



CDL Z80 MACRO III Assembler C12012- 414X  
 85/12/04 15:33:00  
 High Bios For Turbo-ROM  
 1-1 Macros and Constants

```

4
5
6         .phex
7         .xlink
8
9 ;*****
10 ;      UNIVERSAL HIGH-BIOS FOR TURBO ROM
11 ;
12 ;      Copyright 1985 (c), Plu*Perfect Systems
13 ;                P.O. Box 1494
14 ;                Idyllwild, California 92349
15 ;
16 ;*****
17
18         .remark "
19 This code is provided for the use of owners of the
20 Advent Products Turbo ROM (Kaypro versions).  It
21 relies heavily on the presence of the Turbo ROM
22 and will not work without it"
23
24 ;*****
25 ;fill memory up to address with nulls
26         .define PADBYT[addr]=[
34         .define XENTRY[name]=[
0000 42 xcount = 0
0000 43 xstart == xcount ;Restart Computer
44         .slist
3 46 XENTRY xdkrst ;(de-activate HOST buff
6 47 XENTRY xcrtnit ;initialise video drive
9 48 XENTRY xdevnit ;(initialise unit recor
C 49 XENTRY xhome ;(de-activate HOST buff
F 50 XENTRY xseldsk ;Select disk for next a
2 51 XENTRY xsettrk ;Set track for next dis
5 52 XENTRY xsetsec ;Set sector for next di
8 53 XENTRY xsetdma ;Set DMA Address for ne
B 54 XENTRY xread ;Read Sector
E 55 XENTRY xwrite ;Write Sector
1 56 XENTRY xsctrn ;Sector Translation (Du
4 57 XENTRY xdskon ;Trun on Floppy motors
7 58 XENTRY xdskoff ;Turn off/deselect driv
A 59 XENTRY xcrtsta ;Standard Keyboard inpu
D 60 XENTRY xcrtin ;Standard Keyboard inpu
0 61 XENTRY xkbdout ;Keyboard Serial output
3 62 XENTRY xttysta ;TTY input status
6 63 XENTRY xttyin ;get char from TTY
9 64 XENTRY xttyout ;send (C) to TTY
C 65 XENTRY xlptsta ;Centronics output stat
F 66 XENTRY xlptout ;send (C) to Centronics
2 67 XENTRY xttosta ;TTY output status
5 68 XENTRY xcrtout ;send (C) to video scre
8 69 XENTRY xtmsec ;delay (A) ten millseco

```

B	70	XENTRY	xullsta	;User List input status
E	71	XENTRY	xullin	;User List input
1	72	XENTRY	xullout	;User List output

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High Bios For Turbo-ROM

1-2 Macros and Constants

4	73	XENTRY	xullost		;User List output statu
7	74	XENTRY	xldsys		;reload system
A	75	XENTRY	xgetscr		;return next screen cha
D	76	XENTRY	xdefcur		;set cursor to (A)
0	77	XENTRY	xmsec		;delay (A) msec
	79				
0006	80	sioAcommand	=	06H	;TTY command port
0007	81	sioBcommand	=	07H	;Keyboard command port
0007	82	sioBstatus	=	07H	;keyboard status port
0005	83	sioBdata	=	05H	;Keyboard data
000E	84	sioCcommand	=	0EH	;UL1 command port
	85				
0000	86	bauda	=	0	;tty baud rate
0008	87	baudb	=	8	;serial printer (84 onl
	88				
0000	89	topmem	=	0	
FFF8	90	romid	=	topmem - 8	;start of ROM i
FFF0	91	vecptr	=	topmem - 16	;pointer to bas
FFEC	92	hrdptr	=	topmem - 20	;pointer to win
	93				
0028	94	beldly	=	40	;delay before s
000D	95	CR	=	0DH	
000A	96	LF	=	0AH	
	97				

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High Bios For Turbo-ROM  
2-1 Load Parameter Sector (Config. Tables)

```

101 ;*****
102 ;load parameter sector (standard Kaypro)
103 ;This sector is loaded by the Turbo Rom into the
104 ;CP/M directory buffer where it remains through the
105 ;cold boot. It also contains the configuration informa
106 ;*****
107
0000 108 syssiz =\      "Enter System Size (K) - (0 generates r
109
0000' 18FE 116 ldparm: jmp      ldparm      ;ID and safety
0002' 0080' 117      .word    bootcd      ;start loading
0004' 0080' 118      .word    bootcd      ;cold boot entry
0006' 0033 119      .word    sysst      ;number of sectors to l
120 ;-----
121 ;sign-on message, placed here so relocater can patch in
122 ;displayable system size
123
0008' 1A07 124 sign:  .byte    01AH,07      ;clear screen and ring
000A' 30302E3030 130      .ascii   '00.00'      ;patched by relocater
000F' 4B2043502F 132      .ascii   "K CP/M"
0015' 202D205455 133      .ascii   " - TURBO-BIOS$"
0023' 2020202020 134      .ascii   "          "
135 ;-----
136 ;offsets from start of code to other configurable param
137 ;that are set by TURBO CONFIG program
002D' 1834 138      .word    schar    - bootcd      ;screen dump tr
002F' 17B3 139      .word    iflag    - bootcd      ;interrupt flag
0031' 192B 140      .word    motcns   - bootcd      ;motor off time
0033' 17D2 141      .word    rbtdrv   - bootcd      ;warm boot driv
0035' 17F3 142      .word    wptr0    - bootcd      ;pointer to war
0037' 00D2 143      .word    wptr1    - bootcd      ;pointer "
144 ;-----
145 ;Configuration Data Structure
146
147 ;miscellaneous options
148
0039' 81 149 iiobyt: .byte    81H      ;initial I/O byte
150
003A' FF 151 curs83: .byte    7FH + 80H      ;83 cursor (flashing bl
003B' 60 152 curs84: .byte    01100000B ! 00000000B
153      ;84 cursor (slow flashi
003C' 00 154 clk84:  .byte    0      ;84 machine clock entry
155      ;(0 is no clock)
156
003D' 00 157 typena: .byte    0      ;use type ahead console
003E' 00 158 clkmsk: .byte    0      ;enable keyclicks
159
160 ;Floppy disk time constants
003F' 00 161 fflag:  .byte    0      ;flag whether replacement const
0040' 063219 162 ftime:  .byte    6,50,25 ;floppy 0 (step rate,head load,
0043' 063219 163      .byte    6,50,25 ;floppy 1

```

```
0046' 063219      164      .byte  6,50,25 ;floppy 2
0049' 063219      165      .byte  6,50,25 ;floppy 3
166
```

```

167
168 ;Serial Ports
169
170 ; Device initialization tables
171 ; Note order of registers taken from Osborne.
172
004C' 173 devtab:
174
175 ;SIOB keyboard device
004C' 0702 176 .byte sioBcommand, 00000010B ;select
004E' 07 177 .byte sioBcommand
178 ;-----
004F' 00 179 ivect: .byte 0 ;patche
180 ;-----
181
182 ;BAUDA
0050' 0005 183 .byte bauda, 5 ;defaul
184
185
186 ;SIOA tty device
0052' 0614 187 .byte sioAcommand, 00010100B ;select
0054' 0644 188 .byte sioAcommand, 01000100B ;x16, a
189
0056' 0613 190 .byte sioAcommand, 00010011B ;select
0058' 06E1 191 .byte sioAcommand, 11100001B ;rx 8 b
192
005A' 0605 193 .byte sioAcommand, 00000101B ;select
005C' 06E8 194 .byte sioAcommand, 11101000B ;tx 8 b
195
005E' 0601 196 .byte sioAcommand, 00000001B ;select
0060' 0600 197 .byte sioAcommand, 00000000B ;disabl
198
199
000B 200 ilen83 = (. - devtab)/2
201
202 ;BAUDB
0062' 0805 203 .byte baudb, 5 ;defaul
204
205 ;sioC ull serial printer device
0064' 0E14 206 .byte sioCcommand, 00010100B ;select
0066' 0E44 207 .byte sioCcommand, 01000100B ;x16, a
208
0068' 0E13 209 .byte sioCcommand, 00010011B ;select
006A' 0EE1 210 .byte sioCcommand, 11100001B ;rx 8 b
211
006C' 0E05 212 .byte sioCcommand, 00000101B ;select
006E' 0EE8 213 .byte sioCcommand, 11101000B ;tx 8 b
214
0070' 0E01 215 .byte sioCcommand, 00000001B ;select
0072' 0E00 216 .byte sioCcommand, 00000000B ;disabl
217

```

```
0014      218  ilen84  =      (. - devtab)/2
      219
      220
```



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High Bios For Turbo-ROM  
2-3 Load Parameter Sector (Config. Tables)

```
                221 ;warm boot message printed by BDOS string printer
                222 ;DateStamper install moves this
0074' 0D0A576172 223 wmsg0: .ascii [0DH][0AH]'Warm Boot$'
000C                224 wmsglen = . - wmsg0
0080                225 prmlen = . - ldparm
                226
```

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High Bios For Turbo-ROM  
3-1 Cold Boot Initialization Code

```

                                234 ;start of actual Cold Boot Code (note that ROM is switc
0080'                            235         .loc    ldparm + 80H
0080'                            236 bootcd:
                                237 ;must initially set up stack to use during boot, put ju
                                238 ;start of code
0080' 31 0080'                    239         lxi    sp,bootcd
                                240
                                241 ;verify presence of Turbo Rom
0083' 21 FFF8                    242         lxi    h,romid           ;start of ID sequence
0086' E5                          243         push   h
0087' AF                          244         xra    a
0088' 0608                        245         mvi    b,8
008A' 86                          246 ..chks: add    m           ;checksum
008B' 23                          247         inx    h
008C' 10FC                        248         djnz   ..chks
008E' E1                          249         pop    h
008F' 2027                        250         jrnz   xrom           ;jump if wrong ROM
0091' 11 00A0'                    251         lxi    d,sig
0094' 0603                        252         mvi    b,3
0096' 1A                          253 ..csig: ldax  d           ;now check signature
0097' BE                          254         cmp    m
0098' 201E                        255         jrnz   xrom
009A' 23                          256         inx    h
009B' 13                          257         inx    d
009C' 10F8                        258         djnz   ..csig
009E' 182A                        259         jmp    romok
                                260 ;*****
00A0' 505053                      261 sig:   .ascii 'PPS'           ;signature in ROM
                                262 ;*****
                                263 ;message for wrong ROM detected
00A3' 1A07526571                264 msg:   .ascii [1AH][07H]"Requires TURBO ROM!"
0015'                            265 elen  =    . - msg
                                266 ;*****
                                267 ;use direct ROM calls to video output routine
00B8' 21 00A3'                    268 xrom:  lxi    h,msg
00BB' 0615                        269         mvi    b,elen
00BD' 4E                          270 ..loop: mov    c,m
00BE' 23                          271         inx    h
00BF' E5                          272         push   h
00C0' C5                          273         push   b
00C1' CD 0045                    274         call   xcrtout
00C4' C1                          275         pop    b
00C5' E1                          276         pop    h
00C6' 10F5                        277         djnz   ..loop
00C8' F3                          278 ..hang: di
00C9' 76                          279         hlt
                                280 ;*****
                                281 ;find DIRBUF to get initialization tables
00CA' 0E00                        282 romok: mvi    c,0           ;select drive 0 to get
00CC' 1E01                        283         mvi    e,1           ;don't bother redetermi
00CE' CD 000F                    284         call   xseldsk       ;direct ROM call

```

00D1'	11 0008	285	lxi	d,8	
00D4'	19	286	dad	d	;now have pointer to po
00D5'	5E	287	mov	e,m	

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High Bios For Turbo-ROM  
3-2 Cold Boot Initialization Code

```

00D6' 23      288      inx      h
00D7' 56      289      mov      d,m
00D8' D5      290      push     d
00D9' DDE1    291      pop      x           ;index register points
                292
                293 ;*****
                294 ;initialise timer interrupts in case they are later
                295 ;enabled
                296
00DB' 2A FFF0 297      lhld    vecptr    ;get pointer to interrpu
                298                        ;poke low order to writ
                299
00DE' 7C      300      mov      a,h         ;set up CPU interrupt v
00DF' ED47    301      stai
00E1' ED5E    302      im2           ;make sure in Mode 2
                303
00E3' DD754F 304      mov      (ivect - ldparm)(x),l
00E6' 11 19D0' 305      lxi     d,timer     ;note that tx interrupt
00E9' 73      306      mov      m,e
00EA' 23      307      inx      h
00EB' 72      308      mov      m,d         ;put vector in place
                309
                310 ;initialise any unit record devices
                311 ;find which machine
00EC' 3A FFFB 312      lda     0FFFBH    ;get version byte
00EF' 07      313      rlc
                ;move machine bit to cy
00F0' F5      314      push    psw         ;save machine
00F1' DDE5    315      push    x
00F3' E1      316      pop     h
00F4' 11 004C 317      lxi     d,devtab - ldparm
00F7' 19      318      dad     d
00F8' EB      319      xchg
                ;table in DE
00F9' F1      320      pop     psw
00FA' F5      321      push    psw         ;get cy
00FB' 3E0B    322      mvi     a,ilen83
00FD' 3002    323      jrnc   ..do83
00FF' 3E14    324      mvi     a,ilen84
0101' 2E09    325      ..do83: mvi     l,xdevnit ;rom device initialize
0103' CD 1953' 326      call   calrom      ;use ROM function (swit
                327
                328 ;now do other config options like cursor, bell, keyboar
                329 ;interrupt motor turn off, motor deselect time constant
                330 ;character
                331 ;-----
                332 ;cursor definition
0106' F1      333      pop     psw         ;get back machine
0107' DD7E3A 334      mov     a,(curs83 - ldparm)(x)
010A' 3009    335      jrnc   ..cu83
                336 ;for 84 must set up display clock address
010C' DD7E3C 337      mov     a,(clk84 - ldparm)(x)
010F' 32 FFE6 338      sta     0FFE6H     ;entry point in high me

```

```
0112' DD7E3B      339      mov      a,(curs84 - ldparm)(x)
0115' 2E5D        340      ..cu83: mvi      l,xdefcur
0117' CD 1953'    341      call     calrom      ;define the cursor
```

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High Bios For Turbo-ROM  
3-3 Cold Boot Initialization Code

```

342 ;-----
343 ;keyboard type ahead and key clicks
011A' 2A FFEC 344      lhld      hrdptr      ;get pointer to hard di
345      ;point to type ahead flag
011D' 2B      346      dcx       h
011E' DD7E3D 347      mov       a,(typena - ldparm)(x)
0121' 77      348      mov       m,a
349
0122' 2B      350      dcx       h      ;point to ROM bell char
0123' DD7E3E 351      mov       a,(clkmsk - ldparm)(x)
0126' 32 19E1' 352      sta      txchar      ;set bell used by inter
0129' 32 1981' 353      sta      click0
012C' B6      354      ora       m
012D' 77      355      mov       m,a      ;set ROM character
356
357
358      ;move floppy timing
012E' DD7E3F 359      mov       a,(fflag - ldparm)(x)
0131' B7      360      ora       a      ;test if floppy timing
0132' 2816    361      jrz      ..nflp
0134' 2A FFEC 362      lhld      hrdptr
0137' 11 0010 363      lxi      d,16      ;offset to high memory
013A' 19      364      dad      d      ;point to destination
013B' EB      365      xchg
013C' D5      366      push     d
367
013D' DDE5    368      push     x
013F' E1      369      pop      h
0140' 11 0040 370      lxi      d,ftime - ldparm
0143' 19      371      dad      d
0144' D1      372      pop      d
0145' 01 000C 373      lxi      b,12
0148' EDB0    374      ldir
375      ;move 12 time constants
376
014A' DDE5    377      ..nflp: push     x
014C' E1      378      pop      h
014D' 11 0074 379      lxi      d,(wmsg0 - ldparm)
0150' 19      380      dad      d
0152'      381      wptr1 = . + 1      ;for patching by DateSt
0151' 11 1A00' 382      lxi      d,wmsg
0154' 01 000C 383      lxi      b,wmsglen
0157' EDB0    384      ldir
385
386 ;*****
387 ;Note ROM calls above switched RAM back on exit so we c
388 ;page zero
389
390 ;set up initial IOBYTE and Logged on drive
0159' 21 0003 391      lxi      h,3
015C' DD7E39 392      mov       a,(iobyte - ldparm)(x) ;get initial IO

```

```
015F' 77          393          mov     m, a
0160' 23          394          inx     h
0161' 3600        395          mvi     m, 0                                ;start with A0:
```

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High Bios For Turbo-ROM  
3-4 Cold Boot Initialization Code

```

396
397 ;now set rest of page zero
0163' 3EC3 398 mvi a,jmp
0165' 32 0000 399 sta 0
0168' 32 0005 400 sta bdos ;set up BIOS/BDOS jumps
016B' 21 1803' 401 lxi h,cboot+3
016E' 22 0001 402 shld 1 ;BIOS wm boot ptr
0171' 21 0A06' 403 lxi h,ccpentry + 0806H
0174' 22 0006 404 shld bdos+1 ;BDOS ptr
405
406 ;*****
407 ;now print sign on message (can use BDOS as everything
0177' DDE5 408 push x
0179' E1 409 pop h
017A' 11 0008 410 lxi d,(sign - ldparm)
017D' 19 411 dad d
017E' EB 412 xchg ;point to message
017F' 0E09 413 mvi c,9
0181' CD 0005 414 call bdos
415 ;*****
416 ;set up drive to pass to CCP, if extra init code added
417 ;function must be preserved
0184' AF 418 xra a
0185' 4F 419 mov c,a ;always set up correct
0186' 420 endcode:
421 ;pad rest of sector with NOP so we fall through to CCP,
422 ;init code could be patched in here
423
424 .slist
798 ;-----
799 ;start of command processor, on sector boundary
0004 800 ccpsct = 4
801
0200' 802 .loc ldparm + 128*ccpsct
0200' 803 ccpentry:
804
805 ;compute space remaining on previous sector
007A 806 spare = ccpentry - endcode
807 ;*****
808 ; fix BDOS reset disk function in case we are
809 ;installing on top of Plu*Perfect Systems enhancements
810 ;because ROM now handles new logins correctly
811
0A00' 812 bdoslc = ccpentry + 0800H
813
1683' 814 .loc bdoslc + 0C83H
1683' 21 0000 815 lxi h,0000
816
817
818 ;*****
819

```





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 High Bios For Turbo-ROM  
 4-1 BIOS Proper

```

      823
1800'      824      .loc      ccpendry + 1600H
1800' C3 1849'      825      cboot:  jmp      boot
1803' C3 184E'      826      jmp      wboot
1806' C3 1886'      827      jmp      consta
1809' C3 18EC'      828      jmp      conin
180C' C3 1910'      829      jmp      conout
180F' C3 192F'      830      jmp      list
1812' C3 1951'      831      jmp      punch
1815' C3 1990'      832      jmp      reader
1818' C3 1994'      833      jmp      home
181B' C3 1998'      834      jmp      seldsk
181E' C3 199C'      835      jmp      settrk
1821' C3 19A0'      836      jmp      setsec
1824' C3 19A4'      837      jmp      setdma
1827' C3 19A8'      838      jmp      read
182A' C3 19B3'      839      jmp      write
182D' C3 19B7'      840      jmp      listst
1830' C3 1949'      841      jmp      sectrn
      842
      843      ;*****
1833' 00      844      iflag:  .byte  0      ;motor interrupt flag
1834' 00      845      bsflag: .byte  0      ;flags used by BIOS
      846      ;bit 7 (raw/decoded fun
      847      ;bit 6 (foreign languag
      848      ;bit 5 (foreign languag
      849      ;bit 4 (foreign languag
      850      ;bit 3 unused
      851      ;bit 2 unused
      852      ;bit 1 unused
      853      ;bit 0 Write Safe flag
      854      ;*****
1835' 0B0A080C 855      ;standard Kaypro layout of function keys (Pre - Univers
1839' 3031323334 856      akeys:  .byte  0BH,0AH,08H,0CH ;standard ADM 3A cursor
1845' 0D      857      keypad: .ascii  '0123456789-,' ;numeric keypad normal
1846' 2E      858      .byte  0DH
      859      .ascii  '.'
      860      ;*****
      861      ;motor delay used in count down offset preserved
      862      ;(any program can zero this if it wants control of moto
      863
1847' 0000      864      mcnter: .word  0      ;interrupt version only
      865      ;first byte
      866      ;*****
      867      ;TRUE cold boot entry which cause system restart
      868      ;NOTE -- this is different from Kaypro Use
      869      ;
1849' 2E00      870      boot:   mvi      1,xstart
184B' C3 1953'      871      xcalrm: jmp      calrom
      872      ;*****
0003      873      iobYTE = 3      ;page zero address

```

0004	874	cdrive	=	4	;page zero address
0005	875	bdos	=	5	;page zero address
	876				

CDL Z80 MACRO III Assembler C12012- 414X  
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 High Bios For Turbo-ROM  
 4-2 BIOS Proper

```

184E' 31 0100      877 wboot: lxi      sp,0100H      ;make sure we have good
1852'              878 rbtdrv  =          . + 1      ;location to patch for
1851' 3E00         879          mvi      a,0          ;default is to reboot f
1853' 11 0200'    880          lxi      d,ccpentry    ;location to load at
                                881          ;number of sectors and
1856' 01 2C04     882          lxi      b,(1600H/80H)*256 + ccpsect
1859' 2E57        883          mvi      l,57H          ;ROM warm boot entry
185B' CD 1953'    884          call     calrom
185E' 3EC3        885          mvi      a,jmp
1860' 32 0000     886          sta      0
1863' 32 0005     887          sta      bdos          ;set up BIOS/BDOS jumps
1866' 21 1803'    888          lxi      h,cboot+3
1869' 22 0001     889          shld    1          ;BIOS wm boot ptr
186C' 21 0A06'    890          lxi      h,ccpentry + 0806H
186F' 22 0006     891          shld    bdos+1      ;BDOS ptr
                                892
1873'              893 wptr0  =          . + 1      ;for patching by DateSt
1872' 11 1A00'    894          lxi      d,wmsg
1875' 0E09        895          mvi      c,9
1877' CD 0005     896          call     bdos          ;use bdos string printe
                                897
187A' 21 1834'    898          lxi      h,bsflag    ;point at BIOS flag
187D' CBBE        899          res      7,m          ;make sure function key
                                900
187F' 3A 0004     901          lda      cdrive
1882' 4F          902          mov      c,a          ;get logged in drive/us
1883' C3 0203'    903          jmp      ccpentry + 3
                                904 ;*****
                                905 ;console status
1886' 3A 1833'    906 consta: lda      iflag
1889' B7          907          ora      a          ;test if using interrup
188A' 200F        908          jrnz    ..ncnt      ;skip if we are
                                909 ;-----
                                910 ;CONSTAT polling motor count down
188C' 21 1848'    911          lxi      h,mcnter + 1
188F' B6          912          ora      m          ;test for count down (h
1890' 2809        913          jrz     ..ncnt
1892' 2B          914          dcx    h
1893' 35          915          dcr    m          ;decrement low byte
1894' 2005        916          jrnz    ..ncnt
1896' 23          917          inx    h
1897' 35          918          dcr    m
1898' CC 194D'    919          cz     motoff
                                920 ;-----
189B' 3A 0003     921 ..ncnt: lda      iobyte
189E' 0F          922          rrc          ;test for CRT/TTY
189F' 2E33        923          mvi      l,xttysta
18A1' 30A8        924          jrnc   xcalrm      ;No buffering from TTY
                                925
18A4'              926 bufclr =          . + 1
18A3' 3E00        927          mvi      a,0          ;buffer clear flag

```

18A5' B7  
18A6' C0

928  
929  
930

ora a  
rnz

;return if not

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High Bios For Turbo-ROM  
4-3 BIOS Proper

```

931
18A7' 2E2A      932      mvi      l,xcrtsta      ;go see if anything new
18A9' CD 1953'  933      call     calrom
18AC' C8        934      rz              ;return if no character
935
936 ;else fetch it
18AD' 2E2D      937      mvi      l,xcrtin
18AF' CD 1953'  938      call     calrom
939 ;*****
940 ;Check for Screen Dump pressed
18B2' 4F        941      mov      c,a          ;save character
18B4'          942      schar   =      . + 1    ;location of trigger ch
18B3' 3E00      943      mvi      a,0          ;get screen dump flag (
18B5' B7        944      ora      a
18B6' 282A      945      jr      putchr        ;save character
18B8' B9        946      cmp      c              ;actual trigger charact
18B9' 2027      947      jr      putchr
948 ;-----
949 ;Screen Dump Function (we don't have room to speed up
950 ;first home the dump cursor
18BB' 0EFF      951      mvi      c,0FFH
18BD' 2E5A      952      ..loop: mvi     l,xgetscr ;screen dump ROM entry
18BF' CD 1953'  953      call     calrom
18C2' F5        954      push     psw           ;save character
18C3' 7D        955      mov      a,l           ;test for end of line
18C4' E67F      956      ani      07FH          ;mask column
18C6' 200A      957      jr      ..not0        ;jump if not column zer
18C8' 0E0D      958      mvi      c,CR          ;start new line
18CA' CD 192F'  959      call     list
18CD' 0E0A      960      mvi      c,LF
18CF' CD 192F'  961      call     list
18D2' F1        962      ..not0: pop     psw           ;get character
18D3' 280B      963      jr      endscr        ;dump ends with zero re
18D5' 0E20      964      mvi      c,' '        ;skip greek/foreign cha
18D7' B9        965      cmp      c
18D8' 3801      966      jr      ..grph
18DA' 4F        967      mov      c,a          ;get character to print
18DB' CD 192F'  968      ..grph: call    list        ;send it to the printer
18DE' 18DD      969      jmp     ..loop
18E0' AF        970      endscr: xra     a          ;return with status fal
18E1' C9        971      ret
972 ;-----
18E2' 79        973      putchr: mov     a,c
18E3' 32 18F9'  974      sta     bufchr        ;store character in buf
18E6' AF        975      xra     a
18E7' 3D        976      dcr     a
18E8' 32 18A4'  977      sta     bufclr        ;set flag
18EB' C9        978      ret              ;set non zero
979 ;*****
980 ;console input
18EC' CD 1886'  981      conin: call    consta

```

```
18EF' 28FB      982      jrz      conin      ;loop out of ROM
18F1' 3A 0003   983      lda      iobyte
18F4' 0F        984      rrc
```

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```

18F5' D2 1990'   985          jnc      reader          ;no screen dump or
                                     986                ;function keys with TTY
                                     987
18F9'           988  bufchr  =      . + 1          ;one character look-ahe
                                     989                ;places character
18F8' 3E00      990          mvi      a,0
18FA' 21 18A4'  991          lxi      h,bufclr
18FD' 3600      992          mvi      m,0          ;clear buffer flag
                                     993  ;now must map any function keys
18FF' B7        994  mapfnc: ora      a
1900' F0        995          rp              ;if no high bit then re
1901' 21 1834'  996          lxi      h,bsflag      ;see if we are to map
1904' CB7E      997          bit      7,m
1906' C0        998          rnz              ;return raw function if
1907' 21 1835'  999          lxi      h,akeys      ;point to mapping table
190A' E61F      1000         ani      1FH          ;crunch hi bits
190C' 85        1001         add      l
190D' 6F        1002         mov      l,a          ;get offset, (always in
190E' 7E        1003         mov      a,m
190F' C9        1004         ret
                                     1005  ;*****
                                     1006  ;console output
1910' 3A 0003   1007  conout: lda      iobyte
1913' 0F        1008          rrc
1914' 303B      1009          jrnc    punch          ;Send to TTY
                                     1010  ;must trap bell character if interrupt timer being used
1916' 2E45      1011  crtout: mvi      l,xcrtout
1918' 3A 1833'  1012          lda      iflag          ;are we using interrupt
191B' B7        1013          ora      a
191C' 2835      1014          jrz     calrom
191E' 3A 1847'  1015          lda      mcnter        ;is motor still running
1921' B7        1016          ora      a
1922' 282F      1017          jrz     calrom
1924' 79        1018          mov      a,c
1925' FE07      1019          cpi      7          ;test for bell
1927' 202A      1020          jrnz   calrom
1929' 21 19E1'  1021          lxi      h,txchar
192C' CBD6      1022          set     2,m          ;set bell bit
192E' C9        1023         ret
                                     1024
                                     1025  ;*****
                                     1026  ;list device
192F' CD 19B7'  1027  list:  call    listst          ;loop till ready in hi
1932' 28FB      1028          jrz     list
1934' 3A 0003   1029          lda      iobyte
1937' E6C0      1030          ani      0C0H          ;isolate list device
1939' 2816      1031          jrz     punch
193B' 07        1032          rlc
193C' 07        1033          rlc
193D' 3D        1034          dcr     a          ;test for CRT
193E' 28D6      1035          jrz     crtout

```



1940'	3D	1036	dcr	a
1941'	2E3F	1037	mvi	l,xlptout
1943'	280E	1038	jrz	calrom

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```

1945' 2E51      1039      mvi      l,xullout
1947' 180A      1040      jmpr     calrom
1041      ;*****
1042      ;sector translation routine
1949' 2E21      1043      sectrn: mvi      l,xsctrn
194B' 1806      1044      jmpr     calrom
1045      ;*****
1046      ;turn off floppy motor and deselect hard disk
194D' 2E27      1047      motoff: mvi      l,xdskoff
194F' 1802      1048      jmpr     calrom      ;jump to ROM
1049      ;*****
1050      ;punch device (always TTY)
1951' 2E39      1051      punch:  mvi      l,xttyout
1052
1053      ;*****
1054      ;main entry to ROM
1953' F5        1055      calrom: push     psw      ;save A
1056
1057      ;disable SIO status interrupts
1954' 3A 1833'  1058      lda      iflag
1957' B7        1059      ora      a
1958' 2809      1060      jrz     ..skip
195A' F3        1061      di              ;make sure we are not h
195B' 3E01      1062      mvi      a,1      ;select write reg 1
195D' D307      1063      out     sioBcommand
195F' AF        1064      xra     a      ;disable all interrupts
1960' D307      1065      out     sioBcommand
1962' FB        1066      ei
1963' F1        1067      ..skip: pop     psw
1964' CD FFFC   1068      call    0FFFCH   ;fixed ROM entry point
1967' E5        1069      push    h
1968' F5        1070      push    psw
1071      ;check if motor counter needs reset
1969' 3A 1833'  1072      lda      iflag
196C' B7        1073      ora      a
196D' 281E      1074      jrz     notint
196F' 21 1847'  1075      lxi     h,mcnter ;point to current motor
1076      ;used by interrupt coun
1972' A6        1077      ana     m      ;test for zero
1973' 2818      1078      jrz     notint
1079
1080      ;now reinitialize SIO status interrupts
1975' F3        1081      di
1976' DB07      1082      in      sioBstatus ;check if buffer empty
1978' CB57      1083      bit     2,a
197A' 2808      1084      jrz     nempty
197C' 35        1085      dcr     m      ;decrement count
197D' 2001      1086      jrnz    not0
197F' 34        1087      inr     m      ;make sure we are non z
1088      ;only time-out in actua
1981'          1089      click0 =      . + 1

```

```
1980' 3E00      1090 not0:  mvi    a,0
1982' D305      1091          out    sioBdata      ;restart timer
1092
```

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```

1984' 3E01      1093 nempty: mvi      a,1
1986' D307      1094          out      sioBcommand      ;select register 1
1988' 3E06      1095          mvi      a,00000110B      ;enable vectord TX empt
198A' D307      1096          out      sioBcommand
198C' FB        1097          ei
198D' F1        1098 notint: pop      psw
198E' E1        1099          pop      h
198F' C9        1100          ret
                1101
                1102 ;*****
                1103 ;reader device (always TTY)
1990' 2E36      1104 reader: mvi      l,xttyin
1992' 18BF      1105          jmpr     calrom
                1106 ;*****
                1107 ;home selected disk drive
1994' 2E0C      1108 home:   mvi      l,xhome
1996' 18BB      1109          jmpr     calrom
                1110 ;*****
                1111 ;select disk
1998' 2E0F      1112 seldsk: mvi      l,xseldsk
199A' 18B7      1113          jmpr     calrom
                1114 ;*****
                1115 ;set desired track
199C' 2E12      1116 settrk: mvi      l,xsettrk
199E' 18B3      1117          jmpr     calrom
                1118 ;*****
                1119 ;set desired sector
19A0' 2E15      1120 setsec: mvi      l,xsetsec
19A2' 18AF      1121          jmpr     calrom
                1122 ;*****
                1123 ;set DMA address for transfer of next sector
19A4' 2E18      1124 setdma: mvi      l,xsetdma
19A6' 18AB      1125          jmpr     calrom
                1126 ;*****
                1127 ;read specified sector
19A8' 061B      1128 read:   mvi      b,xread
                1129
                1130 ;common read/write entry
19AB'          1131 motcns =      . + 1
19AA' 21 7FFF   1132 stime: lxi      h,7FFFH      ;reset motor off timer
19AD' 22 1847'  1133          shld   mcnter
19B0' 68        1134          mov    l,b      ;get function set up
19B1' 18A0      1135          jmpr     calrom
                1136 ;*****
                1137 ;write specified sector
19B3' 061E      1138 write: mvi      b,xwrite
19B5' 18F3      1139          jmpr     stime
                1140 ;*****
                1141 ;list output status
19B7' 3A 0003  1142 listst: lda     iobyte
19BA' E6C0      1143          ani    0C0H      ;mask out list bits

```

19BC'	2E42	1144	mvi	1,xttosta	
19BE'	2893	1145	jrz	calrom	;TTY used
19C0'	07	1146	rlc		

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```

19C1' 07          1147          rlc                ;moveinto low bits
19C2' 3D          1148          dcr                a                ;test for CRT, always r
19C3' 2809        1149          jrz                ..true
19C5' 3D          1150          dcr                a
19C6' 2E3C        1151          mvi                l,xlptsta
19C8' 2889        1152          jrz                calrom          ;use Centronics
19CA' 2E54        1153          mvi                l,xullost
19CC' 1885        1154          jmp                calrom
19CE' 3D          1155          ..true: dcr       a
19CF' C9          1156          ret                ;always ready
1157          ;*****
1158          ;Interrupt driven motor/deselect timer
1159          ;
1160          ;This interrupt driven timer uses the Keyboard TX buffe
1161          ;which interrupts at 30 HZ rate.  If IFLAG enabled then
1162          ;keyboard must also be enabled, so that occassional fra
1163          ;generated by keyboard firmware bug can be corrected.
1164          ;some very early SMK keyboards with 8749 (cf 8049 in la
1165          ;serious bug that makes operation with interrupts impos
1166          ;symptoms of this problem are ^@'s appearing on console
1167          ;key is pressed.  Maximum timing delay is 8.3 seconds.
1168          ;-----
19D0' ED73 1A40' 1169          timer:  ssp                timstk          ;save current stack
19D4' 31 1A40'   1170          lxi                sp,timstk      ;set up new local stack
19D7' F5          1171          push               psw
19D8' E5          1172          push               h
19D9' 21 1847'   1173          lxi                h,mcnter       ;point to counter
19DC' 35          1174          dcr                m                ;decrement
19DD' CC 194D'   1175          cz                motoff         ;deselect and flush if
19E1'             1176          txchar =          .+1            ;clicks and bell
19E0' 3E00        1177          mvi                a,0            ;character to send to k
19E2' CB57        1178          bit                2,a            ;is bell bit set
19E4' 2808        1179          jrz                ..nbel        ;skip if no bell
19E6' 2628        1180          mvi                h,beldly       ;need to delay
19E8' 2D          1181          ..lp:  dcr                l
19E9' 20FD        1182          jrnz               ..lp
19EB' 25          1183          dcr                h
19EC' 20FA        1184          jrnz               ..lp          ;delay befor bell
19EE' D305        1185          ..nbel: out        sioBdata       ;send character
19F0' CB97        1186          res                2,a            ;clear bell bit
19F2' 32 19E1'   1187          sta                txchar
19F5' E1          1188          pop                h                ;Note motoff saves addi
19F6' F1          1189          pop                psw
19F7' ED7B 1A40' 1190          lspd               timstk         ;get back old stack poi
19FB' FB          1191          ei
19FC' ED4D        1192          reti
1193          ;*****
1194          ;compute total length of system in sectors for bootload
0032          1195          sysst =          (. - bootcd)/128
0033          1197          sysst =          sysst + 1
1A00'          1208          .loc                cboot + 4*128

```

```
1A00'      1209 wmsg:  .blkb  12
           1210
1A40'      1211      .loc   cboot + 4*128 + 64
```

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```
1A40'          1212 ;interrupt stack compatible with Plu*Perfect DateStampe  
                1213 timstk: .blkw 2 ;word to save stack dur  
                1214  
                1215  
                1216 .end
```



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4-9 +++++ Symbol Table +++++

AKEYS	1835'	BAUDA	0000	BAUDB	0008	BDOS	0005
BOOT	1849'	BOOTCD	0080'	BSFLAG	1834'	BUFCHR	18F9'
CBOOT	1800'	CCPENT	0200'	CCPSCT	0004	CDRIVE	0004
CLKMSK	003E'	CONIN	18EC'	CONOUT	1910'	CONSTA	1886'
CURS83	003A'	CURS84	003B'	DEVTAB	004C'	ELEN	0015
ENDSCR	18E0'	FFLAG	003F'	FTIME	0040'	HOME	1994'
IIOBYT	0039'	ILEN83	000B	ILEN84	0014	IOBYTE	0003
LDPARM	0000'	LF	000A	LIST	192F'	LISTST	19B7'
MOTCNS	19AB'	MOTOFF	194D'	NEMPTY	1984'	NOT0	1980'
PUNCH	1951'	PUTCHR	18E2'	RBTDRV	1852'	READ	19A8'
ROMOK	00CA'	SCHAR	18B4'	SECTRN	1949'	SELDSK	1998'
SETTRK	199C'	SIG	00A0'	SIGN	0008'	SIOACO	0006
SIOBST	0007	SIOCCO	000E	SPARE	007A	STIME	19AA'
TIMER	19D0'	TIMSTK	1A40'	TOPMEM	0000	TXCHAR	19E1'
WBOOT	184E'	WMSG	1A00'	WMSG0	0074'	WMSGLE	000C
WRITE	19B3'	XCALRM	184B'	XCOUNT	0060	XCRTIN	002D
XCRTST	002A	XDEFUCU	005D	XDEVNI	0009	XDSKOF	0027
XGETSC	005A	XHOME	000C	XKBDOU	0030	XLDSYS	0057
XMSEC	0060	XREAD	001B	XROM	00B8'	XSCTRN	0021
XSETSE	0015	XSETTR	0012	XSTART	0000	XTMSEC	0048
XTTYOU	0039	XTTYST	0033	XUL1IN	004E	XUL1OS	0054
XWRITE	001E						

