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Son of a Big Board!

Genealogy

The following is for all you computer genealogy buffs—that is, of course, those of you who are interested in the genealogy of your computer.

In the beginning there was the Big Board (BB I). The hardware was designed by Jim Ferguson, the software by Russell Smith (often referred to as the Ferguson and Smith gang). The BB I was announced in the summer of 1980 at a kit price of $649. Jim Tanner of Digital Research Computers of Texas—not to be confused with Digital Research of California—handled marketing, sales, and support.

The initial reaction by the S-100 buffs was that the BB I couldn't be a serious product. After all, what if you wanted to add another port or some more RAM? (And besides, S-100 systems even had their own magazine called S-100 Microsystems.)

Xerox 820

However, during the Fall of 1980 (as opposed to the rise of 1980) Xerox purchased rights to manufacture the Big Board and put it inside their 820. Xerox knew that IBM was working on a micro so Xerox wanted to get their own system onto the market VERY quickly.

The original 820 sold very well the first few months as independent software and hardware designers bought the new system and checked it out for potential new products. The 820 definitely needed some help. It didn't include much software, it had single-sided single-density 5" drives (unless you paid a gob extra for single-density 8"), and it ran at 2.5 MHz.

Information about the system was nonexistent. Xerox engineers had a very bad case of "not invented here" so they acted as though the 820 didn't exist. Because the 820 was a very close copy of the BB I, some of us knew where to get information (many Xerox dealers had to service the 820 using only the $5.00 BB I documentation package from DRC of Texas.)

I contacted Xerox marketing and engineering about supporting technical folks via Micro C. The answer from marketing was a resounding silence. Engineering wasn't so subtle. The engineering manager told me that I was not to speak to any of his engineers. (And then, what hurt most of all, he told his engineers that they weren't to speak to me.) Xerox was very concerned that someone might discover the genealogy of the 820.

Xerox had hired Jim Ferguson to help them with system configuration details but the company refused to listen when Jim suggested that they go to 4 MHz and double density. Much later, the 820-II came out with 4 MHz and double density. Surprise!

Xerox had high hopes for the 820 so they manufactured a whole scad of boards and shipped off thousands of systems to their official distributor, Hamilton Avnet. The rumor has it that two years later, Hamilton Avnet was still sitting on over 10,000 820-1s. (Not exactly the cushiest thing to sit on.)

Anyway, the independent software and hardware folks got tired of trying to pry information out of Xerox (and sales of the 820 were struggling, partially because of lack of independent software and hardware) so they looked around for another system to support.

Kaypro

Meanwhile, Non Linear Systems, a small manufacturer of digital meters, purchased two Big Boards. Lo and behold there soon appeared the KayComp computer. They used that name until the original owner of "KayComp" found out about Non Linear. So, the name became Kaypro II.

The Kaypro II is a Big Board with a few modifications (actually more modifications than Xerox made). Non Linear used eight 64K bit RAM chips instead of

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32 16K bit RAM chips; this made the board smaller. They also replaced the 1771 single density floppy controller with a 1793 double density package. They also removed the three ICs that handled the scroll in the video circuit.

They left all the ports and port addresses as they were. In fact, the Kaypro II and 4 have two PIO chips. They are using half of one for the parallel printer interface and half of the other one for system control. They could have used just one but the BB I had two PIOs. (Stick around, we'll be using the other half of those two in the near future.)

They had to rewrite the monitor routines and the BIOS because of the changes. They had to support double density 5" drives and they had to handle screen scrolling in software.

The choice of double density was very important since it gave the Kaypro II a very definite edge over the Osborne—the 9" screen and 80 columns were also a very good choices—but the choice of software scroll was unfortunate.

Try using the Kaypro as a terminal and set the baud rate over 1200. Once the screen fills, it starts dropping characters each time the screen has to scroll. You see, the processor has to move every character in video memory during a scroll (which takes a while). Meanwhile, the Z80 ignores all about the characters that are coming in the serial port.

With the hardware scroll, the video circuitry automatically shifts everything by one line and points the processor to the correct spot in video memory. The processor doesn't have to so much as raise an address line.

One of the big reasons that speeding up the Kaypro processor improves the performance so much is this silly scroll problem. The Z80 spends most of its time just rewriting the screen. If you purchase one of the many speed-up boards that slows down to 2.5 MHz when writing to the screen, you don't gain much.

Documentation

Non Linear found it easier to produce systems than service manuals. So, it was not unusual to find a Kaypro dealer with a set of Big Board schematics, trying to translate the IC numbers from one system to the other and trying to figure out what was left in, what was left out, and what changed. Somehow it all seemed very familiar.

Character Sets

The evolution of the BB character set is also worth a look. The first BB I boards shipped by Digital Research had an interesting character set. The uppercase characters were very standard uppercase characters. The lower case characters were simply shorter versions of the uppercase. A screen full of text looked very strange—and if you had all one case or the other, you really had trouble telling which you had.

Well, a group of us at Tektronix had placed an order for 7 boards right when the first ad hit the mags. Ours was the first order out the door and I have board A000014.

Anyway, we didn't appreciate the character set, so I took a few minutes one afternoon (with the help of Randy Dietrich and Lynn Cochran) and came up with a real lower case character set. It wasn't very fancy—the y, g, and q were just plain ugly—but the screen looked ten times better than before, so everyone in the group asked for a copy.

I told Jim Tanner that I had changed the characters. He said they were working on a new character ROM themselves and he asked if I would exchange my character ROM for a copy of his when he finished with it.

So I sent him mine. Six months later I called him to find out what had happened to his. He told me not to worry, they had decided to ship Big Boards with my character ROM (he calls it version II).

I mentioned that I had been hoping to sell my character ROM as a way to help finance the start up of Micro Cornucopia. So there I was, my first new product for the BB I was being duplicated by the hundreds and shipped with every new board. (He sent me a BB I kit as payment.)

So I went back to work on the character set and cleaned up the tail draggers that looked so unique (and ugly) and advertised the upgrade in Micro C. The response wasn't earth shaking, but it has helped us get started.

Then one day a friend suggested I take a look at the Kaypro. Well, looking at the Kaypro screen was like homecoming. There were my ugly g, y, q, f, t . . . There was no doubt about it. I knew that within that Kaypro there lay a heart of BB I and inside the character ROM were the remnants of an afternoon at Tek.

So I combined my new character set with the Kaypro Greek characters and produced the Greek PRO-CHARACTER ROM. I also left out the special characters altogether and called it the Clean PRO-CHARACTER. The Clean character set was for those who were being driven to distraction by the funny little greek characters (mostly folks into data communications with mainframes.)

I sent a copy of my character ROM to Non Linear (after getting a non-copying agreement from David Kay). They have upgraded their characters somewhat since receiving mine but they haven't gone all the way with it.

Finally

This is just an overview of the BB I. There have been, for instance, a number of other duplications by user groups and commercial companies.

There are a lot of people who still swear by their original BB I. My old #14 still turns out all the 8" user disks that go out of here and keeps the books on the side (it accounts for itself better than a lot of people I know—and some of my best friends are people).

The BB I was unique in its time. Since

S-100 was the power in the CP/M world three years ago, a single board "unexpandable system" was a break with tradition. The BB I was much smaller than the equivalent S-100 hardware because it was designed with LS (low power schottky) parts which used about 1/10 the power of the standard TTL parts. LS parts could be packed closely together without heat problems and lower power drain meant that power supplies could be much smaller and cheaper.

It turned out, however, that you don't tell a Micro C reader that something is unexpandable—at least not without major consequences. So there are BB Is that bear little resemblance to their original form.

People have added 256K, RAM disks, 5 MHz clocks, double density drives, 8088 co-processors, and 20 Mbyte winchesters. Now folks are working on full blown CP/M 3, MS DOS, and (no doubt) Unix.

It's too bad the BB I is so limited.

S-BASIC

John Steinhauser was very kind to volunteer to do the first S-BASIC column. His introduction to this fascinating language is in this issue.

I'd like to put together folks who would like contribute to the column. I'm especially looking for S-BASIC programmers who have a strong background in Pascal. When BASIC programmers see what happens when they totally leave the line-number/goto style of coding and write really structured code they usually never go back. But the transition is sometimes difficult.

Also, I especially encourage you heavyweight Pascal types—who can leap tall algorithms with a single call, write 10,000 lines of code without a goto, and spot spaghetti coding at 100 paces—to try this language.

I'd like Micro C to become a clearing house for S-BASIC information and programs. It's certainly a very exciting language and this is certainly the right group of people for it.

Third Annual SOG

The third Annual SOG (Semi Official Get-together) will be July 27, 28, and 29 here in Bend. We are now working out the details, but we have already lined up a large log building with a kitchen, balconies for seminars and lots of covered space for people to display what they've been working on for the Big Board, Slicer, and Kaypro.

The building is on the site of an old fish hatchery. The hatchery is no longer there but the river and a large pond are still there. It's a very quiet and beautiful spot about 2 miles west of Bend.

We are going to have another white water raft trip. It is absolutely the best way to get acquainted (or reacquainted) with all those great folks who are building and writing and modifying, and expanding these neat systems.

You'll also get to see the new Micro C office. It's a cute little house in downtown Bend and we're just about moved in. More about moving Micro C out of our house for the first time in future issues.

Anyway, put the last weekend in July down on your calendar. This is one of the most popular areas for exploring, fishing, camping, sightseeing, and skiing in the Northwest. Come see what we've found.

David Thompson
Editor & Publisher