KAYPRO®

286

User's Guide

The KAYPRO 286

User's Guide

Part Number 6246-A

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 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. ALSO THREE OF THE COMPUTER CABLES HAVE FERRITE TORROID INSTALLED ON THEM.

ANY ATTEMPT TO OPERATE WITH SUBSTITUTE CABLES MAY RESULT IN RADIO AND TV INTERFERENCE.

Table of Contents

Chapter Five
Additional MS-DOS Commands

Chapter Six
Technical Information

Chapter Seven
Video Information

Chapter Eight
Kaypro Utility Programs

Appendix Materials

Chapter One

Introduction

Chapter One

Introduction

Thank you and congratulations for choosing the KAYPRO 286 computer. You have invested in a system that gives you the ability to operate today's programs with greater efficiency and a platform to accomodate tomorrow's operating systems and associated programs.

The KAYPRO 286 is modular in concept, allowing all subsystems, including the processor, to be easily exchanged as your needs dictate. When advanced system configurations are available this concept, with its ease of upgrade, protects your investment.

If you are an experienced computer user, you can set up your KAYPRO 286 and begin operations almost immediately. Chapter Two contains the instructions for setting up your system, initializing your hard drive and installing your software.

If you are a novice computer user, read the overview section of this chapter then turn to Chapter Two and follow the instructions for setting up your system and the power-up test. If at any time you feel you need help, particularly before beginning the section on initializing your hard drive, turn to Chapter Three or your *MS-DOS User's Guide* for tutorial information.

Overview

* **Chapter One** provides a road map of how to use this manual, offers suggestions on where to turn for further help, and gives you an outline of the standard features of your machine.

* **Chapter Two** explains the hardware setup procedures for your machine including important information on initializing your hard drive and software installation for the KAYPRO 286.

* **Chapter Three** contains tutorial information about personal computers, operating systems, commands, and files. **If this is your first computer, start in Chapter Three.**

* **Chapter Four** contains information on the Master Menu system including how to run frequently-used MS-DOS commands from Master Menu. This chapter also has a special section on working with directories.

* **Chapter Five** contains information additional MS-DOS commands including wildcards, shortcuts, and other special features.

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

* **Chapter Seven** discusses video with the KAYPRO 286.

* **Chapter Eight** covers the useful Kaypro utility programs packaged with your computer.

* **Appendix A** contains special information about adding a second MS-DOS partition.

* **Appendix B** contains information about modifying Master Menu.

* **Appendix C** has a listing of audible error messages or beep codes.

* **Appendix D** is a standard ASCII chart.

Where do I turn for further help?

Your local Kaypro dealer can answer most of your initial questions about your Kaypro Computer. If you want additional background on personal computers, or information on a topic not covered in these manuals -- **send in your warranty registration card.** As a registered owner of a Kaypro computer you will receive: Information on the nearest Kaypro User's Group. We recommend joining User's Groups. These groups can be the most enjoyable way to get information and helpful hints from people with computers like your own.

You can also get information on User's Groups by contacting: Kaypro Users Group Manager, 533 Stevens Avenue, Solana Beach, CA. 92075. The phone number is (619) 481-4368.

For technical help with a specific applications software product, we suggest contacting the manufacturer of the product. For software packages shipped with your computer, call our software support line at (619) 481-3920.

Features of the KAYPRO 286

Your KAYPRO 286 computer system has seven major subsystems consisting of:

* The 80286 Processor Board including 1MB of memory,
* A 40 MB fixed disk drive,
* A 1.2MB diskette drive,
* An I/O card with an RS232C serial port and a Centronics-compatible parallel port
* A multi-mode video adapter, and
* A monochrome video monitor.
* An enhanced detachable 101 key keyboard, with 12 programmable function keys, and separate keypad and cursor control keys.

The heart of the KAYPRO 286 is the Model 5624 Processor board with an 80286 microprocessor. The advanced architecture of the 80286 yields increased efficiency in applications program execution, which is enhanced by the 12MHz clock rate at which your KAYPRO 286 operates. The processor is so efficient that a switch is provided to slow it down to a 6MHz clock rate required by some applications programs which use timing loops.

Your KAYPRO 286 has a bus board (or backplane) which accommodates the system adapters. There are nine slots available, of which four are used, providing five for expansion of your system. Of these, three are byte-wide (PC compatible) slots -- two half-length and one full-length and two are word-wide (AT compatible) full-length slots. Your KAYPRO 286 is a low-profile enclosure, accommodating PC height adapter boards.

Your KAYPRO 286 computer system features a 160 watt power supply with sufficient power to add additional fixed disk and diskette drives, or other mass storage devices as required by growing needs. Two drive bays are provided for this type of expansion. Consult your Kaypro dealer for these options as they apply to your KAYPRO 286.

Today's MS-DOS compatible applications programs usually employ the full 640KB of memory that MS-DOS will address. This memory is resident on the processor board. The remaining 384KB of memory on the board is at the 1MB address boundary and can be used by RAM Disk and disk cache utility programs that increase the efficiency of applications programs that frequently access your fixed disk.

Chapter Two

Hardware And Software Installation

Chapter Two

Hardware and Software Installation

Hardware Installation

The following pages explain how to connect your computer components and prepare them for operation. If you would like tutorial information before you begin, please refer to the material in Chapter Three.

1. 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

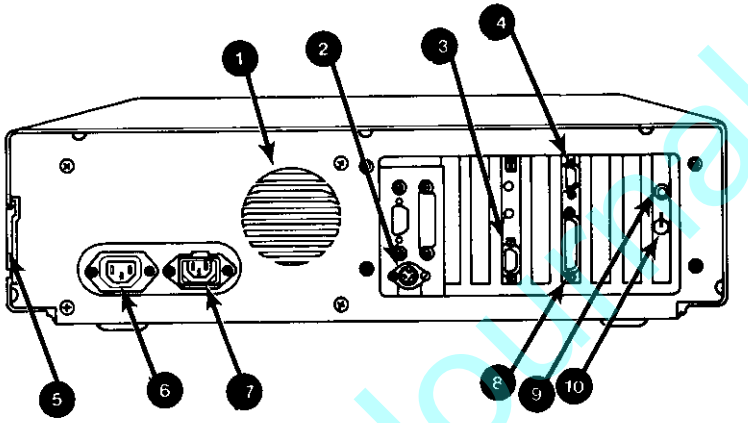
Set aside the packing materials and save them in case you need to transport the computer.

Note:
The illustrations in this manual are intended for use as representations, not precise replicas of your KAYPRO 286.

---

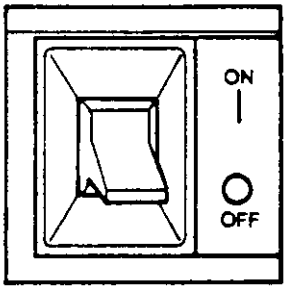
2. Set the computer on a flat work surface. The ideal work surface is a sturdy table or desk that allows access to the front and rear of the unit. Have a small (#2) screwdriver handy.

3. Refer to the illustration below and note the position of the keyboard connector (2), the power switch (5), and the computer power cord connector (7).



1. Fan
2. Keyboard Connector
3. Video Connector
4. Serial Port (RS-232C)
5. Power Switch
6. Monitor Power Connector
7. Power Cord Connector
8. Parallel Port (Centronics)
9. Reset Button
10. Clock Speed Switch

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



5. 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.

6. Take a moment to look at the video (3) and serial (4) connectors. The video connector port can always be distinquished from the serial port even though they are both nine-pin connectors. Refer to the illustration below. The serial port is a male DB-9 connector because it has pins that stick out and the video connector is female because it has receptors for pins. Kaypro monitors have a nine-pin connector (a DB-9S) at the end of their signal cables. This connector fits into the video connector port (3). Use a small slotted screwdriver to attach this connector to the video connector port (3).

Serial Connector

Video Connector

7. Make sure the monitor power switch is turned off. Then plug the power cord from the monitor into a grounded 115-volt wall outlet.

8. Connect the keyboard cord to its connector (2) on the computer.

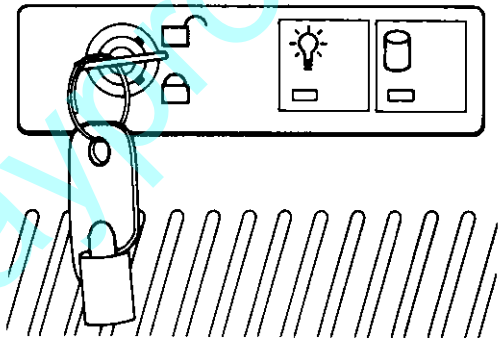
9. Remove the cardboard protector from the diskette drive. Save the protector and put it back in the diskette drive whenever you transport the computer.

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

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

12. 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. Setting the lock will not prevent the computer from starting, nor will it shut off the power if you lock it while the computer is operating. It will prevent unauthorized persons from tampering with your computer when you are away from your desk.



You have now completed the mechanical part of installing your computer. The computer should now be properly connected for operation.

Power-Up Test

Follow these instructions to test the connections you've made to this point.

1. Verify that all the power cords are plugged in and that the cardboard protector has been removed from the diskette drive.

2. Position the monitor, system unit, and keyboard the way you want them.

3. Turn on the monitor.

4. Turn on the computer with the switch on the side.

How Can I Tell If It's OK?

If everything is connected properly, you should see and hear the following:

1. The green LED will light up beneath the light bulb icon in the keylock panel.

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 Random Access Memory (RAM) for integrity. Its progress will be reflected 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 upper disk drive (Drive A) will come on, as the computer begins looking for a diskette containing the Operating System (MS-DOS) files. The red LED will light up beneath the hard disk icon in the keylock panel as the computer continues its search for the MS-DOS files.

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 i 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.

If your dealer has installed the MS-DOS files for you, the KAYPRO 286 wi load the operating system and present you with either a system prompt (C:\ or a request to enter the time and date.

If your dealer has installed ALL of your software for you, the computer will present you with the Master Menu Program (see Chapter Four for particulars).

If the Disk Operating System files have not been installed on your hard disk your screen will display something like this:

Invalid configuration information - please run SETUP program
Strike the F1 key to continue

Followed by something like this:

No boot device available
Strike the F1 key to continue

So far so good! If you see any of these three messages, then you know you have properly connected the keyboard and monitor, and that the computer knows enough to look for the Disk Operating System files.

If anything ELSE happened...

* Check that your keyboard is connected properly. If not, there will be an error message on the screen.

* Make sure the screws on the monitor plug have been carefully tightened.

* Check your power cords for good connections. If your wall outlet or surge suppressor has a switch, make sure it's switched ON.

Where To Turn Next

Your next step depends on how much has been done for you already.

If your power-up test ended with a system prompt (C:\) or a request to enter the time and date: read the information about the SETUP program and then turn to the section on installing your software.

If your power-up test ended with the Master Menu Program on the screen, turn to Chapter Four to start using the Master Menu Program.

If your power-up test ended with the "no boot device" message: read the information about the SETUP program and then follow the instructions on the next few pages to partition and format your hard drive.

If your power-up test ended with a distinct pattern of "beeps" note the pattern and turn to Appendix C for a listing of the audible error codes. Then call your Kaypro dealer for help.

The SETUP Program

The KAYPRO 286 stores information about itself in a battery-backed memory. This memory, called CMOS RAM, is consulted when the machine is first turned on. The configuration information in CMOS RAM is entered and updated with the SETUP program. The SETUP program is run before your KAYPRO 286 leaves the factory and is probably still correct. However, sometimes when a unit is shipped the CMOS RAM loses the factory setting this is referred to as "falling out of SETUP".

If the system falls out of SETUP or if you or your dealer change the configuration of your computer in any way (including changing the date and time) you will need to run SETUP. You do not need to reboot before running SETUP but you must reboot after running SETUP if you have made any changes.

To run the SETUP program before installing your software, place the first Master diskette in the A drive and reboot the KAYPRO 286 using one of two methods: Press the *Ctrl*, *Alt* and *Delete* keys, or push the reset button at the rear of the computer.

You may need to press *F1* if prompted. The AUTOEXEC.BAT file on this diskette will load the INSTALL program. You need to stop this program from loading or to exit it after it is loaded by pressing the *Pause/Break* key while holding down the *Ctrl* key. The screen will display one of two messages:

If the screen displays **Ok.** Type **SYSTEM** and press *Enter*.

If the screen displays **Terminate batch job?** type **Y** and press *Enter*.

At the **A>** prompt type **SETUP** and press *Enter*. A menu similar to this will be displayed:

```
CMOS RAM SETUP utility version x.xx
Copyright 1985 by Kaypro Corporation

F1> Current time is xx:xx:xx
F2> Current date is xx/xx/19xx
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] - Type 40
F6> Second hard disk drive [drive D] - Not installed
F7> Display - Enhanced graphics adapter        [found EGA]
F8> Base memory size is  640K                  [found 640K]
F9> Expansion memory size is 384K              [found 384K]
F10> 80287 numeric coprocessor is not installed [found no coprocessor]

  * 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.
```

Read the configuration information listed on your screen carefully.

When you run SETUP the program makes specific calls to the hardware and reports on what type of video card is installed, how much memory (base and expansion) is installed, and whether an math coprocessor is installed. The information the program gives you about whether these items are installed or not is the most accurate way to determine whether they are installed in your system. The video card information is important when you run the INSTALL program and install your software later in this chapter.

The SETUP program does not look for the first six items listed on the screen and if they are shown as uninstalled it will not report on whether they are present or not. If the first diskette drive and first hard drive are listed as not installed you must enter the proper values. The current standard hard drive is a 40MB type 40 drive. The current factory-standard diskette drive is a 1.2MB high density drive. Check your documentation package for any updates and changes.

Through this screen you can change the values in the CMOS RAM. Follow the directions on the screen to make any needed changes. To change the date and time you must type the punctuation as well as the numbers and you must use the full date (1987 not just 87). After you have entered your new parameters press *Esc* to exit to MS-DOS. Reboot after exiting SETUP.

Notes on SETUP:

By following the instructions in this chapter and in Appendix A your hard drive is divided into at least two logical drives. There is only one physical drive, and one drive (drive C) for the purposes of the SETUP program.

After you install your software the SETUP program will be located in the UTILITY subdirectory.

Partitioning with MS-DOS

The KAYPRO 286 comes with a 40MB hard drive. Current versions of MS-DOS can only support 32MB. To use your entire drive it must be divided into manageable sections or partitions. This is known as partitioning the drive. The hard drive shipped with the KAYPRO 286 has already been low-level formatted, however, no MS-DOS partitions have been created. Before proceeding any further you must partition and high-level format your hard drive. First, you need to decide what size MS-DOS partition you want.

The instructions on the following pages explain how to create the first MS-DOS partition. Creating a 20MB partition and a 30MB partition is explained. Creating a second partition for use with MS-DOS is discussed in Appendix A.

1. After you have exited the INSTALL program as shown on page 2-8, you will be at the system prompt (A>).

   Type: **FDISK**
   Press *Enter*.

   A menu similar to this will appear:

```
Fixed Disk Setup Program Version x.xx
(C) Copyright Microsoft, 198x.

FDISK Options

Choose one of the following:

  1. Create DOS Partition
  2. Change Active Partition
  3. Delete DOS Partition
  4. Display Partition Data

Enter choice: [1]

Press ESC to return to DOS
```

2. Press *Enter* to go to the **Create DOS Partition** menu.

3. Type N and press *Enter* to partition part of the disk.

   A menu similar to this will appear:

```
Total Fixed Disk Space is xxxx cylinders
Maximum available space is xxx.
Cylinders at xxx.
Enter partition size . . . . . .[xxx]
```

4. Type 307 and press *Enter* to create a 20MB partition or type 461 and press *Enter* for a 30MB partition.

5. If prompted for the starting cylinder press *Enter* for the default starting cylinder.

6. In order to boot from your C drive the partition you've just created must be the active partition. After the partition is created press *Esc* and then select option 2 from the main FDISK menu.

A menu similar to this will appear:

Change Active Partition

Current Fixed Disk Drive: 1

Partition	Status	Type	Start	End	Size
1	A	DOS	0	xxx	xx
2	N	non-DOS	xxx	xxx	xx

Total disk space is xxx cylinders

Enter the number of the partition you want to make active. . . . . .: [1]

You can only have one active partition. Press *Enter* to make partition 1 active.

7. Press *Esc* to exit FDISK and then press any key to reboot.

If you've reached this point, congratulate yourself. You have physically set up your KAYPRO 286 and successfully partitioned your hard drive.

You can create additional partitions for use with MS-DOS at any time. If you want to create additional partitions now turn to Appendix A. If you want to create a partition for a different operating system, consult the documentation for the other operating system.

Software Installation

In the previous pages, we explained the steps required to prepare your computer hardware for operation. That's the first half of the installation process. Now comes the second half -- formatting your hard drive and installing the software.

Before installing software on your KAYPRO 286 you or your dealer should have run the SETUP program following the instructions on page 2-7 and partitioned your hard drive following the instructions beginning on page 2-9.

The KAYPRO 286 comes with a variety of useful software programs, to enable you to use your computer right away. All "bundled" 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. You will be copying the programs onto your hard disk and setting up your Master Menu system.

To simplify the process, Kaypro has written an installation program which handles most of the planning and organizational work. Once you start the program, it will guide you through the remaining steps.

If you've just completed the hard disk partitioning, skip step 1 below. When you exit FDISK the machine will reboot and load the INSTALL program.

1. Start the computer with the first Master diskette in Drive A. The computer will automatically load the INSTALL program, which is written in GWBASIC.

2. You will be prompted to respond to questions about your type of machine (286), whether you are using an EGA video board (are you?), and whether you are using a color monitor (probably not).

3. After answering these questions, the program may ask you for the date and time. The numbers of the date can be separated by hyphens or slashes. You do not need to type the 19 in the year. Next, type the correct time, using colons to separate the hour and minutes. Use a 24-hour clock, or military time. To determine the correct time, in the afternoon, add twelve hours to the present time. One o'clock in the afternoon is the same as 13:00. You need not enter the seconds <*ss*> or hundredths of seconds <*cc*>.

4. Next, you will be given a menu of installation choices:

Hard disk install menu
1) Format
2) Install programs onto hard disk
3) Install a floppy-disk-only version of an application
4) Exit this install program

Select option 1 to format your hard disk. Follow the screen prompts carefully.

5. When the menu returns select option 2 to install your software programs. Continue to follow the screen prompts, changing diskettes as necessary until the process is complete. If you insert the wrong diskette, the INSTALL program will ask you to insert the correct one before continuing.

6. When the menu returns again, you may exit the installation program by choosing option 4 and responding to the next prompt by pressing *Enter*.

7. To verify that all has gone well so far, remove the diskette from Drive A and reboot the computer (either push the red button at the rear of the machine or hold down the *Ctrl, Alt,* and *Del* keys at the same time).

The computer will go through a series of commands and then the screen will display the Master Menu Program. See Chapter Four for details on using the Master Menu Program.

Rebooting The System

It is unnecessary to restart the KAYPRO 286 by turning it OFF and ON with the power switch. If you need to restart the computer, you should reboot. When computer is rebooted, it will go through many of the same steps as when it is first turned on. This 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 you've been following the instructions in this manual so far, you've already rebooted several times. There are two approved methods fro rebooting:

* Pushing the red button at the rear of the machine.

* Holding down the *Ctrl, Alt,* and *Del* keys at the same time.

CAUTION:
When you reboot the system using any of the approved methods, this will erase everything that is currently in RAM.

Chapter Three

Tutorial Material

Chapter Three

Tutorial Material

The Keyboard

The computer keyboard's typing angle can be adjusted by moving the fold-down legs on the bottom.

The Keyboard: Layout

The keyboard layout is as follows: across the top there are twelve programmable function keys and some other special keys. To the left there is a typewriter style section. In the middle there is a set of cursor function keys. A numeric keypad is on the right. Take some time to familiarize yourself with the keyboard's arrangement.

The Keys Across the Top

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

F1 through *F12*: These keys are multi-purpose programmable function keys. The function of each of these keys is determined by the program in use. Some of these keys are also used by MS-DOS.

Print Screen/SysRq: sends the current screen display to a parallel printer. Unlike the *PrtSc* key on older keyboards, you do not need to be holding down the *Shift* key for the Print screen function to work. When you hold down the *Ctrl* key and press this key, the screen display echoes 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 when used with MS-DOS operating system.

Scroll Lock: used by some programs to effect display scrolling. MS-DOS does not use this function. When you press this key, an indicator light located above the numeric pad tells you the *Scroll Lock* is activated.

Pause/Break: depending on the program in use, this key pauses the scrolling of text or pauses the operation of a program. This key also functions as a *Break* key and is often used simultaneously with the *Ctrl* key to stop a command.

The Keys On The Left: The Typewriter Area

The keys on the left make up the largest section of the keyboard. These keys are similar to those of a typewriter. However, there are a few special keys that you should become familiar with.

Tab: moves (tabs) the cursor horizontally multiple spaces. This number of spaces depends upon the program in use. When "shifted" it tabs backward in some programs.

Caps Lock: 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. If you have the *Caps Lock* on, the "shifted" position for the alphabetic keys is lower case. When you press this key, an indicator light located above the numeric pad tells you the *Caps Lock* is activated.

Shift: operates much like a typewriter's *Shift* key, but it does not lock into place. In addition to converting the alphabetic keys, number keys and punctuation keys to their shifted function, it also puts the keypad keys into numeric rather than function mode when the *Num Lock* is not on. When *Num Lock* is on, the *Shift* key puts the keypad characters into function mode. There are two *Shift* keys.

Ctrl: (Control) is always used with one or two other keys. Like the *Shift* key the *Ctrl* key must be held down while another key is pressed. Unlike other keys which display on the screen when you press them, the *Ctrl* key sends part of a signal to the computer -- the second half of the signal is the key (or keys) pressed while the *Ctrl* is held down. What the signal means depends on what program is in use and the other key(s) pressed. The key is also shown as this character ^. For example: press and hold down the *Ctrl* key and press the *G* key. This would be notated as ^G and pronounced "control G". There are two *Ctrl* keys on the keyboard.

Alt: is used with one or more other keys to generate an alternate function of the other key(s). It operates much like the *Shift* and *Ctrl* keys. There are two *Alt* keys on the keyboard.

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

Enter: tells the computer to execute a command. Typing a command and pressing the *Enter* key is known as "entering" a command. It also works like a carriage return by moving the cursor to the start of a new line. It is often called "Return" and shown like this <cr>. There is also an *Enter* key in the keypad section of the keyboard.

The Middle Section: Cursor Control And Other Keys

Insert: allows you to insert characters at the cursor position 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 Keys On The Right: 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.

The mathematical function keys are different from older keyboards. They are single mode keys unaffected by the *Num Lock* key. In addition, the keypad now has an *Enter* key.

Num Lock: switches the numeric keys on the keypad from numeric mode to function mode and back again. When you press this key, an indicator light located above the numeric pad tells you the *Num Lock* is activated.

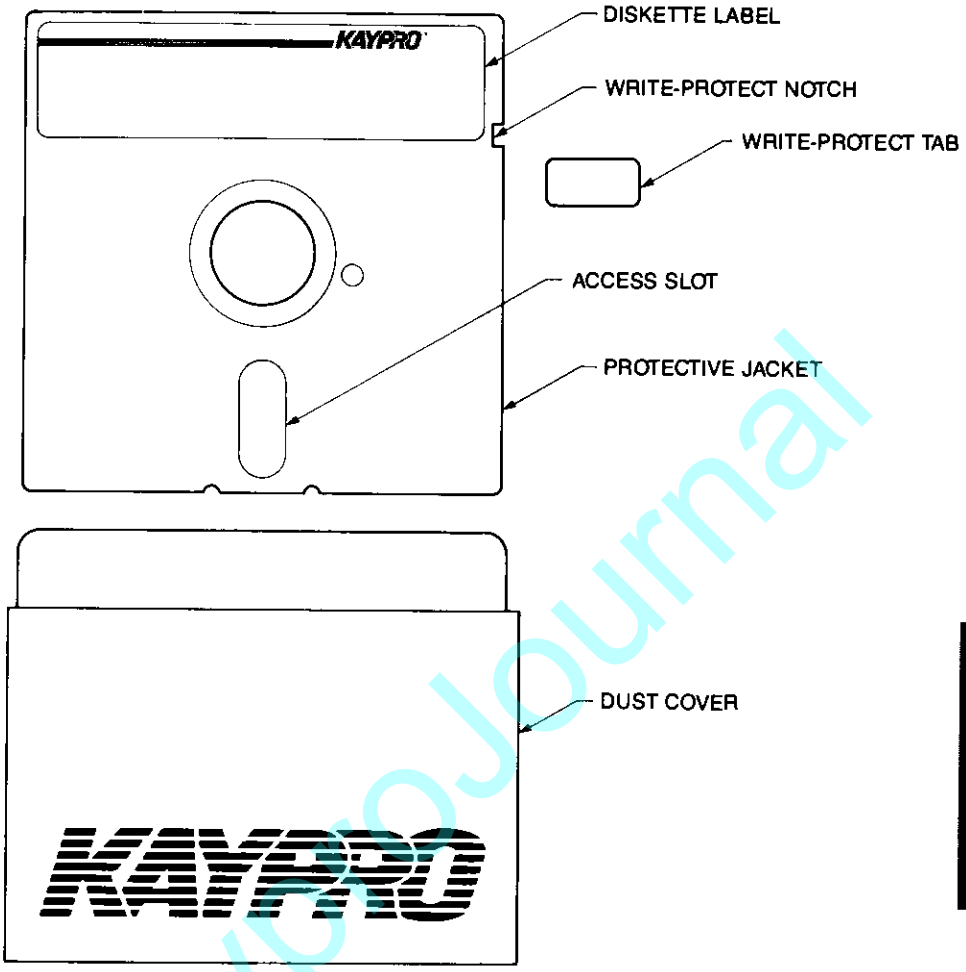
The numeric keys, when the *Num Lock* key is on, output numbers when pressed. When operated in function mode, the numeric keys perform functions relating to cursor movement. These keys in function mode perform exactly like the cursor control keys.

Diskettes

The KAYPRO 286 stores information magnetically on the surface of an oxide-coated mylar diskette, which is permanently sealed inside a protective envelope. Diskettes have invisible tracks along which magnetic pulses are recorded. Computers use these pulses to store information.

The KAYPRO 286 uses 5.25 inch double-sided, double-density, soft-sectored diskettes as a permanent form of data storage. The 286 can use either 1.2 Megabyte high capacity or 360 kilobyte diskettes.

The 1.2MB diskettes are generally marked 96 TPI or 1.2MB and the 360K diskettes are sometimes labelled 48 TPI or DS/DD. While the high density diskettes can store more information, they are more expensive and PC style computers cannot read these diskettes.



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. When a 360K diskette is formatted (using the FORMAT command's /4 option) for the KAYPRO 286 it is magnetically imprinted with 40 circular tracks, with each track having 9 sectors. When a 1.2MB diskette is formatted for the KAYPRO 286 it is imprinted with 80 circular tracks, with each track having 15 sectors.

Chemicals from a fingerprint on the exposed surface of a diskette can destroy the product of an entire day's work. Below on 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 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.

Saving Data and Backup Diskettes

Many applications packages hold data in memory until told to write it to disk. As you create and change files, make it a practice to save your information to disk. Any data still in memory and not saved on disk will be lost if the power fails or the computer malfunctions. Saving your work at frequent intervals safeguards against loss.

It is important to make backup copies of program diskettes to ensure that, if one is lost or damaged, you will have a replacement. With a hard drive machine it is also important to make backup diskettes of the information on your hard drive. How frequently you make backup copies of your files depends on how many changes you make 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 notch. If this notch is covered, 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.

Labelling 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.

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 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.

You Won't Hurt The Computer

The biggest fear of new computer users is "what if it breaks?" Relax, it is much more difficult to break your computer than you might think. Like a television, VCR, or stereo you can hurt the computer by dropping it, spilling liquids on it, and dropping foreign objects into it. You are not likely to break the computer while using it.

Operating Systems and Commands

Like all computers, the KAYPRO 286 does not understand English. It responds to specific instructions in a different kind of language made up of binary numbers, or groups of ones and zeros.

At the simplest level, all computers are based on a series of on-and-off switches. These switches are indicated by 0's and 1's, known as binary numbers. Early computer programmers made the machines perform different functions by physically turning switches off and on in various patterns. Today's computers function very much the same way, but instead of physically moving the switches we now use operating systems, programming languages, and application software to tell the computer what to do.

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 what you type to all 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 lower case if you wish.

The KAYPRO Master Menu program was written to make many operating system functions even easier. The program lets you execute many MS-DOS commands and run applications software in a friendly and interactive environment. Because Master Menu operates within the MS-DOS environment it is important for you to have a basic understanding of MS-DOS.

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 diskette or 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 or diskette when 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 commands. It also indicates that you are interacting directly with the operating system and not with an application software package.

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 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 unit, the upper drive is called drive A, and the lower drive is drive B. On a hard-drive unit 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 valid 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 machine, the computer automatically looks to drive A as the default drive every time you start the computer. On a hard-drive unit the computer looks to drive C unless there is a diskette in drive A.

To change the default drive after you have booted, type the letter of the new drive, followed by a colon, at the system prompt 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 drive. 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, manuals, 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 or spreadsheet. 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. A simple file specification consists of an optional drive specification, a file name of one to eight characters in length, and an extension name of zero to three characters in length.

DriveSpec:Filename.Ext

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

BATch 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*.

COMmand file. This is a program file.

EXEcutable 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.

SYStem 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 a .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. However, you may encounter unexpected results if you use the .BAT extension. It is standard practice to use extensions to indicate what type of file the file is (.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	(])
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,LPT3
Test Device	NUL

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

Chapter Four

Master Menu And Directories

Chapter Four

Master Menu And Directories

Now that you've installed your hardware and software, following the instructions in Chapter Two, you're ready to start working with Master Menu and MS-DOS. If you're a new computer user, be sure to read Chapter Three before you begin.

The first part of this chapter contains information to help you get started with the Master Menu Program. The second part of this chapter is a special section on directories.

What's Been Done For You

When you or your dealer installed your software using the INSTALL program, the following things happened:

1. A specific organizational structure was created on your hard drive.

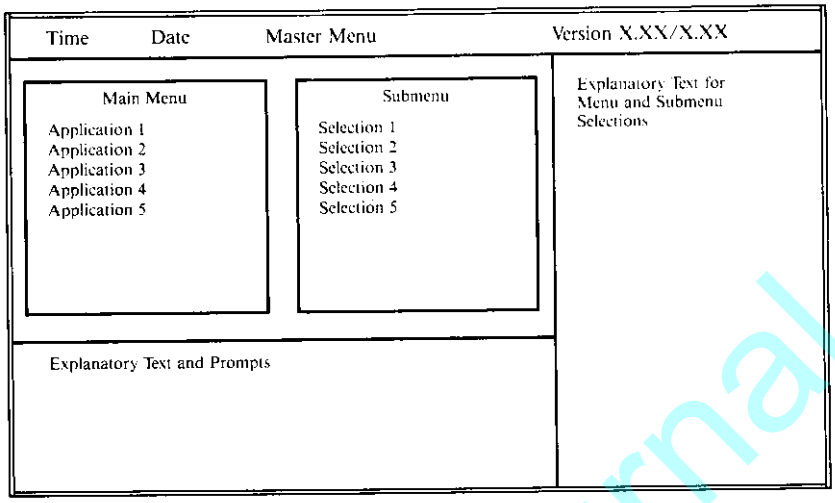
2. Your application software was installed within that structure.

3. A special batch file, called AUTOEXEC.BAT was created. This file automatically executes on power-up and contains a series of commands including a program that starts Master Menu.

The Master Menu Program

Start the KAYPRO 286. Just as before, the computer will check its memory and perform a number of housekeeping tasks. Then you will see the Master Menu.

From the Master Menu you can use most of the application software that came with your KAYPRO 286. You can format diskettes, copy files, make complete duplicates of diskettes, and backup your hard drive. To run any of the software packages that appear as options from Master Menu you do not need to type the program name. You select the program with the arrow keys.



The top bar contains the time, date, and version number of the Master Menu program. In the large central area you will see an outlined box entitled Main Menu. In the right-hand sidebar you will see explanations of the currently highlighted menu item. The lower left bar has instructions of how to move around in Master Menu.

There are a number of different submenus listed under the Main Menu. From each submenu you can perform a variety of different tasks.

Use the arrow keys as directed to explore the different menus and options. If you choose an item by mistake you can usually cancel the activity by pressing *Esc*. If you press *Esc* by accident and the screen displays:

C:\main>

Type: **MENUST**
Press *Enter* to return to Master Menu.

Master Menu is a helpful tool, but you will frequently need to work directly with MS-DOS and the various applications packages. When using Master Menu you still need to be acquainted with MS-DOS and the directory structure of your system. If you are new to hard disks and directories turn to the special directory section of this chapter.

From Master Menu you can run most of your application software and do many of the day-to-day housekeeping chores. In this chapter we will be concentrating on the Utilities and Backup & Restore Submenus.

The chart below lists some of the menu selections available from Master Menu and the MS-DOS command or commands invoked. It is important to note that there are differences between Master Menu and MS-DOS. Some of the commands discussed here are entered in a different manner when working directly with MS-DOS. In addition, there is a **Locate File(s)** option which is the Kaypro LOCATE program discussed in Chapter Eight.

Master Menu Utilities	MS-DOS Commands
Format a Diskette	FORMAT.COM
Space on Disk	CHKDSK.EXE
Directory	DIR/P
Copy Files	COPY
Diskcopy	DISKCOPY.EXE
Set Time & Date	DATE TIME
Back Up Hard Disk	BACKUP.EXE
Restore	RESTORE.EXE

Consult the *MS-DOS User's Guide* for more information about the operating system and the commands covered here. Consult the manuals that came with your software for how to use the applications packages.

Formatting Diskettes

As you know from Chapter Three, MS-DOS cannot use a diskette until it has been formatted. The FORMAT program prepares diskettes for use. FORMAT is an external MS-DOS command. The Master Menu program calls up the program and allows you to format diskettes without leaving the Master Menu.

FORMAT 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 erases all information previously stored on a diskette or hard disk. Any important files contained on a diskette must be copied to another diskette or the hard drive before reformatting. When formatting you must designate a drive. On your KAYPRO 286 the first partition on your hard drive is drive C and the second partition is drive D. The top diskette drive is drive A. If you have an optional second diskette drive it is drive B. *Do not designate drive C or D when formatting* or you will lose every file on your hard drive.

To begin the format procedure you will need at least one blank diskette.

1. Turn the computer and monitor on.

2. After the Master Menu program appears on the screen, insert a blank diskette into the diskette drive (drive A). Carefully slide the diskette into the drive with the label up, and the access slot forward. Latch the drive.

4. From the Master Menu, use the down arrow key to select **Utilities**.

5. Use the right arrow key to enter the Utilities menu. Your options will look something like this:

Utilities

Locate File(s)
Format Diskette
Space on Disk
Directory
Copy Files
Diskcopy
Set Date & Time

6. Use the down arrow key to highlight **Format Diskette**. Then press the right arrow key.

Master Menu program calls up the MS-DOS program FORMAT.

7. To format the diskette in the A drive at the **Drive** prompt type **A:** and press *Enter*. If it is a 360K diskette, type **/4** at the **Switches** and press *Enter*. For a 1.2MB diskette just press *Enter*.

The /4 is called a *switch*. A switch is a parameter that causes a command to use a built-in option in the program.

This switch tells MS-DOS that the diskette to format in the specified drive is a 360K diskette. If you do not use this switch MS-DOS and the KAYPRO 286 will assume the diskette is a 1.2MB diskette. Whether you enter the switch or not the instructions are the same as those for the basic formatting procedure. If you forget to add the switch when formatting a 360K diskette the diskette will not format properly.

The screen will clear and the following message should be displayed in the upper left hand corner of the screen:

```
Insert new diskette for drive A:
and strike any key when ready_
```

8. Press any key. The formatting process is automatic from this point on. During the formatting procedure the screen will display:

```
Head : x  Cylinder : xx
```

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.

```
xxxxxx bytes total disk space
xxxxxx bytes available on disk

Format another? (Y/N)
```

9. If you have another diskette of the same type to format, type: Y and press *Enter*.

Remove the newly-formatted diskette from drive A and insert another blank diskette. Repeat this procedure for as many diskettes as you need.

10. If you do not wish to format any other blank diskettes or if you want to format a different type, remove the diskette from drive A type: N and press *Enter*.

11. This will return you to Master Menu. You'll want 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 itself to a 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.

If you start or reset the KAYPRO 286 with a diskette in the A drive, the computer will attempt to boot from the diskette drive. If the diskette is a system diskette, the computer has all the information it needs to reboot successfully. Your KAYPRO 286 will read the diskette in drive A and copy the operating system from that diskette to the computer's internal memory (RAM).

Note:
If you boot or reboot your hard drive unit from a system diskette, the computer will not go through the series of commands in the AUTOEXEC.BAT file on the C drive automatically. To have the computer execute those commands you will have to enter them or copy this file to your diskette and modify it.

If you boot from a diskette that has a different version of MS-DOS, you might not be able to access the hard drive until you reboot.

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. Select **Format Diskette** from the Utilities Menu and press the right arrow key.

2. At the **Drive** prompt, type the drive where the diskette to format will be located (probably A) and press *Enter*.

3. For a 1.2MB diskette type /S and press *Enter* at the **Switches** prompt. For a 360K diskette type /4/S and press *Enter* at the prompt.

Note:
Where a number of different switches are associated with a command, the switches desired are typed separated by a forward slash (/) before pressing *Enter*. See your *MS-DOS User's Guide* for more information.

Listing Files

From the Master Menu, selecting the **Directory** option of the Utilities submenu will give you a listing of files on a disk, diskette, or in a particular subdirectory.

DIR is the MS-DOS command Master Menu calls on to let you know what's on your disk or diskette. The DIR command lists files, their size in bytes, and the time and date they were last altered.

At the **Pathname** prompt enter a specific pathname or press *Enter* to get a listing of the working directory. At the **Switches** prompt press *Enter*. This will give you file listings a page at a time. Notice that although you must separate filenames and extensions with a period the periods do not appear in the listing.

The default /P switch causes the directory listing to pause after each page (usually a screen) and wait for you to tell it to continue.

Viewing the directory listing a screen at a time is good 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, use a different switch at the **Switches** prompt: type /W and press *Enter*.

Just as it can be directed to a different directory, the DIR command can be directed to a different drive. With your newly formatted diskette in drive A, at the **Pathname** prompt type **A:** and press *Enter*. At the **Switches** prompt type whatever switch(es) you want and press *Enter*.

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

File Not Found.

You can also get file listings from the Word Processing Menu. This will list all text files on your MAIN\WRITE subdirectory. It will screen out files with certain extensions.

Copying Files

The COPY command copies files onto a diskette or hard drive. Whenever you need more than one copy of a file, you can use the COPY command to create an exact duplicate. A simplified format of the COPY command 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. Remember that as a hard disk user you should consider a file specification to include a drive designation, pathname, filename and extension.

Let's copy the file D.COM from your Utility directory to the diskette in drive A. From the Master Menu select **Copy Files**. At the **Source** prompt:

Type: **C:\UTILITY\D.COM**
Press *Enter*

At the **Destination** prompt:

Type: **A:D.COM**
Press *Enter*

The screen will clear and very briefly you will see the message **1 File(s) Copied** before returning to Master Menu.

You can change the filename as you copy the file. To copy the file D.COM to the A drive and rename it TEST.COM, at the **Source** prompt:

Type: **C:\UTILITY\D.COM**
Press *Enter*

At the **Destination** prompt:

Type: **A:TEST.COM**
Press *Enter*

Again you will see the message **1 File(s) Copied**, and the file TEST.COM will be on the diskette in the A 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 (have two files of the same name on the same diskette or subdirectory) and you cannot copy system or hidden files.

At the system prompt, you enter the COPY command differently. The source and destination files appear in the same order as when you use Master Menu but they're on the same line. Additional features of the COPY command include using a /V switch to verify the copy, and using wildcards and special characters with COPY. For an explanation of these options see your *MS-DOS User's Guide* and Chapter Five.

Copying A Diskette

Unlike COPY which copies files one by one, DISKCOPY copies diskettes by making an *exact image* of a diskette. This is good for making backup copies of program diskettes.

1. From the Master Menu you would select **Diskcopy**.

2. At the **Source drive** prompt type the drive where the diskette you want to copy will be located (on a standard machine, A:) and press *Enter*.

3. At the **Destination drive** prompt type the drive where the blank diskette will be located (again probably A:) and press *Enter*.

4. The screen will clear.

5. A message like this will appear in the upper left corner of the screen:

```
Insert SOURCE diskette in drive A:
Strike any key when ready_
```

The source diskette is the one you want to copy.

6. After you have inserted the diskette and pressed a key the screen will display a message telling you what it is doing.

7. Next the screen will display this message:

```
Insert TARGET diskette in drive A:
Strike any key when ready_
```

The target is the blank diskette you want to copy to.

8. When the copying is completed, the following message will be displayed:

```
Copy another (Y/N)?_
```

9. Respond Y to make additional copies. Steps 5 through 8 will repeat.

   Or,

   Respond N to return to Master Menu.

What are the advantages of DISKCOPY?

You do not have to format a diskette before copying files onto it--DISKCOPY automatically formats unformatted diskettes.

DISKCOPY is also faster than using the FORMAT and COPY commands separately.

What are the advantages of using COPY?

The COPY command copies files to a formatted diskette sequentially -- the information will be in order. The DISKCOPY program, on the other hand, makes an exact track-by-track duplicate of the original diskette.

When a program places information on a diskette, it puts data wherever it can find room--it writes randomly to the diskette. One file may be chopped up into fifty sections and be stored in fifty different places on a single diskette.

When backing up a data or text diskette that has been read and written to all day, 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.

Setting the Date and Time

MS-DOS uses the system time (actually known as the Time-Of-Day clock) to keep track of time. Some people mistakenly refer to this as the MS-DOS clock. The MS-DOS system time is not a clock at all but a software program with values that would normally disappear when the machine is reset. On power-up these values are set to those held in CMOS RAM.

You can change the MS-DOS system time with the DATE and TIME commands and with the **Set Date & Time** option. When you select this option, Master Menu calls up a special program that uses the MS-DOS DATE and TIME commands. The **Set Date & Time** option does not change the CMOS RAM RTC (real-time clock).

The CMOS RAM RTC is set before the KAYPRO 286 is shipped. Like the other information held in the CMOS RAM these values can only be changed through the SETUP program.

Checking Space on A Disk

CHKDSK is a program that examines a diskette or hard drive for errors. CHKDSK also tells you how much total storage capacity it has, how many files there are, how much space is left, how much RAM is in use and how much RAM is available.

You should run CHKDSK at regular intervals. From Master Menu, you call CHKDSK by selecting **Space on Disk**. At the **Drive** prompt type either **C:** to select the first hard disk partition or **A:** to select your diskette drive, then press *Enter*.

If you choose the hard disk, CHKDSK will give a status report similar to this:

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

  21204992    bytes total disk space
     45056    bytes in 3 hidden files
     12288    bytes in 6 directories
   1955840    bytes in 137 user files
  19191808    bytes available on disk

    655360    bytes total memory
    605776    bytes free

Strike a key when ready
```

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

Backing Up the Hard Disk

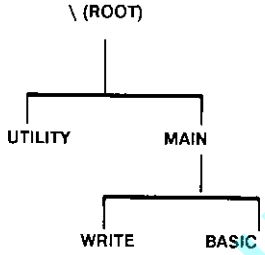
Another housekeeping chore you can do from Master Menu is backing up and restoring some or all of the files on your hard disk. Master Menu calls on the MS-DOS programs BACKUP and RESTORE to do this. You may choose to back up some or all of your files. You cannot use the files that have been backed up until they have been restored with RESTORE.

Depending on the number of files you have created on your hard disk and whether you are using 360K or 1.2MB diskettes it could take 60 or more formatted blank diskettes to back up your C drive.

Section Two: Directories

MS-DOS provides a method of organizing files on a disk, using a structure of *directories*. Directories are separate storage areas for files. Files in one directory are isolated from files in another.

Directories are arranged in a tree-like structure with branches extending downward, as shown in the example below:



The top directory in the tree is called the *root* directory. It is represented by a \. The root is created automatically when you format a diskette or hard drive.

If you had a two-diskette-drive unit, you might never need any directories other than the root. But with a hard drive, organizing files into directories is generally considered necessary since a hard disk can store more than sixty times as much information as a single diskette.

Other than the root, directories and subdirectories do not exist until they are created. The level below the root directory in the structure are *subdirectories*, special files that can hold other files. When you, or your dealer, went through the installation procedure, directories and subdirectories were created.

Directories or subdirectories other than the root may have any number of subdirectories. If you think of the directory tree as being like a family tree it's easy to understand that each subdirectory has a parent directory, which is the directory above it in the structure. In the chart, the root directory is the parent directory of MAIN, and MAIN is the parent directory of WRITE and BASIC.

The root directory contains the AUTOEXEC.BAT file, COMMAND.COM and the subdirectories MAIN and UTILITY.

UTILITY contains the MS-DOS program files, GWBASIC, and useful KAYPRO utilities.

MAIN contains the files that run Master Menu and two subdirectories: WRITE and BASIC.

WRITE contains Word processing programs.

BASIC contains any files you might create while running BASIC from Master Menu

The Working Directory

Under MS-DOS every drive has a *working (or current) directory*. When MS-DOS starts up, the working directory on any drive is the root directory. When the working directory of a drive is changed, access to that drive will take place in the new working directory unless you designate another directory. When you boot your system, the working directory is automatically changed to MAIN.

MS-DOS keeps track of the working directory in much the same way as it keeps track of the default drive. Individual directories are isolated from each other giving the appearance of separate disks. A directory listing of the files on drive C will not show a file on the diskette in drive A. You must either change drives or tell MS-DOS where to look. The same is true for files in different directories or subdirectories.

Accessing Files and Pathnames

Files in separate directories are not totally isolated. You can access files that are not in the current directory in much the same way that you access files that are not on the default drive.

Directory Paths

You can move from directory to directory by means of a path name. A directory path name tells MS-DOS the location of a directory in the directory structure. MS-DOS then follows the "path" you have specified.

A path name consists of a series of directory names separated by backslashes (\) and expressed in 63 characters or less.

Most commands will allow you to place a path name immediately after the drive name and immediately before the file name in the file specification. For example, if you wished to copy a file TEST.TXT from the working directory to the directory \MAIN\WRITE on the C drive, you would:

Type: **COPY TEST.TXT C:\MAIN\WRITE**
Press *Enter*.

Directory paths are similar to road directions. Sometimes you can continue forward or go back just one block and make one turn. Sometimes you have to go back to a major intersection (the root) and make a series of turns to get there from where you are.

There are two kinds of paths: relative paths and absolute paths.

Relative paths are like the easy directions. They tell MS-DOS to start looking for the directory or file at the current directory.

The first item in a relative path is a directory name listed in the current directory. This can be a subdirectory name or .. for the parent directory. In the chart on page 4-13, if the working directory is WRITE, the relative path to BASIC would be:

..\BASIC

Remember, the ".." is shorthand for the parent directory, in this case MAIN.

Absolute paths are like going back to the main intersection. They tell MS-DOS to start looking at the root directory.

The first item in an absolute path is a backslash (\). In the example above, the absolute path to BASIC would be:

\MAIN\BASIC

An absolute path may be immediately preceded by a drive name. For example: C:\MAIN\BASIC

Giving Directions - PATH

Separating information into directories and subdirectories has its drawbacks. If you try to run an external command that is not in the current directory and MS-DOS does not have instructions to look in other directories, the **Bad Command or Filename** message will greet you. To run the external command you would need to change to the directory where the external command is located. You use the PATH command to give MS-DOS its instructions for where to turn next.

PATH is an internal MS-DOS command that allows you to set up a specific search path for MS-DOS to follow when trying to locate programs. Setting up a search path makes changing directories to run many programs unnecessary. The AUTOEXEC.BAT file created by the INSTALL program sets PATH so that after searching in the current subdirectory MS-DOS looks for external commands in UTILITY, ROOT, and MAIN.

After using PATH, if you enter a command and that file is not in the directory you are using, MS-DOS will look in each of the directories specified by PATH. If MS-DOS finds the program in one of the directories, it will run it. For information on how to change PATH, see Chapter Five or your *MS-DOS User's Guide*.

Because of the directory structure, for many programs you should consider a full file specification to include the drive designation, pathname, filename and extension.

However, some programs, particularly those with overlay files, will not work properly unless the overlay files are in the same directory or subdirectory. In addition, some programs will not accept pathnames as part of a filename. If you experience a problem with a specific program, consult the program's manual to see if it has such limitations.

As you create subdirectories of your own, there will be times when you will be in a current directory of your own creation that is not on the path. If you need to use a program or command in another directory and the working directory is not on the path, you will not be able to access those programs or commands unless you know how to use PATH.

The format for PATH is:

PATH *<path>;<path>;<path>;...*

where *<path>* is any valid absolute path name. Path names are separated from each other by a semi-colon (;). A path name must be expressed in 63 characters or less and the total number of characters, including spaces, symbols and the command itself allowable in the path is 127.

If you type **PATH** with no parameters, it will display the current path setting. To display the current path list:

Type: **PATH**
Press *Enter*

If you have not modified your AUTOEXEC.BAT file, MS-DOS will display:

```
PATH=C:\UTILITY;C:\;C:\MAIN
```

If there is no path designated, MS-DOS will display:

```
path=NO PATH
```

Creating Your Own Directories

Before continuing with this section, you should be comfortable with using directories and aware of the directory structure of your hard disk. As you add applications packages you will probably want to create subdirectories of your own. 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*.

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.

Every directory other than root 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.

Escape from Master Menu by pressing *Esc*. At the system prompt (C:\MAIN >) 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
MENUSUB1  BAT         141      10-13-86 12:37p
    8 File(s)  19189760 bytes free

C:\MAIN >_
```

Displaying Directories -- TREE

Your directory structure may vary slightly from the one shown on page 4-3. 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 command TREE. At the system prompt:

Type: **TREE**
Press *Enter*

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

Type: **TREE/F**
Press *Enter*

You can also redirect the output of the TREE program to create a file of your current directory structure by using the methods described on page 5-8. You can also pipe through MORE or create a printed copy. See your *MS-DOS User's Guide* and Chapter Five for details.

Making Directories - MKDIR (MD)

The command for creating new directories is MKDIR. The format for MKDIR is:

MKDIR <*name*>

where <*name*> is a valid directory name. MKDIR will create a subdirectory in the working directory using the name specified.

To create a subdirectory called TEST in the working directory:

Type: **MKDIR TEST**
Press *Enter*

The command MD is a shorthand name for MKDIR. Both MD and MKDIR function in exactly the same way.

Changing The Default Directory - CHDIR (CD)

The command CHDIR changes the working directory on the default drive. The format for CHDIR is:

CHDIR <*path*>

where <*path*> is an absolute or relative path. For example, to change the working directory to a subdirectory called TEST:

Type: **CHDIR TEST**
Press *Enter*

If you type CHDIR without any parameters, it will display the absolute path name of the working directory. For example, to display the name of the working directory:

Type: **CHDIR**
Press *Enter*

The command CD is a shorthand name for CHDIR. Both CD and CHDIR function in exactly the same way.

Removing Directories - RMDIR (RD)

You can remove a subdirectory using the RMDIR command. Before you can remove a directory, you must delete all the files in that directory, and remove any subdirectories in that directory. You cannot remove the root directory, and you cannot remove the working directory. The format for the RMDIR command is:

RMDIR <*path*>

Where <*path*> is an absolute or a relative path name. For example, to remove an empty subdirectory of root called TEST:

Type: **RMDIR\TEST**
Press *Enter*

The command RD is a shorthand name for RMDIR. Both RD and RMDIR function in exactly the same way.

Chapter Five

Additional MS-DOS Commands

Chapter Five

Additional MS-DOS Commands

This chapter assumes you have installed your hardware and software, worked with Master Menu and have a basic familiarity with MS-DOS.

As you know from Chapter Four, Master Menu gives you access to a limited number of MS-DOS commands and their options. In this chapter you will be introduced to more MS-DOS commands, additional features of commands covered in Chapter Four, and handy shortcuts that use special characters, keys and features.

To use the MS-DOS commands covered here, you must be at the MS-DOS system prompt. Exit Master Menu by pressing the *Esc* key. 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.

All the external commands mentioned in this chapter are located in your \UTILITY subdirectory. For additional information on the topics covered here, consult your *MS-DOS User's Guide*.

Shortcuts and Wildcards

If you have been following the instructions in this manual for working with MS-DOS, 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 a file on the A drive called CAT.TXT and rename it DOG.TXT at the A> prompt you would:

Type: **COPY A:CAT.TXT A:DOG.TXT**
Press *Enter*

In this example it wasn't necessary 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?

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.

When you are first learning about MS-DOS or a new command (particularly the DEL command) it is a good idea to use the long form and be certain that the end result will be what you want before pressing the *Enter* key.

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 and all characters (any character includes no characters) that occur to the right of the position of the asterisk in a file name or extension.

The command: DIR *.COM displays all files with an extension of .COM.

The command: DEL FILE?.TXT deletes *all* of the following files: FILE1.TXT, FILE2.TXT, FILE3.TXT, and FILES.TXT.

The command: COPY A:FILE*.TXT C: would copy to drive C any file on drive A with a file name starting with FILE and an extension of .TXT, including those listed in the last example and also: FILE.TXT, FILE45.TXT, FILEINFO.TXT, and FILEIDX.TXT.

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

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**
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**
Press *Enter*

Deleting Files

The DEL command deletes files. 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, you would:

Type: **DEL A:TEST.COM**
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.

Warning:
You should be very careful when using this command as it can do considerable damage. Once a file is deleted, it cannot be recovered without special utilities and knowledge, so think very carefully before deleting any file.

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**
Press *Enter*

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

Viewing Files

TYPE allows you to view the contents of some text files and data files on the screen. Do not attempt to view the contents of a program (.EXE or .COM) 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 system prompt:

Type: **TYPE MYFILES.DIR**
Press *Enter*

You will see a file listing just like when you use the DIR command. To view a file one screenful at a time pipe through MORE.

Type: **TYPE MYFILES.DIR | MORE**
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 some 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 package.

Changing The System Prompt

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

PROMPT <*prompt designation*>

For example, you could do the following:

Type: **GONE TO MAUI**
Press *Enter*

The system prompt would then read **GONE TO MAUI** 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 into 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. The following table shows the codes and what they are replaced by:

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

The system prompt created by the AUTOEXEC.BAT file is very useful on hard drive units. To create a prompt like this you would:

Type: **PROMPT pg**
Press *Enter*

Concatenating (Joining) Files with COPY

To concatenate files is to link them, or join them. Perhaps you have written a number of short 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 you 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 the file the other files are to be written to already exists, the original contents of the file will be destroyed.

If you have two files named COOKIES.LST and CAKE.LST, you can update the file COOKIES.LST with the information in CAKE.LST by typing:

COPY COOKIES.LST+CAKE.LST
and pressing *Enter*

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 line.

Redirecting Output

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 diskette. These files can be edited by most word processors, added to existing documents, etc. The greater-than symbol (>) is one of the special characters used to redirect output.

The command: DIR >MYFILES.DIR sends the directory listing to a file called MYFILES.DIR rather than to the screen.

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.

The command: DIR >>MYFILES.DIR appends the directory listing onto the end of MYFILES.DIR, rather than overwriting the older version.

Other useful methods of redirecting output include redirecting to printer ports, filters, and redirecting to nothing (or null).

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 Chapter, we will be talking about two of the three filters included with MS-DOS: MORE.COM and SORT.COM. MORE.COM was is discussed on page 5-5.

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 (|), which appears on your keyboard and screen as two short vertical lines it is always a shifted version of this character (\).

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.

The command: DIR | SORT sorts the output of the directory command.

The command: DIR | SORT > DISK.DIR sorts the listing of the current directory and writes it to the disk file DISK.DIR) instead of printing it on the screen.

The command: SORT <DATA >SORT.DTA sorts the file DATA and writes the output to the SORT.DTA disk file.

Chapter Six

Technical Information

Chapter Six

Technical Information

Using The Dual Speed CPU Board

The dual speed microprocessor card allows you to operate at two different clock speeds: 6 MHz and 12 MHz. The normal functioning speed of the KAYPRO 286 is 6 MHz. The faster clock speed of 12 MHz allows you to run many programs or program features at an accelerated rate. As the end user of this product, you will be the best judge of when to use this speed-up feature.

Switching the Clock Speed

To use the speed-switching feature, remember the three rules below:

* After changing speeds reset your computer by pressing the hard reset button located above the speed switch. Changing speeds without resetting may produce unpredictable results.

* If the switch is *DOWN*, the setting is 6 MHz.

* If the switch is *UP*, the setting is 12 MHz.

Using Hardware and Software at 12MHz

By switching to 12 MHz you have the option of running your software with fewer delays in processing data. Most of the newest programs have been written to allow for this enhancement. Some older software and hardware which use timing loops or extensive disk access cannot work at 12 MHz. This is because they simply cannot keep up with your KAYPRO 286 when it is speeded up to 12 MHz.

Because of the unique design of the KAYPRO 286's processor board, the problems associated with third party boards which rely on a precise timing relationship have been significantly reduced.

NOTE:
Operating at 12 MHz should not harm software or hardware. Boards and programs should only fail to work properly. Talk with your dealer and make sure that your programs and boards are not the exception to the rule. Before you buy and use any third-party board for your KAYPRO 286, make sure that it can run at 12 MHz. If something does not work at 12 MHz, then switch back to 6 MHz.

I/O Channel Timing:

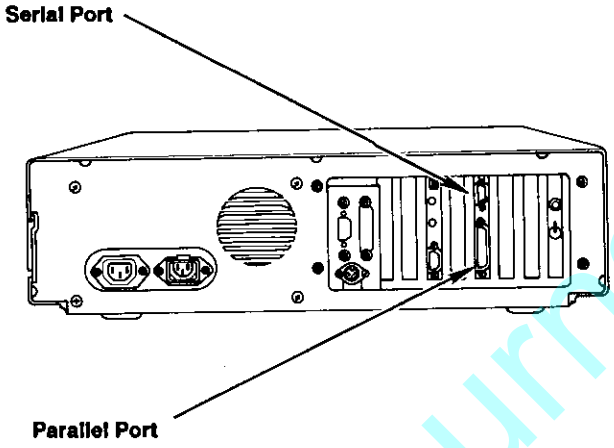
Clock Compatibility Issues

The on-board memory of the KAYPRO 286 Processor Board operates at one wait-state. Off-board memory and I/O operations have additional wait states inserted as required to maintain the same I/O channel timing as a 6MHz 80286 bus.

The I/O channel of the KAYPRO 286 always operates at 6MHz. The bus clock signal is retimed at 12MHz to maintain 6MHz clock compatibility during memory or I/O commands. By maintaining the I/O Channel at a 6MHz rate the problems associated with third party boards which rely on a precise timing relationship between OSC and CLK or CLK and any COMMAND signal are significantly reduced.

Connecting Peripherals

These are the printer ports, located on the rear panel of the computer.



Serial Printers

A serial printer is a printer that receives data from the computer one bit at a time. The computer will send one character, then another, then another, in sequence, one at a time. The KAYPRO 286 sends serial data through the serial port located on the rear panel of the computer. This port is the industry-standard RS-232C and uses a connector called a DB-9, which has nine pins.

If you have a serial printer, and your dealer cannot supply you with the proper cable, you may need to have a cable manufactured. The technician that fabricates your cable will need the serial port pin assignments, which are listed on page 6-4.

Parallel Printers

A parallel printer receives data from the computer eight bits at a time. The signals, eight of them, are transmitted from the computer to the printer at the same time. The KAYPRO 286 sends parallel signals through the parallel port located on the rear panel of the computer. This port uses a DB-25 connector. To connect the KAYPRO 286 to a parallel printer you need a parallel printer cable (available from your dealer). Connect the DB-25 plug end of the cable to your KAYPRO 286 and plug the Centronics (36-pin) end into the connector on the printer.

Serial Devices

The KAYPRO 286, like most computers, is designed for use with a parallel printer. This leaves the serial connector on the rear panel open for serial devices such as a modem, mouse, or serial printer. If you choose to use a serial device, consult your *MS-DOS User's Guide* for detailed information on using the MODE command.

Modem cables and serial printer cables are not the same. If you want to use both a modem and a serial printer, you need two different cables.

Please note that Kaypro Corporation makes no guarantees about the suitability of a given serial device for use with the KAYPRO 286 serial interface. Before you purchase any serial device, insist on a demonstration of its operation.

If you want to connect your computer to a serial device, your dealer should be able to supply you with the correct cable. If the proper cable is not available through your dealer, the pin assignments listed in the next section should be useful to the person who fabricates the cable.

Pin Assignments

Video Pin Assignments: RGB, MDA, and EGA

If you are going to use a monitor other than the KAYPRO Monochrome Monitor then you may need a video cable for your monitor. RGB, MDA (monochrome) and EGA cables are available from your Kaypro Dealer. However, if you wish to have one specially built, then the person that makes the cable will need the following pin assignments.

Pin	RGB	MDA	EGA
1	Ground	Ground	Ground
2	Ground	Ground	Secondary Red
3	Red Input	Not Used	Primary Red
4	Green Input	Not Used	Primary Green
5	Blue Input	Not Used	Primary Blue
6	Intensity	Intensity	Secondary Green
7	Ground	Video	Secondary Blue
8	Horizontal Sync.	Horizontal	Horizontal Sync.
9	Vertical Sync.	Vertical	Vertical Sync.

Parallel Pin Assignments

If your printer has a non-standard connector or you cannot find a suitable cable already assembled, the following pin assignments should prove useful to the person who fabricates your cable.

DB25 Connector (KAYPRO 286) Pin	Signal	Centronics (Printer) Pin
1	STROBE	1
2	DATA 0	2
3	DATA 1	3
4	DATA 2	4
5	DATA 3	5
6	DATA 4	6
7	DATA 5	7
8	DATA 6	8
9	DATA 7	9
10	ACKNOWLEDGE	10
11	BUSY	11
12	PAPER END	12
13	SELECT	13
14	AUTO FEED	14
15	FAULT	32
16	INITIATE	31
17	SELECT IN	36
18	GROUND	34
19	GROUND	19
20	GROUND	21
21	GROUND	23
22	GROUND	
23	GROUND	27
24	GROUND	29
25	GROUND	30

NOTE: All cables used on the KAYPRO 286 must be shielded to comply with FCC regulations.

RS-232C Serial Port Pin Assignments
(Primary Asynchronous Communications)

Pin	Signal	Signal Direction
1	Carrier Detect	<----
2	Receive Data	<----
3	Transmit Data	---->
4	Data Terminal Ready	---->
5	Signal Ground	-----
6	Data Set Ready	<----
7	Request To Send	---->
8	Clear To Send	<----
9	Ring Indicator	<----

Installing Circuit Cards

The KAYPRO 286 has nine circuit card slots, located in the upper left portion of the computer. Six slots are full-length and three are half-length. Five of the nine slots are 16-bit (or word-wide) expansion slots and four are 8-bit (or bit-wide) expansion slots. Four of the nine slots are occupied by the integral circuitry of the computer leaving three 8-bit slots available (one full-length and two half-length) and two full-length 16-bit slots.

Before installing a circuit card, open the package, find, read and follow any instructions provided with the card. The following factors should be considered when installing a card: whether it is a full-length or a half-length card and whether the card is an 8-bit card or 16-bit card.

Note:
Some 8-bit cards (particularly those with a noticeable overhang known as an "apron") will not fit properly into a 16-bit expansion slot. Read any installation instructions included with the board before installing the card.

Installing a card is a fairly simple procedure once you remove the cover. However, the installation does involve working with some delicate parts of your system.

Note:
To avoid damaging the internal circuitry of your system you must dissipate any static electric charge that you might have before removing the cover. It is best to operate your system at a grounded workstation. Even without such a workstation you can dissipate the charge by touching any grounded metal surface: a metal lamp stand or a metal door frame will serve the purpose.

If you have any qualms about working with electronic circuitry, you may want to have a qualified electronics technician do any installation.

Removing The Cover

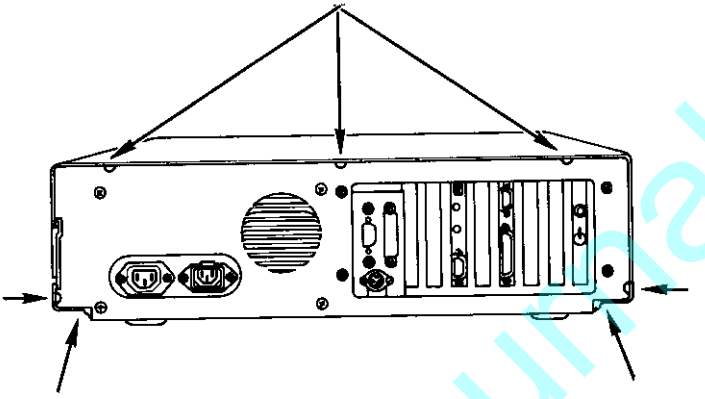
1. Prepare the work surface and tools. You should have a wide clear table that does not move or jar easily, and allows easy access to both the front and rear panels of the computer. The ideal table would also have a padded, anti-static cover to cushion the unit. You will need a #1 phillips screwdriver. Have a small dish or cup ready to hold the screws that you will be removing and replacing during the installation.

2. Turn off the computer and unplug it from the power outlet.

3. Disconnect monitor and remove it. Disconnect all cables connected to the computer.

4. Gently place the computer on the work surface.

5. There are eleven screws that attach the cover to the chassis. Five are located around the rear of the unit: three across the top edge and two on the lower outside edges. There are six more screws that attach the cover to the bottom of the chassis: three on each side.



6. Remove the three screws across the top of the rear of the unit.

7. Next remove the two screws from the sides of the rear of the unit.

8. Finally remove the three screws from the bottom of the sides. It is a good idea to keep the computer on its "feet" You will need to move the computer so that each side in turn faces you and keeping the unit on its "feet" unscrew the cover from the bottom.

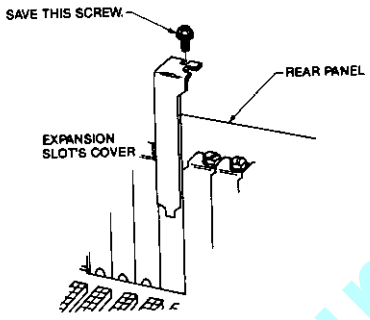
If you feel it is necessary to tip the machine on its side, exercise extreme care, and remember the following rules:

* Do not allow the system to rest on the side where the power switch is located.

* Do not tip the computer forward on its bezel or backward on its rear panel.

9. While facing the front of the computer, carefully slide the cover toward you. Slide the cover forward and off.

10. After deciding where to install the card, remove the expansion slot cover screw, as shown.



11. Carefully remove the circuit card from its anti-static bag.

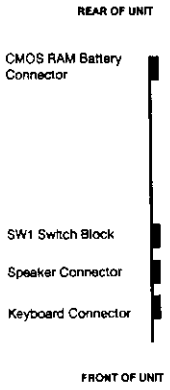
12. Holding the board by the extreme top edge, carefully insert the board into the slot. If the board is full-length, make sure the far end of the board is in the appropriate support bracket. Use the board located in the first slot as a guide.

13. Replace the screw you removed in step two.

14. Replace the computer cover by reversing the previously-described procedure.

Processor Card Connectors

The KAYPRO 286 microprocessor card is the full-length card toward the left side of the bus board from the disk drives. The processor card has the following connectors: a 5-pin dual-in-line keyboard connector, a 4-pin single-in-line speaker connector and a 4-pin single-in-line battery connector.



Replacing The Battery

The KAYPRO 286 uses a 4.5 volt DC battery pack to maintain the standby operation of the CMOS RAM when the power is off. Removal and replacement is a simple procedure:

1. Turn the computer off and remove the cover following the steps to insert a card.

2. Locate and detach the battery holder from the processor board and from the chassis.

3. Insert three new 1.5 volt double A batteries into the holder. While you can use any type of 1.5 volt double A battery, we recommend the use of alkaline batteries.

4. Replace the cover and on power up run SETUP (see Chapter Two).

Switch Settings

Many of the operations of the circuit cards that make up the KAYPRO 286 are controlled by DIP switches. There are three basic types of switch blocks used on devices which may be installed in your KAYPRO 286: rocker, slide, or toggle. In reading the information about setting switches for these boards remember the following:

1. Use a small screwdriver, toothpick or similar tool to set switches. Avoid using pens and pencils; many switch blocks returned as defective have been discolored and damaged by using pens and pencils.

2. Switch blocks may be labelled ON/OFF or OPEN/CLOSED. In all such cases ON = CLOSED and OFF = OPEN.

3. If it is a sliding switch, the switch is in the ON position when the block-type projection is sticking out nearest the edge marked ON.

4. If it is a toggle style switch it is in the ON position when the projection is sticking out nearest the edge marked ON.

5. If the switch block is a rocker type, the switch is in the ON position when the side nearest the edge labelled ON is pressed in.

Processor Card Switches

The KAYPRO 286 microprocessor card is the full-length card toward the left side of the bus board from the disk drives. The processor card has a 5 position rocker style DIP switch block near the top of the board. Switches 1 and 2 control how much memory is active. Switch 3 controls what type of video card the processor expects. Switch 4 is not used and switch 5 is always OFF. Switch 5 is reserved for future developments. Do not change the settings of switches 4 and 5.

Memory Size Selection

The Memory Size Selection is governed by positions 1, and 2 on the 5-position DIP switch block marked SW1 on the processor board. The following are the settings corresponding to memory size:

Switch 1	Switch 2	Active Memory
OFF	OFF	256 K
ON	OFF	512 K
OFF	ON	640 K
ON	ON	640 K **

** Plus 384K at 1 MB Boundary

Video Selection

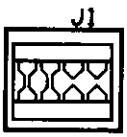
Switch 3 of SW1 tells the KAYPRO 286 what type of video is installed. If you change monitor type you will need to change this switch. The setting should agree with the switch settings on your video board and the type of monitor you are using. For a Monochrome monitor set switch 3 to OFF. For a Color monitor or EGA monitor set switch 3 to ON.

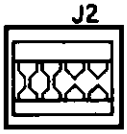
Jumpers on the I/O Card

There are two header configuration jumpers (labelled J1 and J2) on the KAYPRO 286's I/O card. These jumpers are located on the lower corner furthest from the connectors.

The jumper at J1 controls whether the serial port is configured for COM1 or COM2. The factory setting as shown below is COM1.

The jumper at J2 controls whether the parallel port is configured for LPT1 or LPT2. The factory setting as shown below is LPT1.





Configuration Sheet

This page is provided for your convenience in recording additions to your unit.

Standard System

Diskette drives installed: One 1.2M high density (96 TPI).

Hard drives** installed: One 40MB, type 40 drive.

Video Display Adapter installed: Run SETUP and circle one:

MDA CGA EGA

Monitor: Monochrome.

Base memory installed: 640K.

Expansion memory installed: 384K.

Ports Installed: Parallel (378h) and Serial (3F8h)

Options Added

_____

_____

_____

_____

_____

_____

_____

** This drive may be divided a number of logical drives. However, there is only one physical drive, and one drive (drive C) for the purposes of the SETUP program. Check your documentation package for updates.

Reserved I/O Port Addresses

Description	Address (Hex)
DMA Controller (8237A)	000-01F
Interrupt Controller (8259A)	020-03F
Timer (8253; 8253 x2)	040-05F
DMA Page Registers	080-09F
NMI Mask Register	070-07F
Interrupt Controller #2	0A0-0BF
DMA Controller #2 (8237A)	0C0-0DF
CLR/RESET Math Coprocessor	0F0-0F1
Math Coprocessor	0F8-0FF
Fixed Disk Controller	1F0-1F8
Joystick or Game Control	200-207
Parallel Port (LPT 2)	278-27F
Serial Port (COMM 4)	2E8-2EF
Serial Port (COMM 2)	2F8-2FF
Prototype Card	300-31F
Fixed Disk **	320-32F
Parallel Port (LPT 1)	378-37F
SDLC (Bi-Synch #2)	380-38F
Bisynchronous Communications	3B0-3BF
Monochrome Adapter (MDA)	3B0-3BF
Reserved	3C0-3CF
Color/Graphics Adapter (CGA)	3D0-3DF
Serial Port (COMM 3)	3E8-3EF
Diskette Controller	3F0-3F7
Serial Port (COMM 1)	3F8-3FF

** If the CMOS RAM shows no hard disk installed the machine will use this address for the Fixed Disk Controller.

MS-DOS Interrupt Request Line

Number	Function
NMI	I/O Channel Check (memory parity) 8087 Numeric Processor Exception Errors
IRQ 0	Timer Output 0
IRQ 1	Keyboard
IRQ 2	Interrupt from CTLR2
IRQ 3	Serial Port 2

Number	Function
IRQ 4	Serial Port 1
IRQ 5	Parallel Port 2
IRQ 6	Diskette Controller
IRQ 7	Parallel Port 1
IRQ 8	Timer Output 0
IRQ 9	IRQ 2 line (re-directed)
IRQ 10	Reserved
IRQ 11	Reserved
IRQ 12	Reserved
IRQ 13	Math Coprocessor
IRQ 14	Fixed Disk Controller
IRQ 15	Reserved

Interrupt Vectors

Vector Number	Description	Address (Hex)
0	Divide Error	0000
1	Single-step exception	0004
2	NMI (Nonmaskable Interrupt)	0008
3	Breakpoint	000C
4	INTO Detected Overflow	0010
5	BOUND Range Exceeded	0014
6	Invalid Opcode Exception	0018
7	Coprocessor Not Available	0014
8-15	Reserved	0020-003F
16	Coprocessor Error	0040
17-31	Reserved	0044-007C

Memory Map

Start Address	End Address	Page	Description
0000	0FFF	0	Working RAM -- Interrupt Vectors
1000	1FFF	1	Working RAM
2000	2FFF	2	Working RAM
3000	3FFF	3	Working RAM
4000	4FFF	4	Working RAM
5000	5FFF	5	Working RAM
6000	6FFF	6	Working RAM
7000	7FFF	7	Working RAM
8000	8FFF	8	Working RAM
9000	9FFF	9	Working RAM
A000	AFFF	A	EGA Video Memory On Card
B000	B7FF	B0	MDA Video Memory On Card
B800	B8FF	B8	RGB Video Memory On Card
C000	C7FF	C0	EGA ROM BIOS
C800	CFFF	C8	Fixed Disk Controller ROM
D000	DFFF	D	Expansion RAM/ROM
E000	EFFF	E	Expansion RAM/ROM
F000	FFFF	F	Permanent ROM Area: ROM BIOS

Note:
The additional 384K extended memory is at the 1MB boundary and can only be addressed in protected mode.

Chapter Seven

Video Information

Chapter Seven

Video Information

The EGA Half-Card

Your KAYPRO 286 currently comes standard with the EGA Half-Card. Because needs change and technology advances, at some point this video card (and therefore this information) may become outdated. **Should you find documentation on another video board or updated information on this board with your system, insert that documentation here.**

Unlike other video cards, the unique design of the EGA Half-Card allows you to run software written for any of the available video modes on *any* monitor. Other video cards emulate different video modes but to run many software programs you have to switch monitors. In addition, the EGA Half-Card comes with a menu-driven program that allows you to switch video modes with a few simple keystrokes. The special design of this card combined with mode-changing software makes the EGA Half-Card an incredible value.

The type of video signal the EGA Half-Card sends to your monitor is determined by switch settings on the card and by the mode switching software. What you actually see on the screen depends on many factors including: what type of monitor you have, what software you are using, and how you install your software.

Switch Settings

At the top of the EGA Half-Card there is a little window with the block of eight switches showing through. The switch bank may read OPEN and CLOSED or ON and OFF. It may be difficult to read without removing the cover. If the numbers of the individual switches are labelled and visible, generally switches set toward the numbers are in the ON position.

The charts on the following pages describe the switch settings for each type of video signal. These charts all assume you will be operating your computer with the EGA Half-Card as the only video board in your computer.

Note:
It is best to use the charts to verify the factory settings. These settings are indicated int he charts below withh an asterisk (*) and should not be changed unless you are using a monitor other than the standard monochrome. If you need to switch video modes use the mode-switching software.

The first four switches (SW1 through SW4) determine the default video mode. This tells the EGA Half-Card what video mode to display at power-up.

Default Mode	SW1	SW2	SW3	SW4
MDA	OFF	OFF	ON	OFF
CGA (40x25)	ON	OFF	OFF	ON
CGA (80x25)	OFF	OFF	OFF	ON
EGA Normal	ON	ON	ON	OFF
EGA Enhanced	OFF	ON	ON	OFF*

The next three switches (SW5 through SW7) must be set according to the monitor you are using to avoid possible damage to the monitor and the card.

Monitor Type	SW5	SW6	SW7
EGA	ON	OFF	OFF*
CGA	ON	ON	OFF
MDA	OFF	ON	OFF
M/S	ON	OFF	ON

The last switch (SW8) is a special switch that allows certain features of the EGA Half-Card to be enabled or disabled automatically. If you experience an unusual display with SW8 set ON try setting it to the OFF position and changing modes with the SUPERSWITCH program.

Abbreviations Used:

EGA w/CD: Enhanced Graphics Adapter set as CGA
EGA w/MD: Enhanced Graphics Adapter set as MDA
EGA Normal: Enhanced Graphics Adapter 8x8 character resolution
EGA Enhanced: Enhanced Graphics Adapter 8x14 character resolution

MDA: Monochrome Display Adapter
CGA: Color Graphics Adapter
M/S: MultiSync Type Monitors

Changing Video Modes:

The SUPERSWITCH Program

SUPERSWITCH is a video mode-switching program that allows the user to control the video signals sent to the monitor without physically changing switch settings. The SUPERSWITCH program will change the video operation of the board to any of five modes that you designate.

If you are using software programs that need to be configured for specific video modes, you may need to reconfigure the programs after switching modes. Be particularly careful of RAM-resident programs that expect a certain video mode. For example you may switch from monochrome to color mode and but still have a program in RAM configured for your monochrome 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.

To run SUPERSWITCH locate the program (usually in the \UTILITY directory) and from the system prompt type: SMS and press *Enter*.

A menu something like this will appear:

```
1. Monochrome Text 80x25      - M80
2. Color Text  80x25          - C80
3. Color Text 80x25 (Enhanced)- CE80
4. 132 Columns                - 132
5. Enable Enhanced Features   - ENAB
6. Exit to DOS
7. 132 Columns Screen Adjustment
Current Mode is:_____
Enter Option:
```

By selecting different modes in SUPERSWITCH you can run programs written for different monitor types without changing switch settings and without changing monitors.

Bypassing the SUPERSWITCH Menu

After you learn the SUPERSWITCH program, changing modes through the menu may seem time-consuming. To save time or switch modes from a batch file you can bypass the menu by using SUPERSWITCH's keywords. These keywords are located on the right side of the menu shown on the previous page. For example, to enable the special features controlled by Switch 8 you would type **SMS ENAB** and press **Enter**.

Notes on video modes:

The 132 column mode is supported by a limited number of applicationpackages at this time.

Programs written for Hercules Graphics are allocated a full two (2)pages of graphics memory *if the EGA Half-Card is the only video card* in your computer. If there is a second video card only one page of memory is allocated to monochrome graphics.

If You Have Two Video Boards

If you add a second video board you must designate which board will take precedence. If a board is designated as primary the computer will look to that board and accept signals from it first and send those signals to the monitor. To designate which video board is the primary board change the first four switches(SW1-SW4) on the EGA Half-Card according to the chart below. Consult the documentation for the other video board to configure it.

Primary Board	Secondary Board	SW1	SW2	SW3	SW4
EGA w/CD(40x25)	MDA	ON	OFF	OFF	ON
EGA w/CD(80x25)	MDA	OFF	OFF	OFF	ON
EGA Enhanced	MDA	OFF	ON	ON	OFF
EGA Normal	MDA	ON	ON	ON	OFF
EGA w/MD	CGA(80x25)	OFF	OFF	ON	OFF
EGA w/MD	CGA(40x25)	ON	OFF	ON	OFF
MDA	EGA w/CD(40x25)	ON	ON	ON	ON
MDA	EGA w/CD(80x25)	OFF	ON	ON	ON
MDA	EGA Enhanced	OFF	OFF	ON	ON
MDA	EGA Normal	ON	OFF	ON	ON
CGA(40x25)	EGA w/MD	ON	ON	OFF	ON
CGA(80x25)	EGA w/MD	OFF	ON	OFF	ON

Chapter Eight

Kaypro Utility Programs

Chapter Eight

Kaypro Utility Programs

Kaypro Corporation provides several utility programs with their computers 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, LOCATE, and MAXCYL,

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

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 b 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:

[operator [switch] filespec [filespec] [filespec]...]

Operator 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:

? Shows 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 you would:

Type: **CHATTR +h FORMAT.EXE**
Press *Enter*

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

Type: **CHATTR -h FORMAT.EXE**
Press *Enter*

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

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 instructions built into it. If you type **CHATTR** and press *Enter* at the system prompt with no parameters, you will get the following message:

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

D -- A File Listing Utility

D is a lot like DIR, only easier. D is a program that tells the user what files exist on a diskette, and how many kilobytes are in those files (DIR tells you the number of bytes, you have to divide by 1024 to get the number of kilobytes). D does this by displaying a chart containing the filenames and the file sizes. The format for D is:

D <*drive*>

where <*drive*> 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 use D on a diskette in a different drive, you designate the drive.

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. Whenever you designate a directory or directories (including a complete directory tree) to be copied, if the target diskette does not have directories, KCOPY will create directories on the diskette.

KCOPY is located in the UTILITY subdirectory. With a blank formatted diskette in drive A from the root directory:

Type: **KCOPY C:*.* A:**
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.

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.

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.

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 displayed item is 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 or unmark files in a subdirectory. To return to the original directory, press the left arrow key.

The 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 (press the *Alt* key, hold it down, then press the *F1* key) to unmark a file. For example, if you wanted to copy everything from one diskette, to another, except four special files, you would unmark those files and then start the copy operation.

The same is true for directories. If you unmark a directory, then that directory and everything within it (including files, subdirectories and the files within the subdirectories) 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, you may want to 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 your selections.

F3 Mark By Type

This option allows you to mark names according to type. When you press *F3*, you 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. For example, if you wished to mark every file with a .COM extension, you would press *F4*, and at the prompt:

Type: ***.COM**
Press *Enter*

KCOPY will ask whether or not you wish to mark files in subdirectories, before marking all the files with a .COM extension in the current directory and/or in its subdirectories.

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 of the computer. KCOPY automatically sends the files, and the user should have some type of telecommunications software running on the other 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. At the system prompt of the receiving computer:

Type: **CATCH**
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**
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.

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.

? Shows 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 has a built-in help facility, similar to that in CHATTR. Typing **LOCATE** and pressing *Enter* at the system prompt will produce:

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

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

Parking The Hard Drive

If you leave a cassette tape in a tape player without rewinding the tape, the contact between the tape and the head can damage the tape. A similar type of problem can occur when the drive head comes in contact with the hard disk on your KAYPRO 286. The risk of damage and data loss is particularly acute when you transport your system. To guard against these problems, Kaypro has provided the MAXCYL.COM program. MAXCYL.COM is located in your \UTILITY directory. Before shutting down your system type **MAXCYL** and press *Enter*. This will move and park the hard disk drive head to the innermost cylinder of the disk.

Appendix A

Adding A Second Partition

Appendix A

Adding A Second Partition

The SpeedStor* Program

The KAYPRO 286 comes with a 40 Megabyte hard drive but MS-DOS alone will not let you use all of your drive. That is where the SpeedStor PARTED program comes in handy. The PARTED program, like the MS-DOS FDISK program, partitions the hard drive. It supplements MS-DOS by allowing you to create more than one partition.

Following the instructions in Chapter Two you created an MS-DOS partition of 20 or 30MB. If you have not created your first partition, turn to Chapter Two before proceeding. In this Appendix you will learn how to create a second partition. Just as in Chapter Two, you need to decide how you want to partition the rest of the drive.

Your next step depends on whether you have formatted your first partition and installed your software following the instructions in Chapter Two. If you have not already done so, format your first partition:

1. Start the computer with the first Master diskette in the A drive. You may need to press *F1* to continue. Stop the INSTALL program by pressing the *Pause/Break* key while holding down the *Ctrl* key.

   If the screen displays **Ok**, type **SYSTEM** and press *Enter*.

   If the screen displays **Terminate batch job?**, type **Y** and press *Enter*.

2. To format the C drive and give it a volume label:

   Type: **FORMAT C:/S/V**
   Press *Enter*

* SpeedStor is a trademark of Hexis Design

The FORMAT program will ask some questions. Answer the prompts with indicated responses to continue and format the hard disk drive. The formatting process will take some time. Some messages will be displayed as the format process continues to completion, and then the FORMAT program will request a volume label of up to 11 characters. Use only letters, numbers and spaces to identify your fixed disk. After typing the label, press *Enter*. That will finish the FORMAT program and return you to the system prompt.

Now you are ready to create your second partition. The instructions below explain how to create a second MS-DOS compatible partition of either 10 or 20 megabytes. If you choose to divide the drive into more partitions or a different configuration, refer to the PARTED section of the SpeedStor manual. If you want a partition for a different operating system, consult the documentation for that system.

1. Place your SpeedStor diskette in the A drive.

2. Log onto the A drive and at the system prompt:

   Type: **PARTED**
   Press *Enter*.

3. Use your cursor keys to select **Create** from the menu. Then press *Enter*.

4. Select either **DOScompatible** or **DOSextension** from the menu and press *Enter*. Most users should select DOScompatible. The DOSextension option allows you to control the file structure of the partition and should only be used by advanced users. Consult the SpeedStor manual for details.

5. Select **Largest** from the menu and press *Enter*. This will create the largest partition possible given the amount of space remaining on the drive.

6. Select **Format** from the menu and press *Enter*. Select **(2)Two** and press *Enter* to format the second partition. If the screen warns you about data loss on the partition select **Yes** and press *Enter* to continue.

7. Select **Quit** and press *Enter* to return to MS-DOS.

8. Next you need to run a program that creates a CONFIG.SYS file in the root directory of the C drive and installs the device driver that allows MS-DOS to support the second second partition (now your D drive). If you already have a CONFIG.SYS file the program will add to it. From the **A>** prompt:

   Type: **ADDEVICE**
   Press *Enter.*

9. When the screen indicates it has completed running the ADDEVICE program, remove the SpeedStor diskette and reboot by pressing and holding down the *Ctrl*, *Alt*, and *Del* keys. If all has gone well, the Master Menu program will be displayed. When it does, press *Esc* to leave Master Menu and check the other partition (the D drive).

   Type: **D:**
   Press *Enter.*

If the system prompt now shows **D>** you have successfully added a second partition to your 40MB hard disk. In the process you have created another *logical* drive. This second drive (the D drive) is not a second hard disk drive for the purposes of the SETUP program and many other programs.

Appendix B

Modifying Master Menu

Appendix B

Modifying Master Menu

Why change Master Menu at all?

Take a moment to think about the programs and MS-DOS commands you use most often. Are there many commands that you have to exit Master Menu to accomplish? Perhaps you would like to include these commands as Menu items. Have you added another application packages that you want to access through Master Menu? These are all good reasons to change Master Menu. Another good reason is to change the wording of descriptions and user prompts to wording you feel more comfortable with.

The following files (located in the \MAIN directory) make up Master Menu. MENUST.BAT is the file that calls MASMENU.EXE. It is also the start up batch file and the only correct way to start or restart Master Menu. MASPREP.EXE reads MASMENU.TXT and creates MASMENU.DAT. MASMENU.DAT is read by MASMENU.EXE. MASMENU.TXT is a text file that contains batch file lines.

Before beginning any alterations of Master Menu, make backup copies (either on a diskette or special subdirectory) of the Master Menu files. If you've backed up onto diskette, write protect the diskette and store it in a safe place.

There are three ways to modify Master Menu. One type of modification can be done by changing the MENUST.BAT file. Another can be done when you run MASPREP.EXE. Still a third type of change is done by editing MASMENU.TXT.

The first method mentioned above will let you put Master Menu in black and white mode regardless of whether your monitor is monochrome or not. If Master Menu is difficult to read on your monitor you might want to change MENUST.BAT.

Use WordStar's nondocument mode or some other text editor to edit your version of MENUST.BAT. You don't have to use WordStar but if you do be sure to use the nondocument mode. If you don't use WordStar, use a text editor that stores its files with minimal special formatting codes. A good test to tell whether your editor uses ASCII storing or not is to use TYPE to view the file. If you can read the file using TYPE, the text editor is probably all right to use.

The only change that should be made to MENUST.BAT is to the line **masmenu**. To turn the color off change that line to read **masmenu -b**.

The second method mentioned on page B-1 allows you to turn the right justification off or on in the menu descriptions. You do this by running MASPREP.EXE. At the system prompt type **MASPREP -J** and press *Enter*. When you start Master Menu with MENUST, the justification will now be off.

The third method allows you to customize Master Menu by editing MASMENU.TXT. In this method, simple changes like changing the wording of prompts and program descriptions, can be easily accomplished but other changes require a good deal of experience. A good rule of thumb is if you don't understand how something is done, don't change it.

Changing Master Menu using the third method is not for inexperienced users. You should be very familiar with MS-DOS, your directory structure and your application packages. Some of the areas you should be familiar with are: ASCII files, batch files, COMMAND.COM, subdirectories, text editors, and distinctive features of your application packages. If you are fairly experienced and the changes you want to make are not major, you shouldn't have any difficulty. Be sure to guard against unexpected results by backing up your original version and perhaps your favored modifications.

With a working diskette in the A drive, copy and rename MASMENU.TXT onto the diskette. Name it something like A:MASTEST.TXT or A:MASMENU.HJB (your initials).

Create a hard copy of the file, using PRINT.COM or redirecting your screen. You'll want to mark your planned changes as you go along. This appendix assumes you have a printout to work with.

Look at your hard copy. Your version of Master Menu may or may not have certain features. If you are using a color monitor and installed your machine that way, your file will contain code that sets the color of Master Menu's display and instructions for how to change the default colors. If you have a monochrome display or did not install your machine for color, these items will not appear.

Above every element of Master Menu there are remark lines with explanatory text. The remark lines are indicated by two dashes in the first two columns of the line.

You can change any text that appears in quotes. You could choose to have the title read George's Menu or Ala Carte. You can choose to alter the cursor text description.

You can choose whether to display the time in a 12 or 24 hour format by changing the 24/12 hour flag.

You can change whether the date is separated by dashes (-) or slashes(/) and how the time is separated. You can work with the country code in your CONFIG.SYS file or override it. Remember, if you have altered your CONFIG.SYS file in such a way that MS-DOS expects a different date ordering sequence (DD\MM\YY) rather than (MM\DD\YY) you must either change the prompt in Master Menu's **Setting Date & Time** or enter the date in the order MS-DOS expects.

In addition, if you have a color display and have installed your computer for color, you can change the display's colors. The text is fairly self-explanatory.

After the code for date ordering (on a color unit after Color Parameters) there is explanatory material about defining menu groups.

```
--
--    Start defining menu groups
--
--
--    A menu group is:
-- "title"
-- {
--
--    stuff inside
--
-- }
--
--    The stuff inside is one or more groups of:
--    "title"       (keep this short)
--    "description"  (this appears in the right hand box)
--    **            (this means start batch file lines)
--    ...           (one or more MSDOS command lines.
--                        you can use $"ask something" to have the user
--                        respond to a question)
--    **            (end of batch file lines)
--    You should always start off your batch file lines with a "cd" to the
--    directory where the programs you will run or files you will work with
--    are located.  To keep things clean, you should end with a "cd \main."
--
```

A menu group consists of:

1. A title of 20 characters (including spaces) or less enclosed in quotes. This title would appear under the main menu listing.

2. A description of the submenu that follows (i.e. the items below). This would appear in the right side bar and is enclosed in quotes.

3. A curly beginning bracket.

4. A second title, again in quotes, which appears in the right hand menu listing and is a submenu of the first title.

5. Text, in quotes describing the menu item. This text will appear in the right side bar.

6. On a separate line two asterisks indicate that MS-DOS command will follow.

7. Each command appears on a separate line. Remember, the current working directory is C:\MAIN. Pay special attention to the command lines in Set Date and Time group. The **can't nest batch files!** notation indicates that a batch file called from within another batch file will not return to the original invoking batch file. To call another batch file or to use internal MS-DOS commands you must invoke the secondary command processor (COMMAND.COM) and use the /C switch. Use a $"text in quotes" to indicate a user prompt.

8. The command lines are ended with another line of asterisks.

   Items 4 through 8 repeat for each item in the menu.

9. The menu itself is ended with a curly ending bracket.

If you use WordStar remember to use the nondocument mode. If you use another editor use the TYPE test indicated on page B-2.

You can add submenus to the main menu, individual menu items in the submenus, or simply change commands. Typical additions would be submenus to include other applications: spreadsheets, accounting packages, or games. To add an entire submenu, an easy method is to use a block copy and overwrite the text in the old menu. Be sure not to delete the ending brackets.

To change current commands, move to the line where the command appears and insert your desired command. If you are accessing a different directory, remember to change directories.

After you have completed your changes to the text file, copy your version onto C:\MAIN and overwrite the original version (DO NOT OVERWRITE THE ORIGINAL UNLESS YOU HAVE MADE A BACKUP OF IT). While in the Main directory from the C: prompt enter MASPREP. This program will read MASMENU.TXT and write that information to MASMENU.DAT. During the first pass it just reads the text file. If the program encounters any errors, it will send a message to the screen. The line numbers MASPREP sends to the screen may not directly relate to line numbers in WordStar or other text editors but they will help you get close to the problem area.

You might want to do a print screen of any error messages to make you editing easier. If MASPREP finds too many errors it will not write to MASMENU.DAT and Master Menu will operate just as before your changes were made.

If you have an older version of Master Menu, you should use CHKDSK/F on the C drive after running MASPREP. If CHKDSK finds lost clusters save them to file and then delete them.

To see your new Master Menu and determine whether you have accomplished what you intended, from the system prompt of the \MAIN directory start Master Menu with MENUST. If the results are not exactly as planned repeat the editing process until you've achieved the desired result.

Some Limits:

Number of characters in upper bar title..... 30
Number of characters in the version string..... 22
Number of characters in a menu item name.... 20
Number of menu items per menu..... 10
Number of characters in text description..... 396

Remember: You cannot nest batch files.

Appendix C

Audible Error Codes

Appendix C

Audible Error Codes

On power-up the KAYPRO 286 puts itself through a series of tests and communicates the test in progress and any failures through a specific pattern of beeps. The following list shows the meaning of these audible messages.

1-1-3	CMOS write/read test in progress or failed
1-1-4	BIOS ROM Checksum in progress or failed
1-2-1	Programmable Interval Timer in progress or failed
1-2-2	DMA initialization in progress or failed
1-2-3	DMA page register write/read test in progress or failed
1-3-1	RAM Refresh verification in progress or failed
1-3-3	First RAM chip/data line failed - multi-bit
1-3-4	First RAM odd/even logic failed
1-4-1	First RAM address line failed
1-4-2	First RAM parity test failed
2-1-1	First RAM chip/data line failed - bit 0
2-1-2	First RAM chip/data line failed - bit 1
2-1-3	First RAM chip/data line failed - bit 2
2-1-4	First RAM chip/data line failed - bit 3
2-2-1	First RAM chip/data line failed - bit 4
2-2-2	First RAM chip/data line failed - bit 5
2-2-3	First RAM chip/data line failed - bit 6
2-2-4	First RAM chip/data line failed - bit 7
2-3-1	First RAM chip/data line failed - bit 8
2-3-2	First RAM chip/data line failed - bit 9
2-3-3	First RAM chip/data line failed - bit A
2-3-4	First RAM chip/data line failed - bit B
2-4-1	First RAM chip/data line failed - bit C
2-4-2	First RAM chip/data line failed - bit D
2-4-3	First RAM chip/data line failed - bit E
2-4-4	First RAM chip/data line failed - bit F

3-1-1	Slave DMA register test in progress or failed
3-1-2	Master DMA register test in progress or failed
3-1-3	Master interrupt mask register test in progress or failed
3-1-4	Slave interrupt mask register test in progress or failed
3-2-4	Keyboard controller test in progress or failed
3-3-4	Screen memory test in progress or failed
3-4-1	Screen initialization in progress or failed
3-4-2	Screen retrace tests in progress or failed
4-2-1	Timer tick interrupt test in progress or failed
4-2-2	Shutdown test in progress or failed
4-2-3	Gate A20 failed
4-2-4	Unexpected interrupt in protected mode
4-3-1	RAM test in progress or failed above 0FFFFh
4-3-3	Interval Timer channel 2 test in progress or failed
4-3-4	Time-Of-Day Clock test in progress or failed
4-4-1	Serial port test in progress or failed
4-4-2	Parallel port test in progress or failed
4-4-3	Math Coprocessor test in progress or failed

Appendix D

ASCII Chart

Appendix D

ASCII Chart

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
00	0	Blank (Null)	Ctrl 2		Black	Black	Non-Display
01	1	☺	Ctrl A		Black	Blue	Underline
02	2	☻	Ctrl B		Black	Green	Normal
03	3	♥	Ctrl C		Black	Cyan	Normal
04	4	♦	Ctrl D		Black	Red	Normal
05	5	♣	Ctrl E		Black	Magenta	Normal
06	6	♠	Ctrl F		Black	Brown	Normal
07	7	•	Ctrl G		Black	Light Grey	Normal
08	8	◘	Ctrl H, Backspace, Shift Backspace		Black	Dark Grey	Non-Display
09	9	○	Ctrl I		Black	Light Blue	High Intensity Underline
0A	10	◙	Ctrl J, Ctrl↵		Black	Light Green	High Intensity
0B	11	♂	Ctrl K		Black	Light Green	High Intensity
0C	12	♀	Ctrl L,		Black	Light Red	High Intensity
0D	13	♪	Ctrl M, ↵, Shift↵		Black	Light Magenta	High Intensity
0E	14	♫	Ctrl N		Black	Yellow	High Intensity
0F	15	☼	Ctrl O		Black	White	High Intensity
10	16	►	Ctrl P		Blue	Black	Normal
11	17	◄	Ctrl Q		Blue	Blue	Underline
12	18	↕	Ctrl R		Blue	Green	Normal
13	19	‼	Ctrl S		Blue	Cyan	Normal
14	20	¶	Ctrl T		Blue	Red	Normal
15	21	§	Ctrl U			Magenta	Normal
16	22	▬	Ctrl V		Blue	Brown	Normal
17	23	↨	Ctrl W		Blue	Light Grey	Normal

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
18	24	↑	Ctrl X		Blue	Dark Grey	High Intensity
19	25	↓	Ctrl Y		Blue	Light Blue	High Intensity Underline
1A	26	→	Ctrl Z		Blue	Light Green	High Intensity
1B	27	←	Ctrl [, Esc, Shift Esc, Ctrl Esc		Blue	Light Cyan	High Intensity
1C	28	∟	Ctrl \		Blue	Light Red	High Intensity
1D	29	↔	Ctrl]		Blue	Light Magenta	High Intensity
1E	30	▲	Ctrl 6		Blue	Yellow	High Intensity
1F	31	▼	Ctrl —		Blue	White	High Intensity
20	32	Blank Space	Space Bar, Shift, Space, Ctrl Space, Alt Space		Green	Black	Normal
21	33	!	!	Shift	Green	Blue	Underline
22	34	"	"	Shift	Green	Green	Normal
23	35	#	#	Shift	Green	Cyan	Normal
24	36	$	$	Shift	Green	Red	Normal
25	37	%	%	Shift	Green	Magenta	Normal
26	38	&	&	Shift	Green	Brown	Normal
27	39	'	'		Green	Light Grey	Normal
28	40	(	(	Shift	Green	Dark Grey	High Intensity
29	41	)	)	Shift	Green	Light Blue	High Intensity Underline
2A	42	*	*	Note 1	Green	Light Green	High Intensity
2B	43	+	+	Shift	Green	Light Cyan	High Intensity
2C	44	,	,		Green	Light Red	High Intensity
2D	45	—	—		Green	Light Magenta	High Intensity
2E	46	.	.	Note 2	Green	Yellow	High Intensity

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
2F	47	/	/		Green	White	High Intensity
30	48	0	0	Note 3	Cyan	Black	Normal
31	49	1	1	Note 3	Cyan	Blue	Underline
32	50	2	2	Note 3	Cyan	Green	Normal
33	51	3	3	Note 3	Cyan	Cyan	Normal
34	52	4	4	Note 3	Cyan	Red	Normal
35	53	5	5	Note 3	Cyan	Magenta	Normal
36	54	6	6	Note 3	Cyan	Brown	Normal
37	55	7	7	Note 3	Cyan	Light Grey	Normal
38	56	8	8	Note 3	Cyan	Dark Grey	High Intensity
39	57	9	9	Note 3	Cyan	Light Blue	High Intensity Underline
3A	58	:	:	Shift	Cyan	Light Green	High Intensity
3B	59	;	;		Cyan	Light Cyan	High Intensity
3C	60	<	<	Shift	Cyan	Light Red	High Intensity
3D	61	=	=		Cyan	Light Magenta	High Intensity
3E	62	>	>	Shift	Cyan	Yellow	High Intensity
3F	63	?	?	Shift	Cyan	White	High Intensity
40	64	@	@	Shift	Red	Black	Normal
41	65	A	A	Note 4	Red	Blue	Underline
42	66	B	B	Note 4	Red	Green	Normal
43	67	C	C	Note 4	Red	Cyan	Normal
44	68	D	D	Note 4	Red	Red	Normal
45	69	E	E	Note 4	Red	Magenta	Normal
46	70	F	F	Note 4	Red	Brown	Normal
47	71	G	G	Note 4	Red	Light Grey	Normal
48	72	H	H	Note 4	Red	Dark Grey	High Intensity
49	73	I	I	Note 4	Red	Light Blue	High Intensity Underline
4A	74	J	J	Note 4	Red	Light Green	High Intensity

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
4B	75	K	K	Note 4	Red	Light Cyan	High Intensity
4C	76	L	L	Note 4	Red	Light Red	High Intensity
4D	77	M	M	Note 4	Red	Light Magenta	High Intensity
4E	78	N	N	Note 4	Red	Yellow	High Intensity
4F	79	O	O	Note 4	Red	White	High Intensity
50	80	P	P	Note 4	Magenta	Black	Normal
51	81	Q	Q	Note 4	Magenta	Blue	Underline
52	82	R	R	Note 4	Magenta	Green	Normal
53	83	S	S	Note 4	Magenta	Cyan	Normal
54	84	T	T	Note 4	Magenta	Red	Normal
55	85	U	U	Note 4	Magenta	Magenta	Normal
56	86	V	V	Note 4	Magenta	Brown	Normal
57	87	W	W	Note 4	Magenta	Light Grey	Normal
58	88	X	X	Note 4	Magenta	Dark Grey	High Intensity
59	89	Y	Y	Note 4	Magenta	Light Blue	High Intensity Underline
5A	90	Z	Z	Note 4	Magenta	Light Green	High Intensity
5B	91	[	[		Magenta	Light Cyan	High Intensity
5C	92	\	\		Magenta	Light Red	High Intensity
5D	93	]	]		Magenta	Light Magenta	High Intensity
5E	94	^	^	Shift	Magenta	Yellow	High Intensity
5F	95	_	_	Shift	Magenta	White	High Intensity
60	96	`	`		Yellow	Black	Normal
61	97	a	a	Note 5	Yellow	Blue	Underline
62	98	b	b	Note 5	Yellow	Green	Normal
63	99	c	c	Note 5	Yellow	Cyan	Normal
64	100	d	d	Note 5	Yellow	Red	Normal
65	101	e	e	Note 5	Yellow	Magenta	Normal
66	102	f	f	Note 5	Yellow	Brown	Normal

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
67	103	g	g	Note 5	Yellow	Light Grey	Normal
68	104	h	h	Note 5	Yellow	Dark Grey	High Intensity
69	105	i	i	Note 5	Yellow	Light Blue	High Intensity Underline
6A	106	j	j	Note 5	Yellow	Light Green	High Intensity
6B	107	k	k	Note 5	Yellow	Light Cyan	High Intensity
6C	108	l	l	Note 5	Yellow	Light Red	High Intensity
6D	109	m	m	Note 5	Yellow	Light Magenta	High Intensity
6E	110	n	n	Note 5	Yellow	Yellow	High Intensity
6F	111	o	o	Note 5	Yellow	White	High Intensity
70	112	p	p	Note 5	White	Black	Reverse Video
71	113	q	q	Note 5	White	Blue	Underline
72	114	r	r	Note 5	White	Green	Normal
73	115	s	s	Note 5	White	Cyan	Normal
74	116	t	t	Note 5	White	Red	Normal
75	117	u	u	Note 5	White	Magenta	Normal
76	118	v	v	Note 5	White	Brown	Normal
77	119	w	w	Note 5	White	Light Grey	Normal
78	120	x	x	Note 5	White	Dark Grey	Reverse Video
79	121	y	y	Note 5	White	Light Blue	High Intensity Underline
7A	122	z	z	Note 5	White	Light Green	High Intensity
7B	123	{	{	Shift	White	Light Cyan	High Intensity
7C	124	|	|	Shift	White	Light Red	High Intensity
7D	125	}	}	Shift	White	Light Magenta	High Intensity
7E	126	~	~	Shift	White	Yellow	High Intensity
7F	127	Δ	Ctrl ←		White	White	High Intensity

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
■ ■ 80 to FF Hex are Flashing in both Color and Monochrome ■ ■							
80	128	Ç	Alt 128	Note 6	Black	Black	Non-Display
81	129	u	Alt 129	Note 6	Black	Blue	Underline
82	130	é	Alt 130	Note 6	Black	Green	Normal
83	131	â	Alt 131	Note 6	Black	Cyan	Normal
84	132	a	Alt 132	Note 6	Black	Red	Normal
85	133	à	Alt 133	Note 6	Black	Magenta	Normal
86	134	å	Alt 134	Note 6	Black	Brown	Normal
87	135	ç	Alt 135	Note 6	Black	Light Grey	Normal
88	136	ê	Alt 136	Note 6	Black	Dark Grey	Non-Display
89	137	e	Alt 137	Note 6	Black	Light Blue	High Intensity Underline
8A	138	è	Alt 138	Note 6	Black	Light Green	High Intensity
8B	139	ı	Alt 139	Note 6	Black	Light Cyan	High Intensity
8C	140	i	Alt 140	Note 6	Black	Light Red	High Intensity
8D	141	ì	Alt 141	Note 6	Black	Light Magenta	High Intensity
8E	142	A	Alt 142	Note 6	Black	Yellow	High Intensity
8F	143	Å	Alt 143	Note 6	Black	White	High Intensity
90	144	É	Alt 144	Note 6	Blue	Black	Normal
91	145	æ	Alt 145	Note 6	Blue	Blue	Underline
92	146	Æ	Alt 146	Note 6	Blue	Green	Normal
93	147	ô	Alt 147	Note 6	Blue	Cyan	Normal
94	148	o	Alt 148	Note 6	Blue	Red	Normal
95	149	ò	Alt 149	Note 6	Blue	Magenta	Normal
96	150	û	Alt 150	Note 6	Blue	Brown	Normal
97	151	ù	Alt 151	Note 6	Blue	Light Grey	Normal
98	152	ÿ	Alt 152	Note 6	Blue	Dark Grey	High Intensity
99	153	o	Alt 153	Note 6	Blue	Light Blue	High Intensity Underline
9A	154	u	Alt 154	Note 6	Blue	Light Green	High Intensity

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
9B	155	¢	Alt 155	Note 6	Blue	Light Cyan	High Intensity
9C	156	£	Alt 156	Note 6	Blue	Light Red	High Intensity
9D	157	¥	Alt 157	Note 6	Blue	Light Magenta	High Intensity
9E	158	Pt	Alt 158	Note 6	Blue	Yellow	High Intensity
9F	159	ƒ	Alt 159	Note 6	Blue	White	High Intensity
A0	160	á	Alt 160	Note 6	Green	Black	Normal
A1	161	í	Alt 161	Note 6	Green	Blue	Underline
A2	162	ó	Alt 162	Note 6	Green	Green	Normal
A3	163	ú	Alt 163	Note 6	Green	Cyan	Normal
A4	164	ñ	Alt 164	Note 6	Green	Red	Normal
A5	165	Ñ	Alt 165	Note 6	Green	Magenta	Normal
A6	166	ª	Alt 166	Note 6	Green	Brown	Normal
A7	167	º	Alt 167	Note 6	Green	Light Grey	Normal
A8	168	¿	Alt 168	Note 6	Green	Dark Grey	High Intensity
A9	169	⌐	Alt 169	Note 6	Green	Light Blue	High Intensity Underline
AA	170	¬	Alt 170	Note 6	Green	Light Green	High Intensity
AB	171	½	Alt 171	Note 6	Green	Light Cyan	High Intensity
AC	172	¼	Alt 172	Note 6	Green	Light Red	High Intensity
AD	173	¡	Alt 173	Note 6	Green	Light Magenta	High Intensity
AE	174	«	Alt 174	Note 6	Green	Yellow	High Intensity
AF	175	»	Alt 175	Note 6	Green	White	High Intensity
B0	176	░	Alt 176	Note 6	Cyan	Black	Normal
B1	177	▒	Alt 177	Note 6	Cyan	Blue	Underline
B2	178	▓	Alt 178	Note 6	Cyan	Green	Normal
B3	179	│	Alt 179	Note 6	Cyan	Cyan	Normal
B4	180	┤	Alt 180	Note 6	Cyan	Red	Normal
B5	181	╡	Alt 181	Note 6	Cyan	Magenta	Normal
B6	182	╢	Alt 182	Note 6	Cyan	Brown	Normal

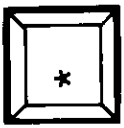
Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
B7	183		Alt 183	Note 6	Cyan	Light Grey	Normal
B8	184		Alt 184	Note 6	Cyan	Dark Grey	High Intensity
B9	185		Alt 185	Note 6	Cyan	Light Blue	High Intensity Underline
BA	186		Alt 186	Note 6	Cyan	Light Green	High Intensity
BB	187		Alt 187	Note 6	Cyan	Light Cyan	High Intensity
BC	188		Alt 188	Note 6	Cyan	Light Red	High Intensity
BD	189		Alt 189	Note 6	Cyan	Light Magenta	High Intensity
BE	190		Alt 190	Note 6	Cyan	Yellow	High Intensity
BF	191		Alt 191	Note 6	Cyan	White	High Intensity
C0	192		Alt 192	Note 6	Red	Black	Normal
C1	193		Alt 193	Note 6	Red	Blue	Underline
C2	194		Alt 194	Note 6	Red	Green	Normal
C3	195		Alt 195	Note 6	Red	Cyan	Normal
C4	196		Alt 196	Note 6	Red	Red	Normal
C5	197		Alt 197	Note 6	Red	Magenta	Normal
C6	198		Alt 198	Note 6	Red	Brown	Normal
C7	199		Alt 199	Note 6	Red	Light Grey	Normal
C8	200		Alt 200	Note 6	Red	Dark Grey	High Intensity
C9	201		Alt 201	Note 6	Red	Light Blue	High Intensity Underline
CA	202		Alt 202	Note 6	Red	Light Green	High Intensity
CB	203		Alt 203	Note 6	Red	Light Cyan	High Intensity
CC	204		Alt 204	Note 6	Red	Light Red	High Intensity
CD	205		Alt 205	Note 6	Red	Light Magenta	High Intensity
CE	206		Alt 206	Note 6	Red	Yellow	High Intensity
CF	207		Alt 207	Note 6	Red	White	High Intensity
D0	208		Alt 208	Note 6	Magenta	Black	Normal

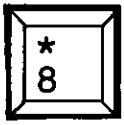
Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
D1	209	╤	Alt 209	Note 6	Magenta	Blue	Underline
D2	210	╥	Alt 210	Note 6	Magenta	Green	Normal
D3	211	╙	Alt 211	Note 6	Magenta	Cyan	Normal
D4	212	╘	Alt 212	Note 6	Magenta	Red	Normal
D5	213	╒	Alt 213	Note 6	Magenta	Magenta	Normal
D6	214	╓	Alt 214	Note 6	Magenta	Brown	Normal
D7	215	╫	Alt 215	Note 6	Magenta	Light Grey	Normal
D8	216	╪	Alt 216	Note 6	Magenta	Dark Grey	High Intensity
D9	217	┘	Alt 217	Note 6	Magenta	Light Blue	High Intensity Underline
DA	218	┌	Alt 218	Note 6	Magenta	Light Green	High Intensity
DB	219	█	Alt 219	Note 6	Magenta	Light Cyan	High Intensity
DC	220	▄	Alt 220	Note 6	Magenta	Light Red	High Intensity
DD	221	▌	Alt 221	Note 6	Magenta	Light Magenta	High Intensity
DE	222	▐	Alt 222	Note 6	Magenta	Yellow	High Intensity
DF	223	▀	Alt 223	Note 6	Magenta	White	High Intensity
E0	224	α	Alt 224	Note 6	Yellow	Black	Normal
E1	225	β	Alt 225	Note 6	Yellow	Blue	Underline
E2	226	Γ	Alt 226	Note 6	Yellow	Green	Normal
E3	227	π	Alt 227	Note 6	Yellow	Cyan	Normal
E4	228	Σ	Alt 228	Note 6	Yellow	Red	Normal
E5	229	σ	Alt 229	Note 6	Yellow	Magenta	Normal
E6	230	μ	Alt 230	Note 6	Yellow	Brown	Normal
E7	231	τ	Alt 231	Note 6	Yellow	Light Grey	Normal
E8	232	Φ	Alt 232	Note 6	Yellow	Dark Grey	High Intensity
E9	233	θ	Alt 233	Note 6	Yellow	Light Blue	High Intensity Underline
EA	234	Ω	Alt 234	Note 6	Yellow	Light Green	High Intensity
EB	235	δ	Alt 235	Note 6	Yellow	Light Cyan	High Intensity

Value		As Characters			As Text Attributes		
					Color/Graphics Monitor		Monochrome Monitor
Hex	Dec	Symbol	Keystrokes	Modes	Background	Foreground	
EC	236	∞	Alt 236	Note 6	Yellow	Light Red	High Intensity
ED	237	ϕ	Alt 237	Note 6	Yellow	Light Magenta	High Intensity
EE	238	ϵ	Alt 238	Note 6	Yellow	Yellow	High Intensity
EF	239	∩	Alt 239	Note 6	Yellow	White	High Intensity
F0	240	≡	Alt 240	Note 6	White	Black	Reverse Video
F1	241	±	Alt 241	Note 6	White	Blue	Underline
F2	242	≥	Alt 242	Note 6	White	Green	Normal
F3	243	≤	Alt 243	Note 6	White	Cyan	Normal
F4	244	⌠	Alt 244	Note 6	White	Red	Normal
F5	245	⌡	Alt 245	Note 6	White	Magenta	Normal
F6	246	÷	Alt 246	Note 6	White	Brown	Normal
F7	247	≈	Alt 247	Note 6	White	Light Grey	Normal
F8	248	°	Alt 248	Note 6	White	Dark Grey	Reverse Video
F9	249	∙	Alt 249	Note 6	White	Light Blue	High Intensity Underline
FA	250	·	Alt 250	Note 6	White	Light Green	High Intensity
FB	251	√	Alt 251	Note 6	White	Light Cyan	High Intensity
FC	252	n	Alt 252	Note 6	White	Light Red	High Intensity
FD	253	2	Alt 253	Note 6	White	Light Magenta	High Intensity
FE	254	■	Alt 254	Note 6	White	Yellow	High Intensity
FF	255	BLANK	Alt 255	Note 6	White	White	High Intensity

Note 1:

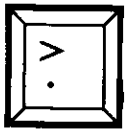
The asterisk (*) can be typed using two methods:

1. Press the  key.

2. Press the  key in shift mode.

Note 2:

The period (.) can be typed using two methods:

1. Press the  key.

2. Press the  key in shift or Num Lock mode.

Note 3:

Numeric characters (0-9) can be typed using two methods:

1. Press the numeric keys on the top row of the typewriter portion of the keyboard.

2. Press the numeric keys on the 10-key pad on the right side of the keyboard in Num Lock mode or in shift mode.

Note 4:

Upper case alphabetic characters (A-Z) may be typed using two methods:

1. In shift mode, press the appropriate alphabetic key.

2. In Caps Lock mode, press the appropriate alphabetic key.

Note 5:

Lower case alphabetic characters (a-z) may be typed using two methods:

1. In normal mode, press the appropriate alphabetic key.

2. In Caps Lock combined with Shift mode, press the appropriate alphabetic key.

Note 6:

The 3 digits after the Alt key must be typed from the numeric key pad (keys 74-83). Character codes 128 through 255 may be entered in this fashion. This method will not work if your display is installed as an ANSI terminal.

Index

Index

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

V

W