```
SERIES-III 8086/8087/8088 MACRO ASSEMBLER V1.1 ASSEMBLY OF MODULE CXUBOOT
OBJECT MODULE PLACED IN :F1:CXUBTM.OBJ
ASSEMBLER INVOKED BY: ASM86.86 :F1:CXUBTM.A86 XREF PRINT(:F5:CXUBTM.LST)


LOC  OBJ                  LINE     SOURCE

                             1 +1  $ TITLE(CXU TEST BOOTSTRAP   2/21/82)
                             2
                             3
                             4     ;
                             5     ;
                             6     ;
                             7
                             8
                             9             NAME    CXUBOOT
                            10
                            11             PUBLIC  LONGCALL
                            12             PUBLIC  CXU_POINTER_FIXUP
                            13
                            14
  0080                      15     CBALOW  EQU     0080H                 ;CONTROL BLOCK ADDRESS LOW
  0081                      16     CBAMID  EQU     0081H                 ;CONTROL BLOCK ADDRESS MID
  02C0                      17     MB_ADDR_REG     EQU     02C0H         ;MULTIBUSS ADDRESS REGISTER PORT
                            18
  0000000000020000          19     MEMSIZ_WORD     EQU     20000H        ; 256K BYTES
                            20
                            21
    0400                    22     TOP_OF_STACK    EQU     0400H         ;INITIAL TOP OF STACK
                            23
                            24
  ----                      25     MBUS_IO_SEG     SEGMENT AT 0C000H
                            26
  0000 ??                   27     DUMMY           DB      ?
                            28
  ----                      29     MBUS_IO_SEG     ENDS
                            30
                            31
  ----                      32     ONBRD_IO_SEG    SEGMENT AT 0D000H
                            33
  0000 ??                   34     DUNCE           DB      ?
                            35
  ----                      36     ONBRD_IO_SEG    ENDS
                            37
                            38     CGROUP  GROUP   CODE
                            39     DGROUP  GROUP   DATA
                            40
  ----                      41     DATA    SEGMENT PUBLIC 'DATA'
                            42
                            43             EXTRN   COM_BLOCK_PTR:WORD
                            44
  0000 ????                 45     WINDOW_BASE             DW      ?
  0002 ????????             46     CALLEE                  DD      ?
                            47
  ----                      48     DATA    ENDS
                            49
                            50
```

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LOC  OBJ                  LINE     SOURCE

                            51
----                        52     STACK   SEGMENT STACK  'STACK'
                            53
----                        54     STACK   ENDS
                            55
                            56
----                        57     CODE            SEGMENT PUBLIC 'CODE'
                            58
                            59     ASSUME          CS:CGROUP,DS:DGROUP,SS:STACK
                            60
                            61
                            62             EXTRN   CXU_BOOT_MAIN: NEAR
                            63
                            64
0000                        65     START:
0000 FA                     66                     CLI
                            67
                            68
                            69     ;               MEMORY FILL ROUTINE USE BEFORE ENABLEING PARITY CHECKING
                            70
                            71
0001 B9FF3F                 72                     MOV     CX,3FFFH                ;SET UP WORD COUNT
0004 33DB                   73                     XOR     BX,BX                   ;POINT FIRST BYTE
0006 BA0010                 74                     MOV DX,1000H
0009 8EC2                   75                     MOV ES,DX
000B 8EDB                   76                     MOV DS,BX
000D 33C0                   77                     XOR     AX,AX
                            78
000F                        79     FILL_MEM_INC:
000F 268907                 80                     MOV     ES:[BX],AX
0012 8907                   81                     MOV     DS:[BX],AX
0014 43                     82                     INC     BX
0015 43                     83                     INC     BX
0016 E2F7                   84                     LOOP    FILL_MEM_INC
0018 8CD8                   85                     MOV AX,DS
001A 0BC0                   86                     OR      AX,AX
001C 7413                   87                     JZ      END_FILL
001E B9FF3F                 88                     MOV     CX,3FFFH
0021 BA0020                 89                     MOV     DX,2000H
0024 8EDA                   90                     MOV     DS,DX
0026 BA0030                 91                     MOV     DX,3000H
0029 8EC2                   92                     MOV     ES,DX
002B 33C0                   93                     XOR     AX,AX
002D 8BD8                   94                     MOV     BX,AX
002F EBDE                   95                     JMP     FILL_MEM_INC
                            96
0031                        97     END_FILL:
                            98
0031 B8----          R      99                     MOV     AX,DATA
0034 8ED8                  100                     MOV     DS,AX
0036 8EC0                  101                     MOV     ES,AX
0038 B8----          R     102                     MOV     AX,STACK
003B 8ED0                  103                     MOV     SS,AX
003D BC0004                104                     MOV     SP,TOP_OF_STACK
                           105
```

```
LOC  OBJ                  LINE     SOURCE

                          106
0040 E8B400               107                    CALL    BUS_RESET
                          108
                          109                                    ;8253 INITIALIZE
0043 B030                 110                    MOV     AL,30H          ;SELECT CTR 0, LSB,MSB,MODE 0
0045 BA4602               111                    MOV     DX,0246H
0048 EE                   112                    OUT     DX,AL
0049 B070                 113                    MOV     AL,70H          ;COUNTER 1
004B EE                   114                    OUT     DX,AL
004C B080                 115                    MOV     AL,080H         ;COUNTER 2
004E EE                   116                    OUT     DX,AL           ;FOR SQUARE WAVE, CHANGE TO 0B6H
                          117
                          118    ;               8259 INITIALIZE
                          119
                          120    ;               ICW1    BIT0=ICW4 NEEDED
                          121    ;                       BIT1=SINGLE 8259
                          122    ;                       BIT2=INTERVAL DONT CARE
                          123    ;                       BIT3=EDGE TRIGGER MODE
                          124    ;                       BIT4=ICW1 FLAG
                          125    ;                       BIT5-7=DONT CARE
                          126
004F B013                 127                    MOV     AL,13H
0051 BA8002               128                    MOV     DX,280H
0054 EE                   129                    OUT     DX,AL
                          130
                          131    ;               ICW2
                          132    ;                       BIT0-2 = DONT CARE
                          133    ;                       BIT3-7 = A11 - A15
                          134
0055 B008                 135                    MOV     AL,08H
0057 83C202               136                    ADD     DX,2
005A EE                   137                    OUT     DX,AL
                          138
                          139    ;               ICW4
                          140
005B B003                 141                    MOV     AL,03H
005D EE                   142                    OUT     DX,AL
                          143
                          144    ;               INTERRUPT MASK, ALL INTERRUPTS ARE MASKED
                          145
005E B0FF                 146                    MOV     AL,0FFH
0060 EE                   147                    OUT     DX,AL
0061 B090                 148                    MOV     AL,090H         ;8255 INIT
0063 BA6602               149                    MOV     DX,0266H
0066 EE                   150                    OUT     DX,AL
                          151
                          152    ;       INIT THE INTERRUPT VECTORS
                          153
0067 B84C01         R     154                    MOV     AX,OFFSET ISR0
006A BB0000               155                    MOV     BX,0
006D B90800               156                    MOV     CX,8
                          157
0070                      158    INIT1:
0070 8907                 159                    MOV     [BX],AX
0072 83C302               160                    ADD     BX,2
```

```
LOC  OBJ                  LINE     SOURCE

0075 C707----        R     161                MOV     [BX],CODE
0079 83C302                162                ADD     BX,2
007C E2F2                  163                LOOP    INIT1
                           164
                           165
                           166
007E C7074D01        R     167                MOV     WORD PTR [BX],OFFSET INTR0
0082 83C302                168                ADD     BX,2
0085 C707----        R     169                MOV     [BX],CODE
0089 83C302                170                ADD     BX,2
008C C7074E01        R     171                MOV     WORD PTR [BX],OFFSET INTR1
0090 83C302                172                ADD     BX,2
0093 C707----        R     173                MOV     [BX],CODE
0097 83C302                174                ADD     BX,2
009A C7074F01        R     175                MOV     WORD PTR [BX],OFFSET INTR2
009E 83C302                176                ADD     BX,2
00A1 C707----        R     177                MOV     [BX],CODE
00A5 83C302                178                ADD     BX,2
00A8 C7075001        R     179                MOV     WORD PTR [BX],OFFSET INTR3
00AC 83C302                180                ADD     BX,2
00AF C707----        R     181                MOV     [BX],CODE
00B3 83C302                182                ADD     BX,2
00B6 C7075101        R     183                MOV     WORD PTR [BX],OFFSET INTR4
00BA 83C302                184                ADD     BX,2
00BD C707----        R     185                MOV     [BX],CODE
00C1 83C302                186                ADD     BX,2
00C4 C7075201        R     187                MOV     WORD PTR [BX],OFFSET INTR5
00C8 83C302                188                ADD     BX,2
00CB C707----        R     189                MOV     [BX],CODE
00CF 83C302                190                ADD     BX,2
00D2 C7075301        R     191                MOV     WORD PTR [BX],OFFSET INTR6
00D6 83C302                192                ADD     BX,2
00D9 C707----        R     193                MOV     [BX],CODE
00DD 83C302                194                ADD     BX,2
00E0 C7075401        R     195                MOV     WORD PTR [BX],OFFSET INTR7
00E4 83C302                196                ADD     BX,2
00E7 C707----        R     197                MOV     [BX],CODE
00EB 83C302                198                ADD     BX,2
                           199
                           200
                           201        ;       END OF INTERRUPT VECTOR SET UP
                           202
                           203        ;
                           204        ;       WAIT FOR ATTENTION 1 INTERRUPT FROM THE BOOT PROCESSOR
                           205        ;
                           206        ;               MOV DX,280H+2   ;8259A OCW PORT
                           207        ;               MOV     AX,7FH          ;MASK ALL LEVELS BUT IR7 - ATTN2
                           208        ;               OUT     DX,AX
                           209        ;               STI
                           210        ;               HLT
                           211        ;
00EE BAC002                212                MOV     DX,2C0H         ; MB WINDOW
00F1 B00E                  213                MOV     AL,0EH          ; POINT WINDOW NEAREST TO EE3B:0
00F3 EE                    214                OUT     DX,AL
                           215        ;
```

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LOC  OBJ                  LINE     SOURCE

                          216      ;
                          217      ;       READ THE BASE ADDRESS OF THE BOOT CONTROL BLOCK
                          218      ;
                          219      ;               CLI
                          220      ;               MOV     DX,CBAMID
                          221      ;               IN      AL,DX
                          222      ;               MOV     AH,AL
                          223      ;               MOV     DX,CBALOW
                          224      ;               IN      AL,DX
                          225      ;               MOV     BX,OFFSET DGROUP:COM_BLOCK_PTR
                          226      ;               MOV     [BX+2],AX
                          227      ;               XOR CX,CX
                          228      ;               MOV     [BX],CX ; ZERO OFFSET
                          229      ;
                          230      ;       WAIT FOR ATTENTION 2 INTERRUPT TO CONTINUE TO BOOTSTRAP
                          231      ;
                          232      ;               MOV     DX,280H+2
                          233      ;               MOV     AX,0FEH         ;MASK ALL LEVELS BUT IRO - ATTN1
                          234      ;               OUT     DX,AX
                          235      ;               STI
                          236      ;               HLT
                          237      ;
                          238
                          239      ;       CONTINUE TO SLAVE BOOTSTRAP CODE
00F4 E80000         E     240              CALL CXU_BOOT_MAIN
                          241      ;
                          242      ;       CONTROL DOES NOT RETURN TO THIS MODULE
                          243      ;
                          244
00F7                      245      BUS_RESET       PROC    NEAR
                          246
00F7 1E                   247              PUSH    DS
00F8 53                   248              PUSH    BX
00F9 50                   249              PUSH    AX
00FA B800D0               250              MOV     AX,ONBRD_IO_SEG
00FD 8ED8                 251              MOV     DS,AX
00FF BB0000               252              MOV     BX,OFFSET DUNCE
0102 8807                 253              MOV     [BX],AL
0104 58                   254              POP     AX
0105 5B                   255              POP     BX
0106 1F                   256              POP     DS
0107 C3                   257              RET
                          258
                          259      BUS_RESET       ENDP
                          260
                          261
                          262
0108                      263      BUS_SET         PROC    NEAR
                          264
0108 1E                   265              PUSH    DS
0109 53                   266              PUSH    BX
010A 50                   267              PUSH    AX
010B B800C0               268              MOV     AX,MBUS_IO_SEG
010E 8ED8                 269              MOV     DS,AX
0110 BB0000               270              MOV     BX,OFFSET DUMMY
```

```
LOC  OBJ                  LINE     SOURCE

0113 8807                  271                 MOV     [BX],AL
0115 58                    272                 POP     AX
0116 5B                    273                 POP     BX
0117 1F                    274                 POP     DS
0118 C3                    275                 RET
                           276
                           277     BUS_SET     ENDP
                           278     ;
                           279     ;
0119                       280     CXU_POINTER_FIXUP       PROC    NEAR
                           281     ;
                           282     ;       MAP MULTIBUS POINTERS INTO THE CXU WINDOW
                           283     ;       MOVE WINDOW TO ENCLOSE AREA POINTED TOO.
                           284     ;       ASSUME 256K COVERS THE AREA
                           285     ;
0119 55                    286                 PUSH    BP
011A 8BEC                  287                 MOV     BP,SP
011C 8B4606                288                 MOV     AX,[BP+6]       ; GET POINTER BASE
011F 50                    289                 PUSH    AX
0120 2500F0                290                 AND     AX,0F000H
0123 B104                  291                 MOV     CL,4
0125 D3C0                  292                 ROL     AX,CL
0127 BAC002                293                 MOV     DX,2C0H
012A EE                    294                 OUT     DX,AL
                           295     ;
012B 58                    296                 POP     AX
012C 25FF0F                297                 AND     AX,0FFFH
012F 050040                298                 ADD AX,4000H
0132 8EC0                  299                 MOV     ES,AX
0134 8B5E04                300                 MOV     BX,[BP+4]       ; RETURN OFFSET UNTOUCHED
0137 8BEC                  301                 MOV     BP,SP
0139 5D                    302                 POP     BP
013A C20400                303                 RET     4H
                           304
                           305     CXU_POINTER_FIXUP       ENDP
                           306     ;
013D                       307     longcall        proc    near                    ;
                           308                                                     ;
013D 58                    309                 pop     ax                      ; pop off return offset
013E 8F060200        R     310                 pop     word ptr callee         ; pop off proc pointer
0142 8F060400        R     311                 pop     word ptr callee+2       ;
0146 0E                    312                 push    cs                      ; simulate far call
0147 50                    313                 push    ax                      ;
0148 FF2E0200        R     314                 jmp     callee                  ;
                           315                                                     ;
                           316     longcall        endp                        ;
                           317
                           318     ;       INTERRUPT HANDLING ROUTINES
                           319
                           320
014C F4                    321     ISR0:           HLT
                           322     ;
014D CF                    323     INTR0:  IRET
014E CF                    324     INTR1:  IRET
014F CF                    325     INTR2:  IRET
```

```
LOC  OBJ                  LINE      SOURCE

0150 CF                    326      INTR3:  IRET
0151 CF                    327      INTR4:  IRET
0152 CF                    328      INTR5:  IRET
0153 CF                    329      INTR6:  IRET
0154 CF                    330      INTR7:  IRET
                           331
                           332
                           333
                           334
----                       335      CODE            ENDS
                           336
                           337                      END     START
```

XREF SYMBOL TABLE LISTING
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```
NAME                TYPE     VALUE  ATTRIBUTES, XREFS

??SEG . . . . . .   SEGMENT        SIZE=0000H PARA PUBLIC
BUS_RESET . . . .   L NEAR   00F7H  CODE  107 245# 259
BUS_SET . . . . .   L NEAR   0108H  CODE  263# 277
CALLEE. . . . . .   V DWORD  0002H  DATA  46# 310 311 314
CBALOW. . . . . .   NUMBER   0880H    15#
CBAMID. . . . . .   NUMBER   0881H    16#
CGROUP. . . . . .   GROUP            CODE   38# 59
CODE. . . . . .     SEGMENT          SIZE=0155H PARA PUBLIC 'CODE'  38# 57 161 169 173 177 181 185 189 193 197 335
COM_BLOCK_PTR . .   V WORD   0000H  EXTRN  43#
CXU_BOOT_MAIN . .   L NEAR   0000H  EXTRN  62# 240
CXU_POINTER_FIXUP   L NEAR   0119H  CODE PUBLIC  12 280# 305
DATA. . . . . .     SEGMENT          SIZE=0006H PARA PUBLIC 'DATA'  39# 41 48 99
DGROUP. . . . . .   GROUP            DATA   39# 59
DUMMY . . . . . .   V BYTE   0000H  MBUS_IO_SEG  27# 270
DUNCE . . . . . .   V BYTE   0000H  ONBRD_IO_SEG  34# 252
END_FILL. . . . .   L NEAR   0031H  CODE  87 97#
FILL_MEM_INC. . .   L NEAR   000FH  CODE  79# 84 95
INIT1 . . . . . .   L NEAR   0070H  CODE  158# 163
INTR0 . . . . . .   L NEAR   014DH  CODE  167 323#
INTR1 . . . . . .   L NEAR   014EH  CODE  171 324#
INTR2 . . . . . .   L NEAR   014FH  CODE  175 325#
INTR3 . . . . . .   L NEAR   0150H  CODE  179 326#
INTR4 . . . . . .   L NEAR   0151H  CODE  183 327#
INTR5 . . . . . .   L NEAR   0152H  CODE  187 328#
INTR6 . . . . . .   L NEAR   0153H  CODE  191 329#
INTR7 . . . . . .   L NEAR   0154H  CODE  195 330#
ISR0. . . . . .     L NEAR   014CH  CODE  154 321#
LONGCALL. . . . .   L NEAR   013DH  CODE PUBLIC  11 307# 316
MB_ADDR_REG . . .   NUMBER   02C0H    17#
MBUS_IO_SEG . . .   SEGMENT          SIZE=0001H PARA ABS   25# 29 268
MEMSIZ_WORD . . .   NUMBER   0000000000020000H  19#
ONBRD_IO_SEG. . .   SEGMENT          SIZE=0001H PARA ABS   32# 36 250
STACK . . . . . .   SEGMENT          SIZE=0000H PARA STACK 'STACK'
START . . . . . .   L NEAR   0000H  CODE  65# 337 337
TOP_OF_STACK. . .   NUMBER   0400H    22# 104
WINDOW_BASE . . .   V WORD   0000H  DATA  45#

END OF SYMBOL TABLE LISTING

ASSEMBLY COMPLETE, NO ERRORS FOUND
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