2633 AD2E2A            LDA     EFTABA
2636 8540              STA     ZPGWRK
2638 60                RTS
```

```
                          PAGE
                  ;
                  ;       DOSGO - GOTO DOS
                  ;
                  DOSGO
2639 20762A               JSR     DOSENT         ;GO TO DOS
263C B001                 BCS     DG1            ;BR IF ERROR
263E 60                   RTS                    ;DONE
                  ;
                  DG1                            ;  *** ERROR ***
263F 20F726               JSR     FILSRC         ; GET FILE TABLE
2642 B005                 BCS     DG2            ; BR IF NOT FOUND
2644 A900                 LDA     #0
2646 A8                   TAY
2647 9140                 STA     (ZPGWRK),Y     ; CLOSE FILE HERE
                  DG2
2649 AD3035               LDA     CCBSTA         ;GET STATUS OF I/O
264C C905                 CMP     #CREEOF        ;EOF ?
264E D006                 BNE     DG3            ;BR IF NOT
2650 A200                 LDX     #0             ;SET OTHER EIF
2652 8E2E35               STX     CCBDAT         ; DONE
2655 60                   RTS
                  DG3
2656 4C6B26               JMP     ERROR          ;GO DO ERROR
                  ;
```

```
                             PAGE
                      ;
                      ;      ERROR ROUTINE
                      ;
2659 A90B     ESYNTX  LDA    #CREFLK+1
265B D00E             BNE    ERROR
265D A90C     ENFA    LDA    #CREFLK+2
265F D00A             BNE    ERROR
2661 A90E     MFERR   LDA    #CREFLK+4
2663 D006             BNE    ERROR
2665 A90D     ERNU1   LDA    #CREFLK+3
2667 D002             BNE    ERROR
2669 A90F     ENBF    LDA    #CREFLK+5
                      ;
              ERROR
266B 8DD629           STA    SVA             ;SAVE MSG NUMBER
266E 20EE26           JSR    CLRSTS
2671 AD302A           LDA    ASIBSW          ;GET AS/IN BASIC SWITCH
2674 F004             BEQ    ERNAS           ;BR IF NOT APPLESOFT
2676 A5D8             LDA    $D8             ;GET ON ERR FLAG
2678 3010             BMI    ERRTN           ;BRT IF ON ERR IS GO
              ERNAS
267A A200             LDX    #0
267C 209526           JSR    EMPR            ;GO OUTPUT
267F AED629           LDX    SVA             ;GET SAVE MSG
2682 209526           JSR    EMPR            ;GO OUTPUT MSG
2685 A210             LDX    #CREFLK+6
2687 209526           JSR    EMPR
268A 20E427   ERRTN   JSR    MVCSW           ;GO MOVE CHAR I/ SW
268D AED629           LDX    SVA
2690 A903             LDA    #03
2692 6C5A1D           JMP (BREAK)
                      ;
              EMPR
2695 BDB829           LDA    EMDTB,X         ;GET ITS DISPL
2698 AA               TAX                    ;INTO X
              EMPR1
2699 8EDD29           STX    TEMP1A          ;SAVE DISPL
269C BD0429           LDA    EMSG,X          ;GET MSG CHAR
269F 48               PHA                    ;SAVE CHAR
26A0 0980             ORA    #$80            ;SET MSB ON
26A2 20771F           JSR    ORTN1           ;OUTPUT CHAR
26A5 AEDD29           LDX    TEMP1A          ;GET INDEX
26A8 E8               INX                    ;INCREMENT IT
26A9 68               PLA                    ;RE-LOAD CHAR
26AA 10ED             BPL    EMPR1           ;BR IF MORE CHARS
26AC 60               RTS                    ;DONE
```

```
                           PAGE
                   ;
                   ;       OPNSUP - OPEN SET UP
                   ;
                   OPNSUP
26AD ADE029                LDA     CV                ; VOLUME
26B0 8D2A35                STA     CCBVOL
26B3 ADE229                LDA     CD                ; DRIVE
26B6 8D2B35                STA     CCBDRV
26B9 ADE429                LDA     CS                ; SLOT
26BC 8D2C35                STA     CCBSLT
26BF AD061D                LDA     FN1ADR            ; FILENAME 1 ADR
26C2 8D2E35                STA     CCBFN1
26C5 AD071D                LDA     FN1ADR+1
26C8 8D2F35                STA     CCBFN1+1
26CB A540                  LDA     ZPGWRK
26CD 8DC929                STA     CFTABA
26D0 A541                  LDA     ZPGWRK+1
26D2 8DCA29                STA     CFTABA+1
26D5 60                    RTS
                   ;
                   ;       MVFN1 - MOVE FILE NAME 1 TO FILE PTR
                   ;
                   MVFN1
26D6 A01D                  LDY     #29
26D8 B9EF29        MVFN1A  LDA     FNAME1,Y
26DB 9140                  STA     (ZPGWRK),Y
26DD 88                    DEY
26DE 10F8                  BPL     MVFN1A
26E0 60                    RTS
                   ;
                   ;       MVBUFP - MOVE BUFFER PTRS TO CCB
                   ;
                   MVBUFP
26E1 A01E                  LDY     #30
26E3 B140          MVBP1   LDA     (ZPGWRK),Y
26E5 991435                STA     CCBFCB-30,Y
26E8 C8                    INY
26E9 C026                  CPY     #38
26EB D0F6                  BNE     MVBP1
26ED 60                    RTS
                   ;
                   ;       CLRSTS - CLEAR STATES
                   ;
                   CLRSTS
26EE A000                  LDY     #0
26F0 8CCB29                STY     ISTATE
26F3 8CCC29                STY     OSTATE
26F6 60                    RTS
```

```
                             PAGE
                        ;
                        ;    FILSRC - SEARCH FOR FILE NAME1
                        ;
                        FILSRC
26F7 A900                    LDA     #0              ;CLEAR SV AVAIL
26F9 8545                    STA     CNUM+1
                        ;
26FB 202527                  JSR     TSINIT          ;GO INIT SEARCH
26FE 4C0627                  JMP     FLS1A
2701 202D27             FLS1 JSR     TSNXT           ;LOOK AT NEXT
2704 F01D                    BEQ     FLS4            ;BR IF NO NEXT
                        ;
2706 203D27             FLS1A JSR    TSTOPN          ;GO TEST OPEN
2709 D00A                    BNE     FLS2            ;BR IF OPEN
                        ;
270B A540                    LDA     ZPGWRK          ;SAVE AVAIL ENTRY ADR
270D 8544                    STA     CNUM
270F A541                    LDA     ZPGWRK+1
2711 8545                    STA     CNUM+1
2713 D0EC                    BNE     FLS1            ;GO LOOK SOME MORE
                        ;
2715 A01D               FLS2 LDY     #29             ; FILE HAD 30 CHARS
2717 B140               FLS3 LDA     (ZPGWRK),Y      ;GET CHAR
2719 D9EF29                  CMP     FNAME1,Y        TEST CHAR
271C D0E3                    BNE     FLS1            ;BR NOT
271E 88                      DEY
271F 10F6                    BPL     FLS3            ;  LOOK AT 30 CHARS
2721 18                      CLC                     ;FOUND
2722 60                      RTS                     ;DONE
                        ;
2723 38                 FLS4 SEC                     ;NOT FOUND
2724 60                      RTS                     ;DONE
```

```
                       PAGE
               ;
               ;       TSINIT - INITIALIZE FOR FTAB SEARCH
               ;       TSNXT - GET NEXT FTAB ENTRY
               ;
               TSINIT
2725 AD001D            LDA     FTAB            ;GET 1ST PTR ADR
2728 AE011D            LDX     FTAB+1
272B D00A              BNE     TSST
               TSNXT
272D A025              LDY     #37             ; GET LINK
272F B140              LDA     (ZPGWRK),Y
2731 F009              BEQ     TSR             ;BR IF NO LINK
               ;
2733 AA                TAX
2734 88                DEY
2735 B140              LDA     (ZPGWRK),Y
               TSST
2737 8641              STX     ZPGWRK+1
2739 8540              STA     ZPGWRK
273B 8A                TXA                     ;SET NE CC
273C 60        TSR     RTS                     ;RTN
               ;
               ;       TSTOPN - TST FOR OPEN FILE
               ;
               TSTOPN
273D A000              LDY     #0              ;GET 1ST CHAR OF FN
273F B140              LDA     (ZPGWRK),Y
2741 60                RTS
               ;
               ;       TSTEXC - TEST CURRENT FILE FOR EXECUTE
               ;
               TSTEXC
2742 AD2D2A            LDA     ESTATE          ; IF ESTATE = 0
2745 F00E              BEQ     TXC1            ; THEN NO EXECUTE FILE
2747 AD2E2A            LDA     EFTABA          ; TEST CURRENT
274A C540              CMP     ZPGWRK
274C D008              BNE     TXC2            ; IS NOT
274E AD2F2A            LDA     EFTABA+1
2751 C541              CMP     ZPGWRK+1
2753 F001              BEQ     TXC2            ; IS
2755 CA        TXC1    DEX                     ; IS NOT
2756 60        TXC2    RTS                     ; DONE
```

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                                  PAGE
  1923                    ;
  1924                    ;       TSTFUC - TEST FILE USE CODE FOR PGM
  1925                    ;
  1926                    TSTFUC
  1927 2757 4D2D35                EOR     CCBFUC
  1928 275A F00A                  BEQ     TFUCR
  1929 275C 297F                  AND     #$7F
  1930 275E F006                  BEQ     TFUCR
  1931 2760 209122                JSR     ECLOSE          ; GO CLOSE THE SOB
  1932 2763 4C6526                JMP     ERNU1
  1933 2766 60            TFUCR   RTS
  1934
```

```
                              PAGE
                      ;
                      ;       BLDFTB - BUILD FILE TABLES
                      ;       TABLE MAP:
                      ;               HIMEM, SOP
                      ;               SBUFF  N          (256)
                      ;               DBUFF  N          (256)
                      ;               FTB      N        (FCBLEN)
                      ;               HEADER N          (38)
                      ;        .
                      ;        .
                      ;               SBUFF  1
                      ;               DBUFF  1
                      ;               FTB    1
                      ;               HEADER 1
                      ;               THIS PROGRAM
                      ;
                      ;       HEADER MAP:
                      ;               FILENAME (30)
                      ;               FTB PTR  (2)
                      ;               DBUF PTR (2)
                      ;               SBUF PTR (2)
                      ;               LINK     (2)
                      ;
                      BLDFTB
2767 38                       SEC
2768 AD001D                   LDA     FTAB              ;START OF FTAB AREA
276B 8540                     STA     ZPGWRK            ;IS 1ST FTB PTR
276D AD011D                   LDA     FTAB+1            ;HEADER
2770 8541                     STA     ZPGWRK+1
2772 ADD129                   LDA     CNFTBS            ;MOVE NO FTABS
2775 8DDD29                   STA     TEMP1A            ;TO TEMP
                      ;
2778 A000             BFT1    LDY     #0
277A 98                       TYA
277B 9140                     STA     (ZPGWRK),Y        ;1ST CHAR FN=0
277D A01E                     LDY     #30               ; INC Y TO FCB PTR
277F 38                       SEC
2780 A540                     LDA     ZPGWRK            ;END OF PTR HEADER
2782 E92D                     SBC     #FCBLEN           ;MINUS FTAB LENGTH
2784 9140                     STA     (ZPGWRK),Y        ;IS START OF FTB
2786 48                       PHA                       ;SAVE LOW ADR BYTE
2787 A541                     LDA     ZPGWRK+1
2789 E900                     SBC     #0
278B C8                       INY
278C 9140                     STA     (ZPGWRK),Y
278E AA                       TAX
278F CA                       DEX                       ;FTB ADR - 256
2790 68                       PLA                       ;IS ADR DIR BUFF
2791 48                       PHA
2792 C8                       INY
2793 9140                     STA     (ZPGWRK),Y        ;SET DIR BUF PTR
2795 8A                       TXA
2796 C8                       INY
2797 9140                     STA     (ZPGWRK),Y
```

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1989 2799 AA                  TAX
1990 279A CA                  DEX                    ;DIR BUFF - 256
1991 279B 68                  PLA                    ;IS SBUFF ADR
1992 279C 48                  PHA
1993 279D C8                  INY
1994 279E 9140                STA    (ZPGWRK),Y
1995 27A0 C8                  INY
1996 27A1 8A                  TXA
1997 27A2 9140                STA    (ZPGWRK),Y
1998                ;
1999 27A4 CEDD29              DEC    TEMP1A          ;DECREMENT TABLE INDEX
2000 27A7 F017                BEQ    BFT2            ;COUNT AND BR IF DONE
2001 27A9 AA                  TAX
2002 27AA 68                  PLA
2003 27AB 38                  SEC
2004 27AC E926                SBC    #38             ; SBUFF ADR - 38
2005 27AE C8                  INY
2006 27AF 9140                STA    (ZPGWRK),Y      ;IF ADR OF NEXT TAB
2007 27B1 48                  PHA                    ;WHICH GOES INTO
2008 27B2 8A                  TXA                    ;LINK
2009 27B3 E900                SBC    #0
2010 27B5 C8                  INY
2011 27B6 9140                STA    (ZPGWRK),Y
2012 27B8 8541                STA    ZPGWRK+1        ;AND INTO ZPGWRK
2013 27BA 68                  PLA                    ;FOR NEXT ENTRY
2014 27BB 8540                STA    ZPGWRK          ;BUILD
2015 27BD 4C7827              JMP    BFT1            ;GO BUILD NEXT
2016                ;
2017                BFT2
2018 27C0 48                  PHA
2019 27C1 A900                LDA    #0              ;SET LAST LINK
2020 27C3 C8                  INY                    ;TO ZERO
2021 27C4 9140                STA    (ZPGWRK),Y
2022 27C6 C8                  INY
2023 27C7 9140                STA    (ZPGWRK),Y
2024                ;
2025 27C9 AD302A              LDA    ASIBSW          ; IF IB THEN GO
2026 27CC F00B                BEQ    BFTIB
2027                ;
2028 27CE 68                  PLA                    ; SET APPLESOFT
2029 27CF 8574                STA    ASHM1+1         ; UPPER MEM LIMITS
2030 27D1 8570                STA    ASHM2+1
2031 27D3 68                  PLA
2032 27D4 8573                STA    ASHM1
2033 27D6 856F                STA    ASHM2
2034 27D8 60                  RTS
2035                ;
2036                BFTIB
2037 27D9 68                  PLA                    ; SET IB
2038 27DA 854D                STA    IBHMEM+1        ; UPPER MEM LIMITS
2039 27DC 85CB                STA    IBSOP+1
2040 27DE 68                  PLA
2041 27DF 854C                STA    IBHMEM
2042 27E1 85CA                STA    IBSOP
2043 27E3 60                  RTS
```

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2044 .
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                       PAGE
               ;
               ;       MVISW - MOVE INPUT SWITCH
               ;
               MVCSW
27E4 A539              LDA     INSW+1
27E6 CD031D            CMP     CINA+1
27E9 F012              BEQ     MVOSW
27EB 8DD029            STA     SVINS+1
27EE A538              LDA     INSW            ;SAVE CHAR IN SWITCH
27F0 8DCF29            STA     SVINS
               ;
27F3 AD021D            LDA     CINA            ;SET DB CHAR IN ADR
27F6 8538              STA     INSW
27F8 AD031D            LDA     CINA+1
27FB 8539              STA     INSW+1
               ;
               ;
               ;       MVOSW - MOVE OUTPUT SWITCH
               ;
               MVOSW
27FD A537              LDA     OUTSW+1
27FF CD051D            CMP     COUTA+1
2802 F012              BEQ     MVSRTN
2804 8DCE29            STA     SVOUTS+1
2807 A536              LDA     OUTSW           ;SAVE CHAR OUT SWITCH
2809 8DCD29            STA     SVOUTS
               ;
280C AD041D            LDA     COUTA           ;SET DB CHAR OUT ADR
280F 8536              STA     OUTSW
2811 AD051D            LDA     COUTA+1
2814 8537              STA     OUTSW+1
               MVSRTN
2816 60                RTS
```

```
                                    PAGE
2079                          ;
2080                          ;     COMMAND NAME TABLE
2081                          ;
2082                          EC1
2083                          CMDNTB
2084 2817 49                        DB01      "INIT"
     2818 4E
     2819 49
     281A D4
2085 281B 4C                        DB01      "LOAD"
     281C 4F
     281D 41
     281E C4
2086 281F 53                        DB01      "SAVE"
     2820 41
     2821 56
     2822 C5
2087 2823 52                        DB01      "RUN"
     2824 55
     2825 CE
2088 2826 43                        DB01      "CHAIN"
     2827 48
     2828 41
     2829 49
     282A CE
2089 282B 44                        DB01      "DELETE"
     282C 45
     282D 4C
     282E 45
     282F 54
     2830 C5
2090 2831 4C                        DB01      "LOCK"
     2832 4F
     2833 43
     2834 CB
2091 2835 55                        DB01      "UNLOCK"
     2836 4E
     2837 4C
     2838 4F
     2839 43
     283A CB
2092 283B 43                        DB01      "CLOSE"
     283C 4C
     283D 4F
     283E 53
     283F C5
2093 2840 52                        DB01      "READ"
     2841 45
     2842 41
     2843 C4
2094 2844 45                        DB01      "EXEC"
     2845 58
     2846 45
     2847 C3
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        2847 C3
```

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   2095 2848 57                    DB01      "WRITE"
        2849 52
        284A 49
        284B 54
        284C C5
   2096 284D 50                    DB01      "POSITION"
        284E 4F
        284F 53
        2850 49
        2851 54
        2852 49
        2853 4F
        2854 CE
   2097 2855 4F                    DB01      "OPEN"
        2856 50
        2857 45
        2858 CE
   2098 2859 41                    DB01      "APPEND"
        285A 50
        285B 50
        285C 45
        285D 4E
        285E C4
   2099 285F 52                    DB01      "RENAME"
        2860 45
        2861 4E
        2862 41
        2863 4D
        2864 C5
   2100 2865 43                    DB01      "CATALOG"
        2866 41
        2867 54
        2868 41
        2869 4C
        286A 4F
        286B C7
   2101 286C 4D                    DB01      "MON"
        286D 4F
        286E CE
   2102 286F 4E                    DB01      "NOMON"
        2870 4F
        2871 4D
        2872 4F
        2873 CE
   2103 2874 50                    DB01      "PR#"
        2875 52
        2876 A3
   2104 2877 49                    DB01      "IN#"
        2878 4E
        2879 A3
   2105 287A 4D                    DB01      "MAXFILES"
        287B 41
        287C 58
        287D 46
        287E 49
```

```
     287F 4C
     2880 45
     2881 D3
2106 2882 46                DB01     "FP"
     2883 D0
2107 2884 49                DB01     "INT"
     2885 4E
     2886 D4
2108 2887 42                DB01     "BSAVE"
     2888 53
     2889 41
     288A 56
     288B C5
2109 288C 42                DB01     "BLOAD"
     288D 4C
     288E 4F
     288F 41
     2890 C4
2110 2891 42                DB01     "BRUN"
     2892 52
     2893 55
     2894 CE
2111 2895 56                DB01     "VERIFY"
     2896 45
     2897 52
     2898 49
     2899 46
     289A D9
2112 289B 00                DB       0
2113
```

```
                                 PAGE
 2114                     ;
 2115                     ;      COMMAND SYNTAX OP EQUATES FOR SYNTAX BYTE ONE
 2116                     ;
 2117         0080        NPB    EQU     $80              ;NO PARMS OK, COMMAND GOES TO BASIC
 2118         0040        NPE    EQU     $40              ;NO PARMS OK, COMMAND TO EXECUTION RTN
 2119         0020        FN1    EQU     $20              ;FILE NAME1 REQD
 2120         0010        FN2    EQU     $10              ;FILE NAME2 REQD
 2121         0008        NUM1   EQU     $08              ;NUMERIC 0-7 REQD
 2122         0004        NUM2   EQU     $04              ;NUMERIC 1-10 REQD
 2123                     ;
 2124                     ;      COMMAND SYNTAX OP EQUATES FOR SYNTAX BYTE TWO
 2125                     ;
 2126         0040        V      EQU     $40              ;VOLUME ALLOWED
 2127         0020        D      EQU     $20              ;DRIVE ALLOWED
 2128         0010        S      EQU     $10              ;SLOT ALLOWED
 2129         0008        L      EQU     $08              ;LENGTH ALLOWED
 2130         0004        R      EQU     $04              ;RECORD NUMBER ALLOWED
 2131         0002        B      EQU     $02              ;BYTE NUMBER ALLOWED
 2132         0001        A      EQU     $01              ; ADDRESS
 2133         0080        CIO    EQU     $80              ;C, I, OR O ALLOWED
 2134                     ;
 2135                     ;      COMMAND SYNTAX TABLE
 2136                     ;              EACH COMMAND HAS TWO BYTE ENTRY
 2137                     ;
 2138                     CMDSTB
 2139 289C 20                    DB      FN1,V+D+S        ; INIT
      289D 70
 2140 289E A0                    DB      NPB+FN1,V+D+S    ;LOAD
      289F 70
 2141 28A0 A0                    DB      NPB+FN1,V+D+S    ;SAVE
      28A1 70
 2142 28A2 A0                    DB      NPB+FN1,V+D+S    ;RUN
      28A3 70
 2143 28A4 20                    DB      FN1,V+D+S        ;CHAIN
      28A5 70
 2144 28A6 20                    DB      FN1,V+D+S        ;DELETE
      28A7 70
 2145 28A8 20                    DB      FN1,V+D+S        ;LOCK
      28A9 70
 2146 28AA 20                    DB      FN1,V+D+S        ;UNLOCK
      28AB 70
 2147 28AC 60                    DB      NPE+FN1,0        ;CLOSE
      28AD 00
 2148 28AE 20                    DB      FN1,B+R          ;READ
      28AF 06
 2149 28B0 20                    DB      FN1,R+V+D+S      ; EXEC
      28B1 74
 2150 28B2 20                    DB      FN1,B+R          ;WRITE
      28B3 06
 2151 28B4 20                    DB      FN1,R            ;POSITION
      28B5 04
 2152 28B6 20                    DB      FN1,L+V+D+S      ;OPEN
      28B7 78
 2153 28B8 20                    DB      FN1,L+V+D+S      ; APPEND
```

```
      28B9 78
 2154 28BA 30              DB       FN1+FN2,V+D+S    ;RENAME
      28BB 70
 2155 28BC 40              DB       NPE,V+D+S        ;CATALOG
      28BD 70
 2156 28BE 40              DB       NPE,CIO          ;MONITOR
      28BF 80
 2157 28C0 40              DB       NPE,CIO          ;NO MONITOR
      28C1 80
 2158 28C2 08              DB       NUM1,0           ;PR#
      28C3 00
 2159 28C4 08              DB       NUM1,0           ;IN#
      28C5 00
 2160 28C6 04              DB       NUM2,0           ;MAXFILES
      28C7 00
 2161 28C8 40              DB       NPE,V+D+S        ;APPLESOFT
      28C9 70
 2162 28CA 40              DB       NPE,0            ; INT
      28CB 00
 2163 28CC 20              DB       FN1,V+D+S+A+L    ; BSAVE
      28CD 79
 2164 28CE 20              DB       FN1,V+D+S+A      ; BLOAD
      28CF 71
 2165 28D0 20              DB       FN1,V+D+S+A      ; BRUN
      28D1 71
 2166 28D2 20              DB       FN1,V+D+S        ; VERIFY
      28D3 70
 2167
```

```
                              PAGE
                    ;
                    ;         OPTAB - OPTIONAL PARMS SYNTAX TABLES
                    ;
                    OPTAB1
28D4 D6                       DB11    "VDSLRBACIO"
28D5 C4
28D6 D3
28D7 CC
28D8 D2
28D9 C2
28DA C1
28DB C3
28DC C9
28DD CF
     000A           OPT1L     EQU     *-OPTAB1
                    OPTAB2
28DE 40                       DB      V,D,S,L,R,B,A,CIO+MC,CIO+MI,CIO+MO
28DF 20
28E0 10
28E1 08
28E2 04
28E3 02
28E4 01
28E5 C0
28E6 A0
28E7 90
                    OPTAB3
28E8 0000                     DB      @@0,@@254          ;VOL RANGE
28EA FE00
28EC 0100                     DB      @@1,@@2            ; DRIVE RANGE
28EE 0200
28F0 0100                     DB      @@1,@@7            ; SLOT RANGE
28F2 0700
28F4 0100                     DB      @@1,@@32767        ;LENGTH RANGE
28F6 FF7F
28F8 0000                     DB      @@0,@@32767        ;REC NO RANGE
28FA FF7F
28FC 0000                     DB      @@0,@@32767        ;REC BYTE NO RANGE
28FE FF7F
2900 0000                     DB      @@0,@@$C000        ; ADDRESS RANGE
2902 00C0
```

```
                            PAGE
                   ;
                   ;        ERROR MESSAGE TABLES
                   ;
                   EMSG
2904 0D                     DB      $0D,$07
2905 07
2906 2A                     DB01    "***DISK: "
2907 2A
2908 2A
2909 44
290A 49
290B 53
290C 4B
290D 3A
290E A0
     000B          EM1      EQU     *-EMSG
     000B          EM2      EQU     *-EMSG
     000B          EM3      EQU     *-EMSG
290F 53                     DB01    "SYS"
2910 59
2911 D3
     000E          EM4      EQU     *-EMSG
2912 57                     DB01    "WRITE PROTECT"
2913 52
2914 49
2915 54
2916 45
2917 20
2918 50
2919 52
291A 4F
291B 54
291C 45
291D 43
291E D4
     001B          EM5      EQU     *-EMSG
291F 45                     DB01    "END OF DATA"
2920 4E
2921 44
2922 20
2923 4F
2924 46
2925 20
2926 44
2927 41
2928 54
2929 C1
     0026          EM6      EQU     *-EMSG
292A 46                     DB01    "FILE NOT FOUND"
292B 49
292C 4C
292D 45
292E 20
292F 4E
```

```
     292F 4E
```

```
     2930 4F
     2931 54
     2932 20
     2933 46
     2934 4F
     2935 55
     2936 4E
     2937 C4
2201      0034      EM7     EQU     *-EMSG
2202 2938 56                DB01    "VOLUME MISMATCH"
     2939 4F
     293A 4C
     293B 55
     293C 4D
     293D 45
     293E 20
     293F 4D
     2940 49
     2941 53
     2942 4D
     2943 41
     2944 54
     2945 43
     2946 C8
2203      0043      EM8     EQU     *-EMSG
2204 2947 44                DB01    "DISK I/O"
     2948 49
     2949 53
     294A 4B
     294B 20
     294C 49
     294D 2F
     294E CF
2205      004B      EM9     EQU     *-EMSG
2206 294F 44                DB01    "DISK FULL"
     2950 49
     2951 53
     2952 4B
     2953 20
     2954 46
     2955 55
     2956 4C
     2957 CC
2207      0054      EM10    EQU     *-EMSG
2208 2958 46                DB01    "FILE LOCKED"
     2959 49
     295A 4C
     295B 45
     295C 20
     295D 4C
     295E 4F
     295F 43
     2960 4B
     2961 45
```

```
          005F      EM11    EQU     *-EMSG
     2963 43                DB01    "CMD SYNTAX"
     2964 4D
     2965 44
     2966 20
     2967 53
     2968 59
     2969 4E
     296A 54
     296B 41
     296C D8
          0069      EM12    EQU     *-EMSG
     296D 4E                DB01    "NO FILE BUFFS AVAIL"
     296E 4F
     296F 20
     2970 46
     2971 49
     2972 4C
     2973 45
     2974 20
     2975 42
     2976 55
     2977 46
     2978 46
     2979 53
     297A 20
     297B 41
     297C 56
     297D 41
     297E 49
     297F CC
          007C      EM13    EQU     *-EMSG
     2980 4E                DB01    "NOT BASIC PROGRAM"
     2981 4F
     2982 54
     2983 20
     2984 42
     2985 41
     2986 53
     2987 49
     2988 43
     2989 20
     298A 50
     298B 52
     298C 4F
     298D 47
     298E 52
     298F 41
     2990 CD
          008D      EM14    EQU     *-EMSG
     2991 50                DB01    "PROGRAM TOO LARGE"
     2992 52
     2993 4F
     2994 47
     2995 52
     2995 52
```

```
     2996 41
     2997 4D
     2998 20
     2999 54
     299A 4F
     299B 4F
     299C 20
     299D 4C
     299E 41
     299F 52
     29A0 47
     29A1 C5
2217      009E       EM15    EQU     *-EMSG
2218 29A2 4E                 DB01    "NOT BINARY FILE"
     29A3 4F
     29A4 54
     29A5 20
     29A6 42
     29A7 49
     29A8 4E
     29A9 41
     29AA 52
     29AB 59
     29AC 20
     29AD 46
     29AE 49
     29AF 4C
     29B0 C5
2219                 ;
2220      00AD       EML     EQU     *-EMSG
2221 29B1 20                 DB      " ERROR"
     29B2 45
     29B3 52
     29B4 52
     29B5 4F
     29B6 52
2222 29B7 8D                 DB      $8D
2223                 EMDTB
2224 29B8 00                 DB      0, EM1, EM2, EM3, EM4
     29B9 0B
     29BA 0B
     29BB 0B
     29BC 0E
2225 29BD 1B                 DB      EM5, EM6, EM7, EM8, EM9
     29BE 26
     29BF 34
     29C0 43
     29C1 4B
2226 29C2 54                 DB      EM10, EM11, EM12, EM13, EM14
     29C3 5F
     29C4 69
     29C5 7C
     29C6 8D
2227 29C7 9E                 DB      EM15
```

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  2229
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                                PAGE
 2230                   ;
 2231                   ;       MISC BUT REQD CELLS
 2232                   ;
 2233 29C9 0000         CFTABA  DB      @0              ;CURRENT FILE TABLE POINTER
 2234 29CB 00           ISTATE  DB      0               ;INPUT STATE
 2235 29CC 00           OSTATE  DB      0               ;OUTPUT STATE
 2236 29CD 0000         SVOUTS  DB      @0              ;SAVED OUT SWITCH
 2237 29CF 0000         SVINS   DB      @0              ;SAVED IN SWITCH
 2238 29D1 00           CNFTBS  DB      0               ;CURRENT NO FILE TABLES
 2239 29D2 03           DFNFTB  DB      3               ;DEFAULT NO FILE TABLES
 2240 29D3 00           SVSTK   DB      0               ;SAVED STACK PTR
 2241 29D4 00           SVX     DB      0               ;DSAVED X REG
 2242 29D5 00           SVY     DB      0               ;SAVED Y REG
 2243 29D6 00           SVA     DB      0               ;SAVED ACU
 2244 29D7 00           LBUFD   DB      0               ;LINE BUFF DISPL
 2245 29D8 00           MONMOD  DB      0               ;MONITOR MODE BITS
 2246      0040         MC      EQU     $40             ;MONITOR CMDS
 2247      0020         MI      EQU     $20             ;MONITOR INPUT
 2248      0010         MO      EQU     $10             ;MONITOR OUTPUT
 2249 29D9 FF           CMDNO   DB      $FF             ;COMMAND NO
 2250 29DA 00           SVBL    DB      0,0
      29DB 00
 2251 29DC 00           SVCMD   DB      0
 2252 29DD 00           TEMP1A  DB      0
 2253 29DE 00           TEMP2A  DB      0
 2254 29DF 00           INOPTS  DB      0               ;INPUT OPTIONS
 2255                   CUROPT                          ;CURRENT OPTIONS
 2256 29E0 0000         CV      DB      @@0             ;VOLUME
 2257 29E2 0000         CD      DB      @@0             ;DRIVE
 2258 29E4 0000         CS      DB      @@0             ;SLOT
 2259 29E6 0100         CL      DB      @@1             ;RECORD LENGTH
 2260 29E8 0000         CR      DB      @@0             ;RECORD NUMBER
 2261 29EA 0000         CB      DB      @@0             ;RECORD BYTE
 2262 29EC 0000         CA      DB      @@0             ;  ADDRESS
 2263 29EE 00           IMBITS  DB      0
 2264      29EF         FNAME1  RMB     30              ;  FILENAME 1
 2265      2A0D         FNAME2  RMB     30              ;  FILENAME 2
 2266 2A2B 03           DFNFTS  DB      3               ;DEFAULT FILE TABLES = 3
 2267 2A2C 84           CCHAR   DB      $84             ;  CONTROL CHAR
 2268 2A2D 00           ESTATE  DB      0               ;  EXECUTE STATE
 2269 2A2E 00           EFTABA  DB      0,0             ;EXECUTE FILE TABLE POINTER
      2A2F 00
 2270 2A30 00           ASIBSW  DB      0               ;  APPLESOFT, IB SWITCH
 2271 2A31 C1           FASB    DB11    "APPLESOFT"
      2A32 D0
      2A33 D0
      2A34 CC
      2A35 C5
      2A36 D3
      2A37 CF
      2A38 C6
      2A39 D4
 2272      0009         FASBL   EQU     *-FASB
 2273
```

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                                PAGE
2274                    ;
2275                    ;       DOS ADR TABLES (RELOCATED)
2276                    ;
2277                    SAT2
2278 2A3A E837          AIOB    DB      @@IOB           ;5-ADR IOB
2279 2A3C 2633          AVTOC   DB      @@VTOC          ;6-ADR VTOC
2280 2A3E 2634          AVOLDR  DB      @@VOLDIR        ;7-ADR VOLDIR
2281 2A40 0040          AEND    DB      @@EDOS          FEND OF DOS
2282                    ;
2283 2A42 F132          CMDVT   DB      @@GOODIO-1      ;0-NULL
2284 2A44 912A                  DB      @@FOPEN-1       ;1-OPEN FILE
2285 2A46 592B                  DB      @@FCLOSE-1      ;2-CLOSE FILE
2286 2A48 AB2B                  DB      @@FREAD-1       ;3-READ DATA
2287 2A4A C32B                  DB      @@FWRITE-1      ;4-WRITE DATA
2288 2A4C 812C                  DB      @@FDEL-1        ;5-DELETE FILE
2289 2A4E EE2C                  DB      @@RDIR-1        ;6-READ DIRECTORY
2290 2A50 422C                  DB      @@FLOCK-1       ;7-LOCK A FILE
2291 2A52 492C                  DB      @@FUNLCK-1      ;8-UNLOCK A FILE
2292 2A54 8D2B                  DB      @@FRNME-1       ;9-RENAME
2293 2A56 652C                  DB      @@FPOSTN-1      ;10-POSITION A FILE
2294 2A58 E32D                  DB      @@FFMT-1        ;FORMAT
2295 2A5A 6B2C                  DB      @@FVAR-1        ; VARIFY
2296 2A5C F132                  DB      @@GOODIO-1      ;11-SPARE
2297                    ;
2298                    RVT
2299 2A5E F132                  DB      @@GOODIO-1
2300 2A60 DD2B                  DB      @@RNXBYT-1      ;1-RD NEXT BYTE
2301 2A62 E92B                  DB      @@RNXBLK-1      ;1-RD NEXT BLOCK
2302 2A64 DA2B                  DB      @@RSPBYT-1      ;2-RD SPECIFIC BYTE
2303 2A66 E62B                  DB      @@RSPBLK-1      ;3 - RD SPECIFIC BLOCK
2304 2A68 F132                  DB      @@GOODIO-1      ;4 - SPARE
2305                    ;
2306                    WVT
2307 2A6A F132                  DB      @@GOODIO-1
2308 2A6C 112C                  DB      @@WNXBYT-1      ;1-WR NEXT BYTE
2309 2A6E 1D2C                  DB      @@WNXBLK-1      ;WR NEXT BLOCK
2310 2A70 0E2C                  DB      @@WSPBYT-1      ;2-WR SPECIFIC BYTE
2311 2A72 1A2C                  DB      @@WSPBLK-1      ;3-WR SPECIFIC BLOCK
2312 2A74 F132                  DB      @@GOODIO-1      ;4 - SPARE
2313                    EAT2
2314
```

```
                       PAGE
               ;
               ;       DOSENT - DOS EXTERNAL ENTRY POINT
               ;               EXIT PARM:
               ;                               CARRY CLEAR = OPERATION OK
               ;                               CARRY SET = ERROR
               ;
               SC2
               DOSENT
2A76 BA                TSX
2A77 8E0A33            STX     ENTSTK
2A7A 20C02D            JSR     CLCFCB          ;GO CALCULATE FCB
2A7D AD2635            LDA     CCBREQ          ;GET REQUEST
2A80 C90D              CMP     #CRQMAX         ;TTEST REQ RANGE
2A82 B00B              BCS     ERR2            ;BR OUT OF RANGE
2A84 0A                ASLA                    ;REQ CODE *2
2A85 AA                TAX
2A86 BD432A            LDA     CMDVT+1, X      ;PUSH ADR ONTO STACK
2A89 48                PHA
2A8A BD422A            LDA     CMDVT, X
2A8D 48                PHA
2A8E 60        DENRTS  RTS
2A8F 4CD632    ERR2    JMP     ERROR2
```

```
                           PAGE
                  ;
                  ;        FOPEN - OPEN A FILE
                  ;
                  FOPEN
2A92 20982A                JSR      DOPEN
2A95 4CF232                JMP      GOODIO
                  ;
                  DOPEN
                  ;
2A98 20302B                JSR      DCBSUP
                  ;
                  ;
2A9B A901                  LDA      #1
2A9D 8D4E35                STA      DCBSDL+1
2AA0 AE2935                LDX      CCBRLN+1       ;MOVE RECORD LENGTH
2AA3 AD2835                LDA      CCBRLN
2AA6 D005                  BNE      F02
2AA8 E000                  CPX      #0
2AAA D001                  BNE      F02
2AAC E8                    INX                     ;SET RL=256
2AAD 8D5335       F02      STA      DCBRCL
2AB0 8E5435                STX      DCBRCL+1
                  ;
2AB3 203C31                JSR      FNDFIL         ;GO FIND FILE
2AB6 9042                  BCC      F03            ;BR IF FOUND
                  ;                                ;CREATE FILE
2AB8 A900                  LDA      #0
2ABA 9D5334                STA      VDFILE+34,X
2ABD A901                  LDA      #1
2ABF 9D5234                STA      VDFILE+33,X
2AC2 8E0B33                STX      TEMP1          ;SAVE VDIR INDEX
2AC5 20B731                JSR      GETSEC         ;GO ALLOCATE SECTOR
2AC8 AE0B33                LDX      TEMP1
2ACB 9D3234                STA      VDFILE+1,X     ;PUT SECTOR INTO VDIR
2ACE 8D3D35                STA      DCBFDS         ;PUT SECTOR AS 1ST FILE DIR
2AD1 8D3F35                STA      DCBCDS         ;PUT SECTOR AS CURRENT FILE DIR
                  ;
2AD4 AD5C35                LDA      DCBATK         ;GET ALLOCATED TRACK
2AD7 9D3134                STA      VDFILE,X       ;PUT INTO VDIR
2ADA 8D3C35                STA      DCBFDT         ;AND AS 1ST FILE DIR
2ADD 8D3E35                STA      DCBCDT         ;AND AS CURRENT FILE DIR
                  ;
2AE0 AD2D35                LDA      CCBFUC         ;SET USE CODE
2AE3 9D3334                STA      VDFILE+2,X     ;INTO DIRECTORY
                  ;
2AE6 20AA2F                JSR      WRVDIR         ;GO WRITE VOL DIRECTORY
                  ;
2AE9 20762E                JSR      MVFCBD         ;MOVE FILE DIR ADR TO ZP
2AEC 20872E                JSR      CLRSEC         ;GO CLEAR IT
2AEF 20AD2E                JSR      WRFDGO         ;GO WRITE FILE DIRECTORY
                  ;                                DONE CREATION
2AF2 AE0B33                LDX      TEMP1          ;RE-GET INDEX
2AF5 A906                  LDA      #CREFNF
2AF7 8D3035                STA      CCBSTA
```

```
2392                   ;
2393                   F03
2394 2AFA BD3134                  LDA     VDFILE,X        ;MOVE FILE DIR TRACK
2395 2AFD 8D3C35                  STA     DCBFDT
2396 2B00 BD3234                  LDA     VDFILE+1,X      ;MOVE FILE DIR SECTOR
2397 2B03 8D3D35                  STA     DCBFDS
2398 2B06 BD3334                  LDA     VDFILE+2,X      ;70VE FILE USE CODE
2399 2B09 8D2D35                  STA     CCBFUC
2400 2B0C 8D6135                  STA     DCBFUC
2401 2B0F BD5234                  LDA     VDFILE+33,X
2402 2B12 8D5935                  STA     DCBNSA
2403 2B15 BD5334                  LDA     VDFILE+34,X
2404 2B18 8D5A35                  STA     DCBNSA+1
2405 2B1B 8E4435                  STX     DCBVDI          ; SAVE DIR INDEX
2406                   ;
2407 2B1E A9FF                    LDA     #255            ;INDICATE NO SECTOR
2408 2B20 8D4B35                  STA     DCBCMS          ;IN MEMORY
2409 2B23 8D4C35                  STA     DCBCMS+1
2410 2B26 AD4D33                  LDA     VTDMS           ;MOVE MAX FD SECTS
2411 2B29 8D4535                  STA     DCBDMS          ;TO DCB
2412 2B2C 18                      CLC
2413 2B2D 4CD12E                  JMP     RDFDIR          ; READ 1ST DIRECTORY RECORD
2414                   ;
2415                   ;
2416                   ;
2417                   ;
2418                   DCBSUP
2419 2B30 A900                    LDA     #0
2420 2B32 AA                      TAX
2421 2B33 9D3C35       F01        STA     FCBDCB,X        ;CLEAR DCB
2422 2B36 E8                      INX
2423 2B37 E02D                    CPX     #DCBLEN
2424 2B39 D0F8                    BNE     F01
2425                   ;
2426 2B3B AD2A35                  LDA     CCBVOL          ;MOVE VOL
2427 2B3E 49FF                    EOR     #$FF            ;INVERT VOL BITS
2428 2B40 8D6435                  STA     DCBVOL
2429 2B43 AD2B35                  LDA     CCBDRV          ;MOVE DRIVE
2430 2B46 8D6335                  STA     DCBDRV
2431 2B49 AD2C35                  LDA     CCBSLT          ;GET USER SPEC SLOT
2432 2B4C 0A                      ASLA                    ;SLOT*16
2433 2B4D 0A                      ASLA
2434 2B4E 0A                      ASLA
2435 2B4F 0A                      ASLA
2436 2B50 AA                      TAX
2437                   F01A
2438 2B51 8E6235                  STX     DCBSLT
2439 2B54 A911                    LDA     #17
2440 2B56 8D6535                  STA     DCBVTN
2441 2B59 60                      RTS
2442
```

```
                              PAGE
                    ;
                    ;         FCLOSE - CLOSE A FILE
                    ;
                    FCLOSE
2B5A 20902E                   JSR     WRSECT            ;WRITE OPEN SECTOR
2B5D 20A72E                   JSR     WRFDIR            ;GO WRITE FILE DIRECTORY
2B60 203632                   JSR     FRETRK            ;FREE UNUSED SECTORS
2B63 A902                     LDA     #IBCWTS
2B65 2D4035                   AND     DCBWRF
2B68 F021                     BEQ     FC2
                    ;
2B6A 206A2F                   JSR     RDVTOC            ; READ VTOC
2B6D A900                     LDA     #0
2B6F 18                       CLC
                    FC1
2B70 20842F                   JSR     RDVDIR            ; READ VDIR
2B73 38                       SEC
2B74 CE4335                   DEC     DCBVDR
2B77 D0F7                     BNE     FC1               ; BR IF NOT
2B79 AE4435                   LDX     DCBVDI            ; GET FILES INDEX
2B7C AD5935                   LDA     DCBNSA            ; MOVE NO SECTORS ALLOCATED
2B7F 9D5234                   STA     VDFILE+33,X
2B82 AD5A35                   LDA     DCBNSA+1
2B85 9D5334                   STA     VDFILE+34,X
2B88 20AA2F                   JSR     WRVDIR            ; WRITE VOL DIR REC
                    ;
                    ;
                    FC2
2B8B 4CF232                   JMP     GOODIO            ;DONE
```

```
                                PAGE
 2473                   ;
 2474                   ;       FRNME - RENAME A FILE
 2475                   ;
 2476                   FRNME
 2477 2B8E 20982A               JSR     DOPEN           ;GO OPEN FILE
 2478 2B91 AD6135               LDA     DCBFUC          ;GET USE CODE
 2479 2B94 302B                 BMI     ER10            ;BR IF LOCKED
 2480 2B96 AD2835               LDA     CCBFN2          ;MOVE NEW FN
 2481 2B99 8542                 STA     ZPGFCB          ;PTR TO ZPG
 2482 2B9B AD2935               LDA     CCBFN2+1
 2483 2B9E 8543                 STA     ZPGFCB+1
 2484 2BA0 AE0B33               LDX     TEMP1           ;GET VDIR INDEX
 2485 2BA3 208F31               JSR     MVFN            ;GO MOVE FILE NAME
 2486 2BA6 20AA2F               JSR     WRVDIR          ;GO WRITE VDIR
 2487 2BA9 4CF232               JMP     GOODIO          ;DONE RENAME
 2488
```

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                                   PAGE
2489                    ;
2490                    ;          FREAD - READ A FILE
2491                    ;
2492                    FREAD
2493                    ;
2494 2BAC AD2735                   LDA     CCBRQM          ;GET REQ MOD
2495 2BAF C905                     CMP     #CRMMAX         ;TEST LIMIT
2496 2BB1 B00B                     BCS     ERR3A           ;BR BAD
2497                    ;
2498 2BB3 0A                       ASLA                    ;CODE*2
2499 2BB4 AA                       TAX
2500 2BB5 BD5F2A                   LDA     RVT+1,X         ;GET READ ROUTINE
2501 2BB8 48                       PHA                     ;VECTOR ADR
2502 2BB9 BD5E2A                   LDA     RVT,X
2503 2BBC 48                       PHA                     ;AND
2504 2BBD 60                       RTS                     ;GO TO IT
2505                    ;
2506 2BBE 4CDA32        ERR3A      JMP     ERROR3
2507 2BC1 4CEE32        ER10       JMP     ERRR10
2508                    ;
2509                    ;          FWRITE - WRITE A FILE
2510                    ;
2511                    FWRITE
2512 2BC4 AD6135                   LDA     DCBFUC          ;IS FILE LOCKED
2513 2BC7 30F8                     BMI     ER10            ;BR IF LOCKED
2514 2BC9 AD2735                   LDA     CCBRQM          ;GET REQ MOD
2515 2BCC C905                     CMP     #CRMMAX         ;IN RANGE
2516 2BCE B0EE                     BCS     ERR3A           ;BR IF NOT IN RANGE
2517                    ;
2518 2BD0 0A                       ASLA
2519 2BD1 AA                       TAX
2520 2BD2 BD6B2A                   LDA     WVT+1,X         ;GET ROUTINE ADR
2521 2BD5 48                       PHA
2522 2BD6 BD6A2A                   LDA     WVT,X
2523 2BD9 48                       PHA
2524 2BDA 60                       RTS     ;AND GO TO IT
2525
```

```
                        PAGE
                ;
                ;       RSPBYT - READ A SPECIFIC BYTE
                ;
                RSPBYT
2BDB 207332             JSR     LOCSEC          ;GO GET REQD REL SECTOR
                ;
                ;       RNXBYT - READ NEXT BYTE
                ;
2BDE 20FC2B     RNXBYT  JSR     GETBYT          ;GO GET BYTE
2BE1 8D2E35             STA     CCBDAT          ;PUT IN CCB
2BE4 4CF232             JMP     GOODIO          ;DONE
                ;
                ;       RSPBLK - READ A SPECIFIC BLOCK
                ;
2BE7 207332     RSPBLK  JSR     LOCSEC          ;GO LOCATE REL SECTOR
                ;
                ;       RNXBLK - READ NEXT BLOCK
                ;
                RNXBLK
2BEA 202831             JSR     DTBLN           ;GO DECR LEN (NOT RTN IF=0)
2BED 20FC2B             JSR     GETBYT          ;GO GET BYTE
2BF0 48                 PHA
2BF1 201531             JSR     MIBDA           ;GO MOVE BLOCK ADR AND INCR
2BF4 A000               LDY     #0
2BF6 68                 PLA
2BF7 9142               STA     (ZPGFCB),Y      ;SET DATA BYTE
2BF9 4CEA2B             JMP     RNXBLK          ;GO FOR NEXT BYTE
                ;
                ;       GETBYT - GET A DATA BYTE
                ;
                GETBYT
2BFC 202930             JSR     LOCNXB          ;LOCATE NEXT BYTE
2BFF B00B               BCS     EOFIN           ;BR IF EOF
2C01 B142               LDA     (ZPGFCB),Y      ;GET DAT BYTE
2C03 48                 PHA                     ;SAVE IT
2C04 20CE30             JSR     INCRRB          ;INCR REC BYTE
2C07 200731             JSR     INCSCB          ;INCR SEC BYTE
2C0A 68                 PLA                     ;GET SAVED BYTE
2C0B 60                 RTS                     ;RETURN
                ;
2C0C 4CE232     EOFIN   JMP     ERROR5          ;GO TO EOF RTN
```

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                                   PAGE
2568                         ;
2569                         ;     WSPBYT - WRITE SPECIFIC BYTE
2570                         ;
2571                         WSPBYT
2572 2C0F 207332                   JSR     LOCSEC          ;GO LOCATE SECTOR
2573                         ;
2574                         ;     WNXBYT - WRITE NEXT BYTE
2575                         ;
2576                         WNXBYT
2577 2C12 AD2E35                   LDA     CCBDAT          ;GET THE BYTE
2578 2C15 202E2C                   JSR     PUTBYT          ;GO WRITE BYTE
2579 2C18 4CF232                   JMP     GOODIO          ;DONE
2580                         ;
2581                         ;     WSPBLK - WRITE A SPECIFIC BLOCK
2582                         ;
2583                         WSPBLK
2584 2C1B 207332                   JSR     LOCSEC          ;GO LOCATE SECTOR
2585                         ;
2586                         ;     WNXBLK - WRITE NEXT BLOCK
2587                         ;
2588                         WNXBLK
2589 2C1E 201531                   JSR     MIBDA           ;GO MOVE ADR TO ZPG AND DEC
2590 2C21 A000                     LDY     #0
2591 2C23 B142                     LDA     (ZPGFCB),Y      ;GET DATA BYTE
2592 2C25 202E2C                   JSR     PUTBYT          ;GO PUT IT
2593 2C28 202831                   JSR     DTBLN           ;GO DEC BLK LEN (NOT RTN IF = 0)
2594 2C2B 4C1E2C                   JMP     WNXBLK
2595                         ;
2596                         ;     PUTBYT - PUT OUT ONE BYTE
2597                         ;
2598                         PUTBYT
2599 2C2E 48                       PHA                     ;SAVE DATA BYTE
2600 2C2F 202930                   JSR     LOCNXB          ;GO LOCATE NEXT BYTE
2601                         ;
2602 2C32 68                 PBO   PLA                     ;GET SAVED BYTE
2603 2C33 9142                     STA     (ZPGFCB),Y      ;PUT THE BYTE
2604 2C35 A940                     LDA     #$40            ;SET WRITE SECTOR REQD
2605 2C37 0D4035                   ORA     DCBWRF
2606 2C3A 8D4035                   STA     DCBWRF
2607                         ;
2608 2C3D 20CE30                   JSR     INCRRB          ;INCR REL REC BYTE
2609 2C40 4C0731                   JMP     INCSCB          ; INCR SECTOR BYTE
2610
```

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                            PAGE
                 ;
                 ;          FLOCK - LOCK A FILE
                 ;
2C43 A980        FLOCK      LDA     #$80            ;REMEMBER LOCK
2C45 8D0D33                 STA     TEMP3
2C48 D005                   BNE     LCKGO
                 ;
                 ;          FUNLCK - UNLOCK A FILE
                 ;
2C4A A900        FUNLCK     LDA     #00             ;REMEMBER UNLOCK
2C4C 8D0D33                 STA     TEMP3
                 ;
                 LCKGO
                 ;
2C4F 20982A                 JSR     DOPEN           ;GO OPEN FILE
2C52 AE0B33                 LDX     TEMP1
2C55 BD3334                 LDA     VDFILE+2,X      ;GET FILE USE CODE
2C58 297F                   AND     #$7F            ;TURN OFF LOCK
2C5A 0D0D33                 ORA     TEMP3
2C5D 9D3334                 STA     VDFILE+2,X
2C60 20AA2F                 JSR     WRVDIR
2C63 4CF232                 JMP     GOODIO
                 ;
                 ;          FPOSTN - POSITION A FILE
2C66 207332      FPOSTN     JSR     LOCSEC          ;GO POSITION
2C69 4CF232                 JMP     GOODIO          ;DONE
                 ;
                 ;
                 ;          FVAR - VARIFY A FILE
                 ;
                 FVAR
2C6C 20982A                 JSR     DOPEN           ; OPEN FILE
2C6F 202930      VAR1       JSR     LOCNXB          ; READ A SECTOR
2C72 B00B                   BCS     VAR2            ; BR IF EOF
2C74 EE4F35                 INC     DCBCRS          ; INCREMENT SECTOR
2C77 D0F6                   BNE     VAR1
2C79 EE5035                 INC     DCBCRS+1
2C7C 4C6F2C                 JMP     VAR1            ; READ THIS ONE
2C7F 4CF232      VAR2       JMP     GOODIO          ; DONE
```

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                           PAGE
                  ;
                  ;        FDEL - DELETE A FILE
                  ;
                  FDEL
2C82 20982A                JSR     DOPEN            ;GO OPEN FILE
                  ;
2C85 AE0B33       FD2      LDX     TEMP1            ;SAVED INDEX
2C88 BD3334                LDA     VDFILE+2,X       ;IS FILE LOCKED
2C8B 1003                  BPL     FD3              ;BR NOT LOCKED
2C8D 4CEE32                JMP     ERRR10
                  ;
                  FD3
2C90 AE0B33                LDX     TEMP1            ;GET SAVED INDEX
2C93 BD3134                LDA     VDFILE,X         ;GET DIR TRACK
2C96 8D3C35                STA     DCBFDT           ;SET AS 1ST FD TRACK
2C99 9D5134                STA     VDFILE+32,X      ; SAVE IN LC OF FN
2C9C A9FF                  LDA     #$FF             ;DELETED FILE MARKER
2C9E 9D3134                STA     VDFILE,X         ;CLEAR ENTRY
2CA1 BC3234                LDY     VDFILE+1,X       ;GET DIR SECTOR
2CA4 8C3D35                STY     DCBFDS           ;SET AS 1ST FD SEC
2CA7 20AA2F                JSR     WRVDIR           ;GO WRITE VOLUME DIR
2CAA 18                    CLC
2CAB 20D12E       FD4      JSR     RDFDIR           ;GET 1ST FILE DIR SECTOR
2CAE B02A                  BCS     FD7              ;BR IF NO MORE
2CB0 20762E                JSR     MVFCBD           ;MOVE DIR TO ZPG
2CB3 A00C                  LDY     #FDENT           ;POINT Y TO 1ST SEC ENT
2CB5 8C0B33       FD5      STY     TEMP1            ;SAVE Y
2CB8 B142                  LDA     (ZPGFCB),Y       ;GET REACK
2CBA 300B                  BMI     FD6              ;BR IF NONE
2CBC F009                  BEQ     FD6              ;BR IF END OF FILE
2CBE 48                    PHA                      ;SAVE TRK
2CBF C8                    INY
2CC0 B142                  LDA     (ZPGFCB),Y       ;GET SECTOR
2CC2 A8                    TAY                      ;TO Y
2CC3 68                    PLA                      ;GET TRK
2CC4 20E02C                JSR     FDSUB            ;GO FREE SECTOR
2CC7 AC0B33       FD6      LDY     TEMP1            ;GET DIR INDEX
2CCA C8                    INY                      ;INCR TO NEXT ENTRY
2CCB C8                    INY
2CCC D0E7                  BNE     FD5              ;BR NOT DONE THIS DIR
2CCE AD3E35                LDA     DCBCDT           ;GET THIS DIR TRK
2CD1 AC3F35                LDY     DCBCDS           ;AND SECTOR
2CD4 20E02C                JSR     FDSUB            ;AND GO FREE IT
2CD7 38                    SEC                      ;GO
2CD8 B0D1                  BCS     FD4              ;READ NEXT DIR
                  FD7
2CDA 206E2F                JSR     WRVTOC
2CDD 4CF232                JMP     GOODIO
                  ;
                  FDSUB
2CE0 38                    SEC                      ;SET FOR RE USE OF SEC
2CE1 205032                JSR     FRESEC           ;GO FREE SECTOR
2CE4 A900                  LDA     #0               ;CLEAR DCB BIT MAP
2CE6 A203                  LDX     #3
```

```
 2705 2CE8 9D5B35     FDS1     STA      DCBALS,X
 2706 2CEB CA                  DEX
 2707 2CEC 10FA                BPL      FDS1
 2708 2CEE 60                  RTS
 2709
```

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                                PAGE
2710                  ;
2711                  ;         RDIR - PRINT DIRECTORY
2712                  ;
2713                  RDIR
2714 2CEF 20302B                JSR     DCBSUP
2715 2CF2 A9FF                  LDA     #$FF
2716 2CF4 8D6435                STA     DCBVOL
2717 2CF7 206A2F                JSR     RDVTOC
2718 2CFA A916                  LDA     #22              ; SET 21 LINES
2719 2CFC 8D0C33                STA     TEMP2
2720 2CFF 20852D                JSR     PRCR             ;GO PRINT
2721 2D02 20852D                JSR     PRCR             ; PRINT ANOTHER CHAR
2722 2D05 A20B                  LDX     #VML             ; VOLUME MSG LENGTH
2723 2D07 BD1A33      RDO       LDA     VOLMES, X        ; GET MSG CHAR
2724 2D0A 20EDFD                JSR     PRINT            ; PRINT IT
2725 2D0D CA                    DEX                      ; DECREMENT COUNT
2726 2D0E 10F7                  BPL     RDO              ; BR IF MORE
2727                  ;
2728 2D10 8645                  STX     CNUM+1
2729 2D12 ADF637                LDA     IBSMOD           ; MOVE VOL NO FOR
2730 2D15 8544                  STA     CNUM             ; CONVERSION
2731 2D17 20982D                JSR     PRNUM            ; GO PRINT VOL NO
2732                  ;
2733 2D1A 20852D                JSR     PRCR             ; PRINT CR
2734 2D1D 20852D                JSR     PRCR             ; AND AGAIN
2735                  ;
2736 2D20 18                    CLC                      ;FIRST RECORD
2737                  ;
2738 2D21 20842F      RD1       JSR     RDVDIR           ;GO READ REC
2739 2D24 B05C                  BCS     RD5
2740 2D26 A200                  LDX     #0               ;SET INDEX=0
2741 2D28 8E0B33      RD2       STX     TEMP1            ;SAVE INDEX
2742 2D2B BD3134                LDA     VDFILE, X        ;GET TRACK
2743 2D2E F052                  BEQ     RD5              ;BR IF END OF DIR
2744 2D30 3049                  BMI     RD4              ;BR IF DELETED
2745                  ;
2746 2D32 A0A0                  LDY     #$A0             ; BLANK
2747 2D34 BD3334                LDA     VDFILE+2, X      ; GET TYPE
2748 2D37 1002                  BPL     RD2A             ; BR IF NOT LOCKED
2749 2D39 A0AA                  LDY     #'*+$80          ; AST
2750 2D3B 98          RD2A      TYA                      ; ACU = AST OR BLANK
2751 2D3C 20EDFD                JSR     PRINT            ; PRINT ACU
2752                  ;
2753 2D3F BD3334                LDA     VDFILE+2, X      ; GET TYPE
2754 2D42 2907                  AND     #$07             ; MASK OUT MISC
2755 2D44 A003                  LDY     #3               ; SET INDEX = 3
2756 2D46 4A          RD2B      LSRA                     ; SHIFT OUT LSB
2757 2D47 B003                  BCS     RD2C             ;BR IF TYPE BIT OUT
2758 2D49 88                    DEY                      ; DEC INDEX
2759 2D4A D0FA                  BNE     RD2B             ; BR IF NOT ACC BITS
2760                  RD2C
2761 2D4C B91633                LDA     FTTAB, Y         ; GET TYPE CODE
2762 2D4F 20EDFD                JSR     PRINT            ; PRINT IT
2763 2D52 A9A0                  LDA     #$A0             ; BLANK
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 2764 2D54 20EDFD              JSR     PRINT           ; PRINT
 2765                 ;
 2766 2D57 BD5234              LDA     VDFILE+33,X     ; MOVE FILE LENGTH
 2767 2D5A 8544                STA     CNUM            ; TO CNUM
 2768 2D5C BD5334              LDA     VDFILE+34,X
 2769 2D5F 8545                STA     CNUM+1
 2770 2D61 20982D              JSR     PRNUM           ; GO PRINT NUMBER
 2771 2D64 A9A0                LDA     #$A0            ; BLANK
 2772 2D66 20EDFD              JSR     PRINT           ; PRINT
 2773                 ;
 2774 2D69 E8                  INX
 2775 2D6A E8                  INX
 2776 2D6B E8                  INX
 2777 2D6C A01D                LDY     #29
 2778 2D6E BD3134     RD3      LDA     VDFILE,X        ;GET CHAR
 2779 2D71 20EDFD              JSR     PRINT           ;PRINT CHAR
 2780 2D74 E8                  INX
 2781 2D75 88                  DEY
 2782 2D76 10F6                BPL     RD3
 2783                 RD3A
 2784 2D78 20852D              JSR     PRCR            ;GO PRINT CR
 2785 2D7B 20A331     RD4      JSR     VDINC           ;INCR INDEX
 2786 2D7E 90A8                BCC     RD2             ;BR IF MORE IN DIR
 2787 2D80 B09F                BCS     RD1             ;GO READ NEXT DIR SECT
 2788                 ;
 2789 2D82 4CF232     RD5      JMP     GOODIO          ;DONE
 2790                 ;
 2791                 PRCR
 2792 2D85 A98D                LDA     #$8D            ;CR
 2793 2D87 20EDFD              JSR     PRINT           ;PRINTED
 2794 2D8A CE0C33              DEC     TEMP2           ;DEC LINE COUNTER
 2795 2D8D D008                BNE     PRCR1           ;BR IF NOT ZERO
 2796 2D8F 200CFD              JSR     GETKEY          ;WAIT FOR INPUT
 2797 2D92 A915                LDA     #21             ; RESET LINE COUNTER
 2798 2D94 8D0C33              STA     TEMP2
 2799 2D97 60         PRCR1    RTS                     ;DONE
 2800
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                                      PAGE
 2801                      PRNUM
 2802 2D98 A002                       LDY       #2              ; 3 DIGITS
 2803 2D9A A900            PRN1       LDA       #0              ; INIT DIGIT TO ZERO
 2804 2D9C 48                         PHA                       ; SAVE IT
 2805                      ;
 2806 2D9D A544            PRN2       LDA       CNUM            ; GET NUMBER
 2807 2D9F D91333                     CMP       CVTAB,Y         ; IF NUM < CVTAB ENTRY
 2808 2DA2 9012                       BCC       PRN3            ; THEN DONE THIS DIGIT
 2809                      ;
 2810 2DA4 F91333                     SBC       CVTAB,Y         ; SUBTRACT TABLE ENTRY
 2811 2DA7 8544                       STA       CNUM            ; FROM NUM
 2812 2DA9 A545                       LDA       CNUM+1
 2813 2DAB E900                       SBC       #0
 2814 2DAD 8545                       STA       CNUM+1
 2815 2DAF 68                         PLA                       ; INCREMENT DIGIT
 2816 2DB0 6900                       ADC       #0
 2817 2DB2 48                         PHA
 2818 2DB3 4C9D2D                     JMP       PRN2            ; TRY AGAIN
 2819                      ;
 2820                      PRN3
 2821 2DB6 68                         PLA                       ; GET DIGIT
 2822 2DB7 09B0                       ORA       #$B0            ; ADD ASCII 0
 2823 2DB9 20EDFD                     JSR       PRINT           ; PRINT IT
 2824 2DBC 88                         DEY                       ; DECREMENT DIGIT COUNT
 2825 2DBD 10DB                       BPL       PRN1            ; BR IF MORE DIGIT
 2826                      ;
 2827 2DBF 60                         RTS                       ; DONE
 2828
```

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                                PAGE
 2829                   ;
 2830                   ;       CLCFCB - GET FCB VIA INDEX AND MOVE IT
 2831                   ;
 2832                   CLCFCB
 2833                   ;
 2834 2DC0 20722E               JSR     MVFCBP          ;MOVE FCB PTR TO ZPG
 2835 2DC3 A000                 LDY     #0
 2836 2DC5 8C3035               STY     CCBSTA
 2837 2DC8 B142         CF3     LDA     (ZPGFCB),Y      ;MOVE FCB TO
 2838 2DCA 993C35               STA     FCB,Y           ;FCB WORK AREA
 2839 2DCD C8                   INY
 2840 2DCE C02D                 CPY     #FCBLEN
 2841 2DD0 D0F6                 BNE     CF3
 2842                   ;
 2843 2DD2 18                   CLC                     ;DONE
 2844 2DD3 60                   RTS
 2845                   ;
 2846                   ;       RTNFCB - MOVE FCB FROM WORK AREA TO FCB
 2847                   ;
 2848                   RTNFCB
 2849 2DD4 20722E               JSR     MVFCBP          ;MOVE FCB ADR TO ZPG
 2850                   ;
 2851 2DD7 A000                 LDY     #0
 2852 2DD9 B93C35       RF1     LDA     FCB,Y
 2853 2DDC 9142                 STA     (ZPGFCB),Y
 2854 2DDE C8                   INY
 2855 2DDF C02D                 CPY     #FCBLEN
 2856 2DE1 D0F6                 BNE     RF1
 2857 2DE3 60                   RTS
 2858
```

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                                PAGE
                        ;
                        ;       FFMT - EXECUTE FORMAT REQUEST
                        ;
                        FFMT
2DE4 20302B                     JSR     DCBSUP          ; SET UP DCB
2DE7 A904                       LDA     #IBFMT
2DE9 20CB2F                     JSR     DCBIO2
2DEC AD6435                     LDA     DCBVOL          ; SET VOL NO
2DEF 49FF                       EOR     #$FF
2DF1 8D2C33                     STA     VVOLNO
2DF4 A911                       LDA     #17
2DF6 8D5633                     STA     VALCA1          ; ALOCATE BYTE 1
2DF9 A901                       LDA     #1
2DFB 8D5733                     STA     VALCA2          ; ADD BYTE 2
                        ;
2DFE A238                       LDX     #VSECAL-VTOC
2E00 A900                       LDA     #0
2E02 9D2633             NT1     STA     VTOC,X          ; CLEAR SECTOR AREA
2E05 E8                         INX
2E06 D0FA                       BNE     NT1
                        ;
2E08 A20C                       LDX     #3*4            ;START AT TRACK 3
2E0A E08C               NT2     CPX     #35*4           ; END AT TRACK 35
2E0C F014                       BEQ     NT4
2E0E A003                       LDY     #3              ; 4 BYTES OF INFO
2E10 B90F33             NT3     LDA     ALC10S,Y        ; 10 SECTORS ALLOCATE
2E13 9D5E33                     STA     VSECAL,X
2E16 E8                         INX
2E17 88                         DEY
2E18 10F6                       BPL     NT3
2E1A E044                       CPX     #17*4           ; AT TRACK 17
2E1C D0EC                       BNE     NT2             ; BR IF NOT
2E1E A248                       LDX     #18*4           ; SKIP TO 18
2E20 D0E8                       BNE     NT2
                        ;
2E22 206E2F             NT4     JSR     WRVTOC          ; WRITE NEW VTOC
                        ;
2E25 A200                       LDX     #0
2E27 8A                         TXA
2E28 9D2634             NT5     STA     VOLDIR,X        ; CLEAR VOLDIR
2E2B E8                         INX
2E2C D0FA                       BNE     NT5
                        ;
2E2E 20B82F                     JSR     MVVDBA          ; MOVE BUF PTRS
                        ;
2E31 A911                       LDA     #17             ; TRACK 17
2E33 AC5B33                     LDY     VNOSEC
2E36 88                         DEY
2E37 88                         DEY
2E38 8DEC37                     STA     IBTRK           ; INTO IOB
2E3B 8D2734             NT6     STA     VDLTRK          ; INTO LINK
2E3E 8C2834             NT7     STY     VDLSEC
2E41 C8                         INY
2E42 8CED37                     STY     IBSECT
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2E45 A902                  LDA      #IBCWTS
2E47 20CB2F                JSR      DCBIO2
2E4A AC2834                LDY      VDLSEC
2E4D 88                    DEY                       ; DECREMENT SECTOR
2E4E 3005                  BMI      NT8              ; BR LAST WRITTEN
2E50 D0EC                  BNE      NT7              ; BR NOT LAST
2E52 98                    TYA                       ; LAST, SET LINK TRK=0
2E53 F0E6                  BEQ      NT6
                 ;
                 NT8
2E55 205E2E                JSR      DLDSUP           ; GO SET UP FOR DOSLDR
2E58 204A37                JSR      WBOOT            ;GO WRITE THE BOOT
2E5B 4CF232                JMP      GOODIO           ; DONE

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                                      PAGE
 2927                        ;
 2928                        ;        DLDSUP - SET UP FOR DOSLDR
 2929                        ;
 2930                        DLDSUP
 2931 2E5E AD2735                     LDA      CCBBSA
 2932 2E61 8DF137                     STA      IBBUFP+1          ; START ADR
 2933 2E64 A900                       LDA      #0
 2934 2E66 8DF037                     STA      IBBUFP
 2935 2E69 AD6435                     LDA      DCBVOL            ; VOL
 2936 2E6C 49FF                       EOR      #$FF
 2937 2E6E 8DEB37                     STA      IBVOL
 2938 2E71 60                         RTS
 2939
```

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                                     PAGE
 2940                       ;
 2941                       ;        MVFCBX - MOVE FCB ADRS TO ZPGFCB
 2942                       ;
 2943 2E72 A200     MVFCBP  LDX      #0                 ;MOVE FCB ADR
 2944 2E74 F006             BEQ      MVF1
 2945 2E76 A202     MVFCBD  LDX      #2                 ;MOVE FCB DIR BUFF
 2946 2E78 D002             BNE      MVF1
 2947 2E7A A204     MVFCBS  LDX      #4                 ;MOVE FCB SECTOR BUFF
 2948                       ;
 2949               MVF1
 2950 2E7C BD3235           LDA      CFCBAD,X           ;DO THE MOVE
 2951 2E7F 8542             STA      ZPGFCB
 2952 2E81 BD3335           LDA      CFCBAD+1,X
 2953 2E84 8543             STA      ZPGFCB+1
 2954 2E86 60               RTS
 2955                       ;
 2956                       ;        CLRSEC - CLEAR SECTOR
 2957                       ;
 2958               CLRSEC
 2959 2E87 A900             LDA      #0
 2960 2E89 A8               TAY
 2961 2E8A 9142     CS1     STA      (ZPGFCB),Y
 2962 2E8C C8               INY
 2963 2E8D D0FB             BNE      CS1
 2964 2E8F 60               RTS
 2965
```

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                                PAGE
                      ;
                      ;         WRSECT - WRITE CURRENT SECTOR IF REQD
                      ;
                      WRSECT
2E90 2C4035                     BIT      DCBWRF           ;GET WRITE REQD FLAG
2E93 7001                       BVS      WRSGO            ;BR IF WRITE SECTOR REQD
2E95 60                         RTS                       ;RTS
                      ;
                      WRSGO
2E96 20572F                     JSR      MVSBA            ;GO MOVE SECT BUFF ADR
                      ;
2E99 A902                       LDA      #IBCWTS          ;GET COMMAND
2E9B 20C52F                     JSR      DCBIO            ;GO FILL IN IOB AND DO IO
                      ;
2E9E A9BF                       LDA      #$BF             ;SET WRITE SECTOR REQD BIT OFF
2EA0 2D4035                     AND      DCBWRF
2EA3 8D4035                     STA      DCBWRF
2EA6 60                         RTS                       ;DONE
```

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                               PAGE
                     ;
                     ;         WRFDIR - WRITE FILE DIRECTRY IF REQD
                     ;
                     WRFDIR
2EA7 AD4035                    LDA      DCBWRF          ;GET WRITE REQD FLAG
2EAA 3001                      BMI      WRFDGO          ;BR IF WRITE DIR REQD
2EAC 60                        RTS                      ;DONE IF NOT
                     ;
                     WRFDGO
2EAD 20BE2E                    JSR      MVFDBA
                     ;
2EB0 A902                      LDA      #IBCWTS         ;GET WRITE CMD
2EB2 20C52F                    JSR      DCBIO           ;GO FILL IN IOB AND DO I/O
                     ;
2EB5 A97F                      LDA      #$7F            ;TURN WRITE DIR REQD BIT OFF
2EB7 2D4035                    AND      DCBWRF
2EBA 8D4035                    STA      DCBWRF
2EBD 60                        RTS                      ;DONE
                     ;
                     ;         MVFDBA - MOVE FILE DIRECTORY BUFF ASDR TO IOD
                     ;
                     MVFDBA
2EBE AD3435                    LDA      CFCBDR          ;MOVE ADR
2EC1 8DF037                    STA      IBBUFP
2EC4 AD3535                    LDA      CFCBDR+1
2EC7 8DF137                    STA      IBBUFP+1
2ECA AE3E35                    LDX      DCBCDT          ;GET TRACK
2ECD AC3F35                    LDY      DCBCDS          ;GET SECTOR
2ED0 60                        RTS
```

```
                                PAGE
                        ;
                        ;       RDFDIR - READ FILE DIRECTORY
                        ;
                        RDFDIR
2ED1 08                         PHP                   ;SAVE STATUS
2ED2 20A72E                     JSR    WRFDIR         ;GO WRITE CURRENT DIR IF REQD
2ED5 20BE2E                     JSR    MVFDBA         ;GO MOVE DBUFF ADR TO IOB
2ED8 20762E                     JSR    MVFCBD         ;MOVE DBUFF ADR TO ZPG
2EDB 28                         PLP                   ;GET SAVED STATUS
2EDC B009                       BCS    RFDNXT         ;BR IF RD NEXT
                        ;
2EDE AE3C35                     LDX    DCBFDT         ;TRACK
2EE1 AC3D35                     LDY    DCBFDS         ;SECTOR
2EE4 4C282F                     JMP    RFDIO1         ;GO READ
                        ;
                        RFDNXT
2EE7 A001                       LDY    #FDLTRK        ;GET LINK TRACK
2EE9 B142                       LDA    (ZPGFCB),Y
2EEB F008                       BEQ    RFDNL          ;NR NO LINK
2EED AA                         TAX                   ;PUT TRACK INTO X
2EEE C8                         INY
2EEF B142                       LDA    (ZPGFCB),Y     ;SET LINK SECTOR
2EF1 A8                         TAY                   ;PUT SECTOR INTO Y
2EF2 4C282F                     JMP    RFDIO1         ;GO DO I/O
                        ;
                        RFDNL
2EF5 AD2635                     LDA    CCBREQ         ;THIS A WRITE
2EF8 C904                       CMP    #CRQWR
2EFA F002                       BEQ    RFDNL1         ;BR IF WRITE
2EFC 38                         SEC                   ;SET EOF
2EFD 60                         RTS                   ;RETURN
                        ;
                        RFDNL1
2EFE 20B731                     JSR    GETSEC         ;GET A SECTOR
2F01 A002                       LDY    #FDLSEC
2F03 9142                       STA    (ZPGFCB),Y     ;PUT IN LINK
2F05 48                         PHA                   ;SAVE SECTOR
2F06 88                         DEY
2F07 AD5C35                     LDA    DCBATK         ;GET TRACK
2F0A 9142                       STA    (ZPGFCB),Y     ;PUT IN LINK
2F0C 48                         PHA                   ;SAVE TRACK
2F0D 20AD2E                     JSR    WRFDGO         ;GO WRITE OLD DIR DEC
                        ;
2F10 20872E                     JSR    CLRSEC         ;CLEAN OUT DIR
2F13 A005                       LDY    #FDFRS         ;SET NEW DIR SEC 1ST REL
2F15 AD4935                     LDA    DCBDNF         ;FILE SECTOR
2F18 9142                       STA    (ZPGFCB),Y
2F1A C8                         INY
2F1B AD4A35                     LDA    DCBDNF+1
2F1E 9142                       STA    (ZPGFCB),Y
                        ;
2F20 68                         PLA                   ;GET SAVED TRACK
2F21 AA                         TAX                   ;INTO X
2F22 68                         PLA                   ;GET SAVED SECTOR
```

```
3069 2F23 A8                TAY                   ;INTO Y
3070 2F24 A902              LDA     #IBCWTS       ;SET WRITE CMD
3071 2F26 D002              BNE     RFDIO2        ;GO DO I/O
3072                ;
3073 2F28 A901      RFDIO1  LDA     #IBCRTS       ;SET READ CMD
3074 2F2A 8E3E35    RFDIO2  STX     DCBCDT        ;SET CURR TRACK
3075 2F2D 8C3F35            STY     DCBCDS        ;SET CURR SECTOR
3076 2F30 20C52F            JSR     DCBIO         ;GO I/O
3077                ;
3078 2F33 A005      RDFDC   LDY     #FDFRS        ;GET POINTER TO FIRST REL SECTOR
3079 2F35 B142              LDA     (ZPGFCB),Y    ;GET FRS
3080 2F37 8D4735            STA     DCBDFS        ;SET INTO DCB
3081 2F3A 18                CLC
3082 2F3B 6D4535            ADC     DCBDMS        ;ADD MAX SECTORS
3083 2F3E 8D4935            STA     DCBDNF        ;PUT INTO DCB
3084                ;
3085 2F41 C8                INY                   ;DO SAME FOR HI BYTE
3086 2F42 B142              LDA     (ZPGFCB),Y
3087 2F44 8D4835            STA     DCBDFS+1
3088 2F47 6D4635            ADC     DCBDMS+1
3089 2F4A 8D4A35            STA     DCBDNF+1
3090                ;
3091 2F4D 18                CLC
3092 2F4E 60                RTS                   ;DONE
3093
```

```
                       PAGE
               ;
               ;       RDSECT - READ A SECTOR
               ;
               RDSECT
2F4F 20572F            JSR     MVSBA           ;GO MOVE SECTOR BUFFER ADR
               ;
2F52 A901              LDA     #IBCRTS
2F54 4CC52F            JMP     DCBIO           ;GO DO I/O
               ;
               ;       MVSBA - MOVE SECTOR BUFFER ADR FOR I/O
               ;
               MVSBA
2F57 AC3635            LDY     CFCBSB          ;GET SECTOR BUFF ADR
2F5A AD3735            LDA     CFCBSB+1
2F5D 8CF037    MSB1    STY     IBBUFP          ;SET IOB SECTOR
2F60 8DF137            STA     IBBUFP+1        ;BUFF PTR
2F63 AE4135            LDX     DCBTRK          ;GET TRACK
2F66 AC4235            LDY     DCBSEC          ;GET SECTOR
2F69 60                RTS                     ;RTN
```

```
                                PAGE
  3114                  ;
  3115                  ;       RDVTOC - READ VTOC
  3116                  ;       WRVTOC - WRITE VTOC
  3117                  ;
  3118                  RDVTOC
  3119 2F6A A901                LDA     #IBCRTS         ;READ
  3120 2F6C D002                BNE     VTIO
  3121                  WRVTOC
  3122 2F6E A902                LDA     #IBCWTS         ;WRITE
  3123                  ;
  3124 2F70 AC3C2A      VTIO    LDY     AVTOC           ;MOVE BUFF ADR
  3125 2F73 8CF037              STY     IBBUFP
  3126 2F76 AC3D2A              LDY     AVTOC+1
  3127 2F79 8CF137              STY     IBBUFP+1
  3128                  ;
  3129 2F7C AE6535              LDX     DCBVTN          ;GET TRACK
  3130 2F7F A000                LDY     #0
  3131 2F81 4CC52F              JMP     DCBIO           ;GO DO I/O
  3132
```

```
                              PAGE
3133                   ;
3134                   ;      RDVDIR - READ VOLUME DIRECTOR
3135                   ;
3136                   RDVDIR
3137 2F84 08                  PHP                   ;SAVE STATUS
3138 2F85 20B82F              JSR     MVVDBA
3139                   ;
3140 2F88 28                  PLP                   ;GET STATUS
3141 2F89 B008                BCS     RVDA          ;BR IF RO NEXT
3142                   ;
3143 2F8B AC2833       RVDC   LDY     VDIRSC        ;GET 1ST SECTOR
3144 2F8E AE2733              LDX     VDIRTK        ;GET FIRST TRK
3145 2F91 D00A                BNE     RVDGO         ;GO READ
3146                   ;
3147                   RVDA
3148 2F93 AE2734              LDX     VDLTRK        ;GET LINK TRACK
3149 2F96 D002                BNE     RDVC          ;BR IF A LINK
3150 2F98 38                  SEC                   ; SET END OF DIR
3151 2F99 60                  RTS
3152                   ;
3153 2F9A AC2834       RDVC   LDY     VDLSEC        ;GET SECTOR
3154                   RVDGO
3155 2F9D 8E0633              STX     CVDTRK        ;SET CUR TRACK
3156 2FA0 8C0733              STY     CVDSEC        ;SET CUR SECTOR
3157 2FA3 A901                LDA     #IBCRTS       ;GET CMD
3158 2FA5 20C52F              JSR     DCBIO         ; GO DO I/O
3159 2FA8 18                  CLC
3160 2FA9 60                  RTS
3161
```

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                                PAGE
                        ;
                        ;       WRVDIR - WRITE VOLUME DIRECTORY SECTOR
                        ;
                        WRVDIR
     2FAA 20B82F                JSR     MVVDBA
                        ;
     2FAD AE0633                LDX     CVDTRK          ;CURRENT TRACK
     2FB0 AC0733                LDY     CVDSEC          ;CURRENT SECTOR
     2FB3 A902                  LDA     #IBCWTS         ;WRITE COMMAND
     2FB5 4CC52F                JMP     DCBIO           ;GO DO I/O
                        ;
                        ;       MVVDBA - MOVE VOL DIR BUF ADR TO IOB
                        ;
                        MVVDBA
     2FB8 AD3E2A                LDA     AVOLDR          ;MOVE ADR
     2FBB 8DF037                STA     IBBUFP
     2FBE AD3F2A                LDA     AVOLDR+1
     2FC1 8DF137                STA     IBBUFP+1
     2FC4 60                    RTS
```

```
                                 PAGE
                      ;
                      ;          DCBIO - DO I/O FOR A DCB
                      ;
                      DCBIO
2FC5 8EEC37                      STX      IBTRK          ;TRACK
2FC8 8CED37                      STY      IBSECT         ;SECTOR
                      DCBIO2
2FCB 8DF437                      STA      IBCMD          ;COMMAND
2FCE C902                        CMP      #IBCWTS
2FD0 D006                        BNE      DCBIO1
2FD2 0D4035                      ORA      DCBWRF
2FD5 8D4035                      STA      DCBWRF
                      DCBIO1
2FD8 AD6435                      LDA      DCBVOL         ;VOL
2FDB 49FF                        EOR      #$FF           ;UNINVERT VOL BITS
2FDD 8DEB37                      STA      IBVOL
2FE0 AD6235                      LDA      DCBSLT         ;SLOT
2FE3 8DE937                      STA      IBSLOT
2FE6 AD6335                      LDA      DCBDRV         ;DRIVE
2FE9 8DEA37                      STA      IBDRVN
2FEC AD4D35                      LDA      DCBSDL         ;LENGTH
2FEF 8DF237                      STA      IBDLEN
2FF2 AD4E35                      LDA      DCBSDL+1
2FF5 8DF337                      STA      IBDLEN+1
2FF8 A901                        LDA      #1             ;IOB TYPE
2FFA 8DE837                      STA      IBTYPE
                      ;
2FFD AC3A2A                      LDY      AIOB           ;IOB ADR
3000 AD3B2A                      LDA      AIOB+1
3003 20003D                      JSR      DISKIO         ;GO DO I/O
                      ;
3006 ADF637                      LDA      IBSMOD
3009 8D2A35                      STA      CCBVOL
300C A9FF                        LDA      #$FF           ;RESET VOL
300E 8DEB37                      STA      IBVOL
3011 B001                        BCS      BADIO          ;BR IF BAD
3013 60                          RTS                     ;RTN IF GOOD
                      ;
3014 ADF537           BADIO      LDA      IBSTAT         ; GET STATUS
3017 A007                        LDY      #CREVMM
3019 C920                        CMP      #IBVMME        ; WAS IT VOLUME MISMATCH
301B F008                        BEQ      BD2            ; BR IF YES
301D A004                        LDY      #CREPRO
301F C910                        CMP      #IBWPER
3021 F002                        BEQ      BD2
3023 A008                        LDY      #CREIOE
3025 98               BD2        TYA
3026 4CF832                      JMP      ERRORB         ;GO RTN
```

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                                PAGE
3231                    ;
3232                    ;       LOCNXB - LOCATE NEXT BYTE
3233                    ;
3234                    LOCNXB
3235 3029 AD4F35                LDA    DCBCRS          ;IS THE CURRENT RELATIVE SECTOR
3236 302C CD4B35                CMP    DCBCMS          ;EQUAL TO THE CURRENT MEM SECTOR
3237 302F D008                  BNE    LNB1            ;BR IF NOT EQ
3238 3031 AD5035                LDA    DCBCRS+1
3239 3034 CD4C35                CMP    DCBCMS+1
3240 3037 F066                  BEQ    LNB8            ;BR IF REQD SECTOR IN MEM
3241                    ;
3242                    LNB1                           ;NEED A DIFFERENT SECTOR IN MEM
3243 3039 20902E                JSR    WRSECT          ;GO WRITE SECTOR (IF REQD)
3244                    ;
3245 303C AD5035        LNB2    LDA    DCBCRS+1        ;IS CURRENT REL SECTORY
3246 303F CD4835                CMP    DCBDFS+1        ;IN CURRENT DIRECTORY (LOW LIMIT)
3247 3042 901C                  BCC    LNB4            ;BR IF IN A PREVIOUS DIR
3248 3044 D008                  BNE    LNB3            ;BR IF MAYBE IN THIS ONE
3249 3046 AD4F35                LDA    DCBCRS          ;TEST LOW BYTES
3250 3049 CD4735                CMP    DCBDFS
3251 304C 9012                  BCC    LNB4            ;BR IF IN PREVIOUS DIR
3252                    ;
3253 304E AD5035        LNB3    LDA    DCBCRS+1        ;IS CURRENT REL SECTOR
3254 3051 CD4A35                CMP    DCBDNF+1        ;IN CURRENT DIRECTOR (HI LIMIT)
3255 3054 9010                  BCC    LNB6            ;BR IF IN THIS ONE
3256 3056 D008                  BNE    LNB4            ;BR IF IN A NEXT DIR
3257 3058 AD4F35                LDA    DCBCRS
3258 305B CD4935                CMP    DCBDNF
3259 305E 9006                  BCC    LNB6            ;BR IF IN THIS ONE
3260                    ;                              ;REQD SECTOR IN A NEXT DIRECTORY
3261 3060 20D12E        LNB4    JSR    RDFDIR          ;GO READ NEXT FILE DIR
3262 3063 90D7                  BCC    LNB2            ;BR NXT AVAIL
3263 3065 60                    RTS                    ;RETURN IF EOF DIR
3264                    ;
3265                    ;
3266                    LNB6                           ;CALCULATE DISPL INTO DIR
3267 3066 38                    SEC
3268 3067 AD4F35                LDA    DCBCRS          ;REQD REL SECTOR MINUS
3269 306A ED4735                SBC    DCBDFS
3270 306D 0A                    ASLA                   ;TIMES 2
3271 306E 690C                  ADC    #FDENT          ;PLUS DISPL TO 1ST
3272 3070 A8                    TAY
3273 3071 20762E                JSR    MVFCBD          ;MOVE DIR ADR TO ZPG
3274 3074 B142                  LDA    (ZPGFCB),Y      ;GET TRACK
3275 3076 D00F                  BNE    LNB7            ;BR IF NOT ZERO
3276 3078 AD2635                LDA    CCBREQ
3277 307B C904                  CMP    #CRQWR          ;WRITE!
3278 307D F002                  BEQ    LNB7A
3279 307F 38                    SEC
3280 3080 60                    RTS
3281 3081 20A730        LNB7A   JSR    GNWSEC          ;GO GET A NEW SECTOR
3282 3084 4C9330                JMP    LNBCON
3283 3087 8D4135        LNB7    STA    DCBTRK          ;SET TRK INTO DCB
3284 308A C8                    INY
```

```
308B B142               LDA    (ZPGFCB),Y     ;GET SECTOR
308D 8D4235             STA    DCBSEC         ;PUT INTO DCB
3090 204F2F             JSR    RDSECT         ;GO READ SECTOR
3093 AD4F35     LNBCON  LDA    DCBCRS         ;MOVE CUR REL SECTOR
3096 8D4B35             STA    DCBCMS
3099 AD5035             LDA    DCBCRS+1       ;TO CUR MEM SECTOR
309C 8D4C35             STA    DCBCMS+1
                ;
                LNB8
309F 207A2E             JSR    MVFCBS         ;MOVE SECTOR BUFF ADR TO ZP
30A2 AC5135             LDY    DCBCSB         ;GET SECT BYTE
30A5 18                 CLC                   ;CARRY CLEAR = ALL OK
30A6 60                 RTS                   ;DONE
```

```
                           PAGE
                   ;
                   ;
                   GNWSEC                         ;NEED NEW SECTOR
30A7 8C0C33                STY     TEMP2          ;SAVE DIR INDEX
30AA 20B731                JSR     GETSEC         ;GET A SECTOR
30AD AC0C33                LDY     TEMP2
30B0 C8                    INY
30B1 9142                  STA     (ZPGFCB),Y     ;SET NEW SECTOR
30B3 8D4235                STA     DCBSEC
30B6 88                    DEY
30B7 AD5C35                LDA     DCBATK
30BA 9142                  STA     (ZPGFCB),Y     ;SET NEW TRACK
30BC 8D4135                STA     DCBTRK
                   ;
30BF 207A2E                JSR     MVFCBS
30C2 20872E                JSR     CLRSEC         ;GO CLEAR SECTOR
                   ;
                   ;
30C5 A9C0                  LDA     #$C0           ;INDICATE BOTH
30C7 0D4035                ORA     DCBWRF         ;DIR AND SECTOR
30CA 8D4035                STA     DCBWRF         ;MUST BE WRITTEN
30CD 60                    RTS                    ;DONE
```

```
              PAGE
         ;
         ;    INCRRB - INCREMENT RELATIVE RECORD BYTE
         ;
         INCRRB
30CE AE5535   LDX  DCBCRR        ;MOVE BYTE JUST READ OR WRITTEN
30D1 8E2835   STX  CCBRRN
30D4 AE5635   LDX  DCBCRR+1
30D7 8E2935   STX  CCBRRN+1
30DA AE5735   LDX  DCBCRB        ;X=REL BYTE (LOW)
30DD AC5835   LDY  DCBCRB+1      ;Y=REL BYTE HI
30E0 8E2A35   STX  CCBBYT
30E3 8C2B35   STY  CCBBYT+1
30E6 E8       INX                ;INC REL BYTE (LOW)
30E7 D001     BNE  INCR1         ;BR IF NO CARRY
30E9 C8       INY                ;INC REL BYTE (HI)
         ;
30EA CC5435 INCR1 CPY DCBRCL+1   ;REL BYTE=REC LENGTH
30ED D011     BNE  INCR2         ;BR IF NOT
30EF EC5335   CPX  DCBRCL        ;TEST LOW BYTES
30F2 D00C     BNE  INCR2
30F4 A200     LDX  #0
30F6 A000     LDY  #0            ;RESET REL BYTE TO ZERO
30F8 EE5535   INC  DCBCRR        ;AND INCR
30FB D003     BNE  INCR2         ;RELATIVE RECORD
30FD EE5635   INC  DCBCRR+1
         ;
3100 8E5735 INCR2 STX DCBCRB     ;SAVE NEW RELATIVE BYTE
3103 8C5835   STY  DCBCRB+1
         ;
3106 60       RTS
```

```
                             PAGE
                   ;
                   ;         INCSCB - INCREMENT SECTOR BYTE
                   ;
                   INCSCB
3107 EE5135                  INC      DCBCSB          ;INC SECTOR BYTE
310A D008                    BNE      INCS2           ;BR IF NOT FULL
310C EE4F35                  INC      DCBCRS          ;AND INCR
310F D003                    BNE      INCS2           ;RELATIVE SECTOR
3111 EE5035                  INC      DCBCRS+1
                   ;
                   ;
                   INCS2
3114 60                      RTS                      ;DONE
```

```
                          PAGE
                   ;
                   ;      MIBDA - MOVE AND INCREMENT CCBDAT
                   ;
                   MIBDA
3115 AC2E35               LDY     CCBBBA          ;Y=ADR LOW
3118 AE2F35               LDX     CCBBBA+1        ;X=ADR HI
311B 8442                 STY     ZPGFCB          ;PUT ADR INTO ZPG
311D 8643                 STX     ZPGFCB+1
                   ;
311F EE2E35               INC     CCBBBA          ;INC ADR LOW
3122 D003                 BNE     MIB1            ;BR IF NOT ZERO
3124 EE2F35               INC     CCBBBA+1        ;INC ADR HI
3127 60            MIB1   RTS                     ;DONE
                   ;
                   ;      DTBLN - DECREMENT BLOCK LENGTH AND TEST ZERO
                   ;
                   DTBLN
3128 AC2C35               LDY     CCBBLN          ;GET LEN LOW
312B D008                 BNE     DTB1            ;BR IF NOT ZERO
312D AE2D35               LDX     CCBBLN+1        ;GET LEN HI
3130 F007                 BEQ     DTB2            ;BR IF LEN=0
3132 CE2D35               DEC     CCBBLN+1        ;DEC LEN (HIGH)
3135 CE2C35        DTB1   DEC     CCBBLN          ;DEC LEN (LOW)
3138 60                   RTS                     ;DONE
                   ;
3139 4CF232        DTB2   JMP     GOODIO          ;FINISHED BLOCK
```

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                              PAGE
 3394                  ;
 3395                  ;      FNDFIL - FIND FILE NAME IN VOLUUME DIR
 3396                  ;
 3397                  FNDFIL
 3398 313C 206A2F             JSR    RDVTOC         ;GO GET VTOC
 3399 313F AD2E35             LDA    CCBFN1         ;MOVE FN PTR
 3400 3142 8542               STA    ZPGFCB         ;TO ZERO PAGE
 3401 3144 AD2F35             LDA    CCBFN1+1
 3402 3147 8543               STA    ZPGFCB+1
 3403 3149 A901               LDA    #1
 3404 314B 8D0C33     FF1     STA    TEMP2
 3405 314E A900               LDA    #0
 3406 3150 8D4335             STA    DCBVDR
 3407 3153 18                 CLC
 3408                  FF2
 3409 3154 EE4335             INC    DCBVDR
 3410 3157 20842F             JSR    RDVDIR         ;GO GET VDIR SECTOR
 3411 315A B051               BCS    FF4A
 3412 315C A200               LDX    #0             ;SET FOR 1ST FILE
 3413                  ;
 3414 315E 8E0B33     FF3     STX    TEMP1          ;SAVE INDEX
 3415 3161 BD3134             LDA    VDFILE,X       ;GET FILE TRK
 3416 3164 F01F               BEQ    FF6            ;BR IF LAST ENTRY
 3417 3166 3022               BMI    FF7            ;BR DELETED ENTRY
 3418 3168 A000               LDY    #0             ;X=X+3
 3419 316A E8                 INX
 3420 316B E8                 INX
 3421 316C E8         FF4     INX
 3422 316D B142               LDA    (ZPGFCB),Y     ;GET FN CHAR
 3423 316F DD3134             CMP    VDFILE,X       ;COMPARE TO ENTRY CHAR
 3424 3172 D00A               BNE    FF5            ;BR IF NOT SAME
 3425 3174 C8                 INY
 3426 3175 C01E               CPY    #30            ; ALL 30 CHARS
 3427 3177 D0F3               BNE    FF4            ;BR IF NOT
 3428 3179 AE0B33             LDX    TEMP1          ;GET INDEX
 3429 317C 18                 CLC                   ;FILE FOUND
 3430 317D 60                 RTS                   ;RETURN
 3431                  ;
 3432                  FF5
 3433 317E 20A331             JSR    VDINC
 3434 3181 90DB               BCC    FF3
 3435 3183 B0CF               BCS    FF2
 3436                  ;
 3437 3185 AC0C33     FF6     LDY    TEMP2          ;LOOKING FOR DELETED
 3438 3188 D0C1               BNE    FF1            ;BR IF NOT (DO)
 3439                  ;
 3440 318A AC0C33     FF7     LDY    TEMP2          ;LOOKING FOR EMPTY
 3441 318D D0EF               BNE    FF5            ;BR IF NOT
 3442                  ;
 3443                  MVFN
 3444 318F A000               LDY    #0             ;HAVE NEW ENTTRY
 3445 3191 E8                 INX
 3446 3192 E8                 INX
 3447 3193 E8         FF8     INX
```

```
3448 3194 B142              LDA    (ZPGFCB),Y      ;MOVE FILE NAME
3449 3196 9D3134            STA    VDFILE,X
3450 3199 C8                INY
3451 319A C01E              CPY    #30
3452 319C D0F5              BNE    FF8
3453               ;
3454 319E AE0B33            LDX    TEMP1           ;GET INDEX
3455 31A1 38                SEC                    ;SET NOT OLD
3456 31A2 60                RTS                    ;DONE
3457               VDINC
3458 31A3 18                CLC
3459 31A4 AD0B33            LDA    TEMP1
3460 31A7 6923              ADC    #35
3461 31A9 AA                TAX
3462 31AA E0F5              CPX    #VDFLEN
3463 31AC 60                RTS
3464               FF4A
3465 31AD A900              LDA    #0
3466 31AF AC0C33            LDY    TEMP2
3467 31B2 D097              BNE    FF1
3468 31B4 4CEA32            JMP    ERROR9
3469
```

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                         PAGE
               ;
               ;         GETSEC - GET A SECTOR
               ;
               GETSEC
31B7 AD5C35              LDA     DCBATK         ;GET ALLOCATED TRK
31BA F021                BEQ     GSS1           ;BR IF NONE
               ;
               GSO
31BC CE5B35              DEC     DCBALS         ;DECREMENT SECTOR NO
31BF 3017                BMI     CS2            ;BR IF NO SECTORS REM
               ;
31C1 18                  CLC
31C2 A204                LDX     #4             ;4 BYTE SHIFT
31C4 3E5C35    GS1       ROL     DCBABM-1,X     ;SHIFT BYTE LEFT
31C7 CA                  DEX
31C8 D0FA                BNE     GS1
31CA 90F0                BCC     GSO            ;BR IF NO SECTOR
               ;
31CC EE5935              INC     DCBNSA
31CF D003                BNE     GS1A
31D1 EE5A35              INC     DCBNSA+1
               GS1A
31D4 AD5B35              LDA     DCBALS         ;GET ALLOCATED SECTOR
31D7 60                  RTS                    ;RETURN
               ;
31D8 A900      CS2       LDA     #0             ;CLEAR ALLOCATED
31DA 8D5C35              STA     DCBATK         ;TRK
               ;
31DD A900      GSS1      LDA     #0             ;SET SEARCH STATE=0
31DF 8D0D33              STA     TEMP3
31E2 206A2F              JSR     RDVTOC         ;GET VTOC
               ;
               GS2
31E5 18                  CLC
31E6 AD5633              LDA     VALCA1         ;GET LAST ALLOCATTED TRK
31E9 6D5733              ADC     VALCA2         ;AD (+1) OR (-1)
31EC F009                BEQ     GS3            ;BR IF DECK TO ZERO
31EE CD5A33              CMP     VNOTRK
31F1 9014                BCC     GS5            ;BR IF NOT AT OUTER LIMIT
31F3 A9FF                LDA     #$FF           ;SET (-1)
31F5 D00A                BNE     GS4
31F7 AD0D33    GS3       LDA     TEMP3          ;GET SEARCH STATE
31FA D037                BNE     ERR9           ;BR IF NOT ZERO
31FC A901                LDA     #1             ;SET (+1)
31FE 8D0D33              STA     TEMP3          ;SET SEARCH STATE = 1
3201 8D5733    GS4       STA     VALCA2         ;SET NEW (+1) OR -1)
3204 18                  CLC
3205 6911                ADC     #17            ; ADD VTOC TRK NO
3207 8D5633    GS5       STA     VALCA1         ;SET NEW LAST ALLOCATED
320A 8D5C35              STA     DCBATK         ;PUT IN DCB
               ;
320D A8                  TAY                    ;ALLOCATED TRACK
320E 0A                  ASLA                   ;TIME 4
320F 0A                  ASLA
```

```
3524 3210 A8                 TAY
3525 3211 A204               LDX     #4
3526 3213 18                 CLC
3527 3214 B96133    GS6      LDA     VSECAL+3,Y       ;MOVE BIT MAP BYTE
3528 3217 9D5C35             STA     DCBABM-1,X
3529 321A F006               BEQ     GS7              ;BR IF NO BITS ON
3530 321C 38                 SEC                      ;SET HAVE A SECTOR
3531 321D A900               LDA     #0               ;CLEAR VTOC BYTE
3532 321F 996133             STA     VSECAL+3,Y
3533 3222 88        GS7      DEY
3534 3223 CA                 DEX
3535 3224 D0EE               BNE     GS6              ;BR IF MORE TO MOVE
3536 3226 90BD               BCC     GS2
3537 3228 206E2F             JSR     WRVTOC           ;GO WRITE VTOC
3538 322B AD5B33             LDA     VNOSEC           ;GET NO SECTORS
3539 322E 8D5B35             STA     DCBALS           ;SET IN DCB SECTOR BYTE
3540 3231 D089               BNE     GS0              ;GO ALLOCATED SECTOR
3541 3233 4CEA32    ERR9     JMP     ERROR9
3542
```

```
                                PAGE
 3543                   ;
 3544                   ;       FRETRK - FREE TRACK OF SECTORS
 3545                   ;
 3546                   FRETRK
 3547 3236 AD5C35               LDA     DCBATK          ;GET ALLOCATED TRACK
 3548 3239 D001                 BNE     FT1             ;BR IF NONE
 3549 323B 60                   RTS                     ;DONE
 3550 323C 48           FT1     PHA
 3551 323D 206A2F               JSR     RDVTOC          ;GET VTOC
 3552 3240 AC5B35               LDY     DCBALS          ;GET SECTOS
 3553 3243 68                   PLA                     ;GET TRACK
 3554 3244 18                   CLC                     ;SET FREE
 3555 3245 205032               JSR     FRESEC          ;GO FREE
 3556 3248 A900                 LDA     #0              ;CLEAR ALLOCATED TRK
 3557 324A 8D5C35               STA     DCBATK
 3558 324D 4C6E2F               JMP     WRVTOC          ;WRITE VTOC
 3559                   ;
 3560                   ;       FRESEC - FREE A SECTOR
 3561                   ;               A=TRK, Y=SECTOR, C=ON/OFF
 3562                   ;
 3563                   FRESEC
 3564 3250 A2FC         FS1     LDX     #252            ;4 BYTE SHIFT
 3565 3252 7E6134       FS2     ROR     DCBABM-252,X    ;SHIFT IN CARRY
 3566 3255 E8                   INX                     ;NEXT BYTE
 3567 3256 D0FA                 BNE     FS2             ;BR IF NOT DONE
 3568 3258 C8                   INY                     ;INC SECTOR NO
 3569 3259 CC5B33               CPY     VNOSEC          ;NORMAL
 3570 325C D0F2                 BNE     FS1             ;BR IF NOT
 3571                   ;
 3572 325E 0A                   ASLA                    ;TRACK*4
 3573 325F 0A                   ASLA
 3574 3260 A8                   TAY
 3575 3261 F00F                 BEQ     FS4
 3576 3263 A204                 LDX     #4
 3577 3265 BD5C35       FS3     LDA     DCBABM-1,X      ;GET BIT MAP BYTE
 3578 3268 196133               ORA     VSECAL+3,Y      ;OR WITH VTOC BM
 3579 326B 996133               STA     VSECAL+3,Y
 3580 326E 88                   DEY
 3581 326F CA                   DEX
 3582 3270 D0F3                 BNE     FS3
 3583 3272 60           FS4     RTS                     ;DONE
 3584
```

```
                                   PAGE
3585                          ;
3586                          ;    LOCSEC - LOCATE SECTOR FOR RECORD I/O
3587                          ;
3588                          ;    RELSEC = (REL REC * RECLEN + RELBYTE)/256
3589                          ;    SECBYT = REMAINDER
3590                          ;
3591                          LOCSEC
3592 3273 AD2835                   LDA    CCBRRN          ;RELATIVE RECORD NUMBER
3593 3276 8D5135                   STA    DCBCSB          ;TO CSB FOR MULT
3594 3279 8D5535                   STA    DCBCRR          ;AND CRR FOR SAVE
3595 327C AD2935                   LDA    CCBRRN+1
3596 327F 8D4F35                   STA    DCBCRS
3597 3282 8D5635                   STA    DCBCRR+1
3598 3285 A900                     LDA    #0
3599 3287 8D5035                   STA    DCBCRS+1        ;HIGH CRS=0
3600 328A A010                     LDY    #16             ;16 BIT MULT
3601                          ;
3602 328C AA                  LS1  TAX                    ;SAVE MS BYTE
3603 328D AD5135                   LDA    DCBCSB
3604 3290 4A                       LSRA   ;IF NO CARRY THEN NO PART PROD
3605 3291 B003                     BCS    LS1A
3606 3293 8A                       TXA
3607 3294 900E                     BCC    LS2
3608 3296 18                  LS1A CLC
3609 3297 AD5035                   LDA    DCBCRS+1        ;FPORM PARTIAL PROD
3610 329A 6D5335                   ADC    DCBRCL
3611 329D 8D5035                   STA    DCBCRS+1
3612 32A0 8A                       TXA
3613 32A1 6D5435                   ADC    DCBRCL+1
3614                          ;
3615 32A4 6A                  LS2  RORA                   ;MULT BY 2
3616 32A5 6E5035                   ROR    DCBCRS+1
3617 32A8 6E4F35                   ROR    DCBCRS
3618 32AB 6E5135                   ROR    DCBCSB
3619 32AE 88                       DEY    ;DEC BIT COUNT
3620 32AF D0DB                     BNE    LS1             ;BR IF MORE BITS
3621                          ;
3622 32B1 AD2A35                   LDA    CCBBYT          ;ADD REL BYTE RESULT
3623 32B4 8D5735                   STA    DCBCRB          ;(SAVE REL BYTE)
3624 32B7 6D5135                   ADC    DCBCSB
3625 32BA 8D5135                   STA    DCBCSB
3626 32BD AD2B35                   LDA    CCBBYT+1
3627 32C0 8D5835                   STA    DCBCRB+1        ;(SAVE REL BYTE)
3628 32C3 6D4F35                   ADC    DCBCRS
3629 32C6 8D4F35                   STA    DCBCRS
3630 32C9 A900                     LDA    #0
3631 32CB 6D5035                   ADC    DCBCRS+1
3632 32CE 8D5035                   STA    DCBCRS+1
3633 32D1 60                       RTS
3634
```

```
                                   PAGE
 3635 32D2 A901       ERROR1  LDA      #CREFUN
 3636 32D4 D022               BNE      ERRORA
 3637 32D6 A902       ERROR2  LDA      #CRERR
 3638 32D8 D01E               BNE      ERRORA
 3639 32DA A903       ERROR3  LDA      #CREMRE
 3640 32DC D01A               BNE      ERRORA
 3641 32DE A904       ERROR4  LDA      #CREPRO
 3642 32E0 D016               BNE      ERRORA
 3643 32E2 A905       ERROR5  LDA      #CREEOF
 3644 32E4 D012               BNE      ERRORA
 3645 32E6 A906       ERROR6  LDA      #CREFNF
 3646 32E8 D00E               BNE      ERRORA
 3647 32EA A909       ERROR9  LDA      #CRENSA
 3648 32EC D00A               BNE      ERRORA
 3649 32EE A90A       ERRR10  LDA      #CREFLK
 3650 32F0 D006               BNE      ERRORA
 3651 32F2 AD3035     GOODIO  LDA      CCBSTA
 3652 32F5 18                 CLC                      ; CARRY=CLR
 3653 32F6 9001               BCC      RETURN          ; GO RETURN
 3654                 ERRORA
 3655 32F8 38         ERRORB  SEC                      ; CARRY=SET
 3656                 RETURN
 3657 32F9 08                 PHP
 3658 32FA 8D3035             STA      CCBSTA          ; SET STA
 3659 32FD 20D42D             JSR      RTNFCB          ; GO RTN FCB
 3660 3300 28                 PLP                      ; GET STATUS
 3661 3301 AE0A33             LDX      ENTSTK          ; GET ENT STACK
 3662 3304 9A                 TXS                      ; RESTORE STACK
 3663 3305 60                 RTS                      ; DONE
 3664                 EC2
 3665
```

```
                                PAGE
3666                    ;
3667                    ;       MISC DOS WORK CELLS
3668                    ;
3669 3306 00            CVDTRK  DB      0               ;CUR VOL DIR TRK
3670 3307 00            CVDSEC  DB      0               ;CUR VOL DIR SECTOR
3671 3308 00            CURCCB  DB      0,0             ;CURRENT CCB ADR
     3309 00
3672 330A 00            ENTSTK  DB      0               ;ENTRY STACK POINTER
3673 330B 00            TEMP1   DB      0               ;TEMP BYTE1
3674 330C 00            TEMP2   DB      0               ;TEMP BYTE 2
3675 330D 00            TEMP3   DB      0               ;TEMP BYTE 3
3676 330E 00            ENTSLT  DB      0               ;BOOT SLOT SAVED
3677 330F 00            ALC10S  DB      0,0,$F8,$FF     ;ALLOCATATION TRACK BIT MAP
     3310 00
     3311 F8
     3312 FF
3678 3313 01            CVTAB   DB      1,10,100        ; CONVERSION TABLE
     3314 0A
     3315 64
3679 3316 D4            FTTAB   DB11    "TBAI"          ; FILE TYPE CONVERSION TABLE
     3317 C2
     3318 C1
     3319 C9
3680 331A A0            VOLMES  DB11    " EMULOV KSID"
     331B C5
     331C CD
     331D D5
     331E CC
     331F CF
     3320 D6
     3321 A0
     3322 CB
     3323 D3
     3324 C9
     3325 C4
3681      000B          VML     EQU     *-VOLMES-1
3682
```

```
                               PAGE
                    ;
                    ;          VTOC RECORD AREA
                    ;
                    VTOC
3326 02             VDOST      DB      2            ; DOS TYPE
3327 11             VDIRTK     DB      17           ;COLUME DIRECTORY SECTOR
3328 0C             VDIRSC     DB      12           ;VOLUME DIRECTORY SECTOR
3329 02             VDOSRN     DB      2            ; DOS RELEASE NUMBER
332A 00                        DB      0            ; SPARE
332B 00                        DB      0            ; SPARE
332C 00             VVOLNO     DB      0            ;VOLUME NUMBER
      332D                     RMB     32           ; SPARE
334D 7A             VTDMS      DB      122          ;MAX SECTORS IN A FILE DIR
      334E          VSPARE     RMB     8            ;SPARES
                    ;
3356 11             VALCA1     DB      17           ;ALOCATION ALGORITHM BYTE 1
3357 01             VALCA2     DB      1            ;AA BYTE2
3358 00             VALCA3     DB      0            ;AA BYTE3
3359 00             VALCA4     DB      0            ;AA BYTE4
335A 23             VNOTRK     DB      35           ;NO TRACKS ON VOL
335B 0D             VNOSEC     DB      13           ; NO SECTORS PER TRACK
335C 0001           VSECLN     DB      @@256        ;NO.  BYTES PER SECTOR
                    ;
      335E          VSECAL     EQU     *            ;SECTOR ALLOCATION AREA
                    ;                               SECTORS ALLOCATED BY BIT MAP
                    ;                               4 BYTES OF BITS PER TRACK
                    ;                               LEFT MOST BIT REPRESENTS SECTOR N
                    ;                               WHERE N=NO SECTORS PER TRACK
                    ;
                    ;

```

```
                                PAGE
 3714       335E                ORG     VTOC+256
 3715                   ;
 3716                   ;       VOLUME DIRECTORY AREA
 3717                   ;
 3718                   VOLDIR
 3719 3426 02           VDTCDE  DB      2               ; VOLUME DIRECTORY TYPE CODE
 3720       3427        VDLTRK  RMB     1               ;VD LINK TRACK
 3721       3428        VDLSEC  RMB     1               ;VD LINK SECTOR
 3722       3429        VDNF    RMB     1               ;VD NUMBER FILES THIS SECTOR
 3723       342A        VDSPAR  RMB     7               ;SPARES
 3724                   ;
 3725       3431        VDFILE  EQU     *               ;FILE ALLOCATION AREA  (7 FILES)
 3726                   ;                               EACH FILE:
 3727                   ;                                      FILE DIR TRK
 3728                   ;                                      FILE DIR SECTOR
 3729                   ;                                      FILE USE CODE
 3730                   ;                                 FILE NAME (30)
 3731                   ;                                FILE SECTOR COUNT (2)
 3732       3431                ORG     VOLDIR+256
 3733       3526        VDEND   EQU     *
 3734       0100        VDLEN   EQU     *-VOLDIR
 3735       00F5        VDFLEN  EQU     *-VDFILE
 3736                   ;
 3737
```

```
                   PAGE
             ;
             ;     COMMAND CONTROL BLOCK (CCB)
             ;
             CCB
      3526   CCBREQ  RMB     1              ;USER REQUEST BYTE
      0000   CRQNUL  EQU     0              ;0-NO REQUEST
      0001   CRQOPN  EQU     1              ;1-OPEN FILE
      0002   CRQCLS  EQU     2              ;2-CLOSE FILE
      0003   CRQRD   EQU     3              ;3-READ DATA
      0004   CRQWR   EQU     4              ;WRITE DATA
      0005   CRQDEL  EQU     5              ;5-DELETE FILE
      0006   CRQDIR  EQU     6              ;6-READ DIRECTORY
      0007   CRQLCK  EQU     7              ;7-LOCK FILE
      0008   CRQUNL  EQU     8              ;8-UNLOCK FILE
      0009   CRQRNM  EQU     9              ;9-RENAME
      000A   CRQPOS  EQU     10             ;10-POSITION FILE
      000B   CRQFMT  EQU     11             ;11-FORMAT
      000C   CRQVAR  EQU     12             ; 12 - VERIFY
      000D   CRQMAX  EQU     13
             ;
             CCBBSA                         ; FORMAT - BOOT START ADR PAGE
      3527   CCBRQM  RMB     1              ;RREQUEST MODIFIER BYTE
      0000   CRMNUL  EQU     0              ;NO MODIFIER
      0001   CRMNBT  EQU     1              ;R/W - 1 - NEXT BYTE
      0002   CRMNBL  EQU     2              ;R/W - 2 - NEXT BLOCK
      0003   CRMSBT  EQU     3              ;R/W - 3 - SPECIFC BYTE
      0004   CRMSBL  EQU     4              ;R/W - 4 - SPECIFIC BLOCK
      0005   CRMMAX  EQU     5
             ;
             CCBRRN                         ;I/O - RELATIVE RECORD NUMBER
             CCBFN2                         ;RENAME - FILE NAME 2 PTR
      3528   CCBRLN  RMB     2              ;OPEN - RECORD LENGTH
             ;
             CCBBYT                         ;I/O - RELATIVE BYTE NO (2 BYTES)
      352A   CCBVOL  RMB     1              ;OPEN - VOL NO.
      352B   CCBDRV  RMB     1              ;OPEN - DRIVE
             ;
             CCBBLN                         ;I/O - BLOCK LENGTH (2 BYTES)
      352C   CCBSLT  RMB     1              ;OPEN - SLOT NO
      352D   CCBFUC  RMB     1              ;OPEN - FILE USE CODE
             ;
             CCBFN1                         ;OPEN, DELETE, LOCK, UNLOCK, RENAME - FILENAME P
             CCBBBA                         ;BLOCKK I/O - BLOCK BUFFER PTR
      352E   CCBDAT  RMB     2              ;BYTE I/O - DATA BYTE
             ;
      3530   CCBSTA  RMB     1              ;RESULT STATUS
      0001   CREFUN  EQU     1              ;FCB UNALLOCATED
      0002   CRERR   EQU     2              ;CCB REQ RANGE ERR
      0003   CREMRE  EQU     3              ;REQ MOD RANGE ERR
      0004   CREPRO  EQU     4              ; WRITE PROTECT
      0005   CREEOF  EQU     5              ;END OF FILE ON READ
      0006   CREFNF  EQU     6              ;FILE NOT FOUND
      0007   CREVMM  EQU     7              ;VOL MIS MATCH
      0008   CREIOE  EQU     8              ;I/O ERR
```

```
 3792      0009      CRENSA  EQU     9               ;NO SECTORS AVAILABLE
 3793      000A      CREFLK  EQU     10              ;FILE LOCKED
 3794                ;
 3795      3531      CCBSM   RMB     1               ;STATUS MODIFIER
 3796      3532      CCBFCB  RMB     2               ;FCB PTR
 3797      3534      CCBDBP  RMB     2               ;DIR BUF PTR
 3798      3536      CCBSBP  RMB     2               ;SECTOR BUF PTR
 3799      3538      CCBSPR  RMB     4               ;SPARE
 3800      0016      CCBLEN  EQU     *-CCB           ;CCB LENGTH
 3801      3532      CFCBAD  EQU     CCBFCB
 3802      3534      CFCBDR  EQU     CCBDBP
 3803      3536      CFCBSB  EQU     CCBSBP
 3804
```

```
                      PAGE
              ;
              ;       FILE CONTROL BLOCK (FCB) DEFINITION
              ;               DCB - FILE DATA CONTROL BLOCK
              ;
              FCB
              ;
              ;       DATA CONTROL BLOCK
              ;
              FCBDCB
     353C     DCBFDT  RMB     1                 ;1ST FILE DIRECTORY TRACK
     353D     DCBFDS  RMB     1                 ;1ST FILE DIRECTORY SECTOR
     353E     DCBCDT  RMB     1                 ;CURRENT FILE DIRECTORY TRACK
     353F     DCBCDS  RMB     1                 ;CURRENT FILE DIRECTORY SECTOR
     3540     DCBWRF  RMB     1                 ;WRITE REQD FLAG
              ;                                 ;$80=WRITE FILE DIR
              ;                                 ;$40=WRITE SECTOR DIR
     3541     DCBTRK  RMB     1                 ;SECTOR TRACK ADR
     3542     DCBSEC  RMB     1                 ;SECTOR ADR
     3543     DCBVDR  RMB     1                 ; VOL DIR REC
     3544     DCBVDI  RMB     1                 ; VOL DIR INDEX
     3545     DCBDMS  RMB     2                 ;MAX NO DIRECTORY SECTORS
     3547     DCBDFS  RMB     2                 ;CURRENT DIR 1ST REL SECTOR
     3549     DCBDNF  RMB     2                 ;REL SECTOR OF NXT DIR
     354B     DCBCMS  RMB     2                 ;SECTOR CURRENTLY IN MEMORY
     354D     DCBSDL  RMB     2                 ;SECTOR DATA LENGTH
     354F     DCBCRS  RMB     2                 ;CURRENT RELATIVE SECTOR
     3551     DCBCSB  RMB     2                 ;CURRENT SECTOR BYTE
     3553     DCBRCL  RMB     2                 ;RECORD LENGTH
     3555     DCBCRR  RMB     2                 ;CURRENT RELATIVE REC
     3557     DCBCRB  RMB     2                 ;CURRENT RELATIVE BYTE
     3559     DCBNSA  RMB     2                 ; NO SECTORS ALLOCATED
              ;
     355B     DCBALS  RMB     1                 ;ALLOCATION SECTOR BYTE
     355C     DCBATK  RMB     1                 ;ALLOCATION TRACK
     355D     DCBABM  RMB     4                 ;ALLOCATION TRACK SECTOR BIT MAP
              ;
     3561     DCBFUC  RMB     1                 ;FILE USE CODE
     3562     DCBSLT  RMB     1                 ;SLOT NUMBER
     3563     DCBDRV  RMB     1                 ;DRIVE NUMBER
     3564     DCBVOL  RMB     1                 ;VOLUME DRIVER
     3565     DCBVTN  RMB     1                 ;VTOC TRACK NUMBER
              ;
     3566     DCBSPR  RMB     3                 ;SPARES
              ;
     002D     DCBLEN  EQU     *-FCBDCB          ;DCB LENGTH
     002D     FCBLEN  EQU     *-FCB             ;FCB LENGTH
```

```
                                  PAGE
 3852                     ;
 3853                     ;       DOS PATCH AREA 1
 3854                     SDP1
 3855       35FE          EDP1    EQU     ORG2-2
 3856
 3857                     ;
 3858                     ;       DOSLDR - DOS LOADER AND WRITTER
 3859                     ;
 3860       3569                  ORG     ORG2
 3861                     DOSLDR
 3862                     ;       GARBAGED BOOT REC 0 HERE
 3863       3600                  RMB     254
 3864 36FE 00             GRSPG   DB      0
 3865 36FF 00             GRPGC   DB      0
 3866
```

```
                          PAGE
                 SC3
                 ;
                 ; READ DOS AFTER BOOT
                 ;;
3700 8EE937               STX      IBSLOT          ;SET BOOT SLOT
3703 8EF737               STX      IBPSLT          ; SET PREVIOUS SLOT
3706 A901                 LDA      #1              ;SET PREV DRIVE
3708 8DF837               STA      IBPDRV
370B 8DEA37               STA      IBDRVN
                 ;
370E ADE037               LDA      NDPGS           ;COPY NO PAGES TO GET
3711 8DE137               STA      BRWCNT
3714 A900                 LDA      #0
3716 8DEC37               STA      IBTRK           ; SET TRACK 0
                 ;
3719 ADE237               LDA      BSDSEC          ;COPY START DOS SECTOR
371C 8DED37               STA      IBSECT
                 ;
371F ADE337               LDA      BGNDOS          ;COPY STARTR DOS ADR
3722 8DF137               STA      IBBUFP+1
                 ;
3725 A901                 LDA      #IBCRTS         ;SET READ
3727 8DF437               STA      IBCMD
                 ;
372A 8A                   TXA                      ;SET PREV TRACK = 0
372B 4A                   LSRA
372C 4A                   LSRA
372D 4A                   LSRA
372E 4A                   LSRA
372F AA                   TAX
3730 A900                 LDA      #0
3732 9DF804               STA      $4F8,X
3735 9D7804               STA      $478,X
3738 209337               JSR      BOOTIO          ; GO READ DOS
                 ;
                 ;        DOSINT - INITIALIZE DOS
                 ;
                 DOSINT
373B A2FF                 LDX      #$FF
373D 9A                   TXS
373E 8EEB37               STX      IBVOL
3741 2093FE               JSR      SETVID
3744 2089FE               JSR      SETKBD
                 ;
3747 4C031B      DI3      JMP      DOSREL          ; GO TO POST INIT ROUTINE

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                              PAGE
                    WBOOT
374A ADF137                   LDA     IBBUFP+1        ;GET START OF DOS
374D 8DE337                   STA     BGNDOS          ;SAVE IT
3750 38                       SEC
3751 ADE737                   LDA     ADOSLD+1        ;CALCULATE
3754 EDE337                   SBC     BGNDOS
3757 8DE037                   STA     NDPGS           ;NO DOS PAGES
                    ;
375A A900                     LDA     #0
375C 8DEC37                   STA     IBTRK           ;TRACK=0
375F 8DED37                   STA     IBSECT          ;SECTOR=0
3762 8DF037                   STA     IBBUFP
                    ;
3765 ADE737                   LDA     ADOSLD+1        ;GET BOOT START ADR
3768 8DF137                   STA     IBBUFP+1        ;TO BUFF
376B 8DFE36                   STA     GRSPG           ;TO GARBAGE RECORD
                    ;
376E A90A                     LDA     #10             ;NO OF BOOT PAGES
3770 8DE137                   STA     BRWCNT          ;TO BOOT I/O COUNTER
3773 8DE237                   STA     BSDSEC
3776 A948                     LDA     #$48
3778 8DFF36                   STA     GRPGC
                    ;
377B A902                     LDA     #IBCWTS         ;SET WRITE
377D 8DF437                   STA     IBCMD
                    ;
3780 209337                   JSR     BOOTIO          ;  GO WRITE BOOT SECTORS
                    ;
3783 ADE337                   LDA     BGNDOS          ;SET START OF DOS
3786 8DF137                   STA     IBBUFP+1
                    ;
3789 ADE037                   LDA     NDPGS
378C 8DE137                   STA     BRWCNT
378F 209337                   JSR     BOOTIO          ;GO WRITE DOS
                    ;
3792 60                       RTS                     ;DONE
```

```
                       PAGE
               BOOTIO
3793 ADE537            LDA    BAIOB+1
3796 ACE437            LDY    BAIOB
3799 20003D            JSR    DISKIO

379C ACED37            LDY    IBSECT          ;GET SECTOR
379F C8                INY                    ;INCREMENT TO NEXT
37A0 C00D              CPY    #13             ;AT END OF TRACK
37A2 D005              BNE    BIO1            ;BR IF NOT
37A4 A000              LDY    #0              ;SET TO SECTOR ZERO
37A6 EEEC37            INC    IBTRK
37A9 8CED37    BIO1    STY    IBSECT          ;SET NEXT SECTOR
               ;
37AC EEF137            INC    IBBUFP+1        ; INCREMENT BUFFER POINTER
37AF CEE137            DEC    BRWCNT          ;DECREMENT PAGE COUNTER
37B2 D0DF              BNE    BOOTIO          ;BR IF NOT  DONE
37B4 60                RTS
               ;

```

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                                PAGE
 3969                   ;
 3970                   ;       DOS PATCH AREA 1
 3971                   ;
 3972      37B5         DP1     EQU      *
 3973                           BOUND 256
 3974      3800                 ORG      *-$20
 3975                   EC3
 3976 37E0 00           NDPGS   DB       0
 3977 37E1 00           BRWCNT  DB       0
 3978 37E2 00           BSDSEC  DB       0
 3979 37E3 00           BGNDOS  DB       0
 3980 37E4 E837         BAIOB   DB       @@IOB
 3981 37E6 0036         ADOSLD  DB       @@DOSLDR
 3982
```

```
                                  PAGE
                        ;
                        ;         IOB -    INPUT / OUTPUT CONTROL BLOCK
                        ;                  THE IOB IS USED FOR THE INTERFACE
                        ;                  BETWEEN DOS AND THE DISK I/O ROUTINES
                        ;
                        IOB
 37E8 01                IBTYPE    DB       1                  ;IOB TYPE CODE
 37E9 07                IBSLOT    DB       7                  ;CONTROLLER SLOT NO.
 37EA 00                IBDRVN    DB       0                  ;DRIVE NUMBER
 37EB FF                IBVOL     DB       $FF                ;VOLUME NUMBER
 37EC 00                IBTRK     DB       0                  ;TRACK NUMBER
 37ED 00                IBSECT    DB       0                  ;SECTOR NUMBER
 37EE FB37              IBDCTP    DB       @@DCT
 37F0 0000              IBBUFP    DB       @@0                ;POINTER TO BUFFER
 37F2 0001              IBDLEN    DB       @@256              ;DATA LENGTH
 37F4 00                IBCMD     DB       0                  ;COMMAND
          0000          IBCNUL    EQU      0                  ;0-NULL COMMAND
          0001          IBCRTS    EQU      1                  ;1-READ TRACK, SECTOR
          0002          IBCWTS    EQU      2                  ;2-WRITE TRACK, SECTOR
          0004          IBFMT     EQU      4                  ;4-FORMAT DISK
          0008          IBBOOT    EQU      8                  ;8-WRITE BOOT
 37F5 00                IBSTAT    DB       0                  ;STATUS
          0080          IBRERR    EQU      $80                ;READ ERR
          0040          IBDERR    EQU      $40                ;DRIVE ERR
          0020          IBVMME    EQU      $20                ;VOLUME MISMATCH
          0010          IBWPER    EQU      $10                ;WRITE PROTECT ERROR
 37F6 00                IBSMOD    DB       0                  ;STATUS MODIFIER BYTE
 37F7 00                IBPSLT    DB       0                  ;PREVIOUS SLOT
 37F8 00                IBPDRV    DB       0                  ;PREVIOUS DRIVE
          37F9          IBSPAR    RMB      2                  ;IOB SPARES
 37FB 00                DCT       DB       0,1,$EF,$D8
 37FC 01
 37FD EF
 37FE D8
```

```
                          PAGE
                  ;
                  ;       FILE DIRECTORY DEFINITION
                  ;
37FF                      ORG     0
          FILDIR
0000      FDUCDE  RMB     1               ;FILE USE CODE
0001      FDLTRK  RMB     1               ;LINK TO NEXT DIR TRACK
0002      FDLSEC  RMB     1               ;LINT TO NEXT DIR SECTOR
0003      FDNSA   RMB     1               ;NO SECTORS ALLOCATED
0004      FDLSDL  RMB     1               ;LAST SECTOR DATA LENGTH
0005      FDFRS   RMB     2               ;1ST RELATIVE SECTOR IN THIS DIR
0007      FDSPAR  RMB     5               ;SPARES
          ;
000C      FDENT   RMB     1               ;START OF FILE ENTRIES (122)
0000      FDTRK   EQU     0               ;TRACK
0001      FDSEC   EQU     1               ;SECTOR
          ;
0100      FDLAST  EQU     FILDIR+256
```

```
                                      PAGE
 4034      0000                      .END
ASECT PTRS

TSECT PTRS

BSECT PTRS


SYMBOL MAP

A       0001  A       ADOSLD  37E6  A       ADRTAB  1C19  A       AEC1    3A8F  A       AEC2    3FFF  A
AEND    2A40  A*      AIOB    2A3A  A       AITSTL  E000  A       ALC1OS  330F  A       AP1     2247  A
AS1VT   1D6A  A       AS1VTL  000A  A       AS2VT   1D74  A       AS2VTL  000A  A       ASBRK1  D865  A
ASBRK2  1067  A       ASC1    3800  A       ASC2    3D00  A       ASEOP   00AF  A       ASEOP2  0069  A
ASHM1   0073  A       ASHM2   006F  A       ASIBSW  2A30  A       ASLMEM  0067  A*      ASRUN1  24B6  A
ASRUN2  24BC  A       ASSOP   0067  A       ASTART  1D0C  A       ATSTV   004C  A       AVOLDR  2A3E  A
AVTOC   2A3C  A       B       0002  A       BADIO   3014  A       BAIOB   37E4  A       BD2     3025  A
BEGIN   1B00  A       BFT1    2778  A       BFT2    27C0  A       BFTIB   27D9  A       BGNDOS  37E3  A
BIO1    37A9  A       BLDFTB  2767  A       BOOTIO  3793  A       BOOTSL  002E  A*      BREAK   1D5A  A
BRWCNT  37E1  A       BSDSEC  37E2  A       CA      29EC  A       CB      29EA  A*      CCB     3526  A
CCBADR  1D0E  A       CCBBBA  352E  A       CCBBLN  352C  A       CCBBSA  3527  A       CCBBYT  352A  A
CCBDAT  352E  A       CCBDBP  3534  A       CCBDRV  352B  A       CCBFCB  3532  A       CCBFN1  352E  A
CCBFN2  3528  A       CCBFUC  352D  A       CCBLDR  1E50  A*      CCBLEN  0016  A       CCBREQ  3526  A
CCBRLN  3528  A       CCBRQM  3527  A       CCBRRN  3528  A       CCBSBP  3536  A       CCBSLT  352C  A
CCBSM   3531  A*      CCBSPR  3538  A*      CCBSTA  3530  A       CCBVOL  352A  A       CCHAR   2A2C  A
CD      29E2  A       CDETAB  1C4A  A       CERTN   1F34  A       CF3     2DC8  A       CFCBAD  3532  A
CFCBDR  3534  A       CFCBSB  3536  A       CFTABA  29C9  A       CHAIN   1D56  A       CHINO   1E6B  A
CHIN1   1E73  A       CHIN2   1E7B  A       CHRIN   1E5E  A       CHROUT  1E8F  A       CINA    1D02  A
CIO     0080  A       CL      29E6  A       CLO     22C3  A       CL1     22C8  A       CL2     22D8  A
CLALL   22BE  A       CLC1    214D  A       CLCFCB  2DC0  A       CLOSE   22A4  A       CLRCCB  2149  A
CLRFNA  203C  A       CLRFNS  2038  A       CLRSEC  2E87  A       CLRSTS  26EE  A       CLX     22AE  A
CMDETB  1D1E  A       CMDGO   2115  A       CMDNO   29D9  A       CMDNTB  2817  A       CMDRTN  1F4B  A
CMDSTB  289C  A       CMDVT   2A42  A       CNF     1FB8  A       CNF1    1FC3  A       CNFTBS  29D1  A
CNUM    0044  A       CONT    1D5E  A       COS0    1EB7  A       COS01   1EC4  A       COS1    1ED6  A
COS1A   1ED9  A       COS2    1EE7  A       COS3    1EF3  A       COS3A   1F03  A       COS3B   1EFC  A
COS4    1F0E  A       COS4A   1F17  A       COS5    1F1D  A       COS6    1F2D  A       COUTA   1D04  A
CR      29E8  A       CREEOF  0005  A       CREFLK  000A  A       CREFNF  0006  A       CREFUN  0001  A
CREIOE  0008  A       CREMRE  0003  A       CRENSA  0009  A       CREPRO  0004  A       CRERR   0002  A
CREVMM  0007  A       CRMMAX  0005  A       CRMNBL  0002  A       CRMNBT  0001  A       CRMNUL  0000  A*
CRMSBL  0004  A*      CRMSBT  0003  A*      CRQCLS  0002  A       CRQDEL  0005  A       CRQDIR  0006  A
CRQFMT  000B  A       CRQLCK  0007  A       CRQMAX  000D  A       CRQNUL  0000  A*      CRQOPN  0001  A
CRQPOS  000A  A       CRQRD   0003  A       CRQRNM  0009  A       CRQUNL  0008  A       CRQVAR  000C  A
CRQWR   0004  A       CS      29E4  A       CS1     2E8A  A       CS2     31D8  A       CSERR   1FD0  A
CURCCB  3308  A*      CUROPT  29E0  A       CV      29E0  A       CVDSEC  3307  A       CVDTRK  3306  A
CVTAB   3313  A       D       0020  A       DBINIT  1D7E  A       DBRST   1DB9  A       DBVECT  1E44  A
DCBABM  355D  A       DCBALS  355B  A       DCBATK  355C  A       DCBCDS  353F  A       DCBCDT  353E  A
DCBCMS  354B  A       DCBCRB  3557  A       DCBCRR  3555  A       DCBCRS  354F  A       DCBCSB  3551  A
DCBDFS  3547  A       DCBDMS  3545  A       DCBDNF  3549  A       DCBDRV  3563  A       DCBFDS  353D  A
DCBFDT  353C  A       DCBFUC  3561  A       DCBIO   2FC5  A       DCBIO1  2FD8  A       DCBIO2  2FCB  A
DCBLEN  002D  A       DCBNSA  3559  A       DCBRCL  3553  A       DCBSDL  354D  A       DCBSEC  3542  A
DCBSLT  3562  A       DCBSPR  3566  A*      DCBSUP  2B30  A       DCBTRK  3541  A       DCBVDI  3544  A
DCBVDR  3543  A       DCBVOL  3564  A       DCBVTN  3565  A       DCBWRF  3540  A       DCT     37FB  A
DELTA   1C6C  A       DENRTS  2A8E  A*      DEPAGE  0040  A       DFNFTB  29D2  A*      DFNFTS  2A2B  A
DG1     263F  A       DG2     2649  A       DG3     2656  A       DI3     3747  A       DISKIO  3D00  A
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DLDSUP  2E5E  A     DOPEN   2A98  A     DOSENT  2A76  A     DOSGO   2639  A     DOSINT  373B  A*
DOSLDR  3600  A     DOSLNG  1C6B  A     DOSREL  1B03  A     DP1     37B5  A*    DPGCNT  1C6D  A
DR0     1B03  A*    DR1     1B13  A     DR10    1C02  A     DR11    1C16  A     DR1A    1B26  A
DR1B    1B0F  A     DR2     1B2B  A     DR3     1B58  A     DR4     1B65  A     DR5     1B73  A
DR6     1B79  A     DR7     1B93  A     DR8     1BA2  A     DR9     1BC1  A     DRTNI   1F53  A
DRTNO   1F4F  A     DSPAGE  001D  A     DTB1    3135  A     DTB2    3139  A     DTBLN   3128  A
EAPND   223C  A     EAS     252D  A     EAS0    2539  A*    EAS1    2540  A     EAS2    2549  A*
EASL1   23FD  A*    EAT1    1D56  A     EAT2    2A76  A     EBLD    2305  A     EBLD1   232D  A
EBLD2   230B  A*    EBLD3   2317  A     EBRUN   2339  A     EBSV    22D9  A     EBSV1   22E5  A
EC1     2817  A     EC2     3306  A     EC3     37E0  A     ECAT    2521  A     ECHAIN  24AA  A
ECL1    22A3  A     ECLOSE  2291  A     ECMD    2121  A     EDEL    2204  A     EDOS    4000  A
EDP1    35FE  A     EEXEC   256F  A     EFTABA  2A2E  A     EIBL    240C  A     EIBSV   236B  A
EIN     21CF  A     EINIT   2504  A     EINT    2551  A     ELD1    23D7  A     ELGO    2218  A
ELOAD   23C2  A     ELOCK   2212  A     EM1     000B  A     EM10    0054  A     EM11    005F  A
EM12    0069  A     EM13    007C  A     EM14    008D  A     EM15    009E  A     EM2     000B  A
EM3     000B  A     EM4     000E  A     EM5     001B  A     EM6     0026  A     EM7     0034  A
EM8     0043  A     EM9     004B  A     EMAXF   21F2  A     EMDTB   29B8  A     EML     00AD  A
EMON    21D4  A     EMPR    2695  A     EMPR1   2699  A     EMSG    2904  A     ENBF    2669  A
ENFA    265D  A     ENM1    21E6  A     ENOMON  21DE  A     ENTSLT  330E  A*    ENTSTK  330A  A
EO1     2263  A     EO3     226F  A     EO4     2272  A*    EO5     2279  A     EO6     227F  A*
EOFIN   2C0C  A     EOPEN   224F  A     EPOS    2589  A     EPR     21CA  A     ER10    2BC1  A
EREAD   24D0  A     EREN    2225  A     ERNAS   267A  A     ERNU1   2665  A     ERR2    2A8F  A
ERR3A   2BBE  A     ERR9    3233  A     ERROR   266B  A     ERROR1  32D2  A*    ERROR2  32D6  A
ERROR3  32DA  A     ERROR4  32DE  A*    ERROR5  32E2  A     ERROR6  32E6  A*    ERROR9  32EA  A
ERRORA  32F8  A     ERRORB  32F8  A     ERRR10  32EE  A     ERRTN   268A  A     ERUN    2493  A
ESAVE   234D  A     ESTATE  2A2D  A     ESYNTX  2659  A     EUNLK   2216  A     EVAR    2221  A
EWRITE  24C2  A     EX0     25A1  A     EX1     25B1  A     EX1A    25AE  A     EX2     25BC  A
EXP1    2597  A     EXP2    259A  A     FO1     2B33  A     FO1A    2B51  A*    FO2     2AAD  A
FO3     2AFA  A     FASB    2A31  A     FASBL   0009  A     FC1     2B70  A     FC2     2B8B  A
FCB     353C  A     FCBDCB  353C  A     FCBLEN  002D  A     FCLOSE  2B5A  A     FD2     2C85  A*
FD3     2C90  A     FD4     2CAB  A     FD5     2CB5  A     FD6     2CC7  A     FD7     2CDA  A
FDEL    2C82  A     FDENT   000C  A     FDFRS   0005  A     FDLAST  0100  A*    FDLSDL  0004  A*
FDLSEC  0002  A     FDLTRK  0001  A     FDNSA   0003  A*    FDS1    2CE8  A     FDSEC   0001  A*
FDSPAR  0007  A*    FDSUB   2CE0  A     FDTRK   0000  A*    FDUCDE  0000  A*    FF1     314B  A
FF2     3154  A     FF3     315E  A     FF4     316C  A     FF4A    31AD  A     FF5     317E  A
FF6     3185  A     FF7     318A  A     FF8     3193  A     FFMT    2DE4  A     FILDIR  0000  A
FILSRC  26F7  A     FLOCK   2C43  A     FLS1    2701  A     FLS1A   2706  A     FLS2    2715  A
FLS3    2717  A     FLS4    2723  A     FN1     0020  A     FN1ADR  1D06  A     FN2     0010  A
FN2ADR  1D08  A     FNAME1  29EF  A     FNAME2  2A0D  A     FNDFIL  313C  A     FNF     234A  A
FOPEN   2A92  A     FPOSTN  2C66  A     FREAD   2BAC  A     FRESEC  3250  A     FRETRK  3236  A
FRNME   2B8E  A     FS1     3250  A     FS2     3252  A     FS3     3265  A     FS4     3272  A
FT1     323C  A     FTAB    1D00  A     FTTAB   3316  A     FUNLCK  2C4A  A     FVAR    2C6C  A
FWRITE  2BC4  A     GETBYT  2BFC  A     GETIN   1E8C  A     GETKEY  FD0C  A     GETNUM  2154  A
GETSEC  31B7  A     GN2     2166  A     GN2A    2169  A     GN3     2171  A     GN4     2197  A
GN5     2199  A     GNBC    213F  A     GNWSEC  30A7  A     GNXTC   212E  A     GNXTCR  213E  A
GO      1D5C  A     GOINIT  2558  A     GOODIO  32F2  A     GRPGC   36FF  A     GRSPG   36FE  A
GS0     31BC  A     GS1     31C4  A     GS1A    31D4  A     GS2     31E5  A     GS3     31F7  A
GS4     3201  A     GS5     3207  A     GS6     3214  A     GS7     3222  A     GSS1    31DD  A
HEXNUM  21A0  A     HN0     21A1  A     HN1     21B7  A     HOME    FC58  A*    IAS1    1DA6  A
IAS1A   1DAD  A     IAS2A   1DEE  A     IAS2B   1DF9  A     IBASVT  1D56  A     IBBOOT  0008  A*
IBBRK   E3E3  A     IBBUFP  37F0  A     IBCHN   E836  A     IBCMD   37F4  A     IBCNUL  0000  A*
IBCONT  E003  A     IBCRTS  0001  A     IBCWTS  0002  A     IBDCTP  37EE  A     IBDERR  0040  A*
IBDLEN  37F2  A     IBDRVN  37EA  A     IBFMT   0004  A     IBGO    E000  A     IBHMEM  004C  A
IBLMEM  004A  A     IBPDRV  37F8  A     IBPSLT  37F7  A     IBRERR  0080  A*    IBRUN   249F  A
IBSECT  37ED  A     IBSLOT  37E9  A     IBSMOD  37F6  A     IBSOP   00CA  A     IBSOV   00CC  A
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IBSPAR   37F9  A*      IBSTAT   37F5  A       IBTRK    37EC  A       IBTYPE   37E8  A       IBVMME   0020  A
IBVOL    37EB  A       IBVT     1D60  A       IBVTL    000A  A       IBWPER   0010  A       ICFD     25D5  A
ICFD0    25F6  A       ICFD1    25F3  A       ICFD2    25E4  A*      ICFD3    25DC  A       ICFD4    25EE  A
ICFDB    260A  A       IFB      1E36  A       IFBL     0027  A       IIB1     1D9A  A       IMBITS   29EE  A
INCR1    30EA  A       INCR2    3100  A       INCRRB   30CE  A       INCS2    3114  A       INCSCB   3107  A
INER     251E  A       INIT2A   0000  U       INITA    1DCB  A       INITA1   1DC2  A       INITA2   1DC7  A*
INITA3   1DCA  A       INITAA   1DB6  A       INITB    1DE3  A       INITC    1DE6  A       INITD    1E02  A
INITE    1E1E  A       INITF    1E36  A       INITG    1E41  A       INITZ    1E19  A       INOPTS   29DF  A
INPRT    FE8B  A       INSDS2   F88E  A       INSW     0038  A       IOB      37E8  A       IOBLDR   1E57  A*
ISTATE   29CB  A       ITSTV    0020  A       KLUTZ    23CF  A       L        0008  A       LBUFD    29D7  A
LBUFF    0200  A       LCKGO    2C4F  A       LD1      2473  A       LD1A     2484  A       LD1B     2486  A
LD1C     2492  A       LD2      2430  A       LD3      2461  A       LDREGS   1F6C  A       LENGTH   002F  A
LNB1     3039  A       LNB2     303C  A       LNB3     304E  A       LNB4     3060  A       LNB6     3066  A
LNB7     3087  A       LNB7A    3081  A       LNB8     309F  A       LNBCON   3093  A       LOC1     0026  A
LOCNXB   3029  A       LOCSEC   3273  A       LS1      328C  A       LS1A     3296  A       LS2      32A4  A
MC       0040  A       MFERR    2661  A       MFULL    246D  A       MI       0020  A       MIB1     3127  A
MIBDA    3115  A       MO       0010  A       MODECK   1F55  A       MONMOD   29D8  A       MSB1     2F5D  A*
MULT     FB63  A*      MVBP1    26E3  A       MVBUFP   26E1  A       MVCSW    27E4  A       MVEFTA   262E  A
MVF1     2E7C  A       MVFCBD   2E76  A       MVFCBP   2E72  A       MVFCBS   2E7A  A       MVFDBA   2EBE  A
MVFN     318F  A       MVFN1    26D6  A       MVFN1A   26D8  A       MVOSW    27FD  A       MVSBA    2F57  A
MVSRTN   2816  A       MVVDBA   2FB8  A       NBPER    23BF  A       NDPGS    37E0  A       NEPAGE   1C6A  A
NOTRUN   2608  A       NPB      0080  A       NPE      0040  A       NSPAGE   1C69  A       NT1      2E02  A
NT2      2E0A  A       NT3      2E10  A       NT4      2E22  A       NT5      2E28  A       NT6      2E3B  A
NT7      2E3E  A       NT8      2E55  A       NUM1     0008  A       NUM2     0004  A       NXTEXC   2613  A
OCTD     25BD  A       OPEN     2251  A       OPNSUP   26AD  A       OPT1L    000A  A       OPTAB1   28D4  A
OPTAB2   28DE  A       OPTAB3   28E8  A       ORG1     1B00  A       ORG2     3600  A       ORTN     1F69  A
ORTN1    1F77  A       OSTATE   29CC  A       OUTPRT   FE95  A       OUTSVT   1D10  A       OUTSW    0036  A
PBO      2C32  A*      PRCIFR   1F84  A       PRCR     2D85  A       PRCR1    2D97  A       PRCRIF   1F7A  A
PRINT    FDED  A       PRN1     2D9A  A       PRN2     2D9D  A       PRN3     2DB6  A       PRNUM    2D98  A
PROMPT   0033  A       PRRTN    1F5A  A       PUTBYT   2C2E  A       R        0004  A       RBYTE    261D  A
RDO      2D07  A       RD1      2D21  A       RD2      2D28  A       RD2A     2D3B  A       RD2B     2D46  A
RD2C     2D4C  A       RD3      2D6E  A       RD3A     2D78  A*      RD4      2D7B  A       RD5      2D82  A
RDFDC    2F33  A*      RDFDIR   2ED1  A       RDIR     2CEF  A       RDSECT   2F4F  A       RDVC     2F9A  A
RDVDIR   2F84  A       RDVTOC   2F6A  A       REPAGE   1C68  A       RETURN   32F9  A       RF1      2DD9  A
RFDIO1   2F28  A       RFDIO2   2F2A  A       RFDNL    2EF5  A       RFDNL1   2EFE  A       RFDNXT   2EE7  A
RNXBLK   2BEA  A       RNXBYT   2BDE  A       RSPAGE   1C67  A       RSPBLK   2BE7  A       RSPBYT   2BDB  A
RTNFCB   2DD4  A       RUN      1D58  A       RVDA     2F93  A       RVDC     2F8B  A*      RVDGO    2F9D  A
RVT      2A5E  A       RWP1     24E6  A       RWP2     24E9  A       RWP2A    24F2  A       RWP3     24FB  A
RWPOSN   24DB  A       RWPR     2503  A       S        0010  A       SAT1     1D00  A       SAT2     2A3A  A
SCO      1F8E  A       SCOA     1F9D  A       SC1      1D7E  A       SC1A     1FAE  A       SC1X     1FA0  A
SC2      2A76  A       SC3      3700  A       SCNCMD   1F85  A       SDP1     3569  A       SERR1    2035  A
SERR2    2112  A       SETKBD   FE89  A       SETVID   FE93  A       SN1      203E  A       SN10     2045  A
SN11     206B  A       SN2      1FE6  A       SN2A     1FF3  A       SN3      1FF7  A       SN4      1FFC  A
SN5      2004  A       SN6      2009  A       SN7      201B  A       SN8      2022  A       SOPTS    206E  A
SP1      2082  A       SP2      20A6  A       SP3      20A8  A       SP4      20B2  A       SP5      20D9  A
SP6      20E9  A       SP7      20FB  A       SP8      20FE  A       START    1D00  A       SV1      2384  A
SV1A     2384  A*      SV2      238F  A       SV3      23AE  A       SVA      29D6  A       SVBL     29DA  A
SVBLA    1D0A  A       SVCMD    29DC  A       SVINS    29CF  A       SVOUTS   29CD  A       SVRB     1EAE  A
SVREGS   1EA3  A       SVRGSA   1EA6  A*      SVSTK    29D3  A*      SVX      29D4  A       SVY      29D5  A
SWTR     256E  A       SWTST    255B  A       SYNTAX   1FD3  A       TEMP1    330B  A       TEMP1A   29DD  A
TEMP2    330C  A       TEMP2A   29DE  A       TEMP3    330D  A       TFUCR    2766  A       TRO      2602  A
TR1      2604  A       TSINIT   2725  A       TSNXT    272D  A       TSR      273C  A       TSST     2737  A
TSTEXC   2742  A       TSTFNF   2342  A       TSTFUC   2757  A       TSTOPN   273D  A       TSTRUN   25F9  A
TXC1     2755  A       TXC2     2756  A       V        0040  A       VALCA1   3356  A       VALCA2   3357  A
```

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VDFILE  3431  A       VDFLEN  00F5  A       VDINC   31A3  A       VDIRSC  3328  A       VDIRTK  3327  A
VDLEN   0100  A*      VDLSEC  3428  A       VDLTRK  3427  A       VDNF    3429  A*      VDOSRN  3329  A*
VDOST   3326  A*      VDSPAR  342A  A*      VDTCDE  3426  A*      VML     000B  A       VNOSEC  335B  A
VNOTRK  335A  A       VOLDIR  3426  A       VOLMES  331A  A       VSECAL  335E  A       VSECLN  335C  A*
VSPARE  334E  A*      VTDMS   334D  A       VTIO    2F70  A       VTOC    3326  A       VVOLNO  332C  A
WBOOT   374A  A       WNXBLK  2C1E  A       WNXBYT  2C12  A       WRFDGO  2EAD  A       WRFDIR  2EA7  A
WRSECT  2E90  A       WRSGO   2E96  A       WRVDIR  2FAA  A       WRVTOC  2F6E  A       WSPBLK  2C1B  A
WSPBYT  2C0F  A       WVT     2A6A  A       ZPGFCB  0042  A       ZPGWRK  0040  A
   1 ERROR LINES   13
SOURCE CK. = 4D9E
 0 LOCAL REGIONS (63 MAX)
REMAINING TABLE SPACE = 15D5
IN RANGE FLAG COUNT=    0
DISC SOURCE FILE (HEX)= 0390-0436
```

```
A
Y
X
                                END OF EXCLUDES
                                END OF INCLUDES
!ABCDEFGHIJKLMNOPQRSTUVWXYZ
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Y YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
72                              LAST COLUMN CARD
0390


ADOSLD     201    3917    3926    3981*
ADRTAB      82      84     102     105     112     193*
AEC1        14*    212
AEC2        16*    213
AEND      2281*
AIOB       464     465    2278*   3209    3210
AITSTL     333*    355    1593    1596    1599
ALC10S    2884    3677*
AP1       1127    1129*   1131
AS1VT      197     197     295*    297     371
AS1VTL     297*    370
AS2VT      198     198     199     199     299*    301     411
AS2VTL     301*    410
ASBRK1     295     331*
ASBRK2     299     332*
ASC1        13*    212
ASC2        15*    213
ASEOP      326*   1288    1291    1382    1384
ASEOP2     327*   1383    1385
ASHM1      328*   1378    2029    2032
ASHM2      329*   2030    2033
ASIBSW     359     369     380     409    1282    1365    1568    1684    1767    2025    2270*
ASLMEM     330*
ASRUN1     295     295    1486*
ASRUN2     299     299    1488*
ASSOP      325*    330    1289    1292    1295    1296    1373    1376    1386    1387
ASTART      66     239*   1543
ATSTV      334*    386    1564
AVAIL"    2212
AVOLDR    2280*   3176    3178
AVTOC     2279*   3124    3126
B         1520    2131*   2148    2150    2175
BADIO     3217    3220*
BAIOB      201    3951    3952    3980*
BASIC     2214
BD2       3223    3226    3228*
BEGIN       20*     62     239
BFT1      1967*   2015
BFT2      2000    2017*
BFTIB     2026    2036*
BGNDOS    3885    3915    3918    3941    3979*
BINARY    2218
BIO1      3958    3961*
BLDFTB     424    1074    1958*
```

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BOOTIO    3900       3939       3946       3950*      3965
BOOTSL     336*
BREAK      288*      1781
BRWCNT    3878       3931       3945       3964       3977*
BSDSEC    3882       3932       3978*
BUFFS     2212
CA        1229       1230       1235       1236       1258       1259       1262       1263       1271       2262*
CB        2261*
CCB        240        948       3741*      3800
CCBADR     240*       460        461
CCBBBA    1336       1337       1414       1416       1434       1435       3371       3372       3376       3378       3780*
CCBBLN    1324       1326       1332       1418       1420       1427       1430       3384       3386       3388       3389       3775*
CCBBSA    1544       2931       3758*
CCBBYT    3332       3333       3622       3626       3771*
CCBDAT    1325       1333       1653       1717       1745       2535       2577       3781*
CCBDBP    3797*      3802
CCBDRV    1805       2429       3773*
CCBFCB    1833       3796*      3801
CCBFN1    1809       1811       3399       3401       3779*
CCBFN2    1113       1115       2480       2482       3768*
CCBFUC    1246       1317       1360       1364       1443       1927       2380       2399       3777*
CCBLDR     459*
CCBLEN     947       3800*
CCBREQ    1168       1197       1328       1422       1529       1655       1713       2326       3041       3276       3742*
CCBRLN    1150       1152       2352       2353       3769*
CCBRQM    1330       1339       1424       1657       1715       2494       2514       3759*
CCBRRN    1524       3327       3329       3592       3595       3767*
CCBSBP    3798*      3803
CCBSLT    1807       2431       3776*
CCBSM     3795*
CCBSPR    3799*
CCBSTA    1126       1273       1351       1741       2391       2836       3651       3658       3783*
CCBVOL    1556       1803       2426       3214       3772*
CCHAR      539        599        623        679        702       2267*
CD         354       1804       2257*
CDETAB     121        123        150        153        160        206*
CERTN      621*       912       1499       1507
CF3       2837*      2841
CFCBAD    2950       2952       3801*
CFCBDR    3007       3009       3802*
CFCBSB    3106       3107       3803*
CFTABA    1609       1611       1813       1815       2233*
CHAIN      286*      1477       1485
CHAR      1870
CHINO      476        478*
CHIN1      475        482*
CHIN2      484        486*
CHRIN      234        472*
CHROUT     235        498*
CINA       234*      2050       2056       2058
CIO        894       2133*      2156       2157       2175       2175       2175
CL         822        823       1142       1144       1147       1149       1151       1232       1233       2259*
CLO       1205*      1210       1212
CL1       1204       1208*
CL2       1207       1215*
CLALL     1071       1177       1202*      1214       1348
CLC1       948*       950
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CLCFCB      2325     2832*
CLOSE       1180     1186*    1213     1671     1696
CLRCCB       910      945*
CLRFNA       779*    1572
CLRFNS       726      776*
CLRSEC ·    2386     2958*    3058     3314
CLRSTS       433      709      909     1697     1766     1841*
CLX         1188     1191*
CMDETB       251*     916      918
CMDGO        451      839      908*
CMDNO        439      450      671      675      718      720      750      767      801      832      914     1445     2249*
CMDNTB       687      698     2083*
CMDRTN       554      624      631*     710
CMDSTB       724      752      769      789      803      834      835     2138*
CMDVT       2283*    2331     2333
CNF          700*     735      774      903     1225     1549
CNF1         703      705*
CNFTBS       423     1073     1964     2238*
CNUM         312*     866      868      871      875      886      888      958      959      970      971      981      984      989      990
             992      993     1000     1001     1025     1026     1033     1039     1069     1156     1161     1852     1863     1865     2728
            2730     2767     2769     2806     2811     2812     2814
CONT         290*     403
COSO         243      529*     600
COSO1        531      536*
COS1         244      548*
COS1A        550*     584
COS2         245      540      560*
COS3         246      570*
COS3A        574      579*
COS3B        575*     582
COS4         247      588*     605
COS4A        590      593*     602
COS5         248      598*
COS6         249      533      535      609*
COUTA        235*    2066     2072     2074
CR          1523     1632     1634     1636     1637     2260*
CREEOF      1676     1742     3643     3788*
CREFLK      1754     1756     1758     1760     1762     1776     3649     3793*
CREFNF      1125     1272     1350     1355     2390     3645     3789*
CREFUN      3635     3784*
CREIOE      3227     3791*
CREMRE      3639     3786*
CRENSA      3647     3792*
CREPRO      3224     3641     3787*
CRERR       3637     3785*
CREVMM      3221     3790*
CRMMAX      2495     2515     3765*
CRMNBL      1338     1423     3762*
CRMNBT      1329     1656     1714     3761*
CRMNUL      3760*
CRMSBL      3764*
CRMSBT      3763*
CRQCLS      1196     3745*
CRQDEL      1079     3748*
CRQDIR      1554     3749*
CRQFMT      1545     3754*
CRQLCK      1090     3750*
```

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CRQMAX     2327   3756*
CRQNUL     3743*
CRQOPN     1139   3744*
CRQPOS     1528   3753*
CRQRD      1421   1712   3746*
CRQRNM     1116   3752*
CRQUNL     1096   3751*
CRQVAR     1105   3755*
CRQWR      1327   1654   3042   3277   3747*
CS          352   1806   2258*
CS1        2961*  2963
CS2        3479   3495*
CSERR       708    712*
CURCCB     3671*
CUROPT      887    889   2255*
CV         1541   1557   1802   2256*
CVDSEC     3156   3169   3670*
CVDTRK     3155   3168   3669*
CVTAB      2807   2810   3678*
D          2127*  2139   2140   2141   2142   2143   2144   2145   2146   2149   2152   2153   2154   2155   2161
           2163   2164   2165   2166   2175
DATA"      2198
DBINIT       20     68     70    300    346*   456   1591
DBRST       379*   455
DBVECT      187    435    455*
DCBABM     3483   3528   3565   3577   3839*
DCBALS     2705   3478   3492   3539   3552   3837*
DCBATK     2375   3053   3309   3474   3496   3519   3547   3557   3838*
DCBCDS     2373   2692   3012   3075   3817*
DCBCDT     2378   2691   3011   3074   3816*
DCBCMS     2408   2409   3236   3239   3289   3291   3828*
DCBCRB     3330   3331   3348   3349   3623   3627   3834*
DCBCRR     3326   3328   3344   3346   3594   3597   3833*
DCBCRS     2645   2647   3235   3238   3245   3249   3253   3257   3268   3288   3290   3359   3361   3596   3599
           3609   3611   3616   3617   3628   3629   3631   3632   3830*
DCBCSB     3295   3357   3593   3603   3618   3624   3625   3831*
DCBDFS     3080   3087   3246   3250   3269   3826*
DCBDMS     2411   3082   3088   3825*
DCBDNF     3060   3063   3083   3089   3254   3258   3827*
DCBDRV     2430   3200   3843*
DCBFDS     2372   2397   2670   3027   3815*
DCBFDT     2377   2395   2665   3026   3814*
DCBFUC     2400   2478   2512   3841*
DCBIO      2978   2997   3076   3101   3131   3158   3171   3185*
DCBIO1     3191   3194*
DCBIO2     2865   2914   3188*
DCBLEN     2423   3849*
DCBNSA     2402   2404   2463   2465   3488   3490   3835*
DCBRCL     2358   2359   3338   3340   3610   3613   3832*
DCBSDL     2351   3202   3204   3829*
DCBSEC     3111   3286   3307   3822*
DCBSLT     2438   3198   3842*
DCBSPR     3847*
DCBSUP     2347   2418*  2714   2863
DCBTRK     3110   3283   3311   3821*
DCBVDI     2405   2462   3824*
DCBVDR     2460   3406   3409   3823*
```

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DCBVOL     2428    2716    2866    2935    3195    3844*
DCBVTN     2440    3129    3845*
DCBWRF     2451    2605    2606    2970    2981    2982    2989    3000    3001    3192    3193    3318    3319    3818*
DCT        3995    4013*
DELTA        63      91     138     224*
DENRTS     2335*
DEPAGE      167     189*    217     222     225
DFNFTB     2239*
DFNFTS      422    2266*
DG1        1731    1734*
DG2        1736    1740*
DG3        1743    1747*
DI3          69      71    3911*
DISK       2190
DISKIO       12*    458    3211    3953
DLDSUP     2923    2930*
DOPEN      2342    2345*   2477    2625    2642    2655
DOS        2281
DOSENT      457    1730    2322*
DOSGO      1169    1198    1331    1334    1340    1425    1436    1530    1658    1716    1729*
DOSINT     3904*
DOSLDR     3861*   3981
DOSLNG       58     222*
DOSREL       22*   3911
DP1        3972*
DPGCNT      181     225*
DRO          26*
DR1          36*     49
DR10        177*    180     185
DR11        182     187*
DR1A         43      47*
DR1B         33*     45
DR2          46      51*
DR3          81*    113
DR4          88*    103     106
DR5          86      94      96*
DR6          97     100*
DR7         119*    161
DR8         126*    151     154
DR9         132     135     137     141*
DRTNI       578     611     635*
DRTNO       594     633*
DSPAGE      190*    216     222     225
DTB1       3385    3389*
DTB2       3387    3392*
DTBLN      2545    2593    3383*
EAPND       266    1123*
EAS         274    1457    1563*   1589
EAS0       1570*
EAS1       1574*   1577
EAS2       1579*
EASL1      1381*
EAT1        194     280*
EAT2        200    2313*
EBLD        277    1241*   1269
EBLD1      1257    1260*
EBLD2      1244*
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EBLD3     1248    1250*
EBRUN      278    1268*
EBSV       276    1220*
EBSV1     1224    1226*
EC1        208    2082*
EC2        209    3664*
EC3        210    3975*
ECAT       268    1553*
ECHAIN     256    1481*
ECL1      1179    1182*
ECLOSE     260    1100    1119    1154    1174*   1181    1341    1437    1440    1931
ECMD       911     913*
EDEL       257    1078*   1354
EDOS        17*    189    2281
EDP1       211    3855*
EEXEC      262    1606*
EFTABA    1610    1612    1720    1722    1914    1917    2269*
EIBL      1366    1390*
EIBSV     1283    1299*
EIN        272    1038*
EINIT      252    1537*
EINT       275    1449    1586*
ELD1      1352    1358*
ELGO      1091    1097*   1106
ELOAD      253    1347*   1465    1482
ELOCK      258    1089*
EM1       2191*   2224
EM10      2207*   2226
EM11      2209*   2226
EM12      2211*   2226
EM13      2213*   2226
EM14      2215*   2226
EM15      2217*   2227
EM2       2192*   2224
EM3       2193*   2224
EM4       2195*   2224
EM5       2197*   2225
EM6       2199*   2225
EM7       2201*   2225
EM8       2203*   2225
EM9       2205*   2225
EMAXF      273    1066*
EMDTB     1784    2223*
EML       2220*   2228
EMON       269    1044*
EMPR      1773    1775    1777    1783*
EMPR1     1786*   1795
EMSG      1788    2188*   2191    2192    2193    2195    2197    2199    2201    2203    2205    2207    2209    2211
          2215    2217    2220
EMULOV    3680
ENBF      1249    1762*
ENFA      1158    1756*
ENM1      1054    1056*
ENOMON     270    1052*
ENTSLT    3676*
ENTSTK    2324    3661    3672*
EO1       1143    1145    1148*
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E03       1118      1153*
E04       1155*
E05       1157      1159*
E06       1163*
EOFIN     2558      2566*
EOPEN      265      1124      1138*     1242      1319      1349      1514      1607      1623
EPOS       264      1620*
EPR        271      1032*
ER10      2479      2507*     2513
EREAD      261      1503*
EREN       267      1111*
ERNAS     1768      1771*
ERNU1     1343      1760*     1932
ERR2      2328      2336*
ERR3A     2496      2506*     2516
ERR9      3512      3541*
ERROR     1356      1677      1748      1755      1757      1759      1761      1764*
ERROR"    2221
ERROR1    3635*
ERROR2    2336      3637*
ERROR3    2506      3639*
ERROR4    3641*
ERROR5    2566      3643*
ERROR6    3645*
ERROR9    3468      3541      3647*
ERRORA    3636      3638      3640      3642      3644      3646      3648      3650      3654*
ERRORB    3229      3655*
ERRR10    2507      2660      3649*
ERRTN     1770      1778*
ERUN       255       444      1464*     1582
ESAVE      254      1281*     1547
ESTATE     425       483       576      1068      1190      1614      1912      2268*
ESYNTX     712      1754*
EUNLK      259      1095*
EVAR       279      1104*
EWRITE     263      1494*
EX0       1632*     1642
EX1       1638*     1641
EX1A      1633      1637*
EX2       1630      1635      1644*
EXP1      1622      1626*
EXP2      1615      1625      1627*
F01       2421*     2424
F01A      2437*
F02       2354      2356      2358*
F03       2362      2393*
FASB      1574      2271*     2272
FASBL     1573      2272*
FC1       2457*     2461
FC2       2452      2470*
FCB       2838      2852      3809*     3850
FCBDCB    2421      3813*     3849
FCBLEN    1973      2840      2855      3850*
FCLOSE    2285      2446*
FD2       2657*
FD3       2659      2662*
FD4       2673*     2695
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FD5       2677*   2690
FD6       2679    2680    2687*
FD7       2674    2696*
FDEL      2288    2654*
FDENT     2676    3271    4028*
FDFRS     3059    3078    4025*
FDLAST    4032*
FDLSDL    4024*
FDLSEC    3049    4022*
FDLTRK    3031    4021*
FDNSA     4023*
FDS1      2705*   2707
FDSEC     4030*
FDSPAR    4026*
FDSUB     2686    2693    2700*
FDTRK     4029*
FDUCDE    4020*
FEND      2281
FF1       3404*   3438    3467
FF2       3408*   3435
FF3       3414*   3434
FF4       3421*   3427
FF4A      3411    3464*
FF5       3424    3432*   3441
FF6       3416    3437*
FF7       3417    3440*
FF8       3447*   3452
FFMT      2294    2862*
FILDIR    4019*   4032
FILE      2212
FILE"     2218
FILSRC    1081    1178    1512    1621    1735    1850*
FLOCK     2290    2614*
FLS1      1856*   1866    1871
FLS1A     1855    1859*
FLS2      1860    1868*
FLS3      1869*   1873
FLS4      1857    1877*
FN1        723    2119*   2139    2140    2141    2142    2143    2144    2145    2146    2147    2148    2149    2150
          2152    2153    2154    2163    2164    2165    2166
FN1ADR     236*   1808    1810
FN2        751    2120*   2154
FN2ADR     237*   1112    1114
FNAME1     236     417     441     740     763     781     787    1175    1453    1575    1613    1822    1870    2264
FNAME2     237     416     759    1454    2265*
FNDFIL    2361    3397*
FNF       1274    1276*
FOPEN     2284    2341*
FOUND"    2200
FPOSTN    2293    2635*
FREAD     2286    2492*
FRESEC    2702    3555    3563*
FRETRK    2449    3546*
FRNME     2292    2476*
FS1       3564*   3570
FS2       3565*   3567
FS3       3577*   3582
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FS4         3575     3583*
FT1         3548     3550*
FTAB         233*    1885     1886     1960     1962
FTTAB       2761     3679*
FULL"       2206
FUNLCK      2291     2620*
FVAR        2295     2641*
FWRITE      2287     2511*
GETBYT      2534     2546     2556*
GETIN        490      494*
GETKEY       340*    2796
GETNUM       792      858      956*
GETSEC      2369     3048     3303     3473*
GN2          967*     994
GN2A         965      968*    1010
GN3          969      975*
GN4          977      979      996*    1002     1014     1018     1020
GN5          980      986      987      999*    1021     1022     1023     1024
GNBC         685      730      827      936*     940      960      967     1009
GNWSEC      3281     3301*
GNXTC        738      744      924*     937
GNXTCR       928      932*     938
GO           289*     404
GOINIT      1566     1590*
GOODIO      2283     2296     2299     2304     2307     2312     2343     2471     2487     2536     2579     2632     2636
            2789     2925     3392     3651*
GRPGC       3865*    3934
GRSPG       3864*    3928
GS0         3477*    3486     3540
GS1         3483*    3485
GS1A        3489     3491*
GS2         3502*    3536
GS3         3506     3511*
GS4         3510     3515*
GS5         3508     3518*
GS6         3527*    3535
GS7         3529     3533*
GSS1        3475     3498*
HEXNUM       963     1006*
HN0         1008*    1027
HN1         1016     1021*
HOME         338*
I           2204
IAS1         357      367*
IAS1A        371*     374
IAS2A        411*     414
IAS2B        416*     419
IBASVT       285*     362      372      412
IBBOOT      4003*
IBBRK        288      291      321*
IBBUFP      2932     2934     3008     3010     3108     3109     3125     3127     3177     3179     3886     3914     3924     392
            3963     3996*
IBCHN        286      291      317*
IBCMD       3189     3889     3937     3998*
IBCNUL      3999*
IBCONT       290      292      323*
IBCRTS      3073     3100     3119     3157     3888     4000*
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IBCWTS    2450    2913    2977    2996    3070    3122    3170    3190    3936    4001*
IBDCTP     202     202    3995*
IBDERR    4006*
IBDLEN    3203    3205    3997*
IBDRVN     353    3201    3875    3991*
IBFMT     2864    4002*
IBGO       289     292     296     322*
IBHMEM     319*   1304    1307    1397    1400    2038    2041
IBLMEM     318*   1405    1473    1475
IBPDRV    3874    4011*
IBPSLT    3872    4010*
IBRERR    4005*
IBRUN      287     291    1472*
IBSECT    2912    3187    3883    3923    3955    3961    3994*
IBSLOT     347    3199    3871    3990*
IBSMOD    2729    3213    4009*
IBSOP      320*   1305    1308    1311    1312    1408    1409    2039    2042
IBSOV      324*   1474    1476
IBSPAR    4012*
IBSTAT    3220    4004*
IBTRK     2908    3186    3880    3922    3960    3993*
IBTYPE    3207    3989*
IBVMME    3222    4007*
IBVOL     2937    3197    3216    3907    3992*
IBVT       196     196     291*    293     361
IBVTL      293*    360
IBWPER    3225    4008*
ICFD       481    1662*
ICFD0     1674    1680*
ICFD1     1669    1678*
ICFD2     1670*
ICFD3     1666*   1707
ICFD4     1639    1675*
ICFDB     1651    1664    1695*
IFB        446*    467
IFBL       434     467*
IIB1       361*    364
IMBITS     821     899     900    1046    1053    1058    2263*
INCR1     3335    3338*
INCR2     3339    3341    3345    3348*
INCRRB    2561    2608    3325*
INCS2     3358    3360    3364*
INCSCB    2562    2609    3356*
INER      1540    1542    1549*
INIT2A     383
INITA      378     391*
INITA1     381     384*
INITA2     387*
INITA3     385     388*
INITAA     365     376*
INITB      402     404*
INITC      406*    477
INITD      408     421*
INITE      435*    438
INITF      440     443     447*
INITG      449     452*
INITZ      426     432*
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INOPTS     820     833     853     854     895     896    1222    1255    1519    1539    1628    2254*
INPRT      315*   1040
INSDS2     128     191*
INSW       310*    494    2049    2053    2057    2059
IOB       2278    3980    3988*
IOBLDR '   463*
ISTATE     401     474     530    1506    1581    1843    2234*
ITSTV      335*    356     382    1587
KLUTZ     1276    1354*
KSID"     3680
L         1221    1223    2129*   2152    2153    2163    2175
LARGE"    2216
LBUFD      544     549     552     682     824     841     925     930    2244*
LBUFF      313*    550     622     626     628     678     701     706     926
LCKGO     2616    2623*
LD1       1368    1392    1442*
LD1A      1448    1451*
LD1B      1453*   1456
LD1C      1444    1459*
LD2       1253    1261    1370    1394    1412*
LD3       1264    1388    1410    1433*
LDREGS     489     640     648*
LENGTH     130     142     192*
LNB1      3237    3242*
LNB2      3245*   3262
LNB3      3248    3253*
LNB4      3247    3251    3256    3261*
LNB6      3255    3259    3266*
LNB7      3275    3283*
LNB7A     3278    3281*
LNB8      3240    3293*
LNBCON    3282    3288*
LOC1        27*     35      37      38      42
LOCKED    2208
LOCNXB    2557    2600    2643    3234*
LOCSEC    2530    2540    2572    2584    2635    3591*
LS1       3602*   3620
LS1A      3605    3608*
LS2       3607    3615*
MC         394     631    2175    2246*
MFERR     1441    1758*
MFULL     1379    1402    1406    1407    1439*
MI         394     635    2175    2247*
MIB1      3377    3379*
MIBDA     2548    2589    3370*
MISMAT    2202
MD         394     633    2175    2248*
MODECK     632     634     637*
MONMOD     395     638     660    1045    1047    1059    1060    2245*
MSB1      3108*
MULT       314*
MVBP1     1832*   1836
MVBUFP    1165    1195    1517    1626    1705    1830*
MVCSW      393     647    1270    1467    1484    1778    2048*
MVEFTA     428    1704    1719*
MVF1      2944    2946    2949*
MVFCBD    2385    2675    2945*   3022    3273
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MVFCBP    2834      2849      2943*
MVFCBS    2947*     3294      3313
MVFDBA    2994      3006*     3021
MVFN      2485      3443*
MVFN1     1164      1820*
MVFN1A    1822*     1825
MVOSW     2051      2064*
MVSBA     2975      3098      3105*
MVSRTN    2067      2076*
MVVDBA    2902      3138      3166      3175*
NBPER     1343*     1361      1363
NDPGS     3877      3919      3944      3976*
NEPAGE      55       169       220*
NOT        835      2200
NOTRUN    1687      1693*
NPB        768      2117*     2140      2141      2142
NPE        768      2118*     2147      2155      2156      2157      2161      2162
NSPAGE      59       219*
NT1       2876*     2878
NT2       2881*     2890      2892
NT3       2884*     2888
NT4       2882      2894*
NT5       2898*     2900
NT6       2909*     2920
NT7       2910*     2918
NT8       2917      2922*
NUM1       788       802      2121*     2158      2159
NUM2       788      2122*     2160
NXTEXC     485      1703*
O"        2204
OCTD       593      1649*
OF        2198      2281
OPEN      1080      1098      1140*     1546      1555
OPNSUP    1166      1801*
OPT1L      844      2173*
OPTAB1     845      2171*     2173
OPTAB2     851      2174*
OPTAB3     869       872       876      2176*
ORG1        10*       19
ORG2        11*     3855      3860
ORTN       453       492       639       646*     1681      1698
ORTN1      641       655*      663      1791
OSTATE     398       488       501       538       542       564       572       592       604       610      1498      1667      1673      1844      22
OUTPRT     316*     1034
OUTSVT     242*      504       506
OUTSW      309*      520       655      2065      2069      2073      2075
PBO       2602*
PRCIFR     661       664*
PRCR      2720      2721      2733      2734      2784      2791*
PRCR1     2795      2799*
PRCRIF     659*     1055      1466      1483
PRINT      339*     2724      2751      2762      2764      2772      2779      2793      2823
PRN1      2803*     2825
PRN2      2806*     2818
PRN3      2808      2820*
PRNUM     2731      2770      2801*
PROGRA    2214
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PROMPT     308*    534
PROTEC    2196
PRRTN      562     565     577     640*    704
PUTBYT    2578    2592    2598*
R         1520    1629    2130*   2148    2149    2150    2151    2175
RBYTE  '  1130    1638    1668    1711*
RD0       2723*   2726
RD1       2738*   2787
RD2       2741*   2786
RD2A      2748    2750*
RD2B      2756*   2759
RD2C      2757    2760*
RD3       2778*   2782
RD3A      2783*
RD4       2744    2785*
RD5       2739    2743    2789*
RDFDC     3078*
RDFDIR    2413    2673    3018*   3261
RDIR      2289    2713*
RDSECT    3097*   3287
RDVC      3149    3153*
RDVDIR    2458    2738    3136*   3410
RDVTOC    2454    2717    3118*   3398    3500    3551
REPAGE     136     217*
RETURN    3653    3656*
RF1       2852*   2856
RFDIO1    3028    3038    3073*
RFDIO2    3071    3074*
RFDNL     3033    3040*
RFDNL1    3043    3047*
RFDNXT    3024    3030*
RNXBLK    2301    2544*   2552
RNXBYT    2300    2534*
RSPAGE      61      65     134     216*
RSPBLK    2303    2540*
RSPBYT    2302    2529*
RTNFCB    2848*   3659
RUN        195     195     287*   1468
RVDA      3141    3147*
RVDC      3143*
RVDGO     3145    3154*
RVT       2298*   2500    2502
RWP1      1513    1516*
RWP2      1515    1518*
RWP2A     1523*   1526
RWP3      1133    1527*
RWPOSN    1495    1504    1511*
RWPR      1521    1531*
S         2128*   2139    2140    2141    2142    2143    2144    2145    2146    2149    2152    2153    2154    2155    2161
          2163    2164    2165    2166    2175
SAT1       194     232*
SAT2       200    2277*
SC0        674*    699
SC0A       680     682*
SC1        208     345*
SC1A       690     693*
SC1X       684*    693
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SC2        209     2321*
SC3        210     3867*
SCNCMD     556      669*
SDP1       211     3854*
SERR1      761      770      774*     793      796      799      807      812      836
SERR2      849      859      870      874      878      903*
SETKBD     307*    3909
SETVID     306*    3908
SHEP         1
SN1        781*     783
SN10       725      786*
SN11       804      810*
SN2        729*     757
SN2A       733      734      736*
SN3        738*     743
SN4        737      740*
SN5        744*     745
SN6        731      739      747*
SN7        748      759*
SN8        753      763*
SOPTS      765      772      790      808      818*
SP1        827*     830      842      881      890
SP2        828      844*
SP3        845*     848
SP4        846      851*
SP5        867      872*
SP6        873      877      880*
SP7        890*     901
SP8        852      892*
START      190      231*
SV1       1228     1252     1285     1301     1315*
SV1A      1316*
SV2       1231     1234     1293     1309     1323*
SV3       1237     1297     1313     1336*
SVA        479      491      508      514      642      649     1652     1679     1765     1774     1779     2243*
SVBL       238     1398     1401     1426     1429     2250*
SVBLA      238*    1413     1415
SVCMD      448      673     1446     2251*
SVINS     2052     2054     2237*
SVOUTS     519     2068     2070     2236*
SVRB       519*     522
SVREGS     473      499      513*
SVRGSA     515*
SVSTK     2240*
SVX        516      583      630      644      651     2241*
SVY        517      643      650     2242*
SWTR      1594     1597     1600*
SWTST      387     1565     1588     1592*
SYNTAX     696      717*    2210
TEMP1      119      149     2368     2370     2389     2484     2626     2657     2663     2677     2687     2741     3414     3428     3454
          3459     3673*
TEMP1A     825      838      840      880     1117     1141     1167     1787     1792     1965     1999     2252*
TEMP2     2719     2794     2798     3302     3304     3404     3437     3440     3466     3674*
TEMP2A     857      861     2253*
TEMP3     2615     2621     2629     3499     3511     3514     3675*
TEST      1870
TFUCR     1928     1930     1933*
```

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THEN      835
TOO      2216
TRO      1688*  1692
TR1      1685   1690*
TSINIT   1203   1854   1884*
TSNXT    1206   1856   1888*
TSR      1891   1900*
TSST     1887   1896*
TSTEXC   1187   1209   1911*
TSTFNF   1099   1243   1272*  1496   1608   1624
TSTFUC   1321   1926*
TSTOPN   1211   1859   1904*
TSTRUN    581   1650   1663   1683*
TXC1     1913   1920*
TXC2     1916   1919   1921*
V        1538   2126*  2139   2140   2141   2142   2143   2144   2145   2146   2149   2152   2153   2154   21
         2161   2163   2164   2165   2166   2175
VALCA1   2870   3504   3518   3698*
VALCA2   2872   3505   3515   3699*
VALCA3   3700*
VALCA4   3701*
VAR1     2643*  2646   2648
VAR2     2644   2649*
VDEND    3733*
VDFILE   2365   2367   2371   2376   2381   2394   2396   2398   2401   2403   2464   2466   2627   2630   26
         2664   2666   2668   2669   2742   2747   2753   2766   2768   2778   3415   3423   3449   3725*  37
VDFLEN   3462   3735*
VDINC    2785   3433   3457*
VDIRSC   3143   3689*
VDIRTK   3144   3688*
VDLEN    3734*
VDLSEC   2910   2915   3153   3721*
VDLTRK   2909   3148   3720*
VDNF     3722*
VDOSRN   3690*
VDOST    3687*
VDSPAR   3723*
VDTCDE   3719*
VML      2722   3681*
VNOSEC   2905   3538   3569   3703*
VNOTRK   3507   3702*
VOLDIR   2280   2898   3718*  3732   3734
VOLMES   2723   3680*  3681
VSECAL   2874   2885   3527   3532   3578   3579   3706*
VSECLN   3704*
VSPARE   3696*
VTDMS    2410   3695*
VTIO     3120   3124*
VTOC     2279   2874   2876   3686*  3714
VVOLNO   2868   3693*
WBOOT    2924   3913*
WNXBLK   2309   2588*  2594
WNXBYT   2308   2576*
WRFDGO   2387   2990   2993*  3056
WRFDIR   2448   2988*  3020
WRSECT   2447   2969*  3243
WRSGO    2971   2974*
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WRVDIR    2383   2467   2486   2631   2671   3165*
WRVTOC    2697   2894   3121*  3537   3558
WSPBLK    2311   2583*
WSPBYT    2310   2571*
WVT       2306*  2520   2522
XOR        835
ZPGFCB     171    174    178    184    337*  2481   2483   2551   2559   2591   2603   2678   2683   2837   285
          2951   2953   2961   3032   3036   3050   3054   3061   3064   3079   3086   3274   3285   3306   331
          3373   3374   3400   3402   3422   3448
ZPGWRK      29     31     34     40     41     48     53     80     85     90     92     95     98    101    122
           124    127    133    139    143    144    146    147    152    168    173    177    183    311*   431
          1084   1160   1162   1194   1721   1723   1739   1812   1814   1823   1832   1862   1864   1869   1890
          1895   1897   1898   1906   1915   1918   1961   1963   1969   1972   1974   1976   1979   1985   1988
          1994   1997   2006   2011   2012   2014   2021   2023

LINES PROCESSED=ALL
UNUSED SPACE =   4550
```