The Kaypro 10

More Than Just a Big Screen Portable

Max A. Lebow

It used to be that a good hard disk drive would cost you more than Kaypro currently charges for its new Kaypro 10. The Kaypro 10 works like the earlier Kaypro II and Kaypro 4, the portable computers that made Kaypro's reputation. The main difference in the Kaypro 10 is the gigantic 10Mb disk drive.

Although hard disk technology has meant complicated procedures for turning the computer on and off, the Kaypro 10 has eliminated them. When you turn

on the Kaypro 10 it automatically logs you onto the hard disk; before power off, you must remember to type SAFETY.

Although Kaypro computers are small enough to be portable, people who buy them are not necessarily interested in the portability. With the Kaypro 10, the relative vulnerability of the hard disk makes rough handling of the machine undesirable.

File Capacity And Data Handling

Think about ten telephone books each from a town of 25,000 people. That is ten megabytes of information. One way of dealing with this much storage is to divide it up into environments. The word processing environment can have all the word processing utilities and the text files. The programming environment can have the languages and the programming tools. A database environment might have the database, associated files, report generation utilities, and some word processing.

When you power up the Kaypro 10,

the first thing you see after the power on message is the CP/M A$>$ prompt. The A drive and the B drive referred to in CP/M are both resident on the hard disk. Drive C is the 400K floppy drive.

The CP/M operating system allows you to set up different environments by assigning each environment a user number. When you are logged on as that user (no password required), the files in that environment are shown in the directory. All other files are available, but you are not reminded of that fact. The latest release of CP/M contains utilities for transferring files across user numbers, and searching for files across user numbers.

Racing Stripes

One feature that identifies all Kaypro portables is the sturdy metal case. This makes Kaypro heavier than many other portables: 31 pounds for the Kaypro 10, slightly less for the earlier models. The paint job enhances the overall appearance of the case, with the characteristic

Max A. Lebow, Microcomputer Consultant, 2121 Locust, Philadelphia, PA 19103.

multiple "racing stripe" carried along the sides.

In use, the Kaypro 10 sits up on a built-in strut. To pack it up for carrying, it uses the keyboard housing for a base. In the position, the carrying handle on the back of the machine faces upward, ready to carry. The main computer attaches to the keyboard at the sides.

Connecting The Keyboard, Printer, And Modem

The keyboard is connected to the computer by a phone cord. This offers

---

One rock or suitcase corner in the wrong place could damage the connectors.

---

several advantages. First, connecting and disconnecting the keyboard is easy. Second, if the cord is damaged, it is easy to find another one. Third, the cord itself is relatively inexpensive, retailing for seven or eight dollars. If you are in a hurry packing up, you don't have to disconnect the keyboard, because even with the keyboard attached, the case will still close.

Two printer connectors, one serial and one Centronics parallel, are provided. Earlier Kaypros have only the Centronics parallel plug. The modem or other device attaches via an RS-232 connector. Both connectors can be configured under the CP/M software from a menu-driven program called CONFIG. The RS-232 port is set up to handle the $100 Signalman modem without modification to either hardware or software. The Centronics parallel port is set up so that many popular printers can be plugged in and run with no modification.

If you are going to be taking the Kaypro on trips, bear in mind that the port connectors are not protected. Although the connectors themselves are quite sturdy, one rock or suitcase corner in the wrong place could damage the connectors. Other portables, the Telcon Zorba, for example, come with at least some form of protection for the connectors.

A modular plug for a light pen is installed in the back of the Kaypro 10, adjacent to the modular plug for the keyboard cable.

Keyboard Programming Pros And Cons

Most computer keyboards come with more keys than anyone who grew up with a typewriter can comfortably use.

Still it is convenient that the cursor control keys and the numerical keypad are programmable. They are not fully programmable, but they can return any designated byte value you choose. This means one programmed key can be the same as holding down the control key and another key.

One writer I know has programmed the numeric keypad on his Kaypro to execute several of the frequently used control key commands found in *Perfect Writer* (another software package that comes with the Kaypro). The keys are personalized using the CONFIG program which is part of the CP/M system supplied with the computer. This is a menu-driven program that depicts the keys to be programmed on the screen and asks the user to supply the hexadecimal value of the byte to be returned when that key is pressed. The hexadecimal values for the ASCII characters and the control codes are available in most programming books, printer instruction manuals, and in appendix M of the MBasic manual supplied with the Kaypro 10.

It is generally agreed that a keyboard should make some sound when you press a key. This gives you some feedback; it tells you the keystroke has been duly registered. This little key click saves you the trouble of looking at the screen all the time to make sure you have not dropped a letter. This is more important in offices than for home users. In fact, home users may want to work near people—children, parents, spouses, in-laws—for whom the key click may be very irritating.

Although the key click on Kaypro keyboards sounds like an expiring cricket, fortunately it is software selectable. You can turn it off if your spouse asks you to. Either an OUT 5, 8 command line issued from MBasic or a command file created from S-Basic (both of which come with the Kaypro), will turn off the click.

The Big Screen

Big screen medium-resolution monochrome graphics (100 by 160 pixels) are available on the Kaypro 10, unlike the earlier Kaypro II and 4. Graphics are accessible from MBasic. Special extensions to S-Basic and sample subroutines in S-Basic are included with the Kaypro 10 to make it easier for programmers to develop graphics applications. (See sidebar). The hardware and software that drive the Kaypro 10 screen support blinking text, reduced intensity, inverse video, and cursor on/off.

Two graphics characters, a solid block and a patterned block, allow some "make-do" graphics on the Kaypro II and 4. Some of the games that come

with the Kaypro use cleverly arranged letters and numbers to form graphic-like patterns for games. Aliens, for example, plays like Space Invaders.

Higher resolution color graphics boards are available for the Kaypro II and 4 as a retrofit. I have seen a wire wrap version of one of these running on a monochrome monitor, and it looked like about 256 by 512 pixels. Frankly, if you want fast, spectacular graphics, pick another machine.

One of the biggest issues among users of portables is screen size and legibility. Early portables designed for news reporting often had tiny screens that could not be read for long without eyestrain. This tradition was carried over to the Osborne 1, which has a 5″ diagonal screen, displaying about 50 characters per line. The Kaypro has a 9″ screen and fits 80 characters on a line. The Osborne Executive has a 7″ screen.

One might be tempted to say that Andy Kay, the inventor of the Kaypro, made his screen bigger when he learned about user resistance to the Osborne screen. However, according to Peter McWilliams, who wrote *Personal Computer Book*, Kay had been planning the Kaypro—as a portable engineering tool—for months before the Osborne came out.

What you see on the screen are green, upper- and lowercase letters. Letters are drawn from the character generation ROM and are a maximum of five dots wide by seven dots high. Letters that normally extend below the line, actually extend below the line when you see them on the screen. Although in earlier Kaypros these descenders tended not to be as tall as the letters that did not descend below the line—for example, the lowercase m was taller than the lowercase g. This curiosity has been remedied in the Kaypro 10.

Math buffs will be happy to know that a Greek character set is accessible by

---

If you want fast, spectacular graphics, pick another machine.

---

sending an ESC-G from the keyboard or PRINT CHR$(27); CHR$(71) from Basic. Lowercase letters are then displayed in Greek. Sending ESC-A or PRINT CHR$(27); CHR$(65) restores the normal lowercase display.

Software, Software, Software

The software collection that comes with the Kaypro 10 starts with the same

word processing, spreadsheet, file management, and utility software offered with previous Kaypro models. *Perfect Writer,* the word processor, was reviewed in the June 1983 *Creative Computing.* Running *Perfect Writer* on a 10Mb machine like the Kaypro 10 means you can have a larger swap file (252K as compared with 64K for the Kaypro II version of *Perfect Writer*). Because *Perfect Writer* views the swap file as an extension of RAM, having a larger one means that you can assemble a larger and more complicated book— more headings and subheadings, more footnotes and cross references.

The greater disk space also alleviates concern about where to put the formatted files *Perfect Writer* creates. These are always at least as long as the original text file. A *WordStar* software bundle has been offered since the middle of June. It does not include *MailMerge,* but does include most of the other packages in the standard Kaypro software bundle.

Two spelling check programs come with the Kaypro 10, *Perfect Speller* and *The Word Plus.* Both contain large dictionaries. The larger storage capacity of the Kaypro 10 means that both of these programs can be accessed without changing disks.

The file manager is *Perfect Filer.* This is a menu-driven system designed to lead the user through the entire database process. Each aspect is covered, via menus: setting up the structure of the database, entering data, selecting data for reporting, and structuring reports for output on the CRT and the printer. Some users have complained the *Perfect Filer* is slow and that the menu structure is cumbersome. It is, however, a capable file manager. Users can specify a wide range of reports based on matching and limiting criteria. However, it is designed for smaller databases (up to about 1200 records), and the extra storage capability of the Kaypro 10 is, in a sense, wasted on it.

Two spreadsheets are included with the Kaypro 10, *Perfect Calc* and *Profit Plan. Profit Plan* is a first generation spreadsheet. Commands are entered by number. Numbers and their corresponding commands are listed along the righthand side of the screen. This feature, although friendly—I was using *Profit Plan* minutes after loading it—is quite cumbersome.

Perfect Calc, on the other hand, lets you move a cursor around the spreadsheet. Further, the program attempts to anticipate what you want done based on the content of the data you enter. For example, entries beginning with a decimal digit, a minus sign, or a decimal point are automatically classified as numerical; entries beginning with letters

and symbols are assumed to be labels; entries beginning with an equal sign are assumed to be formulas.

Perfect Calc also has a respectable collection of built-in statistical and trigonometric functions, although not as many as some spreadsheets. The extra storage of the Kaypro 10 allows more associated spreadsheets and overlays to be linked together on line. Calculation takes place more quickly because disk access is quicker. (Part of the speedup is attributable to the fact that the Kaypro 10 uses a 4MHz Z80A; earlier Kaypros ran with slower clock speed.)

Languages And Systems Software

In addition to the applications programs, the Kaypro 10 comes with Microsoft's MBasic and a compiler Basic called S-Basic from Topaz Programming. CP/M 2.2 is also included.

For those who struggled with Radio Shack's Level I and Level II Basic languages, the best news about the MBasic that comes with the Kaypro is that it allows variable names longer than two characters and a type identifier. Other

---

The best news about the MBasic that comes with the Kaypro is that it allows variable names longer than two characters and a type identifier.

---

handy features for programmers include a command for renumbering program lines or ranges of lines, a function definition facility, and random access disk commands.

CP/M 2.2 for the Kaypro 10 comes with the required hard disk BIOS, and in fact the system initializes to user 0 on the hard disk on power up. A directory management facility, D, helps users find files by alphabetizing directory display, displaying information on file attributes without using the STAT command, for example.

To accommodate the serial printer port, the CONFIG program has been expanded to allow the user to specify which printer port will be used with a given word processing program. Another accommodation for the additional serial port is the inclusion in the system software of two BAUD programs. BAUDM sets the baud rate on the modem port, and BAUDP sets the baud rate on the printer port.

Terminal emulation software—the Kaypro 10 can emulate an ADM3 terminal—is provided with all the other

software. This program, TERM, does enough to get you started on the Source or Compuserve, but it does not support file transfers. Also, under TERM the Kaypro locks up when you go into the terminal communications mode, if no modem is attached, requiring that the system be cold booted. This admittedly minor inconvenience contrasts with the automatic warm boot that occurs when trying to print using the PIP LST:= command. The standard CP/M utilities, DDT and ASM, are included.

A very important command is included in the Kaypro 10 system software. SAFETY moves the read/write heads on the hard disk to the safe landing zone on the disk. This must be done before turning the power off or the surface of the hard disk may be damaged. The SAFETY command is invoked from the command mode in CP/M.

Documentation

Three substantial paperbound books, one each for *Perfect Writer/Speller, Perfect Calc,* and *Perfect Filer* lead you through these software packages. Pocket guides to these programs also arrive with the computer. Three larger paperbound books document MBasic, S-Basic and, CP/M.

A 100-page ring binder introduces the user to the Kaypro 10. This volume replaces the smaller spiral-bound book that introduced users to the Kaypro II and 4. This volume also introduces the major software programs. Pocket guides for *The Word* and MBasic, and the documentation for *Profit Plan* round out the documentation set.

Documentation for MBasic and CP/M seems to have been collected and photocopied from various documents and listed from disk files and photocopied, rather than typeset. The CP/M documentation is in separate sections that appear to have been self contained at one time. One of the many introductions to CP/M now in the book stores would be a wise investment for anyone new to both CP/M and the Kaypro.

In Summary

The overriding impression of this machine is of quick and inexhaustible storage and retrieval capacity. The screen will do, and the keyboard is rugged and reliable. About the only serious limitation is the 8-bit microprocessor. For the near term, there is still more software for 8-bit machines than for the emerging 16-bit machines.

Color graphics would be nice if this were a game machine, but it is not a game machine. It is designed for business, and even the portability, although attractive, is less important than the unbeatable cost/performance ratio. END

A Graphics Interface for Perfect Calc

For some time now, it has been considered desirable to be able to produce graphs from data on a spreadsheet. Products such as Lotus *1,2,3* provide this capability. The alternative is copying numbers from the spreadsheet on paper then entering the numbers into the graphics display program.

Perfect Calc, the spreadsheet program provided in the Kaypro software bundle, provides a limited bar chart capability within the columns of the spreadsheet itself, allowing the user to form horizontal bars of asterisks in the designated column.

Less than a month after the Kaypro 10 was on the market, Jonathan Sackner, a beginning medical student and computer consultant in Philadelphia, demonstrated exclusively for *Creative Computing* a graphics program using the 100 by 160 pixel graphics capability of the Kaypro 10 CRT screen. The program draws bar charts from *Perfect Calc* data.

It works like this. You decide which row(s) or column(s) have the information you want to have graphed. This information, together with the appropriate row or column of labels, is written to a text file by *Perfect Calc.* The text file is then read by the graphics program and the graph is drawn. Scaling of the graph is done automatically, and both positive and negative numbers can be represented.

As of this writing, bar charts produced by Sackner's program can be hollow, filled-in, two dimensional, or three dimensional. The program also allows more than two rows or columns to be graphed. Labels, if available in the *Perfect Calc* file, are positioned and displayed automatically as well. Before it displays a graph, the program requests a title.

Enhancements to the program are under development. For example, more menus are planned to make the graphics program even easier to use.

Graphics Subroutines Included in S-Basic

Table 1.

BAR: Produces a two- or three-dimensional bar on the screen. The lower lefthand corner point is specified by the user, as are the upper righthand corner point and the lefthand back corner point. The bar may be hollow or filled.

CIRCLE: User specifies the radius and the center point.

RECTANGLE: Lower left corner, height, and width are specified by the user to define the rectangle this subroutine displays.

SQUARE: Lower left corner and
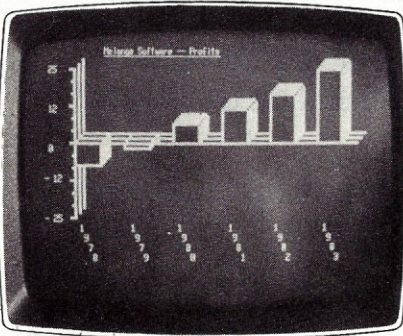
length of side are specified.

LINEON/LINEOFF: User specifies the end points of the line.

PIXON/PIXOFF: Position of pixel to be turned on or off is specified in X and Y coordinates.

POSITION: Positions the cursor at user-specified X and Y coordinates without disturbing pixels or text.

SET.ON/SET.OFF: Turns on or off the pixel at the current cursor location.

Listing 1. S-Basic Subroutines for the Kaypro 10.

```
PROCEDURE SET.ON (ATT=CHAR)
        PRINT CHR(27); 'B'; ATT;
END

PROCEDURE SET.OFF (ATT=CHAR)
        PRINT CHR(27); 'C'; ATT;
END

PROCEDURE POSITION (VERT, HORZ = CHAR)
        PRINT CHR(27); '=' ; VERT+31; HORZ+31;
END

PROCEDURE PIXON (VERT1,HORZ1=CHAR)
        PRINT CHR(27);'*';(VERT1+31);(HORZ1+31);
END

PROCEDURE PIXOFF (VERT1,HORZ1=CHAR)
        PRINT CHR(27);' ';(VERT1+31);(HORZ1+31);
END

PROCEDURE LINEON (VERT1,HORZ1,VERT2,HORZ2=CHAR)
        PRINT CHR(27);'L';(VERT1+31); (HORZ1+31); (VERT2+31); (HORZ2+31);
END

PROCEDURE LINEOFF (VERT1,HORZ1,VERT2,HORZ2=CHAR)
        PRINT CHR(27);'D';(VERT1+31);(HORZ1+31);(VERT2+31);(HORZ2+31);
END

PROCEDURE CLEAR.SCREEN
        PRINT CHR(26)
END

FUNCTION SQRT(N=INTEGER) =INTEGER
        VAR ROOT1,ROOT2 = INTEGER

        ROOT1 = N
        ROOT2 = 1
        WHILE (ROOT1 > ROOT2) DO BEGIN
                ROOT1 = (ROOT1 + ROOT2)/2
                ROOT2 = N/ROOT1
        END
END = ROOT1

PROCEDURE CIRCLE (CENTER.Y, CENTER.X, RADIUS = INTEGER)
        VAR X, Y, OFFSET = INTEGER
        OFFSET = (RADIUS * 100) / 141

        PIXON CENTER.Y + RADIUS - 1, CENTER.X
        PIXON CENTER.Y - RADIUS + 1, CENTER.X

        FOR X = 1 TO OFFSET
                Y = SQRT(RADIUS^2 - X^2)

                PIXON CENTER.Y + Y , CENTER.X + X
                PIXON CENTER.Y + Y , CENTER.X - X
                PIXON CENTER.Y - Y , CENTER.X + X
                PIXON CENTER.Y - Y , CENTER.X - X
        NEXT
```

Listing 1, continued.

```
        PIXON CENTER.Y, CENTER.X + RADIUS - 1
        PIXON CENTER.Y, CENTER.X - RADIUS + 1

        FOR Y = 1 TO OFFSET
                X = SQRT(RADIUS^2 - Y^2 )

                PIXON CENTER.Y + Y , CENTER.X + X
                PIXON CENTER.Y + Y , CENTER.X - X
                PIXON CENTER.Y - Y , CENTER.X + X
                PIXON CENTER.Y - Y , CENTER.X - X
        NEXT
END

PROCEDURE RECTANGLE (Y, X, HEIGHT, WIDTH = INTEGER)
        LINEON Y, X, Y + HEIGHT, X
        LINEON Y, X + WIDTH, Y + HEIGHT. X + WIDTH
        LINEON Y, X, Y, X + WIDTH
        LINEON Y + HEIGHT, X, Y + HEIGHT, X + WIDTH
END

PROCEDURE SQUARE (Y, X, SIDE = INTEGER)
        RECTANGLE Y, X, SIDE, SIDE
END

PROCEDURE BAR(REF.Y,REF.X,HEIGHT,WIDTH,DEPTH,INSIDE,VERT.P,HORZ.P=INTEGER)
        VAR I, TEMP, EMPTY, FULL, X, Y = INTEGER
        DIM INTEGER REF(2) CENTER(2) REAR(2)

        X = 1
        Y = 2
        FULL = 1
        EMPTY = 0

        REF(X) = REF.X
        REF(Y) = REF.Y
        CENTER(X) = REF.X + (WIDTH * HORZ.P)
        CENTER(Y) = REF.Y + (HEIGHT * VERT.P)
        REAR(X) = CENTER(X) + (DEPTH * HORZ.P)
        REAR(Y) = CENTER(Y) + (DEPTH * VERT.P)

        IF (INSIDE = EMPTY) THEN BEGIN
                FOR I = REF(X) TO CENTER(X) STEP HORZ.P
                        LINEOFF REF(Y), I, CENTER(Y), I
                NEXT I

                FOR I = 0 TO (WIDTH*HORZ.P) STEP HORZ.P
                        LINEOFF CENTER(Y), CENTER(X)-I, REAR(Y), (REAR(X)-I)
                NEXT I
                FOR I = 0 TO (HEIGHT*VERT.P) STEP VERT.P
                        LINEOFF CENTER(Y)-I, CENTER(X), (REAR(Y)-I), REAR(X)
                NEXT I

                LINEON REF(Y),REF(X),CENTER(Y),REF(X)
                LINEON REF(Y),REF(X),REF(Y),CENTER(X)
                LINEON CENTER(Y),CENTER(X),CENTER(Y),REF(X)
                LINEON CENTER(Y),CENTER(X),REF(Y),CENTER(X)

                LINEON CENTER(Y),CENTER(X),REAR(Y),REAR(X)

                LINEON REF(Y),CENTER(X),(REAR(Y)-HEIGHT*VERT.P),REAR(X)

                LINEON CENTER(Y),REF(X),REAR(Y),(REAR(X)-WIDTH*HORZ.P)

                LINEON REAR(Y),REAR(X),(REAR(Y)-HEIGHT*VERT.P),REAR(X)
                LINEON REAR(Y),REAR(X),REAR(Y),(REAR(X)-WIDTH*HORZ.P)

        END

        IF (INSIDE = FULL) THEN BEGIN
                FOR I = REF(X) TO CENTER(X) STEP HORZ.P
                        LINEON REF(Y), I, CENTER(Y), I
                NEXT I

                FOR I = 0 TO (WIDTH*HORZ.P) STEP HORZ.P
                        LINEON CENTER(Y), CENTER(X)-I, REAR(Y),(REAR(X)-I)
                NEXT I
                FOR I = 0 TO (HEIGHT*VERT.P) STEP VERT.P
                        LINEON CENTER(Y)-I, CENTER(X), (REAR(Y)-I),REAR(X)
                NEXT I

                LINEOFF CENTER(Y),CENTER(X),CENTER(Y),REF(X)
                LINEOFF CENTER(Y),CENTER(X),REF(Y),CENTER(X)

                LINEOFF CENTER(Y),CENTER(X),REAR(Y),REAR(X)
        END
END
```
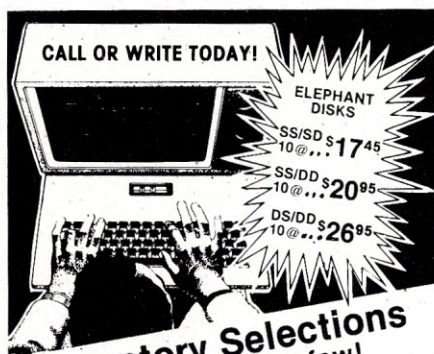
Kaypro 10, continued...

Listing 2. Sample Graphics Program.

```
$INCLUDE GRAPHICS.BAS

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

PRINT CHR(26)

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
```


December 1983 © Creative Computing