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CAD Manager's Newsletter

STRATEGIES AND SOLUTIONS FOR THE REAL WORLD

By Robert Green

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Workstation Minimums for 2022 and Beyond

With the introduction of new workstation technology recently released, it's time to investigate the latest specifications for CAD.

One of the most asked questions I continue to receive from CAD managers is, "What are the minimum specifications for CAD workstations?" (In addition, the topic is one of the most searched on the Cadalyst.com web site.) This question comes from big company IT personnel, two-man design shops, and all sizes of companies in between. So, in this edition of the CAD Manager's Newsletter, I'll update my minimum workstation recommendations for 2022 and explain how I arrived at them in a format that you can send directly to your boss or IT department. Here goes.



Image source: Maksim Kabakou/stock.adobe.com.

General Workstation Truths

Every time I update workstation recommendations, I find the same two things to be true: Users want faster, more capable workstations and management wants to pay less. Yet with more of us working remotely rather than plugged into a corporate LAN, specifying workstations has become a bit tougher to answer.

Before I get into specifics, let's lay out a few guidelines that I've found to be true:

- **Cheap workstations don't save you money.** They only make your software operate slower and soon become obsolete.
- **Upgrading later usually isn't cost effective.** The idea that you can under configure a machine today and upgrade it next year is usually fool's gold. When you consider how quickly technology changes and consider the IT labor required to upgrade anything other than an SSD or maybe a graphics card, it just doesn't make sense.
- **Workstations are dirt cheap and help retain key staff.** I see plenty of companies that have 5-year-old boat anchor computers that drive away CAD power users. I recently spoke to one user who said, "If the company can't shell out \$3,000 to update our technology, why would they ever give me a raise?"

Now that I've got that off my chest, let's get into the specifics.

Processor/Cores

The processor and its cores are the heart and soul of your workstation. If you don't get this part right, you've failed before you start.

The first thing to consider for most CAD programs (think AutoCAD, BricsCAD, Revit, Civil 3D, SOLIDWORKS, etc.) is that processor selection is mostly about frequency (clock rate). CAD applications tend to run on a primary core so it is still better to have fewer, faster cores than more, slower cores. There is a push towards using more cores, but the change isn't dramatic and likely won't be for the popular legacy

tools mentioned above. And, since most high frequency processors have 8 or more cores anyway, the difference may be moot.

The parameters to consider are the base frequency (the speed of ALL the cores) and boost frequency (the maximum speed for a single core). If you consider that other applications are also running on the computer besides CAD (such as office applications, rendering tools, analysis modules, etc.). we can conclude that the best overall processor/core combination will have the highest base frequency AND the highest boost frequency. So, it would be better to have a 14-core processor at a 3.2GHz base frequency boosted to 5.5GHz than a 16-core processor at a 3.2GHz base frequency boosted to 5.0GHz, for example. For CAD, higher frequencies beat more cores every time.

Lastly, only processors with high amounts of cache and hyper-threading should be considered — this rules out Intel i3/i5 processors. What is left are the highest frequency Intel i7 and Intel i9 processors with the Intel i9's being preferred.

Intel Core i9-12xxx series processors provide great base (up to 3.2GHz) and boost (up to 5.5GHz) frequencies and are becoming available in a wide variety of machines (even some high-end laptops) but they are slightly more expensive. To save a little money you could step down to the Intel Core i7-12xxx family which clocks in at 3.6GHz and 5.0GHz boost frequencies.

Minimum recommendation: *An Intel i7 10700K processor with 8 cores would be considered the absolute minimum at this time, but Intel i9 11900 series processors provide 8 cores running at higher base and boost frequencies and are my suggested for minimum, if possible. These processors are faster (for higher productivity right now) and more capable of handling complex workloads (for updated software later). And, if you're going to buy a workstation to lasts you for 3 years or more, doesn't it make sense to buy something that has the latest technology today?*

Senior management note: *Processor selection is the one thing you can't upgrade later, so don't go cheap on your processor — get the higher speed Intel i9.*

RAM and SSDs

Having a fast processor is only part of the performance equation because all the other systems in the workstation support the processor so it can operate at its maximum speed. Given the huge model files that CAD software produces, it stands to reason that harmonizing your processor with the right RAM and SSD systems can you get the absolute best performance from your workstation.

Solid State Disk (SSD). Of course, the processor and RAM must load all the operating system, CAD software, and CAD data from somewhere and that somewhere is the SSD. The fastest available technologies now are NVMe-based SSDs that can read/write data at roughly 3,500/2,300 MB/sec, while older SATA SSDs can only provide read/write speeds of 550/500 MB/sec throughput.

Minimum purchasing recommendations: *Buy 32GB of the fastest technology RAM your workstation will support as a practical minimum for CAD. Buy a 1TB NVMe-based SSD as the boot disk so all operating system, software, and current project files are loaded from a fast SSD — secondary storage used for less frequent access can use cheaper SSD drives. These peripherals will squeeze every bit of power out of your processor for the entire life of the workstation.*

Upgrade recommendations: Bump the RAM up to 64GB for high-end power users and consider the latest NVMe drives like the Samsung 980 PRO that approach read/write speeds of 7,000/5,000 MB/sec. Finally, installing multiple SSDs in a RAID configuration can also spread the load across two drives which drives speed up even more.

Senior management note: Buying the RAM and SSD systems specified will give you awesome performance for years to come without having to replace any components or spending IT time on upgrades. **DO NOT SKIMP** on RAM and SSD components — buy the right components now and be done with it for the life of the machine.

What about GPUs? Many users a laptop, so what should you purchase? And, how can you make the most of your workstation purchases to keep costs down and management happy? Find out more! [Read more >>](#)

Tools & Resources



Webinar: Vehicle Development with Modeling and Simulation, 3 August, 2pm EST.

Using modeling and simulation (MODSIM) tools, OEM engineers can create and validate products in an integrated and digitally connected environment. Industry expert, Abelardo Garza, will discuss how Dassault Systèmes technologies help OEM engineers successfully create and validate products in a unique, integrated and digitally connected environment while increasing productivity, staying in-budget and meeting product launch schedules. [Register >>](#)

CASE STUDY: CadMouse Improves Workflow for Audi Class A Designers

3DConnexion's CadMouse family is a purpose-built line for design and engineering professionals. Find out how Audi has used the products to help them successfully complete projects all while keeping designers ergonomically safe. [Read more >>](#)



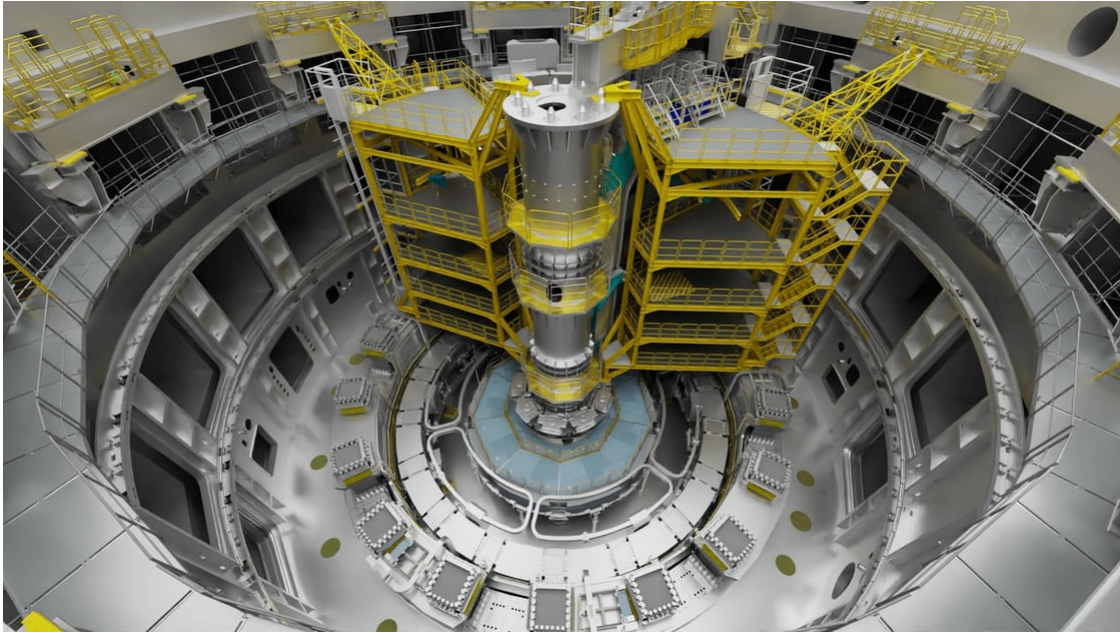
Archicad 26 Released

Graphisoft recently released a new version of flagship architectural design program Archicad. Archicad 26 offers improvements to automated design, documentation, and collaboration workflows. In addition find updates to attributes, navigation, plus enhancements to BIMx, and BIMcloud. [Learn more >>](#)

Autodesk App: Integrated CAD Library App

Ultra Librarian launched the Autodesk Fusion 360 Integrated CAD Library App on the Autodesk App Store. Autodesk collaborated with Ultra Librarian to generate this Fusion 360-compatible app that provides users with free verified schematic symbols, PCB footprints, 3D STEP models, and reference designs from Ultra Librarian directly within the user's software to streamline the design process. Fusion 360 is a cloud-based 3D modeling, CAD, CAM, CAE, and PCB software platform for product design and manufacturing. [Read more >>](#)

From Our Sponsors



Visualization Technology Helps Infrastructure Projects Come to Life

Highlighted at this year's NVIDIA GTC, virtual reality, metaverse, and other concepts are gaining traction and changing how AECO and infrastructure professionals work. By tapping into technologies and integrating them with newer technologies purpose built for infrastructure, engineering and construction teams are finding new ways to tackle project challenges and more readily complete key infrastructure improvements. [Read more >>](#)

What's New at Cadalyst



Herrera on Hardware: Smarter and More Comprehensive Visual Computing Tools Expanding Well Beyond Product Creation

Developing, maintaining, and refining products, buildings, and operations with digital twins. *By Alex Herrera* [Read more >>](#)

Viewpoint: Best Tips to Take the Design From CAD Drawing to CNC Fabrication

Using AI-powered automation tools to provide real-time quotes can bring reliable estimates for part fabrication. Find out how to leverage these techniques. *By Vincent Hua* [Read more >>](#)

Free Resources



CAD Manager Chronicles

Introducing Cadalyst's new CAD Manager Chronicles video series from CAD Management Expert Robert Green. In this kickoff episode, Robert discusses how best to use elevator pitches to make sure your CAD team gets the hardware, software, and support they need to be successful. [Watch the video](#)

From the editors of
cadalyst



Herrera on Hardware:

The Evolving Role of the Mobile Workstation

White Paper

Mobile vs. Desktop Workstations for CAD

The Evolving Role of the Mobile Workstation

It comes down to physics — a desktide can always outperform a mobile workstation. Cadalyst hardware expert, Alex Herrera, looks under the hood of both to break down the pros and cons of each form factor.

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The graphic features a dark blue header with the text 'cadalyst Pro Tips #9' in white. Below this is a yellow background with a dark blue border. On the left is an icon of a clipboard with the 'cadalyst' logo and a checklist with three checkmarks. To the right of the icon, the title 'TRAINING CHECKLISTS FOR CAD MANAGERS' is written in large, bold, black letters. Below the title, a paragraph of text reads: 'Conducting training can be overwhelming. Whether you're an experienced trainer or new to the process, it's easy to overlook details that you need to succeed. With a little guidance from CAD management expert, Robert Green, you can be sure you're ready.'

Cadalyst Pro Tip: Training Checklist for CAD Managers

Training is an essential task on every CAD manager's to-do list. But with all those little details to remember, preparing a clear, informative training session can ve overwhelming. Use this handy checklist from CAD management expert Robert Green to help you be successful.

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