

# The KayPro

Column by David Thompson

This will be an introduction to the KayPro for those of you who are not familiar with this solid little computer. It turns out that Non Linear Systems is not releasing very much information about the system (like schematics) yet, so even its own dealers would like an introduction.

## Differences

In many ways this is a Big Board. The processor clock circuit is the same, as is the processor and much of the RAM select. However, the RAM chips are the 64K devices and the video circuit has been changed slightly.

In the video circuit, the hardware scroll circuit has been removed along with the composite video output. The output is standard separate TTL level signals.

In part, even the board layout is the same but because of the 64K chips, the board is substantially smaller.

## Size

The whole system, however, is not as small as it could be. The cabinet is simple bent aluminum and there is a lot of empty space inside. But that way, it is a lot easier to work on than the somewhat smaller Osborne, and it includes a 9" CRT which displays a full 80 by 24.

## Power Supplies

They have used several different power supplies during the initial production. All have been small switchers producing +5V, +12V, and -12V. Some have not provided very good regulation (the video image shrinks noticeably during disk accesses). Some of the early power supplies appeared to be quite sensitive to spikes on the power line. I notice that there is a MOV (metal oxide varistor) on mine so it appears that they are aware of that problem.

All the power supplies have been jumperable for both 110V and 220VAC.

## Disk Drives

The drives are 5" and they are the most likely source of trouble. Experience seems to indicate that if you are going to have trouble with a drive it will probably be the B drive. (At least on the older models with the vertical drives.) The newer models have the two horizontal

drives, stacked one atop the other. The A drive is on top.

I've heard from dealers that the new arrangement has created some additional heat problems and it has made it more difficult to remove the drives. Mine are vertical and have worked fine. One possible cure might be to cut some air slots in the shield that wraps around the drives, but the shield is probably to protect the drives from the electrostatic field around the CRT. If so, I'd be VERY leery of slots, air or no air.

If you are checking out a new system, try copying files back and forth between the two drives to see if either drive starts generating CRC errors. Let them run for a while so things will have a chance to warm up.

I also understand that for a while, NLS was using SMC 1793's and data separators (I have that brand in mine). They apparently found that many of the SMC chips were dead on arrival and that the ones which worked initially have given trouble in the field. So far mine have worked faithfully but I'm crossing my fingers. If I wind up with drive problems I'll replace the disk controller and data separator first.

The single-sided 5" disks each hold 191K so there is enough room on each disk to get some work done. The system can read (but not write I understand) single density 5" Xerox 820 disks so there is some compatibility with other systems. There may be some other systems that use the KayPro's disk format but I don't know what they are. Anyone for a standard double density format for 5"?

## Heat

Like the Osborne, the KayPro has no fan. So there can also be heat buildup around the processor board. However, unlike the Osborne, the KayPro has enough room inside and enough air holes that convection can remove a good share of the heat.

You still have to be careful about heat inside the system and you may find that a system which gets strange after an hour or two will work fine if you remove the cover. A small whisper fan mounted inside the top cover would do wonders for any heat problem, but replacing the Z80, the SIO, PIOs, 1793, and the ROMs with better parts (higher speed) would also eliminate 99% of the problems related to heat.

## EMR

The electro magnetic radiation from the KayPro is quite noticeable, especially around the keyboard. In fact, there is a sticker on the unit which says specifically that it hasn't been tested for FCC radiation standards. I'm sure it wouldn't pass. You can do a rough test on any system by holding an AM or FM pocket radio next to the equipment. As you move the radio around the cabinet and the keyboard you will hear a raspy buzz if there is any leakage. On some systems you can't even get the radio close and still pick up a local radio station. Fortunately, the KayPro is not that bad.

The cabinet area is pretty clean but around the cables and the keyboard there is a lot of interference.

## Odds and Ends

The keyboard has a standard Selectric-like layout with a keypad. It connects to the system via a 4-wire telephone cable. The keyboard outputs serial data which is input on serial port B. Serial port A is initialized as an 8 bits/char, 300-baud port for modem or printer. There is a configuration routine which comes with the system that lets you change the baud rate and lets you select whether the LST: device is the serial port or their standard Centronics parallel port.

The next time you are in your favorite local computer store, take a look at the small BB that has already captured nearly 10% of the portable computer market.

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