Production Workstation Hardware & Performance Specification for Adobe Professionals

by: Scott Larson on 2016/02/19
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Due to evolving technology, this information will be out of date within a few years time, depending on your specific needs.

Scope

This article focuses on Photographers, Videographers, Editors and Production Specialists who are on a budget or have substantial resources for purchasing a workstation for photo or video productions.

Professionals who prefer to purchase and build there own workstations often come to me for advise on chosing the best hardware for the particular job they are trying to accomplish. Recently, a customer was having problems with performance in Adobe Premiere on his current workstation and wanted to know what might be causing the problem. I thought the best way to handle the question was to create a hardware and performance specification so if this question comes up in the near future I can refer prospects to this article who require more information to help make good hardware purchase choices.

In these types of situations the performance problem usually centers around three main areas:

1. Out of date or current hardware that under performs for the requirements of the job,
2. The performance configuration for the Windows operating system.
3. The performance configuration for the specific application.

With Adobe products like Photoshop, Premiere and Aftereffects, customers with certified and non-certified workstations alike, often have problems getting their workflow to run smoothly from a technical standpoint. My goal is to narrow down the cause of these kinds of issues and provide solutions.

The main concern when working with large data sets is the wait time, or time it takes for the screen to refresh when making or previewing changes to a large project. Editing images and video requires heavy use of processor, the bus speed of the motherboard and the storage device configuration. The application also needs to be configured correctly to force the hardware to handle the load. So the issue becomes a multifaceted one and its often difficult for professionals to locate the cause of the performance hit.

After careful research and testing on my own, I have come to the following conclusions that should resolve most of these performance related issues. But if none of these solutions are working for you, you may be having a problem with your current hardware or software that requires a full diagnostic to troubleshoot and repair. There are four main areas that need to be considered:

1. Improve Application Performance by Obtaining Recommended Hardware
2. Balancing the Cost/Performance Ratio For your Current Price Budget
3. Configuring a Production Workstation for Performance
4. Purchasing a New Workstation For Medium or Heavy Use.

1. Improve Application Performance by Obtaining Recommended Hardware

Adobe Products like Premiere, Photoshop, Aftereffects and Illustrator perform best when configured to use a processor with multiple cores and a lot of memory. A good hardware recommendation will depend on your editing/rendering workload. For editors who have minor or medium workloads, I recommend at a minimum an Intel Core i5-4690K Processor with 16GB of ram using the LGA1150 Intel Z97 Chipset architecture.

For heavy workloads, where you are rendering 8 hours a day, it's a good idea to invest in hardware that is designed for maximum data throughput. In these cases I recommend Intel Xeon Processors on the 2011v3 architecture with 24GB of DDR4 memory or more. The 2011v3 platform supports high capacities of ram and has faster performance between the components, but the price difference is significant compared to the LGA 1150 counterpart.

2. Balancing the Cost/Performance Ratio For your current price budget

Balancing the cost/performance ratio of your production workstation can be tricky. In the price to hardware percentages below I listed two types of architectures, depending on your workload from medium to heavy use. Typically, the medium grade workstations, rendering and previewing speeds will vary. Renders might take around 5-10 minutes per minute of footage, and previews could be relatively smooth or might be choppy especially if you are working with uncompressed video when moving the head across the timeline. Workstations built for heavy use, Renders will be reduced significantly due to the memory and storage device bandwidth, especially if you are reading and writing to a storage device that has a raid configuration, which is very good for uncompressed video or images. Whether you are on a budget or want to spend some serious money on customizing a workstation, there are plenty of options. Here is my recommendation on cost to hardware percentages help you decide where to put your money:

Percent Ratio	Hardware Catagory	Product Recommendation
20%	**Motherboard**	Asus, Gigabyte, or AsRock with the Z97, Z170 or 2011 Chipset
20%	**Storage Devices**	A minimum of two, if not four storage devices, or more depending on your requirements. SSD's are faster than HDD's, but they also have a shorter life span. Also, data corruption is a real possibility when the device or system fails. Make sure you have a secondary storage solution to maintain reliable backups as SSD data recovery is much more complicated than HDD recovery. For more information on a good storage device configuration, check out the

		drive layout recommendation in the "Configuring Adobe Premiere & Aftereffects for Performance" section.
20%	**Video Graphics Card**	Quadro K620 or better Desktop Graphics Card or a Quadro M5000 if you plan on doing a lot of 2d/3d Rendering. You can improve rendering performance on all system configurations if you get a good desktop graphics card that supports CUDA and you have it configured to be used correctly in Adobe Premiere/Aftereffects.
20%	**Processor**	i5 xxxxK, i7xxxxK, or Xeon or Better.
10%	**Memory**	As much memory as your motherboard can handle, depending on your budget. You should reserve at least 2GB of memory per core for the application, if not more for optimal performance.
10%	**Power Supply**	A Corsair, Seasonic, or better power supply with at least 650 Watts or more, depending on your Processor and Graphics Card/s. Your workstation's greatest strength is having enough reliable power, so don't skimp on a PSU. Otherwise you may experience problems with your workstation and not know where to start troubleshooting.

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3. Configuring Adobe Premiere & Aftereffects for Performance

When configuring your workstation for good performance, it's important to consider a good storage device configuration so you can get the best performance out of your software. The biggest performance hit will be how fast your system can read and write data while you working on your production files in the application. If your system is five years old, your limitation might be in the legacy hardware of your motherboard. If you have one storage device that you store all of your data on, your read and write throughput is going to suffer significantly. Depending on the situation, you want a minimum of at least two independent storage devices to read and write data. You can split them into two uses: one for the operating system, and windows virtual memory, and the other drive for projects, exports and disk caching. Ultimately, you should invest in at least four independent storage configuration. Each of them configured for a specific task. Below is a minimum baseline for a drive layout that will reduce the chance of reaching the storage medium's maximum bandwith:

Drive Layout Recommendation

Operating System	Disk Cache/Swap	Source/Captures	Project & Exported Files
Small 500GB or 1TB Single Drive/SSD or Raid 0 Configuration Storage Device	Small 120GB or 240GB Single Drive/SSD or Raid 0 Configuration Storage Device	2TB or Larger Single Drive/SSD or Raid 0 Configuration Storage Device	2TB or Larger Single Drive or Raid 0 Configuration Storage Device
Improves the overall speed of the operating system.	Having a small 120GB or 240GB SSD Helps improve timeline and rendering operations.	Having a large storage device with fast performance improves the ability to store and read captures.	Having a large storage device with good performance improves the ability to store project and exported files. It might be best not to go with an SSD storage device in this case unless you plan on maintaining good backups. My experienec has shown that SSD technology is less is reliable than HDD technology over time.

It's also very important that you configure Adobe Premiere/Aftereffects for your processor, memory and storage configuration for the best performance. Open up Adobe Premiere & Aftereffects and apply these changes:

Preferences

- Go to "Preferences" and select "Media and Disk Cache"

Disk Cache

- Check Enable Disk Cache
- Maximum Disk Cache: As big as possible.
- Disk Cache Drive: Set this drive to your fastest SSD Drive. The recommended size of this disk should be 64GB/128GB or larger depending on the size of your work loads

Conformed Media Cache

- Database: (Sources & Capture Drive): Larger Raid Array 1TB or bigger; Or a single SSD. You can also use a standard single hard disk drive with a large memory cache. Remember the slower this drive is the more it will impact rendering operations.

Memory & MultiProcesssing

Under the Memory Section Change:

- RAM Reserved for other applications: 6GB
- RAM available for: Premiere, Aftereffects

After Effects Multiprocessing:

- Check "Render Multiple Frames Simultaneously"
- Change CPU'S reserved for other applications: Half or 1/3rd of what you have in the "Installed CPU Cores" option above
- Change "Ram allocation per background cpu" At least 2GB per core
- Change "Actual CPU's that will be used" to Half your cores minus 1.

When you open a New Project check the following:

Under General check that "Video Rendering & Playback Renderer" is set to Cuda Support Graphics Processor

Scratch Disks

Configure Video and Audio Previews on the Cache/Swap Disk to be set to the appropriate scratch disk which should be an SSD or disk that is as fast as possible that is also independent of your source, operating system and project storage devices.

Making changes to your Virtual Memory in Windows to improve overall performance

Having your virtual memory set correctly helps the performance of the computer, you want to make sure that your Virtual Memory settings are set to an independent disk from your operating system, source, and project storage devices. In your Virtual Memory settings under "System Properties", "Advanced", "Performance Settings", "Virtual Memory" Change:

- Uncheck: Automatically manage paging file size for all drives

- Drive C: Unset or None for Paging File Size
- Then select your Swap Drive or another independent storage device that is not in use for anything else as the paging disk. Have it set to automatically adjust
- or for better performance set it to twice the size of your memory.

4. Purchasing a New Workstation For Medium or Heavy Use.

Here are two price part lists for professionals that require a custom medium or heavy use multimedia production workstation.

- [Production Workstation Hardware & Performance Specification for Adobe Professionals](#)
- [Heavy Use Custom Multimedia Production Workstation](#)

Scott Larson [designs custom workstations](#) for [professionals](#) of all types, If you have any questions about this specification or you are interested in purchasing a custom workstation, you can contact me by [requesting a free service quote](#).