KAYPRO®

386

READ ME FIRST

USER'S GUIDE

KAYPRO 386

User's Guide

Revision C - March 1987

Part Number 5733-C

FCC INFORMATION

As Kaypro keeps in step with computer technology, the models have changes which affect FCC ratings. The proper rating is affixed to the back of each computer, and the appropriate FCC information is given here.

FCC Information for Class A

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this computer is used with peripheral devices, such as a printer or modem, then well-shielded cables must be used to preserve the radio interference characteristics.

FCC Information for Class B

This equipment generates and uses radio frequency energy and, if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type-tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

WARNING: This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with Class B limits may be attached to this computer, and only with a shielded cable. Operation with non-certified peripherals or with unshielded cable is likely to result in interference to radio and TV reception.

NOTE:

TO PREVENT RADIO AND TV INTERFERENCE, SHIELDED CABLES MUST BE USED TO CONNECT PERIPHERAL DEVICES TO YOUR COMPUTER. THESE CABLES ARE AVAILABLE FROM YOUR KAYPRO DEALER.

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Chapter One
Introduction

Chapter One
Introduction

Thank you and congratulations for buying the KAYPRO 386. You have invested in one of the most powerful personal computers on the market.

Your KAYPRO 386 will run virtually all MS-DOS software at amazing speeds thanks to its 32-bit CPU and fast 16 MHz clock speed. You can even switch to a 8 MHz clock speed for the occasional program that works better on slower computers.

Despite all its power and speed, the KAYPRO 386 operates like nearly any other MS-DOS based personal computer. This manual is written to help you get operational as quickly as possible regardless of your previous computer experience.

The KAYPRO 386 is a very powerful computer, and most of the people purchasing it will have had some prior experience using computers. However, not everyone *using* the computer will have had that experience. This manual is for both types of people.

If you are a novice computer user, there is tutorial material in Chapters 4 and 5 of this manual. You will find additional tutorial material in the *MS-DOS User's Guide*. Once you become familiar with the KAYPRO 386 and MS-DOS, you may use this manual as a reference guide.

If you are an advanced user, you will probably be familiar with MS-DOS to the extent that, as soon as the hardware is set up, you may start using the computer immediately. There is excellent reference information in the appendices of this manual, and in the *MS-DOS User's Guide*.

Overview

Chapter One provides an overview of this manual, and an outline of the standard features of your computer. It also offers suggestions on where to turn for additional help.

Chapter Two explains the basic hardware setup procedures for the different models of the KAYPRO 386. Experienced computer users may start in this chapter.

Chapter Three contains information about software installation for each particular model of the KAYPRO 386.

Chapter Four contains tutorial information about personal computers, operating systems, commands and files. If this is your first computer, don't miss this chapter.

Chapter Five is the "Getting Started" chapter. The first section contains information for KAYPRO 386 computers with diskette drive systems or hard disk systems. The second section deals with information more applicable to hard disk users only.

Chapter Six is the "Advanced Usage" chapter containing information on advanced MS-DOS commands including wildcards, shortcuts and other special features.

Chapter Seven introduces the KAYPRO utility programs packaged with the computer. These programs are unique to KAYPRO computers and are very useful.

Chapter Eight has information about video with the KAYPRO EGA Video Board and the KAYPRO Multi-Video board. This chapter will also cover the KAYPRO Color Monitor, the KAYPRO Monochrome Monitor, and the KAYPRO Enhanced Graphics Color Monitor, as well as software concerned with video.

Chapter Nine contains more detailed information about the hardware, including specifications, switch settings, physical layout of the circuit boards, and procedures for adding optional equipment.

The Appendices contain supplementary information.

An extensive **Index** can be found at the back of this manual.

Standard Features

KAYPRO 386 (All models)

All models of the KAYPRO 386 come with the Intel 80386 microprocessor which runs at 16 MHz but is keyboard switchable to 8 MHz for those programs that need a slower clock rate. Other standard features include:

ROM - Includes self test and diagnostics of system on power up.

Disk Controller - IBM PC/AT compatible disk controller supporting up to two (2) diskette drives and two (2) hard disks of up to 130 MB each.

Keyboard - Detachable, 102 keys, 12 programmable function keys, number pad and separate cursor movement keys.

Input / Output - 1 serial and 1 parallel port, both IBM PC/AT compatible.

Case - Sturdy metal construction: desktop or floor configuration.

Power Supply - 110/220 volt, 215 watt.

Standard Software - MS-DOS 3.2 Operating System; GW-BASIC, a BASICA-compatible programming language by Microsoft Corp; various KAYPRO utility programs.

KAYPRO 386 - Model A

Model A of the KAYPRO 386 includes all the standard features plus:

RAM - 512 KB 32-bit-wide RAM, expandable to 16 MB.

Disk Storage - One double-sided, 1.2 MB diskette drive.

Expansion - Seven available expansion slots: two 32-bit, three 16-bit and two 8-bit. Room for 5 half-height devices.

Optional Hard Disks:

40 MB 5 1/4" High Speed Hard Disk
130 MB 5 1/4" High Speed Hard Disk

KAYPRO 386 - Model E

Model E of the KAYPRO 386 includes all the standard features plus:

RAM - 2.5 MB 32-bit wide RAM, expandable to 16 MB.

Disk Storage - One double-sided, 1.2 MB diskette drive, one 40 MB high speed hard disk.

Expansion - Six available expansion slots: one 32-bit, three 16-bit and two 8-bit. Room for 5 half-height devices.

Optional Hard Disks:

40 MB 5 1/4" High Speed Hard Disk
130 MB 5 1/4" High Speed Hard Disk

KAYPRO 386 - Model N

Model N of the KAYPRO 386 includes all the standard features plus:

RAM - 2.5 MB 32-bit wide RAM, expandable to 16 MB.

Disk Storage - One double-sided, 1.2 MB diskette drive, one 150, 240 or 330 MB high speed hard disk.

Expansion - Six available expansion slots: one 32-bit, three 16-bit and two 8-bit. Room for 5 half-height devices.

Optional Hard Disks:

150 MB 5 1/4" High Speed Hard Disk
240 MB 5 1/4" High Speed Hard Disk
330 MB 5 1/4" High Speed Hard Disk

Optional Features

The following items are available from your KAYPRO dealer and can be added to any model of the KAYPRO 386.

Monitors:

12" Monochrome Monitor
12" Tri-Mode Monitor
13" Color Graphics Monitor
13" Enhanced Graphics Color Monitor

Video Adapters:

Enhanced Graphics Adapter
Multi-Video Board (Color Graphics, Monochrome Graphics and Color Emulation)

Second Diskette Drive:

5 1/4" High-capacity diskette drive (1.2MB storage capacity)
5 1/4" Standard diskette drive (360KB storage capacity)
3 1/2" Micro-floppy diskette drive (720KB storage capacity)

Tape Unit:

Internal 60 MB tape backup, 5 MB/min
External 60 MB tape backup, 5 MB/min

What Are All These Books For?

New computer users may wonder what all the different manuals are for, and which ones should be read first. This User's Guide is the primary reference document for assembling the computer, installing the software and beginning operations. It also contains tutorial information to help you learn to use the KAYPRO 386 and the MS-DOS operating system.

After the computer is assembled and functioning, your primary concern will be learning about the applications software programs that were included with your KAYPRO. There is a manual for each specific program which explains its use in detail.

To operate the computer more efficiently, you will need to learn more about the MS-DOS operating system. Once you get past the range of tutorial material in this book, refer to the *MS-DOS User's Guide*.

Is Further Help Available?

Your local KAYPRO dealer can answer most initial questions about the KAYPRO 386. Dealers can also give information about joining a KAYPRO User's Group. These groups provide a fun and sociable way to share information with other KAYPRO owners.

If you want additional information on a topic not covered in these manuals, there are many computer books and magazines designed for both novices and sophisticated users. Check the computer section of the local library or bookstore.

If you need technical help with a specific applications software product, we suggest contacting the manufacturer of the product. If the software vendor is unable to help, try calling our software support hotline at (619) 481-3920.

Chapter Two
Hardware installation

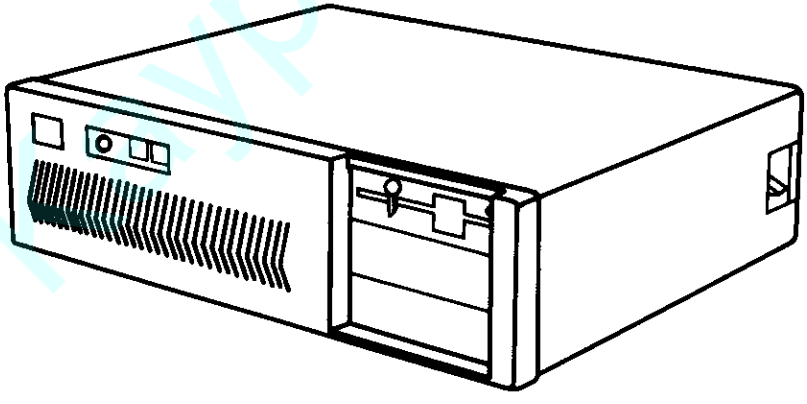
Chapter Two
Hardware Installation

This chapter explains how to connect your computer components and prepare them for operation. If you would like tutorial information before you begin, please refer to Chapter Four.

Remove the computer and keyboard from the shipping box. The box should also contain:

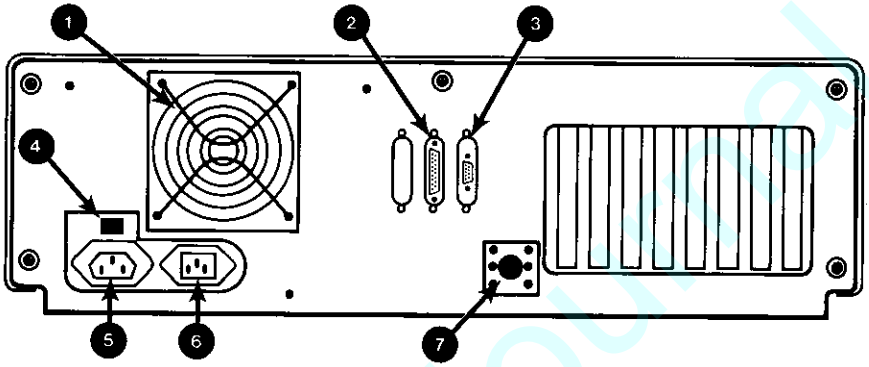
- KAYPRO Ownership Documents
- Hardware and Software Manuals and Addenda
- Master Diskettes
- Power Cable
- Two keys for Keyboard Security Lock

Set aside the packing materials and save them in case you ever need to transport the computer.



Set the computer on a flat work surface. The ideal work surface is a sturdy table or desk that allows access to the front and back of the computer. Have a small (#2) slotted screwdriver handy.

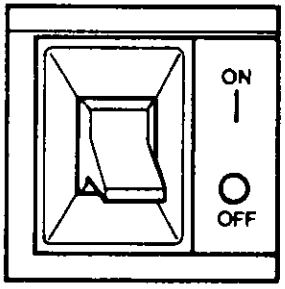
Refer to the illustration below and note the position of the keyboard connector (7), the serial port (3), and the computer power connector (6).



1. Fan
2. Parallel Port (Centronics)
3. Serial Port (RS-232C)
4. 120/240 Volt Switch
5. Monitor Power Connector
6. Power Cord Connector
7. Keyboard Connector

Kaypro offers a choice of video boards to go with the KAYPRO 386. Consult your dealer for the type and location of your video board.

The power switch is located on the right side of the computer. Make certain that it is in the OFF (down) position.



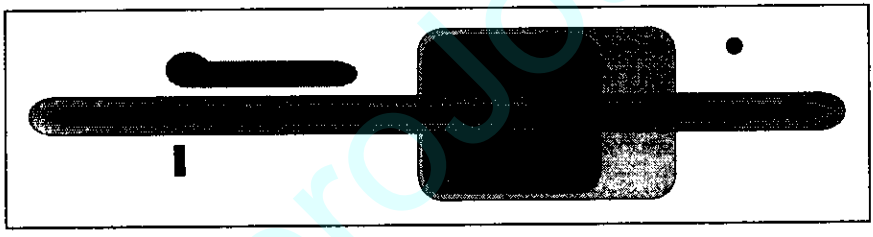
Remove the monitor from its box and carefully set it on the computer with the monitor's rear panel, power cord and signal cable facing the rear of the computer.

KAYPRO monitors have a nine-pin connector (a DB-9S) at the end of their signal cable. This connector fits into the video connector port. Use a small slotted screwdriver to attach this connector to the video connector port.

Make sure the monitor power switch is turned off. Then plug the power cord from the monitor into a grounded 115-volt outlet. If you have a monochrome monitor with the correct type of plug, you may plug it into the Monitor Power Connector (5). **Do not** plug a color monitor into this socket, as the power drain may be too great and you may cause damage to the computer.

Connect the keyboard cord to its connector (7) on the computer.

To open the diskette drive door, turn the lever up. Latch or close the drive by turning the lever down.



Remove the cardboard protector(s) from the diskette drive(s). Save these protectors and put them back in the drives whenever you transport the computer.

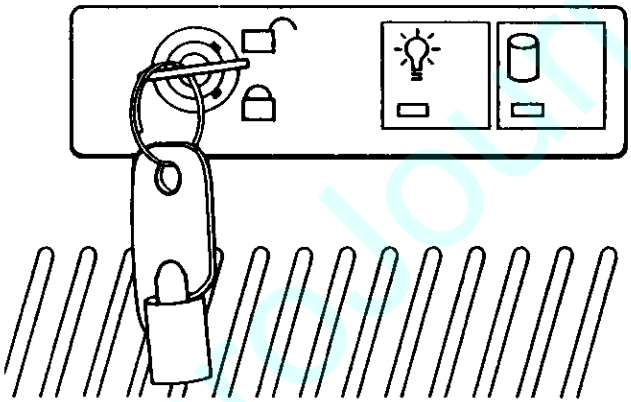
Connect one end of the power cord to its connector (6) on the computer.

Plug the other end of the power cord into a grounded 115-volt outlet.

Use one of your two keyboard security keys to set your keylock to the unlocked (upper) position.

NOTE:

When the keylock is set for the locked (lower) position, the keyboard input is disabled and the computer sheet metal is locked into position. Setting the lock will not prevent the computer from booting, nor will it shut off the power if you lock it while the computer is operating. It is installed to prevent unauthorized persons from tampering with your computer while you are away from it.



You have now completed the mechanical part of installing your computer. The computer should now be properly connected for operation. The following power-up test will determine if everything is correct up to this point. If so, you may proceed to Chapter Three, Software Installation.

- Verify that all power cords are plugged in and that the cardboard protectors have been removed from the diskette drives.
- Position the monitor, system unit, and keyboard the way you want them.
- Turn on the monitor.
- Turn on the computer with the switch on the right side.

How Can I Tell If It's Okay?

If everything is connected properly, the following things will take place:

1. The green LED will light up beneath the light bulb icon in the keylock panel. This means that the computer has been turned on.
2. There will be a quiet whirring sound from the power supply cooling fan.
3. The monitor will display the version number of the ROM BIOS.
4. The built-in diagnostics will begin checking the RAM (Random Access Memory). These numbers will be flashed on the screen.
5. You will hear a single short "beep" as the RAM test is completed.
6. The light on the front of the disk drive (drive A) will glow as the computer begins looking for a diskette containing MS-DOS and its files.
7. If your computer has a hard disk, the red LED on the keylock panel under the cylinder icon will light up as the computer continues its search for MS-DOS and its files on the hard disk. If MS-DOS has been loaded onto the hard disk, the computer should now prompt for a time and date. Otherwise...
8. A message will appear on the screen:

   Boot disk failure
   Press any key to continue

The SETUP Program

The KAYPRO 386 stores certain information about itself in battery-backed memory. This memory, called CMOS RAM, is consulted when the KAYPRO 386 is first turned on. The configuration information in CMOS RAM is entered and updated with the SETUP program. If your dealer has already run SETUP, the information should still be correct, but we recommend checking it at this point.

Starting SETUP

1. Insert MS-DOS Diskette 2 of 2 in drive A and latch the door. Reboot the computer by holding down the **Ctrl** and **Alt** keys and pressing the **Del** key.
2. Press **Enter** at the date and time prompts.
3. At the **A>** system prompt, type:

   \K286I\SETUP

   and press **Enter**.

Running SETUP

You will now see a menu that looks something like the one below.

CMOS RAM SETUP utility version *x.xx*
(C) Copyright 1985 by Kaypro Corporation

F1> Current time is 12:41:37
F2> Current date is 02/10/1987
F3> First diskette drive [drive A] - 1.2M high density (96 TPI)
F4> Second diskette drive [drive B] - Not installed
F5> First hard disk drive [drive C] - Not installed
F6> Secondhard disk drive [drive D] - Not installed
F7> Display - Enhanced graphics adapter
F8> Base memory size is 512K
F9> Expansion memory size is 0K
F10> 80287 numeric coprocessor is not installed

* Hit F1 through F10 to change the corresponding parameter.
* Hit SPACE to step through and enter all parameters.
* Hit ESC to exit this program and return to DOS.

Look through the menu and make sure that what you see on the screen is exactly what you have on your system.

The first time that you run SETUP, it is a good idea to step through each parameter. To do this, press the space bar and make sure that all of the default choices are the correct ones for your system.

NOTE:

Any time you change anything in the configuration of your system, including adding a hard disk or another diskette drive, adding memory or installing a numeric coprocessor, you must run SETUP.

- If it is necessary to change the date, you must use slashes to separate the numbers and you must type the 19 in the year.
- If you are installing a KAYPRO 40MB hard disk, choose type 33 as the First hard disk drive type. If you are installing a different hard disk, consult your dealer for help.
- If you have the 32-bit 2MB memory expansion board (standard on Models E and N, optional on Model A), leave the base memory set for 512KB and set expansion memory for 2048KB. The memory management software (explained later in this chapter) will automatically reassign a portion of the 2048KB to conventional memory and bring it up to 640KB. However, this assignment takes place after the computer checks the CMOS RAM information.

Installing a Hard Disk - the SpeedStor Program

Hard disks, under the MS-DOS operating system, are usually limited to 32MB. SpeedStor circumvents these limitations, and allows you to add a larger hard disk by partitioning the disk and dividing it into two or more *logical* drives. If you are installing the KAYPRO 40MB hard disk, configure the SETUP program's First hard disk drive option as a type 33. If you are installing a different type of hard drive, consult your dealer for help in determining what type of drive it is.

Initializing the Hard Disk

When the hard disk is shipped from Kaypro, a low-level format has already been done. Do not attempt to do a low-level format on a hard disk that has been shipped from Kaypro.

1. Insert the MS-DOS Master Diskette Number 1 in drive A and latch the door. Reboot the computer by holding down the **Ctrl** and **Alt** keys and pressing the **Del** key. When the **A>** system prompt appears, remove the MS-DOS diskette and insert the SpeedStor diskette.

2. Type:

   PARTED

   and press **Enter**.

3. Use the cursor keys to select the **Create** option from the menu. Press **Enter**.

4. Use the cursor keys to select **BootableDOS**. Press **Enter**.

5. Select **Largest** from the menu and press **Enter**. This will create a partition of 32MB.

6. Select **Create** and press **Enter**. Select **CompatibleDOS** from the Create menu and press **Enter**. This will create a second partition of the remaining space on the hard disk (about 8MB).

7. Select **Format** from the main menu and press **Enter**. Select (1)**One** from the Format menu and press **Enter**. This process will take several minutes.

8. When the process is completed, you must format the second partition of the hard disk. Select **Format** and press **Enter**. From the Format menu, select (2)**Two** and press **Enter**. This process should take considerably less time.

Note:

The formatting process *replaces* the high-level formatting normally done with the MS-DOS FORMAT program. Do not attempt to format the hard disk after running SpeedStor.

9. When SpeedStor has completed the format process, select **Quit** from the main menu and press **Enter**.

10. When the process is completed, SpeedStor will list instructions to copy MS-DOS to the hard disk. Remove the SpeedStor diskette from drive A and insert the MS-DOS Master Diskette #1. Latch the drive. Reboot using the **Ctrl-Alt-Del** method.

11. At the **A>** system prompt, type:

    SYS C:

    and press **Enter**. You will soon see the message:

    System transferred

12. At the **A>** system prompt, type:

    COPY A:COMMAND.COM C:

    and press **Enter**. When the process is completed, you will see the message:

    1 file(s) copied

13. Remove the MS-DOS Master Diskette #1 from drive A and insert the SpeedStor diskette. Latch the door. At the **A>** system prompt, type:

    ADDEVICE

    and press **Enter**.

Using the Hard Disk

Your hard disk has now been initialized and partitioned. Even though you only have one hard disk installed in the computer, SpeedStor has created two *logical* drives (drive C and drive D) from your 40MB hard disk.

Check to see if these drives have been created by removing the diskette from drive A and reboot the computer by holding down the **Ctrl** and **Alt** keys and pressing the **Del** key. If the *boot track* has been installed correctly, the screen

will display a **C>** system prompt (you may be prompted to press the **F1** function key before **C>** can be displayed). When the **C>** system prompt is displayed, check drive D by typing:

D:

(don't forget the colon), and pressing **Enter**. The system prompt should now be **D>**. If you see the message:

Invalid drive specification

repeat the initialization process. If you are still unsuccessful, consult your dealer for help.

For more information on SpeedStor, its diagnostics and installation procedure, refer to the manual that came with the SpeedStor diskette.

Expanded Memory Board

In order to use the 2MB on the expanded memory board and backfill conventional memory to 640K, you must run the Quarterdeck software that was included with your computer.

1. At the A> system prompt, type:

   INSTQEMM

   and press **Enter**.

2. The installation program will ask you what drive you boot from (C:, the hard disk), and presents you with the default settings which should all be correct. Press **Enter** in each case.

3. The Quarterdeck program will show a message that tells you it has updated (or created) a CONFIG.SYS file and that the QEMM files have been copied to the hard drive.

For more information on Quarterdeck software, refer to the manual that came with the Quarterdeck diskette.

Chapter Three
Software Installation

Chapter Three
Software Installation

Overview

In the previous chapter, we explained the steps required to prepare your computer hardware for operation. That's the first half of the installation process. Now we're ready for the second half -- installing the software. This chapter is divided into three sections: this overview, a section for systems with diskette drives and a section for systems with a hard disk.

It should be noted that the terms hard disk, hard disk drive, hard drive, fixed disk and non-removable disk can be used interchangeably, but for this manual, we will use hard disk.

Also, the terms floppy drive, floppy disk drive, and diskette drive are interchangeable, but here we will use diskette drive.

All models of the KAYPRO 386 come with the following:

- MS-DOS - The Microsoft Disk Operating System. The operating system is used directly for various tasks, and functions as a command interpreter for all the other programs.
- MS-DOS and KAYPRO Utilities - Programs used for day-to-day functions such as formatting and copying diskettes, backing up and restoring hard disk files and checking disks for errors.
- GW-BASIC - A programming language.

All these programs are provided on Master Diskettes, and must be transferred to other media for day-to-day usage. Software installation, then, is the process of transferring these programs to other media, and making various choices to personalize them for your needs.

Important Information About Conventions Used in Examples

All examples in this manual will follow the same conventions. You should keep the following points in mind as you follow instructions and read examples.

CAPITALS - Command names (FORMAT, DIR, etc.) and filenames (CONFIG.SYS, DISKCOPY.COM, etc.) will be in upper case. You may type the commands in any combination of upper or lower case; MS- DOS will change them to upper case.

italics - Items shown in italic lower case letters mean that you are to substitute the item. For example, *pathname* means that you should type the directory path (including the name of your file, if applicable), in place of the word *pathname*.

[Square Brackets] - Items inside square brackets are optional. If you want to include optional information, do not type the brackets, only the information within the brackets.

You must include all punctuation where shown (with the exception of square brackets), such as commas, equal signs, question marks, colons, slashes, periods or dashes.

Note to hard disk owners:

If your dealer has already formatted your hard disk AND installed your software, you may skip the section on installing your software. Turn to Chapter Five "Getting Started." If your dealer has not formatted your hard disk and installed your software, turn to Section B of this chapter.

How do you know if the dealer has done the formatting and installation? Turn on your machine with no diskette in the diskette drive. If it boots and comes up with a time and date prompt, then the dealer has done the formatting and has loaded the operating system.

If You Have Only One Diskette Drive

On a single-drive system, you enter the commands as you would on a multi-drive system.

MS-DOS treats drive A as if it was both drive A and drive B. When you switch between A and B, MS-DOS will prompt you to change diskettes. So, instead of A and B representing two physical drives, A and B represent different diskettes used in the same drive.

If you specify drive B when the drive A diskette was the last used, you are prompted to insert the diskette for drive B. For example:

```
A>FORMAT B:
Insert diskette for drive B:
and strike ENTER when ready
```

If you specify drive A when the drive B diskette was last used, you are prompted again to change diskettes. This time, MS-DOS prompts you to insert the drive A diskette.

The letter displayed in the system prompt represents the drive where MS-DOS looks to find a file whose name is entered without a drive letter. The letter in the system prompt does *not* represent the last diskette used.

For example, assume that A is the drive you are using. If the last command you typed was **DIR B:**, MS-DOS believes the drive B diskette is still in the drive. Nevertheless, the system prompt is A>, because A is the drive MS-DOS is using. If you type **DIR**, MS-DOS prompts you for the drive A diskette because drive A is the current disk drive and you did not specify another drive in the DIR command.

Section A: Diskette Drive Systems

If you have a two-diskette-drive system, you will be formatting blank diskettes and copying programs from the Master Diskettes to the newly-formatted blanks.

Backing Up the MS-DOS Diskettes

1. Start the computer with the MS-DOS Diskette 1 of 2 in drive A. The computer will prompt you for a date. If the date is correct, you need only press **Enter**. If the date is incorrect, type in the current date, using hyphens or slashes to separate the numbers. You need not include the 19 in the year. For example, at the prompt you could type:

   8-18-87

   or

   08/18/87

   and press **Enter**.

   The number of days in the months and leap years are changed automatically.

   After the date is entered, the prompt for the time will appear. If the time is correct, you only need to press **Enter**. If the time is incorrect, type in the current time, using colons to separate the numbers. Use a 24-hour clock, or military time, to enter the correct time. After noon, add twelve hours to the present time. You need not enter the seconds or hundredths of seconds. To change the displayed time to 1:00 p.m., type:

   13:00

   and press **Enter**.

2. You will then see a system prompt (**A>**). At the system prompt, type:

   DISKCOPY A: B:

   and press **Enter**. You may type the command in upper or lower case characters. This command instructs the computer to copy the diskette in drive A to the diskette in drive B. The following message should appear on your screen:

Insert source diskette in drive A:
Insert target diskette in drive B:
Strike any key when ready

If you only have one diskette drive, leave MS-DOS Diskette 1 of 1 in the drive, (because this is the diskette you want to copy), press a key and wait to be prompted to swap diskettes. If you have two diskette drives, insert a blank diskette in drive B, latch the door and press a key. MS-DOS will automatically copy the contents of the drive A diskette to the drive B diskette. Use the time to write a label for a new copy.

3. When the copy process is complete, the following message will be displayed:

Copy complete
Copy another (y/n)?

4. Remove the diskettes from both drives and return them to their paper dust covers. To copy the second diskette, put the MS-DOS Diskette 2 of 2 in drive A and a new blank diskette in drive B. Type **Y** and press **Enter**. Follow the directions on the screen; they will be the same as above.

5. When you have made all your working copies, store your Master Diskettes in a safe place. Type **N** and press **Enter** to say that you don't want to copy another.

Section B: Hard Disk Systems

Loading MS-DOS Onto the Hard Disk

1. Place the MS-DOS Diskette 1 of 2 in drive A and latch the door. Reboot the computer by holding down the **Ctrl** and **Alt** keys, and pressing the **Del** key.

2. After answering the time and date prompts, and at the **A>** system prompt, type:

   COPY A:*.* C:/V

   and press **Enter**. This tells the computer to take all the files from drive A, copy them to drive C and verify that there are no errors. The filename of each file will be displayed on the screen as it is being copied. When all the files have been copied, you will see a message similar to this:

   33 File(s) Copied

3. Remove MS-DOS Diskette 1 of 2 from drive A and put it back in its paper dust cover. Put MS-DOS Diskette 2 of 2 in drive A and latch the door. At the system prompt, type:

   COPY A:*.* C:/V

   and press **Enter**. Again the filename of each file will be displayed on the screen as it is being copied.

4. After all the files have been copied, at the system prompt, type:

   COPY A:\K286I*.* C:/V

   and press **Enter**. Notice that the first two slashes are backslashes. This command tells MS-DOS to go to drive A, look in the subdirectory named K286I, get all the files (in this case, only SETUP.COM is there), copy them to drive C and verify that there are no errors.

We will be discussing subdirectories in a later chapter.

Rebooting the System

When the computer is turned on, it follows a procedure that is permanently stored in its ROM (Read Only Memory). This procedure directs the computer to check its RAM and then look for a diskette in the A drive. If it doesn't find a diskette in drive A, it activates the C drive, reads the drive, locates the operating system, and moves that system into RAM (Random Access Memory). This is what happens when you turn the computer on. The process of reading the drive and loading the operating system into RAM is known as *booting* the system.

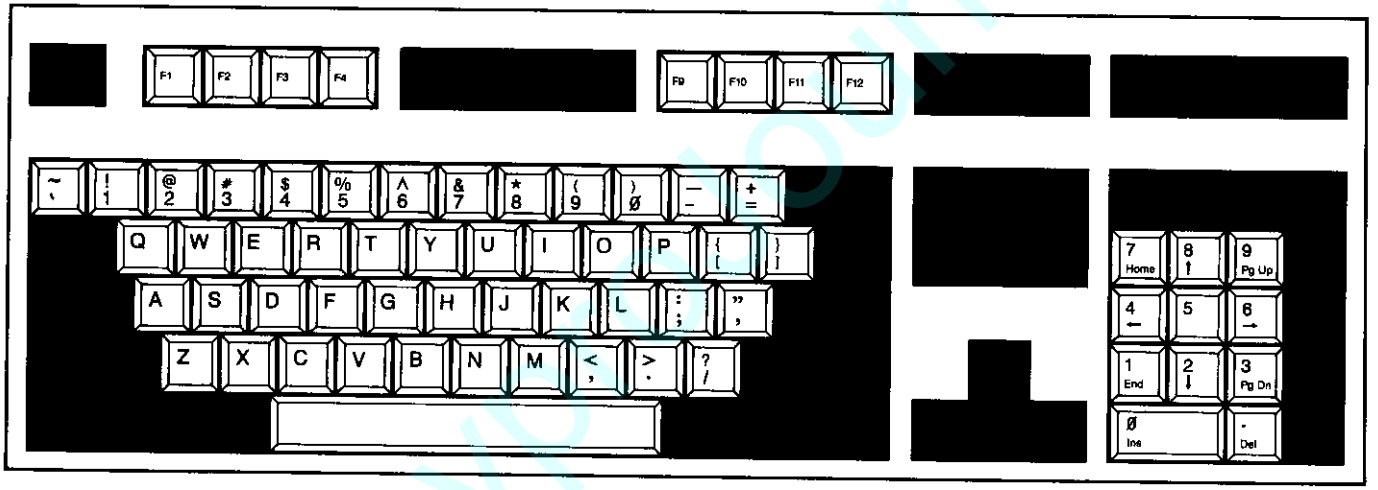
It is not a good idea to restart the KAYPRO 386 by turning it OFF and ON with the power switch. If you need to restart the computer, you should reboot it by holding down the **Ctrl** and **Alt** keys and pressing the **Del** key. When the computer is rebooted, it will go through many of the same steps as when it is first turned on. Rebooting is a useful procedure under certain circumstances, particularly when the computer is in a software hangup and does not respond to the keyboard. Rebooting will clear memory in much the same way as a power failure. If possible, save your work before rebooting. If the computer does not respond to the **Ctrl-Alt-Del** method of rebooting, make sure that none of the drive lights are on, then turn the computer off using the switch on the right side of the computer. **Wait at least 10 seconds before turning the computer back on.** This method should be used only as a last resort.

CAUTION:

When you reboot the system using either of the above methods, you will erase everything that is currently in RAM.

If all has gone well, the computer will make some beeping noises, the screen will clear and a sequence of numbers will appear in the upper left hand corner of the screen. These numbers indicate that the computer is checking its memory. The computer will go through a series of commands and then will prompt you for a time and date.

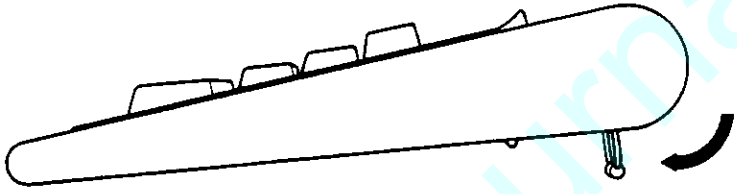
Chapter Four
Tutorial Material



Chapter Four
Tutorial Material

The Keyboard

The typing angle of the KAYPRO 386 keyboard can be adjusted by moving the fold-down legs on the bottom.

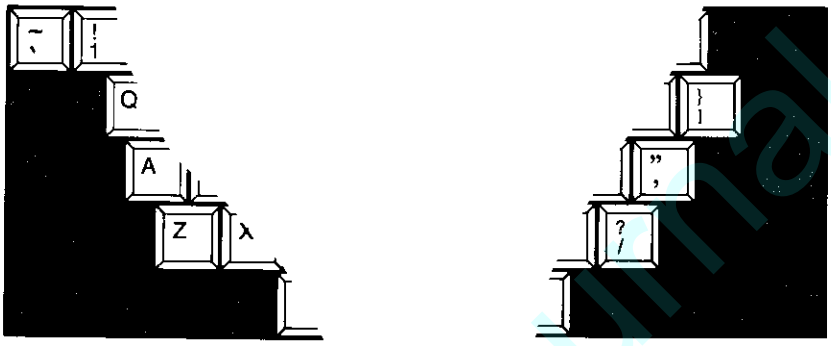


There is a bank of twelve programmable function keys on the top of the keyboard, a set of cursor function keys in the middle and a numeric keypad on the right. The keypad has two modes of operation--numeric and function. Both modes are described in the keypad section.

Programmable Function Keys

The keys across the top of the keyboard labeled **F1** through **F12** are multi-purpose programmable function keys. The function of each of these keys is determined by the program in use. MS-DOS also uses these keys. See "MS-DOS Editing and Function Keys" in the *MS-DOS User's Guide*.

Typewriter Area



The keys in the center area of the keyboard are similar to those of a typewriter. However, there are a few different keys that you should become familiar with.

The following keys perform special functions:

Esc: This key (Escape) is often used to cancel some action or to escape from an undesired activity.

Tab: This key moves (tabs) the cursor horizontally multiple spaces. The number of spaces depends upon the program in use. In some programs, when used with the **Shift** key, it will tab the cursor backwards.

Caps Lock: This key behaves like a typewriter's **Shift Lock** key by converting alphabetic characters from lower case to upper case. Unlike a typewriter's Shift Lock, this key does not convert punctuation or number keys to their shifted position. The **Shift** key temporarily reverses the state of **Caps Lock**. That is, when the **Caps Lock** is off, the **Shift** key changes letter keys to upper case. When the **Caps Lock** is on, the **Shift** key changes letter keys to lower case. Each time you press the **Caps Lock** key, it will change from one mode to the other.

Shift: This key operates much like a typewriter's **Shift** key, and it does not lock into place. In addition to converting the alphabetic keys, number keys and punctuation keys to their shifted function, it also temporarily reverses the state of the **Num Lock** key. That is, when the **Num Lock** is off, the **Shift** key puts the keypad in numeric mode, and when **Num Lock** is on, the **Shift** key puts the keypad characters into function mode.

Ctrl: (Control) This key is used in conjunction with other keys to generate control codes. Like the **Shift** key, the **Ctrl** key must be held down while the next key is pressed. For example: to stop a command, press the **Ctrl** and **Break** keys.

Alt: This key is used with one or more other keys to generate an alternate function of the other key(s). It operates like the **Shift** and **Ctrl** keys in that it must be held down while the other key(s) is (are) being pressed.

Backspace: This key moves the cursor from right to left (backspaces). Some programs erase the characters as the cursor moves.

Enter: This key tells the computer to execute a command. It also works like a carriage return by moving the cursor to the start of a new line.

Miscellaneous Function Keys

The miscellaneous function keys shown below may perform different functions depending on the program being used. Consult the user's guide of the particular program to determine the specific use of each key.

Print Screen/SysRq: Sends the current screen display to a parallel printer. When used with the **Ctrl** key, it echos the screen display to the parallel printer until you cancel this function by pressing the **Ctrl** and **Print Screen** keys again, or reset the computer. The **SysRq** key has no meaning at this time.

Scroll Lock: This key is used by some programs to effect display scrolling. MS-DOS does not use this function.

Pause/Break: This key acts to pause the scrolling of text or the operation of a program. Press any other key to continue. This key can be used with the **Control** key to abort a program.

Insert: Allows you to insert characters in a line of text. In some programs it may "toggle" between insert and overwrite mode.

Delete: Deletes the character under the cursor or the character to the left of the cursor depending upon the program in use.

Home: Moves the cursor to the top left of the screen. In some programs, it moves the cursor to the beginning of a line.

End: Moves the cursor to the bottom right of the screen. In some programs, it moves the cursor to the end of a line.

Page Up: Displays the previous page of text.

Page Down: Displays the next page of text.

The four **arrow keys** move the cursor in the direction indicated by the arrow on each key.

The Keypad

The calculator-style keypad includes mathematical function keys and number keys which double as cursor movement keys. The cursor movement functions of the number keys are duplicated in the bank of keys to the left of the keypad.

Num Lock: This key switches the numeric keys on the keypad from *numeric* mode to *function* mode and back again. Each time you press this key, the computer switches from one mode to the other. The **Shift** key temporarily reverses the **Num Lock** mode. That is, when the **Num Lock** is off, the **Shift** key

puts the keypad in numeric mode, and when **Num Lock** is on, the **Shift** key puts the keypad characters into function mode.

The numeric keys, when the **Num Lock** key is on, output numbers when pressed. When operated in function mode, the numeric keys perform functions relating to cursor movement. The program in use usually determines the function of each key.

The Keypad Keys in Function Mode

0/Ins: Allows you to insert characters in a line of text. In some programs it may "toggle" between insert and overwrite mode.

./Del: Deletes the character under the cursor or the character to the left of the cursor depending upon the program in use.

7/Home: Moves the cursor to the top left of the screen.

1/End: Moves the cursor to the last character on a line or to the bottom right of the screen.

9/PgUp: Displays the previous page of text.

3/PgDn: Displays the next page of text.

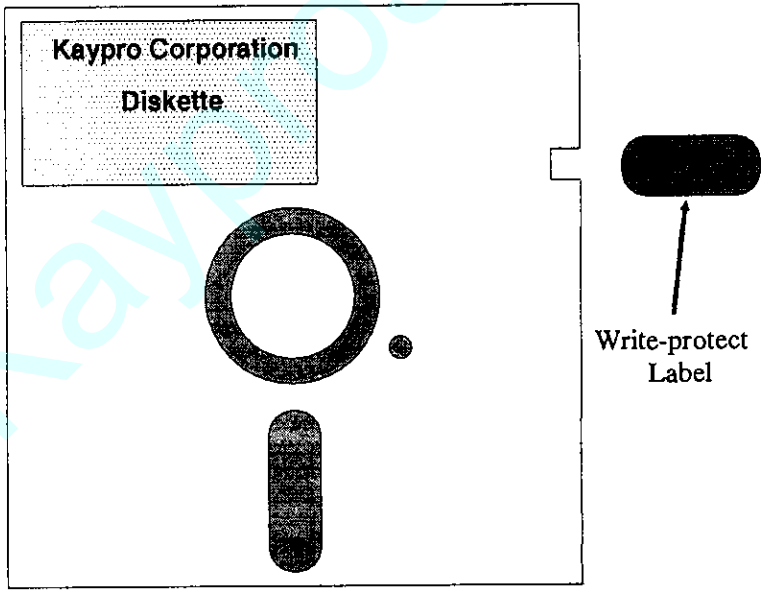
2, 4, 6 and 8: The arrow on each of these keys move the cursor in the direction indicated by that arrow.

Diskettes

The KAYPRO 386 uses 5.25 inch, double-sided, high-density, soft-sector diskettes that provide 1.2 megabytes of formatted storage. You may also use regular double-sided double-density diskettes that provide 360 kilobytes of formatted storage capacity, but they must be formatted using the /4 switch. See the FORMAT command in Chapters 5 and 6 of this manual and in the *MS-DOS User's Guide*.

Information is stored magnetically on the surface of an oxide-coated mylar diskette, which is permanently sealed inside a protective plastic envelope. Diskettes have invisible tracks along which magnetic pulses are recorded. Computers use these pulses to store information.

Diskettes can be formatted for many different types of computers. No information can be stored on a diskette until it is formatted. Formatting magnetizes the diskette and organizes it into tracks and sectors. Formatting diskettes will be covered in Chapters Five and Six.



Caring for Diskettes

Chemicals from a fingerprint on the exposed surface of a diskette can destroy the product of an entire day's work. In the following pages there are a few simple guidelines for handling and using diskettes.

Handling Diskettes

Always handle diskettes by the label or the protective jacket. Do not touch the exposed surface (the access slot) of a diskette. Do not bend diskettes.

Storing Diskettes

Keep diskettes in their paper dust covers when they are not in use. Store diskettes in a container or file in a clean, dry, cool place. Do not store diskettes near any magnetic fields, such as those in dictating equipment, electronic calculators, telephones, your computer monitor, and other electronic devices. Do not store diskettes near any chemicals or expose them to excessive tobacco smoke or fumes from cleaning solvents.

Backup Diskettes

It is important to make backup copies of your diskettes so that, if one is lost or damaged, you will have a replacement. As you create and change files, make it a practice to save your information on a diskette. How frequently you make backup copies of these files should depend on how many changes you make in a day, and the value of the information in the files. In a business environment, files should be backed up daily, if possible.

Protecting Data

There is a square notch on one side of the diskette jacket called the write-protect (or sometimes write-enable) notch. If this notch is covered, (or not there, as in the case of Master Diskettes), information can only be read from the diskette. You will not be able to make changes on a diskette that has the write-protect notch covered. To ensure that you do not accidentally erase stored information, cover the write-protect notch with the tabs that are provided with new diskettes.

Saving Data

Making frequent backups of your work will safeguard against its loss in the event of a power failure or computer malfunction. Remember that any information in the computer's memory, if not saved on disk, will be lost if the power fails.

Labeling Diskettes

Label all diskettes that contain information. Use only press-apply adhesive labels. Write the label first, and then apply it to your diskette. If you must write on a label which is already in place, use only a soft, felt-tip pen, as a pencil or ballpoint pen can damage the diskette.

Removing Diskettes From the Drives

Do not remove a diskette from the drive when the drive lamp is on. Always remove diskettes from drives before turning the computer off.

Open the drive by turning the lever up. Close or latch the drive by turning the lever down.

Video Monitors

Four different monitors are optional with the KAYPRO 386:

- 13" EGA (Enhanced Graphics Adapter) Color Monitor
- 13" Color/Graphics Monitor
- 12" Monochrome Monitor.
- 12" Tri-Mode Monitor

You may read more about these monitors and their video boards in Chapter Eight.

Computer Maintenance

In normal operation your computer should need very little maintenance or service. A few commonsense practices will help your computer stay in top shape.

It is important to keep the computer and diskettes dust-free. The computer itself can be cleaned with a damp, lint-free cloth. A mild kitchen detergent can be used, if necessary. **Do not allow water or fluid of any kind to contact any electronic circuitry.**

The part of the diskette drive that reads and writes information to the diskette is called the read/write head, or the drive head. As the drive head passes over the diskette, the head can pick up dust, hair, smoke particles, etc. Consequently the drive heads should be cleaned from time to time. If you use your computer every day, cleaning the heads once every few months is probably a good idea. Drive head cleaning kits are available from your KAYPRO dealer or at any store selling computer accessories.

Care for peripheral devices, such as printers, should be explained in the manuals that came with the devices.

Changing the Clock Speed

When the KAYPRO 386 first boots, the clock speed is 16 MHz. Most software programs will be able to handle this speed. However, some copy-protected software and some timing-dependent software may not. If you find that you are having inexplicable problems with your particular program, the KAYPRO offers a slower mode that emulates the performance of an 8 MHz IBM PC/AT board. To change to the slower mode, hold down the **Ctrl** and **Alt** keys and press the **1** key. To change back to 16 MHz, hold down the **Ctrl** and **Alt** keys and press the **2** key.

Operating Systems and Commands

Operating systems like MS-DOS (MicroSoft Disk Operating System) were developed to make it easy for you to create and maintain files, load and run applications software and access peripheral devices attached to the computer.

Commands are the way you communicate with your computer. The operating system accepts your commands through the keyboard, and translates them into the language of the computer.

You may enter commands in any combination of upper case and lower case; MS-DOS converts everything you type to upper case before acting on the command. By pressing the **Enter** key, you "enter" the command. In this manual all the commands are shown in upper case; you may enter them in either case.

Two Types of Commands

An internal command is one you have at your disposal whenever the cursor is at the system prompt. Internal commands are automatically loaded into memory along with the operating system when the computer is turned on.

An external command is an MS-DOS program that must be loaded into memory from a disk or diskette before it can be run.

When you type and enter an external command at the system prompt, MS-DOS looks on the disk for the program you have designated, loads it into memory, and runs it. The program is usually contained in a file with a .EXE or .COM extension. For example, the FORMAT command, used to prepare a diskette for use, is an external command. If the file FORMAT.EXE is not on the disk and you issue the FORMAT command, MS-DOS responds with the message:

Bad command or file name.

The System Prompt

The *system prompt* indicates that MS-DOS is loaded into memory and is waiting for your command. It also indicates that you are interacting directly with the operating system and not with an application software program.

In its basic format, the *system prompt* consists of the name of the default drive and a greater than sign (>). Later in this manual, you will learn how to customize the system prompt. The short, flashing line (in some cases, a rectangular box) is a *cursor*. It shows you the exact position on the screen where the next character typed will be displayed.

The Default Drive

Every drive in an MS-DOS system has a name consisting of one letter. On a two-diskette-drive system, the upper drive is called drive A, and the lower drive is drive B. On a hard-drive system the hard drive is called drive C and the upper diskette drive is called drive A.

When designating a drive to MS-DOS and many software packages, the letter is always followed by a colon (:) like this (**A:**). If you omit the colon, MS-DOS will not recognize the letter as a drive specification.

At any given time, one of the drives in the system serves as the *default drive*. The default drive, also called the *current drive*, is the drive where MS-DOS will look for files if no other drive name is specified. On a two-diskette-drive system, the computer automatically looks to drive A as the default drive every time you start the computer. On a hard-drive system the computer looks to drive C unless there is a diskette in drive A and the drive is latched.

To change the default drive after you have booted, at the system prompt type the letter of the new drive followed by a colon and press **Enter**.

MS-DOS expects to find a diskette in the new drive. If the drive is not latched or there is no diskette in the designated drive, you will see an error message like this:

Not ready error reading drive *x*
Abort, Retry, Ignore?

Put the diskette into the drive and latch the door. Respond to the question with **R** for Retry.

If you type the name of a drive that does not exist, this error message will appear:

Invalid drive specification.

Understanding Files

In computer terms, a *file* is a collection of information, stored on a magnetic surface such as a diskette or hard disk, that has been given a specific name. All information in your computer is stored in the form of files.

A file's function is similar to a file folder in a filing cabinet: each stores information for easy reference. Each file has a name, just like the name on the tab of a file folder in a file cabinet.

Files usually contain one of three types of information: text, data, or programs.

- Text files are generally letters, notes, documents, etc.-- information stored in a form that people use.
- Data files contain information like customer mailing lists, control information for computer programs, and dictionaries for spelling checkers-- information stored in a format used by a computer program.
- Program files contain the actual programs you use, like a word processor, spreadsheet or utility. The information in a program file is stored in a form used by the computer.

File Specifications and Naming Files

Under MS-DOS, files are referred to by their file specifications, sometimes abbreviated *filespec*. A file specification consists of an optional drive specification, a file name of one to eight characters in length, and an optional extension name of up to three characters in length. For example:

A:FILENAME.EXT

If included, the drive specification consists of a drive letter separated from the filename by a colon. The drive specification tells MS-DOS which drive contains the diskette that has the file. If the drive specification is omitted, MS-DOS assumes the file is located on the default drive.

If a file name includes an extension, the extension is separated from the file name by a period (.). Certain file name extensions have special meanings:

BAT ch file. A batch file is a text file that contains a list of MS-DOS commands. For more information about batch files consult the *MS-DOS User's Guide*.

COM mand file. This is a program file.

EXE cutable file. This is also a program file. The only difference between .COM and .EXE files is internal to MS-DOS. They have the same external characteristics.

SYS tem file. A system file is a text file that contains a list of MS-DOS commands. For more information about system files consult the *MS-DOS User's Guide*.

Program files with a .COM or an .EXE extension are run directly by the user. Any .COM, .EXE, or .BAT file can be run by typing its file name without the extension, at the MS-DOS system prompt.

With the exception of .COM, .EXE, and .SYS, you're free to use whatever extensions you wish in naming files. However, you may encounter unexpected results if you use the .BAT extension. It is standard practice to use extensions to indicate the type of file (.TXT for text files, .BAS for BASIC programs, .BAK for backup files, etc.).

Reserved Characters and File Names

The following characters have special meaning to the operating system and should not be used in a file name:

Period	(.)	Comma	(,)
Colon	(:)	Semicolon	(;)
Plus Sign	(+)	Equal Sign	(=)
Less than sign	(<)	Greater than sign	(>)
Slash	(/)	Backslash	(\)
Left Bracket	([)	Right Bracket	(])
Vertical Bar	(|)	Quotes	(")
Space	( )		

Hardware devices on your computer like the screen are accessed through a device name. The following MS-DOS device names are reserved for the devices indicated and cannot be used to name files:

DEVICE	NAME
Console (keyboard/screen)	CON
First serial port	AUX or COM1
Second serial port	COM2
First printer port	LPT1 or PRN
Second and Third printer port	LPT2 and LPT3
Test Device	NUL

For more information on device names, see the *MS-DOS User's Guide.*

Chapter Five
Getting Started

Chapter Five
Getting Started

Now that you've installed your hardware and software, following the instructions in Chapters 2 and 3, you're ready to start working with MS-DOS. The following instructions will get you started. Consult the *MS-DOS User's Guide* and Chapter Six of this manual for further explanation of the commands covered here. See page 3-2 for an explanation of the conventions used in examples.

If You Have Only One Diskette Drive

Please read the information on page 3-3 before you continue with these instructions. If you only have one diskette drive, you will be swapping diskettes and the information on that page will make it easier to understand what you are doing.

If You Have a Hard Disk

If you have a hard disk, your MS-DOS utilities and files will be on drive C. For all examples in this chapter, substitute drive C for examples showing drive A, and use drive A where the examples show drive B.

Starting the Computer

1. The upper drive of the computer is the A drive. Open the A drive and gently insert your working copy of the MS-DOS Diskette. Be sure that the label is up and the access slot is forward. Do not yet latch the drive. (If you have a hard disk, ignore this step.)
2. Turn on the monitor. Adjust the angle until it is comfortable for you.
3. The power switch is located on the right side of the computer. Move it to the ON position. Latch the drive.

When the computer is turned on, it follows a procedure that is permanently stored in its ROM (Read Only Memory). The instructions in this procedure direct the computer to "check RAM, activate the A drive, read the diskette, locate the operating system, and move that system into RAM." This is what happens when you load MS-DOS from a diskette. The process of reading the dis-

kette and loading the operating system into RAM is known as *booting* the system.

A sequence of numbers will appear in the upper left corner of the screen. These numbers indicate that the computer is checking its memory.

After the computer checks RAM it looks for a diskette in drive A. If a diskette is not inserted or if the drive is not latched before the computer finishes checking its memory, the following message may appear:

Disk Boot Failure

If this happens, correct the problem. Then hold down the **Ctrl** and **Alt** keys, and press the **Del** key. This is known as *rebooting* and will reset the computer and will give you the opportunity to try again.

Setting the Date and Time

If you use a bootable diskette, the screen may display a request for you to type in the current date. This is called a date prompt.

When the date prompt appears on the screen, the computer is ready to accept information from you.

Current date is Tue 1-01-1980
Enter new date:_

MS-DOS uses the *system date* to keep track of your files. Each time you create or update a file it is marked with the current date, so it is important for the date to be correct.

If the date given in the prompt is correct, press **Enter** and the date will remain unchanged. If the date is incorrect, type in the current date, using hyphens or slashes to separate the numbers. You need not include the 19 in the year. For example, at the prompt you could type:

8-18-87

Or:

8/18/87

then press **Enter**.

The number of days in the months and leap years are changed automatically.

If you type the date incorrectly, MS-DOS displays an error message indicating an invalid date. It will then give you the opportunity to try again.

After the date is entered, the next message is a request for the *system time*, the time that MS-DOS uses and constantly updates.

```
Current time is  00:00
Enter new time: _
```

If the time given is correct, press **Enter** and the time will remain unchanged. If the time is incorrect, type the current time, using colons to separate the hour and minutes. Use a 24-hour clock, or military time, to enter the correct time. In the afternoon, add twelve hours to the present time. You need not enter the seconds or hundredths of seconds. To change the displayed time to 1:00 p.m., type:

```
13:00
```

and press **Enter**.

Rebooting The System

It is not a good idea to restart a computer by turning it OFF and ON with the power switch. If you need to restart the computer, you should *reboot* by holding down the **Ctrl** and **Alt** keys and pressing the **Del** key. When the KAYPRO 386 is rebooted, it will react in very much the same way as when it was first turned on. This is a useful procedure under certain circumstances, particularly when the keyboard is inoperable and will not accept MS-DOS commands. Rebooting will clear memory in much the same way as a power failure. If possible, save your work to a diskette before rebooting.

If there is no response to the **Ctrl-Alt-Del** method, make sure that none of the drive lights are glowing, remove the diskette from the drive, and turn the computer off. **Wait at least 10 seconds before turning the power back on.** This should be used only as a last resort.

CAUTION:

When you reboot the system using either of the above methods, this will erase everything that is currently in RAM.

Formatting Diskettes

As you know from Chapter Four, MS-DOS cannot use a diskette until it has been formatted. Although you formatted some diskettes during your installation procedure, there is a more convenient way to prepare diskettes. The FORMAT program prepares diskettes for use.

The FORMAT program also checks for any defective tracks. No information will be stored on a defective track. If a diskette is badly damaged, it may not be possible for you to format it. When the computer is unable to format a diskette, it will abort the process and display an explanatory error message. A faulty diskette should be discarded or returned to the dealer.

CAUTION:

Reformatting destroys all information previously stored on the diskette. Any important files contained on the diskette must be copied to another diskette before reformatting.

Formatting With MS-DOS

To begin the format procedure you will need at least one blank diskette and your MS-DOS diskette.

1. Insert a blank diskette into the lower drive (drive B). Carefully slide the diskette into the drive with the label up, and the access slot forward. Latch the drive.

2. Insert your working copy of the operating system into the upper drive (drive A). Latch the drive.

3. If you have not turned the computer off, the *system prompt* should be displayed. After the **A>** type:

   FORMAT B:

   This command directs MS-DOS to format the diskette in the B drive. Press **Enter**.

   The following message should be displayed on the screen:

   Insert new diskette for drive B:
   and strike ENTER when ready_

4. Press **Enter**. The formatting process is automatic from this point on. During the formatting procedure the screen will display:

   Head: *x* **Cylinder:** *x*

   When the formatting process is complete, the following message will be displayed:

   Format complete

   In addition, there will be information on the amount of disk space available.

   xxxxx **bytes total disk space**
   xxxxx **bytes available on disk**
   Format another? (y/n)

5. If you have another diskette to format, type: **Y** and press **Enter**.

   The screen will display the same message as in step 3. Remove the newly-formatted diskette from drive B and insert another blank diskette. Repeat steps 4 and 5 for as many diskettes as you need.

6. If you do not wish to format any other blank diskettes, remove the diskettes from drives A and B. Then type **N** and press **Enter**.

7. It is a good idea to keep a supply of formatted diskettes on hand.

Adding MS-DOS to the Diskette While Formatting

When formatting, you have the option of adding the operating system to the diskette. This will create a *boot*, or *system* diskette. Adding MS-DOS to a formatted diskette allows you to load and run programs directly from that diskette without needing a separate boot diskette.

If you have a system diskette in the drive when you start or reset the computer, the KAYPRO 386 will read the diskette and copy the operating system from the diskette to the internal memory (RAM). It will then continue the boot process.

Note:
Adding MS-DOS to the diskette uses nearly 70 kilobytes of storage space. Consider the amount of space you will need on a diskette before creating a system diskette.

To add MS-DOS while formatting:

1. Insert the diskette to be formatted into the B drive.
2. At the system prompt, type the following command:

   FORMAT B: /S

   Press **Enter**.

The /S is called a *switch*. A switch is a parameter that causes a command to use some built-in option. This particular switch directs MS-DOS to format the diskette in the B drive and to add the operating system to that diskette. From this point on, the instructions are the same as those for the basic formatting procedure.

Assigning a Volume Name to a Diskette

You can also assign a volume name to a diskette while formatting by using the /V switch. A volume name is a convenient way for you to keep track of your diskettes. A unique volume name identifies the diskette, much like a name tag.

If you type: **FORMAT B:/S/V** and press **Enter** MS-DOS will add both a volume name and the operating system to the diskette in drive B. A volume name takes up no storage space.

The instructions for formatting are the same as before. When the formatting is complete, you will be asked to type in the volume name of the diskette. You may use up to 11 letters, numbers and spaces in the volume name. Do not use any special characters.

Listing Files

DIR is the command that lists files, their size in bytes, and the time and date they were last altered. It lets you know what's on your diskette. With your working copy of MS-DOS in drive A and your newly-formatted diskette in drive B, start your computer and at the system prompt, type:

DIR

and press **Enter.**

A listing of information for the files on drive A will be displayed. In fact, it may pass by without pausing. To cause the listing to pause when the screen is full, type:

DIR/P

and press **Enter.**

The /P switch causes the directory listing to pause when the screen is full and wait for you to tell it to continue.

Viewing the directory listing a screen at a time is better, but you may not care about times, dates or file size. You may want to see a listing of filenames all on one screen. For a wide display of filenames only, type:

DIR/W

and press **Enter.**

The DIR command can be directed to a different drive. You can view a directory of the files on the B drive by typing, at the **A>** system prompt:

DIR B:

and pressing **Enter.**

If you formatted the diskette in the B drive and created a system diskette, then you will see one file listed, COMMAND.COM. If the diskette in drive B is not a system diskette, then you will see the message:

File Not Found

The switches still work. You can use either one of these two forms: DIR/P B: or DIR B:/P.

Copying Files

The COPY command copies files onto a diskette. Whenever you need more than one copy of a file, you can use COPY to create an exact duplicate. A simplified format of COPY can be expressed like this:

COPY *filespec1 filespec2*

Where *filespec1* is the file you want to copy, and *filespec2* is the file you want to create. See Chapter Four and your *MS-DOS User's Guide* for a more complete definition of file specifications.

The following example will copy the file D.COM from the MS-DOS diskette to the diskette in drive B. From the **A>** system prompt, type:

COPY A:D.COM B:D.COM /V

and press **Enter.**

You will see the message **1 File(s) Copied.** The /V tells MS-DOS to **verify** the copy--to tell you of any errors while copying.

You can **change the filename** as you copy the file. To copy the file D.COM to the B drive and rename it TEST.COM, type:

COPY A:D.COM B:TEST.COM /V

and press **Enter.**

Again you will see the message **1 File(s) Copied,** and the file TEST.COM will be on the diskette in the B drive. It will be exactly the same as D.COM in every respect, except it is now named TEST.COM.

There are some rules to the COPY command: you cannot copy a file onto itself (that is, have two files of the same name on the same diskette) and you cannot copy system or hidden files. More options of the COPY command will be shown in Chapter Six.

Copying A Diskette

The COPY command copies files one by one. DISKCOPY makes an exact image of an entire diskette.

The format for the DISKCOPY command is:

DISKCOPY *drive1*: *drive2*:

Where *drive1* is the letter of the drive you want to copy from, and *drive2* is the letter of the drive you want to copy to. That is, *drive1* is the source and *drive2* is the target.

To use DISKCOPY:

1. Place your working copy of your MS-DOS diskette in Drive A. Run DIR to be certain it contains a .EXE or .COM file called DISKCOPY. Versions of MS-DOS earlier than 3.0 had .COM files where later versions have .EXE files.

2. Insert a blank diskette into the lower drive (drive B). The diskette does not need to be formatted, but it should not contain any information that is important. DISKCOPY will destroy any information previously on the diskette. Latch the drive.

3. The system prompt should be displayed. After the **A>** type:

   DISKCOPY A: B:

   You may type upper or lowercase characters. This MS-DOS command instructs the computer to copy everything from the diskette in drive A onto the diskette in drive B. Then press **Enter**.

   The following messages should appear on the screen.

   Insert source diskette in drive A:
   Insert target diskette in drive B:
   Strike any key when ready

   If you have only one diskette drive, put the source diskette in the drive, strike a key and wait to be prompted to swap diskettes. Otherwise, if you've followed these instructions, the two diskettes are already in place. Press any key and MS-DOS will automatically copy the contents of the diskette in drive A to the diskette in drive B. While waiting, you can write a label for your new copy.

4. When the copy process is complete, the following message will be displayed:

   Copy complete
   Copy another? (y/n)

5. Remove the diskette from the A drive and return it to the paper envelope. Remove the diskette from the B drive, apply the label, and place the diskette its paper envelope. If you want to copy another diskette, type: **Y** and press **Enter**.

   Follow the directions on the screen and place the diskette you want to copy in drive A and another blank diskette in drive B.

6. If you do not wish to copy another diskette, or after you have made all your copies, remove the diskettes from drives A and B, place a system diskette in drive A and type: N and press **Enter**.

What are the advantages of using DISKCOPY?

You do not have to format a diskette before copying files onto it--DISKCOPY automatically formats unformatted disks. DISKCOPY is also faster than using the FORMAT and COPY commands separately.

What are the advantages of using COPY?

When a program places information on a diskette, it puts data wherever it can find room. It fills up the first available area, moves to the next area, fills that area and moves again. It continues this process until all the data is stored. One file may be chopped up into fifty sections and be stored in fifty different places on a single diskette. It takes longer to read and write to such a file and the chances of errors when reading and writing to the file are increased.

The COPY command copies files one at a time to a formatted diskette, keeping each file together on the diskette. The DISKCOPY program, on the other hand, makes an exact duplicate of the original diskette, copying information track by track.

Suggestion:

When backing up a data or text diskette that is frequently used, format a diskette then use the COPY command. If you are copying a program diskette or one that already contains information in sequential order, use DISKCOPY.

Checking A Diskette For Errors

CHKDSK is a program that examines a diskette or hard drive for errors. CHKDSK also tells you how much total space there is on the diskette, how many files there are, how much space is left, how much RAM is installed in the computer and how much RAM is available.

You should run CHKDSK at regular intervals. For diskettes that are used daily, such as data diskettes or word processing diskettes, you should run CHKDSK more frequently. The format for CHKDSK is:

CHKDSK *drive*:

where *drive* is the letter of the drive that contains the diskette you want to check.

If you do not include the drive designation in the command, then CHKDSK will check the diskette in the default drive.

As an example, place your MS-DOS diskette in the A drive and at the system prompt, type:

CHKDSK

and press **Enter**.

CHKDSK will give a status report on the diskette similar to this:

```
Volume 225-395   created Dec 4, 1985 5:51p

362496  bytes total disk space
 25600  bytes in 3 hidden files
312320  bytes in 44 user files
 24576  bytes available on disk

655360  bytes total memory
561392  bytes free
```

If CHKDSK gives you a message indicating that it has found errors, refer to your *MS-DOS User's Guide*.

Chapter Six
Advanced Usage

Chapter Six
Advanced Usage

This chapter assumes you have installed your hardware and software and worked with the commands in your Getting Started chapter.

Now you're ready for "Advanced Usage." In this chapter you will be introduced to the following additional internal MS-DOS commands: DEL, TYPE, REN, PROMPT, and CLS. You will also learn additional external commands, some handy shortcuts that use special characters, keys and features. For more information on the topics covered here, consult your *MS-DOS User's Guide*.

This chapter is divided into two parts. The first section is for owners of all types of KAYPRO 386's, those with just diskette drives and also those with hard drive systems. The second section contains material specifically geared to the directory structure of a hard disk system.

Whether your computer has a hard drive or not, you must be at the MS-DOS system prompt to issue MS-DOS commands to your computer. At the system prompt, type the name of the command, followed by whatever additional information the command needs. This additional information is called the command's *parameters*. When you have completed typing the command and its parameters, press the **Enter** key, and MS-DOS will execute the command.

For Hard Disk Users:

All the examples in this chapter assume drive A is the primary drive. You should substitute drive C when the example says drive A, and substitute drive A when the example states drive B.

Section A: All Systems

Renaming Files

REN allows you to change the name of any file to a new name you designate. The format for the REN command is:

REN *filespec1 filespec2*

where *filespec1* is the file to rename, and *filespec2* is its new name. REN will leave the renamed file on the drive and directory where it was originally. MS-DOS will respond with an error message if there is a different drive name in the second file specification.

As an example, change the name of the file A:TEST.COM to TEMP.COM. From the **A>** system prompt, type:

REN A:TEST.COM TEMP.COM

and press **Enter.**

List the files (using DIR), and you will see that the filename has changed. To change it back, type:

REN A:TEMP.COM TEST.COM

and press **Enter.**

Deleting Files

The DEL command deletes files. You should be very careful when using this command as it can do considerable damage. Once a file is deleted, it cannot be recovered, so think carefully before deleting any file. The format of the DEL command is:

DEL *filespec*

where *filespec* is the file to delete.

To delete the file TEST.COM from the A drive, type:

DEL A:TEST.COM

and press **Enter.**

The system prompt will return and the file will be deleted. List the files (with DIR) and you will see that it has disappeared.

Clearing The Screen

CLS clears the screen of any text that is currently displayed, then displays the system prompt in the upper left corner of the screen.

To illustrate, fill the screen with text by listing the files on the diskette in the A drive using DIR/W.

The screen will fill up with text. After the system prompt, type:

CLS

and press **Enter**.

The screen will clear and the system prompt will reappear in the upper left corner of the screen.

Shortcuts and Wildcards

You have been doing more typing than necessary. The COPY command and many other MS-DOS commands make use of *default values*.

To make a copy of the file CAT.TXT and rename it DOG.TXT at the A prompt, type:

COPY A:CAT.TXT A:DOG.TXT

and press **Enter**.

In this example, you didn't need to designate the source drive or target drive. COPY would assume that the file CAT.TXT is on the default drive and that you wanted to create the file DOG.TXT on drive A. To illustrate, if A is the default drive, then:

COPY A:CAT.TXT A:DOG.TXT

is the same as:

COPY CAT.TXT DOG.TXT

If you do not designate a source drive, MS-DOS assumes the file you wish to copy is on the drive you are using. If you do not designate a target drive, MS-DOS assumes you want the copy to be on the default drive.

If you were simply copying CAT.TXT onto another drive you could use either:

```
COPY  CAT.TXT  B:CAT.TXT
```

or:

```
COPY  CAT.TXT  B:
```

When you omit the filename of the target file, MS-DOS will assume you want to use the *default filename*. CAT.TXT is the default filename because it is the original name of the file.

Why use the long form at all?

Because sometimes specifying the drive and the target filename is important. Remember you cannot have two files with exactly the same name on the same diskette or hard disk directory.

Wildcard Characters

The question mark (?) and the asterisk (*) are referred to as wildcard characters. Wildcard characters are used in commands to match any character that appears in a certain location in a file name.

The question mark (?) matches any one character that occurs at the position of the question mark in a file name or extension.

The asterisk (*) matches any characters that occur to the right of the position of the asterisk in a file name or extension.

Examples:

The command

```
DIR  *.COM
```

displays all files with an extension of .COM

The command:

DEL FILE?.TXT

deletes *all* of the following files:

FILE.TXT
FILE1.TXT
FILE2.TXT
FILE3.TXT
FILES.TXT

The command:

COPY A:FILE*.TXT B:

would copy to drive B any file on drive A with a file name starting with FILE and an extension of .TXT, including those listed in the last example but also:

FILE45.TXT
FILEINFO.TXT
FILEIDX.TXT

NOTE:
In all of these examples, a file with no characters in its name where the wildcard character appears would also be acted upon by the command line.

Editing Command Lines

Another timesaving feature of MS-DOS is that command lines can be stored and repeated when you need them. When you enter a command at the system prompt, the command is stored in a command template. The contents of the command template are replaced every time you enter a command.

By using the function keys on the left of the keyboard, the *last-entered command* can be repeated with two keystrokes. You do not enter a command until you press the **Enter** key.

You also can recall the command line, make changes to it, and then enter the edited command line.

Consider the advantages:

- You can repeat a command without retyping.
- When MS-DOS gives you the **Bad command or file name** error message, you can press one key and see what you entered.
- You can correct errors in commands, or enter a series of similar commands by editing the previous command instead of retyping.

To display the command template one character at a time:

Press **F1** (also called COPY1) or the right arrow key. Make sure the **Num Lock** is not on.

To display the entire contents of the command template at once:

Press **F3** (also called COPYALL)

To display the contents of the command template up to character x:

Press **F2** (also called COPYUP) followed by the character you want x to represent.

If the second key you press is not found in the command template, the contents of the template can still be checked by pressing **F3** or **F1**.

To skip the contents of the command template up to character *x*:

Press **F4** (also called SKIPUP) followed by the character you want x to represent, then press **F1** to display and begin editing at character *x*.

If the second key you press is not found in the command template, the contents of the template can still be checked by pressing **F3** or **F1**.

To edit your redisplayed command line use the **Backspace** key or the left arrow key to erase. You can type your changes and then enter your new command. If you make a mistake in typing simply backspace and redisplay again using either **F1**, **F3** or the right arrow key. For more information on editing the command line, refer to "MS-DOS Editing and Function Keys" in your *MS-DOS User's Guide*.

Redirecting Screens

Redirecting Screens

In normal operation, MS-DOS has a set pattern of how information moves. This pattern can be referred to as standard input and output. By using special characters you can alter the pattern or redirect the flow.

You can create files out of things like directory listings that you would normally see on the screen, by redirecting the screen output to a file. These files can be edited by most word processors, added to existing documents, etc. The greater-than symbol (>) is the special character used to redirect output.

To send the directory listing to a file called MYFILES.DIR rather than to the screen, type:

DIR > MYFILES.DIR

and press **Enter**.

Having this type of file on hand is useful because it tells you exactly what files you had on a given day. It helps you keep a record of your computer work.

If you want a cumulative record of your computer work, you could use a different name every time you store a directory listing to diskette, or you can append the new information into MYFILES.DIR. To append the directory listing onto the end of MYFILES.DIR, rather than overwriting the older version, type:

DIR > > MYFILES.DIR

and press **Enter**.

Concatenating (Joining) Files with COPY

To concatenate files is to link or join them. Perhaps you have written a number of small WordStar letter files. At the end of the month, you want to merge them into one large file. You can use a special option of the COPY command to merge the files and create one large file. To concatenate files, use the plus sign between the filenames or file specifications.

Note:

Do not try to concatenate files with COM or EXE extensions.

The command:

COPY LETTER1.TXT+LETTER2.TXT LETTERS.TXT

creates the file LETTERS.TXT and copies the first two files into it. If the file LETTERS.TXT already existed, its contents would be overwritten.

You can use wildcard characters when concatenating files.

The command:

COPY *.TXT TOGETHER.TXT

takes all files with an extension of TXT and combines them into a new file file named TOGETHER.TXT.

Remember:

If you try to concatenate files to a file that already exists, the original contents of the file will be destroyed.

Earlier we appended the new directory listing to the file MYFILES.DIR by redirecting the output. You can perform the same function with the COPY command. If you have two files named COOKIES.LST and CAKE.LST, you can update the file COOKIES.LST with the information in CAKE.LST with the command:

COPY COOKIES.LST+CAKE.LST

Whenever you concatenate files and forget to add a final file name, the COPY command appends the contents of the other files into the first file listed in the command.

Filters and Pipes

A filter is a program that reads a file or other input, modifies the contents in some specific manner, and sends the output (usually) to the screen. In this section, we will be talking about two of the three filters included with MS-DOS: MORE.COM and SORT.COM.

Command *piping* lets you give more than one command to the system at a time. By piping, you can combine commands, filters, and redirection into one command line. Pipes are specified with the vertical bar, or pipe (|). This character appears on your keyboard and screen as two short vertical lines.

There is always a space between the command and the pipe and between the pipe and the next command. The most important guideline to piping is that the command on the left side of the pipe must create output that the command on the right side of the pipe can accept as input.

The SORT filter is particularly useful for reorganizing directory listings before viewing them. It sorts in a way that numbers come before letters and uppercase and lowercase letters have the same value. To sort the output of the directory command, type:

DIR | SORT

and press **Enter**.

To sort the listing of the current directory and write it to a disk file (for example, DISK.DIR) instead of printing it on the screen, type:

DIR | SORT > DISK.DIR

and press **Enter**.

For more information on SORT, see "MS-DOS Commands" in the *MS-DOS User's Guide*.

Viewing Files

TYPE allows you to view the contents of some text files and data files on the screen. You cannot view the contents of a program file with the TYPE command. The format for the TYPE command is:

TYPE *filespec*

where *filespec* is the file you want to view.

To view your new file MYFILES.DIR, from the **A>** system prompt, type:

TYPE MYFILES.DIR

and press **Enter**.

You will see a file listing exactly like the DIR command. To view a file one screenful at a time, pipe through MORE. Type:

TYPE MYFILES.DIR | MORE

and press **Enter**.

The MORE filter is one of the most useful filters to pipe through. It works much like the DIR command's /P switch. By sending the output of a command like TYPE through MORE, the screen will fill and then pause with this message:

--More--

At this prompt you may press any key to continue and view the next screenful.

Documents created with WordStar and other software packages may contain unusual characters when viewed with TYPE. These strange characters are codes used by the software program. They will not be visible to you when you use the software program.

Changing The System Prompt

The command PROMPT enables you to create your own prompts. Instead of **A>** as a prompt you can use **Time--13:00, Drive A** or designate any message you choose as the system prompt. The format for the PROMPT command is:

PROMPT *prompt designation*

For example, type:

PROMPT Your wish is my command!

and press **Enter**.

The system prompt would then read "**Your wish is my command!**" To change the prompt back to the default, just type **PROMPT** again and press **Enter**.

The PROMPT command has an additional feature: it has codes that allow you to place values from MS-DOS in the system prompt. You can put the time or date in a prompt, the version number of MS- DOS, or any one of many values. To place these values in the prompt, you type a dollar sign ($) in the prompt designation, followed by each *control code* you desire. These are the codes and what they mean:

$t	The current time
$d	The current date
$p	The current directory of the logged diskette drive
$v	The MS-DOS version number
$n	The default drive
$g	The greater-than character (>)
$l	The less-than character (<)
$b	The vertical bar character (|)
$_	A carriage return and a line feed
$s	A leading space
$h	A backspace
$e	The ESCape character

For example, you could use the PROMPT command to create a prompt with the time and date, in addition to the current drive and familiar >. To create a prompt that looks like this:

18:25:57.04 Tue 8-18-1987 A>

at thc system prompt, type:

PROMPT $t $d ng

and press **Enter.**

For hard drive users, you can have a system prompt that shows the current directory by using a **$p**. Type:

PROMPT pg

and press **Enter.**

This produces a prompt like this:

C:\>

Section B: Hard Drive Systems

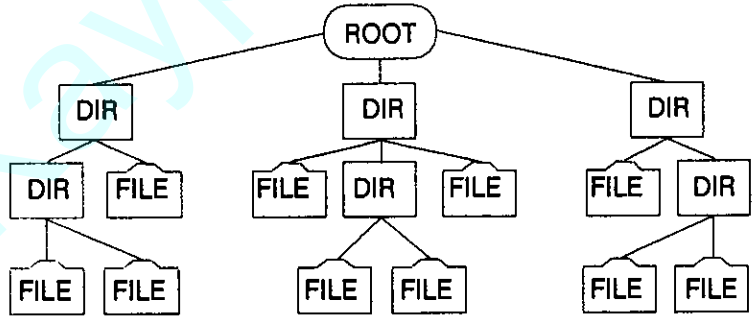
The following section explains the MS-DOS commands to create, change, and remove directories. For more information on the commands covered here, see your *MS-DOS User's Guide*.

Directories

The names of your files are kept in a directory on each disk. The directory also contains information on the size of the files, and the dates they were created and updated.

When there is more than one user on your computer, or when you are working on several different projects, the number of files in the directory can become large and unwieldy. You may want your own files kept separate from a co-worker's, or you may want to organize your programs into categories that are convenient for you.

In an office, you can separate files by putting them in different filing cabinets; in effect, creating different directories of information. MS-DOS allows you to organize the files on your disks into directories. Directories are a way of dividing your files into convenient groups. For example, you may want all of your accounting programs in one directory and text files in another. Any one directory can contain any reasonable number of files, and it may also contain other directories (referred to as subdirectories). This method of organizing your files is called a multilevel directory structure.



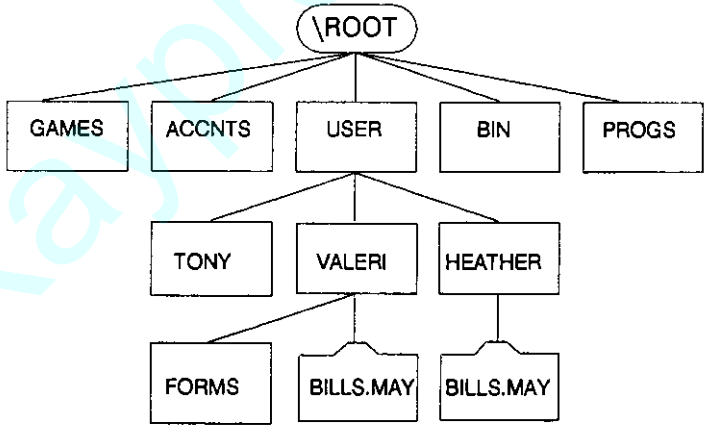
A multilevel directory structure can be thought of as a tree structure: directories are branches of the tree and files are the leaves, except that the tree

grows downward: the root is at the top. The root is the first level in the directory structure. The root directory is automatically created when you format a disk and start putting files on it. You can create more directories and subdirectories by following the instructions later in this chapter.

The directory structure grows as you create new directories for groups of files, or for other people on the system. Within each new directory, files can be added, or new subdirectories can be created.

It is possible for you to travel around this structure to find any file in the system by starting at the root, then traveling down any of the branches to the desired file. Conversely, you can start where you are within the file system and travel toward the root.

The directory you are in at any time is called the working directory or current directory. The filenames discussed earlier in this chapter are relative to your working directory, and do not apply to any other directories in the structure. Thus, when you turn on your computer, you are in the *working directory*. Unless you take special action when you create a file, the new file is created in the working directory. Users can have files of the same name that are unrelated because each is in a different directory. See the figure below, which illustrates a typical multilevel directory structure.



The root directory is the first level in the directory structure. You can create subdirectories from the root by using the MKDIR command. In this example, five subdirectories of ROOT have been created. These include:

1. A directory of games, named GAMES.
2. A directory containing accounting information, named ACCTS.
3. A USER directory containing separate subdirectories for all users of the system.
4. A directory of all external commands, named BIN.
5. A directory of programs, named PROGS.

Tony, Valeri and Heather each have their own directories which are subdirectories of the USER directory. Valeri has a subdirectory named FORMS. Valeri and Heather have files in their directories, each named BILLS.MAY. Valeri's BILLS.MAY file is unrelated to Heather's.

This organization of files and directories is not important if you only work with files in your own directory. But if you work with someone else, or on several projects at one time, the multilevel directory structure becomes very handy. For example, you could get a list of the files in Valeri's FORMS directory by typing:

```
DIR  \USER\VALERI\FORMS
```

Note that a backward slash mark (\) is used to separate directories from other directories and files. The first slash indicates the separation from the root directory.

To find out what files Heather has in her directory, you could type:

```
DIR  \USER\HEATHER
```

This command tells MS-DOS to travel down the directory structure from the root to the USER directory, and then to the HEATHER directory, and to display all filenames in the HEATHER directory.

Paths

When you use multilevel directories, you must tell MS-DOS where the files are located in the directory structure. Both Heather and Valeri, for example, have files named BILLS.MAY. Each will have to tell MS-DOS in which directory her file resides when she wants to use it. This is done by giving MS-DOS a pathname to the file.

Pathnames

A pathname is a sequence of directory names followed by a filename, each separated from the previous one by a backward slash (\).

The general format of pathnames is:

[*directoryname*]\[*directoryname...*]\[*filename*]

A pathname may contain any number of directory names. If a pathname begins with a slash, MS-DOS searches for the file beginning at the root (or top) of the directory structure. Otherwise, MS-DOS begins at the working (current) directory and searches downward from there.

The pathname of Valeri's BILLS.MAY file is:

\USER\VALERI\BILLS.MAY

The pathname of Heather's BILLS.MAY file is:

\USER\HEATHER\BILLS.MAY

When you are in your working directory, a filename and its corresponding pathname may be used interchangeably. Some sample names are:

\ Indicates the root directory.

\PROGS is a directory under the root directory that contains program files.

\USER\VALERI\FORMS\1A is a typical full pathname. This one happens to be a file named 1A in the directory named FORMS belonging to Valeri.

BILLS.MAY is a name of a file in the working directory.

Each directory that has subdirectories beneath it is called a *parent directory*. MS-DOS provides special shorthand notations for the working directory and the parent directory (one level up) of the working directory:

. MS-DOS uses this shorthand name to indicate the name of the working directory in all multilevel directory listings. MS-DOS automatically creates this entry when a directory is made.

.. The shorthand name of the working directory's parent directory (one level up). If you type:

DIR ..

MS-DOS will list the files in the parent directory of your working directory.

If you type:

DIR ..\..

MS-DOS will list the files in the parent's parent directory.

Paths and Internal Commands

Internal commands are the simplest, most commonly-used commands. They execute immediately because they are loaded into your computer's memory when you start MS-DOS.

Some internal commands can use paths. The following four commands, COPY, DIR, DEL and TYPE have greater flexibility when you specify a path-name after the command.

The format of these commands is shown below.

COPY *pathname pathname*

If the second *pathname* is a directory, all files are copied into that directory. For example, the command:

COPY \BIN\USER\TONY \ACCTS

will copy all of the files in \BIN\USER\TONY and copy them to the \ACCTS subdirectory.

DEL *pathname*

If *pathname* is a directory, all the files in that directory are deleted. The prompt **Are you sure (Y/N)?** will be displayed if you try to delete a path. Type Y (for Yes) to complete the command, or type N (for No) to stop the command. For example, the command:

DEL \USER\TONY

will delete **all files** in the subdirectory USER\TONY.

WARNING:

DEL is a powerful command. **Once files are deleted, they cannot be recovered.** Make sure you want to erase all the files in the subdirectory before you use this command.

DIR *pathname*

Displays the directory for a specific path. Example:

DIR \USER\TONY

TYPE *pathname*

You must specify a filename in a path for this command. MS-DOS will display the file on your screen in response to the TYPE command. Example:

TYPE \USER\VALERI\REPORT.DOC

Paths and External Commands

External commands reside on disks as program files. They must be read from the disk before they can execute.

When you are working with more than one directory, it is convenient to put all MS-DOS external commands into a separate directory so they do not clutter your other directories. When you issue an external command to MS-DOS, MS-DOS expects to find that command in your working directory. If that command is in a different directory, you have two choices:

1. Type the full pathname of the command to be executed, or
2. Use the PATH command.

For example, if you are in a working directory named \BIN\PROGS, and all MS-DOS external commands are in \BIN, you must tell MS-DOS to choose the \BIN path to find the FORMAT command. The command:

PATH \BIN

tells MS-DOS to search in your working directory and the \BIN directory for all commands. You only have to specify this path once to MS-DOS during

each computer session. If you want to know what the working path is, type the word:

PATH

and press **Enter**. The working path will be displayed on the screen.

You can establish a permanent path by including the PATH command in a special file named AUTOEXEC.BAT.

For more information on the MS-DOS PATH command and the AUTOEXEC.BAT file, refer to the *MS-DOS User's Guide.*

Using Directories

The following sections describe how to display, change, and delete your working directory. You will also learn how to create directories and subdirectories.

Displaying Your Working Directory

All commands are executed while you are in your working directory. You can find out the name of the directory you are in by issuing the MS-DOS command CHDIR (Change Directory) with no pathname. For example, if your working directory is \USER\VALERI, when you type:

CHDIR

and press the **Enter** key, you will see:

C:\USER\VALERI

This is your working drive plus the working directory (\USER\VALERI).

Shortcut: You can use the letters CD for the CHDIR command to save time. The command **CD \USER\VALERI** is the same as **CHDIR \USER\VALERI.**

If you now want to see what is in the \USER\VALERI directory, you can use the MS-DOS DIR command. The following is an example of the display you might receive from the DIR command for a subdirectory:

```
Volume in drive C has no ID
Directory of C:\USER\VALERI

.            <DIR>          08-09-82   10:09a
..           <DIR>          08-09-82   10:09a
TEXT         <DIR>          08-09-82   10:09a
FILE1   COM      5243       08-04-82    9:30a
FILE2   COM      4490       08-06-82   11:23p

     5 File(s)    836320 bytes free
```

A volume ID for this disk was not assigned when the disk was formatted. (For information on assigning a volume ID to a disk, turn to the FORMAT command or the LABEL command in the *MS-DOS User's Guide*.) Note that MS-DOS lists both files and directories in this output. As you can see, Joe has a subdirectory named TEXT. The . means the working directory \USER\VALERI, and the .. is short for the parent directory \USER. FILE1.COM is a file in the \USER\VALERI directory. All of these directories and files are on the disk in drive C.

Note:

Because files and directories are listed together, you cannot give a subdirectory the same name as a file in that directory. For example, if you have a path \BIN\USER\HEATHER where HEATHER is a subdirectory, you cannot create a file in the \BIN\USER directory named HEATHER.

Creating a Directory

To create a subdirectory in your working directory, use the MKDIR (Make Directory) command. For example, to create a new directory named NEWDIR under your working directory, simply type:

```
MKDIR NEWDIR
```

After MS-DOS runs this command, a new directory will exist under your working directory. You can make directories anywhere in the directory structure by specifying MKDIR and the full pathname.

Shortcut: You can use the letters MD for the MKDIR command to save time. The command **MD NEWDIR** is the same as **MKDIR NEWDIR**.

There is a limit on the length of the directory pathname that can be typed at the MS-DOS prompt:

```
a:\attorney\jacobson\contracts\ellis.new
  |_____________________________|
from here                     to here
```

This pathname cannot be over 63 characters long. You may create deeper subdirectories, but you would need to change subdirectories in stages to get there.

Changing Your Working Directory

Changing from your working directory to another directory is very easy in MS-DOS. Simply type the CHDIR (Change Directory) command and then a pathname. For example, type:

CHDIR \USER

and press the **Enter** key. MS-DOS changes the working directory to \USER. You can specify any pathname after the command to travel around the directory structure. The command:

CHDIR ..

always puts you in the parent directory of your working directory.

Shortcut: You can use the letters CD for the CHDIR command to save time. The command **CD \USER** is the same as **CHDIR \USER.**

Deleting a Directory

To delete a directory in the structure, use the MS-DOS RMDIR (Remove Directory) command. For example, to remove the NEWDIR directory from the working directory, type:

RMDIR NEWDIR

The NEWDIR directory must be empty except for the . and .. entries before it can be removed. This prevents you from accidentally deleting files and directories. You can delete any directory by specifying its pathname. To remove the \USER\HEATHER directory, make sure that it has only the . and .. entries, then type:

RMDIR \USER\ANDY

Shortcut: You can use the letters RD for the RMDIR command to save time. The command **RD \USER\ANDY** is the same as **RMDIR \USER\ANDY.**

To remove all the files in a directory (except for the . and .. entries), type DEL and then the pathname of the directory. For example, to delete all files in the \USER\JOHN directory, type:

DEL \USER\JOHN

MS-DOS will prompt:

Are you sure (Y/N)?

If you are sure you want to delete all the files in the directory, type Y (for Yes). Type N (for No) to stop the command.

You cannot delete the . and .. entries. They are created by MS-DOS as part of the multilevel directory structure.

Renaming a Directory

There is no command to rename a directory in MS-DOS. You can, however, rename a directory that has no subdirectories by following these steps:

1. Create a new directory with the new name using the MKDIR command.
2. Copy all files from the old directory to the new directory with the COPY *.* command.
3. Delete the contents of the old directory with the DEL *.* command.
4. Delete the old directory with the RMDIR command.

For example, if you want to rename the \USER\ANDY directory to \USER\VALERI, type:

MKDIR \USER\VALERI

and press **Enter**. Type:

COPY \USER\ANDY*.* \USER\VALERI

and press **Enter**. Type:

DEL \USER\ANDY*.* or **DEL \USER\ANDY**

and press **Enter**. Type Y in response to the prompt **Are you sure?** Type:

RMDIR \USER\ANDY

and press **Enter**.

Directory Names

You cannot name the *root* directory. With that exception, directories are named in the same format as file names, but without extensions. All characters that are valid for file names are also valid for directory names. Review the section in Chapter Four if you have any questions about naming files.

Every directory except the root directory contains two special entries: One contains a single period (.) instead of a file name--it identifies the directory as a subdirectory. The other entry contains two periods (..) instead of a file name, and is a shorthand name for the directory's parent.

At the system prompt, type **DIR** and press **Enter**. Your screen should look something like this:

```
C:\MAIN >dir
Volume in drive C has no label
Directory of C:\MAIN
 .              <DIR>          10-13-86     12:20p
 ..             <DIR>          10-13-86     12:20p
WRITE           <DIR>          10-13-86     12:20p
BASIC           <DIR>          10-13-86     12:20p
MASMENU         DAT     7929    8-21-86      5:14p
MASMENU         EXE    16568    6-18-86      3:11p
MASMENU         TXT    19278    8-21-86      5:14p
MASPREP         EXE    12784    6-18-86      3:11p
MENUST          BAT      249    6-18-86      3:11p
BEGINNER        BAT      483   10-13-86     12:33p
MENUSUB1        BAT      141   10-13-86     12:37p
         11 File(s)  19189760 bytes free
C:\MAIN _ >
```

Displaying Directories -- TREE

Your directory structure will vary from the one shown above. Once you have created your own subdirectories, you will probably want to know what directories and subdirectories exist on your hard disk, and in what organization. To get this information, use the MS-DOS TREE command. At the system prompt, type:

TREE

and press **Enter.**

To also view the files within each directory and subdirectory use the /F switch. Type:

TREE/F

and press **Enter.**

You can also redirect the output of the TREE program to create a file of your current directory structure. You can also create a printed copy. See your *MS-DOS User's Guide* for more details.

Chapter Seven
KAYPRO Utility Programs

Chapter Seven
KAYPRO Utility Programs

Kaypro Corporation has provided several utility programs with the KAYPRO 386 that are not a part of standard MS-DOS. These utilities are provided for more convenient operation of your computer. The programs we will discuss here are CHATTR, D, KCOPY, and LOCATE.

CHATTR -- For Changing File Attributes

Files have different attributes -- characteristics that allow them to be used in specific ways. Some files are *hidden*, so they cannot be viewed, erased or copied, while others are protected by being *read only* files. The following is a list of attributes a file may possess.

System Files

A *system* file is one that makes up the operating system, such as MSDOS.SYS. System files are hidden files (see below).

Read Only Files

A *read only* file is a file that cannot be erased or changed in any way.

Hidden Files

A *hidden* file is a file that exists, but cannot be observed or affected by most commands. Were you to list the files on a diskette, you would see every file in the directory except the hidden files. A hidden file cannot be copied or erased. CHATTR and KCOPY do affect hidden files. KCOPY is described later in this chapter.

Archive Files

An *archive* file is one that has not been copied (by a backup program) since it was last changed. Every time you change a file, the archive attribute is set. Every time you make a backup of a file, the archive attribute is cleared. This is useful because it allows backup programs to only back up those files which have changed since the last backup.

CHATTR is a program for changing the attributes of a file. A file may possess any or all of these attributes and each attribute may be turned on or off independently. CHATTR can be used to set or change any of the above attributes. CHATTR can also be used to change or display the volume name of a hard drive or diskette.

The standard syntax for using CHATTR is:

CHATTR *function* [*function*] ...

where *function* refers to any of the allowable operations. CHATTR allows you to string together several different operations on the same command line.

The syntax for *function* is:

[*operation* [*switch*] *filespec* [*filespec*] [*filespec*]...]

operation may be any one of the following:

+ Turns on the specified attribute(s) without affecting any other.

- Turns off the specified attribute(s) without affecting any other. The - operator is also required by the ? switch to request the help screens, and by the v switch when working with Volume names.

= Turns on the specified attribute(s) and turns off any that are not mentioned.

The *switches* are:

? Type CHATTR -? at the DOS prompt to get the first of several help screens: push the spacebar to release succeeding screens.

m Used only in conjunction with -? to disable the pauses between screens.

r Specifies the Read-Only attribute.

s Specifies the System attribute.

h Specifies the Hidden attribute.

a Specifies the Archive attribute.

d Instructs CHATTR to perform the requested operation on files matching filespec in the specified directory AND all subdirectories beneath the specified directory. (Normally CHATTR only works in the specified directory.)

v Used to change or display volume label. Must be used with the - operator. See below for instructions on using the v switch.

Filespec refers to any drive and file designations normally usable with MS-DOS. Wildcards such as * and ? are permitted.

For example, to change the file FORMAT.EXE in the current directory to a Hidden file, type:

CHATTR +h FORMAT.EXE

and press **Enter.**

Now try listing the files with DIR. FORMAT.EXE will not appear. To change it back, type:

CHATTR -h FORMAT.EXE

and press **Enter.**

To use CHATTR to change the Volume name of a disk, type:

CHATTR -v [*d*:] [*name*] [/d]

where [*d*:] is the drive name; [*name*] is the desired Volume name; and [/d] is a switch to delete an existing Volume name (not used when a *name* is specified).

The program CHATTR has built-in instructions. If you type CHATTR at the DOS prompt with no parameters, you will get the following message:

```
Chattr ver X.XX Kaypro Corporation
Usage:
chattr [[-|+|=[rshadm?] filespec [filespec [...]]...]
chattr -?    for extra help
```

D -- A File Listing Utility

D is a lot like the MS-DOS DIR command, but easier to use. The D program lists all the files on a disk in alphabetical order and shows the size in kilobytes, all on an easy-to-read chart. The format for D is:

D *d*:

where *d*: is the name of the drive where the files you want to list are located.

If you do not type a drive designation, then D will display the files on the diskette in the default drive.

To see a listing of the files on a diskette in a different drive, you designate the drive. To list the files on the diskette in drive B, type:

D B:

and press **Enter.**

Remember that D is an external command, and requires the presence of the file D.COM to run.

KCOPY - A File Copy Program

KCOPY is a utility program that enables the user to designate specific files and directories to copy. KCOPY is also helpful in searching through a disk, especially a hard drive with multiple subdirectories.

KCOPY functions within the MS-DOS system, so it is important to understand how that system is set up and in what manner it handles information. Before proceeding further, review the definitions of directories and paths, the DIR, COPY, CHDIR and MKDIR commands, and the definition of wildcards in this manual. Read the more extensive definitions in the *MS-DOS User's Guide*. Pay special attention to the COPY command.

KCOPY uses the same syntax as the COPY command in MS-DOS, with two important differences: KCOPY allows the user to copy a file onto itself, and KCOPY copies *everything.*

KCOPY will copy directories, the files in directories, subdirectories, the files in subdirectories, etc. If you use KCOPY to copy a complete directory tree to a blank formatted diskette, KCOPY will create directories on the blank diskette. Whenever you designate a directory to be copied, and the target diskette does not have that directory on it, KCOPY will create that directory on the target.

For diskette drive systems, put the working copy of your MS- DOS diskette in drive A, a blank formatted diskette in drive B, and from the system prompt, type:

KCOPY A:*.* B:

and Press **Enter.**

For hard disk systems, put a blank formatted diskette in drive A. At the system prompt, type:

KCOPY C:*.* A:

and press **Enter.**

If you were using COPY all the files and directories from the source drive would begin to be copied onto the target diskette. KCOPY stops and allows you to select *exactly* which files and directories will be transferred.

You will see a menu of function keys with explanations at the top of your screen, and a listing of the files in your root directory at the bottom.

The Columns

Between the list of files and the left side of the KCOPY frame there are five columns. Each column designates an attribute of the file on that row. From left to right, the columns indicate whether files are marked, archive, hidden, read-only or system files. If a column is blank, the file does not possess that attribute.

Marking Files

On the far left hand side of the KCOPY frame, you will see a column of "M's." This means every file and directory is marked. If you were to start copying now, every file and every directory would be copied.

Scrolling Through Files And Directories

Use the **down arrow** key to move down through the files, the **up arrow** key to move up. Pressing the **Pg Up** key scrolls up a screen at a time, pressing the **Pg Dn** key scrolls down. Pressing the **Home** key takes the highlighted bar to the top of the list, pressing the **End** key takes it to the bottom.

Another column on the right side of your screen designates the amount of kilobytes in each file. If the highlighted bar is positioned on a directory name, you will see "- - -" in the right column. When the highlighted bar is on a directory, rather than a file, pressing the **right arrow** key will take you into that directory. The displayed list will disappear and a list of the directory the highlighted bar was resting on will appear. This is how you mark files in a subdirectory. To return to the original directory, press the **left arrow** key.

Function Keys

F1 - Mark Highlighted Name For Copy

Use this key to mark a file or directory for copying.

Alt-F1 - Unmark Highlighted Name

Use this key sequence to unmark a file. For example, if you want to copy everything from one diskette to another except four special files, unmark those files and start the copy operation.

The same is true for directories. If you unmark a directory, that directory (and everything in it) will not be copied.

F2 - Mark All Names

This option allows you to mark every file and directory on a diskette.

ALT-F2 - Unmark All Names

This option allows you to unmark every file and directory on a diskette. If a diskette contains many files and you wish to copy only a few, unmark all the files and directories, then mark the ones you wish to copy. Remember, KCOPY begins with all files marked, so to copy only a selected number of files or directories you would first unmark all files, then mark each selection.

F3 - Mark By Type

This option allows you to mark names according to type. When you press **F3**, you will see the prompt **What file type letter(s)?** There are four types: *directories, hidden files, archive files,* and *system files.*

Directories

By entering a backslash (\), you tell KCOPY to mark only directories, not the files within them.

Hidden Files

Mark all hidden files by entering an **H**.

Archive Files

Notice the column directly to the left of the filename column. The "A" stands for archive. Backup programs such as KCOPY normally turn off the archive attribute after they make a backup copy of the file. KCOPY gives you the option of maintaining the archive attribute by giving you this prompt before each copy operation:

Clear archive bit after copying?

If you answer *Yes* and copy a file, then the file ceases to be an archive file. The archive column appears empty. If the archive bit is to be cleared, the source diskette must not be write-protected.

System Files

By entering an S, you tell KCOPY to mark only the files that make up the operating system, such as MSDOS.SYS. There is a column to the left of the name column that will contain an S if the file is a system file.

Alt-F3 - Unmark By Type

This allows you to unmark files using the conventions described under "F3 Mark By Type."

F4 - Mark By Pattern

This option allows you to mark files using *wildcards* (? and *). For example, if you wished to mark every file with a .COM extension, you would press F4, and at the prompt, type:

*.COM

and press Enter.

You will be asked whether or not you wish to mark files in subdirectories, then KCOPY would mark all the files with a .COM extension.

Alt-F4 - Unmark By Pattern

This allows you to unmark files using conventions described in "F4 Mark By Pattern."

F5 - Start Copying Files

Pressing the F5 key begins the copy operation.

F6 - Quit KCOPY

Pressing the F6 key ends KCOPY and returns to MS-DOS.

F7 - Replace Source Disk

Pressing the F7 key enables the user to change the logged diskette drive. If you wish to switch diskettes or access another drive or directory, use this option.

F8 - Transfer Files Over Data Link

This option allows the user to transfer marked files and directories to another computer through the serial port. The user should have some type of communications software running on the computer waiting to receive the files. Set the telecommunications software on the receiving computer to the following parameters:

Protocol:	**XMODEM/B CRC**
Baud Rate:	**9600**
Data Bits:	**8**
Stop Bit:	**1**
Parity:	**NONE**

The XMODEM/B protocol will not allow the transfer of subdirectories or directory structures. If you wish to copy subdirectories or directory structures over a data link, you must run the KAYPRO program CATCH.EXE on the receiving computer instead of telecommunications software.

To transfer files through a data link; at the system prompt of the receiving computer type:

CATCH

and press **Enter**.

NOTE:

The **F8** option does not work with modems. It works only with a direct, computer-to-computer connection.

The KCOPY Switches

Switches are characters placed at the end of the command line that cause KCOPY to operate in a specific manner. These are the switches.

/A Copies all archive files and clears the archive bit.

/B Marks only archive files.

/C Copies all files and directories.

/M Marks according to specified wildcard pattern.

/U Unmarks according to specified wildcard pattern.

/S Allows the user to swap diskettes before KCOPY runs.

/X Copies all files and directories to a data link.

The /A, /C, and /X options bypass the KCOPY menu and start copying immediately. For example, to cause KCOPY to bypass the mark/un-mark menu and begin the copy operation immediately, place the /C switch at the end of the command. Type:

KCOPY A:*.* C: /C

and press **Enter**.

This command copies every file and directory from drive A to drive C, without displaying a menu or a file and directory list.

Using Escape and Control-C

To stop any operation at any time, press either the **Esc** key, or simultaneously press the **Ctrl** and the C keys.

LOCATE -- A File-Finding Utility

LOCATE will help you find a file on your hard disk, regardless of where the file is stored or in which subdirectory you begin your search. LOCATE can also be used to find subdirectories. The syntax is:

LOCATE [*-switch*] *filespec*

switch may be one of the following:

d Disregards subdirectories that match *filespec*.

s Shows directories, but does not display the trailing backslash (\) on the end of the directory name.

? Typing **LOCATE -?** at the DOS prompt gives you the first of two help screens. Press the spacebar to release the second screen.

m Disables the pause between help screens.

Filespec may include the wildcard characters * and ?. LOCATE will find subdirectories as well as files and programs. LOCATE can also find duplicate files, regardless of how widely scattered they are.

LOCATE also has a built-in help facility, similar to that in CHATTR. Typing LOCATE at the DOS prompt will produce:

```
Locate ver X.XX Kaypro Corporation
Usage:
Locate [-dsm?] [d:] [pathname] filespec [...]
Locate -?       for extra help
```

Just for fun, you may want to find out how many files begin with the letter "r." To do this,type:

LOCATE r*.*

and press **Enter.**

If your LOCATE listing is more than one screenful you can pipe LOCATE through MORE.COM. See Chapter Six "Advanced Usage" and your *MS-DOS User's Guide* for more detailed information.

Chapter Eight
Video Information

Chapter Eight
Video Information

The KAYPRO 386 is shipped without monitor or video board installed so that your dealer may assess what kind of system may be best for your needs. Kaypro offers you several video options:

- The KAYPRO Multi-Video Board with either the Monochrome Monitor or the Color/Graphics Monitor
- The KAYPRO Enhanced Graphics Adapter with either the Monochrome Monitor, the Color/Graphics Monitor or the Enhanced Graphics Monitor.

The KAYPRO Monochrome Monitor

The KAYPRO Monochrome Monitor displays all text in one color: green. It displays twenty-five rows and eighty columns of very crisp, high resolution text. Normally the monitor cannot display any color graphics. However, the KAYPRO Multi-Video Board will allow your monochrome monitor to **emulate** color graphics (see Emulation Mode later in this section). The KAYPRO EGA Board will also drive a monochrome monitor, but will not emulate color graphics as the Multi-Video Board will.

The KAYPRO Color Monitor

The KAYPRO Color Monitor displays 80 columns and 25 rows of either color or black and white text. It will also display graphics in 320 x 200 resolution with 16 colors or in 640 x 200 resolution with 4 colors. Read the booklet that came with it for full details on its capabilities.

The KAYPRO Enhanced Graphics Monitor

The KAYPRO Enhanced Graphics Monitor displays very high resolution color graphics and text in 640 x 350 pixel resolution using 64 colors. Enhanced graphics video is useful in scientific and engineering applications as well as for charts and graphs used in business applications. The KAYPRO Multi-Video Board will not drive this monitor in Enhanced Graphics mode; you will need the KAYPRO EGA Board.

KAYPRO 386 with the Multi-Video Board

The KAYPRO 386 with the KAYPRO Multi-Video Board can use either Color/Graphics or Monochrome monitors and make monochrome behave like color. In addition, it is compatible with most of the major video types.

Read the following text carefully. It will explain the types of video your computer is capable of displaying. It will then describe how to use the video mode switching software.

This board is quite versatile. It has the video characteristics of the IBM Color/Graphics Adapter (CGA), the IBM Monochrome/Display Adapter (MDA) and the Hercules Graphics Card. It also has its own Color Graphics Emulation Mode.

The KAYPRO Multi-Video Board emulates these other boards by functioning in one of four modes: emulation mode, monochrome mode, monochrome graphics mode, or color graphics mode. Following are detailed explanations of each mode.

Emulation Mode

Probably the most powerful feature of this board is its ability to simulate high resolution color graphics on your monochrome monitor: It runs all color graphics software on a monochrome monitor by automatically converting the color signals into varying shades of green.

In emulation mode the KAYPRO Multi-Video Board will function *exactly like an IBM Color Graphics Adapter*. Because of this you should configure your software for the IBM Color/Graphics Adapter. For example, if you were setting up the popular spreadsheet program Lotus 123 (Release 2) you would run the Lotus Install program and choose as a display **The IBM Color Card.**

Emulation mode displays the high resolution monochrome character set (letters, numbers), and also does full screen graphics.

Monochrome Mode

This mode displays the high resolution monochrome character set on a monochrome monitor, with the KAYPRO Multi-Video Board functioning exactly like an IBM Monochrome/Display Adapter. You will have crisp clear text, but no graphics capability. Graphics software written for the IBM Color/Graphics Adapter or the Hercules Graphics Card will not run under this mode.

Monochrome Graphics Mode

The KAYPRO Multi-Video Board can function exactly like the Hercules Graphics Card for the IBM Monochrome Display. This mode, with the use of special software, will allow you to run some color graphics on a monochrome monitor. If you have software specifically configured for the Hercules board you can run it. Otherwise use the emulation mode. Graphics software written for the IBM Color/Graphics Adapter will not run under this mode.

Color/Graphics Mode

This mode will run all IBM Color/Graphics programs as well as graphics software designed for use with the Plantronics ColorPlus Adapter.

In this mode you can use an RGB or composite color monitor and the KAYPRO Multi-Video Board will function exactly like an IBM Color Graphics adapter. You will have medium or high resolution color graphics with the RGB monitor.

The Video Mode Switching Software

MS.COM

MS.COM is in the \VIDEO subdirectory of the MS-DOS Diskette #2. This program will change the video operation of the KAYPRO Multi-Video Board to any of eight modes that you designate.

NOTE:

Do not use MS.COM with the KAYPRO Enhanced Graphics Adapter (EGA) Board. MS.COM is only for use with the KAYPRO Multi-Video Board.

The procedure has four steps: run the MS program, choose the type of video you need from the MS menu, switch monitors if necessary, and finish running the program.

When you switch video modes, make sure that any RAM-resident programs you are using can work with the video mode you are selecting. For example you may switch from monochrome to color mode and but still have a program in RAM configured for a monochrome monitor. The program in RAM will expect a monochrome monitor and find a color monitor. If this happpens your computer may refuse to accept input or refuse to display anything on the screen, and you will have to reset your computer.

The following example will lead you through the procedure for switching from color graphics emulation mode to monochrome mode and back again.

1. Place your MS-DOS utilities diskette in the A drive. Then from the **A>** system prompt, type:

   MS

   and press **Enter.**

2. A menu that looks something like this will appear:

   1. Monochrome Text 80x25 - MT
   2. Monochrome Text 132x25 - M25
   3. Monochrome Text 132x44 - M44
   4. Monochrome Graphics 1 page - MG1
   5. Monochrome Graphics 2 pages - MG2
   6. Emulation Text - E80
   7. Color Text 80x25 - C80 0
   8. Color Text 132x25 - C132
   9. Exit to DOS

   10. Monochrome 132 columns screen adjustment
   11. Color 132 columns screen adjustment
   Enter Option : _

3. Choose Monochrome Text 80x25. Type:

   1

   and press **Enter.**

   This choice will change the video mode from the default color graphics emulation to monochrome mode. After you choose option one the program will end and you will see the **A>** system prompt. The characters will appear the same. They are not. Monochrome mode uses the same monochrome characters but will not display color graphics. If you were to run a program requiring color graphics it would not operate under this mode.

4. To change back to emulation mode, type:

   MS

   and press **Enter.**

5. The MS menu will display again. This time choose Emulation Text. Type:

   6

   and press **Enter**.

This is the basic procedure for switching video modes. If you are switching between monochrome and color monitors the program MS.COM will stop and display this text:

Direction to change to Color Monitor

1. Disconnect Monochrome Monitor if connected
2. Hit any key when ready
3. Connect Color Monitor when beep

**** Use Ctrl-C to exit without changes**

Following these instructions is very important because if the wrong signals are sent to a monitor (color to monochrome or monochrome to color) **the monitor may be damaged**. Always make sure that the your monitor is receiving the correct signals.

There is an option in the menu (number three) to change the video to monochrome 132 columns by 44 lines. The KAYPRO 386's design, while not precluding the use of 44 lines, does not support it either. So if you invoke this option you may see some strange things on the screen, or you may not. It is best to stick with 80 columns by 25 lines.

About Hercules Monochrome Graphics

If you plan to use the Monochrome Graphics mode, which emulates the Hercules Graphics Card, then you must choose the option which allocates either one or two pages of memory for monochrome graphics.

- One page of graphics memory: This allows the presence or use of an additional video board.
- Two pages of graphics memory: This is the option you must use to run Lotus 123 and most monochrome graphics programs. If you run Lotus 123 you must configure the Lotus 123 video driver for the Hercules board.

Bypassing the MS Menu

Once you learn the MS program, working through a menu to choose an option may seem time-consuming. Also, you may want to run MS.COM from a batch file (see batch processing in the MS-DOS User's Guide). For these reasons you can switch to any video mode with a single command by using *switches* that work with MS.COM. These switches are listed on the right side of the MS menu on page 8-4. If you want to change from emulation mode to 80x25 monochrome mode with a single command, then from the system prompt, type:

MS MT

and press **Enter.**

The MODE Command

Another method to switch video modes is with the MS-DOS MODE.EXE. The MODE command enables you to change the video output from the standard monochrome display to a color display, or a black and white display. Use this command if you are using a new monitor, and you need to configure the video output for it. MODE also enables you to change the number of columns and rows your screen displays from the standard 80 by 25, to any of several options. To use the MODE command, type:

MODE *display*

and press **Enter**.

display is the code for the type of display you want. Below is a list of possible display options.

Display	Selects
MONO	Monochrome, 80 columns by 25 rows.
BW40	40 by 25 black and white text mode on a color monitor.
BW80	80 by 25 black and white text mode on a color monitor.
CO40	40 by 25 color text mode.
CO80	80 by 25 color text mode.
40	40 columns in the current mode. Forty column monochrome is not available.
80	80 columns in the current mode.

For example, if you need to switch from monochrome to color mode, and retain the same screen format, type:

MODE CO80

and press **Enter**.

The Mode command also enables you to change the the operating mode of the parallel or serial port, and reroute the printer output. See the *MS-DOS User's Guide*.

Switch Settings for the Multi-Video Board

If you change monitors, may need to change the *DIP* switches on the the Multi-Video Board and on the system board. On the top of the board is an 8-position DIP switch. These switches govern the Default Display Mode, the Monitor Type, the Composite Monitor, and Software Protection. Depending on the configuration your computer has, the switches are as follows:

Default Display Mode	**SW1**	**SW2**
Monochrome Display	ON	OFF
Color Display	OFF	ON
Color Emulation Mode	OFF	OFF
Monitor Type	**SW3**	**SW4**
Composite	OFF	ON
Monochrome	ON	OFF
Color/Graphics	OFF	OFF
Composite Video Mode	**SW5**	**SW6**
Composite Color	ON	OFF
Composite Monochrome	OFF	OFF
Software Switchable Video Mode	**SW7**	**SW8**
Allow	ON	ON
Disallow	OFF	OFF

Consult your dealer to determine if the switches have been set for the configuration you have.

The Enhanced Graphics Adapter (EGA) Board

The KAYPRO Enhanced Graphics Adapter provides three types of video: monochrome/graphics, color graphics and enhanced color graphics. It does not allow for color emulation on monochrome monitors.

Monochrome Graphics Mode

The KAYPRO EGA Board can function exactly like the Hercules Graphics Card for the IBM Monochrome Display. This mode, with the use of special software, will allow you to run some color graphics on a monochrome monitor. If you have software specifically configured for the Hercules board you can run it. Graphics software written for the IBM Color/Graphics Adapter will not run under this mode.

Color/Graphics Mode

This mode will run all IBM Color/Graphics programs. In this mode you can use an RGB color monitor (such as the KAYPRO Color Monitor) or composite color monitor (such as a television) and the KAYPRO EGA Board will function exactly like an IBM Color Graphics adapter. You will have medium- or high-resolution color graphics with the RGB monitor.

Enhanced Color Graphics Mode

This mode will run any software that needs enhanced color graphics capabilities. The resolution is 640 horizontal lines by 350 vertical lines resulting in clear, crisp text nearly as good as monochrome, but in sixty-four colors instead of one.

Switch Settings for the KAYPRO EGA Board

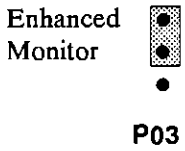
The KAYPRO 386, with the KAYPRO EGA Board, can use either monochrome, color or enhanced graphics monitors. The type of signal the EGA Board sends is determined by several settings on the EGA Board. If you have only the KAYPRO EGA Board, the switch settings are as follows:

Display	SW2	SW3	SW4	SW5
Color Monitor (40 x 25)	ON	OFF	OFF	ON
Color Monitor (80 x 25)	OFF	OFF	OFF	ON
Enhanced Monitor	OFF	ON	ON	OFF
Monochrome Monitor	OFF	OFF	ON	OFF

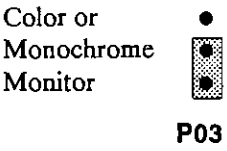
If you add another video board, the switch settings may have to be changed depending on which board is to be the primary board, and the secondary board's settings. If the KAYPRO EGA Board is to be used as the primary board, the switch settings are the same as above. If the KAYPRO EGA Board is to be used as the secondary board, the switch settings will be as follows:

Primary Board	EGA Board Display	SW 2	SW 3	SW 4	SW 5
Monochrome	Color (40x25)	ON	ON	ON	ON
Monochrome	Color (80x25)	OFF	ON	ON	ON
Monochrome	Enhanced	OFF	OFF	ON	ON
CGA(40x25)	Monochrome	ON	ON	OFF	ON
CGA(80x25)	Monochrome	OFF	ON	OFF	ON

In addition to the switches, there is a jumper setting on the EGA Board that determines monitor type. The jumper is at location P03 and consists of three upright posts, two of which are covered by a plastic jumper block.



P03



P03

Caution:

Do not use MS.COM with the KAYPRO EGA Board. This program is for use with the KAYPRO Multi-Video Board only.

Appendix A
Titles for Further Reading

Appendix A
Current Titles For Further Reading

As of this printing (March 1987), the following titles are available at local bookstores and might help you use and understand your computer more fully. Many other titles may also prove helpful.

Ashley, Ruth and Fernandez, Judi N. *WordStar Without Tears: A Self-Teaching Guide.* New York: Wiley Press, 1984.

Boyce, Jefferson C. *Understanding Microcomputer Concepts: A Guide For Beginners and Hobbyists.* New York: Prentice Hall, 1984.

Duncan, Ray. Advanced MS-DOS: *The Microsoft Guide For Assembly Language and C Programmers.* Redmond, Washington: Microsoft Press, 1986.

Ettlin, Walter A. *WordStar Made Easy.* Berkeley, CA: Osborne/McGraw Hill, 1982.

Froehlich, Robert A. *The IBM PC (and Compatibles) Free Software Catalog and Directory.* New York: Dilithium Press, 1986.

Glossbrenner, Alfred. *How To Get Free Software.* New York: St. Martin's Press, 1984.

Kamin, Jonathan. MSDOS *Power User's Guide.* Berkeley, CA.: Sybex, 1986.

Norton, Peter. *Inside The IBM PC.* New York: Prentice Hall, 1986.

Stone, M. David. *Getting The Most From WordStar and Mailmerge: Things MicroPro Never Told You.* Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1984.

Wolverton, Van. *Running MSDOS: The Microsoft Guide to Getting the Most Out of the Standard Operating System for the IBM PC and 50 Other Personal Computers.* Redmond, WA: Microsoft Press, 2nd ed., 1985.

Wolverton, Van. *Supercharging MSDOS: Techniques for Customizing Your System for Maximum Performance.* Redmond, WA: Microsoft Press, 1986.

Yasuda, Phyllis and Frederick, Vivian. *Using Microcomputers (IBM Version).* Menlo Park, CA: Benjamin Cummings, 1986.

Appendix B
ASCII Charts

Appendix B
ASCII Charts

To use these charts, first find the character you want to use on the Quick Reference Charts. The decimal value of that character can be found by adding the decimal value on the top of the chart above the character to the decimal value on the left side of the chart.

The hex value of each character is the value of the number on the top plus the number (letter) on the side.

In the Quick Reference Charts, characters that do not print on the screen are represented by their respective ASCII codes.

The 'notes' in the *Modes* column of the Character Charts are at the end of the Appendix.

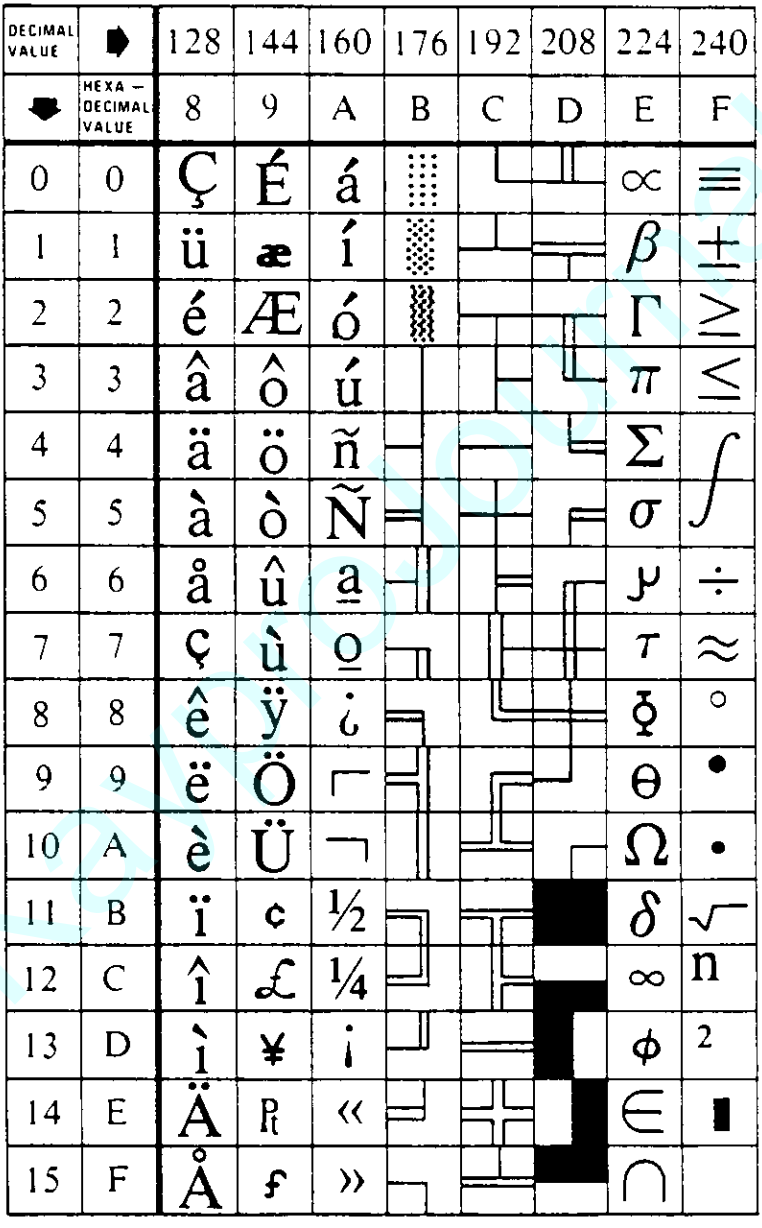
The codes in the *Monochrome Attributes* column of the Character Charts are as follows:

ND	Non-Display
U	Underline
N	Normal
HI	High Intensity
RV	Reverse Video

Quick Reference Chart 1

DECIMAL VALUE ➡		0	16	32	48	64	80	96	112
⬇	HEXA-DECIMAL VALUE	0	1	2	3	4	5	6	7
0	0	NULL	►	SPACE	0	@	P	‘	p
1	1	☺	◄	!	1	A	Q	a	q
2	2	☻	↕	"	2	B	R	b	r
3	3	♥	!!	#	3	C	S	c	s
4	4	♦	¶	$	4	D	T	d	t
5	5	♣	§	%	5	E	U	e	u
6	6	♠	▬	&	6	F	V	f	v
7	7	•	↨	’	7	G	W	g	w
8	8	◘	↑	(	8	H	X	h	x
9	9	○	↓	)	9	I	Y	i	y
10	A	◙	→	*	:	J	Z	j	z
11	B	♂	←	+	;	K	[	k	{
12	C	♀	∟	,	<	L	\	l	¦
13	D	♪	↔	—	=	M	]	m	}
14	E	♫	▲	.	>	N	^	n	~
15	F	☼	▼	/	?	O	_	o	△

Quick Reference Chart 2



Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
00	0	Ctrl-2		Black	Black	ND
01	1	Ctrl-A		Black	Blue	U
02	2	Ctrl-B		Black	Green	N
03	3	Ctrl-C		Black	Cyan	N
04	4	Ctrl-D		Black	Red	N
05	5	Ctrl-E		Black	Magenta	N
06	6	Ctrl-F		Black	Brown	N
07	7	Ctrl-G		Black	Gray	N
08	8	Ctrl-H Backspace Ctrl-Bksp		Black	Dark Gray	ND
09	9	Ctrl-I,TAB		Black	Lt. Blue	HI,U
0A	10	Ctrl-J Ctrl-Enter		Black	Lt. Green	HI
0B	11	Ctrl-K		Black	Lt. Cyan	HI
0C	12	Ctrl-L		Black	Lt. Red	HI
0D	13	Ctrl-M Enter Ctrl-Enter	Note 1	Black	Lt. Magenta	HI
0E	14	Ctrl-N		Black	Yellow	HI
0F	15	Ctrl-O		Black	White	HI
10	16	Ctrl-P		Blue	Black	N
11	17	Ctrl-Q		Blue	Blue	U
12	18	Ctrl-R		Blue	Green	N
13	19	Ctrl-S		Blue	Cyan	N
14	20	Ctrl-T		Blue	Red	N
15	21	Ctrl-U		Blue	Magenta	N
16	22	Ctrl-V		Blue	Brown	N
17	23	Ctrl-W		Blue	Gray	N
18	24	Ctrl-X		Blue	Dark Gray	HI
19	25	Ctrl-Y		Blue	Lt. Blue	HI,U
1A	26	Ctrl-Z		Blue	Lt. Green	HI
1B	27	Ctrl-[ESC Shift-ESC Ctrl-ESC		Blue	Lt. Cyan	HI
1C	28	Ctrl-\		Blue	Lt. Red	HI
1D	29	Ctrl-]		Blue	Lt. Magenta	HI
1E	30	Ctrl-6		Blue	Yellow	HI
1F	31	Ctrl--(dash)		Blue	White	HI
20	32	Space Bar Shift-Space Alt-Space Ctrl-Space		Green	Black	N
21	33	!		Green	Blue	N

Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
22	34	"	Shift	Green	Green	U
23	35	#	Shift	Green	Cyan	N
24	35	$	Shift	Green	Red	N
25	37	%	Shift	Green	Magenta	N
26	38	&	Shift	Green	Brown	N
27	39	'		Green	Gray	N
28	40	(	Shift	Green	Dark Gray	HI
29	41	)	Shift	Green	Lt. Blue	HI,U
2A	42	*	Note 2	Green	Lt. Green	HI
2B	43	+	Note 3	Green	Lt. Cyan	HI
2C	44	,		Green	Lt. Red	HI
2D	45	-	Note 4	Green	Lt. Magenta	HI
2E	46	.	Note 5	Green	Yellow	HI
2F	47	/	Note 6	Green	White	HI
30	48	0	Note 7	Cyan	Black	N
31	49	1	Note 7	Cyan	Blue	U
32	50	2	Note 7	Cyan	Green	N
33	51	3	Note 7	Cyan	Cyan	N
34	52	4	Note 7	Cyan	Red	N
35	53	5	Note 7	Cyan	Magenta	N
36	54	6	Note 7	Cyan	Brown	N
37	55	7	Note 7	Cyan	Gray	N
38	56	8	Note 7	Cyan	Dark Gray	HI
39	57	9	Note 7	Cyan	Lt. Blue	HI,U
3A	58	:	Shift	Cyan	Lt. Green	HI
3B	59	;		Cyan	Lt. Cyan	HI
3C	60	<	Shift	Cyan	Lt. Red	HI
3D	61	=		Cyan	Lt. Magenta	HI
3E	62	>	Shift	Cyan	Yellow	HI
3F	63	?	Shift	Cyan	White	HI
40	64	@	Shift	Red	Black	N
41	65	A	Note 8	Red	Blue	U
42	66	B	Note 8	Red	Green	N
43	67	C	Note 8	Red	Cyan	N
44	68	D	Note 8	Red	Red	N
45	69	E	Note 8	Red	Magenta	N
46	70	F	Note 8	Red	Brown	N
47	71	G	Note 8	Red	Gray	N
48	72	H	Note 8	Red	Dark Gray	U
49	73	I	Note 8	Red	Lt. Blue	HI,U
4A	74	J	Note 8	Red	Lt. Green	HI
4B	75	K	Note 8	Red	Lt. Cyan	HI

Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
4C	76	L	Note 8	Red	Lt. Red	HI
4D	77	M	Note 8	Red	Lt. Magenta	HI
4E	78	N	Note 8	Red	Yellow	HI
4F	79	O	Note 8	Red	White	HI
50	80	P	Note 8	Magenta	Black	N
51	81	Q	Note 8	Magenta	Blue	U
52	82	R	Note 8	Magenta	Green	N
53	83	S	Note 8	Magenta	Cyan	N
54	84	T	Note 8	Magenta	Red	N
55	85	U	Note 8	Magenta	Magenta	N
56	86	V	Note 8	Magenta	Brown	N
57	87	W	Note 8	Magenta	Gray	N
58	88	X	Note 8	Magenta	Dark Gray	HI
59	89	Y	Note 8	Magenta	Lt. Blue	HI,U
5A	90	Z	Note 8	Magenta	Lt. Green	HI
5B	91	[		Magenta	Lt. Cyan	HI
5C	92	\		Magenta	Lt. Red	HI
5D	93	]		Magenta	Lt. Magenta	HI
5E	94	^	Shift	Magenta	Yellow	HI
5F	95	_	Shift	Magenta	White	HI
60	96	`		Brown	Black	N
61	97	a	Note 9	Brown	Blue	U
62	98	b	Note 9	Brown	Green	N
63	99	c	Note 9	Brown	Cyan	N
64	100	d	Note 9	Brown	Red	N
65	101	e	Note 9	Brown	Magenta	N
66	102	f	Note 9	Brown	Brown	N
67	103	g	Note 9	Brown	Gray	N
68	104	h	Note 9	Brown	Dark Gray	HI
69	105	i	Note 9	Brown	Lt. Blue	HI,U
6A	106	j	Note 9	Brown	Lt. Green	HI
6B	107	k	Note 9	Brown	Lt. Cyan	HI
6C	108	l	Note 9	Brown	Lt. Red	HI
6D	109	m	Note 9	Brown	Lt. Magenta	HI
6E	110	n	Note 9	Brown	Yellow	HI
6F	111	o	Note 9	Brown	White	HI
70	112	p	Note 9	Gray	Black	N
71	113	q	Note 9	Gray	Blue	U
72	114	r	Note 9	Gray	Green	N
73	115	s	Note 9	Gray	Cyan	N
74	116	t	Note 9	Gray	Red	N
75	117	u	Note 9	Gray	Magenta	N

Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
76	118	v	Note 9	Gray	Brown	N
77	119	w	Note 9	Gray	Gray	N
78	120	x	Note 9	Gray	Dark Gray	RV
79	121	y	Note 9	Gray	Lt. Blue	HI,U
7A	122	z	Note 9	Gray	Lt. Green	HI
7B	123	{	Shift	Gray	Lt. Cyan	HI
7C	124	|	Shift	Gray	Lt. Red	HI
7D	125	}	Shift	Gray	Lt. Magenta	HI
7E	126	~	Shift	Gray	Yellow	HI
7F	127	Del Ctrl-Bksp	Note 10	Gray	White	HI

80 to FF Hex are flashing in both color and monochrome

80	128	Alt-128	Note 11	Black	Black	ND
81	129	Alt-129	Note 11	Black	Blue	U
82	130	Alt-130	Note 11	Black	Green	N
83	131	Alt-131	Note 11	Black	Cyan	N
84	132	Alt-132	Note 11	Black	Red	N
85	133	Alt-133	Note 11	Black	Magenta	N
86	134	Alt-134	Note 11	Black	Brown	N
87	135	Alt-135	Note 11	Black	Gray	N
88	136	Alt-136	Note 11	Black	Dark Gray	HI
89	137	Alt-137	Note 11	Black	Lt. Blue	HI,U
8A	137	Alt-138	Note 11	Black	Lt. Green	HI
8B	139	Alt-139	Note 11	Black	Lt. Cyan	HI
8C	140	Alt-140	Note 11	Black	Lt. Red	HI
8D	141	Alt-141	Note 11	Black	Lt. Magenta	HI
8E	142	Alt-142	Note 11	Black	Yellow	HI
8F	143	Alt-143	Note 11	Black	White	HI
90	144	Alt-144	Note 11	Blue	Black	N
91	145	Alt-145	Note 11	Blue	Blue	U
92	146	Alt-146	Note 11	Blue	Green	N
93	147	Alt-147	Note 11	Blue	Cyan	N
94	148	Alt-148	Note 11	Blue	Red	N
95	149	Alt-149	Note 11	Blue	Magenta	N
96	150	Alt-150	Note 11	Blue	Brown	N
97	151	Alt-151	Note 11	Blue	Gray	N
98	152	Alt-152	Note 11	Blue	Dark Gray	HI

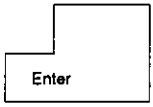
Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
99	153	Alt-153	Note 10	Blue	Lt. Blue	HI,U
9A	154	Alt-154	Note 10	Blue	Lt. Green	HI
9B	155	Alt-155	Note 10	Blue	Lt. Cyan	HI
9C	156	Alt-156	Note 10	Blue	Lt Red	HI
9D	157	Alt-157	Note 10	Blue	Lt. Magenta	HI
9E	158	Alt-158	Note 10	Blue	Yellow	HI
9F	159	Alt-159	Note 10	Blue	White	HI
A0	160	Alt-160	Note 10	Green	Black	N
A1	161	Alt-161	Note 10	Green	Blue	U
A2	162	Alt-162	Note 10	Green	Green	N
A3	163	Alt-163	Note 10	Green	Cyan	N
A4	164	Alt-164	Note 10	Green	Red	N
A5	165	Alt-165	Note 10	Green	Magenta	N
A6	166	Alt-166	Note 10	Green	Brown	N
A7	167	Alt-167	Note 10	Green	Gray	N
A8	168	Alt-168	Note 10	Green	Dark Gray	HI
A9	169	Alt-169	Note 10	Green	Lt. Blue	HI,U
AA	170	Alt-170	Note 10	Green	Lt. Green	HI
AB	171	Alt-171	Note 10	Green	Lt. Cyan	HI
AC	172	Alt-172	Note 10	Green	Lt. Red	HI
AD	173	Alt-173	Note 10	Green	Lt. Magenta	HI
AE	174	Alt-174	Note 10	Green	Yellow	HI
AF	175	Alt-175	Note 10	Green	White	HI
B0	176	Alt-176	Note 10	Cyan	Black	N
B1	177	Alt-177	Note 10	Cyan	Blue	U
B2	178	Alt-178	Note 10	Cyan	Green	N
B3	179	Alt-179	Note 10	Cyan	Cyan	N
B4	180	Alt-180	Note 10	Cyan	Red	N
B5	181	Alt-181	Note 10	Cyan	Magenta	N
B6	182	Alt-182	Note 10	Cyan	Brown	N
B7	183	Alt-183	Note 10	Cyan	Gray	N
B8	184	Alt-184	Note 10	Cyan	Dark Gray	HI
B9	185	Alt-185	Note 10	Cyan	Lt. Blue	HI,U
BA	186	Alt-186	Note 10	Cyan	Lt. Green	HI
BB	187	Alt-187	Note 10	Cyan	Lt. Cyan	HI
BC	188	Alt-188	Note 10	Cyan	Lt. Red	HI
BD	189	Alt-189	Note 10	Cyan	Lt. Magenta	HI
BE	190	Alt-190	Note 10	Cyan	Yellow	HI
BF	191	Alt-191	Note 10	Cyan	White	HI
C0	192	Alt-192	Note 10	Red	Black	N
C1	193	Alt-193	Note 10	Red	Blue	U

Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
C2	194	Alt-194	Note 10	Red	Green	N
C3	195	Alt-195	Note 10	Red	Cyan	N
C4	196	Alt-196	Note 10	Red	Red	N
C5	197	Alt-197	Note 10	Red	Magenta	N
C6	198	Alt-198	Note 10	Red	Brown	N
C7	199	Alt-199	Note 10	Red	Gray	N
C8	200	Alt-200	Note 10	Red	Dark Gray	HI
C9	201	Alt-201	Note 10	Red	Lt. Blue	HI,U
CA	202	Alt-202	Note 10	Red	Lt. Green	HI
CB	203	Alt-203	Note 10	Red	Lt. Cyan	HI
CC	204	Alt-204	Note 10	Red	Lt. Red	HI
CD	205	Alt-205	Note 10	Red	Lt. Magenta	HI
CE	206	Alt-206	Note 10	Red	Yellow	HI
CF	207	Alt-207	Note 10	Red	White	HI
D0	208	Alt-208	Note 10	Magenta	Black	N
D1	209	Alt-209	Note 10	Magenta	Blue	U
D2	200	Alt-200	Note 10	Magenta	Green	N
D3	211	Alt-211	Note 10	Magenta	Cyan	N
D4	212	Alt-212	Note 10	Magenta	Red	N
D5	213	Alt-213	Note 10	Magenta	Magenta	N
D6	214	Alt-214	Note 10	Magenta	Brown	N
D7	215	Alt-215	Note 10	Magenta	Gray	N
D8	216	Alt-216	Note 10	Magenta	Dark Gray	HI
D9	217	Alt-217	Note 10	Magenta	Lt. Blue	HI,U
DA	218	Alt-218	Note 10	Magenta	Lt. Green	HI
DB	219	Alt-219	Note 10	Magenta	Lt. Cyan	HI
DC	220	Alt-220	Note 10	Magenta	Lt. Red	HI
DD	221	Alt-221	Note 10	Magenta	Lt. Magenta	HI
DE	222	Alt-222	Note 10	Magenta	Yellow	HI
DF	223	Alt-223	Note 10	Magenta	White	HI
E0	224	Alt-224	Note 10	Brown	Black	N
E1	225	Alt-225	Note 10	Brown	Blue	U
E2	226	Alt-226	Note 10	Brown	Cyan	N
E3	227	Alt-227	Note 10	Brown	Red	N
E4	228	Alt-228	Note 10	Brown	Magenta	N
E5	229	Alt-229	Note 10	Brown	Brown	N
E6	230	Alt-230	Note 10	Brown	Gray	N
E7	231	Alt-231	Note 10	Brown	Dark Gray	HI
E8	232	Alt-232	Note 10	Brown	Lt. Blue	HI,U
E9	233	Alt-233	Note 10	Brown	Lt. Green	HI

Hex Val	Dec Val	Key-Strokes	Modes	Color Back ground	Color Fore-ground	Mono-chrome Attributes
EA	234	Alt-234	Note 10	Brown	Lt. Cyan	HI
EB	235	Alt-235	Note 10	Brown	Lt. Red	HI
EC	236	Alt-236	Note 10	Brown	Lt. Magenta	HI
ED	237	Alt-237	Note 10	Brown	Magenta	HI
EE	238	Alt-238	Note 10	Brown	Yellow	HI
EF	239	Alt-239	Note 10	Brown	White	HI
F0	240	Alt-240	Note 10	Gray	Black	N
F1	241	Alt-241	Note 10	Gray	Blue	U
F2	242	Alt-242	Note 10	Gray	Green	N
F3	243	Alt-243	Note 10	Gray	Cyan	N
F4	244	Alt-244	Note 10	Gray	Red	N
F5	245	Alt-245	Note 10	Gray	Magenta	N
F6	246	Alt-246	Note 10	Gray	Brown	N
F7	247	Alt-247	Note 10	Gray	Gray	N
F8	248	Alt-248	Note 10	Gray	Dark Gray	HI
F9	249	Alt-249	Note 10	Gray	Lt. Blue	HI,U
FA	250	Alt-250	Note 10	Gray	Lt. Green	HI
FB	251	Alt-251	Note 10	Gray	Lt. Cyan	HI
FC	252	Alt-252	Note 10	Gray	Lt. Red	HI
FD	253	Alt-253	Note 10	Gray	Lt. Magenta	HI
FE	254	Alt-254	Note 10	Gray	Yellow	HI
FF	255	Alt-255	Note 10	Gray	White	HI

Notes from the Modes Column

Note 1: **Enter** can be typed using two methods:

1. Press the 

key.

2. Press the 

key on the numeric keypad.

Note 2: The asterisk (*) can be typed using two methods:

1. Press the 

key in Shift mode.

2. Press the 

key on the numeric keypad.

Note 3: The plus sign (+) can be typed using two methods:

1. Press the 

key in Shift mode.

2. Press the 

key on the numeric keypad.

Note 4: The hyphen or minus sign (-) can be typed using two methods:

1. Press the 

key.

2. Press the 

key on the numeric keypad.

Note 5: The period (.) can be typed using three methods:

1. Press the  key.

2. With the Num Lock on, press the  key on the number pad.

3. With the Num Lock off, press the  key in Shift mode.

Note 6: The slash or division symbol (/) can be typed using two methods:

1. Press the  key.

2. Press the  key on the number pad.

Note 7: Numeric characters (0-9) can be typed using three methods:

1. Press the numeric keys on the top row of typewriter portion of the keyboard.
2. With Num Lock on, press the numeric keys on the numeric keypad on the right side of the keyboard.
3. With Num Lock off, press the numeric keys on the numeric keypad in Shift mode.

Note 8: Upper case alphabetic characters (A-Z) can be typed using two methods:

1. With Caps Lock on, press the appropriate alphabetic key.
2. With Caps Lock off, press the appropriate alphabetic key in Shift mode.

Note 9: Lower case alphabetic characters (**a-z**) can be typed using two methods:

1. With Caps Lock on, press the appropriate alphabetic key in Shift mode.
2. With Caps Lock off, press the appropriate alphabetic key.

Note 10: Delete can be typed using three methods:

1. Press the 

key in the middle section of the keyboard.

2. With Num Lock on, press the 

key on the numeric keypad.

3. With Num Lock off, press the 

key on the numeric keypad in Shift mode.

Note 11: The 3 digits after the Alt key must be typed from the numeric keypad. Character codes 128 through 255 may be entered in this fashion. This method will not work if the display is installed as an ANSI terminal.

Appendix C
Technical Information

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Mainboard Jumpers

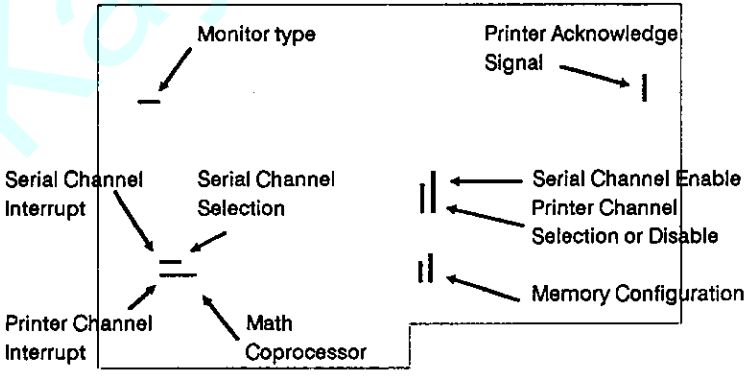
The KAYPRO 386 has several jumper blocks on the mainboard that are used to determine the configuration of the system. With these jumpers, you may determine:

- Monitor type
- Memory Configuration
- Serial Communications port
- Parallel Printer port
- Printer acknowledge signal
- The absence or presence of a Math Coprocessor

This appendix will tell you how to make changes to your mainboard if you ever modify your system configuration.

Jumper Locations

The illustration below shows the approximate locations of the jumper blocks described in this appendix. The pin numbers indicated on the following pages are silk-screened on the board so that the pins can be located easily.



Monitor Type

Your dealer should set these pins for you when your video board is installed. However, if you change monitor types from Enhanced or Color to Monochrome or vice versa, the jumpers should be set as follows:

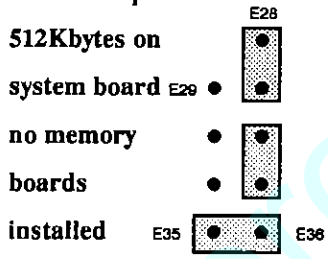
Color Monitor

Monochrome Monitor

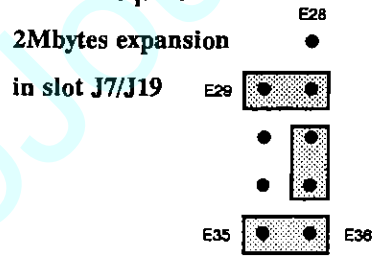
Memory Configuration Selection

If you add memory boards to your KAYPRO 386 you will need to change the jumpers on the mainboard to correspond to the amount of memory you install. Jumper pins E28 through E36 identify the amount of memory installed.

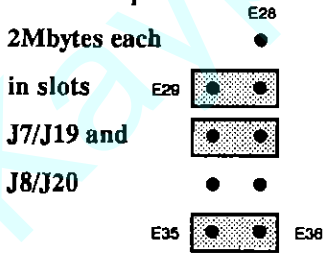
Option 1



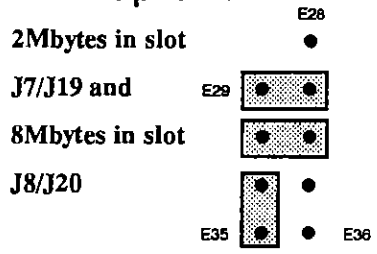
Option 2



Option 3



Option 4



If you install 16-bit memory boards to fill conventional memory to its 640K limit or to add expanded memory, you should use the third option.

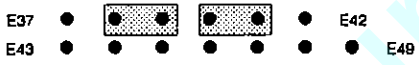
Serial Communications Port Selection

Selecting the serial communications port involves selecting the port number, selecting the interrupt request (IRQ) line used with the port, and enabling or disabling the port.

Jumpers E40 through E42 determine the selection of COM1 or COM2. Jumpers E37 through E39 determine the interrupt request (IRQ) used with the port. The settings are as follows:

Select COM1 with IRQ4

Select COM2 with IRQ3



Regardless of the port selected, the serial port may be enabled or disabled.

Disable Serial Port

Enable Serial Port

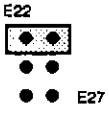
Parallel Printer Port Selection

Selecting the parallel printer port involves selecting the port as LPT1, LPT2 or disabled, and selecting the interrupt request (IRQ) line used with the port.

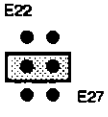
WARNING:

Only one of the following three jumper settings is permitted. Installing jumpers in more than one position could damage the mainboard.

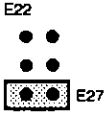
Select LPT1



Select LPT2

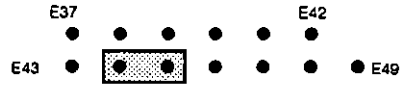


Disable Printer Port

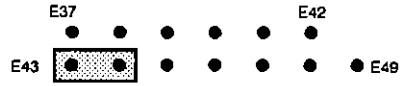


Pins E43 through E45 determine the Interrupt Request (IRQ) line used with the port

IRQ7 (LPT1)



IRQ5 (LPT2)



Printer Acknowledge Signal

Jumper pins E7 through E9 select whether the leading or trailing edge of the printer acknowledge signal is used to trigger the interrupt line selected above. Check your printer instructions to determine which acknowledge signal is needed.

Trailing edge of acknowledge

Leading edge of acknowledge

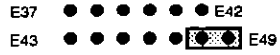
Math Coprocessor

If you add a math coprocessor (either a 80287 or 80387), you must change the jumpers on the mainboard.

WARNING:

Only one of the following two jumper settings is permitted. Installing jumpers in both positions could damage the mainboard.

Math Coprocessor not installed



Math coprocessor installed

Connector Pin Assignments

Power Supply Connector

J13 supplies power to the mainboard and to the expansion slots. Pins 1 through 6 of the P8 connector from the power supply must match pins 1 through 6 of J13. Pins 1 through 6 of the P9 connector from the power supply must match pins 7 through 12 of J13. The pin assignments for J13 are shown below.

J13 Pin	Signal/Function
1	System Reset
2	+5V
3	+12V
4	-12V
5	Ground
6	Ground
7	Ground
8	Ground
9	-5V
10	+5V
11	+5V
12	+5V

Serial Communications Port

The Serial Communications port is a DB-9P connector. The pin assignments are as follows:

DB-9P Pin	Signal/Function
1	Data Carrier Detect
2	Receive Data
3	Transmit Data
4	Data Terminal Ready
5	Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Ring Indicator

Parallel Printer Port

The Parallel Printer Port is a DB-25S. The pin assignments are as follows:

DB-25S pin	Signal/Function
1	Strobe
2	Data Bit 0
3	Data Bit 1
4	Data Bit 2
5	Data Bit 3
6	Data Bit 4
7	Data Bit 5
8	Data Bit 6
9	Data Bit 7
10	Acknowledge
11	Busy
12	Paper End
13	Select
14	Auto Feed
15	Error
16	Initialize Printer
17	Select Input
18-25	Ground

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