V0LT Workstation Build

The specs sheet and explanations for my main workstation

V0LT (Conner Vieira) – v0lttech.com

About 8 months ago, my 2016 MacBook Pro started to fail. This was the 5th time I had problems with manufacturing defects on the single computer, so I decided it was time to build my own from scratch. I started researching, and after months of learning and planning, I've finally finished building my first desktop workstation PC.

Quick specs:

CPU – Ryzen 9 3900X (12 core, 24 threads)

GPU – Sapphire Pulse BE AMD 5700 XT

Motherboard – MSI B-550 A Pro

RAM – 32GB (2 * 16GB) G.Skill DDR4 3600mhz

Case – Lian Li Lancool 205 (White)

CPU Cooler – AMD Wraith Prism

Storage – 1TB M.2 SSD

Display - LG 34GK950F-B (3440x1440p@144hz Ultrawide HDR)

PSU – Seasonic Focus+ 650W 80+ Gold

OS – Pop!_OS 20.04

Explanations:

CPU: In terms of computer components, CPU performance is critical for a lot of what I do. Having 24 threads drastically improves the computer's ability to process scenes with a lot of physics, as well as encoding songs and videos. Of course, the CPU is responsible for compiling code, which is something that has to be done very frequently while developing software. These 4 tasks are things I have to do very often for V0LT, so having a CPU with a lot of fast cores is critical for a workstation capable of providing a smooth experience. However, affordability is a concern as well. The next step up from the 3900X is the 3950X, which is significantly more expensive for just another 4 cores. To me, the cost to performance drops off too significantly to warrant upgrading to a 3950X over the 3900X.

GPU: The GPU is another computer component that's critical to what I do. Despite the fact that I'm not serious about playing games, being able to quickly render 3D models, load complex scenes in a game engine, or generate particles in an editor are all very important aspects of developing games. However, a fast GPU isn't particularly helpful if you spend too much time getting all of its features to work. Since I use Linux, Nvidia gets ruled out fairly quickly for this reason. This lead me to the 5700XT, which is AMD's most powerful 5000 series GPU. It's drivers are open source and baked into the Linux kernel, which makes it a great fit for game development on Linux. It also serves are a great placeholder to be upgraded to AMD's 6000 series after the drivers are more worked out on Linux.

Motherboard: The decision for the motherboard was based more on the components that attach to it, and less about the specifications of the board itself. Ensure compatibility with the processor was the first priority, as you would expect. After this, I looked for a board that didn't have RGB or gaming branding. Out of the remaining boards, I looked for one with dual PCIe 16x slots, which would allow me to run dual graphics cards in the future. From this selection, I looked for a board with good reviews, and settled on the MSI B550 A Pro.

RAM: I chose the RAM based on specs, and less on brand. I didn't want RGB, but otherwise, I didn't care what company it came from. I chose 32GB of RAM since I felt like it was a good balance between affordable and overkill. 16GB would be more than suitable for most of what I do, but having 32GB is enough to do everything without hassle. I can save 5 minutes of 3440x1440p@120fps screen record video to a memory buffer without making a dent in the RAM available to an video editor working with 4k video. I can simultaneously run a video editor, 3D modeling program, screen recording, and game engine, with plenty of memory to spare for wherever I may need it.

Case: I didn't put too much thought into the case. I just looked for a case that looked clean and modern with good airflow. I considered the NZXT H500, but decided against it due to its somewhat restrictive airflow design.

CPU Cooler: In terms of CPU cooler, I considered getting an AIO water cooler, but decided against it due to its complexity and cost. I don't plan on overclocking, since the 3900X provides plenty of processing power at its stock clocks, so the stock cooler is more than adequate.

Storage: Similar to the RAM and case, I didn't really care what brand the SSD was, and was more concerned with capacity, lifespan, and reviews. I went with a 1TB M.2 since I plan I purchasing a hard drive down the road for bulk storage. 1TB is more than enough for what I do on a day to day basis, and the speeds provided by an M.2 drive make developing content drastically faster than a hard drive.

Display: At first, I was looking to get two discrete monitors to place side by side. However, having one continuous display makes using a tiling window manager drastically more elegant and efficient, so I decided on a single, ultra-wide monitor. I wanted something that was one step above what I would probably need in all metrics. That means 1440p over 1080p, 144hz over 120hz, and 10-bit color over 8-bit color. The price of the LG 34GK950F-B is very steep, but being able to.

PSU: In terms of power supplies, I looked for something with good reviews, and enough overhead to allow me to upgrade my CPU and GPU down the line without having to purchase a new power supply. Based on my calculations, the PC in its current configuration uses just over 450 watts. This gives me about 200 watts of overhead. This is more than enough for an upgraded graphics card and CPU.

OS: As a strong supporter of free/libre software and privacy advocate, Windows was immediately off the table. At first, I considered Ubuntu due to its wide support. However, I disliked certain aspects, and how it seemed to force certain things on users. As a result, I chose to go with Pop!_OS, which is heavily Ubuntu based, but with various improvements. Pop!_OS is also developed by a hardware manufacturer, which means it has great built in compatibility with nearly all of the parts I used in my build.