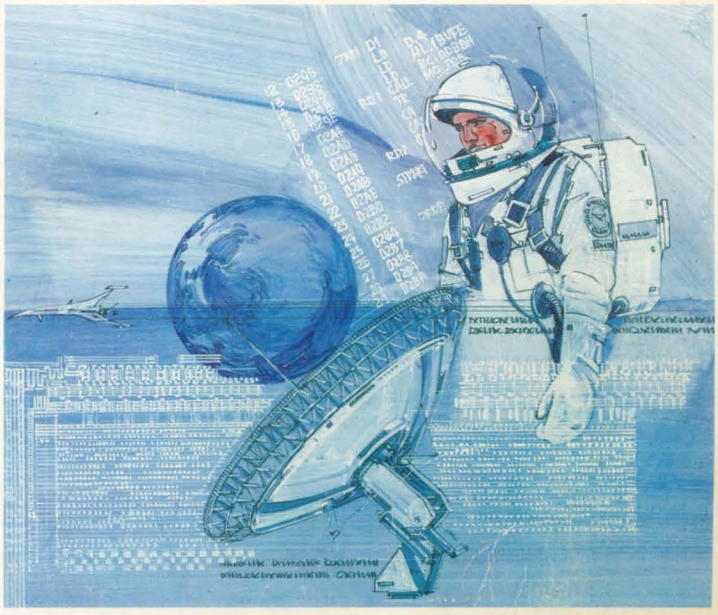
Personal Computer

MZ-80B

MONITOR SB-1510
REFERENCE MANUAL



SHARP

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Personal Computer

MZ-80B

Monitor SB-1510 Reference Manual

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NOTICE

This manual is applicable to the MONITOR SB-1510 system software used with the SHARP MZ-80B Personal Computer. The MZ-80B general-purpose personal computer is supported by system software which is filed in software packs (cassettes and diskettes).

All system software is subject to revision without prior notice; therefore, you are requested to pay special attention to their file version numbers.

This manual has been carefully prepared and checked for completeness, accuracy and clarity. However, in the event that you should notice any errors or ambiguities, please feel free to contact your local Sharp representative for clarification.

Introduction

This manual describes commands and subroutines of standard system software MONITOR SB-1510 for the Sharp MZ-80B and procedures for coding machine language programs and generating data.

MONITOR SB-1510 is part of the system software for the MZ-80B and it acts mainly as the monitor program for BASIC SB-5510, DISK BASIC SB-6510 and Double Precision DISK BASIC SB-6710. Further, MONITOR SB-1510 can be used as a machine language monitor by transferring system control to it. With this feature, you can not only code and debug machine language programs but also generate system programs of your own.

This manual includes all MONITOR SB-1510 assembly listings for reference.

Contents

Chapter 1

MONITOR SB-1510 Commands and Subroutines

This chapter describes six commands executed at the monitor command level and monitor subroutines enables the user to generate, execute and/or file a simple machine language program; that is, to operate the MZ-80B at the CPU level. Machine language programs generated can be linked with other BASIC programs with the USR function of the BASIC language.

1.1 Function of the monitor program

A Monitor program generally monitors system programs such as the BASIC interpreter. The MZ-80B uses a Monitor program called MONITOR SB-1510. It includes various functional subroutines which control the keyboard, display, sound circuit, cassette tape deck, etc. These subroutines are called by the BASIC interpreter when it executes INPUT statement, SAVE command, MUSIC statement or other commands or statements. Monitor subroutines may also be called by the user at will.

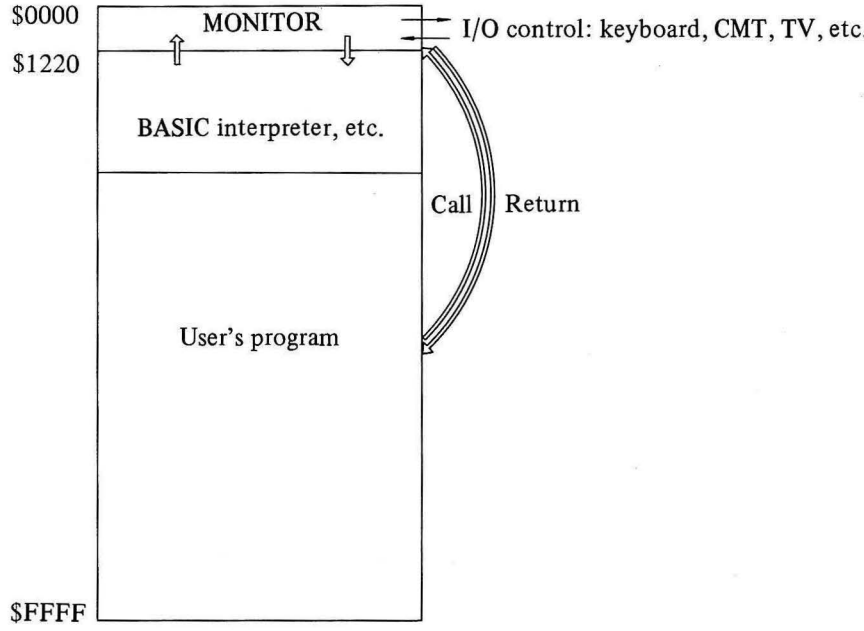


FIGURE 1.1 Monitor subroutine call

MONITOR SB-1510 occupies 4.5K bytes of memory and is stored in memory addresses $0000 through $121F. Its required work area is included within this area. Therefore, MONITOR SB-1510 can be used as an individual system program. That is, it can perform the following functions in addition to system monitoring.

- It generates, executes and files machine language programs using 6 monitor commands:

  M : Memory correction
  D : Memory dump
  J : Jump
  S : Save
  V : Verify
  L : Load

- Since MONITOR SB-1510 is stored in RAM, its contents may be varied with commands. For example, the contents of $0000 - $0038 and $0066, which are called when processing an interrupt, can be changed at will or the function of a monitor subroutine can be modified.
  Programs may be freely written on cassette tape, so a machine language program including MONITOR SB-1510 can be filed for future use. See the assembly listing for MONITOR SB-1510 in Appendix A.3.

To use monitor commands, system control must be transferred to the Monitor from the BASIC interpreter or other system program.

- To transfer system control from the BASIC interpreter to the Monitor, execute a MON command.
- To transfer system control from the Assembler or Linker† to the Monitor, execute a ! command.
- To transfer system control from the PASCAL interpreter†† to the Monitor, execute an editor command, Q/.

FIGURE 1.2 shows a display flame when a BASIC command MON is executed. After the MON command has been executed, the cursor moves to the next line, an asterisk at the beginning of the new line and the cursor flickers to inform the operator that system control has been transferred to the Monitor.

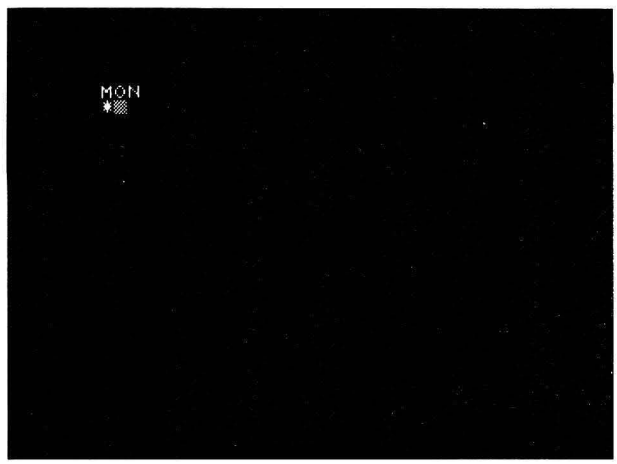


FIGURE 1.2 Execution of a BASIC command MON

†. ††. Refer to the Assembler, Linker and PASCAL interpreter manuals.

1.2 Using monitor commands

General conventions for use of Monitor commands are as follows:

- Commands and data are input from the keyboard with the [CR] key pressed to conclude the entry.
- Data display and input are in hexadecimal. One byte of data consists of two hexadecimal digits and an address consists of four hexadecimal digits.
- When the number of characters input firm the keyboard exceeds the number the required by the Monitor program, the excess are ignored.
- To cancel execution of a command, press the [BREAK] key.
- Every command can access any memory location, allowing a wide range of applications, but special care must be taken not to destroy required data or a program.

1.2.1 M command

Function : Corrects the contents of the specified memory address.
Operation : When a M command is entered, the display is as shown in FIGURE 1.3.

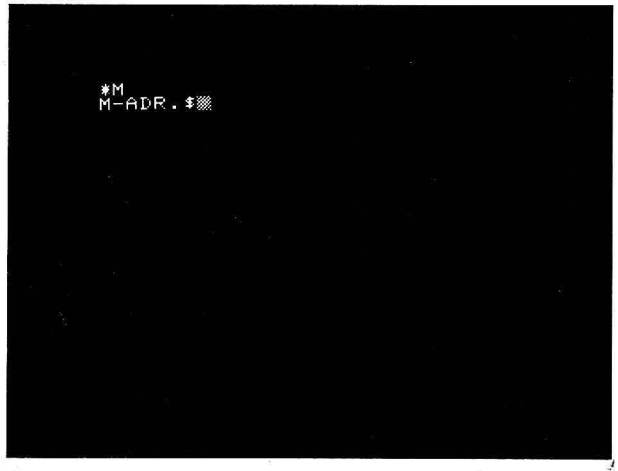


FIGURE 1.3

In this case, the Monitor requests the operator to enter the address at which memory correction is to start.

For example, let memory correction start at memory address $70A0. Enter **70A0** from the keyboard, then press the [CR] key. The display is as shown in FIGURE 1.4.

FIGURE 1.4

The monitor program displays the contents, $00, of memory address $70A0 and requests the operator to determine whether or not the contents of $70A0 are to be corrected. To correct them, enter two hexadecimal digits, from of 00 to FF, at the cursor position from the keyboard. For example, to change the contents of $70A0 from $00 to $C9 (operation code of the RET command), enter "C9", then press the [CR] key.

The monitor program then corrects the contents of the memory address and the display is as shown in FIGURE 1.5.

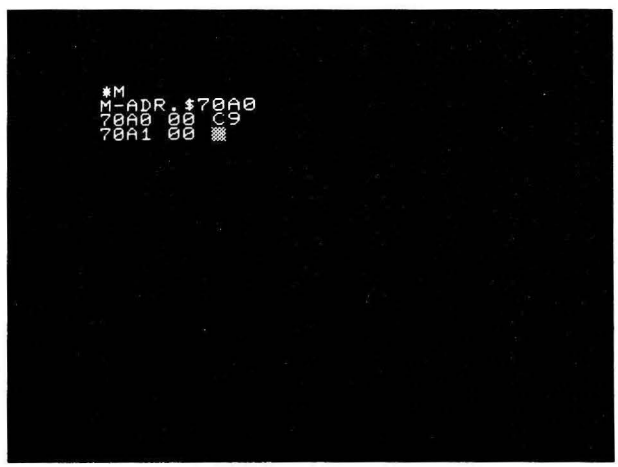


FIGURE 1.5

In this case, the monitor program requests the operator to determine whether or not the next address contents are to be corrected. When correction is not required, press the [CR] key. The display then indicates the next address. For example, when the [CR] key is pressed when the display is as shown in FIGURE 1.5, the display changes as shown in FIGURE 1.6.

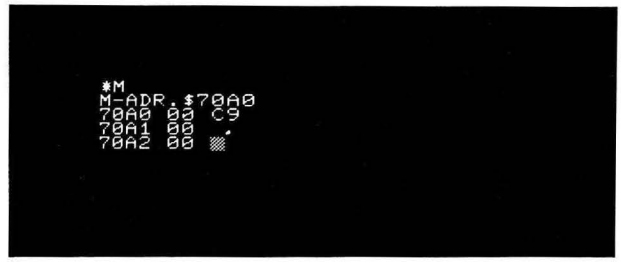


FIGURE 1.6

When any characters other than hexadecimal digits are entered from the keyboard, the monitor program requests the operator to enter a new memory address. FIGURE 1.7 shows the display as it appears when "S" is entered from the keyboard.

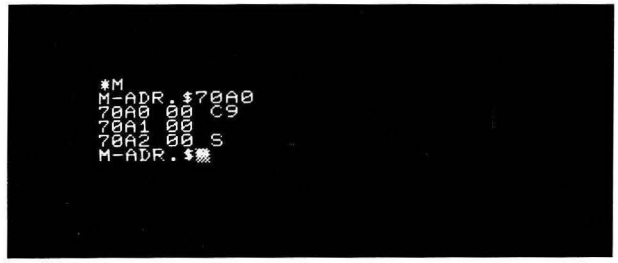


FIGURE 1.7

Now, enter "70A0" to determine whether the contents of the memory addresses starting at $70A0 have been properly corrected. The display will be as shown in FIGURE 1.8.†

FIGURE 1.8

To cancel the M command to return to the monitor command level, press the [BREAK] key.

† Make it a habit to check the memory contents after correction as shown above. Even a small error in an operation code of a machine language program may result in uncontrolled program execution and destruction of the memory. Proper care will prevent this.
The memory contents are also checked by the D command which is explained below.

1.2.2 D command

Function : Dumps the specified memory block.

Operation : When a D command is entered, the display screen is as shown in FIGURE 1.9.

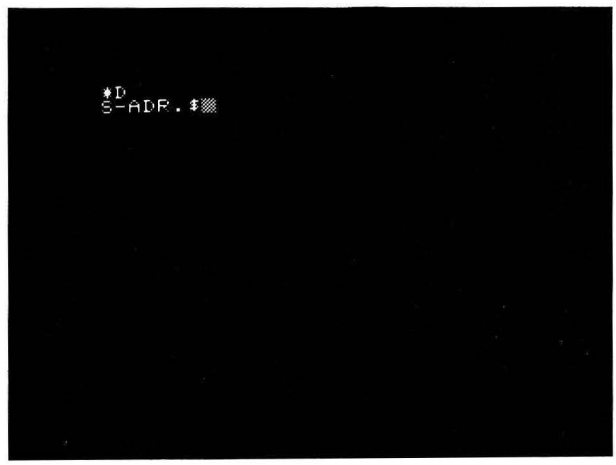


FIGURE 1.9

At this time, the monitor program requests the operator to enter the first address of the memory block. For example, to dump the memory block from $0000 through $007F (where part of the monitor program is stored) enter "0000" from the keyboard as the start address (S-ADR), then press the [CR] key. The display will then be as shown in FIGURE 1.10.

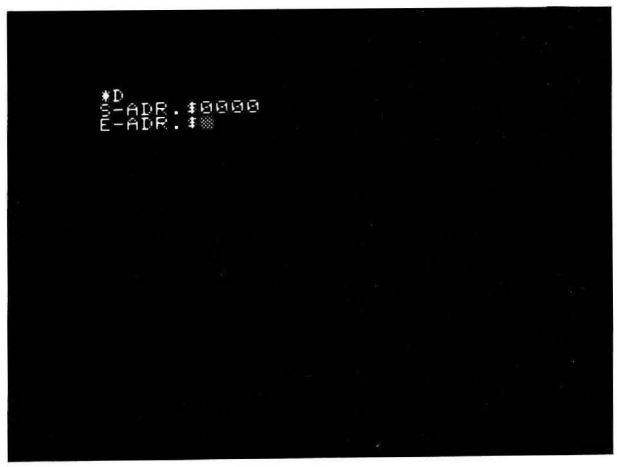


FIGURE 1.10

The monitor program now requests the operator to enter the end address (E-ADR) of the memory block to be dumped. When "007F" is entered from the keyboard and the [CR] key is pressed, the contents of the memory block are listed as shown in FIGURE 1.11.

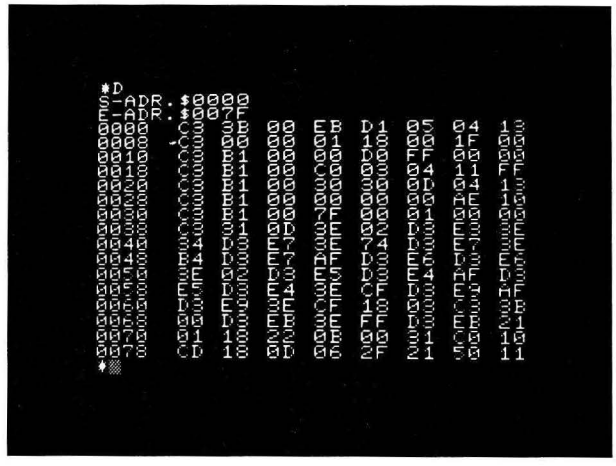


FIGURE 1.11

As shown in FIGURE 1.11, the contents of 8 bytes of memory are displayed on each line.

If the space bar is pressed during a memory dump, the display is fixed as long as it is held down. This function is effective when a large block of memory is to be dumped at one time.

1.2.3 J command

Function : Transfers system control to the specified address, that is, loads the specified address in the program counter of the CPU.

Operation : When a J command is entered, the display is as shown in FIGURE 1.12.

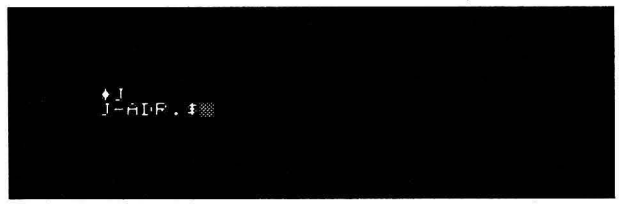


FIGURE 1.12

At this time, the monitor program requests the operator to enter the address to which system control is to be transferred. Enter a 4-digit hexadecimal address from the keyboard and press the [CR] key. System control is then transferred to the machine language program starting at the specified address.

This command is used to invoke a machine language program. Before executing a machine language program, carefully check the program. Careless execution of a machine language program may result in a serious error.† This command is also used to restart the BASIC interpreter or other system program if it has not been destroyed. There are two methods of restarting the system program: warm start and cold start. With a warm start, previous system data (that is, data which was stored in the system work area at the end of the last execution of the system program) are not erased. With a cold start, previous system data are ignored just as during an initial start with the IPL. The start addresses of the BASIC interpreter are as follows:

Warm start address = $1280
Cold start address = $1220

---

† The hardware will not be damaged, but a file protected tape may be overwritten with something else or the program in RAM may be destroyed.

The RST 7 instruction (OBJ Code: $FF) is used to stop machine language program execution. When the RST 7 instruction is encountered, system control is transferred to the monitor program to wait for the next command. At the same time, the contents of registers AF, BC, DE, HL and PC are displayed on the CRT screen in sequence in 4 digit hexadecimal notation. The PC register contains the address where the RST 7 instruction is stored.

It is recommended that RST 7 instructions be placed in appropriate program locations for ease of debugging. To continue program execution, execute the J command. (The contents of the PC register which were pushed to the stack by the RST 7 instruction have been popped from the stack by the break routine. Therefore, no RET instruction can be executed.)

1.2.4 S command

Function : Saves the contents of the specified memory block on cassette tape with the specified file name assigned.

Operation : When a S command is entered, the display is as shown below.

```
*S
FILENAME: ■
```

The monitor requests the operator to specify file name. Enter an appropriate file name of 16 characters or less from the keyboard and press the [CR] key. For example, when "ABRACADABRA" is specified, the display is as shown below.†

```
*S
FILENAME: ABRACADABRA
S-ADR.$ ■
```

After the file name has been specified, the monitor requests the operator to specify the memory block to be saved. Enter the start and end addresses in the manner described in the D command explanation. Any start and end addresses of the installed memory can be specified; however, if the monitor area is saved, a file which cannot be coded is generated on the cassette tape. This is because the monitor saves itself, so check sum codes necessarily mismatch.

† If the [CR] key is pressed without specifying a file name, a nameless file is generated. This is not desirable. It is strongly recommended that file names be specified for all significant files.

For example, to save the memory block from $6000 to $60A3 with the file name "ABRACADABRA" assigned, enter "6000" and press the [CR] key, then enter "60A3" and press the [CR] key. The display is as shown below.

```
*S
FILENAME: ABRACADABRA
S-ADR.$6000
E-ADR.$60A3
J-ADR.$
```

The monitor now requests the operator to enter a jump address. If a jump address is specified, system control will be transferred to this address after loading when the file is later loaded by a L command. This feature is useful when the file is an individual machine language program file.

When the file is a data file or program file which is linked with the BASIC interpreter, the jump address is not specified.† In this case, the monitor will retain system control after file loading.

For example, when file "ABRACADABRA" includes a program with a starting address of $6050, enter "6050" from the keyboard as shown below.

```
J-ADR.$6050
```

After the [CR] key is pressed, the file will be saved. When no cassette is installed in the cassette tape deck, the cassette tape cover will open and the message "SET TAPE" will appear on the screen if a S command is attempted. When a file protected tape is loaded, the message "WRITE PROTECT" will appear on the screen if a S command is attempted.

† Press the [CR] key without entering the address.

1.2.5 V command

Function : Checks to confirm that data in a cassette tape file matches the original data in the memory block from which it was saved.

Operation : When a V command is entered, the display is as shown below.

```
*V
FILENAME: ■
```

The monitor requests the operator to specify the file name to be verified. For example, when file "ABRACADABRA" is to be verified, enter "ABRACADABRA" from the keyboard as shown below. Note that the cassette tape must first be rewound.

```
*V
FILENAME: ABRACADABRA
```

When the [CR] key is pressed, verification is performed automatically. The memory block with which the specified file is compared is indicated by information recorded when the file was saved with the S command.
If the file name is not specified, the first cassette tape file data encountered will be verified.
When the file data is the same as data in the memory block, "OK" is displayed; when it differs, "ERROR" is displayed.

Although cassette deck read/write operation is highly reliable, it is recommended that a habit be made of verifying data every time a file is saved.

1.2.6 L command

Function : Loads the specified file into the memory.

Operation : When a L command is entered, the display is as shown below.

```
*L
FILE NAME:
```

The monitor requests the operator to specify the name of the file to be loaded. For example, when file "ABRACADABRA" is to be loaded, enter the file name as shown below.

```
*L
FILE NAME: ABRACADABRA
```

When the [CR] key is pressed, a search is made for the specified file. After the file is found it is loaded into memory. Following shows the display as it appears after files "OPEN SESAME" and "ABRACADABRA" have been loaded.

```
*L
FILE NAME: ABRACADABRA
FOUND  OPEN SESAME
FOUND  ABRACADABRA
LOADING  ABRACADABRA
```

The memory address to which the file is loaded is indicated in the file information recorded when the file was saved.

In this example, file "ABRACADABRA" was saved in the cassette tape file from the memory block from $6000 to $60A3 with an S command. Therefore, the file is loaded into $6000 to $60A3 by the L command. See FIGURE 1.13.

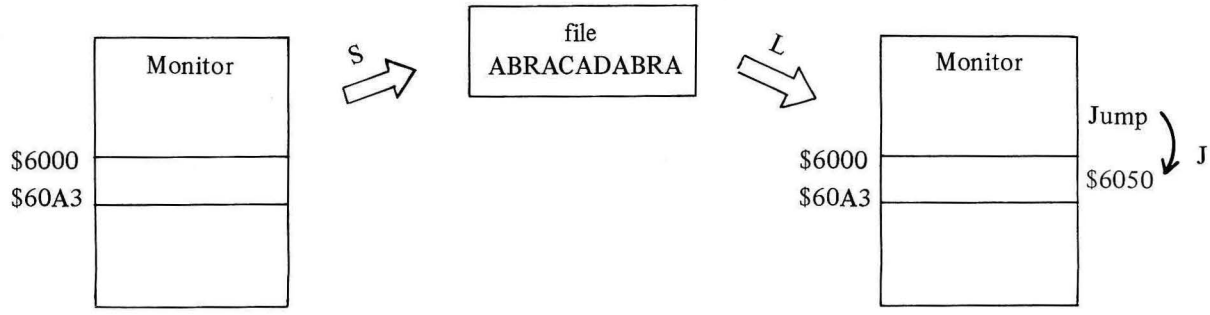


FIGURE 1.13

In FIGURE 1.13, when file "ABRACADABRA" is generated by a command, the jump address specified is $6050. Therefore, after file "ABRACADABRA" has been loaded, system control is transferred to this address. If the jump address is not specified, the monitor waits for the next command after loading is completed.

1.3 Monitor Subroutines

MONITOR SB-1510 subroutines are listed in Table 1.1. The subroutine names indicated are the same as the labels shown in the monitor program assembly listing in the Appendix. Each name is a mnemonic representing the subroutine's function.

To call a subroutine, use the CALL statement as follows:

CALL *subroutine address*

For example, to call LETNL, issue

```
CDB008 . . . . CALL   08B0H
```

Care must be taken with register contents just before a subroutine is called, since some registers are modified by some subroutines.

The number of stacks required for each subroutine is also shown in Table 1.1. Required stack area memory capacity is indicated in Table 1.1. (For example, subroutine LETNL requires 8 stacks as shown in Table 1.1. Each stack requires 2 bytes. Then, 8 x 2 = 16 bytes are required for the LETNL stack area.)

Table 1.1 Monitor Subroutine List

Subroutine name and address (in hexadecimal)	Function	Number of Stacks
CALL LETNL $08B0	Moves the cursor on the display screen to the beginning of the next line. All register contents other than those of the AF register are protected.	8
CALL PRNTS $08B9	Displays a blank in the current cursor position and advances the cursor one character.	3
CALL PRNT $0916	Displays the character corresponding to the ASCII code stored in the A register at the current cursor position. (For ASCII codes, refer to FIGURE OWNER'S MANUAL.)	3

continued →

Subroutine name and address (in hexadecimal)	Function	Number of Stacks
	Note that ASCII codes $01 through $0F are control codes; when any of these characters are stored in the A register, the corresponding display control is performed. For example, $01 performs the same function as the [↓] key.	
CALL MSG $08DB	Display characters stored in the area whose start address is stored in the DE register, starting at the cursor position and continuing until $0D (the carriage return code) is encountered. Carriage return is not performed in this case. Display control is performed with ASC codes $01-$0A, $0C, $0E and $0F. All register contents are protected.	4
CALL BELL $0EBE	Sounds middle range tone (about 440 Hz) for a short time.	4
CALL MELDY $0EE9	Plays music according to music data. The music data area start address must be set in the DE register in advance. Music data is coded in the same manner as described for the MUSIC statement in the BASIC Language Manual. The end mark is $0D (carriage return) or $2A (*). When control is returned to the calling program, the C flag has the following meanings: 0 - play has been completed. 1 - play has been stopped by the [BREAK] key.	4
CALL XTEMP $0DF8	Specifies the tempo at which music is played. Tempo data ($01-$07) must be set in the A register in advance. $01: Lowest tempo $04: Medium tempo $07: Highest tempo	3
CALL SOUT $0ECC	Sounds a tone of the desired pitch and duration. The pitch and duration must be set, respectively, in the HL and BC registers in advance. (For example, when $00A4 is set in the HL register, the pitch is middle la).	3

Subroutine name and address (in hexadecimal)	Function	Number of Stacks
CALL TIMST **$0E06**	Sets the built-in clock. Time data must be set in advance as follows: A register ← 0: AM 1: PM DE register ← Time (in seconds) (2 byte data)	3
CALL TIMRD **$0E51**	Reads the built-in clock. Time data are set as follows: A register ← 0: AM 1: PM DE register ← Time (in seconds) (2 byte data) All register contents other than those of the AF and DE registers are protected.	3
CALL BRKEY **$0562**	Checks whether or not the [BREAK] key is pressed. Z flag ← 0: not pressed 1: pressed	2
CALL GETL **$06A4**	Obtain one line of data from the keyboard. The start address of the area in which the input data are to be stored and the number of characters to be accepted must be set as follows: DE register ← Input data storage area start address KNUMBS (address $06A2) ← Number of characters accepted The key input sequence is terminated by pressing the [CR] (or [ENT]) key. When the [CR] (or [ENT]) key is pressed, the end mark ($0D) is stored following the input data. Therefore, the setting indicating the number of characters to be accepted must include one for the end mark. The input data are displayed on the screen and cursor control, insertion and deletion of characters are possible. When the [BREAK] key is pressed in the middle of a key input sequence, the break code ($0B) is set in the start address indicated by the DE register and control is returned to the calling program. The monitor program uses this subroutine by setting label BUFER (address $103F) in the DE register and $14 in address KNUMBS.	8

Subroutine name and address (in hexadecimal)	Function	Number of Stacks
CALL GETKY $0871	Obtains one character from the keyboard and stores it in the A register. For example, when CALL GETKY is executed while the B key is being pressed, ASCII code $42 (B) is set in the A register. When CALL GETKY is executed while no key is pressed, $00 is set in the A register. The input character is not displayed on the screen.	8
CALL ASC $05F3	Converts the lower 4 bit contained in the A register into the ASCII code corresponding to their hexadecimal equivalent and sets it in the A register. For example, when the lower 4 bits of the A register are 1000 ($8 in hexadecimal), $38 (the ASCII code corresponding to "8") is set in the A register.	1
CALL HEX $05FD	When the A register contains an ASCII code corresponding to a hexadecimal number, this subroutine sets the binary equivalent of the hexadecimal number in the lower 4 bits of the A register. For example, when the A register contains $42, the ASCII code corresponding to "B", 1011 ($B in hexadecimal) is set to the lower 4 bits of the A register. If the A register contains codes other than those corresponding to characters representing hexadecimals, the C flag (carry flag) is set to 1 and the A register contents are undefined. C flag at return 0: Lower 4 bits of A register are properly set. 1: Data error.	1
CALL 2HEX $0623	When the 2 successive bytes of data contained in the area starting at the address indicated in the DE register are an ASCII code string representing a 2 digit hexadecimal number, this subroutine sets the 2 digit hexadecimal number in the A register and returns control to the calling program. If the ASCII code string does not represent any 2 digit hexadecimal number, this subroutine sets the C flag to 1 and returns control to the calling program. In this case, the contents of the A register are undefined.	2

Subroutine name and address (in hexadecimal)	Function	Number of Stacks
CALL HLHEX $0614	When the 4 successive bytes of data contained in the area starting at the address indicated in the DE register are an ASCII code string representing a 4 digit hexadecimal number, this subroutine sets the 4 digit hexadecimal number in the HL register and returns control to the calling program. If the ASCII code string does not represents a 4 digit hexadecimal number, this subroutine sets the C flag to 1 and returns control to the calling program. In this case, the A register contents are undefined. For example, when $33, $30, $43 and $39 are stored in successive areas starting at $8000, $30C9 is set in the HL register by executing. LD DE, 8000H CALL 0614H	4
CALL CURSR $0B2C	Sets the Video-RAM address corresponding to the current cursor position in the HL register. For example, when the cursor is in the home position (upper left corner), $D000 is set in the HL register.	2

APPENDIX

Correspondence between each object (OBJ) code and mnemonic code is shown in sections A.1 and A.2. In A.1, mnemonic codes are arranged in the alphabetic order; this arrangement is convenient when cross-referencing from Z80A CPU instructions to corresponding object codes. In A.2, object codes are arranged in hexadecimal order; this arrangement is convenient when it is necessary to look up the mnemonic code corresponding to a particular object code.

Details on operation, flag operation, execution time, etc., for each instruction are contained in the Z80A CPU reference data in the appendix of the MZ-80B OWNER's MANUAL.

The MONITOR SB-1510 assembly listing is shown in A.3.

A.1 Mnemonic Codes and Corresponding Object Codes

(Mnemonic codes are arranged in alphabetic order.)

Note

nn, n, d and e in the operands of each mnemonic code represent constant data. The example values set forth below are used for these constants in this table.

nn = 584H
n = 20H
d = 5
e = 30H

Data codes represented by example values are shown in italic and underlined.

OP-Code	Mnemonic
8E	ADC A, (HL)
DD8E*05*	ADC A, (IX+d)
FD8E*05*	ADC A, (IY+d)
8F	ADC A, A
88	ADC A, B
89	ADC A, C
8A	ADC A, D
8B	ADC A, E
8C	ADC A, H
8D	ADC A, L
CE*20*	ADC A, n
ED4A	ADC HL, BC
ED5A	ADC HL, DE
ED6A	ADC HL, HL
ED7A	ADC HL, SP
86	ADD A, (HL)
DD86*05*	ADD A, (IX+d)
FD86*05*	ADD A, (IY+d)
87	ADD A, A
80	ADD A, B
81	ADD A, C
82	ADD A, D
83	ADD A, E
84	ADD A, H
85	ADD A, L
C6*20*	ADD A, n
09	ADD HL, BC
19	ADD HL, DE
29	ADD HL, HL
39	ADD HL, SP
DD09	ADD IX, BC
DD19	ADD IX, DE
DD29	ADD IX, IX
DD39	ADD IX, SP
FD09	ADD IY, BC
FD19	ADD IY, DE
FD29	ADD IY, IY
FD39	ADD IY, SP

OP-Code	Mnemonic
A6	AND (HL)
DDA6*05*	AND (IX+d)
FDA6*05*	AND (IY+d)
A7	AND A
A0	AND B
A1	AND C
A2	AND D
A3	AND E
A4	AND H
A5	AND L
E6*20*	AND n
CB46	BIT 0, (HL)
DDCB*05*46	BIT 0, (IX+d)
FDCB*05*46	BIT 0, (IY+d)
CB47	BIT 0, A
CB40	BIT 0, B
CB41	BIT 0, C
CB42	BIT 0, D
CB43	BIT 0, E
CB44	BIT 0, H
CB45	BIT 0, L
CB4E	BIT 1, (HL)
DDCB*05*4E	BIT 1, (IX+d)
FDCB*05*4E	BIT 1, (IY+d)
CB4F	BIT 1, A
CB48	BIT 1, B
CB49	BIT 1, C
CB4A	BIT 1, D
CB4B	BIT 1, E
CB4C	BIT 1, H
CB4D	BIT 1, L
CB56	BIT 2, (HL)
DDCB*05*56	BIT 2, (IX+d)
FDCB*05*56	BIT 2, (IY+d)
CB57	BIT 2, A
CB50	BIT 2, B
CB51	BIT 2, C
CB52	BIT 2, D
CB53	BIT 2, E
CB54	BIT 2, H
CB55	BIT 2, L
CB5E	BIT 3, (HL)
DDCB*05* 5E	BIT 3, (IX+d)
FDCB*05*5E	BIT 3, (IY+d)
CB5F	BIT 3, A
CB58	BIT 3, B
CB59	BIT 3, C
CB5A	BIT 3, D
CB5B	BIT 3, E
CB5C	BIT 3, H
CB5D	BIT 3, L
CB66	BIT 4, (HL)
DDCB*05*66	BIT 4, (IX+d)
FDCB*05*66	BIT 4, (IY+d)
CB67	BIT 4, A
CB60	BIT 4, B
CB61	BIT 4, C
CB62	BIT 4, D
CB63	BIT 4, E
CB64	BIT 4, H
CB65	BIT 4, L
CB6E	BIT 5, (HL)
DDCB*05*6E	BIT 5, (IX+d)
FDCB*05*6E	BIT 5, (IY+d)
CB6F	BIT 5, A
CB68	BIT 5, B
CB69	BIT 5, C
CB6A	BIT 5, D
CB6B	BIT 5, E
CB6C	BIT 5, H
CB6D	BIT 5, L
CB76	BIT 6, (HL)
DDCB*05*76	BIT 6, (IX+d)
FDCB*05*76	BIT 6, (IY+d)
CB77	BIT 6, A
CB70	BIT 6, B
CB71	BIT 6, C
CB72	BIT 6, D
CB73	BIT 6, E

OP-Code	Mnemonic
CB74	BIT 6,H
CB75	BIT 6,L
CB7E	BIT 7,(HL)
DDCB*05*7E	BIT 7,(IX+d)
FDCB*05*7E	BIT 7,(IY+d)
CB7F	BIT 7,A
CB78	BIT 7,B
CB79	BIT 7,C
CB7A	BIT 7,D
CB7B	BIT 7,E
CB7C	BIT 7,H
CB7D	BIT 7,L
DC*8405*	CALL C,nn
FC*8405*	CALL M,nn
D4*8405*	CALL NC,nn
CD*8405*	CALL nn
C4*8405*	CALL NZ,nn
F4*8405*	CALL P,nn
EC*8405*	CALL PE,nn
E4*8405*	CALL PO,nn
CC*8405*	CALL Z,nn
3F	CCF
BE	CP (HL)
DDBE*05*	CP (IX+d)
FDBE*05*	CP (IY+d)
BF	CP A
B8	CP B
B9	CP C
BA	CP D
BB	CP E
BC	CP H
BD	CP L
FE*20*	CP n
EDA9	CPD
EDB9	CPDR
EDA1	CPI

OP-Code	Mnemonic
EDB1	CPIR
2F	CPL
27	DAA
35	DEC (HL)
DD35*05*	DEC (IX+d)
FD35*05*	DEC (IY+d)
3D	DEC A
05	DEC B
0B	DEC BC
0D	DEC C
15	DEC D
1B	DEC DE
1D	DEC E
25	DEC H
2B	DEC HL
DD2B	DEC IX
FD2B	DEC IY
2D	DEC L
3B	DEC SP
F3	DI
10*2E*	DJNZ e
FB	EI
E3	EX (SP),HL
DDE3	EX (SP),IX
FDE3	EX (SP),IY
08	EX AF,AF'
EB	EX DE,HL
D9	EXX
76	HALT
ED46	IM 0
ED56	IM 1

OP-Code	Mnemonic
ED5E	IM 2
ED78	IN A,(C)
DB*20*	IN A,(n)
ED40	IN B,(C)
ED48	IN C,(C)
ED50	IN D,(C)
ED58	IN E,(C)
ED60	IN H,(C)
ED68	IN L,(C)
34	INC (HL)
DD34*05*	INC (IX+d)
FD34*05*	INC (IY+d)
3C	INC A
04	INC B
03	INC BC
0C	INC C
14	INC D
13	INC DE
1C	INC E
24	INC H
23	INC HL
DD23	INC IX
FD23	INC IY
2C	INC L
33	INC SP
EDAA	IND
EDBA	INDR
EDA2	INI
EDB2	INIR
E9	JP (HL)
DDE9	JP (IX)
FDE9	JP (IY)
DA*8405*	JP C,nn
FA*8405*	JP M,nn
D2*8405*	JP NC,nn
C3*8405*	JP nn

OP-Code	Mnemonic
C2*8405*	JP NZ,nn
F2*8405*	JP P,nn
EA*8405*	JP PE,nn
E2*8405*	JP PO,nn
CA*8405*	JP Z,nn
38*2E*	JR C,e
18*2E*	JR e
30*2E*	JR NC,e
20*2E*	JR NZ,e
28*2E*	JR Z,e
02	LD (BC),A
12	LD (DE),A
77	LD (HL),A
70	LD (HL),B
71	LD (HL),C
72	LD (HL),D
73	LD (HL),E
74	LD (HL),H
75	LD (HL),L
36*20*	LD (HL),n
DD77*05*	LD (IX+d),A
DD70*05*	LD (IX+d),B
DD71*05*	LD (IX+d),C
DD72*05*	LD (IX+d),D
DD73*05*	LD (IX+d),E
DD74*05*	LD (IX+d),H
DD75*05*	LD (IX+d),L
DD36*0520*	LD (IX+d),n
FD77*05*	LD (IY+d),A
FD70*05*	LD (IY+d),B
FD71*05*	LD (IY+d),C
FD72*05*	LD (IY+d),D
FD73*05*	LD (IY+d),E
FD74*05*	LD (IY+d),H
FD75*05*	LD (IY+d),L
FD36*0520*	LD (IY+d),n
32*8405*	LD (nn),A
ED43*8405*	LD (nn),BC

OP-Code	Mnemonic
ED53*8405*	LD (nn),DE
22*8405*	LD (nn),HL
DD22*8405*	LD (nn),IX
FD22*8405*	LD (nn),IY
ED73*8405*	LD (nn),SP
0A	LD A,(BC)
1A	LD A,(DE)
7E	LD A,(HL)
DD7E*05*	LD A,(IX+d)
FD7E*05*	LD A,(IY+d)
3A *8405*	LD A,(nn)
7F	LD A,A
78	LD A,B
79	LD A,C
7A	LD A,D
7B	LD A,E
7C	LD A,H
ED57	LD A,I
7D	LD A,L
3E*20*	LD A,n
46	LD B,(HL)
DD46*05*	LD B,(IX+d)
FD46*05*	LD B,(IY+d)
47	LD B,A
40	LD B,B
41	LD B,C
42	LD B,D
43	LD B,E
44	LD B,H
45	LD B,L
06*20*	LD B,n
ED4B*8405*	LD BC,(nn)
01*8405*	LD BC,nn
4E	LD C,(HL)
DD4E*05*	LD C,(IX+d)
FD4E*05*	LD C,(IY+d)
4F	LD C,A
48	LD C,B
49	LD C,C
4A	LD C,D

OP-Code	Mnemonic
4B	LD C,E
4C	LD C,H
4D	LD C,L
0E*20*	LD C,n
56	LD D,(HL)
DD56*05*	LD D,(IX+d)
FD56*05*	LD D,(IY+d)
57	LD D,A
50	LD D,B
51	LD D,C
52	LD D,D
53	LD D,E
54	LD D,H
55	LD D,L
16*20*	LD D,n
ED5B*8405*	LD DE,(nn)
11*8405*	LD DE,nn
5E	LD E,(HL)
DD5E*05*	LD E,(IX+d)
FD5E*05*	LD E,(IY+d)
5F	LD E,A
58	LD E,B
59	LD E,C
5A	LD E,D
5B	LD E,E
5C	LD E,H
5D	LD E,L
1E*20*	LD E,n
66	LD H,(HL)
DD66*05*	LD H,(IX+d)
FD66*05*	LD H,(IY+d)
67	LD H,A
60	LD H,B
61	LD H,C
62	LD H,D
63	LD H,E
64	LD H,H
65	LD H,L
26*20*	LD H,n
2A*8405*	LD H,(nn)

OP-Code	Mnemonic
21*8405*	LD HL,nn
ED47	LD I,A
DD2A*8405*	LD IX,(nn)
DD21*8405*	LD IX,nn
FD2A*8405*	LD IY,(nn)
FD21*8405*	LD IY,nn
6E	LD L,(HL)
DD6E*05*	LD L,(IX+d)
FD6E*05*	LD L,(IY+d)
6F	LD L,A
68	LD L,B
69	LD L,C
6A	LD L,D
6B	LD L,E
6C	LD L,H
6D	LD L,L
2E*20*	LD L,n
ED7B*8405*	LD SP,(nn)
F9	LD SP,HL
DDF9	LD SP,IX
FDF9	LD SP,IY
31*8405*	LD SP,nn
EDA8	LDD
EDB8	LDDR
EDA0	LDI
EDB0	LDIR
ED44	NEG
00	NOP
B6	OR (HL)
DDB6*05*	OR (IX+d)
FDB6*05*	OR (IY+d)
B7	OR A
B0	OR B
B1	OR C
B2	OR D
B3	OR E
B4	OR H
B5	OR L
F6*20*	OR n
EDBB	OTDR
EDB3	OTIR
ED79	OUT (C),A
ED41	OUT (C),B
ED49	OUT (C),C
ED51	OUT (C),D
ED59	OUT (C),E
ED61	OUT (C),H
ED69	OUT (C),L
D3*20*	OUT (n),A
EDAB	OUTD
EDA3	OUTI
F1	POP AF
C1	POP BC
D1	POP DE
E1	POP HL
DDE1	POP IX
FDE1	POP IY
F5	PUSH AF
C5	PUSH BC
D5	PUSH DE
E5	PUSH HL
DDE5	PUSH IX
FDE5	PUSH IY
CB86	RES 0,(HL)
DDCB*05*86	RES 0,(IX+d)
FDCB*05*86	RES 0,(IY+d)
CB87	RES 0,A
CB80	RES 0,B
CB81	RES 0,C
CB82	RES 0,D
CB83	RES 0,E
CB84	RES 0,H

OP-Code	Mnemonic
CB85	RES 0,L
CB8E	RES 1,(HL)
DDCB*05*8E	RES 1,(IX+d)
FDCB*05*8E	RES 1,(IY+d)
CB8F	RES 1,A
CB88	RES 1,B
CB89	RES 1,C
CB8A	RES 1,D
CB8B	RES 1,E
CB8C	RES 1,H
CB8D	RES 1,L
CB96	RES 2,(HL)
DDCB*05*96	RES 2,(IX+d)
FDCB*05*96	RES 2,(IY+d)
CB97	RES 2,A
CB90	RES 2,B
CB91	RES 2,C
CB92	RES 2,D
CB93	RES 2,E
CB94	RES 2,H
CB95	RES 2,L
CB9E	RES 3,(HL)
DDCB*05*9E	RES 3,(IX+d)
FDCB*05*9E	RES 3,(IY+d)
CB9F	RES 3,A
CB98	RES 3,B
CB99	RES 3,C
CB9A	RES 3,D
CB9B	RES 3,E
CB9C	RES 3,H
CB9D	RES 3,L
CBA6	RES 4,(HL)
DDCB*05*A6	RES 4,(IX+d)
FDCB*05*A6	RES 4,(IY+d)
CBA7	RES 4,A
CBA0	RES 4,B
CBA1	RES 4,C
CBA2	RES 4,D
CBA3	RES 4,E
CBA4	RES 4,H

OP-Code	Mnemonic
CBA5	RES 4,L
CBAE	RES 5,(HL)
DDCB*05*AE	RES 5,(IX+d)
FDCB*05*AE	RES 5,(IY+d)
CBAF	RES 5,A
CBA8	RES 5,B
CBA9	RES 5,C
CBAA	RES 5,D
CBAB	RES 5,E
CBAC	RES 5,H
CBAD	RES 5,L
CBB6	RES 6,(HL)
DDCB*05*B6	RES 6,(IX+d)
FDCB*05*B6	RES 6,(IY+d)
CBB7	RES 6,A
CBB0	RES 6,B
CBB1	RES 6,C
CBB2	RES 6,D
CBB3	RES 6,E
CBB4	RES 6,H
CBB5	RES 6,L
CBBE	RES 7,(HL)
DDCB*05*BE	RES 7,(IX+d)
FDCB*05*BE	RES 7,(IY+d)
CBBF	RES 7,A
CBB8	RES 7,B
CBB9	RES 7,C
CBBA	RES 7,D
CBBB	RES 7,E
CBBC	RES 7,H
CBBD	RES 7,L
C9	RET
D8	RET C
F8	RET M
D0	RET NC
C0	RET NZ
F0	RET P
E8	RET PE
E0	RET PO

OP-Code	Mnemonic
C8	RET Z
ED4D	RETI
ED45	RETN
CB16	RL (HL)
DDCB*05*16	RL (IX+d)
FDCB*05*16	RL (IY+d)
CB17	RL A
CB10	RL B
CB11	RL C
CB12	RL D
CB13	RL E
CB14	RL H
CB15	RL L
17	RLA
CB06	RLC (HL)
DDCB*05*06	RLC (IX+d)
FDCB*05*06	RLC (IY+d)
CB07	RLC A
CB00	RLC B
CB01	RLC C
CB02	RLC D
CB03	RLC E
CB04	RLC H
CB05	RLC L
07	RLCA
ED6F	RLD
CB1E	RR (HL)
DDCB*05*1E	RR (IX+d)
FDCB*05*1E	RR (IY+d)
CB1F	RR A
CB18	RR B
CB19	RR C
CB1A	RR D
CB1B	RR E
CB1C	RR H
CB1D	RR L
1F	RRA

OP-Code	Mnemonic
CB0E	RRC (HL)
DDCB*05*0E	RRC (IX+d)
FDCB*05*0E	RRC (IY+d)
CB0F	RRC A
CB08	RRC B
CB09	RRC C
CB0A	RRC D
CB0B	RRC E
CB0C	RRC H
CB0D	RRC L
0F	RRCA
ED67	RRD
C7	RST 0
D7	RST 10H
DF	RST 18H
E7	RST 20H
EF	RST 28H
F7	RST 30H
FF	RST 38H
CF	RST 8
9E	SBC A,(HL)
DD9E*05*	SBC A,(IX+d)
FD9E*05*	SBC A,(IY+d)
9F	SBC A,A
98	SBC A,B
99	SBC A,C
9A	SBC A,D
9B	SBC A,E
9C	SBC A,H
9D	SBC A,L
DE*20*	SBC A,n
ED42	SBC HL,BC
ED52	SBC HL,DE
ED62	SBC HL,HL
ED72	SBC HL,SP
37	SCF

OP-Code	Mnemonic
CBC6	SET 0,(HL)
DDCB*05*C6	SET 0,(IX+d)
FDCB*05*C6	SET 0,(IY+d)
CBC7	SET 0,A
CBC0	SET 0,B
CBC1	SET 0,C
CBC2	SET 0,D
CBC3	SET 0,E
CBC4	SET 0,H
CBC5	SET 0,L
CBCE	SET 1,(HL)
DDCB*05*CE	SET 1,(IX+d)
FDCB*05*CE	SET 1,(IY+d)
CBCF	SET 1,A
CBC8	SET 1,B
CBC9	SET 1,C
CBCA	SET 1,D
CBCB	SET 1,E
CBCC	SET 1,H
CBCD	SET 1,L
CBD6	SET 2,(HL)
DDCB*05*D6	SET 2,(IX+d)
FDCB*05*D6	SET 2,(IY+d)
CBD7	SET 2,A
CBD0	SET 2,B
CBD1	SET 2,C
CBD2	SET 2,D
CBD3	SET 2,E
CBD4	SET 2,H
CBD5	SET 2,L
CBD8	SET 3,B
CBDE	SET 3,(HL)
DDCB*05*DE	SET 3,(IX+d)
FDCB*05*DE	SET 3,(IY+d)
CBDF	SET 3,A
CBD9	SET 3,C
CBDA	SET 3,D
CBDB	SET 3,E
CBDC	SET 3,H
CBDD	SET 3,L

OP-Code	Mnemonic
CBE6	SET 4,(HL)
DDCB*05*E6	SET 4,(IX+d)
FDCB*05*E6	SET 4,(IY+d)
CBE7	SET 4,A
CBE0	SET 4,B
CBE1	SET 4,C
CBE2	SET 4,D
CBE3	SET 4,E
CBE4	SET 4,H
CBE5	SET 4,L
CBEE	SET 5,(HL)
DDCB*05*EE	SET 5,(IX+d)
FDCB*05*EE	SET 5,(IY+d)
CBEF	SET 5,A
CBE8	SET 5,B
CBE9	SET 5,C
CBEA	SET 5,D
CBEB	SET 5,E
CBEC	SET 5,H
CBED	SET 5,L
CBF6	SET 6,(HL)
DDCB*05*F6	SET 6,(IX+d)
FDCB*05*F6	SET 6,(IY+d)
CBF7	SET 6,A
CBF0	SET 6,B
CBF1	SET 6,C
CBF2	SET 6,D
CBF3	SET 6,E
CBF4	SET 6,H
CBF5	SET 6,L
CBFE	SET 7,(HL)
DDCB*05*FE	SET 7,(IX+d)
FDCB*05*FE	SET 7,(IY+d)
CBFF	SET 7,A
CBF8	SET 7,B
CBF9	SET 7,C
CBFA	SET 7,D
CBFB	SET 7,E
CBFC	SET 7,H
CBFD	SET 7,L

OP-Code	Mnemonic
CB26	SLA (HL)
DDCB*05*26	SLA (IX+d)
FDCB*05*26	SLA (IY+d)
CB27	SLA A
CB20	SLA B
CB21	SLA C
CB22	SLA D
CB23	SLA E
CB24	SLA H
CB25	SLA L
CB2E	SRA (HL)
DDCB*05*2E	SRA (IX+d)
FDCB*05*2E	SRA (IY+d)
CB2F	SRA A
CB28	SRA B
CB29	SRA C
CB2A	SRA D
CB2B	SRA E
CB2C	SRA H
CB2D	SRA L
CB3E	SRL (HL)
DDCB*05*3E	SRL (IX+d)
FDCB*05*3E	SRL (IY+d)
CB3F	SRL A
CB38	SRL B
CB39	SRL C
CB3A	SRL D
CB3B	SRL E
CB3C	SRL H
CB3D	SRL L
96	SUB (HL)
DD96*05*	SUB (IX+d)
FD96*05*	SUB (IY+d)
97	SUB A
90	SUB B
91	SUB C
92	SUB D

OP-Code	Mnemonic
93	SUB E
94	SUB H
95	SUB L
D6*20*	SUB n
AE	XOR (HL)
DDAE*05*	XOR (IX+d)
FDAE*05*	XOR (IY+d)
AF	XOR A
A8	XOR B
A9	XOR C
AA	XOR D
AB	XOR E
AC	XOR H
AD	XOR L
EE*20*	XOR n

A.2 Object Codes and Corresponding Mnemonic Codes

(Object codes are arranged in hexadecimal order.)

OP-Code	Mnemonic
00	NOP
01*8405*	LD BC,nn
02	LD (BC),A
03	INC BC
04	INC B
05	DEC B
06*20*	LD B,n
07	RLCA
08	EX AF,AF'
09	ADD HL,BC
0A	LD A,(BC)
0B	DEC BC
0C	INC C
0D	DEC C
0E*20*	LD C,n
0F	RRCA
10*2E*	DJNZ e
11*8405*	LD DE,nn
12	LD (DE),A
13	INC DE
14	INC D
15	DEC D
16*20*	LD D,n
17	RLA
18*2E*	JR e
19	ADD HL,DE
1A	LD A,(DE)
1B	DEC DE
1C	INC E
1D	DEC E
1E*20*	LD E,n
1F	RRA
20*2E*	JR NZ,e
21*8405*	LD HL,nn
22*8405*	LD (nn),HL
23	INC HL
24	INC H
25	DEC H

Note

The underlined data codes shown in italic take the following example values. These constants are represented by nn, n, d and e in the operands of each mnemonic code.

nn = 584H
n = 20H
d = 5
e = 30H

Note that instructions whose first two letters are CB, DD, ED or FD are collected in the last part of the table.

OP-Code	Mnemonic
26*20*	LD H,n
27	DAA
28*2E*	JR Z,e
29	ADD HL,HL
2A *8405*	LD HL,(nn)
2B	DEC HL
2C	INC L
2D	DEC L
2E *20*	LD L,n
2F	CPL
30*2E*	JR NC,e
31*8405*	LD SP,nn
32*8405*	LD (nn),A
33	INC SP
34	INC (HL)
35	DEC (HL)
36*20*	LD (HL),n
37	SCF
38*2E*	JR C,e
39	ADD HL,SP
3A *8405*	LD A,(nn)
3B	DEC SP
3C	INC A
3D	DEC A
3E*20*	LD A,n
3F	CCF
40	LD B,B
41	LD B,C
42	LD B,D
43	LD B,E
44	LD B,H
45	LD B,L
46	LD B,(HL)
47	LD B,A
48	LD C,B
49	LD C,C
4A	LD C,D
4B	LD C,E
4C	LD C,H
4D	LD C,L
4E	LD C,(HL)
4F	LD C,A
50	LD D,B
51	LD D,C
52	LD D,D
53	LD D,E
54	LD D,H
55	LD D,L
56	LD D,(HL)
57	LD D,A
58	LD E,B
59	LD E,C
5A	LD E,D
5B	LD E,E
5C	LD E,H
5D	LD E,L
5E	LD E,(HL)
5F	LD E,A
60	LD H,B
61	LD H,C
62	LD H,D
63	LD H,E
64	LD H,H
65	LD H,L
66	LD H,(HL)
67	LD H,A
68	LD L,B
69	LD L,C
6A	LD L,D
6B	LD L,E
6C	LD L,H
6D	LD L,L
6E	LD L,(HL)
6F	LD L,A
70	LD (HL),B

OP-Code	Mnemonic
71	LD (HL),C
72	LD (HL),D
73	LD (HL),E
74	LD (HL),H
75	LD (HL),L
76	HALT
77	LD (HL),A
78	LD A,B
79	LD A,C
7A	LD A,D
7B	LD A,E
7C	LD A,H
7D	LD A,L
7E	LD A,(HL)
7F	LD A,A
80	ADD A,B
81	ADD A,C
82	ADD A,D
83	ADD A,E
84	ADD A,H
85	ADD A,L
86	ADD A,(HL)
87	ADD A,A
88	ADC A,B
89	ADC A,C
8A	ADC A,D
8B	ADC A,E
8C	ADC A,H
8D	ADC A,L
8E	ADC A,(HL)
8F	ADC A,A
90	SUB B
91	SUB C
92	SUB D
93	SUB E
94	SUB H
95	SUB L
96	SUB (HL)

OP-Code	Mnemonic
97	SUB A
98	SBC A,B
99	SBC A,C
9A	SBC A,D
9B	SBC A,E
9C	SBC A,H
9D	SBC A,L
9E	SBC A,(HL)
9F	SBC A,A
A0	AND B
A1	AND C
A2	AND D
A3	AND E
A4	AND H
A5	AND L
A6	AND (HL)
A7	AND A
A8	XOR B
A9	XOR C
AA	XOR D
AB	XOR E
AC	XOR H
AD	XOR L
AE	XOR (HL)
AF	XOR A
B0	OR B
B1	OR C
B2	OR D
B3	OR E
B4	OR H
B5	OR L
B6	OR (HL)
B7	OR A
B8	CP B
B9	CP C
BA	CP D
BB	CP E
BC	CP H

OP-Code	Mnemonic
BD	CP L
BE	CP (HL)
BF	CP A
C0	RET NZ
C1	POP BC
C2*8405*	JP NZ,nn
C3*8405*	JP nn
C4*8405*	CALL NZ,nn
C5	PUSH BC
C6*20*	ADD A,n
C7	RST 0
C8	RET Z
C9	RET
CA*8405*	JP Z,nn
CC*8405*	CALL Z,nn
CD*8405*	CALL nn
CE*20*	ADC A,n
CF	RST 8
D0	RET NC
D1	POP DE
D2*8405*	JP NC,nn
D3*20*	OUT (n),A
D4*8405*	CALL NC,nn
D5	PUSH DE
D6*20*	SUB n
D7	RST 10H
D8	RET C
D9	EXX
DA*8405*	JP C,nn
DB*20*	IN A,(n)
DC*8405*	CALL C,nn
DE*20*	SBC A,n
DF	RST 18H
E0	RET PO
E1	POP HL
E2*8405*	JP PO,nn
E3	EX (SP),HL
E4*8405*	CALL PO,nn
E5	PUSH HL
E6*20*	AND n
E7	RST 20H
E8	RET PE
E9	JP (HL)
EA*8405*	JP PE,nn
EB	EX DE,HL
EC*8405*	CALL PE,nn
EE*20*	XOR n
EF	RST 28H
F0	RET P
F1	POP AF
F2*8405*	JP P,nn
F3	DI
F4*8405*	CALL P,nn
F5	PUSH AF
F6*20*	OR n
F7	RST 30H
F8	RET M
F9	LD SP,HL
FA*8405*	JP M,nn
FB	EI
FC*8405*	CALL M,nn
FE*20*	CP n
FF	RST 38H
CB00	RLC B
CB01	RLC C
CB02	RLC D
CB03	RLC E
CB04	RLC H
CB05	RLC L
CB06	RLC (HL)
CB07	RLC A
CB08	RRC B
CB09	RRC C
CB0A	RRC D
CB0B	RRC E

OP-Code	Mnemonic
CB0C	RRC H
CB0D	RRC L
CB0E	RRC (HL)
CB0F	RRC A
CB10	RL B
CB11	RL C
CB12	RL D
CB13	RL E
CB14	RL H
CB15	RL L
CB16	RL (HL)
CB17	RL A
CB18	RR B
CB19	RR C
CB1A	RR D
CB1B	RR E
CB1C	RR H
CB1D	RR L
CB1E	RR (HL)
CB1F	RR A
CB20	SLA B
CB21	SLA C
CB22	SLA D
CB23	SLA E
CB24	SLA H
CB25	SLA L
CB26	SLA (HL)
CB27	SLA A
CB28	SRA B
CB29	SRA C
CB2A	SRA D
CB2B	SRA E
CB2C	SRA H
CB2D	SRA L
CB2E	SRA (HL)
CB2F	SRA A
CB38	SRL B
CB39	SRL C
CB3A	SRL D
CB3B	SRL E
CB3C	SRL H
CB3D	SRL L
CB3E	SRL (HL)
CB3F	SRL A
CB40	BIT 0,B
CB41	BIT 0,C
CB42	BIT 0,D
CB43	BIT 0,E
CB44	BIT 0,H
CB45	BIT 0,L
CB46	BIT 0,(HL)
CB47	BIT 0,A
CB48	BIT 1,B
CB49	BIT 1,C
CB4A	BIT 1,D
CB4B	BIT 1,E
CB4C	BIT 1,H
CB4D	BIT 1,L
CB4E	BIT 1,(HL)
CB4F	BIT 1,A
CB50	BIT 2,B
CB51	BIT 2,C
CB52	BIT 2,D
CB53	BIT 2,E
CB54	BIT 2,H
CB55	BIT 2,L
CB56	BIT 2,(HL)
CB57	BIT 2,A
CB58	BIT 3,B
CB59	BIT 3,C
CB5A	BIT 3,D
CB5B	BIT 3,E
CB5C	BIT 3,H
CB5D	BIT 3,L
CB5E	BIT 3,(HL)

OP-Code	Mnemonic
CB5F	BIT 3,A
CB60	BIT 4,B
CB61	BIT 4,C
CB62	BIT 4,D
CB63	BIT 4,E
CB64	BIT 4,H
CB65	BIT 4,L
CB66	BIT 4,(HL)
CB67	BIT 4,A
CB68	BIT 5,B
CB69	BIT 5,C
CB6A	BIT 5,D
CB6B	BIT 5,E
CB6C	BIT 5,H
CB6D	BIT 5,L
CB6E	BIT 5,(HL)
CB6F	BIT 5,A
CB70	BIT 6,B
CB71	BIT 6,C
CB72	BIT 6,D
CB73	BIT 6,E
CB74	BIT 6,H
CB75	BIT 6,L
CB76	BIT 6,(HL)
CB77	BIT 6,A
CB78	BIT 7,B
CB79	BIT 7,C
CB7A	BIT 7,D
CB7B	BIT 7,E
CB7C	BIT 7,H
CB7D	BIT 7,L
CB7E	BIT 7,(HL)
CB7F	BIT 7,A
CB80	RES 0,B
CB81	RES 0,C
CB82	RES 0,D
CB83	RES 0,E
CB84	RES 0,H
CB85	RES 0,L
CB86	RES 0,(HL)
CB87	RES 0,A
CB88	RES 1,B
CB89	RES 1,C
CB8A	RES 1,D
CB8B	RES 1,E
CB8C	RES 1,H
CB8D	RES 1,L
CB8E	RES 1,(HL)
CB8F	RES 1,A
CB90	RES 2,B
CB91	RES 2,C
CB92	RES 2,D
CB93	RES 2,E
CB94	RES 2,H
CB95	RES 2,L
CB96	RES 2,(HL)
CB97	RES 2,A
CB98	RES 3,B
CB99	RES 3,C
CB9A	RES 3,D
CB9B	RES 3,E
CB9C	RES 3,H
CB9D	RES 3,L
CB9E	RES 3,(HL)
CB9F	RES 3,A
CBA0	RES 4,B
CBA1	RES 4,C
CBA2	RES 4,D
CBA3	RES 4,E
CBA4	RES 4,H
CBA5	RES 4,L
CBA6	RES 4,(HL)
CBA7	RES 4,A
CBA8	RES 5,B
CBA9	RES 5,C

OP-Code	Mnemonic
CBAA	RES 5,D
CBAB	RES 5,E
CBAC	RES 5,H
CBAD	RES 5,L
CBAE	RES 5,(HL)
CBAF	RES 5,A
CBB0	RES 6,B
CBB1	RES 6,C
CBB2	RES 6,D
CBB3	RES 6,E
CBB4	RES 6,H
CBB5	RES 6,L
CBB6	RES 6,(HL)
CBB7	RES 6,A
CBB8	RES 7,B
CBB9	RES 7,C
CBBA	RES 7,D
CBBB	RES 7,E
CBBC	RES 7,H
CBBD	RES 7,L
CBBE	RES 7,(HL)
CBBF	RES 7,A
CBC0	SET 0,B
CBC1	SET 0,C
CBC2	SET 0,D
CBC3	SET 0,E
CBC4	SET 0,H
CBC5	SET 0,L
CBC6	SET 0,(HL)
CBC7	SET 0,A
CBC8	SET 1,B
CBC9	SET 1,C
CBCA	SET 1,D
CBCB	SET 1,E
CBCC	SET 1,H
CBCD	SET 1,L
CBCE	SET 1,(HL)
CBCF	SET 1,A

OP-Code	Mnemonic
CBD0	SET 2,B
CBD1	SET 2,C
CBD2	SET 2,D
CBD3	SET 2,E
CBD4	SET 2,H
CBD5	SET 2,L
CBD6	SET 2,(HL)
CBD7	SET 2,A
CBD8	SET 3,B
CBD9	SET 3,C
CBDA	SET 3,D
CBDB	SET 3,E
CBDC	SET 3,H
CBDD	SET 3,L
CBDE	SET 3,(HL)
CBDF	SET 3,A
CBE0	SET 4,B
CBE1	SET 4,C
CBE2	SET 4,D
CBE3	SET 4,E
CBE4	SET 4,H
CBE5	SET 4,L
CBE6	SET 4,(HL)
CBE7	SET 4,A
CBE8	SET 5,B
CBE9	SET 5,C
CBEA	SET 5,D
CBEB	SET 5,E
CBEC	SET 5,H
CBED	SET 5,L
CBEE	SET 5,(HL)
CBEF	SET 5,A
CBF0	SET 6,B
CBF1	SET 6,C
CBF2	SET 6,D
CBF3	SET 6,E
CBF4	SET 6,H
CBF5	SET 6,L

OP-Code	Mnemonic
CBF6	SET 6,(HL)
CBF7	SET 6,A
CBF8	SET 7,B
CBF9	SET 7,C
CBFA	SET 7,D
CBFB	SET 7,E
CBFC	SET 7,H
CBFD	SET 7,L
CBFE	SET 7,(HL)
CBFF	SET 7,A
DD09	ADD IX,BC
DD19	ADD IX,DE
DD21 *8405*	LD IX,nn
DD22 *8405*	LD (nn),IX
DD23	INC IX
DD29	ADD IX,IX
DD2A*8405*	LD IX,(nn)
DD2B	DEC IX
DD34 *05*	INC (IX+d)
DD35 *05*	DEC (IX+d)
DD36 *0520*	LD (IX+d),n
DD39	ADD IX,SP
DD46 *05*	LD B,(IX+d)
DD4E*05*	LD C,(IX+d)
DD56 *05*	LD D,(IX+d)
DD5E*05*	LD E,(IX+d)
DD66 *05*	LD H,(IX+d)
DD6E*05*	LD L,(IX+d)
DD70 *05*	LD (IX+d),B
DD71 *05*	LD (IX+d),C
DD72 *05*	LD (IX+d),D
DD73 *05*	LD (IX+d),E
DD74 *05*	LD (IX+d),H
DD75 *05*	LD (IX+d),L
DD77 *05*	LD (IX+d),A
DD7E*05*	LD A,(IX+d)
DD86 *05*	ADD A,(IX+d)
DD8E*05*	ADC A,(IX+d)
DD96 *05*	SUB (IX+d)

OP-Code	Mnemonic
DD9E *05*	SBC A,(IX+d)
DDA6 *05*	AND (IX+d)
DDAE*05*	XOR (IX+d)
DDB6 *05*	OR (IX+d)
DDBE*05*	CP (IX+d)
DDE1	POP IX
DDE3	EX (SP),IX
DDE5	PUSH IX
DDE9	JP (IX)
DDF9	LD SP,IX
DDCB*05*06	RLC (IX+d)
DDCB*05*0E	RRC (IX+d)
DDCB*05*16	RL (IX+d)
DDCB*05*1E	RR (IX+d)
DDCB*05*26	SLA (IX+d)
DDCB*05*2E	SRA (IX+d)
DDCB*05*3E	SRL (IX+d)
DDCB*05*46	BIT 0,(IX+d)
DDCB*05*4E	BIT 1,(IX+d)
DDCB*05*56	BIT 2,(IX+d)
DDCB*05*5E	BIT 3,(IX+d)
DDCB*05*66	BIT 4,(IX+d)
DDCB*05*6E	BIT 5,(IX+d)
DDCB*05*76	BIT 6,(IX+d)
DDCB*05*7E	BIT 7,(IX+d)
DDCB*05*86	RES 0,(IX+d)
DDCB*05*8E	RES 1,(IX+d)
DDCB*05*96	RES 2,(IX+d)
DDCB*05*9E	RES 3,(IX+d)
DDCB*05*A6	RES 4,(IX+d)
DDCB*05*AE	RES 5,(IX+d)
DDCB*05*B6	RES 6,(IX+d)
DDCB*05*BE	RES 7,(IX+d)
DDCB*05*C6	SET 0,(IX+d)
DDCB*05*CE	SET 1,(IX+d)
DDCB*05*D6	SET 2,(IX+d)
DDCB*05*DE	SET 3,(IX+d)
DDCB*05*E6	SET 4,(IX+d)
DDCB*05*EE	SET 5,(IX+d)

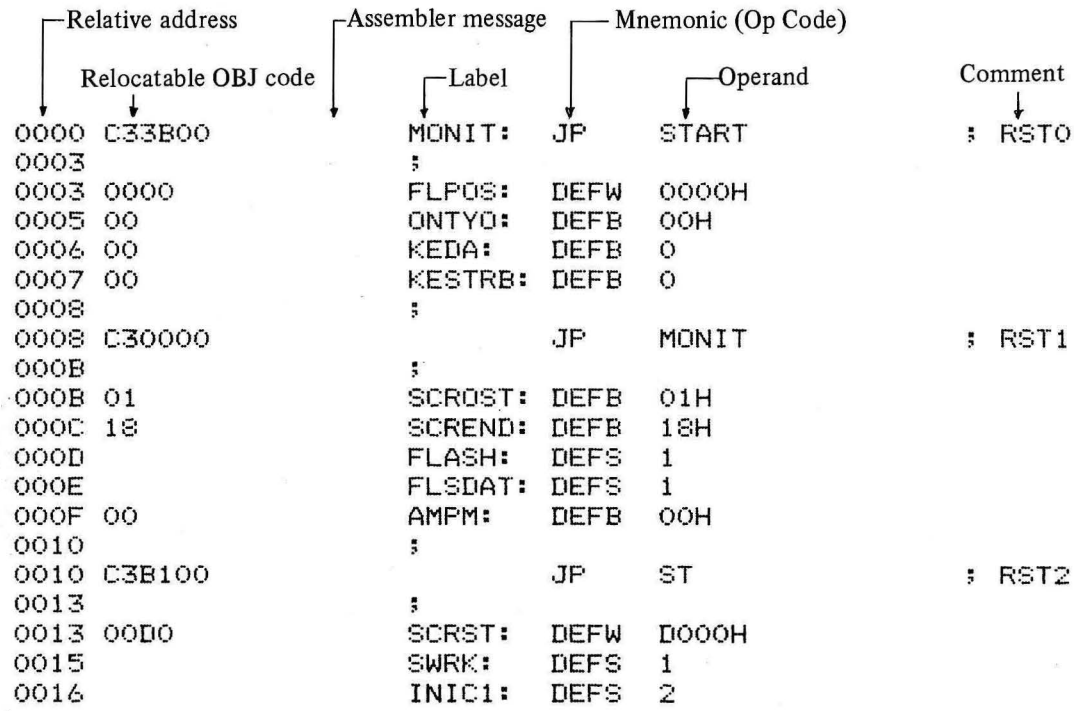
OP-Code	Mnemonic
DDCB*05*F6	SET 6,(IX+d)
DDCB*05*FE	SET 7,(IX+d)
ED40	IN B,(C)
ED41	OUT (C),B
ED42	SBC HL,BC
ED43*8405*	LD (nn),BC
ED44	NEG
ED45	RETN
ED46	IM 0
ED47	LD I,A
ED48	IN C,(C)
ED49	OUT (C),C
ED4A	ADC HL,BC
ED4B*8405*	LD BC,(nn)
ED4D	RETI
ED50	IN D,(C)
ED51	OUT (C),D
ED52	SBC HL,DE
ED53*8405*	LD (nn),DE
ED56	IM 1
ED57	LD A,I
ED58	IN E,(C)
ED59	OUT (C),E
ED5A	ADC HL,DE
ED5B*8405*	LD DE,(nn)
ED5E	IM 2
ED60	IN H,(C)
ED61	OUT (C),H
ED62	SBC HL,HL
ED67	RRD
ED68	IN L,(C)
ED69	OUT (C),L
ED6A	ADC HL,HL
ED6F	RLD
ED72	SBC HL,SP
ED73*8405*	LD (nn),SP
ED78	IN A,(C)
ED79	OUT (C),A
ED7A	ADC HL,SP
ED7B*8405*	LD SP,(nn)
EDA0	LDI
EDA1	CPI
EDA2	INI
EDA3	OUTI
EDA8	LDD
EDA9	CPD
EDAA	IND
EDAB	OUTD
EDB0	LDIR
EDB1	CPIR
EDB2	INIR
EDB3	OTIR
EDB8	LDDR
EDB9	CPDR
EDBA	INDR
EDBB	OTDR
FD09	ADD IY,BC
FD19	ADD IY,DE
FD21*8405*	LD IY,nn
FD22*8405*	LD (nn),IY
FD23	INC IY
FD29	ADD IY,IY
FD2A*8405*	LD IY,(nn)
FD2B	DEC IY
FD34*05*	INC (IY+d)
FD35*05*	DEC (IY+d)
FD36*0520*	LD (IY+d),n
FD39	ADD IY,SP
FD46 *05*	LD B,(IY+d)
FD4E*05*	LD C,(IY+d)
FD56 *05*	LD D,(IY+d)
FD5E*05*	LD E,(IY+d)
FD66 *05*	LD H,(IY+d)
FD6E*05*	LD L,(IY+d)
FD70 *05*	LD (IY+d),B
FD71 *05*	LD (IY+d),C
FD72 *05*	LD (IY+d),D
FD73 *05*	LD (IY+d),E

OP-Code	Mnemonic
FD74 *05*	LD (IY+d),H
FD75 *05*	LD (IY+d),L
FD77 *05*	LD (IY+d),A
FD7E *05*	LD A,(IY+d)
FD86 *05*	ADD A,(IY+d)
FD8E *05*	ADC A,(IY+d)
FD96 *05*	SUB (IY+d)
FD9E *05*	SBC A,(IY+d)
FDA6 *05*	AND (IY+d)
FDAE *05*	XOR (IY+d)
FDB6 *05*	OR (IY+d)
FDBE *05*	CP (IY+d)
FDE1	POP IY
FDE3	EX (SP),IY
FDE5	PUSH IY
FDE9	JP (IY)
FDF9	LD SP,IY
FDCB *05* 06	RLC (IY+d)
FDCB *05* 0E	RRC (IY+d)
FDCB *05* 16	RL (IY+d)
FDCB *05* 1E	RR (IY+d)
FDCB *05* 26	SLA (IY+d)
FDCB *05* 2E	SRA (IY+d)
FDCB *05* 3E	SRL (IY+d)
FDCB *05* 46	BIT 0,(IY+d)
FDCB *05* 4E	BIT 1,(IY+d)
FDCB *05* 56	BIT 2,(IY+d)
FDCB *05* 5E	BIT 3,(IY+d)
FDCB *05* 66	BIT 4,(IY+d)
FDCB *05* 6E	BIT 5,(IY+d)
FDCB *05* 76	BIT 6,(IY+d)
FDCB *05* 7E	BIT 7,(IY+d)
FDCB *05* 86	RES 0,(IY+d)
FDCB *05* 8E	RES 1,(IY+d)
FDCB *05* 96	RES 2,(IY+d)
FDCB *05* 9E	RES 3,(IY+d)
FDCB *05* A6	RES 4,(IY+d)
FDCB *05* AE	RES 5,(IY+d)
FDCB *05* B6	RES 6,(IY+d)
FDCB *05* BE	RES 7,(IY+d)
FDCB *05* C6	SET 0,(IY+d)
FDCB *05* CE	SET 1,(IY+d)
FDCB *05* D6	SET 2,(IY+d)
FDCB *05* DE	SET 3,(IY+d)
FDCB *05* E6	SET 4,(IY+d)
FDCB *05* EE	SET 5,(IY+d)
FDCB *05* F6	SET 6,(IY+d)
FDCB *05* FE	SET 7,(IY+d)

A.3 MONITOR SB-1510 Assembly Listing

The MONITOR SB-1510 assembly listing is shown in following pages.

This assembly listing was obtained with the Z80A Macro-Assembler. The meaning of each column is as follows.




```
0000 C33B00             MONIT:  JP      START           ; RST0
0003                    ;
0003 0000               FLPOS:  DEFW    0000H
0005 00                 ONTYO:  DEFB    00H
0006 00                 KEDA:   DEFB    0
0007 00                 KESTRB: DEFB    0
0008                    ;
0008 C30000                     JP      MONIT           ; RST1
000B                    ;
000B 01                 SCROST: DEFB    01H
000C 18                 SCREND: DEFB    18H
000D                    FLASH:  DEFS    1
000E                    FLSDAT: DEFS    1
000F 00                 AMPM:   DEFB    00H
0010                    ;
0010 C3B100                     JP      ST              ; RST2
0013                    ;
0013 00D0               SCRST:  DEFW    D000H
0015                    SWRK:   DEFS    1
0016                    INIC1:  DEFS    2
```

FIGURE A.1

Since the first address of MONITOR SB-1510 is $0000, relative addresses and relocatable OBJ codes may be regarded as absolute addresses and OBJ codes without interpretation.

This assembly listing is for reference only. The Sharp corporation is not obliged to answer any questions about the contents of this program.

```
0000                    ;
0000                    ;
0000                    ; 12/10 1980 MONITOR SB-1510
0000                    ;
0000                    ;
0000 C33B00             MONIT:  JP      START           ; RST0
0003                    ;
0003 0000               FLPOS:  DEFW    0000H
0005 00                 ONTYO:  DEFB    00H
0006 00                 KEDA:   DEFB    0
0007 00                 KESTRB: DEFB    0
0008                    ;
0008 C30000                     JP      MONIT           ; RST1
000B                    ;
000B 01                 SCROST: DEFB    01H
000C 18                 SCREND: DEFB    18H
000D                    FLASH:  DEFS    1
000E                    FLSDAT: DEFS    1
000F 00                 AMPM:   DEFB    00H
0010                    ;
0010 C3B100                     JP      ST              ; RST2
0013                    ;
0013 00D0               SCRST:  DEFW    D000H
0015                    SWRK:   DEFS    1
0016                    INIC1:  DEFS    2
0018                    ;
0018 C3B100                     JP      ST              ; RST3
001B                    ;
001B 8007               SCRSIZ: DEFW    0780H
001D                    TEMPW:  DEFS    1
001E                    C2DATA: DEFS    2
0020                    ;
0020 C3B100                     JP      ST              ; RST4
0023                    ;
0023 3030               FOARE:  DEFW    3030H
0025 0D                         DEFB    0DH
0026                    KDATW:  DEFS    1
0027                    KDATW1: DEFS    1
0028                    ;
0028 C3B100                     JP      ST              ; RST5
002B                    ;
002B                    SHL:    ENT
002B                    SUMDT:  DEFS    2
002D                    STRGF:  DEFS    1
002E                    STACK:  DEFS    2
0030                    ;
0030 C3B100                     JP      ST              ; RST6
0033                    ;
0033                    EHL:    ENT
0033                    CSMDT:  DEFS    2
0035 40                 REPTCT: DEFB    40H
0036                    RATIO:  DEFS    2
0038                    ;
0038 C3310D                     JP      REGIST          ; RST7
003B                    ;
003B 3E02               START:  LD      A,2
003D D3E3                       OUT     (E3H),A
003F 3E34                       LD      A,34H           ; C0 MODE2
0041 D3E7                       OUT     (E7H),A
0043 3E74                       LD      A,74H           ; C1 MODE2
```

```
0045 D3E7                       OUT     (E7H),A
0047 3EB4                       LD      A,B4H           ; C2 MODE2
0049 D3E7                       OUT     (E7H),A
004B AF                         XOR     A
004C D3E6                       OUT     (E6H),A         ; C2=0000 SET
004E D3E6                       OUT     (E6H),A
0050 3E02                       LD      A,2             ; C1=0002 SET
0052 D3E5                       OUT     (E5H),A         ; C0=0002 SET
0054 D3E4                       OUT     (E4H),A
0056 AF                         XOR     A
0057 D3E5                       OUT     (E5H),A
0059 D3E4                       OUT     (E4H),A
005B 3ECF                       LD      A,CFH           ; PIOA=MOD3
005D D3E9                       OUT     (E9H),A
005F AF                         XOR     A               ; A=ALL OUTPUT
0060 D3E9                       OUT     (E9H),A
0062 3ECF                       LD      A,CFH           ; B=MOD3
0064 1803                       JR      +5
0066                    ;
0066 C33B00                     JP      START           ; NMI
0069                    ;
0069 D3EB                       OUT     (EBH),A
006B 3EFF                       LD      A,FFH           ; B=ALL INPUT
006D D3EB                       OUT     (EBH),A
006F 210118                     LD      HL,1801H
0072 220B00                     LD      (SCROST),HL
0075 31C010                     LD      SP,IBUFE
0078 CD180D                     CALL    CHR40
007B 062F                       LD      B,2FH
007D 215011                     LD      HL,MODE
0080 3E12                       LD      A,12H
0082 77                         LD      (HL),A
0083 D3E0                       OUT     (E0H),A         ; INIT CMT
0085 23                         INC     HL
0086 CD4F06                     CALL    ?CLER
0089 3E0D                       LD      A,0DH
008B D3E3                       OUT     (E3H),A
008D 06A0                       LD      B,A0H
008F CD5006                     CALL    ?DINT
0092 218B11                     LD      HL,118BH
0095 227011                     LD      (FKAE),HL
0098 3E04                       LD      A,4
009A 321D00                     LD      (TEMPW),A
009D 3C                         INC     A
009E 320500                     LD      (ONTYO),A
00A1 115506                     LD      DE,TITMES
00A4 CDB605                     CALL    NLMSG
00A7 ED56                       IM      1
00A9 3EFF               SS:     LD      A,FFH
00AB 321500                     LD      (SWRK),A
00AE                    ;
00AE C3B100             GOOUT:  JP      EXIT
00B1                    ;
00B1 3E0D               ST:     LD      A,0DH           ; READ MODE
00B3 D3E3                       OUT     (E3H),A
00B5 31C010                     LD      SP,IBUFE
00B8 CDAB08                     CALL    NL
00BB 3E2A                       LD      A,2AH           ; *
00BD CD1609                     CALL    PRNT
00C0 113F10                     LD      DE,BUFER
```

```
00C3 3E14                       LD      A,20
00C5 32A206                     LD      (KNUMBS),A
00C8 CDA406                     CALL    GETL
00CB 1A                         LD      A,(DE)
00CC FE2A                       CP      2AH             ; *
00CE 20E1                       JR      NZ,ST
00D0 13                         INC     DE
00D1 1A                         LD      A,(DE)
00D2 21E700                     LD      HL,SELTBL
00D5 0606                       LD      B,6
00D7 BE                 SEL0:   CP      (HL)
00D8 2807                       JR      Z,SEL1
00DA 23                         INC     HL
00DB 23                         INC     HL
00DC 23                         INC     HL
00DD 10F8                       DJNZ    SEL0
00DF 18D0                       JR      ST
00E1 23                 SEL1:   INC     HL
00E2 5E                         LD      E,(HL)
00E3 23                         INC     HL
00E4 56                         LD      D,(HL)
00E5 EB                         EX      DE,HL
00E6 E9                         JP      (HL)
00E7                    ;
00E7 4A                 SELTBL: DEFB    4AH             ; J
00E8 4B02                       DEFW    JUMP
00EA 4D                         DEFB    4DH             ; M
00EB F900                       DEFW    MCLECT
00ED 44                         DEFB    44H             ; D
00EE 2001                       DEFW    DUMP
00F0 4C                         DEFB    4CH             ; L
00F1 CB01                       DEFW    MLOAD
00F3 53                         DEFB    53H             ; S
00F4 4E01                       DEFW    MSAVE
00F6 56                         DEFB    56H             ; V
00F7 1702                       DEFW    MVRFY
00F9                    ;
00F9                    ;
00F9                    ;
00F9 3E4D               MCLECT: LD      A,4DH           ; M
00FB CD8C05                     CALL    KIN
00FE 2B                         DEC     HL
00FF 23                 MR:     INC     HL
0100 CDBC05                     CALL    NLPHLS
0103 7E                         LD      A,(HL)
0104 CDDD05                     CALL    PRTHX
0107 CDB908                     CALL    PRNTS
010A 113F10                     LD      DE,BUFER
010D CDC505                     CALL    GETLBR
0110 114710                     LD      DE,BUFER+8
0113 1A                         LD      A,(DE)
0114 FE0D                       CP      0DH             ; CR
0116 28E7                       JR      Z,MR
0118 CD2306                     CALL    2HEX
011B 38DC                       JR      C,MCLECT
011D 77                         LD      (HL),A
011E 18DF                       JR      MR
0120                    ;
0120                    ;
0120                    ;
```

```
0120 CD7A05          DUMP:   CALL   SSET
0123 CD8305                  CALL   ESET
0126 EB                      EX     DE,HL
0127 2A2B00                  LD     HL,(SHL)
012A CDBC05          DUMPO:  CALL   NLPHLS
012D 0610                    LD     B,16
012F CDB908          DUMP1:  CALL   PRNTS
0132 7E                      LD     A,(HL)
0133 CDDD05                  CALL   PRTHX
0136 E5                      PUSH   HL
0137 AF                      XOR    A
0138 ED52                    SBC    HL,DE
013A E1                      POP    HL
013B CAB100                  JP     Z,ST
013E CD6205                  CALL   BRKEY
0141 28F8                    JR     Z,-6
0143 DBEA                    IN     A,(EAH)
0145 FEFD                    CP     FDH                ; SPKEY
0147 28FA                    JR     Z,-4
0149 23                      INC    HL
014A 10E3                    DJNZ   DUMP1
014C 18DC                    JR     DUMPO
014E                 ;
014E                 ;
014E                 ;
014E 3E02            MSAVE:  LD     A,2
0150 321602                  LD     (MWARK),A
0153                 ;
0153 21C001          MENAME: LD     HL,FNCOM
0156 113F10                  LD     DE,BUFER
0159 010B00                  LD     BC,11
015C D5                      PUSH   DE
015D EDB0                    LDIR
015F EB                      EX     DE,HL
0160 0611                    LD     B,11H
0162 3E0D                    LD     A,0DH
0164 CD5006                  CALL   ?DINT
0167 D1                      POP    DE
0168 CDB605                  CALL   NLMSG
016B CDC505                  CALL   GETLBR
016E 3A1602                  LD     A,(MWARK)
0171 FE02                    CP     2
0173 C2CF01                  JP     NZ,MLOVE
0176 11C010                  LD     DE,IBUFE
0179 3E01                    LD     A,1
017B 12                      LD     (DE),A
017C 13                      INC    DE
017D 214910                  LD     HL,BUFER+10
0180 011000                  LD     BC,16
0183 EDB0                    LDIR
0185 3E0D                    LD     A,0DH
0187 12                      LD     (DE),A
0188 CD7A05          MNAM1:  CALL   SSET
018B 22D410                  LD     (DTADR),HL
018E CD8305                  CALL   ESET
0191 ED5B2B00                LD     DE,(SHL)
0195 AF                      XOR    A
0196 ED52                    SBC    HL,DE
0198 38EE                    JR     C,MNAM1
019A 22D210                  LD     (SIZE),HL
```

```
019D 21B100                     LD    HL,ST
01A0 22D610                     LD    (EXADR),HL
01A3 3E4A                       LD    A,4AH             ; J
01A5 329905                     LD    (KINP+1),A
01A8 CD9805             KIN2:   CALL  KINP
01AB 2808                       JR    Z,SAVEGO
01AD CD1406                     CALL  HLHEX
01B0 38F6                       JR    C,KIN2
01B2 22D610                     LD    (EXADR),HL
01B5 CD5102             SAVEGO: CALL  ?WRI
01B8 3803                       JR    C,+5
01BA CD8202                     CALL  ?WRD
01BD C3B100             JST1:   JP    ST
01C0                    ;
01C0 46494C45           FNCOM:  DEFM  'FILE NAME:'
01C4 204E414D
01C8 453A
01CA 0D                         DEFB  0DH
01CB                    ;
01CB                    ;
01CB                    ;
01CB 3E01               MLOAD:  LD    A,1
01CD 1881                       JR    MSAVE+2
01CF                    ;
01CF 214910             MLOVE:  LD    HL,BUFER+10
01D2 7E                         LD    A,(HL)
01D3 FE0D                       CP    0DH
01D5 F5                         PUSH  AF
01D6 CD8E02                     CALL  ?RDI
01D9 38E2                       JR    C,JST1
01DB F1                         POP   AF
01DC C4F601                     CALL  NZ,NAMECK
01DF 20EE                       JR    NZ,MLOVE
01E1 3A1602                     LD    A,(MWARK)
01E4 3D                         DEC   A
01E5 2033                       JR    NZ,MVERY
01E7 112D02                     LD    DE,LOAMES
01EA CDCF05                     CALL  DSPNAM
01ED CDB202                     CALL  ?RDD
01F0 38CB                       JR    C,JST1
01F2 2AD610                     LD    HL,(EXADR)
01F5 E9                         JP    (HL)
01F6                    ;
01F6 114102             NAMECK: LD    DE,FOUMES
01F9 CDCF05                     CALL  DSPNAM
01FC 114910                     LD    DE,BUFER+10
01FF 21C110                     LD    HL,NAME
0202 0610                       LD    B,16
0204 CD3A06                     CALL  SAME
0207 C8                         RET   Z
0208 CDB104                     CALL  SERSP
020B CDCE04                     CALL  MSTOP
020E 38AD                       JR    C,JST1
0210 CD1105                     CALL  DEL6
0213 C1                         POP   BC                ; ADJ
0214 18B9                       JR    MLOVE
0216                    ;
0216                    MWARK:  DEFS  1
0217                    ;
0217                    :
```

```
0217                    ;
0217 AF                 MVRFY:  XOR     A
0218 18B3                       JR      MLOAD+2
021A                    ;
021A 113602             MVERY:  LD      DE,VERMES
021D CDCF05                     CALL    DSPNAM
0220 CDBE02                     CALL    ?VRFY
0223 3898                       JR      C,JST1
0225 114802                     LD      DE,OKMES
0228 CDB605             NMSGST: CALL    NLMSG
022B 1890                       JR      JST1
022D                    ;
022D 4C4F4144           LOAMES: DEFM    'LOADING '
0231 494E4720
0235 0D                         DEFB    0DH
0236 56455249           VERMES: DEFM    'VERIFYING '
023A 4659494E
023E 4720
0240 0D                         DEFB    0DH
0241 464F554E           FOUMES: DEFM    'FOUND '
0245 4420
0247 0D                         DEFB    0DH
0248 4F4B               OKMES:  DEFM    'OK'
024A 0D                         DEFB    0DH
024B                    ;
024B                    ;
024B                    ;
024B 3E4A               JUMP:   LD      A,4AH           ; J
024D CD8C05                     CALL    KIN
0250 E9                         JP      (HL)
0251                    ;
0251                    ;
0251                    ;
0251                    WRINF:  ENT
0251 F3                 ?WRI:   DI
0252 1601                       LD      D,1             ; 0001:WI
0254 21C010                     LD      HL,IBUFE
0257 018000                     LD      BC,0080H
025A CD2304             WRI1:   CALL    CKSUM
025D CD5704                     CALL    MOTOR
0260 384B                       JR      C,STPRET
0262 CB42                       BIT     0,D
0264 280B                       JR      Z,WRI2          ; WD
0266 D5                         PUSH    DE
0267 117B06                     LD      DE,WRIMES
026A CDCF05                     CALL    DSPNAM
026D D1                         POP     DE
026E CDF904                     CALL    TSPE
0271 CDC703             WRI2:   CALL    GAP
0274 CDDA02                     CALL    WTAPE
0277 3834                       JR      C,STPRET
0279 CB4A                       BIT     1,D
027B C4F904                     CALL    NZ,TSPE
027E 202D                       JR      NZ,STPRET
0280 FB                         EI
0281 C9                         RET
0282                    WRDAT:  ENT
0282 F3                 ?WRD:   DI
0283 1602                       LD      D,2             ; 0010:WD
0285 ED4BD210                   LD      BC,(SIZE)
```

```
0289 2AD410                     LD      HL,(DTADR)
028C 18CC                       JR      WRI1
028E                    ;
028E                    ;
028E                    ;
028E                    RDINF:  ENT
028E F3                 ?RDI:   DI
028F 1604                       LD      D,4             ; 0100:RI
0291 21C010                     LD      HL,IBUFE
0294 018000                     LD      BC,0080H
0297 CD5704             RD1:    CALL    MOTOR
029A 3811                       JR      C,STPRET
029C CDF103                     CALL    TMARK
029F 380C                       JR      C,STPRET
02A1 CD0B03                     CALL    RTAPE
02A4 3807                       JR      C,STPRET
02A6 CB5A               RD2:    BIT     3,D
02A8 2806                       JR      Z,STPRET+3
02AA CDB104                     CALL    SERSP
02AD CDCE04             STPRET: CALL    MSTOP
02B0 FB                         EI
02B1 C9                         RET
02B2                    RDDAT:  ENT
02B2 F3                 ?RDD:   DI
02B3 1608                       LD      D,8             ; 1000:RD
02B5 ED4BD210                   LD      BC,(SIZE)
02B9 2AD410                     LD      HL,(DTADR)
02BC 18D9                       JR      RD1
02BE                    ;
02BE                    ;
02BE                    ;
02BE                    VERFY:  ENT
02BE F3                 ?VRFY:  DI
02BF 1608                       LD      D,8             ; RD
02C1 ED4BD210                   LD      BC,(SIZE)
02C5 2AD410                     LD      HL,(DTADR)
02C8 CD2304                     CALL    CKSUM
02CB CD5704                     CALL    MOTOR
02CE 38DD                       JR      C,STPRET
02D0 CDF103                     CALL    TMARK
02D3 38D8                       JR      C,STPRET
02D5 CD5803                     CALL    TVRFY
02D8 18CC                       JR      RD2
02DA                    ;
02DA                    ;
02DA                    ;
02DA 1E02               WTAPE:  LD      E,2
02DC C5                         PUSH    BC
02DD E5                         PUSH    HL
02DE 7E                 WTAP1:  LD      A,(HL)
02DF CD8F03                     CALL    WBYTE
02E2 CD6C05                     CALL    BRK
02E5 3818                       JR      C,RETHB
02E7 23                 WTAP2:  INC     HL
02E8 0B                         DEC     BC
02E9 78                         LD      A,B
02EA B1                         OR      C
02EB 20F1                       JR      NZ,WTAP1
02ED 2A2B00                     LD      HL,(SUMDT)
02F0 7C                         LD      A,H
```

```
02F1 CD8F03                    CALL   WBYTE
02F4 7D                        LD     A,L
02F5 CD8F03                    CALL   WBYTE
02F8 CD3905                    CALL   LONG
02FB 1D                        DEC    E
02FC 2004                      JR     NZ,WTAP4
02FE AF                        XOR    A
02FF E1                RETHB:  POP    HL
0300 C1                        POP    BC
0301 C9                        RET
0302 CD1D05            WTAP4:  CALL   SHORT
0305 10FB                      DJNZ   -3
0307 E1                        POP    HL
0308 C1                        POP    BC
0309 18D1                      JR     WTAPE+2
030B                   ;
030B                   ;
030B                   ;
030B 1E02              RTAPE:  LD     E,2
030D C5                        PUSH   BC
030E E5                        PUSH   HL
030F CD4604            RTAP1:  CALL   EDGE
0312 38EB                      JR     C,RETHB
0314 CD5405                    CALL   DLYR
0317 DBE1                      IN     A,(E1H)
0319 E640                      AND    40H
031B 28F2                      JR     Z,RTAP1
031D 210000                    LD     HL,0000H
0320 222B00                    LD     (SUMDT),HL
0323 E1                        POP    HL
0324 C1                        POP    BC
0325 C5                        PUSH   BC
0326 E5                        PUSH   HL
0327 CDA003            RTAP2:  CALL   RBYTE
032A 38D3                      JR     C,RETHB
032C 77                        LD     (HL),A
032D 23                        INC    HL
032E 0B                        DEC    BC
032F 78                        LD     A,B
0330 B1                        OR     C
0331 20F4                      JR     NZ,RTAP2
0333 2A2B00                    LD     HL,(SUMDT)
0336 CDA003                    CALL   RBYTE
0339 38C4                      JR     C,RETHB
033B 4F                        LD     C,A
033C CDA003                    CALL   RBYTE
033F 38BE                      JR     C,RETHB
0341 BD                        CP     L
0342 2006                      JR     NZ,RTAP3
0344 79                        LD     A,C
0345 BC                        CP     H
0346 3E00                      LD     A,0
0348 28B5                      JR     Z,RETHB
034A 1D                RTAP3:  DEC    E
034B 20C2                      JR     NZ,RTAP1
034D 119206            TAPER:  LD     DE,SUMMES
0350 CDB605                    CALL   NLMSG
0353 3EFF                      LD     A,FFH
0355 37                        SCF
0356 18A7                      JR     RETHB
```

```
0358                    ;
0358                    ;
0358                    ;
0358 1E02               TVRFY:  LD      E,2
035A C5                         PUSH    BC
035B E5                         PUSH    HL
035C CD4604             TVF1:   CALL    EDGE
035F 389E                       JR      C,RETHB
0361 CD5405                     CALL    DLYR
0364 DBE1                       IN      A,(E1H)
0366 E640                       AND     40H
0368 28F2                       JR      Z,TVF1
036A CDA003             TVF2:   CALL    RBYTE
036D 3890                       JR      C,RETHB
036F BE                         CP      (HL)
0370 20DB                       JR      NZ,TAPER
0372 23                         INC     HL
0373 0B                         DEC     BC
0374 78                         LD      A,B
0375 B1                         OR      C
0376 20F2                       JR      NZ,TVF2
0378 2A3300                     LD      HL,(CSMDT)
037B CDA003                     CALL    RBYTE
037E BC                         CP      H
037F 20CC                       JR      NZ,TAPER
0381 CDA003                     CALL    RBYTE
0384 BD                         CP      L
0385 20C6                       JR      NZ,TAPER
0387 1D                         DEC     E
0388 CAFF02                     JP      Z,RETHB
038B E1                         POP     HL
038C C1                         POP     BC
038D 18CB                       JR      TVRFY+2
038F                    ;
038F                    ;
038F                    ;
038F C5                 WBYTE:  PUSH    BC
0390 0608                       LD      B,8
0392 CD3905                     CALL    LONG
0395 07                 WBY1:   RLCA
0396 DC3905                     CALL    C,LONG
0399 D41D05                     CALL    NC,SHORT
039C 10F7                       DJNZ    WBY1
039E C1                         POP     BC
039F C9                         RET
03A0                    ;
03A0                    ;
03A0                    ;
03A0 E5                 RBYTE:  PUSH    HL
03A1 210008                     LD      HL,0800H
03A4 CD4604             RBY1:   CALL    EDGE
03A7 381C                       JR      C,RBY3
03A9 CD5405                     CALL    DLYR
03AC DBE1                       IN      A,(E1H)
03AE E640                       AND     40H
03B0 280A                       JR      Z,RBY2
03B2 E5                         PUSH    HL
03B3 2A2B00                     LD      HL,(SUMDT)
03B6 23                         INC     HL
03B7 222B00                     LD      (SUMDT),HL
```

```
03BA E1                     POP   HL
03BB 37                     SCF
03BC CB15           RBY2:   RL    L
03BE 25                     DEC   H
03BF 20E3                   JR    NZ,RBY1
03C1 CD4604                 CALL  EDGE
03C4 7D                     LD    A,L
03C5 E1             RBY3:   POP   HL
03C6 C9                     RET
03C7                ;
03C7                ;
03C7                ;
03C7 C5             GAP:    PUSH  BC
03C8 E5                     PUSH  HL
03C9 01F82A                 LD    BC,2AF8H
03CC 211414                 LD    HL,1414H
03CF CB4A                   BIT   1,D
03D1 2004                   JR    NZ,GAP1           ; WD
03D3 011027                 LD    BC,2710H          ; 55F0H(K)
03D6 29                     ADD   HL,HL
03D7 CD1D05         GAP1:   CALL  SHORT
03DA 0B                     DEC   BC
03DB 78                     LD    A,B
03DC B1                     OR    C
03DD 20F8                   JR    NZ,GAP1
03DF CD3905         GAP2:   CALL  LONG
03E2 25                     DEC   H
03E3 20FA                   JR    NZ,GAP2
03E5 CD1D05         GAP3:   CALL  SHORT
03E8 2D                     DEC   L
03E9 20FA                   JR    NZ,GAP3
03EB CD3905                 CALL  LONG
03EE E1             RETHB1: POP   HL
03EF C1                     POP   BC
03F0 C9                     RET
03F1                ;
03F1                ;
03F1                ;
03F1 E5             TMARK:  PUSH  HL
03F2 2E14                   LD    L,14H
03F4 CB5A                   BIT   3,D
03F6 2002                   JR    NZ,TM1
03F8 CB05                   RLC   L
03FA 65             TM1:    LD    H,L
03FB CD4604         TM2:    CALL  EDGE
03FE 3821                   JR    C,TM4
0400 CD5405                 CALL  DLYR
0403 DBE1                   IN    A,(E1H)
0405 E640                   AND   40H
0407 28F1                   JR    Z,TM1
0409 25                     DEC   H
040A 20EF                   JR    NZ,TM2
040C 65                     LD    H,L
040D CD4604         TM3:    CALL  EDGE
0410 380F                   JR    C,TM4
0412 CD5405                 CALL  DLYR
0415 DBE1                   IN    A,(E1H)
0417 E640                   AND   40H
0419 20DF                   JR    NZ,TM1
041B 25                     DEC   H
```

```
041C 20EF                       JR      NZ,TM3
041E CD4604                     CALL    EDGE
0421 E1                 TM4:    POP     HL
0422 C9                         RET
0423                    ;
0423                    ;
0423                    ;
0423 C5                 CKSUM:  PUSH    BC
0424 E5                         PUSH    HL
0425 D5                         PUSH    DE
0426 110000                     LD      DE,0000H
0429 78                 CKS1:   LD      A,B
042A B1                         OR      C
042B 200A                       JR      NZ,CKS2
042D EB                         EX      DE,HL
042E 222B00                     LD      (SUMDT),HL
0431 223300                     LD      (CSMDT),HL
0434 D1                         POP     DE
0435 18B7                       JR      RETHB1
0437 7E                 CKS2:   LD      A,(HL)
0438 C5                         PUSH    BC
0439 0608                       LD      B,8
043B 07                 CKS3:   RLCA
043C 3001                       JR      NC,+3
043E 13                         INC     DE
043F 10FA                       DJNZ    CKS3
0441 C1                         POP     BC
0442 23                         INC     HL
0443 0B                         DEC     BC
0444 18E3                       JR      CKS1
0446                    ;
0446                    ;
0446                    ;
0446 DBE1               EDGE:   IN      A,(E1H)
0448 2F                         CPL
0449 07                         RLCA
044A D8                         RET     C
044B 07                         RLCA
044C 30F8                       JR      NC,EDGE
044E DBE1               EDGE1:  IN      A,(E1H)
0450 2F                         CPL
0451 07                         RLCA
0452 D8                         RET     C
0453 07                         RLCA
0454 38F8                       JR      C,EDGE1
0456 C9                         RET
0457                    ;
0457                    ;
0457                    ;
0457 CD7105             MOTOR:  CALL    KBSET
045A DBE1                       IN      A,(E1H)
045C E620                       AND     20H
045E 2818                       JR      Z,MOT2
0460 D5                         PUSH    DE
0461 117206                     LD      DE,SETMES
0464 CDB605                     CALL    NLMSG
0467 D1                         POP     DE
0468 CD8C04                     CALL    OPEN
046B CD6C05             MOT1:   CALL    BRK
046E D8                         RET     C
```

```
046F DBE1                   IN    A,(E1H)
0471 E620                   AND   20H
0473 20F6                   JR    NZ,MOT1
0475 CD1705                 CALL  DEL1M
0478 3E03             MOT2: LD    A,3             ; 0011:WRITE  1100:READ
047A A2                     AND   D
047B 281E                   JR    Z,PLAY
047D DBE1             MOTW: IN    A,(E1H)
047F E610                   AND   10H
0481 2814                   JR    Z,MOTWG
0483 D5                     PUSH  DE
0484 118406                 LD    DE,WPRMES
0487 CDB605                 CALL  NLMSG
048A D1                     POP   DE
048B 37                     SCF
048C                  ;
048C 3E08             OPEN: LD    A,08H
048E D3E3                   OUT   (E3H),A
0490 CD1705                 CALL  DEL1M
0493 3C                     INC   A
0494 D3E3                   OUT   (E3H),A
0496 C9                     RET
0497                  ;
0497 3E0C             MOTWG: LD   A,0CH           ; WRITE MODE
0499 D3E3                   OUT   (E3H),A
049B 7A               PLAY: LD    A,D
049C E605                   AND   05H
049E C4D204                 CALL  NZ,MPLAY
04A1 CDE104                 CALL  FR
04A4 3A5011                 LD    A,(MODE)
04A7 CBD7                   SET   2,A
04A9 182C                   JR    BLK4
04AB 00                     NOP
04AC D3E3             FR1:  OUT   (E3H),A
04AE C31105                 JP    DEL6
04B1                  ;
04B1                  ;
04B1                  ;
04B1 CDCE04           SERSP: CALL MSTOP
04B4 CD1105                 CALL  DEL6
04B7 CDE904                 CALL  FFWD
04BA CD1105                 CALL  DEL6
04BD 01A601           SSP1: LD    BC,01A6H
04C0 DBE1                   IN    A,(E1H)
04C2 2F                     CPL
04C3 07                     RLCA
04C4 D8                     RET   C
04C5 07                     RLCA
04C6 30F5                   JR    NC,SSP1
04C8 0B                     DEC   BC
04C9 78                     LD    A,B
04CA B1                     OR    C
04CB 20F3                   JR    NZ,SSP1+3
04CD C9                     RET
04CE                  ;
04CE                  ;
04CE                  ;
04CE                  MSTOP: ENT
04CE 3E0D                   LD    A,0DH           ; READ MODE
04D0 D3E3                   OUT   (E3H),A
```

```
04D2 3A5011          MPLAY:  LD      A,(MODE)
04D5 CBDF                    SET     3,A
04D7 CDDD04          BLK4:   CALL    BLK1
04DA 3A5011          BLK3:   LD      A,(MODE)
04DD D3E0            BLK1:   OUT     (E0H),A
04DF 1830                    JR      DEL6
04E1                 ;
04E1 3E0B            FR:     LD      A,0BH
04E3 CDAC04                  CALL    FR1
04E6 3D                      DEC     A
04E7 18C3                    JR      FR1
04E9                 ;
04E9                 ;
04E9                 ;
04E9 CD7105          FFWD:   CALL    KBSET
04EC CDDA04                  CALL    BLK3
04EF CDE104                  CALL    FR
04F2 CDDA04                  CALL    BLK3
04F5 CBC7                    SET     0,A
04F7 18DE                    JR      BLK4
04F9                 ;
04F9                 ;
04F9                 ;
04F9 3E0E            TSPE:   LD      A,0EH
04FB D3E3                    OUT     (E3H),A
04FD CD0005                  CALL    DELT
0500                 ;
0500                 ;
0500                 ;
0500 C5              DELT:   PUSH    BC
0501 012B0F                  LD      BC,3883         ; 4S
0504 F5              D1M:    PUSH    AF
0505 AF                      XOR     A
0506 3D                      DEC     A
0507 20FD                    JR      NZ,-1
0509 0B                      DEC     BC
050A 78                      LD      A,B
050B B1                      OR      C
050C 20F7                    JR      NZ,D1M+1
050E F1                      POP     AF
050F C1                      POP     BC
0510 C9                      RET
0511                 ;
0511 C5              DEL6:   PUSH    BC
0512 012301                  LD      BC,291          ; 300MS
0515 18ED                    JR      D1M
0517                 ;
0517 C5              DEL1M:  PUSH    BC
0518 019607                  LD      BC,1942         ; 2S
051B 18E7                    JR      D1M
051D                 ;
051D                 ;
051D                 ;
051D F5              SHORT:  PUSH    AF
051E 3E0F                    LD      A,0FH
0520 D3E3                    OUT     (E3H),A
0522 0A                      LD      A,(BC)
0523 3E2A                    LD      A,2AH           ; 2AH(H):166.75US
0525 325C05                  LD      (DLY+1),A       ; 3FH(L):240.25US
0528 CD5B05                  CALL    DLY
```

```
052B 3E0E                       LD      A,0EH
052D D3E3                       OUT     (E3H),A
052F 3E25                       LD      A,25H           ; 25H(H):166US
0531 325C05                     LD      (DLY+1),A       ; 3AH(L):221.5US
0534 CD5B05                     CALL    DLY
0537 F1                         POP     AF
0538 C9                         RET
0539                    ;
0539 F5                 LONG:   PUSH    AF
053A 3E0F                       LD      A,0FH
053C D3E3                       OUT     (E3H),A
053E 3E5A                       LD      A,5AH           ; 5AH(H):333US
0540 325C05                     LD      (DLY+1),A       ; 81H(L):469.5US
0543 CD5B05                     CALL    DLY
0546 3E0E                       LD      A,0EH
0548 D3E3                       OUT     (E3H),A
054A 3E55                       LD      A,55H           ; 55H(H):334US
054C 325C05                     LD      (DLY+1),A       ; 7CH(L):452.5US
054F CD5B05                     CALL    DLY
0552 F1                         POP     AF
0553 C9                         RET
0554                    ;
0554 7C                 DLYR:   LD      A,H
0555 7D                         LD      A,L
0556 3E41                       LD      A,41H           ; 66H(K)
0558 325C05                     LD      (DLY+1),A       ;
055B                    ;
055B 3EFF               DLY:    LD      A,FFH
055D 3D                         DEC     A
055E C25D05                     JP      NZ,-1
0561 C9                         RET
0562                    ;
0562                    ;
0562                    BRKEY:  ENT
0562 CD7105                     CALL    KBSET
0565 DBEA                       IN      A,(EAH)
0567 DBEA                       IN      A,(EAH)
0569 E680                       AND     80H
056B C9                         RET
056C                    ;
056C                    ;
056C                    ;
056C DBEA               BRK:    IN      A,(EAH)
056E 2F                         CPL
056F 07                         RLCA
0570 C9                         RET
0571                    ;
0571                    ;
0571                    ;
0571 DBE8               KBSET:  IN      A,(E8H)
0573 E6E0                       AND     E0H
0575 F613                       OR      13H
0577 D3E8                       OUT     (E8H),A
0579 C9                         RET
057A                    ;
057A                    ;
057A                    ;
057A 3E53               SSET:   LD      A,53H           ; S
057C CD8C05                     CALL    KIN
057F 222B00                     LD      (SHL),HL
```

```
0582 C9                 RET
0583                    ;
0583 3E45               ESET:   LD      A,45H           ; E
0585 CD8C05             CALL    KIN
0588 223300             LD      (EHL),HL
058B C9                 RET
058C                    ;
058C                    ;
058C 329905             KIN:    LD      (KINP+1),A
058F CD9805             KIN1:   CALL    KINP
0592 CD1406             CALL    HLHEX
0595 38F8               JR      C,KIN1
0597 C9                 RET
0598                    ;
0598                    ;
0598                    ;
0598 3EFF               KINP:   LD      A,FFH
059A 113F10             LD      DE,BUFER
059D 12                 LD      (DE),A
059E D5                 PUSH    DE
059F 13                 INC     DE
05A0 216B06             LD      HL,COMES
05A3 010700             LD      BC,7
05A6 EDB0               LDIR
05A8 D1                 POP     DE
05A9 CDB605             CALL    NLMSG
05AC CDC505             CALL    GETLBR
05AF 114610             LD      DE,BUFER+7
05B2 1A                 LD      A,(DE)
05B3 FE0D               CP      0DH
05B5 C9                 RET
05B6                    ;
05B6                    NLMSG:  ENT
05B6 CDAB08             CALL    NL
05B9 C3CD08             JP      MSGX
05BC                    ;
05BC CDAB08             NLPHLS: CALL    NL
05BF CDD805             CALL    PRTHL
05C2 C3B908             JP      PRNTS
05C5                    ;
05C5 CDA406             GETLBR: CALL    GETL
05C8 1A                 LD      A,(DE)
05C9 FE0B               CP      0BH
05CB CAB100             JP      Z,ST
05CE C9                 RET
05CF                    ;
05CF CDB605             DSPNAM: CALL    NLMSG
05D2 11C110             LD      DE,NAME
05D5 C3CD08             JP      MSGX
05D8                    ;
05D8                    ;
05D8                    ;
05D8 7C                 PRTHL:  LD      A,H
05D9 CDDD05             CALL    PRTHX
05DC 7D                 LD      A,L
05DD                    ;
05DD F5                 PRTHX:  PUSH    AF
05DE E6F0               AND     F0H
05E0 0F                 RRCA
05E1 0F                 RRCA
```

```
05E2 0F                         RRCA
05E3 0F                         RRCA
05E4 CDF305                     CALL    ASC
05E7 CD1609                     CALL    PRNT
05EA F1                         POP     AF
05EB E60F                       AND     0F
05ED CDF305                     CALL    ASC
05F0 C31609                     JP      PRNT
05F3                    ;
05F3                    ;
05F3                    ;
05F3 E60F               ASC:    AND     0FH
05F5 C630                       ADD     A,30H
05F7 FE3A                       CP      3AH
05F9 D8                         RET     C
05FA C607                       ADD     A,07H
05FC C9                         RET
05FD                    ;
05FD                    ;
05FD                    ;
05FD FE47               HEX:    CP      47H
05FF 3011                       JR      NC,HEXCR
0601 FE41                       CP      41H
0603 300A                       JR      NC,HEX1
0605 FE3A                       CP      3AH
0607 3009                       JR      NC,HEXCR
0609 FE30                       CP      30H
060B D8                         RET     C
060C D630                       SUB     30H
060E C9                         RET
060F D637               HEX1:   SUB     37H
0611 C9                         RET
0612 37                 HEXCR:  SCF
0613 C9                         RET
0614                    ;
0614                    ;
0614                    ;
0614 D5                 HLHEX:  PUSH    DE
0615 CD2306                     CALL    2HEX
0618 3807                       JR      C,HL1
061A 67                         LD      H,A
061B CD2306                     CALL    2HEX
061E 3801                       JR      C,HL1
0620 6F                         LD      L,A
0621 D1                 HL1:    POP     DE
0622 C9                         RET
0623                    ;
0623                    ;
0623                    ;
0623 C5                 2HEX:   PUSH    BC
0624 1A                         LD      A,(DE)
0625 13                         INC     DE
0626 CDFD05                     CALL    HEX
0629 380D                       JR      C,2HEX1
062B 07                         RLCA
062C 07                         RLCA
062D 07                         RLCA
062E 07                         RLCA
062F 4F                         LD      C,A
0630 1A                         LD      A,(DE)
```

```
0631 13                         INC   DE
0632 CDFD05                     CALL  HEX
0635 3801                       JR    C,2HEX1
0637 B1                         OR    C
0638 C1                 2HEX1:  POP   BC
0639 C9                         RET
063A                    ;
063A                    ;
063A                    ;
063A C5                 SAME:   PUSH  BC
063B D5                         PUSH  DE
063C E5                         PUSH  HL
063D 1A                 SAME1:  LD    A,(DE)
063E BE                         CP    (HL)
063F 2002                       JR    NZ,SAME2
0641 1004                       DJNZ  SAME3
0643 E1                 SAME2:  POP   HL
0644 D1                         POP   DE
0645 C1                         POP   BC
0646 C9                         RET
0647 FE0D               SAME3:  CP    0DH
0649 28F8                       JR    Z,SAME2
064B 13                         INC   DE
064C 23                         INC   HL
064D 18EE                       JR    SAME1
064F                    ;
064F                    ;
064F                    ;
064F AF                 ?CLER:  XOR   A
0650                    ;
0650 77                 ?DINT:  LD    (HL),A
0651 23                         INC   HL
0652 10FC                       DJNZ  -2
0654 C9                         RET
0655                    ;
0655                    ;
0655                    ;
0655 2A2A204D           TITMES: DEFM  '** MONITOR SB-1510 **'
0659 4F4E4954
065D 4F522053
0661 422D3135
0665 3130202A
0669 2A
066A 0D                         DEFB  0DH
066B 2D414452           COMES:  DEFM  '-ADR.$'
066F 2E24
0671 0D                         DEFB  0DH
0672 53455420           SETMES: DEFM  'SET TAPE'
0676 54415045
067A 0D                         DEFB  0DH
067B 57524954           WRIMES: DEFM  'WRITING '
067F 494E4720
0683 0D                         DEFB  0DH
0684 57524954           WPRMES: DEFM  'WRITE PROTECT'
0688 45205052
068C 4F544543
0690 54
0691 0D                         DEFB  0DH
0692 43484543           SUMMES: DEFM  'CHECK SUM ERROR'
0696 4B205355
```

```
069A 4D204552
069E 524F52
06A1 0D                         DEFB  0DH
06A2                    ;
06A2                    ; GETL KEY
06A2                    ;
06A2                    KNUMBS: DEFS  1
06A3                    KNUMB:  DEFS  1
06A4                    ;
06A4                    GETL:   ENT
06A4 F5                         PUSH  AF
06A5 C5                         PUSH  BC
06A6 E5                         PUSH  HL
06A7 D5                         PUSH  DE
06A8 3AA206                     LD    A,(KNUMBS)
06AB 32A306                     LD    (KNUMB),A
06AE AF                         XOR   A
06AF 322D00                     LD    (STRGF),A
06B2 CD530C             KEYW:   CALL  ?PONT
06B5 220300                     LD    (FLPOS),HL
06B8 CD680C                     CALL  DSPR
06BB 320D00                     LD    (FLASH),A
06BE 320E00                     LD    (FLSDAT),A
06C1 ED732E00           KEYW2:  LD    (STACK),SP
06C5 2A0300                     LD    HL,(FLPOS)
06C8 3A0E00             KEYW1:  LD    A,(FLSDAT)
06CB FE1F                       CP    1FH
06CD 200B                       JR    NZ,DYSCSL
06CF 3A0D00                     LD    A,(FLASH)
06D2 320E00             KEYW3:  LD    (FLSDAT),A
06D5 CD7A0C                     CALL  DSPW
06D8 1804                       JR    KEYFL
06DA 3E1F               DYSCSL: LD    A,1FH
06DC 18F4                       JR    KEYW3
06DE F5                 KEYFL:  PUSH  AF
06DF E5                         PUSH  HL
06E0 010003                     LD    BC,0300H
06E3 C5                 KYFL1:  PUSH  BC
06E4 CD5009                     CALL  KEY
06E7 FE1E                       CP    1EH               ;NO KEY DATA
06E9 200A                       JR    NZ,KEYDIS
06EB C1                 KYFL2:  POP   BC
06EC 0B                         DEC   BC
06ED 79                         LD    A,C
06EE B0                         OR    B
06EF 20F2                       JR    NZ,KYFL1
06F1 E1                         POP   HL
06F2 F1                         POP   AF
06F3 18D3                       JR    KEYW1
06F5 F5                 KEYDIS: PUSH  AF
06F6 FE01                       CP    01H
06F8 3833                       JR    C,DISPM
06FA FE05                       CP    05H
06FC 302F                       JR    NC,DISPM
06FE CB50                       BIT   2,B
0700 282B                       JR    Z,DISPM
0702 AF                         XOR   A
0703 320600                     LD    (KEDA),A
0706 320700                     LD    (KESTRB),A
0709 3E78                       LD    A,78H             ;CURSOL KEY ONLY
```

```
070B 327711                LD    (KSTD+3),A
070E 3A3500                LD    A,(REPTCT)
0711 3D                    DEC   A
0712 323500                LD    (REPTCT),A
0715 2811                  JR    Z,REPT
0717 F1'                   POP   AF
0718 CD5009          REPT1:CALL  KEY
071B FE01                  CP    01H
071D 3804                  JR    C,REPT2
071F FE05                  CP    05H
0721 38D2                  JR    C,KEYDIS
0723 CD6808          REPT2:CALL  FLASW
0726 184B                  JR    KFINO
0728 3E40            REPT: LD    A,40H
072A 323500                LD    (REPTCT),A
072D CD6808          DISPM:CALL  FLASW
0730 F1                    POP   AF
0731 4F                    LD    C,A
0732 3A1500                LD    A,(SWRK)
0735 B7                    OR    A
0736 CCBE0E                CALL  Z,BELL
0739 79                    LD    A,C
073A E6F0                  AND   F0
073C FE20                  CP    20H
073E 383C                  JR    C,FUNC
0740 79                    LD    A,C
0741 CB58                  BIT   3,B                ;RVS?
0743 2007                  JR    NZ,KDIS1
0745 215011                LD    HL,MODE            ;RVS MODE ?
0748 CB7E                  BIT   7,(HL)
074A 280C                  JR    Z,KDIS2
074C 3A0700          KDIS1:LD    A,(KESTRB)
074F E60F                  AND   0FH
0751 FE03                  CP    03H
0753 79                    LD    A,C
0754 3802                  JR    C,KDIS2
0756 F680                  OR    80H
0758 4F              KDIS2:LD    C,A
0759 3A2D00                LD    A,(STRGF)
075C B7                    OR    A
075D FA6607                JP    M,GT2
0760 2804                  JR    Z,GT2
0762 3D              GT9:  DEC   A
0763 322D00                LD    (STRGF),A
0766 3AA306          GT2:  LD    A,(KNUMB)
0769 3D                    DEC   A
076A 32A306                LD    (KNUMB),A
076D 2841                  JR    Z,GTCR
076F 79                    LD    A,C
0770 CD7F08                CALL  ?DSP
0773 21B206          KFINO:LD    HL,KEYW
0776 ED7B2E00              LD    SP,(STACK)
077A E5                    PUSH  HL
077B C9                    RET
077C CB67            FUNC: BIT   4,A
077E 79                    LD    A,C
077F C20908                JP    NZ,FTAB
0782 FE0D                  CP    0DH
0784 282A                  JR    Z,GTCR
```

```
0786 FE0B                CP     0BH
0788 2813                JR     Z,GTBRK
078A FE08                CP     08H
078C 2805                JR     Z,GTINS
078E CD6E0A      GT5:    CALL   ?DPCT
0791 18E0                JR     KFINO
0793 3A2D00      GTINS:  LD     A,(STRGF)
0796 3C                  INC    A
0797 322D00              LD     (STRGF),A
079A 79                  LD     A,C
079B 18F1                JR     GT5
079D ED7B2E00    GTBRK:  LD     SP,(STACK)
07A1 E1                  POP    HL
07A2 E5                  PUSH   HL
07A3 360B                LD     (HL),0BH          ;BREAK
07A5 23                  INC    HL
07A6 360D                LD     (HL),0DH          ;CR
07A8 CDB008      GETLR:  CALL   LETNL
07AB D1                  POP    DE
07AC E1                  POP    HL
07AD C1                  POP    BC
07AE F1                  POP    AF
07AF C9                  RET
07B0 2A5111      GTCR:   LD     HL,(DSPXY)
07B3 5C                  LD     E,H
07B4 012800              LD     BC,40             ; CK80
07B7 CD4A0C              CALL   MAGA
07BA EB                  EX     DE,HL
07BB 2A5111              LD     HL,(DSPXY)
07BE 2011                JR     NZ,GETLA
07C0 13          GTCR0:  INC    DE
07C1 1A                  LD     A,(DE)
07C2 B7                  OR     A
07C3 281B                JR     Z,GETLC
07C5 3E28                LD     A,40
07C7 81                  ADD    A,C
07C8 4F                  LD     C,A
07C9 18F5                JR     GTCR0
07CB 25          ADDGA:  DEC    H
07CC 3E28                LD     A,40
07CE 81                  ADD    A,C
07CF 4F                  LD     C,A
07D0 C9                  RET
07D1 3D          GETLA:  DEC    A
07D2 2809                JR     Z,GETLA1
07D4 3D                  DEC    A
07D5 2803                JR     Z,GETLA2
07D7 CDCB07              CALL   ADDGA
07DA CDCB07      GETLA2: CALL   ADDGA
07DD CDCB07      GETLA1: CALL   ADDGA
07E0 2E00        GETLC:  LD     L,00H
07E2 CD560C              CALL   ?PNT1
07E5 ED7B2E00            LD     SP,(STACK)
07E9 D1                  POP    DE
07EA D5                  PUSH   DE
07EB C5                  PUSH   BC
07EC CD870C              CALL   DWLDIR
07EF C1                  POP    BC
07F0 E1                  POP    HL
07F1 E5                  PUSH   HL
07F2 41                  LD     B,C
```

```
07F3 7E          GLOP1:  LD      A,(HL)
07F4 B7                  OR      A
07F5 CC0608              CALL    Z,SPACE
07F8 77                  LD      (HL),A
07F9 23                  INC     HL
07FA 10F7                DJNZ    GLOP1
07FC 360D        GLOP2:  LD      (HL),0DH
07FE 2B                  DEC     HL
07FF 7E                  LD      A,(HL)
0800 FE20                CP      20H
0802 28F8                JR      Z,GLOP2
0804 18A2                JR      GETLR
0806 3E20        SPACE:  LD      A,20H
0808 C9                  RET
0809 FE1B        FTAB:   CP      1BH
080B 282C                JR      Z,TAB
080D FE1A                CP      1AH
080F 284E                JR      Z,FOO
0811 E60F                AND     0FH             ;00-09  F1-F10
0813 3C                  INC     A
0814 47                  LD      B,A
0815 218011              LD      HL,FARE         ; 1180-121F
0818 54                  LD      D,H
0819 5D                  LD      E,L
081A 7D                  LD      A,L
081B FE20                CP      20H             ; FARE END
081D 2810                JR      Z,+18
081F 7E                  LD      A,(HL)
0820 23                  INC     HL
0821 FE0D                CP      0DH
0823 20F5                JR      NZ,-9
0825 10F1                DJNZ    -13
0827 1A          MRUN:   LD      A,(DE)
0828 FE7F                CP      7FH             ;?CR
082A CAB007              JP      Z,GTCR
082D FE0D                CP      0DH
082F CA7307              JP      Z,KFINO
0832 4F                  LD      C,A
0833 CDEE08              CALL    ?PRT
0836 13                  INC     DE
0837 18EE                JR      MRUN
0839 3E03        TAB:    LD      A,03H
083B CD6E0A              CALL    ?DPCT
083E 3A5111              LD      A,(DSPXY)
0841 B7                  OR      A
0842 CAB007              JP      Z,GTCR
0845 214011              LD      HL,TABDAT       ;TAB DATA ARER
0848 23          TAB1:   INC     HL
0849 3E27                LD      A,39
084B BE                  CP      (HL)
084C DAB007              JP      C,GTCR
084F 3A5111      TAB2:   LD      A,(DSPXY)
0852 96                  SUB     (HL)
0853 CA7307              JP      Z,KFINO
0856 30F0                JR      NC,TAB1
0858 3E03                LD      A,03H
085A CD6E0A              CALL    ?DPCT
085D 18F0                JR      TAB2
085F 112300      FOO:    LD      DE,FOARE
0862 CDCD08              CALL    MSGX
```

```
0865 C37307                     JP      KFINO
0868 2A0300             FLASW:  LD      HL,(FLPOS)
086B 3A0D00                     LD      A,(FLASH)
086E C37A0C                     JP      DSPW
0871                    ;
0871                    ;
0871                    ;
0871                    GETKY:  ENT
0871 C5                         PUSH    BC
0872 D5                         PUSH    DE
0873 E5                         PUSH    HL
0874 CD5009                     CALL    KEY
0877 E1                         POP     HL
0878 D1                         POP     DE
0879 C1                         POP     BC
087A FE1E                       CP      1EH
087C C0                         RET     NZ
087D AF                         XOR     A
087E C9                         RET
087F                    ;
087F                    ;
087F                    ;
087F F5                 ?DSP:   PUSH    AF
0880 C5                         PUSH    BC
0881 D5                         PUSH    DE
0882 E5                         PUSH    HL
0883 CD530C             DSP0:   CALL    ?PONT
0886 CD7A0C                     CALL    DSPW
0889 2A5111                     LD      HL,(DSPXY)
088C 7D                         LD      A,L
088D FE27                       CP      39
088F 2017                       JR      NZ,DSP4
0891 5C                 DSP1:   LD      E,H
0892 CD4A0C                     CALL    MAGA
0895 23                         INC     HL
0896 3601                       LD      (HL),1
0898 B7                         OR      A
0899 280A                       JR      Z,DSP3
089B 3602               DSPJR:  LD      (HL),2          ;CHR80:JR DSP3+1
089D 3D                         DEC     A
089E 2805                       JR      Z,DSP3
08A0 3603                       LD      (HL),3
08A2 3D                         DEC     A
08A3 2001                       JR      NZ,DSP3+1
08A5 23                 DSP3:   INC     HL
08A6 3600                       LD      (HL),0
08A8 C32C0B             DSP4:   JP      CURSR
08AB                    ;
08AB                    ;
08AB                    NL:     ENT
08AB 3A7211                     LD      A,(DPRNT)
08AE B7                         OR      A
08AF C8                         RET     Z
08B0                    ;
08B0                    LETNL:  ENT
08B0 AF                         XOR     A
08B1 327211                     LD      (DPRNT),A
08B4 3E0D                       LD      A,0DH
08B6 C36E0A                     JP      ?DPCT
08B9                    ;
```

```
08B9                    PRNTS:  ENT
08B9 3E20                       LD      A,20H
08BB C31609                     JP      PRNT
08BE                    ;
08BE                    PRNTT:  ENT
08BE CDB908                     CALL    PRNTS
08C1 3A7211                     LD      A,(DPRNT)
08C4 B7                         OR      A
08C5 C8                         RET     Z
08C6 D60A                       SUB     10
08C8 38F4                       JR      C,-10
08CA 20FA                       JR      NZ,-4
08CC C9                         RET
08CD                    ;
08CD                    MSGX:   ENT
08CD F5                         PUSH    AF
08CE C5                         PUSH    BC
08CF D5                         PUSH    DE
08D0 1A                 MSGX1:  LD      A,(DE)
08D1 FE0D                       CP      0DH
08D3 2815                       JR      Z,MSG2
08D5 CD0709                     CALL    PRT3
08D8 13                         INC     DE
08D9 18F5                       JR      MSGX1
08DB                    ;
08DB                    MSG:    ENT
08DB F5                         PUSH    AF
08DC C5                         PUSH    BC
08DD D5                         PUSH    DE
08DE 1A                 MSG1:   LD      A,(DE)
08DF FE0D                       CP      0DH
08E1 2807                       JR      Z,MSG2
08E3 4F                         LD      C,A
08E4 CDEE08                     CALL    ?PRT
08E7 13                         INC     DE
08E8 18F4                       JR      MSG1
08EA D1                 MSG2:   POP     DE
08EB C1                         POP     BC
08EC F1                         POP     AF
08ED C9                         RET
08EE                    ;
08EE 79                 ?PRT:   LD      A,C
08EF E6F0                       AND     F0H
08F1 79                         LD      A,C
08F2 2013                       JR      NZ,PRT3
08F4 CD6E0A                     CALL    ?DPCT
08F7 FE03                       CP      03H             ;CURSR
08F9 280F                       JR      Z,PRT4
08FB FE05                       CP      05H             ;HOME
08FD 2803                       JR      Z,PRT2
08FF FE06                       CP      06H             ;CLRS
0901 C0                         RET     NZ
0902 AF                 PRT2:   XOR     A
0903 327211                     LD      (DPRNT),A
0906 C9                         RET
0907 CD7F08             PRT3:   CALL    ?DSP
090A 3A7211             PRT4:   LD      A,(DPRNT)
090D 3C                         INC     A
090E FEA0                       CP      160
0910 38F1                       JR      C,PRT2+1
```

```
0912 D6A0                       SUB    160
0914 18ED                       JR     PRT2+1
0916                    ;
0916                    PRNT:   ENT
0916 FE0D                       CP     0DH
0918 2896                       JR     Z,LETNL
091A C5                         PUSH   BC
091B 4F                         LD     C,A
091C CDEE08                     CALL   ?PRT
091F 79                         LD     A,C
0920 C1                         POP    BC
0921 C9                         RET
0922                    ;
0922                    ; SCROL DATA IN
0922                    ;   (SCROST)=START LINE
0922                    ;   (SCREND)=END LINE
0922                    ;   INITIAL:1 , 24
0922                    SCRSET: ENT
0922 F5                         PUSH   AF
0923 C5                         PUSH   BC
0924 D5                         PUSH   DE
0925 E5                         PUSH   HL
0926 3A0B00                     LD     A,(SCROST)
0929 47                         LD     B,A
092A 4F                         LD     C,A
092B 21D8CF                     LD     HL,SCRN-40
092E 112800                     LD     DE,0028H
0931 19                         ADD    HL,DE
0932 10FD                       DJNZ   -1
0934 221300                     LD     (SCRST),HL
0937                    ;
0937 3A0C00                     LD     A,(SCREND)
093A 3C                         INC    A
093B 91                         SUB    C
093C 47                         LD     B,A
093D 210000                     LD     HL,0000H
0940 19                         ADD    HL,DE
0941 10FD                       DJNZ   -1
0943 221B00                     LD     (SCRSIZ),HL
0946 3E06                       LD     A,06H
0948 CD6E0A                     CALL   ?DPCT
094B E1                         POP    HL
094C D1                         POP    DE
094D C1                         POP    BC
094E F1                         POP    AF
094F C9                         RET
0950                    ;
0950                    ;
0950                    ;
0950                    KEY:    ENT
0950 DBE8               KSWEP:  IN     A,(E8H)
0952 E6F0                       AND    F0H
0954 F61B                       OR     1BH
0956 57                         LD     D,A                    ;D=STROB
0957 D3E8                       OUT    (E8H),A
0959 AF                         XOR    A
095A 322600                     LD     (KDATW),A
095D 322700                     LD     (KDATW1),A
0960 DBEA                       IN     A,(EAH)
0962 2F                         CPL
```

```
0963 47                     LD    B,A               ;B=BIT DATA
0964 0EEA                   LD    C,EAH             ;C=I/O PORT
0966 0D             SWEP:   DEC   C
0967 0D                     DEC   C
0968 15                     DEC   D
0969 ED51                   OUT   (C),D
096B 0C                     INC   C
096C 0C                     INC   C
096D D5                     PUSH  DE
096E 217411                 LD    HL,KSTD
0971 7A                     LD    A,D
0972 E60F                   AND   0FH
0974 5F                     LD    E,A
0975 1600                   LD    D,0
0977 19                     ADD   HL,DE
0978 ED78                   IN    A,(C)
097A 5F                     LD    E,A
097B 2F                     CPL
097C A6                     AND   (HL)
097D 73                     LD    (HL),E
097E D1                     POP   DE
097F 5F                     LD    E,A
0980 B7                     OR    A
0981 C4690A                 CALL  NZ,DATA1
0984 7A                     LD    A,D               ;STROB END?
0985 E60F                   AND   0FH
0987 20DD                   JR    NZ,SWEP
0989 ED5B2600               LD    DE,(KDATW)
098D 7B                     LD    A,E
098E B7                     OR    A
098F 204F                   JR    NZ,DATA           ;KSWEP END
0991 AF             NOKD:   XOR   A
0992 320600                 LD    (KEDA),A
0995 320700                 LD    (KESTRB),A
0998 217311         NOKD1:  LD    HL,KYBDA          ;SPECIAL BIT DATA
099B 78                     LD    A,B
099C BE                     CP    (HL)
099D 282E                   JR    Z,KFINA
099F 77                     LD    (HL),A
09A0 215011         NOKD2:  LD    HL,MODE           ;RGSX XXXX
09A3 FE01                   CP    01H
09A5 281B                   JR    Z,GRPHO           ;G
09A7 FE02                   CP    02H
09A9 281E                   JR    Z,SMALLO          ;SL
09AB FE03                   CP    03H               ;DISP CR
09AD 2821                   JR    Z,CRDIS           ;G+SL
09AF FE05                   CP    05H
09B1 2820                   JR    Z,GSHFO           ;G+S
09B3 FE06                   CP    06H
09B5 281F                   JR    Z,SMSHFO          ;SL+S
09B7 FE08                   CP    08H
09B9 281E                   JR    Z,RVSO            ;R
09BB FE0C                   CP    0CH
09BD 200E                   JR    NZ,KFINA
09BF 3E0C           RSHFO:  LD    A,0CH             ;R+S
09C1 C9             KDIS:   RET
09C2 CB76           GRPHO:  BIT   6,(HL)
09C4 2807                   JR    Z,KFINA
09C6 3E0E           LMOD:   LD    A,0EH
09C8 C9                     RET                     ; KDIS
```

```
09C9 CB6E          SMALLO: BIT   5,(HL)
09CB 20F9                  JR    NZ,LMOD
09CD 3E1E          KFINA:  LD    A,1EH          ;NOKEY DATA
09CF C9                    RET                  ; KDIS
09D0 3E7F          CRDIS:  LD    A,7FH
09D2 C9                    RET                  ; KDIS
09D3 3E09          GSHFO:  LD    A,09H
09D5 C9                    RET                  ; KDIS
09D6 3E0A          SMSHFO: LD    A,0AH
09D8 C9                    RET                  ; KDIS
09D9 CB7E          RVSO:   BIT   7,(HL)
09DB 28F0                  JR    Z,KFINA
09DD 3E0F                  LD    A,0FH
09DF C9                    RET                  ; KDIS
09E0 210600        DATA:   LD    HL,KEDA
09E3 BE                    CP    (HL)
09E4 2005                  JR    NZ,NEW
09E6 23                    INC   HL
09E7 7A                    LD    A,D
09E8 BE                    CP    (HL)
09E9 28B5                  JR    Z,NOKD2
09EB ED530600      NEW:    LD    (KEDA),DE
09EF 7B                    LD    A,E
09F0 1E00                  LD    E,00H
09F2 B7                    OR    A
09F3 1F            ROT:    RRA
09F4 3803                  JR    C,ROTE
09F6 1C                    INC   E
09F7 18FA                  JR    ROT
09F9 B7            ROTE:   OR    A
09FA 20D1                  JR    NZ,KFINA
09FC 3E0F          KDIN:   LD    A,0FH
09FE A2                    AND   D              ;D=STROB DATA
09FF 1F                    RRA
0A00 57                    LD    D,A
0A01 3004                  JR    NC,KD1
0A03 3E08                  LD    A,08H
0A05 83                    ADD   A,E
0A06 5F                    LD    E,A
0A07 7A            KD1:    LD    A,D
0A08 4A                    LD    C,D            ;D=ADD STROB
0A09 07                    RLCA
0A0A 07                    RLCA
0A0B 07                    RLCA
0A0C 07                    RLCA
0A0D B3                    OR    E
0A0E 5F                    LD    E,A
0A0F AF                    XOR   A
0A10 57                    LD    D,A
0A11 79                    LD    A,C
0A12 FE02                  CP    02H
0A14 383B                  JR    C,LMKY
0A16 FE04                  CP    04H
0A18 300A                  JR    NC,SMKY
0A1A 78            THREE:  LD    A,B            ;B=SPECIAL BIT DATA
0A1B FE01                  CP    01H            ;G?
0A1D 2018                  JR    NZ,TWO
0A1F 21B80D        KGRP:   LD    HL,KTBLG
0A22 1830                  JR    KADD
0A24 78            SMKY:   LD    A,B
```

```
0A25 FE02                CP    02H          ;SL?
0A27 282E                JR    Z,KSMAL
0A29 FE04                CP    04H          ;S?
0A2B 282A                JR    Z,KSMAL
0A2D E607                AND   07H
0A2F B7                  OR    A
0A30 209B                JR    NZ,KFINA
0A32 215011              LD    HL,MODE
0A35 1816                JR    ONE1
0A37 78          TWO:    LD    A,B
0A38 FE02                CP    02H          ;SL?
0A3A 281B                JR    Z,KSMAL
0A3C FE04                CP    04H          ;S?
0A3E 2817                JR    Z,KSMAL
0A40 E607        TWO1:   AND   07H
0A42 B7                  OR    A
0A43 C2CD09              JP    NZ,KFINA
0A46 215011      ONE:    LD    HL,MODE
0A49 CB76                BIT   6,(HL)       ;G MODE?
0A4B 20D2                JR    NZ,KGRP
0A4D CB6E        ONE1:   BIT   5,(HL)       ;S MODE?
0A4F 200B                JR    NZ,KSMALS
0A51 21480D      LMKY:   LD    HL,KTBL      ;L MODE
0A54 19          KADD:   ADD   HL,DE
0A55 7E                  LD    A,(HL)
0A56 C9                  RET                ; KDIS
0A57 21000D      KSMAL:  LD    HL,KTBLS
0A5A 18F8                JR    KADD
0A5C             ;
0A5C 21800D      KSMALS: LD    HL,KTBLS
0A5F 19                  ADD   HL,DE
0A60 7E                  LD    A,(HL)
0A61 FE09                CP    09H
0A63 D0                  RET   NC
0A64 FE05                CP    05H
0A66 D8                  RET   C
0A67 18E8                JR    LMKY
0A69             ;
0A69 ED532600    DATA1:  LD    (KDATW),DE
0A6D C9                  RET
0A6E             ;
0A6E             ;
0A6E             ?DPCT:  ENT
0A6E F5                  PUSH  AF
0A6F C5                  PUSH  BC
0A70 D5                  PUSH  DE
0A71 E5                  PUSH  HL
0A72 B7                  OR    A
0A73 2834                JR    Z,RETN
0A75 21830A              LD    HL,TDPCT
0A78 3D                  DEC   A
0A79 07                  RLCA
0A7A 4F                  LD    C,A
0A7B 0600                LD    B,0
0A7D 09                  ADD   HL,BC
0A7E 5E                  LD    E,(HL)
0A7F 23                  INC   HL
0A80 56                  LD    D,(HL)
0A81 EB                  EX    DE,HL
0A82 E9                  JP    (HL)
```

```
0A83 140B               TDPCT:  DEFW   CURSD
0A85 230B                       DEFW   CURSU
0A87 2C0B                       DEFW   CURSR
0A89 470B                       DEFW   CURSL
0A8B 7C0B                       DEFW   HOME
0A8D 5B0B                       DEFW   CLRS
0A8F 840B                       DEFW   DEL
0A91 CB0B                       DEFW   INST
0A93 C90A                       DEFW   GRAPH
0A95 C00A                       DEFW   SMALL
0A97 A90A                       DEFW   RETN             ;BREAK
0A99 B90A                       DEFW   RVS
0A9B 120C                       DEFW   CR
0A9D AE0A                       DEFW   LAMODE
0A9F A10A                       DEFW   CANRVS
0AA1                    ;
0AA1 215011             CANRVS: LD     HL,MODE
0AA4 CBBE                       RES    7,(HL)
0AA6 7E                 OUTRT:  LD     A,(HL)
0AA7 D3E0                       OUT    (E0H),A
0AA9 E1                 RETN:   POP    HL
0AAA D1                         POP    DE
0AAB C1                         POP    BC
0AAC F1                         POP    AF
0AAD C9                         RET
0AAE 215011             LAMODE: LD     HL,MODE
0AB1 00                         NOP
0AB2 00                         NOP
0AB3 CBB6                       RES    6,(HL)
0AB5 CBAE                       RES    5,(HL)
0AB7 18ED                       JR     OUTRT
0AB9 215011             RVS:    LD     HL,MODE
0ABC CBFE                       SET    7,(HL)
0ABE 18E6                       JR     OUTRT
0AC0 215011             SMALL:  LD     HL,MODE
0AC3 CBEE                       SET    5,(HL)
0AC5 CBB6                       RES    6,(HL)
0AC7 18DD                       JR     OUTRT
0AC9 215011             GRAPH:  LD     HL,MODE
0ACC CBAE                       RES    5,(HL)
0ACE CBF6                       SET    6,(HL)
0AD0 18D4                       JR     OUTRT
0AD2                    ;
0AD2                    ;
0AD2 ED5B1300           SCROL:  LD     DE,(SCRST)
0AD6 ED4B1B00                   LD     BC,(SCRSIZ)
0ADA 212800                     LD     HL,0028H         ;40
0ADD 19                         ADD    HL,DE
0ADE CD870C                     CALL   DWLDIR
0AE1 EB                         EX     DE,HL
0AE2 0628                       LD     B,40
0AE4 CD960C                     CALL   DSCL
0AE7 3A0B00                     LD     A,(SCROST)
0AEA 4F                         LD     C,A
0AEB 3A0C00                     LD     A,(SCREND)
0AEE 91                         SUB    C
0AEF C603                       ADD    A,03H
0AF1 4F                         LD     C,A
0AF2 0600                       LD     B,0
0AF4 115311                     LD     DE,MANG
```

```
0AF7 3A0B00                     LD      A,(SCROST)
0AFA 6F                         LD      L,A
0AFB 2600                       LD      H,0
0AFD 19                         ADD     HL,DE
0AFE E5                         PUSH    HL
0AFF D1                         POP     DE
0B00 1B                         DEC     DE
0B01 D5                         PUSH    DE
0B02 EDB0                       LDIR
0B04 3600                       LD      (HL),00H
0B06 E1                         POP     HL
0B07 7E                         LD      A,(HL)
0B08 B7                         OR      A
0B09 289E                       JR      Z,RETN
0B0B 2A5111             SCR02:  LD      HL,(DSPXY)
0B0E 25                         DEC     H
0B0F 225111                     LD      (DSPXY),HL
0B12 18BE                       JR      SCROL
0B14                    ;
0B14 2A5111             CURSD:  LD      HL,(DSPXY)
0B17 3A0C00                     LD      A,(SCREND)
0B1A BC                         CP      H
0B1B 28B5                       JR      Z,SCROL
0B1D 24                         INC     H
0B1E 225111             CURS1:  LD      (DSPXY),HL
0B21 1886                       JR      RETN
0B23                    ;
0B23 CD3C0C             CURSU:  CALL    SCRDSD
0B26 CAA90A                     JP      Z,RETN
0B29 25                         DEC     H
0B2A 18F2                       JR      CURS1
0B2C                    ;
0B2C 2A5111             CURSR:  LD      HL,(DSPXY)
0B2F 7D                         LD      A,L
0B30 FE27                       CP      39
0B32 3003                       JR      NC,CURS2
0B34 2C                         INC     L
0B35 18E7                       JR      CURS1
0B37 2E00               CURS2:  LD      L,0
0B39 24                         INC     H
0B3A 3A0C00                     LD      A,(SCREND)
0B3D BC                         CP      H
0B3E 30DE                       JR      NC,CURS1
0B40 67                         LD      H,A
0B41 225111                     LD      (DSPXY),HL
0B44 C3D20A                     JP      SCROL
0B47                    ;
0B47 2A5111             CURSL:  LD      HL,(DSPXY)
0B4A 7D                         LD      A,L
0B4B B7                         OR      A
0B4C 2803                       JR      Z,CURL1
0B4E 2D                         DEC     L
0B4F 18CD                       JR      CURS1
0B51 2E27               CURL1:  LD      L,39
0B53 CD3F0C                     CALL    SCRSTD
0B56 2824                       JR      Z,HOME
0B58 25                         DEC     H
0B59 18C3                       JR      CURS1
0B5B                    ;
0B5B                    ;
```

```
0B5B 210B00          CLRS:   LD      HL,SCROST
0B5E 5E                      LD      E,(HL)
0B5F 23                      INC     HL
0B60 7E                      LD      A,(HL)
0B61 93                      SUB     E
0B62 3C                      INC     A
0B63 3C                      INC     A
0B64 4F                      LD      C,A
0B65 2A1300                  LD      HL,(SCRST)
0B68 0628            CLRS1:  LD      B,40
0B6A CD960C                  CALL    DSCL
0B6D 0D                      DEC     C
0B6E 20F8                    JR      NZ,CLRS1
0B70 215311                  LD      HL,MANG
0B73 4B                      LD      C,E
0B74 09                      ADD     HL,BC
0B75 3E6F                    LD      A,6FH
0B77 95                      SUB     L
0B78 47                      LD      B,A
0B79 CD4F06                  CALL    ?CLER
0B7C                 ;
0B7C CD3F0C          HOME:   CALL    SCRSTD
0B7F 67                      LD      H,A
0B80 2E00                    LD      L,0
0B82 189A                    JR      CURS1
0B84                 ;
0B84 CD3C0C          DEL:    CALL    SCRDSD
0B87 2005                    JR      NZ,DEL0
0B89 AF                      XOR     A
0B8A B5                      OR      L
0B8B CAA90A                  JP      Z,RETN
0B8E 7D              DEL0:   LD      A,L
0B8F B7                      OR      A
0B90 2010                    JR      NZ,DEL1
0B92 5C                      LD      E,H
0B93 CD4A0C                  CALL    MAGA
0B96 200A                    JR      NZ,DEL1
0B98 CD530C                  CALL    ?PONT
0B9B 2B                      DEC     HL
0B9C AF                      XOR     A
0B9D CD7A0C                  CALL    DSPW
0BA0 18A5                    JR      CURSL
0BA2 CD450C          DEL1:   CALL    DSMAG
0BA5 0600                    LD      B,0
0BA7 78              DEL10:  LD      A,B
0BA8 C628                    ADD     A,40
0BAA 47                      LD      B,A
0BAB 7E                      LD      A,(HL)
0BAC B7                      OR      A
0BAD 2803                    JR      Z,DEL2
0BAF 23                      INC     HL
0BB0 18F5                    JR      DEL10
0BB2 2A5111          DEL2:   LD      HL,(DSPXY)
0BB5 78                      LD      A,B
0BB6 95                      SUB     L
0BB7 4F                      LD      C,A
0BB8 0600                    LD      B,0
0BBA CD530C                  CALL    ?PONT
0BBD E5                      PUSH    HL
0BBE D1                      POP     DE
0BBF 1B                      DEC     DE
0BC0 CD870C                  CALL    DWLDIR
0BC3 2B                      DEC     HL
```

```
0BC4 AF                     XOR   A
0BC5 CD7A0C                 CALL  DSPW
0BC8 C3470B                 JP    CURSL
0BCB CD450C         INST:   CALL  DSMAG
0BCE EB                     EX    DE,HL
0BCF 0E00                   LD    C,0
0BD1 2A5111                 LD    HL,(DSPXY)
0BD4 2E27                   LD    L,39
0BD6 280A                   JR    Z,INST0
0BD8 24             INSTR0: INC   H
0BD9 79                     LD    A,C
0BDA C628                   ADD   A,40
0BDC 4F                     LD    C,A
0BDD 13                     INC   DE
0BDE 1A                     LD    A,(DE)
0BDF B7                     OR    A
0BE0 20F6                   JR    NZ,INSTR0
0BE2 CD560C         INST0:  CALL  ?PNT1
0BE5 CD680C                 CALL  DSPR
0BE8 B7                     OR    A
0BE9 C2A90A                 JP    NZ,RETN
0BEC E5                     PUSH  HL
0BED 2A5111                 LD    HL,(DSPXY)
0BF0 3E27                   LD    A,39
0BF2 95                     SUB   L
0BF3 81                     ADD   A,C
0BF4 47                     LD    B,A
0BF5 D1             INST2:  POP   DE
0BF6 D5                     PUSH  DE
0BF7 E1                     POP   HL
0BF8 2B                     DEC   HL
0BF9 DBE8                   IN    A,(E8H)
0BFB CBFF                   SET   7,A
0BFD F3                     DI
0BFE D3E8                   OUT   (E8H),A
0C00 7E             INST1:  LD    A,(HL)
0C01 12                     LD    (DE),A
0C02 3620                   LD    (HL),20H
0C04 2B                     DEC   HL
0C05 1B                     DEC   DE
0C06 10F8                   DJNZ  INST1
0C08 DBE8                   IN    A,(E8H)
0C0A CBBF                   RES   7,A
0C0C D3E8                   OUT   (E8H),A
0C0E FB                     EI
0C0F C3A90A                 JP    RETN
0C12                ;
0C12 CD450C         CR:     CALL  DSMAG
0C15 EB                     EX    DE,HL
0C16 2A5111                 LD    HL,(DSPXY)
0C19 CA370B                 JP    Z,CURS2
0C1C 0600                   LD    B,0
0C1E 04             CR0:    INC   B
0C1F 13                     INC   DE
0C20 1A                     LD    A,(DE)
0C21 B7                     OR    A
0C22 20FA                   JR    NZ,CR0
0C24 24             CR1:    INC   H
0C25 2E00                   LD    L,0
0C27 3A0C00                 LD    A,(SCREND)
```

```
0C2A 57                     LD    D,A
0C2B 7C                     LD    A,H
0C2C 80                     ADD   A,B
0C2D BA                     CP    D
0C2E 3806                   JR    C,CR2
0C30 225111                 LD    (DSPXY),HL
0C33 C3D20A                 JP    SCROL
0C36 24               CR2:  INC   H
0C37 10FD                   DJNZ  CR2
0C39 C31E0B                 JP    CURS1
0C3C                  ;
0C3C 2A5111           SCRDSD: LD    HL,(DSPXY)
0C3F 3A0B00           SCRSTD: LD    A,(SCROST)
0C42 3D                     DEC   A
0C43 BC                     CP    H
0C44 C9                     RET
0C45                  ;
0C45 2A5111           DSMAG:  LD    HL,(DSPXY)
0C48 5C                     LD    E,H
0C49 1C                     INC   E
0C4A 1600             MAGA:   LD    D,0
0C4C 215311                 LD    HL,MANG
0C4F 19                     ADD   HL,DE
0C50 7E                     LD    A,(HL)
0C51 B7                     OR    A
0C52 C9                     RET
0C53                  ;
0C53 2A5111           ?PONT:  LD    HL,(DSPXY)
0C56 C5               ?PNT1:  PUSH  BC
0C57 D5                     PUSH  DE
0C58 E5                     PUSH  HL
0C59 C1                     POP   BC
0C5A 04                     INC   B
0C5B 112800                 LD    DE,0028H
0C5E 21D8CF                 LD    HL,SCRN-40
0C61 19               PON1:   ADD   HL,DE
0C62 10FD                   DJNZ  PON1
0C64 09                     ADD   HL,BC
0C65 D1                     POP   DE
0C66 C1                     POP   BC
0C67 C9                     RET
0C68                  ;
0C68                  DSPRED: ENT
0C68 F3               DSPR:   DI
0C69 C5                     PUSH  BC
0C6A 0EE8                   LD    C,E8H
0C6C ED40                   IN    B,(C)
0C6E CBF8                   SET   7,B
0C70 ED41                   OUT   (C),B
0C72 7E                     LD    A,(HL)
0C73 CBB8             DSPWRR: RES   7,B
0C75 ED41                   OUT   (C),B
0C77 C1                     POP   BC
0C78 FB                     EI
0C79 C9                     RET
0C7A F3               DSPW:   DI
0C7B C5                     PUSH  BC
0C7C 0EE8                   LD    C,E8H
0C7E ED40                   IN    B,(C)
0C80 CBF8                   SET   7,B
```

```
0C82 ED41                       OUT     (C),B
0C84 77                         LD      (HL),A
0C85 18EC                       JR      DSPWRR
0C87 F3                 DWLDIR: DI
0C88 DBE8                       IN      A,(E8H)
0C8A CBFF                       SET     7,A
0C8C D3E8                       OUT     (E8H),A
0C8E EDB0                       LDIR
0C90 CBBF               DWLDRN: RES     7,A
0C92 D3E8                       OUT     (E8H),A
0C94 FB                         EI
0C95 C9                         RET
0C96 F3                 DSCL:   DI
0C97 DBE8                       IN      A,(E8H)
0C99 CBFF                       SET     7,A
0C9B D3E8                       OUT     (E8H),A
0C9D AF                         XOR     A
0C9E 77                         LD      (HL),A
0C9F 23                         INC     HL
0CA0 10FC                       DJNZ    -2
0CA2 DBE8                       IN      A,(E8H)
0CA4 18EA                       JR      DWLDRN
0CA6                    ;
0CA6                    ;
0CA6                    ;
0CA6                    CHR80:  ENT
0CA6 3E10                       LD      A,10H
0CA8 322E01                     LD      (DUMP0+4),A
0CAB 211809                     LD      HL,0918H
0CAE 229B08                     LD      (DSPJR),HL
0CB1 3EB0                       LD      A,B0H
0CB3 32C10C                     LD      (CHX0+1),A
0CB6 3EEF                       LD      A,EFH
0CB8 32FE0C                     LD      (CHX2+1),A
0CBB 3E4F                       LD      A,4FH
0CBD 32C90C                     LD      (CHX1+1),A
0CC0 3EB0               CHX0:   LD      A,B0H
0CC2 322C09                     LD      (SCRSET+10),A
0CC5 325F0C                     LD      (?PNT1+9),A
0CC8 3E4F               CHX1:   LD      A,4FH
0CCA 324A08                     LD      (TAB1+2),A
0CCD 328E08                     LD      (DSP0+11),A
0CD0 32310B                     LD      (CURSR+5),A
0CD3 32520B                     LD      (CURL1+1),A
0CD6 32D50B                     LD      (INST+10),A
0CD9 32F10B                     LD      (INST0+15),A
0CDC 3C                         INC     A
0CDD 32B507                     LD      (GTCR+5),A
0CE0 32C607                     LD      (GTCR0+6),A
0CE3 32CD07                     LD      (ADDGA+2),A
0CE6 322F09                     LD      (SCRSET+13),A
0CE9 32DB0A                     LD      (SCROL+9),A
0CEC 32E30A                     LD      (SCROL+17),A
0CEF 32690B                     LD      (CLRS1+1),A
0CF2 32A90B                     LD      (DEL10+2),A
0CF5 32DB0B                     LD      (INSTR0+3),A
0CF8 325C0C                     LD      (?PNT1+6),A
0CFB DBE8                       IN      A,(E8H)
0CFD CBEF               CHX2:   SET     5,A
0CFF D3E8                       OUT     (E8H),A
```

```
0D01 2100D0                     LD      HL,D000H
0D04 AF                         XOR     A
0D05 D3F4                       OUT     (F4H),A         ;GRAPHIC I10X
0D07 47                         LD      B,A
0D08 CD960C             DCL:    CALL    DSCL
0D0B 7C                         LD      A,H
0D0C FEE0                       CP      E0H
0D0E 20F8                       JR      NZ,DCL
0D10 CD2209                     CALL    SCRSET
0D13 3E06                       LD      A,06H           ;CL
0D15 C36E0A                     JP      ?DPCT
0D18                    ;
0D18                    CHR40:  ENT
0D18 3E08                       LD      A,08H
0D1A 322E01                     LD      (DUMP0+4),A
0D1D 213602                     LD      HL,0236H
0D20 229B08                     LD      (DSPJR),HL
0D23 3ED8                       LD      A,D8H
0D25 32C10C                     LD      (CHX0+1),A
0D28 3EAF                       LD      A,AFH
0D2A 32FE0C                     LD      (CHX2+1),A
0D2D 3E27                       LD      A,27H
0D2F 188C                       JR      CHX0-3
0D31                    ;
0D31                    ;
0D31                    ;
0D31 E5                 REGIST: PUSH    HL
0D32 D5                         PUSH    DE
0D33 C5                         PUSH    BC
0D34 F5                         PUSH    AF
0D35 0604                       LD      B,4
0D37 E1                         POP     HL
0D38 CDD805                     CALL    PRTHL
0D3B CDB908                     CALL    PRNTS
0D3E 10F7                       DJNZ    -7
0D40 E1                         POP     HL
0D41 2B                         DEC     HL
0D42 CDD805                     CALL    PRTHL
0D45 C3B100                     JP      ST
0D48                    ;
0D48                    ;
0D48                    ;KEY TABL
0D48                    ;
0D48                    ;S0
0D48 1011               KTBL:   DEFW    1110H
0D4A 1213                       DEFW    1312H
0D4C 1415                       DEFW    1514H
0D4E 1617                       DEFW    1716H
0D50                    ;S1
0D50 1819                       DEFW    1918H
0D52 3839                       DEFW    3938H
0D54 1A2E                       DEFW    2E1AH
0D56 2B2D                       DEFW    2D2BH
0D58                    ;S2
0D58 3031                       DEFW    3130H
0D5A 3233                       DEFW    3332H
0D5C 3435                       DEFW    3534H
0D5E 3637                       DEFW    3736H
0D60                    ;S3
0D60 1B20                       DEFW    201BH
```

```
0D62 0D02                       DEFW  020DH
0D64 0104                       DEFW  0401H
0D66 030B                       DEFW  0B03H
0D68                    ;S4
0D68 2F41                       DEFW  412FH
0D6A 4243                       DEFW  4342H
0D6C 4445                       DEFW  4544H
0D6E 4647                       DEFW  4746H
0D70                    ;S5
0D70 4849                       DEFW  4948H
0D72 4A4B                       DEFW  4B4AH
0D74 4C4D                       DEFW  4D4CH
0D76 4E4F                       DEFW  4F4EH
0D78                    ;S6
0D78 5051                       DEFW  5150H
0D7A 5253                       DEFW  5352H
0D7C 5455                       DEFW  5554H
0D7E 5657                       DEFW  5756H
0D80                    ;S7
0D80 5859               KTBLS:  DEFW  5958H
0D82 5A5E                       DEFW  5E5AH
0D84 5C3F                       DEFW  3F5CH
0D86 2E2C                       DEFW  2C2EH
0D88                    ;S8
0D88 3031                       DEFW  3130H
0D8A 3233                       DEFW  3332H
0D8C 3435                       DEFW  3534H
0D8E 3637                       DEFW  3736H
0D90                    ;S9
0D90 3839                       DEFW  3938H
0D92 3A3B                       DEFW  3B3AH
0D94 2D40                       DEFW  402DH
0D96 5B00                       DEFW  005BH
0D98                    ;S10
0D98 5D00                       DEFW  005DH
0D9A 0507                       DEFW  0705H
0D9C 0000                       DEFW  0000H
0D9E 0000                       DEFW  0000H
0DA0                    ;SMALL
0DA0                    ;S4S
0DA0 8461                       DEFW  6184H
0DA2 6263                       DEFW  6362H
0DA4 6465                       DEFW  6564H
0DA6 6667                       DEFW  6766H
0DA8                    ;S5S
0DA8 6869                       DEFW  6968H
0DAA 6A6B                       DEFW  6B6AH
0DAC 6C6D                       DEFW  6D6CH
0DAE 6E6F                       DEFW  6F6EH
0DB0                    ;S6S
0DB0 7071                       DEFW  7170H
0DB2 7273                       DEFW  7372H
0DB4 7475                       DEFW  7574H
0DB6 7677                       DEFW  7776H
0DB8                    ;S7S
0DB8 7879               KTBLG:  DEFW  7978H
0DBA 7A7E                       DEFW  7E7AH
0DBC 7C82                       DEFW  827CH
0DBE 3E3C                       DEFW  3C3EH
0DC0                    ;S8S
```

```
0DC0 5F21                       DEFW  215FH
0DC2 2223                       DEFW  2322H
0DC4 2425                       DEFW  2524H
0DC6 2627                       DEFW  2726H
0DC8                    ;S9S
0DC8 2829                       DEFW  2928H
0DCA 2A2B                       DEFW  2B2AH
0DCC 3D60                       DEFW  603DH
0DCE 7B00                       DEFW  007BH
0DD0                    ;S10S
0DD0 7D00                       DEFW  007DH
0DD2 0608                       DEFW  0806H
0DD4 0000                       DEFW  0000H
0DD6 0000                       DEFW  0000H
0DD8                    ;GRAPH
0DD8                    ;S4G
0DD8 8398                       DEFW  9883H
0DDA 8886                       DEFW  8688H
0DDC 9A9E                       DEFW  9E9AH
0DDE 9B99                       DEFW  999BH
0DE0                    ;S5G
0DE0 8089                       DEFW  8980H
0DE2 908D                       DEFW  8D90H
0DE4 8F92                       DEFW  928FH
0DE6 948C                       DEFW  8C94H
0DE8                    ;S6G
0DE8 8B97                       DEFW  978BH
0DEA 9F96                       DEFW  969FH
0DEC 9C8A                       DEFW  8A9CH
0DEE 8795                       DEFW  9587H
0DF0                    ;S7G
0DF0 859D                       DEFW  9D85H
0DF2 8E5E                       DEFW  5E8EH
0DF4 5C81                       DEFW  815CH
0DF6 FF91                       DEFW  91FFH
0DF8                    ;
0DF8                    ;TEMPO
0DF8                    ;       A=VALUE
0DF8                    XTEMP:   ENT
0DF8 F5                         PUSH  AF
0DF9 C5                         PUSH  BC
0DFA E60F                       AND   0FH
0DFC 47                         LD    B,A
0DFD 3E08                       LD    A,8
0DFF 90                         SUB   B
0E00 321D00                     LD    (TEMPW),A
0E03 C1                         POP   BC
0E04 F1                         POP   AF
0E05 C9                         RET
0E06                    ;
0E06                    ;TIME SET
0E06                    ;       BC=C2
0E06                    ;       DE=SECOND
0E06                    ;       C2=0-FFFF 12H
0E06                    ;       C1=A8C0H=12HSEC
0E06                    ;       C0=7A12H=31.25KHZ
0E06                    TIMST:   ENT
0E06 C5                 ?TMST:   PUSH  BC
0E07 320F00                     LD    (AMPM),A
0E0A ED531600                   LD    (INIC1),DE
```

```
0E0E 3EC1                       LD    A,C1H             ;C1=A8C1 SET
0E10 D3E5                       OUT   (E5H),A
0E12 3EA8                       LD    A,A8H
0E14 D3E5                       OUT   (E5H),A
0E16 3E02                       LD    A,02H             ;C0=0002 SET
0E18 D3E4                       OUT   (E4H),A
0E1A AF                         XOR   A
0E1B D3E4                       OUT   (E4H),A
0E1D                    ;
0E1D D3F0                       OUT   (F0H),A           ;C0 C1 RESET
0E1F                    ;
0E1F 3E44               TMS1:   LD    A,44H             ;C1 LATCH
0E21 D3E7                       OUT   (E7H),A
0E23 DBE5                       IN    A,(E5H)           ;C1 READ
0E25 4F                         LD    C,A
0E26 DBE5                       IN    A,(E5H)
0E28 FEA8                       CP    A8H
0E2A 20F3                       JR    NZ,TMS1
0E2C 3EC0                       LD    A,C0H
0E2E B9                         CP    C
0E2F 20EE                       JR    NZ,TMS1
0E31 3EC0                       LD    A,C0H             ;C1=A8C0 SET
0E33 D3E5                       OUT   (E5H),A
0E35 3EA8                       LD    A,A8H
0E37 D3E5                       OUT   (E5H),A
0E39 3E12                       LD    A,12H             ;C0=7A12 SET
0E3B D3E4                       OUT   (E4H),A
0E3D 3E7A                       LD    A,7AH
0E3F D3E4                       OUT   (E4H),A
0E41 3E84                       LD    A,84H             ;C2 LATCH
0E43 D3E7                       OUT   (E7H),A
0E45 DBE6                       IN    A,(E6H)           ;C2 READ
0E47 4F                         LD    C,A
0E48 DBE6                       IN    A,(E6H)
0E4A 47                         LD    B,A
0E4B ED431E00                   LD    (C2DATA),BC
0E4F C1                         POP   BC
0E50 C9                         RET
0E51                    ;
0E51                    ;TIME READ
0E51                    ;       BC=C2 12H
0E51                    ;       DE=SECOND
0E51                    TIMRD:  ENT
0E51 C5                 ?TMRD:  PUSH  BC
0E52 E5                         PUSH  HL
0E53 3E84                       LD    A,84H             ;C2 LATCH
0E55 D3E7                       OUT   (E7H),A
0E57 3E44                       LD    A,44H             ;C1 LATCH
0E59 D3E7                       OUT   (E7H),A
0E5B DBE6                       IN    A,(E6H)           ;C2 READ
0E5D 4F                         LD    C,A
0E5E DBE6                       IN    A,(E6H)
0E60 47                         LD    B,A
0E61 DBE5                       IN    A,(E5H)           ;C1 READ
0E63 5F                         LD    E,A
0E64 DBE5                       IN    A,(E5H)
0E66 57                         LD    D,A
0E67 2A1E00                     LD    HL,(C2DATA)
```

```
0E6A AF                     XOR   A
0E6B ED42                   SBC   HL,BC
0E6D 7D                     LD    A,L
0E6E 0F                     RRCA
0E6F DCAF0E                 CALL  C,TMUP
0E72 D5                     PUSH  DE
0E73 7A                     LD    A,D
0E74 B3                     OR    E
0E75 2003                   JR    NZ,TMX
0E77 11C0A8                 LD    DE,A8C0H
0E7A 21C0A8           TMX:  LD    HL,A8C0H        ;HL=A8C0-C1
0E7D ED52                   SBC   HL,DE
0E7F ED5B1600               LD    DE,(INIC1)      ;HL=HL+INISET
0E83 19                     ADD   HL,DE
0E84 3823                   JR    C,TMX1
0E86 E5                     PUSH  HL
0E87 11C0A8                 LD    DE,A8C0H        ;HL=HL-A8C0
0E8A ED52                   SBC   HL,DE
0E8C 3814                   JR    C,TMR1
0E8E F1                     POP   AF              ; ADJ
0E8F EB               TMX2: EX    DE,HL
0E90 3A0F00                 LD    A,(AMPM)
0E93 EE01                   XOR   01H
0E95 E1                     POP   HL
0E96 010100                 LD    BC,0001H
0E99 ED42                   SBC   HL,BC
0E9B 2002                   JR    NZ,+4
0E9D EE01                   XOR   01H
0E9F E1                     POP   HL
0EA0 C1                     POP   BC
0EA1 C9                     RET
0EA2 D1               TMR1: POP   DE
0EA3 E1                     POP   HL
0EA4 3A0F00                 LD    A,(AMPM)
0EA7 18F6                   JR    -8
0EA9 114057           TMX1: LD    DE,5740H
0EAC 19                     ADD   HL,DE
0EAD 18E0                   JR    TMX2
0EAF ED431E00         TMUP: LD    (C2DATA),BC
0EB3 3A0F00                 LD    A,(AMPM)
0EB6 EE01                   XOR   01H
0EB8 320F00                 LD    (AMPM),A
0EBB C9                     RET
0EBC 0000                   DEFW  0000H
0EBE                  ;
0EBE                  ;  BELL
0EBE                  ;
0EBE                  BELL: ENT
0EBE C5                     PUSH  BC
0EBF E5                     PUSH  HL
0EC0 013000                 LD    BC,0030H
0EC3 216000                 LD    HL,0060H
0EC6 CDCC0E                 CALL  SOUT
0EC9 E1                     POP   HL
0ECA C1                     POP   BC
0ECB C9                     RET
0ECC                  ;
```

```
0ECC                    ; SOUND OUT
0ECC                    ;       BC=ONCH00
0ECC                    ;       HL=ONTEI
0ECC C5                 SOUT:   PUSH    BC
0ECD D5                         PUSH    DE
0ECE 3E05               SOUT1:  LD      A,05H
0ED0 CDDF0E                     CALL    SOUT2
0ED3 3E04                       LD      A,04H
0ED5 CDDF0E                     CALL    SOUT2
0ED8 0B                         DEC     BC
0ED9 79                         LD      A,C
0EDA B0                         OR      B
0EDB 20F1                       JR      NZ,SOUT1
0EDD 1852                       JR      PORET1
0EDF                    ;
0EDF D3E3               SOUT2:  OUT     (E3H),A
0EE1 54                         LD      D,H
0EE2 5D                         LD      E,L
0EE3 1B                         DEC     DE
0EE4 7A                         LD      A,D
0EE5 B3                         OR      E
0EE6 20FB                       JR      NZ,-3
0EE8 C9                         RET
0EE9                    ;
0EE9                    ; MELODY
0EE9                    ;       DE=DATA LOW ADDRESS
0EE9                    MELDY:  ENT
0EE9 C5                         PUSH    BC
0EEA D5                         PUSH    DE
0EEB E5                         PUSH    HL
0EEC 3E02                       LD      A,2
0EEE 326F11                     LD      (OCTV),A
0EF1 1A                 MLD1:   LD      A,(DE)
0EF2 FE0D                       CP      0DH
0EF4 283A                       JR      Z,MLD4
0EF6 FE2A                       CP      2AH             ;* END MARK
0EF8 2836                       JR      Z,MLD4
0EFA FE2D                       CP      2DH             ;- UNDER OCTAVE
0EFC 2826                       JR      Z,MLD2
0EFE FE2B                       CP      2BH             ;+ UPPER OCTAVE
0F00 282A                       JR      Z,MLD3
0F02 21940F                     LD      HL,MTBL
0F05 FE23                       CP      23H             ;#
0F07 3E00                       LD      A,00
0F09 2005                       JR      NZ,+7
0F0B 21AC0F                     LD      HL,M#TBL
0F0E 3C                         INC     A
0F0F 13                         INC     DE
0F10 323D10                     LD      (CH#),A
0F13 CD340F                     CALL    ONPU
0F16 38D9                       JR      C,MLD1
0F18 CDDD0F                     CALL    RYTHM
0F1B 3E02                       LD      A,2
0F1D 326F11                     LD      (OCTV),A
0F20 380E                       JR      C,MLD4
0F22 18CD                       JR      MLD1
0F24 3E03               MLD2:   LD      A,3
0F26 326F11                     LD      (OCTV),A
0F29 13                         INC     DE
0F2A 18C5                       JR      MLD1
```

```
0F2C 3E01          MLD3:   LD      A,1
0F2E 18F6                  JR      MLD2+2
0F30 E1            MLD4:   POP     HL
0F31 D1            PORET1: POP     DE
0F32 C1                    POP     BC
0F33 C9                    RET
0F34               ;
0F34               ; ONPU TO RATIO CONV
0F34               ;       (RATIO)=ONTEI
0F34               ;       C=ONCH00*TEMPO
0F34 C5            ONPU:   PUSH    BC
0F35 0608                  LD      B,8
0F37 1A            ONP1:   LD      A,(DE)
0F38 BE                    CP      (HL)
0F39 2809                  JR      Z,ONP2
0F3B 23                    INC     HL
0F3C 23                    INC     HL
0F3D 23                    INC     HL
0F3E 10F8                  DJNZ    ONP1+1
0F40 37                    SCF
0F41 13                    INC     DE
0F42 C1                    POP     BC
0F43 C9                    RET
0F44 78            ONP2:   LD      A,B
0F45 323E10                LD      (TOF),A
0F48 23                    INC     HL
0F49 D5                    PUSH    DE
0F4A 5E                    LD      E,(HL)
0F4B 23                    INC     HL
0F4C 56                    LD      D,(HL)
0F4D EB                    EX      DE,HL
0F4E 7C                    LD      A,H
0F4F B5                    OR      L
0F50 280A                  JR      Z,ONP3
0F52 3A6F11                LD      A,(OCTV)
0F55 3D                    DEC     A
0F56 2836                  JR      Z,HOCT
0F58 3D                    DEC     A
0F59 2801                  JR      Z,ONP3
0F5B 29                    ADD     HL,HL
0F5C 223600        ONP3:   LD      (RATIO),HL
0F5F D1                    POP     DE
0F60 13                    INC     DE
0F61 1A                    LD      A,(DE)
0F62 47                    LD      B,A
0F63 E6F0                  AND     F0H
0F65 FE30                  CP      30H
0F67 2805                  JR      Z,+7
0F69 3A0500                LD      A,(ONTYO)
0F6C 1807                  JR      +9
0F6E 13                    INC     DE
0F6F 78                    LD      A,B
0F70 E60F                  AND     0FH
0F72 320500                LD      (ONTYO),A
0F75 4F                    LD      C,A
0F76 0600                  LD      B,0
0F78 21C40F                LD      HL,OPTBL
0F7B 09                    ADD     HL,BC
0F7C D5                    PUSH    DE
0F7D 5E                    LD      E,(HL)
```

```
0F7E 50                         LD      D,B
0F7F 3A1D00                     LD      A,(TEMPW)
0F82 47                         LD      B,A
0F83 62                         LD      H,D
0F84 6A                         LD      L,D
0F85 19                         ADD     HL,DE
0F86 10FD                       DJNZ    -1
0F88 D1                         POP     DE
0F89 C1                         POP     BC
0F8A E5                         PUSH    HL
0F8B C1                         POP     BC
0F8C AF                         XOR     A
0F8D C9                         RET
0F8E CB3C               HOCT:   SRL     H
0F90 CB1D                       RR      L
0F92 18C8                       JR      ONP3
0F94                    ;
0F94 43                 MTBL:   DEFB    'C'
0F95 2501                       DEFW    0125H
0F97 44                         DEFB    'D'
0F98 0501                       DEFW    0105H
0F9A 45                         DEFB    'E'
0F9B E900                       DEFW    00E9H
0F9D 46                         DEFB    'F'
0F9E DC00                       DEFW    00DCH
0FA0 47                         DEFB    'G'
0FA1 C300                       DEFW    00C3H
0FA3 41                         DEFB    'A'
0FA4 AE00                       DEFW    00AEH
0FA6 42                         DEFB    'B'
0FA7 9B00                       DEFW    009BH
0FA9 52                         DEFB    'R'
0FAA 0000                       DEFW    0000H
0FAC 43                 M#TBL:  DEFB    'C'
0FAD 1501                       DEFW    0115H
0FAF 44                         DEFB    'D'
0FB0 F600                       DEFW    00F6H
0FB2 45                         DEFB    'E'
0FB3 DC00                       DEFW    00DCH
0FB5 46                         DEFB    'F'
0FB6 CF00                       DEFW    00CFH
0FB8 47                         DEFB    'G'
0FB9 B800                       DEFW    00B8H
0FBB 41                         DEFB    'A'
0FBC A400                       DEFW    00A4H
0FBE 42                         DEFB    'B'
0FBF 9200                       DEFW    0092H
0FC1 52                         DEFB    'R'
0FC2 0000                       DEFW    0000H
0FC4 01                 OPTBL:  DEFB    01H
0FC5 02                         DEFB    02H
0FC6 03                         DEFB    03H
0FC7 04                         DEFB    04H
0FC8 06                         DEFB    06H
0FC9 08                         DEFB    08H
0FCA 0C                         DEFB    0CH
0FCB 10                         DEFB    10H
0FCC 18                         DEFB    18H
0FCD 20                         DEFB    20H
0FCE
```

```
0FCE 08                 TABLE1: DEFB  8
0FCF 0F                         DEFB  15
0FD0 0D                         DEFB  13
0FD1 0C                         DEFB  12
0FD2 0B                         DEFB  11
0FD3 0A                         DEFB  10
0FD4 09                         DEFB  9
0FD5 08                         DEFB  8
0FD6 10                         DEFB  16
0FD7 0E                         DEFB  14
0FD8 0D                         DEFB  13
0FD9 0B                         DEFB  11
0FDA 0B                         DEFB  11
0FDB 0A                         DEFB  10
0FDC 08                         DEFB  8
0FDD                    ;
0FDD                    ; RHYTHM
0FDD                    ;
0FDD                    RYTHM:  ENT
0FDD CD7105                     CALL  KBSET
0FE0 CD6C05                     CALL  BRK
0FE3 D8                         RET   C
0FE4 D5                         PUSH  DE
0FE5 C5                         PUSH  BC
0FE6 C5                         PUSH  BC
0FE7 21CD0F                     LD    HL,TABLE1-1
0FEA 3A3D10                     LD    A,(CH#)
0FED FE00                       CP    0
0FEF 2804                       JR    Z,RYTHM1
0FF1 010700                     LD    BC,7
0FF4 09                         ADD   HL,BC
0FF5 3A3E10             RYTHM1: LD    A,(TOF)
0FF8 4F                         LD    C,A
0FF9 FE01                       CP    1
0FFB 2005                       JR    NZ,RYTHM3
0FFD 3E02                       LD    A,2
0FFF 326F11                     LD    (OCTV),A
1002 09                 RYTHM3: ADD   HL,BC
1003 46                         LD    B,(HL)
1004 3A6F11                     LD    A,(OCTV)
1007 3D                         DEC   A
1008 2807                       JR    Z,RYTHM2
100A 3D                         DEC   A
100B 2806                       JR    Z,*N
100D CB38                       SRL   B
100F 1802                       JR    *N
1011 CB20               RYTHM2: SLA   B
1013 D1                 *N:     POP   DE
1014 210000                     LD    HL,0000H
1017 19                         ADD   HL,DE
1018 10FD                       DJNZ  -1
101A 44                         LD    B,H
101B 4D                         LD    C,L
101C 2A3600                     LD    HL,(RATIO)
101F 7C                         LD    A,H
1020 B5                         OR    L
1021 2806                       JR    Z,RDEL
1023 CDCC0E                     CALL  SOUT
1026 C1                 *N1:    POP   BC
1027 D1                         POP   DE
```

```
1028 C9                         RET
1029 E5                 RDEL:   PUSH    HL
102A 3E04                       LD      A,4
102C 32CF0E                     LD      (SOUT1+1),A
102F 212501                     LD      HL,0125H
1032 CDCC0E                     CALL    SOUT
1035 3E05                       LD      A,5
1037 32CF0E                     LD      (SOUT1+1),A
103A E1                         POP     HL
103B 18E9                       JR      *N1
103D                    ;
103D                    CH#:    DEFS    1
103E                    TOF:    DEFS    1
103F                    ;
103F                    ;
103F                    BUFER:  DEFS    20
1053                    ;
1053  P                 IBUFE:  EQU     10C0H
1053  P                 ATRB:   EQU     10C0H
1053  P                 NAME:   EQU     10C1H
1053  P                 SIZE:   EQU     10D2H
1053  P                 DTADR:  EQU     10D4H
1053  P                 EXADR:  EQU     10D6H
1053  P                 COMNT:  EQU     10D8H
1053  P                 TABDAT: EQU     1140H
1053  P                 MODE:   EQU     1150H
1053  P                 DSPXY:  EQU     1151H
1053  P                 MANG:   EQU     1153H
1053  P                 OCTV:   EQU     116FH
1053  P                 FKAE:   EQU     1170H
1053  P                 DPRNT:  EQU     1172H
1053  P                 KYBDA:  EQU     1173H
1053  P                 KSTD:   EQU     1174H
1053  P                 FARE:   EQU     1180H
1053  P                 SCRN:   EQU     D000H
1053  P                 EXIT:   EQU     00B1H
1053                    ;
1053                    ;
1053                    ;
1053                            END
```

*N	1013	*N1	1026	2HEX	0623	2HEX1	0638	?CLER	064F
?DINT	0650	?DPCT	0A6E	?DSP	087F	?PNT1	0C56	?PONT	0C53
?PRT	08EE	?RDD	02B2	?RDI	028E	?TMRD	0E51	?TMST	0E06
?VRFY	02BE	?WRD	0282	?WRI	0251	ADDGA	07CB	AMPM	000F
ASC	05F3	ATRB	10C0	BELL	0EBE	BLK1	04DD	BLK3	04DA
BLK4	04D7	BRK	056C	BRKEY	0562	BUFER	103F	C2DATA	001E
CANRVS	0AA1	CH#	103D	CHR40	0D18	CHR80	0CA6	CHX0	0CC0
CHX1	0CC8	CHX2	0CFD	CKS1	0429	CKS2	0437	CKS3	043B
CKSUM	0423	CLRS	0B5B	CLRS1	0B68	COMES	066B	COMNT	10D8
CR	0C12	CR0	0C1E	CR1	0C24	CR2	0C36	CRDIS	09D0
CSMDT	0033	CURL1	0B51	CURS1	0B1E	CURS2	0B37	CURSD	0B14
CURSL	0B47	CURSR	0B2C	CURSU	0B23	D1M	0504	DATA	09E0
DATA1	0A69	DCL	0D08	DEL	0B84	DEL0	0B8E	DEL1	0BA2
DEL10	0BA7	DEL1M	0517	DEL2	0BB2	DEL6	0511	DELT	0500
DISPM	072D	DLY	055B	DLYR	0554	DPRNT	1172	DSCL	0C96
DSMAG	0C45	DSP0	0883	DSP1	0891	DSP3	08A5	DSP4	08A8
DSPJR	089B	DSPNAM	05CF	DSPR	0C68	DSPRED	0C68	DSPW	0C7A
DSPWRR	0C73	DSPXY	1151	DTADR	10D4	DUMP	0120	DUMP0	012A
DUMP1	012F	DWLDIR	0C87	DWLDRN	0C90	DYSCSL	06DA	EDGE	0446
EDGE1	044E	EHL	0033	ESET	0583	EXADR	10D6	EXIT	00B1
FOO	085F	FOARE	0023	FARE	1180	FFWD	04E9	FKAE	1170
FLASH	000D	FLASW	0868	FLPOS	0003	FLSDAT	000E	FNCOM	01C0
FOUMES	0241	FR	04E1	FR1	04AC	FTAB	0809	FUNC	077C
GAP	03C7	GAP1	03D7	GAP2	03DF	GAP3	03E5	GETKY	0871
GETL	06A4	GETLA	07D1	GETLA1	07DD	GETLA2	07DA	GETLBR	05C5
GETLC	07E0	GETLR	07A8	GLOP1	07F3	GLOP2	07FC	GOOUT	00AE
GRAPH	0AC9	GRPH0	09C2	GSHF0	09D3	GT2	0766	GT5	078E
GT9	0762	GTBRK	079D	GTCR	07B0	GTCR0	07C0	GTINS	0793
HEX	05FD	HEX1	060F	HEXCR	0612	HL1	0621	HLHEX	0614
HOCT	0F8E	HOME	0B7C	IBUFE	10C0	INIC1	0016	INST	0BCB
INST0	0BE2	INST1	0C00	INST2	0BF5	INSTR0	0BD8	JST1	01BD
JUMP	024B	KADD	0A54	KBSET	0571	KD1	0A07	KDATW	0026
KDATW1	0027	KDIN	09FC	KDIS	09C1	KDIS1	074C	KDIS2	0758
KEDA	0006	KESTRB	0007	KEY	0950	KEYDIS	06F5	KEYFL	06DE
KEYW	06B2	KEYW1	06C8	KEYW2	06C1	KEYW3	06D2	KFIN0	0773
KFINA	09CD	KGRP	0A1F	KIN	058C	KIN1	058F	KIN2	01A8
KINP	0598	KNUMB	06A3	KNUMBS	06A2	KSMAL	0A57	KSMALS	0A5C
KSTD	1174	KSWEP	0950	KTBL	0D48	KTBLG	0DB8	KTBLS	0D80
KYBDA	1173	KYFL1	06E6	KYFL2	06EB	LAMODE	0AAE	LETNL	08B0
LMKY	0A51	LMOD	09C6	LOAMES	022D	LONG	0539	M#TBL	0FAC
MAGA	0C4A	MANG	1153	MCLECT	00F9	MELDY	0EE9	MENAME	0153
MLD1	0EE1	MLD2	0F24	MLD3	0F2C	MLD4	0F30	MLOAD	01CB
MLOVE	01CF	MNAM1	0188	MODE	1150	MONIT	0000	MOT1	046B
MOT2	0478	MOTOR	0457	MOTW	047D	MOTWG	0497	MPLAY	04D2
MR	00FF	MRUN	0827	MSAVE	014E	MSG	08DB	MSG1	08DE
MSG2	08EA	MSGX	08CD	MSGX1	08D0	MSTOP	04CE	MTBL	0F94
MVERY	021A	MVRFY	0217	MWARK	0216	NAME	10C1	NAMECK	01F6
NEW	09EB	NL	08AB	NLMSG	05B6	NLPHLS	05BC	NMSGST	0228
NOKD	0991	NOKD1	0998	NOKD2	09A0	OCTV	116F	OKMES	0248
ONE	0A46	ONE1	0A4D	ONP1	0F37	ONP2	0F44	ONP3	0F5C
ONPU	0F34	ONTYO	0005	OPEN	048C	OPTBL	0FC4	OUTRT	0AA6
PLAY	049B	PON1	0C61	PORET1	0F31	PRNT	0916	PRNTS	08B9
PRNTT	08BE	PRT2	0902	PRT3	0907	PRT4	090A	PRTHL	05D8
PRTHX	05DD	RATIO	0036	RBY1	03A4	RBY2	03BC	RBY3	03C5
RBYTE	03A0	RD1	0297	RD2	02A6	RDDAT	02B2	RDEL	1029
RDINF	028E	REGIST	0D31	REPT	0728	REPT1	0718	REPT2	0723
REPTCT	0035	RETHB	02FF	RETHB1	03EE	RETN	0AA9	ROT	09F3
ROTE	09F9	RSHF0	09BF	RTAP1	030F	RTAP2	0327	RTAP3	034A
RTAPE	030B	RVS	0AB9	RVS0	09D9	RYTHM	0FDD	RYTHM1	0FF5

RYTHM2	1011	RYTHM3	1002	SAME	063A	SAME1	063D	SAME2	0643
SAME3	0647	SAVEGO	01B5	SCRDSD	0C3C	SCREND	000C	SCRN	D000
SCRO2	0B0B	SCROL	0AD2	SCROST	000B	SCRSET	0922	SCRSIZ	001B
SCRST	0013	SCRSTD	0C3F	SEL0	00D7	SEL1	00E1	SELTBL	00E7
SERSP	04B1	SETMES	0672	SHL	002B	SHORT	051D	SIZE	10D2
SMALL	0AC0	SMALLO	09C9	SMKY	0A24	SMSHFO	09D6	SOUT	0ECC
SOUT1	0ECE	SOUT2	0EDF	SPACE	0806	SS	00A9	SSET	057A
SSP1	04BD	ST	00B1	STACK	002E	START	003B	STPRET	02AD
STRGF	002D	SUMDT	002B	SUMMES	0692	SWEP	0966	SWRK	0015
TAB	0839	TAB1	0848	TAB2	084F	TABDAT	1140	TABLE1	0FCE
TAPER	034D	TDPCT	0A83	TEMPW	001D	THREE	0A1A	TIMRD	0E51
TIMST	0E06	TITMES	0655	TM1	03FA	TM2	03FB	TM3	040D
TM4	0421	TMARK	03F1	TMR1	0EA2	TMS1	0E1F	TMUP	0EAF
TMX	0E7A	TMX1	0EA9	TMX2	0E8F	TOF	103E	TSPE	04F9
TVF1	035C	TVF2	036A	TVRFY	0358	TWO	0A37	TWO1	0A40
VERFY	02BE	VERMES	0236	WBY1	0395	WBYTE	038F	WPRMES	0684
WRDAT	0282	WRI1	025A	WRI2	0271	WRIMES	067B	WRINF	0251
WTAP1	02DE	WTAP2	02E7	WTAP4	0302	WTAPE	02DA	XTEMP	0DF8