The Kaypro Column

By David Thompson

It looks like everyone is coming out with a Kaypro speed-up kit. Most slow down when reading and writing to the outside world (by adding wait states). In fact, any modification that doesn't change the monitor ROM to a fast part is spending a good part of its life saying "Hey ROM, you there?" and then sitting around twiddling its address lines, waiting for "Yes Boss, I'm here."

Many of these boards are running slow enough to let you format disks without a switch, but the truly fast ones (ones that change the monitor ROM and really run 5 MHz) won't run the copy program unless you can switch them back to 2.5 MHz.

Also, the faster plug-in boards which do change the ROM must also change CAS and MUX signals or many machines will not run dependably. The CAS and MUX change (U66) is the one which we published with our speed up in issue #12.

Bad Boards

If you aren't comfortable doing the speed-up we published in issue #12, then try to locate a local CP/M users group, Kaypro group, or technician to help you with it. (Most people are very surprised when they look at a friend's modded system. The actual amount of wiring is very small. You just have to do it carefully.

If you don't have access to knowledgable help, then you are probably in the market for a speed-up board.

Please don't call us if you get an add-on board and it doesn't work. The manufacturer (or store) should be responsible enough to get you going or give you your money back.

Companies have to be willing to support their products. If you run into someone who isn't willing to do that, send us a short letter to the editor. Every company is going to produce a few things that don't work (we certainly have) but any company that isn't willing or able to support its products (especially hundred dollar packages) definitely needs a little special publicity.

Stuck Up

We've gotten a number of calls and letters from people who are trying to do the 5 MHz speedup but have found that U66 and U86 are soldered in place rather than socketed.

Well, you can still do the 5 MHz speed-up, it's just going to take a little more time and effort because of the soldered-in parts.

In the original speed-up, we bent pins out so that they wouldn't go back into the socket. We did this in order to disconnect these pins from the circuit.

With soldered-in ICs you can, of course, unsolder the pins you want to isolate and pull them up so that they don't touch the board (just as in the original modification). Unsoldering pins can be dangerous if you haven't done it before because it is easy to damage the board. (A 15 to 25 watt iron and a solder sucker, both available from Radio Shack and other parts houses, are very necessary.) If you are not familiar with unsoldering, then either find someone who is, or isolate the pins by cutting the copper traces (runs) on the board.

Cutting traces (the copper strips which connect pads together on the board) sounds hard but once you've done it once or twice, you'll find that it is quite easy. The trick is to make two cuts about 1/16 inch apart all the way through the copper foil and then pry up and remove the 1/16 inch length of copper between the cuts. This way you are sure that the trace is cut.

A Dremel Moto tool cuts runs in a jiffy, an Xacto knife or a very small chisel work pretty well also. Regular pocket knives are the most difficult way to go. I usually cut the copper trace right next to the pad (and pin) I am isolating.

Once the pad is isolated, I can solder right to the pad rather than having to solder to the pin on top of the board.

If you get confused, follow the schematic. Issue #12 shows you the "before" and "after" for the affected circuits.

Missing Q1 and C6

About the missing transistor and capacitor (Q1 and C6). The 74HC04 chips that Kaypro is using for U67 have been working extremely well at 5 MHz without any additional circuitry. Don't worry about the missing Q1 and C6—they aren't needed with the 74HC04.

Speed-up Problems

The most common problem for people doing the speed-up is that they get confused on the U66 mod. U66 is used as a delay device and the higher the pin number, the longer the delay. You are going to reduce the delay by connecting the circuit (trace) that used to connect to U66 pin 4 to U66 pin 3 (the pin on the IC). You will also connect the circuit that used to go to U66 pin 5 to U66 pin 4. That's it. You are just reducing the delay, and you are making the system run better (even at 2.5 MHz) than it did before.

Also, the SGS brand Z80Bs are often turning out to be unreliable at 5 MHz. Some people have gone through 3 or 4 SGS parts to find one that will run 5 MHz for more than half an hour (like any IC, they get slower as they warm up). Most of the $10-$15 Z80Bs on the market are SGS's. Zilog and Japanese Z80s have been the best.

Also, you can do one change at a time. First, modify U66 (change nothing else) and then fire up your Kaypro.

Then add the switch and wiring changes for 2.5 and 5 MHz. The system should still run at 2.5 MHz.

Now replace the Z80 with a Z80B. If you have a Kaypro 4 your system should now run at 2.5 and 5 MHz. If you have a Kaypro II (it signs-on saying Kaypro II) then it will run only 2.5 MHz.

Now, if you have an old II, stick in your PRO-Monitor II and you should have 5 MHz.

If the system will not run at 2.5 MHz after any of the above steps, stop and carefully check the step you've just done.

Slow RAM

Once in a very great while, someone reports that they had to replace their RAM in order to run 5 MHz. Usually it turns out that they didn't do the U66 mod. However, if you have this problem (system gets flaky after a while and the processor and ROM aren't the problem) then you might try changing the following four parts that control the memory.

Change U33 and U34 from 74LS157s to 74S157s. Change U39 from a 74LS00 to a 74S00 and U48 from a 74LS04 to a 74S04. The S parts are the same as the LS parts except the S parts are quite a bit faster and run a bit hotter.

Kaypro Disks

Quite a few people have gotten into the habit of calling just to ask if we have any new disks. We usually do. We have been receiving some really great software lately so new disks seem to pop up every couple of weeks or so. This creates a problem. Our ads and catalogs are usually out of date by the time they are printed. So, we'll try to have the latest scoop here in the Kaypro column.

Kaypro Disk K20
Software for MicroSphere's
Color Graphics Board

SKETCH: This is an interactive sketching program written in SBASIC.

PIE: These make up a pie chart generator package.

PACMAN.C, PACMAN.COM ... : This is a newer, fancier, more configurable version of PACMAN for the color graphics board written in Aztec C.

Kaypro Disk K21
Screen Dump Programs &
SBASIC Primer

This disk is absolutely dynamite! It contains games, educational programs, and utilities, all of which double as examples of SBASIC programs. Also, you can pay from $60 to $100 for a screen dump from a commercial outfit but you won't get better software than DUMP and we even include the source! Then check out DIR+, DRIVER, and SCROLL. This disk is as important an offering as K2.

DIR+: This is a new fancy version of SWEEP (transfer files, delete files, print, display, tag ...) that occupies only 4K on the disk!

DUMP: This program dumps all the data on your screen to your printer (while you are in any program). You can make a hardcopy record off anything that shows up on the screen. The DUMP programs on this disk support every available Kaypro (and include source)! Dana and several very special subscribers spent many long hours writing and improving these DUMP programs. They are indispensable.

HANGMAN, MATH, MATH1, MSTRMIND: These are games and in-structional programs written in SBASIC. MATH is a structured version of MATH1, which along with the documentation gives you a good idea what structured programming is all about.

SCREEN, XLATE, DRIVER: These are utilities written in SBASIC. These are very useful for both the new and the experienced SBASIC programmer. The documentation for SCREEN is very thorough.

SCROLL: This is the icing on this disk. This program replaces your CP/M TYPE command and is a favorite in the office. It lets you scroll forward, scroll backward, page forward, page backward, print, search for characters, and more! Plus, it's only a 1K program! It's a faster and easier way to check out text files than your text editor.

Kaypro Disk K22
ZCPR (Again)

This disk is filled with ZCPR files. You get ZCPR for the Kaypro II, Kaypro 4, and the Kaypro 10. This version is fixed so that you can pass control characters (such as cntl-P) to the system and you can choose to have it recognize the semicolon for drive select (as well as the colon). So you can enter "B;" or "B:" to select drive B. Super neat!

ZCPR, for those of you who don't know, makes CP/M a lot friendlier. It searches drive A for any .COM file it doesn't find on the current drive, the TYPE command scrolls text 24 lines at a time, and a new LIST command outputs a file to the printer.

Kaypro Disk K23
Fast Terminal Software & New BYE

This disk contains interrupt-driven terminal programs for all Kaypros. If you are tired of being limited to 1200 baud when you use your Kaypro as a terminal, then take heart. With these programs, your Kaypro can outrun the big boys by receiving and sending up to 19,200 baud without dropping a single character!

Also, a new version of BYE that not only lets you run your Kaypro remotely, but also figures out whether you have a 63K or 64K system so it will run with any Kaypro using an external modem.

Kaypro Disk K24
MBASIC Games & Keyboard Translator

We sifted through many, many games before coming up with these gems. All will work on any Kaypro and all come in MBASIC source.

USOPEN shows you the fairway on the screen. You select the club and direction for each stroke. After you reach the green the display shifts to show details of the green and flag. For one to four players.

DUCK is an offshoot of aliens (pardon the pun). Hunter tries to shoot down ducks while ducks try to bomb hunter. (Much fairer than real life.)

CASTLE is an adventure in which you select your attributes (strength, dexterity, and intelligence) and you get to purchase arms and protection before starting. Great documentation and very interesting game.

KSTROKES is a keyboard translator similar to Smartkey. Bill Forbes did an excellent job creating this program. You can create and save translation files on disk. The program even includes a table which generates WordStar commands from the Kaypro's keypad! You can define 8 keystrokes at up to 63 characters each.

Kaypro Disk K25
Z80 Macro Assembler

This is a real Z80 macro assembler! Syntax closely follows RMAC and MAC. Also includes pseudo-ops to support conditional assembly, etc. No .phase or relocatable code though.

Kaypro Disk K26
EPROM Programmer &
Character Editor

This is the software for the Kaypro EPROM programmer written up in Issue #18. This software and the programmer turn your Kaypro into a very powerful development system. You can read ROMs, write ROMs, save data on disk and restore data from disk.

Plus, you get a character editor which will help you design custom character ROMs for the non-graphic Kaypros!

Computer Components Unlimited

We've received a number of calls from people who ordered new CDC drives from Computer Components Unlimited and have received units marked "Refurbished" or "Repaired."

When we start getting complaints about an outfit that we've mentioned in the magazine, I wonder whether it's worth giving anyone a plug. (We did purchase two CDCs from them. The drives were new and worked great so we mentioned them.)

Anyway, I called CCU to see what was going on (after all, some of the drives had not only been used, they were definitely defective).

Tom McKessy said that he had purchased the drives as surplus from an OEM. He has been getting about 20 percent back from purchasers because they are defective. He said he would be glad to replace any defective units and that they were putting the bad ones in a "to be repaired" pile.

Once the defective units have been repaired he says he is selling them to dealers rather than sending them to mail order customers. (But then who gets them in the end?)

When I asked him why people were receiving drives with repair stickers, he said they might have been pulled from the wrong pile. So, if your CCU CDC has a repair or refurbish tag you might want to send it back for a replacement. If your PRO-8 is acting strangely (especially if you have two quad drives and one is not working correctly), then the drive is probably your problem.

Anyway, I understand that CCU is out of the drives now anyway. In case you need to get a hold of them, the phone number is 1-800-847-1718.

Driving On and On

Meanwhile, I've been getting rave reviews about the TEAC model 55F drives from National Diskon Corp. They are half-power, half-height (perfect for four drives inside a Kaypro) and we haven't heard a single negative comment.

I've also heard some murmuring that Diskon may have Shugart 465 (quad-density, half-wide) drives. Many people think these are the best quad-density drives on the market.

Diskon's phone number is 415-490-7150, and the TEACs are about $215 each.

I purchased some Epson half-wide, double-sided double-density drives at the Computer Faire ($169 each!). They are very low power, very quiet, and they have been absolutely reliable. They can flawlessly read and write disks that would curl the heads on a Tandon 100-1 (not a pretty sight).

What is Half-power?

When we refer to half-power we are talking about the +12V demand. The Kaypro has plenty of extra +5V on board but its +12V is very limited. Tandon 100-1s and 100-2s draw about 1 amp of +12V each. So, any drive that draws about 1/2 amp at +12V qualifies as half-power. So far, all the half-wides I've seen are half-power.

The PRO-8 Plus-4

Well, we finally did it. This is everything you need to connect 4 drives (of any type) to your Kaypro 4 (or Kaypro II that you've turned into a 4).

Those of you who already have the PRO-8+ ROM (there are plusses surrounding the ROM sign-on) have two options:

1. You can build your own 4-drive decoder circuit from the schematic in issue #17 and order Plus-4 disk for the software you need to set up a 63K CP/M and do the copying and formatting for four drives. The Plus-4 disk (only) is $12.00.

2. You can order the genuine Micro Cornucopia Plus-4 Drive Decoder package for $39.95. This package includes the assembled drive decoder board and the Plus-4 disk. The Decoder Board plugs onto your main computer board where the drive cable is currently connected. Your drive cable then plugs into our decoder board. Simple.

All you will have to do is supply the data and power connections for the new drives. If you will be running four half-power, half-wide drives (TEAC, for instance) inside your Kaypro, you can simply add two 34-pin data connectors (they are available at Radio Shack) to your present 34-conductor data cable and add two power connectors to the power supply built into the Kaypro. (Note that the TEAC data connectors are upside down from everyone else so your original cable will be short if you mix TEACs and other brands inside the Kaypro.)

If you are using regular power or full-width drives, you'll need to pick up a drive cabinet (with power supply) and then put together a new, longer data cable with four 34-pin connectors.

Two Circuit Corrections

A few folks have called asking why the Monitor Select Circuit schematic and the text (Issue #15, page 15) didn't exactly match. Actually, you can either follow the text or the schematic, it will make no difference. If you want them to agree, just change the schematic so that U60 pin 15 is connected to U80 pin 5 and U60 pin 14 is connected to U80 pin 4.

A more significant correction is for the Plus-4 decoder circuit in Figure 2, Issue #17, page 18. U71 pin 6 should connect to the 7445's pin 14. U71 pin 8 should connect to the 7445's pin 15.

Corrected Monitor Select Circuit
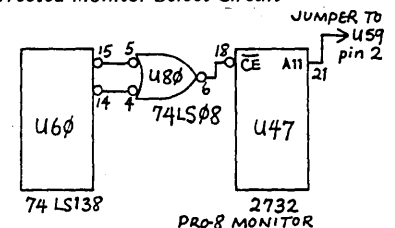
Corrected Plus-4 Decoder Circuit
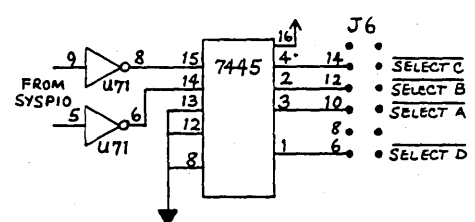
Upgrading Legacy to Pro-8

We've been getting a lot of Pro-8 orders from people who already have the Legacy quad density package. If you have the Legacy package working on your system, you can upgrade to ours by moving the end of the jumper that goes to E29 (part of the Legacy mod) over to the pad on the board marked E40. Then just plug in the Pro-8 monitor and you are on your way. It's that simple.

■ ■ ■