

# Render faster. Create more.

Dell™ Precision™ M4600 and M6600 workstations with NVIDIA® Quadro® graphics outperformed Apple® MacBook® Pros on video production tasks.



Those who use video editing software increasingly rely on powerful portable workstations to do their work. The time these systems take to complete compute-intensive tasks such as video renderings varies considerably. Selecting one that completes tasks quickly can save workers an enormous amount of time.

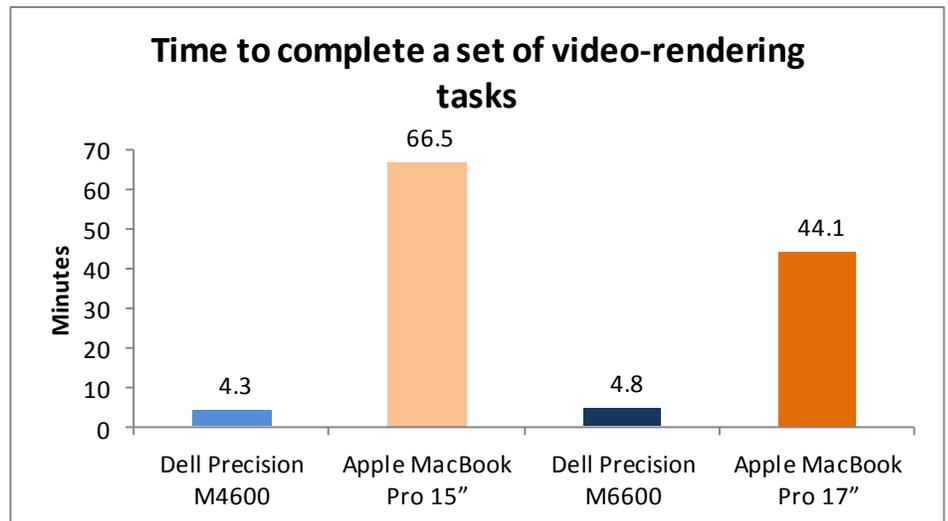
In our labs, PT tested two Dell Precision™ mobile workstations with NVIDIA® Quadro® graphics—the M4600 and the M6600—and two Apple® MacBook® Pro systems with AMD Radeon™ graphics—the 15 inch and 17 inch—to determine the relative speed at which they could perform a variety of video-rendering tasks. While each pair of systems was priced comparably, the Dell systems accomplished the tasks in a fraction of the time it took the Apple systems, with time savings of up to 97.5 percent.

This dramatic difference would be very noticeable to a video professional performing these kinds of tasks on a daily basis. Less time waiting for your system to finish a job means greater productivity and a greater return on your investment.

## QUICKER RENDERING SAVES TIME AND BOOSTS PRODUCTIVITY

We tested two 15-inch mobile systems, the Dell Precision M4600 and the 15-inch Apple MacBook Pro, and two 17-inch systems, the Dell Precision M6600 and the 17-inch Apple MacBook Pro. On all four systems, we completed a set of video-rendering tasks using Adobe® Premiere® Pro CS5.5. As Figure 1 shows, the Dell systems needed only a fraction of the time the MacBook Pros needed.

**Figure 1: The 15-inch Dell system took only 6.5 percent of the time the Apple system needed to complete the rendering tasks and the 17-inch Dell took only 10.8 percent of the time the Apple system needed. Lower numbers are better.**



As Figure 2 shows, each pair of systems was priced comparably. The Dell Precision systems were available with 16 GB of RAM and included a three-year warranty. The Apple MacBook Pros were available with a maximum of 8 GB of RAM and included a one-year Apple care warranty. A three-year Apple care warranty was available for an additional \$349.

	Price (USD)	RAM	Years of warranty included in base price
<b>15" systems</b>			
Apple MacBook Pro 15"	\$2,899	8 GB	1
Dell Precision M4600	\$2,783	16 GB	3
<b>17" systems</b>			
Apple MacBook Pro 17"	\$3,049	8 GB	1
Dell Precision M6600	\$3,247	16 GB	3

**Figure 2: Pricing, RAM, and warranty information for the four systems we tested. Prices, which exclude tax and shipping, came from [www.dell.com](http://www.dell.com) and [www.apple.com](http://www.apple.com) on March 9, 2012.**

The Dell systems' performance advantage, along with the more attractive warranty, makes them an excellent, cost-effective choice for anyone whose workday includes video-rendering tasks.

Also, while we tested Dell systems that most closely approximate the specifications and pricing of the two Apple systems, Dell also provides notebook systems that scale much higher in terms of processor speed, RAM capacity, and graphics cards. These would likely deliver even greater performance advantages than the systems we tested.

The following section provides more detailed test results. [Appendix A](#) provides configuration information for the four systems and [Appendix B](#) provides the specifics of our testing.

## OUR FINDINGS IN DETAIL

As Figures 3 and 4 show, the Dell Precision M4600 mobile workstation performed Adobe Premiere Pro video-rendering tasks in a fraction of the time that the 15" Apple MacBook Pro did, reducing rendering time by as much as 97.5 percent. To render an entire work area for an AVCHD three-layer video, the Dell Precision M4600 took only 22 seconds to do what it took the 15" Apple MacBook Pro nearly 15 minutes to accomplish.

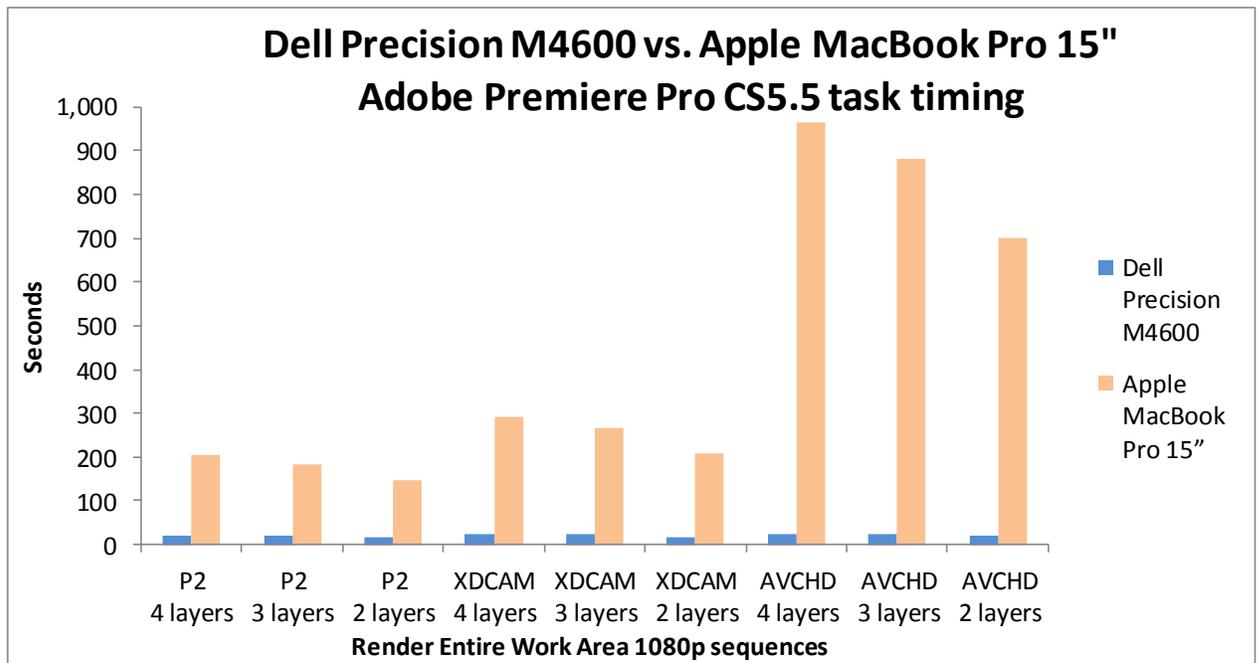
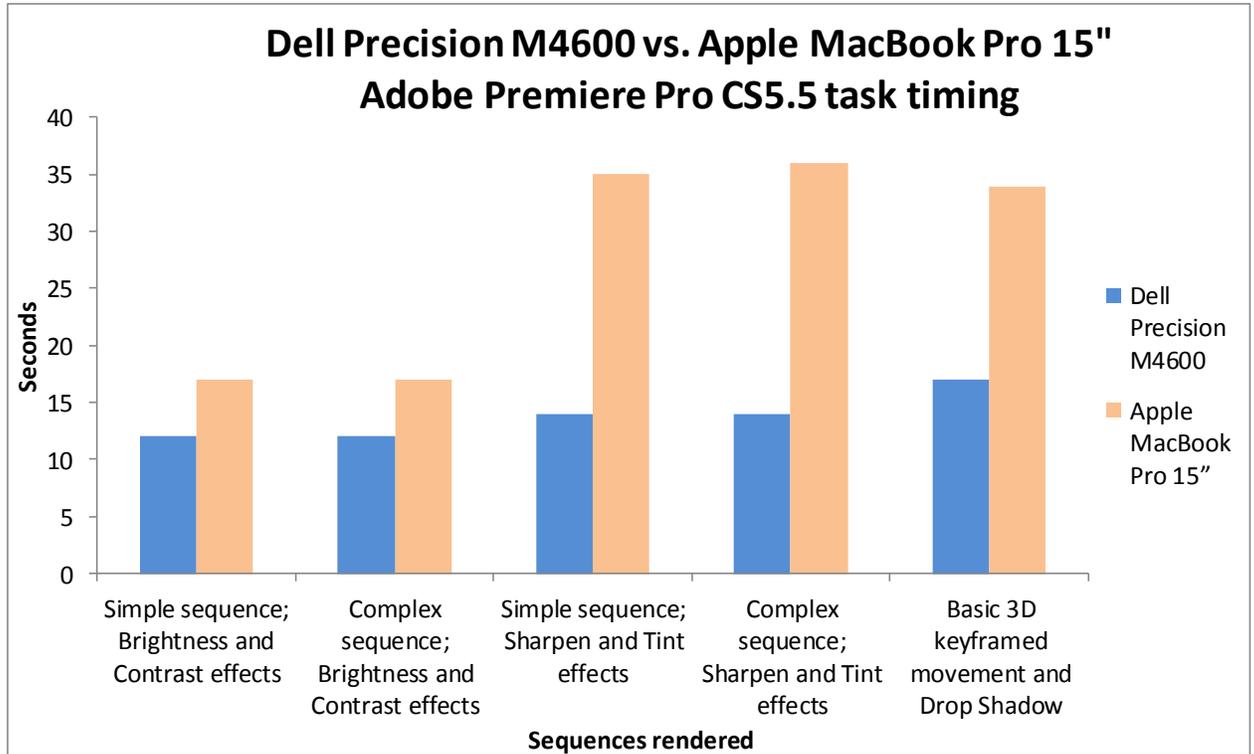
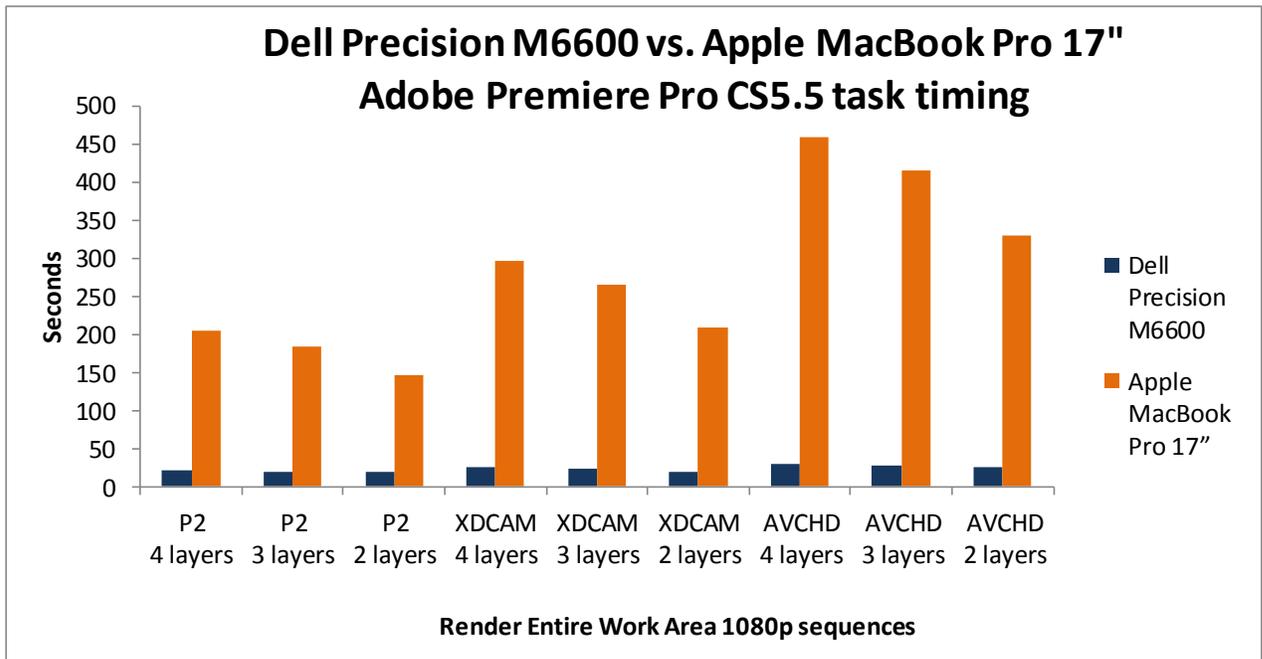


Figure 3: The time the two 15-inch notebook systems took to render the entire work area. Lower numbers are better.



**Figure 4: The time the two 15-inch notebook systems took to render the workload. Lower numbers are better.**

As Figures 5 and 6 show, the Dell Precision M6600 mobile workstation performed Adobe Premiere Pro video-rendering tasks up to 93.5 percent faster than the 17" Apple MacBook Pro.



**Figure 5: The time the two 17-inch notebook systems took to render the entire work area. Lower numbers are better.**

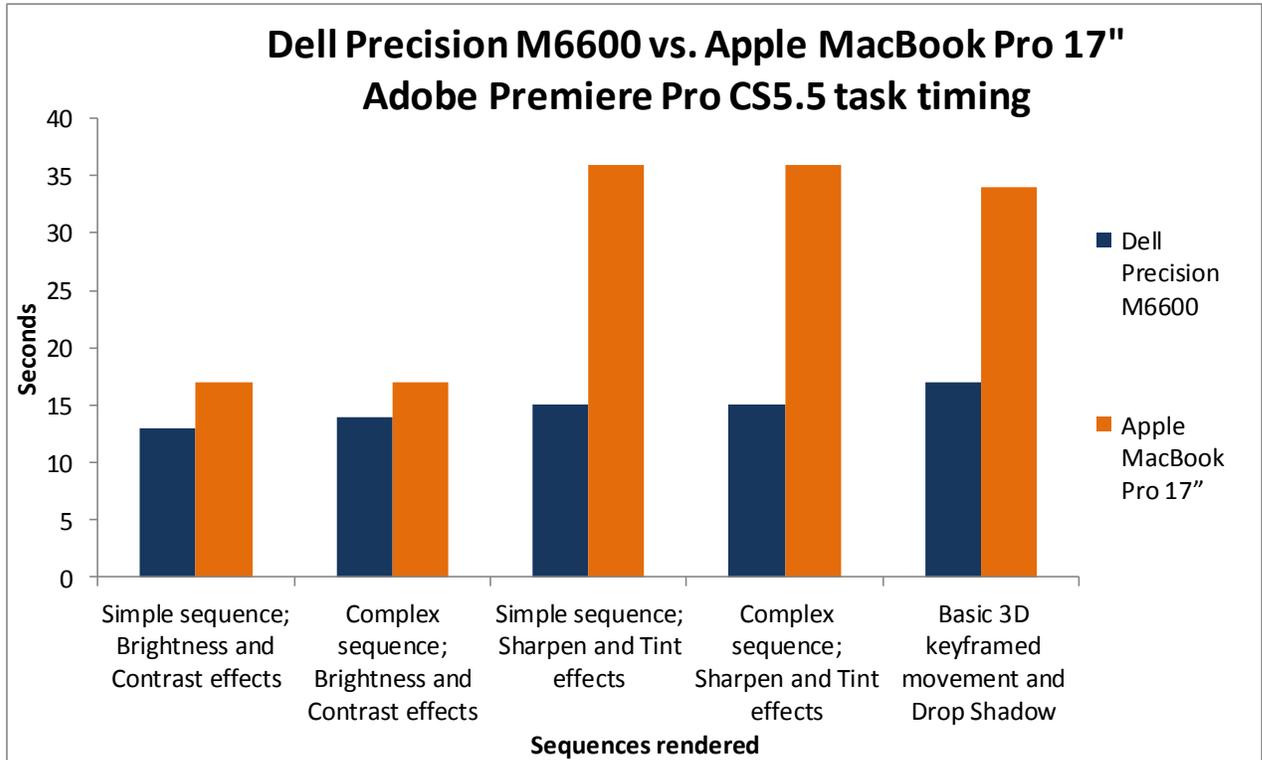


Figure 6: The time the two 17-inch notebook systems took to render the workload. Lower numbers are better.

Figure 7 provides the time it took, in seconds, for the 15-inch systems to complete each task, along with the percentage time savings the Dell Precision M4600 delivered compared to the Apple MacBook Pro 15”.

Premiere Pro CS5.5	Dell Precision M4600	Apple MacBook Pro 15"	Percentage win for Dell
<b>Render Entire Work Area 1080p</b>			
P2 sequence - 4 video layers	20	204	90.2%
P2 sequence – 3 video layers	19	183	89.6%
P2 sequence - 2 video layers	18	146	87.7%
XDCAM sequence - 4 video layers	25	293	91.5%
XDCAM sequence - 3 video layers	23	265	91.3%
XDCAM sequence - 2 video layers	18	209	91.4%
AVCHD sequence - 4 video layers	25	966	97.4%
AVCHD sequence - 3 video layers	22	880	97.5%
AVCHD sequence - 2 video layers	21	702	97.0%
<b>Perform other common tasks</b>			
Render simple sequence with Brightness and Contrast effects	12	17	29.4%
Render complex sequence with Brightness and Contrast effects	12	17	29.4%
Render simple sequence with Sharpen and Tint effects	14	35	60.0%

Premiere Pro CS5.5	Dell Precision M4600	Apple MacBook Pro 15"	Percentage win for Dell
Render complex sequence with Sharpen and Tint effects	14	36	61.1%
Render sequence with Basic 3D keyframed movement and Drop Shadow	17	34	50.0%
Total time in seconds	260	3,987	93.5%
Total time in minutes	4.3	66.5	

Figure 7: Summary of times, in seconds, the 15-inch systems needed to complete the test tasks. Lower numbers are better (except for percentage win).

Figure 8 details the time it took, in seconds, for the 17-inch systems to complete each task, along with the percentage time savings the Dell Precision M6600 delivered compared to the Apple MacBook Pro 17".

Premiere Pro CS5.5	Dell Precision M6600	Apple MacBook Pro 17"	Percentage win for Dell
<b>Render Entire Work Area 1080p</b>			
P2 sequence - 4 video layers	22	204	89.2%
P2 sequence - 3 video layers	19	184	89.7%
P2 sequence - 2 video layers	18	147	87.8%
XDCAM sequence - 4 video layers	26	295	91.2%
XDCAM sequence - 3 video layers	24	265	90.9%
XDCAM sequence - 2 video layers	20	209	90.4%
AVCHD sequence - 4 video layers	30	458	93.4%
AVCHD sequence - 3 video layers	27	414	93.5%
AVCHD sequence - 2 video layers	26	329	92.1%
<b>Perform other common tasks</b>			
Render simple sequence with Brightness and Contrast effects	13	17	23.5%
Render complex sequence with Brightness and Contrast effects	14	17	17.6%
Render simple sequence with Sharpen and Tint effects	15	36	58.3%
Render complex sequence with Sharpen and Tint effects	15	36	58.3%
Render sequence with Basic 3D keyframed movement and Drop Shadow	17	34	50.0%
Total time in seconds	286	2,645	89.2%
Total time in minutes	4.8	44.1	

Figure 8: Summary of times, in seconds, the 17-inch systems needed to complete the test tasks. Lower numbers are better (except for percentage win).

## CONCLUSION

When you work with graphics and video day in and day out, choosing the right system is paramount. A system that not only produces top-of-the-line images but also does so quickly and efficiently can shave hours off your day, leaving you more productive and less frustrated with waiting for your system to do its job.

In our tests, the Dell Precision mobile workstations were able to handle many typical graphics rendering tasks more efficiently than comparably priced Apple MacBook Pro notebooks. With up to 97.5 percent reduction in time to complete common tasks that the Dell workstations achieve, you can spend more time being creative and less time waiting.

## APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figures 9 and 10 provide detailed configuration information for the test systems.

System	Dell Precision M4600	15-inch Apple MacBook Pro
<b>General</b>		
Number of processor packages	1	1
Number of cores per processor	4	4
Number of hardware threads per core	2	2
System power management policy	Dell	Apple default
Processor power-saving option	Enhanced Intel® SpeedStep® Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	14-1/2" x 10-3/8" x 1-3/8"	14-3/8" x 9-7/8" x 7/8"
System weight	7 lbs. 2 oz.	5 lbs. 2 oz.
<b>CPU</b>		
Vendor	Intel	Intel
Name	Core™ i7 Extreme 2920XM	Core i7 Extreme 2920XM
Model number	2920XM	2920XM
Stepping	D2	D2
Socket type and number of pins	Socket 988B rPGA	Socket 988B rPGA
Core frequency (GHz)	2.50	2.50
L1 cache	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	256 KB (per core)	256 KB (per core)
L3 cache	8 MB (shared)	8 MB(shared)
<b>Platform</b>		
Vendor	Dell Inc.	Apple Inc.
Motherboard model number	03HYJK	Intel 6 series chipset
Motherboard chipset	Intel Sandy Bridge Rev 09	Intel 6 series chipset
BIOS name and version	Dell Inc. A08 (10/18/2011)	Apple Inc. MBP81.0047.B27
<b>Memory module(s)</b>		
Vendor and model number	Samsung M471B5273DH0-CH9	Hynix HMT351S6BFR8C-H9
Type	PC3-10600	PC3-10600
Speed (MHz)	1,333	1,333
Speed running in the system (MHz)	1,333	1,333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	9-9-9-24	9-9-9-24
Size (MB)	4,096	4,096
Number of memory module(s)	4	2
Chip organization (single-sided/double-sided)	Double-sided	Double-sided
Channel (single/dual)	Dual	Dual
<b>Hard disk</b>		
Vendor and model number	Samsung PM830	Toshiba THNSNC128GBSJ
Number of disks in system	1	1
Size (GB)	128	128

System	Dell Precision M4600	15-inch Apple MacBook Pro
Buffer size (MB)	N/A	N/A
RPM	N/A	N/A
Type	SSD 6.0 Gb/s	SSD 3.0 Gb/s
Controller	Intel QM67	Intel 6 series chipset
Driver	Intel 10.1.0.1008 (11/6/2010)	N/A
<b>Operating system</b>		
Name	Windows® 7 Professional	Mac OS X® Lion
Build number	7601	10.7.2
Service Pack	SP1	N/A
File system	NTFS	Journaled HFS+
Kernel	ACPI x64-based PC	Darwin 11.2.0
Language	English	English
Microsoft DirectX® version	DirectX 11	N/A
<b>Graphics</b>		
Vendor and model number	NVIDIA Quadro 2000M	AMD Radeon HD 6670M
Type	Discrete	Discrete
Chipset	Quadro 2000M	Radeon HD 6670M
BIOS version	70.6.36.0.3	N/A
Total available graphics memory (MB)	5,866	1,024
Dedicated video memory (MB)	2,048	N/A
System video memory (MB)	0	N/A
Shared system memory (MB)	3,818	N/A
Resolution	1,920 x 1,080 x 32-bit	1,680 x 1,050 x 32-bit
Driver	NVIDIA 8.17.12.7605 (9/9/2011)	N/A
<b>Graphics #2</b>		
Vendor and model number	N/A	Intel HD Graphics 3000
Type	N/A	Integrated
Chipset	N/A	Intel HD Graphics 3000
BIOS version	N/A	N/A
Total available graphics memory (MB)	N/A	512
Dedicated video memory (MB)	N/A	N/A
System video memory (MB)	N/A	N/A
Shared system memory (MB)	N/A	N/A
Resolution	N/A	1,680 x 1,050 x 32-bit
Driver	N/A	N/A
<b>Sound card/subsystem</b>		
Vendor and model number	NVIDIA High Definition Audio	Intel High Definition Audio
Driver	NVIDIA 1.2.23.3 (5/10/2011)	N/A
<b>Ethernet</b>		
Vendor and model number	Intel 82579LM Gigabit Network Adapter	Broadcom® 57765-BO
Driver	Intel 11.13.51.0 (7/20/2011)	N/A
<b>Wireless</b>		
Vendor and model number	Dell Wireless 1501	AirPort

System	Dell Precision M4600	15-inch Apple MacBook Pro
Driver	Broadcom 5.100.235.12 (1/7/2011)	N/A
<b>Optical drive(s)</b>		
Vendor and model number	Superdrive HL-DT-ST GS30N	Superdrive HL-DT-ST GS31N
Type	DVD-RW	DVD-RW
<b>USB ports</b>		
Number	4	2
Type	2 x 2.0, 2 x 3.0	2.0
Other	Media card reader	Media card reader
<b>IEEE 1394 ports</b>		
Number	1	0
<b>Monitor</b>		
LCD type	LED Back-Lit	LED Back-Lit
Screen size	15.6"	15.4"
Refresh rate (Hz)	60	60
<b>Battery</b>		
Type	Dell FV993 Lithium-ion	Lithium-ion
Size (length x width x height)	7-1/2" x 3-1/4" x 3/4"	9-7/8" x 3-3/8" x 1/2"
Rated capacity	8,700mAh / 11.1V (97Wh)	7,100mAh / 10.95V (77.5Wh)
Weight	1 lb. 1 oz.	N/A (built in)

Figure 9: System configuration information for the Dell Mobile Precision M4600 and Apple MacBook Pro 15".

System	Dell Precision M6600	17-inch Apple MacBook Pro
<b>Pricing</b>		
Price without shipping or handling		
<b>General</b>		
Number of processor packages	1	1
Number of cores per processor	4	4
Number of hardware threads per core	2	2
System power management policy	Dell	Apple default
Processor power-saving option	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	16-3/8" x 10-3/4" x 1-1/2"	15-1/2" x 10-5/8" x 7/8"
System weight	8 lbs. 4 oz.	6 lbs. 2 oz.
<b>CPU</b>		
Vendor	Intel	Intel
Name	Core i7 Extreme 2920XM	Core i7 Extreme 2920XM
Model number	2920XM	2920XM
Stepping	D2	D2
Socket type and number of pins	Socket 988B rPGA	Socket 988B rPGA
Core frequency (GHz)	2.50	2.50
L1 cache	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	256 KB (per core)	256 KB (per core)

System	Dell Precision M6600	17-inch Apple MacBook Pro
L3 cache	8 MB	8 MB
<b>Platform</b>		
Vendor	Dell Inc.	Apple Inc.
Motherboard model number	03HYJK	Intel 6 series chipset
Motherboard chipset	Intel Sandy Bridge Rev 09	Intel 6 series chipset
BIOS name and version	Dell Inc. A08 (10/18/2011)	Apple Inc. MBP81.0047.B27
<b>Memory module(s)</b>		
Vendor and model number	Samsung M471B5273DH0-CH9	Hynix HMT351S6BFR8C-H9
Type	PC3-10600	PC3-10600
Speed (MHz)	1,333	1,333
Speed running in the system (MHz)	1,333	1,333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	9-9-9-24	9-9-9-24
Size (MB)	4,096	4,096
Number of memory module(s)	4 x 4,096 MB	2 x 4,096 MB
Chip organization (single-sided/double-sided)	Double-sided	Double-sided
Channel (single/dual)	Dual	Dual
<b>Hard disk</b>		
Vendor and model number	Seagate ST9750420AS	Hitachi HTS727575A9E362
Number of disks in system	1	1
Size (GB)	750	750
Buffer size (MB)	16	16
RPM	7,200	7,200
Type	SATA 3.0 Gb/s	SATA 3.0Gb/s
Controller	Intel QM67	Intel 6 series chipset
Driver	Intel 10.1.0.1008 (11/6/2010)	N/A
<b>Operating system</b>		
Name	Windows 7 Professional	Mac OS X Lion
Build number	7601	10.7.2
Service Pack	SP1	N/A
File system	NTFS	Journaled HFS+
Kernel	ACPI x64-based PC	Darwin 11.2.0
Language	English	English
Microsoft DirectX version	DirectX 11	N/A
<b>Graphics</b>		
Vendor and model number	NVIDIA Quadro 3000M	AMD Radeon HD 6770M
Type	Discrete	Discrete
Chipset	Quadro 3000M	Radeon HD 6770M
BIOS version	70.4.3a.1.1	N/A
Total available graphics memory (MB)	5,866	1,024
Dedicated video memory (MB)	2,048	N/A
System video memory (MB)	0	N/A
Shared system memory (MB)	3,818	N/A

System	Dell Precision M6600	17-inch Apple MacBook Pro
Resolution	1,920 x 1,080 x 32-bit	1,920 x 1,200 x 32-bit
Driver	NVIDIA 8.17.12.7605 (9/9/2011)	N/A
<b>Graphics #2</b>		
Vendor and model number	Intel HD Graphics 3000	Intel HD Graphics 3000
Type	Integrated	Integrated
Chipset	Intel HD Graphics 3000	Intel HD Graphics 3000
BIOS version	2089.11	N/A
Total available graphics memory (MB)	1,696	512
Dedicated video memory (MB)	64	N/A
System video memory (MB)	0	N/A
Shared system memory (MB)	1,632	N/A
Resolution	1,920 x 1,080 x 32 bit	1,920 x 1,200 x 32-bit
Driver	Intel 8.15.10.2418 (06/10/2011)	N/A
<b>Sound card/subsystem</b>		
Vendor and model number	NVIDIA High Definition Audio	Intel High Definition Audio
Driver	NVIDIA 1.2.23.3 (5/10/2011)	N/A
<b>Ethernet</b>		
Vendor and model number	Intel 82579LM Gigabit Network Adapter	Broadcom 57765-BO
Driver	Intel 11.13.51.0 (7/20/2011)	N/A
<b>Wireless</b>		
Vendor and model number	Intel Centrino Ultimate-N 6300 AGN	AirPort
Driver	Intel 14.0.1.2 (12/21/2010)	N/A
<b>Optical drive(s)</b>		
Vendor and model number	Superdrive HL-DT-ST GS30N	Matshita UJ-8A8
Type	DVD-RW	DVD-R
<b>USB ports</b>		
Number	4	3
Type	2 x 2.0, 2 x 3.0	2.0
Other	Media card reader	Media card reader
<b>IEEE 1394 ports</b>		
Number	1	0
<b>Monitor</b>		
LCD type	LED Back-Lit	LED Back-Lit
Screen size	17.3"	17"
Refresh rate (Hz)	60	60
<b>Battery</b>		
Type	Dell FV993 Lithium-ion	Lithium-ion
Size (length x width x height)	7-1/2" x 3-1/4" x 3/4"	11" x 4" x 1/2"
Rated capacity	8,700mAh / 11.1V (97Wh)	8,700mAh / 10.95V (95Wh)
Weight	1 lb. 1 oz.	N/A (built in)

Figure 10: System configuration information for the Dell Mobile Precision M6600 and Apple MacBook Pro 17".

## APPENDIX B - HOW WE TESTED

We conducted the following Adobe Premiere Pro CS5.5 tests:

- Render P2 Sequence
- Render XDCAM Sequence
- Render AVCHD Sequence
- Render simple sequence with Brightness and Contrast effects
- Render complex sequence with Brightness and Contrast effects
- Render simple sequence with Sharpen and Tint effects
- Render complex sequence with Sharpen and Tint effects
- Render sequence with Basic 3D keyframed movement and Drop Shadow

All tests are hand-timed and require a stopwatch.

### Rendering Entire Work Area

1. Double-click the desired sequence project file.
2. When the Scratch Disk dialog opens, click Yes.
3. Navigate to Footage→P2 and select the requested file.
4. Click Open.
5. When the project opens, prepare the stopwatch.
6. Click Sequence, and simultaneously select Render Entire Work Area from the drop-down menu and start the stopwatch.
7. Stop the stopwatch when the Rendering Progress window disappears.
8. Close Adobe Premiere and repeat steps 1 through 8 two more times.
9. Repeat the test for three-and two-stream configurations by deselecting the fourth stream for a three-stream run and deselecting the fourth and third streams for a two-stream run.
10. Repeat the test for XDCAM and AVCHD sequences.

### Performing other common tasks in Premiere CS5.5

1. Double-click the CS5\_Benchmarks project file.
2. When the Scratch Disk dialog opens, click Yes.
3. Navigate to Footage→XDCAM, and select the requested file.
4. Click Open.
5. When the project opens, click the desired sequence to highlight it.
6. Prepare the stopwatch.
7. Click Sequence, and simultaneously select Render Entire Work Area from the drop-down menu and start the stopwatch.
8. Stop the stopwatch when the Rendering Progress window disappears.
9. Repeat steps 1 through 8 two more times.
10. Repeat the test for each CS5 Benchmark sequence.

## ABOUT PRINCIPLED TECHNOLOGIES



Principled Technologies, Inc.  
1007 Slater Road, Suite 300  
Durham, NC, 27703  
[www.principledtechnologies.com](http://www.principledtechnologies.com)

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

---

Principled Technologies is a registered trademark of Principled Technologies, Inc.  
All other product names are the trademarks of their respective owners.

---

#### Disclaimer of Warranties; Limitation of Liability:

PRINCIPLED TECHNOLOGIES, INC. HAS MADE REASONABLE EFFORTS TO ENSURE THE ACCURACY AND VALIDITY OF ITS TESTING, HOWEVER, PRINCIPLED TECHNOLOGIES, INC. SPECIFICALLY DISCLAIMS ANY WARRANTY, EXPRESSED OR IMPLIED, RELATING TO THE TEST RESULTS AND ANALYSIS, THEIR ACCURACY, COMPLETENESS OR QUALITY, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE. ALL PERSONS OR ENTITIES RELYING ON THE RESULTS OF ANY TESTING DO SO AT THEIR OWN RISK, AND AGREE THAT PRINCIPLED TECHNOLOGIES, INC., ITS EMPLOYEES AND ITS SUBCONTRACTORS SHALL HAVE NO LIABILITY WHATSOEVER FROM ANY CLAIM OF LOSS OR DAMAGE ON ACCOUNT OF ANY ALLEGED ERROR OR DEFECT IN ANY TESTING PROCEDURE OR RESULT.

IN NO EVENT SHALL PRINCIPLED TECHNOLOGIES, INC. BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH ITS TESTING, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL PRINCIPLED TECHNOLOGIES, INC.'S LIABILITY, INCLUDING FOR DIRECT DAMAGES, EXCEED THE AMOUNTS PAID IN CONNECTION WITH PRINCIPLED TECHNOLOGIES, INC.'S TESTING. CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES ARE AS SET FORTH HEREIN.

---