

The Kaypro Column

By David Thompson

Those of you who have asked for more product reviews in Micro C should look closely at the following. (Those of you who want beef should go to Wendy's.)

It just turned out that this column is a collection of all the bits and pieces that I thought you should know. Of course, the big thing is the K16 (no matter which side of the MSDOS vrs CP/M 80 fence you're on). As goes the K16 and the soon-to-be announced 8088 lap portable, so goes Kaypro. (At least it appears that way—see the economic section later in this column).

The Kaypro 16, A Cursory Look

The Kaypro 16 is at once classic Kaypro and unclassic Kaypro. At first glance, it could be any of their other systems, but inside, it is definitely unique. Where the 2, 4, and 10 have lots of spare space the 16 is packed.

The main board on the original Kaypros has been replaced by a large motherboard which primarily holds the dynamic RAM and 4 IBM expansion sockets. There is room on the motherboard for 512K (with parity), and 256K is installed at the factory.

When you remove the top of the 16, the first thing you see is the underside of the motherboard. To fit everything into the stock cabinet, Kaypro turned the motherboard upside down so that the plug-in boards hang just inside the back of the cabinet. The power supply is now tucked between the winchester and the video monitor.

The Kaypro 16 comes with three boards. The first is the processor board with an 8088, an empty socket for an 8087 math chip, a clock (generates 4.77 MHz), and a bunch of address and data buffers.

The Monitor

The monitor was written by an individual who had never seen the source of the IBM monitor. He was given a specification which he coded. Then they (an outfit named Phoenix) tested the ROM by running IBM specific programs. As the programs pointed out problems, they tightened up their specifications for the monitor. At this point, Kaypro is say-



K16 Keyboard

ing that the the 16 will run most IBM software, but as far as they know, there isn't anything that won't run.

Flight Simulator

Of the benchmark software there are two that everyone asks about. The first is 123 (because of its popularity) and the second is flight simulator. Why on earth would so many folks care about a pilot training program? Because it has become the standard test for IBM compatibility.

I'm told, for instance, that flight simulator knows that IBM's 4.77 MHz system clock is a precise multiple of the dot frequency on a color monitor. Using that fact, flight simulator knows precisely when to turn on and off the video to light the correct color dots on a color video screen even though the IBM (or Kaypro) thinks it is talking to a B&W monitor. Voila! Color on an IBM without buying a color card. Of course, the Kaypro comes with a color card but that doesn't keep flight simulator from doing it the hard way.

In fact, for this pseudo-color trick to work, the 4.77 MHz clock must be within

400 Hz, so Kaypro has added a small variable capacitor across the master crystal. They can simply tweak the clock until flight simulator generates color. If you are holding your breath for a fully compatible system that runs faster than the PC or XT, you're going to be waiting a long time. It's not compatible while it's running faster.

Keyboard

The keyboard (Keyboard) is IBM, right down to the lousy return key. Sorry, but you asked for compatibility and you got compatibility, compatibility, compatibility, compatibility.

I/O Board

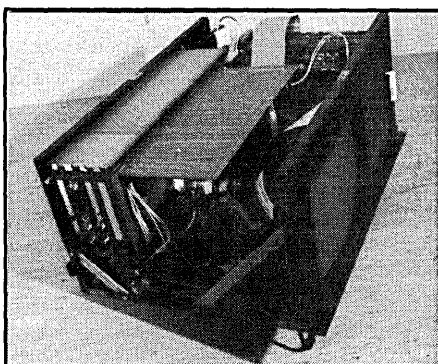
The second board plugged into the motherboard handles the disk control, serial, and parallel interfaces as well as providing space for another 128K of RAM (there are sockets for 640K total). The serial connector is a nine-pin db-9 and the parallel connector is a standard db-25, the type that is used for the serial interfaces on the Z80 Kaypros. (Confused? It appears that they chose these connectors in order to save space.)

Video Board

The video board is a real bonus. You get full color graphics with both composite and RGB (Red-Green-Blue) color output to an external monitor. The internal monitor displays the standard B&W graphics.

The board is capable of twice the resolution of the standard IBM but alas, they chose compatibility.

Anyway, IBM reserved memory space for both B&W and color graphics. Kay-



Naked Kaypro 16

pro is using the color space for both. On the B&W monitor they display the color as 16 shades of grey.

There are 256 characters in the character ROM. The first 32 are described as the IBM "funny characters." From there through 127 is the standard ASCII set and from 128 to 255 the ROM contains a full European character set (accents etc.), some simple line graphics, and a Greek set.

The graphics board contains the character ROM, a whole scad of TTL, and a 6845 video controller.

Servicing

One of the real selling points of the original Kaypros (both to dealers and civilians) was ease of service. The processor board just stood right up there staring at you, and you could fire it up and probe and prod at will with no one even suspecting that you'd never done it before.

Well, with the K16, all that has changed. As it comes from the factory, you can't run the system unless it is installed in the cabinet (the cables are too short)—and when the boards are installed in the cabinet, you only have access to the underside of the memory/motherboard. Even if you could run the system with the motherboard turned right-side-up you'd find it next to impossible to get at the parts on the plug-in boards because they're enclosed in a cage.

This system is not going to get any points from repair folks. Plus, the mere installation of a plug-in board will send many users back to their dealer. It's not a particularly difficult project, but it's a lot more involved than it should be.

Heat

Kaypro has finally installed a quality fan in a system. In this case, it's absolutely necessary. All the heat from all the memory, LSI processors, and TTL is trapped in the little card cage and under the upside down memory board (heat rises, you know). They even added a baffle to direct the air where it is most needed and they are moving quite a lot of it. You definitely know it when the K16 is running.

I found the noise much more irritating

than the sounds of the toy fans they put on the 4s and 10s but then I really believe that computers should be seen, not heard.

Cabinets And Systems

The culprit which caused all this servicing and heat trouble is the decision to put the K16 into the K10 cabinet. The word is that they won't change the cabinet for THIS model. I leave you to your own conclusions about what that statement really says, but several people within Kaypro (beginning with David Kay) have told me that the company has recently purchased several IBM ATs to look at and they are planning introduction of a lap portable (IBM with LCD display) sometime in the near future (possibly the first quarter of 1985). Somehow we'll get a new box, but not for this model.

Software

The K16 comes with the complete MicroPro package. The editor, the spreadsheet, the data filer, and some other odds and ends.

Product Conclusion

For \$3295, this XT clone is a good \$1000 cheaper than anything else on the market and it's portable. You only have one free plug-in slot but most of the accessories you'd want to add to an IBM are already installed on the Kaypro.

The easy access to the working parts (the fun stuff) is pretty much gone. I don't know how much effect that will have on most prospective customers but it's significant to me and it should be significant to dealers.

Heat probably won't be much of a problem if they stay with the high-velocity fans but the noise may force them to compromise on their cooling and then reliability could suffer. It's not a very comfortable tradeoff.

They haven't really begun advertising the product since they are just putting together a few (about 1,000 were backordered as of early December). They are gearing up to manufacture the boards themselves, but meanwhile they are buying them from the designer, Personal Computer Products Inc.

On-Board Dip Switches

There are a number of on-board dip switches which are, so far, undocumented. The following is not guaranteed to be perfectly accurate (I haven't had a chance to verify everything) but it should be close.

Processor Board SW1

1—8087 numeric processor, on = not installed.

2,3—Both on, no video board. 2 on, 3 off, 40X25 color video installed. 2 off, 3 on, 80X25 video installed. Both off, B&W video board.

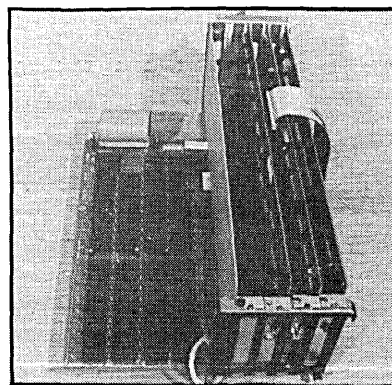
4,5—Both on, one floppy drive. 4 on, 5 off, two floppy drives. 4 off, 5 on, three floppy drives. Both off is four floppies.

Floppy Board SW1

The floppy board can contain up to 128K of dynamic RAM. This 128K in addition to the 512K on the motherboard total 640K, the maximum memory you can stuff into an IBM (and, of course, the K16) without overlapping the monitor. Thus, you are limited to adding two banks of 64K chips on this board.

You will need to add a 74LS409 (U28) and a 74LS280 (U54) to this board before you can add the RAM. The 409 handles address decoding and refresh, the 280 does the parity checking.

1,2,3,4—These first four bits control the start address of RAM on the floppy



K16 Motherboard and PC Cards

(continued next page)

board (in 10K increments). When all the switches are on, it means that the board starts at 0K. It comes set at off, on, on, on from the factory (80K).

5,6,7—These three bits tell the 74LS409 which type of RAM is plugged into the board. For 64K chips, set 5 on, 6 off, and 7 on.

8—This is the parity selection. When on, parity check is enabled and the system stops if there is an error.

Floppy Board SW2

This switch determines where the serial and parallel ports appear on the system.

1,2—Both off, serial port disabled. 1 on, 2 off, serial port is COM2. Both on means serial port is COM1. 1 off, 2 on, serial port disabled. (COM1 lies at 3F8 hex, COM2 lies at 2F8 hex.)

3,4—Both off, parallel port disabled. 4 on, 3 off, parallel port is addressed at 278 hex. 3 on, 4 off, parallel port is addressed at 378 hex. Both on, parallel port is addressed at 3BC hex.

Floppy Cable

The floppy cable has a twist which swaps lines 10,12,14, and 16. If you install a drive data connector before the twist and one after the twist you can configure both drives as drive B and they will work as A and B. (What manufacturers will go through to keep the user, or dealer, from having to move a drive select jumper.)

K16 User Feedback

Thomas Benjey called to say that he has been pushing and prodding on his own K16. He has tried the system with 123 and flight simulator and they both work.

He feels that AutoCad II is one of the best tests of a system (this is a \$2000 drafting, graphics, and circuit board layout package). AutoCad II reportedly takes advantage of everything that IBM offers graphically. This package can also drive a Hercules high-res monochrome graphics card, so he plugged in one and fired it up. He noticed that the Kaypro's

and Hercules' video boards seemed to interfere with each other (he said that his Columbia had the same problem). Anyway, he unplugged the Kaypro's graphics card and the Hercules high-res video worked just fine.

Bits And Pieces

The MicroSphere 64K add-on which I mentioned in the Letters column in issue #17, probably won't be produced. 128K RAM chips are getting cheap enough that real 512K RAM disks are quite reasonable (and significantly faster than the track buffers). In fact, they have a fully stuffed 1 meg board for about \$1200. (One meg? That's bigger than a quad drive!) I understand that it works nicely with the PRO-8.

One of the cheapest ways to get a pair of legs for your Kaypro is available at your local camera store. Ask for two plastic film cans (normally used for 35mm) with lids. Then just remove the two rubber feet from the front of the Kaypro and replace them with the film cans. The screw which held the Kaypro's original front paws in place will hold the cans nicely.

The First Osborne Group is trying to entice Kaypro owners to join them by setting up an RBBS for Kaypro users. (You'd think they'd notice that Kaypro owners have already discovered how to do their own RBBS.) You must register with FOG at 415-755-4140 before dialing up the bulletin board at 415-285-2687 (300-1200 baud, 24 hrs).

Robie Recalls (But Not Well)

We are getting reports that Kaypro is recalling the Robies that wander back to dealers because of bad drives. What initially appeared to be disk problems are turning out to be problems with the disks, the drives, and the Kaypro.

I've heard that Kaypro is letting folks trade in their flaky Robies for Kaypro 10s. You give them your Robie and \$100 and they give you a 10. That's not a bad deal. (I understand that Drivetec has gotten back a whole slew of units from Kaypro.)

Kaypro thinks it has straightened out the problems with the Robie and they are beginning to release a few with new drives, new media, and modified

boards. But even if they work flawlessly, I think people will be a little reluctant to purchase a system that requires special preformatted disks which retail for \$11 each. If the drives aren't very popular, where are folks going to get the disks?

Meanwhile In the Drive World

Teac, Mitsubishi, and Epson are producing 1.2 Mbyte 5.25" drives. Depending on the rpm they are running, they look like 5.25" or 8". At 300 rpm the floppy controller can read and write 200K, 400K, and 800K disks formatted on standard 5.25" drives. In this mode, the data transfer rate is 250K bps.

At 360 rpm they appear to be 8" drives because the data transfer rate doubles to 500K bps.

Physically, the new drives (at least the Epsos I saw) look just like standard 5 inchers and unlike the DriveTecs, they have a single stepper motor. The word I got was that they are available for \$110 each in OEM quantities, half as much as the Drivetecs.

My guess is that the reason quad density (800K) drives have become so cheap is that these new 1.2M drives are taking over the high capacity market. IBM is now installing them on their hard disk systems to make backup easier.

New Kaypro 2

Kaypro has done its best to confuse prospective customers by introducing a "New 2." This new system has the standard 84 board like the 2-84 but it has one 390K drive rather than two 191K units. Retail price is \$995. My guess is that this system will be particularly popular with schools and other institutions that currently purchase large numbers of Apples. The only software packages included with the system are WordStar, MBASIC, and a single-drive copy program.

Also, I've gotten reports that the New 2 has CP/M in ROM. That's good because you don't need to put CP/M on your disks. That's bad because we may not be able to sell ROM upgrades for them (at least not without including a license for CP/M with each).

Kaypro is offering a junior business package that includes the New 2, and the

Kaypro letter quality (actually a Juki) printer for \$1495. Kaypro also has a New 2 upgrade kit that includes a 390K drive with CalcStar, InfoStar, and ProfitPlan. The kit retails for \$495.

Cheap Upgrades

If you don't need the software from the upgrade kit, you can simply purchase a Shugart or Mitsubishi double sided drive and plug it into the New 2. The power and data connectors are already installed. You just remove the cabinet top and the little drive cover and slide the new drive in. So, you could effectively have a Kaypro 2X (minus a little software) for \$995 plus about \$135 for an additional drive.

Or, you can purchase the New 2 and then add MicroSphere's RAM disk as the second drive. That'll give you the advantages of two drives and the advantages of a RAM disk for little more than the price of a standard Kaypro 2. Such a deal.

Kaypro Declares Loss For Fourth Quarter

Something interesting happens when you go public. You go very public. Everyone wants to know, and gets to know, every time the company, or the chief executive officer, sneezes. Well, Kaypro has sneezed. (Rumors are that sneezes inevitably lead to pneumonia, we'll just have to wait and see.)

Kaypro has made some very big changes in its management. John Coul-

ter is one person I've had a chance to get know and John has recently been hired to straighten out quality control. Hooray!

Kaypro's strength has been the long-term reliability of the original II and 4. Though the screens twitched when the drives fired up (from an over-rated power supply) and the original character set was ugly (sorry, that was my fault), they worked on and on. In fact, when I advertised for old broken down Kaypro IIs for practice surgery, all the units offered were reportedly in perfect running condition.

I purchased one, serial number 2000 and something. It's got the twitches all right but it is screaming along at 5 MHz like nobody's business.

Kaypro Bulletin Boards

If you get the urge for an evening out, try the following phone numbers. I don't have the particulars on these but they are supposedly aimed at Kaypro and I would assume that they are 300/1200 baud, 24 hrs, 8 bits, no parity. As far as passwords etc. you'll just have to log on and find out.

The Kaywest Users Group in Newport Beach: 714-646-3060.

The MVKug, in Mission Viejo: 714-581-1556.

The Torrance Kaypro Users Group: 213-618-0151.

The Resource Board (not just Kaypro) in Garden Grove: 714-539-9418.

Kaypro Looks At Dimension Boards

David Kay confirmed that the company had considered using the Dimension Computer board in their K16. The Dimension is a 68000 based system that lets you plug in Z80, 8088, and 6502 coprocessors.

The system runs multi-user Unix and Idris as well as single-user CP/M 80, TRS-DOS, AppleSoft, and MS-DOS. It is supposed to be 95% compatible with the PC and 100% compatible with the TRS-80 and Apple as well as CP/M 80 hardware. You can even move a file between, say, an Apple disk and a Radio Shack disk, or between a CP/M 68K disk and an MS-DOS disk.

David said one reason they didn't choose the Dimension is that Kaypro has a reputation for inexpensive systems rather than for bells and whistles.

Co-Power Adds 123

Lynn Bailey sent in a clipping about one of SWP's new products. The SWP folks have put together a utility that lets you run 123 on a Co-Power board installed in a Kaypro 10 or 4/84 (123 doesn't run on the Big Board and Xerox versions of the Co-Power). The utility is available for \$29.95.

SWP has also brought up a 1 Meg version of the Co-Power. I haven't seen a price yet, but their 256K version is about \$800.

■ ■ ■

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