

# Kaypro Column

By David Thompson

I got my first good look at the insides of the Kaypro 10 during the SOG. There were a couple here, and they both ran like tops.

Many of the visiting Big Board folks suspected that there might be more than casual similarity between the Kaypro 10 and the Big Board II. There is quite a bit of similarity but not nearly as much as between the Kaypro II and the BB I.

## Inside the 10

The Kaypro 10 has two Z80 SIO chips, so there are 4 serial interfaces available. One interface is used for the keyboard, just like the II and 4. Two are brought out to the back panel, one marked "modem" and the other marked "printer." That totals three. The fourth port is left as pads E5 through E17 on the board.

The parallel ports have changed radically from the earlier Kaypros. The Z80 PIO is gone, and a couple of 74LS373 octal latches (U18 and U11) have taken its place. It appears that they are using a 74LS244 (U5) to handle the strobe output. The system and character ROMs are 2732As.

The video is generated by a Signetics 6545. Two 4016s make up the 4K video RAM which hold the characters and the character attributes. Each character can be underlined, reversed, blinking, reduced intensity, or underlined.

We've had problems with jitter on the output of the BB II's 6845 video controller, so getting a really good screen image has been a fight for us. I noticed that Non Linear picked a very slow phosphor for the 10—which means that the new block cursor leaves a trail as it bounces about the screen. However, a slow phosphor really cleans up a jittery image so I'm definitely not complaining. As far as I'm concerned, the ghosting of past letters is a small price to pay for a very solid image.

Graphics are generated in two-wide by four-high blocks.

The processor runs at 4 MHz and the 4 MHz is generated from a 16 MHz crystal.

The cabinet is classic Kaypro, which is a tribute to the amount of room that was left over in the original system. The winchester is quite silent but there is now a small—but fairly noisy—fan just behind

it. I really appreciate the fan, it keeps things much cooler, but some very popular person is going to come out with a quieter version. There is something very nice about a really silent system when you work in as quiet a place as I do.

We will start work on a Kaypro 10 schematic and theory of operation shortly.

## The Winchester

The winchester appears to go to the safety area a second or two after a disk access. So it may not matter whether you run the safety program. After all, having the head parked in a non-data zone means that power glitches can't accidentally write nasties onto the system or directory tracks (a definite no-no when the system boots off the winchester).

There is a phone connector on the back panel of the 10. It is not the handset connector but rather a standard wall type connector. Perhaps for a built-in modem connection?

## More on drives

I've received a number of calls about Tandon drive alignment, two of them from Tandon itself.

According to Tandon, the drives get only a rough alignment before going to OEMs (original equipment manufacturers) like Non Linear. The OEMs are responsible for the final tweaking before shipment.

So, with that in mind, Dana and I bundled both of Micro C's Kaypros into the Civic and went tooling down to the local dealer.

All four drives were in very good alignment; we adjusted alignment on one but it was within spec. before the adjustment. The spindle speed was slightly fast on two, the other two were right on.

## Removing the drives

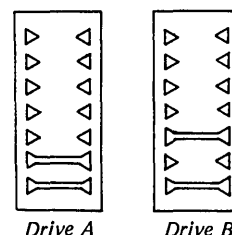
On the newer Kaypros with the A: drive on top of the B: drive, you begin by removing the main circuit board. Then remove the allen screws from both sides of the metal drive shield. On the older version you don't need to remove the circuit board.

After you have disconnected the ribbon cable, the 3-wire power connector, and the ground clip from the back of

each drive, you can pull each unit forward out the front of the system.

Now reconnect your A: drive to the system (it's easier to have just one drive connected at a time). Look at location 1E on the circuit board (the socket which contains the shunt). The shunt for drive A: has the bottom two connections closed and the rest broken. The shunt for drive B: has the bottom trace closed, the next open, and then the third one closed. All the rest are open. See Figure 1 for shunt information.

Figure 1 - Kaypro Drive Shunts



With drive A: connected to the ribbon cable (the red edge of the ribbon cable is pin one) and to the power connector (and ground clip), turn on the Kaypro and boot up your system disk. If the disk does not boot, recheck all your connections.

Now you can use one of the disk utilities such as DU77 on user disk K2 to step the head out to the proper track. Just load DU77, then remove the system disk, and replace it with your alignment disk (Dysan 224/2A).

Now have DU77 read sector 1 on whichever track you need. Because the alignment disk doesn't have normal information, the system should hang up while trying to read the track, occasionally homing and then retrying the track.

The instruction sheet with the alignment disk will tell you which tracks you need to select.

After you have finished aligning the first drive, remove the drive from the power and ribbon cables and swap shunts between the first drive and the second drive. That way the second drive (drive B) will look like drive A to the system. Now connect the second drive to the cables and do the alignment. Before reinstalling the drives in the system, swap the shunts again. That's so the ter-

minator (in socket 2F) will be on the last drive on the ribbon cable.

The Tandon manual does a commendable job of explaining the alignment procedure. Section 1 contains a description of the alignment process and section 2 gives you a blow by blow account of what to do. The manual is P/N 179:22-001 and covers both single-sided and double-sided drives. It is available for \$25.00 from Tandon Corporation, 20320 Prairie St., Chatsworth, CA. 213-493-5965.

### Broken Drive Door latches

I've heard numerous stories about drive latches that fall off in users' hands. (I've watched it happen.) I've also received one report about why it happens.

According to the report, tightening down the drives in their housing causes them to pull against the Kaypro's front panel. This causes the drive bezel to bend outwards, stressing the door latch.

Some dealers have been using hot soldering irons to "fix" the little plastic hook which breaks. They don't even pull out the drives. However, it looks like a more permanent fix is to check incoming units for slightly bowed bezels, and then adjust affected drives forward in the case to reduce the pressure.

Anyone with more information about this should get in touch.

### Speeding up the II and 4

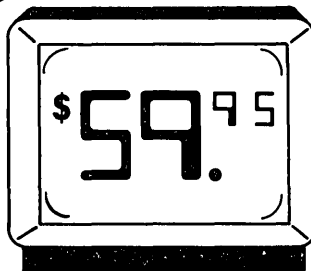
I've received a number of questions about the speed-up mods in issue 12. First, if you have a Kaypro II, you have to change the monitor ROM.

That ROM can be any 350 ns or faster part and it will be designated as a 2716-1 or 2716-H. To get the part programmed you'll need access to a ROM burner, or you can send us the part and an article or software contribution and we'll burn it for you (with our zingy new monitor besides). Otherwise, you can send us \$29.95 and we'll send you our pro monitor ROM, all ready to go 5 MHz.

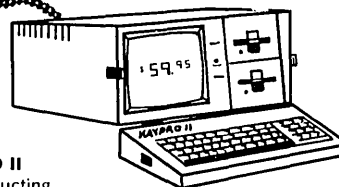
If you have a Kaypro 4, the monitor is already fast enough to run 4 or 5 MHz.

You might not have to change the CAS and MUXC to get the system to run, but the change even improves the RAM timing for 2.5 MHz so it wouldn't hurt everyone to make that change.

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As for the Z80, all you need is a Z80B CPU. It should cost between 10 and 20 bucks at your local parts outlet.

If the system doesn't come right up, you'll probably need to locate someone with an oscilloscope, to check the clock signal you are getting to the processor.

### Kaypro reverse video Two more parallel ports

Dear Editor,

I have made a simple hardware mod to my Kaypro II which gives you black characters on a green background.

I added a 74LS27 gate (I used only 1 section) and used the spare flip flop from U32. You could use a combination of gates from the 74LS27 but it didn't seem worth the effort just to avoid using any

extra parts. See Figure 2 for schematic of changes.

I also brought out the unused PORT B of U54 and U72 to connectors on the back and use them for real-time I/O (ham radio applications mostly). I've gotten a CW sender to work using a bit from one of these ports (not too difficult).

I'm working on a simple mod for bit-mapped graphics using the TI 4416 (16K X 4) chips. Two of them will do for graphics memory. I intend to put them in the second memory bank but software to drive it may get tricky.

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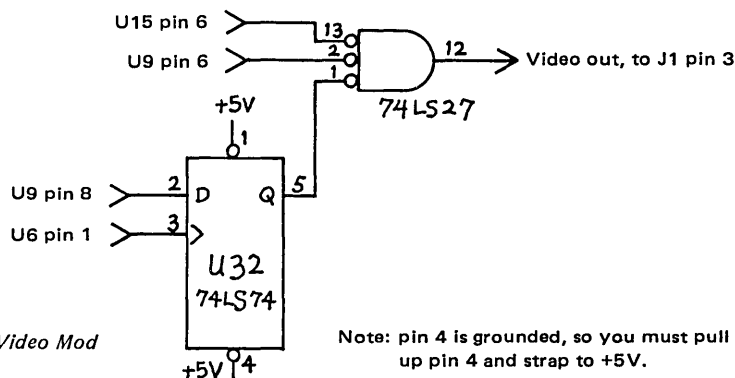


Figure 2 - Reverse Video Mod

Note: pin 4 is grounded, so you must pull up pin 4 and strap to +5V.