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HP Smart Buys

HP Z210 CMT Workstation
Special deals starting at $659.

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HP Z400 Workstation
Special deals starting at $924.

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HP's Z210 Workstations
Great value for mainstream CAD on a budget.

By Robert Green, *Cadalyst* Contributing Expert

Look around your company and take stock of what CAD users actually do and you'll see that some need ultra powerful workstations for animations, analysis, and rendering but most simply need solid performance for mainstream 2D and some 3D modeling tasks. The latter category of users really don't need a high-end workstation but they do need multiple cores, 64-bit operating systems, decent graphics, fast disks and more RAM than consumer grade PC's can provide.[2]

What these users need is an entry-level workstation that delivers great performance at a value price. HP is addressing exactly this need with its latest HP Z Series Workstations: the HP Z210 CMT Workstation (convertable mini-tower) and HP Z210 SFF Workstation (small form factor). Prices for the HP Z210 CMT Workstation start at $759.

The HP Z Workstation Family

The HP Z Workstation family includes five models with progressively more impressive specifications. The HP Z210 CMT Workstation and HP Z210 SFF Workstation (see figure below) join the HP Z400, HP Z600, and HP Z800 Workstations to offer a comprehensive range of machines that support anything from mainstream CAD (the HP Z210) to no-holds-barred, high-end power for analysts and animators (the HP Z800).

The HP Z210 CMT Workstation and HP Z210 SFF Workstation (at right) have front accessible drive bays but otherwise maintain front accessible USB and FireWire ports and vertical pipe styling like their siblings the HP Z800, HP Z600, and HP Z400.

Beefy Specs

Because the HP Z210's are the entry-level HP Z Workstations (replacing the HP Z200 before it) you might think that it would be lacking in features, options, or expandability — but in reality they provide substantial performance capabilities. The HP Z210's single-processor architecture (the HP Z600 and HP Z800 support dual processors[1,3]) and 16 GB RAM limitation (the HP Z800 tops out at 192 GB by comparison) provide more than adequate resources for most CAD applications.

In fact, the specifications for the HP Z210 are quite robust.

Processor and RAM. The HP Z210's single-processor architecture is based on the Intel c206 chip set supporting Intel Core i3 dual-core, Intel Core i5/i7 quad-core (with Intel Vpro™) or Intel Xeon E3 quad-core (with Intel vPro™) processors[1,2,3] addressing up to 16 GB of ECC or non-ECC 1,333-MHz RAM in four memory DIMM slots (the HP Z210 CMT Workstation will also support 32 GB of ECC RAM using 8 GB modules when available later this year). These multicore processors and RAM specifications provide an ideal platform for Windows 7 operating systems.*

Processor cores, cache, and memory technology varies widely as follows:

- Intel Core i3 dual-core processors max out at a 3.30-GHz clock speed with 3 MB of Intel Smart Cache spread over four processing threads and two-channel DDR memory architecture.[1,3]
- Intel Core i5 quad-core processors max out at a 3.30-GHz clock speed with 6 MB of Intel Smart Cache and Intel Turbo Boost Technology spread over eight processing threads and two-channel DDR memory architecture.[1,3]
- Intel Core i7 quad-core processors max out at a 3.40-GHz clock speed with 8 MB of Intel Smart Cache, Intel Turbo Boost and with Intel vPro™ spread over eight processing threads and two-channel DDR memory architecture.[1,3]
- Intel Intel Xeon E3 quad-core processors max out at a 3.50 GHz clock speed with 6 or 8 MB of Intel Smart Cache, Intel Turbo Boost and with Intel vPro™ spread over eight processing threads and two-channel DDR memory architecture.[1,3]

Drives and chassis. The HP Z210 CMT Workstation is built in a mid-tower size, tool-free chassis that features three internal 3.5-inch drive bays and three external 5.25-inch drive bays to accommodate a variety of hard drives from 160 GB to 1.5 TB in capacity and 4.5 TB total storage. An integrated SATA 3-GB/second drive controller supporting RAID 0, 1, 5, and 10 protocols handles hard drives from 7200 to 10,000 rpm as well as solid state (SSD) drives.[4,5]

The HP Z210 SFF Workstation is housed in a mini-tower tool-free chassis that features one internal 3.5-inch drive bay, an internal/external shared 3.5-inch drive bay and one 5.25-inch drive bay to accommodate a variety of hard drives from 160 GB to 1.0 TB in capacity and 2.0 TB total storage. An integrated SATA 3-GB/second drive controller handles hard drives from 7200 to 10,000 rpm as well as solid state (SSD) drives though drive bay limitations preclude RAID support.[4,5]

Graphics. The HP Z210 Workstations feature an on-board Intel HD 2000 graphics for Intel Core i3, i5 and i7 processors[3] and Intel HD P3000 graphics for Intel Xeon E3 processors to enable high performance 2D, single screen graphics suitable for many CAD users without an add on graphics card.

To enable accelerated 2D or 3D performance beyond the included HD graphics, the HP Z210 CMT Workstation and HP Z210 SFF Workstation both support the following graphics cards:

- For professional 2D: AMD FirePro 2270, NVIDIA Quadro NVS 295, NVIDIA NVS 300—single or dual graphics cards supported
- For entry-level 3D: ATI FirePro V3800, NVIDIA Quadro 400, NVIDIA Quadro

600

Due to its larger chassis and power supply the HP Z210 CMT Workstation supports the following graphics cards:

- For mid-range 3D: ATI FirePro V4800, ATI FirePro V5800, NVIDIA Quadro 2000, NVIDIA Quadro 4000 (AMO only)

Abundant connections. One of my pet peeves is having to crawl under the desk to connect a portable hard drive, digital camera or memory stick. There are no problems like that on the HP Z210's as it has three (3) (HP Z210 CMT Workstation) or four (4) (HP Z210 SFF Workstation) USB ports, FireWire (optional), microphone, and headphone connections located centrally in the front of the machine along with six (6) more USB ports, audio inputs and outputs, DVI and DisplayPort digital video outputs on the back. No more struggling to find the connector you need.

Cheaper and Easier to Maintain. The HP Z210's processor capabilities, memory capacity, and graphics capabilities at a great price are one thing but the machine has several other features that make maintaining and working with the machine less costly over time — making them easier to justify.

Energy consumption. The ENERGY STAR-certified HP Z210 CMT Workstation has a 90% efficient, 400-W power supply that drives a full complement of disks and graphics boards while the smaller HP Z210 SFF Workstation has a 90% efficient, 240-W unit. As with all HP Z Workstations, the HP Z210 uses HP WattSaver technology allows for less than 1-W power consumption in standby mode for substantial energy cost savings throughout the life of the workstation.

Configuration and driver management. The HP Z210 Series Workstations are equipped with HP Performance Advisor, a configuration-management software tool that tracks CAD application drivers and 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.

If you've ever wished you could tune up your machine and have it stay optimally configured without searching for updates, patches, and drivers, then Performance Advisor is the application you've wanted. In fact during a three-year life span (the warranty period for the HP Z210), being able to avoid spending several hours per year keeping track of hardware and software drivers can substantially lower the cost of owning a HP Z210.

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

Tool-free chassis. The HP Z210's, like the other HP Z Series Workstations, has a tool-free chassis design that lets IT staff swap interior components faster than other machines, which makes it easily serviceable and lowers the cost of maintenance over time as well.

Justifying the Cost

Let's face it — your boss isn't going to buy you a new workstation because it is cool or because you really, really want one. Your company is only going to invest in a new workstation if it pays for itself. To justify a HP Z210, you must make a financial case, which isn't hard to do, given the HP Z210's low price. Here's how:

- Find the cost of the workstation in your specific configuration.
- Compute the user-time savings due to faster processing.
- Compute the IT configuration-time savings due to HP Performance Advisor.
- Compute the savings due to lowered energy usage.

For the purposes of these calculations, I'll assume that all labor time is valued at $50/hour and that the lifetime of the HP Z210 Workstation is three years. You can use the following calculations as examples to compute your own numbers.

Machine cost. Obviously machine cost depends on how the machine is configured. You can go to HP's Configurable HP Z210 Workstation SATA/SAS page to find an exact cost, but for the purposes of this discussion I'll use $1,278 for a workstation with a 3.1-GHz i3 series processor, a 1 TB hard drive[5], and 8 GB of RAM.

Savings due to faster processing.[6] What would it mean if you could save an engineer one-half hour per week by giving him or her a faster workstation? What would the savings be over the three-year life of your workstation? Using a labor rate of $50/hour and assuming a 48-week year, the calculation would look something like this:

0.5 hour/week X $50/hour X 48 weeks/year X 3 years =

0.5 X $50 X 48 X 3 = $3,600

Savings due to HP Performance Advisor.[6] What would it mean if you could cut 4 hours of IT support time each year by keeping your workstation optimally configured using HP Performance Advisor? Using a labor rate of $50/hour over a three-year machine lifetime, the calculation would look like this:

4 hours/year X $50/hour X 3 years =

4 X $50 X 3 = $600

Final justification. The examples above show that even modest time savings compounded over a few years can far exceed machine cost. In fact, our examples resulted in a $4,200 time savings in three years, given a $1,278 cost. Therefore, the machine pays for itself in slightly less than the first year you own it. Or simply divide your $4,200 savings by the $1,278 cost of the workstation to compute a 329% three-year return on investment (ROI) for the workstation.

Wrapping Up

Given the tendency for computer makers to always push for bigger, faster, and more expensive hardware, HP's Z210 Workstation is a refreshing change. By providing performance features that are more than adequate for high-end 2D and mid-level 3D in an affordable, expandable 64-bit-capable machine, HP has made it affordable to own the latest Intel technology.

If you work with big 2D models, medium-sized 3D models, or even perform occasional rendering or analysis work, the HP Z210 Workstations may provide exactly the right price-to-performance ratio for you.

About the Author

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DISCLAIMERS

(1) Dual-Core and Quad-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; Not all customers or software applications will necessarily benefit from use of these technologies.

(2) 64-bit computing on Intel architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See http://www.intel.com/info/em64t for more information.

(3) Intel's numbering is not a measurement of higher performance.

(4) SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.

(5) For hard drives, 1 GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 20 GB of hard drive (or system disk) is reserved for the system recovery software for Windows 7.

(6) Note that these are the author's estimates for the purpose of example, and not intended to be accurate in individual situations, as users' experiences will vary depending on their circumstances and implementation.

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