

The Kaypro Column

By David Thompson

Kaypro has suddenly become IBM "compatible" with its inclusion of the Co-Power 88 board on special versions of the Kaypro II and 4. The Co-Power board raises the price of the Kaypro by about \$400.

How easy is the Co-Power Mod?

This is an easy mod. A small interface board plugs into your Z80 socket, your original Z80 simply plugs onto the adapter board. Now a cable from the adapter board gives the 8088 on the Co-Power board access to all the Kaypro I/O. So it uses the drives, the power, the video, the serial and parallel ports from the original Kaypro. Otherwise it lives pretty much on its own. It can act as a RAM disk for the Z80, however.

IBM Compatibility

IBM compatibility is the magic word, however. Yes, this board runs MSDOS just like the IBM, however, there are some I/O differences, especially in the display. You see, the IBM is capable of graphics and as yet, there is no way for the Kaypro to display graphics the same way.

The MicroSphere color graphics board supports CP/M standard graphics (which is considerably more powerful than either IBM or Apple graphics) but is not compatible with either IBM or Apple.

Is IBM Exciting?

People sometimes lose sight of the fact that IBM did not design the PC to be particularly powerful or a particularly good value. IBM designed around hardware that was mature when they started the design. In fact, in many cases the 4 MHz Z80 runs the same instructions faster than the 4.77 MHz 8088.

Sure, the 8088 can address more memory than the Z80, but the memory is addressed in 64K chunks (similar to bank switching on the Z80). Also, programs that were written in assembly language on the Z80 to maximize speed and minimize program size are often being written in high level languages for the IBM because there is so much more memory. These programs run slower than their assembly language counterparts. So, the

trend has been toward larger, slower programs.

784K per drive

Would you believe 784K per drive on a Kaypro II or 4? Well, believe it. See the article in this issue on doing your own upgrades for these systems. 784K on a 5" drive is really incredible, especially when you figure that we are using whole bits (half-bits are still in the experimental stage and two-bit technology is, of course, dead). And, of course this new Pro-8 is compatible with the II and the 4.

Interference and the Older Kaypro

Some rural readers have noted that they can't run their Kaypros and their TVs at the same time. So, in recognition of marital bliss week—and to avoid putting old Kaypros out to pasture prematurely—I have a few suggestions.

AC Cord

The oldest (and noisiest) Kaypros have an AC cord that is permanently connected the back panel (not a plug and socket). These units don't have an AC line filter (the AC wires go directly to the on/off switch).

If you have one of these units, the first thing you need to do is purchase an AC line filter. You can get one that mounts on the inside of the cabinet, then you connect very short leads from the power cord to the filter. Or, even better, you can purchase a new cord and filter combination (the filter has a power socket built in).

Cabinet Lid

Now, check the inside edge of your cabinet lid. There should be rectangles of shiny bare aluminum which match up with shiny bare rectangles on the main cabinet (they line up with the screw holes). These rectangles provide electrical contact between the cover and the main cabinet. If you don't have the rectangles, get a good file and make some shiny spots around the screw holes.

These two modifications should cure most of the problem. (You remembered to replace the lid, right?) If you are still having problems then you need to check out the radiation from the keyboard and printer cables.

Take an AM/FM pocket radio and place it near the Kaypro. Tune around on both bands noting any strong signals (might be raspy). Any signals generated by the Kaypro will disappear when you turn the power off.

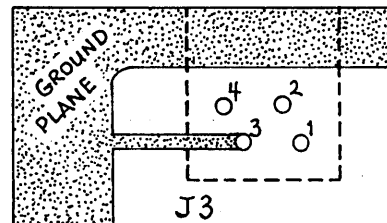
Move the radio around the Kaypro and see where the signals are the loudest. If your cover is doing its job, the cabinet will be quiet and the signals will be loudest around the keyboard, the keyboard cable, and the printer or modem cable.

You can purchase shielded RS232 and parallel interface cables (or just get shielded multiconductor wire and add your own shielded connectors). Or you can keep the serial and parallel cables disconnected during prime time.

Keyboard

The keyboard is another matter. It's hard to do much with the Kaypro when the keyboard is unplugged and I haven't heard of any shielded phone cables that you could use for the keyboard.

However, you can try bypassing the the keyboard interface. Solder a .01 disc ceramic capacitor (25V or higher rating) between ground and pins 1, 2, and 4 on J3. J3 pin 3 is grounded and you can see the ground plane running to it on top of the circuit board. (Look for J3 stenciled on the top of the circuit board, right above where the keyboard plugs in.) The pin diagram and numbers are stenciled right behind the pins themselves.



Gently scrape the green solder mask from the ground plane (large copper area) so you'll have a space to solder the capacitor leads. Keep the capacitor leads very short.

When you get done with all this, you should have the quietest Kaypro on the block. If that isn't quiet enough then to heck with marital bliss.

Lubricating drives

Drive manufacturers have universally insisted that you shouldn't lubricate their drives. I bought that line until one day my trusty (though noisy) Shugart 8" boat anchor locked up solid. I was desperate and I had nothing to lose, the drive was no good to me the way it was.

So I rummaged through the garage looking for something that might be slick or slippery. The choice was axel grease, gear lube, 3-in-1 oil, 30-weight Valvoline, Liquid Wrench, or WD-40. I chose WD-40 (after all, it worked on hood latches) and very lightly moistened a q-tip.

I used the q-tip to lubricate everything that wiggled, slid, squeaked, twisted, or groaned. I didn't use much, you understand. In fact I used so little that it took a while for things to free up. But they did free up very nicely and for the last year and a half, has been the quietest drive in the house.

Some kind person called me and suggested that I try lubricating my 5" Tandons (makes them silent he said). Well, I wrote his name down and immediately lost the slip—probably because he was so quiet. Anyway, until he calls again, he will also be anonymous.

He recommended that I use either Tri-Flon or Tri-Flow—available in any sporting goods or lock store. However, WD-40 had worked before (and I've since learned that Xerox computer repair centers use it) so I got out my trusty can, soaked a new q-tip, and went to work.

Removing the Drives

First, you need to remove the drives from the cabinet. If you have the stacked horizontal drives (newer Kaypro) you need to take out the PC board and then remove the 8 allen screws along the sides of the drive housing (on the older units, remove the 8 standard screws, 4 on top and 4 underneath). Then the drives pull out the front of the cabinet. Remove the the power and control cables as you pull the drives forward.

Mark drive A with a piece of masking tape if you're not sure you're going to be able to tell A from B after they are out.

Opening up a Drive

Remove the circuit board from the drive by disconnecting plug 6 (as well as plug 5 if the drive is double-sided), remove the two screws holding down the board. Then slide the board back slightly and pull it up and away from the drive. Now you can see the head assembly.

Greasing the Skids

Lightly lubricate the steel rods the head rides on. Then move the head assembly back and forth gently to spread the lubricant. Be very careful how you handle the head carriage, don't stress it. The head assembly will always have some drag because of the permanent field in the stepper motor, so don't expect it to slide lightly from end to end.

Before you turn the drive over, lubricate the door latch rod and take a close look at the head(s). Shine a strong light on them and look closely at the light's reflection off the surface of the head.

If the heads are clean and shiny (no marks) then leave them alone. If they have dull spots or lines, then saturate a clean q-tip in rubbing alcohol and gently swab them. Let them dry a minute or two and see if they are clean. If not, repeat the swabbing.

If there are marks that don't come off, then you need a new head (usually cheaper to get a new drive). Don't use a standard head cleaning disk, they are very abrasive! (Sure, the salesmen like to sell head cleaning disks but the folks I know who repair drives refuse to use them. In fact, they refuse to even swab the heads unless they need it.) Sure, inspect the heads every few months, but don't destroy them.

Now turn the drive over. Gently remove the drive belt and use a phillips-head screwdriver to remove the screw from the large drive wheel (the one with all the little timing spokes). Pull the wheel free (rock it gently).

Here, I used the little tube on the WD-40 can to inject (dribble) a tiny amount of lubricant into the exposed bearing. (Not all over it, just a touch, then rotate the bearing so you can feel it get freer.) Replace the wheel (you'll probably have to hold the shaft on the disk side to tighten the screw again).

Also dribble a tiny amount of lubricant onto the drive motor bearing (under the small pulley) and onto the stepper motor bearing (through the little hole in the plastic). Don't expect either motor to spin freely, steppers are supposed to be rachety feeling.

Back Together

Reinstall the drive belt, the circuit board, and the plug(s) for the head(s). Note that a plug's number should be up so you can see it and should correspond with the number printed on the circuit board. Now put the drives back into the cabinet.

CAUTION: Most folks think that if a little lubricant is good, then more lubricant is better. Not here. More lubricant just runs all over, ruining disks and collecting dirt (then system bugs start tracking gooey, oily dirt all over). Use only enough lubricant to free things up.

Slow RAM

I have a report that some Kaypros are not making 5 MHz because of slow RAM. Don Williams called to say that about 10 percent of the systems they modified wouldn't run 5 MHz until they changed the eight 64K RAM chips (U20-27). That's surprising because the older Kaypros that I've seen have been 200 ns (usually a -2 after the part number).

Locating a Slow Part

Heat is a real problem in the Kaypro II and 4 if you have one or more parts that are marginal. As ICs warm up they slow down, so marginal parts finally give up.

Once your system is really out to lunch (it won't respond to anything but a greasy hamburger or a reset) then slip off the lid and start cooling the parts one at a time (leave the system powered up). Start cooling the 40 pin ICs first, then the smaller ones like the ROMs and RAMs.

Two Ways to Cool It

There are two ways to cool a part. You can purchase a can of freeze spray (it comes under various brand names) and then spray a part until it is covered with frost and try doing whatever didn't work. Unfortunately these cans contain fluorocarbons. Fluorocarbons are not good for the ionosphere (or you either).

You can put an ice cube in a plastic bag and then hold the bag firmly against the IC. This method isn't as fast as the freeze spray but I've found it just as effective. You need to hold the cube against the IC for about 60 seconds to be sure the circuit inside the chip has cooled down. Then try the system.

Perfect Help

Perfect Software has moved its technical help department from Eugene, Oregon to 702 Harrison St, Berkeley, Ca, 94701. Their number is 415-524-1926 (7 a.m. to 6 p.m. Pacific Time).

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