



## Rig of the Month Submittal: Printer-to-Computer-Project February, 2004



*By Allen C. Haid (a.k.a. BigAl)*

[scummins@cox.net](mailto:scummins@cox.net)

The most obvious question concerning the printer-to-computer project (PTCP) would have to be, “Why ruin a printer to make it into a computer”? Before I answer that question, I must explain how this printer came under my control.

The IT department at my office was trying to get rid of some old computer hardware in December 2003. They used a closed bid process, with the highest bidder winning the item. I put in a bid for a couple of printers and a scanner, and ended up with an old HP LaserJet 4 printer for \$6.50. There was no guarantee that the printer would work, and naturally, it didn’t work very well. In fact, paper jams and “low toner” were the keywords for this machine. I got so frustrated at one point that I even kicked the printer in the side. Definitely not a recommended response to a paper jam, but it was satisfying however.

Then I had this novel idea. If I stopped kicking the poor thing in the side, maybe I could turn the chassis into a computer. Yeah, I could do that. But it had to look like a printer. I really wanted this to be a stealth machine, something that could pass for the printer it once was. With an initial approval from my wife (for the money I would spend), I was free to tear into the printer and as I dug deeper, I started thinking about what type of computer this would become.

Right from the start, I knew that I had to document this project with lots of pictures. Not that I wanted to write a mod manual or anything like that, but I did want to show people in several forums I subscribe to (<http://www.cooltechzone.com/forums/viewtopic.php?t=16> and <http://www.pcabusers.net/forums/showthread.php?s=&threadid=32828> ) what was involved with fabricating a structure that would support the computer components. Figure 1 gives you a feel for the number of pieces I removed from the chassis; it took over two hours to pull this stuff out.

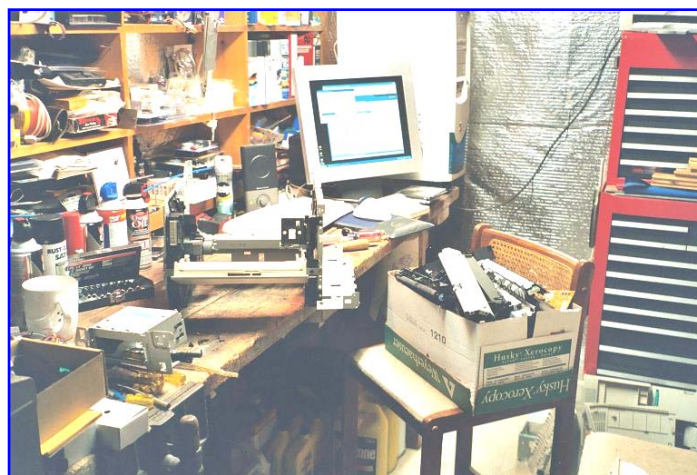


Figure 1. Box of parts pulled out of the printer chassis



## Rig of the Month Submittal: Printer-to-Computer-Project February, 2004



The first and probably the most significant problem I encountered was how to mount a motherboard in this sectional chassis. I did my best to retain the attachment points for the main sections, as I needed these intact to hold the outside trim pieces in place. The original base, which was above the removable paper tray, had a step in the middle – not a level surface. I had to cut this piece into two sections, and the result is shown in Figure 2. Other challenges included mounting a 400 Watt Antec Power Supply in the area when the original power supply was located, and adding some cross-flow ventilation, courtesy of a Thermaltake variable-speed fan. These items are also shown in Figure 2.



Figure 2. Fabricating a new base for the motherboard.

With the motherboard installation worked out (at least I thought so initially), I focused on the optical drive (generic DVD-ROM) and the hard drive (Western Digital 80 GB 8 MB cache). I decided to mount these in the removable paper tray, which meant I had to go to work with my Dremel tool and cut out the front of the tray. I have a tough time cutting things with a Dremel tool due to an old motorcycle injury to my right wrist. I get tired quickly, but the battery charge in the Dremel tool doesn't last long, so when the juice is gone, I've pretty much had it anyhow.

Remember that motherboard? Well, once I started placing the videocard (an old PNY Geforce4 Ti4200) and some sample PCI cards into the slots, I realized that a bracket was necessary to hold them in place. After searching my workshop for something appropriate, I ended up using hacksaw blades – yes, and they are sharp too. Anyway, I broke a few of them when twisting the blade 90 degrees to make a mounting point to the sides of the chassis. The end result works quite well, and is very stable. Figure 3 is a good shot of the upper mounting, and of my next challenge – a custom fan grill. As you can see, I cut out an HP logo in the side panel, and then mounted some black aluminum window screen behind it. I also placed two blue LEDs in-between the side panel and the chassis. That gives me a very cool glowing “HP” logo, one of the few indications that this is no ordinary laser printer! The rear panel required the most Dremel work. I think it took me two nights to cut this out, and there was lots of test fitting to make sure it would clear the ports, the power plug, and the hacksaw blade support structure.



## Rig of the Month Submittal: Printer-to-Computer-Project February, 2004



Figure 3. Hacksaw blades form the upper support for the AGP and PCI cards.

The remaining tasks were to integrate a power switch (into the rocker switch mechanism from the original design), the reset switch (mounted behind the front manual paper feed cover), the power LED (replacement for the original power light), the fan speed control (mounted to the rear panel), and something cool for the LED display that used to say “Ready”. I ended up printing “Bigal’s Computers” in white text on a black background, and then I cut the text out with an Exact-o blade so light could shine through my “stencil”. I mounted two red LEDs behind the stencil, and this looks pretty nice. My original thought was to integrate an LCD display into the existing LED panel, but these displays were too big. Besides, they cost upwards of \$80, and I was on a limited budget.

Final assembly was started almost the minute my Thermalright heat-pipe heatsink (SP-97) arrived. But I wasn’t too eager, thank goodness, because two of the mounting holes had surface mounted devices (SMDs) too close for comfort. In fact, I had to grind down two of the studs to provide adequate clearance over the SMDs before I tightened the studs down. After that, everything went together fine, and the converted printer booted up without a fight. I only had to reverse the wires on the power LED, and everything was fine. My motherboard (Shuttle MN31N, and nForce2 dual channel micro-ATX form factor), CPU (AMD Athlon XP 2500+), and memory (two sticks of Corsair XMS 256 MB PC3200 CAS 2.0) enjoyed the baseline operating parameters, but within a few hours of installing the OS (Windows XP Professional), I was over-clocking the CPU to 2.2 GHz (Athlon XP 3200+ rating) with a 200 MHz FSB. Figures 4-9 show some final pictures, and more details for parts of the assembly. The external case pieces are still intact, and the outward appearance is basically a laser printer. Inside however, lies the heart of a truly powerful computer, ready for gaming or just browsing the net.

Total time investment:	Approximately 60 hours
Total monetary investment:	\$500 plus small parts lying around my workshop
Next project:	It’s hard to say, but I have my eye on an old HP SCSI scanner....



## Rig of the Month Submittal: Printer-to-Computer-Project February, 2004



Figure 4. Finished – it still looks like a printer, but it's a powerful computer!



Figure 5. The Shuttle motherboard with the Thermalright SP-97 heatsink.



Figure 6. With the motherboard installed, it's time for the XMS memory.

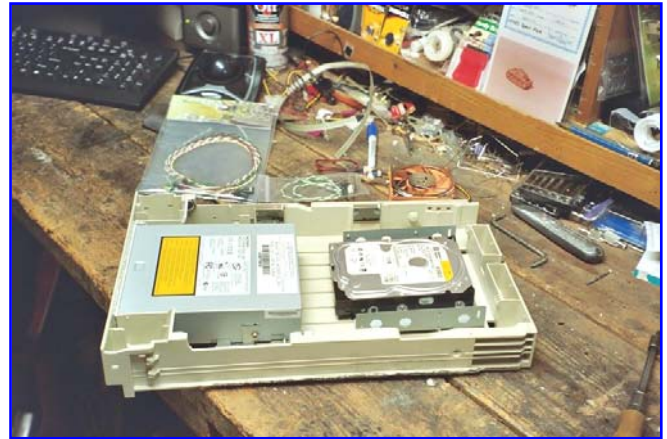


Figure 7. The paper tray holds the DVD and hard drives.



Figure 8. After creating a stencil, I used a Dremel to cut out the HP logo.



Figure 9. I used the existing rocker switch to activate the PC power switch.