CAD Road Warriors Need Powerful Grab and Go Computing

HP EliteBook 8560w and 8760w Mobile Workstations

By Robert Green, *Cadalyst* Contributing Expert

As CAD software becomes more powerful, models become larger, and rendering high-resolution images becomes a common expectation, CAD road warriors carrying ordinary laptops are increasingly not able to perform as needed. And who's to say that a great design idea won't come to you sitting in an airport, hotel or coffee shop? Would your low power laptop allow you to work through your idea in these cases?

For power-hungry CAD users trying to design while on the road, a mobile workstation such as HP's EliteBook 8560w Mobile Workstation and EliteBook 8760w Mobile Workstation bring the features and speed required.

What's the Difference?

That is: what's the difference between a consumer grade laptop and a mobile workstation? The fact of the matter is that CAD applications simply require more power to run well compared to general office software, and thus overwhelm conventional consumer laptops. Mobile workstations offer higher speed multi-core processors, RAM, high-speed hard drives, and high-resolution graphics accelerators required to run 3D CAD and rendering applications.[1]

Special deals starting at $640.

Screen image courtesy of Autodesk

HP Z400 Workstation
Special deals starting at $924.

Screen image courtesy of Autodesk

HP Z600 Workstation
Special deals starting at $1,729.

Screen image courtesy of Cannon Design

HP Z800 Workstation
Special deals starting at $1,813.

Screen image courtesy of Autodesk

Figure 1. The HP EliteBook 8560w Mobile Workstation has a 15.6" screen size which makes it the same size and just as portable as consumer laptops, but it possesses workstation class features.

Processor and Memory

Both the HP EliteBook 8760w Mobile Workstation (17.3 Inch) and HP EliteBook 8560w Mobile Workstation (15.6 inch) are built on Intel's QM67 mobile chipset. Processor selections include: the Intel® Core™ i5 dual core 2520M (2.50GHz, 3 MB cache) or 2540M (2.60GHz, 3 MB cache); or Intel® Core™ i7 processors ranging from the low end dual core 2620M (2.7GHz, 4 MB cache model) up to the quad core 2960M (2.70GHz, 8 MB cache model) model). Quad core models support up to 32 GB of RAM using 8 GB modules while dual cores top out at 16 GB. Using less expensive 4 GB modules yields 16 GB and 8 GB, respectively. (Most of the i7 quad core processors support Intel vPro or Extreme technology with intelligent turbo speeds of up to 3.50GHz.)[2,3,4]

Figure 2. Intel's Core™ i7 2920XM 2.50GHz chips provide Quad Core power, 32 GB of 1600Mz RAM capability and vPro turbo speeds of 3.50GHz.

With these processors and memory capacities, you can see how anything from an 8 GB dual core machine to a 32 GB quad core can be configured for virtually any type of CAD workload. In fact, the mobile workstations compare very favorably with HP's Z200 Series Workstations.

Hard Disks

With most consumer laptops now offering hard drives up to 500 GB[5] in size, storage space is no longer an issue, but drive speeds of 4200 to 5400RPM mean less disk throughput than the 7200RPM drives found on HP's Mobile Workstations.

While you may not think that disk speed would matter that much, consider how much disk activity you see on a normal workstation that works with complex BIM or mechanical models, then you'll begin to understand how critical higher speed drives are for CAD workstations. HP Mobile Workstations offer two separate drive bays that can each accommodate a 320 GB to 750 GB[5] 7200RPM hard drive or a 128/256 GB solid state drive (SSD) for cases where extreme access speed is required. An

additional 500 GB 7200RPM drive may also be installed in place of DVD/CD drives in the expansion bay if desired.

Ruggedness and Weight

The feel of both HP Mobile Workstations is sturdy and solid — noticeably more so than the all plastic construction of many consumer notebooks. Built on a stamped metal chassis that conforms to military standards (MIL-STD 810G) for drops, vibration, dirt infiltration, altitude, and high temperature operation, these machines won't flinch at an aggressive toss into an overhead bin.[6]

In addition to the rugged construction, both mobile workstations are configured with HP 3D DriveGuard which used a 3-axis digital accelerometer to automatically park the hard drive heads when adverse motion conditions are sensed. The optional 128 GB or 256 GB Solid State Drive (SSD) can also be used to provide even greater resistance to aggressive vibration environments.

Figure 3. HP 3D DriveGuard protects the disk against mechanical jarring and parks the drive automatically so you can move your workstation without worrying about data loss.

Surprisingly the ruggedness of these machines doesn't make the units overly heavy, especially for the power they bring to bear. The 17.3" HP 8670w weighs in at 7.8 lbs.[7] while the 15.6" HP 8650w is 6.9 lbs.[7] (both weights include the DVD drive in the expansion bay and a single hard drive). If weight is an overriding concern, the smaller 14" HP 8640w Mobile Workstation comes in at 4.9 lbs with the DVD drive removed (5.2 lbs installed).

Graphics System

With many consumer laptops achieving only 1280 x 800 resolution and 32-bit color the ability to render true color, full size images or displaying true HD simply isn't in the cards. Both HP Mobile Workstations support HD+[8] (1600 x 900), FHD (1920 x 1080) and DreamColor (1920 x 1080 at 1 billion plus colors). Perfect for CAD users.

To support popular CAD applications, both machines support high-end ISV certified graphics accelerators from AMD and NVIDIA that span a wide range of graphics memory and screen configurations. The HP 8560w supports the AMD FirePro M5950 with 1 GB of GDDR5 RAM and NVIDIA Quadro 1000/2000M cards with 2 GB of DDR3 RAM into a 15.6" display while the HP 8760w supports the FirePro M5950 and NVIDIA Quadro 3000M/42000M/5010M cards with 2/2/4 GB of GDDR5 RAM, respectively, into a 17.3" display. Given the resolution and memory configuration possibilities, HP Mobile Workstations have the graphical power required for virtually any rendering, animation,

and CAD application you're likely to run.

And, if you present to clients in boardrooms, at the office or at tradeshows, the ability to use a variety of analog (VGA) and digital connectors to drive projectors or external monitors at up to full HD resolution gives you a wide range of options.

Figure 4. The HP EliteBook 8760w Mobile Workstation has a 17.3" screen size which makes it the same size and just as portable as consumer laptops, but possesses workstation class features.

Connectivity and Expandability

Living up to its workstation title, both the HP 8560w and HP 8750w come equipped with an expansive list of connectivity options listed here:

- two USB 3.0 ports
- two USB 2.0 ports (1 charging)
- eSATA/USB 2.0 combo port for portable drives
- 1394a FireWire interface
- SD/MMC reader
- VGA output for analog projectors
- DisplayPort connector
- 1 Gigabit Ethernet adapter
- 802.11 a/b/g/n wireless adapter
- Bluetooth 2.1
- 56K Modem
- Optional HP Mobile Broadband
- Optional HD webcam
- Microphone input
- Headphone/line output
- Docking connector (docking station optional)
- Second battery connector

Unlike many consumer laptops that cut corners by not offering a thorough range of connectivity options, HP Mobile Workstations comes well equipped to interface to

almost anything you'd want to plug them into.

Battery Options and Chargers

Of course if you load up either HP Mobile Workstation with maximum cores, RAM, graphics, and monitor brightness, your battery life won't equal that of smaller consumer laptop, although battery life isn't as bad as you might think. With the 83 WattHour Lithium Ion battery, an HP 8560w dual core i5 model at 8 GB running at minimum screen brightness, can achieve up to 4 hours of operation. With optional second batteries, you can essentially double battery capacity at the expense of some extra weight.[9]

To save some weight, the mobile workstations offer a selection of HP Smart AC Adapters ranging from 120W and 150W (for the HP 8560w only), to 200W (for the HP 8560w or HP 8760w) and a 230W for well-loaded HP 8570w configurations. This means you can buy the power supply you need for your particular requirements and not have to carry a heavy power supply if it isn't needed. Thankfully, if you use the HP web site to build a custom configuration, you'll be prompted to select from only the valid power supply options.

HP Performance Advisor

Like all HP machines, HP Mobile Workstations are preinstalled with HP Performance Advisor, a configuration-management utility that keeps CAD specific graphics and system drivers up to date so you don't have to. If you've ever struggled trying to find the right graphics driver for a workstation in the past you'll appreciate how simple HP Performance Advisor makes this otherwise drudgerous task.

Figure 5. HP Performance Advisor keeps track of device and driver configurations automatically.

Cost Justifying Mobility

The plain fact is that mobile workstations cost more than consumer grade laptops because they provide more features, expandability, and performance. The next plain fact is that you'll have to make a compelling case for why mobile workstations justify the added cost. When doing so, consider the following:

Designing when the inspiration strikes. If you carry a mobile workstation, you can work through design iterations or do conceptual research at hotels, airport lounges, or any other location where you'd otherwise have unproductive time. What is it worth to have the design tools you need with you when you need them?

Fast response to clients while travelling. You'll be able to perform even complex 3D CAD edits and renderings at a client's office with a mobile workstation that would have locked up your underpowered laptop. What will it be worth to meet customers' needs faster than you could before?

Demo capability. What would it be worth to have a real time demonstration of a complex building design or machine motion study running on a 50" HDTV at a client's office or exhibition booth running on a machine that fits in a carryon bag? How much could you save by not having to travel with full size computers in checked luggage to perform these functions?

Obviously, there are many more ways that mobile workstations could make your travel computing easier and cheaper, but these ideas should get you started. If you can save on shipping desktop machines and be more responsive while on the road, the question becomes, "How can I afford NOT to use mobile workstations?"

Wrapping Up

With all the cool, small tablet and ultra portable notebook computers seemingly getting all the attention in today's computer market, it's nice to know we CAD users haven't been forgotten. CAD applications still require lots of processing, RAM, disk, and graphics power to run and that's where mobile workstations come into their own.

While mobile workstations do cost more and weigh more than a consumer laptop, the time savings gained from being able to achieve workstation-level performance while travelling more than makes up the difference.

About the Author

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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 www.cad-manager.com.

LINKS
8560w Overview and Features
8760w Overview and Features

DISCLAIMERS

(1) Systems may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. Not all features are available in all editions of Windows 7. See www.microsoft.com/windows/windows-7/ for details.

(2) Intel® Turbo Boost 2.0 technology requires a PC with a processor with Intel Turbo Boost 2.0 capability. Intel Turbo Boost 2.0 performance varies depending on hardware, software, and overall system configuration. See www.intel.com/technology/turboboost for more information.

(3) Some functionality of Intel vPro, such as Intel Active management technology and Intel Virtualization technology, requires additional third-party software in order to run. Availability of future "virtual appliances" applications for vPro technologies is dependent on third-party software providers. Compatibility with future "virtual appliances," Microsoft Windows Vista, and Windows 7 operating systems is yet to be determined.

(4) Dual/Quad Core is a new technology 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 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. Intel's numbering is not a measurement of higher performance.

(5) For hard drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 15 GB of memory is reserved for system recovery software.

(6) MIL-STD-810G testing was not intended to demonstrate fitness for U.S. Department of Defense contracts or for military use. Test results are not a guarantee of future performance under these test conditions.

(7) Actual weight will vary by configuration.

(8) HD content required to view HD images.

(9) HP Power Assistant enhances management of the system energy requirements and enables users to take control of their power consumption for a reduced impact on the environment. Power calculations and cost calculations are estimates. Results will vary based on variables, which include information provided by the user, time PC is in different power states (on, standby, hibernate, off), time PC is on battery or AC, hardware configuration, variable electricity rates, and utilities provider. HP advises customers to use information reported by HP Power Assistant for reference only and to validate impact in their environment. Environmental calculations were based on U.S. EPA eGrid 2007 data found at www.epa.gov/egrid/. Regional results will vary. Microsoft Windows required.
