THE
KAYPRO 10
USER'S GUIDE

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Meet KAYPRO 1Ø!

We hope that you will enjoy many useful and pleasurable years with your computer — whether at business or at home.

If you've never used a computer before, we'll introduce you to the KAYPRO 1Ø with step-by-step instructions to help you get started right away.

If you're an old hand at computer operation, we know you're eager to get started, but PLEASE take a few minutes to read the instructions for getting started with your KAYPRO 1Ø. It will save time and prevent problems.

Many of the terms used in this manual are explained in the glossary at the back.

UNPACKING YOUR KAYPRO 1Ø

When unpacking your KAYPRO 1Ø, be sure to save the packing materials in case you want to ship it some day. The box should also contain the following:

        Manuals for the software
        KAYPRO ownership documents
        Coiled cable (found when the computer
           is opened)

WHAT YOU WILL NEED

BLANK DISKETTES

It is advisable to have blank diskettes for backing up the files in which you store information, such as: text files, mailing lists, and programs which you write. The KAYPRO 1Ø uses 5¼-inch single-sided or double-sided, double-density, soft-sector floppy diskettes. If you value the information you'll be storing, don't buy low-quality diskettes.

WORK SURFACE

You will want a work surface with leg room underneath.

POWER REQUIREMENTS

Power requirements for the KAYPRO 1Ø are 115 to 125 VAC, 5Ø to 6Ø Hertz at 6Ø watts (normal house current). The outlet should be grounded. Your dealer can switch the power supply to 22Ø VAC if you want to take your computer overseas. For power requirements for peripherals such as a printer, consult the owner's manual for the peripheral.

OPTIONAL LINE FILTER

If you have heavy machinery operating from the same power source, or if you experience frequent power shortages or surges, it may be advisable to use a line filter. Even machines such as air conditioners, irons, and electric drills can cause problems.

OPTIONAL BACKUP POWER SOURCE

To provide continuous power in case of a power outage, backup power sources are available from various manufacturers. Contact your dealer about this.

SETTING UP YOUR KAYPRO 1Ø

1. Set the KAYPRO 1Ø on the work surface where you want the keyboard to be, because the keyboard is on the bottom. While it is in this position, look at the rear panel to locate the controls, switches, and ports.
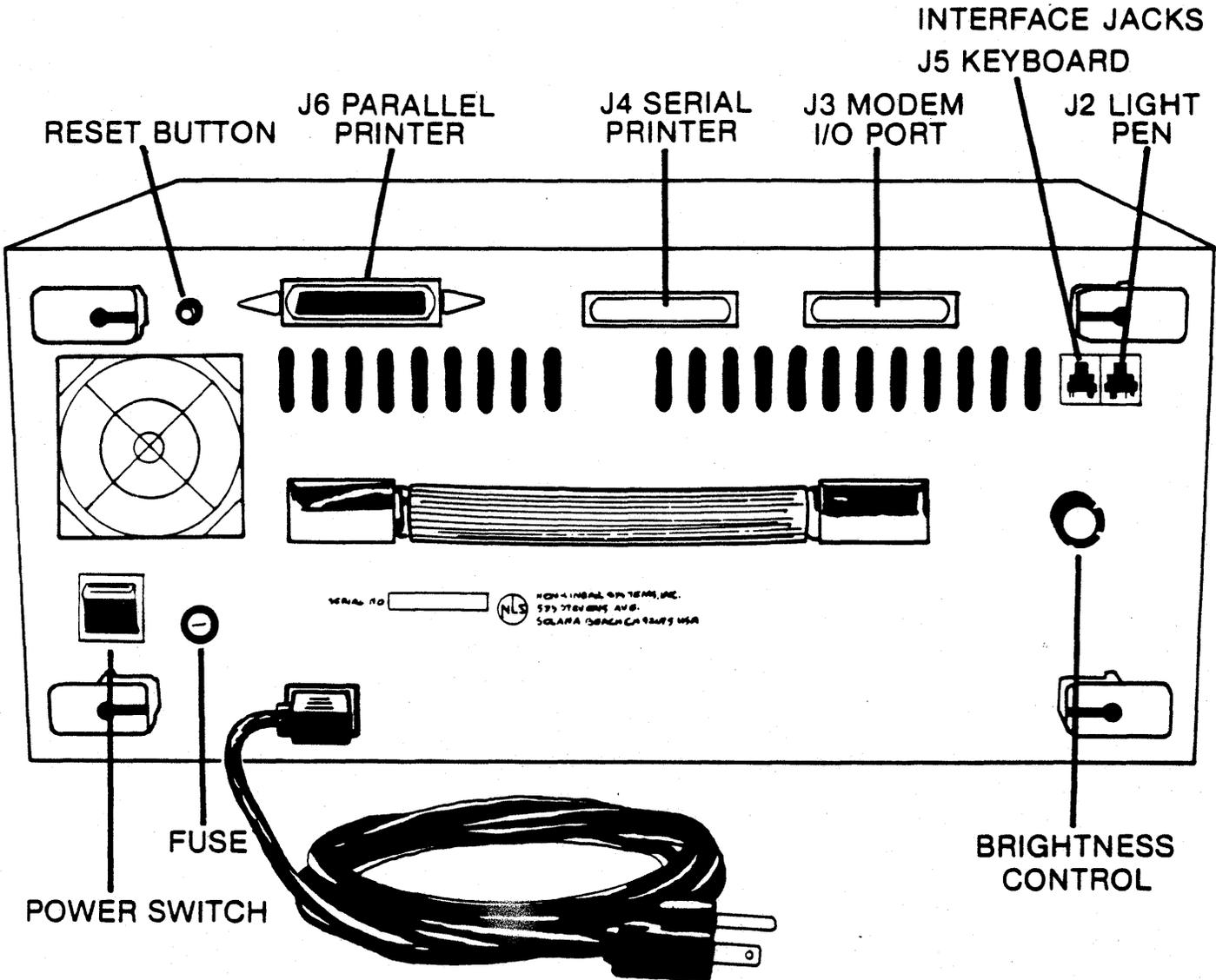
2. Then, turn the KAYPRO 1∅ so the ventilated side faces away from your work position.

3. Unwind the AC line power cord, but DO NOT PLUG IT IN YET.

4. Push down the tops of the latches on both sides of the KAYPRO; then pull out the bottoms of the latches to detach them from the keyboard.
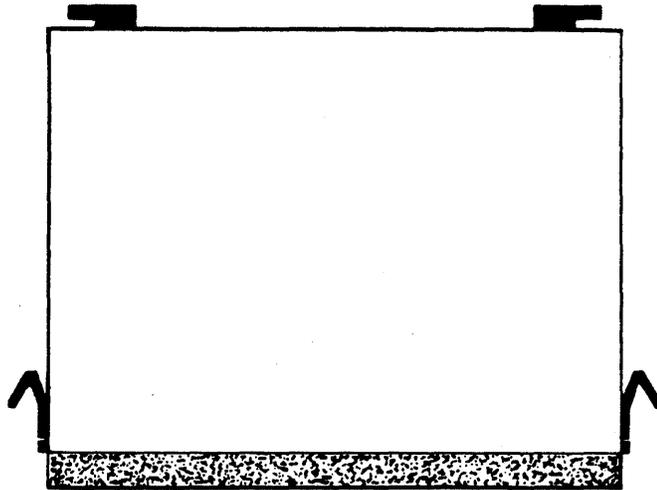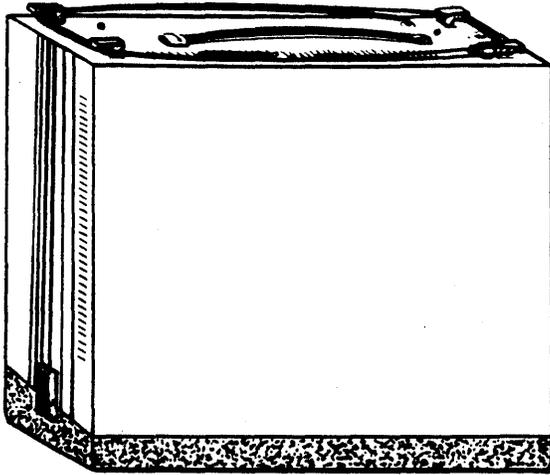
5. Carefully lift the computer off the keyboard, and lay it on the working surface with the large, ventilated surface down.

6. Place the keyboard where you can use it comfortably.

7. Raise the front of the computer, and pull down the metal stand.
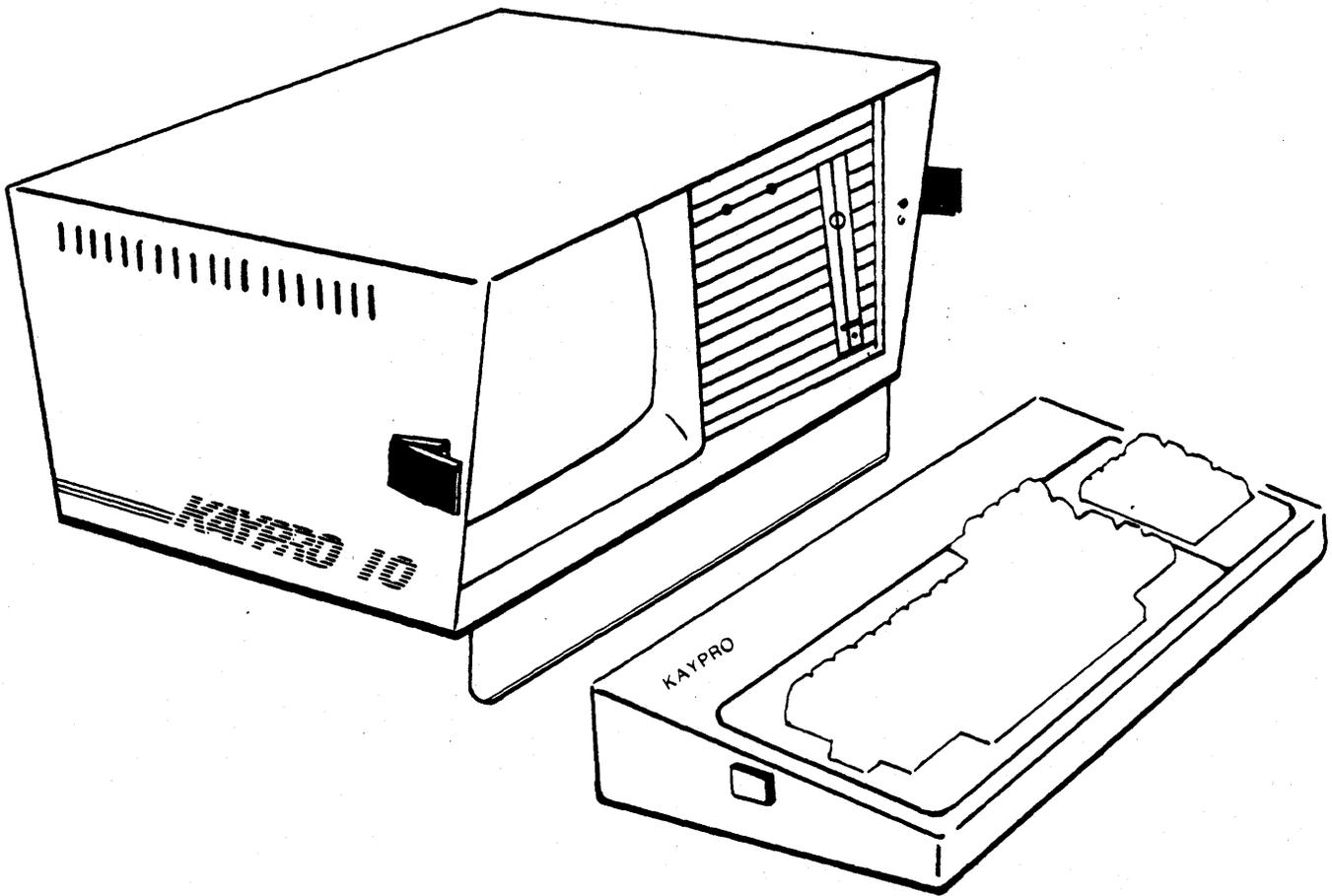
8. Plug one end of the coiled cable into the J5 keyboard jack on the back panel of the computer. The protrusion on the plastic connector should be up.
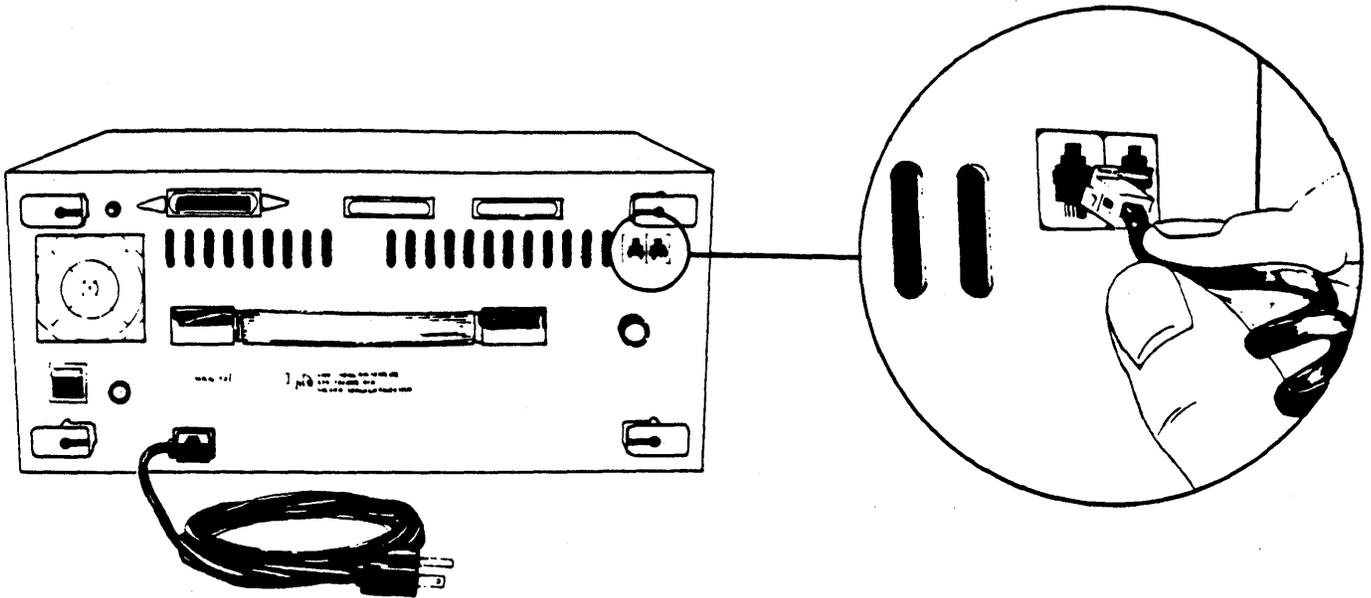
9. Plug the other end of the cable into the jack on the back of the keyboard. The protrusion on the plastic connector should be down.
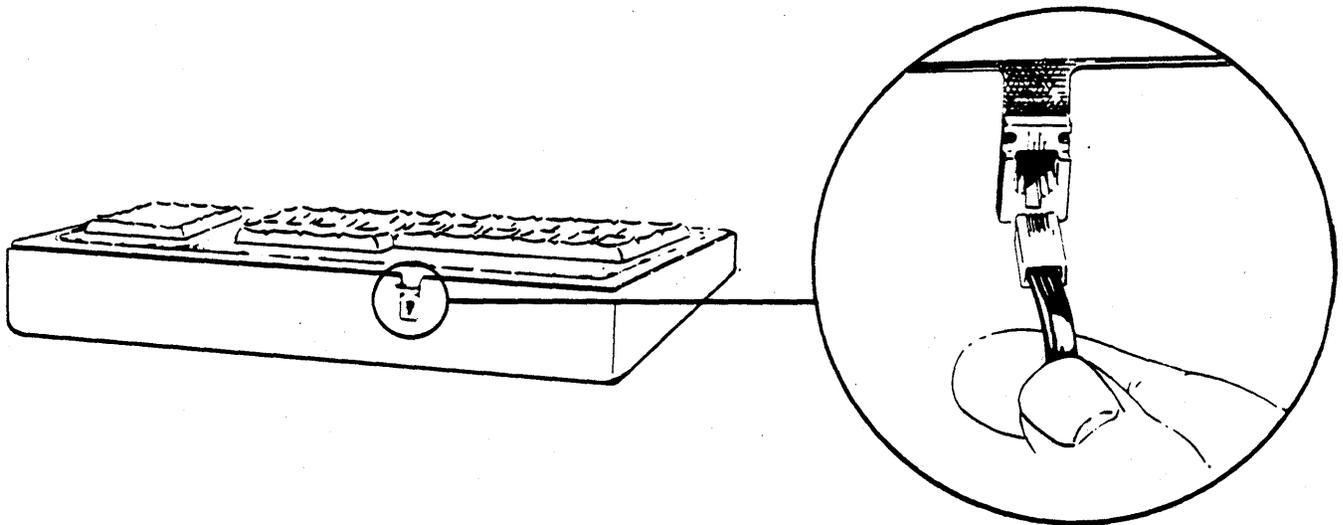
10. Route the coiled cable under the computer.

11. Turn the latch at the front of the drive counterclockwise from horizontal to vertical and remove the cardboard disk-drive protector from the disk drive.

    If you close the computer to carry it, reinsert this protector. A handy place to keep the protector is tucked under the handle on the back of the computer. If you ever ship your KAYPRO 1Ø, be sure to place the protector in the disk drive, or the drive warranty will be void.

12. Make sure the ON-OFF rocker-type switch on the back of the computer is turned OFF (down).

13. Then connect the computer to the power source.

    Before you turn the computer ON, take the time to read the next section. It contains information regarding memory, the CP/M operating system, the screen, the cursor, and floppy diskettes.

BECOMING ACQUAINTED WITH YOUR COMPUTER
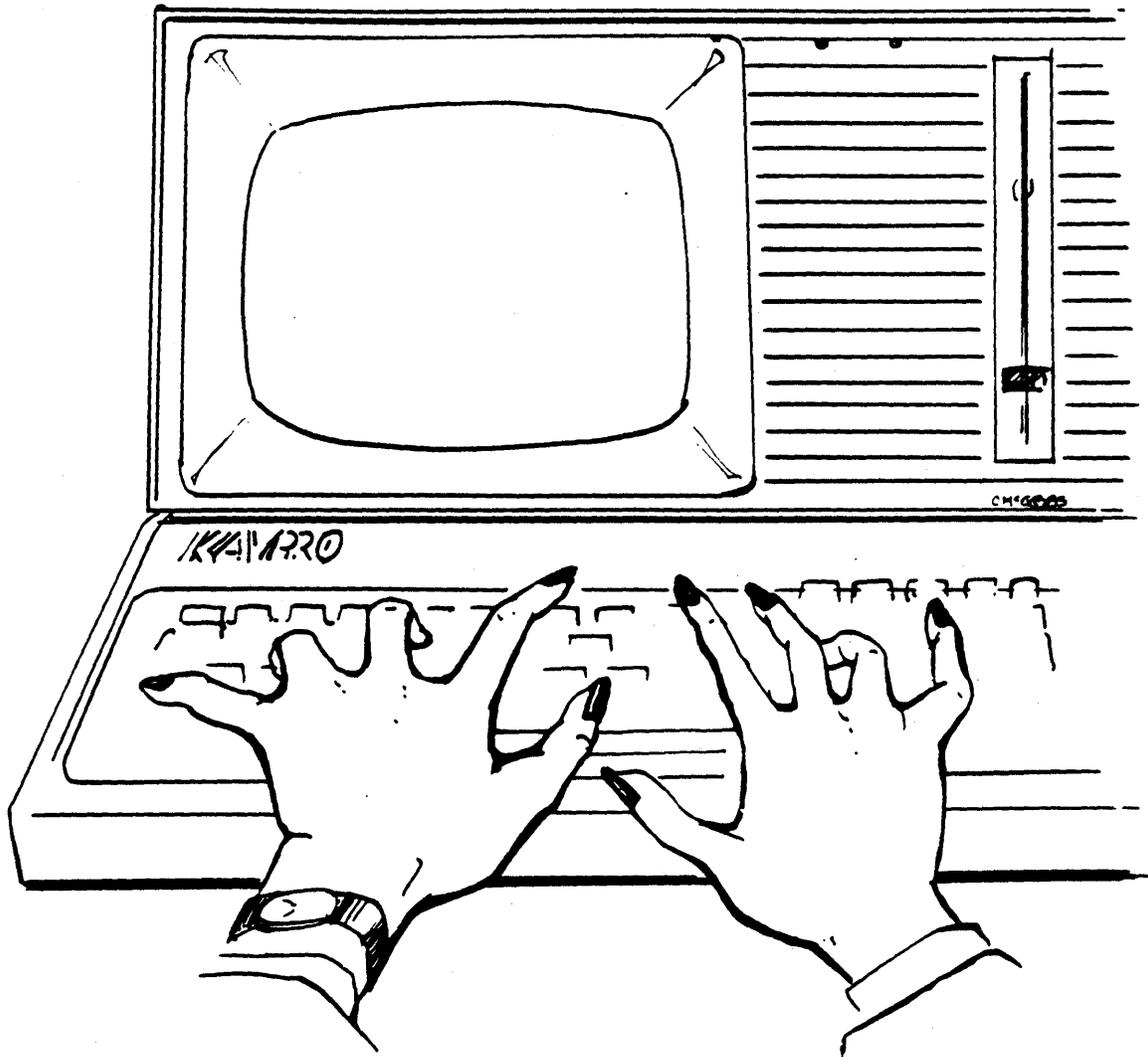
THE CURSOR AND CURSOR KEYS

The cursor is a place marker to show where information can be entered. On the KAYPRO 10, it is indicated by a flashing rectangle. The next character you type will appear at this location.

When you are using certain programs, you can use the cursor keys (arrow keys) to move the cursor freely in any direction on the screen:

UP   DOWN   LEFT   RIGHT
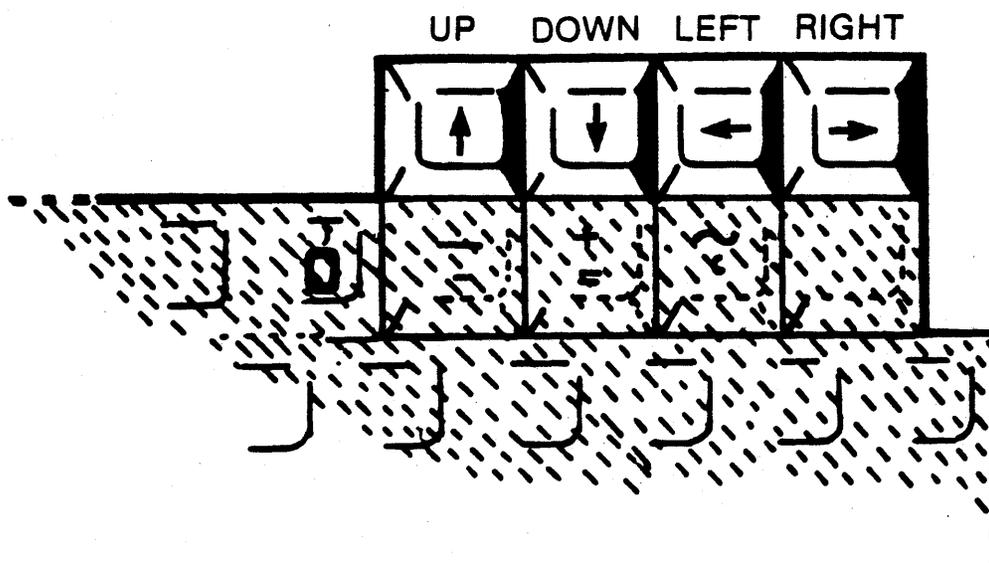
You can use the CONFIG program to change the arrow keys to act as any character or control key that you desire. Look in the index under, "arrow keys, reconfiguring."

These keys will not function in this manner in CP/M.

KEYS ON THE LEFT OF THE KEYBOARD
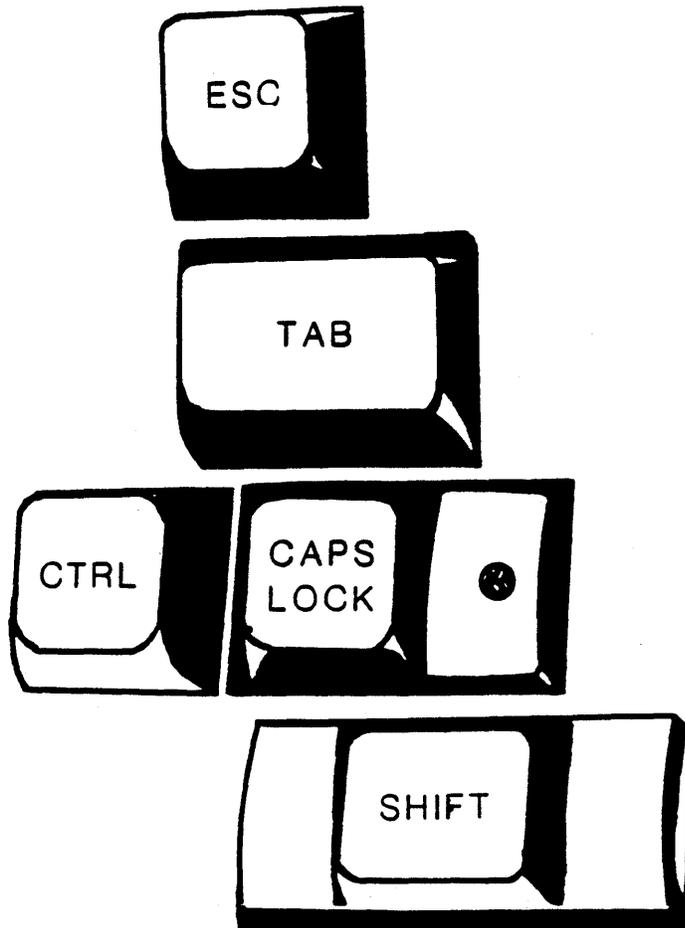
The ESCape key is used according to instructions.

The TAB key moves the cursor horizontally a set number of spaces and inserts those spaces, depending on the program in use.

The CONTROL key is used simultaneously with letter keys to do certain functions. Depress the CTRL key; then, while it is depressed, type the letter. Sometimes the control function will display as a ^ character followed by a second character.

The CAPS LOCK key puts alphabetic characters in upper case. Press once to activate it (the red light on the key goes on), and press again to deactivate it.

The SHIFT key is used simultaneously with letter keys to put alphabetic characters in upper case. It also accesses the characters on the upper part of keys which have two characters, for example @ and ?.

KEYS ON THE RIGHT OF THE KEYBOARD

The BACKSPACE key moves the cursor backward, sometimes deleting the character over which it moves, depending on the program being used.

The DELETE key echoes the previous character while *deleting* it. You will see this happen if you try to use the key to correct command lines. It has other functions, depending on the program being used. For instance, in word processing programs, it simply deletes the previous character, much like a self-correcting typewriter.

The RETURN key moves the cursor down a line and returns the cursor to the left of the screen. It also tells the computer to execute a command and has various other uses. <RET> and <CR> are computer symbols to indicate that you should press the return key.

The LINE FEED key moves the cursor down one line with no return to the left.
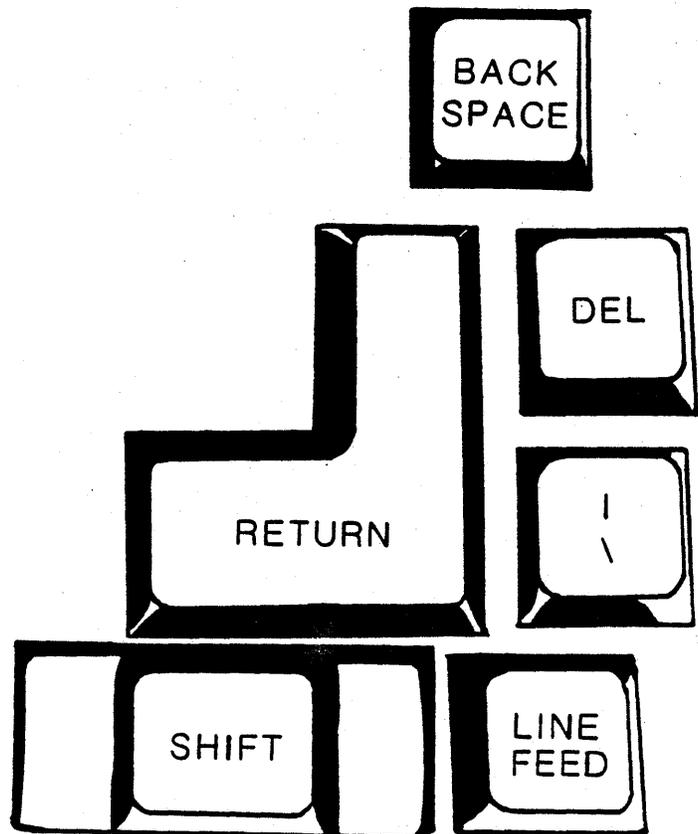
THE KEYPAD

To the right of the main keyboard are 14 keys in a numeric calculator-style layout.

With the exception of a few control keys, such as CTRL, ESC, and RETURN, all of the keys, including the cursor movement keys, will automatically repeat when held down.
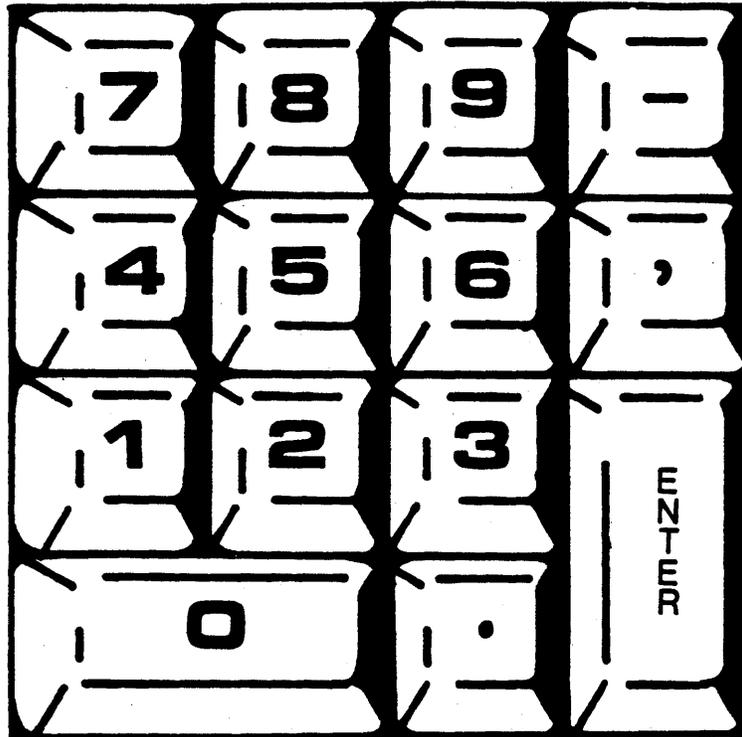
You can use the CONFIG program to change the keys on the keypad to act as any character or control key that you desire. WSKPCONF will allow you to program the keypad for use with WordStar. Look in the index under "keypad, reconfiguring."

THE BIG GREEN SCREEN

The video screen displays information communicated between you and the computer, such as characters typed on the keyboard, stored information, and prompts (requests for you to type information).

The screen holds 1,920 characters in 80 vertical columns and 24 horizontal lines. There is another (25th) line, which is a status line.

The character set is the standard ASCII set.

You can adjust the brightness of the display by turning the brightness knob on the back panel.

MEMORY
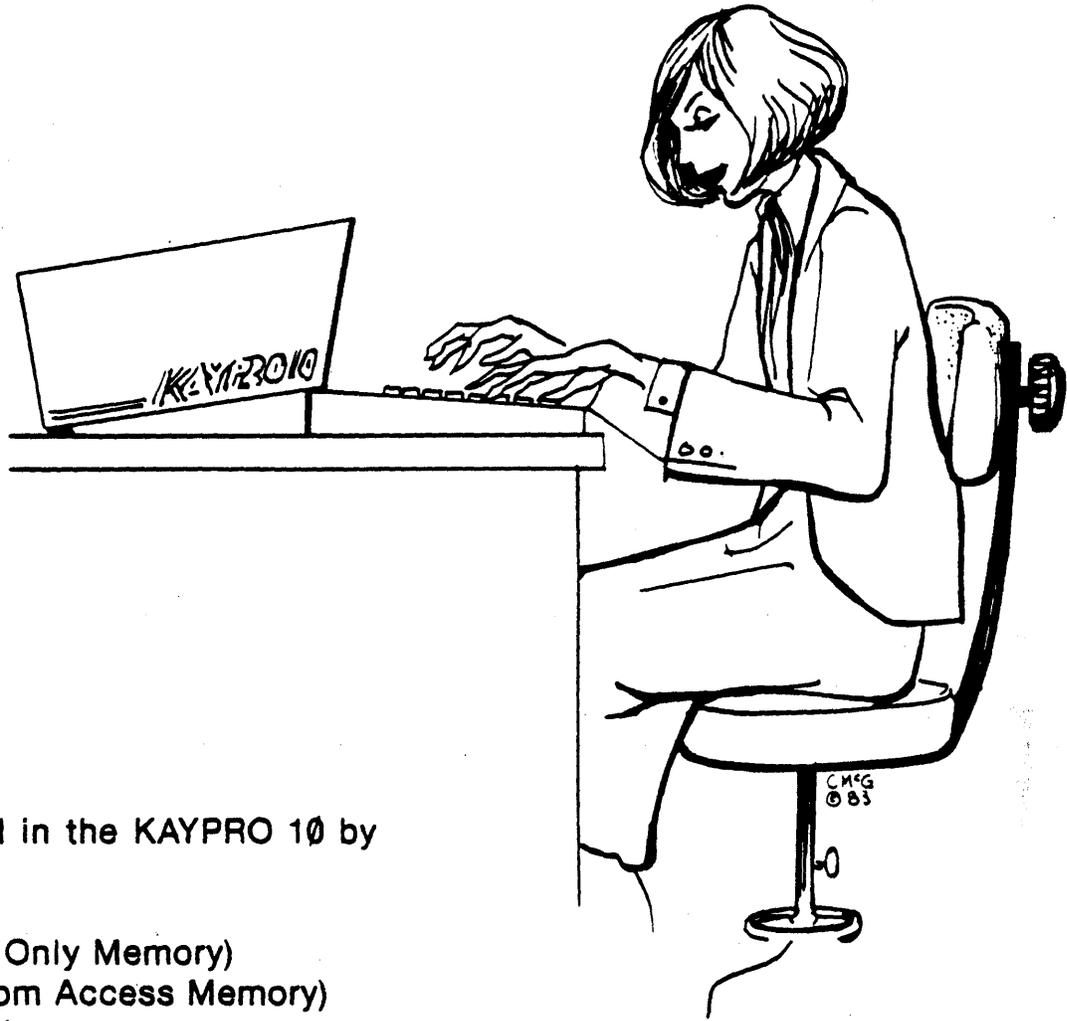
Data is stored in the KAYPRO 1Ø by means of:

- ROM (Read Only Memory)
- RAM (Random Access Memory)
- the hard disk

ROM is the smallest portion of memory — about 4 kbytes (4,ØØØ bytes). ROM contains *unchanging* programs and information most frequently used.

RAM holds 64 kilobytes (64 thousand bytes). RAM can be read from and written to. RAM is lost when the computer's power is turned off, so, if you want to save a program or data which you have put in RAM, you will have to save it on the hard disk.

The hard disk holds 1Ø million bytes of information that may be stored, retrieved, changed, and erased, as necessary. If the information you are storing has continuing value for you, you will want to back up the information which is on hard disk by copying the information to a floppy diskette.

STORAGE OF PROGRAMS AND INFORMATION

Information is stored in the form of *files*. The number of files that can be stored on a disk depends on how much information is in each file.

The *hard disk* contains the CP/M program, which operates the computer, and the software programs. The hard disk is permanently fixed within the machine. The head disk interface is vulnerable to rough handling when moving the computer.

On the KAYPRO 1Ø, *diskette* storage is used to back up files which are on the hard disk. The KAYPRO 1Ø uses 5¼-inch single-sided or double-sided, double-density soft-sector diskettes. Single-sided diskettes can store 195K bytes, and double-sided diskettes can store 39ØK bytes. 4K bytes of space are reserved for the operating system and other essentials.

CARE OF DISKETTES

Floppy diskettes store data on a magnetic surface that is vulnerable to damage which could result in the loss of data. Damage can be caused by:

- heat or cold
- moisture
- dust
- touching (chemicals or oils on fingers)
- bending or folding
- exposure to magnetic fields or equipment

Here are a few simple guidelines for handling and using diskettes.

POWER:

- Do not turn the computer ON or OFF with a diskette in the drive.
- Always remove the diskette before turning OFF the computer.
- Do not have the diskette in the drive when you turn ON the power.

HANDLE DISKETTES WITH CARE: Do not flex or bend diskettes.

INSERT DISKETTES CAREFULLY: Turn the latch at the front of the drive to the left until it is vertical. Holding the diskette with the label to the left and the notch down, insert the diskette into the drive. There will be some resistance when the diskette is almost in the drive. Continue to push it in until a click is heard and the diskette stays in the slot. Turn the latch to the right until it is horizontal. The latch loads and unloads the heads on the floppy disk.
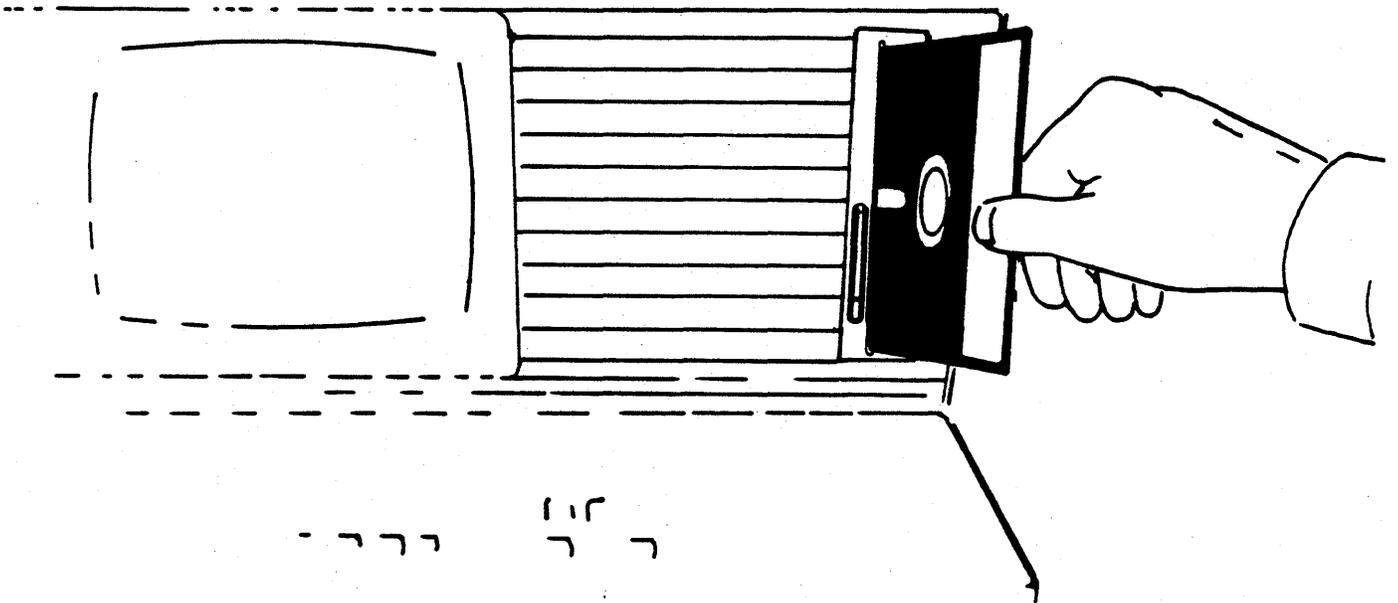
TO REMOVE A DISKETTE: Turn the latch at the front of the drive counterclockwise from horizontal to vertical. The diskette will eject slightly. Take the diskette completely out of the drive so as to not confuse the computer as to whether it should boot up from the diskette.

CLEAR THE COMPUTER AFTER CHANGING DISKETTES: When a diskette is inserted and the drive door is closed, the information on that diskette is loaded into the computer and stays there until the computer is cleared. If you remove the diskette and insert another without clearing the computer, the information from the newly-inserted diskette will load, but there will be problems. So, after changing diskettes, ALWAYS reset the computer by holding down the CTRL key and pressing the C key.

KEEP DISKETTES COVERED: Keep diskettes in their protective covers when not in use. Do not touch the exposed (brown) portions of the diskettes.

STORE DISKETTES SAFELY: Store diskettes in a container or file in a clean, dry, cool place away from magnetic fields, away from the computer, away from telephone lines, etc.

STORE INFORMATION FREQUENTLY: Store information on the hard disk as you create it — about two to four times an hour — and store your work whenever you leave the computer, even briefly. The procedure for storing information depends on the program being used.

BACK UP: It is a good idea to back up with diskettes the files which are on hard disk. Then, if something unexpected happens regarding your computer or the hard disk, you will have the information.

LABEL DISKETTES CAREFULLY: Immediately label all diskettes which contain programs or data. Use plain "press-apply" labels to identify the files you transfer to diskettes. Write the label first, and then apply it to your diskette. If you must write on a label which is already on a disk, use only a soft, felt-tip pen, as a ballpoint pen can damage a diskette.

Note: If you have a single-sided diskette (one formatted for a KAYPRO 2) in the drive on the KAYPRO 1Ø, and you press the reset button, the computer will hang.

LABEL

WRITE PROTECT NOTCH

KAYPRO

DIVISION OF NON-LINEAR SYSTEMS
DEL MAR, CALIFORNIA

CP/M SERIAL # _____

CP M* Version 2.2
Copyright 1981 by Digital Research, Inc.
S-BASIC™ Compiler
Copyright 1982 by TOPAZ Programming

All software on this diskette may be
used and copied only in accordance with
license agreement.

SPINDLE HOLE   HEAD ACCESS   INDEX HOLE
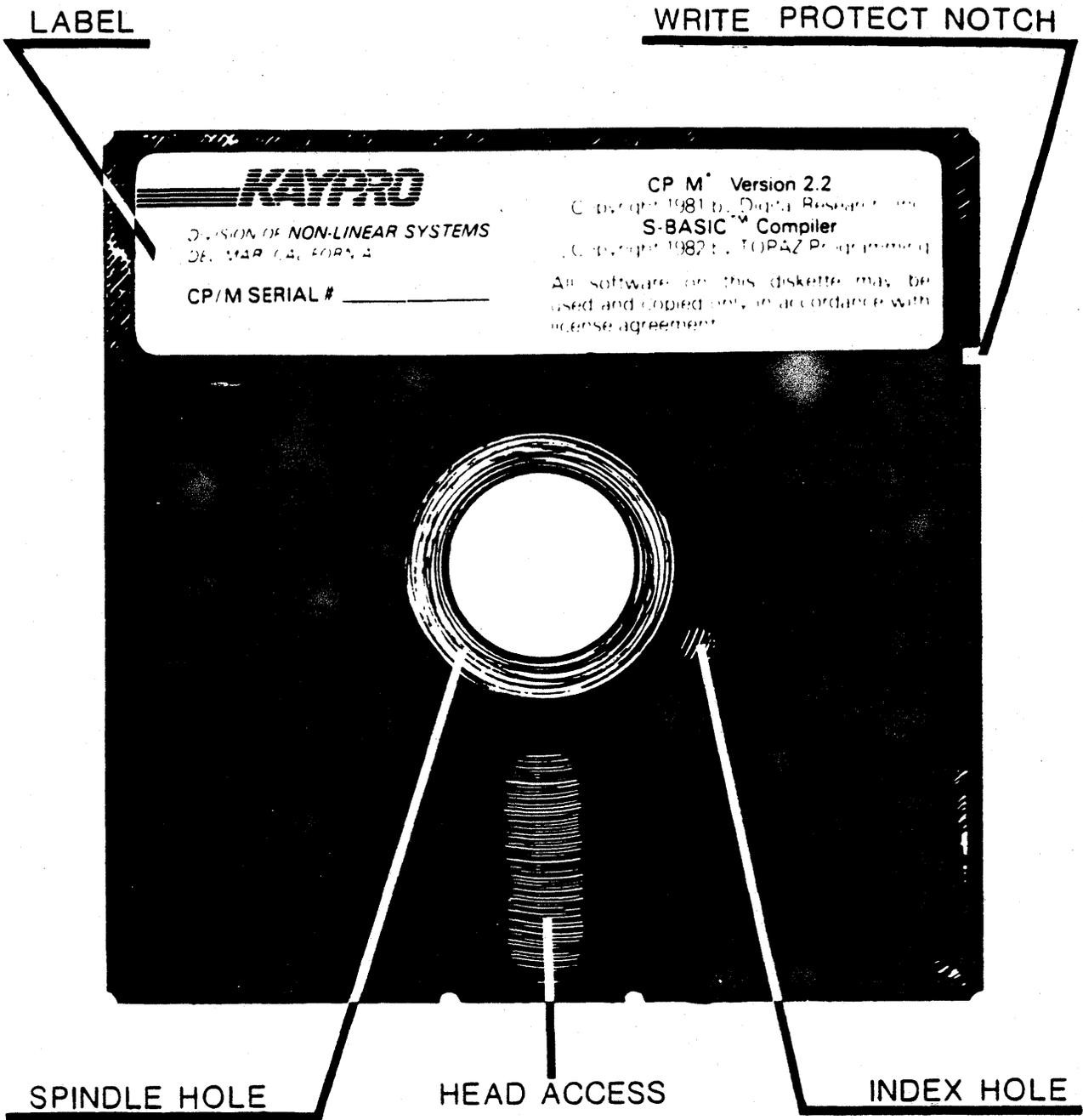
WRITE-PROTECT NOTCH: A write-protect notch allows information to be written to or read from a diskette.

- If this notch is covered, information can only be read FROM the diskette.

- If you want to write information to a diskette, don't cover its write-protect notch.

- When you want to ensure that you do not accidently erase stored information, cover the write-protect notch with the tabs provided with new diskettes.

NAMING FILES

Files must be named according to established practices, and the file names must be typed correctly.

<center>B:NAME.MSS</center>

The letter of the drive which contains the file. It must be followed by a colon (:).	The actual name. It describes the contents of the file, is no longer than eight characters, and must start with an alphabetical character.	The filetype describes the kind of file, such as .LTR for letter. It is preceded by a period and is no more than three characters long.
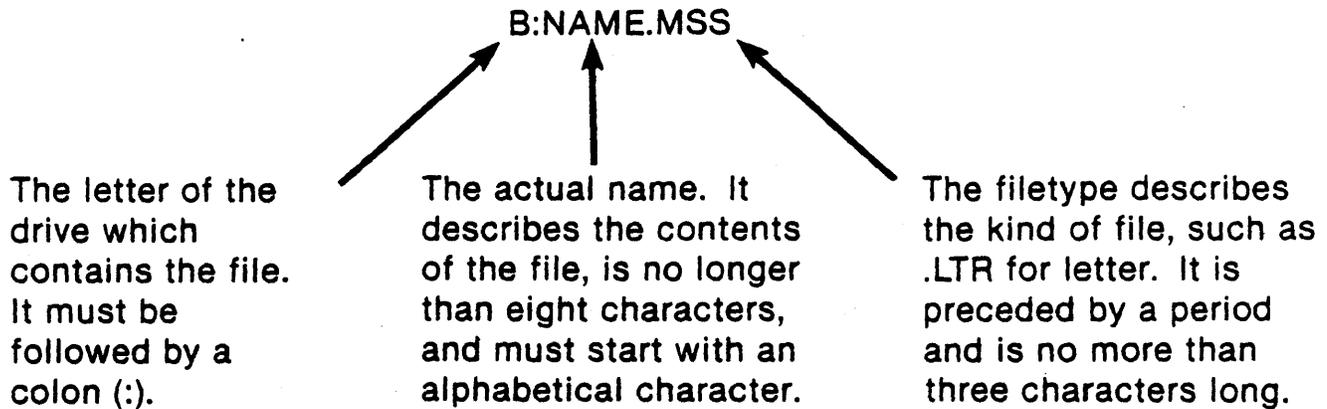
There are some characters that you must NOT use in a file name:

$$< \quad > \quad (\quad) \quad \backslash \quad ; \quad : \quad = \quad ? \quad * \quad [\quad] \quad . \quad , \quad \_ \quad \% \quad |$$

We recommend that you use only the letters A to Z and the numbers 0 to 9, as some programs may have problems with other characters.

Be sure to type the letter of the drive you want before the file name; otherwise the computer will stay in the current drive.

When creating a file, use upper case letters. However, when accessing programs, you may type file names and drive names in lower case.

In computer books, the generic name for a file is <filename>. When you see this, substitute the name of the file you want to use, but do not type the angle brackets < >. Include the filetype, if there is one.

THE SETUP OF THE HARD DISK

KAYPRO 1∅ is a ten-megabyte unit. This means 1∅ million characters can be stored on the hard disk!

The hard disk is divided into two logical units, with five megabytes each. Each unit is designated as a drive. The hard disk is drives A and B. The drive which takes the diskette is drive C.

THE DRIVE ON WHICH THE BOOT IS DONE IS ALWAYS A. Therefore:

If the boot is done on the hard disk (no diskette in the drive), the hard disk is drive A and drive B, and the diskette drive is C.

On the other hand, if there is a diskette in the drive when the computer is booted, then the diskette drive is A, and the hard disk is drives B and C.

Each drive is further subdivided into sixteen user areas, which are tagged with user area numbers from ∅ to 15. (User areas are further explained in the *CP/M User's Guide.*)

Within each of the user areas, you can set up files to hold information, much as a filing cabinet holds information in file folders. There is no specified amount of space in each user area. Each user area takes from the full storage capacity as it needs it. When a file is erased, the space previously taken by the file goes back into main storage.

A user area can contain up to five megabytes, if the space on that drive is not used by other user areas.

The hard disk of your KAYPRO 1∅ will have various programs in the various user areas: utilities, word processor, spreadsheet, data base, programming languages, and games. Later in this manual you will learn how to find what is in the various user areas. However, if you always choose to enter these programs from the Master Menu, you will never need to know what files are in the user areas.

CAUTION: In addition, user area 15 has provisions for a file, [UNUSED].BAD. This is a safety feature which will not concern the user but which *should not be erased* if you find it in user 15.

COLD BOOT AND WARM BOOT

Cold boot and warm boot are computer slang for two processes which are also called cold start and warm start.

COLD BOOT: This is the process which starts the computer when you turn it on. When you see the AØ> prompt on the screen, the cold boot has been accomplished, and the computer is ready for a program to be implemented.

Pressing the reset button while the computer is on also accomplishes a cold boot.
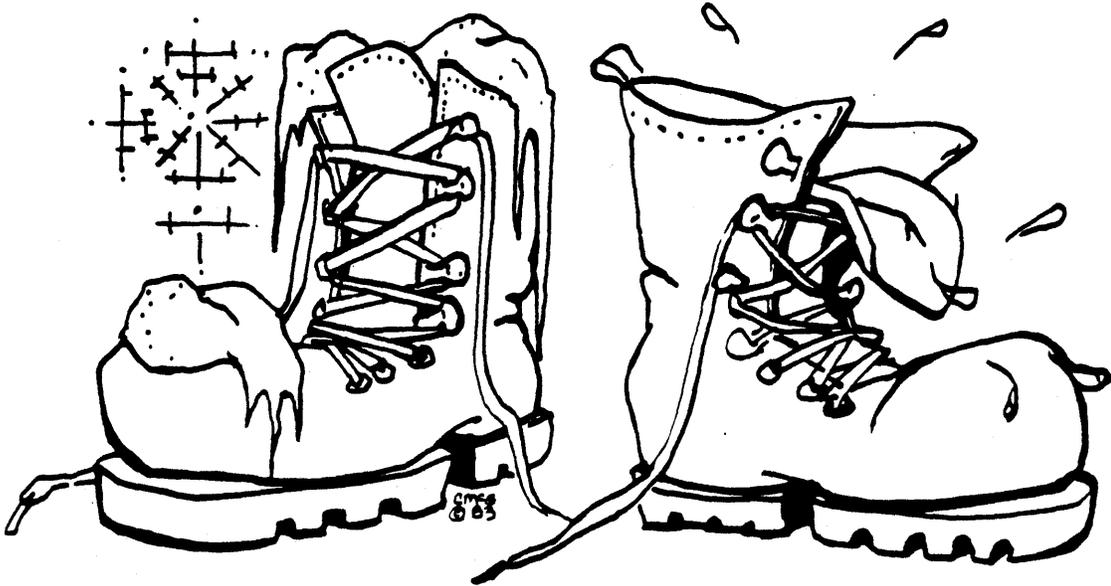
WARM BOOT: This is the process which restarts the computer while it is turned on. When it is restarted, any information you have entered, but not saved, will no longer be available.

Some programs do a warm boot for you when the program is finished, and you will see (for example) the message:

Warm Boot

A0>

When you see the prompt, A0>, CP/M is waiting for you to enter the name of a program you want to run or to give it a warm boot instruction.

To give the warm boot instruction, press the CTRL key, and, while holding it down, press the C key.

For more information about cold and warm boots, refer to the CP/M manual provided with your KAYPRO 10.

If your KAYPRO 10 fails to boot, it may be because the hard disk has lost its system tracks. Consult the section in this user's guide on Rebuilding System Tracks.

Strange things may happen when you do something that the program/computer doesn't expect or that may be a result of a "bug" (a hole in the logic of a program). Do NOT pull the plug or turn off the machine, as this can destroy information on the hard disk. If all attempts to recover fail, push the reset button on the back panel. This will destroy information which is in the temporary memory of the computer, but will not affect the information which has been saved on the disk.

STARTING YOUR KAYPRO 1Ø

1. Turn on the computer, using the power switch on the back panel. Wait 15-2Ø seconds while the hard disk within the computer rotates up to speed.

   If you receive an error message at the bottom of your screen, leave the computer on and let it warm up for 5 minutes, then press the reset button on the back panel. (Look in the index under System Status Messages for additional information.)

   The disk unit runs with the read/write head close to the disk at all times. When the computer is not "busy", the head is moved into a safety zone on the disk, and the red light on the right goes off.

2. Wait for the ready light on the right to go off.

INDICATOR LIGHTS

POWER

Small, red light on front panel tells you that the power is ON.

10 MB READY

Small, red light on front panel tells you that the hard disk is ready.
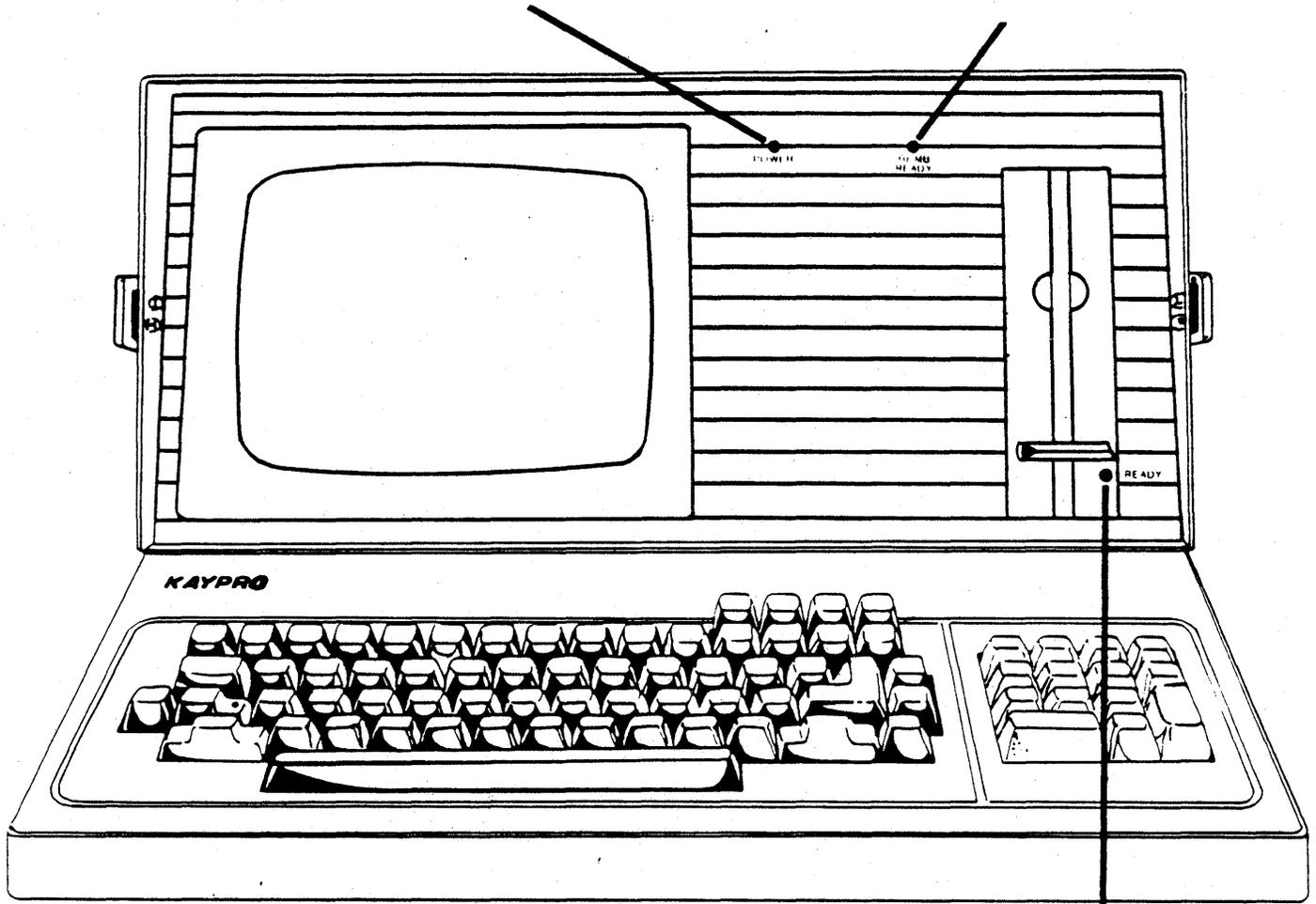
DISK DRIVE INDICATOR LIGHT

Small, red light next to the disk drive door tells you that the drive is in operation.

3. It may be necessary to use the brightness control knob on the back of the
    computer to adjust the brightness of the screen.

BRIGHTNESS
CONTROL
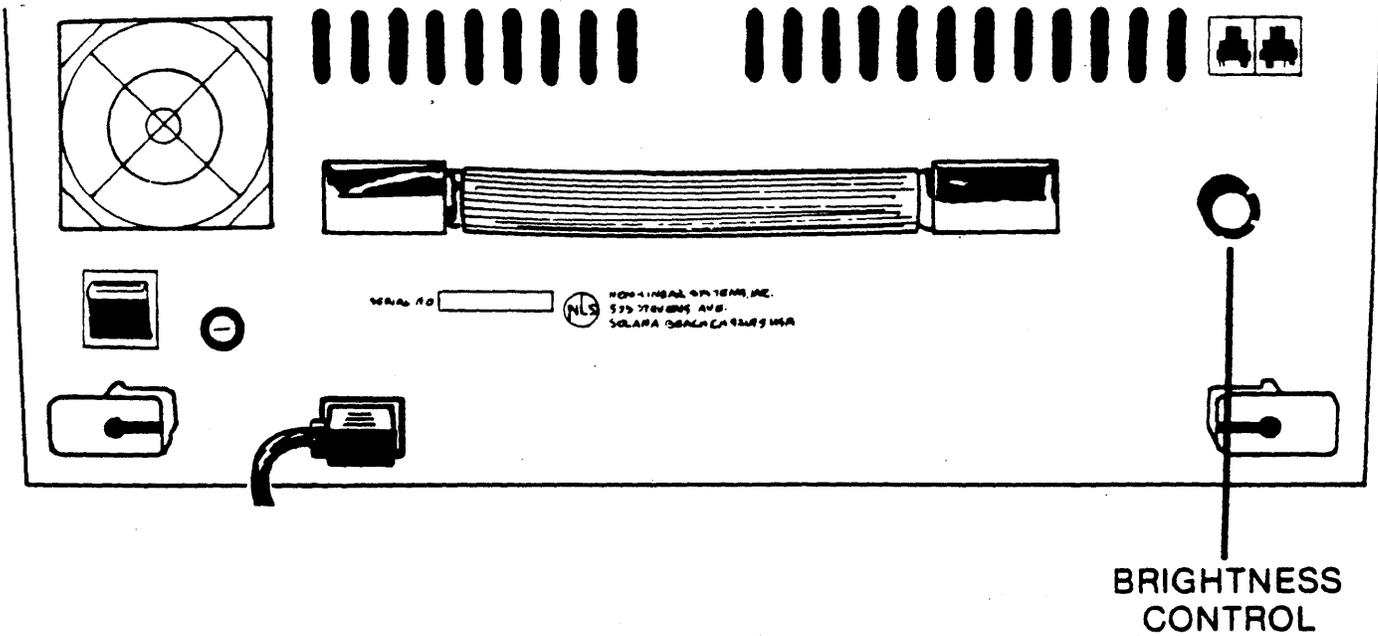
4. You will see a Master Menu. On this menu, there is a list of programs from
    which you can choose. Pressing the down arrow key will move the high-
    lighted bar down the menu, giving some information about each program
    as it moves. Also, information about each program is found in the manual,
    INTRODUCTION TO SOFTWARE, which is included with your KAYPRO 1Ø.
    A complete description of how to use each program is found in each pro-
    gram's own manual — also included with the KAYPRO 1Ø.

    Another option on the Master Menu is given at the bottom of the
    screen. To exit to the CP/M operating system, press ESCape. Many of the
    instructions in this manual are for CP/M utility programs. These are ex-
    plained in the pages which follow.

    Note: The Master Menu program creates and uses temporary files named
    $$$.SUB. These files should not be erased.

FINDING FILES ON THE HARD DISK

There are always three drives to use — A, B, and C. The drive on which the boot is done is always A, so, if the boot is done on the hard disk, the hard disk is drive A and drive B, and the diskette drive is C.

If you are continuing from the previous page, there is now displayed on the screen: A∅>
This signifies that the head is located on drive A in user area ∅.

The prompt, A >, with a number between the A and the >, indicates the currently-logged drive, meaning the drive in which the computer will automatically look for files if the drive name (A: or B:) isn't specified. The computer cannot locate a file on a drive or in a user area that is not the logged drive.

These prompts are CCP (Console Command Program) prompts. They occur for each of the three drives, and for each of the 16 user areas numbered ∅ to 15 which are in each drive. When you see an A>, B>, or C> prompt, the CCP is waiting for you to give it a command.

All the files can be listed on the screen so that you can find the exact spelling of file names, user area numbers, and number of bytes used by each file.

Directory entries for all the user areas are intermixed in one massed directory, but you can treat them as fifteen separate working areas (∅-14). (Remember, do not use or erase user area 15.)

1.   To list the files in the current user area, type: d
     Press RETURN.

     The files in the current user area (A∅) will be listed alphabetically with the size of the files. If there are more file names than the screen can display, on the bottom line, a prompt will tell you to:

          Press space to continue.

2.   To list all files of an entire drive, type: d $uvs
     Press RETURN.

The $uvs is a combination of switches which also can be used individually.

$u — shows files in all user areas

$v — expands the directory to show user number and file attributes

$s — shows protected "system" files which don't normally show in the directory; called "verify"

3. Move to user area 1 by typing: user 1
   Press RETURN.

   There will be an A1> to show that the computer is now in user area 1.

4. Type: d
   Press RETURN.

   The files which are in drive A, user area 1, will be listed.

5. Move to each of the other user areas as you did above; then list its directory. If you are new to computers, you will not understand what the file names signify, but a list of descriptions of many of them are in the *Introduction to Software.*

6. To list the files on drive B, type: d b:$uvs
   Press RETURN.

   When your KAYPRO 1Ø is new, there may not be any files on drive B. The B drive is the usual location for files into which you put data.

7. If you have a diskette in drive C, from the A> you can type: d c:
   Press RETURN.

   Diskettes also are able to have user area numbers. SO — the number of the user area you were using before you changed to drive C is the number of the user area in which your file will be on the floppy diskette. This is OK if you are only using a KAYPRO 1Ø; however, if you are also using a KAYPRO 2 or KAYPRO 4 and are interchanging diskettes, be aware that your files are going into the corresponding user area on the diskette.

TURNING OFF YOUR KAYPRO 1∅

When the 1∅ MB READY light is off, the read-write head is in the safety zone. An additional safeguard is provided which will move the read-write head into a safety zone when you turn off the KAYPRO 1∅. To do this:

1. If the B > or C >prompt is displayed, type: A:
    Press RETURN.

2. At the A > prompt, type: safety
    Press RETURN.

3. The 1∅ MB READY light will go off, and a prompt will appear, indicating it is safe to turn off the machine. Turn off the power, using the ON/OFF switch on the back panel.

    Practice this now.

    Remember, before turning off your KAYPRO 1∅, it is wise to type: safety

CP/M — THE PROGRAM WHICH OPERATES THE KAYPRO 10

Your KAYPRO 10 computer uses the CP/M (Control Program for Microprocessors) operating system. Most CP/M functions operate without your being aware of them, but a few utility files can be used under your control. Three important "automatic" components of CP/M are:

BDOS, the Basic Disk Operating system, which handles user areas and files on diskettes;

BIOS, the Basic Input/Output Sytem, which communicates with printers and other peripheral devices; and

CCP, the Console Command Program, which communicates between you, the user at the keyboard, and the internal processing of the computer.

A complete discussion of CP/M is found in the CP/M manual included with your KAYPRO 1Ø. For your immediate needs, here are some of the most-often-used functions.

- TYPE   TYPEs the contents of a document file on the screen.
              General form: TYPE THATFILE.MSS

- REN   RENames the file specified
              General form: REN B:NEWNAME.MSS = B:OLDNAME.MSS

- STAT   Gives the STATistics about how much space in a drive or user
              area has been used.
              General form: (from drive A)

              For statistics for drive A, current user area   STAT
              For statistics for drive B, current area   STAT B:
              For statistics for drive A, all user areas   STAT *.*

Read your CP/M manual for more details.

- CONFIG   CONFIG allows you to:

              alter the device assignments so that you can, for instance, use a
              serial printer instead of a parallel printer,

              change the functions of the four arrow keys and the numeric
              keypad.

- BAUDM   Temporarily changes the baud rate of the RS-232C serial interface
              for a **modem**. (CONFIG can permanently change the baud rate.)

- BAUDP   Temporarily changes the baud rate of the RS-232C serial interface
              for a **printer**.

COPYING FILES FROM ONE USER AREA
INTO ANOTHER USER AREA

1. This procedure must be done from drive A. If you are not in drive A, at the
    B> prompt, type: A:
    Press RETURN.

2. Type: user

3. Type the number of the user area into which you want to copy the files, for
    example: user 1∅
    Press RETURN.

4. List the directory by typing: d
    Press RETURN.

    Note: The directory lists files without the period between the file name
    and the file tag. The period must be included in your file name.

5. To copy a file from (for example) user area 2 into the currently-logged user
    area on drive A, substitute the name of your file for filename and
    type: PIP A: = A:filename[G2OV]
    (G stands for Get From.)
    Press RETURN.

    The square brackets must be square brackets, not parentheses.
    To correct an error in typing, use the BACKSPACE key.
    If there is an INVALID FORMAT error message, check very carefully to see
    that everything is typed correctly.

    To check to see whether the file has been copied, type: D

6. To copy all files from one user area into another user area, for example, user area 2, the command form is: pip a: = a:*.*[g2OV]

    There will be a COPYING — notation with the name of the files appearing as each is finished copying.

7. You can copy a file from a user area in drive A to the user area of the same number in drive B. Type: pip b: = a:filename [OV]

8. You can copy a file to a user area on B from a different user area on A. Go to the user area on A which corresponds to the user area to which you want to copy the file. In this example, 2 denotes the user area from which the file will be copied. Type: PIP B: = A:filename [g2ov]

Refer to the CP/M manual for a full discussion of PIP.

ERASING FILES

To erase a file:

1. Go to the user area containing the file.

2. Type: era

3. Add the file name with its file type.
   Press RETURN.

   Example: era vehicle.exp

FORMATTING A DISKETTE

This procedure applies only to floppy diskettes, because the hard disk has already been formatted for you.

Before you can use a new diskette, you must first format the diskette to prepare it to receive information.

When a diskette is formatted, it is magnetically imprinted with 80 circular tracks, with each track having 10 sectors.

It is wise to format new diskettes when you receive them, as it may not be convenient to do so when you need them.

CAUTION: Formatting a diskette which has information ERASES ALL the information.

To format a diskette:

1. After the A0> prompt, type: FLPYFMT
   Press RETURN.

2. Follow the prompts.

Once a diskette has been formatted double-sided, it cannot be formatted single-sided. If you attempt to reformat it, the second side will remain formatted and confuse the computer.

COPYING FILES TO DISKETTES

Here is the procedure to use every time you copy a file from the hard disk to a diskette.

1. Insert a blank, formatted diskette in drive C with the notch down, and rotate the latch clockwise from vertical to horizontal.

2. Warm boot the computer by entering CTRL—C.

3. At the A> prompt, type: PIP
    (PIP means copy.)
    Press RETURN. An asterisk will appear.

4. The general form of the command is:

    c: = a:<filename>[g∅v]

    c: is the drive you are copying TO

    = signifies EQUALS

    a: is the drive you are copying FROM

    <filename> is the file name, including the period and the file type, if any.

g stands for Get From

Ø is the user area number

v stands for Verify

5.　You can copy as many files as the diskette will hold. When you are finished and after the asterisk appears, Press RETURN. Warm Boot and AØ> will appear.

Here is an example:

To copy the file, example.txt, from drive A, user 8, of the hard disk to user Ø of the diskette in drive C:

1. At AØ>, type:　pip
   Press RETURN.

2. Type:　c: = a:example.txt[g8v]

3. When the asterisk appears, press RETURN. Warm Boot and AØ> will appear.

4. You can check drive C for the file by typing:　dir c:
   Press RETURN.

5. Label the diskette.

Note:　A .$$$ means the information was incorrectly typed. The file name appears on the directory with .$$$ as the file type, but no information is in the file.
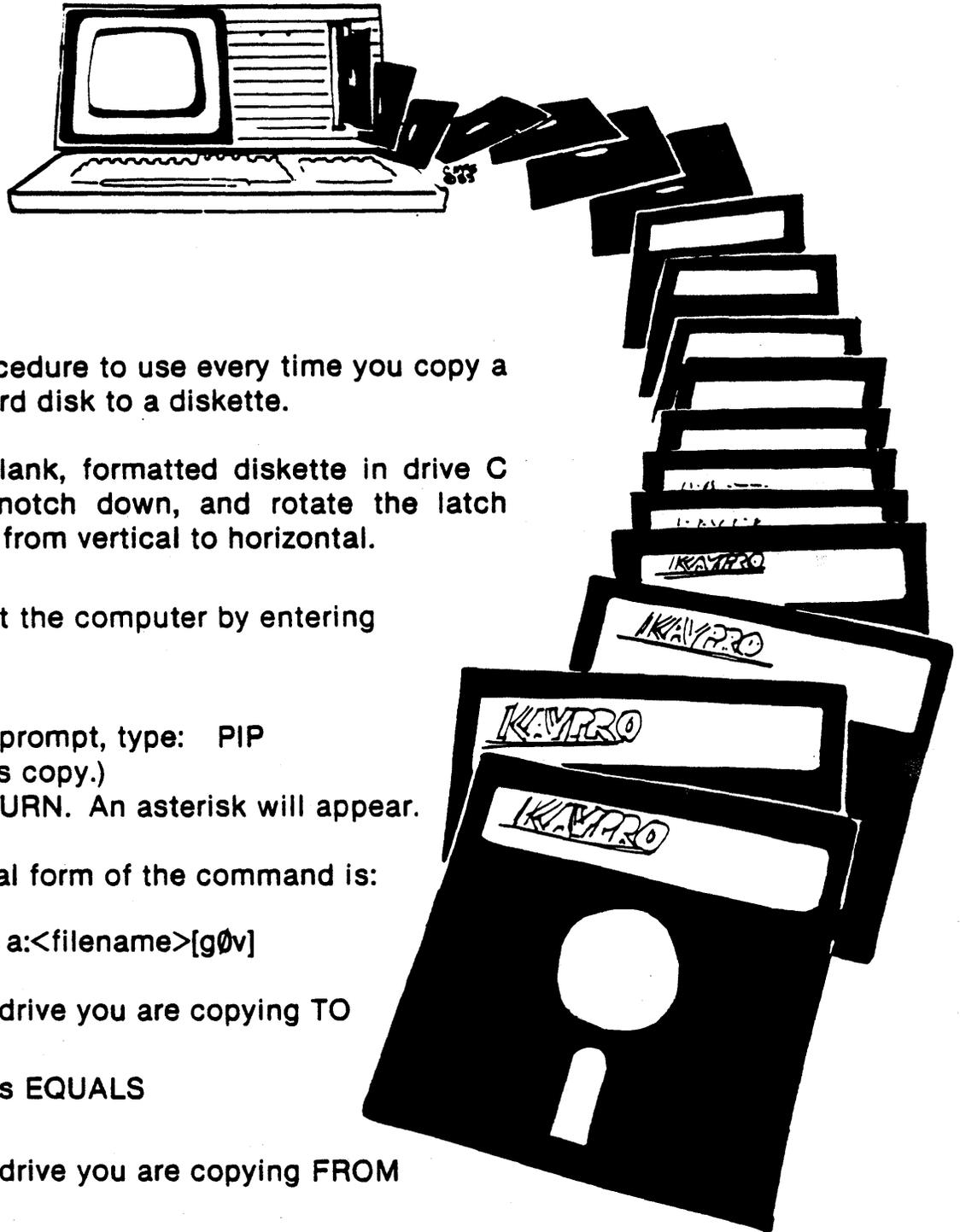
BACKING UP YOUR FILES

It is imperative that all of your files be backed up on floppy diskettes. If a hard disk ever crashes, it can be re-formatted, repaired, or replaced. The information on it cannot. However, if you have backed up your hard-disk files onto floppies, they can be re-loaded onto the hard disk.

DISTRIBUTION SOFTWARE

The software that came with your KAYPRO 10 is located on drive A. Recommended procedure is:

1. Following the instructions in Formatting a Diskette, format one floppy diskette for each user area containing software.

2. Following the instructions in the section, Copying Files from One User Area to Another User Area, use PIP to transfer the files in each user area to its own floppy diskette.

3. Label each disk with the user area from which the files came.

If you ever need to boot the KAYPRO 10 from a floppy diskette, that diskette will need to have system tracks on it. So, to finish the backing up of your hard disk:

1. Log onto drive A, user 0.

2. Insert a formatted diskette into drive C.

3. Warm boot the computer by entering: CTRL-C

4. Type: GENFLPY
   Press RETURN.

5. GENFLPY will sign on with:

   KAYPRO SYSGEN VER 2.2
   SOURCE DRIVE NAME (OR RETURN TO SKIP)

   Reply by pressing RETURN.

6. The next line will say:

   DESTINATION DRIVE NAME (OR RETURN TO REBOOT)

   PRESS C (do not touch the RETURN key)

7. After a short delay a new prompt will say:

   DESTINATION ON C, THEN TYPE RETURN

   Press RETURN.

8. There will be a slightly longer delay. Then the prompt from step 6 will repeat itself. Now the diskette in C drive is finished.

9. If you want to make more bootable diskettes, insert the next one, and repeat steps 6 through 8 for each one. When you are finished making bootable diskettes, reply to the step 6 prompt by pressing RETURN. This ends the program and returns to the operating system.

NOTE: GENFLPY does not report bad sectors.

IMPORTANT NOTE

When the KAYPRO 1∅ is booted from the floppy drive, all of the drive letters are changed!

One characteristic of CP/M is that is ALWAYS BOOTS FROM DRIVE A. Therefore, if there is a diskette in the diskette drive, and the latch is closed, then the boot is from the diskette drive, and the diskette drive becomes drive A.

After booting from a diskette, the new drive assignments are:

DISKETTE DRIVE — A: (normally C:)

HARD DISK — B: AND C:

That portion of the hard disk that was A drive is now B drive. The part that was B drive is now C drive.

These assignments remain in effect until the computer is powered up or reset from the hard disk with no diskette in the diskette drive.

DATA FILES

Data files, especially business data files, such as those from an accounting system, require a more elaborate backup. The following system is the MINIMUM and the least complicated method.

1. On day 1, back up all data on a blank diskette. This diskette, or diskettes, is the Grandfather.

2. At the end of day 2, back up all data on a second blank diskette. This diskette is the Father.

3. Following the end of business on day 3, back up that day's data on the Grandfather diskette. This process will overwrite the old information with new data. This diskette is now the new Father, and the old Father becomes the Grandfather.

4. Repeat this procedure at the end of each business day.

These steps illustrate the basic sequence of a simple backup schedule for data diskettes. The worst that can happen is that two days' data will have to be reconstructed. Some companies will carry this sequence on to a Son generation of backup and always keep the Grandfather in another location. The old Grandfather (new Son) is brought in each day for backup, and the old Father (new Grandfather) is removed from the premises. That way, even a fire or other catastrophe will not destroy the business records. We are talking about the accounting records of a business. Without them a business cannot survive.

In word processing or other business uses the total storage space in a user area frequently exceeds the storage capacity of a single floppy diskette. Backing up the files in this situation rapidly becomes a rather complex operation. MUFBAR is a series of backup utility programs to solve this program. Refer to appendix A for a full description and operating instructions.

NOTES

COPYING DISKETTES TO THE HARD DISK

Any time you want to input programs or data to the hard disk from a diskette, here is the procedure to use.

1. Turn on your KAYPRO 1∅, or if it's already on, warm boot the computer by entering the command: CTRL-C

2. At the A∅> prompt, type: user

3. Type the number of the user area into which you want to copy the program, for example: user 1∅
    Press RETURN.

4. Insert the master diskette into drive C with the notch down, and rotate the latch clockwise from vertical to horizontal.

5. To copy the program from the diskette to the current user area, 1∅, type:
    PIP A: = C:*.*[G∅ov]
    Press RETURN.

    There will be a COPYING — notation with the names of the files appearing as each is finished copying.

6. An * will appear when the diskette is copied.
    Press RETURN.
    The A> prompt will return.

7. To check to see that it has been copied, type: DIR
    Press RETURN.

8. Remove your master diskette, and store in it a safe place.

CHECKING A HARD DISK FOR BAD SECTORS

FINDBAD.COM is a utility program that checks a disk for bad sectors. It is normally used after a hard disk has been reformatted or when you are getting BAD SECTOR errors.

During the checking process, any bad sectors are "locked out" by gathering them into a file called [UNUSED.BAD]. CP/M will then not be able to write to these bad sectors.

To run FINDBAD:

1. Boot the computer.

2. To lock out bad sectors on drive A, after the A∅> prompt, type: FINDBAD

    To lock out bad sectors on drive B, after the A∅> prompt, type: FINDBAD B:

    You will see:

> FINDBAD – ver 5.4
> Bad sector lockout program
> Universal version
>
> Type CTL-C to abort
>
> Testing directory area...
>
> Testing data area...

FINDBAD will print an asterisk for each track as it checks the disk.

- If any errors are found, the track and sector number will be printed on the screen. The check will continue until the whole disk has been tested.

Then control will return to the operating system.

- If no bad errors are found, FINDBAD will print the message, No bad blocks found. Then control will return to the operating system.

Any bad sectors will be gathered into a file named [UNUSED].BAD. DO NOT ERASE THIS FILE.

VERIFYING A HARD DISK

CHECK.COM is a disk verification program for your KAYPRO 10 hard disk. This program is for experienced users only.

Before using this program, there are some things you should know about your hard disk.

- Within the check program only, the hard disk is addressed as drive 1. Logically, to the operating system, it is divided into drives A and B.

- Four read-write heads are used. Heads 0 and 1 access drive A. Heads 2 and 3 access drive B.

- Disk 1, cylinder (same as track) 0, heads 0 through 3 refers to a critical area of the disk containing the Operating System, BIOS, Error messages, and some overlays for screen graphics.

Should your KAYPRO 10 refuse to boot from the hard disk, run the check program on this area. If no permanent errors are reported, use PUTSYS and PUTOVL to rewrite the system information.

The commands to CHECK for this area are:

```
FIRST DISK, LAST DISK? (0-3, 0-3) 1, 1
FIRST HEAD, LAST HEAD? (0-7, 0-7) 0, 3
FIRST CYLINDER, LAST CYLINDER? (0, 305 0-305) 0, 0
```

Cylinder 1, 2, and 3 are reserved.

Cylinders 4 through 6 contain the directories.

Cylinders 7 through 304 are for programs and data storage.

Cylinder 305 is a reserved "safety" area.

USING CHECK.COM

1. Go to drive A, user area Ø.

2. Call the program by typing: CHECK
    Press RETURN.

    There will be a copyright message stating that it is suitable for use only on the KAYPRO 1Ø.

    During the following entries:

        To back up to the previous prompt, press ESCape.

        To return to the operating system from the first entry, press ESCape.

    Next, you will be asked:

        FIRST DISK, LAST DISK? (Ø-3, Ø-3)

3. Reply by typing: 1,1
    Press RETURN.

    Any other numbers will cause CHECK to attempt to select and test non-existent disks 2 and 3. There will be a message that the disk (that isn't there) is not ready. Then CHECK will give a 6Ø-second countdown while it tries to access the disk. Finally, you will be told that you are either accessing a non-existent disk or you have a serious problem.

    The next prompt is:

        FIRST HEAD, LAST HEAD? (Ø-7, Ø-7)

    The KAYPRO only has heads Ø through 3. Numbers greater than 3 will give a long string of error messages.

4. Reply by typing, for instance: Ø,3
    Press RETURN.

    The last prompt is:

        FIRST CYLINDER, LAST CYLINDER (Ø, 3Ø5)

All 305 cylinders (tracks) are valid. This entry sets the inclusive range of cylinders to be tested.

5.   Reply by typing, for instance: 0, 305
Press RETURN.

During the testing phase, the screen is updated with a readout of the current drive, cylinder, and head numbers. Error codes are placed inside parentheses to the right of the readout.

Press ESCape to halt the readout for viewing of the error codes.

Press any key to continue.

6.   At the end of the testing phase, you are asked if you wish to make another testing pass.

Pressing Y (for yes) returns you to the initial series of prompts.

Pressing N ends the programs and warm boots the system.

ERROR CODES

During the testing process, all errors appear to the right of the screen update and inside parentheses.

ABC   Aborted Command. For some reason the controller was unable to complete the test on this area.

BBD   Bad Block Detect. An attempt was made to access a sector with a BAD BLOCK marker in it. These markers are only generated by the formatting program. This is a SERIOUS ERROR.

COR   Correctable error. An error was detected in the data field, but the controller was able to PHYSICALLY CORRECT it. This is an acceptable error.

IDC   CRC error in ID Field. The sector was found, but the ID field contained an error and couldn't be trusted.

NID   ID not found. The sector could not be found at all.

TR∅   Track Zero. Track zero not asserted when expected.

UND   Undefined Error. Similar to ???. Very serious; contact dealer.

UNC   Uncorrectable Error. The controller found an error and was not able to correct it.

WFT   Write Fault. A fault condition occurred during a write attempt, and the write was aborted.

???   Error detected, but no flag set by controller. This error is theoretically impossible. If you get this error, DO NOT USE THE COMPUTER any further. Contact your dealer.

Other Errors.   Look for errors that are not in the logical range of possibility, such as:

- Sector numbers greater than 16
- Cylinder numbers greater than 3∅5
- Head numbers greater than 3
- Incorrect disk numbers
- Any numbers not in the range you have specified

These errors generally indicate faults in other areas of the system, such as memory or the hard disk controller. Notify your dealer.

It is normal to have a reasonable number of errors. If there are not a large number of them and none of them are the ones noted as serious, the system is OK.

Should you get a sudden increase in the number of errors or a large quantity of one type (except COR), contact your dealer. Be prepared to tell the dealer what error codes are being found and the approximate number of times they are being found.

USING GRAPHICS ON THE KAYPRO 1Ø

The KAYPRO 1Ø has graphics capability. However, it needs a program to tell it what to do. If you are able to write these programs, then the information you need is on the following pages. If you are not able to write the programs and want to use the KAYPRO 1Ø graphics capability for business or other purposes, then it is best to find someone to write a program to do what you want.
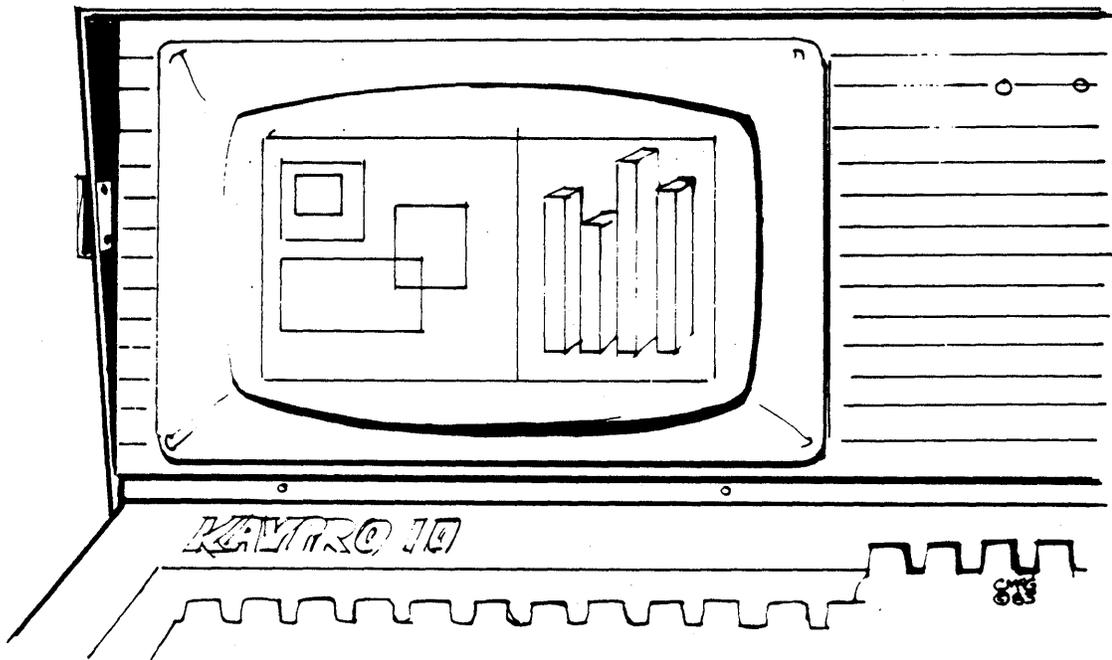
VIDEO GRAPHICS AND ATTRIBUTES COMMAND SET

The KAYPRO 1Ø has a graphics and attributes set that currently includes drawing and erasing lines, drawing and erasing pixels, inverse video, reduced intensity, blinking fields, graphics characters, cursor positioning, and cursor on/off.

DRAWING GRAPHICS

To draw graphics on the KAYPRO 1Ø, the screen is treated as an array 1ØØ pixels high, and 16Ø pixels wide. Any spot on the screen can be addressed by a vertical coordinate (ranging from 32 to 131) and a horizontal coordinate (ranging from 32 to 191). The pixel in the upper left corner of the screen has coordinates of 32,32. It would seem natural to start the numbering of coordinates at 1 or Ø. However, some byte values of 32 or less are interpreted by BDOS as control keys.

Line and pixel graphics are drawn on the screen by writing an escape sequence to the console output. For the purpose of drawing lines and pixels, an escape sequence is a 4- or 6-byte sequence defined as follows:

Escape sequence =

ESC <sequence-type> <V1> <H1> [<V2> <H2>]

where:

1) ESC is an ASCII 27 (1B hex).
2) <sequence-type> is a character of the set:

*	to write a pixel
(space)	to erase a pixel
L	to draw a line
D	to delete a line

3) V1, H1, V2, H2 are 1-byte values indicating locations on the screen.

To write a pixel:

>The sequence-type must be a "*".
>H2 and V2 are not used.
>V1 is the vertical coordinate of the pixel.
>H1 is the horizontal coordinate.

To erase a pixel:

>The sequence-type must be a space.
>H1, V1, H2, and V2 are the same as above.

To draw a line:

>The sequence-type must be an "L".
>H1 is the horizontal coordinate of the first point of the line.
>V1 is the vertical coordinate of the first point.
>H2 is the horizontal coordinate of the last point.
>V2 is the vertical coordinate of the last point.

To delete a line:

>The sequence-type must be a "D".
>H1, V1, H2, and V2 are the same as above.

CURSOR POSITIONING

When positioning the cursor on the KAYPRO 1Ø, the screen is treated as an array 25 characters high, and 8Ø characters wide. Any spot on the screen can be addressed by:

a vertical coordinate (ranging from 32 to 56)

a horizontal coordinate (ranging from 32 to 111).

The character in the upper left corner of the screen has coordinates of 32,32.

The cursor can be moved to a desired position on the screen by writing an escape sequence to the console output. For the purpose of cursor positioning, an escape sequence is a 4-byte sequence defined as follows:

Escape sequence = ESC EQUALSIGN <V1> <H1>

where:

1) ESC is an ASCII 27 (1B hex).
2) EQUALSIGN is the character '=' (3D hex).
3) V1, H1 are 1-byte values indicating the location on the screen.

GRAPHICS CHARACTERS

Each of the character positions on the screen occupies the same area as eight pixels (4 high, 2 wide). Thus, pixels can be addressed in groups of eight at a time. To set pixels in a character position, the cursor is moved to that position, and then a byte is sent to the console output. This byte must have the high-order bit set to 1 to distinguish it from normal characters. The remaining seven bits are used to set 7 of the 8 pixels.

i.e., to write these pixels....

Pixel # 1 ————————→   ←———————— Pixel # 0

Pixel # 3 ————————→   ←———————— Pixel # 2

Pixel # 5 ————————→   ←———————— Pixel # 4

Pixel # 7 (off) ————————→   ←———————— Pixel # 6

output this byte:

must be '1'   bit for # 0

bit for # 6   bit for # 1

bit for # 5   bit for # 2

bit for # 4   bit for # 3
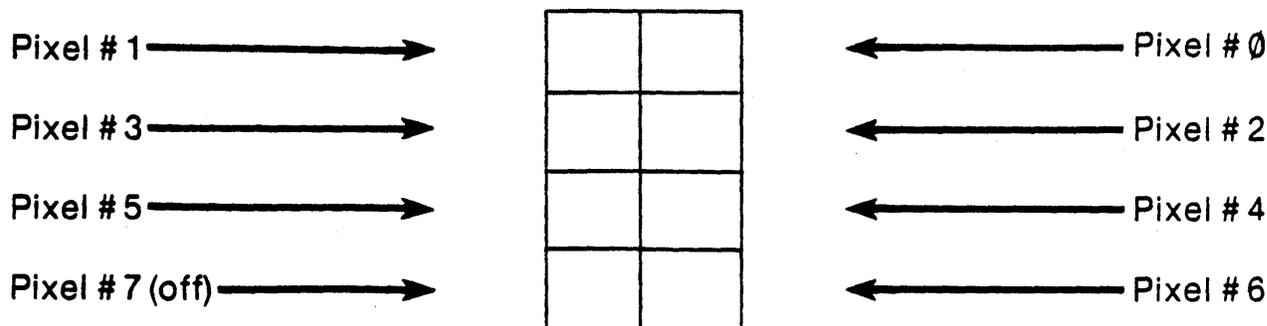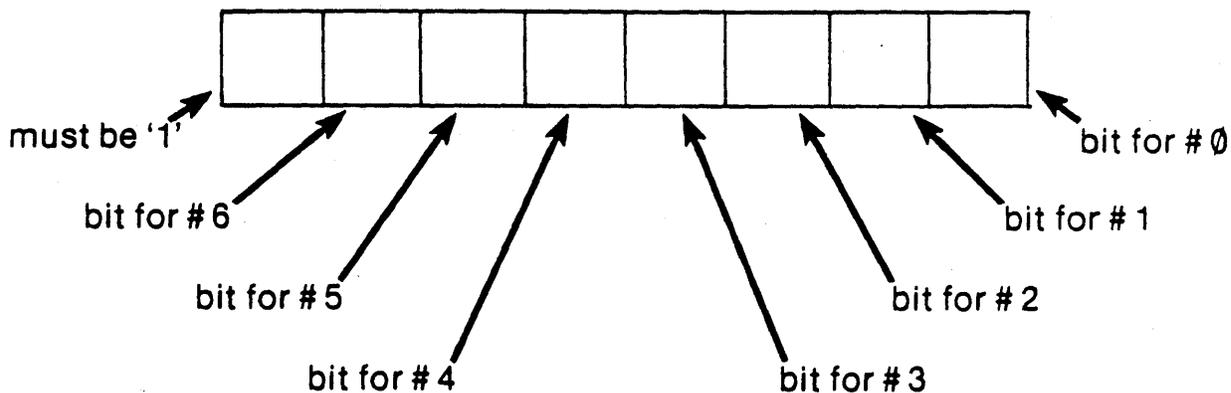
As shown above, pixel # 7 is off. To write a pixel with it on, send the inverse video command (ESC,B,0), then output the inverse for bits 0 through 6, i. e., 10000000b would print a blank graphics character;   (ESC,B,0),10000000b would print a solid character.

With video mode on, 2 bytes are required for each graphic character. The Least Significant Bit of byte 1 controls pixel #7. The rest of the characters are controlled by byte #2 in the normal manner.

CHARACTER ATTRIBUTES COMMANDS

Characters can be set to inverse video, blinking, reduced intensity, or under-lined. Also, the cursor can be turned off. These attributes are activated by sending a 3-byte escape sequence to the console output:

Escape sequence = ESC <on-off-code> <attribute-code>

where:

1) ESC is an ASCII 27 (1B hex)
2) <on-off-code> is a:

> B   to set an attribute ON, or
> C   to set it OFF.

3) <attribute-code> has a value of Ø through 4, as follows:

> Ø = inverse video,
> 1 = reduced intensity,
> 2 = blinking,
> 3 = underline,
> 4 = cursor.

Default for these attributes is:

inverse video	= off
reduced intensity	= off
blinking	= off
underline	= off
cursor	= on

Comments:

1) Examples of line and pixel drawing can be found in GRAPHICS.BAS.

2) A line drawn from point A to point B will not always look the same as a line from B to A; it will be a mirror image.

3) Graphics characters, pixels, and lines cannot write over normal characters.

SUMMARY OF COMMANDS

Graphics commands:

Set pixel	ESC,*,V1,H1
Clear pixel	ESC, ,V1,H1
Set line	ESC,L,V1,H1,V2,H2
Delete line	ESC,D,V1,H1,V2,H2

Attribute commands:

	To Turn ON:	To Turn OFF:
Inverse video	ESC,B,∅	ESC,C,∅
Reduced Intensity	ESC,B,1	ESC,C,1
Blinking	ESC,B,2	ESC,C,2
Underlining	ESC,B,3	ESC,C,3
Cursor	ESC,B,4	ESC,C,4

In the S-BASIC graphics package (GRAPHICS.BAS), there are several procedures that allow the user to draw complicated figures with just one command. These are routines for drawing circles, rectangles, squares, and bars.

Circles — require three parameters:

1) the vertical coordinate of the center of the circle
2) the horizontal coordinate of the center
3) the radius of the circle.

Rectangles — have four parameters:

1) the vertical coordinate of the upper left corner
2) the horizontal coordinate of that corner
3) the height
4) the width.

Squares — need three parameters:

1) the vertical coordinate of the upper left corner
2) the horizontal coordinate of the upper left corner
3) the length of a side.

Bars — require eight parameters:

1) the vertical coordinate of the base of the bar
2) the horizontal coordinate of the base
3) the height
4) the width
5) the depth
6) the interior of the bar filled or empty
   This parameter should be:
         Ø for an empty bar
         1 for a full one.
7) vertical illusion of depth up or down
         − 1 for up
         1 for down
8) horizontal illusion of depth left or right.
         − 1 for left
         1 for right

To observe the use of these procedures, we recommend that you run the following program:

```
$INCLUDE GRAPHICS

VAR   V1,H1,RADIUS = INTEGER
VAR   V2,H2,HEIGHT,WIDTH = INTEGER
VAR   V3,H3,LENGTH = INTEGER
VAR   V4,H4,H,W,V.PERSPECTIVE = INTEGER
VAR   H.PERSPECTIVE, INTERIOR,DEPTH = INTEGER

V1 = 15
H1 = 15
RADIUS = 10
CIRCLE   V1,H1,RADIUS

V2 = 30
H2 = 10
HEIGHT = 20
WIDTH = 40
RECTANGLE   V2,H2,HEIGHT,WIDTH

V3 = 60
H3 = 20
LENGTH = 30
SQUARE   V3,H3,LENGTH

V4 = 80
H4 = 80
H = 50
W = 15
DEPTH = 8
V.PERSPECTIVE = −1
H.PERSPECTIVE = 1
INTERIOR = 0
BAR   V4,H4,H,W,DEPTH,INTERIOR,V.PERSPECTIVE,H.PERSPECTIVE

V4 = 20
H4 = 130
H = 50
W = 10
DEPTH = 15
V.PERSPECTIVE = 1
H.PERSPECTIVE = 1
INTERIOR = 1
BAR   V4,H4,H,W,DEPTH,INTERIOR,V.PERSPECTIVE,H.PERSPECTIVE
```

NOTE: If the graphics system fails completely, see the section on Rebuilding System Tracks in this user's guide.

NOTES

TECHNICAL INFORMATION

TROUBLESHOOTING

If you have difficulties when operating your KAYPRO 1∅, PLEASE check the following list of symptoms and remedies before calling your dealer. Of course, when programs don't do what you expect, read the manual for that program.

If the following quick checks don't fix the problem, contact your dealer for assistance with both the operation of your software and the service needed for your KAYPRO 1∅.

SYMPTOM: Programs won't load or execute.

PROBABLE CAUSES AND REMEDIES:

1.   No AC power. Be sure that the power cord is plugged in. Check the power switch and any switches controlling the wall outlet.

2.   No video display. Adjust brightness control on rear panel.

3.   Latch on drive door not turned to horizontal position.

4.   Diskette is in drive when it is not needed.

5.   Diskette in drive isn't the diskette expected by the operating program.

6.   Diskette isn't in the drive correctly (label side to the left and the write-protect notch down).

7.   Diskette has been damaged. Try making a copy.

8.   Incorrect response to a prompt or invalid menu selection; check for error message from program.

9.   You're asking the program to do something it can't. When all else fails, read your manual.

SYMPTOM: Computer unexpectedly ignores keyboard entries.

PROBABLE CAUSES AND REMEDIES:

1. Disconnect and reconnect the coiled cord which attaches the keyboard to the computer.

2. Fluctuations in the AC power line. Use another outlet or an External Power Conditioner. Some battery backup units will filter out noise from heavy electrical machinery as well as cover for temporary "brownouts."

3. External peripheral devices or their connecting cables may be at fault. Try operation without peripheral or with different cable to isolate the problem.

4. Damaged or faulty diskette. Try to make a copy.

5. Incorrect instruction sequence. Check the appropriate manual to insure that you are using the correct operations and sequence.

HINT: If the keyboard gets "latched up," disconnecting the cord to the keyboard and reconnecting it will perform a RESET action on the keyboard.

MAINTENANCE

Because of the generally high reliability of modern, solid-state components, with normal use your computer should need very little maintenance or service.

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.

Care for peripheral devices, such as printers, should be covered in the manual that came with the device.

Occasionally the filter on the back panel will need to be cleaned. DO NOT REMOVE THE SCREWS ON THE GRILL HOLDER. Simply grasp the center section with two fingers and pull until the grill pops out. Clean the filter by gently agitating it in water and mild soap or detergent. Let it dry, replace it, and replace the grill.

CONNECTING A PRINTER

PARALLEL PRINTER

Your KAYPRO 1∅ computer comes equipped with a Centronics-type connector on the back panel. It is labelled: J6 PRINTER OUTPUT. If you have a printer with a similar 36-pin connector, then all you need is a standard parallel printer cable (available from your dealer) to connect the two units. If you have a non-standard connector on your printer or cannot find a suitable cable already assembled, then the following pin assignments should prove useful to the person who fabricates your cable.

1	STROBE ——>	A negative going signal to printer which indicates that the data being sent is valid.
2	DATA 1 ———>	
3	" 2 ———>	
4	" 3 ———>	Data lines to printer.
5	" 4 ———>	
6	" 5 ———>	
7	" 6 ———>	
8	" 7 ———>	
9	" 8 ———>	
1∅	Not connected	
11	BUSY ————>	The KAYPRO expects a low signal on this line from the printer to indicate readiness to receive a character. A high signal indicates that the printer is BUSY, and the KAYPRO should not send.

12, 13, 14, 15,
18, 31, 32, 34, 35, 36   Not connected

16, 17
19 – 3∅, 33   Ground

The following is an illustration of the pin assignments on the Centronics-type connector on the back panel.

STROBE (OUT)	DATA 1(LSB)	DATA 2	DATA 3	DATA 4	DATA 5	DATA 6	DATA 7	DATA 8 (MSB)		BUSY (IN)					GND	GND	(TOP)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND		GND				(BOTTOM)
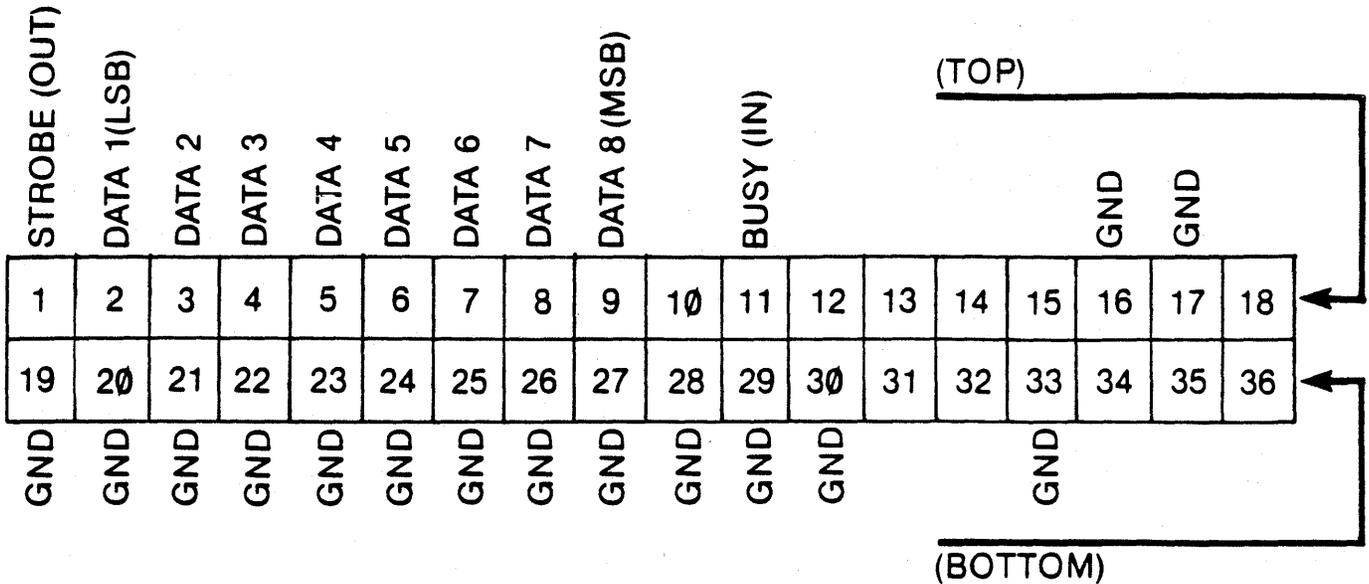
Note that the BUSY line is read by the KAYPRO as ACTIVE when left disconnected. If you tell your computer to print something when there's no printer there, your computer will sit patiently and wait for a printer to say that it's ready for data. And wait and wait and... Press the reset button on the back panel.

SERIAL PRINTER

Your KAYPRO 1Ø was designed to be as easy to use as possible. The standard KAYPRO expanded system consists of your computer connected to a standard parallel printer via the parallel connector, and connected to a modem via the RS-232C serial connector, J4. However, if you have a serial printer, you will need to adapt your serial interface for your printer.

The following information is provided to aid such modifications. Please note that Kaypro Corporation makes no guarantees about the suitability of a given serial printer for use with the KAYPRO 1Ø RS-232C serial interface. The reasons for some of the difficulties are given here, but before you purchase any serial printer, insist upon a demonstration of its operation.

There are three things you must do if you are to use a serial printer with the KAYPRO 1Ø computer:

1. You must tell CP/M to redirect the printer output to the serial interface. Use STAT to change the physical assignment, like this: A>STAT LST: = TTY:

2. You can make the change from a parallel printer (LPT:) to serial (TTY:) permanent for some of your programs by using the CONFIG program, which is a part of CP/M.

3. Make sure that the line being used by your computer for data transmission (pin 3 of connector J4) is connected to the printer's data reception pin. This is usually, but not always, pin 3 of the printer connector.

4. The remaining task is to take care of the hand-shaking signal lines. You can strap the signals, so that they are always true (i.e., connect pins 8 and 5 of connector J4 to pin 6). The potential problem with defeating the hand-shaking lines in this manner is that you have to limit your baud rate to avoid overwriting the printer's internal buffer. For example, if you leave the the baud rate of the KAYPRO 1Ø at 3ØØ baud, your printer must be able to print at least 3Ø characters per second.

If you have problems with overwriting the buffer in your serial printer, you will have to implement some handshaking to correct the problem. The KAYPRO 1Ø uses pin 2Ø DTR (see the following figure) as an indicator of printer readiness. For proper handshaking, the serial printer must produce a "not busy" signal for pin 2Ø that is high when the printer can accept data. Details of the handshaking required by your printer should be in its owner's manual.

KAYPRO SERIAL PRINTER PORT RS-232C

Note that the serial printer port on the KAYPRO 1Ø is hard-wired as DCE, Data Communications Equipment. All other serial ports in the Kaypro equipment line, including the serial modem port on the KAYPRO 1Ø, are wired as DTE, Data Terminal Equipment.

Pin assignments for the SERIAL PRINTER PORT (DCE)

   Pin 1 - Chassis ground
   Pin 2 - Receive Data - to computer
   Pin 3 - Transmit Data - from computer
   Pin 7 - Signal ground
   Pin 2Ø - Data Terminal Ready (used as printer busy)

Pin assignments for the SERIAL MODEM PORT (DTE)

   Pin 1 - Chassis Ground
   Pin 2 - Transmit Data - from computer
   Pin 3 - Receive Data - to computer
   Pin 4 - Request to Send
   Pin 5 - Clear to Send
   Pin 6 - Data Set Ready
   Pin 7 - Signal Ground
   Pin 8 - Data Carrier Detect
   Pin 2Ø - Data Terminal Ready

SERIAL PORT ASSIGNMENTS

For Modem (serial channel A):

PORT 4 is the Z-8Ø SIO data port.
PORT 6 is the Z-8Ø SIO control and status port.

Received character available is obtained by testing bit Ø of the status port; Transmit Buffer Empty is obtained by testing bit 2 of the status port. Other details can be found in the Z-8Ø documentation available from Zilog.

The serial output is an 8-bit word with one start, one stop, and no parity.

Baud Rate Table

HEX #	Baud Rate
Ø	5Ø
1	75
2	11Ø
3	134.5
4	15Ø
5	3ØØ
6	6ØØ
7	12ØØ
8	18ØØ
9	2ØØØ
A	24ØØ
B	36ØØ
C	48ØØ
D	72ØØ
E	96ØØ
F	192ØØ

(NOTE: The baud rate will be 3ØØ baud upon power up or when the computer is reset. Only CONFIG will permanently alter the baud rate.

I/O PORT ADDRESSES
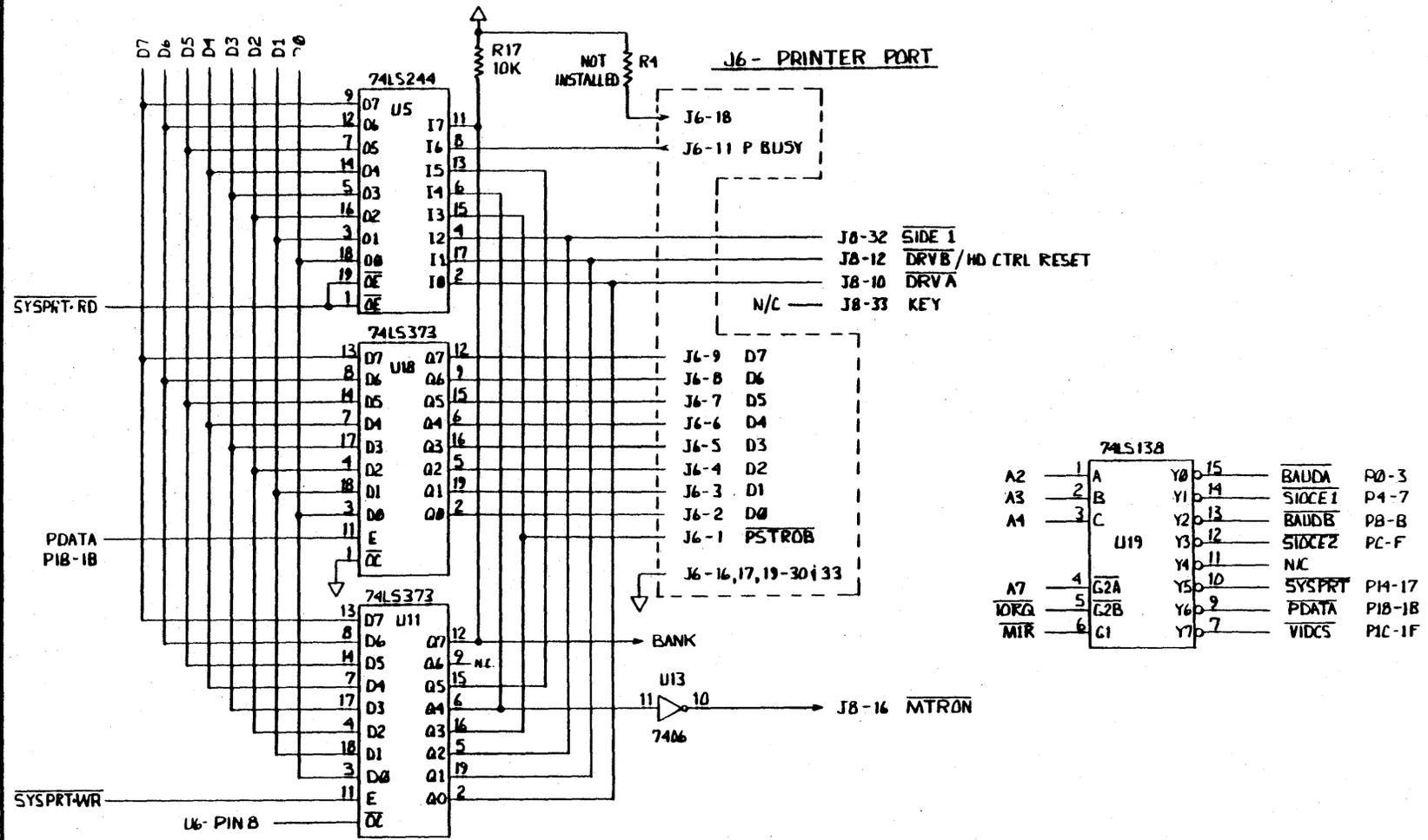
Port # (hex)   Use and/or assignment

00   Baud rate for Modem (Write only)
                    Writing a number between 0 and F
                    (hex — see preceding table) to this
                    port will set the RS-232C baud rate.

04   RS-232C Serial Data. (R/W)
                    Data register of the Z-80 SIO

05   Keyboard Data. (R/W)
                    Eight-bit data from detachable
                    keyboard. See the following S-BASIC
                    program for an example of writing to
                    this port.

06   RS-232C Status. (R/W)
                    Control/status port for the Z-80A
                    SIO. See Zilog and Mostek
                    Microcomputer Data Books.

07   Keyboard Control/Status

08   Baud Rate for Serial Printer

14   System Port. (R/W)
                    This port is used for system control.
                    The various bits are used for memory
                    bank selection, disk drive control,
                    and printer handshaking.

                    BIT
                    0   Drive A   0 = SELECT A
                    1   Drive B   0 = SELECT B
                    2   Side One   0 = SIDE 1
                    3   PSTROB   0 = LOW
                    4   MTRON   0 = FLOPPY MOTOR ON
                    5   DDEN   0 = DOUBLE DENSITY
                    6   NO CONNECTION
                    7   BANK   0 = RAM SELECT

70

18	Parallel Printer Port (Write only) Eight-bit data to parallel printer connector
ØC	Serial Printer Data (RS-232C)
ØE	Serial Printer Control/Status
1C	Video Register Select
1D	Video Attribute
ØD	Unused Serial Port
ØF	Unused Serial Status/Control

Disk Controller

1Ø	Status/Command
11	Track
12	Sector
13	Data

PRINTER PORT
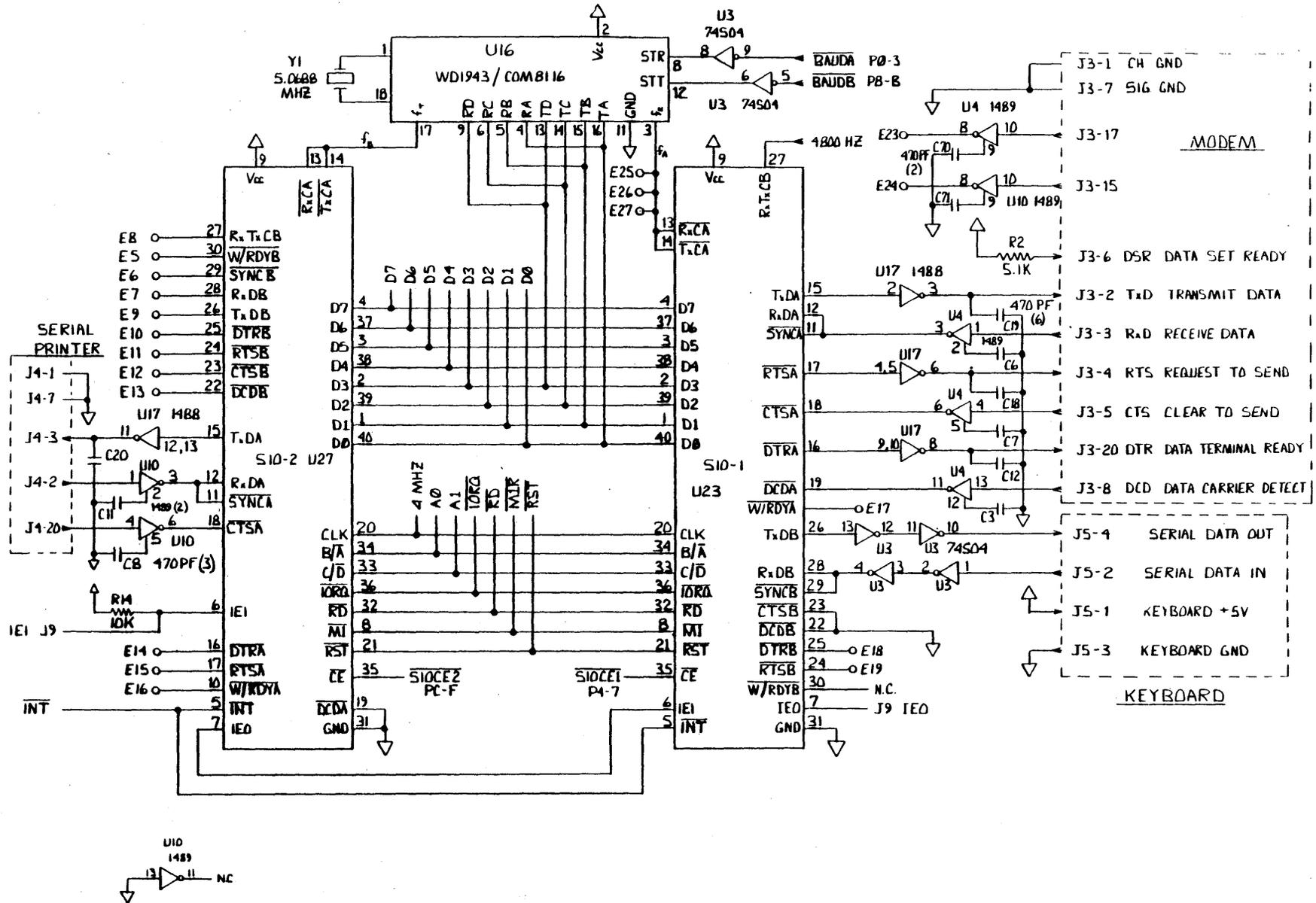
REBUILDING SYSTEM TRACKS

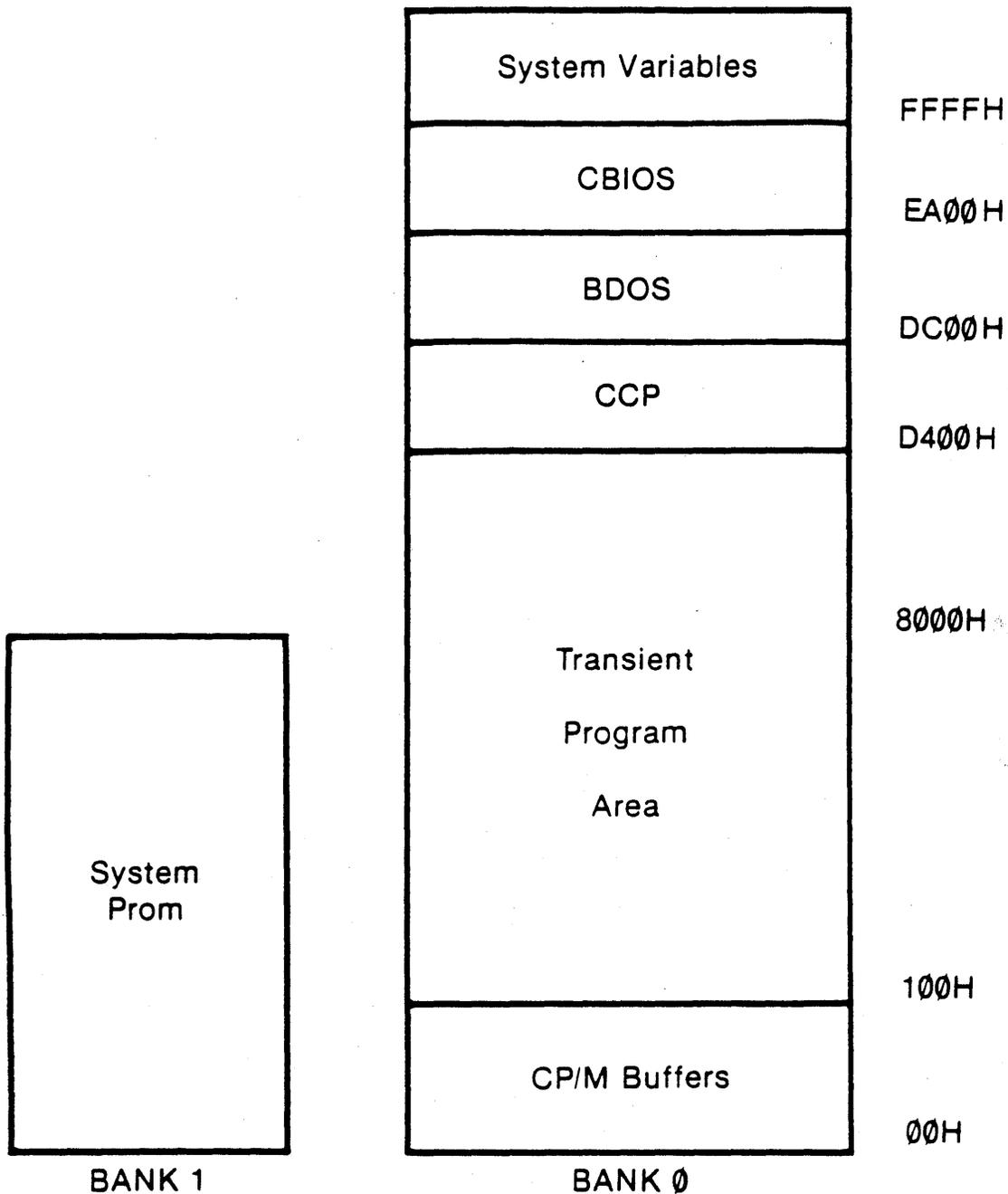If your KAYPRO 1∅ fails to boot, it may be because the hard disk has lost its system tracks. Also, if the graphics system fails completely, it may be because the system tracks also contain overlays for the graphics. In either instance, if you have backed up user ∅ on diskette, you can rebuild the tracks by doing the following:

1. Insert the backup diskette of user ∅ in the drive

2. Reset the computer.

3. Type: d
    Press RETURN.

4. Type d b:
    Press RETURN.

    Remember, since you used a diskette to boot, drive C is now drive A; drive A is now drive B.

5. Compare the two directories. If they are the same, proceed. If they are not the same, PIP the entire diskette onto B∅ by typing:
    PIP B: = A:*.*[OV]

6. Type: PUTSYS
    Press RETURN. You will see: PUTSYS VER X.X

7. Type: PUTOVL

    Press RETURN. You will see: PUTOVL VER X.X

8. Remove the diskette from drive C.

9. Reset the computer by pressing the reset button. Your computer should now boot. If it doesn't, return the computer to your dealer for service.

MEMORY MAP OF THE KAYPRO 1Ø COMPUTER

System Variables	
	FFFFH
CBIOS	
	EAØØH
BDOS	
	DCØØH
CCP	
	D4ØØH
	8ØØØH
Transient Program Area	
	1ØØH
CP/M Buffers	
	ØØH

System Prom

BANK 1

BANK Ø

Please note that only the lowest 16 Kbytes of memory will change with the bank select bit; addresses above 7FFF hexadecimal are always available for either bank.

COMMON CONTROL FUNCTIONS IN CP/M PROGRAMS

DEL   Delete and echo the last character typed at the console (Same as rubout)

CTRL-U   Delete the entire line typed at the console

CTRL-X   Same as CTRL-U

CTRL-R   Retype current command line: types a "clean line" following character deletion with rubouts

CTRL-C   CP/M system reboot (warm start)

CTRL-E   Physical end of line: carriage is returned, but line is not sent until RETURN key is depressed

CTRL-Z   End input from console (used in PIP and ED)

CTRL-P   Copies all subsequent console output to the currently assigned list device (e.g., a printer) and the console device until the next CTRL-P is typed.

CTRL-S   Stops the console output temporarily. Program execution and output continue when another character is typed at the console (e.g., another CTRL-S). This feature is used to stop output on high-speed consoles, such as CRTs, in order to view a segment of output before continuing.

VIDEO COMMAND PROTOCOL FOR KAYPRO 1∅

The KAYPRO video section was designed to imitate most of the control sequences of a Lear-Siegler ADM-3A terminal. For most commercial software, this means you can "install" or customize the display characteristics by choosing ADM-3A from the menu. For custom software or those instances where there is no choice of "ADM-3A" on the menu, the complete command protocol for the KAYPRO 1∅ is:

Control Characters

Action	Dec	Hex
Ring bell	∅7	∅7
Cursor left (non-destructive)	∅8	∅8
Cursor right	12	∅C
Cursor down	1∅	∅A
Cursor up	11	∅B
Erase to end of screen	23	17
Erase to end of line	24	18
Clear screen, home cursor	26	1A
Home cursor	3∅	1E

ESCape Sequences

Insert line	ESCape,R
Delete line	ESCape,E
Cursor address	ESCape, = ,row + 32,col + 32
Reverse video start	ESCape,B,∅
Reverse video stop	ESCape,C,∅
Half intensity start	ESCape,B,1
Half intensity stop	ESCape,C,1
Blinking start	ESCape,B,2
Blinking stop	ESCape,C,2
Underline start	ESCape,B,3
Underline stop	ESCape,C,3
Cursor on	ESCape,B,4
Cursor off	ESCape,C,4
Video mode on	ESCape,B,5

ASCII CHART

Dec	Hex	Char		Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	00	NUL	or ^@	32	20	Space	64	40	@	96	60	'
1	01	SOH	or ^A	33	21	!	65	41	A	97	61	a
2	02	STX	or ^B	34	22	"	66	42	B	98	62	b
3	03	ETX	or ^C	35	23	#	67	43	C	99	63	c
4	04	EOT	or ^D	36	24	$	68	44	D	100	64	d
5	05	ENQ	or ^E	37	25	%	69	45	E	101	65	e
6	06	ACK	or ^F	38	26	&	70	46	F	102	66	f
7	07	BEL	or ^G	39	27	'	71	47	G	103	67	g
8	08	BS	or ^H	40	28	(	72	48	H	104	68	h
9	09	HT	or ^I	41	29	)	73	49	I	105	69	i
10	0A	LF	or ^J	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	or ^K	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	or ^L	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	or ^M	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	or ^N	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	or ^O	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	or ^P	48	30	0	80	50	P	112	70	p
17	11	DC1	or ^Q	49	31	1	81	51	Q	113	71	q
18	12	DC2	or ^R	50	32	2	82	52	R	114	72	r
19	13	DC3	or ^S	51	33	3	83	53	S	115	73	s
20	14	DC4	or ^T	52	34	4	84	54	T	116	74	t
21	15	NAK	or ^U	53	35	5	85	55	U	117	75	u
22	16	SYN	or ^V	54	36	6	86	56	V	118	76	v
23	17	ETB	or ^W	55	37	7	87	57	W	119	77	w
24	18	CAN	or ^X	56	38	8	88	58	X	120	78	x
25	19	EM	or ^Y	57	39	9	89	59	Y	121	79	y
26	1A	SUB	or ^Z	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	or ^[	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	or ^\	60	3C	<	92	5C	\	124	7C		
29	1D	GS	or ^]	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	or ^^	62	3E	>	94	5E	^	126	7E	~
31	1F	US	or ^_	63	3F	?	95	5F	_	127	7F	DEL

Please note that, while the normal ASCII-printable characters are displayed on the screen, the operation of control codes not documented above is subject to change and may not be what your software expects.

RECONFIGURING THE KEYPAD

If you have little use for entering numerical data with the numeric keypad, you may want to reconfigure the keypad. This will enable you to activate with one keystroke functions which usually take up to four keystrokes. Here is the procedure:

1. Make a diagram of the keypad with the changes you want to make. This will help you in the reconfiguration, and, after the reconfiguration, will serve to remind you of the new functions you have given the keys.

2. At the A∅> prompt, type: CONFIG
   Press RETURN.

3. From the menu, select Redefine the number pad by typing: N

4. Follow the instructions on the screen.

RECONFIGURING THE ARROW KEYS

The procedure for reconfiguring the arrow keys is the same, except in step 3 select Redefine the vector pad by typing: V

RECONFIGURING THE KEYPAD FOR WORDSTAR

You may reconfigure the keypad to enable you to activate WordStar commands with a single keystroke.

The procedure is the same, except in step 2, at the A1> prompt, type: WSKPCONF

When you want to use WordStar with the reconfigured keypad, at the A1> prompt, instead of WS, type: WSKP

When you exit WordStar with the reconfigured keypad, the command, KP-RESET will appear briefly on your screen. This is an automatic function that returns the computer to the default keypad.

PROGRAM TO TURN OFF THE KEYBOARD BEEPER

This program is in the M-BASIC programming language. See your M-BASIC manual for details.

```
10   REM THIS PROGRAM TURNS OFF THE KEYBOARD BEEPER.
20   DEFINT A-Z
30   KEYBOARD = 5
40   QUIET = 8
50   OUT KEYBOARD, QUIET
60   END
```

APPENDIX A

HOW TO USE MUFBAR™* MULTI-FLOPPY BACKUP AND RESTORE SYSTEM

FOR CP/M* AND MP/M** VERSION 2.0

1.0 INTRODUCTION

The MUFBAR™ (MUlti-Floppy Backup And Restore) system is a set of disk utilities which enables you to make backup copies of files which are on Winchester hard disks. Three programs are included in the system.

- MUFBACK is a backup program for a hard disk. It will split a file of up to 8 megabytes into smaller files so they will easily fit on a number of flexible disks.

- MUFLOOK is a lookup utility which allows the user to look at the information in the header records which have been created by MUFBACK for each subfile. These header records uniquely identify the file and provide information about its origin.

- MUFREST is a restore program which may be used to merge the files from several flexible disks into the original large file on the hard disk.

The programs require 36k of free memory.

These programs are written in 8080 machine language.

* MUFBAR is a trademark of Total Systems, Inc., 8900 Keystone Crossing, Suite 680, Indianapolis, IN 46240, (317) 844-DATA

** CP/M and MP/M are trademarks of Digital Research, Inc.

They are designed to operate through the CP/M or MP/M operating system. (CP/M 2.2 or greater is required.) The programs operate directly through the CP/M operating system and are completely independent of the size, capacity, density, or other aspects of a particular disk system. Additionally, all interaction with the user is via CP/M's console drivers, making these programs completely hardware-independent.

This document describes how to use MUFBAR, version 2.0 or greater. Version 2.0 is completely incompatible with earlier versions. If you have created a backup file using earlier versions, you must use the old RESTORE program. MUFREST will not restore it.

The discussion assumes that the reader has a minimal working knowledge of CP/M and its file structure.

2.0   BACKUP

This system will make backup copies of one type of file at a time. The file or group of files that you want to back up is called the SOURCE FILE(S). The files which will receive the pieces of backed-up file are called DESTINATION FILES.

You will be asked for a SPECIFICATION FOR SOURCE FILES. A specification may designate a maximum of 255 source files. Specifications can be ambiguous or unambiguous CP/M file specifications. Your CP/M manual has details on CP/M file-naming conventions. Basically, file names can have one to eight alphanumeric characters and can be followed by a period (.) and a file type of one to three characters. Wildcard specifiers, * and ?, may be used to specify a group of similar files.

Names of files need to be preceded by the LETTER OF THE DRIVE which contains the files. If the drive specification is omitted, the letter of the current drive is used.

IMPORTANT NOTE: The drive specification of all DESTINATION files must refer to a different drive than the SOURCE specification. If you do specify the same drive for source and destination drives, you will receive an error message.

WARNING: THE CURRENT DEFAULT DRIVE SHOULD NOT BE THE FLEXIBLE DISK DRIVE. For example, if A: is the hard disk and B: is the flexible disk, then the CP/M prompt should be A>, not B>.

2.1 HOW TO BACK UP FILES

Let's assume the files FILEA.DAT, FILEB.DAT, FILEC.DAT and FILED.DAT are on your hard disk which is drive A:. Assume also that, although some may fit on a single disk, others are larger than an entire floppy disk. The CP/M program PIP could be used to copy the small files, but the large files cannot be copied using PIP.

To make a backup copy of all four files:

1. Determine the size of your source file(s) by using STAT or a similar utility.

2. Prepare enough blank, formatted flexible disks to contain the parts of the source file(s). CAUTION: If you do not have enough disks prepared before you begin the process, you will have to abort the program, format more disks, and re-run the MUFBACK program.

3. Get the CP/M prompt.

4. Type: MUFBACK
    Press RETURN.

    You will receive the following message:

    A>MUFBACK

    MUlti-Floppy Backup And Restore System
    MUFBAR Backup Version x.y zzzz
    Copyright © 1982 by Total Systems, Inc.

    Type an identifying comment (Date, Time, etc.)
    Comment->____

5. Type a one-line comment (64 character maximum) which will uniquely iden-tify this backup, such as:

    Inventory files Nov. 13, 1982, 4:30 p.m.

This comment will be written into each header record for comparison by MUFREST. If you try later to restore files for which the headers do not match, an error message is printed, and the restore is aborted.

When you have typed the comment, press RETURN. You will see...

Type Source File Specification — >____

6. Respond with the name of the SOURCE file or files (i.e., the large files which you want to back up such as A:FILE?.DAT).
   Press RETURN.

   • If you make an error in typing, there will be a message, ERROR IN SOURCE NAME, and the program will terminate. Re-run MUFBACK, and type the name correctly.

   • If the the file is not found, there will be a message, SOURCE FILE(S) NOT FOUND, and you will be asked again for the file name.

   • You may also get a message, SOURCE AND DESTINATION CANNOT BE ON THE SAME DRIVE. The source files remain open during most of the backup process, and the destination drive must be reset after every disk change, so you must specify a different drive for source and destination.

   • If no error occurs, you will then see...

     Opening file — A:FILEA.DAT
     Insert next disk and type the destination drive name (A - P) ____

   A:FILEA.DAT is the first file in your specification.

7. Place a formatted disk in the drive of your choice.

8. Type the letter of that drive followed by a colon.
   Press RETURN.

   If the letter you type does not specify one of the drives for your system, there will be a DRIVE ERROR message. Type the correct letter and a colon.

   You will see...

```
Creating file — B:MUFBAR   .001
Closing file — B:MUFBAR    .001
Closing file — A:FILEA     .DAT
Opening file — A:FILEB     .DAT
Creating file — B:MUFBAR   .002
Insert next disk and type the
destination drive name (A - P) ____
```

The MUFBACK program creates the destination files automatically with the names MUFBAR.001, MUFBAR.002, MUFBAR.003...etc. These numbers are in hexadecimal notation (...008, 009, 00A, ... 00F, 010, ...). A new MUF-BAR file is opened after each source file is read or whenever the floppy disk becomes full. Any previous file using this name will be removed, and an empty file will be created and filled.

The "Insert next..." message means that the first destination disk is full.

If you get a DIRECTORY FULL prompt, change disks as usual, and the same file will be re-opened on the next disk.

If you get a DISK FULL, DELETING FILE — message, MUFBAR is deleting a partially-opened file from a full disk. Just change disks as usual, and the same file will be reopened on the next disk.

9. Change flexible disks.

10. Specify a drive for the next file by typing the drive letter and a colon. Recall that all destination files must be on a different drive from the source.

   Press RETURN.

   If you get the message, READ ERROR...BACKUP ABORTED, there was a system level disk I/O error on a read operation. Try to re-run MUFBACK from scratch. If the error persists, you have a system problem.

   You will continue to be asked for new destination disks until all of the source files have been transferred. The program will terminate with the message: "END OF BACKUP. ALL FILES CLOSED." You have success-fully completed the backup process.

3.∅ LOOKUP

MUFLOOK is a program which allows you to read the header records. Why should there be headers and why do you need to look at them?

A header record is a 128-byte record which is written on the front of each MUF-BAR.nnn file. The record contains the following information:

- The name of the file itself, such as MUFBAR.∅∅1.

- The original specification for the backup, such as FILE???.DAT.

- The ID Comment which you typed at the start of the backup.

- The name of the original file which contained this data. This is the name which will be used to restore the file. For example: FILEA.DAT.

- The original size of the file. This is a hexadecimal count of the number of 128-byte records in the original file. All of the records may not be in this file.

- The starting and ending record numbers for this file. Assume MUF-BAR.∅∅1 can hold only the first ∅1∅∅h records of FILE.DAT which contains ∅18∅h records (numbered ∅∅∅∅h through ∅17Fh). Then MUFBAR.∅∅2 would contain the remainder. The header record of MUF-BAR.∅∅1 will contain the number ∅∅∅∅h as the start and ∅∅FFh as the ending record numbers; MUFBAR.∅∅2 will contain 1∅∅h as its start record and ∅17h as its ending record.

- The number of original files in this backup.

Information in the header record is compared during the restoration process to make sure the files are being re-assembled properly. The program MUFLOOK allows the user to read these header records to determine their nature and origin.

To run the program:

1. Obtain the CP/M prompt. Note: the default drive should not be your floppy drive when running this program.

2. Type: MUFLOOK
    Press RETURN.

When the program has loaded, you will see...

```
A>MUFLOOK

MUlti-Floppy Backup and Restore System
MUFBAR Lookup Version x.y zzzz
Copyright © 1982 by Total Systems, Inc.

Insert disk containing MUFBAR.nnn files and type the drive name
(A-P) ____.
```

5. Insert the disk containing MUFBAR.$\emptyset\emptyset$1 into the floppy disk drive of your choice.

6. Type its drive letter.
   Press RETURN.

   You will see something similar to this...

```
File name                                     "B:MUFBAR    .ØØ1"
    Original Backup specification             "A:FILE???    .DAT"
    ID Comment "Inventory files Nov. 13, 1982, 4:3Ø p.m."
    Original file name                        "A:FILEA.     DAT"
    This is file #Ø1 out of Ø4 in this backup.
    Original size of file                            Ø18Ø hex.
    This MUFBAR file contains records
    Starting with record number                      ØØØØ hex.
    Through record number                            ØØFF hex.
    Press <RETURN> to continue...
```

7. To see the header of MUFBAR.$\emptyset\emptyset$2, press RETURN.

   If MUFBAR.$\emptyset\emptyset$2 is not on this disk, you will be asked to replace the floppy disk with the next one. Then you will need to type the drive letter.

   After you have seen the summaries of all files of this backup, you will see:

```
LAST FILE IN THIS BACKUP.  EXITING LOOKUP
```

   If MUFBAR.$\emptyset\emptyset$1 is not on the first disk, the program will proceed to the next MUFBAR file.

Suppose you are cleaning out your disk box and find an unmarked disk containing MUFBAR.005. You don't know to which backup it belongs or where its corresponding MUFBAR.001 through ..004 files are. You may run MUFLOOK and insert this disk. It will notice that there are no MUFBAR.001 ... 004 files and it will begin with MUFBAR.005 and it will show you its header. After it has found a MUFBAR file, it expects you to supply it with disks in the proper numerical order. In our example, it would expect MUFBAR.006 next. The program will continue to ask for MUFBAR.006 until it finds it. You might not have that disk available, so just exit the program by entering CTRL-C.

4.0 RESTORE

MUFREST is the program used to restore to the hard disk the files created by MUFBACK.

You may restore only one or a few of a group of files from a particular backup run, but it is not possible to restore only part of a particular file.

Here is an example. Let's assume your backup consists of several MUFBAR.nnn files which were created by the specification A:FILE?.DAT. You can, if you wish, restore a single file, such as FILEC.DAT, and leave the others alone.

To begin the restore process:

1. Have the proper floppy disks available.

2. Know what files each disk contains. The MUFLOOK program may be of assistance.

3. Put the first diskette in the drive.

    WARNING: THE CURRENT DEFAULT DRIVE SHOULD NOT BE THE FLEX-IBLE DISK DRIVE. For example, if A: is the hard disk and B: is the flexible disk, then the CP/M prompt should be A> not B>.

4. To use the MUFREST utility, type: MUFREST

You will receive the following message:

```
A>MUFREST

MULti-Floppy Backup And Restore System
MUFBAR Restore Version 2.0 x.y zzzz
Copyright © 1982 by Total Systems, Inc.
Type the destination drive name (A - P) ____
```

5. Type the letter of your hard disk drive. You will then see...

```
Insert next source disk and type drive name (A - P) ____
```

6. Insert the disk containing the file MUFBAR.001.

7. Then type its drive letter.
   Press RETURN.

   If you type an incorrect drive designation, you will receive a DRIVE ERROR message. Type the letter for the correct drive. You will now see...

```
Opening file — B:MUFBAR .001
A:FILEA   .DAT already exists.   Remove it? (Y/N) ____
```

The program has opened MUFBAR.001 and determined from the header record that it contains the first part of the file, FILEA.DAT. It then noticed that drive A: already has such a file. Let's assume we only want to restore FILEC.DAT. We must tell the program to skip FILEA.DAT, FILEB.DAT, and FILED.DAT. FILEC.DAT is on MUFBAR.005, so we will have to read from MUFBAR.001 through MUFBAR.004.

We don't want to remove the current FILEA.DAT.

8. Type: N
   Press RETURN. You will see...

```
Ignoring file — A:FILEA   .DAT
Closing file — B:MUFBAR   .001
Opening file — B:MUFBAR   .002
A:FILEB   .DAT already exists.   Remove it?   (Y/N) ____
```

10. To skip FILEB.DAT, type N again. If the next MUFBAR file in sequence is on the NEXT disk, you will see...

B:MUFBAR   .003 cannot be found on this disk.
Insert next source disk and type drive name (A - P) ____

This means that the next MUFBAR file in sequence is not on this disk.

11. Remove the floppy disk, and replace it with the next one.

12. Type the drive letter.
Press RETURN.

Eventually we come to FILEC.DAT which is what we want.

13. Answer the prompt by typing Y. You will see...

Opening file — B:MUFBAR   .005
A:FILEC   .DAT already exists.   Remove it? (Y/N) **Y**
Removed current file.
Restoring new — A:FILEC   .DAT

The current file which is removed is the file which existed when you began the restoration. The new file is from the floppy disk.

If you get the message, ERROR CANNOT REMOVE FILE. RESTORE ABORTED, you have attempted to restore a write-protected file or disk,

If you get the message, ERROR DIRECTORY FULL, the destination drive (hard disk) is full. You must remove some files and re-run MUFREST.

If you get the message, ERROR IN HEADER RECORD. RESTORE ABORTED, the header record of a MUFBAR file does not match the header record of MUFBAR.001. You have inserted the wrong disk. Re-start the restoration with the proper disks.

If you get the message, CANNOT OPEN OUTPUT FILE. RESTORE ABORTED, the destination drive is write-protected. You must change its status and re-run MUFREST.

If you get the message, ERROR IN WRITING OUTPUT FILE. RESTORE ABORTED, you have a system I/O error or are out of space.

When all files have been processed (restored or skipped), the program will terminate and you will see the message:

END OF RESTORE. ALL FILES CLOSED

In the example above, we wanted to restore only one of the four original files. This may not be a good idea if the files are logically interrelated. Depending upon the type of processing you are doing and the amount of work done since the backup, you may foul up your system by restoring only some files.

The "Remove it?" question will only be asked if the file already exists on the hard disk which you specified. If you plan to restore all of the files from a particular backup, you may wish to erase them from the hard disk before running MUFREST. For example: you could type...

    A>ERA FILE?.DAT
    A>MUFREST

You would then be relieved of answering YES to all of the "Remove it?" questions.

5.Ø INFORMATION ABOUT RANDOM ACCESS FILES

One aspect of this system which we have not discussed concerns random access files. In CP/M, when you write in random access mode, only those extents and records to which you have actually written will have disk space allocated to them. For example, if you open an empty file and write to record number 1,ØØØ in random access mode, there will not be space allocated for records 1 through 999. When the backup program reads the source file, it sequentially reads in random mode. In the case of the file described above, the program will detect the fact that no data exists for the first 999 records. When MUFBACK finds such records, it will write a block of 128 NULLS (ASCII code zero) to the destination file. Upon restoration, there will be ALL 1ØØØ records on disk. Those records not previously allocated will now contain NULLS.

This may affect your processing in two ways.

First, any files which have numerous "holes" in them will likely require more disk space after restoration than the original files did.

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Second, if your application program searches the file for an unwritten record, it will not find any.

These consequences occur only after a file has been restored. You need to be aware of them now because an unusable backup is like no backup at all. In nearly all situations, these aspects of the system will have no effect on your operations.

APPENDIX B

SYSTEM STATUS MESSAGES

Meaning of System Status messages:

System Status Ø1 — Write Error

System Status Ø2 — Read Error

System Status messages will be printed on the 25th line of the CRT. These messages will occur any time the disk controller detects a read or write error. These errors are referred to as either hard or soft errors.

SOFT ERRORS

Soft error means a temporary error due to fluctuations on the power line, overheating, excess humidity, etc. Soft errors will occasionally happen; nothing will eliminate them entirely.

On a power up sequence, power supply transients may cause a System Status message to appear in the 25th line of the screen. Wait a couple of minutes to allow the power supply to stabilize, then press the reset button. The System Status message should disappear.

If a System Status message appears during normal operation, after warm-up, and pressing the reset button clears the message, it is safe to assume that the error is temporary.

The only time soft errors should concern you is when they reoccur constantly. This indicates a hardware problem that interferes in the proper functioning of the disk controller.

HARD ERRORS

A hard error indicates one of two possibilities. Either physical damage has occurred to the disk media, or a marginal sector has finally failed.

Any hard disk will have a few marginal sectors, and the system is designed to accept and work around a reasonable number of damaged sectors. Hard disks are designed with extra sectors specifically for that reason. Internal logic replaces damaged and failed sectors with one of the extra sectors.

Serious problems are indicated only when there is a sudden increase in the number of bad sectors reported by the CHECK program.

APPENDIX C

TEMPERATURE ADJUSTMENT FOR YOUR KAYPRO 1Ø

When transporting your KAYPRO 1Ø from one environment to another, some time may be needed so the hard disk can adjust to temperature change. Because some expansion and contraction will occur with temperature changes, the hard disk must reach a stable temperature before it can be used reliably.

The required time is calculated on 1 hour of waiting time for each 18 degrees Fahrenheit change in temperature.

Note: THE WARM-UP MUST BE PERFORMED WITH THE POWER ON.

Two tables of warm-up times will be found on the following page. One is for degrees Fahrenheit, and one is for degrees Celcius.

Example:

> Your KAYPRO 1Ø has been in your car trunk at 45 degrees Fahrenheit during a business trip. At your destination the working temperature of the office is 7Ø degrees Fahrenheit. The difference in temperature is 25 degrees.
>
> 1. Locate 25 degrees in the left-hand column of the Fahrenheit Table.
>
> 2. In the right-hand column of the Fahrenheit Table is a time value of 1 hr and 25 minutes. This is the warm-up time required before using your computer.

Warm-up Tables

FAHRENHEIT		CELCIUS	
Temperature difference	Waiting time	Temperature difference	Waiting time
Ø degrees	Ø hr. Ø min.	Ø degrees	Ø hr. Ø min.
5 degrees	Ø hr. 18 min.	5 degrees	Ø hr. 30 min.
10 degrees	Ø hr. 36 min.	10 degrees	1 hr. Ø min.
15 degrees	Ø hr. 48 min.	15 degrees	1 hr. 30 min.
20 degrees	1 hr. Ø6 min.	20 degrees	2 hrs. Ø min.
25 degrees	1 hr. 24 min.	25 degrees	2 hrs. 30 min.
30 degrees	1 hr. 42 min.	30 degrees	3 hrs. Ø min.
35 degrees	1 hr. 54 min.	35 degrees	3 hrs. 30 min.
40 degrees	2 hrs. 12 min.	40 degrees	4 hrs. Ø min.
45 degrees	2 hrs. 30 min.	45 degrees	4 hrs. 30 min.
50 degrees	2 hrs. 48 min.	50 degrees	5 hrs. Ø min.
55 degrees	3 hrs. Ø6 min.	55 degrees	5 hrs. 30 min.
60 degrees	3 hrs. 18 min.	60 degrees	6 hrs. Ø min.
65 degrees	3 hrs. 36 min.	65 degrees	6 hrs. 30 min.
70 degrees	3 hrs. 54 min.	70 degrees	7 hrs. Ø min.
75 degrees	4 hrs. 12 min.	75 degrees	7 hrs. 30 min.
80 degrees	4 hrs. 24 min.	80 degrees	8 hrs. Ø min.
85 degrees	4 hrs. 42 min.	85 degrees	8 hrs. 30 min.
90 degrees	5 hrs. Ø min.	90 degrees	9 hrs. Ø min.
95 degrees	5 hrs. 18 min.	95 degrees	9 hrs. 30 min.
100 degrees	5 hrs. 36 min.	100 degrees	10 hrs. Ø min.

GLOSSARY

ADDRESS	a number used by the computer to keep track of different memory locations
ARRAY	a set of elements arranged in a pattern
ASCII	acronym for American Standard Code for Information Interchange; a 7-bit code for representing character data such as letters, punctuation, etc.
BACK UP	to copy information or programs as a protective measure
BAUD RATE	the speed of serial communications; BAUD is used generally as meaning bits per second: 300 baud would be 300 bits/second or 30 characters per second
BDOS	acronym for Basic Disk Operating System: the section of CP/M that keeps track of disk files
BIOS	acronym for Basic Input/Output System: the section of CP/M that handles the hardware of the KAYPRO
BIT	a binary digit, the smallest piece of information a computer can handle (see BYTE)
BOOT	loading CP/M into the computer's memory from drive A, COLD BOOT occurs when the machine is first turned on; WARM BOOT occurs when you press the CTRL and C keys simultaneously (see CP/M manual for details)
BUFFER	an area of memory set aside for storing and manipulating data associated with I/O devices, such as disks and keyboards.
BUG	a problem or undesirable side-effect of a computer program, almost always unexpected and unwelcome (see DEBUG)
BYTE	8 bits; the size of a memory location in the KAYPRO; a computer "word" (note: a kilobyte or kbyte is one thousand bytes)

CCP	acronym for Console Command Processor: the section of CP/M that makes sense of what you type on the keyboard
CHIP	slang for an integrated circuit
CONSOLE	the device used for communication between the computer and you. Normally, this is the keyboard and the video display.
CP/M	acronym for Control Program for Microcomputers. The most popular disk operating system for 8080 and Z-80 microcomputers, CP/M keeps track of the files and programs on the hard disk and the floppy disks and facilitates their use.
CPU	acronym for Central Processing Unit: the microprocessor chip
CRT	acronym for Cathode Ray Tube: the "TV" tube used as the video display
DEBUG	to remove mistakes from a computer program (see BUG)
DIR	a built-in CP/M command that lists the files of a user area or diskette. See AN INTRODUCTION TO CP/M FEATURES AND FACILITIES for details.
DIRECTORY	the list of files in a user area or on a disk. The KAYPRO 10 allows 1024 directory entries for each logical disk. The exception is drive C: which may have up to 64 directory entries.
FILE	a collection of characters, data, or what-have-you that is stored in a user area or on a disk. A file can contain a program or information to be used by other programs or a manuscript, etc.
FILENAME	the name of a file, which you see when you list the directory or use when you access a file. The general form for a filename is: B:NAME.MSS The first part (A:, B: or C:) indicates which drive the file is in. The second part is the name and can be up to eight characters long. The last part is called the file type, can be up to three characters long, and is separated from the name by a period.
FLOPPY	a diskette of magnetic media which is encased in a sturdy envelope. It stores data in areas called files.

FORMAT	the organization of data on a disk. A single-sided, double-density format on the floppy disk consists of 4Ø tracks per disk, with each track divided into 1Ø sectors.
HARD DISK	A fixed, durable disk for storing information magnetically. It is permanently located within the computer.
HARDWARE	the physical parts of the computer and its peripheral equipment, as opposed to SOFTWARE.
HIGH-LEVEL LANGUAGE	a computer programming language that is similar to English or mathematics. S-BASIC and PASCAL, for example, are high-level languages.
INPUT	data put into the computer. By extension, the process or means of putting data into the computer.
LOAD	to take information from a storage medium, such as a disk or tape, and put it into the computer's memory.
MACHINE LANGUAGE	a binary language that a computer can understand, as opposed to either assembly language (see the ASM section of your CP/M manual) or high-level languages like S-BASIC.
MODEM	acronym for MOdulation/DEModulatIon: a device that connects a computer terminal to another computer terminal via a communications link, such as the telephone system. With the KAYPRO, modems are connected directly to the RS-232C connector at the rear of the machine.
OUTPUT	information displayed or used to control devices external to a computer. By extension, the process or means of getting information out of a computer.
PERIPHERAL	any device connected to and used with your computer (e.g., a printer or modem).
PIXEL	an element or location on the screen for the purpose of forming characters or graphic displays.
PROGRAM	a set of instructions for a computer; the SOFTWARE. When these instructions are in a high-level language like BASIC, they will always have to be converted into a set of low-level or machine language instructions by either an interpreter (M-BASIC) or a compiler (S-BASIC).

PROMPT	a unique character or characters displayed by a program to inform the user that the program requires some instruction or information. In CP/M, the A> is a prompt which indicates that the computer is waiting for the user to enter a command.
RAM	acronym for Random Access Memory: the memory that the computer uses for short-term storage of information and programs. Unlike ROM, the information stored in RAM is changeable and volatile, meaning it will disappear when the power to the computer is turned off.
ROM	acronym for Read Only Memory: the memory that is used for unchanging information and programs. Information stored in ROM is not volatile, and will remain intact regardless of whether the power to the computer is on or off.
SAFETY ZONE	a portion of a hard disk which is reserved as a space to which the read-write head can move when it has nothing else to do. Also, the head must be moved to the safety zone before the computer is turned off. This is done by typing after the A> prompt: safety
SECTOR	a group of bytes on a disk. The standard KAYPRO double-density floppy disk has 10 sectors on each track, with each sector containing 512 bytes of information.
STAT	a CP/M program that gives the statistics of a disk's files, showing how much space (in kilobytes) each file is using and how much empty space is left on a disk.
TRACK	a ring of information on a disk. A double-density floppy disk has 40 tracks.
USER AREA	the 15 areas on a hard disk which are set up to hold files. They have no specific size, but adjust in size as necessary.
UTILITY	a program often used, particularly by system programmers. For example, PIP is a utility program (details in the CP/M manual) that allows the transfer of files.

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