CCST

MS-DOS
User's Guide

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CONVENTION

Convention	Meaning
↵	Press **RETURN** or **ENTER** key
< y >	Press the key with label y
<Ctrl-X> or <^X>	Press **CTRL** key and another key **X** simultaneously
...	Indicates that the item preceding it may be repeated
[ ]	Encloses optional items, unless otherwise specified
single grey line box	Highlights required command syntax
double line clear box	Highlights screen input and output

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1   Introduction

A typical Personal Computer (PC) is composed of a main body which contains the central processing unit (CPU), motherboard, random access memory (RAM), floppy drives and hard disks, a monitor and a keyboard. Optionally, a local printer may be connected to it. If the PC is connected to a network, the user will enjoy network services such as network printing, e-mail, etc.

1.1   What is DOS?

DOS is the acronym of Disk Operating System. It is manufactured by Microsoft Corporation and licensed to IBM and other microcomputer manufacturers. If it is ordered from Microsoft, it is called MS-DOS and it is called PC-DOS if it is ordered from IBM. HKUST is now using MS-DOS version 5.0 as the operating system for most PCs.

An operating system is a system software which provides the interface between the hardware and both the user and other software. MS-DOS is an operating system for IBM PC or its compatibles. The other popular operating systems for PC are Unix and OS/2.

1.2   Some Functions of MS-DOS

- Create and keep track of files.
- Run and link programs.
- Access peripheral devices, for examples, printers, disk drives, that are attached to your PC.

1.3   Boot Up

DOS is either installed in hard disk or stored in diskette. DOS consists of two hidden files, namely, IO.SYS and MSDOS.SYS; a command processor COMMAND.COM (which includes the DOS internal commands); and a set of utility commands (called DOS external commands).

To start up a PC with a hard disk, you need DOS on the hard disk. To start up a PC with a floppy diskette, you need to use a <u>bootable disk,</u> which is one with two hidden DOS system files and the command processor on it. A bootable disk with the DOS external commands on it is called a <u>DOS diskette</u>. In UST, all PC are installed with DOS in hard disk.

A PC must be booted up before you can use it. To boot up means to load DOS into the memory and start running on DOS. The sequence of loading DOS into the memory is the following:

- ROM BIOS
- Load boot record
- Load IO.SYS AND MSDOS.SYS
- Load COMMAND.COM

After boot up, MS-DOS will search for a file called **config.sys** which let you set up DOS for use with certain devices or application programs. MS-DOS will search for a second file called **autoexec.bat** which performs a set of commands you would like to run each time you boot up the PC and execute the file if it exists. Afterwards, you can issue commands to DOS.

When the PC has no response for any keystroke, that means you are hung up in PC, you need to reboot the PC by pressing <Ctrl-Alt-Del> simultaneously and this is called <u>warm boot</u>. If the PC is still inactive after the warm booting, you need to press the Reset or power on the PC again and this is called the <u>cold boot</u>.

DOS assigns A and B for the drive names of two floppy drives and C and D for the drive names of the hard disk hooked up to the system. If one has more physical drives or logical drives, one can use additional letter to name the drives. Most PCs boots up at hard disk drive C unless you put a DOS system diskette in the default boot up floppy drive A.

After boot up, you are usually at C drive. To change drive,

```
C:\> drivename:
```

For example, to change from C drive to A drive,

```
C:\> a: ↵
```

1.4   Types of MS-DOS Commands

There are two types of commands in DOS, namely internal commands and external commands.

1.   Internal commands
   - simple and most commonly used
   - cannot be seen in the directory listing
   - contained in command processor COMMAND.COM
     e.g. DIR, TYPE, COPY, DATE, PATH.

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2. External commands
   • can be seen in directory listing
   • must be read from disk before they can be executed
     e.g. FORMAT, DISKCOPY.

1.5 MS-DOS Editing and Function Keys

The MS-DOS editing keys provide you a set of editing tools to save your time in correcting typing errors and repeating frequently used commands. Some of them are described as follows:

Key	Function
F1 or →	Copies one character from the last command entry to the command line.
F2 and char	Copies characters up to the character specified in the last command entry to the command line.
F3	Copies all remaining characters in the last command entry to the command line.
F4 and char	Skips over the character in the last command entry up to character specified.
ESC	Cancels the current line; empties the command line; and then outputs a backslash. Press ↵ and the last command entry is unaffected.
F5	Makes the new line the new command entry and the contents of the last command entry are deleted.
F6 or <Ctrl-Z>	Put an end of file mark in the new command entry.
<Ctrl-C> or <Ctrl-BREAK>	Aborts the current command.
<Ctrl-S>	Suspends output display on terminal screen. Press any key to resume.

2 Files and Directories

2.1 File

- It is a collection of related information.
- It has an unique name and resides in a directory of a particular disk.

2.2 Directory

- It is a collection of files.
- Files are usually kept in directories on a disk.
- Directories contain information on the size of the files, their location on the disk, the dates they were created.
- The directory that you are working on is called the current directory or working directory.
- When you format the disk, one empty directory called the root directory is created.

2.3 Filename

DOS file specification consists of 2 parts; namely Filename and Extension, with a period in between. It may include a drive designation. If not specified, the default disk drive will be used. DOS allows each of the filename to be 1 to 8 characters and file extension to be 0 to 3 characters long including:

```
1. letters    : A - Z, a - z
2. numbers    : 0 - 9
3. symbols    : $ & # % @ ! - ' ` ( ) { } ~ _
```

Note:

- NO space is allowed in between the drive, the filename and the extension.
- Some applications may not let you use all of the above symbols. If in doubt use only letters and numbers.
- Some names in DOS are reserved for the devices and therefore cannot be used as filenames. However, they can be used as extension except CLOCK$ if you like.

  They are: AUX, CLOCK$, COM, CON, LPT, LST, NUL, PRN.

Example for valid filenames:

```
A:MYPROG.BAS
INCOME.WK1
```

- Directory name has the same name convention as filename.

2.4   Wild Cards for Filename

There are two special characters, namely asterisk (*) and question mark (?), that are called wild cards which give you flexibility in specifying files and paths.

?   It indicates that any character can occupy that position.

   e.g.   To list all the files in the current directory that meet the following condition with DIR command:

   DIR DEMO?.DOC

   Then DEMO1.DOC, DEMO2.DOC, DEMOA.DOC can meet this requirement will be displayed on screen if they exist.

*   It indicates that any character can occupy that position or any of the remaining positions in the filename or extension.

   e.g.   DIR *.*

   It refers to list all files at the current directory.

   e.g.   DIR DEMO*.TXT

   Some examples of files that meet the requirement are: DEMO.TXT, DEMO1.TXT, DEMO123.TXT, DEMODBAS.TXT

2.5   Subdirectories

Subdirectories allow you to organize the files into convenient groups of files. A hierarchical directory structure (a tree structure) is used in MS-DOS. Tree grows downward by creating subdirectories as root directory stays at the top. In the directory structure, it is possible to travel around starting at any directory.

Example:

```
                              ROOT (\)


   ┌────────┬────────┬────────┬────────────┬────────────┐
 DATA      WP      USERS    LOTUS        DBASE        PASCAL
                 ┌────┼────┐
               PETER  MARY  ANN
                 │     │     │
             DEMO.TXT FILES FILES
```
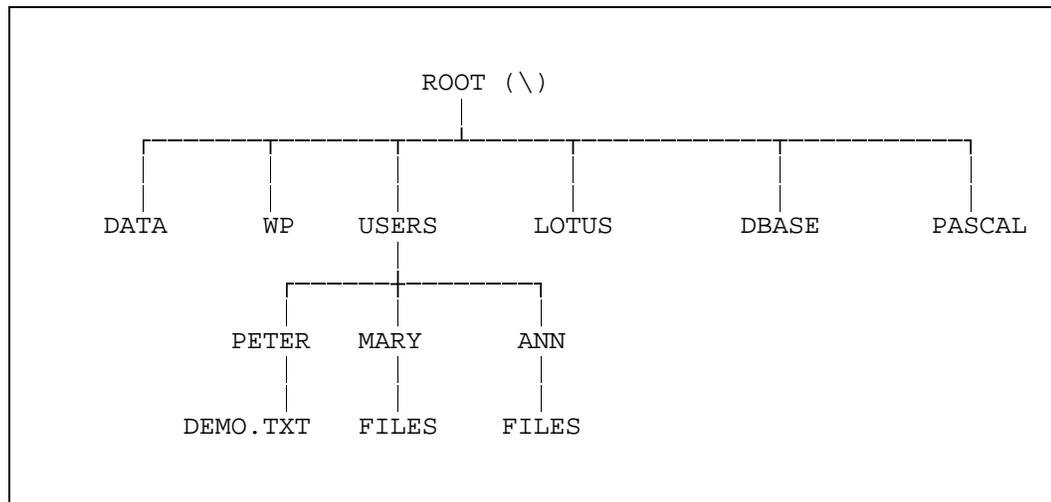
It is difficult to distinguish filename and directory name. To differentaiate he two, one can use DIR command. The details of DIR command is discussed in 3.1. If the name is a directory, "<DIR>" will be displayed after the directory name to indicate that it is a directory. Besides, the date and time of creation of the directory will be displayed. If the name is a file, the file size in bytes will be shown instead of "<DIR>".

Example:

```
 C:\> DIR ↵
 Volume in Drive C is NET_ADD900
 Directory of C:\

 AUTOEXEC BAT          1271   9-28-91        2:30p
 CONFIG   SYS          242    9-28-91        2:35p
 UST                   <DIR> 9-28-91         2:40p
 DECNET                <DIR> 9-28-91         2:45p
 DOS                   <DIR> 9-28-91         2:48p
```

2.6   Pathname

A pathname is a sequence of directory names followed by a filename. Each directory is separated from the previous one by a backslash (\).

e.g.   \USERS\PETER\DEMO.TXT

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The first backslash in the example indicates the root directory and the other backslashes are the separators for subdirectories.

Referring to the example in 2.5, suppose you are at USERS directory and want to get access to the file demo.txt, you can use the pathname either PETER\DEMO.TXT or \USERS\PETER\DEMO.TXT. The former is called **relative path** and the latter is called **absolute path**. The relative path uses the current directory as the reference and absolute path uses the root directory as the reference.

MS-DOS provides shorthand notations for the working directory and parent directory.

.   a shorthand notation to indicate the name of working directory in all multilevel directory listings.

..   a shorthand name for the working directory's parent directory.

e.g.   Suppose you are in directory PETER in the example of 2.5,
       DIR ..\.. means to list the root directory.
       DIR \USERS\ANN means to list all the files in Ann's directory.

Note:

- It is highly recommended that users organize their own data files into subdirectories apart from the software program files for the ease of maintenance and backup. The files can be organized according to the type of the files, such as WordPerfect, 123 and dbase, the project based and other criteria that are up to one's discretions.

- Suppose Simon uses WordPerfect, 123 and dbase extensively and wants to organize the corresponding files into wp, 123 and db subdirectories respectively according to the type of the files, he is advised to create the following subdirectories to manage his data files:

  \SIMON\WP
  \SIMON\123
  \SIMON\DB

  If he wants to group his WordPerfect files further according to the project concerned, he can create subdirectories such as PROJA, PROJB, etc. with respect to the WP directory. The distinct advantage of this kind of organization is that it is easy to be backed up and restored. For details, refer to 7.1 and 7.2.

•   The command PATH is used to display or set a search path for executable files.

Example:

```
C:\> PATH ↵
PATH=C:\;C:\DOS;C:\UST
```

Assume you want to use MS-WINDOWS which locate under the directory C:\WINDOWS. The current directory is root directory. After entering the command "WIN", you get a error message.

```
C:\> WIN ↵
Bad command or file name
```

The error is due to the command cannot be found under the directory C:\, C:\DOS and C:\UST. To execute MS-WINDOWS at any working directory, you should set the PATH properly :

```
C:\> PATH=C:\;C:\DOS;C:\UST;C:\WINDOWS ↵
C:\> WIN ↵
(MS-WINDOWS is running ... )
```

3   Directory Management

3.1   DIR

List the files in a directory with their size in bytes and with time and date of their last modification.

Format:

```
DIR  [drive:][pathname][/P][/W]
```

/P   in Page Mode
/W   in Wide Mode

- Page mode means one directory/file name at a row to be listed for the specified directory and a message **Strike a key when ready...** will be prompted for further action if the screen is filled. If any key is pressed in response to the prompt, another screen of directories or files will be listed and prompts for further action until all subdirectories/files of the specified directory have been listed.

- Wide mode means at most five directory/file names at a row to be listed for the specified directory.

Example:

```
C:\> DIR/W ↵
```

List the directory of the disk on the C drive root directory in wide mode.

```
C:\> DIR *.EXE ↵
```

List all the files with EXE extension on the C drive root directory.

3.2 MKDIR (MD)

Create a hierarchical directory structure.

Format:

```
MD [drive:]path ↵
```

- The maximum number of files/subdirectories in the root directory for 720 KB and 1.44 MB diskettes are 112 and 224 respectively. There are no limitations in the subdirectories.

- DOS restricts pathname to a total length of 63 characters. If each subdirectory has a name of 8 characters, the maximum number of levels in the hierarchical directory structure is 8 if the root directory (\) is first hierarchical level.

Example:

```
C:\> MD TEMP ↵
```

Make a subdirectory named TEMP under the current directory.

3.3 CHDIR (CD)

Change to a different directory and make it the current directory.

Format:

```
CD [path]
```

Example:

```
C:\> CD \USERS\PETER ↵
```

Change the subdirectory named \USERS\PETER as the current directory.

Example:

```
C:\> A: ↵
A:\> CD DEMO ↵
A:\DEMO>
```

Change the subdirectory named DEMO in A drive as the current directory.

Example:

```
A:\DEMO>CD .. ↵
A:\>
```

Change from the directory DEMO to parent directory (..) in A drive as the current directory.

3.4   RMDIR (RD)

Remove a directory from a hierarchical directory structure. You must delete all the files first. If files exist in that directory, the error message is shown as follows:

Invalid path, not directory,
or directory is not empty

Format:

```
RD [drive:]path
```

Example:

```
C:\> RD \USERS\ANN ↵
```

Remove the subdirectory ANN from \USERS directory.

4   File Management

4.1   TYPE

Display the content of a file.

Format:

```
TYPE [drive:]filename
```

Example:

```
TYPE A:DEMO.TXT ↵
```

Display the content of the file DEMO.TXT.

4.2   MORE

Displays output one screen at a time. Press ↵ to display another screen of information until it is done.

Format:

```
MORE < source

or

source | MORE
```

Source is a file or command.

Example:

```
C:\> MORE  <  README.DOC  ↵
C:\> TYPE README.DOC | MORE  ↵
```

4.3   COPY

Copy one or more files from a disk to the same disk or another disk.

Format:

```
COPY [drive:]pathname1  [drive:][pathname2]  [/V]
```

/V - causes DOS to check whether all files were copied successfully.

Example:

```
C:\> COPY C:LETTER.TXT  A:  ↵
C:\> COPY A:DEMO  C:\USERS\PETER  ↵
```

Concatenate a set of files.

Format:

```
COPY pathname1 + pathname2 [...]  pathnameN
```

Example:

```
C:\> COPY CLASS1.DAT + CLASS2.DAT  CLASS.DAT  ↵
```

4.4   XCOPY

Copy files and directories, including lower level subdirectories, if they exist.

Format:

```
XCOPY [drive:]pathname [drive:][pathname] [/S][/V]
```

/S - copies files from all subdirectories within the specified directory in addition to the directory's files.
/V - causes DOS to check whether all files were copied successfully.

Example:

```
C:\> XCOPY C:\TEST1\*.*  C:\TEST2 /S ↵
```

4.5   DEL / ERASE

Delete all the files with the designated file specification. If *.* which means deleting all files in the current directory is used , "Are you sure (Y/N)?" will be prompted for confirmation.

Format:

```
DEL [drive:]pathname [/P]
```

Example:

```
C:\> DEL *.*  ↵
C:\> ERASE \USERS\ANN\*.BAS ↵
```

If /P is used, "Deleted (Y/N)?" will be prompted for confirmation before deleting each file.

Example:

```
C:\> DEL MY.TXT /P ↵

C:\> MY.TXT,   Delete (Y/N)?N ↵
```

4.6   UNDELETE

Restores files that were previously deleted by using the command DEL.   "... Undelete (Y/N)?" will be prompted for confirmation. After answering "Y", you should type the first character of the file name.

Example:

```
C:\> DEL MY.TXT ↵
C:\> UNDELETE ↵

Directory: C:\
File Specifications: *.*

  Deletion-tracking file not found.

  MS-DOS directory contains    1 deleted files.
  Of those,    1 files may be recovered.

Using the MS-DOS directory.

   ?Y     TXT      5  4-30-95 10:01p  ...A  Undelete (Y/N)?Y
   Please type the first character for ?Y     .TXT: M

File successfully undeleted.
```

4.7   RENAME (REN)

Change the first filespec to the second filespec.

Format:

```
REN [drive:][path]filename1  filename2
```

Example:

```
C:\> REN  TEST1.DAT  TEST2.DAT  ↵
```

4.8   PRINT

Prints a text file on a lineprinter.

Format:

```
PRINT [drive:][pathname]
```

Example:

```
C:\> PRINT myfile  ↵
```

Note:

•   If you have a local printer, you can print the text file to the local printer with the PRINT command though you are connecting to the network printer as long as you are in the DOS environment. Alternatively, you can use **copy filename lpt1:** to accomplish the same function. To print the screen output to the local printer, press <Prt-Scr>. Since all network printer in HKUST are postscript printers, one has to use the utility program usttp.exe to print text files to network printer.

To print a text file to network printer,

```
USTTP [drive:]pathname [/W132] > LPT2:
```

Output is printed in landscape form if /W132 option is specified. Otherwise, the output is in portrait form.

Example:

```
C:\> USTTP MYFILE1.TXT > LPT2: ↵
C:\> USTTP MYFILE2.TXT /W132 > LPT2: ↵
```

4.9   Input/Output Redirection

Input from keyboard and output to screen can be redirected to other files and devices.

<   Redirect input

>   Redirect output

>>   Append the output to a file

Example:

```
C:\> DIR > DIRLIST ↵
```

Redirect the directory list to a file. If the file doesn't exist, MS-DOS will create it. If it does exist, MS-DOS will overwrite it.

Example:

```
C:\> DIR \USERS >> DIRLIST ↵
```

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Append the directory list of \USERS to the file dirlist.

Example:

```
C:\> SORT  <  NAMES  >  NAMELIST  ↵
```

Sort the file **names** and send the sorted output to the file **namelist**.

4.10   Pipe

| Use output of one command as input of the another.

Example:

```
C:\> DIR | SORT > DIRLIST  ↵
```

Sort the directory listing of the root directory and store the sorted output in the file dirlist.

4.11   SORT

Read input and write the sorted data to the screen, to a file, or to another device.

Format:

```
[source] | SORT [/R]

or

SORT [/R]  <  source
```

/R - Reverses the sort; i.e. sorts from Z to A, and then from 9 to 0.

Example:

```
C:\> DIR | SORT ↵
```

Sort the listing of of the current directory and output to the screen.

5   Batch Files

A sequence of DOS commands can be saved in a special file with extension **.bat** (called a batch file) and get executed by just entering the filename without extension as though the batch file's name were a command. This is called batch processing.

For example,

```
C:\> TYPE CPFILE.BAT ↵
    xcopy b:*.* a: /s
    dir/w a:
```

cpfile.bat copies all the files including subdirectories from drive b: (presumably 5.25" high density drive) to drive a: (presumably 3.5" high density drive) and lists the files in drive a.

You can stop any running batch file by pressing <Ctrl-C> or <Ctrl-Break>. DOS will ask you to confirm the interruption.

After boot up, DOS searches a file called **autoexec.bat** in the root directory of the boot disk for execution. If it exists, the commands inside the batch file will be executed. It is useful if one wants to run a specific application under DOS and wants DOS to run some commands each time as one starts the computer.

Note:

•   In UST, the **autoexec.bat** file is established for system set up to connect to network disks, files and printer services. Please be advised not to change the **autoexec.bat** file. For sophiticated users, they may create additional batch files, say, **autou1.bat** and   **autou2.bat** for setting path to applications or accessing network services in addition to the system default, and execute them explicitly.

•   There is another file called **config.sys** which DOS will search and execute prior to the search for **autoexec.bat** after the computer is started. It contains the system default configuration settings. Typical autoexec.bat and config.sys files are shown in the following example.

Example:

```
C:\> TYPE CONFIG.SYS ↵
   FILES=20
   BUFFERS=20
C:\> TYPE AUTOEXEC.BAT ↵
   DATE
   TIME
   PROMPT $P$G
   DIR
```

6   Diskette Handling

6.1   FORMAT

A blank diskette must be formatted with the MS-DOS FORMAT command before it can be used by MS-DOS. During formatting, DOS allocates sectors for the following:

- Boot record (if formatted with the system files copied onto the disks)
- File allocation table (FAT)
- Root directory entries
- Data sectors

File Allocation Table (FAT) is an additional system area which keeps track of the location of the files on the disk and contains information about free space on the disk for new files.

Besides changing the disk to a format that MS-DOS can use, FORMAT command also analyses the disk for defective tracks. If bad sectors are found, an message will be prompted.

Standard PC diskette drive types:

- 360 KB 5.25" drive
- 1.2 MB 5.25" drive
- 1.44 MB 3.5" drive

Diskette types:

- 5.25" DS DD (360 KB) diskettes
- 5.25" DS HD (1.2 MB) diskettes
- 3.5" 1 MB (720 KB) diskettes
- 3.5" 2 MB (1.44 MB) (HD) diskettes

For 3.5" 720 KB diskettes, the format command is

```
FORMAT A: /N:9 /T:80 [/S] [/V]
```

/S -   copy the system files onto the new disk
/V -   enter the volume label, i.e. the name tag of the disk

For 3.5" 1.44 MB diskettes, the format command is

```
FORMAT A:  [/S] [/V]
```

Formatting 1.2 MB diskettes with 1.2 MB drive, the command is

```
FORMAT A: [/S][/V]
```

Formatting 360 KB diskettes with 1.2 MB drive, the command is

```
FORMAT A: /4 [/S][/V]
```

6.2   DISKCOPY

Duplicate the disk in the source drive to a formatted or unformatted diskette in the destination drive on a track-to-track basis.

Format:

```
DISKCOPY [drive1:] [drive2:]
```

- For diskcopy, diskettes of the same type must be used.

- A defective diskette might not be able to complete the diskcopy function, in that case one had better use COPY *.* command.

Example:

```
C:\> DISKCOPY A: A: ↵
```

Then follow the messages to insert source diskette and target diskette alternatively to complete the diskcopy.

6.3   CHKDSK

Scan the directory of the specified disk drive, to check it for consistency and to report the status report of the disk.

Format:

```
CHKDSK [drive:][pathname] [/F][/V]
```

/F - fix switch. DOS attempts to correct the errors found in the directory. All errors fixed will be stored in the file with the extension CHK.

/V - list all the files and the paths.

Example:

```
C:\> CHKDSK C: /F ↵
```

7   Using the Hard Disk

In using the hard disk, observe the following:

- Always put the files in directories.
- Avoid large directories.
- Always backup periodically (e.g. at the end of a day).

To backup files in hard disk to diskettes, use BACKUP command. To restore files from diskettes to hard disk, use RESTORE command.

7.1   BACKUP

Back up specified files including all subdirectories to the destination-drive.

Format:

```
BACKUP [sourcedrive:][pathname][targetdrive:] [/S]
```

/S - back up subdirectories

With /S options, all files including subdirectories of the specified directory will be backed up. In the process, DOS will prompt for formatted diskettes to be inserted sequentially until all files in the specified directory have been backed up.

Example:

```
C:\> BACKUP C:\SIMON\*.*  A: /S  ↵
```

7.2   RESTORE

Restores files to disk and directory from which they were backed up including all subdirectories.

Format:

```
RESTORE  sourcedrive:  [targetdrive:][pathname] [/S]
```

/S - restore subdirectories also.

In the process, DOS will prompt for sequential backup diskettes to be inserted to restore the backup files.

Example:

```
C:\> RESTORE  A: C:\SIMON\*.* /S ↵
```

8   HELP

Displays the information of the command.

Format:

```
HELP [command] ↵
```

If no command is specified after HELP, you get a list of commands. You can move the cursor to the command by the arrow keys or by mouse and then press the ENTER key or click the mouse button to get the information of that command.

If a command is specified after HELP,

Example:

```
C:\> HELP CLS  ↵
```

a new window is evoked. The information of the command is shown directly :

```
                              CLS

Clears the screen.

The cleared screen shows only the command prompt and cursor.

Syntax

  CLS
```

To exit the help screen, press Alt Key, F Key and then X key to exit to DOS.

Alternatively, if there is a parameter "/?" after the command , the information of that command will also be displayed.

Format:

> COMMAND /? ↵

Example:

> C:\> CLS /? ↵
> Clears the screen.
>
> CLS

Appendix A: MS-DOS Command Summary

The following summarizes some commonly used DOS commands which have been described in this user's guide. For details refer to PORRO DOS 6.20 User's Guide and User's Reference.

BACKUP	:	Backs up one or more files from one disk to another.
CHDIR (CD)	:	Changes directories or displays the working directory.
CHKDSK	:	Scans the disk in the specified drive and checks it for errors.
COPY	:	Copies the specified file(s).
DEL (ERASE)	:	Deletes the specified file(s).
DIR	:	Lists the files in a directory.
DISKCOPY	:	Copies disks.
FORMAT	:	Formats a disk to receive MS-DOS files.
HELP	:	Display the information of the command.
MKDIR (MD)	:	Makes a directory.
MORE	:	Displays output one screen at a time.
PRINT	:	Prints files.
RENAME (REN)	:	Renames first file as second file.
RESTORE	:	Restores backup files.
RMDIR (RD)	:	Removes a directory.
SORT	:	Sorts data forward or backward.
TYPE	:	Displays the contents of a file.
UNDELETE	:	Undeletes the specified file(s).
XCOPY	:	Copies files and subdirectories.

Appendix B: Reference

Microsoft MS-DOS 6 User's Guide, Microsoft Corporation 1993.