HP Z230 Small Form Factor (SFF) Workstation delivers real ROI for AutoCAD® users

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HP recommends Windows.

"Hanging on to outdated, slow computers isn't really saving you money—it's costing you! Invest in a professional HP Z230 SFF Workstation that will boost AutoCAD productivity and deliver an ROI that you can't afford to ignore."

— Robert Green, CAD Consultant, Cadalyst

The HP Z230 SFF Workstation is an ideal AutoCAD platform

During the past several years of economic uncertainty, the trend of using less expensive, slower consumer-grade PCs for AutoCAD has become more common in the offices I visit as a CAD-management consultant. Not only that, but the common practice of pushing four- and five-year-old consumer PCs to run AutoCAD makes the situation even worse. With the recent introduction of the AutoCAD 2015 product line, Autodesk® has raised the bar on what you can do with its flagship CAD product, but what's the point if your old, slow hardware can't keep up? In this article, we'll examine why using a professional and surprisingly affordable workstation such as the HP Z230 SFF can actually lower your cost of ownership and deliver a great return on investment (ROI) compared to consumer PCs.

AutoCAD 2015 New Features

Anyone who uses a current version of AutoCAD knows that it isn't just for 2D drafting anymore. In fact, with the ability to import 3D geometry from other software packages or from 3D scanned point cloud files, AutoCAD is becoming a 2D/3D everything-for-everyone product in many companies, making 3D performance a much larger issue than it has been in years past.

Of course, the ability to visualize this 3D geometry requires computing resources and a graphics processing unit (GPU) that are well beyond the capabilities of most consumer PCs. Plus, as CAD models grow ever larger, the processor caching, system RAM speed, and controller technologies that bring the data from storage disk to processor must be more robust as well. In short, that four-year-old, dual-core machine with the generic graphics card, insufficient RAM, and old disk subsystems really isn't up to the tasks of today's AutoCAD.

Larson & Darby: A decade of benefits running workstations for AutoCAD®

> "Clients certainly aren't interested in our hardware issues. They want to know when their project is going to be done. If using workstation-class machines can allow us to do that work more efficiently, why wouldn't we make that investment?"

In a time when many design firms are just beginning to understand the benefits of using professional-grade workstations for AutoCAD, Larson & Darby Group has a decade of experience under its belt.

Based in Rockford, Illinois, the full-service architecture, engineering, interiors, and technology design firm was one of the first in its region to use computer-aided design, beginning in the early '80s with AutoCAD v1.8. Gedeon Trias, associate director of design, recalls running the software on IBM AT and XT PCs. "Some of our veteran staff joke about how it took half an hour for commands in AutoCAD to run on those old machines."

"From there, we used PCs of various types—until the late '90s–early 2000s. The PCs did their jobs well for most tasks, but they did have a tendency to be finicky depending on what they were asked to do. We were still doing a lot of drafting, but I was doing 3D, and PCs couldn't handle it. We were also using 3D Studio Max more frequently and running renderings overnight. Some serious issues arose as we more fully integrated 3D work into our design process; it was really taxing those machines. It wasn't quite 30 minutes

in between 3D commands, but the lag was noticeable—and all the more infuriating when a deadline was looming."

That's when the firm made the transition to workstation-class machines, Trias said. "The switch was in part an effort to standardize equipment as well as part of a major software upgrade. The group opted for HP xw4100s and HP xw6200s, 'plus a few xw8000s thrown in there,'" Trias said, and it has relied on HP workstations ever since. Today, approximately 25 workstation users are running a mix of HP Z220s, Z230s, Z620s, and Z800s to support CAD work with AutoCAD, building information modeling (BIM) with Autodesk® Revit, and design visualization with Autodesk 3ds Max Design.

Even more so than the increased power offered by workstations compared to PCs, Trias said he values the reliability. Hardware reliability should not be something any user has to contend with as he or she strives to finish a job, Trias explained.

Trias continued, "We've gotten plenty of lifetime out of our workstations without any major problems, and the computing power

has managed to keep up with what we were asking the machines to do. This certainly becomes more of an issue and more essential as we've made the transition to BIM."

Another bonus, Trias added: "I've become more and more impressed with how HP has handled the modularity of the workstation design," he said, referring to the tool-less chassis of the latest models that allows users to effortlessly replace or upgrade RAM, hard drives, graphics cards, power supplies, and other components. The procedure is just a matter of "popping out a couple of switches and swapping parts," Trias said. "In those instances when you do have to open up the case to replace or upgrade something, what in the past might have been a minor surgical operation is now an unbelievably painless process."

Does the firm ever second-guess the extra investment in workstation-caliber computers vs. standard PCs? Absolutely not, according to Trias. Whether using AutoCAD or more compute-intensive BIM and design visualization, the more you push your software, the more you need a workstation. "What we're doing is too important to leave [hardware reliability] to chance, and I think our clients would agree. Clients certainly aren't interested in our hardware issues. They want to know when their project is going to be done. If using workstation-class machines can allow us to do that work more efficiently, why wouldn't we make that investment? The extra investment isn't all that great when you consider what's at stake."

Workstations are cheap; old computers are expensive

Let's look at an example case based on an actual client experience I dealt with recently. It illustrates why keeping that old computer isn't the frugal move many companies think it is. We will examine a day in the life of Jim, a civil engineer who uses AutoCAD® to design roadways for a multi-disciplinary engineering firm.

For several years Jim has told his management team that he needs a workstation-class machine to do his job, but every year is told that "a workstation is simply too expensive." So, each day Jim fires up his four-year-old, dual-core machine equipped with 8 GB of RAM and generic graphics card and goes to battle with huge AutoCAD files. Crashes happen daily, often during the overnight sessions he relies on to render images for proposals, so he has to start over and over again. This adds up to at least five hours of lost time per week.

Here's where the story gets really interesting: Jim is a senior design engineer who is paid about $110,000 a year when benefits are taken into consideration. This pushes his internal rate to almost $80 per hour. This means that every week Jim loses $400 in productivity (5 hours x $80 per hour) due to lockups. If Jim works 48 weeks per year, his lost productivity jumps to an astounding $19,200 per year or $57,600 over the typical three-year life of a computer.

Conclusion: Jim's company unknowingly loses $57,600 in productivity over three years because "a $1,250 computer is too expensive."

Doesn't it all become clear when you look at the situation from this perspective? In reality, investing in new workstations costs less than running obsolete machines.

Confronting workstation costs

Traditionally workstations cost much more than consumer PCs and you can't purchase them at the corner big box office store. But a workstation such as the HP Z230 SFF is surprisingly affordable, and brings far more computing resources and reliability to the table than consumer PCs do.

Consider the price of the following HP Z230 SFF "Value Configuration" for AutoCAD, with an Intel® Core™ i7 quad-core processor[1] and you'll get the picture.

You now have a quad-core processor; a mechanical drive that provides 1 TB of data storage;[2] and a professional NVIDIA® Quadro® graphics card.

What will all this cost?
$1,250 (estimated), without a monitor.

Does it outperform the consumer PC?
Yes. The latest Intel Core i7, combined with professional graphics tuned for AutoCAD offers higher performance. Certified professional NVIDIA Quadro graphics with a 3-year next day parts replacement limited warranty make this professional class workstation, designed for

heavy workloads, much more powerful than a vanilla consumer PC.

For users seeking uncompromising power and performance, the HP Z230 SFF "Power Configuration" for AutoCAD offers an Intel Xeon® E3-1241 v3 processor[1] with 16 GB of ECC memory[3,4] support for improved reliability, a higher performance NVIDIA Quadro K620 professional graphics card, and the HP Z Turbo drive, a PCIe-based SSD storage solution that offers up to 2X the performance of conventional SATA SSDs to load applications rapidly and speed through large data set processing with ease. These SSDs can be combined with mechanical HDDs to meet the needs of the users needing to maximize storage space while still yielding blazing performance.

If you're still not convinced that the extra power and reliability isn't worth the extra investment, here's another way to look at it: A CAD professional will typically spend 5,760 hours at the computer in a three-year period. This means that an HP Z230 SFF Power Configuration Workstation such as the one referenced above will cost $0.29 per hour. Why would you ever force a highly compensated professional to suffer with an old, consumer PC when they could be so much more productive for so little?

For more information, visit hp.com/go/Z230

HP Z230 SFF Workstation with AutoCAD 2015 model by Larson & Darby

HP Z230 SFF	Value Configuration for AutoCAD	Power Configuration for AutoCAD
	Price: $1,250 (estimated)	Price: $1,680 (estimated)
Operating system	Windows 7 Professional 64-bit*	Windows 7 Professional 64-bit*
Processor[1]	Intel® Core™ i7 4790 3.6 GHz	Intel® Xeon® E3-1241 v3
Memory[3,4]	8 GB	16 GB ECC Memory
Graphics	NVIDIA® Quadro® K420 Professional Graphics	NVIDIA® Quadro® K620 Professional Graphics
Storage[2]	1 TB SATA 3 HDD	256 GB PCIe SSD Z Turbo Drive

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– Gedeon Trias, associate director of design, Larson & Darby Group

Real-world ROI

Going back to the story of Jim highlights how we can use a lost time study to make a financial case for new workstations. The trick is to figure out how much time you're losing by not having modern, fast, reliable workstations on your users' desktops.

Let's start the ROI discussion by asking these diagnostic questions:

- What does it cost every time a computer locks up or crashes?

- How much time do we lose due to slow rendering/processing of models?

- What does it cost when a computer breaks down?

- What does it cost to keep up with hardware drivers for new AutoCAD versions? *

- How much time will IT spend keeping computers up to date? *

- What are the implications when poorly performing computers keep us from optimizing design iteration and innovation?

- What does it cost to be stuck with consumer PCs that we can't upgrade?

*Note: On conventional PCs, these tasks are performed manually, typically by IT or power user staff, but can be performed automatically on workstations equipped with HP Performance Advisor software, which we'll talk about in an upcoming section.

Now the only remaining task is to total the time you are losing during a three-year service life of a new workstation and compute how long it will take to pay back the cost of the new workstation.

In Jim's case, the math based on five hours of crashes and restarts per week looks something like this:

- 5 hours/week x $80/hour = $400/week in lost productivity

- 48 weeks/year x 3 years x $400/week in losses = $57,600 total lost productivity

- $1,250 new workstation cost (Jim continues to use his existing monitor) divided by $57,600 over a period of three years = 1.1 months to pay back!

If you could invest $1,250 today to gain $57,600 in productivity in three years, would you do it?

Here's an ROI calculator to help you determine workstation ROI for your own environment.

See "HP Z230 SFF Workstation ROI Calculator" for details.

HP Z230 SFF Workstation ROI Calculator

Analyze the return on investment (ROI) of a new workstation over a three-year period.

AutoCAD Operator Rate ($/hr)			$40
IT/CAD Manager Rate ($/hr)			$40
Cost of New HP Z230 SFF Workstation plus Peripherals			$1250

CAD Time Saved		Hrs/week	Annual Savings	3 Year Savings
Due to speedier workflows		2	$3,840.00	$11,520.00
Due to reduced crashing/downtime		2	$3,840.00	$11,520.00
IT Time Saved		Hrs/year	Annual Savings	3 Year Savings
Locating/updating drivers		2	$100.00	$300.00
Costs Saved via 3 Year Warranty				3 Year Costs
Average PC 3 year repair costs - parts				$300.00
Average PC 3 year repair - labor				$300.00
			Total 3 Year Savings	$23,940.00

Measurement Category			ROI / Payback Ratio
3 Year Total ROI			1910%
Annual ROI			637%
Years to pay back			0.2

The NVIDIA® Quadro® K420 is a 1 GB DDR3 RAM card designed for professional AutoCAD users.

Performance saves time

If you're still not sold on the value of a workstation investment—or if you know you'll need more ammunition to convince your management—let's delve further into the many ways an HP Z230 SFF Workstation can help you save money in day-to-day CAD operations.

In the case of Jim we saw how an old, dual-core processor with slow RAM and disk systems can cause lockups and slow performance. To speed overall computing performance, the HP Z230 SFF brings workstation class resources to the table.

Certified graphics increase power and decrease problems

Because AutoCAD® 2015-based products do much more visual processing and 3D work than previous versions, the GPU now becomes a more important component to consider. When configured with an NVIDIA® Quadro® K420 graphics card—which is certified by Autodesk® to support AutoCAD 2015—the HP Z230 SFF has the graphics memory and power required not just for professional 2D, but 3D as well.

Why invest extra money in a professional, certified GPU for AutoCAD? This is an often-repeated and reasonable question that today has a new answer: AutoCAD 2015's new anti-aliasing graphics display and high-precision visual styles actually benefit from a powerful GPU to create a much more realistic and readable screen image—even when working with 2D linework and text, the difference is notable. And when working with point clouds or 3D geometry, the added GPU power makes a huge difference. Either way, the user experience is substantially speedier and crisper looking with 2015's GPU optimization.

HP Z Turbo Drive
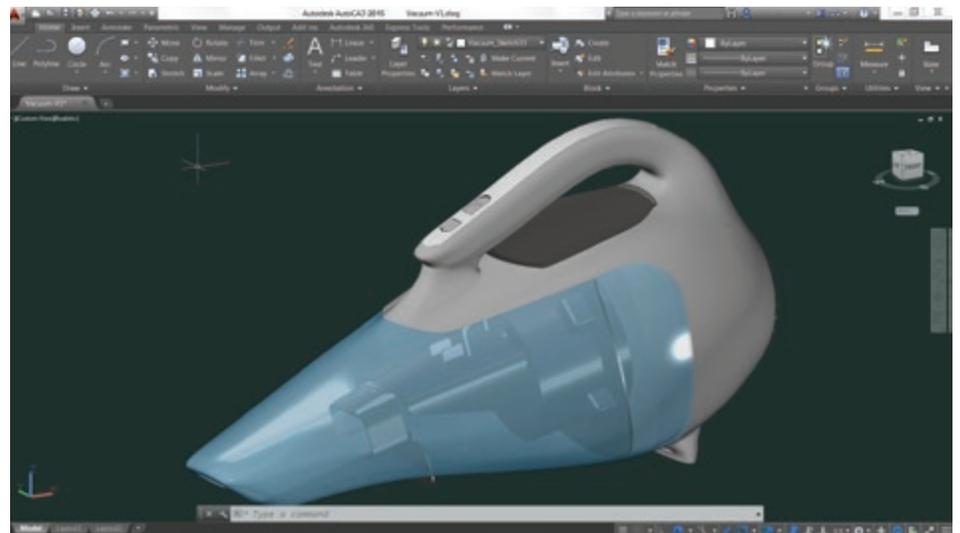
Greater use of GPU resources yields much better visual output in AutoCAD 2015 model and paper space viewports.
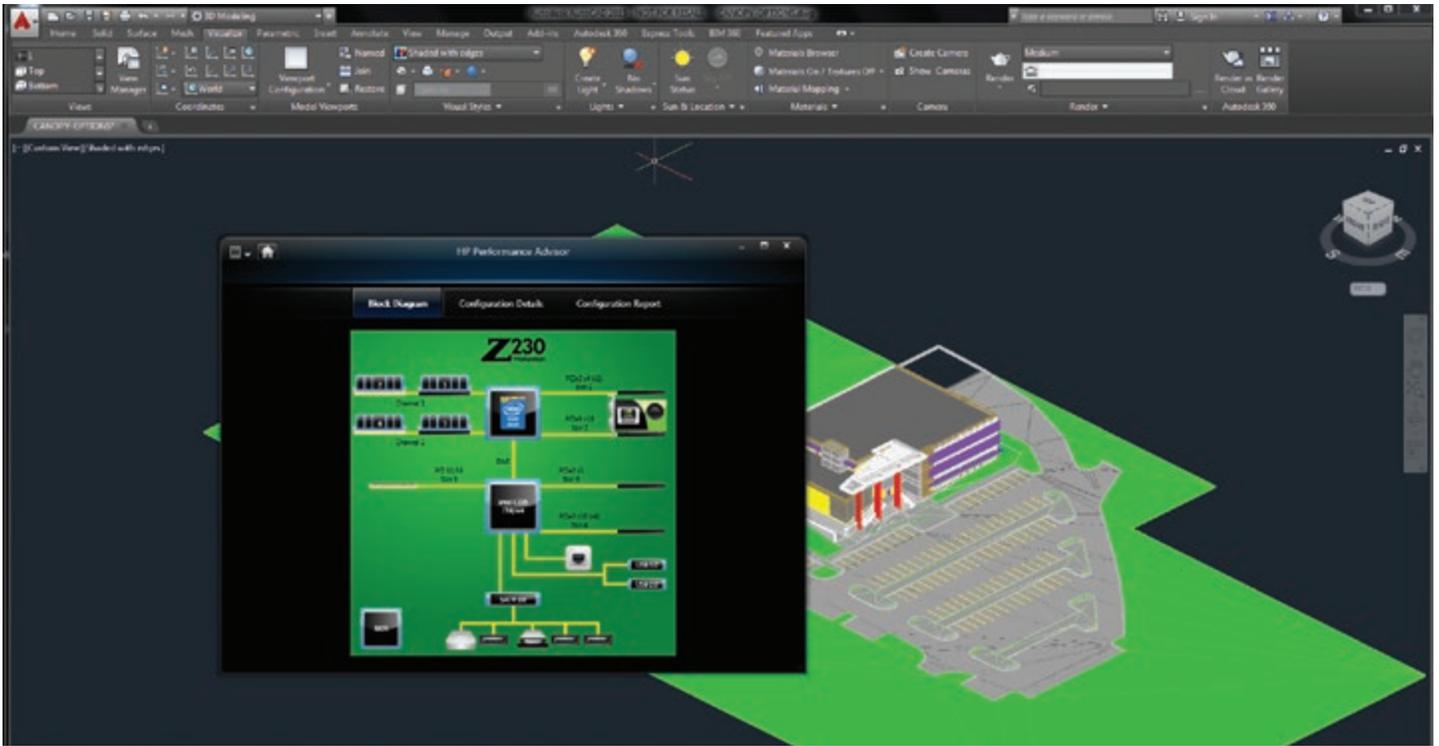
Serviceability cuts down time

With an included three-year parts and labor, next-day onsite replacement warranty,[5] the HP Z230 SFF won't surprise you with the repair costs that pop up for consumer PCs. Simply put, higher-grade workstation components and peripherals are designed from the ground up to be more reliable than consumer-grade products.

When something breaks on your consumer PC, how long does it take to fix? How much time does it take to keep hardware drivers up to date? Contrast your answers with the reality of owning a professional workstation such as the HP Z230 SFF, which offers features such as the following:

• Next-day parts replacement and onsite service. The exact part you need will be sent overnight for an easy swap out. How hard would it be to figure out and obtain the exact part you need to fix a consumer PC?

• Telephone support. HP Z Workstations all offer 24/7/365 phone support.

• Tool-free servicing. The HP Z230 SFF has a tool-free chassis that is easy to open and easy to service. No messing with screwdrivers, thumbscrews or cabling, just power down, swap out parts, and power up. This is also very handy if you decide to upgrade components in the future.

HP Performance Advisor[6]

Configuration and certified driver management. HP Z230 SFF Workstations come equipped with HP Performance Advisor, a utility that tracks your software application drivers for graphics cards and automatically installs them when greater performance may be obtained. In addition to driver management, HP Performance Advisor gives users the ability to customize functions such as processor prioritization for specific applications to yield greater performance for the applications used most often. This functionality is especially valuable when Autodesk® upgrades are released.

For more information, visit
hp.com/go/hpperformanceadvisor

HP Performance Advisor keeps track of device and driver configurations so you don't have to.

Maximize your workstation performance

Top performer. Tuned for AutoCAD
Maximize your entire workstation environment with HP Performance Advisor.

Complete system view at your fingertips
Gain a quick and accurate understanding of your entire system in one simple, intelligent interface.

Identify performance bottlenecks
Ensure top performance throughout the entire life of your workstation with quick and easy performance analysis.
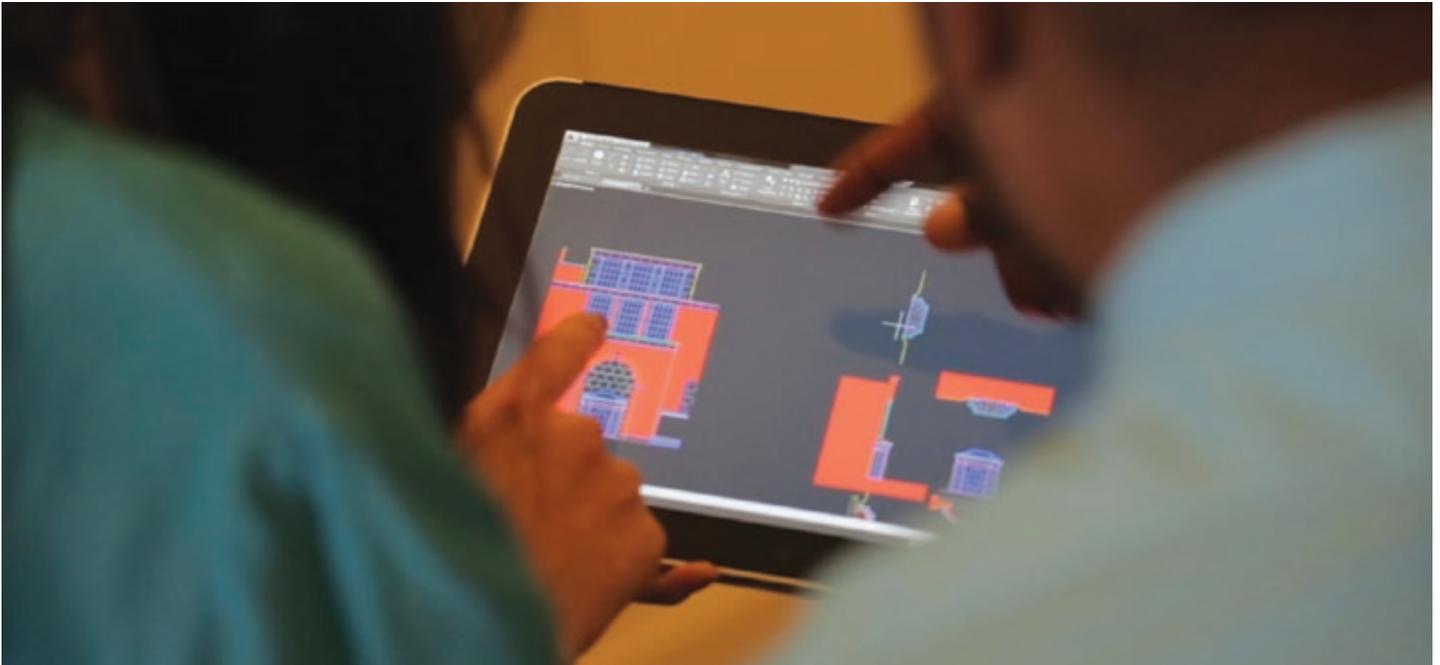
Benefits from unlimited remote access

Real-time collaboration
Share your workstation screen with multiple users simultaneously—grant view-only or full interactive access.

Remote workers
Professionals can connect to their HP Z Workstations from remote computers at any location.

Workstation class mobility even on a tablet
Get complete remote access to the full power of your workstation and your professional workstation-class applications when off-site,[8] even when using a tablet.[9]

HP Remote Graphics Software[7]

By using HP Remote Graphics Software (RGS), included with the HP Z230 SFF, AutoCAD users can access their HP Z230 SFF Workstation from home, the road, their laptop or wherever they happen to be. HP's RGS software is a remote desktop solution for serious workstation users and their most demanding 2D, 3D, and data-intensive applications. This advanced tool lets users access and share the desktop of their workstation to full advantage of the compute and graphics resources of the HP Z230 SFF remote system.

HP RGS uses highly compressed graphics algorithms to provide a "just like being there" remote work experience that feels much more natural than other web based remote control programs I've used. With HP RGS, your HP Z230 SFF is always utilized and never sits unused no matter where your workstation users happen to be.

For more information, visit hp.com/go/rgs

Analyzing your options

If a move to AutoCAD® 2015 is in your future, consider some of the parameters discussed to analyze your options. While we can't do the analysis for you, we can make the process easier by encouraging you to use the companion ROI calculator to calculate the savings you might achieve by converting your old, slow consumer computers and

non-supported XP machines to HP Z230 SFF Workstations. You'll find all the information you'll need in the ROI calculator so you can crunch through as many user scenarios as you like.

Summing up

I hope this write-up has brought home the message that hanging on to outdated, slow computers isn't really saving you money—it's costing you! Avoid the mistake made by Jim's company and invest in a professional HP Z230 SFF Workstation that will boost AutoCAD productivity and deliver an ROI that you can't afford to ignore.

Robert Green
Contributing Editor, Cadalyst

Robert provides CAD implementation, consulting, and programming services for a variety of companies throughout the United States and Canada. He holds a degree in mechanical engineering from the Georgia Institute of Technology and is the author of Expert CAD Management: The Complete Guide. Reach him via his web site at cad-manager.com.

HP Z Workstations for AutoCAD® featuring Lynn Allen

Learn more at
hp.com/go/AutoCAD

Screen images courtesy of Autodesk, Inc.

Images/drawings courtesy of Larson & Darby Group/UIC University of Illinois College of Medicine at Rockford

*Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. See microsoft.com.

1. Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing system required. Performance will vary depending on your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

2. For hard drives and solid state drives, 1 GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 10GB of system disk (for Windows 7) is reserved for system recovery software.

3. Each processor supports up to 2 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel. Maximum memory capacities assume Windows 64-bit operating systems or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

4. Intel® Xeon® E3, Intel Core i3 and Intel Pentium processors can support either ECC or non-ECC memory. Intel Core i5 and i7 processors only support non-ECC memory.

5. HP Care Services are optional extended service contracts that go beyond the standard limited warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Services Lookup Tool at hp.com/go/cpc. Additional HP Care Services information by product is available at hp.com/go/carepack. Service levels and response times for HP Care Services may vary depending on your geographic location.

6. HP Performance Advisor requires Windows and an internet connection.

7. Remote Graphics Software requires Windows and internet access.

8. Requires network connection. Performance dependent on network latency and image frame content.

9. Windows 8 tablets only.

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