KAYPRO II

THE KAYPRO II™ USER'S GUIDE

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REDIRECTION

Please first direct all queries and problems to your dealer.

* After Nov. 6, 1982, Telephone 619-755-1134.

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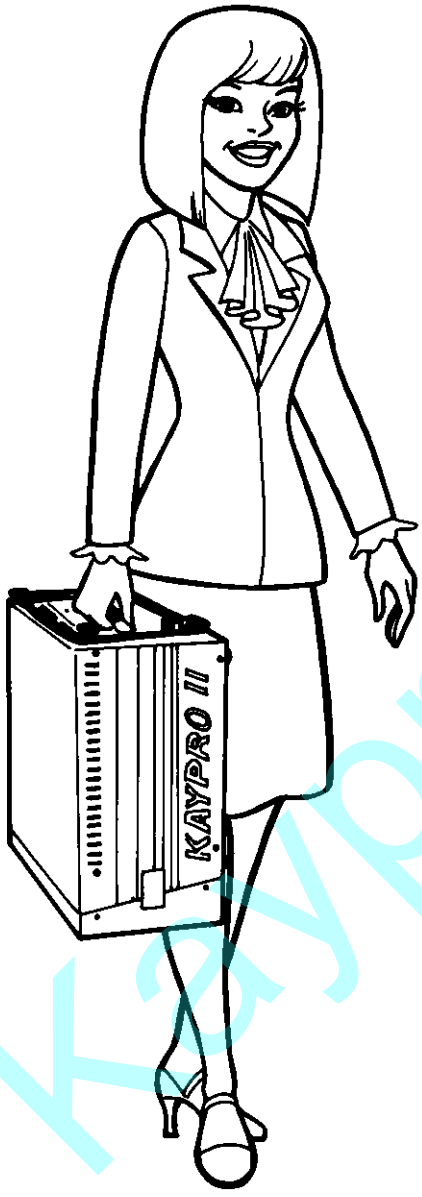
INTRODUCTIONS

Meet KAYPRO II™



WE HOPE that you will enjoy
many useful and pleasurable
years with your computer,
whether at business
or at home.

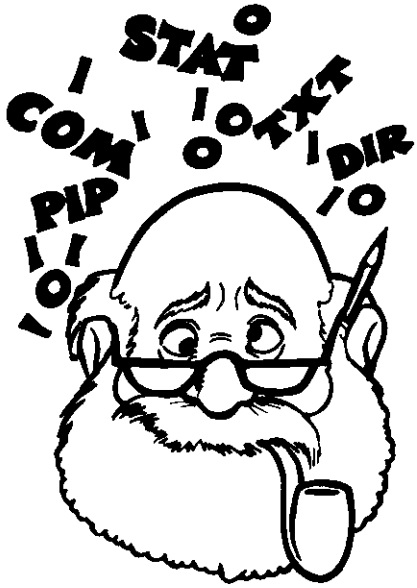
MAYBE YOU'VE NEVER USED
A COMPUTER BEFORE...

DON'T WORRY.
WE'LL INTRODUCE YOU to the
KAYPRO II with step-by-step
instructions,
to help you get started right away.

NOW IF YOU'RE AN OLD HAND
AT COMPUTER OPERATION...

WE KNOW you're eager
to get started...

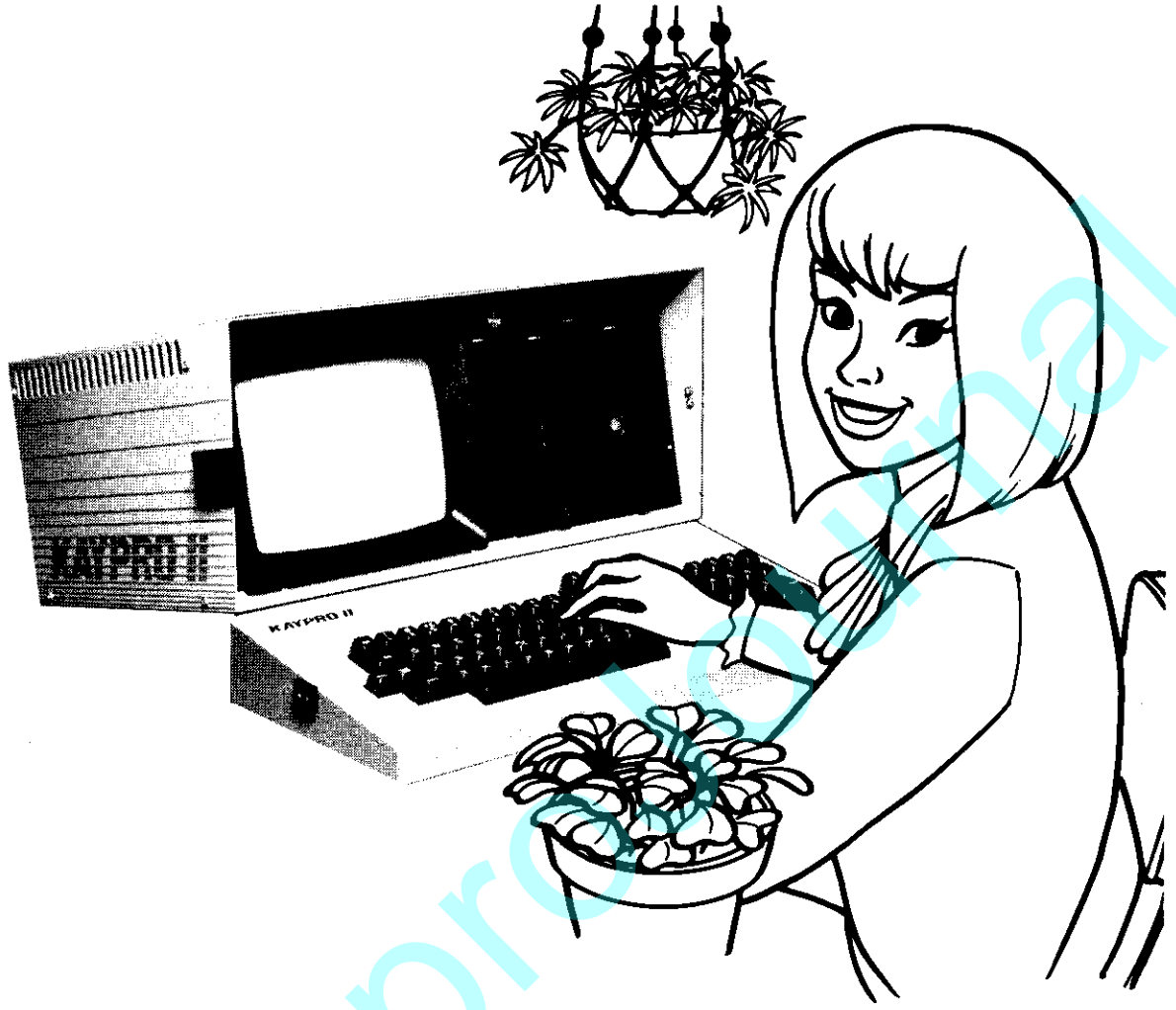
BUT



PLEASE take a few minutes to read
the instructions for installing and
connecting your **KAYPRO II**
and copying diskettes.
It will save time and prevent problems.

Introducing KAYPRO II

Your executive assistant



KAYPRO II is ready to do a myriad of chores for you ---

- writing and editing
- financial planning
- programming
- filing and record-keeping

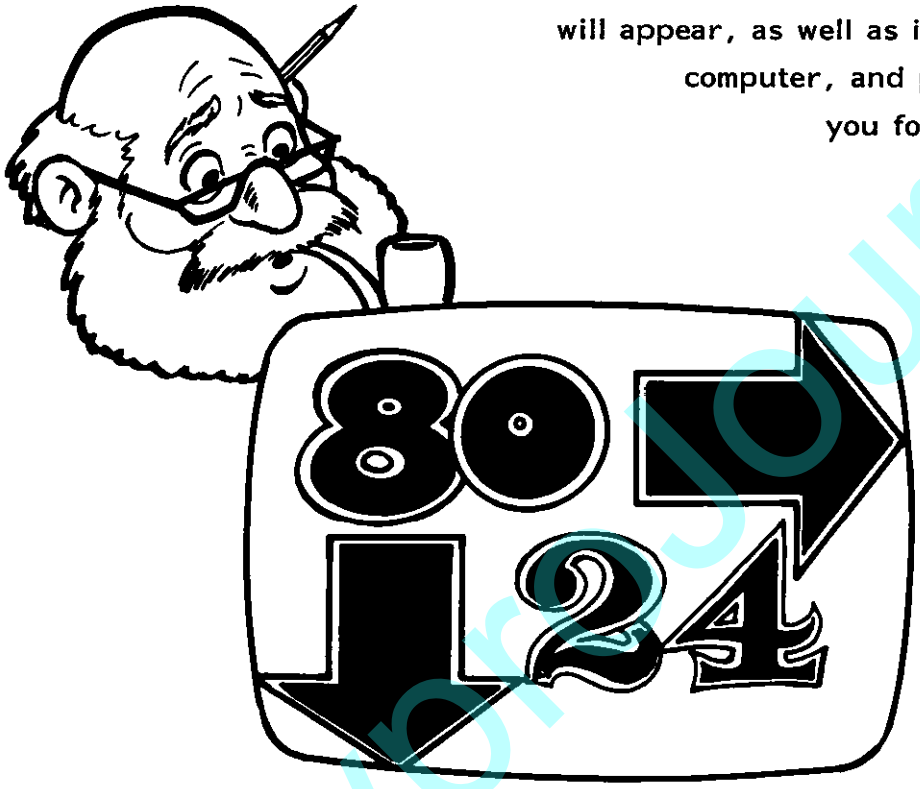
and much, much more.

You give the instructions -- **KAYPRO II** does the work!
After all, that's why you have a computer!

Getting Around

The big green screen

On the video display screen, what you enter will appear, as well as information from the computer, and prompts, which ask you for more information.



The screen holds 1,920 characters in 80 columns and 24 lines.

You can adjust the brightness of the screen by turning the knob on the upper middle of the front panel..

Cursor

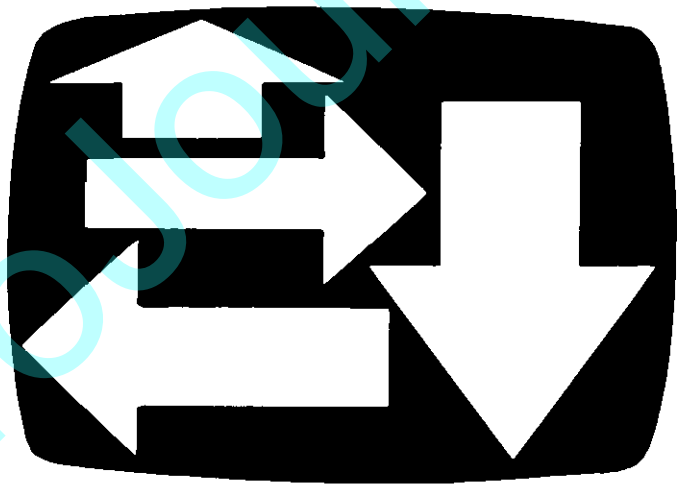
Where you are on the screen shows as a flashing underscore.
What you type will appear at this location.
If there is already a character there,
that character will flash.

When the cursor reaches the far right column of the screen, typing the next character will cause an automatic linefeed (wraparound). That means that without your having to instruct it to do so, the computer will automatically end the line with the last word that will fit within the format, and begin the next line -- you do not have to press RETURN.

Cursor keys

With the cursor keys, you can move the cursor freely in any direction on the screen --

UP ↑
DOWN ↓
LEFT ←
RIGHT →



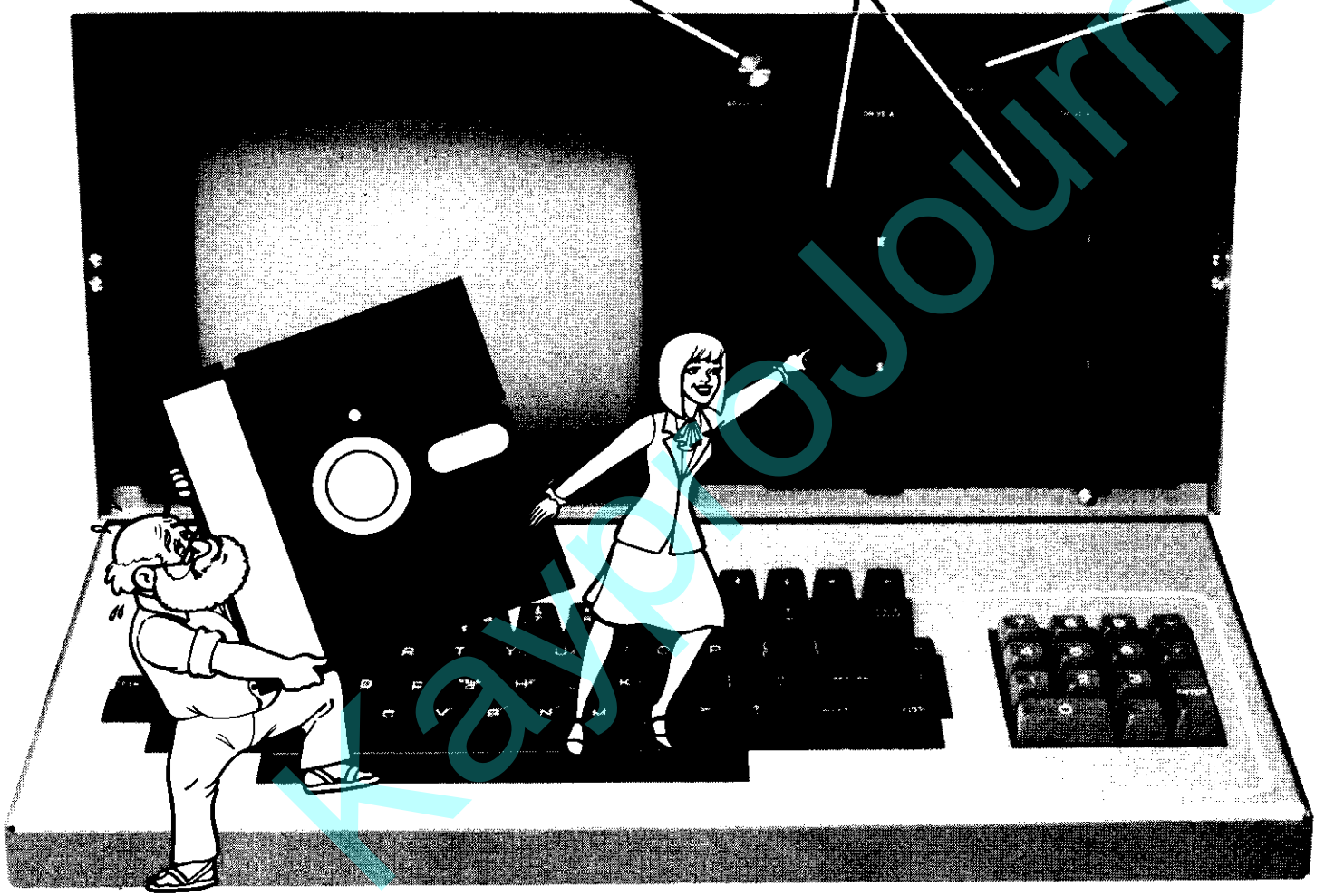
However, please note that these keys will perform these functions ONLY in certain programs: SELECT, PROFITPLAN and certain others -- but will not function in this manner in CP/M

Controls & indicators

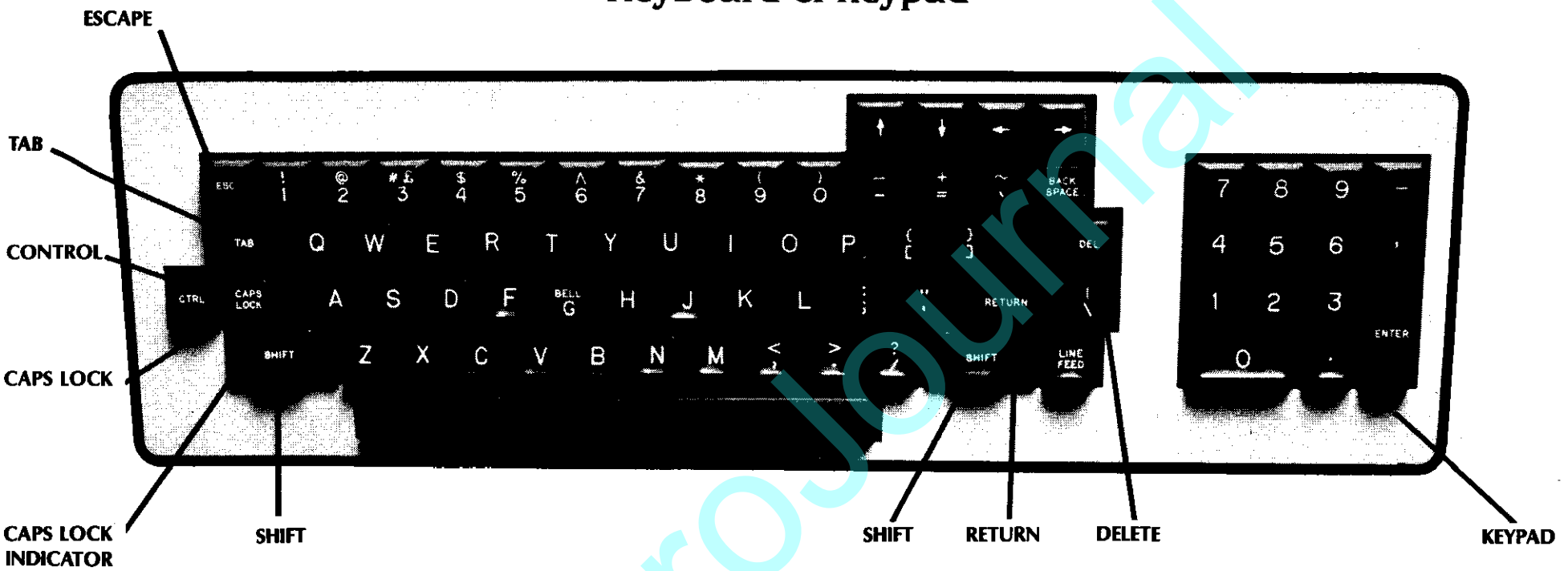
BRIGHTNESS CONTROL
Turn the dial clockwise for brighter, counter-clockwise for softer video display.

DISK DRIVE INDICATOR LIGHTS
Small red lights next to the door of each disk drive – tell you which drive was selected last.

POWER ON
Small red light on front panel above disk drives tells you that the power is ON.



Keyboard & keypad



KEYBOARD - The main keyboard has 62 keys. It's similar to a typewriter keyboard and it has a number of special keys for special functions.

ESCAPE - Escape function

TAB - Horizontal tab

CONTROL - Used with other letters to perform control functions.

CAPS LOCK - Produces upper-case letters for all alpha keys without affecting numerals.

CAPS LOCK INDICATOR - Small red light that indicates you are in the caps mode.

SHIFT - Selects the upper character on 2-character keys, upper-case on alpha keys.

DELETE - Function depends on program in use.

RETURN - Used for carriage return, also tells computer to "execute" and has other uses.

SHIFT

KEYPAD - 14 keys for entering numeric data rapidly 0 through 9 plus period.

ENTER is the same as RETURN.

Setting up Your KAYPRO II

When unpacking your **KAYPRO II**, be sure to save the packing materials, should you wish to ship it again some day. Save the cables, instructions, etc. that came in the box, too.

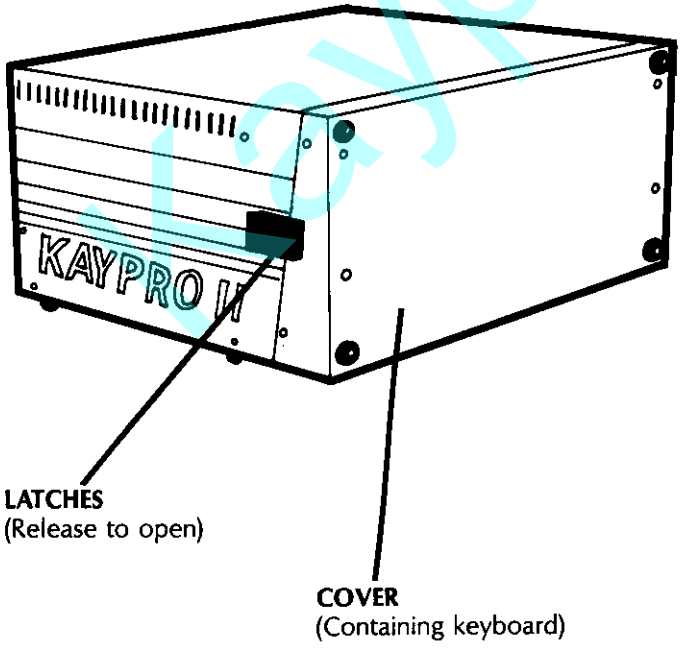
Check to see that, in addition to the computer, you have:

A telephone-type coiled cord

4 diskettes	and	4 manuals
CP/M-S-BASIC		CP/M
PROFITPLAN		SELECT/PROFITPLAN
SELECT		S-BASIC
INSTALL/TEACH		KAYPRO II

You will need to supply 4 blank, single-sided, double-density, soft sector diskettes for copying the master diskettes and as many others as you wish to use to store information.

You'll want a work surface that's about 25 inches high with leg room underneath.

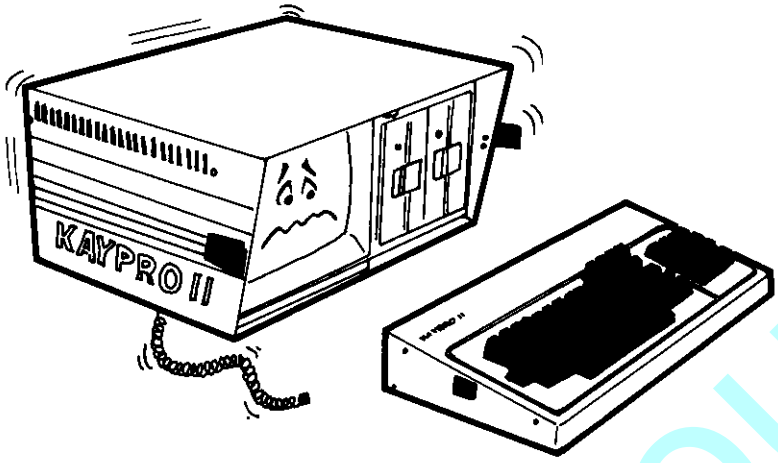


First, set the computer on the work surface with its blue base in front. (This is actually the "cover" that contains the keyboard.)

REMOVE THE COVER CAREFULLY by releasing the black latches on each side. (Just pull on the back part of the latch and it will come up, releasing the keyboard)

Carefully remove the keyboard and place it where you can use it comfortably. Connect one end of the coiled cord at the back of the keyboard and connect the other end on the rear panel of the **KAYPRO II**.

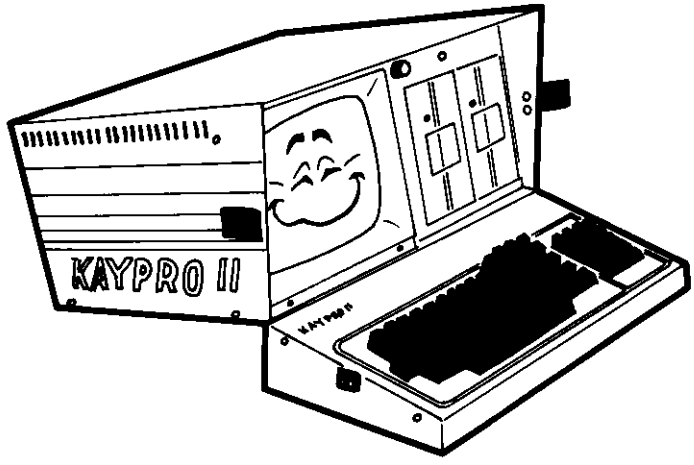
(You may route the cord under the computer.)



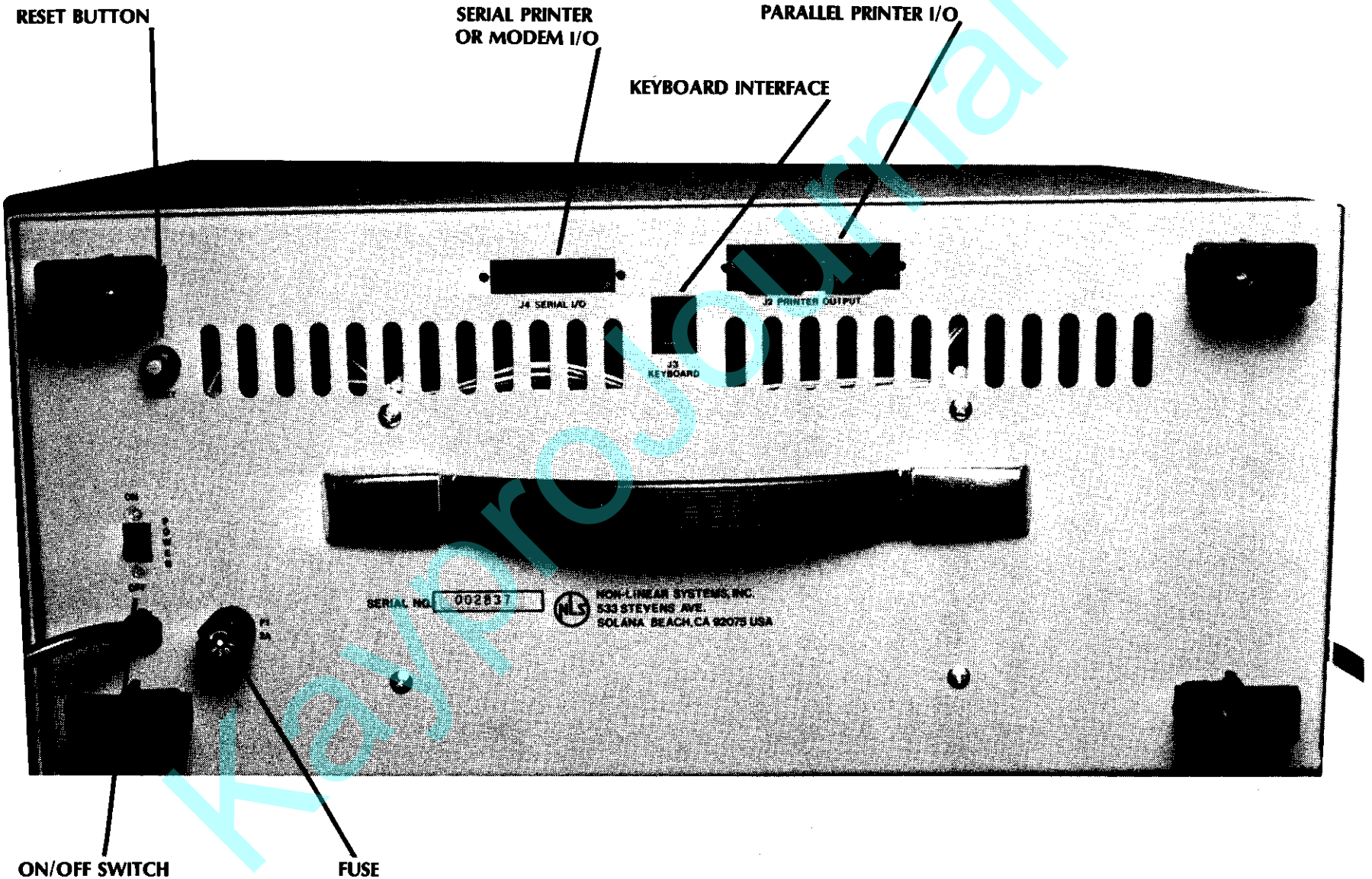
Next, set the computer on the work surface with its rubber feet resting on the top rear edge of the keyboard. (This tips the display screen to a good viewing angle.)

Remove the cardboard disk-drive protectors from each of the disk drives.

Unwind the AC line power cord, BUT DO NOT CONNECT THE POWER yet.



Rear view of the KAYPRO II showing switches and I/O ports



Connecting KAYPRO II to a Power Source

Before connecting your computer to a power source, please take note of a few precautions. First of all, both the computer and any peripheral devices should be turned OFF.

Power requirements for the **KAYPRO II** are 115 to 125 nominal 115 VAC 50 to 60 hertz at 60 watts (normal house current). Your dealer can switch the power supply to 220 VAC if you want to take your computer overseas. For power requirements for peripherals (e.g. printers, etc.) be sure to check the owner's manual for the device.

If you have heavy machinery operating from the same power source, or if you experience frequent power shortages, line filtering may be advisable. Line filtering will protect your **KAYPRO II** from power surges or other undesirable occurrences from the power source. Backup power sources are also available from various manufacturers to provide continuous power in the case of a power outage. Contact your dealer.

Bringing Up the Computer

Connect the computer to a power source with both computer and any peripheral devices turned OFF. Connect the peripherals (such as a line printer or modem) to a power source.

Turn on the peripheral devices FIRST.

Then, turn on the computer with the rocker-type switch on the rear panel of the KAYPRO. The ON position is UP.

Insert the CP/M diskette that came with the **KAYPRO II** into disk drive A with the write-protect notch in the UP position.

Close the disk drive door. On the screen you will see

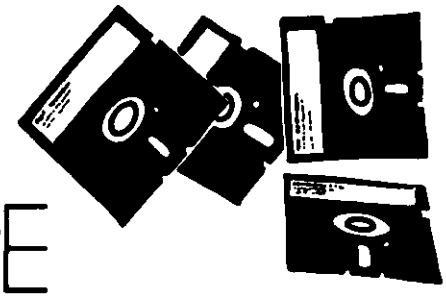
A>

This is a "prompt" or an indication that the system is waiting for your next instruction.

You can adjust the brightness of the display screen with the control dial located at the upper right-hand corner of the front panel -- clockwise for brighter; counter-clockwise for softer.

You are now ready to use CP/M.

A TOUR OF THE SOFTWARE



In the envelope that came with your KAYPRO computer are four floppy diskettes:

#1 CP/M-S-BASIC -- the system and language diskette
#2 PROFITPLAN -- a calculating mathematical spreadsheet
#3 SELECT -- a word processor
#4 TEACH -- the self-teaching tutorial in SELECT

Information about these programs and how to use them is found in the four software manuals that accompanied your computer:

CP/M -- a thorough guide to the operating system
SELECT/PROFITPLAN -- a guide to the word processor and how to use the spreadsheet
S-BASIC -- an explanation of SBASIC and applications for the experienced programmer
KAYPRO II USER'S GUIDE -- an introduction to the **KAYPRO II**

There are a few things you might like to know . . . before diving into CP/M.

CP/M™ — The Operating System

Before you can begin to work with your **KAYPRO II**, you must load CP/M into the computer's memory. CP/M, or "the system," acts as a middleman between you and the computer, enabling you to (1) store and retrieve programs and data and (2)receive and transmit programs and data to and from the outside world. Three important components of CP/M are BDOS, which is in charge of disks and disk files; BIOS, which communicates with printers and other peripheral devices; and CCP, which interprets between you, the user at the keyboard, and the internal processing in the computer. Through these three modules, CP/M can manage the file system, send information to the printer and to the display screen, and provide the general environment required for constructing programs, storage, editing, and assembly, etc.

This is the only diskette that will "boot up" after being inserted into drive A. (The other diskettes will display a reminder that you have to make copies of them.)

Along with the CP/M operating system, there are a number of standard "utility" programs like DUMP, STAT, LOAD and DDT. For information on these programs and the working of CP/M in general, see the Digital Research manuals bound as the CP/M-S-BASIC Manual, particularly the first section, An Introduction to CP/M Features and Facilities..

Three of the utility programs -- ED, ASM and DDT -- are described in detail in separate sections near the end of the CP/M manual that came with your computer.

The CP/M-S-BASIC diskette also contains some programs developed especially for the **KAYPRO II**:

COPY allows you to copy all of the information on one diskette onto another. Additionally, you can use COPY to verify that two diskettes are the same.

FORMAT is used to format blank diskettes to the double-density standard used by the **KAYPRO II**. (Although this computer can read single-density diskettes using the Xerox format, it can only format to the NLS double-density standard.

CONFIG is a program used to reCONFIGure a system diskette. CONFIG allows you to create a word processing diskette that will boot up expecting a serial printer instead of the stock version that expects you to hook up to a parallel printer. CONFIG also allows you to change the way the computer "sees" the arrow keys and blue keypad so that you actually have 18 Function keys available for special purposes.

BAUD is a simple program that changes the baud rate of the RS-232 serial interface. (Note that CONFIG also allows changes in the baud rate, but neither program can change the fact that when the machine is first turned on, it will always be set for a rate of 300 baud, the standard modem rate.)

SELECT™ — Word Processing

With SELECT, the word processing program, you can use your KAYPRO to write, edit, reorganize, print and file a document. You can create a mailing list with the MERGE function, and also a MERGEable document. And it's self-teaching. The 90-minute or less tutorial, TEACH, will give you mastery of SELECT's commands and make its many capabilities accessible to you. SELECT can also be used to write programs.

PROFITPLAN™ — The Mathematical Spreadsheet

Budgeting, forecasting, and financial planning are available with PROFITPLAN. Computations are done as a series of steps. You select a command and PROFITPLAN will ask you for the necessary data through questions and prompts on the screen.

Each table can have up to 200 rows and up to 60 columns. Commands are in numbers, decimals from 1 to 3 digits. Data is entered into the rows and columns and computations made. If you change one or more values in the table, new totals will be computed automatically.

S-BASIC® — The Compiler

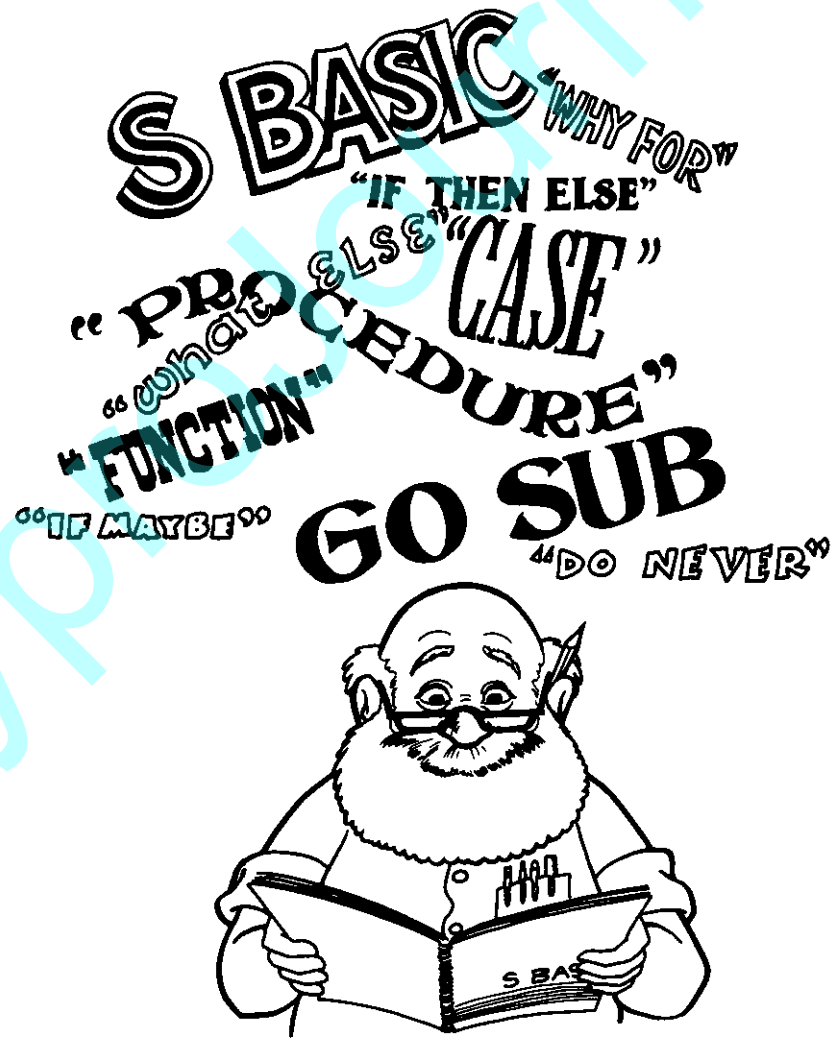
Diskette #1 also contains all the S-BASIC files. S-BASIC is a compiler. If you aren't familiar with a compiler, it can best be described as a bulk translator. The compiler (translator) converts your BASIC source program into Z80 machine code so that the KAYPRO computer can execute it. (A number of tutorial books are available, if you are not experienced in BASIC programming.)

In addition to the SBASIC compiler, there are three demonstration programs:

1) FAC.BAS -- computes factorials;

2) DISPLAY.BAS -- illustrates file accessing in SBASIC; and

3) XAMN.BAS -- a disk utility that checks for bad or damaged sectors on your diskettes.



OF DATA & DISKETTES

Memory

Data stored in the computer goes into two kinds of memory:

ROM (Read Only Memory) and

RAM (Random Access Memory)

ROM is the smallest portion of memory, only 2 kilobytes (2048 bytes). It contains those programs and unchanging information most frequently used.

RAM takes up 64 kilobytes (65,535 bytes) of information that may be stored, retrieved, changed and erased as necessary. It can be read and written to.

RAM memory is lost when the computer's power is turned off, so any program or data stored there has to be stored on a diskette if you wish to retain it.

Protecting Your Data

Data may be lost by power interruption, operator error, or equipment failure. Some of these hazards can be prevented, but not all. Some ways to prevent data loss are:

READ ONLY - A file may be made safe from operator error (but not equipment failure) by changing one of its attributes to "read only" with the STAT utility.

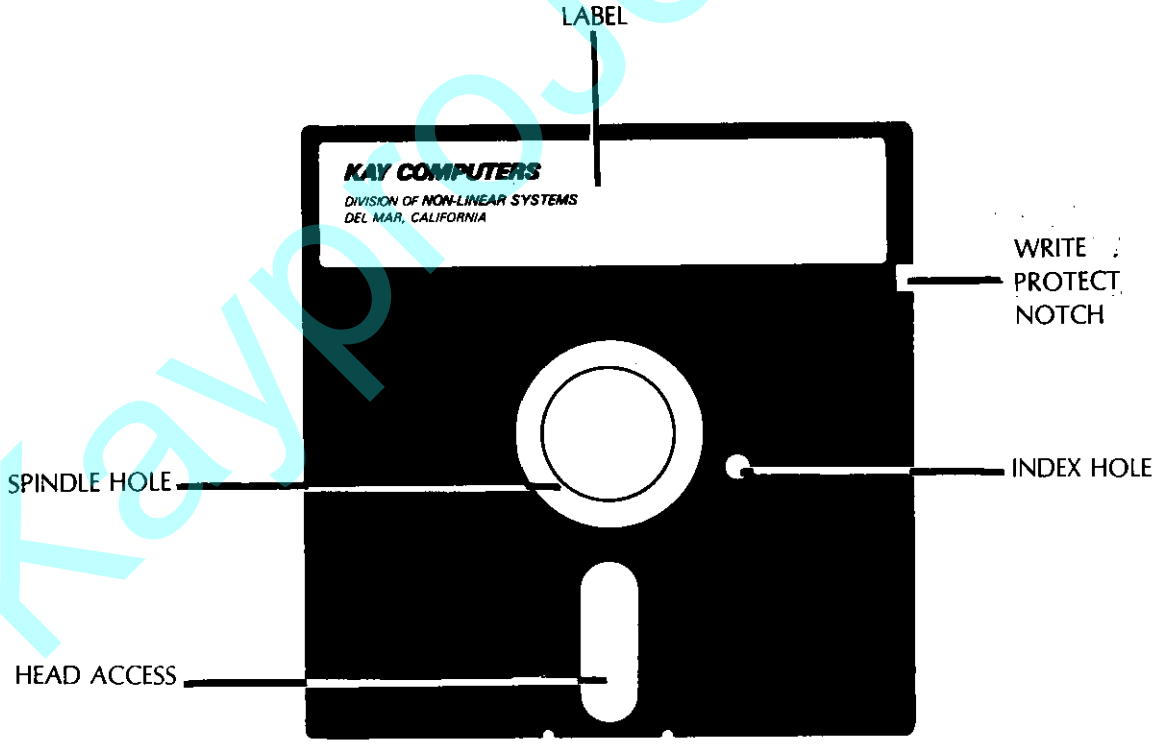
SAVING - Save information as you create it, about 2 to 4 times per hour, and save your work whenever you leave the computer, even briefly.

BACKUP - Copy the file you are using -- if the file is accidentally erased, you can retrieve the lost data from the backup copy.

Disk Storage

The diskettes used in the **KAYPRO II** are single-sided, double-density; that is, they can store twice as much information as single-sided, single-density diskettes. Each diskette can hold 195K bytes, or 60 typewritten pages of text. (Track 0 and parts of Track 1 are reserved for the system and other essentials, leaving 191K available to the user.)

Many types of information can be stored on the diskette: text files, mailing lists, a single long S-BASIC program, or saved reports from PROFITPLAN.



Tender Loving Care for Diskettes

Your floppy diskettes store data on a magnetic surface that is vulnerable to damage, resulting in loss of data. Some of those hazards are:

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

Following a few simple rules in handling and using your diskettes will help to prevent loss of data:

MAKE BACKUP COPIES. Use the original diskettes that came with your **KAYPRO II**, the master diskettes, only to make working copies. You can do this with the COPY program (see page 23). This insures that, in case of an accident, you will have only a minimal replacement cost (the price of a new, blank diskette) instead of a major one (replacing the master).

HANDLE WITH CARE. Do not bend or flex diskettes. Hold the diskette with the label up and to the right (or with the unseamed, smooth side to the right) when inserting into drive -- no force is necessary.

KEEP COVERED. Keep the diskettes in their protective covers when not in use. Do not touch the exposed portion of the diskette.

STORE SAFELY. Store in a clean, dry, cool place away from magnetic fields, away from the computer itself, telephone lines, etc. Do not place diskettes on top of the computer terminal.

LABEL CAREFULLY. Be sure to label all new copies immediately and date them. Use the KAYPRO labels provided to identify your diskette copies. Use only a soft, felt-tip pen, or mark the label before sticking it onto the diskette (the pressure of a ball-point pen can damage the diskette.)

WRITE PROTECT. Covering the write-protect notch will keep data safe when diskettes are stored.

PERMANENT BACKUP COPIES should be made of:

1. the system and language diskette (CP/M-S-BASIC)
2. the spreadsheet diskette (PROFITPLAN)
3. the word processing diskette (SELECT)
4. the self-teaching word processing diskette (TEACH)

GETTING STARTED

Making Copies of Your Master Diskettes

The first, and most important, step for you to take after setting up and connecting your **KAYPRO II** is to copy each of the master diskettes that came with the computer. By following the procedure outlined here, you will not only accomplish that task; you will become familiar with some of the functions that will prove useful to you in the future. By carefully following these steps, you will have mastered a vital technique.

Diskettes #2 (PROFITPLAN), #3 (SELECT), and #4 (TEACH) cannot be used until copies are made. Diskette #1 (CP/M-S-BASIC) is usable, but DO COPY ALL OF THESE VALUABLE DISKETTES.

step 1 -- Turn the power switch ON.

step 2 -- Put the CP/M diskette (Diskette #1) into drive A with the Write Protect Tab on top and the label facing right.

step 3 -- Close the diskette drive door and the display should show:

```
KAYPRO II
64K CP/M v 2.2

A>
```

step 4 -- Put the diskette to be formatted into drive B. The write-protect notch should point up BUT the tab should be removed. (A tab placed over the notch tells the computer not to write or format the diskette.)

Format

step 5 -- To run the formatting program,
Type FORMAT and
Press RETURN key

step 6 -- When prompted by the menu on the screen,
press F to format the diskette in drive B.

step 7 -- After the machine formats the diskette in drive B and checks its work in the Verification cycle, you have completed the formatting process. Remove the newly formatted diskette from drive B, unless you will go on to use it to make a copy.
FORMAT all the blank diskettes by repeating steps 4 through 7.

step 8 -- When you have completed formatting all the blank diskettes,
Type E to exit the FORMAT program and re-enter CP/M.

Display shows A>

Copy

step 9 -- To run the copying program,
Type COPY and
Press RETURN key

step 10 -- Remove the CP/M master diskette (unless you wish to copy it)

step 11 -- Put the diskette you wish to duplicate into drive A with the write protect tab pointing up.

step 12 -- Place a blank, formatted diskette in drive B. Make sure its write protect notch is pointing up, with no tab.

step 13 -- To start the COPY program,
Type C

step 14 -- After the program is done copying and has verified that a good duplicate was made, remove the diskette from drive B and label it.
To make more copies, just repeat steps 10 through 13.

Sysgen

step 15 -- Remove the diskette you just copied from drive A and put it away in a safe place. Place the CP/M diskette in drive A and, to exit the COPY program,

Type E

Display will show:

Warm boot

A>

step 16 -- Type SYSGEN and

Press RETURN key

step 17 -- You are now running the SYStem diskette GENerating program. SYSGEN copies CP/M from one diskette to another.

When display shows

SOURCE DRIVE NAME (OR RETURN TO SKIP)

Type A

step 18 -- When display returns message

SOURCE ON A, THEN TYPE RETURN

Press RETURN key

(You have just told the program that drive A contains a diskette with CP/M on it.)

step 19 -- Place the diskette you intend to use as a "working copy" into drive B (Write Protect notch up, no tab).

(The SYSGEN program has already copied the CP/M information from drive A; now all you have to do is tell the program where the new working diskette is.)

step 20 -- When you see

DESTINATION DRIVE NAME (OR RETURN TO REBOOT)

Type B and

step 21 -- When you see

DESTINATION ON B, THEN TYPE RETURN,

Press RETURN

Again, the screen will show

DESTINATION DRIVE NAME (OR RETURN TO REBOOT)

step 22 -- Now you have a choice. You may:

1) Remove the diskette from drive B. THIS IS YOUR NEW "WORKING COPY" OF A MASTER DISKETTE.

2) Make working "system diskettes" by repeating steps 17 through 19, putting the CP/M system information on all of your newly copied working diskettes.

step 23 -- When finished, you can press RETURN to come back to CP/M, when A> will appear.

Getting Started in Word Processing

Because the TEACH program so efficiently and quickly orientates you to SELECT -- the commands and how to use them -- we recommend that you take the time (about 90 minutes or less) to go through the TEACH program before utilizing the word processor.

step 1 -- Put the SELECT diskette in drive A
and the TEACH diskette in drive B. Be sure that the write-protect tape is removed from the TEACH diskette.

step 2 -- Press the RESET button.

step 3 -- Type SELECT
Press RETURN

step 4 -- Choose "T" for TEACH from the menu.

step 5 -- Display shows:

TEACH: ENTER DRIVE (A-P)

step 6 -- Type B
Press RETURN

Now you may proceed, following prompts, instructions, and exercises that appear on your screen.

Getting Started with PROFITPLAN

step 1 -- Insert your working copy of PROFITPLAN in Drive A.

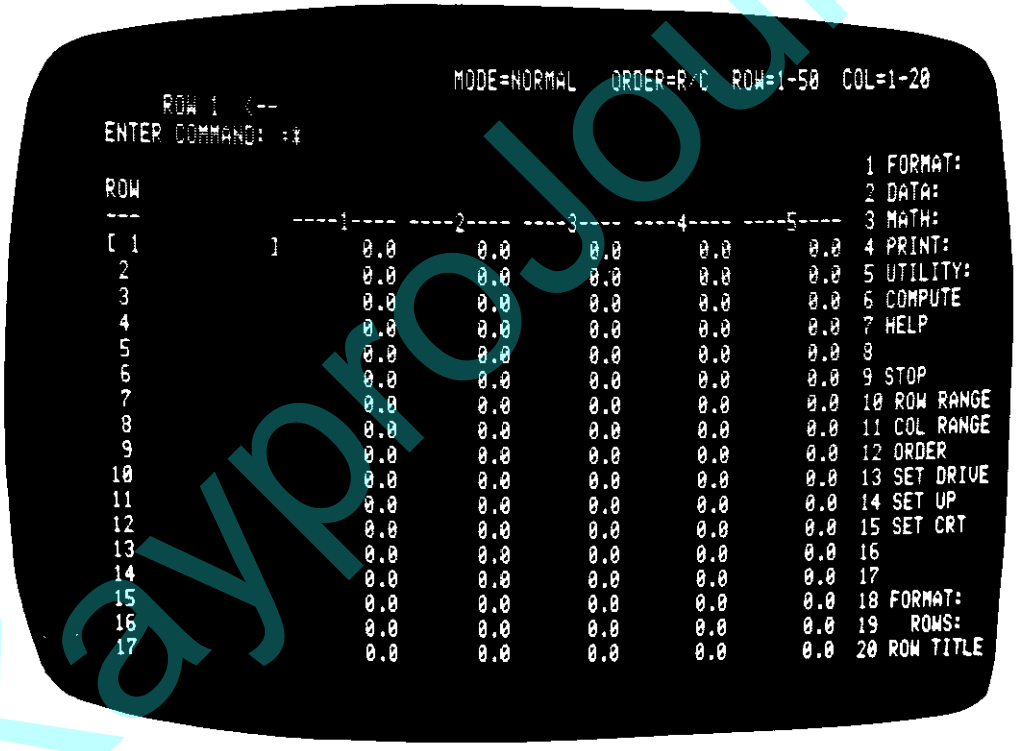
Display will show:

A>

step 2 -- Type PP

Press RETURN

step 3 -- The spreadsheet PROFITPLAN will appear in about 10 seconds.



On the right side of the display are the first 20 commands. Commands 1 through 5 are comprehensive; each gives you access to a number of commands.

FORMAT includes commands 18 through 28. With them you can name rows, name columns, specify width and move columns, set decimals, etc.

DATA includes commands 30 through 39. You can enter data, move the data pointer, fix, nullify, and go to.

MATH includes commands 40 through 58. They provide the means to add, subtract, multiply, divide and perform all four operations with a constant, as well as round off, etc.

UTILITY commands are 60 through 68. These enable you to retrieve your table from diskette, save on diskette, clear all data, reset, list and erase.

PRINT includes commands 70 through 75, enabling you to choose report options, print reports on the printer, save to a disk file, etc.

A sample spreadsheet

PROFITPLAN comes with a sample table called Sales Forecast. The computer reads it as

SLS-FCST

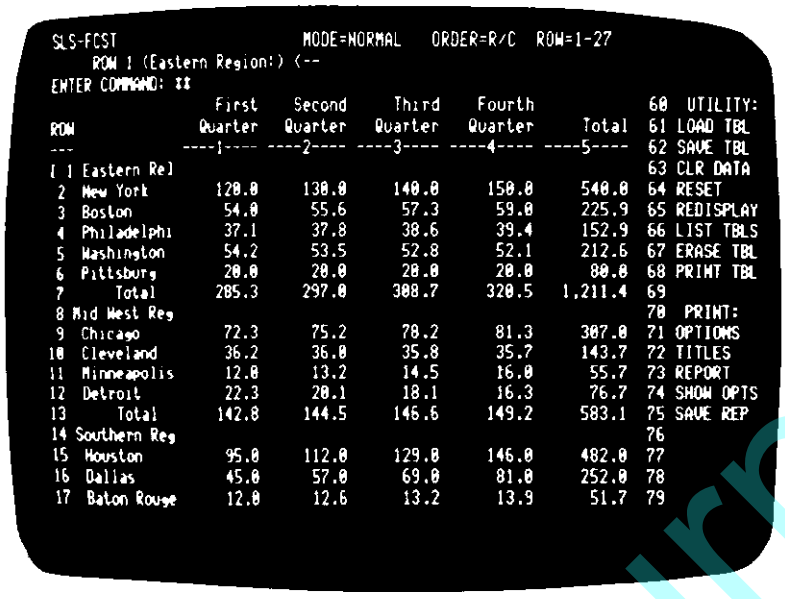
To call up Sales Forecast, bring up PROFITPLAN, as above, and look at the Utilities by typing 5. Type 61 to load tables.

The question will come up

WHAT TABLE?

Type SLS-FCST

In 3 to 4 seconds your example will appear.



You may change numbers in any row or column, using command 31. Once you have changed one or more numbers, you may use command 6 and the entire table will automatically recompute.

If you wish to save this table, give it a new name by typing command 62. Otherwise, only the revised version will remain as SLS-FCST. Now you will have two tables: 1) the sample, SLS-FCST: and 2) your own version named, for example, FCST-TWO.

Getting Started with S-BASIC

The first step in programming in S-BASIC is to create a diskette that has both S-BASIC and SELECT on it. You will be using SELECT to create and edit (change) BASIC programs. S-BASIC will be used to compile these programs.

step 1 -- Make a copy of your SELECT diskette (NOT the TEACH diskette).

step 2 -- Make a copy of your CP/M-S-BASIC diskette.

step 3 -- Place the CP/M-S-BASIC diskette in drive A.
Place the SELECT diskette in drive B.

step 4 -- Push the RESET button.
Display will show:
A>

step 6 -- Type PIP
*B:=A:SBASIC.COM[OV]
*B=A:OVERLAYB.COM[OV]
*B:=A:BASICLIB.REL[OV]
*B:=A:USERLIB.REL[OV]
*
Press RETURN

You have now copied the S-BASIC compiler from the A drive to the B drive. The SELECT diskette in drive B now has a copy of S-BASIC on it. Remove it and label it S-BASIC/SELECT.

This will be your working programmer's diskette. You will use it in disk drive A.

step 1 -- CP/M-S-BASIC diskette is in drive A.
Prepare a blank diskette (FORMAT and SYSGEN: see p.25)

step 2 -- Place the formatted diskette in drive B.

step 3 -- Press the RESET button
Display shows: A>

step 4 -- Type PIP B:=A:*.BAS

The diskette in drive B is your working program diskette.
On this diskette you will create, modify, and compile programs.

step 5 -- Place the S-BASIC/SELECT diskette in drive A.
Place the program diskette in drive B.
step 6 -- Press the RESET button.

Now you can begin writing programs and running them.

A programming sample

step 1 -- To enter the SELECT word processor,
Type SELECT
At this point you might want to read the SELECT Manual (Instructions for entering SELECT are on page 4).
step 2 -- To enter the program development mode,
Type A
To edit a file,
Type E
step 3 -- When SELECT asks for a name,
Type B:FAC.BAS

When it asks for a new name,
Press RETURN (only)

You may now edit the BASIC program, making changes, etc. But at this time do not make any changes. SELECT places a < at the end of every line. These < are not a part of your BASIC program; SELECT uses them to keep track of the ends of the lines.

step 4 -- To exit editing,
Type Q and either K or A, as per the SELECT Manual.

At this point we wish to compile the program, FAC.BAS that is on drive B. We must "RUN" the compiler.

step 5 -- Type R
Then type SBASIC FAC.BBX

This brings SBASIC into action and tells it to compile the program FAC. The general command from SELECT is "SBASIC filename.BBX", where filename is only the "name" field of the file's name. When the compiler is done, the message

PRESS ANY KEY

will appear. Press any key and you will be back in SELECT.

The file FAC.COM has been created by the compiler on drive B. Now you can run this program using the same R command that you used to bring S-BASIC into action. But, since FAC.COM is on drive B, you will need to type B:FAC. You need not enter the COM part of the file name as it is assumed to be COM by SELECT.

FAC is a program that enters the number and computes the factorial. If you don't know what this means, don't worry; it's not important. When you "RUN" FAC, it will print a "?".

Type "CONTROL-C" to exit FAC and return to SELECT.

Summary

SELECT is placed in the program development mode and is used to create and edit BASIC programs. These programs are then compiled using S-BASIC. The compiled programs are then "RUN" using the SELECT "R" command. If changes need to be made to the programs, the process of edit and compile is simply repeated.

The compiled programs can be run outside of SELECT. To do this, quit SELECT. You should get the system prompt, A >
To run a compiled program,

Type B:filename

To run FAC,

Type B:FAC

TECHNICAL INFORMATION

Troubleshooting & Maintenance

If you have any difficulties in operating your **KAYPRO II**, please take the time to check the following list of symptoms and remedies before calling your dealer. Of course, when programs such as SELECT or PROFITPLAN don't do what you expect, it would be a good idea to go ahead and read your manual.

If the quick checks listed below don't fix the problem, contact your dealer for assistance. Your dealer should be able to help you with both the operation of your software and service needed for your **KAYPRO II.**

SYMPTOM: Programs won't load or execute.

POSSIBLE CAUSES & REMEDIES:

1) No AC power. Check that the power cord is plugged in. (Don't laugh -- it's happened!) Check power switch and any switches controlling the wall outlet.

2) Video display. Adjust Brightness Control.

SYMPTOM: Programs won't load or execute.

POSSIBLE CAUSES & REMEDIES:

1) Disk door not closed properly.

2) Diskette in drive doesn't contain CP/M or isn't diskette expected by operating program.

3) Diskette has been damaged. Try making another copy from your master.

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

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

SYMPTOM: Computer "hangs up" and unexpectedly ignores keyboard entries. Operates fine after pressing RESET button.

POSSIBLE CAUSES & REMEDIES:

1) 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".

2) External peripheral devices or their connecting cables may be at fault. Try operation without peripheral or with different cable to isolate where problems are coming from.

3) Damaged or faulty diskette. Try another copy of your master diskette.

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

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 like printers should be covered in the manual that came with the device.

Warm & Cold Boots

Dear Dr. Kaybyte,

Every time I change disks in the middle of my XYZ Superprogram, my computer stops and puts a message on the video display:

BDOS ERROR ON B: R/O

A friend of mine who has an Apricot computer told me to "warm boot" more often. I've tried kicking my KAYPRO II computer when those messages appear, but the only results were a sore foot and more BDOS errors. What do I do now?

Signed,

Confused

Dr. Kaybyte was able to help poor Confused with his problem through some patient explanations of a few computer "buzz words" (along with a referral to a podiatrist for the broken toe).

Warm boot" and "cold boot" are computer slang for two processes also called "warm start" and "cold start" (in the manual that came with your KAYPRO, An Introduction to CP/M Features and Facilities).

COLD BOOT. When you first turn on your KAYPRO computer, all the computer knows is how to put a simple message on the screen and wait for you to insert your system diskette (the diskette containing the CP/M Disk Operating System) in drive A. The process that the computer goes through between the time you turn on the power and when you see the CP/M announce itself on the screen with the A> prompt is called a COLD BOOT. The important thing to remember about a COLD BOOT is that the computer doesn't remember anything at first, and it has to "read" the CP/M program from the diskette in drive A before it can do any useful work.

Occasionally strange things will begin to happen, perhaps when you do something in a program that the program/computer doesn't expect or maybe as a result of a "but" -- a hole in the logic of a program. Then, the first thing to do is NOT to pull the plug or turn off the machine -- you can destroy good information contained on the diskettes that are inserted in the machine at the time. In such a circumstance, the RESET button can be a lifesaver.

RESET. In an emergency, if you press the RESET button, you can usually start over again without the damaging side effects you would experience if you turned off the power. This is a COLD BOOT. When you press the RESET button, the computer tries to load the CP/M into its memory from drive A again. Remember that RESET can get you out of awkward situations in programs, but it can also wipe out useful information that you have put into the computer's memory.

WARM BOOT. You will need to WARM BOOT often, because when you change diskettes, the CP/M maintains the previous diskette in memory until you instruct it to change over. Some programs do a warm boot for you when the program is finished and you will see the message, "Warm Boot" on your screen.

But when CP/M gives you the prompt, A> , it is waiting for you to give it either the name of a program you want to run or a warm boot instruction.

HOW TO DO A WARM BOOT

Hold "CTRL" key down. At the same time, press "C". The keyboard will produce a special code that tells the CP/M to perform a warm boot. All you have to do is press "Control-C" when you see the A> prompt.

Some programs like SELECT will keep track when you change diskettes, but generally, it's a good habit to do a warm boot whenever you change diskettes and receive the A> prompt on the screen.

For more technical information about cold starts, warm boots, and BDOS messages, the best place to start is the first section of the CP/M manual, An Introduction to CP/M, Features and Facilities.

System at a glance

The keyboard is a detachable unit connected to the computer via a coiled "telephone-style" cord. The main keyboard consists of 61 keys (including the four "arrow" keys that control the cursor movement). To the right of the main group of keys are 14 keys in a numeric, "calculator-style" layout. With the exception of a few control keys like CTRL, ESC, and RETURN, all of the keys have an automatic repeat function. This includes the cursor keys. Both the numeric pad and the cursor control keys are user programmable through the CONFIG program on diskette #1 (CP/M-S-BASIC).

The video display consists of 1,920 characters in the standard arrangement of 80 columns and 24 rows on a 9" diagonal screen. The character set consists of the Standard ASCII set with the addition of some Greek characters; all characters are mapped into a 5 x 8 display cell.

The CPU used with the **KAYPRO II** is a Z-80. The computer has 64 kilobytes of RAM available for program and CP/M usage. On a bank of memory separate from the user RAM exists the system ROM (2 kbytes) and the video display memory (2 kbytes).

The system memory is supplemented by two double-density floppy disk drives, each of which can hold 191 kilobytes of information in CP/M files.

The KAYPRO computer also comes equipped with two I/O Connectors for use with peripheral equipment. The first connector, labelled J2, is a "Centronics-type" connector that should work with most, if not all, parallel printers. The second, labelled J4, is a standard 25-pin connector for RS-232 serial interface applications. The **KAYPRO II** is configured as a Data Terminal Equipment interface, which means that you should be able to connect modems through an unmodified RS-232 cable.

Connecting a Printer

Parallel printer

Your KAYPRO computer comes equipped with a "Centronics-type" connector in the rear, labelled "J2 PRINTER OUTPUT." If you have a printer with a similar 36-pin connector, then all you have to do is use 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 pin assignments below should prove useful to the person who fabricates your cable.

PIN NO.	SIGNAL NAME	SIGNAL SOURCE
1	STROBE	Computer (Active Low)
2	DATA 0	Computer
3	DATA 1	Computer
4	DATA 2	Computer
5	DATA 3	Computer
6	DATA 4	Computer
7	DATA 5	Computer
8	DATA 6	Computer
9	DATA 7	Computer
10	ACKNLG	Printer (Not connected)
11	BUSY	Printer (Active High)

Pins 10, 12-15, 18, 31, 32, 34-36 are unconnected.
Pins 16, 17, 19-30 and 33 are connected to logic ground.

(Note: after 4th quarter '82, pin 18 will be connected to +5 VDC through a current-limiting resistor.)

Note that the BUSY line is read by the KAYPRO computer as ACTIVE when left disconnected. If you tell your computer to print something when there is no printer there, your computer will sit patiently and wait for the "phantom printer" to say it's ready for data. And wait and wait and....

Serial printer

Your **KAYPRO II** computer was designed to be as easy to use as possible. The standard KAYPRO expanded system consists of your computer connected to a modem and a printer. The connectors on the back of your KAYPRO were designed to make these connections very simple: standard parallel printer and RS-232C modem cables can be plugged in without any need of modification. Unfortunately, although daisy-wheel and dot-matrix printers are both available and less expensive with the standard parallel connector, some of you will need to adapt your serial port for use with an XUZ serial printer.

The following information is provided to aid such modifications. But please note that Non-Linear systems, Inc. and Kay Computers make no guarantees about the suitability of a given serial printer for use with the **KAYPRO II**'s RS-232 serial interface. The reasons for some of the difficulties are given below, but before you purchase any serial printer, insist upon a demonstration of its operation.

Three potential snags have to be taken care of if you are to use a serial printer with the **KAYPRO II** 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:
```

Once you have made this change from the parallel printer (LPT:) to serial (TTY:), you can make it a permanent change for some of your diskettes by using the CONFIG program on diskette #1.

2) You should make sure that the line being used by the KAYPRO computer for data transmission (pin 2 of connector J4) is connected to the printer's data reception pin (this is usually, but not always, pin 3 of the printer connector.)

3) The remaining task is to take care of the "handshaking" signal lines. You can strap the signals so that they are always true (e.g. connect pin 5 of J4 to pin 6 of J4). The potential problem with defeating the handshaking lines in this manner is that you have to limit your baud rate to avoid overwriting the printer's internal buffer. As an example, if you leave the KAYPRO baud rate at 300 baud, your printer must be able to print at least 30 characters per second.

If you have problems with overwriting the buffer in your serial printer, to correct the problem you will have to implement some handshaking. The **KAYPRO II** uses pin 5, Clear to Send, as an indicator of printer readiness. For proper handshaking, the serial printer must produce a "not busy" signal for pin 5 of the **KAYPRO II** that is high (true) when the printer can accept data. Details of the handshaking your printer will require should be in its manual.

APPENDIX

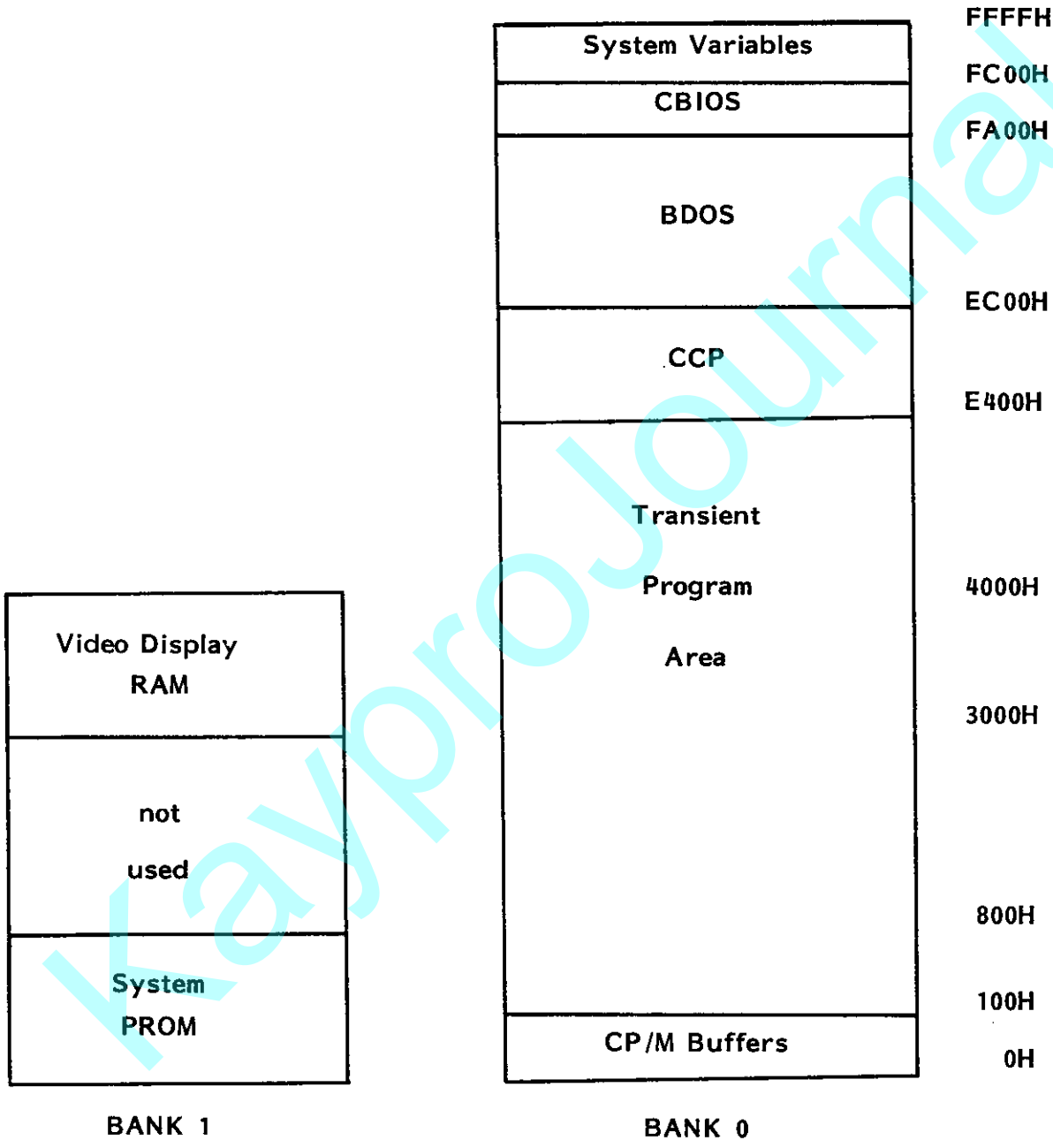
I/O Port Addresses

Port #	Use and/or Assignment
0	Baud rate. (Write only) Writing a number between 0 and 15 (decimal) to this port will set the RS-232 baud rate.
4	RS-232 Serial Data. (R/W) Data register of the Z-80 SIO.
5	Keyboard Data. (R/W) Eight-bit data from detachable keyboard. See the S-BASIC program below for an example of writing to this port.
6	RS-232 Status. (R/W) Control and Status port for the Z-80 SIO. See the Zilog and Mostek Microcomputer Data Books.
8	Printer Port. (Write only) Eight-bit data to parallel printer connector.
1CH	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.

Sample S-BASIC program

```
10  REM  This program turns off the keyboard beeper.
20  VAR QUIET,KEYBOARD = INTEGER
30  KEYBOARD=5
40  QUIET=8
50  OUT KEYBOARD,QUIET
60  END
```

Memory Map of the KAYPRO II Computer



Please note that only the lowest 16 Kbytes of memory will change with the Bank Select bit; addresses above 3FFF hexadecimal are always available for either bank.

Control Key and Functions

The control key is used in conjunction with other characters to produce several control functions. For some all you need to do is press the control key simultaneously with the character; for others you must then press RETURN to execute the function. For some, a character will appear on the display screen; for others there will be no visible indication. When displayed, the control function will appear as two characters: the (exponentation) character, followed by a second character; for example, H (called CTRL-H) represents a backspace.

NOTE: The control functions available to the operator depend on the program in use. The same control command can have different functions in different programs. Consult the appropriate software manual to determine which control functions are available.

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 the RETURN key is depressed.

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

Control functions CTRL-P and CTRL-S affect console output as shown below:

CTRL-P Copy all subsequent console output to the currently assigned list device and the console device until the next is typed.

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

Keyboard ASCII Codes

HEX DESIGNATION	KEYBOARD DESIGNATION	DESCRIPTION
03	CTRL C	WARM START
05	CTRL E	PHYSICAL END OF LIFE
08	BACKSPACE	BACKSPACE
08		BACKSPACE
09	TAB	HORIZONTAL TAB
0A	LINE FEED	LINEFEED
0A		LINEFEED
0B		CURSOR UP
0C	SPACE	CURSOR RIGHT
0C		CURSOR RIGHT
0D	RETURN	CARRIAGE RETURN
0D	ENTER	CARRIAGE RETURN
10	CTRL P	TOGGLES PRINTER ON & OFF
12	CTRL R	RETYPE LINE AFTER DEL
13	CTRL S	STOP CONSOLE OUTPUT
15	CTRL U	DELETE LINE AT CONSOLE
18	CTRL X	SAME AS CTRL U
1A	CTRL Z	END INPUT FROM CONSOLE
1B	ESC	ESCAPE SEQUENCE
20	SPACE	SPACE
21	! (SHIFT 1)	EXCLAMATION MARK
22	" (SHIFT ')	QUOTATION MARK
23	# (SHIFT 3)	NUMBER OR POUNDS
24	$ (SHIFT 4)	DOLLAR SIGN
25	% (SHIFT 5)	PERCENT
26	& (SHIFT 7)	AND
27	'	APOSTROPHE
28	((SHIFT 9)	LEFT BRACKET
29	) (SHIFT 0)	RIGHT BRACKET

2A	* (SHIFT 8)	(DISPLAYED AS) ASTERISK, MULTIPLY
2B	+ (SHIFT =)	PLUS, ADD
2C	,	COMMA
2D	-	MINUS, HYPHEN, SUBTRACT
2E	.	PERIOD
2F	/	SLASH, DIVIDE
30	0	NUMBER ZERO
31	1	" ONE
32	2	" TWO
33	3	" THREE
34	4	" FOUR
35	5	" FIVE
36	6	" SIX
37	7	" SEVEN
38	8	" EIGHT
39	9	" NINE
3A	: (SHIFT ;)	COLON
3B	;	SEMICOLON
3C	< (SHIFT ,)	LESS THAN
3D	=	EQUALS
3E	> (SHIFT .)	GREATER THAN
3F	? (SHIFT /)	QUESTION MARK
40	@ (SHIFT 2)	AT
41	A (SHIFT A)	UPPER-CASE LETTER A
42	B (SHIFT B)	" " " B
43	C (SHIFT C)	" " " C
44	D (SHIFT D)	" " " D
45	E (SHIFT E)	" " " E
46	F (SHIFT F)	" " " F
47	G (SHIFT G)	" " " G
48	H (SHIFT H)	" " " H
49	I (SHIFT I)	" " " I
4A	J (SHIFT J)	" " " J
4B	K (SHIFT K)	" " " K
4C	L (SHIFT L)	" " " L
4D	M (SHIFT M)	" " " M

4E	N (SHIFT N)	UPPER-CASE LETTER N
4F	O (SHIFT O)	" " " O
50	P (SHIFT P)	" " " P
51	Q (SHIFT Q)	" " " Q
52	R (SHIFT R)	" " " R
53	S (SHIFT S)	" " " S
54	T (SHIFT T)	" " " T
55	U (SHIFT U)	" " " U
56	V (SHIFT V)	" " " V
57	W (SHIFT W)	" " " W
58	X (SHIFT X)	" " " X
59	Y (SHIFT Y)	" " " Y
5A	Z (SHIFT Z)	" " " Z
5B	[	LEFT SQUARE BRACKET
5C	\	BACKSLASH
5D	[	RIGHT SQUARE BRACKET
5E	^ (SHIFT 6)	EXPONENTATION, ESCAPE
5F	_	UNDERSCORE, DASH
60	`	ACCENT GRAVE
61	a	LOWER-CASE LETTER A
62	b	" " " B
63	c	" " " C
64	d	" " " D
65	e	" " " E
66	f	" " " F
67	g	" " " G
68	h	" " " H
69	i	" " " I
6A	j	" " " J
6B	k	" " " K
6C	l	" " " L
6D	m	" " " M
6E	n	" " " N
6F	o	" " " O
70	p	" " " P
71	q	" " " Q

72	r	LOWER CASE LETTER R
73	s	" " " S
74	t	" " " T
75	u	" " " U
76	v	" " " V
77	w	" " " W
78	x	" " " X
79	y	" " " Y
7A	z	" " " Z
7B	{ (SHIFT [)	LEFT POINTED BRACKET
7C	| (SHIFT /)	VERTICAL SLASH, DISPLAYED AS
7D	} (SHIFT])	RIGHT POINTED BRACKET
7E	~ (SHIFT `)	APPROXIMATELY
7F	DEL	DELETE, REBOOT

Glossary

ADDRESS - a number used by the computer to keep track of different memory locations.

ASCII - acronym for American Standard Code for Information Interchange, a 7-bit code for representing character data such as letters, punctuation, etc.

BACKUP - to copy information or programs as a protective measure.

BAUD RATE - the speed of serial communications; generally BAUD is used as meaning bits per second. Thus, 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 - when the machine is first turned on, or when you press the RESET button.
WARM BOOT - when you press CTRL and C keys simultaneously. See the 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, keyboards, etc.

BUG - a problem or undesirable side-effect of a computer program, almost always unexpected and unwelcome. Less often, slang for an integrated circuit. See DEBUG and DDT.

BYTE - 8 bits; the size of a memory location in the KAYPRO computer; a computer "word."

CCP - acronym for Console Command Processor; the part 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 KAYPRO and you. Normally, this is the KAYPRO keyboard and the video display.

CP/M - Control Program for Microcomputers. The most popular disk operating system for 8080 &Z80 microcomputers, CP/M keeps track of the files and programs on the floppy disks and facilitates their use.

CPU - Central Processing Unit. Actually, the microprocessor chip.

CRT - Cathode Ray Tube, the "tv tube" used in the video display.

DDT - Dynamic Debugging Tool, a program development aid furnished with CP/M and proof that even computer programmers have a sense of humor. See BUG and DEBUG.

DEBUG - to remove mistakes from a computer program. For all but the simplest programs, the debugging will take as long as or longer than the initial writing of the program. See BUG and DDT.

DIR - built-in command of CP/M that gives a list of a diskette's programs and files. See An Introduction to CP/M Features and Facilities for details.

DIRECTORY - the list of programs and files on a diskette used by CP/M for "housekeeping." Most CP/M systems allow 64 different entries in the directory. See DIR and STAT.

FILE - a collection of characters, data or what-have-you that is stored on diskettes. A file can contain a program or information to be used by other programs.

FORMAT - 1) the organization of sets of data on diskette -- in the **KAYPRO II**, the double-density format consists of 40 tracks per diskette, with each track holding 10 "sectors" (groups of bytes).

2) a program used to put a particular format on a blank or erased diskette.

HARDWARE - the physical aspects of the computer and its peripheral equipment. Used in contrast to SOFTWARE.

HIGH-LEVEL LANGUAGE - a computer programming language that is similar to either natural languages (e.g. English) or mathematics. S-BASIC and PASCAL, for example, are high-level languages.

INPUT - information or data put into the computer. By extension, the process or means of putting information into the computer.

LOAD - to take information from a storage medium such as tape or diskette and put it into the computer's memory.

MACHINE LANGUAGE - a program in the binary language that computers understand, as opposed to either assembly language (see the ASM section of your CP/M Manual), or high-level languages like S-BASIC and PASCAL.

MODEM - a device that connects a computer or computer terminal to another computer/terminal via a communications link such as the telephone system. With the KAYPRO computer, modems are connected directly to the RS-232 connector at the rear of the machine.

OUTPUT - information displayed or used to control devices external to the computer. By extension, the process or means of getting information out of the computer.

PERIPHERAL - any device connected to and used with your computer. Examples are printers and modems.

PROGRAM - a set of instructions for the computer. 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 (Microsoft BASIC) or a compiler (SBASIC).

PROMPT - a unique character displayed by a program to inform the user that the program requires some instruction or information. In CP/M, the A> is a prompt telling the user that CP/M is waiting for a command.

RAM - acronym for Random Access Memory. This is the memory that the computer uses for short-term storage of information and programs. Unlike ROM, information stored in RAM is changeable and will "go away" when the power is turned off.

ROM - acronym for Read Only Memory. This is the memory that is used for information and programs that are not expected to ever change. The advantage over storing information in RAM is that data or programs stored in ROM are not "volatile' and will remain valid regardless of the power being on or off.

SECTOR - a group of bytes on a diskette. The standard KAYPRO double-density diskette has 10 sectors on each track, with each sector containing 512 bytes of information. See BYTE and TRACK.

SYSGEN - a program on the CP/M-S-BASIC diskette that allows the transfer of the CP/M system from one disk to another.

TRACK - a ring of information on a diskette. Each floppy diskette used with the KAYPRO computer contains 40 such concentric rings, or tracks.

UTILITY - a program that is often used, particularly by system programmers. PIP is a utility program (details in the CP/M Manual) that allows the transfer of files from diskette to diskette or from diskette to peripherals.

FCC NOTIFICATION

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. As temporarily permitted by regulation it has not been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interferences. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

On your instrument appears the following label:

This equipment has not been tested to show compliance with new FCC rules (47 CFR Part 15) designed to limit interference to radio and TV reception. Operation of this equipment in a residential area is likely to cause unacceptable interference to radio communication requiring the operator to take whatever steps are necessary to correct the interference.

–Notes –