Apple *II*

Reference Manual Addendum: Monitor ROM Listings

For *IIe* Only

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Warning

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

Apple *IIe*

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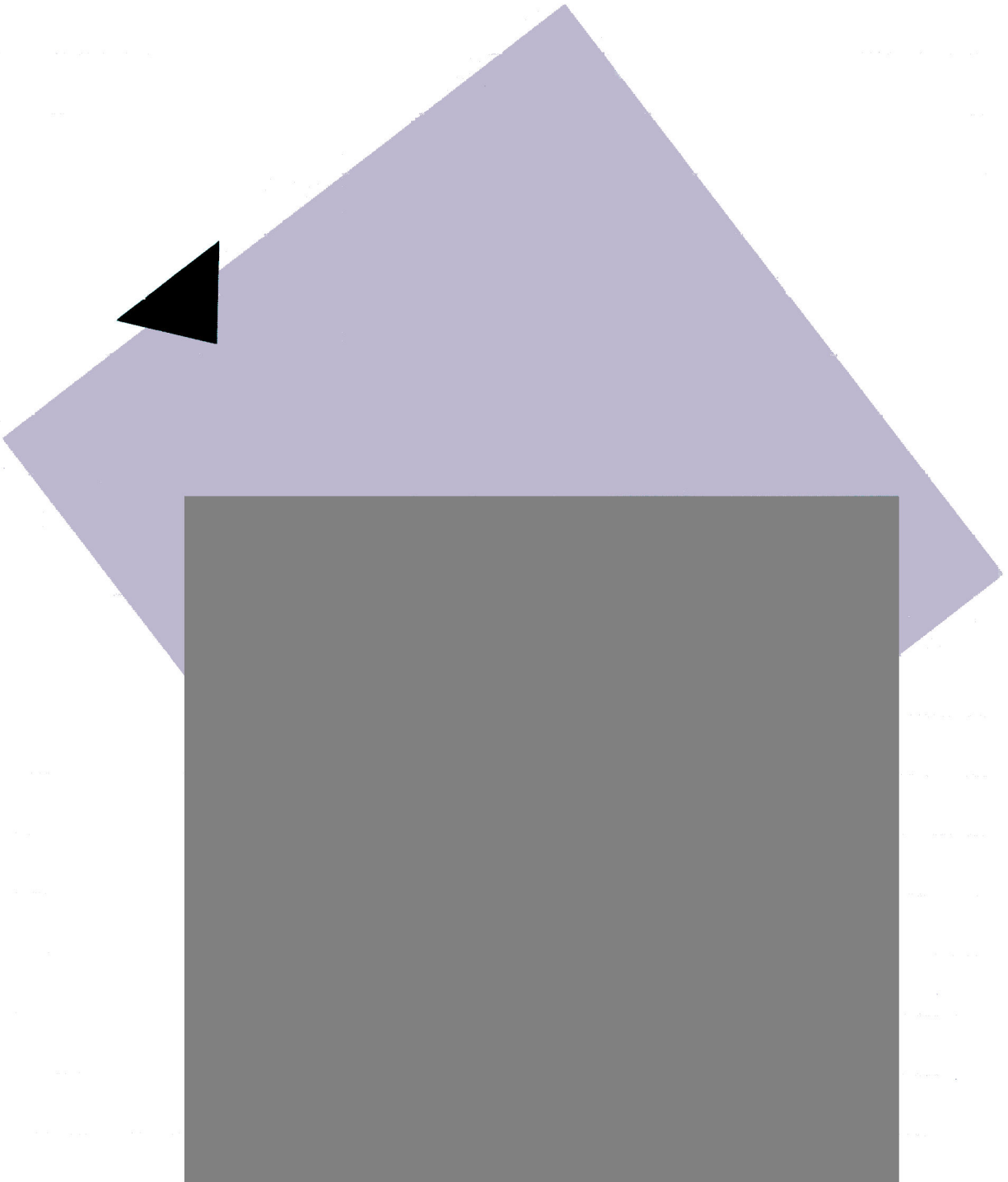

Radio and Television Interference

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly, that is, in strict accordance with our instructions, it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if you use a "rabbit ear" television antenna. (A "rabbit ear" antenna is the telescoping-rod type usually contained on TV receivers.)

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripheral devices. To further isolate the problem:

- Disconnect the peripheral devices and their input/output cables one at a time. If the interference stops, it is caused by either the peripheral device or its I/O cable. These devices usually require shielded I/O cables. For Apple peripheral devices, you can obtain the proper shielded cable from your dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

If your computer does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the TV or radio antenna until the interference stops.
- Move the computer to one side or the other of the TV or radio.
- Move the computer farther away from the TV or radio.
- Plug the computer into an outlet that is on a different circuit than the TV or radio. (That is, make certain the computer and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and TV.

If necessary, you should consult your dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet, prepared by the Federal Communications Commission:

"How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, stock number 004-000-00345-4.

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3 Monitor ROM Listings

Monitor Firmware Listing

```
0000:                  2 ********************************
0000:                  3 *
0000:                  4 * APPLE II
0000:                  5 * MONITOR II
0000:                  6 *
0000:                  7 * COPYRIGHT 1978 BY
0000:                  8 * APPLE COMPUTER, INC.
0000:                  9 *
0000:                 10 * ALL RIGHTS RESERVED
0000:                 11 *
0000:                 12 * STEVE WOZNIAK
0000:                 13 *
0000:                 14 ********************************
0000:                 15 *
0000:                 16 * MODIFIED NOV 1978
0000:                 17 * BY JOHN A
0000:                 18 *
0000:                 19 * MODIFIED SEP 1981
0000:                 20 * BY RICK AURICCHIO
0000:                 21 *    & BRYAN STEARNS
0000:                 22 *    FOR APPLE2E BOCOLS
0000:                 23 *
0000:                 24 * CHANGES MARKED BY 'RRA0981'
0000:                 25 *
0000:          0001   26 APPLE2E     EQU   1             ;COND ASSM/RRA0981
0000:                 27 *
0000:                 28 ********************************
----- NEXT OBJECT FILE NAME IS BJS.SRC1.OBJ0
F800:          F800   29              ORG   $F800
F800:          0000   30              OBJ   $2000
F800:                 31 ********************************
F800:          0000   32 LOC0          EQU   $00
F800:          0001   33 LOC1          EQU   $01
F800:          0020   34 WNDLFT        EQU   $20
F800:          0021   35 WNDWDTH       EQU   $21
F800:          0022   36 WNDTOP        EQU   $22
F800:          0023   37 WNDBTM        EQU   $23
F800:          0024   38 CH            EQU   $24
F800:          0025   39 CV            EQU   $25
F800:          0026   40 GBASL         EQU   $26
F800:          0027   41 GBASH         EQU   $27
F800:          0028   42 BASL          EQU   $28
F800:          0029   43 BASH          EQU   $29
F800:          002A   44 BAS2L         EQU   $2A
F800:          002B   45 BAS2H         EQU   $2B
F800:          002C   46 H2            EQU   $2C
F800:          002C   47 LMNEM         EQU   $2C
F800:          002D   48 V2            EQU   $2D
F800:          002D   49 RMNEM         EQU   $2D
F800:          002E   50 MASK          EQU   $2E
F800:          002E   51 CHKSUM        EQU   $2E
F800:          002E   52 FORMAT        EQU   $2E
F800:          002F   53 LASTIN        EQU   $2F
F800:          002F   54 LENGTH        EQU   $2F
F800:          002F   55 SIGN          EQU   $2F
F800:          0030   56 COLOR         EQU   $30
F800:          0031   57 MODE          EQU   $31
F800:          0032   58 INVFLG        EQU   $32
F800:          0033   59 PROMPT        EQU   $33
F800:          0034   60 YSAV          EQU   $34
F800:          0035   61 YSAV1         EQU   $35
F800:          0036   62 CSWL          EQU   $36
F800:          0037   63 CSWH          EQU   $37
F800:          0038   64 KSWL          EQU   $38
F800:          0039   65 KSWH          EQU   $39
F800:          003A   66 PCL           EQU   $3A
F800:          003B   67 PCH           EQU   $3B
F800:          003C   68 A1L           EQU   $3C
F800:          003D   69 A1H           EQU   $3D
F800:          003E   70 A2L           EQU   $3E
F800:          003F   71 A2H           EQU   $3F
F800:          0040   72 A3L           EQU   $40
F800:          0041   73 A3H           EQU   $41
F800:          0042   74 A4L           EQU   $42
F800:          0043   75 A4H           EQU   $43
F800:          0044   76 A5L           EQU   $44
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F800:          0045   77 A5H          EQU   $45
F800:          0045   78 ACC          EQU   $45          ; NOTE OVERLAP WITH A5H!
F800:          0046   79 XREG         EQU   $46
F800:          0047   80 YREG         EQU   $47
F800:          0048   81 STATUS       EQU   $48
F800:          0049   82 SPNT         EQU   $49
F800:          004E   83 RNDL         EQU   $4E
F800:          004F   84 RNDH         EQU   $4F
F800:          0095   85 PICK         EQU   $95
F800:          0200   86 IN           EQU   $0200
F800:          03F0   87 BRKV         EQU   $3F0         ; NEW VECTOR FOR BRK
F800:          03F2   88 SOFTEV       EQU   $3F2         ; VECTOR FOR WARM START
F800:          03F4   89 PWREDUP      EQU   $3F4         ; THIS MUST = EOR #$A5 OF SOFTEV+1
F800:          03F5   90 AMPERV       EQU   $3F5         ; APPLESOFT & EXIT VECTOR
F800:          03F8   91 USRADR       EQU   $03F8
F800:          03FB   92 NMI          EQU   $03FB
F800:          03FE   93 IRQLOC       EQU   $3FE
F800:          0400   94 LINE1        EQU   $400
F800:          07F8   95 MSLOT        EQU   $07F8
F800:          C000   96 IOADR        EQU   $C000
F800:          C000   97 KBD          EQU   $C000
F800:          C010   98 KBDSTRB      EQU   $C010
F800:          C020   99 TAPEOUT      EQU   $C020
F800:          C030  100 SPKR         EQU   $C030
F800:          C050  101 TXTCLR       EQU   $C050
F800:          C051  102 TXTSET       EQU   $C051
F800:          C052  103 MIXCLR       EQU   $C052
F800:          C053  104 MIXSET       EQU   $C053
F800:          C054  105 LOWSCR       EQU   $C054
F800:          C055  106 HISCR        EQU   $C055
F800:          C056  107 LORES        EQU   $C056
F800:          C057  108 HIRES        EQU   $C057
F800:          C058  109 SETANO       EQU   $C058
F800:          C059  110 CLRANO       EQU   $C059
F800:          C05A  111 SETAN1       EQU   $C05A
F800:          C05B  112 CLRAN1       EQU   $C05B
F800:          C05C  113 SETAN2       EQU   $C05C
F800:          C05D  114 CLRAN2       EQU   $C05D
F800:          C05E  115 SETAN3       EQU   $C05E
F800:          C05F  116 CLRAN3       EQU   $C05F
F800:          C060  117 TAPEIN       EQU   $C060
F800:          C064  118 PADDL0       EQU   $C064
F800:          C070  119 PTRIG        EQU   $C070
F800:          CFFF  120 CLRROM       EQU   $CFFF
F800:          E000  121 BASIC        EQU   $E000
F800:          E003  122 BASIC2       EQU   $E003
F800: 4A             123 PLOT         LSR   A            ;Y-COORD/2
F801: 08             124              PHP                ;SAVE LSB IN CARRY
F802: 20 47 F8       125              JSR   GBASCALC     ;CALC BASE ADR IN GBASL,H
F805: 28             126              PLP                ;RESTORE LSB FROM CARRY
F806: A9 0F          127              LDA   #$0F         ;MASK $0F IF EVEN
F808: 90 02    F80C  128              BCC   RTMASK
F80A: 69 E0          129              ADC   #$E0         ;MASK $F0 IF ODD
F80C: 85 2E          130 RTMASK       STA   MASK
F80E: B1 26          131 PLOT1        LDA   (GBASL),Y    ;DATA
F810: 45 30          132              EOR   COLOR        ; XOR COLOR
F812: 25 2E          133              AND   MASK         ;  AND MASK
F814: 51 26          134              EOR   (GBASL),Y    ;    XOR DATA
F816: 91 26          135              STA   (GBASL),Y    ;     TO DATA
F818: 60             136              RTS
F819: 20 00 F8       137 HLINE        JSR   PLOT         ;PLOT SQUARE
F81C: C4 2C          138 HLINE1       CPY   H2           ;DONE?
F81E: B0 11    F831  139              BCS   RTS1         ; YES, RETURN
F820: C8             140              INY                ; NO, INCR INDEX (X-COORD)
F821: 20 0E F8       141              JSR   PLOT1        ;PLOT NEXT SQUARE
F824: 90 F6    F81C  142              BCC   HLINE1       ;ALWAYS TAKEN
F826: 69 01          143 VLINEZ       ADC   #$01         ;NEXT Y-COORD
F828: 48             144 VLINE        PHA                ; SAVE ON STACK
F829: 20 00 F8       145              JSR   PLOT         ; PLOT SQUARE
F82C: 68             146              PLA
F82D: C5 2D          147              CMP   V2           ;DONE?
F82F: 90 F5    F826  148              BCC   VLINEZ       ; NO, LOOP.
F831: 60             149 RTS1         RTS
F832: A0 2F          150 CLRSCR       LDY   #$2F         ;MAX Y, FULL SCRN CLR
F834: D0 02    F838  151              BNE   CLRSC2       ;ALWAYS TAKEN
F836: A0 27          152 CLRTOP       LDY   #$27         ;MAX Y, TOP SCRN CLR
F838: 84 2D          153 CLRSC2       STY   V2           ;STORE AS BOTTOM COORD
F83A:                154                                 FOR VLINE CALLS
F83A: A0 27          155              LDY   #$27         ;RIGHTMOST X-COORD (COLUMN)
F83C: A9 00          156 CLRSC3       LDA   #$00         ;TOP COORD FOR VLINE CALLS
F83E: 85 30          157              STA   COLOR        ;CLEAR COLOR (BLACK)
F840: 20 28 F8       158              JSR   VLINE        ;DRAW VLINE
F843: 88             159              DEY                ;NEXT LEFTMOST X-COORD
F844: 10 F6    F83C  160              BPL   CLRSC3       ;LOOP UNTIL DONE
F846: 60             161              RTS
F847: 48             162 GBASCALC     PHA                ;FOR INPUT  00DEFGH
F848: 4A             163              LSR   A
F849: 29 03          164              AND   #$03
F84B: 09 04          165              ORA   #$04         ;GENERATE GBASH=000001FG
F84D: 85 27          166              STA   GBASH
F84F: 68             167              PLA                ;AND GBASL=HDEDE000
F850: 29 18          168              AND   #$18
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F852:90 02   F856  169             BCC   GBCALC
F854:69 7F         170             ADC   #$7F
F856:85 26         171 GBCALC      STA   GBASL
F858:0A            172             ASL   A
F859:0A            173             ASL   A
F85A:05 26         174             ORA   GBASL
F85C:85 26         175             STA   GBASL
F85E:60            176             RTS
F85F:A5 30         177 NXTCOL      LDA   COLOR         ;INCREMENT COLOR BY 3
F861:18            178             CLC
F862:69 03         179             ADC   #$03
F864:29 0F         180 SETCOL      AND   #$0F          ;SETS COLOR=17*A MOD 16
F866:85 30         181             STA   COLOR
F868:0A            182             ASL   A             ;BOTH HALF BYTES OF COLOR EQUAL
F869:0A            183             ASL   A
F86A:0A            184             ASL   A
F86B:0A            185             ASL   A
F86C:05 30         186             ORA   COLOR
F86E:85 30         187             STA   COLOR
F870:60            188             RTS
F871:4A            189 SCRN        LSR   A             ;READ SCREEN Y-COORD/2
F872:08            190             PHP                 ;SAVE LSB (CARRY)
F873:20 47 F8      191             JSR   GBASCALC      ;CALC BASE ADDRESS
F876:B1 26         192             LDA   (GBASL),Y     ;GET BYTE
F878:28            193             PLP                 ;RESTORE LSB FROM CARRY
F879:90 04   F87F  194 SCRN2       BCC   RTMSKZ        ;IF EVEN, USE LO H
F87B:4A            195             LSR   A
F87C:4A            196             LSR   A
F87D:4A            197             LSR   A             ;SHIFT HIGH HALF BYTE DOWN
F87E:4A            198             LSR   A
F87F:29 0F         199 RTMSKZ      AND   #$0F          ;MASK 4-BITS
F881:60            200             RTS
F882:A6 3A         201 INSDS1      LDX   PCL           ;PRINT PCL,H
F884:A4 3B         202             LDY   PCH
F886:20 96 FD      203             JSR   PRYX2
F889:20 48 F9      204             JSR   PRBLNK        ;FOLLOWED BY A BLANK
F88C:A1 3A         205 INSDS2      LDA   (PCL,X)       ;GET OPCODE
F88E:A8            206             TAY
F88F:4A            207             LSR   A             ;EVEN/ODD TEST
F890:90 09   F89B  208             BCC   IEVEN
F892:6A            209             ROR   A             ;BIT 1 TEST
F893:B0 10   F8A5  210             BCS   ERR           ;XXXXXX11 INVALID OP
F895:C9 A2         211             CMP   #$A2
F897:F0 0C   F8A5  212             BEQ   ERR           ;OPCODE $89 INVALID
F899:29 87         213             AND   #$87          ;MASK BITS
F89B:4A            214 IEVEN       LSR   A             ;LSB INTO CARRY FOR L/R TEST
F89C:AA            215             TAX
F89D:BD 62 F9      216             LDA   FMT1,X        ;GET FORMAT INDEX BYTE
F8A0:20 79 F8      217             JSR   SCRN2         ;R/L H-BYTE ON CARRY
F8A3:D0 04   F8A9  218             BNE   GETFMT
F8A5:A0 80         219 ERR         LDY   #$80          ;SUBSTITUTE $80 FOR INVALID OPS
F8A7:A9 00         220             LDA   #$00          ;SET PRINT FORMAT INDEX TO 0
F8A9:AA            221 GETFMT      TAX
F8AA:BD A6 F9      222             LDA   FMT2,X        ;INDEX INTO PRINT FORMAT TABLE
F8AD:85 2E         223             STA   FORMAT        ;SAVE FOR ADR FIELD FORMATTING
F8AF:29 03         224             AND   #$03          ;MASK FOR 2-BIT LENGTH
F8B1:              225 ; (0=1 BYTE, 1=2 BYTE, 2=3 BYTE)
F8B1:85 2F         226             STA   LENGTH
F8B3:98            227             TYA                 ;OPCODE
F8B4:29 8F         228             AND   #$8F          ;MASK FOR 1XXX1010 TEST
F8B6:AA            229             TAX                 ; SAVE IT
F8B7:98            230             TYA                 ;OPCODE TO A AGAIN
F8B8:A0 03         231             LDY   #$03
F8BA:E0 8A         232             CPX   #$8A
F8BC:F0 0B   F8C9  233             BEQ   MNNDX3
F8BE:4A            234 MNNDX1      LSR   A
F8BF:90 08   F8C9  235             BCC   MNNDX3        ;FORM INDEX INTO MNEMONIC TABLE
F8C1:4A            236             LSR   A
F8C2:4A            237 MNNDX2      LSR   A             ;  1) 1XXX1010 => 00101XXX
F8C3:09 20         238             ORA   #$20          ;  2) XXXYYY01 => 00111XXX
F8C5:88            239             DEY                 ;  3) XXXYYY10 => 00110XXX
F8C6:D0 FA   F8C2  240             BNE   MNNDX2        ;  4) XXXYY100 => 00100XXX
F8C8:C8            241             INY                 ;  5) XXXXX000 => 000XXXXX
F8C9:88            242 MNNDX3      DEY
F8CA:D0 F2   F8BE  243             BNE   MNNDX1
F8CC:60            244             RTS
F8CD:FF FF FF      245             DFB   $FF,$FF,$FF
F8D0:20 82 F8      246 INSTDSP     JSR   INSDS1        ;GEN FMT, LEN BYTES
F8D3:48            247             PHA                 ;SAVE MNEMONIC TABLE INDEX
F8D4:B1 3A         248 PRNTOP      LDA   (PCL),Y
F8D6:20 DA FD      249             JSR   PRBYTE
F8D9:A2 01         250             LDX   #$01          ;PRINT 2 BLANKS
F8DB:20 4A F9      251 PRNTBL      JSR   PRBL2
F8DE:C4 2F         252             CPY   LENGTH        ;PRINT INST (1-3 BYTES)
F8E0:C8            253             INY                 ;IN A 12 CHR FIELD
F8E1:90 F1   F8D4  254             BCC   PRNTOP
F8E3:A2 03         255             LDX   #$03          ;CHAR COUNT FOR MNEMONIC INDEX
F8E5:C0 04         256             CPY   #$04
F8E7:90 F2   F8DB  257             BCC   PRNTBL
F8E9:68            258             PLA                 ;RECOVER MNEMONIC INDEX
F8EA:A8            259             TAY
F8EB:B9 C0 F9      260             LDA   MNEML,Y
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F8EE: B5 2C          261              STA   LMNEM         ;FETCH 3-CHAR MNEMONIC
F8F0: B9 00 FA       262              LDA   MNEMR,Y       ;   (PACKED INTO 2-BYTES)
F8F3: 85 2D          263              STA   RMNEM
F8F5: A9 00          264 PRMN1        LDA   #$00
F8F7: A0 05          265              LDY   #$05
F8F9: 06 2D          266 PRMN2        ASL   RMNEM         ;SHIFT 5 BITS OF CHARACTER INTO A
F8FB: 26 2C          267              ROL   LMNEM
F8FD: 2A             268              ROL   A             ;   (CLEARS CARRY)
F8FE: 88             269              DEY
F8FF: D0 F8   F8F9   270              BNE   PRMN2
F901: 69 BF          271              ADC   #$BF          ;ADD "?" OFFSET
F903: 20 ED FD       272              JSR   COUT          ;OUTPUT A CHAR OF MNEM
F906: CA             273              DEX
F907: D0 EC   F8F5   274              BNE   PRMN1
F909: 20 48 F9       275              JSR   PRBLNK        ;OUTPUT 3 BLANKS
F90C: A4 2F          276              LDY   LENGTH
F90E: A2 06          277              LDX   #$06          ;CNT FOR 6 FORMAT BITS
F910: E0 03          278 PRADR1       CPX   #$03
F912: F0 1C   F930   279              BEQ   PRADR5        ;IF X=3 THEN ADDR.
F914: 06 2E          280 PRADR2       ASL   FORMAT
F916: 90 0E   F926   281              BCC   PRADR3
F918: BD B3 F9       282              LDA   CHAR1-1,X
F91B: 20 ED FD       283              JSR   COUT
F91E: BD B9 F9       284              LDA   CHAR2-1,X
F921: F0 03   F926   285              BEQ   PRADR3
F923: 20 ED FD       286              JSR   COUT
F926: CA             287 PRADR3       DEX
F927: D0 E7   F910   288              BNE   PRADR1
F929: 60             289              RTS
F92A: 88             290 PRADR4       DEY
F92B: 30 E7   F914   291              BMI   PRADR2
F92D: 20 DA FD       292              JSR   PRBYTE
F930: A5 2E          293 PRADR5       LDA   FORMAT
F932: C9 E8          294              CMP   #$E8          ;HANDLE REL ADR MODE
F934: B1 3A          295              LDA   (PCL),Y       ;SPECIAL (PRINT TARGET,
F936: 90 F2   F92A   296              BCC   PRADR4        ;   NOT OFFSET)
F938: 20 56 F9       297 RELADR       JSR   PCADJ3
F93B: AA             298              TAX                 ;PCL,PCH+OFFSET+1 TO A,Y
F93C: E8             299              INX
F93D: D0 01   F940   300              BNE   PRNTYX        ;+1 TO Y,X
F93F: C8             301              INY
F940: 98             302 PRNTYX       TYA
F941: 20 DA FD       303 PRNTAX       JSR   PRBYTE        ;OUTPUT TARGET ADR
F944: 8A             304 PRNTX        TXA                 ;   OF BRANCH AND RETURN
F945: 4C DA FD       305              JMP   PRBYTE
F948: A2 03          306 PRBLNK       LDX   #$03          ;BLANK COUNT
F94A: A9 A0          307 PRBL2        LDA   #$A0          ;LOAD A SPACE
F94C: 20 ED FD       308 PRBL3        JSR   COUT          ;OUTPUT A BLANK
F94F: CA             309              DEX
F950: D0 F8   F94A   310              BNE   PRBL2         ;LOOP UNTIL COUNT=0
F952: 60             311              RTS
F953: 38             312 PCADJ        SEC                 ;0=1 BYTE, 1=2 BYTE,
F954: A5 2F          313 PCADJ2       LDA   LENGTH        ;   2=3 BYTE
F956: A4 3B          314 PCADJ3       LDY   PCH
F958: AA             315              TAX                 ;TEST DISPLACEMENT SIGN
F959: 10 01   F95C   316              BPL   PCADJ4        ;   (FOR REL BRANCH)
F95B: 88             317              DEY                 ;EXTEND NEG BY DECR PCH
F95C: 65 3A          318 PCADJ4       ADC   PCL
F95E: 90 01   F961   319              BCC   RTS2          ;PCL+LENGTH(OR DISPL)+1 TO A
F960: C8             320              INY                 ;   CARRY INTO Y (PCH)
F961: 60             321 RTS2         RTS
F962:                322 ; FMT1 BYTES:    XXXXXXYO INSTRS
F962:                323 ; IF Y=0         THEN LEFT HALF BYTE
F962:                324 ; IF Y=1         THEN RIGHT HALF BYTE
F962:                325 ;                  (X=INDEX)
F962: 04             326 FMT1         DFB   $04
F963: 20             327              DFB   $20
F964: 54             328              DFB   $54
F965: 30             329              DFB   $30
F966: 0D             330              DFB   $0D
F967: 80             331              DFB   $80
F968: 04             332              DFB   $04
F969: 90             333              DFB   $90
F96A: 03             334              DFB   $03
F96B: 22             335              DFB   $22
F96C: 54             336              DFB   $54
F96D: 33             337              DFB   $33
F96E: 0D             338              DFB   $0D
F96F: 80             339              DFB   $80
F970: 04             340              DFB   $04
F971: 90             341              DFB   $90
F972: 04             342              DFB   $04
F973: 20             343              DFB   $20
F974: 54             344              DFB   $54
F975: 33             345              DFB   $33
F976: 0D             346              DFB   $0D
F977: 80             347              DFB   $80
F978: 04             348              DFB   $04
F979: 90             349              DFB   $90
F97A: 04             350              DFB   $04
F97B: 20             351              DFB   $20
F97C: 54             352              DFB   $54
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F97D: 3B          353              DFB   $3B
F97E: 0D          354              DFB   $0D
F97F: 80          355              DFB   $80
F980: 04          356              DFB   $04
F981: 90          357              DFB   $90
F982: 00          358              DFB   $00
F983: 22          359              DFB   $22
F984: 44          360              DFB   $44
F985: 33          361              DFB   $33
F986: 0D          362              DFB   $0D
F987: C8          363              DFB   $C8
F988: 44          364              DFB   $44
F989: 00          365              DFB   $00
F98A: 11          366              DFB   $11
F98B: 22          367              DFB   $22
F98C: 44          368              DFB   $44
F98D: 33          369              DFB   $33
F98E: 0D          370              DFB   $0D
F98F: C8          371              DFB   $C8
F990: 44          372              DFB   $44
F991: A9          373              DFB   $A9
F992: 01          374              DFB   $01
F993: 22          375              DFB   $22
F994: 44          376              DFB   $44
F995: 33          377              DFB   $33
F996: 0D          378              DFB   $0D
F997: 80          379              DFB   $80
F998: 04          380              DFB   $04
F999: 90          381              DFB   $90
F99A: 01          382              DFB   $01
F99B: 22          383              DFB   $22
F99C: 44          384              DFB   $44
F99D: 33          385              DFB   $33
F99E: 0D          386              DFB   $0D
F99F: 80          387              DFB   $80
F9A0: 04          388              DFB   $04
F9A1: 90          389              DFB   $90
F9A2: 26          390              DFB   $26
F9A3: 31          391              DFB   $31
F9A4: 87          392              DFB   $87
F9A5: 9A          393              DFB   $9A
F9A6:             394 ; ZZXXXY01 INSTR'S
F9A6: 00          395 FMT2         DFB   $00        ;ERR
F9A7: 21          396              DFB   $21        ;IMM
F9A8: 81          397              DFB   $81        ;Z-PAGE
F9A9: 82          398              DFB   $82        ;ABS
F9AA: 00          399              DFB   $00        ;IMPLIED
F9AB: 00          400              DFB   $00        ;ACCUMULATOR
F9AC: 59          401              DFB   $59        ;(ZPAG,X)
F9AD: 4D          402              DFB   $4D        ;(ZPAG),Y
F9AE: 91          403              DFB   $91        ;ZPAG,X
F9AF: 92          404              DFB   $92        ;ABS,X
F9B0: 86          405              DFB   $86        ;ABS,Y
F9B1: 4A          406              DFB   $4A        ;(ABS)
F9B2: 85          407              DFB   $85        ;ZPAG,Y
F9B3: 9D          408              DFB   $9D        ;RELATIVE
F9B4: AC          409 CHAR1        DFB   $AC        ;','
F9B5: A9          410              DFB   $A9        ;')'
F9B6: AC          411              DFB   $AC        ;','
F9B7: A3          412              DFB   $A3        ;'#'
F9B8: A8          413              DFB   $A8        ;'('
F9B9: A4          414              DFB   $A4        ;'$'
F9BA: D9          415 CHAR2        DFB   $D9        ;'Y'
F9BB: 00          416              DFB   $00
F9BC: D8          417              DFB   $D8        ;'X'
F9BD: A4          418              DFB   $A4        ;'$'
F9BE: A4          419              DFB   $A4        ;'$'
F9BF: 00          420              DFB   $00
F9C0: 1C          421 MNEML        DFB   $1C
F9C1: 8A          422              DFB   $8A
F9C2: 1C          423              DFB   $1C
F9C3: 23          424              DFB   $23
F9C4: 5D          425              DFB   $5D
F9C5: 8B          426              DFB   $8B
F9C6: 1B          427              DFB   $1B
F9C7: A1          428              DFB   $A1
F9C8: 9D          429              DFB   $9D
F9C9: 8A          430              DFB   $8A
F9CA: 1D          431              DFB   $1D
F9CB: 23          432              DFB   $23
F9CC: 9D          433              DFB   $9D
F9CD: 8B          434              DFB   $8B
F9CE: 1D          435              DFB   $1D
F9CF: A1          436              DFB   $A1
F9D0: 00          437              DFB   $00
F9D1: 29          438              DFB   $29
F9D2: 19          439              DFB   $19
F9D3: AE          440              DFB   $AE
F9D4: 69          441              DFB   $69
F9D5: A8          442              DFB   $A8
F9D6: 19          443              DFB   $19
F9D7: 23          444              DFB   $23
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F9D8: 24          445          DFB   $24
F9D9: 53          446          DFB   $53
F9DA: 1B          447          DFB   $1B
F9DB: 23          448          DFB   $23
F9DC: 24          449          DFB   $24
F9DD: 53          450          DFB   $53
F9DE: 19          451          DFB   $19          ; (A) FORMAT ABOVE
F9DF: A1          452          DFB   $A1
F9E0: 00          453          DFB   $00
F9E1: 1A          454          DFB   $1A
F9E2: 5B          455          DFB   $5B
F9E3: 5B          456          DFB   $5B
F9E4: A5          457          DFB   $A5
F9E5: 69          458          DFB   $69
F9E6: 24          459          DFB   $24          ; (B) FORMAT
F9E7: 24          460          DFB   $24
F9E8: AE          461          DFB   $AE
F9E9: AE          462          DFB   $AE
F9EA: A8          463          DFB   $A8
F9EB: AD          464          DFB   $AD
F9EC: 29          465          DFB   $29
F9ED: 00          466          DFB   $00
F9EE: 7C          467          DFB   $7C          ; (C) FORMAT
F9EF: 00          468          DFB   $00
F9F0: 15          469          DFB   $15
F9F1: 9C          470          DFB   $9C
F9F2: 6D          471          DFB   $6D
F9F3: 9C          472          DFB   $9C
F9F4: A5          473          DFB   $A5
F9F5: 69          474          DFB   $69
F9F6: 29          475          DFB   $29          ; (D) FORMAT
F9F7: 53          476          DFB   $53
F9F8: 84          477          DFB   $84
F9F9: 13          478          DFB   $13
F9FA: 34          479          DFB   $34
F9FB: 11          480          DFB   $11
F9FC: A5          481          DFB   $A5
F9FD: 69          482          DFB   $69
F9FE: 23          483          DFB   $23          ; (E) FORMAT
F9FF: A0          484          DFB   $A0
FA00: D8          485 MNEMR    DFB   $D8
FA01: 62          486          DFB   $62
FA02: 5A          487          DFB   $5A
FA03: 48          488          DFB   $48
FA04: 26          489          DFB   $26
FA05: 62          490          DFB   $62
FA06: 94          491          DFB   $94
FA07: 88          492          DFB   $88
FA08: 54          493          DFB   $54
FA09: 44          494          DFB   $44
FA0A: C8          495          DFB   $C8
FA0B: 54          496          DFB   $54
FA0C: 68          497          DFB   $68
FA0D: 44          498          DFB   $44
FA0E: E8          499          DFB   $E8
FA0F: 94          500          DFB   $94
FA10: 00          501          DFB   $00
FA11: B4          502          DFB   $B4
FA12: 08          503          DFB   $08
FA13: 84          504          DFB   $84
FA14: 74          505          DFB   $74
FA15: B4          506          DFB   $B4
FA16: 28          507          DFB   $28
FA17: 6E          508          DFB   $6E
FA18: 74          509          DFB   $74
FA19: F4          510          DFB   $F4
FA1A: CC          511          DFB   $CC
FA1B: 4A          512          DFB   $4A
FA1C: 72          513          DFB   $72
FA1D: F2          514          DFB   $F2
FA1E: A4          515          DFB   $A4          ; (A) FORMAT
FA1F: 8A          516          DFB   $8A
FA20: 00          517          DFB   $00
FA21: AA          518          DFB   $AA
FA22: A2          519          DFB   $A2
FA23: A2          520          DFB   $A2
FA24: 74          521          DFB   $74
FA25: 74          522          DFB   $74
FA26: 74          523          DFB   $74          ; (B) FORMAT
FA27: 72          524          DFB   $72
FA28: 44          525          DFB   $44
FA29: 68          526          DFB   $68
FA2A: B2          527          DFB   $B2
FA2B: 32          528          DFB   $32
FA2C: B2          529          DFB   $B2
FA2D: 00          530          DFB   $00
FA2E: 22          531          DFB   $22          ; (C) FORMAT
FA2F: 00          532          DFB   $00
FA30: 1A          533          DFB   $1A
FA31: 1A          534          DFB   $1A
FA32: 26          535          DFB   $26
FA33: 26          536          DFB   $26
```

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FA34: 72              537              DFB   $72
FA35: 72              538              DFB   $72
FA36: 88              539              DFB   $88          ; (D) FORMAT
FA37: C8              540              DFB   $C8
FA38: C4              541              DFB   $C4
FA39: CA              542              DFB   $CA
FA3A: 26              543              DFB   $26
FA3B: 48              544              DFB   $48
FA3C: 44              545              DFB   $44
FA3D: 44              546              DFB   $44
FA3E: A2              547              DFB   $A2          ; (E) FORMAT
FA3F: C8              548              DFB   $C8
FA40: 85 45           549 IRQ          STA   ACC         ; *** IRQ HANDLER
FA42: 68              550              PLA
FA43: 48              551              PHA
FA44: 0A              552              ASL   A
FA45: 0A              553              ASL   A
FA46: 0A              554              ASL   A
FA47: 30 03   FA4C    555              BMI   BREAK       ;TEST FOR 'BRK'
FA49: 6C FE 03        556              JMP   (IRQLOC)    ;USER ROUTINE VECTOR IN RAM
FA4C: 28              557 BREAK        PLP
FA4D: 20 4C FF        558              JSR   SAV1        ;SAVE REG'S ON BREAK
FA50: 68              559              PLA               ; INCLUDING PC
FA51: 85 3A           560              STA   PCL
FA53: 68              561              PLA
FA54: 85 3B           562              STA   PCH
FA56: 6C F0 03        563              JMP   (BRKV)      ;BRKV WRITTEN OVER BY DISK BOOT
FA59: 20 82 F8        564 OLDBRK       JSR   INSDS1      ;PRINT USER PC
FA5C: 20 DA FA        565              JSR   RGDSP1      ;  AND REGS
FA5F: 4C 65 FF        566              JMP   MON         ;GO TO MONITOR (NO PASS GO, NO $200!)
FA62: D8              567 RESET        CLD               ;DO THIS FIRST THIS TIME
FA63: 20 84 FE        568              JSR   SETNORM
FA66: 20 2F FB        569              JSR   INIT
FA69: 20 93 FE        570              JSR   SETVID
FA6C: 20 89 FE        571              JSR   SETKBD
FA6F: AD 5B C0        572 INITAN       LDA   SETANO      ; AN0 = TTL HI
FA72: AD 5A C0        573              LDA   SETAN1      ; AN1 = TTL HI
FA75:           0001  574              DO    APPLE2E     ;/RRA0981
FA75: A0 05           575              LDY   #5          ;CODE=INIT/RRA0981
FA77: 20 B4 FB        576              JSR   GOTOCX      ;DO APPLE2E INIT/RRA0981
FA7A: EA              577              NOP               ;/RRA0981
FA7B:                 578              ELSE              ;/RRA0981
 S                    579              LDA   CLRAN2      ; AN2 = TTL LO
 S                    580              LDA   CLRAN3      ; AN3 = TTL LO
FA7B:                 581              FIN               ;/RRA0981
FA7B: AD FF CF        582              LDA   CLRROM      ; TURN OFF EXTNSN ROM
FA7E: 2C 10 C0        583              BIT   KBDSTRB     ; CLEAR KEYBOARD
FA81: D8              584 NEWMON       CLD
FA82: 20 3A FF        585              JSR   BELL        ; CAUSES DELAY IF KEY BOUNCES
FA85: AD F3 03        586              LDA   SOFTEV+1    ;IS RESET HI
FA88: 49 A5           587              EOR   #$A5        ;A FUNNY COMPLEMENT OF THE
FA8A: CD F4 03        588              CMP   PWREDUP     ; PWR UP BYTE ???
FA8D: D0 17   FAA6    589              BNE   PWRUP       ; NO SO PWRUP
FA8F: AD F2 03        590              LDA   SOFTEV      ; YES SEE IF COLD START
FA92: D0 0F   FAA3    591              BNE   NOFIX       ; HAS BEEN DONE YET?
FA94: A9 E0           592              LDA   #$E0        ; DOES SOFT ENTRY VECTOR POINT AT BASIC
FA96: CD F3 03        593              CMP   SOFTEV+1
FA99: D0 08   FAA3    594              BNE   NOFIX       ; YES SO REENTER SYSTEM
FA9B: A0 03           595 FIXSEV       LDY   #3          ; NO SO POINT AT WARM START
FA9D: 8C F2 03        596              STY   SOFTEV      ; FOR NEXT RESET
FAA0: 4C 00 E0        597              JMP   BASIC       ; AND DO THE COLD START
FAA3: 6C F2 03        598 NOFIX        JMP   (SOFTEV)    ; SOFT ENTRY VECTOR
FAA6:                 599 *****************
FAA6: 20 60 FB        600 PWRUP        JSR   APPLEII
FAA9:           FAA9  601 SETPG3       EQU   *           ; SET PAGE 3 VECTORS
FAA9: A2 05           602              LDX   #5
FAAB: BD FC FA        603 SETPLP       LDA   PWRCON-1,X  ; WITH CNTRL B ADRS
FAAE: 9D EF 03        604              STA   BRKV-1,X    ; OF CURRENT BASIC
FAB1: CA              605              DEX
FAB2: D0 F7   FAAB    606              BNE   SETPLP
FAB4: A9 C8           607              LDA   #$C8        ; LOAD HI SLOT +1
FAB6: 86 00           608              STX   LOC0        ; SETPG3 MUST RETURN X=0
FAB8: 85 01           609              STA   LOC1        ; SET PTR H
FABA: A0 07           610 SLOJP        LDY   #7          ; Y IS BYTE PTR
FABC: C6 01           611              DEC   LOC1
FABE: A5 01           612              LDA   LOC1
FAC0: C9 C0           613              CMP   #$C0        ; AT LAST SLOT YET?
FAC2: F0 D7   FA9B    614              BEQ   FIXSEV      ; YES AND IT CAN'T BE A DISK
FAC4: 8D F8 07        615              STA   MSLOT
FAC7: B1 00           616 NXTBYT       LDA   (LOC0),Y    ; FETCH A SLOT BYTE
FAC9: D9 01 FB        617              CMP   DISKID-1,Y  ; IS IT A DISK ??
FACC: D0 EC   FABA    618              BNE   SLOOP       ; NO, SO NEXT SLOT DOWN
FACE: 88              619              DEY
FACF: 88              620              DEY               ; YES, SO CHECK NEXT BYTE
FAD0: 10 F5   FAC7    621              BPL   NXTBYT      ; UNTIL 4 BYTES CHECKED
FAD2: 6C 00 00        622              JMP   (LOC0)      ; GO BOOT...
FAD5: EA              623              NOP
FAD6: EA              624              NOP
FAD7:                 625 * REGDSP MUST ORG $FAD7
FAD7: 20 8E FD        626 REGDSP       JSR   CROUT       ;DISPLAY USER REG CONTENTS
FADA: A9 45           627 RGDSP1       LDA   #$45        ;WITH LABELS
FADC: 85 40           628              STA   A3L
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FADE: A9 00          629              LDA   #$00
FAE0: 85 41          630              STA   A3H
FAE2: A2 FB          631              LDX   #$FB
FAE4: A9 A0          632 RDSP1        LDA   #$A0
FAE6: 20 ED FD       633              JSR   COUT
FAE9: BD 1E FA       634              LDA   RTBL-251,X
FAEC: 20 ED FD       635              JSR   COUT
FAEF: A9 BD          636              LDA   #$BD
FAF1: 20 ED FD       637              JSR   COUT
FAF4:                638 * LDA ACC+5,X
FAF4: B5 4A          639              DFB   $B5,$4A
FAF6: 20 DA FD       640              JSR   PRBYTE
FAF9: E8             641              INX
FAFA: 30 E8   FAE4   642              BMI   RDSP1
FAFC: 60             643              RTS
FAFD: 59 FA          644 PWRCON       DW    OLDBRK
FAFF: 00 E0 45       645              DFB   $00,$E0,$45
FB02: 20 FF 00 FF    646 DISKID       DFB   $20,$FF,$00,$FF
FB06: 03 FF 3C       647              DFB   $03,$FF,$3C
FB09: C1 F0 F0 EC    648 TITLE        ASC   'Apple        ]['
FB11:         FB11   649 XLTBL        EQU   *
FB11: C4 C2 C1       650              DFB   $C4,$C2,$C1
FB14: FF C3          651              DFB   $FF,$C3
FB16: FF FF FF       652              DFB   $FF,$FF,$FF
FB19:                653 *  MUST ORG $FB19
FB19: C1 D8 D9       654 RTBL         DFB   $C1,$D8,$D9  ;REGISTER NAMES FOR REGDSP
FB1C: D0 D3          655              DFB   $D0,$D3      ;'AXYPS'
FB1E: AD 70 C0       656 PREAD        LDA   PTRIG        ;TRIGGER PADDLES
FB21: A0 00          657              LDY   #$00         ;INIT COUNT
FB23: EA             658              NOP                ;COMPENSATE FOR 1ST COUNT
FB24: EA             659              NOP
FB25: BD 64 C0       660 PREAD2       LDA   PADDLO,X     ;COUNT Y-REG EVERY 12 USEC.
FB28: 10 04   FB2E   661              BPL   RTS2D
FB2A: C8             662              INY
FB2B: D0 F8   FB25   663              BNE   PREAD2       ;EXIT AT 255 MAX
FB2D: 88             664              DEY
FB2E: 60             665 RTS2D        RTS
FB2F:                666              CHN   BUS.SRC2
FB2F:                  1 *
FB2F: A9 00            2 INIT         LDA   #$00         ;CLR STATUS FOR DEBUG SOFTWARE
FB31: 85 48            3              STA   STATUS
FB33: AD 56 C0         4              LDA   LORES
FB36: AD 54 C0         5              LDA   LOWSCR       ;INIT VIDEO MODE
FB39: AD 51 C0         6 SETTXT       LDA   TXTSET       ;SET FOR TEXT MODE
FB3C: A9 00            7              LDA   #$00         ;FULL SCREEN WINDOW
FB3E: F0 0B   FB4B     8              BEQ   SETWND
FB40: AD 50 C0         9 SETGR        LDA   TXTCLR       ;SET FOR GRAPHICS MODE
FB43: AD 53 C0        10              LDA   MIXSET       ;LOWER 4 LINES AS TEXT WINDOW
FB46: 20 36 F8        11              JSR   CLRTOP
FB49: A9 14           12              LDA   #$14
FB4B: 85 22           13 SETWND       STA   WNDTOP       ;SET FOR 40 COL WINDOW
FB4D: A9 00           14              LDA   #$00         ;TOP IN A-REG,
FB4F: 85 20           15              STA   WNDLFT       ; BOTTOM AT LINE $24
FB51:         0001    16              DO    APPLE2E      ;/RRA0981
FB51: A0 08           17              LDY   #8           ;CODE=SETWND /RRA0981
FB53: D0 5F   FBB4    18              BNE   GOTOCX       ;DO 40/80 /RRA0981
FB55:                 19              ELSE               ;/RRA0981
 S                    20              LDA   #$28
 S                    21              STA   WNDWDTH
FB55:                 22              FIN                ;/RRA0981
FB55: A9 18           23              LDA   #$18
FB57: 85 23           24              STA   WNDBTM
FB59: A9 17           25              LDA   #$17         ;VTAB TO ROW 23
FB5B: 85 25           26 TABV         STA   CV           ;VTABS TO ROW IN A-REG
FB5D: 4C 22 FC        27              JMP   VTAB
FB60: 20 58 FC        28 APPLEII      JSR   HOME         ;CLEAR THE SCRN
FB63: A0 08           29              LDY   #8
FB65: B9 08 FB        30 STITLE       LDA   TITLE-1,Y    ;GET A CHAR
FB68: 99 0E 04        31              STA   LINE1+14,Y   ;PUT IT AT TOP CENTER OF SCREEN
FB6B: 88              32              DEY
FB6C: D0 F7   FB65    33              BNE   STITLE
FB6E: 60              34              RTS
FB6F: AD F3 03        35 SETPWRC      LDA   SOFTEV+1     ;ROUTINE TO CALCULATE THE 'FUNNY
FB72: 49 A5           36              EOR   #$A5         ;COMPLEMENT' FOR THE RESET VECTOR
FB74: 8D F4 03        37              STA   PWREDUP
FB77: 60              38              RTS
FB78:         FB78    39 VIDWAIT      EQU   *            ;CHECK FOR A PAUSE (CONTROL-S).
FB78: C9 8D           40              CMP   #$8D         ;ONLY WHEN I HAVE A CR
FB7A: D0 18   FB94    41              BNE   NOWAIT       ;NOT SO, DO REGULAR
FB7C: AC 00 C0        42              LDY   KBD          ;IS KEY PRESSED?
FB7F: 10 13   FB94    43              BPL   NOWAIT       ;NO.
FB81: C0 93           44              CPY   #$93         ;YES -- IS IT CTRL-S?
FB83: D0 0F   FB94    45              BNE   NOWAIT       ;NOPE - IGNORE
FB85: 2C 10 C0        46              BIT   KBDSTRB      ;CLEAR STROBE
FB88: AC 00 C0        47 KBDWAIT      LDY   KBD          ;WAIT TILL NEXT KEY TO RESUME
FB8B: 10 FB   FB88    48              BPL   KBDWAIT      ;WAIT FOR KEYPRESS
FB8D: C0 83           49              CPY   #$83         ;IS IT CONTROL-C?
FB8F: F0 03   FB94    50              BEQ   NOWAIT       ;YES, SO LEAVE IT
FB91: 2C 10 C0        51              BIT   KBDSTRB      ;CLR STROBE
FB94: 4C FD FB        52 NOWAIT       JMP   VIDOUT       ;DO AS BEFORE
FB97: 38              53 ESCOLD       SEC                ;INSURE CARRY SET
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FB9B:4C 2C FC       54              JMP   ESC1
FB9B:AB             55 ESCNOW       TAY                   ;USE CHAR AS INDEX
FB9C:B9 48 FA       56              LDA   XLTBL-$C9,Y     ;TRANSLATE IJKM TO CBAD
FB9F:20 97 FB       57              JSR   ESCOLD          ;DO THE CURSOR MOTION
FBA2:         0001  58              DO    APPLE2E         ;FOR FULL ESCAPES/RRA0981
FBA2:20 21 FD       59              JSR   RDESC           ;GET IJKM, ijkm, ARROWS/RRA0981
FBA5:               60              ELSE                  ;/RRA0981
 S                  61              JSR   RDKEY           ;AND GET NEXT
FBA5:               62              FIN                   ;/RRA0981
FBA5:C9 CE          63 ESCNEW       CMP   #$CE            ;IS THIS AN 'N'?
FBA7:B0 EE    FB97  64              BCS   ESCOLD          ;'N' OR GREATER - DO IT!
FBA9:C9 C9          65              CMP   #$C9            ;LESS THAN 'I'?
FBAB:90 EA    FB97  66              BCC   ESCOLD          ;YES, SO DO OLD WAY
FBAD:C9 CC          67              CMP   #$CC            ;IS IT AN 'L'?
FBAF:F0 E6    FB97  68              BEQ   ESCOLD          ;DO NORMAL
FBB1:D0 E8    FB9B  69              BNE   ESCNOW          ;GO DO IT
FBB3:         0001  70              DO    APPLE2E         ;/RRA0981
FBB3:         C006  71 SETSLOTCXROM EQU   $C006           ;/RRA0981
FBB3:         C007  72 SETINTCXROM  EQU   $C007           ;/RRA0981
FBB3:         C015  73 RDCXROM      EQU   $C015           ;/RRA0981
FBB3:               74 *                                  /RRA0981
FBB3:06             75 VERSION      DFB   $06             ;FOR IDCHECK/RRA0981
FBB4:         FBB4  76 GOTOCX       EQU   *               ;/RRA0981
FBB4:08             77              PHP                   ;SAVE USER IRQ STATE/RRA0981
FBB5:78             78              SEI                   ;INHIBIT DURING BANKSWITCH/RRA0981
FBB6:2C 15 C0       79              BIT   RDCXROM         ;GET CURRENT STATE/RRA0981
FBB9:08             80              PHP                   ;SAVE ROMBANK STATE/RRA0981
FBBA:8D 07 C0       81              STA   SETINTCXROM     ;SET ROMS ON/RRA0981
FBBD:4C 00 C1       82              JMP   $C100           ;=>OFF TO CXSPACE/RRA0981
FBC0:               83 *                                  /RRA0981
FBC0:EA             84              NOP                   ;/RRA0981
FBC1:               85              ELSE                  ;/RRA0981
 S                  86              NOP                   ;"I GOT PLENTY OF NOTHING!"
 S                  87              NOP
 S                  88              NOP
 S                  89              NOP
 S                  90              NOP
 S                  91              NOP
 S                  92              NOP
 S                  93              NOP
 S                  94              NOP
 S                  95              NOP
 S                  96              NOP
 S                  97              NOP
 S                  98              NOP
 S                  99              NOP
FBC1:               100             FIN                   ;/RRA0981
FBC1:               101 *     MUST ORG $FBC1
FBC1:48             102 BASCALC     PHA                   ;CALCBASE ADDR IN BASL,H
FBC2:4A             103             LSR   A               ; FOR GIVEN LINE NO.
FBC3:29 03          104             AND   #$03            ; 0<=LINE NO.<=$17
FBC5:09 04          105             ORA   #$04            ;ARG=000ABCDE, GENERATE
FBC7:85 29          106             STA   BASH            ; BASH=000001CD
FBC9:68             107             PLA                   ; AND
FBCA:29 18          108             AND   #$18            ; BASL=EABAB000
FBCC:90 02    FBD0  109             BCC   BASCLC2
FBCE:69 7F          110             ADC   #$7F
FBD0:85 28          111 BASCLC2     STA   BASL
FBD2:0A             112             ASL   A
FBD3:0A             113             ASL   A
FBD4:05 28          114             ORA   BASL
FBD6:85 28          115             STA   BASL
FBD8:60             116             RTS
FBD9:C9 87          117 BELL1       CMP   #$87            ;BELL CHAR? (CONTROL-G)
FBDB:D0 12    FBEF  118             BNE   RTS2B           ; NO, RETURN.
FBDD:A9 40          119             LDA   #$40            ; YES...
FBDF:20 A8 FC       120             JSR   WAIT            ;DELAY .01 SECONDS
FBE2:A0 C0          121             LDY   #$C0
FBE4:A9 0C          122 BELL2       LDA   #$0C            ;TOGGLE SPEAKER AT 1 KHZ
FBE6:20 A8 FC       123             JSR   WAIT            ; FOR .1 SEC.
FBE9:AD 30 C0       124             LDA   SPKR
FBEC:88             125             DEY
FBED:D0 F5    FBE4  126             BNE   BELL2
FBEF:60             127 RTS2B       RTS
FBF0:A4 24          128 STORADV     LDY   CH              ;CURSOR H INDEX TO Y-REG
FBF2:91 28          129             STA   (BASL),Y        ;STORE CHAR IN LINE
FBF4:E6 24          130 ADVANCE     INC   CH              ;INCREMENT CURSOR H INDEX
FBF6:A5 24          131             LDA   CH              ; (MOVE RIGHT)
FBF8:C5 21          132             CMP   WNDWDTH         ;BEYOND WINDOW WIDTH?
FBFA:B0 66    FC62  133             BCS   CR              ; YES, CR TO NEXT LINE.
FBFC:60             134 RTS3        RTS                   ; NO, RETURN.
FBFD:C9 A0          135 VIDOUT      CMP   #$A0            ;CONTROL CHAR?
FBFF:B0 EF    FBF0  136             BCS   STORADV         ; NO, OUTPUT IT.
FC01:A8             137             TAY                   ;INVERSE VIDEO?
FC02:10 EC    FBF0  138             BPL   STORADV         ; YES, OUTPUT IT.
FC04:C9 8D          139             CMP   #$8D            ;CR?
FC06:F0 5A    FC62  140             BEQ   CR              ; YES.
FC08:C9 8A          141             CMP   #$8A            ;LINE FEED?
FC0A:F0 5A    FC66  142             BEQ   LF              ; IF SO, DO IT.
FC0C:C9 88          143             CMP   #$88            ;BACK SPACE? (CONTROL-H)
FC0E:D0 C9    FBD9  144             BNE   BELL1           ; NO, CHECK FOR BELL.
FC10:C6 24          145 BS          DEC   CH              ;DECREMENT CURSOR H INDEX
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FC12:10 E8    FBFC  146                BPL   RTS3          ;IF POSITIVE, OK; ELSE MOVE UP.
FC14:A5 21          147                LDA   WNDWDTH       ;SET CH TO WINDOW WIDTH - 1.
FC16:85 24          148                STA   CH
FC18:C6 24          149                DEC   CH            ;(RIGHTMOST SCREEN POS)
FC1A:A5 22          150 UP             LDA   WNDTOP        ;CURSOR V INDEX
FC1C:C5 25          151                CMP   CV
FC1E:B0 0B    FC2B  152                BCS   RTS4          ;IF TOP LINE THEN RETURN
FC20:C6 25          153                DEC   CV            ;DECR CURSOR V INDEX
FC22:A5 25          154 VTAB           LDA   CV            ;GET CURSOR V INDEX
FC24:20 C1 FB       155 VTABZ          JSR   BASCALC       ;GENERATE BASE ADDRESS
FC27:65 20          156                ADC   WNDLFT        ;ADD WINDOW LEFT OFFSET
FC29:85 28          157                STA   BASL          ; TO BASL
FC2B:60             158 RTS4           RTS
FC2C:49 C0          159 ESC1           EOR   #$C0          ;ESC '@'?
FC2E:F0 28    FC58  160                BEQ   HOME          ; IF SO DO HOME AND CLEAR
FC30:69 FD          161                ADC   #$FD          ;ESC-A OR B CHECK
FC32:90 C0    FBF4  162                BCC   ADVANCE       ; A, ADVANCE
FC34:F0 DA    FC10  163                BEQ   BS            ; B, BACKSPACE
FC36:69 FD          164                ADC   #$FD          ;ESC-C OR D CHECK
FC38:90 2C    FC66  165                BCC   LF            ; C, DOWN
FC3A:F0 DE    FC1A  166                BEQ   UP            ; D, GO UP
FC3C:69 FD          167                ADC   #$FD          ;ESC-E OR F CKECK
FC3E:90 5C    FC9C  168                BCC   CLREOL        ; E, CLEAR TO END OF LINE
FC40:D0 E9    FC2B  169                BNE   RTS4          ; ELSE NOT F,RETURN
FC42:               170                DO    APPLE2E       ;/RRA0981
FC42:         FC42  171 CLREOP         EQU   *             ;/RRA0981
FC42:A0 00          172                LDY   #0            ;CODE=CLREOP/RRA0981
FC44:F0 2C    FC72  173                BEQ   XGOTOCX       ;DO 40/80 /RRA0981
FC46:A8 C3 A9 A0    174                ASC   '(C)  1981-82, APPLE'
FC58:               175                ELSE                ;/RRA0981
 S                  176 CLREOP         LDY   CH            ;ESC F IS CLR TO END OF PAGE
 S                  177                LDA   CV
 S                  178 CLEOP1         PHA                 ;SAVE CURRENT LINE NO. ON STACK
 S                  179                JSR   VTABZ         ;CALC BASE ADDRESS
 S                  180                JSR   CLEOLZ        ;CLEAR TO EOL. (SETS CARRY)
 S                  181                LDY   #$00          ;CLEAR FROM H INDEX=0 FOR REST
 S                  182                PLA                 ;INCREMENT CURRENT LINE NO.
 S                  183                ADC   #$00          ;(CARRY IS STILL SET)
 S                  184                CMP   WNDBTM        ;DONE TO BOTTOM OF WINDOW?
 S                  185                BCC   CLEOP1        ; NO, KEEP CLEARING LINES.
 S                  186                BCS   VTAB          ; YES, VTAB TO CURRENT LINE.
FC58:               187                FIN                 ;/RRA0981
FC58:         0001  188                DO    APPLE2E       ;/RRA0981
FC58:         FC58  189 HOME           EQU   *             ;/RRA0981
FC58:A0 01          190                LDY   #1            ;CODE=HOME/RRA0981
FC5A:D0 16    FC72  191                BNE   XGOTOCX       ;DO 40/80 /RRA0981
FC5C:D2 C9 C3 CB    192                ASC   'RICK  A'  ;OUR HERO...
FC62:               193                ELSE                ;/RRA0981
 S                  194 HOME           LDA   WNDTOP        ;INIT CURSOR V
 S                  195                STA   CV            ;  AND H INDICES
 S                  196                LDY   #$00
 S                  197                STY   CH            ;THEN CLEAR TO END OF PAGE.
 S                  198                BEQ   CLEOP1        ;(ALWAYS TAKEN)
FC62:               199                FIN                 ;/RRA0981
FC62:A9 00          200 CR             LDA   #$00          ;CURSOR TO LEFT OF INDEX
FC64:85 24          201                STA   CH            ;(RET CURSOR H=0)
FC66:E6 25          202 LF             INC   CV            ;INCR CURSOR V. (DOWN 1 LINE)
FC68:A5 25          203                LDA   CV
FC6A:C5 23          204                CMP   WNDBTM        ;OFF SCREEN?
FC6C:90 B6    FC24  205                BCC   VTABZ         ;  NO, SET BASE ADDR
FC6E:C6 25          206                DEC   CV            ;DECR CURSOR V. (BACK TO BOTTOM)
FC70:         0001  207                DO    APPLE2E       ;/RRA0981
FC70:         FC70  208 SCROLL         EQU   *             ;/RRA0981
FC70:A0 02          209                LDY   #2            ;CODE=SCROLL/RRA0981
FC72:4C B4 FB       210 XGOTOCX        JMP   GOTOCX        ;DO 40/80 /RRA0981
FC75:               211 *
FC75:               212 * IRQ SNIFFER FOR VIDEO CODE:
FC75:               213 *
FC75:         C018  214 RDB0STORE      EQU   $C018         ;/RRA0981
FC75:         C01C  215 RDPAGE2        EQU   $C01C         ;/RRA0981
FC75:48             216                PHA                 ;PRESERVE AC/RRA0981
FC76:AD 18 C0       217                LDA   RDB0STORE     ;FLAG->N /RRA0981
FC79:0A             218                ASL   A             ;FLAG->C /RRA0981
FC7A:68             219                PLA                 ;RESTORE AC/RRA0981
FC7B:2C 1C C0       220                BIT   RDPAGE2       ;FLAG->N /RRA0981
FC7E:08             221                PHP                 ;/RRA0981
FC7F:90 03    FC84  222                BCC   RDCX          ;NOT BANKSWITCHING/RRA0981
FC81:8D 54 C0       223                STA   $C054         ;FORCE MB TXTPAGE/RRA0981
FC84:2C 15 C0       224 RDCX           BIT   RDCXROM       ;FLAG->N /RRA0981
FC87:8D 06 C0       225                STA   SETSLOTCXROM  ;RESTORE BANK/RRA0981
FC8A:58             226                CLI                 ;ENABLE IRQ/RRA0981
FC8B:78             227                SEI                 ;NOW DISABLE/RRA0981
FC8C:10 03    FC91  228                BPL   ISSLOTS       ;=>WAS SLOTS/RRA0981
FC8E:8D 07 C0       229                STA   SETINTCXROM   ;BANK-IN CX/RRA0981
FC91:         FC91  230 ISSLOTS        EQU   *             ;/RRA0981
FC91:28             231                PLP                 ;WHAT VID BANK/PAGE?/RRA0981
FC92:90 05    FC99  232                BCC   ISPAGE1       ;=>NOT BANKED/RRA0981
FC94:10 03    FC99  233                BPL   ISPAGE1       ;IT'S PAGE1/RRA0981
FC96:2C 55 C0       234                BIT   $C055         ;FORCE PAGE2/RRA0981
FC99:         FC99  235 ISPAGE1        EQU   *             ;/RRA0981
FC99:60             236                RTS                 ;CONTINUE VIDEO/RRA0981
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FC9A:EA              237                   NOP               ;/RRA0981
FC9B:EA              238                   NOP               ;/RRA0981
FC9C:                239                   ELSE              ;/RRA0981
 S                   240 SCROLL    LDA     WNDTOP            ;START AT TOP OF SCROLL WINDOW
 S                   241           PHA
 S                   242           JSR     VTABZ             ;GENERATE BASE ADDRESS
 S                   243 SCRL1     LDA     BASL              ;COPY BASL,H
 S                   244           STA     BAS2L             ; TO BAS2L,H
 S                   245           LDA     BASH
 S                   246           STA     BAS2H
 S                   247           LDY     WNDWDTH           ;INIT Y TO RIGHTMOST INDEX
 S                   248           DEY                       ; OF SCROLLING WINDOW
 S                   249           PLA
 S                   250           ADC     #$01              ;INCR LINE NUMBER
 S                   251           CMP     WNDBTM            ;DONE?
 S                   252           BCS     SCRL3             ; YES, FINISH
 S                   253           PHA
 S                   254           JSR     VTABZ             ;FORM BASL,H (BASE ADDR)
 S                   255 SCRL2     LDA     (BASL),Y          ;MOVE A CHAR UP ONE LINE
 S                   256           STA     (BAS2L),Y
 S                   257           DEY                       ;NEXT CHAR OF LINE
 S                   258           BPL     SCRL2
 S                   259           BMI     SCRL1             ;NEXT LINE
 S                   260 SCRL3     LDY     #$00              ;CLEAR BOTTOM LINE
 S                   261           JSR     CLEOLZ            ;GET BASE ADDR FOR BOTTOM LINE
 S                   262           BCS     VTAB              ;CARRY IS SET
FC9C:                263           FIN                       ;/RRA0981
FC9C:          0001  264           DO      APPLE2E           ;/RRA0981
FC9C:          FC9C  265 CLREOL    EQU     *                 ;/RRA0981
FC9C:18              266           CLC                       ;SAY 'EOL'/RRA0981
FC9D:B0              267           DFB     $B0               ;'BCS' OPCODE /RRA0981
FC9E:          FC9E  268 CLREOLZ   EQU     *                 ;/RRA0981
FC9E:38              269           SEC                       ;SAY 'EOLZ'/RRA0981
FC9F:84 1F           270           STY     $1F               ;VIDEO'S YSAV1/RRA0981
FCA1:A0 03           271           LDY     #3                ;CODE=EOL/RRA0981
FCA3:90 CD    FC72   272           BCC     XGOTOCX           ;->IT'S EOL/RRA0981
FCA5:C8              273           INY                       ;CODE-EOLZ/RRA0981
FCA6:D0 CA    FC72   274           BNE     XGOTOCX           ;->ALWAYS/RRA0981
FCA8:                275           ELSE                      ;/RRA0981
 S                   276 CLREOL    LDY     CH                ;CURSOR H INDEX
 S                   277 CLEOLZ    LDA     #$A0              ;STORE BLANKS FROM 'HERE'
 S                   278 CLEOL2    STA     (BASL),Y          ;  TO END OF LINES (WNDWDTH)
 S                   279           INY
 S                   280           CPY     WNDWDTH
 S                   281           BCC     CLEOL2
 S                   282           RTS
FCA8:                283           FIN                       ;/RRA0981
FCA8:38              284 WAIT      SEC
FCA9:48              285 WAIT2     PHA
FCAA:E9 01           286 WAIT3     SBC     #$01
FCAC:D0 FC    FCAA   287           BNE     WAIT3             ;1.0204 USEC
FCAE:68              288           PLA                       ;(13+2712*A+512*A*A)
FCAF:E9 01           289           SBC     #$01
FCB1:D0 F6    FCA9   290           BNE     WAIT2
FCB3:60              291           RTS
FCB4:E6 42           292 NXTA4     INC     A4L               ;INCR 2-BYTE A4
FCB6:D0 02    FCBA   293           BNE     NXTA1             ; AND A1
FCB8:E6 43           294           INC     A4H
FCBA:A5 3C           295 NXTA1     LDA     A1L               ;INCR 2-BYTE A1.
FCBC:C5 3E           296           CMP     A2L               ; AND COMPARE TO A2
FCBE:A5 3D           297           LDA     A1H               ; (CARRY SET IF >=)
FCC0:E5 3F           298           SBC     A2H
FCC2:E6 3C           299           INC     A1L
FCC4:D0 02    FCC8   300           BNE     RTS4B
FCC6:E6 3D           301           INC     A1H
FCC8:60              302 RTS4B     RTS
FCC9:A0 4B           303 HEADR     LDY     #$4B              ;WRITE A*256 'LONG 1'
FCCB:20 DB FC        304           JSR     ZERDLY            ; HALF CYCLES
FCCE:D0 F9    FCC9   305           BNE     HEADR             ; (650 USEC EACH)
FCD0:69 FE           306           ADC     #$FE
FCD2:B0 F5    FCC9   307           BCS     HEADR             ;THEN A 'SHORT 0'
FCD4:A0 21           308           LDY     #$21              ; (400 USEC)
FCD6:20 DB FC        309 WRBIT     JSR     ZERDLY            ;WRITE TWO HALF CYCLES
FCD9:C8              310           INY                       ; OF 250 USEC ('0')
FCDA:C8              311           INY                       ; OR 500 USEC ('1')
FCDB:88              312 ZERDLY    DEY
FCDC:D0 FD    FCDB   313           BNE     ZERDLY
FCDE:90 05    FCE5   314           BCC     WRTAPE            ;Y IS COUNT FOR
FCE0:A0 32           315           LDY     #$32              ; TIMING LOOP
FCE2:88              316 ONEDLY    DEY
FCE3:D0 FD    FCE2   317           BNE     ONEDLY
FCE5:AC 20 C0        318 WRTAPE    LDY     TAPEOUT
FCE8:A0 2C           319           LDY     #$2C
FCEA:CA              320           DEX
FCEB:60              321           RTS
FCEC:A2 08           322 RDBYTE    LDX     #$08              ;8 BITS TO READ
FCEE:48              323 RDBYT2    PHA                       ;READ TWO TRANSITIONS
FCEF:20 FA FC        324           JSR     RD2BIT            ; (FIND EDGE)
FCF2:68              325           PLA
FCF3:2A              326           ROL     A                 ;NEXT BIT
FCF4:A0 3A           327           LDY     #$3A              ;COUNT FOR SAMPLES
FCF6:CA              328           DEX
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FCF7:D0 F5    FCEE  329             BNE   RDBYT2
FCF9:60             330             RTS
FCFA:20 FD FC       331 RD2BIT      JSR   RDBIT
FCFD:88             332 RDBIT       DEY                   ;DECR Y UNTIL
FCFE:AD 60 C0       333             LDA   TAPEIN          ; TAPE TRANSITION
FD01:45 2F          334             EOR   LASTIN
FD03:10 F8    FCFD  335             BPL   RDBIT
FD05:45 2F          336             EOR   LASTIN
FD07:85 2F          337             STA   LASTIN
FD09:C0 80          338             CPY   #$80            ;SET CARRY ON Y-REG.
FD0B:60             339             RTS
FD0C:A4 24          340 RDKEY       LDY   CH
FD0E:B1 28          341             LDA   (BASL),Y        ;SET SCREEN TO FLASH
FD10:48             342             PHA
FD11:29 3F          343             AND   #$3F
FD13:09 40          344             ORA   #$40
FD15:91 28          345             STA   (BASL),Y
FD17:68             346             PLA
FD18:6C 38 00       347             JMP   (KSWL)          ;GO TO USER KEY-IN
FD1B:         0001  348             DO    APPLE2E
FD1B:         FD1B  349 KEYIN       EQU   *
FD1B:A0 06          350             LDY   #6              ;RDKEY/RRA0981
FD1D:4C B4 F8       351             JMP   GOTOCX          ;/RRA0981
FD20:EA             352             NOP                   ;/RRA0981
FD21:         FD21  353 RDESC       EQU   *
FD21:20 0C FD       354             JSR   RDKEY           ;GET A KEY
FD24:A0 07          355             LDY   #7              ;CODE=FIXIT
FD26:4C B4 FB       356             JMP   GOTOCX
FD29:               357 *
FD29:               358 * RETURN FROM GOTOCX HERE:
FD29:               359 *
FD29:BD 06 C0       360             STA   SETSLOTCXROM    ;RESTORE BANK/RRA0981
FD2C:28             361             PLP                   ;RESTORE IRQ/RRA0981
FD2D:60             362             RTS                   ;RETURN TO CALLER/RRA0981
FD2E:               363             ELSE                  ;/RRA0981
 S                  364 KEYIN       INC   RNDL            ;INCR RND NUMBER
 S                  365             BNE   KEYIN2
 S                  366             INC   RNDH
 S                  367 KEYIN2      BIT   KBD             ;KEY DOWN?
 S                  368             BPL   KEYIN           ; LOOP UNTIL WE GET ONE
 S                  369             STA   (BASL),Y        ;REPLACE FLASHING SCREEN
 S                  370             LDA   KBD             ;GET KEYCODE
 S                  371             BIT   KBDSTRB         ;CLR KEY STROBE
FD2E:               372             FIN                   ;/RRA0981
FD2E:60             373             RTS
FD2F:         0001  374             DO    APPLE2E         ;/RRA0981
FD2F:20 21 FD       375 ESC         JSR   RDESC           ;/RRA0981
FD32:               376             ELSE                  ;/RRA0981
 S                  377 ESC         JSR   RDKEY           ;GET KEYCODE
FD32:               378             FIN                   ;/RRA0981
FD32:20 A5 FB       379             JSR   ESCNEW          ;HANDLE ESC FUNCTION.
FD35:20 0C FD       380 RDCHAR      JSR   RDKEY           ;GO READ KEY
FD38:C9 9B          381             CMP   #$9B            ;'ESC'?
FD3A:F0 F3    FD2F  382             BEQ   ESC             ;  YES, DON'T RETURN.
FD3C:60             383             RTS
FD3D:A5 32          384 NOTCR       LDA   INVFLG
FD3F:48             385             PHA
FD40:A9 FF          386             LDA   #$FF
FD42:         0001  387             DO    APPLE2E         ;/RRA0981
FD42:EA             388             NOP                   ;DON'T CHANGE INPUT/RRA0981
FD43:EA             389             NOP                   ; TO NORMAL/RRA0981
FD44:               390             ELSE                  ;/RRA0981
 S                  391             STA   INVFLG          ;CONVERT TYPED CHAR TO 'NORMAL'
FD44:               392             FIN                   ;/RRA0981
FD44:BD 00 02       393             LDA   IN,X
FD47:20 ED FD       394             JSR   COUT            ;ECHO TYPED CHAR
FD4A:68             395             PLA
FD4B:85 32          396             STA   INVFLG
FD4D:BD 00 02       397             LDA   IN,X
FD50:C9 88          398             CMP   #$88            ;CHECK FOR EDIT KEYS
FD52:F0 1D    FD71  399             BEQ   BCKSPC          ;  - BACKSPACE
FD54:C9 98          400             CMP   #$98
FD56:F0 0A    FD62  401             BEQ   CANCEL          ;  - CONTROL-X
FD58:E0 F8          402             CPX   #$F8
FD5A:90 03    FD5F  403             BCC   NOTCR1          ;MARGIN?
FD5C:20 3A FF       404             JSR   BELL            ; YES, SOUND BELL
FD5F:E8             405 NOTCR1      INX                   ;ADVANCE INPUT INDEX
FD60:D0 13    FD75  406             BNE   NXTCHAR
FD62:A9 DC          407 CANCEL      LDA   #$DC            ;BACKSLASH AFTER CANCELLED LINE
FD64:20 ED FD       408             JSR   COUT
FD67:20 8E FD       409 GETLNZ      JSR   CROUT           ;OUTPUT 'CR'
FD6A:A5 33          410 GETLN       LDA   PROMPT          ;OUTPUT PROMPT CHAR
FD6C:20 ED FD       411             JSR   COUT
FD6F:A2 01          412             LDX   #$01            ;INIT INPUT INDEX
FD71:8A             413 BCKSPC      TXA
FD72:F0 F3    FD67  414             BEQ   GETLNZ          ;WILL BACKSPACE TO 0
FD74:CA             415             DEX
FD75:20 35 FD       416 NXTCHAR     JSR   RDCHAR
FD78:C9 95          417             CMP   #$95            ;USE SCREEN CHAR
FD7A:D0 02    FD7E  418             BNE   CAPTST          ; FOR CONTROL-U
FD7C:B1 28          419             LDA   (BASL),Y
FD7E:C9 E0          420 CAPTST      CMP   #$E0            ;LOWER CASE?
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FD80:90 02    FD84  421              BCC   ADDINP
FD82:         0001  422              DO    APPLE2E      ;/RRA0981
FD82:29 FF          423              AND   #$FF         ;DON'T CONVERT TO UPPER CASE!/RRA0981
FD84:               424              ELSE               ;/RRA0981
 S                  425              AND   #$DF         ;SHIFT TO UPPER CASE
FD84:               426              FIN                ;/RRA0981
FD84:9D 00 02       427 ADDINP       STA   IN,X         ;ADD TO INPUT BUFFER
FD87:C9 8D          428              CMP   #$8D
FD89:D0 B2    FD3D  429              BNE   NOTCR
FD8B:20 9C FC       430              JSR   CLREOL       ;CLR TO EOL IF CR
FD8E:A9 8D          431 CROUT        LDA   #$8D
FD90:D0 5B    FDED  432              BNE   COUT         ;(ALWAYS)
FD92:A4 3D          433 PRA1         LDY   A1H          ;PRINT CR,A1 IN HEX
FD94:A6 3C          434              LDX   A1L
FD96:20 BE FD       435 PRYX2        JSR   CROUT
FD99:20 40 F9       436              JSR   PRNTYX
FD9C:A0 00          437              LDY   #$00
FD9E:A9 AD          438              LDA   #$AD         ;PRINT '-'
FDA0:4C ED FD       439              JMP   COUT
FDA3:A5 3C          440 XAM8         LDA   A1L
FDA5:09 07          441              ORA   #$07         ;SET TO FINISH AT
FDA7:85 3E          442              STA   A2L          ; MOD 8=7
FDA9:A5 3D          443              LDA   A1H
FDAB:85 3F          444              STA   A2H
FDAD:A5 3C          445 MOD8CHK      LDA   A1L
FDAF:29 07          446              AND   #$07
FDB1:D0 03    FDB6  447              BNE   DATAOUT
FDB3:20 92 FD       448 XAM          JSR   PRA1
FDB6:A9 A0          449 DATAOUT      LDA   #$A0
FDB8:20 ED FD       450              JSR   COUT         ;OUTPUT BLANK
FDBB:B1 3C          451              LDA   (A1L),Y
FDBD:20 DA FD       452              JSR   PRBYTE       ;OUTPUT BYTE IN HEX
FDC0:20 BA FC       453              JSR   NXTA1
FDC3:90 E8    FDAD  454              BCC   MOD8CHK      ;NOT DONE YET. GO CHECK MOD 8
FDC5:60             455 RTS4C        RTS                ;DONE.
FDC6:4A             456 XAMPM        LSR   A            ;DETERMINE IF MONITOR MODE IS
FDC7:90 EA    FDB3  457              BCC   XAM          ; EXAMINE, ADD OR SUBTRACT
FDC9:4A             458              LSR   A
FDCA:4A             459              LSR   A
FDCB:A5 3E          460              LDA   A2L
FDCD:90 02    FDD1  461              BCC   ADD
FDCF:49 FF          462              EOR   #$FF         ;FORM 2'S COMPLEMENT FOR SUBTRACT.
FDD1:65 3C          463 ADD          ADC   A1L
FDD3:48             464              PHA
FDD4:A9 BD          465              LDA   #$BD         ;PRINT '=', THEN RESULT
FDD6:20 ED FD       466              JSR   COUT
FDD9:68             467              PLA
FDDA:48             468 PRBYTE       PHA                ;PRINT BYTE AS 2 HEX DIGITS
FDDB:4A             469              LSR   A            ; (DESTROYS A-REG)
FDDC:4A             470              LSR   A
FDDD:4A             471              LSR   A
FDDE:4A             472              LSR   A
FDDF:20 E5 FD       473              JSR   PRHEXZ
FDE2:68             474              PLA
FDE3:29 0F          475 PRHEX        AND   #$0F         ;PRINT HEX DIGIT IN A-REG
FDE5:09 B0          476 PRHEXZ       ORA   #$B0         ;LSBITS ONLY.
FDE7:C9 BA          477              CMP   #$BA
FDE9:90 02    FDED  478              BCC   COUT
FDEB:69 06          479              ADC   #$06
FDED:6C 36 00       480 COUT         JMP   (CSWL)       ;VECTOR TO USER OUTPUT ROUTINE
FDF0:C9 A0          481 COUT1        CMP   #$A0
FDF2:90 02    FDF6  482              BCC   COUTZ        ;DON'T OUTPUT CTRL'S INVERSE.
FDF4:25 32          483              AND   INVFLG       ;MASK WITH INVERSE FLAG
FDF6:84 35          484 COUTZ        STY   YSAV1        ;SAVE Y-REG
FDF8:48             485              PHA                ;SAVE A-REG
FDF9:20 78 FB       486              JSR   VIDWAIT      ;OUTPUT CHR & CHECK FOR CTRL-S
FDFC:68             487              PLA                ;RESTORE A-REG
FDFD:A4 35          488              LDY   YSAV1        ; AND Y-REG
FDFF:60             489              RTS                ; RETURN TO SENDER...
FE00:C6 34          490 BL1          DEC   YSAV
FE02:F0 9F    FDA3  491              BEQ   XAM8
FE04:CA             492 BLANK        DEX                ;BLANK TO MON
FE05:D0 16    FE1D  493              BNE   SETMDZ       ;AFTER BLANK
FE07:C9 BA          494              CMP   #$BA         ;DATA STORE MODE?
FE09:D0 BB    FDC6  495              BNE   XAMPM        ; NO; XAM, ADD, OR SUBTRACT.
FE0B:85 31          496 STOR         STA   MODE         ;KEEP IN STORE MODE
FE0D:A5 3E          497              LDA   A2L
FE0F:91 40          498              STA   (A3L),Y      ;STORE AS LOW BYTE AT (A3)
FE11:E6 40          499              INC   A3L
FE13:D0 02    FE17  500              BNE   RTS5         ;INCR A3, RETURN.
FE15:E6 41          501              INC   A3H
FE17:60             502 RTS5         RTS
FE18:A4 34          503 SETMODE      LDY   YSAV         ;SAVE CONVERTED ':', '+',
FE1A:B9 FF 01       504              LDA   IN-1,Y       ; '-', '.' AS MODE
FE1D:85 31          505 SETMDZ       STA   MODE
FE1F:60             506              RTS
FE20:A2 01          507 LT           LDX   #$01
FE22:B5 3E          508 LT2          LDA   A2L,X        ;COPY A2 (2 BYTES) TO
FE24:95 42          509              STA   A4L,X        ; A4 AND A5
FE26:95 44          510              STA   A5L,X
FE28:CA             511              DEX
FE29:10 F7    FE22  512              BPL   LT2
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FE2B:60             513              RTS
FE2C:B1 3C          514 MOVE         LDA   (A1L),Y      ;MOVE (A1) THRU (A2) TO (A4)
FE2E:91 42          515              STA   (A4L),Y
FE30:20 B4 FC       516              JSR   NXTA4
FE33:90 F7   FE2C   517              BCC   MOVE
FE35:60             518              RTS
FE36:B1 3C          519 VFY          LDA   (A1L),Y      ;VERIFY (A1) THRU (A2)
FE38:D1 42          520              CMP   (A4L),Y      ; WITH (A4)
FE3A:F0 1C   FE58   521              BEQ   VFYOK
FE3C:20 92 FD       522              JSR   PRA1
FE3F:B1 3C          523              LDA   (A1L),Y
FE41:20 DA FD       524              JSR   PRBYTE
FE44:A9 A0          525              LDA   #$A0
FE46:20 ED FD       526              JSR   COUT
FE49:A9 A8          527              LDA   #$A8
FE4B:20 ED FD       528              JSR   COUT
FE4E:B1 42          529              LDA   (A4L),Y
FE50:20 DA FD       530              JSR   PRBYTE
FE53:A9 A9          531              LDA   #$A9
FE55:20 ED FD       532              JSR   COUT
FE58:20 B4 FC       533 VFYOK        JSR   NXTA4
FE5B:90 D9   FE36   534              BCC   VFY
FE5D:60             535              RTS
FE5E:20 75 FE       536 LIST         JSR   A1PC         ;MOVE A1 (2 BYTES) TO
FE61:A9 14          537              LDA   #$14         ; PC IF SPEC'D AND
FE63:48             538 LIST2        PHA                ; DISASSEMBLE 20 INSTRUCTIONS.
FE64:20 D0 F8       539              JSR   INSTDSP
FE67:20 53 F9       540              JSR   PCADJ        ;ADJUST PC AFTER EACH INSTRUCTION.
FE6A:85 3A          541              STA   PCL
FE6C:84 3B          542              STY   PCH
FE6E:68             543              PLA
FE6F:38             544              SEC
FE70:E9 01          545              SBC   #$01         ;NEXT OF 20 INSTRUCTIONS
FE72:D0 EF   FE63   546              BNE   LIST2
FE74:60             547              RTS
FE75:8A             548 A1PC         TXA                ;IF USER SPECIFIED AN ADDRESS,
FE76:F0 07   FE7F   549              BEQ   A1PCRTS      ; COPY IT FROM A1 TO PC.
FE78:B5 3C          550 A1PCLP       LDA   A1L,X        ;YEP, SO COPY IT.
FE7A:95 3A          551              STA   PCL,X
FE7C:CA             552              DEX
FE7D:10 F9   FE78   553              BPL   A1PCLP
FE7F:60             554 A1PCRTS      RTS
FE80:A0 3F          555 SETINV       LDY   #$3F         ;SET FOR INVERSE VID
FE82:D0 02   FE86   556              BNE   SETIFLG      ; VIA COUT1
FE84:A0 FF          557 SETNORM      LDY   #$FF         ;SET FOR NORMAL VID
FE86:84 32          558 SETIFLG      STY   INVFLG
FE88:60             559              RTS
FE89:A9 00          560 SETKBD       LDA   #$00         ;DO 'IN#0'
FE8B:85 3E          561 INPORT       STA   A2L          ;DO 'IN#AREG'
FE8D:A2 38          562 INPRT        LDX   #KSWL
FE8F:A0 1B          563              LDY   #KEYIN
FE91:D0 08   FE9B   564              BNE   IOPRT
FE93:A9 00          565 SETVID       LDA   #$00         ;DO 'PR#0'
FE95:85 3E          566 OUTPORT      STA   A2L          ;DO 'PR#AREG'
FE97:A2 36          567 OUTPRT       LDX   #CSWL
FE99:A0 F0          568              LDY   #COUT1
FE9B:A5 3E          569 IOPRT        LDA   A2L          ;SET INPUT/OUTPUT VECTORS
FE9D:29 0F          570              AND   #$0F
FE9F:F0 06   FEA7   571              BEQ   IOPRT1
FEA1:09 C0          572              ORA   #<IOADR
FEA3:A0 00          573              LDY   #$00
FEA5:F0 02   FEA9   574              BEQ   IOPRT2
FEA7:A9 FD          575 IOPRT1       LDA   #<COUT1
FEA9:        FEA9   576 IOPRT2       EQU   *
FEA?:94 00          577              STY   LOC0,X
FEAB:95 01          578              STA   LOC1,X
FEAD:60             579              RTS
FEAE:EA             580              NOP
FEAF:00             581 CKSUMFIX     DFB   0            ;/RRA0981
FEB0:               582 *    ;-->CORRECT CKSUM AT CREATE TIME.
FEB0:4C 00 E0       583 XBASIC       JMP   BASIC        ;TO BASIC, COLD START
FEB3:4C 03 E0       584 BASCONT      JMP   BASIC2       ;TO BASIC, WARM START
FEB6:20 75 FE       585 GO           JSR   A1PC         ;ADDR TO PC IF SPECIFIED
FEB9:20 3F FF       586              JSR   RESTORE      ;RESTORE FAKE REGISTERS
FEBC:6C 3A 00       587              JMP   (PCL)        ;AND GO!
FEBF:4C D7 FA       588 REGZ         JMP   REGDSP       ;GO DISPLAY REGISTERS
FEC2:60             589 TRACE        RTS                ;TRACE IS GONE
FEC3:EA             590              NOP
FEC4:60             591 STEPZ        RTS                ;STEP IS GONE
FEC5:C2 F2 F9 E1    592              ASC   'Bryan'
FECA:4C F8 03       593 USR          JMP   USRADR       ;JUMP TO CONTROL-Y VECTOR IN RAM
FECD:A9 40          594 WRITE        LDA   #$40         ;TAPE WRITE ROUTINE
FECF:20 C9 FC       595              JSR   HEADR        ;WRITE 10-SEC HEADER
FED2:A0 27          596              LDY   #$27
FED4:A2 00          597 WR1          LDX   #$00
FED6:41 3C          598              EOR   (A1L,X)
FED8:48             599              PHA
FED9:A1 3C          600              LDA   (A1L,X)
FEDB:20 ED FE       601              JSR   WRBYTE
FEDE:20 BA FC       602              JSR   NXTA1
FEE1:A0 1D          603              LDY   #$1D
FEE3:68             604              PLA
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FEE4: 90 EE    FED4  605            BCC   WR1
FEE6: A0 22          606            LDY   #$22
FEE8: 20 ED FE       607            JSR   WRBYTE
FEEB: F0 4D    FF3A  608            BEQ   BELL
FEED: A2 10          609 WRBYTE     LDX   #$10
FEEF: 0A             610 WRBYT2     ASL   A
FEF0: 20 D6 FC       611            JSR   WRBIT
FEF3: D0 FA    FEEF  612            BNE   WRBYT2
FEF5: 60             613            RTS
FEF6: 20 00 FE       614 CRMON      JSR   BL1          ;HANDLE CR AS BLANK
FEF9: 68             615            PLA                ;  THEN POP STACK
FEFA: 68             616            PLA                ;  AND RETURN TO MON
FEFB: D0 6C    FF69  617            BNE   MONZ         ;(ALWAYS)
FEFD: 20 FA FC       618 READ       JSR   RD2BIT       ;TAPE READ - FIND TAPEIN EDGE
FF00: A9 16          619            LDA   #$16         ;DELAY 3.5 SECONDS
FF02: 20 C9 FC       620            JSR   HEADR
FF05: 85 2E          621            STA   CHKSUM       ;INITIAL CHECKSUM = $FF
FF07: 20 FA FC       622            JSR   RD2BIT       ;FIND AN EDGE
FF0A: A0 24          623 RD2        LDY   #$24         ;LOOK FOR SYNC BIT
FF0C: 20 FD FC       624            JSR   RDBIT        ;  (SHORT 0)
FF0F: B0 F9    FF0A  625            BCS   RD2          ;LOOP 'TIL FOUND
FF11: 20 FD FC       626            JSR   RDBIT        ;SKIP 2ND HALF CYCLE
FF14: A0 3B          627            LDY   #$3B         ;INDEX FOR 0/1 TEST
FF16: 20 EC FC       628 RD3        JSR   RDBYTE       ;READ A BYTE
FF19: 81 3C          629            STA   (A1L,X)      ;PUT IT AT (A1)
FF1B: 45 2E          630            EOR   CHKSUM       ;UPDATE RUNNING CHECKSUM
FF1D: 85 2E          631            STA   CHKSUM
FF1F: 20 BA FC       632            JSR   NXTA1        ;INCR A1, COMPARE TO A2
FF22: A0 35          633            LDY   #$35         ;COMPENSATE 0/1 INDEX
FF24: 90 F0    FF16  634            BCC   RD3          ;REPEAT 'TIL DONE.
FF26: 20 EC FC       635            JSR   RDBYTE       ;READ CHECKSUM BYTE
FF29: C5 2E          636            CMP   CHKSUM       ;DOES THE RECORDED CHKSM MATCH OURS?
FF2B: F0 0D    FF3A  637            BEQ   BELL         ;  YEP, READ OK.  BEEP AND RETURN.
FF2D: A9 C5          638 PRERR      LDA   #$C5         ;PRINT 'ERR', THEN FALL INTO
FF2F: 20 ED FD       639            JSR   COUT         ;  FWEEPER.
FF32: A9 D2          640            LDA   #$D2
FF34: 20 ED FD       641            JSR   COUT
FF37: 20 ED FD       642            JSR   COUT
FF3A: A9 87          643 BELL       LDA   #$87         ;MAKE A JOYFUL NOISE, THEN RETURN.
FF3C: 4C ED FD       644            JMP   COUT
FF3F: A5 48          645 RESTORE    LDA   STATUS       ;RESTORE 6502 REGISTER CONTENTS
FF41: 48             646            PHA                ;  USED BY DEBUG SOFTWARE
FF42: A5 45          647            LDA   A5H
FF44: A6 46          648 RESTR1     LDX   XREG
FF46: A4 47          649            LDY   YREG
FF48: 28             650            PLP
FF49: 60             651            RTS
FF4A: 85 45          652 SAVE       STA   A5H          ;SAVE 6502 REGISTER CONTENTS
FF4C: 86 46          653 SAV1       STX   XREG         ;  FOR DEBUG SOFTWARE
FF4E: 84 47          654            STY   YREG
FF50: 08             655            PHP
FF51: 68             656            PLA
FF52: 85 48          657            STA   STATUS
FF54: BA             658            TSX
FF55: 86 49          659            STX   SPNT
FF57: D8             660            CLD
FF58: 60             661            RTS
FF59: 20 84 FE       662 OLDRST     JSR   SETNORM      ;SET SCREEN MODE
FF5C: 20 2F FB       663            JSR   INIT         ;  AND INIT KBD/SCREEN
FF5F: 20 93 FE       664            JSR   SETVID       ;  AS I/O DEVS.
FF62: 20 89 FE       665            JSR   SETKBD
FF65: D8             666 MON        CLD                ;MUST SET HEX MODE!
FF66: 20 3A FF       667            JSR   BELL         ;FWEEPER.
FF69: A9 AA          668 MONZ       LDA   #$AA         ;'*' PROMPT FOR MONITOR
FF6B: 85 33          669            STA   PROMPT
FF6D: 20 67 FD       670            JSR   GETLNZ       ;READ A LINE OF INPUT
FF70: 20 C7 FF       671            JSR   ZMODE        ;CLEAR MONITOR MODE, SCAN IDX
FF73: 20 A7 FF       672 NXTITM     JSR   GETNUM       ;GET ITEM, NON-HEX
FF76: 84 34          673            STY   YSAV         ;  CHAR IN A-REG.
FF78: A0 17          674            LDY   #$17         ;  X-REG=0 IF NO HEX INPUT
FF7A: 88             675 CHRSRCH    DEY
FF7B: 30 E8    FF65  676            BMI   MON          ;COMMAND NOT FOUND, BEEP & TRY AGAIN.
FF7D: D9 CC FF       677            CMP   CHRTBL,Y     ;FIND COMMAND CHAR IN TABLE
FF80: D0 F8    FF7A  678            BNE   CHRSRCH      ;NOT THIS TIME
FF82: 20 BE FF       679            JSR   TOSUB        ;GOT IT!  CALL CORRESPONDING SUBROUTINE
FF85: A4 34          680            LDY   YSAV         ;PROCESS NEXT ENTRY ON HIS LINE
FF87: 4C 73 FF       681            JMP   NXTITM
FF8A: A2 03          682 DIG        LDX   #$03
FF8C: 0A             683            ASL   A
FF8D: 0A             684            ASL   A            ;GOT HEX DIGIT,
FF8E: 0A             685            ASL   A            ;  SHIFT INTO A2
FF8F: 0A             686            ASL   A
FF90: 0A             687 NXTBIT     ASL   A
FF91: 26 3E          688            ROL   A2L
FF93: 26 3F          689            ROL   A2H
FF95: CA             690            DEX                ;LEAVE X=$FF IF DIG
FF96: 10 F8    FF90  691            BPL   NXTBIT
FF98: A5 31          692 NXTBAS     LDA   MODE
FF9A: D0 06    FFA2  693            BNE   NXTBS2       ;IF MODE IS ZERO,
FF9C: B5 3F          694            LDA   A2H,X        ;  THEN COPY A2 TO A1 AND A3
FF9E: 95 3D          695            STA   A1H,X
FFA0: 95 41          696            STA   A3H,X
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FFA2: E8              697 NXTBS2    INX
FFA3: F0 F3    FF98   698           BEQ   NXTBAS
FFA5: D0 06    FFAD   699           BNE   NXTCHR
FFA7: A2 00           700 GETNUM    LDX   #$00          ;CLEAR A2
FFA9: 86 3E           701           STX   A2L
FFAB: 86 3F           702           STX   A2H
FFAD: B9 00 02        703 NXTCHR    LDA   IN,Y          ;GET CHAR
FFB0: C8              704           INY
FFB1: 49 B0           705           EOR   #$B0
FFB3: C9 0A           706           CMP   #$0A
FFB5: 90 D3    FF8A   707           BCC   DIG           ;BR IF HEX DIGIT
FFB7: 69 88           708           ADC   #$88
FFB9: C9 FA           709           CMP   #$FA
FFBB: B0 CD    FF8A   710           BCS   DIG
FFBD: 60              711           RTS
FFBE: A9 FE           712 TOSUB     LDA   #<GO          ;DISPATCH TO SUBROUTINE, BY
FFC0: 48              713           PHA                 ; PUSHING THE HI-ORDER SUBR ADDR,
FFC1: B9 E3 FF        714           LDA   SUBTBL,Y      ; THEN THE LO-ORDER SUBR ADDR
FFC4: 48              715           PHA                 ; ONTO THE STACK.
FFC5: A5 31           716           LDA   MODE          ; (CLEARING THE MODE, SAVE THE OLD
FFC7: A0 00           717 ZMODE     LDY   #$00          ; MODE IN A-REG),
FFC9: 84 31           718           STY   MODE
FFCB: 60              719           RTS                 ; AND 'RTS' TO THE SUBROUTINE!
FFCC: BC              720 CHRTBL    DFB   $BC           ;^C   (BASIC WARM START)
FFCD: B2              721           DFB   $B2           ;^Y   (USER VECTOR)
FFCE: BE              722           DFB   $BE           ;^E   (OPEN AND DISPLAY REGISTERS)
FFCF: B2              723           DFB   $B2           ;T    (ONCE WAS TRACE; NEVER USED.)
FFD0: EF              724           DFB   $EF           ;V    (MEMORY VERIFY)
FFD1: C4              725           DFB   $C4           ;^K   (IN#SLOT)
FFD2: B2              726           DFB   $B2           ;S    (ONCE WAS STEP; NOW NEVER USED.)
FFD3: A9              727           DFB   $A9           ;^P   (PR#SLOT)
FFD4: BB              728           DFB   $BB           ;^B   (BASIC COLD START)
FFD5: A6              729           DFB   $A6           ;'-'  (SUBTRACTION)
FFD6: A4              730           DFB   $A4           ;'+'  (ADDITION)
FFD7: 06              731           DFB   $06           ;M    (MEMORY MOVE)
FFD8: 95              732           DFB   $95           ;'<'  (DELIMITER FOR MOVE, VFY)
FFD9: 07              733           DFB   $07           ;N    (SET NORMAL VIDEO)
FFDA: 02              734           DFB   $02           ;I    (SET INVERSE VIDEO)
FFDB: 05              735           DFB   $05           ;L    (DISASSEMBLE 20 INSTRS)
FFDC: F0              736           DFB   $F0           ;W    (WRITE TO TAPE)
FFDD: 00              737           DFB   $00           ;G    (EXECUTE PROGRAM)
FFDE: EB              738           DFB   $EB           ;R    (READ FROM TAPE)
FFDF: 93              739           DFB   $93           ;':'  (MEMORY FILL)
FFE0: A7              740           DFB   $A7           ;'.'  (ADDRESS DELIMITER)
FFE1: C6              741           DFB   $C6           ;'CR' (END OF INPUT)
FFE2: 99              742           DFB   $99           ;BLANK
FFE3: B2              743 SUBTBL    DFB   $B2           ;TABLE OF LO-ORDER MONITOR ROUTINE
FFE4: C9              744           DFB   $C9           ; DISPATCH ADDRESSES
FFE5: BE              745           DFB   $BE
FFE6: C1              746           DFB   $C1
FFE7: 35              747           DFB   $35
FFE8: BC              748           DFB   $BC
FFE9: C4              749           DFB   $C4
FFEA: 96              750           DFB   $96
FFEB: AF              751           DFB   $AF
FFEC: 17              752           DFB   $17
FFED: 17              753           DFB   $17
FFEE: 2B              754           DFB   $2B
FFEF: 1F              755           DFB   $1F
FFF0: 83              756           DFB   $83
FFF1: 7F              757           DFB   $7F
FFF2: 5D              758           DFB   $5D
FFF3: CC              759           DFB   $CC
FFF4: B5              760           DFB   $B5
FFF5: FC              761           DFB   $FC
FFF6: 17              762           DFB   $17
FFF7: 17              763           DFB   $17
FFF8: F5              764           DFB   $F5
FFF9: 03              765           DFB   $03
FFFA: FB 03           766           DW    NMI           ;NON-MASKABLE INTERRUPT VECTOR
FFFC: 62 FA           767           DW    RESET         ;RESET VECTOR
FFFE: 40 FA           768           DW    IRQ           ;INTERRUPT REQUEST VECTOR
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Monitor Symbol Table, Sorted by Symbol

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   3D A1H          3C A1L          FE75 A1PC       FE78 A1PCLP
 FE7F A1PCRTS      3F A2H            3E A2L          41 A3H
   40 A3L          43 A4H            42 A4L          45 A5H
   44 A5L          45 ACC          FDD1 ADD        FD84 ADD1NP
 FBF4 ADVANCE    ?03F5 AMPERV        01 APPLE2E    FB60 APPLEII
?  2B BAS2H     ?  2A BAS2L       FBC1 BASCALC    FBD0 BASCLC2
?FE83 BASCONT      29 BASH         E000 BASIC      E003 BASIC2
   28 BASL       FD71 BCKSPC     FBD9 BELL1      FBE4 BELL2
 FF3A BELL       FE00 BL1        ?FE04 BLANK     FA4C BREAK
 03F0 BRKV       FC10 BS         FD62 CANCEL     FD7E CAPTST
 F9B4 CHAR1      F9BA CHAR2        2E CHKSUM     FF7A CHRSRCH
   24 CH         FFCC CHRTBL     ?FEAF CKSUMFIX  ?C059 CLRANO
?C05B CLRAN1    ?C05D CLRAN2    ?C05F CLRAN3    FC9C CLREOL
?FC9E CLREOLZ   ?FC42 CLREOP      CFFF CLRROM   FB38 CLRSC2
 F83C CLRSC3    ?F832 CLRSCR    F836 CLRTOP       30 COLOR
 FDED COUT       FDF0 COUT1      FDF6 COUTZ    FD8E CROUT
 FC62 CR       ?FEF6 CRMON     ?  37 CSWH        36 CSWL
   25 CV         FDB6 DATAOUT    FF8A DIG      FB02 DISKID
 F8A5 ERR        FD2F ESC        FC2C ESC1     F8A5 ESCNEW
 FB9B ESCNOW     FB97 ESCOLD     FA9B FIXSEV   F962 FMT1
 F9A6 FMT2         2E FORMAT     F847 GBASCALC     27 GBASH
   26 GBASL      F856 GBCALC     F8A9 GETFMT   ?FD6A GETLN
 FD67 GETLNZ     FFA7 GETNUM     FBB4 GOTOCX     FEB6 GO
   2C H2         FCC9 HEADR    ?C057 HIRES     ?C055 HISCR
?F819 HLINE      F81C HLINE1     FC58 HOME     FB9B IEVEN
?FA6F INITAN     FB2F INIT     ?FE8B INPORT    ?FE8D INPRT
 F882 INSDS1   ?F88C INSDS2      F8D0 INSTDSP      32 INVFLG
 0200 IN         C000 IOADR      FEA7 IOPRT1     FEA9 IOPRT2
 FE9B IOPRT      03FE IRQLOC     FA40 IRQ        FC99 ISPAGE1
 FC91 ISSLOTS    C000 KBD        C010 KBDSTRB    FB88 KBDWAIT
 FD1B KEYIN    ?  39 KSWH          38 KSWL       2F LASTIN
   2F LENGTH     FC66 LF       0400 LINE1      FE63 LIST2
?FE5E LIST         2C LMNEM       00 LOC0       01 LOC1
 C056 LORES      C054 LOWSCR     ?FE20 LT        FE22 LT2
   2E MASK     ?C052 MIXCLR      C053 MIXSET     F9C0 MNEML
 FA00 MNEMR      FBBE MNNDX1     F8C2 MNNDX2     F8C9 MNNDX3
 FDAD MODBCHK      31 MODE       FF65 MON        FF69 MONZ
 FE2C MOVE       07F8 MSLOT    ?FAB1 NEWMON      03FB NMI
 FAA3 NOFIX      FD5F NOTCR1     FD3D NOTCR      FB94 NOWAIT
 FCBA NXTA1      FCB4 NXTA4      FF98 NXTBAS     FF90 NXTBIT
 FFA2 NXTBS2     FAC7 NXTBYT     FD75 NXTCHAR    FFAD NXTCHR
?F85F NXTCOL     FF73 NXTITM     FA59 OLDBRK   ?FF59 OLDRST
 FCE2 ONEDLY   ?FE95 OUTPORT   ?FE97 OUTPRT      C064 PADDLO
?F954 PCADJ2     F956 PCADJ3     F953 PCADJ      F95C PCADJ4
   3B PCH          3A PCL     ?  95 PICK        F80E PLOT1
 F800 PLOT       FD92 PRA1       F910 PRADR1     F914 PRADR2
 F926 PRADR3     F92A PRADR4     F930 PRADR5     F94A PRBL2
?F94C PRBL3      F948 PRBLNK     FDDA PRBYTE     FB25 PREAD2
?FB1E PREAD    ?FF2D PRERR       FDE5 PRHEX2   ?FDE3 PRHEX
 F8F5 PRMN1      F8F9 PRMN2    ?F941 PRNTAX      F8DB PRNTBL
 F8D4 PRNTOP   ?F944 PRNTX       F940 PRNTYX       33 PROMPT
 FD96 PRYX2      C070 PTRIG      FAFD PWRCON     03F4 PWREDUP
 FAA6 PWRUP      FCFA RD2BIT     FF0A RD2        FF16 RD3
 C018 RDBOSTORE  FCFD RDBIT      FCEE RDBYT2     FCEC RDBYTE
 FD35 RDCHAR     C015 RDCXROM    FCB4 RDCX       FD21 RDESC
 FD0C RDKEY      C01C RDPAGE2    FAE4 RDSP1    ?FEFD READ
 FAD7 REQDSP   ?FEBF REQZ      ?F93B RELADR      FA62 RESET
 FF3F RESTORE  ?FF44 RESTR1      FADA RGDSP1       2D RMNEM
?  4F RNDH     ?  4E RNDL         FB19 RTBL     F80C RTMASK
 F87F RTMSKZ     FB31 RTS1       F961 RTS2       FBEF RTS2B
 FB2E RTS2D      FBFC RTS3       FCC8 RTS4B    ?FDC5 RTS4C
 FC2B RTS4       FE17 RTS5       FF4C SAV1     ?FF4A SAVE
?FB71 SCRN       FB79 SCRN2    ?FC70 SCROLL      C058 SETANO
 C05A SETAN1   ?C05C SETAN2    ?C05E SETAN3    ?FB64 SETCOL
?FB40 SETGR      FE86 SETIFLG    C007 SETINTCXROM?FE80 SETINV
 FE89 SETKBD     FE1D SETMDZ   ?FE18 SETMODE     FE84 SETNORM
?FAA9 SETPG3     FAAB SETPLP   ?FB6F SETPWRC     C006 SETSLOTCXROM
?FB39 SETTXT     FE93 SETVID     FB4B SETWND   ?  2F SIGN
 FABA SLOOP      03F2 SOFTEV     C030 SPKR       49 SPNT
   48 STATUS   ?FEC4 STEPZ       FB65 STITLE   ?FE0B STOR
 FBF0 STORADV    FFE3 SUBTBL   ?FB5B TABV       C060 TAPEIN
 C020 TAPEOUT    FB09 TITLE      FFBE TOSUB    ?FEC2 TRACE
 C050 TXTCLR     C051 TXTSET     FC1A UP       ?FECA USR
 03FB USRADR       2D V2       ?FBB3 VERSION     FE58 VFYOK
 FE36 VFY        FBFD VIDOUT     FB78 VIDWAIT    FB2B VLINE
 FB26 VLINEZ     FC22 VTAB       FC24 VTABZ      FCA8 WAIT
 FCA9 WAIT2      FCAA WAIT3        23 WNDBTM       20 WNDLFT
```

```
   22 WNDTOP          21 WNDWDTH        FED4 WR1          FCD6 WRBIT
 FEEF WRBYT2        FEED WRBYTE       ?FECD WRITE        FCE5 WRTAPE
 FDB3 XAM           FDA3 XAMB          FDC6 XAMPM       ?FEB0 XBASIC
 FC72 XGOTOCX       FB11 XLTBL           46 XREG           47 YREG
   34 YSAV            35 YSAV1         FCDB ZERDLY       FFC7 ZMODE
** SUCCESSFUL ASSEMBLY := NO ERRORS
** ASSEMBLER CREATED ON 05-JAN-82 000004
** TOTAL LINES ASSEMBLED  1435
** FREE SPACE PAGE COUNT   67
    2  BJS.SRC2
```

Monitor Symbol Table, Sorted by Address

```
   00 LOC0          01 APPLE2E       01 LOC1          20 WNDLFT
   21 WNDWDTH       22 WNDTOP        23 WNDBTM        24 CH
   25 CV            26 GBASL         27 GBASH         28 BASL
   29 BASH        ? 2A BAS2L       ? 2B BAS2H         2C H2
   2C LMNEM         2D V2            2D RMNEM         2E MASK
   2E CHKSUM        2E FORMAT        2F LASTIN        2F LENGTH
 ? 2F SIGN          30 COLOR         31 MODE          32 INVFLG
   33 PROMPT        34 YSAV          35 YSAV1         36 CSWL
 ? 37 CSWH          38 KSWL        ? 39 KSWH          3A PCL
   3B PCH           3C A1L           3D A1H           3E A2L
   3F A2H           40 A3L           41 A3H           42 A4L
   43 A4H           44 A5L           45 A5H           45 ACC
   46 XREG          47 YREG          48 STATUS        49 SPNT
 ? 4E RNDL        ? 4F RNDH        ? 95 PICK        0200 IN
 03F0 BRKV        03F2 SOFTEV      03F4 PWREDUP     ?03F5 AMPERV
 03F8 USRADR      03FB NMI         03FE IRQLOC      0400 LINE1
 07F8 MSLOT       C000 IOADR       C000 KBD         C006 SETSLOTCXROM
 C007 SETINTCXROM C010 KBDSTRB     C015 RDCXROM     C018 RD80STORE
 C01C RDPAGE2     C020 TAPEOUT     C030 SPKR        C050 TXTCLR
 C051 TXTSET    ?C052 MIXCLR       C053 MIXSET      C054 LOWSCR
?C055 HISCR       C056 LORES     ?C057 HIRES        C058 SETAN0
?C059 CLRAN0    ?C05A SETAN1     ?C05B CLRAN1     ?C05C SETAN2
?C05D CLRAN2    ?C05E SETAN3     ?C05F CLRAN3       C060 TAPEIN
 C064 PADDL0      C070 PTRIG       CFFF CLRROM      E000 BASIC
 E003 BASIC2      F800 PLOT        F80C RTMASK      F80E PLOT1
?F819 HLINE       F81C HLINE1      F826 VLINEZ      F828 VLINE
 F831 RTS1      ?F832 CLRSCR       F836 CLRTOP      F83B CLRSC2
 F83C CLRSC3      F847 GBASCALC    F856 GBCALC    ?F85F NXTCOL
?F864 SETCOL    ?F871 SCRN         F879 SCRN2       F87F RTMSKZ
 F882 INSDS1    ?F88C INSDS2       F89B IEVEN       F8A5 ERR
 F8A9 GETFMT      F8BE MNNDX1      F8C2 MNNDX2      F8C9 MNNDX3
 F8D0 INSTDSP     F8D4 PRNTOP      F8DB PRNTBL      F8F5 PRMN1
 F8F9 PRMN2       F910 PRADR1      F914 PRADR2      F926 PRADR3
 F92A PRADR4      F930 PRADR5    ?F938 RELADR       F940 PRNTYX
?F941 PRNTAX    ?F944 PRNTX        F948 PRBLNK      F94A PRBL2
?F94C PRBL3      F953 PCADJ     ?F954 PCADJ2       F956 PCADJ3
 F95C PCADJ4      F961 RTS2        F962 FMT1        F9A6 FMT2
 F9B4 CHAR1       F9BA CHAR2       F9C0 MNEML       FA00 MNEMR
 FA40 IRQ         FA4C BREAK       FA59 OLDBRK      FA62 RESET
?FA6F INITAN    ?FA81 NEWMON       FA9B FIXSEV      FAA3 NOFIX
 FAA6 PWRUP     ?FAA9 SETPG3       FAAB SETPLP      FABA SLOOP
 FAC7 NXTBYT      FAD7 REGDSP      FADA RGDSP1      FAE4 RDSP1
 FAFD PWRCON      FB02 DISKID      FB09 TITLE       FB11 XLTBL
 FB19 RTBL      ?FB1E PREAD        FB25 PREAD2      FB2E RTS2D
 FB2F INIT      ?FB39 SETTXT     ?FB40 SETGR        FB4B SETWND
?FB5B TABV        FB60 APPLEII     FB65 STITLE    ?FB6F SETPWRC
 FB78 VIDWAIT     FB88 KBDWAIT     FB94 NOWAIT      FB97 ESCOLD
 FB9B ESCNOW      FBA5 ESCNEW    ?FBB3 VERSION      FBB4 GOTOCX
 FBC1 BASCALC     FBD0 BASCLC2     FBD9 BELL1       FBE4 BELL2
 FBEF RTS2B       FBF0 STORADV     FBF4 ADVANCE     FBFC RTS3
 FBFD VIDOUT      FC10 BS          FC1A UP          FC22 VTAB
 FC24 VTABZ       FC2B RTS4        FC2C ESC1      ?FC42 CLREOP
 FC58 HOME        FC62 CR          FC66 LF        ?FC70 SCROLL
 FC72 XGOTOCX     FC84 RDCX        FC91 ISSLOTS     FC99 ISPAGE1
 FC9C CLREOL    ?FC9E CLREOLZ      FCAB WAIT        FCA9 WAIT2
 FCAA WAIT3       FCB4 NXTA4       FCBA NXTA1       FCC8 RTS4B
 FCC9 HEADR       FCD6 WRBIT       FCDB ZERDLY      FCE2 ONEDLY
 FCE5 WRTAPE      FCEC RDBYTE      FCEE RDBYT2      FCFA RD2BIT
 FCFD RDBIT       FD0C RDKEY       FD1B KEYIN       FD21 RDESC
 FD2F ESC         FD35 RDCHAR      FD3D NOTCR       FD5F NOTCR1
 FD62 CANCEL      FD67 GETLNZ    ?FD6A GETLN        FD71 BCKSPC
 FD75 NXTCHAR     FD7E CAPTST      FD8B ADDINP      FD8E CROUT
 FD92 PRA1        FD96 PRYX2       FDA3 XAMB        FDAD MOD8CHK
 FDB3 XAM         FDB6 DATAOUT   ?FDC5 RTS4C        FDC6 XAMPM
 FDD1 ADD         FDDA PRBYTE    ?FDE3 PRHEX        FDE5 PRHEXZ
 FDED COUT        FDF0 COUT1       FDF6 COUTZ       FE00 BL1
?FE04 BLANK     ?FE0B STOR         FE17 RTS5      ?FE18 SETMODE
 FE1D SETMDZ    ?FE20 LT           FE22 LT2         FE2C MOVE
 FE36 VFY         FE58 VFYOK     ?FE5E LIST         FE63 LIST2
 FE75 A1PC        FE78 A1PCLP      FE7F A1PCRTS   ?FE80 SETINV
 FE84 SETNORM     FE86 SETIFLG     FE89 SETKBD    ?FE8B INPORT
?FE8D INPRT       FE93 SETVID    ?FE95 OUTPORT    ?FE97 OUTPRT
 FE9B IOPRT       FEA7 IOPRT1      FEA9 IOPRT2    ?FEAF CKSUMFIX
?FEB0 XBASIC    ?FEB3 BASCONT      FEB6 GO        ?FEBF REGZ
?FEC2 TRACE '   ?FEC4 STEPZ      ?FECA USR        ?FECD WRITE
 FED4 WR1         FEED WRBYTE      FEEF WRBYT2    ?FEF6 CRMON
```

```
?FEFD READ            FF0A RD2             FF16 RD3           ?FF2D PRERR
 FF3A BELL            FF3F RESTORE        ?FF44 RESTR1         ?FF4A SAVE
 FF4C SAV1           ?FF59 OLDRST          FF65 MON             FF69 MONZ
 FF73 NXTITM          FF7A CHRSRCH         FF8A DIG             FF90 NXTBIT
 FF98 NXTBAS          FFA2 NXTBS2          FFA7 GETNUM          FFAD NXTCHR
 FFBE TOSUB           FFC7 ZMODE           FFCC CHRTBL          FFE3 SUBTBL
** SUCCESSFUL ASSEMBLY := NO ERRORS
** ASSEMBLER CREATED ON 05-JAN-82 000004
** TOTAL LINES ASSEMBLED  1438
** FREE SPACE PAGE COUNT   67
    2  BJS.SRC2
```

80-Column Firmware Listing

```
0000:                2 ****************************************
0000:                3 *
0000:                4 * Apple //e VIDEO FIRMWARE
0000:                5 *
0000:                6 * RICK AURICCHIO 08/81
0000:                7 *
0000:                8 * (C) 1981, APPLE COMPUTER INC.
0000:                9 *      ALL RIGHTS RESERVED
0000:               10 *
0000:               11 ****************************************
0000:               12 *
0000:  0006         13 GOODF8       EQU   6             ;F8 ROM VERSION
0000:               14 *
0000:               15 * HARDWARE EQUATES:
0000:               16 *
0000:  C000         17 KBD          EQU   $C000         ;KEYBOARD PORT
0000:  C000         18 CLR80COL     EQU   $C000         ;DISABLE 80COL STORE
0000:  C001         19 SET80COL     EQU   $C001         ;ENABLE 80COL STORE
0000:  C002         20 RDMAINRAM    EQU   $C002         ;READ MAINBOARD RAM
0000:  C003         21 RDCARDRAM    EQU   $C003         ;READ CARD RAM
0000:  C004         22 WRMAINRAM    EQU   $C004         ;WRITE MAINBOARD RAM
0000:  C005         23 WRCARDRAM    EQU   $C005         ;WRITE CARD RAM
0000:  C007         24 SETINTCXROM  EQU   $C007         ;SET INTERNAL CX00 ROM
0000:  C008         25 SETSTDZP     EQU   $C008         ;SET STD ZP/STK
0000:  C009         26 SETALTZP     EQU   $C009         ;SET ALT ZP/STK
0000:  C00B         27 SETSLOTC3ROM EQU   $C00B
0000:  C00C         28 CLR80VID     EQU   $C00C         ;DISABLE 80COL VIDEO
0000:  C00D         29 SET80VID     EQU   $C00D         ;ENABLE 80COL VIDEO
0000:  C00E         30 CLRALTCHAR   EQU   $C00E         ;NORM LC, FLASH UC
0000:  C00F         31 SETALTCHAR   EQU   $C00F         ;NORM/INV LC, NO FLASH
0000:  C010         32 KBDSTRB      EQU   $C010         ;CLEAR STROBE
0000:  C011         33 RDLCBNK2     EQU   $C011         ;READS LC BANK2
0000:  C012         34 RDLCRAM      EQU   $C012         ;READS LC RAM ENABLE
0000:  C013         35 RDRAMRD      EQU   $C013         ;READS RAMREAD STATE
0000:  C014         36 RDRAMWRT     EQU   $C014         ;READS BANKWRT STATE
0000:  C018         37 RD80COL      EQU   $C018         ;READS SET80COL
0000:  C019         38 RDVBLBAR     EQU   $C019         ; ~VBL SIGNAL
0000:  C01A         39 RDTEXT       EQU   $C01A         ;READS TXT MODE
0000:  C01C         40 RDPAGE2      EQU   $C01C         ;PAGE1/2 STATUS
0000:  C01F         41 RD80VID      EQU   $C01F         ;READS SET80VID
0000:  C030         42 SPKR         EQU   $C030         ;TOGGLE SPEAKER
0000:  C054         43 TXTPAGE1     EQU   $C054         ;PAGE1 TEXT
0000:  C055         44 TXTPAGE2     EQU   $C055         ;PAGE2 TEXT
0000:               45 *
0000:               46 * MONITOR EQUATES:
0000:               47 *
0000:  FBB3         48 FBVERSION    EQU   $FBB3         ;F8 ROM ID
0000:  FD0C         49 RDKEY        EQU   $FD0C         ;GET A KEYSTROKE
0000:  FE89         50 SETKBD       EQU   $FE89         ;IN#0
0000:  FE93         51 SETVID       EQU   $FE93         ;PR#0
0000:  FF58         52 IORTS        EQU   $FF58         ;KNOWN RTS
0000:               54 * ZEROPAGE EQUATES:
0000:               55 *
0000:               56              DSECT
001F:  001F         57              ORG   $1F
001F:  0001         58 YSAV1        DS    1             ;SAFE PLACE IN ALL ENVIRONS
0020:  0001         59 WNDLFT       DS    1             ;SCROLLING WINDOW LEFT
0021:  0001         60 WNDWDTH      DS    1             ;SCROLLING WINDOW WIDTH
0022:  0001         61 WNDTOP       DS    1             ;SCROLLING WINDOW TOP
0023:  0001         62 WNDBTM       DS    1             ;SCROLLING WINDOW BOTTOM
0024:  0001         63 CH           DS    1             ;CURSOR HORIZONTAL
0025:  0001         64 CV           DS    1             ;CURSOR VERTICAL
0026:  0002         65              DS    2             ;GBASL
0028:  0002         66 BASL         DS    2             ;BASE ADDRESS
002A:  0029         67 BASH         EQU   BASL+1
002A:  0002         68 BAS2L        DS    2             ;BASE ADDR FOR SCROLL
002C:  002B         69 BAS2H        EQU   BAS2L+1
0032:  0032         70              ORG   $32
0032:  0001         71 INVFLG       DS    1             ;>127=NORMAL
0033:  0003         72              DS    3             ;N/A
0036:  0002         73 CSWL         DS    2             ;COUT HOOK
0038:  0037         74 CSWH         EQU   CSWL+1
0038:  0002         75 KSWL         DS    2             ;KEYIN HOOK
003A:  0039         76 KSWH         EQU   KSWL+1
003C:  003C         77              ORG   *$3C
003C:  0002         78 A1L          DS    2             ;MONITOR TEMPS FOR MOVE
```

```
003E:          003D   79 A1H          EQU   A1L+1
003E:          0002   80 A2L          DS    2
0040:          003F   81 A2H          EQU   A2L+1
0040:          0002   82              DS    2             ;A3 NOT USED
0042:          0002   83 A4L          DS    2
0044:          0043   84 A4H          EQU   A4L+1
004E:          004E   85              ORG   $4E
004E:          0002   86 RNDL         DS    2             ;RANDOM NUMBER SEED
0050:          004F   87 RNDH         EQU   RNDL+1
0000:                 88              DEND
0000:                 90 * PERMANENT DATA IN SCREENHOLES
0000:                 91 *
0000:                 92 * NOTE: THESE RESIDE IN PAGE 1 OF
0000:                 93 *  THE 80-COLUMN SCREEN PAIR; ANY
0000:                 94 *  ROUTINE WHICH SETS PAGE2 *MUST*
0000:                 95 *  RESTORE BACK TO PAGE1 SO THAT
0000:                 96 *  WE CAN CORRECTLY ACCESS THESE
0000:                 97 *  PERMS. UNDER *NO* CIRCUMSTANCES
0000:                 98 *  IS ANY ROUTINE TO BE CALLED WHILE
0000:                 99 *  WE HAVE PAGE2 BANKED IN!
0000:                100 *
0000:          047B  101 TEMP1        EQU   $47B          ;A TEMP
0000:          047B  102 OLDCH        EQU   $47B+3        ;OLD CH SET FOR USER
0000:          04FB  103 MODE         EQU   $4FB+3        ;OPERATING MODE
0000:                104 * MODE BITS
0000:                105 * 0....... - ESC-R INACTIVE
0000:                106 * 1....... - ESC-R ACTIVE
0000:                107 * .0...... - BASIC PRINT
0000:                108 * .1...... - BASIC INPUT
0000:                109 * ..0..... - LANGUAGE=BASIC
0000:                110 * ..1..... - LANGUAGE=PASCAL
0000:                111 * ...0.... - U/C RESTRICT MODE
0000:                112 * ...1.... - LITERAL UC/LC MODE
0000:                113 * ....0... - GOTOXY N/A
0000:                114 * ....1... - GOTOXY IN PROGRESS
0000:                115 * .....0.. - NORMAL  VIDEO (PASCAL)
0000:                116 * .....1.. - INVERSE VIDEO (PASCAL)
0000:                117 * ......0. - PASCAL 1.1 F/W ACTIVE
0000:                118 * ......1. - PASCAL 1.0 INTERFACE
0000:                119 * .......0 - CALLER SEI'D (BASIC)
0000:                120 * .......1 - CALLER CLI'D (BASIC)
0000:                121 *       0 - NORMAL MODE (PASCAL)
0000:                122 *       1 - TRANSPARENT MODE (PASCAL)
0000:          0080  123 M.ESCR       EQU   $80           ;ESC-R ACTIVE
0000:          0040  124 M.BINPUT     EQU   $40           ;BASIC INPUTTING
0000:          0020  125 M.PASCAL     EQU   $20           ;PASCAL RUNNING
0000:          0010  126 M.LIT        EQU   $10           ;LITERAL UC/LC INPUT
0000:          0008  127 M.GOXY       EQU   $08           ;GOTOXY IN PROGRESS
0000:          0004  128 M.VMODE      EQU   $04           ;PASCAL VIDEO MODE
0000:          0002  129 M.PAS1.0     EQU   $02           ;PASCAL 1.0 MODE
0000:          0001  130 M.IRQ        EQU   $01           ;IRQ ENABLED (BASIC ONLY)
0000:          0001  131 M.TRANS      EQU   $01           ;TRANSPARENT MODE IF F/W PROTOCOL
0000:          057B  132 OURCH        EQU   $57B+3        ;80-COL CH
0000:          05FB  133 OURCV        EQU   $5FB+3        ;CURSOR VERTICAL
0000:          067B  134 CHAR         EQU   $67B+3        ;IN/OUT CHAR
0000:          06FB  135 XCOORD       EQU   $6FB+3        ;X-COORD (GOTOXY)
0000:          077B  136 OLDBASL      EQU   $77B+3        ;PASCAL SAVED BASL
0000:          07FB  137 OLDBASH      EQU   $7FB+3        ;PASCAL SAVED BASH
0000:                138 *
0000:                139 * GENERAL SCREEN STUFF:
0000:                140 *
0000:          07FB  141 CBSLOT       EQU   $7FB          ;IRQ CB PROTOCOL
0000:                142             CHR   '-'
0000:                  4             INCLUDE BFUNC
----- NEXT OBJECT FILE NAME IS VIDEO.OBJ0
C100:          C100    2             ORG   $C100
C100:          C100    3 BFUNCPG     EQU   *
C100:          FD29    4 FUNCEXIT    EQU   $FD29         ;RETURN ADDRESS
C100:          FBC1    5 F.BASCALC   EQU   $FBC1
C100:          FC22    6 F.VTAB      EQU   $FC22
C100:          FC24    7 F.VTABZ     EQU   $FC24
C100:                   8 ----------------------------------------
C100:                   9 * BASIC FUNCTION HOOK:
C100:                  10 ----------------------------------------
C100:                  11 * THIS ROUTINE IS CALLED BY THE
C100:                  12 *  PATCHED F8 ROM.
C100:                  13 *  THIS CODE WILL ALWAYS PERFORM THE
C100:                  14 *  FUNCTION HERE AND RETURN TO THE
C100:                  15 *  CALLER
C100:                  16 *
C100:                  17 * NOTE: F8 ROM DISABLES I/O TO GET US
C100:                  18 *  RUNNING HERE. WE RETURN TO F8 SPACE.
C100:                  19 ----------------------------------------
C100:                  20 * INPUT: Y=FUNCTION AS FOLLOWS:
C100:                  21 *            0=CLREOP
C100:                  22 *            1=HOME
C100:                  23 *            2=SCROLL
C100:                  24 *            3=CLREOL
C100:                  25 *            4=CLEOLZ
C100:                  26 *            5=INIT @ RESET
C100:                  27 *            6=KEYIN
C100:                  28 *            7=FIX ESCAPE CHAR
```

```
C100:                 29 *           B=SETWND
C100:                 30 *
C100:                 31 *        STK HAS PHP FOR STATUS
C100:                 32 *          OF BANK & IRQ BIT
C100:                 33 * VOLATILE: AC,Y
C100:                 34 ----------------------------------------
C100:                 35 * NOTE:  IF WE HAVE A CARD INSTALLED,
C100:                 36 *   THEN USE THE VIDEO ROUTINES, SINCE
C100:                 37 *   WE 'OWN' SLOT3 SCREENHOLES.
C100:                 38 * IF NOT, DUPLICATE FBROM ROUTINES
C100:                 39 *   AND AVOID SLOT3 INTERFERENCE.
C100:                 40 ----------------------------------------
C100:                 41 * VECTOR TO KEYIN/ESCFIX IMMEDIATELY
C100:                 42 *  TO AVOID AC DESTRUCTION:
C100:                 43 *
C100:          C100   44 B.FUNC       EQU   *
C100: C0 06           45             CPY   #6            ;IS IT KEYIN?
C102: D0 03    C107   46             BNE   B.FUNCNK      ;NO
C104: 4C 88 C2        47             JMP   B.KEYIN
C107:          C107   48 B.FUNCNK     EQU   *
C107: C0 07           49             CPY   #7            ;IS IT ESCAPE-FIX?
C109: D0 03    C10E   50             BNE   B.FUNCNE      ;NO
C10B: 4C 6E C2        51             JMP   B.ESCFIX      ;=>YES!
C10E:          C10E   52 B.FUNCNE     EQU   *
C10E: 98              53             TYA                 ;SAVE Y
C10F: 48              54             PHA
C110: 20 24 CB        55             JSR   TESTCARD      ;DO WE HAVE A CARD?
C113: D0 0A    C11F   56             BNE   B.OLDFUNC     ;=>NO
C115:                 57 *
C115:                 58 * NOTE:  THIS TEST COULD TURN OUT
C115:                 59 *  WRONG ON POWER-UP, SINCE THE
C115:                 60 *  MODEBYTE IS UNDEFINED.  HOWEVER,.
C115:                 61 *  SINCE THE MONITOR IS DOING A
C115:                 62 *  SIMPLE 'SETWND' CALL, WE WON'T
C115:                 63 *  GET INTO TROUBLE EVEN IF WE
C115:                 64 *  MAKE THE WRONG DECISION. . .
C115:                 65 *
C115: AD FB 04        66             LDA   MODE          ;IS MODE VALID?
C118: 29 28           67             AND   #M.PASCAL+M.GOXY ; FOR BASIC
C11A: D0 03    C11F   68             BNE   B.OLDFUNC     ;=>DEFINITELY NOT!
C11C: 4C A4 C1        69             JMP   B.FUNCO       ;=>YES, GO NEW WAY
C11F:                 70 *
C11F:                 71 * NO CARD.  DO THINGS THE OLD WAY.
C11F:                 72 *
C11F:          C11F   73 B.OLDFUNC    EQU   *
C11F: 68              74             PLA
C120: A8              75             TAY                 ;RESTORE Y
C121: A9 C1           76             LDA   #CBFUNCPG     ;TRANSFER VIA
C123: 48              77             PHA                 ; THE RTS-TRICK
C124: B9 EA CF        78             LDA   F.TABLE,Y     ;GET LO ADDRESS
C127: 48              79             PHA
C128: 60              80             RTS                 ;TRANSFER TO ROUTINE
C129:                 81 ----------------------------------------
C129: A4 24           82 F.CLREOP    LDY   CH            ; ESC F IS CLR TO END OF PAGE
C12B: A5 25           83             LDA   CV
C12D: 48              84 CLEOP1      PHA
C12E: 20 24 FC        85             JSR   F.VTABZ
C131: 20 F4 C2        86             JSR   X.CLEOLZ
C134: A0 00           87             LDY   #$00
C136: 68              88             PLA
C137: 69 00           89             ADC   #$00
C139: C5 23           90             CMP   WNDBTM
C13B: 90 F0    C12D   91             BCC   CLEOP1
C13D: 20 22 FC        92             JSR   F.VTAB
C140: 4C EB C2        93             JMP   F.RETURN      ;DONE
C143:                 94 ----------------------------------------
C143: A5 22           95 F.HOME      LDA   WNDTOP
C145: 85 25           96             STA   CV
C147: A0 00           97             LDY   #$00
C149: 84 24           98             STY   CH
C14B: F0 E0    C12D   99             BEQ   CLEOP1        ;(ALWAYS TAKEN)
C14D:                100 ----------------------------------------
C14D: A5 22          101 F.SCROLL    LDA   WNDTOP
C14F: 48             102             PHA
C150: 20 24 FC       103             JSR   F.VTABZ
C153: A5 28          104 SCRL1       LDA   BASL
C155: 85 2A          105             STA   BAS2L
C157: A5 29          106             LDA   BASH
C159: 85 2B          107             STA   BAS2H
C15B: A4 21          108             LDY   WNDWDTH
C15D: 88             109             DEY
C15E: 68             110             PLA
C15F: 69 01          111             ADC   #$01
C161: C5 23          112             CMP   WNDBTM
C163: B0 0D    C172  113             BCS   SCRL3
C165: 48             114             PHA
C166: 20 24 FC       115             JSR   F.VTABZ
C169: B1 28          116 SCRL2       LDA   (BASL),Y
C16B: 91 2A          117             STA   (BAS2L),Y
C16D: 88             118             DEY
C16E: 10 F9    C169  119             BPL   SCRL2
```

```
C170: 30 E1    C153  120              BMI   SCRL1
C172: A0 00          121 SCRL3        LDY   #$00
C174: 20 F4 C2       122              JSR   X.CLEOLZ
C177: 20 22 FC       123              JSR   F.VTAB
C17A: 4C EB C2       124              JMP   F.RETURN      ;=>DONE
C17D: A4 24          125 F.CLREOL     LDY   CH
C17F: A9 A0          126              LDA   #$A0
C181: 91 28          127 CLEOL2       STA   (BASL),Y
C183: C8             128              INY
C184: C4 21          129              CPY   WNDWDTH
C186: 90 F9    C181  130              BCC   CLEOL2
C188: B0 17    C1A1  131              BCS   F.GORET       ;DONE (ALWAYS TAKEN)
C18A:                132 ----------------------------------------
C18A:          C18A  133 F.SETWND     EQU   *
C18A: A9 28          134              LDA   #40
C18C: 85 21          135              STA   WNDWDTH
C18E: A9 18          136              LDA   #24
C190: 85 23          137              STA   WNDBTM
C192: A9 17          138              LDA   #23
C194: 85 25          139              STA   CV
C196: 20 22 FC       140              JSR   F.VTAB
C199: 4C EB C2       141              JMP   F.RETURN
C19C:                142 ----------------------------------------
C19C:          C19C  143 F.CLEOLZ     EQU   *
C19C: A4 1F          144              LDY   YSAV1         ;RESTORE HORIZ POSITION
C19E: 20 F4 C2       145              JSR   X.CLEOLZ      ;DO IT
C1A1: 4C EB C2       146 F.GORET      JMP   F.RETURN      ;DONE
C1A4:          C1A4  148 B.FUNCO      EQU   *
C1A4: 68             149              PLA                 ;RESTORE Y
C1A5: A8             150              TAY
C1A6:                151 *
C1A6:                152 * SET IRQMODE:
C1A6:                153 *
C1A6: AD FB 04       154              LDA   MODE          ;ASSUME IRQ IS DISABLED
C1A9: 29 FE          155              AND   #255-M.IRQ
C1AB: 8D FB 04       156              STA   MODE
C1AE: 68             157              PLA                 ;PULL CXBANK STATUS
C1AF: 8D 78 04       158              STA   TEMP1         ; OFF STACK
C1B2: 68             159              PLA                 ;GET USER'S PSTATUS
C1B3: 48             160              PHA                 ; (LEAVE ALONE ON STACK)
C1B4: 4A             161              LSR   A             ;MOVE 'I' BIT TO
C1B5: 4A             162              LSR   A             ; THE CARRY
C1B6: 4A             163              LSR   A
C1B7: AD 78 04       164              LDA   TEMP1         ;PUT CXBANK STATUS
C1BA: 48             165              PHA                 ; BACK ON STACK
C1BB: B0 08    C1C5  166              BCS   NOI           ;=>HE'S INHIBITED
C1BD: AD FB 04       167              LDA   MODE
C1C0: 09 01          168              ORA   #M.IRQ
C1C2: 8D FB 04       169              STA   MODE
C1C5:          C1C5  170 NOI          EQU   *
C1C5: A5 25          171              LDA   CV            ;COPY USER CV
C1C7: 8D FB 05       172              STA   OURCV         ; TO OURS
C1CA: 4C FF C1       173              JMP   B.VECTOR      ;CONTINUE
C1CD:                174 *
C1CD:                175 * NOTE: THIS KEEPS B.XXXX ROUTINES
C1CD:                176 *  ALL IN THE C100 PAGE...
C1CD:                177 *
C1CD:                178 *
C1CD:          C1CD  179 B.SCROLL     EQU   *
C1CD: 20 A4 CC       180              JSR   SCROLLUP      ;DO IT FOR CALLER
C1D0: 4C EB C2       181              JMP   F.RETURN      ; AND RETURN DIRECTLY
C1D3:                182 *
C1D3:          C1D3  183 B.CLREOL     EQU   *
C1D3: 20 48 CD       184              JSR   X.GS          ;CLEAR TO EOL
C1D6: 4C EB C2       185              JMP   F.RETURN      ;RETURN DIRECTLY TO CALLER
C1D9:                186 ----------------------------------------
C1D9:          C1D9  187 B.CLEOLZ     EQU   *
C1D9: A4 1F          188              LDY   YSAV1         ;RESTORE HORIZ POSITION
C1DB: 20 4E CD       189              JSR   X.GSEOLZ      ;DO IT TO EOL
C1DE: 4C EB C2       190              JMP   F.RETURN
C1E1:                191 ----------------------------------------
C1E1:          C1E1  192 B.CLREOP     EQU   *
C1E1: 20 23 CD       193              JSR   X.VT          ;CLEAR TO EOS
C1E4: 4C EB C2       194              JMP   F.RETURN      ;RETURN DIRECTLY TO CALLER
C1E7:                195 ----------------------------------------
C1E7: 4C 19 C2       196 B.SETWND     JMP   B.SETWNDX
C1EA: 4C 34 C2       197 B.RESET      JMP   B.RESETX      ;MUST BE IN BFUNC PAGE
C1ED:                198 ----------------------------------------
C1ED:          C1ED  199 B.HOME       EQU   *
C1ED: 20 42 CD       200              JSR   X.FF          ;HOME & CLEAR
C1F0: AD 78 05       201              LDA   OURCH
C1F3: 85 24          202              STA   CH            ;COPY CH/CV FOR CALLER
C1F5: 8D 7B 04       203              STA   OLDCH         ;REMEMBER WHAT WE SET
C1F8: AD FB 05       204              LDA   OURCV
C1FB: 85 25          205              STA   CV
C1FD: 10 2F    C22E  206              BPL   GOBACK        ;(ALWAYS TAKEN)
C1FF:                207 *
C1FF:                208 * COPY USER'S CURSOR IF IT DIFFERS
C1FF:                209 *  FROM OURS (AND WE'RE RUNNING
C1FF:                210 *  IN 80-COLUMN MODE).  IF WE ARE
C1FF:                211 *  NOT IN 80-MODE, THEN ALWAYS USE
```

```
C1FF:                  212 *  THE USER'S CH VALUE SINCE OURS
C1FF:                  213 *  IS PROBABLY INVALID.
C1FF:                  214 *
C1FF:          C1FF    215 B.VECTOR    EQU   *
C1FF:20 51 CB          216             JSR   BASCALC
C202:A5 24             217             LDA   CH          ;GET USER CH VALUE
C204:2C 1F C0          218             BIT   RDBOVID     ;DISPLAYING 80-COLS?
C207:10 05    C20E     219             BPL   B.GETCH     ;=>NO, USER CH IS IT
C209:CD 7B 04          220             CMP   OLDCH       ;IS IT DIFFERENT?
C20C:F0 03    C211     221             BEQ   B.FUNC1     ;=>NO, USE OURS
C20E:          C20E    222 B.GETCH     EQU   *
C20E:8D 7B 05          223             STA   OURCH       ;USE HIS CH
C211:          C211    224 B.FUNC1     EQU   *
C211:A9 C1             225             LDA   #<BFUNCPG   ;TRANSFER TO ROUTINE
C213:48                226             PHA               ; VIA RTS-TRICK
C214:B9 F3 CF          227             LDA   B.TABLE,Y   ;GET LO ADDRESS
C217:48                228             PHA
C218:60                229             RTS
C219:                  230 ----------------------------------------
C219:          C219    231 B.SETWNDX   EQU   *
C219:A9 50             232             LDA   #80         ;ASSUME 80-COLS
C21B:2C 1F C0          233             BIT   RDBOVID     ;WHICH MODE?
C21E:30 01    C221     234             BMI   B.SETWND2   ;=>IT'S 80
C220:4A                235             LSR   A           ;MAKE IT 40
C221:          C221    236 B.SETWND2   EQU   *
C221:85 21             237             STA   WNDWDTH
C223:A9 18             238             LDA   #24         ;SET BOTTOM
C225:85 23             239             STA   WNDBTM
C227:A9 17             240             LDA   #23         ;VTAB TO BOTTOM
C229:8D FB 05          241             STA   OURCV
C22C:85 25             242             STA   CV
C22E:20 51 CB          243 GOBACK      JSR   BASCALC
C231:4C EB C2          244             JMP   F.RETURN
C234:                  245 *
C234:                  246 * HANDLE RESET FOR MONITOR:
C234:                  247 *
C234:          C234    248 B.RESETX    EQU   *
C234:A9 FF             249             LDA   #$FF        ;DESTROY MODE BYTE
C236:8D FB 04          250             STA   MODE
C239:AD 5D C0          251             LDA   $C05D       ;SETUP
C23C:AD 5F C0          252             LDA   $C05F       ; ANNUNCIATORS
C23F:                  253 *
C23F:                  254 * IF THE OPEN APPLE KEY
C23F:                  255 *  (ALIAS PADDLE BUTTONS 0) IS
C23F:                  256 *  DEPRESSED, COLDSTART THE SYSTEM
C23F:                  257 *  AFTER DESTROYING MEMORY:
C23F:                  258 *
C23F:AD 62 C0          259             LDA   $C062       ;GET BUTTON 1 (SOLID)
C242:30 1D    C261     260             BMI   DIAGS       ;=>DOWN, DO DIAGS
C244:AD 61 C0          261             LDA   $C061       ;GET BUTTON 0 (OPEN)
C247:10 1B    C264     262             BPL   RESETRET    ;=>NOT JIVE OR DIAGS
C249:                  263 *
C249:                  264 * BLAST 2 BYTES OF EACH PAGE,
C249:                  265 *  INCLUDING THE RESET VECTOR:
C249:                  266 *
C249:A0 B0             267             LDY   #$B0        ;LET IT PRECESS DOWN
C24B:A9 00             268             LDA   #0
C24D:85 3C             269             STA   A1L
C24F:A9 BF             270             LDA   #$BF        ;START FROM BFXX DOWN
C251:38                271             SEC               ;FOR SUBTRACT
C252:          C252    272 BLAST       EQU   *
C252:85 3D             273             STA   A1H
C254:91 3C             274             STA   (A1L),Y
C256:88                275             DEY
C257:91 3C             276             STA   (A1L),Y
C259:E9 01             277             SBC   #1          ;BACK DOWN TO NEXT PAGE
C25B:C9 01             278             CMP   #1          ;STAY AWAY FROM STACK!
C25D:D0 F3    C252     279             BNE   BLAST
C25F:F0 03    C264     280             BEQ   RESETRET    ;(ALWAYS)
C261:                  281 *
C261:          C261    282 DIAGS       EQU   *
C261:4C 01 C4          283             JMP   $C401       ;RUN DIAGS
C264:                  284 *
C264:          C264    285 RESETRET    EQU   *
C264:20 24 CB          286             JSR   TESTCARD    ;CARD PLUGGED IN?
C267:F0 14    C27D     287             BEQ   GORETN      ;=>YES
C269:8D 0B C0          288             STA   SETSLOTC3ROM ;NO, DISABLE ROM
C26C:D0 0F    C27D     289             BNE   GORETN      ;(ALWAYS TAKEN)
C26E:                  290 ----------------------------------------
C26E:          C26E    291 B.ESCFIX    EQU   *
C26E:29 DF             292             AND   #$DF        ;FORCE TO UPPERCASE
C270:A0 03             293             LDY   #4-1        ;SCAN FOR A MATCH
C272:          C272    294 B.ESCFIX2   EQU   *
C272:D9 80 C2          295             CMP   ESCIN,Y     ;IS IT?
C275:D0 03    C27A     296             BNE   B.ESCFIX3   ;=>NAW
C277:B9 84 C2          297             LDA   ESCOUT,Y    ;YES, TRANSLATE IT
C27A:          C27A    298 B.ESCFIX3   EQU   *
C27A:88                299             DEY
C27B:10 F5    C272     300             BPL   B.ESCFIX2
C27D:4C EB C2          301 GORETN      JMP   F.RETURN    ;RETURN: CHAR IN AC
C280:                  302 ----------------------------------------
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C280:88 95 8A 8B   303 ESCIN       DFB   $88,$95,$8A,$8B
C284:CA CB CD C9   304 ESCOUT      ASC   'JKMI'        ;THE ARROWS
C288:              305 ----------------------------------------
C288:         C288 306 B.KEYIN     EQU   *
C288:8D 78 04      307              STA   TEMP1         ;SAVE ORIGINAL CHAR
C28B:68            308              PLA                 ;HOLD ONTO
C28C:A8            309              TAY                 ; CXBANK STATUS
C28D:68            310              PLA                 ;GET USER'S
C28E:48            311              PHA                 ; IRQ STATE
C28F:6A            312              ROR   A             ;MOVE IRQ BIT TO
C290:6A            313              ROR   A             ; THE
C291:6A            314              ROR   A             ;  CARRY
C292:98            315              TYA                 ;PUT CXBANK STATUS
C293:48            316              PHA                 ; BACK ON STACK
C294:8A            317              TXA                 ;SAVE
C295:48            318              PHA                 ; XREQ
C296:              319 *
C296:B8            320              CLV                 ;ASSUME NOT INTERRUPTIBLE
C297:B0 03    C29C 321              BCS   B.KEYIN2      ;=>WE WERE RIGHT
C299:2C 00 CF      322              BIT   SEV           ;SAY "INTERRUPTIBLE"
C29C:         C29C 323 B.KEYIN2    EQU   *
C29C:A9 FF         324              LDA   ##FF          ;CURSOR=NORMAL DELETE
C29E:A4 24         325              LDY   CH
C2A0:91 28         326              STA   (BASL),Y
C2A2:20 C6 C2      327              JSR   KEYDLY        ;WAIT FOR A KEY
C2A5:B0 0E    C2B5 328              BCS   GOTKEY        ;=>GOT ONE
C2A7:AD 78 04      329              LDA   TEMP1         ;REPLACE ORIG CHAR
C2AA:A4 24         330              LDY   CH
C2AC:91 28         331              STA   (BASL),Y
C2AE:20 C6 C2      332              JSR   KEYDLY        ;WAIT FOR A KEY
C2B1:B0 02    C2B5 333              BCS   GOTKEY        ;=>GOT ONE
C2B3:90 E7    C29C 334              BCC   B.KEYIN2      ;(ALWAYS TAKEN)
C2B5:              335 *
C2B5:         C2B5 336 GOTKEY      EQU   *
C2B5:AD 78 04      337              LDA   TEMP1         ;RESTORE ORIGINAL
C2B8:A4 24         338              LDY   CH
C2BA:91 28         339              STA   (BASL),Y      ; CHARACTER
C2BC:68            340              PLA                 ;RESTORE
C2BD:AA            341              TAX                 ; XREQ
C2BE:AD 00 C0      342              LDA   KBD           ;GET THE NEW KEYSTROKE
C2C1:8D 10 C0      343              STA   KBDSTRB       ;CANCEL THE STROBE
C2C4:30 25    C2EB 344              BMI   F.RETURN      ;(ALWAYS TAKEN)
C2C6:              345 ***
C2C6:              346 *** INPUT: VFLAG SET IF INTERRUPTIBLE
C2C6:         C2C6 347 KEYDLY      EQU   *
C2C6:A2 0C         348              LDX   ##$0C         ;SHORT DELAY FOR IRQ
C2C8:70 02    C2CC 349              BVS   IK1           ;->INTERRUPTIBLE
C2CA:A2 31         350              LDX   ##$31         ;LONG  DELAY FOR NO IRQ
C2CC:         C2CC 351 IK1         EQU   *
C2CC:A0 00         352              LDY   #0
C2CE:         C2CE 353 IK2         EQU   *
C2CE:50 05    C2D5 354              BVC   IK2A          ;=>NOT INTERRUPTIBLE
C2D0:08            355              PHP                 ;SAVE OFLOW
C2D1:20 75 FC      356              JSR   SNIFFIRQ      ;ALLOW IRQ
C2D4:28            357              PLP                 ;RESTORE OFLOW
C2D5:         C2D5 358 IK2A        EQU   *
C2D5:E6 4E         359              INC   RNDL
C2D7:D0 02    C2DB 360              BNE   IK3
C2D9:E6 4F         361              INC   RNDH
C2DB:         C2DB 362 IK3         EQU   *
C2DB:AD 00 C0      363              LDA   KBD           ;KEYPRESS?
C2DE:30 09    C2E9 364              BMI   KDRETY        ;=>YES
C2E0:88            365              DEY
C2E1:D0 EB    C2CE 366              BNE   IK2
C2E3:CA            367              DEX
C2E4:D0 E6    C2CC 368              BNE   IK1
C2E6:         C2E6 369 KDRETN      EQU   *
C2E6:18            370              CLC
C2E7:90 01    C2EA 371              BCC   KDRET
C2E9:         C2E9 372 KDRETY      EQU   *
C2E9:38            373              SEC
C2EA:         C2EA 374 KDRET       EQU   *
C2EA:60            375              RTS
C2EB:              376 *
C2EB:              377 * EXIT. EITHER EXIT WITH OR WITHOUT
C2EB:              378 *  ENABLING I/O SPACE.
C2EB:              379 *
C2EB:         C2EB 380 F.RETURN    EQU   *
C2EB:28            381              PLP                 ;GET PRIOR I/O DISABLE
C2EC:30 03    C2F1 382              BMI   F.RET1        ;=>LEAVE IT DISABLED
C2EE:4C 29 FD      383              JMP   FUNCEXIT      ;=>EXIT & ENABLE I/O
C2F1:4C 2C FD      384 F.RET1       JMP   FUNCEXIT+3    ;EXIT DISABLED
C2F4:              385 ----------------------------------------
C2F4:         C2F4 386 X.CLEOLZ    EQU   *
C2F4:A9 A0         387              LDA   #$A0
C2F6:         C2F6 388 X.CLEOL2    EQU   *
C2F6:91 28         389              STA   (BASL),Y
C2F8:C8            390              INY
C2F9:C4 21         391              CPY   WNDWDTH
C2FB:90 F9    C2F6 392              BCC   X.CLEOL2
C2FD:60            393              RTS                 ;ALWAYS RETURN DIRECTLY
C2FE:         0002 394 ZSPAREC2    EQU   $C300-*
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```
C2FE:          0002  395              DS    $C300-*,0
C300:                  5              INCLUDE C3SPACE
C300:                  2 ----------------------------------------
C300:                  3 *
C300:                  4 * THIS IS THE $C3XX ROM SPACE:
C300:                  5 *
C300:                  6 ----------------------------------------
C300:          C300    7 CN00         EQU   *
C300:          C300    8 BASICINT     EQU   *
C300: 2C 58 FF         9              BIT   IORTS          ;SET VFLAG (INIT)
C303: 70 12    C317   10              BVS   BASICENT       ;(ALWAYS TAKEN)
C305:          C305   11 BASICIN      EQU   *
C305: 38               12              SEC
C306: 90               13              DFB   $90            ;BCC OPCODE (NEVER TAKEN)
C307:          C307   14 BASICOUT     EQU   *
C307: 18               15              CLC
C308: B8               16              CLV                  ;CLEAR VFLAG (NOT INIT)
C309: 50 0C    C317   17              BVC   BASICENT       ;(ALWAYS TAKEN)
C30B:                 18 *
C30B:                 19 * PASCAL 1.1 FIRMWARE PROTOCOL TABLE:
C30B:                 20 *
C30B: 01              21              DFB   $01            ;GENERIC SIGNATURE BYTE
C30C: 88              22              DFB   $88            ;DEVICE SIGNATURE BYTE
C30D:                 23 *
C30D: 4B              24              DFB   >JPINIT        ;PASCAL INIT
C30E: 51              25              DFB   >JPREAD        ;PASCAL READ
C30F: 57              26              DFB   >JPWRITE       ;PASCAL WRITE
C310: 5D              27              DFB   >JPSTAT        ;PASCAL STATUS
C311:                 28 ----------------------------------------
C311:                 29 *
C311:                 30 * 128K SUPPORT ROUTINE ENTRIES:
C311:                 31 *
C311: 4C 63 C3        32              JMP   MOVE           ;MEMORY MOVE ACROSS BANKS
C314: 4C B0 C3        33              JMP   XFER           ;TRANSFER ACROSS BANKS
C317:                 34 ----------------------------------------
C317:                 35 * BASIC I/O ENTRY POINT:
C317:                 36 ----------------------------------------
C317:          C317   37 BASICENT     EQU   *
C317: 8D 7B 06        38              STA   CHAR           ;SAVE CHARACTER
C31A: 48              39              PHA                  ;SAVE AC
C31B: 98              40              TYA                  ;  AND Y
C31C: 48              41              PHA
C31D: 8A              42              TXA                  ;  AND X
C31E: 48              43              PHA
C31F: 08              44              PHP                  ;SAVE CARRY & VFLAG
C320:                 45 *
C320:                 46 * SET IRQMODE:
C320:                 47 *
C320: AD FB 04        48              LDA   MODE           ;ASSUME IRQ IS DISABLED
C323: 29 FE           49              AND   #255-M.IRQ
C325: 8D FB 04        50              STA   MODE
C328: 68              51              PLA                  ;GET PSTATUS
C329: 48              52              PHA                  ;  AND LEAVE ON STACK
C32A: 29 04           53              AND   #$04           ;IS 'I' BIT SET?
C32C: D0 08    C336   54              BNE   BASICENT2      ;=>YES, DISABLED
C32E: AD FB 04        55              LDA   MODE
C331: 09 01           56              ORA   #M.IRQ
C333: 8D FB 04        57              STA   MODE           ;SET IT ENABLED
C336:          C336   58 BASICENT2    EQU   *
C336: AD FF CF        59              LDA   $CFFF          ;KICK OUT ALL C8 ROMS
C339: A5 25           60              LDA   CV             ;GET USER CV AND
C33B: 8D F8 05        61              STA   OURCV          ;  STUFF IT FOR US
C33E: 20 E8 C3        62              JSR   SETC8          ;SETUP C8 INDICATOR
C341: 28              63              PLP                  ;GET VFLAG (INIT)
C342: 08              64              PHP
C343: 70 03    C348   65              BVS   JBASINIT       ;=>DO THE INIT
C345: 4C 66 C8        66              JMP   C8BASIC        ;GET OUT OF CN SPACE
C348: 4C 03 C8        67 JBASINIT    JMP   BASICINIT      ;=>GOTO C8 SPACE
C34B:                 68 *
C34B:          C34B   69 JPINIT       EQU   *
C34B: 20 E8 C3        70              JSR   SETC8          ;SETUP C8 INDICATOR
C34E: 4C 4F CA        71              JMP   PINIT          ;XFER TO PASCAL INIT
C351:          C351   72 JPREAD       EQU   *
C351: 20 E8 C3        73              JSR   SETC8          ;SETUP C8 INDICATOR
C354: 4C 74 CA        74              JMP   PREAD          ;XFER TO PASCAL READ
C357:          C357   75 JPWRITE      EQU   *
C357: 20 E8 C3        76              JSR   SETC8          ;SETUP C8 INDICATOR
C35A: 4C 8E CA        77              JMP   PWRITE         ;XFER TO PASCAL WRITE
C35D:          C35D   78 JPSTAT       EQU   *
C35D: 20 E8 C3        79              JSR   SETC8          ;SETUP C8 INDICATOR
C360: 4C 94 C9        80              JMP   PSTATUS        ;XFER TO PASCAL STATUS
C363:                 82 ----------------------------------------
C363:                 83 * NAME     : MOVE
C363:                 84 * FUNCTION: PERFORM CROSSBANK MEMORY MOVE
C363:                 85 * INPUT    : A1=SOURCE ADDRESS
C363:                 86 *          : A2=SOURCE END
C363:                 87 *          : A4=DESTINATION START
C363:                 88 *          : CARRY SET=MAIN-->CARD
C363:                 89 *                CLR=CARD-->MAIN
C363:                 90 * OUTPUT   : NONE
C363:                 91 * VOLATILE: NOTHING
```

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C363:                  92 * CALLS    : NOTHING
C363:                  93 ----------------------------------------
C363:                  94 *
C363:          C363    95 MOVE         EQU   *
C363: 48               96              PHA                 ;SAVE AC
C364: 98               97              TYA                 ; AND Y
C365: 48               98              PHA
C366: AD 13 C0         99              LDA   RDRAMRD       ;SAVE STATE OF
C369: 48              100              PHA                 ; MEMORY FLAGS
C36A: AD 14 C0        101              LDA   RDRAMWRT
C36D: 48              102              PHA
C36E:                 103 *
C36E:                 104 * SET FLAGS FOR CROSSBANK MOVE:
C36E:                 105 *
C36E: 90 08    C378   106              BCC   MOVEC2M       ;=>CARD-->MAIN
C370: 8D 02 C0        107              STA   RDMAINRAM     ;SET FOR MAIN
C373: 8D 05 C0        108              STA   WRCARDRAM     ; TO CARD
C376: B0 06    C37E   109              BCS   MOVESTRT      ;=>(ALWAYS TAKEN)
C378:                 110 *
C378:          C378   111 MOVEC2M      EQU   *
C378: 8D 04 C0        112              STA   WRMAINRAM     ;SET FOR CARD
C37B: 8D 03 C0        113              STA   RDCARDRAM     ; TO MAIN
C37E:                 114 *
C37E:          C37E   115 MOVESTRT     EQU   *
C37E: A0 00           116              LDY   #0            ;DUMMY INDEX
C380:                 117 *
C380:          C380   118 MOVELOOP     EQU   *
C380: B1 3C           119              LDA   (A1L),Y       ;GET A BYTE
C382: 91 42           120              STA   (A4L),Y       ;MOVE IT
C384: E6 42           121              INC   A4L
C386: D0 02    C38A   122              BNE   NXTA1
C388: E6 43           123              INC   A4H
C38A: A5 3C           124 NXTA1       LDA   A1L
C38C: C5 3E           125              CMP   A2L
C38E: A5 3D           126              LDA   A1H
C390: E5 3F           127              SBC   A2H
C392: E6 3C           128              INC   A1L
C394: D0 02    C398   129              BNE   C01
C396: E6 3D           130              INC   A1H
C398: 90 E6    C380   131 C01          BCC   MOVELOOP      ;=>MORE TO MOVE
C39A:                 132 *
C39A:                 133 * RESTORE ORIGINAL FLAGS:
C39A:                 134 *
C39A: 8D 04 C0        135              STA   WRMAINRAM     ;CLEAR FLAG2
C39D: 68              136              PLA                 ;GET ORIGINAL STATE
C39E: 10 03    C3A3   137              BPL   C03           ;=>IT WAS OFF
C3A0: 8D 05 C0        138              STA   WRCARDRAM
C3A3:          C3A3   139 C03          EQU   *
C3A3: 8D 02 C0        140              STA   RDMAINRAM     ;CLEAR FLAG1
C3A6: 68              141              PLA                 ;GET ORIGINAL STATE
C3A7: 10 03    C3AC   142              BPL   MOVERET       ;=>IT WAS OFF
C3A9: 8D 03 C0        143              STA   RDCARDRAM
C3AC:          C3AC   144 MOVERET      EQU   *
C3AC: 68              145              PLA                 ;RESTORE Y
C3AD: A8              146              TAY
C3AE: 68              147              PLA                 ; AND AC
C3AF: 60              148              RTS
C3B0:                 149 ----------------------------------------
C3B0:                 150 * NAME     : XFER
C3B0:                 151 * FUNCTION: TRANSFER CONTROL CROSSBANK
C3B0:                 152 * INPUT    : $03ED=TRANSFER ADDR
C3B0:                 153 *          : CARRY SET=XFER TO CARD
C3B0:                 154 *                CLR=XFER TO MAIN
C3B0:                 155 *          : VFLAG CLR=USE STD ZP/STK
C3B0:                 156 *          :       SET=USE ALT ZP/STK
C3B0:                 157 * OUTPUT   : NONE
C3B0:                 158 * VOLATILE: $03ED/03EE IN DEST BANK
C3B0:                 159 * CALLS    : NOTHING
C3B0:                 160 * NOTE     : ENTERED VIA JMP, NOT JSR
C3B0:                 161 ----------------------------------------
C3B0:                 162 *
C3B0:          C3B0   163 XFER         EQU   *
C3B0: 48              164              PHA                 ;SAVE AC ON CURRENT STACK
C3B1:                 165 *
C3B1:                 166 * COPY DESTINATION ADDRESS TO THE
C3B1:                 167 *  OTHER BANK SO THAT WE HAVE IT
C3B1:                 168 *  IN CASE WE DO A SWAP:
C3B1:                 169 *
C3B1: AD ED 03        170              LDA   $03ED         ;GET XFERADDR LO
C3B4: 48              171              PHA                 ;SAVE ON CURRENT STACK
C3B5: AD EE 03        172              LDA   $03EE         ;GET XFERADDR HI
C3B8: 48              173              PHA                 ;SAVE IT TOO
C3B9:                 174 *
C3B9:                 175 * SWITCH TO APPROPRIATE BANK:
C3B9:                 176 *
C3B9: 90 0A    C3C5   177              BCC   XFERC2M       ;=>CARD-->MAIN
C3BB: 8D 03 C0        178              STA   RDCARDRAM     ;SET FOR RUNNING
C3BE: 8D 05 C0        179              STA   WRCARDRAM     ; IN CARD RAM
C3C1: 50 19    C3DC   180              BVC   XFERSZP       ;=>USE STD ZP/STK
C3C3: 70 08    C3CD   181              BVS   XFERAZP       ;=>USE ALT ZP/STK
C3C5:          C3C5   182 XFERC2M      EQU   *
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C3C5:8D 02 C0      183              STA   RDMAINRAM   ;SET FOR RUNNING
C3C8:8D 04 C0      184              STA   WRMAINRAM   ; IN MAIN RAM
C3CB:50 0F   C3DC  185              BVC   XFERSZP     ;=>USE STD ZP/STK
C3CD:              186 *
C3CD:        C3CD  187 XFERAZP     EQU   *           ;SWITCH TO ALT ZP/STK
C3CD:68            188              PLA               ;STUFF XFERADDR
C3CE:8D EE 03      189              STA   $03EE       ; HI AND
C3D1:68            190              PLA
C3D2:8D ED 03      191              STA   $03ED       ;  LO
C3D5:68            192              PLA               ;RESTORE AC
C3D6:8D 09 C0      193              STA   SETALTZP    ;SWITCH TO ALT ZP/STK
C3D9:6C ED 03      194              JMP   ($03ED)     ;=>OFF WE GO!
C3DC:              195 *
C3DC:        C3DC  196 XFERSZP     EQU   *
C3DC:68            197              PLA               ;STUFF XFERADDR
C3DD:8D EE 03      198              STA   $03EE       ; HI AND
C3E0:68            199              PLA
C3E1:8D ED 03      200              STA   $03ED       ;  LO
C3E4:68            201              PLA               ;RESTORE AC
C3E5:8D 08 C0      202              STA   SETSTDZP    ;=>SWITCH TO STD ZP/STK
C3E8:6C ED 03      203              JMP   ($03ED)     ;OFF WE GO!
C3EB:              204 ----------------------------------------
C3EB:              205 * NAME     : SETC8
C3EB:              206 * FUNCTION: SETUP IRQ $C800 PROTOCOL
C3EB:              207 * INPUT    : NONE
C3EB:              208 * OUTPUT   : NONE
C3EB:              209 * VOLATILE: NOTHING
C3EB:              210 * CALLS    : NOTHING
C3EB:              211 ----------------------------------------
C3EB:              212 *
C3EB:        C3EB  213 SETC8       EQU   *
C3EB:48            214              PHA               ;SAVE AC
C3EC:A9 C3         215              LDA   #>CN00      ;SLOT NUMBER
C3EE:8D F8 07      216              STA   C8SLOT      ;STUFF IT
C3F1:68            217              PLA               ;RESTORE AC
C3F2:60            218              RTS
C3F3:                6              INCLUDE C8SPACE
C3F3:                2 ----------------------------------------
C3F3:                3 * THIS IS THE C8XX SPACE:
C3F3:                4 ----------------------------------------
C3F3:        0000    5              DO    TEST
 S                   6              ORG   $D800
C3F3:                7              ELSE
----- NEXT OBJECT FILE NAME IS VIDEO.OBJ1
C800:        C800    8              ORG   $C800
C800:                9              FIN
C800:4C 4A CA       10              JMP   PINIT1.0    ;PASCAL 1.0 INIT
C803:               11 * BASIC INITIALIZATION:
C803:               12 ----------------------------------------
C803:        C803   13 BASICINIT    EQU   *
C803:A9 06          14              LDA   #$00DF8     ;CHECK F8 ROM
C805:CD B3 FB       15              CMP   F8VERSION   ; IS IT OK?
C808:F0 0C   C816   16              BEQ   BINIT1      ;=>YES
C80A:20 7B CF       17              JSR   COPYROM     ;TRY COPYING TO RAMCARD
C80D:CD B3 FB       18              CMP   F8VERSION
C810:F0 04   C816   19              BEQ   BINIT1      ;=>NOW IT'S GOOD
C812:78             20              SEI               ;CRASH THE SYSTEM!
C813:        C813   21 HANG        EQU   *
C813:4C 13 C8       22              JMP   HANG        ;HANG FOREVER
C816:               23 *
C816:        C816   24 BINIT1      EQU   *
C816:A9 C3          25              LDA   #>CN00      ;SET HOOKS FOR
C818:85 37          26              STA   CSWH
C81A:85 39          27              STA   KSWH        ; IN & OUT
C81C:A9 05          28              LDA   #>BASICIN
C81E:85 38          29              STA   KSWL
C820:A9 07          30              LDA   #>BASICOUT
C822:85 36          31              STA   CSWL
C824:A9 00          32              LDA   #0          ;SET FULL 40-COL WINDOW
C826:85 20          33              STA   WNDLFT
C828:A9 00          34              LDA   #0          ;ASSUME TEXT MODE
C82A:2C 1A C0       35              BIT   RDTEXT      ;IN TEXT MODE?
C82D:30 02   C831   36              BMI   BINIT1A     ;=>YES
C82F:A9 14          37              LDA   #20         ;IF GR, SET 4 LINES
C831:        C831   38 BINIT1A     EQU   *
C831:85 22          39              STA   WNDTOP
C833:A9 18          40              LDA   #24
C835:85 23          41              STA   WNDBTM
C837:A9 28          42              LDA   #40
C839:85 21          43              STA   WNDWDTH
C83B:A5 24          44              LDA   CH          ;COPY USER CH
C83D:8D 7B 04       45              STA   OLDCH       ; AS 'OLD' SETTING
C840:A9 01          46              LDA   #M.IRQ      ;GET READY TO CLEAR
C842:2D FB 04       47              AND   MODE        ;PRESERVE IRQ STATUS
C845:8D FB 04       48              STA   MODE        ;CLEAR MODES
C848:4C 50 C8       49              JMP   BINIT2      ;=>CONTINUE AFTER PASCAL 1.0 HOOK
C84B:               50 ----------------------------------------
C84B:               51 *
C84B:               52 * PASCAL 1.0 INPUT HOOK:
C84B:               53 *
C84B:00             54              BRK
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C84C:00              55              BRK
C84D:          0000  56              IFNE  *-$C84D     ;ERR IF WRONG ADDR
 5                   57              FAIL  2,'C84D     HOOK ALIGNMENT'
C84D'                58              FIN
C84D:4C 31 C3        59              JMP   JPREAD      ;=>GO TO STANDARD READ
C850:                60 ---------------------------------------
C850:                61 *
C850:                62 * IS THERE A CARD?
C850:                63 *
C850:          C850  64 BINIT2        EQU   *
C850:20 24 CB        65              JSR   TESTCARD    ;SEE IF CARD PLUGGED IN
C853:D0 08    C85D   66              BNE   CLEARIT     ;=>IT'S 40
C855:06 21           67              ASL   WNDWDTH     ;SET 80-COL WINDOW
C857:8D 01 C0        68              STA   SETB0COL    ;ENABLE 80 STORE
C85A:8D 0D C0        69              STA   SETB0VID    ; AND 80 VIDEO
C85D:                70 *
C85D:                71 * HOME & CLEAR:
C85D:                72 *
C85D:          C85D  73 CLEARIT       EQU   *
C85D:8D 0F C0        74              STA   SETALTCHAR  ;SET NORM/INV LCASE
C860:20 42 CD        75              JSR   X.FF        ;CLEAR IT
C863:28              76              PLP               ;CLC ASSURES THAT
C864:18              77              CLC               ; WE PRINT THIS
C865:08              78              PHP               ;  INITIAL CHARACTER
C866:                80 *
C866:                81 * COMPENSATE FOR INTEGER BASIC'S
C866:                82 *  HITTING OF $C000 ON INITIAL ENTRY:
C866:                83 *
C866:          C866  84 C8BASIC       EQU   *           ;BASIC IN/OUT
C866:2C 1F C0        85              BIT   RD80VID     ;WHICH MODE?
C869:10 09    C874   86              BPL   C8B2        ;=>40.  LEAVE ALONE
C86B:8D 01 C0        87              STA   SETB0COL    ;80.  ENABLE STORE.
C86E:                88 *
C86E:                89 * MAKE SURE SCROLLING WINDOW IS
C86E:                90 *  AN EVEN NUMBER FOR 80-COLS:
C86E:                91 *
C86E:A5 21           92              LDA   WNDWDTH
C870:29 FE           93              AND   #$FE
C872:85 21           94              STA   WNDWDTH     ;ROUND IT TO LOWER EVEN
C874:                95 *
C874:                96 * COPY USER'S CH IF IT DIFFERS FROM
C874:                97 *  WHAT WE LAST PUT THERE:
C874:                98 *
C874:          C874  99 C8B2          EQU   *
C874:A5 24           100             LDA   CH          ;GET IT
C876:CD 7B 04        101             CMP   OLDCH       ;IS IT THE SAME?
C879:F0 03    C87E   102             BEQ   C8B3        ;=>YES, USE OUR OWN
C87B:8D 7B 05        103             STA   OURCH       ;=>NO, USE HIS
C87E:          C87E  104 C8B3         EQU   *
C87E:A9 06           105             LDA   #GOODF8     ;CHECK F8 ROM
C880:CD B3 F8        106             CMP   F8VERSION   ;IF DIFFERENT, USER
C883:F0 0B    C890   107             BEQ   C8B4        ; HAS RELOADED RAMCARD
C885:                108 *
C885:                109 * COPY F8 ROM TO LANG CARD:
C885:                110 *
C885:20 7B CF        111             JSR   COPYROM     ;COPY IT AGAIN
C888:CD B3 F8        112             CMP   F8VERSION   ;IS IT NOW CORRECT?
C88B:F0 03    C890   113             BEQ   C8B4        ;=>GREAT
C88D:4C 13 C8        114             JMP   HANG        ;=>WE HAVE WRONG ROM!
C890:                115 *
C890:          C890  116 C8B4         EQU   *
C890:28              117             PLP               ;RECOVER CARRY (IN/OUT)
C891:90 03    C896   118             BCC   BOUT        ;=>PRINT A CHAR
C893:4C F6 C8        119             JMP   BINPUT      ;=>INPUT A CHAR
C896:          C896  120 BOUT         EQU   *
C896:AD FB 04        121             LDA   MODE        ;SAY THAT WE'RE
C899:29 BF           122             AND   #255-M.BINPUT ;  PRINTING
C89B:8D FB 04        123             STA   MODE
C89E:4C A1 C8        124             JMP   BPRINT      ;->OUTPUT A CHAR
C8A1:                  7             INCLUDE BPRINT
C8A1:                  2 ---------------------------------------
C8A1:                  3 * BASIC OUTPUT:
C8A1:                  4 ---------------------------------------
C8A1:          C8A1    5 BPRINT       EQU   *
C8A1:AD 7B 06          6             LDA   CHAR        ;GET CHARACTER
C8A4:C9 8D             7             CMP   #$8D        ;IS IT C/R?
C8A6:D0 18    C8C0     8             BNE   NOWAIT      ;=>NOPE, NO VIDWAIT
C8A8:AC 00 C0          9             LDY   KBD         ;IS KEY PRESSED?
C8AB:10 13    C8C0    10             BPL   NOWAIT      ;NO
C8AD:C0 93             11             CPY   #$93        ;IS IT CTL-S?
C8AF:D0 0F    C8C0     12             BNE   NOWAIT      ;NO, IGNORE IT
C8B1:2C 10 C0          13             BIT   KBDSTRB     ;CLEAR STROBE
C8B4:AC 00 C0          14 KBDWAIT     LDY   KBD         ;WAIT FOR NEXT KEYPRESS
C8B7:10 FB    C8B4     15             BPL   KBDWAIT
C8B9:C0 83             16             CPY   #$83        ;IF CTL-C, LEAVE IT
C8BB:F0 03    C8C0     17             BEQ   NOWAIT      ;  IN THE KBD BUFFER
C8BD:2C 10 C0          18             BIT   KBDSTRB     ;CLEAR OTHER CHARACTER
C8C0:          C8C0    19 NOWAIT      EQU   *
C8C0:29 7F             20             AND   #$7F        ;DROP POSSIBLE HI BIT
C8C2:C9 20             21             CMP   #$20        ;IS IT CONTROL CHAR?
C8C4:B0 06    C8CC     22             BCS   BPNCTL      ;=>NOPE
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C8C6:20 99 CB          23              JSR   CTLCHAR      ;EXECUTE POSSIBLE CTL CHAR
C8C9:4C E2 C8          24              JMP   BIORET       ;=>EXECUTED OR IGNORED
C8CC:                  25 *
C8CC:                  26 * NOT A CTL CHAR. PRINT IT.
C8CC:                  27 *
C8CC:          C8CC    28 BPNCTL       EQU   *
C8CC:AC 7B 05          29              LDY   OURCH        ;GET CH
C8CF:AD 7B 06          30              LDA   CHAR         ;GET CHAR (ALL 8 BITS)
C8D2:20 F2 CE          31              JSR   STORCHAR     ;STUFF ONTO SCREEN
C8D5:                  32 *
C8D5:                  33 * BUMP THE CURSOR HORIZONTAL:
C8D5:                  34 *
C8D5:EE 7B 05          35              INC   OURCH        ;BUMP IT
C8D8:AD 7B 05          36              LDA   OURCH        ;ARE WE PAST THE
C8DB:C5 21             37              CMP   WNDWDTH      ; END OF THE LINE?
C8DD:90 03   C8E2      38              BCC   BIORET       ;=>NO, NO PROBLEM
C8DF:20 EC CB          39              JSR   X.CR         ;YES, DO C/R
C8E2:                  40 *
C8E2:          C8E2    41 BIORET       EQU   *
C8E2:AD 7B 05          42              LDA   OURCH        ;SET CH AND CV
C8E5:20 AF CE          43              JSR   SETCH        ; FOR BASIC
C8E8:AD FB 05          44              LDA   OURCV
C8EB:85 25             45              STA   CV
C8ED:68                46              PLA                ;RESTORE
C8EE:AA                47              TAX
C8EF:68                48              PLA                ;X AND Y
C8F0:A8                49              TAY
C8F1:68                50              PLA                ; AND AC
C8F2:AD 7B 06          51              LDA   CHAR
C8F5:60                52              RTS                ;RETURN TO BASIC
C8F6:                   8              INCLUDE BINPUT
C8F6:                   2 * BASIC INPUT:
C8F6:                   3 *
C8F6:          C8F6     4 BINPUT        EQU   *
C8F6:AD FB 04           5              LDA   MODE         ;SAY THAT
C8F9:09 40              6              ORA   #M.BINPUT    ; WE'RE INPUTTING
C8FB:8D FB 04           7              STA   MODE
C8FE:AD 7B 06           8              LDA   CHAR         ;GET CHAR AT CURSOR AND
C901:A4 24              9              LDY   CH           ;GET CURSOR POSITION
C903:91 28             10              STA   (BASL),Y     ; REPAIR MONITOR'S SILLY ATTEMPT
C905:          C905    11 B.INPUT      EQU   *
C905:20 DD CE          12              JSR   INVERT       ;CREATE OUR OWN CURSOR IMAGE
C908:20 15 CB          13              JSR   GETKEY       ;GET A KEY
C90B:8D 7B 06          14              STA   CHAR         ;SAVE IT
C90E:20 DD CE          15              JSR   INVERT       ;REMOVE CURSOR
C911:C9 9B             16              CMP   #$9B         ;ESCAPE KEY?
C913:F0 03   C918      17              BEQ   ESCAPING     ;=>YES IT IS
C915:4C B7 C9          18              JMP   NOESC        ;=>NO, IT'S NORMAL
C918                   20 * START AN ESCAPE SEQUENCE:
C918:                  21 *  WE HANDLE THE FOLLOWING ONES:
C918:                  22 *    @ - HOME & CLEAR
C918:                  23 *    E - CLR TO EOL
C918:                  24 *    F - CLR TO EOS
C918:                  25 *    I - CURSOR UP
C918:                  26 *    J - CURSOR LEFT
C918:                  27 *    K - CURSOR RIGHT
C918:                  28 *    M - CURSOR DOWN
C918:                  29 *    R - RESTRICT TO UPPERCASE
C918:                  30 *    T - TURN OFF ESC-R
C918:                  31 *    4 - GOTO 40 COLUMN MODE
C918:                  32 *    8 - GOTO 80 COLUMN MODE
C918:                  33 * CTL-Q- QUIT (PR#0/IN#0)
C918:                  34 *   THE FOUR ARROW KEYS (AS IJKM)
C918:                  35 *
C918:                  36              MSB   OFF
C918:          C918    37 ESCAPING     EQU   *
C918:20 52 CF          38              JSR   ESCON        ;ESCAPE CURSORON
C91B:20 15 CB          39              JSR   GETKEY       ;GET ESCAPE FUNCTION
C91E:20 65 CF          40              JSR   ESCOFF       ;REPLACE ORIGINAL CHARACTER
C921:29 7F             41              AND   #$7F         ;DROP HI BIT
C923:C9 60             42              CMP   #$60         ;IS IT LOWERCASE?
C925:90 02   C929      43              BCC   ESC1         ;=>NO, DON'T UPSHIFT
C927:29 DF             44              AND   #255-$20     ;UPSHIFT
C929:          C929    45 ESC1         EQU   *
C929:A0 11             46              LDY   #ESCNUM      ;COUNT/INDEX
C92B:          C92B    47 ESC2         EQU   *
C92B:D9 72 C9          48              CMP   ESCTAB,Y     ;IS IT A VALID ESCAPE?
C92E:F0 05   C935      49              BEQ   ESC3         ;=>YES
C930:88                50              DEY
C931:10 F8   C92B      51              BPL   ESC2         ;TRY 'EM ALL...
C933:30 10   C945      52              BMI   ESCSPEC      ;=>MAYBE IT'S A SPECIAL ONE
C935:                  53 *
C935:          C935    54 ESC3         EQU   *
C935:B9 83 C9          55              LDA   ESCCHAR,Y    ;GET CHAR TO "PRINT"
C938:29 7F             56              AND   #$7F         ;DROP HI BIT (FLAG)
C93A:20 99 CB          57              JSR   CTLCHAR      ;EXECUTE IT
C93D:B9 83 C9          58              LDA   ESCCHAR,Y    ;GET FLAG
C940:30 D6   C918      59              BMI   ESCAPING     ;=>STAY IN ESCAPE MODE
C942:4C 05 C9          60              JMP   B.INPUT      ;=>QUIT ESCAPE MODE
C945:                  61 *
C945:          C945    62 ESCSPEC      EQU   *
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C945: C9 11          63              CMP   #$11          ;IS IT ESC-CTLQ?
C947: D0 0B   C954   64              BNE   ESCSPEC2      ;=>NO
C949: 20 AA CD       65              JSR   QUIT          ;DO THE QUITTING STUFF
C94C: A9 98          66              LDA   #$98          ;RETURN CTL-X AS
C94E: 8D 7B 06       67              STA   CHAR          ; THE CHARACTER
C951: 4C E2 C8       68              JMP   BIORET        ;=>QUIT THE CARD FOREVER
C954:                69 *
C954:         C954   70 ESCSPEC2     EQU   *
C954: C9 52          71              CMP   #'R'          ;IS IT ESC-R?
C956: D0 0B   C963   72              BNE   ESCSPEC3      ;=>NO
C958: AD FB 04       73              LDA   MODE          ;YES, SET IT
C95B: 09 80          74              ORA   #M.ESCR
C95D: 8D FB 04       75              STA   MODE
C960: 4C 05 C9       76 ESCNONE     JMP   B.INPUT       ;QUIT ESCAPE MODE
C963:                77 *
C963:         C963   78 ESCSPEC3     EQU   *
C963: C9 54          79              CMP   #'T'          ;IS IT ESC-T?
C965: D0 F9   C960   80              BNE   ESCNONE       ;=>NOTHING
C967: AD FB 04       81              LDA   MODE
C96A: 29 7F          82              AND   #255-M.ESCR
C96C: 8D FB 04       83              STA   MODE
C96F: 4C 05 C9       84              JMP   B.INPUT       ;QUIT ESCAPE MODE
C972:         C972   86 ESCTAB       EQU   *
C972: 40             87              ASC   '@'
C973: 41             88              ASC   'A'           ;HANDLE OLD ESCAPES
C974: 42             89              ASC   'B'
C975: 43             90              ASC   'C'
C976: 44             91              ASC   'D'
C977: 45             92              ASC   'E'
C978: 46             93              ASC   'F'
C979: 49             94              ASC   'I'
C97A: 4A             95              ASC   'J'
C97B: 4B             96              ASC   'K'
C97C: 4D             97              ASC   'M'
C97D: 34             98              ASC   '4'
C97E: 38             99              ASC   '8'
C97F: 08            100              DFB   $08           ;LEFT ARROW
C980: 0A            101              DFB   $0A           ;DOWN ARROW
C981: 0B            102              DFB   $0B           ;UP   ARROW
C982: 15            103              DFB   $15           ;RITE ARROW
C983:         0011  104 ESCNUM       EQU   *-ESCTAB
C983:               105              MSB   ON
C983:         C983  106 ESCCHAR      EQU   *
C983: 0C            107              DFB   $0C+$00       ;@: FORMFEED
C984: 1C            108              DFB   $1C           ;A: FS
C985: 08            109              DFB   $08           ;B: BS
C986: 0A            110              DFB   $0A           ;C: LF
C987: 1F            111              DFB   $1F           ;D: US
C988: 1D            112              DFB   $1D+$00       ;E: GS
C989: 0B            113              DFB   $0B+$00       ;F: VT
C98A: 9F            114              DFB   $1F+$80       ;I: US (STAY ESC)
C98B: 88            115              DFB   $08+$80       ;J: BS (STAY ESC)
C98C: 9C            116              DFB   $1C+$80       ;K: FS (STAY ESC)
C98D: 8A            117              DFB   $0A+$80       ;M: LF (STAY ESC)
C98E: 11            118              DFB   $11+$00       ;4 :DC1
C98F: 12            119              DFB   $12+$00       ;8 :DC2
C990: 88            120              DFB   $08+$80       ;<-:BS (STAY ESC)
C991: 8A            121              DFB   $0A+$80       ;DN:LF (STAY ESC)
C992: 9F            122              DFB   $1F+$80       ;UP:US (STAY ESC)
C993: 9C            123              DFB   $1C+$80       ;->:FS (STAY ESC)
C994:               124 ----------------------------------------
C994:               126 ----------------------------------------
C994:               127 * PASCAL STATUS:
C994:               128 ----------------------------------------
C994:         C994  129 PSTATUS      EQU   *
C994: AA            130              TAX                 ;SAVE REQUEST CODE
C995: 20 C8 CF      131              JSR   PSETUP        ;SETUP ZP STUFF
C998: 8A            132              TXA                 ;IS IT 'READY FOR OUTPUT?'
C999: D0 03   C99E  133              BNE   PSTATUS2      ;=>NO
C99B: 38            134              SEC                 ;YES, READY FOR OUTPUT
C99C: B0 16   C9B4  135              BCS   PSTATUS4
C99E:               136 *
C99E:         C99E  137 PSTATUS2     EQU   *
C99E: C9 01         138              CMP   #1            ;IS IT 'ANY INPUT?'
C9A0: F0 0E   C9B0  139              BEQ   PSTATUS3      ;=>YES
C9A2: A2 03         140              LDX   #3            ;IORESULT='ILGL OPERATION'
C9A4: 18            141              CLC
C9A5: 60            142              RTS
C9A6:               143 ----------------------------------------
C9A6:               144 * PASCAL 1.0 OUTPUT HOOK:
C9A6:               145 ----------------------------------------
C9A6: 00            146              BRK                 ;PADDING
C9A7: 00            147              BRK
C9A8: 00            148              BRK
C9A9: 00            149              BRK
C9AA:         0000  150              IFNE  *-$C9AA
 S                  151              FAIL  2,'C9AA       HOOK ALIGNMENT'
C9AA:               152              FIN
C9AA: AD 7B 06      153              LDA   CHAR          ;GET OUTPUT CHARACTER
C9AD: 4C 57 C3      154              JMP   JPWRITE       ;=>USE STANDARD WRITE
C9B0:               155 *
```

```
C9B0:          C9B0  156 PSTATUS3    EQU   *
C9B0:AD 00 C0        157               LDA   KBD          ;IS THERE A KEYPRESS?
C9B3:0A              158               ASL   A            ;STROBE-->CARRY
C9B4:A2 00           159 PSTATUS4    LDX   #0           ;IORESULT='GOOD'
C9B6:60              160               RTS
C9B7:                161 ----------------------------------------
C9B7:                162 *---- BASIC INPUT, CONTINUED:
C9B7:                163 *---- NOT AN ESCAPE SEQUENCE----
C9B7:                164 ----------------------------------------
C9B7:          C9B7  165 NOESC         EQU   *            ;NOT ESCAPE KEY
C9B7:                166 *
C9B7:C9 95           167               CMP   #$95         ;IS IT PICK?
C9B9:D0 08     C9C6  168               BNE   B.NOPICK     ;=>NOPE
C9BB:AC 7B 05        169               LDY   OURCH        ;YOU CAN PICK YER FRIENDS....
C9BE:20 01 CF        170               JSR   PICK         ;YES, PICK THE CHAR
C9C1:09 80           171               ORA   #$80         ;ALWAYS PICK AS NORMAL
C9C3:8D 7B 06        172               STA   CHAR         ;SAVE AS KEYSTROKE
C9C6:                173 *
C9C6:                174 * TRACK QUOTATION MARKS FOR THE
C9C6:                175 *  RESTRICT-UPPERCASE FEATURE:
C9C6:                176 *
C9C6:          C9C6  177 B.NOPICK      EQU   *
C9C6:AD FB 04        178               LDA   MODE         ;ARE WE DOING LITERAL INPUT?
C9C9:29 10           179               AND   #M.LIT
C9CB:D0 12     C9DF  180               BNE   B.CHKCAN     ;=>YES
C9CD:                181 *
C9CD:                182 * LITERAL INPUT'S INACTIVE.  SEE IF
C9CD:                183 *  WE CAN START LITERAL INPUT:
C9CD:                184 *
C9CD:AD 7B 06        185               LDA   CHAR         ;GET THE CHAR
C9D0:C9 A2           186               CMP   #$A2         ;IS IT A DOUBLE QUOTE?
C9D2:F0 23     C9F7  187               BEQ   B.FLIP       ;=>YES, FLIP LITERAL MODE
C9D4:C9 88           188               CMP   #$88         ;IS HE MOVING LEFT?
C9D6:D0 32     CA0A  189               BNE   B.FIXCHR     ;=>NOPE, JUST REG CHAR
C9D8:20 27 CA        190               JSR   GETPRIOR     ;GRAB PRIOR CHAR
C9DB:D0 2D     CA0A  191               BNE   B.FIXCHR     ;=>NOT DELETING A QUOTE
C9DD:F0 18     C9F7  192               BEQ   B.FLIP       ;(ALWAYS) HE'S DELETED THE QUOTE
C9DF:                193 *
C9DF:                194 * LITERAL INPUT'S ACTIVE.  SEE IF
C9DF:                195 *  IT SHOULD BE CANCELLED YET:
C9DF:                196 *
C9DF:          C9DF  197 B.CHKCAN      EQU   *
C9DF:AD 7B 06        198               LDA   CHAR         ;GET CURRENT CHAR
C9E2:C9 A2           199               CMP   #$A2         ;IS CURRENT CHAR THE CLOSING QUOTE?
C9E4:F0 1C     CA02  200               BEQ   B.CANLIT     ;=>YES
C9E6:C9 98           201               CMP   #$98         ;CANCEL LITERAL INPUT
C9E8:F0 18     CA02  202               BEQ   B.CANLIT     ;  IF CTLX OR RETURN
C9EA:C9 8D           203               CMP   #$8D         ;   OR BACK OVER "
C9EC:F0 14     CA02  204               BEQ   B.CANLIT
C9EE:C9 88           205               CMP   #$88         ;BACKSPACE?
C9F0:D0 18     CA0A  206               BNE   B.FIXCHR     ;=>NO, NOT DELETING QUOTE
C9F2:20 27 CA        207               JSR   GETPRIOR     ;GET CHAR HE'S DELETING
C9F5:D0 13     CA0A  208               BNE   B.FIXCHR     ;=>NOT DELETING A QUOTE
C9F7:                209 *
C9F7:          C9F7  210 B.FLIP        EQU   *
C9F7:AD FB 04        211               LDA   MODE         ;FLIP THE MODE
C9FA:49 10           212               EOR   #M.LIT
C9FC:8D FB 04        213               STA   MODE
C9FF:4C 0A CA        214               JMP   B.FIXCHR
CA02:          CA02  215 B.CANLIT      EQU   *
CA02:AD FB 04        216               LDA   MODE
CA05:29 EF           217               AND   #255-M.LIT   ;CANCEL LITERAL INPUT
CA07:8D FB 04        218               STA   MODE
CA0A:                219 *
CA0A:          CA0A  220 B.FIXCHR      EQU   *
CA0A:AD FB 04        221               LDA   MODE         ;ESC-R FACILITY ACTIVE?
CA0D:29 80           222               AND   #M.ESCR
CA0F:F0 13     CA24  223               BEQ   B.INRET      ;=>NOPE
CA11:AD FB 04        224               LDA   MODE         ;LITERAL INPUT ACTIVE?
CA14:29 10           225               AND   #M.LIT
CA16:D0 0C     CA24  226               BNE   B.INRET      ;=>YES, NO UPSHIFT
CA18:AD 7B 06        227               LDA   CHAR         ;GET THE CHAR
CA1B:C9 E0           228               CMP   #$E0         ;IS CHAR LOWERCASE?
CA1D:90 05     CA24  229               BCC   B.INRET      ;=>NO, NO NEED TO SHIFT IT
CA1F:29 DF           230               AND   #$DF         ;RESTRICT TO U/C
CA21:8D 7B 06        231               STA   CHAR
CA24:                232 ----------------------------------------
CA24:          CA24  233 B.INRET       EQU   *
CA24:4C E2 C8        234               JMP   BIORET       ;=>RETURN TO CALLER
CA27:                235 ----------------------------------------
CA27:                236 * NAME     : GETPRIOR
CA27:                237 * FUNCTION: GET CHAR BEFORE CURSOR
CA27:                238 * INPUT    : OURCH,OURCV
CA27:                239 * OUTPUT   : 'BEQ' IF CHAR=DBL QUOTE
CA27:                240 *          : 'BNE' IF NOT
CA27:                241 * VOLATILE: AC,'TEMP1'
CA27:                242 * CALLS    : PICK,X.BS,X.FS
CA27:                243 ----------------------------------------
CA27:                244 *
CA27:          CA27  245 GETPRIOR      EQU   *
CA27:AD FB 05        246               LDA   OURCV        ;DON'T TRY TO LOOK
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CA2A: 0D 7B 05      249              ORA   OURCH        ; BACK IF @ UPPER-LEFT
CA2D: F0 1A   CA49  250              BEQ   GPX          ;  CORNER OF WINDOW!!!
CA2F: 98            251              TYA                ;SAVE Y
CA30: 48            252              PHA
CA31: 20 DB CB      253              JSR   X.BS         ;BACK UP 1 CHAR
CA34: AC 7B 05      254              LDY   OURCH        ;GET CH AND
CA37: 20 01 CF      255              JSR   PICK         ; PICK PRIOR CHAR
CA3A: 09 80         256              ORA   #$80         ;PICK AS NORMAL VIDEO
CA3C: 8D 7B 04      257              STA   TEMP1        ;HOLD CHAR
CA3F: 20 26 CC      258              JSR   X.FS
CA42: 68            259              PLA                ;RESTORE
CA43: A8            260              TAY                ; Y
CA44: AD 7B 04      261              LDA   TEMP1
CA47: C9 A2         262              CMP   #$A2         ;IS IT DBL QUOTE?
CA49:         CA49  263 GPX          EQU   *
CA49: 60            264              RTS                ;RETURN WITH BEQ/BNE
CA4A:                 9              INCLUDE PINIT
CA4A:                 2 ----------------------------------------
CA4A:                 3 * PASCAL INITIALIZATION:
CA4A:                 4 ----------------------------------------
CA4A:         CA4A    5 PINIT1.0     EQU   *
CA4A: A9 22           6              LDA   #M.PASCAL+M.PAS1.0
CA4C: 4C 51 CA        7              JMP   PINIT2
CA4F:         CA4F    8 PINIT        EQU   *
CA4F: A9 20           9              LDA   #M.PASCAL    ;SAY WE'RE
CA51:                10 *
CA51:         CA51   11 PINIT2       EQU   *
CA51: 8D FB 04       12              STA   MODE         ; RUNNING PASCAL
CA54: 20 9B CD       13              JSR   FULL80       ;SET FULL 24x80 WINDOW
CA57: 20 C8 CF       14              JSR   PSETUP       ;SETUP ZP STUFF
CA5A:                15 * BASE ADDR IS WRONG, BUT X.FF FIXES IT BELOW:
CA5A:                16 *  JSR BASCALC ;FORCE A GOOD BASCALC
CA5A:                17 *
CA5A:                18 * SEE IF THE CARD'S PLUGGED IN:
CA5A:                19 *
CA5A: 20 24 CB       20              JSR   TESTCARD     ;IS IT THERE?
CA5D: F0 03   CA62   21              BEQ   PIGOOD       ;=>YES
CA5F: A2 09          22              LDX   #9           ;IORESULT='NO DEVICE'
CA61: 60             23              RTS
CA62:                24 *
CA62:         CA62   25 PIGOOD       EQU   *
CA62: 8D 01 C0       26              STA   SETB0COL     ;ENABLE 80 STORE
CA65: 8D 0D C0       27              STA   SETB0VID     ;  AND 80 VIDEO
CA68: 8D 0F C0       28              STA   SETALTCHAR   ;NORM+INV LCASE
CA6B: 20 42 CD       29              JSR   X.FF         ;HOME & CLEAR IT
CA6E: 20 DD CE       30              JSR   INVERT       ;PUT CURSOR THERE
CA71: A2 00          31              LDX   #0           ;IORESULT='GOOD'
CA73: 60             32              RTS
CA74:                10              INCLUDE PREAD
CA74:                 2 ----------------------------------------
CA74:                 3 * PASCAL INPUT:
CA74:                 4 ----------------------------------------
CA74:         CA74    5 PREAD        EQU   *
CA74: 20 C8 CF        6              JSR   PSETUP       ;SETUP ZP STUFF
CA77:                 7 *
CA77: 20 15 CB        8              JSR   GETKEY       ;GET A KEYSTROKE
CA7A: 29 7F           9              AND   #$7F         ;DROP HI BIT
CA7C: 8D 7B 06       10              STA   CHAR         ;SAVE THE CHAR
CA7F: A2 00          11              LDX   #0           ;IORESULT='GOOD'
CA81: AD FB 04       12              LDA   MODE         ;ARE WE IN 1.0-MODE?
CA84: 29 02          13              AND   #M.PAS1.0
CA86: F0 02   CA8A   14              BEQ   PREADRET2    ;=>NOPE
CA88: A2 C3          15              LDX   #<CNOO       ;YES, RETURN CN IN X
CA8A:                16 *
CA8A:         CA8A   17 PREADRET2    EQU   *
CA8A: AD 7B 06       18              LDA   CHAR         ;RESTORE CHAR
CA8D: 60             19              RTS
CA8E:                11              INCLUDE PWRITE
CA8E:                 2 ----------------------------------------
CA8E:                 3 * PASCAL OUTPUT:
CA8E:                 4 ----------------------------------------
CA8E:         CA8E    5 PWRITE       EQU   *
CA8E: 8D 7B 06        6              STA   CHAR         ;SAVE CHARACTER
CA91: 20 C8 CF        7              JSR   PSETUP       ;SETUP ZP STUFF
CA94:                 8 *
CA94: 20 DD CE        9              JSR   INVERT       ;TURN CURSOR OFF
CA97: AD FB 04       10              LDA   MODE         ;ARE WE DOING GOTOXY?
CA9A: 29 08          11              AND   #M.GOXY
CA9C: F0 2D   CACB   12              BEQ   PWRITE3      ;=>NO, PRINT IT
CA9E:                13 *
CA9E:                14 *  HANDLE GOTOXY STUFF:
CA9E:                15 *
CA9E:         CA9E   16 PWRITE2      EQU   *
CA9E: AD FB 06       17              LDA   XCOORD       ;ARE WE WAITING FOR X?
CAA1: 10 0C   CAAF   18              BPL   GETY        ;=>NO, THIS IS Y
CAA3: AD 7B 06       19              LDA   CHAR
CAA6: 38             20              SEC
CAA7: E9 20          21              SBC   #32          ;MAKE BINARY
CAA9: 8D FB 06       22              STA   XCOORD
CAAC: 4C 0F CB       23              JMP   PWRITERET    ;=>NOW WAIT FOR Y
CAAF:                24 *
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CAAF:                    25 * NOW DO THE GOTOXY:
CAAF:                    26 *
CAAF:           CAAF     27 GOTY         EQU   *
CAAF:AD 7B 06            28              LDA   CHAR          ;CONVERT YCOORD
CAB2:38                  29              SEC
CAB3:E9 20               30              SBC   #32
CAB5:8D FB 05            31              STA   OURCV
CAB8:20 51 CB            32              JSR   BASCALC       ;COMPUTE BASE ADDRESS
CABB:AD FB 06            33              LDA   XCOORD
CABE:8D 7B 05            34              STA   OURCH
CAC1:AD FB 04            35              LDA   MODE          ;TURN OFF GOTOXY
CAC4:29 F7               36              AND   #255-M.GOXY
CAC6:8D FB 04            37              STA   MODE
CAC9:D0 44     CBOF      38              BNE   PWRITERET    ;=>DONE (ALWAYS TAKEN)
CACB:                    39 *
CACB:           CACB     40 PWRITE3      EQU   *
CACB:AD 7B 06            41              LDA   CHAR          ;GET CHAR TO PRINT
CACE:C9 1E               42              CMP   #$1E          ;IS IT GOTOXY?
CAD0:F0 0A     CADC      43              BEQ   STARTXY       ;=>YES
CAD2:C9 20               44              CMP   #$20          ;IS IT OTHER CTL?
CAD4:B0 15     CAEB      45              BCS   PWRITE4       ;=>NO, PRINT IT
CAD6:20 99 CB            46              JSR   CTLCHAR       ;EXECUTE IT IF POSSIBLE
CAD9:4C OF CB            47              JMP   PWRITERET     ;=>EXECUTED OR IGNORED
CADC:                    48 *
CADC:                    49 * START THE GOTOXY SEQUENCE:
CADC:                    50 *
CADC:           CADC     51 STARTXY      EQU   *
CADC:AD FB 04            52              LDA   MODE          ;TURN ON FLAG
CADF:09 08               53              ORA   #M.GOXY
CAE1:8D FB 04            54              STA   MODE
CAE4:A9 FF               55              LDA   #-1           ;SET X NEGATIVE TO
CAE6:8D FB 06            56              STA   XCOORD        ;  SHOW WE NEED IT
CAE9:30 24     CBOF      57              BMI   PWRITERET     ;=>EXIT TILL COORDS COME BY (ALWAYS)
CAEB:                    58 *
CAEB:                    59 * JUST A PRINTABLE CHARACTER:
CAEB:                    60 *
CAEB:           CAEB     61 PWRITE4      EQU   *
CAEB:09 80               62              ORA   #$80          ;FORCE TO NORMAL
CAED:AC 7B 05            63              LDY   OURCH         ;GET CH
CAF0:20 F2 CE            64              JSR   STORCHAR      ;STUFF IT!
CAF3:                    65 *
CAF3:                    66 * BUMP CURSOR HORIZONTAL:
CAF3:                    67 *
CAF3:EE 7B 05            68              INC   OURCH         ;BUMP IT
CAF6:AD 7B 05            69              LDA   OURCH         ;ARE WE PAST THE
CAF9:C5 21               70              CMP   WNDWDTH       ;  END OF THE LINE?
CAFB:90 12     CBOF      71              BCC   PWRITERET     ;=>NO, NO PROBLEM
CAFD:                    72 *
CAFD:                    73 * IF IN TRANSPARENT MODE, DON'T
CAFD:                    74 *  WRAPAROUND THE RIGHT EDGE...
CAFD:                    75 *
CAFD:AD FB 04            76              LDA   MODE          ;GET MODE
CB00:29 01               77              AND   #M.TRANS      ;WELL???
CB02:F0 05     CB09      78              BEQ   PWWRAP        ;=>NOT TRANSPARENT
CB04:CE 7B 05            79              DEC   OURCH         ;PIN AT RIGHT EDGE
CB07:D0 06     CBOF      80              BNE   PWRITERET     ;(ALWAYS TAKEN)
CB09:                    81 *
CB09:           CB09     82 PWWRAP       EQU   *
CB09:20 EC CB            83              JSR   X.CR          ;YES, DO C/R
CB0C:20 91 CC            84              JSR   X.LF          ;  AND L/F
CBOF:                    85 *
CBOF:           CBOF     86 PWRITERET    EQU   *
CBOF:20 DD CE            87              JSR   INVERT        ;TURN CURSOR ON
CB12:A2 00               88              LDX   #0            ;IORESULT='GOOD'
CB14:60                  89              RTS
CB15:                    12              INCLUDE SUBS1
CB15:                     2 ------------------------------------------
CB15:                     3 * NAME     : GETKEY
CB15:                     4 * FUNCTION: GET A KEYSTROKE
CB15:                     5 * INPUT    : NONE
CB15:                     6 * OUTPUT   : AC=KEYCODE
CB15:                     7 * VOLATILE: NONE
CB15:                     8 ------------------------------------------
CB15:                     9 *
CB15:           CB15     10 GETKEY       EQU   *
CB15:E6 4E               11              INC   RNDL          ;BUMP RANDOM SEED
CB17:D0 02     CB1B      12              BNE   GETK2
CB19:E6 4F               13              INC   RNDH
CB1B:           CB1B     14 GETK2        EQU   *
CB1B:AD 00 C0            15              LDA   KBD           ;KEYPRESS?
CB1E:10 F5     CB15      16              BPL   GETKEY        ;=>NOPE
CB20:8D 10 C0            17              STA   KBDSTRB       ;CLEAR STROBE
CB23:60                  18              RTS
CB24:                    19 ------------------------------------------
CB24:                    20 * NAME     : TESTCARD
CB24:                    21 * FUNCTION: SEE IF 80COL CARD PLUGGED IN
CB24:                    22 * INPUT    : NONE
CB24:                    23 * OUTPUT   : 'BEQ' IF CARD AVAILABLE
CB24:                    24 *          : 'BNE' IF NOT
CB24:                    25 * VOLATILE: AC,Y
CB24:                    26 ------------------------------------------
CB24:                    27 *
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CB24:           CB24    28 TESTCARD     EQU   *
CB24: AD 1C C0          29              LDA   RDPAGE2       ;REMEMBER CURRENT VIDEO DISPLAY
CB27: 0A                30              ASL   A             ; IN THE CARRY
CB28: A9 BB             31              LDA   #$BB          ;USEFUL CHAR FOR TESTING
CB2A: 2C 1B C0          32              BIT   RD80COL       ;REMEMBER VIDEO MODE IN 'N'
CB2D: 8D 01 C0          33              STA   SET80COL      ;ENABLE 80COL STORE
CB30: 08                34              PHP                 ;LOCK INTERRUPTS WHILE
CB31: 78                35              SEI                 ; SCREENHOLES ARE WRONG
CB32: 08                36              PHP                 ;SAVE 'N' AND 'C' FLAGS
CB33: 8D 55 C0          37              STA   TXTPAGE2      ;SET PAGE2
CB36: AC 00 04          38              LDY   $0400         ;GET FIRST CHAR
CB39: 8D 00 04          39              STA   $0400         ;SET TO A '*'
CB3C: AD 00 04          40              LDA   $0400         ;GET IT BACK FROM RAM
CB3F: 8C 00 04          41              STY   $0400         ;RESTORE ORIG CHAR
CB42: 28                42              PLP                 ;RESTORE 'N' AND 'C' FLAGS
CB43: B0 03     CB48    43              BCS   STAY2         ;STAY IN PAGE2
CB45: 8D 54 C0          44              STA   TXTPAGE1      ;RESTORE PAGE1
CB48:           CB48    45 STAY2        EQU   *
CB48: 30 03     CB4D    46              BMI   STAY80        ;=>STAY IN 80COL MODE
CB4A: 8D 00 C0          47              STA   CLR80COL      ;TURN OFF 80COL STORE
CB4D:           CB4D    48 STAY80       EQU   *
CB4D: 28                49              PLP                 ;ALLOW IRQ AGAIN
CB4E:           CB4E    50 TESTFAIL     EQU   *
CB4E: C9 BB             51              CMP   #$BB          ;WAS CHAR VALID?
CB50: 60                52              RTS                 ;RETURN RESULT AS BEQ/BNE
CB51:                   53 ----------------------------------------
CB51:                   54 * NAME     : BASCALC,BASCALCZ
CB51:                   55 * FUNCTION : CALC BASE ADDR FOR SCREEN LINE
CB51:                   56 * INPUT    : OURCV (BASCALC)
CB51:                   57 *          : AC=CV (BASCALCZ)
CB51:                   58 * OUTPUT   : BASL/BASH
CB51:                   59 * VOLATILE : NOTHING
CB51:                   60 * CALLS    : SNIFFIRQ
CB51:                   61 ----------------------------------------
CB51:                   62 *
CB51:           FC75    63 SNIFFIRQ     EQU   $FC75
CB51:                   64 *
CB51:           CB51    65 BASCALC      EQU   *             ;RIPPED OFF FROM F8 ROM
CB51: 18                66              CLC                 ;SHOW ENTRY POINT
CB52: 90 01     CB55    67              BCC   BSCLC1
CB54:           CB54    68 BASCALCZ     EQU   *
CB54: 38                69              SEC                 ;SHOW ENTRY POINT
CB55:           CB55    70 BSCLC1       EQU   *
CB55: 48                71              PHA                 ;SAVE AC
CB56: B0 03     CB5B    72              BCS   BSCLC1A       ;=>CV ALREADY IN AC
CB58: AD FB 05          73              LDA   OURCV
CB5B:           CB5B    74 BSCLC1A      EQU   *
CB5B: 48                75              PHA
CB5C: 4A                76              LSR   A
CB5D: 29 03             77              AND   #$03
CB5F: 09 04             78              ORA   #$04
CB61: 85 29             79              STA   BASH
CB63: 8D FB 07          80              STA   OLDBASH       ;SAVE FOR F/W PROTOCOL
CB66: 68                81              PLA
CB67: 29 18             82              AND   #$18
CB69: 90 02     CB6D    83              BCC   BSCLC2
CB6B: 69 7F             84              ADC   #$7F
CB6D: 85 28             85 BSCLC2       STA   BASL
CB6F: 0A                86              ASL   A
CB70: 0A                87              ASL   A
CB71: 05 28             88              ORA   BASL
CB73: 85 28             89              STA   BASL
CB75:                   90 *
CB75:                   91 * HANDLE THE SCROLLING WINDOW:
CB75:                   92 *
CB75: A5 20             93              LDA   WNDLFT
CB77: 08                94              PHP                 ;PRESERVE CARRY
CB78: 2C 1F C0          95              BIT   RD80VID       ;WHICH MODE?
CB7B: 10 01     CB7E    96              BPL   BASCLC3       ;=>40.  NO DIVIDE.
CB7D: 4A                97              LSR   A             ;DIVIDE BY 2 FOR 80COL WINDOW
CB7E:           CB7E    98 BASCLC3      EQU   *
CB7E: 28                99              PLP                 ;RESTORE CARRY
CB7F: 65 28            100              ADC   BASL          ;ADJUST BASE FOR WNDLFT
CB81: 85 28            101              STA   BASL
CB83: 8D 7B 07         102              STA   OLDBASL       ;SAVE FOR F/W PROTOCOL
CB86:                  103 *
CB86:                  104 * SNIFF FOR IRQ IF NECESSARY:
CB86:                  105 *
CB86: AD FB 04         106              LDA   MODE
CB89: 29 01            107              AND   #M.IRQ
CB8B: F0 0A     CB97   108              BEQ   BASCLCX       ;=>IRQ DISABLED, RETURN
CB8D: AD FB 04         109              LDA   MODE          ;IS BASIC RUNNING?
CB90: 29 20            110              AND   #M.PASCAL
CB92: D0 03     CB97   111              BNE   BASCLCX       ;=>DON'T SNIFF UNDER PASCAL
CB94: 20 75 FC         112              JSR   SNIFFIRQ      ;GO DO IT
CB97:           CB97   113 BASCLCX      EQU   *
CB97: 68               114              PLA                 ;RESTORE AC
CB98: 60               115              RTS
CB99:                  116 ----------------------------------------
CB99:                  117 * NAME     : CTLCHAR
CB99:                  118 * FUNCTION : EXECUTE CTL CHAR
CB99:                  119 * INPUT    : AC=CHAR
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CB99:                  120 * OUTPUT   : 'BCS' IF NOT CTL
CB99:                  121 *          : 'BCC' IF CTL EXECUTED
CB99:                  122 * VOLATILE: NOTHING
CB99:                  123 * CALLS    : MANY THINGS
CB99:                  124 ----------------------------------------
CB99:                  125 *
CB99:          CB99    126 CTLCHAR     EQU   *
CB99:8D 78 04          127             STA   TEMP1        ;TEMP SAVE OF CHAR
CB9C:48                128             PHA                ;SAVE AC
CB9D:98                129             TYA                ;SAVE Y
CB9E:48                130             PHA
CB9F:                  131 *
CB9F:AC 78 04          132             LDY   TEMP1        ;GET CHAR IN QUESTION
CBA2:C0 07             133             CPY   #$07         ;IS IT NUL..ACK?
CBA4:90 05   CBAB      134             BCC   CTLCHARX     ;=>YES, NOT USED
CBA6:B9 71 CC          135             LDA   CTLADH-7,Y   ;IS IT CTL?
CBA9:D0 03   CBAE      136             BNE   CTLGO        ;=>YES
CBAB:          CBAB    137 CTLCHARX    EQU   *
CBAB:38                138             SEC                ;SAY 'NOT CTL'
CBAC:B0 04   CBB2      139             BCS   CTLRET       ;=>DONE
CBAE:                  140 *
CBAE:          CBAE    141 CTLGO       EQU   *
CBAE:20 B6 CB          142             JSR   CTLXFER      ;EXECUTE SUBROUTINE
CBB1:                  143 *
CBB1:18                144             CLC                ;SAY 'CTL CHAR EXECUTED'
CBB2:          CBB2    145 CTLRET      EQU   *
CBB2:68                146             PLA                ;RESTORE
CBB3:A8                147             TAY                ; Y
CBB4:68                148             PLA                ;   AND AC
CBB5:60                149             RTS
CBB6:                  150 *
CBB6:          CBB6    151 CTLXFER     EQU   *
CBB6:48                152             PHA                ;PUSH ONTO STACK FOR
CBB7:B9 58 CC          153             LDA   CTLADL-7,Y   ; TRANSFER TRICK
CBBA:48                154             PHA
CBBB:60                155             RTS                ;XFER TO ROUTINE
CBBC:                  156 *
CBBC:                  157 * EXECUTE BELL:
CBBC:                  158 *
CBBC:          CBBC    159 X.BELL      EQU   *
CBBC:A9 40             160             LDA   #$40         ;RIPPED OFF FROM MONITOR
CBBE:20 CF CB          161             JSR   WAIT
CBC1:A0 C0             162             LDY   #$C0
CBC3:A9 0C             163 BELL2       LDA   #$0C
CBC5:20 CF CB          164             JSR   WAIT
CBC8:AD 30 C0          165             LDA   SPKR
CBCB:88                166             DEY
CBCC:D0 F5   CBC3      167             BNE   BELL2
CBCE:60                168             RTS
CBCF:                  169 *
CBCF:          CBCF    170 WAIT        EQU   *            ;RIPPED OFF FROM MONITOR ROM
CBCF:38                171             SEC
CBD0:48                172 WAIT2       PHA
CBD1:E9 01             173 WAIT3       SBC   #1
CBD3:D0 FC   CBD1      174             BNE   WAIT3
CBD5:68                175             PLA
CBD6:E9 01             176             SBC   #1
CBD8:D0 F6   CBD0      177             BNE   WAIT2
CBDA:60                178             RTS
CBDB:                  179 *
CBDB:                  180 * EXECUTE BACKSPACE:
CBDB:                  181 *
CBDB:          CBDB    182 X.BS        EQU   *
CBDB:CE 7B 05          183             DEC   OURCH        ;BACK UP CH
CBDE:10 0B   CBEB      184             BPL   BSDONE       ;=>DONE
CBE0:A5 21             185             LDA   WNDWDTH      ;BACK UP TO PRIOR LINE
CBE2:          CBE2    186 BS40        EQU   *
CBE2:8D 7B 05          187             STA   OURCH        ;SET CH
CBE5:CE 7B 05          188             DEC   OURCH
CBE8:20 34 CC          189             JSR   X.US         ;NOW DO REV LINEFEED
CBEB:          CBEB    190 BSDONE      EQU   *
CBEB:60                191             RTS
CBEC:                  192 *
CBEC:                  193 * EXECUTE CARRIAGE RETURN:
CBEC:                  194 *
CBEC:          CBEC    195 X.CR        EQU   *
CBEC:AD FB 04          196             LDA   MODE         ;WHICH LANGUAGE?
CBEF:29 20             197             AND   #M.PASCAL
CBF1:D0 0A   CBFD      198             BNE   X.CRPAS      ;=>PASCAL, NO CLR EOL
CBF3:AD FB 04          199             LDA   MODE         ;INPUT OR OUTPUT?
CBF6:29 40             200             AND   #M.BINPUT
CBF8:F0 03   CBFD      201             BEQ   X.CRPAS      ;=>OUTPUT. NO CLEARING
CBFA:20 48 CD          202             JSR   X.CS         ;CLEAR TO EOL
CBFD:                  203 *
CBFD:          CBFD    204 X.CRPAS     EQU   *
CBFD:A9 00             205             LDA   #0           ;BACK UP CH TO
CBFF:8D 7B 05          206             STA   OURCH        ; BEGINNING OF LINE
CC02:AD FB 04          207             LDA   MODE         ;ARE WE IN BASIC?
CC05:29 20             208             AND   #M.PASCAL
CC07:D0 03   CC0C      209             BNE   X.CRRET      ;=>PASCAL, AVOID AUTO L/F
CC09:20 91 CC          210             JSR   X.LF         ;EXECUTE AUTO LF FOR BASIC
CC0C:          CC0C    211 X.CRRET     EQU   *
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CC0C:60             212               RTS
CC0D:         0000  213               DO    0           ;NO MORE ROM SPACE!
 S                  214 *
 S                  215 *             EXECUTE SYNC:
 S                  216 *
 S                  217 X.SYN         EQU   *
 S                  218               LDA   RDVBLBAR    ;WAIT FOR VBL
 S                  219               BPL   X.SYN       ;=>WAIT FOR VIDEO SCAN
 S                  220 X.SYN2        LDA   RDVBLBAR    ;NOW WAIT FOR
 S                  221               BMI   X.SYN2      ; BLANKING TO BEGIN
 S                  222               RTS
CC0D:               223               FIN
CC0D:               224 *
CC0D:               225 * EXECUTE HOME:
CC0D:               226 *
CC0D:         CC0D  227 X.EM          EQU   *
CC0D:A5 22          228               LDA   WNDTOP
CC0F:8D FB 05       229               STA   OURCV       ;STUFF CV
CC12:A9 00          230               LDA   #0
CC14:8D 7B 05       231               STA   OURCH       ;STUFF CH
CC17:4C 51 CB       232               JMP   BASCALC     ;RETURN VIA BASCALC (UGH!)
CC1A:               233 *
CC1A:               234 * EXECUTE CLEAR LINE:
CC1A:               235 *
CC1A:         CC1A  236 X.SUB         EQU   *
CC1A:A4 21          237               LDY   WNDWDTH
CC1C:88             238               DEY
CC1D:         CC1D  239 X.SUB80       EQU   *
CC1D:A9 A0          240               LDA   #' '        ;BLANKIE BLANK
CC1F:         CC1F  241 X.SUBLP       EQU   *
CC1F:20 F2 CE       242               JSR   STORCHAR    ;STUFF THE BLANK
CC22:88             243               DEY
CC23:10 FA    CC1F  244               BPL   X.SUBLP     ;=>CLEAR THE LINE
CC25:60             245               RTS
CC26:               246 *
CC26:               247 * EXECUTE FORWARD SPACE:
CC26:               248 *
CC26:         CC26  249 X.FS          EQU   *
CC26:EE 7B 05       250               INC   OURCH       ;BUMP CH
CC29:AD 7B 05       251               LDA   OURCH       ;GET THE POSITION
CC2C:C5 21          252               CMP   WNDWDTH     ;OFF THE RIGHT SIDE?
CC2E:90 03    CC33  253               BCC   X.FSRET     ;=>NO, GOOD
CC30:20 EC CB       254               JSR   X.CR        ;=>YES, WRAP AROUND
CC33:               255 *
CC33:         CC33  256 X.FSRET       EQU   *
CC33:60             257               RTS
CC34:               258 *
CC34:               259 * EXECUTE REVERSE LINEFEED:
CC34:               260 *
CC34:         CC34  261 X.US          EQU   *
CC34:CE FB 05       262               DEC   OURCV       ;BACK UP CV
CC37:30 07    CC40  263               BMI   X.US1       ;=>OFF TOP OF SCREEN
CC39:AD FB 05       264               LDA   OURCV
CC3C:C5 22          265               CMP   WNDTOP      ;OFF TOP OF WINDOW?
CC3E:B0 05    CC45  266               BCS   X.US2       ;=>NO, STILL IN WINDOW
CC40:               267 *
CC40:               268 * PIN CV TO WINDOW TOP:
CC40:               269 *
CC40:         CC40  270 X.US1         EQU   *
CC40:EE FB 05       271               INC   OURCV       ;PUT BACK WHERE IT WAS
CC43:F0 03    CC48  272               BEQ   X.USRET     ;IT GOES TO 0 ALWAYS
CC45:         CC45  273 X.US2         EQU   *
CC45:20 51 CB       274               JSR   BASCALC     ;RECOMPUTE BASE ADDR
CC48:         CC48  275 X.USRET       EQU   *
CC48:60             276               RTS
CC49:               277 *
CC49:               278 * EXECUTE "NORMAL VIDEO"
CC49:               279 *
CC49:         CC49  280 X.SO          EQU   *
CC49:AD FB 04       281               LDA   MODE        ;SET MODE BIT
CC4C:29 FB          282               AND   #255-M.VMODE ;SET 'NORMAL'
CC4E:A0 FF          283               LDY   #255
CC50:D0 07    CC59  284               BNE   STUFFINV    ;(ALWAYS)
CC52:               285 *
CC52:               286 * EXECUTE "INVERSE VIDEO"
CC52:               287 *
CC52:         CC52  288 X.SI          EQU   *
CC52:AD FB 04       289               LDA   MODE        ;SET MODE BIT
CC55:09 04          290               ORA   #M.VMODE    ;SET 'INVERSE'
CC57:A0 7F          291               LDY   #127
CC59:         CC59  292 STUFFINV      EQU   *
CC59:8D FB 04       293               STA   MODE        ;SET MODE
CC5C:84 32          294               STY   INVFLG      ;STUFF FLAG TOO
CC5E:60             295               RTS
CC5F:         CC5F  297 CTLADL        EQU   *
CC5F:BB             298               DFB   >X.BELL-1   ;BEL
CC60:DA             299               DFB   >X.BS-1     ;BS
CC61:00             300               DFB   0           ;HT
CC62:90             301               DFB   >X.LF-1     ;LF
CC63:22             302               DFB   >X.VT-1     ;VT
CC64:41             303               DFB   >X.FF-1     ;FF
CC65:EB             304               DFB   >X.CR-1     ;CR
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CC66: 4B              305              DFB   >X.SO-1       ;SO
CC67: 51              306              DFB   >X.SI-1       ;SI
CC68: 00              307              DFB   0             ;DLE
CC69: 5B              308              DFB   >X.DC1-1      ;DC1
CC6A: 76              309              DFB   >X.DC2-1      ;DC2
CC6B: 00              310              DFB   0             ;DC3
CC6C: 00              311              DFB   0             ;DC4
CC6D: BF              312              DFB   >X.NAK-1      ;NAK
CC6E: A9              313              DFB   >SCROLLDN-1   ;SYN
CC6F: A3              314              DFB   >SCROLLUP-1   ;ETB
CC70: 00              315              DFB   0             ;CAN
CC71: 0C              316              DFB   >X.EM-1       ;EM
CC72: 19              317              DFB   >X.SUB-1      ;SUB
CC73: 00              318              DFB   0             ;ESC
CC74: 25              319              DFB   >X.FS-1       ;FS
CC75: 47              320              DFB   >X.GS-1       ;GS
CC76: 00              321              DFB   0             ;RS
CC77: 33              322              DFB   >X.US-1       ;US
CC78:                 323 *
CC78:          CC78   324 CTLADH       EQU   *
CC78: CB              325              DFB   <X.BELL-1     ;BEL
CC79: CB              326              DFB   <X.BS-1       ;BS
CC7A: 00              327              DFB   0             ;HT
CC7B: CC              328              DFB   <X.LF-1       ;LF
CC7C: CD              329              DFB   <X.VT-1       ;VT
CC7D: CD              330              DFB   <X.FF-1       ;FF
CC7E: CB              331              DFB   <X.CR-1       ;CR
CC7F: CC              332              DFB   <X.SO-1       ;SO
CC80: CC              333              DFB   <X.SI-1       ;SI
CC81: 00              334              DFB   0             ;DLE
CC82: CD              335              DFB   <X.DC1-1      ;DC1
CC83: CD              336              DFB   <X.DC2-1      ;DC2
CC84: 00              337              DFB   0             ;DC3
CC85: 00              338              DFB   0             ;DC4
CC86: CD              339              DFB   <X.NAK-1      ;NAK
CC87: CC              340              DFB   <SCROLLDN-1   ;SYN
CC88: CC              341              DFB   <SCROLLUP-1   ;ETB
CC89: 00              342              DFB   0             ;CAN
CC8A: CC              343              DFB   <X.EM-1       ;EM
CC8B: CC              344              DFB   <X.SUB-1      ;SUB
CC8C: 00              345              DFB   0             ;ESC
CC8D: CC              346              DFB   <X.FS-1       ;FS
CC8E: CD              347              DFB   <X.GS-1       ;GS
CC8F: 00              348              DFB   0             ;RS
CC90: CC              349              DFB   <X.US-1       ;US
CC91:                  13              INCLUDE SUBS2
CC91:                   2 *
CC91:                   3 * EXECUTE LINEFEED:
CC91:                   4 *
CC91:          CC91     5 X.LF          EQU   *
CC91: EE FB 05          6               INC   OURCV         ;BUMP CV
CC94: AD FB 05          7               LDA   OURCV         ;SEE IF OFF BOTTOM
CC97: C5 23             8               CMP   WNDBTM        ;OFF THE END?
CC99: B0 03    CC9E     9               BCS   X.LF2         ;=>YES
CC9B: 4C 20 CD         10               JMP   X.LFRET       ;=>NO, DONE
CC9E:          CC9E    11 X.LF2        EQU   *
CC9E: A4 23            12               LDY   WNDBTM        ;SET TO
CCA0: 88               13               DEY
CCA1: 8C FB 05         14               STY   OURCV         ; THE BOTTOM
CCA4:                  15 *
CCA4:                  16 * SCROLL THE SCREEN:
CCA4:                  17 *
CCA4:          CCA4    18 SCROLLUP     EQU   *
CCA4: 8A               19               TXA                 ;SAVE X
CCA5: 48               20               PHA
CCA6: A2 01            21               LDX   #1            ;DIRECTION=UP
CCA8: D0 04    CCAE    22               BNE   SCROLL1
CCAA:          CCAA    23 SCROLLDN     EQU   *
CCAA: 8A               24               TXA                 ;SAVE X
CCAB: 48               25               PHA
CCAC: A2 00            26               LDX   #0            ;DIRECTION=DOWN
CCAE:                  27 *
CCAE:          CCAE    28 SCROLL1      EQU   *
CCAE: 2C 1F C0         29               BIT   RDBOVID       ;WHICH MODE?
CCB1: 10 05    CCB8    30               BPL   SCROLL2       ;=>40.  DO WITH EXISTING WIDTH
CCB3: A5 21            31               LDA   WNDWDTH       ;TEMPORARILY SAVE
CCB5: 48               32               PHA                 ; THE WIDTH AND
CCB6: 46 21            33               LSR   WNDWDTH       ;  DIVIDE IT BY 2
CCB8:                  34 *
CCB8:          CCB8    35 SCROLL2      EQU   *
CCB8: 20 D1 CC         36               JSR   SCRLSUB       ;SCROLL 40 COLS
CCBB: 2C 1F C0         37               BIT   RDBOVID       ;ARE WE IN 80-MODE?
CCBE: 10 51    CD11    38               BPL   X.SCRLRET     ;=>NO, DONE
CCC0:                  39 *
CCC0:                  40 * FOR 80, DO THE OTHER PAGE...
CCC0:                  41 *
CCC0: 08               42               PHP                 ;ENSURE IRQ INHIBITED
CCC1: 78               43               SEI                 ; WHILE TXTPAGE2 MAPPED IN
CCC2: AD 55 C0         44               LDA   TXTPAGE2      ;SET PAGE2
CCC5: 20 D1 CC         45               JSR   SCRLSUB       ;SCROLL PAGE 2
CCC8: AD 54 C0         46               LDA   TXTPAGE1      ;RESTORE PAGE1
CCCB: 28               47               PLP                 ;RESTORE IRQ STATE NOW
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CCCC:68              48              PLA
CCCD:85 21           49              STA   WNDWDTH
CCCF:D0 40    CD11   50              BNE   X.SCRLRET   ;=>DONE SCROLLBO (ALWAYS TAKEN)
CCD1:                51 *
CCD1:                52 * 40-COLUMN WINDOWED SCROLL:
CCD1:                53 *
CCD1:          CCD1  54 SCRLSUB      EQU   *
CCD1:BC F9 CF        55              LDY   WNDTAB,X    ;GET WINDOW TOP/BOT
CCD4:B9 00 00        56              LDA   0,Y
CCD7:E0 01           57              CPX   #1          ;SCROLLING UP?
CCD9:B0 02    CCDD   58              BCS   MSCRLO      ;=>YES, NO PROBLEM
CCDB:E9 00           59              SBC   #0          ;-1 IF DOWN (SRC=BTM-1)
CCDD:          CCDD  60 MSCRLO       EQU   *
CCDD:48              61              PHA
CCDE:20 54 CB        62              JSR   BASCALCZ
CCE1:A5 2B           63 MSCRL1       LDA   BASL
CCE3:85 2A           64              STA   BAS2L
CCE5:A5 29           65              LDA   BASH
CCE7:85 2B           66              STA   BAS2H
CCE9:A4 21           67              LDY   WNDWDTH
CCEB:88              68              DEY
CCEC:68              69              PLA
CCED:18              70              CLC
CCEE:7D F0 CF        71              ADC   PLUSMINUS1,X ;UP/DOWN
CCF1:D5 22           72              CMP   WNDTOP,X    ;AT THE END?
CCF3:F0 0D    CD02   73              BEQ   MSCRLRET
CCF5:48              74              PHA
CCF6:20 54 CB        75              JSR   BASCALCZ
CCF9:B1 28           76 MSCRL2       LDA   (BASL),Y
CCFB:91 2A           77              STA   (BAS2L),Y
CCFD:88              78              DEY
CCFE:10 F9    CCF9   79              BPL   MSCRL2
CD00:30 DF    CCE1   80              BMI   MSCRL1
CD02:                81 *
CD02:          CD02  82 MSCRLRET     EQU   *
CD02:E0 00           83              CPX   #0          ;SCROLLING DOWN?
CD04:D0 0A    CD10   84              BNE   MSCRLRTS    ;=>NO
CD06:20 54 CB        85              JSR   BASCALCZ
CD09:          CD09  86 ONEMORE      EQU   *
CD09:B1 28           87              LDA   (BASL),Y
CD0B:91 2A           88              STA   (BAS2L),Y
CD0D:88              89              DEY
CD0E:10 F9    CD09   90              BPL   ONEMORE
CD10:          CD10  91 MSCRLRTS     EQU   *
CD10:60              92              RTS
CD11:                93 *
CD11:                94 * DONE WITH THE SCROLLING JAZZ:
CD11:                95 *
CD11:          CD11  96 X.SCRLRET    EQU   *
CD11:B4 22           97              LDY   WNDTOP,X    ;CLEAR TOP OR BOTTOM LINE
CD13:8A              98              TXA               ;IF GETTING TOP,
CD14:F0 01    CD17   99              BEQ   X.SCRLRET2  ; DON'T DECREMENT!
CD16:88             100              DEY
CD17:          CD17 101 X.SCRLRET2   EQU   *
CD17:98             102              TYA               ;TEMP CV SETUP
CD18:20 54 CB       103              JSR   BASCALCZ    ;COMPUTE BASE OF LINE TO CLEAR
CD1B:68             104              PLA               ;RESTORE
CD1C:AA             105              TAX               ; X
CD1D:20 1A CC       106              JSR   X.SUB       ;CLEAR BOTTOM LINE
CD20:               107 *
CD20:          CD20 108 X.LFRET      EQU   *
CD20:4C 51 CB       109              JMP   BASCALC     ;RETURN VIA BASCALC (UGH!)
CD23:               110 *
CD23:               111 * EXECUTE CLR TO EOS:
CD23:               112 *
CD23:          CD23 113 X.VT         EQU   *
CD23:20 48 CD       114              JSR   X.GS        ;CLEAR TO EOL
CD26:AD FB 05       115              LDA   OURCV       ;SAVE CV
CD29:48             116              PHA
CD2A:10 06    CD32  117              BPL   X.VTNEXT    ;DO NEXT LINE (ALWAYS TAKEN)
CD2C:          CD2C 118 X.VTLOOP     EQU   *
CD2C:20 51 CB       119              JSR   BASCALC     ;BASCALC IT
CD2F:20 1A CC       120              JSR   X.SUB       ;CLEAR LINE
CD32:          CD32 121 X.VTNEXT     EQU   *
CD32:EE FB 05       122              INC   OURCV       ;BUMP CV
CD35:AD FB 05       123              LDA   OURCV
CD38:C5 23          124              CMP   WNDBTM      ;OFF SCREEN?
CD3A:90 F0    CD2C  125              BCC   X.VTLOOP    ;=>NO, KEEP GOING
CD3C:68             126              PLA               ;RESTORE
CD3D:8D FB 05       127              STA   OURCV       ; CV
CD40:10 DE    CD20  128              BPL   X.LFRET     ;RETURN VIA SIMILAR CODE
CD42:               129 *
CD42:               130 * EXECUTE CLEAR:
CD42:               131 *
CD42:          CD42 132 X.FF         EQU   *
CD42:20 0D CC       133              JSR   X.EM        ;HOME THE CURSOR
CD45:4C 23 CD       134              JMP   X.VT        ;RETURN VIA CLREOS (UGH!)
CD48:               135 *
CD48:               136 * EXECUTE CLEAR TO EOL:
CD48:               137 *
CD48:          CD48 138 X.GS         EQU   *
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CD4B:AC 7B 05      139              LDY   OURCH       ;GET CH
CD4B:4C 54 CD      140              JMP   X.GS2       ;CHECK FOR END FIRST!
CD4E         CD4E  141 X.GSEOLZ     EQU   *           ;FER U HACKERS
CD4E:A9 A0         142              LDA   #' '
CD50:20 F2 CE      143              JSR   STORCHAR    ;STUFF IT
CD53:C8            144              INY
CD54         CD54  145 X.GS2        EQU   *
CD54:C4 21         146              CPY   WNDWDTH     ;STOP SOMETIME
CD56:90 F6   CD4E  147              BCC   X.GSEOLZ    ;YASL DO MORE
CD58:60            148              RTS
CD59               149 *
CD59               150 * EXECUTE '40COL MODE':
CD59               151 *
CD59         CD59  152 X.DC1        EQU   *
CD59:A9 00         153              LDA   #0          ;ASSUME TEXTMODE
CD5B:85 20         154              STA   WNDLFT
CD5D:2C 1A C0      155              BIT   RDTEXT      ;ARE WE IN TEXT MODE?
CD60:30 02   CD64  156              BMI   X.DC1B      ;=>YES
CD62:A9 14         157              LDA   #20         ;IF GR, SET SPLITSCREEN
CD64         CD64  158 X.DC1B       EQU   *
CD64:85 22         159              STA   WNDTOP
CD66:A9 18         160              LDA   #24
CD68:85 23         161              STA   WNDBTM
CD6A:A9 28         162              LDA   #40
CD6C:85 21         163              STA   WNDWDTH
CD6E:2C 1F C0      164              BIT   RD80VID     ;WERE WE IN 80-MODE?
CD71:10 03   CD76  165              BPL   X.DC1RTS    ;=>NO, NO CVT NEEDED
CD73:20 D8 CD      166              JSR   SCRN84      ;CVT 80-->40
CD76         CD76  167 X.DC1RTS     EQU   *
CD76:60            168              RTS
CD77               169 *
CD77               170 * EXECUTE '80COL MODE':
CD77               171 *
CD77         CD77  172 X.DC2        EQU   *
CD77:20 24 C8      173              JSR   TESTCARD    ;IS CARD THERE?
CD7A:D0 1E   CD9A  174              BNE   X.DC2RET    ;=>NOPE, FORGET IT
CD7C:20 98 CD      175              JSR   FULL80      ;SET FULL WINDOW
CD7F:2C 1A C0      176              BIT   RDTEXT      ;ARE WE IN TEXT MODE?
CD82:30 04   CD88  177              BMI   X.DC2B      ;=>YES
CD84:A9 14         178              LDA   #20         ;IF GR, SET SPLITSCREEN
CD86:85 22         179              STA   WNDTOP
CD88         CD88  180 X.DC2B       EQU   *
CD88:2C 18 C0      181              BIT   RD80COL     ;REMEMBER PRIOR MODE
CD8B:30 0D   CD9A  182              BMI   X.DC2RET    ;=>NO CVT NEEDED IF WAS 80
CD8D:4C 32 CE      183              JMP   SCRN48      ;RET VIA CONVERT 40-->80
CD90               184 *
CD90               185 * EXECUTE 'QUIT':
CD90               186 *
CD90         CD90  187 X.NAK        EQU   *
CD90:AD FB 04      188              LDA   MODE        ;ONLY VALID IN BASIC
CD93:29 20         189              AND   #M.PASCAL
CD95:D0 03   CD9A  190              BNE   X.NAKRET    ;IGNORE IF PASCAL
CD97:20 AA CD      191              JSR   QUIT        ;GET SETUP TO QUIT
CD9A         CD9A  192 X.NAKRET     EQU   *
CD9A         CD9A  193 X.DC2RET     EQU   *
CD9A:60            194              RTS               ;DONE; CALLER WON'T RETURN
CD9B               195 ----------------------------------------
CD9B               196 * NAME     : FULL80
CD9B               197 * FUNCTION: SET FULL 80COL WINDOW
CD9B               198 * INPUT    : NONE
CD9B               199 * OUTPUT   : WINDOW PARAMETERS
CD9B               200 * VOLATILE: AC
CD9B               201 ----------------------------------------
CD9B               202 *
CD9B         CD9B  203 FULL80       EQU   *
CD9B:A9 00         204              LDA   #0
CD9D:85 22         205              STA   WNDTOP
CD9F:85 20         206              STA   WNDLFT
CDA1:A9 50         207              LDA   #80
CDA3:85 21         208              STA   WNDWDTH
CDA5:A9 18         209              LDA   #24
CDA7:85 23         210              STA   WNDBTM
CDA9:60            211              RTS
CDAA               212 ----------------------------------------
CDAA               213 * NAME     : QUIT
CDAA               214 * FUNCTION: SETUP TO QUIT THE CARD
CDAA               215 * INPUT    : NOTHING
CDAA               216 * OUTPUT   : NOTHING
CDAA               217 * VOLATILE: ALL REGS
CDAA               218 * CALLS    : X.FF,FULL80,BASCALC
CDAA               219 *          : SETKBD,SETVID
CDAA               220 ----------------------------------------
CDAA               221 *
CDAA         CDAA  222 QUIT         EQU   *
CDAA:A9 00         223              LDA   #0          ;SET FULL 40-COL WINDOW
CDAC:85 22         224              STA   WNDTOP
CDAE:85 20         225              STA   WNDLFT
CDB0:A9 18         226              LDA   #24
CDB2:85 23         227              STA   WNDBTM
CDB4:A9 28         228              LDA   #40
CDB6:85 21         229              STA   WNDWDTH
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CDB8:2C 1F C0      230             BIT   RD80VID     ;WHAT WIDTH?
CDBB:10 03   CDC0  231             BPL   QUIT2       ;=>NO CVT NEEDED IF 40
CDBD:20 DB CD      232             JSR   SCRN84      ;CONVERT 40-->80
CDC0:              233 *
CDC0:        CDC0  234 QUIT2       EQU   *
CDC0:A9 17         235             LDA   #23         ;VTAB TO THE
CDC2:8D FB 05      236             STA   OURCV       ; BOTTOM LINE
CDC5:20 51 CB      237             JSR   BASCALC
CDC8:A9 00         238             LDA   #0          ;   AND PLACE CURSOR
CDCA:8D 7B 05      239             STA   OURCH       ;    AT LEFT SIDE
CDCD:8D 0E C0      240             STA   CLRALTCHAR  ;LCASE CHARS OFF
CDD0:A9 FF         241             LDA   #$FF        ;DESTROY THE
CDD2:8D F8 04      242             STA   MODE        ; MODE BYTE
CDD5:20 93 FE      243             JSR   SETVID      ;PR#0
CDD8:4C B9 FE      244             JMP   SETKBD      ;RETURN VIA IN#0 (UGH!)
CDDB:              245 ----------------------------------------
CDDB:              246 * NAME     : SCRN84
CDDB:              247 * FUNCTION: CONVERT 80VID-->40VID
CDDB:              248 * INPUT    : NONE
CDDB:              249 * OUTPUT   : NONE
CDDB:              250 * VOLATILE: ALL REGISTERS
CDDB:              251 * NOTE     : USES 'BAS2H/L' AS TEMPS
CDDB:              252 ----------------------------------------
CDDB:              253 *
CDDB:        CDDB  254 SCRN84      EQU   *
CDDB:AD FB 05      255             LDA   OURCV       ;SAVE CURRENT
CDDE:48            256             PHA
CDDF:AD 7B 05      257             LDA   OURCH       ; SETTINGS
CDE2:48            258             PHA
CDE3:              259 *
CDE3:A9 17         260             LDA   #23
CDE5:85 2A         261             STA   BAS2L       ;USE AS A TEMP
CDE7:8D 01 C0      262             STA   SET80COL
CDEA:A5 2A         263 SCR40       LDA   BAS2L
CDEC:20 54 CB      264             JSR   BASCALCZ    ;BEGIN AT BOTTOM AND WORK UP
CDEF:20 0A CE      265             JSR   ATEFOR      ;DO THIS LINE
CDF2:C6 2A         266             DEC   BAS2L
CDF4:30 0B   CE01  267             BMI   SCR4ORET    ;=>DONE (HIT TOP)
CDF6:2C 1A C0      268             BIT   RDTEXT      ;ARE WE IN MIDEXMODE?
CDF9:30 EF   CDEA  269             BMI   SCR40       ;=>NO, DO ENTIRE SCREEN
CDFB:A5 2A         270             LDA   BAS2L       ;IF SO, ONLY DO BOTTOM
CDFD:C9 14         271             CMP   #20         ; FOUR (4) LINES OF WINDOW
CDFF:B0 E9   CDEA  272             BCS   SCR40
CE01:        CE01  273 SCR4ORET    EQU   *
CE01:8D 00 C0      274             STA   CLR80COL
CE04:8D 0C C0      275             STA   CLR80VID
CE07:4C 58 CE      276             JMP   SCRNRET     ;RETURN VIA SIMILAR CODE
CE0A:              277 *
CE0A:        CE0A  278 ATEFOR      EQU   *
CE0A:08            279             PHP               ;LOCK IRQ WHILE
CE0B:78            280             SEI               ; SCREENHOLES ARE WRONG
CE0C:A0 28         281             LDY   #40
CE0E:84 2B         282             STY   BAS2H
CE10:2C 54 C0      283             BIT   TXTPAGE1
CE13:20 22 CE      284 ATEFOR1     JSR   GET84
CE16:2C 55 C0      285             BIT   TXTPAGE2
CE19:20 22 CE      286             JSR   GET84
CE1C:A4 2B         287             LDY   BAS2H       ;DONE?
CE1E:D0 F3   CE13  288             BNE   ATEFOR1     ;=>NO, DO WHOLE LINE
CE20:28            289             PLP               ;RESTORE IRQ NOW
CE21:60            290             RTS
CE22:              291 *
CE22:C6 2B         292 GET84       DEC   BAS2H
CE24:A5 2B         293             LDA   BAS2H
CE26:4A            294             LSR   A
CE27:AB            295             TAY
CE28:B1 28         296             LDA   (BASL),Y
CE2A:A4 2B         297             LDY   BAS2H
CE2C:2C 54 C0      298             BIT   TXTPAGE1
CE2F:91 28         299             STA   (BASL),Y
CE31:60            300             RTS
CE32:              301 ----------------------------------------
CE32:              302 * NAME     : SCRN48
CE32:              303 * FUNCTION: CONVERT 40VID-->80VID
CE32:              304 * INPUT    : NONE
CE32:              305 * OUTPUT   : NONE
CE32:              306 * VOLATILE: ALL REGISTERS
CE32:              307 * NOTE     : USES 'BAS2H/L' AS TEMPS
CE32:              308 ----------------------------------------
CE32:              309 *
CE32:        CE32  310 SCRN48      EQU   *
CE32:AD FB 05      311             LDA   OURCV       ;SAVE CV
CE35:48            312             PHA
CE36:AD 7B 05      313             LDA   OURCH       ; AND CH
CE39:48            314             PHA
CE3A:              315 *
CE3A:A9 17         316             LDA   #23
CE3C:85 2A         317             STA   BAS2L       ;USE AS A TEMP
CE3E:A5 2A         318 SCR80       LDA   BAS2L
CE40:20 54 CB      319             JSR   BASCALCZ    ;BEGIN AT BOTTOM AND WORK UP
CE43:20 63 CE      320             JSR   FORATE      ;DO THIS LINE
CE46:C6 2A         321             DEC   BAS2L
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CE48:30 08    CE55  322             BMI   SCR80RET    ;=>DONE (HIT TOP)
CE4A:2C 1A C0       323             BIT   RDTEXT      ;ARE WE IN MIXEDMODE?
CE4D:30 EF    CE3E  324             BMI   SCR80       ;NO, DO FULL SCREEN
CE4F:A5 2A          325             LDA   BAS2L       ;IF 80, ONLY DO BOTTOM
CE51:C9 14          326             CMP   #20         ; FOUR (4) LINES OF WINDOW
CE53:B0 E9    CE3E  327             BCS   SCR80
CE55:               328 *
CE55:         CE55  329 SCR80RET    EQU   *
CE55:8D 0D C0       330             STA   SET80VID    ;DISPLAY IN 80-MODE
CE58:         CE58  331 SCRNRET     EQU   *           ;USED BY SCRN84
CE58:68             332             PLA               ;RESTORE
CE59:8D 7B 05       333             STA   OURCH       ; CH AND
CE5C:68             334             PLA               ;  CV
CE5D:8D FB 05       335             STA   OURCV
CE60:4C 51 C8       336             JMP   BASCALC     ;RETURN VIA BASCALC (UGH!)
CE63:               337 *
CE63:               338 *
CE63:         CE63  339 FORATE      EQU   *
CE63:08             340             PHP               ;DON'T ALLOW IRQ WHILE
CE64:78             341             SEI               ; SCREENHOLES ARE WRONG
CE65:A0 00          342             LDY   #0
CE67:84 28          343             STY   BAS2H
CE69:8C 01 C0       344             STY   SET80COL
CE6C:2C 54 C0       345             BIT   TXTPAGE1
CE6F:B1 28          346 FORATE1     LDA   (BASL),Y
CE71:2C 55 C0       347             BIT   TXTPAGE2
CE74:20 A3 CE       348             JSR   DO48
CE77:2C 54 C0       349             BIT   TXTPAGE1
CE7A:B1 28          350             LDA   (BASL),Y
CE7C:20 A3 CE       351             JSR   DO48
CE7F:C0 28          352             CPY   #40
CE81:90 EC    CE6F  353             BCC   FORATE1
CE83:               354 *
CE83:20 91 CE       355             JSR   CLRHALF     ;CLEAR RIGHT HALF
CE86:2C 55 C0       356             BIT   TXTPAGE2    ; OF BOTH PAGES
CE89:20 91 CE       357             JSR   CLRHALF
CE8C:2C 54 C0       358             BIT   TXTPAGE1
CE8F:28             359             PLP               ;OK TO ALLOW IRQ NOW
CE90:60             360             RTS
CE91:               361 *
CE91:         CE91  362 CLRHALF     EQU   *
CE91:A0 14          363             LDY   #20
CE93:A9 A0          364             LDA   #' '
CE95:24 32          365             BIT   INVFLG      ;WHICH MODE?
CE97:30 02    CE9B  366             BMI   CLRHALF2    ;=>NORMAL
CE99:29 7F          367             AND   #$7F        ;INVERSE
CE9B:         CE9B  368 CLRHALF2    EQU   *
CE9B:91 28          369             STA   (BASL),Y    ;STUFF THE BLANK
CE9D:C8             370             INY
CE9E:C0 28          371             CPY   #40
CEA0:D0 F9    CE9B  372             BNE   CLRHALF2
CEA2:60             373             RTS
CEA3:               374 *
CEA3:48             375 DO48        PHA
CEA4:98             376             TYA
CEA5:4A             377             LSR   A
CEA6:A8             378             TAY
CEA7:68             379             PLA
CEA8:91 28          380             STA   (BASL),Y
CEAA:E6 28          381             INC   BAS2H
CEAC:A4 28          382             LDY   BAS2H
CEAE:60             383             RTS
CEAF:                14             INCLUDE SUBS3
CEAF:                 2 ----------------------------------------
CEAF:                 3 * NAME     : SETCH
CEAF:                 4 * FUNCTION: SET OURCH AND CH
CEAF:                 5 * INPUT    : AC=CH VALUE
CEAF:                 6 * OUTPUT   : OURCH, CH MOD 40
CEAF:                 7 * VOLATILE: NOTHING
CEAF:                 8 * CALLS    : NOTHING
CEAF:                 9 ----------------------------------------
CEAF:                10 *
CEAF:         CEAF   11 SETCH       EQU   *
CEAF:8D 7B 05        12             STA   OURCH       ;STUFF OURCH
CEB2:85 24           13             STA   CH          ;STUFF IN CASE WE'RE 40 MODE
CEB4:8D 7B 04        14             STA   OLDCH
CEB7:2C 1F C0        15             BIT   RDB0VID     ;IN 80-MODE?
CEBA:10 1D    CED9   16             BPL   SETCHRTS    ;=>NO, DONE
CEBC:                17 *
CEBC:                18 * IF WE'RE NEAR THE END OF OUR
CEBC:                19 *  80COL LINE, MOVE CH UP. IF NOT,
CEBC:                20 *  LEAVE CH PINNED AT ZERO...
CEBC:                21 *
CEBC:A9 00           22             LDA   #0          ;PIN CH AT ZERO
CEBE:85 24           23             STA   CH
CEC0:8D 7B 04        24             STA   OLDCH       ;REMEMBER THE SETTING
CEC3:A5 21           25             LDA   WNDWDTH     ;CHECK IF NEAR THE END
CEC5:38              26             SEC
CEC6:ED 7B 05        27             SBC   OURCH       ;GET ABS CH
CEC9:C9 08           28             CMP   #8          ;NEAR THE END?
CECB:B0 0C    CED9   29             BCS   SETCHRTS    ;=>NOPE
CECD:85 24           30             STA   CH          ;YES, MOVE CH UP NEAR RIGHT
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CECF: A9 28          31              LDA   #40
CED1: 38             32              SEC
CED2: E5 24          33              SBC   CH
CED4: 85 24          34              STA   CH            ;BASIC WILL SEE THAT NOW
CED6: 8D 7B 04       35              STA   OLDCH         ;REMEMBER THE SETTING
CED9:                36 *
CED9:         CED9   37 SETCHRTS     EQU   *
CED9: AD 7B 05       38              LDA   OURCH         ;RESTORE AC
CEDC: 60             39              RTS
CEDD:                40 ------------------------------------------
CEDD:                41 * NAME     : INVERT
CEDD:                42 * FUNCTION: INVERT CHAR AT CH/CV
CEDD:                43 * INPUT    : NOTHING
CEDD:                44 * OUTPUT   : CHAR AT CH/CV INVERTED
CEDD:                45 * VOLATILE: NOTHING
CEDD:                46 * CALLS    : PICK, STORCHAR
CEDD:                47 ------------------------------------------
CEDD:                48 *
CEDD:         CEDD   49 INVERT      EQU   *
CEDD: 48             50              PHA                 ;SAVE AC
CEDE: 98             51              TYA                 ; AND Y
CEDF: 48             52              PHA
CEE0: AC 7B 05       53              LDY   OURCH         ;GET CH
CEE3: 20 01 CF       54              JSR   PICK          ;GET CHARACTER
CEE6: 49 80          55              EOR   #$80          ;FLIP INVERSE/NORMAL
CEE8: 2C 00 CF       56              BIT   SEV           ;PUT DIRECTLY BACK
CEEB: 20 06 CF       57              JSR   SCREENIT      ; ONTO SCREEN
CEEE: 68             58              PLA                 ;RESTORE Y
CEEF: A8             59              TAY                 ; AND AC
CEF0: 68             60              PLA
CEF1: 60             61              RTS
CEF2:                62 ------------------------------------------
CEF2:                63 * NAME     : STORCHAR
CEF2:                64 * FUNCTION: STORE A CHAR ON SCREEN
CEF2:                65 * INPUT    : AC=CHAR
CEF2:                66 *          :  Y=CH POSITION
CEF2:                67 * OUTPUT   : CHAR ON SCREEN
CEF2:                68 * VOLATILE: NOTHING
CEF2:                69 * CALLS    : SCREENIT
CEF2:                70 ------------------------------------------
CEF2:                71 *
CEF2:         CEF2   72 STORCHAR    EQU   *
CEF2: 48             73              PHA                 ;SAVE AC
CEF3: 24 32          74              BIT   INVFLG        ;NORMAL OR INVERSE?
CEF5: 30 02   CEF9   75              BMI   STOR2         ;=>NORMAL
CEF7: 49 80          76              EOR   #$80          ;INVERSE
CEF9:         CEF9   77 STOR2       EQU   *
CEF9: 2C 00 CF       78              BIT   SEV           ;V SET FOR STORE
CEFC: 20 06 CF       79              JSR   SCREENIT      ;=>DO IT!
CEFF: 68             80              PLA                 ;RESTORE AC
CF00: 60             81 SEV          RTS
CF01:                82 ------------------------------------------
CF01:                83 * NAME     : PICK
CF01:                84 * FUNCTION: GET A CHAR FROM SCREEN
CF01:                85 * INPUT    : Y=CH POSITION
CF01:                86 * OUTPUT   : AC=CHARACTER
CF01:                87 * VOLATILE: NOTHING
CF01:                88 * CALLS    : SCREENIT
CF01:                89 ------------------------------------------
CF01:                90 *
CF01:         CF01   91 PICK        EQU   *
CF01: B8             92              CLV                 ;V CLEAR FOR PICK
CF02: 20 06 CF       93              JSR   SCREENIT      ;DO IT!
CF05: 60             94              RTS
CF06:                95 ------------------------------------------
CF06:                96 * NAME     : SCREENIT
CF06:                97 * FUNCTION: STORE OR PICK CHAR
CF06:                98 * INPUT    : V CLR FOR PICK
CF06:                99 *          : V SET FOR STORE
CF06:               100 *          : AC=CHAR FOR STORE
CF06:               101 *          :  Y=CH POSITION
CF06:               102 * OUTPUT   : AC=CHAR (PICK)
CF06:               103 * VOLATILE: NOTHING
CF06:               104 * CALLS    : NOTHING
CF06:               105 ------------------------------------------
CF06:               106 *
CF06:         CF06  107 SCREENIT    EQU   *
CF06: 84 1F         108              STY   YSAV1         ;SAVE Y
CF08: 48            109              PHA                 ;SAVE CHARACTER IF STORING
CF09:               110 * AVOID CHANGING VFLAG VIA BIT!
CF09: AD 1F C0      111              LDA   RDBOVID       ;WHAT DISPLAY MODE?
CF0C: 10 32   CF40  112              BPL   SCRN40        ;=>40-COL MODE
CF0E:               113 *
CF0E:               114 * 80-COLUMN MODE:
CF0E:               115 *
CF0E: A5 1F         116              LDA   YSAV1         ;GET CURSOR HORIZ
CF10: 4A            117              LSR   A             ;DIVIDE BY TWO FOR PAGE
CF11: A8            118              TAY                 ;CH TO YREG
CF12: 70 16   CF2A  119              BVS   STOR80        ;=>GONNA STORE THE CHAR
CF14:               120 *
CF14:               121 * 80-COL PICK:
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CF14:                   122 *
CF14:08                 123             PHP                 ;LOCK INTERRUPTS WHILE
CF15:78                 124             SEI                 ; SCREENHOLES ARE WRONG
CF16:AD 55 C0           125             LDA   TXTPAGE2      ;ASSUME PAGE 2 (EVENS)
CF19:90 03    CF1E      126             BCC   SCRN2         ;=>IT IS
CF1B:AD 54 C0           127             LDA   TXTPAGE1      ;ODDS GO TO PAGE1
CF1E:         CF1E      128 SCRN2       EQU   *
CF1E:B1 28              129             LDA   (BASL),Y      ;PICK THE CHARACTER
CF20:A8                 130             TAY                 ;HOLD CHAR TEMPORARILY
CF21:AD 54 C0           131             LDA   TXTPAGE1      ;RESTORE PAGE1
CF24:28                 132             PLP                 ; AND ALLOW IRQ AGAIN
CF25:68                 133             PLA                 ;TRASH SAVED AC
CF26:98                 134             TYA
CF27:48                 135             PHA                 ;MAKE CHAR GET RESTORED TO AC
CF28:50 24    CF4E      136             BVC   STPKEXIT      ;=>DONE (ALWAYS TAKEN)
CF2A:                   137 *
CF2A:         CF2A      138 STORBO      EQU   *
CF2A:68                 139             PLA                 ;RESTORE CHARACTER
CF2B:48                 140             PHA                 ;(LEAVE ON STACK)
CF2C:08                 141             PHP                 ;LOCK INTERRUPTS WHILE
CF2D:78                 142             SEI                 ; THE SCREENHOLES ARE WRONG
CF2E:48                 143             PHA                 ;HOLD THE CHAR TEMPORARILY
CF2F:AD 55 C0           144             LDA   TXTPAGE2      ;ASSUME PAGE2 (EVENS)
CF32:90 03    CF37      145             BCC   SCRN3         ;=>IT IS
CF34:AD 54 C0           146             LDA   TXTPAGE1      ;ODDS GO TO PAGE1
CF37:         CF37      147 SCRN3       EQU   *
CF37:68                 148             PLA                 ;GET CHAR TO BE STORED
CF38:91 28              149             STA   (BASL),Y      ;STUFF ONTO SCREEN
CF3A:AD 54 C0           150             LDA   TXTPAGE1      ;RESTORE PAGE1
CF3D:28                 151             PLP                 ; AND ALLOW IRQ AGAIN
CF3E:70 0E    CF4E      152             BVS   STPKEXIT      ;=>DONE (ALWAYS TAKEN)
CF40:                   153 *
CF40:                   154 * 40-COLUMN MODE:
CF40:                   155 *
CF40:         CF40      156 SCRN40      EQU   *
CF40:A4 1F              157             LDY   YSAV1         ;GET CURSOR HORIZ
CF42:70 06    CF4A      158             BVS   STOR40        ;=>STORE IT
CF44:68                 159             PLA                 ;TRASH SAVED CHAR
CF45:B1 28              160             LDA   (BASL),Y      ;PICK THE CHARACTER
CF47:48                 161             PHA                 ;SAVE CHAR FOR RESTORE
CF48:50 04    CF4E      162             BVC   STPKEXIT      ;DONE (ALWAYS TAKEN)
CF4A:                   163 *
CF4A:         CF4A      164 STOR40      EQU   *
CF4A:68                 165             PLA                 ;GET THE CHARACTER
CF4B:48                 166             PHA                 ;(LEAVE ON STACK)
CF4C:91 28              167             STA   (BASL),Y      ;STUFF ONTO SCREEN
CF4E:                   168 *
CF4E:         CF4E      169 STPKEXIT    EQU   *
CF4E:68                 170             PLA                 ;RESTORE AC
CF4F:A4 1F              171             LDY   YSAV1         ;RESTORE Y
CF51:60                 172             RTS
CF52:                   173 ----------------------------------------
CF52:                   174 * NAME     : ESCON
CF52:                   175 * FUNCTION: TURN ON 'ESCAPE' CURSOR
CF52:                   176 * INPUT    : NONE
CF52:                   177 * OUTPUT   : 'CHAR'=ORIGINAL CHAR
CF52:                   178 * VOLATELE: NOTHING
CF52:                   179 * CALLS    : PICK,STORCHAR
CF52:                   180 ----------------------------------------
CF52:                   181 *
CF52:         CF52      182 ESCON       EQU   *
CF52:48                 183             PHA                 ;SAVE AC
CF53:98                 184             TYA                 ; AND Y
CF54:48                 185             PHA
CF55:AC 7B 05           186             LDY   OURCH         ;GET CH
CF58:20 01 CF           187             JSR   PICK          ;GET ORIGINAL CHARACTER
CF5B:8D 7B 06           188             STA   CHAR          ; AND REMEMBER FOR ESCOFF
CF5E:29 80              189             AND   #$80          ;SAVE NORMAL/INVERSE BIT
CF60:49 AB              190             EOR   #$AB          ;MAKE IT AN INVERSE '+'
CF62:4C 6E CF           191             JMP   ESCRET        ;RETURN VIA SIMILAR CODE
CF65:                   192 ----------------------------------------
CF65:                   193 * NAME     : ESCOFF
CF65:                   194 * FUNCTION: TURN OFF 'ESCAPE' CURSOR
CF65:                   195 * INPUT    : 'CHAR'=ORIGINAL CHAR
CF65:                   196 * OUTPUT   : NONE
CF65:                   197 * VOLATILE: NOTHING
CF65:                   198 * CALLS    : STORCHAR
CF65:                   199 ----------------------------------------
CF65:                   200 *
CF65:         CF65      201 ESCOFF      EQU   *
CF65:48                 202             PHA                 ;SAVE AC
CF66:98                 203             TYA                 ; AND Y
CF67:48                 204             PHA
CF68:AC 7B 05           205             LDY   OURCH         ;GET CH
CF6B:AD 7B 06           206             LDA   CHAR          ;GET ORIGINAL CHARACTER
CF6E:         CF6E      207 ESCRET      EQU   *             ;USED BY ESCON
CF6E:2C 00 CF           208             BIT   SEV           ; AND PUT IT BACK
CF71:20 06 CF           209             JSR   SCREENIT      ;  EXACTLY AS IT WAS
CF74:68                 210             PLA                 ;RESTORE Y
CF75:A8                 211             TAY
CF76:68                 212             PLA                 ; AND AC
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CF77:60             213              RTS
CF78:               214 ----------------------------------------
CF78:               215 * NAME     : COPYROM
CF78:               216 * FUNCTION: COPY F8 ROM TO LCARD
CF78:               217 * INPUT    : NOTHING
CF78:               218 * VOLATILE: X,Y
CF78:               219 * CALLS    : NOTHING
CF78:               220 ----------------------------------------
CF78:               221 *
CF78:        CF78   222 COPYROM      EQU   *
CF78:48             223              PHA                 ;SAVE AC
CF79:08             224              PHP                 ;ENSURE IRQ INHIBITED
CF7A:78             225              SEI                 ; WHILE COPYING ROM
CF7B:               226 *
CF7B:AD 11 C0       227              LDA   RDLCBNK2      ;GET BANK2
CF7E:48             228              PHA
CF7F:               229 *
CF7F:AE 12 C0       230              LDX   RDLCRAM       ; AND RAM FLAGS
CF82:AD 81 C0       231              LDA   $C081         ;SET READ-ROM
CF85:AD 81 C0       232              LDA   $C081         ; WRITE-RAM MODE
CF88:               233 *
CF88:A0 00          234              LDY   #0
CF8A:A9 F8          235              LDA   #$F8
CF8C:85 37          236              STA   CSWH          ;USE HOOK FOR MOVE
CF8E:A5 36          237              LDA   CSWL          ;PRESERVE LO BYTE
CF90:48             238              PHA
CF91:A9 00          239              LDA   #0
CF93:85 36          240              STA   CSWL
CF95:        CF95   241 COPYROM2     EQU   *             ;COPY ONLY PATCHED PAGES
CF95:B1 36          242              LDA   (CSWL),Y      ;MOVE THE ROM
CF97:91 36          243              STA   (CSWL),Y
CF99:C8             244              INY
CF9A:D0 F9   CF95   245              BNE   COPYROM2
CF9C:E6 37          246              INC   CSWH
CF9E:D0 F5   CF95   247              BNE   COPYROM2
CFA0:               248 *
CFA0:68             249              PLA                 ;RESTORE THE
CFA1:85 36          250              STA   CSWL          ; HOOK
CFA3:A9 C3          251              LDA   #<CN00
CFA5:85 37          252              STA   CSWH
CFA7:               253 *
CFA7:68             254              PLA                 ;WHICH LC BANK?
CFA8:10 0F   CFB9   255              BPL   LCB1          ;=>BANK1
CFAA:8A             256              TXA                 ;RAM OR ROM READ?
CFAB:10 06   CFB3   257              BPL   LCB2ROM       ;=>ROM
CFAD:AD 80 C0       258              LDA   $C080         ;BANK2,RAM
CFB0:4C C5 CF       259              JMP   COPYRET
CFB3:AD 81 C0       260 LCB2ROM      LDA   $C081         ;BANK2,ROM
CFB6:4C C5 CF       261              JMP   COPYRET
CFB9:8A             262 LCB1         TXA                 ;RAM OR ROM READ?
CFBA:10 06   CFC2   263              BPL   LCB1ROM       ;=>ROM
CFBC:AD 88 C0       264              LDA   $C088         ;BANK1,RAM
CFBF:4C C5 CF       265              JMP   COPYRET
CFC2:AD 89 C0       266 LCB1ROM      LDA   $C089         ;BANK1,ROM
CFC5:               267 *
CFC5:        CFC5   268 COPYRET      EQU   *
CFC5:28             269              PLP                 ;RESTORE IRQ STATE NOW
CFC6:68             270              PLA                 ;  AND AC
CFC7:60             271              RTS
CFC8:               272 ----------------------------------------
CFC8:               273 * NAME     : PSETUP
CFC8:               274 * FUNCTION: SETUP ZP FOR PASCAL
CFC8:               275 * INPUT    : NONE
CFC8:               276 * OUTPUT   : NONE
CFC8:               277 * VOLATILE: AC
CFC8:               278 * CALLS    : NOTHING
CFC8:               279 ----------------------------------------
CFC8:               280 *
CFC8:        CFC8   281 PSETUP       EQU   *
CFC8:AD FB 04       282              LDA   MODE          ;TRANSPARENT MODE?
CFCB:29 01          283              AND   #M.TRANS
CFCD:D0 03   CFD2   284              BNE   PSETUP2       ;=>YES, TRUST WINDOW
CFCF:20 9B CD       285              JSR   FULLBO        ;SET FULL BOCOL WINDOW
CFD2:               286 *
CFD2:        CFD2   287 PSETUP2      EQU   *
CFD2:A9 FF          288              LDA   #255
CFD4:85 32          289              STA   INVFLG        ;ASSUME NORMAL MODE
CFD6:               290 *
CFD6:AD FB 04       291              LDA   MODE
CFD9:29 04          292              AND   #M.VMODE
CFDB:F0 02   CFDF   293              BEQ   PSETUPRET     ;=>IT'S NORMAL
CFDD:46 32          294              LSR   INVFLG        ;MAKE IT INVERSE
CFDF:               295 *
CFDF:        CFDF   296 PSETUPRET    EQU   *
CFDF:AD 78 07       297              LDA   OLDBASL       ;SET UP BASE ADDRESS
CFE2:85 28          298              STA   BASL
CFE4:AD F8 07       299              LDA   OLDBASH
CFE7:85 29          300              STA   BASH
CFE9:60             301              RTS
CFEA:               302 ----------------------------------------
CFEA:               303 * NOTE: ENTRIES 6-7 OF THESE TABLES
```

```
CFEA:                   304 *  ARE NOT USED.  THUS THERE ARE
CFEA:                   305 *  SOME OTHER VALUES STUFFED IN.
CFEA:                   306 *
CFEA: 28                307 F.TABLE     DFB   >F.CLREOP-1
CFEB: 42                308             DFB   >F.HOME-1
CFEC: 4C                309             DFB   >F.SCROLL-1
CFED: 7C                310             DFB   >F.CLREOL-1
CFEE: 9B                311             DFB   >F.CLEOLZ-1
CFEF: E9                312             DFB   >B.RESET-1   ;USE SAME RESET
CFF0: FF 01             313 PLUSMINUS1  DFB   -1,1         ;SCROLL USES THIS
CFF2: B9                314             DFB   >F.SETWND-1
CFF3:                   315 *
CFF3: E0                316 B.TABLE     DFB   >B.CLREOP-1
CFF4: EC                317             DFB   >B.HOME-1
CFF5: CC                318             DFB   >B.SCROLL-1
CFF6: D2                319             DFB   >B.CLREOL-1
CFF7: D8                320             DFB   >B.CLEOLZ-1
CFF8: E9                321             DFB   >B.RESET-1   ;USE SAME RESET
CFF9: 23 22             322 WNDTAB      DFB   WNDBTM,WNDTOP ;SCROLL USES THIS
CFFB: E6                323             DFB   >B.SETWND-1
CFFC: 00                324             DFB   0            ;AVOID CFFF PIPELINING
CFFD:           CFFD     15 ZZEND       EQU   *
```

80-Column Symbol Table, Sorted by Symbol

```
   3D A1H          3C A1L          3F A2H          3E A2L
   43 A4H          42 A4L        CE13 ATEFOR1    CE0A ATEFOR
 CA02 B.CANLIT   C9DF B.CHKCAN   C1D9 B.CLEOLZ   C1D3 B.CLREOL
 C1E1 B.CLREOP   C26E B.ESCFIX   C272 B.ESCFIX2  C27A B.ESCFIX3
 CA0A B.FIXCHR   C9F7 B.FLIP     C1A4 B.FUNC0    C10E B.FUNCNE
?C100 B.FUNC     C211 B.FUNC1    C107 B.FUNCNK   C20E B.GETCH
 C1ED B.HOME     C905 B.INPUT    CA24 B.INRET    C288 B.KEYIN
 C29C B.KEYIN2   C9C6 B.NOPICK   C11F B.OLDFUNC  C1EA B.RESET
 C234 B.RESETX   C1CD B.SCROLL   C221 B.SETWND2  C219 B.SETWNDX
 C1E7 B.SETWND   CFF3 B.TABLE    C1FF B.VECTOR     2B BAS2H
   2A BAS2L      CB54 BASCALCZ   CB51 BASCALC    CB7E BASCLC3
 CB97 BASCLCX      29 BASH       C317 BASICENT   C336 BASICENT2
 C803 BASICINIT  C305 BASICIN   ?C300 BASICINT   C307 BASICOUT
   2B BASL       CBC3 BELL2      C100 BFUNCPG    CB31 BINIT1A
 CB16 BINIT1     CB50 BINIT2     C8F6 BINPUT     C8E2 BIORET
 C292 BLAST      C896 BOUT       C8CC BPNCTL     C8A1 BPRINT
?CBE2 BS40       CB5B BSCLC1A    CB55 BSCLC1     CB6D BSCLC2
 CBEB BSDONE     C398 C01        C3A3 C03        CB74 CBB2
 C87E CBB3       C890 C8B4       C866 C8BASIC    07F8 CBSLOT
   24 CH         067B CHAR       C85D CLEARIT    C181 CLEOL2
 C12D CLEOP1     C000 CLR80COL   C00C CLR80VID   C00E CLRALTCHAR
 CE9B CLRHALF2   CE91 CLRHALF    C300 CN00       CFC5 COPYRET
 CF95 COPYROM2   CF78 COPYROM      37 CSWH       C836 CSWL
 CC78 CTLADH     CC5F CTLADL     CB99 CTLCHAR    CBAB CTLCHARX
 CBAE CTLGO      CBB2 CTLRET     CBB6 CTLXFER      25 CV
 C261 DIAGS      CEA3 DO4B       C929 ESC1       C92B ESC2
 C935 ESC3       C918 ESCAPING   C9B3 ESCCHAR    C280 ESCIN
 C960 ESCNONE    0011 ESCNUM     CF65 ESCOFF     CF52 ESCON
 C284 ESCOUT     CF6E ESCRET     C945 ESCSPEC    C954 ESCSPEC2
 C963 ESCSPEC3   C972 ESCTAB   ?FBC1 F.BASCALC   C19C F.CLEOLZ
 C17D F.CLREOL   C129 F.CLREOP   C1A1 F.GORET     C143 F.HOME
 C2F1 F.RET1     C2EB F.RETURN   C14D F.SCROLL   C18A F.SETWND
 CFEA F.TABLE    FC22 F.VTAB     FC24 F.VTABZ    FBB3 F8VERSION
 CE6F FORATE1    CE63 FORATE     CD9B FULL80     FD29 FUNCEXIT
 CE22 GET84      CB1B GETK2      CB15 GETKEY     CA27 GETPRIOR
 CAAF GETY       C22E GOBACK       06 GOODF8     C27D GORETN
 C2B5 GOTKEY     CA49 GPX        CB13 HANG       C2CC IK1
 C2D5 IK2A       C2CE IK2        C2DB IK3        CEDD INVERT
   32 INVFLG     FF58 IORTS      C34B JBASINIT   C34B JPINIT
 C351 JPREAD     C35D JPSTAT     C357 JPWRITE    C010 KBDSTRB
 C000 KBD        CBB4 KBDWAIT    C2EA KDRET     ?C2E6 KDRETN
 C2E9 KDRETY     C2C6 KEYDLY       39 KSWH         3B KSWL
 CFB9 LCB1       CFC2 LCB1ROM      40 M.BINPUT     80 M.ESCR
   80 M.ESCR       08 M.GOXY       01 M.IRQ        02 M.PAS1.0
   02 M.PAS1.0     20 M.PASCAL     01 M.TRANS      10 M.LIT
 04FB MODE       C378 MOVEC2M    C380 MOVELOOP   04 M.VMODE
 C37E MOVESTRT   C363 MOVE       CCDD MSCRLO     C3AC MOVERET
 CCF9 MSCRL2     CD02 MSCRLRET   CD10 MSCRLRTS   CCE1 MSCRL1
 C1C5 NOI        C8C0 NOWAIT     C38A NXTA1      C9B7 NOESC
 0778 OLDBASL    047B OLDCH      CD09 ONEMORE    07FB OLDBASH
 05FB OURCV      CF01 PICK       CA6Z PIGOOD     057B OURCH
 CA51 PINIT2     CA4F PINIT      CFF0 PLUSMINUS1 CA4A PINIT1.0
 CA8A PREADRET2  CFD2 PSETUP2    CFC8 PSETUP     CA74 PREAD
 C99E PSTATUS2   C994 PSTATUS    C9B0 PSTATUS3   CFDF PSETUPRET
?CA9E PWRITE2    CAC8 PWRITE3    CABE PWRITE     C9B4 PSTATUS4
 CB0F PWRITERET  CB09 PWWRAP     CDC0 QUIT2      CAEB PWRITE4
 C018 RDB0COL    C01F RDB0VID    C003 RDCARDRAM  CDAA QUIT
 C011 RDLCBNK2   C012 RDLCRAM    C002 RDMAINRAM ?FD0C RDKEY
 C013 RDRAMRD    C014 RDRAMWRT   C01A RDTEXT     C01C RDPAGE2
 C264 RESETRET     4F RNDH       4E RNDL       ?C019 RDVBLBAR
 CDEA SCR40      CE3E SCRB0      CE55 SCRB0RET   CE01 SCR40RET
 C153 SCRL1      C169 SCRL2      C172 SCRL3      CF06 SCREENIT
 CF1E SCRN2      CF37 SCRN3      CF40 SCRN40     CCD1 SCRLSUB
 CDDB SCRN84     CE58 SCRNRET    CCAE SCROLL1    CE32 SCRN48
 CCAA SCROLLDN   CCA4 SCROLLUP   C001 SETB0CDL   CB0B SCROLL2
 C00F SETALTCHAR C009 SETALTZP   C3EB SETC8      C00D SETB0VID
 CED9 SETCHRTS ?C007 SETINTCXROM FE89 SETKBD     CEAF SETCH
 C008 SETSTDZP   FE93 SETVID     CF00 SEV        C00B SETSLOTC3ROM
 C030 SPKR       CADC STARTXY    CB4B STAY2      FC75 SNIFFIRQ
 CEF9 STOR2      CF4A STOR40     CF2A STORB0     CB4D STAY80
 CF4E STPKEXIT   CC59 STUFFINV   047B TEMP1      CEF2 STORCHAR
 CB24 TESTCARD ?CB4E TESTFAIL    C054 TXTPAGE1     00 TEST
 CBCF WAIT       CBD0 WAIT2      CBD1 WAIT3      C055 TXTPAGE2
   20 WNDLFT     CFF9 WNDTAB       22 WNDTOP       23 WNDBTM
 C005 WRCARDRAM  C004 WRMAINRAM  CBBC X.BELL       21 WNDWDTH
 C2F6 X.CLEOL2   C2F4 X.CLEOLZ   CC0C X.CRRET    CBDB X.BS
                                                 CBEC X.CR
```

```
 CBFD X.CRPAS        CD64 X.DC1B         CD76 X.DC1RTS       CD59 X.DC1
 CD88 X.DC2B         CD9A X.DC2RET       CD77 X.DC2          CC0D X.EM
 CD42 X.FF           CC33 X.FSRET        CC26 X.FS           CD48 X.GS
 CD54 X.GS2          CD4E X.GSEOLZ       CC91 X.LF           CC9E X.LF2
 CD20 X.LFRET        CD90 X.NAK          CD9A X.NAKRET       CD11 X.SCRLRET
 CD17 X.SCRLRET2     CC52 X.SI           CC49 X.SO           ?CC1D X.SUBBO
 CC1F X.SUBLP        CC1A X.SUB          CC34 X.US           CC40 X.US1
 CC45 X.US2          CC48 X.USRET        CD23 X.VT           CD2C X.VTLOOP
 CD32 X.VTNEXT       06FB XCOORD         C3B0 XFER           C3CD XFERAZP
 C3C5 XFERC2M        C3DC XFERSZP          1F YSAV1          ?  02 ZSPAREC2
?CFFD ZZEND
** SUCCESSFUL ASSEMBLY := NO ERRORS
** ASSEMBLER CREATED ON 05-JAN-82 000004
** TOTAL LINES ASSEMBLED  2419
** FREE SPACE PAGE COUNT   49
    2  EQUATES
    3  BFUNC
    4  C3SPACE
    5  C8SPACE
    6  BPRINT
    7  BINPUT
    8  PINIT
    9  PREAD
   10  PWRITE
   11  SUBS1
   12  SUBS2
   13  SUBS3
```

80-Column Symbol Table, Sorted by Address

```
   00 TEST          01 M.TRANS       01 M.IRQ         02 M.PAS1.0
?  02 ZSPAREC2      04 M.VMODE       06 GOODFB        08 M.GOXY
   10 M.LIT         0011 ESCNUM      1F YSAV1         20 M.PASCAL
   20 WNDLFT        21 WNDWDTH       22 WNDTOP        23 WNDBTM
   24 CH            25 CV            28 BASL          29 BASH
   2A BAS2L         2B BAS2H         32 INVFLG        36 CSWL
   37 CSWH          38 KSWL          39 KSWH          3C A1L
   3D A1H           3E A2L           3F A2H           40 M.BINPUT
   42 A4L           43 A4H           4E RNDL          4F RNDH
   80 M.ESCR        0478 TEMP1       047B OLDCH       04FB MODE
 057B OURCH         05FB OURCV       067B CHAR        06FB XCOORD
 077B OLDBASL       07F8 CBSLOT      07FB OLDBASH     C000 CLR80COL
 C000 KBD           C001 SET80COL    C002 RDMAINRAM   C003 RDCARDRAM
 C004 WRMAINRAM     C005 WRCARDRAM   ?C007 SETINTCXROM C008 SETSTDZP
 C009 SETALTZP      C00B SETSLOTC3ROM C00C CLR80VID   C00D SET80VID
 C00E CLRALTCHAR    C00F SETALTCHAR  C010 KBDSTRB     C011 RDLCBNK2
 C012 RDLCRAM       C013 RDRAMRD     C014 RDRAMWRT    C018 RD80COL
?C019 RDVBLBAR      C01A RDTEXT      C01C RDPAGE2     C01F RD80VID
 C030 SPKR          C054 TXTPAGE1    C055 TXTPAGE2   ?C100 B.FUNC
 C100 BFUNCPG       C107 B.FUNCNK    C10E B.FUNCNE    C11F B.OLDFUNC
 C129 F.CLREOP      C12D CLEOP1      C143 F.HOME      C14D F.SCROLL
 C153 SCRL1         C169 SCRL2       C172 SCRL3       C17D F.CLREOL
 C1B1 CLEOL2        C18A F.SETWND    C19C F.CLEOLZ    C1A1 F.GORET
 C1A4 B.FUNCO       C1C5 NOI         C1CD B.SCROLL    C1D3 B.CLREOL
 C1D9 B.CLEOLZ      C1E1 B.CLREOP    C1E7 B.SETWND    C1EA B.RESET
 C1ED B.HOME        C1FF B.VECTOR    C20E B.GETCH     C211 B.FUNC1
 C219 B.SETWNDX     C221 B.SETWND2   C22E GOBACK      C234 B.RESETX
 C252 BLAST         C261 DIAGS       C264 RESETRET    C26E B.ESCFIX
 C272 B.ESCFIX2     C27A B.ESCFIX3   C27D GORETN      C280 ESCIN
 C2B4 ESCOUT        C2B8 B.KEYIN     C29C B.KEYIN2    C2B5 GOTKEY
 C2C6 KEYDLY        C2CC IK1         C2CE IK2         C2D5 IK2A
 C2DB IK3          ?C2E6 KDRETN      C2E9 KDRETY      C2EA KDRET
 C2EB F.RETURN      C2F1 F.RET1      C2F4 X.CLEOLZ    C2F6 X.CLEOL2
 C300 CN00         ?C300 BASICINT    C305 BASICIN     C307 BASICOUT
 C317 BASICENT      C336 BASICENT2   C348 JBASINIT    C34B JPINIT
 C351 JPREAD        C357 JPWRITE     C35D JPSTAT      C363 MOVE
 C378 MOVEC2M       C37E MOVESTRT    C380 MOVELOOP    C38A NXTA1
 C398 CO1           C3A3 CO3         C3AC MOVERET     C3B0 XFER
 C3C5 XFERC2M       C3CD XFERAZP     C3DC XFERSZP     C3E8 SETC8
 C803 BASICINIT     C813 HANG        C816 BINIT1      C831 BINIT1A
 C850 BINIT2        C85D CLEARIT     C866 CBBASIC     C874 CBB2
 C87E CBB3          C890 CBB4        C896 BOUT        C8A1 BPRINT
 C8B4 KBDWAIT       C8C0 NOWAIT      C8CC BPNCTL      C8E2 BIORET
 C8F6 BINPUT        C905 B.INPUT     C918 ESCAPING    C929 ESC1
 C92B ESC2          C935 ESC3        C945 ESCSPEC     C954 ESCSPEC2
 C960 ESCNONE       C963 ESCSPEC3    C972 ESCTAB      C983 ESCCHAR
 C994 PSTATUS       C99E PSTATUS2    C9B0 PSTATUS3    C9B4 PSTATUS4
 C9B7 NOESC         C9C6 B.NOPICK    C9DF B.CHKCAN    C9F7 B.FLIP
 CA02 B.CANLIT      CA0A B.FIXCHR    CA24 B.INRET     CA27 GETPRIOR
 CA49 GPX           CA4A PINIT1.0    CA4F PINIT       CA51 PINIT2
 CA62 PIGOOD        CA74 PREAD       CA8A PREADRET2   CA8E PWRITE
?CA9E PWRITE2       CAAF GETY        CACB PWRITE3     CADC STARTXY
 CAEB PWRITE4       CB09 PWWRAP      CB0F PWRITERET   CB15 GETKEY
 CB1B GETK2         CB24 TESTCARD    CB48 STAY2       CB4D STAY80
?CB4E TESTFAIL      CB51 BASCALC     CB54 BASCALCZ    CB55 BSCLC1
 CB5B BSCLC1A       CB6D BSCLC2      CB7E BASCLC3     CB97 BASCLCX
 CB99 CTLCHAR       CBAB CTLCHARX    CBAE CTLGO       CBB2 CTLRET
 CBB6 CTLXFER       CBBC X.BELL      CBC3 BELL2       CBCF WAIT
 CBDO WAIT2         CBD1 WAIT3       CBDB X.BS       ?CBE2 BS40
 CBEB BSDONE        CBEC X.CR        CBFD X.CRPAS     CC0C X.CRRET
 CC0D X.EM          CC1A X.SUB      ?CC1D X.SUB80     CC1F X.SUBLP
 CC26 X.FS          CC33 X.FSRET     CC34 X.US        CC40 X.USI
 CC45 X.US2         CC48 X.USRET     CC49 X.SO        CC52 X.SI
 CC59 STUFFINV      CC5F CTLADL      CC78 CTLADH      CC91 X.LF
 CC9E X.LF2         CCA4 SCROLLUP    CCAA SCROLLDN    CCAE SCROLL1
 CCB8 SCROLL2       CCD1 SCRLSUB     CCDD MSCRLO      CCE1 MSCRL1
 CCF9 MSCRL2        CD02 MSCRLRET    CD09 DNEMORE     CD10 MSCRLRTS
 CD11 X.SCRLRET     CD17 X.SCRLRET2  CD20 X.LFRET     CD23 X.VT
 CD2C X.VTLOOP      CD32 X.VTNEXT    CD42 X.FF        CD48 X.GS
 CD4E X.GSEOLZ      CD54 X.GS2       CD59 X.DC1       CD64 X.DC1B
 CD76 X.DC1RTS      CD77 X.DC2       CD88 X.DC2B      CD90 X.NAK
 CD9A X.NAKRET      CD9A X.DC2RET    CD9B FULL80      CDAA QUIT
 CDCO QUIT2         CDDB SCRN84      CDEA SCR40       CE01 SCR40RET
 CE0A ATEFOR        CE13 ATEFOR1     CE22 GET84       CE32 SCRN48
 CE3E SCR80         CE55 SCR80RET    CE58 SCRNRET     CE63 FORATE
 CE6F FORATE1       CE91 CLRHALF     CE98 CLRHALF2    CEA3 DD4B
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 CEAF SETCH          CED9 SETCHRTS       CEDD INVERT         CEF2 STORCHAR
 CEF9 STOR2          CF00 SEV            CF01 PICK           CF06 SCREENIT
 CF1E SCRN2          CF2A STOR80         CF37 SCRN3          CF40 SCRN40
 CF4A STOR40         CF4E STPKEXIT       CF52 ESCON          CF65 ESCOFF
 CF6E ESCRET         CF78 COPYROM        CF95 COPYROM2       CFB3 LCB2ROM
 CF89 LCB1           CFC2 LCB1ROM        CFC5 COPYRET        CFC8 PSETUP
 CFD2 PSETUP2        CFDF PSETUPRET      CFEA F.TABLE        CFF0 PLUSMINUS1
 CFF3 B.TABLE        CFF9 WNDTAB       ?CFFD ZZEND           FBB3 F8VERSION
?FBC1 F.BASCALC      FC22 F.VTAB         FC24 F.VTABZ        FC75 SNIFFIRQ
?FD0C RDKEY          FD29 FUNCEXIT       FE89 SETKBD         FE93 SETVID
 FF58 IORTS
** SUCCESSFUL ASSEMBLY := NO ERRORS
** ASSEMBLER CREATED ON 05-JAN-82 000004
** TOTAL LINES ASSEMBLED  2421
** FREE SPACE PAGE COUNT   49
    2  EQUATES
    3  BFUNC
    4  C3SPACE
    5  C8SPACE
    6  BPRINT
    7  BINPUT
    8  PINIT
    9  PREAD
   10  PWRITE
   11  SUBS1
   12  SUBS2
   13  SUBS3
```

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