Personal Computer MZ-80B Owner's Manual
SUPPLEMENT
Complete MZ-80B IPL Assembly Listing

This supplement shows the complete MZ-80B IPL (Initial Program Loader) assembly listing. Although operation of IPL is described in the Owner's Manual, this booklet is prepared for users who want to know operational details of IPL. This booklet is for reference only. The Sharp Corporation is not obliged to answer any questions about the contents of this assembly listing.

IPL includes the following routines: the CMT CONTROL routine, which loads programs from the cassette tape into the memory and executes them; the MFM MINIFLOPPY CONTROL routine, which loads programs from the floppy diskette into the memory and executes them; and the INTRAM-EXROM routine, which loads programs from ROM connected to the extension port of the MZ-80B into the memory and executes them. Each routine name is shown in the remarks column.

SHARP

MZ-80B BEDIENUNGSANLEITUNG
SUPPLEMENT
Komplettes MZ-80B IPL Assemblerprotokoll

Diese Ergänzung führt das komplette MZ-80B IPL (Initial Program Loader/Urlader) Assemblerprotokoll auf. Wenngleich die IPL-Operation in der Bedienungsanleitung beschrieben wird, wurde diese Broschüre für Anwender zusammengestellt, die Betriebsdetails des IPL wissen möchten. Diese Broschüre ist nur zur Referenz. Die Sharp Corporation ist nicht verpflichtet, irgendwelche Fragen über die Inhalte dieses Assemblerprotokolls zu beantworten.

IPL umfaßt die folgenden Routinen: die CMT CONTROL Routine, die Programme vom Kassettenband in den Speicher lädt und sie ausführt; die MFM MINIFLOPPY CONTROL Routine, die Programme von der Floppy Diskette in den Speicher lädt und sie ausführt und die INTRAM-EXROM Routine, die Programme vom am Erweiterungsport des MZ-80B angeschlossenen ROM in den Speicher lädt und sie ausführt. Jeder Routinename ist in der Spalte "Bemerkungen" aufgeführt.

SHARP

```
0000                    ;*************************
0000                    ;
0000                    ;     Personal Computer
0000                    ;          MZ-80B
0000                    ;
0000                    ;          Initial
0000                    ;          Program
0000                    ;          Loader
0000                    ;
0000                    ;*************************
0000                    ;
0000 1804                       JR      START
0002                    ;;;;;;;;;;;;;;;;
0002                    ; NST RESET
0002                    ;
0002 3E03               NST:    LD      A,3H
0004 D3E3                       OUT     (E3H),A
0006                    ;;;;;;;;;;;;;;;;
0006                    ;INITIALIZE
0006                    ;
0006 3E82               START:  LD      A,82H           ;8255 A=OUT B=IN C=OUT
0008 D3E3                       OUT     (E3H),A
000A 3E0F                       LD      A,0FH           ;PIO A=OUT
000C D3E9                       OUT     (E9H),A
000E 3ECF                       LD      A,CFH           ;PIO B=IN
0010 D3EB                       OUT     (EBH),A
0012 3EFF                       LD      A,FFH
0014 D3EB                       OUT     (EBH),A
0016 3E58                       LD      A,58H           ;BST=1 OPEN=1 WRITE=1
0018 D3E2                       OUT     (E2H),A
001A 3E12                       LD      A,12H
001C D3E0                       OUT     (E0H),A
001E AF                         XOR     A
001F D3F4                       OUT     (F4H),A
0021 31E0FF                     LD      SP,FFE0H
0024 2100D0                     LD      HL,D000H
0027 3EB3                       LD      A,B3H
0029 D3E8                       OUT     (E8H),A
002B 3600               CLEAR:  LD      (HL),00H        ;DISPLAY CLEAR
002D 23                         INC     HL
002E 7C                         LD      A,H
002F B5                         OR      L
0030 20F9                       JR      NZ,CLEAR
0032 3E13                       LD      A,13H
0034 D3E8                       OUT     (E8H),A
0036 AF                         XOR     A
0037 32ECFF                     LD      (DRINO),A
003A 32E6FF                     LD      (MTFG),A
003D CD4B00             KEYIN:  CALL    KEYS1
0040 CB5F                       BIT     3,A
0042 2827                       JR      Z,CMT
0044 CB47                       BIT     0,A
0046 CAEF05                     JP      Z,EXROMT
0049 180C                       JR      NKIN
004B                    ;
004B 0614               KEYS1:  LD      B,14H           ;KEY STROBE OUT
004D DBE8               KEYS:   IN      A,(E8H)
004F E6F0                       AND     F0H
0051 B0                         OR      B
0052 D3E8                       OUT     (E8H),A
0054 DBEA                       IN      A,(EAH)
0056 C9                         RET
0057                    ;
0057                    ;
0057 CD5F00             NKIN:   CALL    FDCC
005A CA3C03                     JP      Z,FD
005D 180C                       JR      CMT
005F                    ;
005F 3EA5               FDCC:   LD      A,A5H
0061 47                         LD      B,A
```

```
0062 D3D9                       OUT     (D9H),A
0064 CDD605                     CALL    DLY80U
0067 DBD9                       IN      A,(D9H)
0069 B8                         CP      B
006A C9                         RET
006B                    ;;;;;;;;;;;;;;;;;
006B                    ;               ;
006B                    ;  CMT CONTROL  ;
006B                    ;               ;
006B                    ;;;;;;;;;;;;;;;;;
006B CDB501             CMT:    CALL    MSTOP
006E CD1D02                     CALL    DEL6
0071 CDCE01                     CALL    KYEMES
0074 CDAE00                     CALL    ?RDI
0077 3817                       JR      C,ST1
0079 CD3002                     CALL    LDMSG
007C 2101CF                     LD      HL,NAME
007F 1E10                       LD      E,10H
0081 0E10                       LD      C,10H
0083 CD3902                     CALL    DISP2
0086 3A00CF                     LD      A,(ATRB)
0089 FE01                       CP      1
008B 2011                       JR      NZ,MISMCH
008D CDCF00                     CALL    ?RDD
0090 F5                 ST1:    PUSH    AF
0091 CD1D02                     CALL    DEL6
0094 CD0B02                     CALL    REW
0097 F1                         POP     AF
0098 DA5F05                     JP      C,TRVAG
009B C30200                     JP      NST
009E                    ;
009E 212603             MISMCH: LD      HL,MES16
00A1 1E0A                       LD      E,0AH
00A3 0E0F                       LD      C,15
00A5 CD4602                     CALL    DISP
00A8 CDB501                     CALL    MSTOP
00AB 37                         SCF
00AC 18E2                       JR      ST1
00AE                    ;
00AE                    ;READ INFORMATION
00AE                    ;       CF=1:ERROR
00AE                    RDINF:  ENT
00AE F3                 ?RDI:   DI
00AF 1604                       LD      D,4
00B1 010000                     LD      BC,0080H
00B4 2100CF                     LD      HL,IBUFE
00B7 CD8601             RD1:    CALL    MOTOR
00BA 380E                       JR      C,STPEIR
00BC CD5201                     CALL    TMARK
00BF 3809                       JR      C,STPEIR
00C1 CDDB00                     CALL    RTAPE
00C4 3804                       JR      C,STPEIR
00C6 CB5A               RET2S:  BIT     3,D
00C8 2803                       JR      Z,EIRTN
00CA CDB501             STPEIR: CALL    MSTOP
00CD FB                 EIRTN:  EI
00CE C9                         RET
00CF                    ;
00CF                    ;
00CF                    ;READ DATA
00CF                    RDDAT:  ENT
00CF F3                 ?RDD:   DI
00D0 1608                       LD      D,8
00D2 ED4B12CF                   LD      BC,(SIZE)
00D6 210080                     LD      HL,8000H
00D9 18DC                       JR      RD1
00DB                    ;
00DB                    ;
00DB                    ;READ TAPE
00DB                    ;       BC=SIZE
```

```
00DB                    ;       DE=LOAD ADDRESS
00DB D5                 RTAPE:  PUSH    DE
00DC C5                         PUSH    BC
00DD E5                         PUSH    HL
00DE 2602                       LD      H,2
00E0 CD7A01             RTP2:   CALL    SPDIN
00E3 3838                       JR      C,TRTN1
00E5 28F9                       JR      Z,RTP2
00E7 54                         LD      D,H
00E8 210000                     LD      HL,0000H
00EB 22E0FF                     LD      (SUMDT),HL
00EE E1                         POP     HL
00EF C1                         POP     BC
00F0 C5                         PUSH    BC
00F1 E5                         PUSH    HL
00F2 CD3201             RTP3:   CALL    RBYTE
00F5 3826                       JR      C,TRTN1
00F7 77                         LD      (HL),A
00F8 23                         INC     HL
00F9 0B                         DEC     BC
00FA 78                         LD      A,B
00FB B1                         OR      C
00FC 20F4                       JR      NZ,RTP3
00FE 2AE0FF                     LD      HL,(SUMDT)
0101 CD3201                     CALL    RBYTE
0104 3817                       JR      C,TRTN1
0106 5F                         LD      E,A
0107 CD3201                     CALL    RBYTE
010A 3811                       JR      C,TRTN1
010C BD                         CP      L
010D 2004                       JR      NZ,RTP5
010F 7B                         LD      A,E
0110 BC                         CP      H
0111 280A                       JR      Z,TRTN1
0113 15                 RTP5:   DEC     D
0114 2803                       JR      Z,RTP6
0116 62                         LD      H,D
0117 18C7                       JR      RTP2
0119 CD3F02             RTP6:   CALL    BOOTER
011C 37                         SCF
011D E1                 TRTN1:  POP     HL
011E C1                         POP     BC
011F D1                         POP     DE
0120 C9                         RET
0121                    ;EDGE
0121 DBE1               EDGE:   IN      A,(E1H)
0123 2F                         CPL
0124 07                         RLCA
0125 D8                         RET     C
0126 07                         RLCA
0127 30F8                       JR      NC,EDGE
0129 DBE1               EDGE1:  IN      A,(E1H)
012B 2F                         CPL
012C 07                         RLCA
012D D8                         RET     C
012E 07                         RLCA
012F 38F8                       JR      C,EDGE1
0131 C9                         RET
0132                    ; 1 BYTE READ
0132                    ;       DATA=A
0132                    ;       SUMDT STORE
0132 E5                 RBYTE:  PUSH    HL
0133 210008                     LD      HL,0800H
0136 CD7A01             RBY1:   CALL    SPDIN
0139 3815                       JR      C,RBY3
013B 280A                       JR      Z,RBY2
013D E5                         PUSH    HL
013E 2AE0FF                     LD      HL,(SUMDT)
0141 23                         INC     HL
0142 22E0FF                     LD      (SUMDT),HL
```

```
0145 E1                         POP   HL
0146 37                         SCF
0147 CB15               RBY2:   RL    L
0149 25                         DEC   H
014A 20EA                       JR    NZ,RBY1
014C CD2101                     CALL  EDGE
014F 7D                         LD    A,L
0150 E1                 RBY3:   POP   HL
0151 C9                         RET
0152                    ;TAPE MARK DETECT
0152                    ;       E=L:INFORMATION
0152                    ;       E=S:DATA
0152 E5                 TMARK:  PUSH  HL
0153 211414                     LD    HL,1414H
0156 CB5A                       BIT   3,D
0158 2001                       JR    NZ,TM0
015A 29                         ADD   HL,HL
015B 22E2FF             TM0:    LD    (TMCNT),HL
015E 2AE2FF             TM1:    LD    HL,(TMCNT)
0161 CD7A01             TM2:    CALL  SPDIN
0164 38EA                       JR    C,RBY3
0166 28F6                       JR    Z,TM1
0168 25                         DEC   H
0169 20F6                       JR    NZ,TM2
016B CD7A01             TM3:    CALL  SPDIN
016E 38E0                       JR    C,RBY3
0170 20EC                       JR    NZ,TM1
0172 2D                         DEC   L
0173 20F6                       JR    NZ,TM3
0175 CD2101                     CALL  EDGE
0178 18D6                       JR    RBY3
017A                    ;
017A CD2101             SPDIN:  CALL  EDGE
017D D8                         RET   C
017E CD2902                     CALL  DLY2
0181 DBE1                       IN    A,(E1H)
0183 E640                       AND   40H
0185 C9                         RET
0186                    ;
0186                    ;
0186                    ;MOTOR ON
0186 D5                 MOTOR:  PUSH  DE
0187 C5                         PUSH  BC
0188 E5                         PUSH  HL
0189 DBE1                       IN    A,(E1H)
018B E620                       AND   20H
018D 281F                       JR    Z,MOTRD
018F 21AB02                     LD    HL,MES6
0192 1E0A                       LD    E,AH
0194 0E0E                       LD    C,14D
0196 CD4602                     CALL  DISP
0199 CDC201                     CALL  OPEN
019C DBEA               MOT1:   IN    A,(EAH)
019E 2F                         CPL
019F 07                         RLCA
01A0 380F                       JR    C,MOTR
01A2 DBE1                       IN    A,(E1H)
01A4 E620                       AND   20H
01A6 20F4                       JR    NZ,MOT1
01A8 CDCE01                     CALL  KYEMES
01AB CD2302                     CALL  DEL1M
01AE CDD901             MOTRD:  CALL  PLAY
01B1 E1                 MOTR:   POP   HL
01B2 C1                         POP   BC
01B3 D1                         POP   DE
01B4 C9                         RET
01B5                    ;
01B5                    ;
01B5                    ;MOTOR STOP
01B5 3E0D               MSTOP:  LD    A,0DH
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01B7 D3E3                       OUT     (E3H),A         ;READ MODE
01B9 3E1A                       LD      A,1AH
01BB D3E0                       OUT     (E0H),A
01BD CD1D02                     CALL    DEL6
01C0 182D                       JR      BLK3
01C2                    ;EJECT
01C2 3E08               OPEN:   LD      A,08H
01C4 D3E3                       OUT     (E3H),A
01C6 CD1D02                     CALL    DEL6
01C9 3E09                       LD      A,09H
01CB D3E3                       OUT     (E3H),A
01CD C9                         RET
01CE                    ;
01CE                    ;
01CE 216F02             KYEMES: LD      HL,MES3
01D1 1E04                       LD      E,4H
01D3 0E1C                       LD      C,28D
01D5 CD4602                     CALL    DISP
01D8 C9                         RET
01D9                    ;
01D9                    ;PLAY
01D9 CDF401             PLAY:   CALL    FR
01DC CD1D02                     CALL    DEL6
01DF 3E16                       LD      A,16H
01E1 D3E0                       OUT     (E0H),A
01E3 180A                       JR      BLK3
01E5 CD1D02             BLK1:   CALL    DEL6
01E8 CDEF01                     CALL    BLK3
01EB 3E13                       LD      A,13H
01ED D3E0               BLK2:   OUT     (E0H),A
01EF 3E12               BLK3:   LD      A,12H
01F1 D3E0                       OUT     (E0H),A
01F3 C9                         RET
01F4                    ;
01F4                    ;
01F4 3E12               FR:     LD      A,12H
01F6 D3E0               FR1:    OUT     (E0H),A
01F8 CD1D02                     CALL    DEL6
01FB 3E0B                       LD      A,0BH
01FD D3E3                       OUT     (E3H),A
01FF CD1D02                     CALL    DEL6
0202 3E0A                       LD      A,0AH
0204 D3E3                       OUT     (E3H),A
0206 C9                         RET
0207 3E10               RR:     LD      A,10H
0209 18EB                       JR      FR1
020B                    ;REWIND
020B CD0702             REW:    CALL    RR
020E 18D5                       JR      BLK1
0210                    ;
0210                    ;TIMING DEL
0210 F5                 D1M:    PUSH    AF
0211 AF                         XOR     A
0212 3D                         DEC     A
0213 20FD                       JR      NZ,-1
0215 0B                         DEC     BC
0216 78                         LD      A,B
0217 B1                         OR      C
0218 20F7                       JR      NZ,D1M+1
021A F1                         POP     AF
021B C1                         POP     BC
021C C9                         RET
021D C5                 DEL6:   PUSH    BC
021E 01E900                     LD      BC,233
0221 18ED                       JR      D1M
0223 C5                 DEL1M:  PUSH    BC
0224 010F06                     LD      BC,1551
0227 18E7                       JR      D1M
0229                    ;
0229                    ;TAPE DELY TIMING
```

```
0229                    ;
0229                    ;
0229 3E31               DLY2:   LD      A,31H
022B 3D                         DEC     A
022C C22B02                     JP      NZ,DLY2+2
022F C9                         RET
0230                    ;
0230                    ;
0230                    ;
0230                    ;;;;;;;;;;;;;;;;;;;;;;;;
0230  P                 IBUFE:  EQU     CF00H
0230  P                 ATRB:   EQU     CF00H
0230  P                 NAME:   EQU     CF01H
0230  P                 SIZE:   EQU     CF12H
0230  P                 DTADR:  EQU     CF14H
0230  P                 SUMDT:  EQU     FFE0H
0230  P                 TMCNT:  EQU     FFE2H
0230                    ;;;;;;;;;;;;;;;;;;;;;;;;
0230'                   ;
0230 216102             LDMSG:  LD      HL,MES1
0233 1E00                       LD      E,0H
0235 0E0E                       LD      C,14D
0237 180D                       JR      DISP
0239                    ;
0239 3E93               DISP2:  LD      A,93H
023B D3E8                       OUT     (E8H),A
023D 1817                       JR      DISP1
023F                    ;
023F 219902             BOOTER: LD      HL,MES8
0242 1E0A                       LD      E,AH
0244 0E0D                       LD      C,13D
0246                    ;
0246 3E93               DISP:   LD      A,93H
0248 D3E8                       OUT     (E8H),A
024A D9                         EXX
024B 2100D0                     LD      HL,D000H
024E 3600               DISP3:  LD      (HL),00H
0250 23                         INC     HL
0251 7C                         LD      A,H
0252 B5                         OR      L
0253 20F9                       JR      NZ,DISP3
0255 D9                         EXX
0256 AF                 DISP1:  XOR     A
0257 47                         LD      B,A
0258 16D0                       LD      D,D0H
025A EDB0                       LDIR
025C 3E13                       LD      A,13H
025E D3E8                       OUT     (E8H),A
0260 C9                         RET
0261                    ;
0261                    ;
0261 49504C20           MES1:   DEFM    'IPL is loading'
0265 6973206C
0269 6F616469
026D 6E67
026F 49504C20           MES3:   DEFM    'IPL is looking for a program'
0273 6973206C
0277 6F6F6B69
027B 6E672066
027F 6F722061
0283 2070726F
0287 6772616D
028B 4D616B65           MES6:   DEFM    'Make ready CMT'
028F 20726561
0293 64792043
0297 4D54
0299 4C6F6164           MES8:   DEFM    'Loading error'
029D 696E6720
02A1 6572726F
02A5 72
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02A6 4D616B65          MES9:   DEFM  'Make ready FD'
02AA 20726561
02AE 64792046
02B2 44
02B3 50726573          MES10:  DEFM  'Press F or C'
02B7 73204620
02BB 6F722043
02BF 463A466C          MES11:  DEFM  'F:Floppy diskette'
02C3 6F707079
02C7 20646973
02CB 6B657474
02CF 65
02D0 433A4361          MES12:  DEFM  'C:Cassette tape'
02D4 73736574
02D8 74652074
02DC 617065
02DF 44726976          MES13:  DEFM  'Drive No? (1-4)'
02E3 65204E6F
02E7 3F202831
02EB 2D3429
02EE 54686973          MES14:  DEFM  'This diskette is not master'
02F2 20646973
02F6 6B657474
02FA 65206973
02FE 206E6F74
0302 206D6173
0306 746572
0309 50726573          MES15:  DEFM  'Pressing S key starts the CMT'
030D 73696E67
0311 20532068
0315 65792073
0319 74617274
031D 73207468
0321 6520434D
0325 54
0326 46696C65          MES16:  DEFM  'File mode error'
032A 206D6F64
032E 65206572
0332 726F72
0335                   ;
0335 01                IPLMC:  DEFB  01H
0336 49504C50                  DEFM  'IPLPRO'
033A 524F
033C                   ;
033C                   ;
033C                   ;
033C                   ;;;;;;;;;;;;;;;;;;;;;;;;;;;
033C                   ;                         ;
033C                   ;  MFM MINIFLOPPY CONTROL  ;
033C                   ;                         ;
033C                   ;;;;;;;;;;;;;;;;;;;;;;;;;;;
033C                   ;
033C                   ;  CASE OF DISK INITIALIZE
033C                   ;     DRIVE NO=DRINO (0-3)
033C                   ;
033C                   ;  CASE OF SEQUENTIAL READ
033C                   ;     DRIVE NO=DRINO (0-3)
033C                   ;     BYTE SIZE      =IY+2,3
033C                   ;     ADDRESS        =IX+0,1
033C                   ;     NEXT TRACK     =IY+0
033C                   ;     NEXT SECTOR    =IY+1
033C                   ;     START TRACK    =IY+4
033C                   ;     START SECTOR   =IY+5
033C                   ;
033C                   ;
033C                   ; I/O PORT ADDRESS
033C                   ;
033C  P                CR:     EQU   D8H              ;STATUS/COMAND PORT
033C  P                TR:     EQU   D9H              ;TRACK REG PORT
033C  P                SCR:    EQU   DAH              ;SECTOR REG PORT
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033C  P             DR:     EQU   DBH            ;DATA REG PORT
033C  P             DM:     EQU   DCH            ;MOTOR/DRIVE PORT
033C  P             HS:     EQU   DDH            ;HEAD SIDE SELECT PORT
033C                ;
033C                ;;;;;;;;;;
033C                ;FD
033C DD2100CF       FD:     LD    IX,IBADR1
0340 AF                     XOR   A
0341 321ECF                 LD    (CF1EH),A
0344 321FCF                 LD    (CF1FH),A
0347 FD21E0FF               LD    IY,FFE0H
034B 210001                 LD    HL,0100H
034E FD7502                 LD    (IY+2),L
0351 FD7403                 LD    (IY+3),H
0354 CD7A04                 CALL  BREAD          ;INFORMATION INPUT
0357 2100CF                 LD    HL,CF00H       ;MASTER CHECK
035A 113503                 LD    DE,IPLMC
035D 0606                   LD    B,6
035F 4E             MCHECK: LD    C,(HL)
0360 1A                     LD    A,(DE)
0361 B9                     CP    C
0362 C24A05                 JP    NZ,NMASTE
0365 23                     INC   HL
0366 13                     INC   DE
0367 10F6                   DJNZ  MCHECK
0369 CD3002                 CALL  LDMSG
036C 2107CF                 LD    HL,CF07H
036F 1E10                   LD    E,10H
0371 0E0A                   LD    C,AH
0373 CD3902                 CALL  DISP2
0376 DD210080               LD    IX,IBADR2
037A 2A14CF                 LD    HL,(CF14H)
037D FD7502                 LD    (IY+2),L
0380 FD7403                 LD    (IY+3),H
0383 CD7A04                 CALL  BREAD
0386 CDF303                 CALL  MOFF
0389 C30200                 JP    NST
038C                ;
038C                ;
038C 21A602         NODISK: LD    HL,MES9
038F 1E0A                   LD    E,AH
0391 0E0D                   LD    C,DH
0393 CD4602                 CALL  DISP
0396 C35905                 JP    ERROR1
0399                ;
0399                ; READY CHECK
0399                ;
0399                READY:  ENT
0399 3AE6FF                 LD    A,(MTFG)
039C 0F                     RRCA
039D D4CC03                 CALL  NC,MTON
03A0 3AECFF                 LD    A,(DRINO)      ;DRIVE NO GET
03A3 F604                   OR    04H
03A5 D3DC                   OUT   (DM),A         ;DRIVE SELECT MOTON
03A7 AF                     XOR   A
03A8 CDE405                 CALL  DLY60M
03AB 210000                 LD    HL,00H
03AE 2B             REDY0:  DEC   HL
03AF 7C                     LD    A,H
03B0 B5                     OR    L
03B1 28D9                   JR    Z,NODISK
03B3 DBD8                   IN    A,(CR)         ;STATUS GET
03B5 2F                     CPL
03B6 07                     RLCA
03B7 38F5                   JR    C,REDY0
03B9 3AECFF                 LD    A,(DRINO)
03BC 4F                     LD    C,A
03BD 21E7FF                 LD    HL,CLBF0
03C0 0600                   LD    B,00H
03C2 09                     ADD   HL,BC
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```
03C3 CB46                       BIT   0,(HL)
03C5 C0                         RET   NZ
03C6 CD0904                     CALL  RCLB
03C9 CBC6                       SET   0,(HL)
03CB C9                         RET
03CC                    ;
03CC                    ; MOTOR ON
03CC                    ;
03CC                    MTON:   ENT
03CC 3E80                       LD    A,80H
03CE D3DC                       OUT   (DM),A
03D0 060A                       LD    B,10              ; 1SEC DELAY
03D2 21193C             MTD1:   LD    HL,3C19H
03D5 2B                 MTD2:   DEC   HL
03D6 7D                         LD    A,L
03D7 B4                         OR    H
03D8 20FB                       JR    NZ,MTD2
03DA 10F6                       DJNZ  MTD1
03DC 3E01                       LD    A,1
03DE 32E6FF                     LD    (MTFG),A
03E1 C9                         RET
03E2                    ;
03E2                    ;SEEK TREATMENT
03E2                    ;
03E2                    SEEK:   ENT
03E2 3E1B                       LD    A,1BH
03E4 2F                         CPL
03E5 D3D8                       OUT   (CR),A
03E7 CD2104                     CALL  BUSY
03EA CDE405                     CALL  DLY60M
03ED DBD8                       IN    A,(CR)
03EF 2F                         CPL
03F0 E699                       AND   99H
03F2 C9                         RET
03F3                    ;
03F3                    ;MOTOR OFF
03F3                    ;
03F3                    MOFF:   ENT
03F3 CDDD05                     CALL  DLY1M             ;1000US DELAY
03F6 AF                         XOR   A
03F7 D3DC                       OUT   (DM),A
03F9 32E7FF                     LD    (CLBF0),A
03FC 32E8FF                     LD    (CLBF1),A
03FF 32E9FF                     LD    (CLBF2),A
0402 32EAFF                     LD    (CLBF3),A
0405 32E6FF                     LD    (MTFG),A
0408 C9                         RET
0409                    ;
0409                    ;RECALIBLATION
0409                    ;
0409                    RCLB:   ENT
0409 E5                         PUSH  HL
040A 3E0B                       LD    A,0BH
040C 2F                         CPL
040D D3D8                       OUT   (CR),A
040F CD2104                     CALL  BUSY
0412 CDE405                     CALL  DLY60M
0415 DBD8                       IN    A,(CR)
0417 2F                         CPL
0418 E685                       AND   85H
041A EE04                       XOR   04H
041C E1                         POP   HL
041D C8                         RET   Z
041E C35605                     JP    ERROR
0421                    ;
0421                    ;BUSY AND WAIT
0421                    ;
0421                    BUSY:   ENT
0421 D5                         PUSH  DE
0422 E5                         PUSH  HL
```

```
0423 CDD605                     CALL   DLY80U
0426 1E07                       LD     E,7
0428 210000             BUSY2:  LD     HL,00H
042B 2B                 BUSY0:  DEC    HL
042C 7C                         LD     A,H
042D B5                         OR     L
042E 2809                       JR     Z,BUSY1
0430 DBD8                       IN     A,(CR)
0432 2F                         CPL
0433 0F                         RRCA
0434 38F5                       JR     C,BUSY0
0436 E1                         POP    HL
0437 D1                         POP    DE
0438 C9                         RET
0439 1D                 BUSY1:  DEC    E
043A 20EC                       JR     NZ,BUSY2
043C C35605                     JP     ERROR
043F                    ;
043F                    ;DATA CHECK
043F                    ;
043F 0600               CONVRT: LD     B,0
0441 111000                     LD     DE,16
0444 2A1ECF                     LD     HL,(CF1EH)
0447 AF                         XOR    A
0448 ED52               TRANS:  SBC    HL,DE
044A 3803                       JR     C,TRANS1
044C 04                         INC    B
044D 18F9                       JR     TRANS
044F 19                 TRANS1: ADD    HL,DE
0450 60                         LD     H,B
0451 2C                         INC    L
0452 FD7404                     LD     (IY+4),H
0455 FD7505                     LD     (IY+5),L
0458 3AECFF             DCHK:   LD     A,(DRINO)
045B FE04                       CP     4
045D 3018                       JR     NC,DTCK1
045F FD7E04                     LD     A,(IY+4)
0462 FE46                       CP     70
0464 3011                       JR     NC,DTCK1
0466 FD7E05                     LD     A,(IY+5)
0469 B7                         OR     A
046A 280B                       JR     Z,DTCK1
046C FE11                       CP     17
046E 3007                       JR     NC,DTCK1
0470 FD7E02                     LD     A,(IY+2)
0473 FDB603                     OR     (IY+3)
0476 C0                         RET    NZ
0477 C35605             DTCK1:  JP     ERROR
047A                    ;
047A                    ;SEQENTIAL READ
047A                    ;
047A                    BREAD:  ENT
047A F3                         DI
047B CD3F04                     CALL   CONVRT
047E 3E0A                       LD     A,10
0480 32EBFF                     LD     (RETRV),A
0483 CD9903             READ1:  CALL   READY
0486 FD5603                     LD     D,(IY+3)
0489 FD7E02                     LD     A,(IY+2)
048C B7                         OR     A
048D 2801                       JR     Z,RE0
048F 14                         INC    D
0490 FD7E05             RE0:    LD     A,(IY+5)
0493 FD7701                     LD     (IY+1),A
0496 FD7E04                     LD     A,(IY+4)
0499 FD7700                     LD     (IY+0),A
049C DDE5                       PUSH   IX
049E E1                         POP    HL
049F CB3F               RE8:    SRL    A
04A1 2F                         CPL
```

```
04A2 D3DB                    OUT   (DR),A
04A4 3004                    JR    NC,RE1
04A6 3E01                    LD    A,01H
04A8 1802                    JR    RE2
04AA 3E00              RE1:  LD    A,00
04AC 2F                RE2:  CPL
04AD D3DD                    OUT   (HS),A
04AF CDE203                  CALL  SEEK
04B2 206A                    JR    NZ,REE
04B4 0EDB                    LD    C,DBH
04B6 FD7E00                  LD    A,(IY+0)
04B9 CB3F                    SRL   A
04BB 2F                      CPL
04BC D3D9                    OUT   (TR),A
04BE FD7E01                  LD    A,(IY+1)
04C1 2F                      CPL
04C2 D3DA                    OUT   (SCR),A
04C4 D9                      EXX
04C5 21F704                  LD    HL,RE3
04C8 E5                      PUSH  HL
04C9 D9                      EXX
04CA 3E94                    LD    A,94H            ;READ & CMD
04CC 2F                      CPL
04CD D3D8                    OUT   (CR),A
04CF CD2D05                  CALL  WAIT
04D2 0600              RE6:  LD    B,00H
04D4 DBD8              RE4:  IN    A,(CR)
04D6 0F                      RRCA
04D7 D8                      RET   C
04D8 0F                      RRCA
04D9 38F9                    JR    C,RE4
04DB EDA2                    INI
04DD 20F5                    JR    NZ,RE4
04DF FD3401                  INC   (IY+1)
04E2 FD7E01                  LD    A,(IY+1)
04E5 FE11                    CP    17
04E7 2805                    JR    Z,RETS
04E9 15                      DEC   D
04EA 20E6                    JR    NZ,RE6
04EC 1801                    JR    RE5
04EE 15                RETS: DEC   D
04EF 3ED8              RE5:  LD    A,D8H            ;FORCE INTER RUPT
04F1 2F                      CPL
04F2 D3D8                    OUT   (CR),A
04F4 CD2104                  CALL  BUSY
04F7 DBD8              RE3:  IN    A,(CR)
04F9 2F                      CPL
04FA E6FF                    AND   FFH
04FC 2020                    JR    NZ,REE
04FE D9                      EXX
04FF E1                      POP   HL
0500 D9                      EXX
0501 FD7E01                  LD    A,(IY+1)
0504 FE11                    CP    17
0506 2008                    JR    NZ,REX
0508 3E01                    LD    A,01H
050A FD7701                  LD    (IY+1),A
050D FD3400                  INC   (IY+0)
0510 7A                REX:  LD    A,D
0511 B7                      OR    A
0512 2005                    JR    NZ,RE7
0514 3E80                    LD    A,80H
0516 D3DC                    OUT   (DM),A
0518 C9                      RET
0519 FD7E00            RE7:  LD    A,(IY+0)
051C 1881                    JR    RE8
051E 3AEBFF            REE:  LD    A,(RETRY)
0521 3D                      DEC   A
0522 32EBFF                  LD    (RETRY),A
0525 282F                    JR    Z,ERROR
```

```
0527 CD0904                     CALL   RCLB
052A C38304                     JP     READ1
052D                    ;
052D                    ; WAIT AND BUSY OFF
052D                    ;
052D D5                 WAIT:   PUSH   DE
052E E5                         PUSH   HL
052F CDD605                     CALL   DLY80U
0532 1E08                       LD     E,8
0534 210000             WAIT2:  LD     HL,00H
0537 2B                 WAIT0:  DEC    HL
0538 7C                         LD     A,H
0539 B5                         OR     L
053A 2809                       JR     Z,WAIT1
053C DBD8                       IN     A,(CR)
053E 2F                         CPL
053F 0F                         RRCA
0540 30F5                       JR     NC,WAIT0
0542 E1                         POP    HL
0543 D1                         POP    DE
0544 C9                         RET
0545 1D                 WAIT1:  DEC    E
0546 20EC                       JR     NZ,WAIT2
0548 180C                       JR     ERROR
054A                    ;
054A 21EE02             NMASTE: LD     HL,MES14
054D 1E07                       LD     E,7H
054F 0E1B                       LD     C,27D
0551 CD4602                     CALL   DISP
0554 1803                       JR     ERROR1
0556                    ;
0556                    ;;;;;;;;;;;;;;;;;;;;;;;;;
0556                    ;                       ;
0556                    ;   ERROR OR BREAK       ;
0556                    ;                       ;
0556                    ;;;;;;;;;;;;;;;;;;;;;;;;;
0556 CD3F02             ERROR:  CALL   BOOTER
0559 CDF303             ERROR1: CALL   MOFF
055C 31E0FF             TRYAG2: LD     SP,FFE0H
055F                    ;
055F                    ;TRYAG
055F                    ;
055F CD5F00             TRYAG:  CALL   FDCC
0562 2047                       JR     NZ,TRYAG3
0564 21E302                     LD     HL,MES10
0567 1E5A                       LD     E,5AH
0569 0E0C                       LD     C,12D
056B CD3902                     CALL   DISP2
056E 1EAB                       LD     E,ABH
0570 0E11                       LD     C,17D
0572 CD3902                     CALL   DISP2
0575 1ED3                       LD     E,D3H
0577 0E0F                       LD     C,15D
0579 CD3902                     CALL   DISP2
057C CD4B00             TRYAG1: CALL   KEYS1
057F CB5F                       BIT    3,A
0581 CA6B00                     JP     Z,CMT
0584 CB77                       BIT    6,A
0586 2802                       JR     Z,DNO
0588 18F2                       JR     TRYAG1
058A 21DF02             DNO:    LD     HL,MES13         ;DRIVE NO SELECT
058D 1E0A                       LD     E,AH
058F 0E0F                       LD     C,FH
0591 CD4602                     CALL   DISP
0594 1612               DNO10:  LD     D,12H
0596 CDC105                     CALL   DNO0
0599 3009                       JR     NC,DNO3
059B 1618                       LD     D,18H
059D CDC105                     CALL   DNO0
05A0 3002                       JR     NC,DNO3
```

```
05A2 18F0                       JR      DNO10
05A4 78                 DNO3:   LD      A,B
05A5 32ECFF                     LD      (DRINO),A
05A8 C33C03                     JP      FD
05AB                    ;
05AB 210903             TRYAG3: LD      HL,MES15
05AE 1E54                       LD      E,54H
05B0 0E1D                       LD      C,29
05B2 CD3902                     CALL    DISP2
05B5 0606               TRYAG4: LD      B,6
05B7 CD4D00             TRYAG5: CALL    KEYS
05BA CB5F                       BIT     3,A
05BC CA6B00                     JP      Z,CMT
05BF 18F6                       JR      TRYAG5
05C1                    ;
05C1 DBE8               DNO0:   IN      A,(E8H)
05C3 E6F0                       AND     F0H
05C5 B2                         OR      D
05C6 D3E8                       OUT     (E8H),A
05C8 DBEA                       IN      A,(EAH)
05CA 0600                       LD      B,0
05CC 0E04                       LD      C,4
05CE 0F                         RRCA
05CF 0F                 DNO1:   RRCA
05D0 D0                         RET     NC
05D1 04                         INC     B
05D2 0D                         DEC     C
05D3 20FA                       JR      NZ,DNO1
05D5 C9                         RET
05D6                    ;
05D6                    ;  TIME DELAY (1M &60M &80U )
05D6                    ;
05D6 D5                 DLY80U: PUSH    DE
05D7 110D00                     LD      DE,13
05DA C3E805                     JP      DLYT
05DD D5                 DLY1M:  PUSH    DE
05DE 118200                     LD      DE,130D
05E1 C3E805                     JP      DLYT
05E4 D5                 DLY60M: PUSH    DE
05E5 112C1A                     LD      DE,6700
05E8 1B                 DLYT:   DEC     DE
05E9 7B                         LD      A,E
05EA B2                         OR      D
05EB 20FB                       JR      NZ,DLYT
05ED D1                         POP     DE
05EE C9                         RET
05EF                    ;
05EF                    ;;;;;;;;;;;;;;;;;;;;;;;;
05EF                    ;INPUT BUFFER ADDRESS
05EF                    ;
05EF  P                 IBADR1: EQU     CF00H
05EF  P                 IBADR2: EQU     8000H
05EF                    ;
05EF                    ;   SUBROUTINE WORK
05EF                    ;
05EF  P                 NTRACK: EQU     FFE0H
05EF  P                 NSECT:  EQU     FFE1H
05EF  P                 BSIZE:  EQU     FFE2H
05EF  P                 STTR:   EQU     FFE4H
05EF  P                 STSE:   EQU     FFE5H
05EF  P                 MTFG:   EQU     FFE6H
05EF  P                 CLBF0:  EQU     FFE7H
05EF  P                 CLBF1:  EQU     FFE8H
05EF  P                 CLBF2:  EQU     FFE9H
05EF  P                 CLBF3:  EQU     FFEAH
05EF  P                 RETRY:  EQU     FFEBH
05EF  P                 DRINO:  EQU     FFECH
05EF                    ;
05EF                    ;;;;;;;;;;;;;;;;;;;;
05EF                    ;                   ;
```

```
05EF                    ;    INTRAM-EXROM    ;
05EF                    ;                    ;
05EF                    ;;;;;;;;;;;;;;;;;;;;
05EF 210080             EXROMT: LD     HL,8000H
05F2 DD21F805                   LD     IX,EROM1
05F6 181A                       JR     SEROMA
05F8 DBF9               EROM1:  IN     A,(F9H)
05FA FE00                       CP     00H
05FC C25700                     JP     NZ,NKIN
05FF DD210506                   LD     IX,EROM2
0603 180D               EROMT1: JR     SEROMA
0605 DBF9               EROM2:  IN     A,(F9H)
0607 77                         LD     (HL),A
0608 23                         INC    HL
0609 7D                         LD     A,L
060A B4                         OR     H
060B 20F6                       JR     NZ,EROMT1
060D D3F8                       OUT    (F8H),A
060F C30200                     JP     NST
0612                    ;
0612 7C                 SEROMA: LD     A,H
0613 D3F8                       OUT    (F8H),A
0615 7D                         LD     A,L
0616 D3F9                       OUT    (F9H),A
0618 1604                       LD     D,4
061A 15                 SEROMD: DEC    D
061B 20FD                       JR     NZ,SEROMD
061D DDE9                       JP     (IX)
061F                    ;
061F                    ;
061F                            END
```

?RDD	00CF	?RDI	00AE	ATRB	CF00	BLK1	01E5	BLK2	01ED
BLK3	01EF	BOOTER	023F	BREAD	047A	BSIZE	FFE2	BUSY	0421
BUSY0	042B	BUSY1	0439	BUSY2	0428	CLBF0	FFE7	CLBF1	FFE8
CLBF2	FFE9	CLBF3	FFEA	CLEAR	002B	CMT	006B	CONVRT	043F
CR	00D8	D1M	0210	DCHK	0458	DEL1M	0223	DEL6	021D
DISP	0246	DISP1	0256	DISP2	0239	DISP3	024E	DLY1M	05DD
DLY2	0229	DLY60M	05E4	DLY80U	05D6	DLYT	05E8	DM	00DC
DNO	058A	DNO0	05C1	DNO1	05CF	DNO10	0594	DNO3	05A4
DR	00DB	DRINO	FFEC	DTADR	CF14	DTCK1	0477	EDGE	0121
EDGE1	0129	EIRTN	00CD	EROM1	05F8	EROM2	0605	EROMT1	0603
ERROR	0556	ERROR1	0559	EXROMT	05EF	FD	033C	FDCC	005F
FR	01F4	FR1	01F6	HS	00DD	IBADR1	CF00	IBADR2	8000
IBUFE	CF00	IPLMC	0335	KEYIN	003D	KEYS	004D	KEYS1	004B
KYEMES	01CE	LDMSG	0230	MCHECK	035F	MES1	0261	MES10	02B3
MES11	02BF	MES12	02D0	MES13	02DF	MES14	02EE	MES15	0309
MES16	0326	MES3	026F	MES6	028B	MES8	0299	MES9	02A6
MISMCH	009E	MOFF	03F3	MOT1	019C	MOTOR	0186	MOTR	01B1
MOTRD	01AE	MSTOP	01B5	MTD1	03D2	MTD2	03D5	MTFG	FFE6
MTON	03CC	NAME	CF01	NKIN	0057	NMASTE	054A	NODISK	038C
NSECT	FFE1	NST	0002	NTRACK	FFE0	OPEN	01C2	PLAY	01D9
RBY1	0136	RBY2	0147	RBY3	0150	RBYTE	0132	RCLB	0409
RD1	00B7	RDDAT	00CF	RDINF	00AE	RE0	0490	RE1	04AA
RE2	04AC	RE3	04F7	RE4	04D4	RE5	04EF	RE6	04D2
RE7	0519	RE8	049F	READ1	0483	READY	0399	REDY0	03AE
REE	051E	RET2S	00C6	RETRY	FFEB	RETS	04EE	REW	020B
REX	0510	RR	0207	RTAPE	00DB	RTP2	00E0	RTP3	00F2
RTP5	0113	RTP6	0119	SCR	00DA	SEEK	03E2	SEROMA	0612
SEROMD	061A	SIZE	CF12	SPDIN	017A	ST1	0090	START	0006
STPEIR	00CA	STSE	FFE5	STTR	FFE4	SUMDT	FFE0	TM0	015B
TM1	015E	TM2	0161	TM3	016B	TMARK	0152	TMCNT	FFE2
TR	00D9	TRANS	0448	TRANS1	044F	TRTN1	011D	TRYAG	055F
TRYAG1	057C	TRYAG2	055C	TRYAG3	05AB	TRYAG4	0585	TRYAG5	05D7
WAIT	052D	WAIT0	0537	WAIT1	0545	WAIT2	0534		