SORRY!!

Pages 5-57 to 5-60 of this manual were changed after the QX-10 Operation Manual had already gone to press. The corrected text is shown below.

DISKCOPY

The DISKCOPY program has three functions: formatting a disk, making a copy of another disk on the formatted disk, and verifying the copy; copying the entire contents of a disk and verifying the copy; and comparing the contents of two disks.

Operating procedures

(1) Type "DISKCOPY" and press the [←┘] key.
(2) The following message appears on the screen.

```
A>DISKCOPY

QX-10 DISKCOPY  ver X.X

Press F or C or V  ( or RETURN to reboot )
      Format and Copy and Verify ---- F
      Copy and Verify ------------- C
      Verify ---------------------- V
```

Press the "F" key to format a disk and make a copy of another disk; press the "C" key to copy a disk; or press the "V" key to compare two disks.

Formatting and copying a disk

a. When the "F" key is pressed, the following message appears on the screen.

[Format & Copy & Verify]

* Source drive name (or RETURN to reboot)__

b. Enter the source drive name (A or B).
c. If drive A is specified, the following message appears on the screen.

* Source on A, then press RETURN__

d. Press the [←┘] key; the following message then appears.

* Destination drive name (or RETURN to reboot)__

e. Enter the destination drive name. If drive B is specified, the following message appears.

```
* Destination on B, then press RETURN_
```

f. Press the [←┘] key, and the following message appears.

```
# Set diskettes on A and B, then press RETURN_
```

g. Insert the source disk in drive A and the disk which is to be formatted (and on which the copy is to be made) in drive B. Then, press the [←┘] key.

h. After the function has been completed the display changes as shown below.

```
A>DISKCOPY

QX-10 DISKCOPY  ver X.X

Press F or C or V  ( or RETURN to reboot )
       Format and Copy and Verify  ---- F
       Copy and Verify  ------------- C
       Verify  ---------------------- V
F

[ Format & Copy & Verify ]
* Source drive name  ( or RETURN to reboot ) A
* Source on A, then press RETURN
* Destination drive name  ( or RETURN to reboot ) B
* Destination on B, then press RETURN
# Set diskettes on A and B, then press RETURN
00  01  02  03  04  05  06  07  08  09  10  11  12  13  14  15  16  17  18  19
20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39
Function complete

Continue ? ( Y/N )
```

Pressing the "Y" key allows you to continue formatting and copying with other disks starting at step f.

Pressing the "N" key terminates operation and displays the following message on the screen again.

```
Press F or C or V (or RETURN to reboot)

    Format and Copy and verify ---------- F

    Copy and Verify---------------------- C

    Verify------------------------------- V
```

Pressing the BREAK key (or "CTRL" + "C") causes the following message to be displayed.

```
* Change CP/M system disk and press RETURN_
```

This message also appears if the BREAK key (or "CTRL" + "C") key is pressed when a prompt for key entry is displayed, or if the [←┘] key is pressed when the message "(or RETURN to reboot)" is displayed.
Insert the system disk in drive A and press the [←┘] key; the system then returns to the command level.

Disk copy

a. When the "C" key is pressed, the following message appears on the screen.

```
[Copy and Verify]

* Source drive name (or RETURN to reboot)_
```

b. Enter the source drive name.

c. If drive A is specified, the following message appears on the screen.

```
* Source on A, then press RETURN_
```

d. Press the [←┘] key and the following message appears.

```
* Destination drive name (or RETURN to reboot)_
```

e. Enter the destination drive name. If drive B is specified, the following message appears.

```
* Destination on B, then press RETURN_
```

f. Press the [←┘] and the following message appears.

```
* Set diskettes on A and B, then press RETURN_
```

g. Insert the source disk in drive A and a formatted new disk in drive B and press the [←┘] key.

h. After copying is completed, the display becomes as follows.

```
A>DISKCOPY

QX-10 DISKCOPY  ver X.X

Press F or C or V  ( or RETURN to reboot )
       Format and Copy and Verify ---- F
       Copy and Verify ------------- C
       Verify ---------------------- V
C

[ Copy & Verify ]
* Source drive name  ( or RETURN to reboot ) A
* Source on A, then press RETURN
* Destination drive name  ( or RETURN to reboot ) B
* Destination on B, then press RETURN
# Set diskettes on A and B, then press RETURN
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Function complete

Continue ? ( Y/N )
```

Pressing the "Y" key allows you to continue copying starting at step a.
Pressing the "N" key terminates copying and displays the following message on the screen again.

```
Press F or C or V (or RETURN to reboot)

    Format and Copy and verify ---------- F

    Copy and Verify---------------------------------------- C

    Verify ------------------------------------------------- V
```

Pressing the BREAK key (or "CTRL" + "C") causes the following message to be displayed.

```
* Change CP/M system disk and press RETURN_
```

This message also appears if the BREAK key (or "CTRL" + "C") key is pressed when a prompt for key entry is displayed, or if the ⏎ key is pressed when the message "(or RETURN to reboot)" is displayed.
Insert the system disk in drive A and press the ⏎ key; the system then returns to the command level.

Verify

a. If the "V" key is pressed in step (2), the following message appears on the screen.

[Verify]

* Source drive name (or RETURN to reboot)__

b. Enter the source drive name. If drive A is specified, the following message appears.

* Source on A, then press RETURN__

c. Press the [←┘] key and the following message appears.

* Destination drive name (or RETURN to reboot)__

d. Enter the destination drive name. If drive B is specified, the following message appears.

* Destination on B, then press RETURN__

e. Press the [←┘] key and verification starts.

f. After verification is completed, the display changes as shown below.

```
A>DISKCOPY

QX-10 DISKCOPY  ver X.X

Press F or C or V  ( or RETURN to reboot )
       Format and Copy and Verify ---- F
       Copy and Verify ------------- C
       Verify ---------------------- V
V

[ Verify ]
* Source drive name  ( or RETURN to reboot ) A
* Source on A, then press RETURN
* Destination drive name  ( or RETURN to reboot ) B
* Destination on B, then press RETURN
# Set diskettes on A and B, then press RETURN
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Function complete

Continue ? ( Y/N )
```

Pressing the "Y" key allows you to continue verifying starting at step e.
Pressing the "N" key terminates verification and displays the following message on the screen.

Press F or C or V (or RETURN to reboot)

Format and Copy and verify ---------- F

Copy and Verify---------- C

Verify---------- V

Pressing the BREAK key (or "CTRL" + "C") causes the following message to be displayed.

* Change CP/M system disk and press RETURN_

This message also appears if the BREAK key (or "CTRL" + "C") key is pressed when a prompt for key entry is displayed, or if the [←┘] key is pressed when the message "(or RETURN to reboot)" is displayed.
Insert the system disk in drive A and press the [←┘] key; the system then returns to the command level.

Error messages

The following error messages may appear during execution of the DISKCOPY command.

Message	Meaning
Invalid drive name (Use A or B or C or D)	An invalid drive name was specified. Specify A or B.
(Use B or C or D) or (Use A or C or D)	Specify a drive other than the source drive.
Permanent error, press RETURN to try again	A read or write error has occurred on the disk. Press to retry the read or write, or press the BREAK key (or "CTRL" + "C") to abort.

NOTE:
The DISKCOPY command cannot be used for drives E and F.

Chapter 5 CP/M COMMANDS

Three types of commands are supported by the CP/M operating system for the QX-10: Control key commands, built-in commands and transient commands. Control key and built-in commands are included in CCP, and are not listed in the directory of the system disk. The programs for transient commands are stored as individual program files on the system disk with file type .COM assigned.

5.1 Control Key Commands

Control key commands are entered by pressing a specific key while holding down the CTRL key. These commands are as listed below.

[CTRL] and [C] : Performs warm boot of CP/M.

[CTRL] and [E] : Physically terminates a line.

[CTRL] and [H] : Performs the same function as the "BS" key.

[CTRL] and [I] : Performs the same function as the "TAB" key.

[CTRL] and [P] : Entering this command once causes all information displayed on the CRT to be printed on the printer (LST:). Entering it again restores normal operation.

[CTRL] and [R] : Redisplays the current command line.

[CTRL] and [S] : Entering this command once suspends any operation. Entering it again restarts operation.

[CTRL] and [U] : Invalidates the current entry and moves the cursor to the top of the next line.

[CTRL] and [X] : Deletes the current entry and moves the cursor to the top of the current line.

[CTRL] and [Z] : Terminates input from the console.

5.2 Built-in Commands

Built-in commands are resident in main memory and are executed immediately when they are entered. In the explanations below, drives E and F are also applicable where drive B is indicated.

Built-in commands of the MF CP/M are as follows.

DIR

ERA

REN

SAVE

TYPE

USER

DIR (Directory)

The DIR command lists the names of all files satisfying the specified ambiguous file name (afn) on the display screen. The format is

DIR afn

As a special case,

DIR

is used to list the names of all the files on the currently logged disk. This is equivalent to "DIR *.*".
A drive name other than that currently logged in can also be specified as follows.

DIR B:afn

If any key is pressed while the directory is being listed, listing stops and the system returns to the command level.

Example 1

The following example lists all files on the disk in drive A.

```
A>DIR
A: MOVCPM  COM : .OSTAB  SYS : .PFKTAB  SYS : .FOREIGN SYS
A: .GAIJI  SYS : PIP     COM : SUBMIT   COM : ED       COM
A: STAT    COM : ASM     COM : LOAD     COM : DDT      COM
A: SYSGEN  COM : DUMP    COM : XSUB     COM : DUMP     ASM
A: BIOS    ASM : CBIOS   ASM : DEBLOCK  ASM : DISKDEF  LIB
A: FORMAT  COM : CONFIG  COM : PFKSET   COM : DIRINIT  COM
A: TERM    COM : DISKCOPY COM : CHARADEF COM : MFONT    COM
A: NORM    COM : AUTOST  COM : MFBASIC  COM :
A>
```

In the figures in this chapter, characters entered from the keyboard by the operator are underlined.

Example 2

The following example lists the names of files in drive A, which satisfy the ambiguous file name DUMP.*.

```
A>DIR DUMP.*
A: DUMP    COM : DUMP    ASM
A>
```

Example 3

The following example lists the names of files on the disk in drive B which satisfy the ambiguous file name D???.*.

```
A>DIR B:D???.*
B: DDT      COM : DUMP     COM : DUMP     ASM
A>
```

Note that the file with the file name DUMPS.COM is not listed because D???.* is satisfied only by filenames beginning with D which have 4 or fewer characters.

ERA (Erase)

The ERA commands erases a specific file or all files that satisfy a specified ambiguous file name from the currently logged in disk. The format of this command is as follows.

```
ERA ufn
or ERA afn
```

A drive other than that currently logged in can also be specified as shown below.

```
ERA B:filename.typ
```

Examples

ERA ABC.ASM	Erases file ABC.ASM.
ERA *.*	Erases all files on the currently logged disk. In this case, the system displays the message ALL FILES (Y/N) to prompt for confirmation that all files are to be erased. Enter Y to erase all files; enter N if command excution is to be terminated.
ERA B:*.BAS	Erases all files on drive B that satisfy ambiguous file name *.BAS.

Note: Files with the R/O attribute cannot be erased.

REN (Rename)

The REN command changes the name of a file. The format for this command is as follows.

REN ufnl = ufn2

This changes the file name from ufn2 to ufnl.
A drive name can be specified before either or both file names (in the latter case, the same drive name must be specified for both file names). If a drive name precedes ufnl, it is assumed that the same drive name precedes ufn2, and vice versa.

NOTE:
If ufn2 already exists on the specified disk, the message "FILE EXISTS" is displayed and no change is made.

SAVE

The SAVE command saves the contents of the specified number of pages (256 byte blocks) of the transient program area (which starts at address 100H) on a disk under the specified filename. The format for this command is as follows.

SAVE n ufn

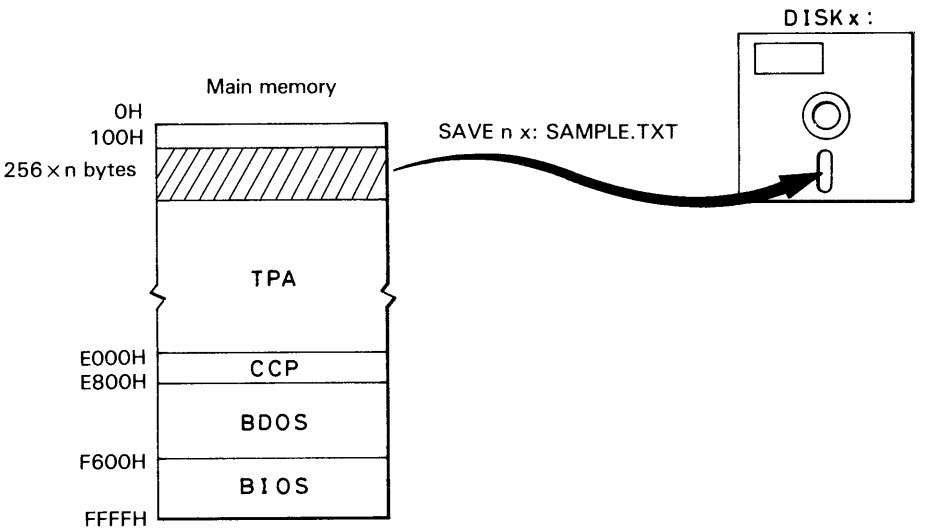
Here, n represents the number of pages to be saved. A drive number can be specified preceding the file name as follows.

SAVE n B:ufn

Examples:

SAVE 3 ABC.ASM — Saves the contents of the memory area from 100H to 3FFH on the currently logged in disk under the file name ABC.ASM assigned.

SAVE 10 B:D.BAS — Saves the contents of the memory area from 100H to 0AFFH on the disk in drive B under the file name D.BAS.



TYPE

The TYPE commands displays the contents of the specified ASCII file in the currently logged disk. The format for this command is as follows.

TYPE ufn

A drive other than that currently logged in can also be specified as shown below.

TYPE B:ufn

If any key is pressed during execution of the TYPE command, display is interrupted and the system returns to the command level.

```
A>TYPE SAMPLE.PRN

0100                    ORG     100H
0100 0E0D               MVI     C,0DH
0102 CD0FEA             CALL    0EA0FH
0105 C9                 RET
0106                    END

A>
```

USER

The USER command allows different users to specify their own logical directories on the same disk. The logical directory 0 is automatically specified after cold start. The user can open another logical directory with the USER command. The format for this command is as follows.

```
USER n
```

Here, n is the user number (an integer from 0 to 15) which specifies a logical directory. When a logical directory is specified, only files cataloged in the specified directory can be accessed; that is, files generated under one user number cannot be accessed under any other user numbers.

5.3 Standard Transient Commands

The standard transient commands are included as program files on the system disk, and are not resident in main memory. When a transient command is typed following the system prompt, the corresponding program file is loaded in the transient program area, then executed.
Standard transient commands are briefly explained below. For details, see any of the various publications available on CP/M.

In explanations of subcommands, Z represents the CTRL and Z keys pressed together.

Standard transient commands of the MF CP/M are as follows.

ASM.COM

DDT.COM

DUMP.COM

ED.COM

LOAD.COM

MOVCPM.COM

PIP.COM

STAT.COM

SUBMIT.COM

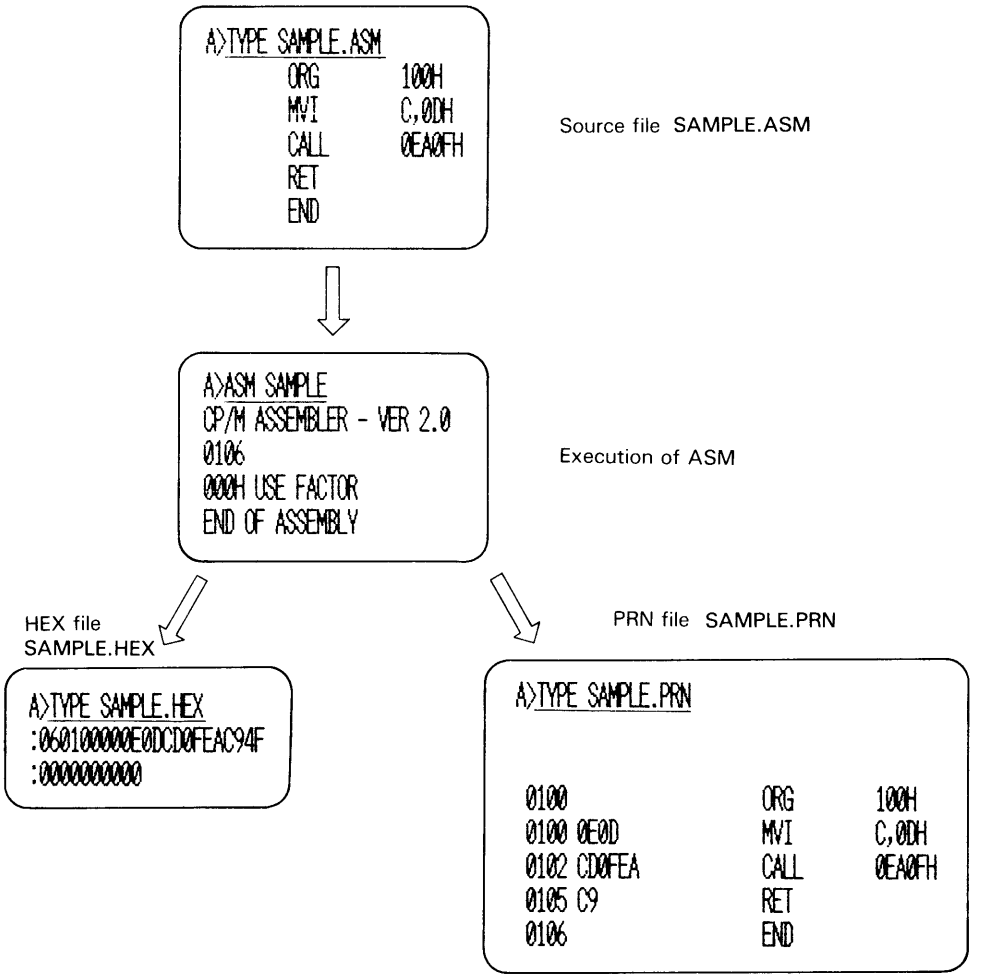
SYSGEN.COM

XSUB.COM

ASM (Assembler)

The ASM command loads and starts the Intel 8080 assembler program. This program reads source files generated with the ED command, converts them to machine language programs in Intel "HEX" format, and produces assembly list files. Although the QX-10 uses a Z80 compatible CPU, some mnemonics peculiar to the Z80 cannot be used in source files when using this assembler. For the full set of Z80 mnemonics, you may use an optional assembler program such as MAC or M80.

The file type of the source file must be ASM, that of the object file is automatically set to HEX and that of the list file is automatically set to PRN.



The general format for the ASM command is shown below.

Format 1

ASM dr:filename

Assembles the source file "filename.ASM" from the disk in the specified file, then saves the object file "filename.HEX" and the list file "filename.PRN" on the same disk. dr can be omitted if the disk is in the drive which is currently logged in.

Format 2

ASM filename.shp

Assembles the source file "filename.ASM" from the disk in drive s, outputs the object file "filename.HEX" to the device specified by h, and outputs the list file "filename.PRN" to the device specified by p.

s: drive name (A, B, E and F)

h: drive name (A, B, E and F)
Specify X if no object file is to be created.

p: drive name (A, B, E and F),
Specify Z if no list file is to be created, or X to output the list file to the console. (The list file can also be output to the printer by pressing the CTRL and P keys together prior to assembly.)

Examples

A>ASM SAMPLE ↵

This example assembles SAMPLE.ASM from the disk in drive A, then outputs SAMPLE.HEX and SAMPLE.PRN to the same disk.

A>ASM B:SAMPLE ↵

This example assembles SAMPLE.ASM from the disk in drive B, then outputs SAMPLE.HEX and SAMPLE.PRN to the same disk.

A>ASM SAMPLE.BBA ↵

This example assembles SAMPLE.ASM from the disk in drive B, then outputs SAMPLE.HEX to the same disk, and outputs SAMPLE.PRN to the disk in drive A.

A>ASM SAMPLE.AZX ↵

This example assembles SAMPLE.ASM from the disk in drive A and outputs SAMPLE.PRN to the console, but does not create an object file.

A>ASM SAMPLE.AZZ ↵

This example assembles SAMPLE.ASM, but does not create object or list files. Since program errors are displayed with this format, it is often used to check for program errors.

Error messages

When the assembler detects errors in the source program during assembly, it displays the relevant line(s) with an error message appended to the left end of the line as shown below.

```
A>ASM SAMPLE1
CP/M ASSEMBLER - VER x.x
E                       MOV     C A
E0000 40                MVI     B,0DH
V0001 CD0000            CALL    0EA0FH
U0004 1E00              MVI     E,ABC
0007
000H USE FACTOR
END OF ASSEMBLY

A>
```

Error message	Typical causes
D	Incorrect data expression in data area
E	Incorrect expression which cannot be computed by assembler
L	Incorrect use of label (duplicate label)
N	Use of features not implemented
O	Expression too complicated
P	Phase error: Label does not have the same value on a subsequent pass.
R	Improper register specification
S	Syntax error
U	Undefined label
V	Value of operand or expression is out of range.

DDT (Dynamic debugging Tool)

The DDT command loads and executes the dynamic debugging tool, a debugger which operates at the machine language level. Enter this command using one of the following formats.

DDT

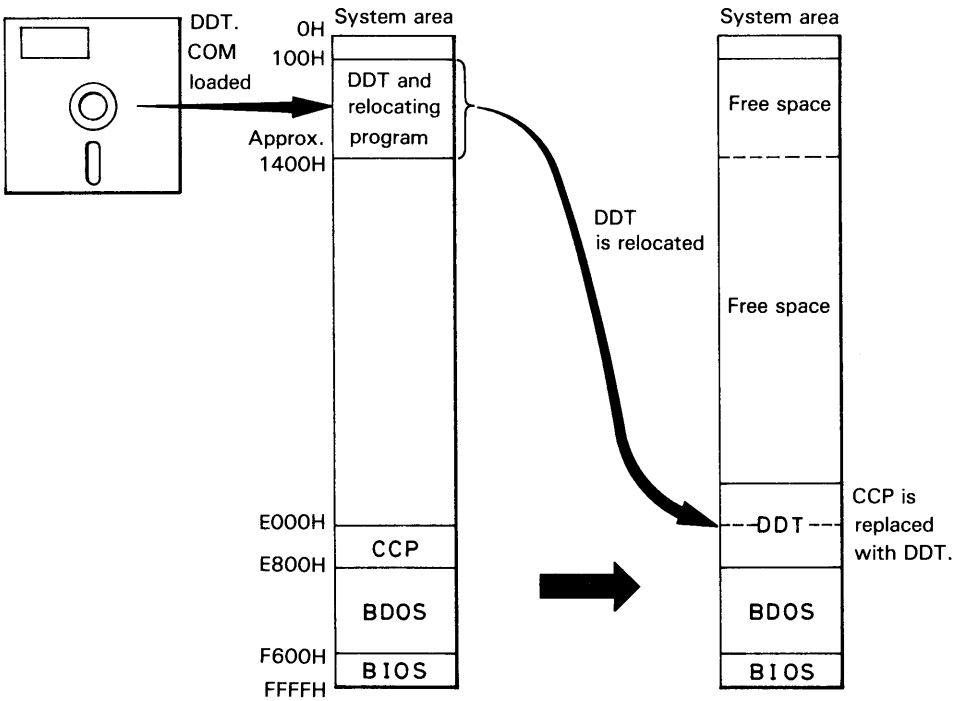
This format loads the DDT into main memory. Files to be processed are loaded with a subcommand.

DDT filename.COM

DDT filename.HEX

This format loads filename.COM or filename.HEX into main memory for debugging.

The DDT subcommands are as follows. These may be entered when the subcommand prompt "–" is shown on the display. The DDT command can be terminated by entering subcommand G0 or pressing CTRL and C together.



After DDT (plus the relocating program) has been loaded in the memory area starting at 100H, DDT is relocated to the memory are below BDOS by the relocating program. After relocation has been completed, the prompt "–" appears on the screen.

Iufn

This subcommand catalogs file name ufn in the default file control block at address 5CH.

R or Roffset

These subcommands load the file specified in the default file control block into memory. The starting address of the memory area into which the file is loaded is 100H (or 100H + offset) when the file is of the COM type; when a HEX type file is loaded, the starting address of the memory area is that specified in the program (plus the offset, if specified). The offset must be specified as a hexadecimal numer.

Example

```
-IABC.COM ↵
-R ↵
```

This example loads file ABC.COM into the memory area starting at address 100H.

Hnnnn mmmm

This subcommand calculates the results of nnnnH + mmmmH and nnnnH − mmmmH.

Example

```
-H100 1F00 ↵
2000 E200
```

The value on the left is the result of addition and that on the right is the result of subtraction. Results of up to 4 digits are displayed, and overflow and underflow errors are ignored.

D, Daddress or Daddress1 address2

This command displays the contents of the main memory area starting at "last display address + 1" in both hexadecimal and ASCII form. The starting address for display when the DDT command is first activated is 100H.

Example 1

```
-D ↵
```

This subcommand displays the contents of memory starting at 100H on 12 lines of the screen.

Example 2

```
-D200 ↵
```

This subcommand displays the contents of memory starting at 200H on 12 lines of the screen.

Example 3

-D100 200 ↵

This subcommand displays the contents of the memory area from 100H to 200H.

Faddress1 address2 c

This subcommands fills the memory area from address1 to address2 with the hexadecimal constant c.

Example

-F0195 01A3 4C ↵

This subcommands fills the memory area from 0195H to 01A3H with 4CH.

Maddress1 address2 address3

This subcommand transfers the contents of the memory area from address1 to address2 to the area starting at address3.

Saddress

This subcommand is used to change the contents of memory.

Example

-S100 ↵

0100 01

To change the contents, type the new data 02 and press the ↵ key. The contents of address 100H are changed to 02, then the next address is displayed for modification as follows.

0100 01 02 ↵

0101 BC

Pressing the ↵ key by itself increments the address without changing its contents.

0100 01 02

0101 BC ↵

0102 . ↵

—

Typing "." instead of new data terminates the subcommand.

Aaddress

This subcommand assembles 8080 mnemonic instructions entered following the indicated addresses. Numeric values specified in operands must be hexadecimal number. (However, "H" must not be appended to the numbers.)

Example

```
-A100
0100_
```

Type a mnemonic instruction and press the ↵ key.

```
0100 LXI SP,80 ↵
0103_
```

This causes the machine language instruction corresponding to the above mnemonics to be loaded into the area from 100H to 102H.
Pressing the ↵ key by itself terminates the subcommand.

```
0100 LXI SP,80
0103 ↵
-
```

In this case, the contents of address 103H is not changed.

L, Laddress or Laddress1 address2

This subcommand lists the contents of the specified memory area in 8080 mnemonics.

Example 1

```
-L ↵
```

This example lists 11 lines of memory contents, starting at "last list address + 1". Immediately after the DDT command is activated, the last address is 100H.

Example 2

```
-L100 105 ↵
```

This example lists the contents of memory from 100H to 105H.

X or Xr

This subcommand displays the register contents and flag settings, and allows you to change their contents.

Example 1

```
-X ↵
```

Displays the register contents.

Example 2

```
-XP ↵
P=0100
```

Displays the contents of the program counter. To change its contents, type a new address and press the ↵ key.

```
P=0100 0200 ↵
```

G

The G subcommand starts execution of a program loaded by the DDT command. Execution starts at the address specified in the subcommand, and up to two break points can be set. The general format for this subcommand is as follows.

```
Gaddr,bp1 bp2
```

Here, bp1 and bp2 indicate break points. Any parameters can be omitted; if the starting address is omitted, execution starts at the current address contained in the program counter.

Example 1

```
-G ↵
```

Starts execution from the program counter address.

Example 2

```
-G100,120 ↵
*120
-
```

Starts execution at address 100H and stops execution at address 120H.

Tm

This subcommand traces m steps of the program starting at the program counter address. Flag setting, register contents, and program mnemonics are displayed for each step traced. If m is omitted, the subcommand traces one step. Pressing any key stops tracing.

Um

This subcommand traces m steps of the program starting at the program counter address. Trace results are displayed only for the last instruction executed.

DUMP

The DUMP command displays the contents of the specified file on the screen in hexadecimal form. Each 16-byte section of the file is displayed on one line, with the starting address of each section listed to the left of each line. The format for this command is as follows.

DUMP ufn

DUMP dr:ufn

Example

```
A>DUMP SAMPLE.ASM

0000 20 20 20 20 20 20 20 20 4F 52 47 20 20 20 20 20
0010 20 20 20 31 30 30 48 0D 0A 20 20 20 20 20 20 20
0020 20 4D 56 49 20 20 20 20 20 20 20 20 43 2C 30 44
0030 48 0D 0A 20 20 20 20 20 20 20 20 43 41 4C 4C 20
0040 20 20 20 20 20 20 30 45 41 30 46 48 0D 0A 20 20
0050 20 20 20 20 20 20 52 45 54 0D 0A 20 20 20 20 20
0060 20 20 20 45 4E 44 0D 0A 1A 1A 1A 1A 1A 1A 1A 1A
0070 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A 1A

A>
```

The ED command allows the user to generate new text files or to edit existing files. The format for the ED command is as follows.

```
ED dr:filename.typ
```

The file name may be either the name of a new file or an existing file. Specify the name of an existing file to edit it; specify a new name to create a new file.

When the ED command is entered to create a new file, the display appears as follows.

```
A>ED B:SAMPLE.ASM

NEW FILE
   : *
```

When the ED command is entered to edit an existing file, the display appears as follows.

```
A>ED B:SAMPLE.ASM
   : *
```

In either cases, an asterisk is displayed as shown below to prompt for entry of sub-commands.

ED subcommands

nA

Appends the n lines of text from the disk to the contents of the edit buffer.

0A

Appends text from the disk to the contents of the edit buffer until half of the edit buffer is filled.

±B

Moves the character pointer (CP) to the beginning (+) or end (−) of the text in the edit buffer.

±nL

Moves the CP ±n lines from the current line and locates it at the beginning of the new line.

±n
Moves the CP ±n lines from the current line, locates it at the beginning of the new line, and displays that line. (= ±nLT)

0
Moves the CP to the beginning of the current line and displays the current line. (=0LT)

Moves the CP to the beginning of the next line and displays that line. (Same as with LT.)

n:
Moves the CP to the beginning of line n.

±nC
Moves the CP ±n characters from its current position.

±nT
Displays the ±n lines from the current CP position.

0T
Displays the current line from its beginning to the CP position.

n::mT
Displays the text from line n to line m.

±nP
Displays the ±n pages from the current CP position. (1 page = 23 lines)

nFstring
Locates the n'th occurence of the character string following the current CP position and locates the CP to the end of that string.

nNstring
Appends the remainder of the text from the disk and performs the same function as nFstring.

±nD
Deletes the n characters preceding (-) or following (+) the CP position.

±nK
Deletes the n lines preceding (-) or following (+) the line on which the CP is located. When + is specified, the current line is deleted; otherwise, it is excluded.

I
Enters the insert mode to allow insertions to be made.

Istring^Z
Inserts the specified string at the current CP position.

Istring ↵
Inserts the specified string and a CR/LF in the current CP position to generate a new line.

R
Inserts lines previously saved as temporary file X$$$$$$$.LIB (with the nX subcommand) at the current CP position.

Rfilename
Inserts a file of type LIB at the current CP position. (The file must exist on the disk which contains the original source file or on which the new file is to be stored.)

nSstring1^Zstring2
Replaces the n'th occurence of string1 following the current CP position with string2, then locates the CP at the end of string2.

nJstring1^Zstring2^Zstring3
Inserts string2 following the n'th occurence of stringl following the current CP position, then deletes all characters from the end of string2 to the beginning of string3. string3 is not deleted.

nX
Appends the n lines of the text following the CP to the contents of temporary file X$$$$$$$.LIB.

R
Inserts the contents of temporary file X$$$$$$$.LIB at the current CP position.

0X
Empties temporary file X$$$$$$$.LIB.

±U
+U causes all characters to be converted to upper case as they are entered; −U resets this function.

nMsubcommand
Repeats the specified subcommand n times.

Msubcommand
Repeats the specified subcommand until the end of buffer is reached. (=0M, 1M)

±V
−V makes line numbers invisible. +V resets this mode.

0V
Displays the amount of free space and total space in the edit buffer.

nZ
Delays display by approximately 1/4n seconds.

nW
Saves the n lines from the beginning of the edit buffer to temporary file filename.$$$. Lines saved are deleted from the edit buffer.

E
Saves the contents of the edit buffer and the remainder of the source file to the disk and terminates the ED command.

H
Saves the contents of the edit buffer and the remainder of the source file to the disk, deletes the contents of the edit buffer, and restarts the ED command for the same file name.

O
Cancels and clears all preceding editing operations to allow editing to be started over.

Q
Terminates the ED command; no change is made on the original file.

n:subcommand
Moves the CP to the beginning of the current line and executes subcommand.

:nsubcommand
Executes subcommand for the text between the CP and line n.

NOTES:

* *The CP is an abbreviation for character pointer.*
* *The + symbol can be omitted.*
* *n can be omitted when it is 1.*
* *When # is specified as n for subcommands A and W, all lines of the text are indicated.*
* *More than one command can be entered at the same time.*
* *When any of subcommands I, S, J, R and F are entered in uppercase, lowercase characters in the text are converted to uppercase characters. Therefore, these subcommands must be entered in lowercase when the text includes lowercase characters.*
* *Line editing can be done using control keys during ED operation. Pressing the CTRL and L keys together inserts a CR/LF in the text without using the [←┘] key.*

When the ED command is terminated with subcommand E, the type of the original file is changed to BAK and it remains on the disk so that it is used as a backup file.

Error messages

When an error occurs during editing, the ED command displays the message

BREAK "X" AT C

Here, C is the command which caused the error and X is one of the following.

?: Incorrect command

>: Edit buffer full

#: Subcommand cannot be executed the number of times specified.

0: LIB file cannot be opened by subcommand R.

Example 1

The following example generates the command procedure file used in the example for the SUBMIT command.

```
A>ED SAMPLE.SUB [←┘]
NEW FILE
    : *I [←┘]
   1: FORMAT [←┘]
   2: SYSGEN [←┘]
   3: PIP B:=A:*.* [←┘]
   4:^Z
    : *E [←┘]
A>
```

LOAD

The LOAD command converts Intel "HEX" format object files generated with the ASM command into executable machine code files (with file type COM assigned) and saves them on the specifed disk.
The example below converts SAMPLE.HEX to SAMPLE.COM and saves it to the disk in drive A.

```
A>LOAD SAMPLE

FIRST ADDRESS 0100
LAST  ADDRESS 0105
BYTES READ    0006
RECORDS WRITTEN 01


A>
```

Whether SAMPLE.COM has been saved can be checked with the STAT command as follows.

```
A>STAT SAMPLE.*

 Recs  Bytes  Ext Acc
    1     2k    1 R/W A:SAMPLE.ASM
    2     2k    1 R/W A:SAMPLE.BAK
    1     2k    1 R/W A:SAMPLE.COM
    1     2k    1 R/W A:SAMPLE.HEX
    2     2k    1 R/W A:SAMPLE.PRN
Bytes Remaining On A: 58k

A>
```

MOVCPM

The MOVCPM command allows the user to reconfigure the CP/M system for different memory sizes. The format for this command is as follows.

MOVCPM	Reconfigures the system for the available memory, but does not record the new system on the disk.
MOVCPM n	Reconfigures the system for a memory of n kilobytes; does not record the new system on the disk. n must be a number from 26 to 59.
MOVCPM n *	Reconfigures the system for a memory of n kilobytes and records the new system on the disk. n must be a number from 26 to 59.
MOVCPM * *	Reconfigures the system for the available memory and records the new system on the disk.

NOTE:
The new system can be used without rebooting, however the last asterisk must be specified in order to save the new system to the disk.

When the MOVCPM command is entered, the following message appears on the screen (assuming that a 32K CP/M system is being reconfigured.)

```
A>MOVCPM 32 * ↵

CONSTRUCTING 32k CP/M vers x.x
READY FOR "SYSGEN" OR
"SAVE 59 CPM32.COM"

A>
```

The new CP/M system is now in the TPA awaiting SYSGEN or SAVE. To modify the BIOS portion of the system, save it, then load it into memory again with the DDT command; now you can modify the BIOS portion of the system. (If you want to make a major modification, it is easier to create your own BIOS.)
You can merge files such as CBIOS.COM and BOOT.COM with the new CPM32.COM system when you load it into memory with DDT, or you can modify them while testing the new system. Finally, use SYSGEN to save the new system onto the first two tracks of a new system disk in drive B. For example,

A>SYSGEN [←┘]

QX10 SYSGEN

Source Drive Name (or RETURN to skip) [←┘]

([←┘] is pressed because the system is already in memory.)

Source Drive Name (or RETURN to reboot) A [←┘]
Source on A, then press RETURN [←┘]

Destination Drive Name (or RETURN to reboot) B
Destination on B, then press RETURN [←┘]

Function complete
Destination Drive Name (or RETURN to reboot) [←┘]

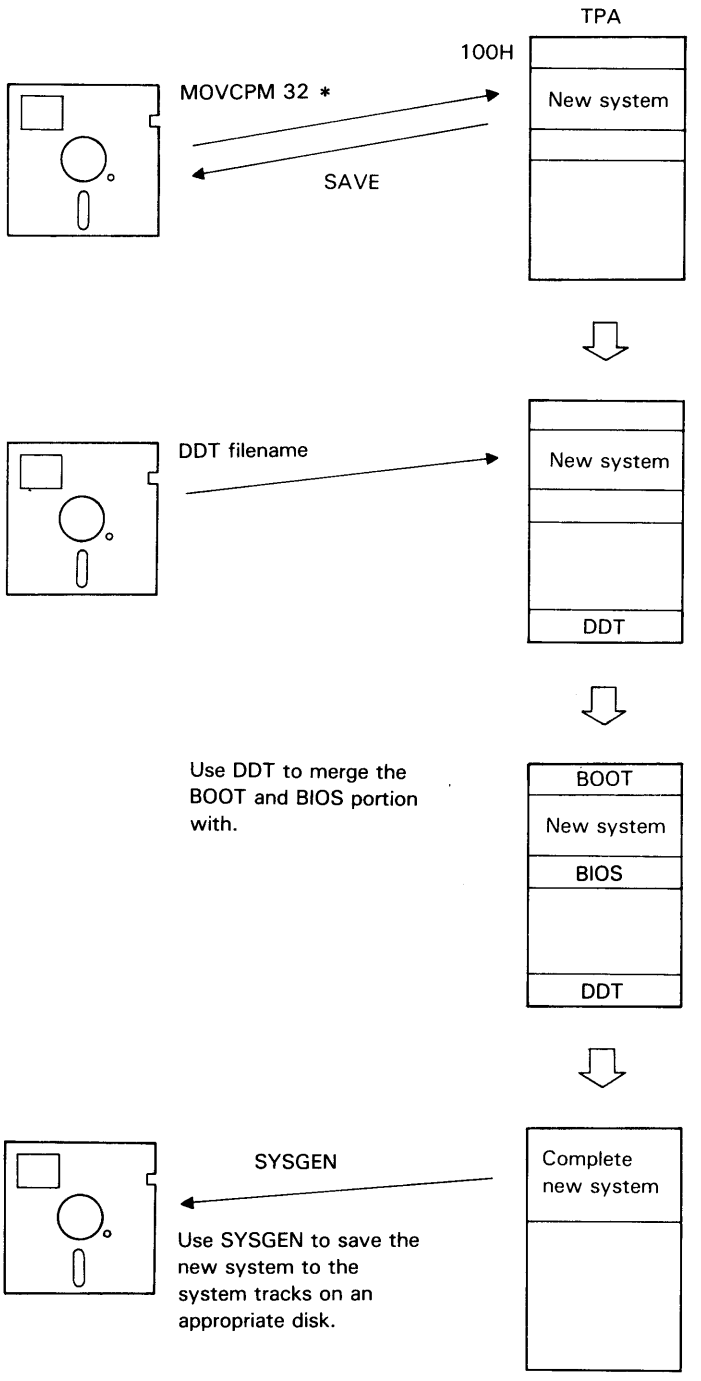
A>PIP B:=A:*.*[V] [←┘]

....

.... (Copying message)

A>

The above procedures are shown in the figure below.


TPA
100H
MOVCPM 32 *
SAVE
New system
DDT filename
New system
DDT
Use DDT to merge the BOOT and BIOS portion with.
BOOT
New system
BIOS
DDT
SYSGEN
Use SYSGEN to save the new system to the system tracks on an appropriate disk.
Complete new system

If you have a copy of new CP/M as a file with type COM assigned, you can use the following procedures.

```
A>SYSGEN CPM.COM [←┘]

QX10 SYSGEN vers x.x

Destination Drive Name (or RETURN to reboot)

.....
```

For modification of BIOS and creation of your own BOOT program, refer to Digital Research's CP/M Version 2.2 Alteration Guide.
For comparison of the reconfigured system with the original system, refer to Appendix B.

NOTE:
The following commands cannot be used with a 26K to 56K CP/M system which has been reconfigured with the MOVCPM command.

CHARADEF

MFONT

NORM

MFBASIC

MOVCPM

AUTOST

Operation of the following transient commands is limited under the reconfigured CP/M system as shown below.

FORMAT:	Drives E and F cannot be specified.
CONFIG:	Printers and countries cannot be selected. "Data char" cannot be set to 6 bits/char or less.
DIRINIT:	Drives E and F cannot be selected.
TERM:	"Data char" cannot be set to 6 bits/char or less.

The following commands are used in the same manner as with the MF CP/M.

PIP
SUBMIT
ED
STAT
ASM
LOAD
DDT
SYSGEN
DUMP
XSUB
PFKSET
DISKCOPY

PIP (Peripheral Interchange Program)

PIP is used to transfer data between peripheral devices. This command was used in Chapter 3 to copy the system disk. The general format for this command is as follows.

```
PIP destination = source [param]

PIP ↵

*destination = source1[param], source2[param], ...
```

The destination may be a logical output device, or a drive name or file name, such as LST:, CON:, B: or B:ABC.COM; source may be a logical input device or a file name preceded by a drive name; e.g. RDR:, A:*.* or A:ABC.COM. Two or more sources may be specified, and any of about 20 options may be specified; these must be specified within square brackets ([ ]), exactly as shown in the general format above. Since this command is very useful, reference to other publications on CP/M is recommended to become familiar with it.

Example 1

```
A>PIP
*LST:=A:SAMPLE.PRN
```

This lists the contents of SAMPLE.PRN on the printer (LST:).

Example 2

Copying one file from drive A to drive B

```
A>PIP B:=A:EXAMPLE.DAT[V]
```

Option [V] specifies that the file is to be verified after copying is completed.

Example 3

Copying all files from drive A to drive B

```
A>PIP B:=A:*.*[V]
```

When this command is executed, the message "COPYING" appears on the display as shown below, followed by the name of each file as it is copied.

```
COPYING
MOVCPM.COM
PIP.COM
SUBMIT.COM
  .
  .
```

(PIP parameters)

[B] (Block)
When [B] is specified, PIP performs block mode transfer. That is, PIP loads data received into a buffer until an ASCII "X-off" character (CTRL-S) is received, then saves data from the buffer to the destination device and clears the buffer to receive more data.

[Dn] (Delete)
When [Dn] is specified, PIP deletes characters exceeding column n of each line.

[E] (Echo)
When [E] is specified, data transferred is also output to the console.

[F] (Form feed)
When [F] is specified, form feed characters (0CH) are removed from data transferred.

[Gn]
When [Gn] is specified, data can be transferred from another user area.

[H] (Hex format)
When [H] is specified, PIP checks to confirm that data transferred is in Intel HEX format. (If not, operation is terminated.)

[I] (Ignore null)
When [I] is specified, PIP ignores null records (00:) and checks to confirm that data transferred is Intel HEX format. (If not, operation is terminated.)

[L] (Lowercase)
When [L] is specified, all uppercase characters are converted to lowercase characters.

[N] (Line number)
When [N] is specified, line numbers are added to the beginning of each line. Specifying "N2" adds zeros to the beginning of each line number.

[O] (Object files)
When [O] is specified, PIP ignores the physical end of file code (1AH) during concatenation and transfer. This makes it possible to transfer files other than ASCII files.

[Pn] (Page eject)
When [Pn] is specified, PIP makes a page eject every n lines. When n is 1 or omitted, 60 is assumed.

[Qstring/^Z] (Quit)
When [Qstring/^Z] is specified, PIP quits transfer when the specified string is detected.

[Sstring/^Z] (Start)
When [Sstring/^Z] is specified, PIP searches the data to be transferred for the specified string, then starts transfer from the point at which it is detected.

[R] (Read)
Specifying [R] makes it possible to transfer .SYS files. (The [W] parameter is set automatically when [R] is specified.)

[Tn] (Tab)
When [Tn] is specified, the tab width for transfer is set to n columns.

[U] (Uppercase)
When [U] is specified, all lowercase characters are converted to uppercase characters.

[V] (Verify)
When [V] is specified, each file is verified as it is copied.

[W] (Write in R/O)
When [W] is specified, the R/O attributes of destination files are ignored.

[Z] (Zero parity)
When [Z] is specified, parity bits of data received are turned to zero.

NOTE:
When the system disk is copied using the PIP command, the message "DESTINATION IS R/O, DELETE (Y/N) ?" appears whenever a file whose type is SYS is to be copied. Since these files have already been created by the SYSGEN command, press the N key when this message is displayed. (Do not specify either the [R] or [W] parameter.)

STAT (Statistical Information)

The STAT command provides general statistical information about files and devices. It is also used to specify the attributes of files and peripheral devices.
This command is entered in many formats as shown below.

File related formats

STAT
This format displays the amount of free space on the disk in the currently logged-in drive and other drives which have been at least once used, as well as their R/W attribute.

STAT dr:
This format displays the amount of free space on the disk in the specified drive.

STAT dr:filename.typ
This format displays the size and attributes of the specified file(s).

STAT dr:filename.typ $S
This format displays the size and attributes of the specified file(s) in detail.

STAT dr:filename.typ $R/O
This format sets the specified file to read only.

STAT dr:filename.typ $R/W
This format makes it possible to read or write the specified file(s).

STAT dr:filename.typ $SYS
This format sets the SYS attribute of the specified file(s).

STAT dr:filename.typ $DIR
This format sets the DIR attribute of the specified file(s).

Device related formats

STAT DEV:
This format displays the current physical-to-logical device assignments (that is, the contents of IOBYTE).

STAT VAL:
This format displays instructions for specifying the operand of the STAT command as follows.

```
Temp R/O Disk: d: = R/O
Set Indicator: d:filename.typ $R/O $R/W $SYS $DIR
Disk Status: DSK: d:DSK:
User Status: USR:
Iobyte Assign:
CON: = TTY: CRT: BAT: UC1:
RDR: = TTY: PTR: UR1: UR2:
PUN: = TTY: PTP: UP1: UP2:
LST: = TTY: CRT: LPT: UL1:
```

Iobyte Assign indicates the permissible logical-to-physical device assignments.

STAT DSK:
This format displays the status of the currently logged-in drive and other drives which have been used at least once.

STAT USR:
This format displays the current user number and user numbers which have active files on the current disk.

STAT dr: = R/O
This format sets the specified drive to read only. The read only state remains effective until a cold or warm start is made.

STAT logical: = physical:
This format assigns the specified physical device to the specified logical device.

SUBMIT

The SUBMIT command allows several CP/M commands and programs to be executed in sequence. This requires using the ED (editor) command to create a command procedure file containing the commands and programs to be executed. The file type must be "SUB".

Example

The following example makes it possible to generate a backup copy of the system disk by executing one SUBMIT command. Assume that command procedure file SAMPLE.SUB containing the following has been created with the ED command.

```
FORMAT
SYSGEN
PIP B:=A:*.*[V]
```

Typing the following executes the above commands in sequence.

```
A>SUBMIT SAMPLE
```

Wildcard names can be specified for files and commands in SUB type files using $1, $2, $3, and so forth. In this case, the actual file/command names must be specified in the SUBMIT command as shown below.

```
A>SUBMIT filename a1 a2 a3 .....
```

Here, al is the actual file name corresponding to $1, a2 is that corresponding to $2, and so forth.

SYSGEN (System generator)

The SYSGEN command makes a copy of the CP/M operating system on a new disk. (This command was used in Chapter 3 to make a copy of the system disk.) It does not copy transient commands or other program files.

After the SYSGEN command has been activated, follow the instructions given in messages displayed.

```
A>SYSGEN
QX-10 SYSGEN  ver X.X

Source Drive Name ( or RETURN to skip ) A
Source on A, then press RETURN ←┘
Function complete
Destination Drive Name ( or RETURN to reboot ) B
Destination on B, then press RETURN ←┘
Function complete
Destination Drive Name ( or RETURN to reboot )
```

After the SYSGEN command has been activated, disks in both the source and destination drives can be changed any number of times and any number of copies can be made.

NOTE:
The SYSGEN command for the QX-10 is not the same as that used with other computers, so system disks for another computer cannot be made using the SYSGEN command for the QX-10.

XSUB

The XSUB command allows the SUBMIT command to read the console buffer, that is, specifying XSUB in the command procedure file for the SUBMIT command allows subcommands and data to be included in the command procedure file.

Example

Assume that command procedure file TEST.SUB is as follows.

```
XSUB
DDT
I$1.HEX
R
GO
SAVE 1 $2.COM
```

Executing the following command executes the above commands in sequence.

```
A>SUBMIT TEST GOOD BAD
```

Here, GOOD coresonds to $1 and BAD corresponds to $2.

5.4 Transient Commands Unique to the QX-10

The commands described below are unique to the QX-10 and are not explained in publications on standard CP/M.

Transient commands unique to the QX-10 are as follows.

AUTOST
CHARADEF
CONFIG
DIRINIT
DISKCOPY
FORMAT
MFBASIC
MFONT
NORM
PFKSET
TERM

CHARADEF

The CHARADEF command allows you to design dot matrix patterns (which can be displayed or printed by application programs), and store them on a system disk. These patterns are referred to as user-defined characters. The dot matrix for a user-defined character consists of 14 × 18 dots. Although all matrix dots are displayed on the CRT screen, the uppermost row of dots is not printed on paper; this row is used to determine proportional spacing of each character when printed on EPSON MX series printers (except the MX-80). Up to 66 characters can be defined and stored on the disk. Each user-defined character is coded as a 2-byte internal code from F7AC to F7ED. Internal codes F7A0 to F7AB are already defined by the system. However, they can be redefined with this command.

Operating Procedures

(1) Type "CHARADEF" and press the [←┘] key.

(2) Message

Source drive name (or RETURN to skip)

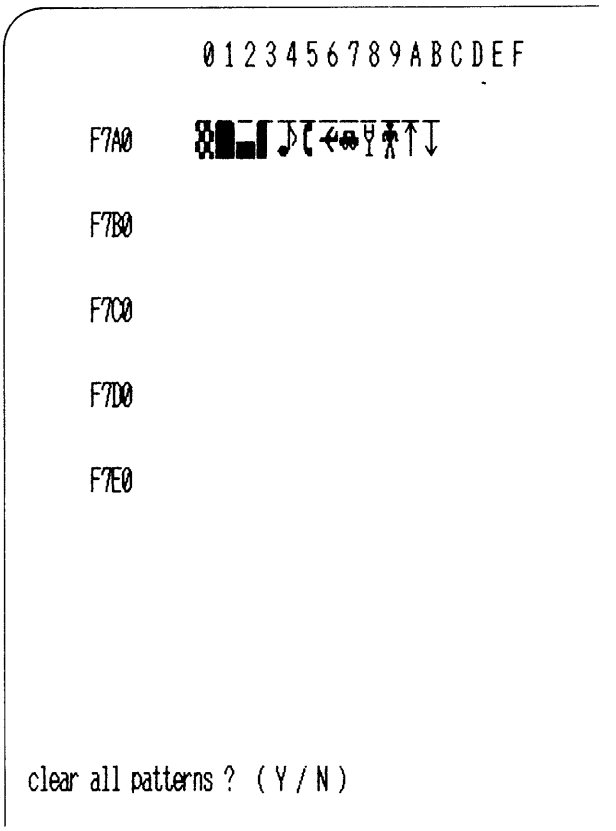
appears on the display. Type the source drive name (e.g., A). Then,

Source on A, then press RETURN_

appears on the display. Confirm that the disk is set in the source drive and press the [←┘] key.

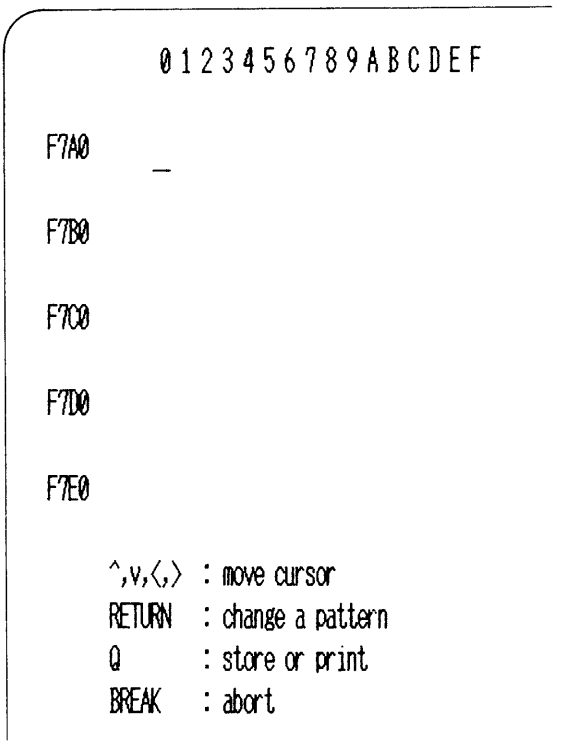
Note:
If the [←┘] key is pressed without specifying the source drive name, the character patterns used are those read by the bootstrap loader when the cold start was made.

(3) User-defined character patterns are read from the specified disk and displayed as follows.

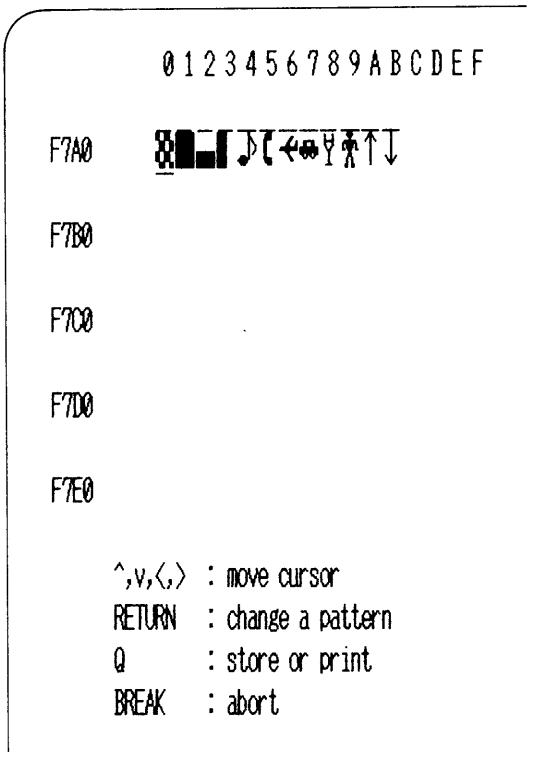


Hexadecimal numbers at the top and left side indicate the internal codes for user-defined characters.

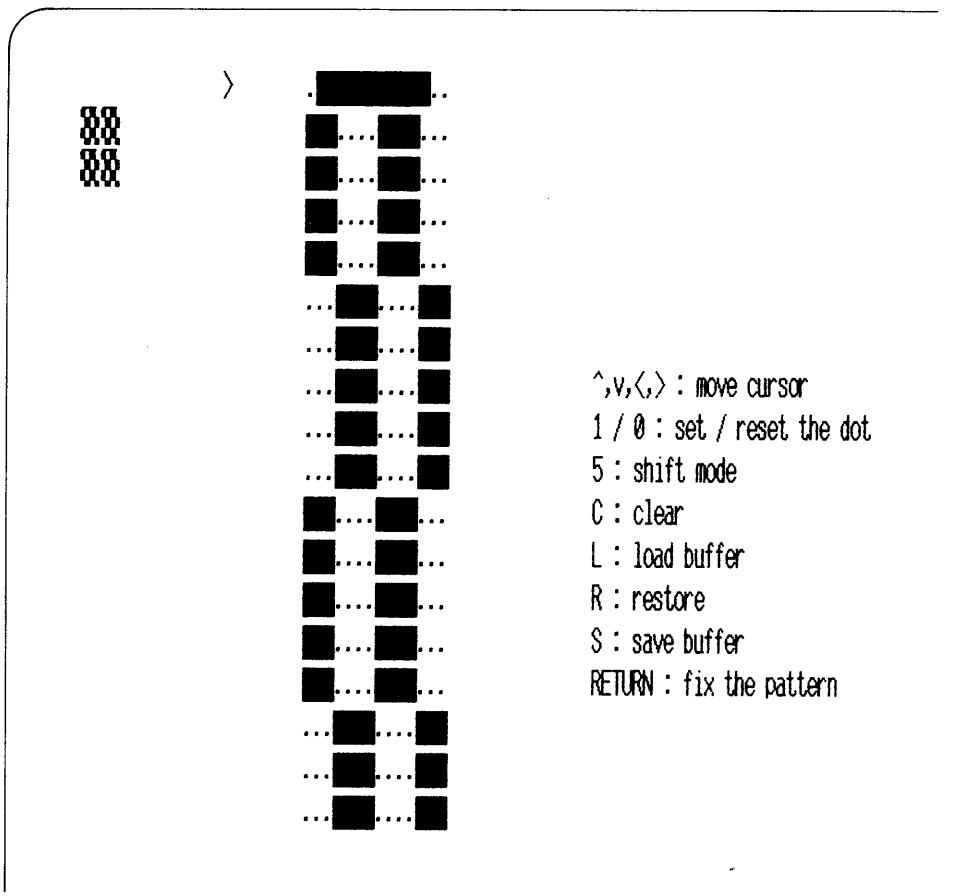
(4) If you want to redefine all patterns including those defined by the system, press the "Y" key; otherwise, press the "N" key. If the "Y" key is pressed, the display changes as follows.



(5) If the N key is pressed at step 3), the display changes as follows.



(6) In either case, use the cursor keys to move the cursor to the position corresponding to the code whose pattern is to be set. Then, press the [←┘] key to display the character pattern in enlarged form as shown below.

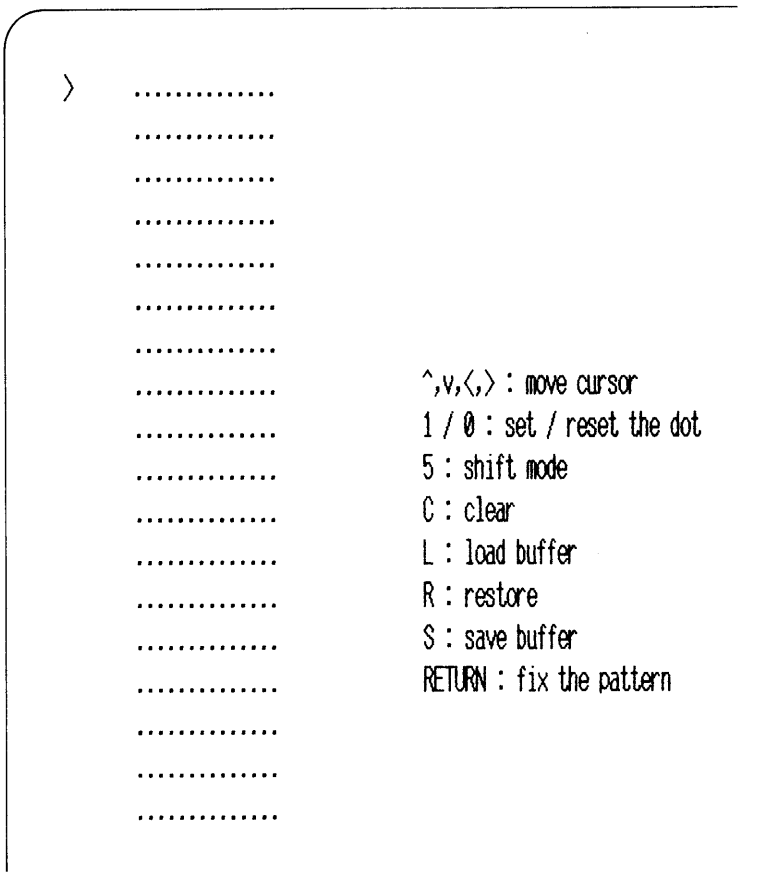


The uppermost row of dots contains the proportional spacing data for printing. (See the explanation of proportional spacing data below.)

(7) You can define your own pattern using the keys indicated in the lower left corner of the display.

[C] (Clear)

This key clears the current user character pattern.



[S] (Save buffer)

This key saves the defined character pattern in memory. The saved pattern can be loaded again by the "L" key (unless the CHARADEF command is terminated).

[L] (Load buffer)

This key replaces the pattern currently being displayed with that last saved.

[R] (Restore)

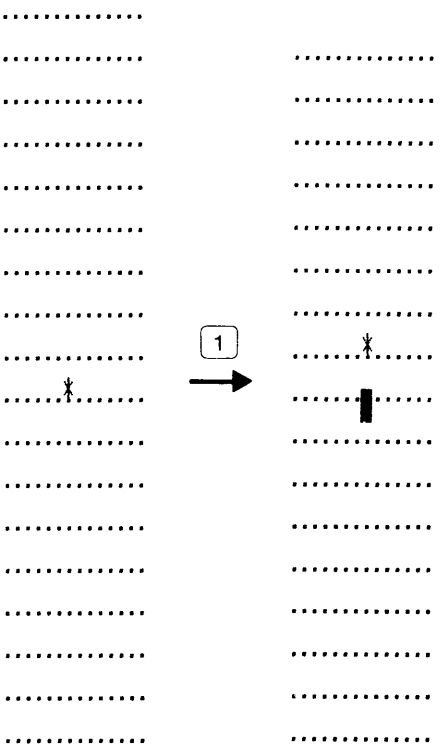
This key restores the pattern which was last fixed.

[↑], [↓], [←] and [→] (Move cursor)

These keys move the cursor up, down, right and left. The direction of cursor movement is indicated to the upper left of the pattern with Λ , V, < and >.

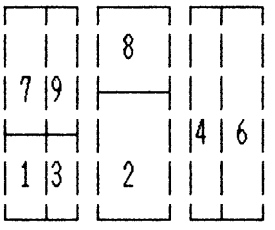
[1] and [0] (Set/reset dot)

These keys are used to set or reset the dot at the cursor position. Pressing "1" sets the dot and moves the cursor in the currently indicated direction. Pressing "0" resets the dot and moves the cursor in the currently indicated direction.



[5] (Shift mode)

This key divides the pattern area into two or four sections with horizontal and vertical lines which cross at the cursor position and makes it possible to shift the pattern within one section in the specified direction. The section to be shifted is specified by a numeric key other than 0 and 5 as shown below.



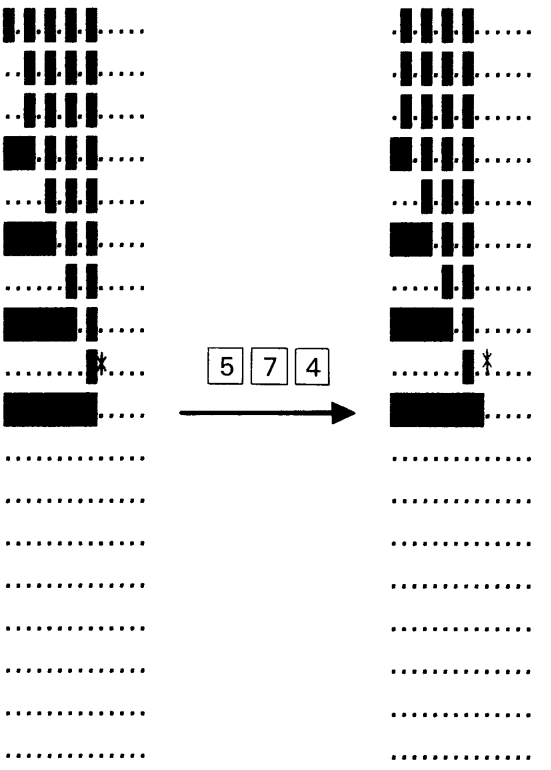
5 : cancel shift mode

The direction of shift can then be specified by the "2", "4", "6" or "8" key as follows.

[2] : Down
[4] : Left
[6] : Right
[8] : Up

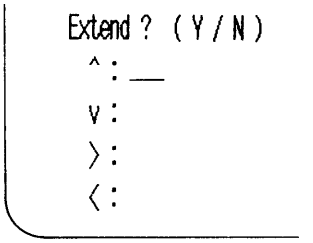
For example, when the following keys are pressed in sccession with the cursor located as shown at left below, the pattern changes as shown at right below.

[5] → [7] → [4]



Pressing the "5" key again has no effect on the pattern.

Pressing this key causes the following message to be displayed at the bottom left of the screen.



When user-defined characters are displayed on the CRT screen, the characters are separated from each other characters by two dots even if all dots within the patterns are set, so the screen is not filled with set dots. However, spaces can be filled with dots by extending the user-defined pattern. To fill the space above a pattern, extend it in the upward direction by pressing the "Y" key when the display is as shown above. The cursor then moves to the "V:" position. Press the "Y" key to extend the pattern downward, and so forth. If you don't want to extend the pattern in the indicated direction, press the "N" key. Pressing the [←┘] key terminates specification of extension, with "N" assumed for all the remaining directions. The display then changes as follows.

```
Extend ? ( Y / N )
  ^ : Y
  v : N
  > : Y
  < : N

Print ? ( Y / N )__
```

If an EPSON MX series printer (excluding the MX-80) is connected to the QX-10, the pattern defined can be printed by pressing the "Y" key. Three lines of 10 characters each are printed in the non-proportional mode, followed by three lines of 10 characters each printed in the proportional mode, as shown below.

```
F7A8
Y Y Y Y Y Y Y Y Y Y
Y Y Y Y Y Y Y Y Y Y
Y Y Y Y Y Y Y Y Y Y
Y Y Y Y Y Y Y Y Y Y
Y Y Y Y Y Y Y Y Y Y
Y Y Y Y Y Y Y Y Y Y
```

The display then changes as shown in step 5). Pressing the "N" key causes the display to change as shown in step 5).

(8) Press the "Q" key to store the pattern defined on the disk. The message

Destination drive name (or RETURN to skip)__

then appears on the screen; type the name of the drive containing the CP/M system disk, then press the [←┘] key after the following message is displayed.

Destination on A, then press RETURN__

(9) The following message then appears on the screen.

```
Print? (Y/N)_
```

Pressing the "Y" key at this point prints all user-defined characters as follows.

```
F7A0
F7B0
F7C0
F7D0
F7E0
```

In the example above, the upper line of characters is printed with non-proportional spacing while the lower is printed with proportional spacing. After printing or pressing the "N" key, the message

```
Source drive name (or RETURN to skip)_
```

appears again, allowing characters to be defined for another drive. Press the BREAK key to terminate the CHARADEF command.

Proportional printing

All the EPSON printers except the MX-80 support proportional printing, in which appropriate spaces are printed between characters to provide a balanced appearance. To achieve this, characters sent to the printer must contain proportional spacing information. Proportional spacing information for user-defined characters is contained in the uppermost horizontal line of 14 dots. When the printer is in the proportional printing mode, it prints as follows. When any of the dots of the uppermost line of a user-defined character are set, a one dot space is added at the position corresponding to the left end of the proportional spacing information line and a two dot space is added to the position corresponding to the right end of the line when the character is printed. That is, the user-defined character is printed in a dot matrix of 4×18 dots to 17×18 dots, depending on the width of the uppermost line. If the width of the user-defined character pattern exceeds the width determined by the uppermost line, part of the character will not be printed. If no dot is set in the uppermost line, the user-defined character will not be printed at all.

CONFIG

The CONFIG command makes it possible to reconfigure the system for different printers and RS-232C communication formats, to set the clock, and to select one of the 8 international character sets.

NOTE:

The CONFIG command changes the contents of the system disk. Therefore, if the system disk is write protected, it is not reconfigured even though message "configuration completed" is displayed. Be sure to remove the write protect tab before executing the CONFIG command.

Operating procedures

(1) Type CONFIG following the system prompt and press the [←┘] key. The following message will then be displayed.

```
QX-10 CONFIGuration  ver X.X

printer  : MX-80/II,III    alter (y/n) ?
```

The message above indicates that the MX-80/TYPEII or MX-80/TYPEIII printer can be connected. If you are using another type of printer, press the Y key. If not, press the N key.

(2) If the Y key is pressed, the display changes as follows.

```
QX-10 CONFIGuration  ver X.X

printer  : MX-80/II,III    select 1-8 or RETURN ?

                    MX-80/I       —1
                    MX-80/II,III  —2
                    MX-82/II,III  —3
                    MX-100/II,III —4
                    FX-80         —5
                    FX-100        —6
                    RX-80         —7
```

Press the number corresponding to your printer.

(3) Press the [←┘] key; the display changes as follows.

```
QX-10 CONFIGuration  ver X.X

printer   : MX-80/II,III
rs232c    : bit rate= 300  parity= no      stop bit= 1   data char= 8bit
alter (y/n) ?
```

Press the Y key if you want to change the RS-232C communication format. If not, press the N key, the display then changes as shown in step 5).

(4) The display changes as follows when the Y key is pressed in step 3). Press appropriate keys according to the format to be set. For example, if you want to change the bit rate to 2400 bps and use even parity, type "C" and "1", then press the [←┘] key.

```
QX-10 CONFIGuration   ver X.X

printer   : MX-80/II,III

rs232c    : bit rate= 300   parity= no      stop bit= 1    data char= 8bit

select A-9 or RETURN ?
            bit rate        parity          stop bit       data char

              9600 -A        no      -0      1   -3          0-5bit -6
              4800 -B        yes even -1     1.5 -4          6bit   -7
              2400 -C        yes odd  -2     2   -5          7bit   -8
              1800 -D                                        8bit   -9
              1200 -E
               900 -F
               600 -G
               400 -H
               300 -I
               200 -J
               150 -K
               135 -L
               110 -M
                75 -N
                50 -O
```

(5) The display changes as follows.

```
QX-10 CONFIGuration  ver X.X

 printer   : MX-80/II,III

 rs232c    : bit rate= 2400  parity= yes even  stop bit= 1    data char= 8bit

 date,time : 01/20/83 19:54:50

 reset (y/n) ?
```

If you want to set the clock, press the Y key. If not, press the N key; the display then changes as shown in step 8).

(6) If the Y key is pressed in step 5), the message "Enter the date as MM/DD/YY" appears. Enter the date in the following format.

MM(month)/DD(day)/YY(year) [↵]

(7) The message "Enter the time as HH:MM:SS" appears. Enter the time in the following format.

HH(hour):MM(minute):SS(second) [↵]

(8) The display changes as follows.

```
QX-10 CONFIGuration  ver X.X

 printer   : MX-80/II,III

 rs232c    : bit rate= 300   parity= no       stop bit= 1    data char= 8bit

 date,time : 01/21/83 05:50:11

 language  : USASCII   alter (y/n) ?
```

If you want to select a character set other than that specified, press the Y key. Otherwise, press the N key; configuration will then be completed.

(9) If the Y key is pressed at step 8), the display changes as follows.

```
QX-10 CONFIGuration   ver X.X

 printer   : MX-80/II,III

 rs232c    : bit rate= 2400  parity= yes even  stop bit= 1    data char= 8bit

 date,time : Today is Thursday    Jan 20 1983   at 08:02:00

 language  : USASCII    select 1-8 or RETURN ?

                    USASCII —1
                    FRENCH  —2
                    GERMAN  —3
                    ENGLISH —4
                    DENISH  —5
                    SWEDISH —6
                    ITALIAN —7
                    SPANISH —8
```

Type the number corresponding to the country of the character set to be selected, then press the [←┘] key. Configuration is completed when the following message is displayed.

```
configuration completed

A>
```

DIRINIT

The DIRINIT command erases and initializes the disk's file directory. When this command is executed, the contents of all files on the disk are lost.

Operating procedures

(1) Type "DIRINIT" following the system prompt, then press the [←┘] key.

```
A>DIRINIT
QX-10 DIRectory INITialize  ver X.X


Destination drive name ( or RETURN to reboot )
```

(2) Set the disk whose directory is to be initialized in either drive, then type the drive name (A, B, E or F). In the following example, the disk is set in drive B and "B" is typed.

```
A>DIRINIT
QX-10 DIRectory INITialize  ver X.X


Destination drive name ( or RETURN to reboot ) B
Destination on B, then press RETURN
Function complete

Destination drive name ( or RETURN to reboot )
```

(3) Press the [←┘] key. When initialization is completed, the message "Destination drive name (or RETURN to reboot)" is displayed again. If you have another disk whose directories are to be initialized, return to step 2); otherwise, press the [←┘] key.

Example

The following figure shows the display after the directory of disk image RAM E has been initialized.

```
A>DIRINIT
QX-10 DIRectory INITialize  ver X.X


Destination drive name ( or RETURN to reboot ) E
Destination is RAM E, then press RETURN
Function complete

Destination drive name ( or RETURN to reboot )
```

NOTE:
The following message will be displayed if a non-existent drive name is entered. Enter the correct drive name.

Invalid drive name (Use A - F)

Destination drive name (or RETURN to reboot)

DISKCOPY

The DISKCOPY program copies the entire contents of a disk and verifies the copy, or compares the contents of two disks.

Operating procedures

(1) Type "DISKCOPY" and press the [←┘] key.
(2) The following message appears on the screen.

```
QX-10 DISKCOPY ver X.X

Press C or V (or RETURN to reboot)

    Copy and Verify ---- C

            Verify ---- V
```

Press the "C" key to copy a disk, or the "V" key to compare two disks.

Disk copy

a. When the "C" key is pressed, the following message appears on the screen.

```
[Copy]

* Source drive name (or RETURN to reboot)_
```

b. Enter the source drive name.

c. If drive A is specified, the following message appears on the screen.

```
* Source on A, then press RETURN_
```

d. Press the [←┘] key. The following message then appears.

```
* Destination drive name (or RETURN to reboot)_
```

e. Enter the destination drive name. If drive B is specified, the following message appears.

```
* Destination on B, then press RETURN
```

f. Press the [←┘] key, and the following message appears.

```
* Set diskettes on A and B, then press RETURN_
```

g. Set the source disk into drive A and a formatted new disk into drive B and press the [←┘] key.

h. After copying is completed, the display becomes as follows.

```
A>DISKCOPY

QX-10 DISKCOPY  ver X.X

Press C or V ( or RETURN to reboot )
       Copy and Verify — C
       Verify ————————— V
C

[ Copy ]
* Source drive name  ( or RETURN to reboot ) A
* Source on A, then press RETURN
* Destination drive name  ( or RETURN to reboot ) B
* Destination on B, then press RETURN
* Set diskettes on A and B, then press RETURN
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
Function complete

Continue ? ( Y/N )
```

Pressing the "Y" key allows you to continue copying starting at step a.
Pressing the "N" key terminates copying and displays the following message on the screen again.

```
Press C or V (or RETURN to reboot)
      Copy and Verify ---- C
             Verify ---- V
```

Pressing the BREAK key (or "CTRL" + "C") causes the following message to be displayed.

```
* Change CP/M system disk and press RETURN_
```

Insert the system disk in drive A and press the [←┘] key; the system then returns to the command level.

Verify

a. If the "V" key is pressed in step 2), the following message appears on the screen.

[Verify]

* Source drive name (or RETURN to reboot)__

b. Enter the source drive name. If drive A is specified, the following message appears.

* Source on A, then press RETURN__

c. Press the [←┘] key and the following message appears.

* Destination drive name (or RETURN to reboot)__

d. Enter the destination drive name. If drive B is specified, the following message appears.

* Destination on B, then press RETURN__

e. Press the [←┘] key and verification starts.
f. After verification is completed, the display changes as shown below.

```
A>DISKCOPY

QX-10 DISKCOPY  ver X.X

Press C or V  ( or RETURN to reboot )
       Copy and Verify  — C
       Verify  ————————— V
V

[ Verify ]
* Source drive name  ( or RETURN to reboot ) A
* Source on A, then press RETURN
* Destination drive name  ( or RETURN to reboot ) B
* Destination on B, then press RETURN
* Set diskettes on A and B, then press RETURN
00  01  02  03  04  05  06  07  08  09  10  11  12  13  14  15  16  17  18  19
20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39
Function complete

Continue ? ( Y/N )
```

Pressing the "Y" key allows you to continue verifying starting at step a.
Pressing the "N" key terminates verification and displays the following message on the screen.

```
Press C or V (or RETURN to reboot)
        Copy and Verify ---- C
                Verify ---- V
```

Pressing the BREAK key (or "CTRL" + "C") causes the following message to be displayed.

```
Change CP/M system disk and press RETURN
```

Insert the system disk in drive A and press the [←┘] key, the system then returns to the command level.

Error messages

The following error messages may appear during execution of the DISKCOPY command.

Message	Meaning
Invalid drive name (Use A - F)	An invalid drive name was specified. Specify A, B, E or F.
Permanent error, press RETURN to try again -	A read or write error has occurred on the disk. Press [←┘] to retry the read or write, or press the BREAK key (or "CTRL" + "C") to abort.

NOTE:
The DISKCOPY command cannot be used for drives E and F.

FORMAT

The FORMAT command formats a new disk and writes ID information on the disk after formatting it. The ID information includes the track numbers, sector numbers and sector size. The operating system refers to this ID information when writing or reading disk data; therefore, no data can be read or written if this information is destroyed.

Tracks 0 through 6 are formatted when the destination is a disk image RAM while tracks 0 through 39 are formatted when the destination is a flexible disk drive.

After formatting, all data bytes on the disk are filled with the hexadecimal code E5H ($(229)_D$).

Operating procedures for formatting a flexible disk

(1) Type the following characters when the system prompt is displayed.

A>FORMAT ↵

(2) Insert the disk to be formatted into drive B and press the B key.

(3) Press the ↵ key.
Track numbers are displayed as each track is formatted.

(4) When formatting is completed, the following message is displayed.

Continue ? (Y/N)

Press the Y key if you want to format another disk, then remove the disk formatted previously and insert the next disk in drive B. (Return to step 3.)
Press the N key in response to the above message when no new disk is to be formatted.

Operating procedures for formatting a disk image RAM

(1) Type "FORMAT" when the system prompt is displayed.

A>FORMAT ↵

(2) Type a name of disk image RAM when the message "Destination Drive Name ? (or RETURN to reboot)" is displayed.
(3) Performs steps 3) and 4) of the operating procedures for formatting a flexible disk.

Example 1

The figure below shows the display after the disk in drve B has been formatted.

```
A>FORMAT

QX-10 FORMAT  ver X.X

Destination Drive Name ? ( or RETURN to reboot ) B
Destination on B, then press RETURN
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

Function complete

Continue ? (Y/N)
```

Example 2

The figure below shows the display after disk image RAM E has been formatted.

```
A>FORMAT

QX-10 FORMAT  ver X.X

Destination Drive Name ? ( or RETURN to reboot ) E
Destination is RAM E, then press RETURN
00 01 02 03 04 05 06

Function complete

Continue ? (Y/N)
```

Example 3

The figure below shows a display as it appears when formatting is inhibited because the disk is write protected.

```
A>FORMAT

QX-10 FORMAT   ver X.X

Destination Drive Name ? ( or RETURN to reboot ) B
Destination on B, then press RETURN
00
PERMANENT ERROR, press RETURN to reboot
```

MFBASIC

See the QX-10 MultiFonts BASIC Reference Manual.

MFONT

The MFONT command sets CP/M in the MultiFonts (MF) mode. If this command is executed without the MultiFonts character generator ROM card, the message "No MultiFonts Option Board !" appears on the display. In this case, the system remains in the non-MF mode.

NORM

The NORM command sets CP/M in the normal (non-MF) mode.

PFKSET

The PFKSET command allows you to assign character strings stored in the system's PFK table or your own PFK table to programmable function keys. Once made, these assignments are effective until the system power is turned off. This command also allows you to change either PFK table.

Format

PFKSET

Assigns strings to the programmable function keys from the system's PFK table.

PFKSET /L

Loads the PFK table from the disk and allows you to change the contents of the system's PFK table.

PFKSET x:ufn

Assigns strings to the programmable function keys from file ufn in drive x.
PFK is assumed as the file type if no file type is specified.

PFKSET x:ufn /L

Allows you to change the contents of your own PFK table or generate a new one. If the file type is omitted, PFK is assumed.

Operating procedures

Assigning strings to programmable function keys

Type "PFKSET" or "PFKSET x:filename.typ" and press the [←┘] key; PFK assignments are then made from the system's PFK table or your own PFK table, respectively.

● **Changing the PFK table**

Use the following procedures to change the contents of the system's PFK table.

(1) Type "PFKSET /L" and press the [←┘] key. The system's PFK table is then listed as follows.

```
* CP/M function key list
      PF1    DIR Δ
      PF2    TYPE Δ
      PF3    LOAD Δ
      PF4    STAT Δ
      PF5    DDT Δ
      PF6    PIPΔ
      PF7    DUMP Δ
      PF8    SAVE Δ
      PF9    SUBMIT Δ
      PF10   MFBASIC Δ

# BASIC function key list
      PF1    FILES Δ
      PF2    LIST Δ
      PF3    LOAD "Δ
      PF4    AUTO Δ
      PF5    EDIT Δ
      PF6    INPUT Δ
      PF7    PRINT Δ
      PF8    SAVE "Δ
      PF9    RUN↑MΔ
      PF10   SYSTEMΔ
```

(2) To change characters in the list, move the cursor to the position of each character to be changed using the [↑], [↓], [→] and [←] keys, then type the new characters. Use the DEL and INS keys to delete or insert characters. "△" indicates the end of each character string, and is not included in the string assigned. A string may contain control characters such as [←┘] and "BREAK". These control characters are indicated in the list by "↑" followed by the alphabetic character whose ASCII code is equal to that of the control character plus $(64)_D$. For example [←┘] $(13)_D$ is represented by "↑" followed by M $(77)_D$.

↑ M

However, control characters corresponding to the following keys cannot be included in strings assigned to PFKs because they are used as function keys for the

PFKSET command.

[↑] , [↓] , [→] and [←] : Move the cursor.

[DEL] : Deletes the character at the cursor position.

[HOME] : Moves the cursor to the position of the lst character of the first string in the PFK in the list.

[ESC] : Initiates the command mode.

(3) After changes in the lists have been completed, press the "ESC" key; the subcommand prompt "*" then appears on the display to prompt you to enter a subcommand. Type a subcommand from the subcommands listed below, followed by [←┘] .

E: Changes the PFK table on the disk without changing the current PFK assignments.

M: Changes the PFK table on the disk and assigns the string in the table to the programmable function keys.

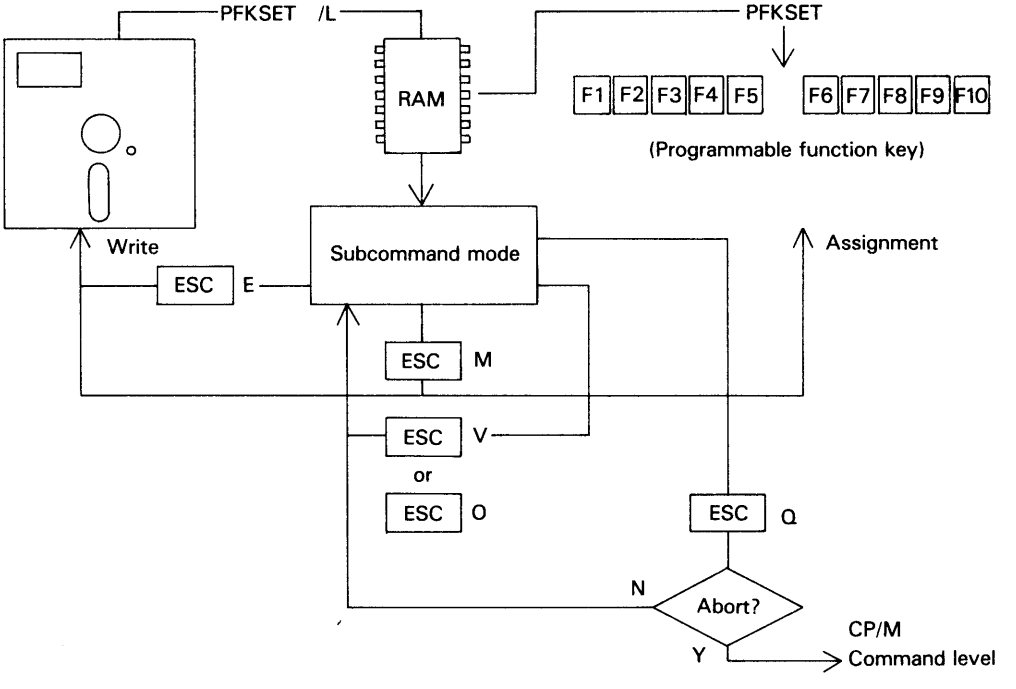
V: Terminates the command mode to allow further changes to be made in the PFK list.

O: Terminates the subcommand mode and restores the PFK list to its original state to allow changes to be started over.

Q: Displays the following message.

ABORT (Y/N)

Pressing the Y key terminates the PFK command and redisplays the system prompt without changing the PFK table. Pressing the N key does nothing, and subcommand prompt "*" is displayed again.



Perform the following steps to change your own PFK table.

(1) Type "PFKSET x:ufn /L" and press the [←┘] key. Your own PFK table will then be listed.
(2) Change the contents of the table in the same manner as with the system PFK table.

Error messages

Error messages which may appear during execution of the PFKSET command are as listed below.

Error messages	Typical causes
? Command error:	The command input format is incorrect.
No source file on disk:	The specified file cannot be found in the specified disk.
Invalid drive name Use A or B or C or D : ???	An incorrect drive name was specified. Specify A or B. An incorrect subcommand was entered.
Permanent error, press RETURN to ignore:	A read or write error occurred. Press the [←┘] key to retry the operation; press any other key to terminate execution of the command.
Disk full:	The disk is full.

Each programmable function key is covered with a transparent plastic cap; these caps can be removed to allow labels to be inserted in the key tops.

TERM

The TERM command makes it possible to use the QX-10 either as a terminal or host computer for remote operation. It also allows specification of various communications conditions, such as bit rate, parity bit, stop bits and word length.

Operating procedures

(1) Type "TERM" and press the [←] key, the following message is then displayed.

```
QX-10 TERMinal or Remote  ver X.X

 rs232c   : bit rate= 300  parity= no      stop bit= 1   data char= 8bit

Terminal mode ---- 1
Remote  mode ---- 2
Normal  mode ---- 3
change rs232c ---- X

                  select 1-3 or X ?
```

Select one of the three modes, (Terminal, Remote or Normal), or type "X" to change the RS-232C communication conditions.

Terminal mode
In this mode, the QX-10 operates as a teletypewriter terminal. Characters input from the keyboard are transmitted to the RS-232C port and characters received through the RS-232C port are displayed on the screen. To cancel this mode, press the HELP key.

Remote mode
In this mode, the QX-10 operates as a host computer. The keyboard and CRT screen are electrically separated from the CPU and replaced with those of the remote terminal. Characters received from the remote terminal through the RS-232C port are input to the CPU and characters output from the CPU are transmitted to the remote terminal through the RS-232C port. To cancel this mode, the TERM command must be entered from the remote terminal to change the mode from Remote to Normal, then the HELP key must be pressed at the remote terminal.

Normal mode
This mode is selected to cancel the remote mode.

(2) When "X" is typed in step 1), the display changes as follows. The conditions displayed can be temporarily changed by pressing the appropriate keys. Pressing the [←┘] key returns the display to the condition shown in step 1.

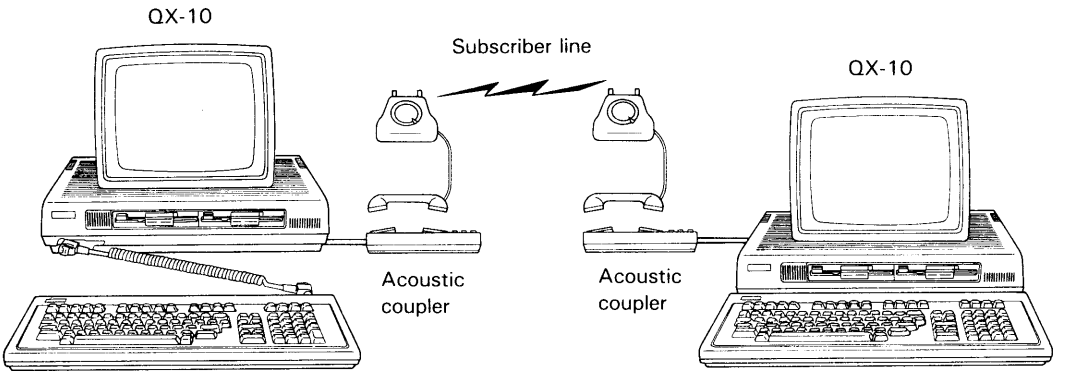
```
QX-10 TERMinal or Remote   ver X.X

rs232c   : bit rate= 300   parity= no      stop bit= 1   data char= 8bit

                 select A-9 or RETURN ?

          bit rate      parity          stop bit      data char
           9600 -A       no      -0      1    -3       0-5bit -6
           4800 -B       yes even -1     1.5  -4       6bit   -7
           2400 -C       yes odd  -2     2    -5       7bit   -8
           1800 -D                                     8bit   -9
           1200 -E
            900 -F
            600 -G
            400 -H
            300 -I
            200 -J
            150 -K
            135 -L
            110 -M
             75 -N
             50 -O
```

Example of connection



AUTOST

The AUTOST command makes it possible to start a program automatically when the CP/M system is activated. The program specified will be started whenever CP/M is activated until a different program name is specified by executing the AUTOST command again.

Operating procedures

(1) Type AUTOST and press the [←┘] key. The following message is then displayed.

```
A>AUTOST

QX-10 AUTO-START ver X.X

Do you want to set Auto Start for a program (Y/N) ? _
```

(2) When you want a program to start automatically, press the "Y" key; otherwise, press the "N" key.

(3) If the "Y" key is pressed, the display changes as follows.

```
A>AUTOST

QX-10 AUTO-START ver X.X

Do you want to set Auto Start for a program (Y/N) ? Y
Enter The Auto Start Program Name
*
```

Enter the program name following the prompt ("*"). A command line, such as DIR B: or MFBASIC SAMPLE, can be specified as the program name. Pressing the [←┘] key without entering a program name reboots the system, and the previously cataloged program name is cancelled.

The message "OK? (Y/N)__" appears on the display. If the command name has been entered correctly, press the "Y" key; otherwise, press the "N" key. If the "N" key is pressed, the prompt "*" is displayed again; reenter the program name.

The maximum number of characters which can be entered on the command line is 80.

The figure below shows the display as it appears when the MFBASIC command is to be automatically activated and user program SAMPLE (written in BASIC) is to be executed automatically.

```
A>AUTOST

QX-10 AUTO-START ver X.X

Do you want to set Auto Start for a program (Y/N) ? Y
Enter The Auto Start Program Name
*MFBASIC SAMPLE
        OK ? (Y/N) Y

Function complete

A>
```

(4) If the "N" key is pressed at step 2), control is transferred to CCP and the system prompt "A>" appears. In this case, the previously cataloged command line is not changed.

NOTE:
The program cataloged in the AUTOST command is automatically executed only upon a cold start.

5.5 Others

The system disk contains the following files in addition to the files described in the previous pages.

.OSTAB.SYS
.PFKTAB.SYS
.FOREIGN.SYS
.GAIJI.SYS
DUMP.ASM
BIOS.ASM
CBIOS.ASM
DEBLOCK.ASM
DISKDEF.LIB

The first four files are system files which are generated and used by the system program. Some of the system functions will not operate if these files are erased. The next four files are included for reference. DUMP.ASM is the ASM file for the DUMP command, BIOS.ASM is the ASM file for the Digital Research's BIOS program and CBIOS.ASM is an example of Digital Research's customized BIOS program which has been tailored for specific devices. DEBLOCK.ASM is the ASM file for a deblocking program. The last file, DISK.LIB, is the disk definition macro library file which is used to generate the disk parameter table and scratch RAM area required for a customized BIOS program. They are automatically generated when this file is assembled with assembler "MAC" distributed by Digital Research.
Refer to CP/M Alteration Guide published by Digital Research for modification of BIOS.