

## Modifying a Thin Client into a Standalone Computer



Thin Clients are workstation terminal units with more than just server communication capabilities. They were designed to have more graphical capability at the workstation but still rely on the server for program and file storage. Some Thin Clients can be modified to load and run a full featured OS, including Linux. Most have many I/O ports for peripherals via, serial, parallel, multiple usb, sound, LAN, video, keyboard, and mouse ports. The cpu speeds, and RAM capacity vary on the model selected. Some have expandable RAM, up to 2Gb, and even a PCI or PCI-E slot. They are completely silent, (convection cooled), low power, 18-20 watts, no moving parts, and quite small, designed to mount on the back of a monitor. This makes them attractive for dedicated, remote, or any task that you don't want to tie up a desktop platform. They can be accessed via LAN, wired or wireless, or full VPN connection. They all have some embedded operating system, whether it be Windows CE, Window XPe, Linux, or a proprietary one, and the OS can be downloaded from the vendor's site if it has been wiped. The most *attractive* feature to me, is that on some of them, there is the ability to install a hard drive and load a full blown operating system.

Thin Clients can be obtained from a variety of sources. Look at office equipment liquidators, eBay, and postings on Craigslist. You will find the latest models command the highest prices, but not necessarily the most adaptable. Do your homework first, and look at the specifications and forums for the particular models that will fit your application. Thin Clients obviously can also be put on your local network with either with an assigned IP or DHCP via the RJ-45, or can run wireless with an inexpensive usb wireless adapter. There are many forums for modifying and using Thin Clients in standalone configurations. Your application may not require your usual full install of the OS on a hard drive and may do very well on the embedded version of the OS on the extensive flash memory. Also, if your model has a boot sequence in the bios, you can boot to one of the usb ports using a thumb drive.

The particular Thin Client I selected is an HP t5720 from eBay for \$40. It has a standard bios and is easily configurable. The flash comes preloaded with Windows XPe or Linux, but can be easily modified to use an inexpensive laptop IDE hard drive and install a full version of Windows XP Pro. The flash memory module is removed and the hard drive is plugged into a standard laptop hard drive 44 pin header. Laptop hard drives get the necessary supply voltages and data through the 20cm long, 44 pin cable. Simply match pin #1 of the hard drive to pin#1 of the motherboard. Windows XP Pro can be loaded as you would on any desktop via a usb cd drive. It came with the 100-240 VAC to 12 VDC adapter, so remote operation with any 12 VDC source is a plus.

### **General HP t5720 Specifications:**

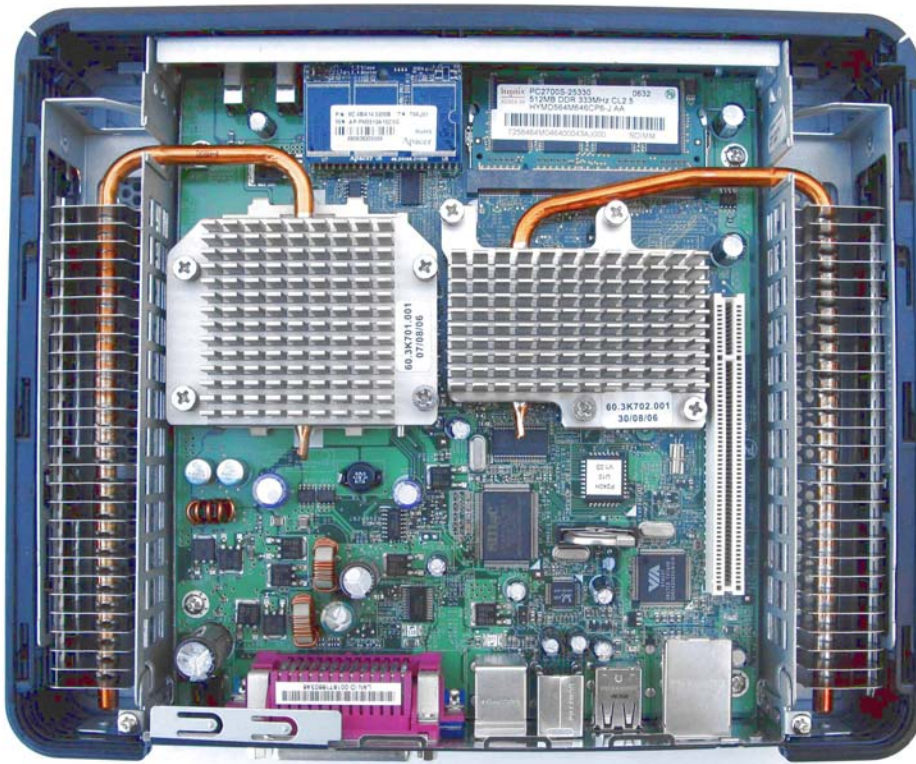
Processor: AMD Geode NX 1500 CPU, running at 1GHz.  
7th generation core (based on Mobile Athlon XP-M).  
Power management: AMD PowerNow!, ACPI 1.0b and ACPI 2.0.  
128 KB L1 cache.  
256 KB L2 cache with hardware data prefetch  
133 MHz Front Side Bus (FSB)  
3DNow!, MMX and SSE instruction sets

System Memory: 256MB, 512MB, or 1GB PC2700 DDR SDRAM SODIMM, 333MHz  
 Flash Memory: 1GB or 512MB (remove for hard drive modification)  
 Video: Video SiS741 GX Integrated, 2048 x 1536 max resolution, 32bit@60 Hz

USB ports: Six USB 2.0 ports (2 front / 4 rear)  
 Serial/Parallel: 1 Serial / 1 Parallel  
 PS/2 ports: 2 PS/2 (keyboard and mouse)  
 Audio: 16 bit stereo, 44 KHz sample rate (1/8" input and 1/8" output jacks), and built-in speaker.

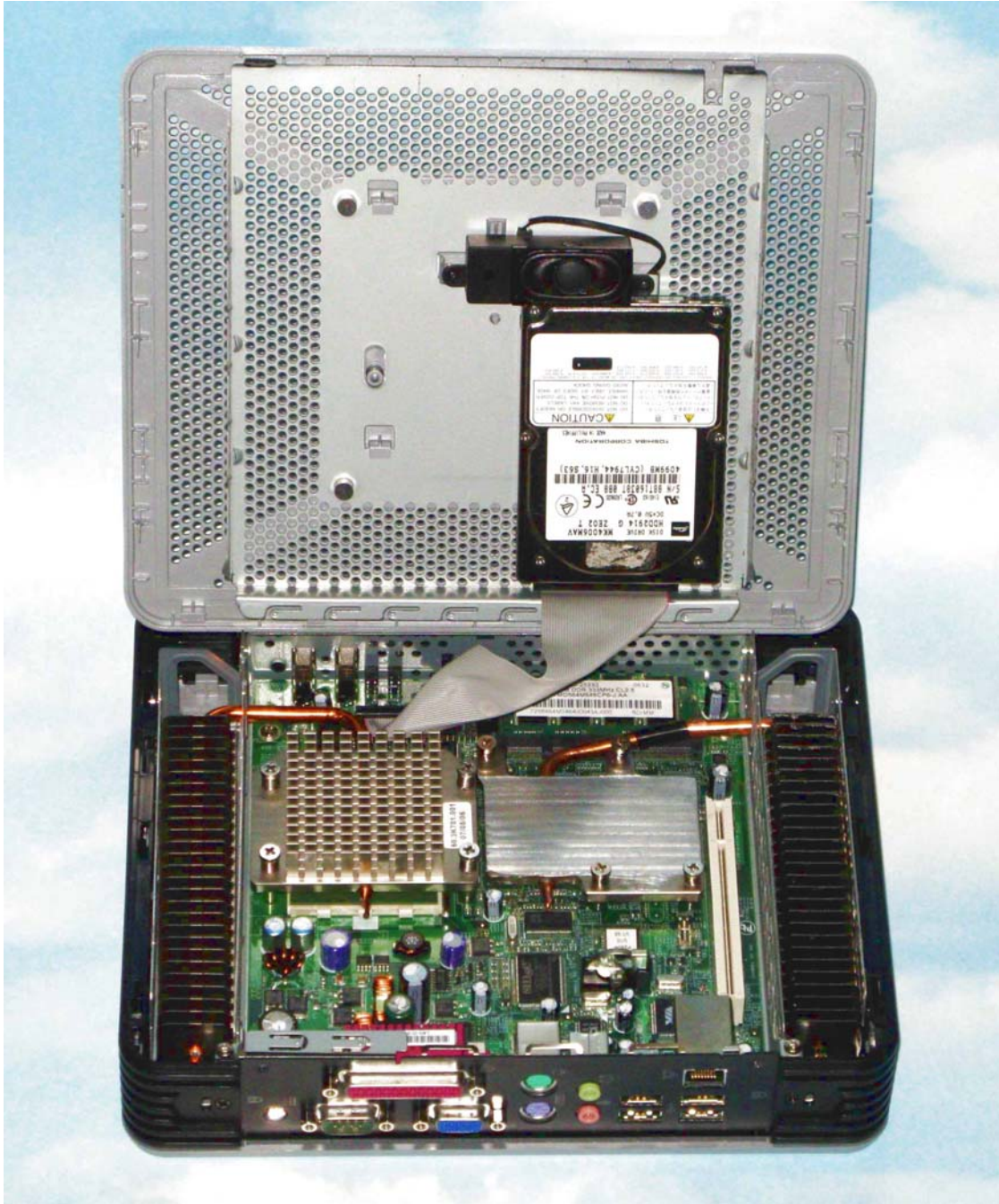
Networking: 10/100 BaseT Fast Ethernet, RJ-45  
 VPN Connection through MS Point-to-Point  
 Wake on LAN

PCI Expansion: 1 slot  
 Power Supply: 100-240VAC 50/60 Hz, to 12 VDC, 3.3 A adapter  
 Dimensions: 9.85"H x 8.09"D x 2.59"THK., Weight 3.7 lbs.



As received, with the cover removed...





I modified my HP t5720 by upgrading the motherboard BIOS from the HP site to v1.12a via bootable usb thumb drive, installed a surplus 2.5" 80GB IDE hard drive, and with a little creative fitting it mounts with screws to the inside of the case. After a full install of Windows XP Pro with SP3, and a upgrade to 1GB RAM, I have a fully functional, quiet, mini-desktop. I used HP's SP37648 for installing the bios, and SIS A12112D for the audio driver.

[http://qrpbuilder.com/wp-content/uploads/2016/11/t5720\\_video\\_drivers.zip](http://qrpbuilder.com/wp-content/uploads/2016/11/t5720_video_drivers.zip)

[http://qrpbuilder.com/wp-content/uploads/2016/11/t5720\\_audio\\_7012\\_107\\_xp.zip](http://qrpbuilder.com/wp-content/uploads/2016/11/t5720_audio_7012_107_xp.zip)

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