



Performance and battery life ratings of 10 notebook PCs with Intel and AMD processors

Executive summary

Intel Corporation (Intel) commissioned Principled Technologies (PT) to run BAPCo's MobileMark 2007 Productivity test on the following 10 notebook systems in their out-of-the-box (OOB) configurations:

- an AMD Athlon 64 X2 Dual-Core Mobile TK-55 1.8 GHz-based system from OEM 1 (System 1A)
- an Intel Core 2 Duo T5250 1.5 GHz-based system from OEM 1 (System 1B)
- an AMD Turion 64 X2 Dual-Core Mobile TL-64 2.2 GHz-based system from OEM 1 (System 1C)
- an Intel Core 2 Duo T7500 2.2 GHz-based system from OEM 1 (System 1D)
- an AMD Athlon 64 X2 Dual-Core Mobile TK-55 1.8 GHz-based system from OEM 2 (System 2A)
- an Intel Core 2 Duo T5250 1.5 GHz-based system from OEM 2 (System 2B)
- an AMD Turion 64 X2 Dual-Core Mobile TL-60 2.0 GHz-based system from OEM 2 (System 2C)
- an Intel Core 2 Duo T7500 2.2 GHz-based system from OEM 2 (System 2D)
- an AMD Turion 64 X2 Dual-Core Mobile TL-60 2.0 GHz-based system from OEM 3 (System 3A)
- an Intel Core 2 Duo T7500 2.2 GHz-based system from OEM 3 (System 3B)

KEY FINDINGS

- Across the five pairs of systems we tested, the Intel Centrino Duo based notebooks showed a performance advantage ranging from 20 percent to 66 percent over the comparably priced AMD -based systems.
- Across the five pairs of systems we tested, the Intel Centrino Duo based systems demonstrated battery life ranging from 8 percent to 56 percent longer than that of the comparably priced AMD-based systems.
- The price points of the Intel processor-based notebook PCs ranged from \$50 more than the AMD processor-based systems to \$110 less.

The goal of the testing was to gauge the performance and battery life that buyers would experience. Intel selected the systems, ensuring that the pairs were as comparable as reasonably possible in terms of both hardware and price. Each pair of comparable systems had identical hard drives, RAM amount, LCD size, and battery rating. PT purchased the systems in September 2007, set them up, and executed the tests over a four-week period. To keep the focus of this report on the relative performance of the Intel and AMD processors at the core of the test systems, Intel requested we not disclose the name of the manufacturers of the systems.

We measured system performance using BAPCo MobileMark 2007 Productivity, an industry-standard benchmark that provides a performance score as well as battery life rating.

The systems with Intel processors had higher Performance ratings and longer battery life ratings than the corresponding systems with AMD processors.

The Test results section shows these results in more detail, while the Test methodology section explains how we ran those tests. Appendix A provides the price of the test systems, and Appendix B details their configurations.

Test results

Figure 1 presents the median Battery Life rating and the corresponding Performance Qualification rating of MobileMark 2007 Productivity for the 10 systems. We ran MobileMark 2007 Productivity three times on each system. In the event of a tie, we chose the run with the higher Performance Qualification score. For MobileMark 2007 Productivity results, a higher Performance Qualification rating and a higher Battery Life rating indicate better system performance.

System	MobileMark 2007 Productivity Performance Qualification		MobileMark 2007 Productivity Battery Life	
	Score (median)	Comparative rating	Score (minutes)	Comparative rating
OEM 1 systems				
OEM System 1A AMD Athlon 64 X2 Dual-Core Mobile TK-55 1.8 GHz (80 nits)	86	Baseline	168	Baseline
OEM System 1B Intel Core 2 Duo T5250 1.5 GHz (90 nits)	110	28% better	227	35% better
OEM System 1C AMD Turion 64 X2 Dual-Core Mobile TL-64 2.2 GHz (83 nits)	100	Baseline	163	Baseline
OEM System 1D Intel Core 2 Duo T7500 2.2 GHz (98 nits)	166	66% better	225	38% better
OEM 2 systems				
OEM System 2A AMD Athlon 64 X2 Dual-Core Mobile TK-55 1.8 GHz (76 nits)	93	Baseline	187	Baseline
OEM System 2B Intel Core 2 Duo T5250 1.5GHz (78 nits)	112	20% better	216	16% better
OEM System 2C AMD Turion 64 X2 Dual-Core Mobile TL-60 2.0 GHz (72 nits)	108	Baseline	195	Baseline
OEM System 2D Intel Core 2 Duo T7500 2.2 GHz (78 nits)	172	59% better	210	8% better
OEM 3 systems				
OEM System 3A AMD Turion 64 X2 Dual-Core Mobile TL-60 2.0 GHz (76 nits)	121	Baseline	177	Baseline
OEM System 3B Intel Core 2 Duo T7500 2.2 GHz (78 nits)	192	59% better	277	56% better

Figure 1: MobileMark 2007 Productivity Performance Qualification and Battery Life scores for the 10 notebook systems we tested. Higher scores and longer battery life results are better.

Because screen brightness can affect the amount of energy a system consumes, we check the brightness of every system we test and adjust it when necessary. For each pair of systems, we set the levels of brightness to match as closely as possible and to meet MobileMark’s required minimum brightness of 60 nits. If we could not adjust the two systems to identical levels of brightness, we set the AMD processor-based system to be dimmer to avoid any possible advantage for the Intel processor-based system.

The brightness at which we tested each system, in nits, appears in parentheses in Figure 1.

Test methodology

This section discusses some differences in the configurations of the test systems and details the methodologies we followed in testing them.

Configuration differences

We purchased the built-to-order systems from the vendors' Web sites. We made them as identical and as close in price as possible, but we could not avoid the following differences:

- The hard drive controllers in the systems differ.
- The graphics controllers in the systems differ.
- The Ethernet and wireless network controllers in the systems differ.
- The sound cards in the systems differ.
- The prices differ. (We exclude here shipping and tax charges, but include any instant rebates.)

For more detailed pricing information, see Appendix A. For more details on the system configurations, see Appendix B.

Initial setup

When the systems arrived, we unpacked and set up each one. We went through the following process with the Windows Vista Home Premium systems the first time we booted it:

OEM 1

1. At the Set up Windows screen, select United States, English and U.S. keyboard, and click Next.
2. At the Microsoft and Manufacturer End User License Agreements, select Yes, I accept them, and click Next.
3. Type a user name.
4. Leave the password blank, and click Next.
5. Name the computer with its model, and click Next.
6. At the Help protect Windows automatically screen, click Ask me later (because our goal is to test each PC as it came directly out of the box).
7. At the Review your time and date settings, select Eastern Time, and click Next.
8. At the Thank you screen, click Start.
9. At the manufacturers Getting started screen, click Close.
10. At the Norton Internet Security screen, click Next.
11. At the User Account Control dialog, click Continue.
12. At the License Agreement screen, select I agree, and click Next.
13. At the 30 day Subscription Status screen, click Next.
14. Click Finish.
15. At the LiveUpdate screen, click Next.
16. Click Finish.
17. Close the Norton Internet Security Console.
18. At the Norton AntiVirus Definition Alert screen, select Notify me again in 14 days, and click OK.
19. At the manufacturer's Support Center Setup screen, click Next.
20. At the License Agreement screen, chose I accept, and click Next.
21. At the User Settings screen, accept the defaults, and click Next.
22. At the User Account Control dialog, click Continue.
23. At the Starting Manufacturer's Support Center screen, click Next.
24. At the Congratulations screen, click Finish.
25. Close the manufacturer's Support Center screen.
26. At the manufacturer's support software license screen, click I agree.

OEM 2

1. At the Set up Windows screen, select United States, English and U.S. keyboard, and click Next.
2. At the Microsoft and Manufacturer End User License Agreements, select Yes, I accept them, and click Next.
3. Type a user name.
4. Leave the password blank, and click Next.

5. Name the computer with its model, and click Next.
6. At the Help protect Windows automatically screen, click Ask me later (because our goal is to test each PC as it came directly out of the box).
7. At the Review your time and date settings, select Eastern Time, and click Next.
8. At the Thank you screen, click Start.
9. At the manufacturers registration screen, and click Begin.
10. Fill in the required information and click Next.
11. Uncheck Notify me when critical product updates are available, and click Next.
12. At the Connect your PC screen, click Next.
13. Select the Keep my ISP tab, and click Next.
14. At the Congratulations screen, click Finish.
15. At the Macromedia Flash Player, click Close.
16. At the Total Care Advisor screen, click Preferences.
17. Under the General Settings section, uncheck Launch Total Care Advisor automatically, and click Apply.
18. Under the Updates section, select Never check for updates, and click Apply.
19. Under the Messaging section, uncheck I would like to receive the following updates, and click Apply.
20. At the User Account Control dialog, click Allow.
21. Close Total Care Advisor.
22. At the Norton Internet Security screen, click Next.
23. At the User Account Control dialog, click Continue.
24. At the License Agreement screen, select I agree, and click Next.
25. At the 60 day Subscription Status screen, click Next.
26. Click Finish.
27. At the LiveUpdate screen, click Next.
28. Click Finish.
29. Close the Norton Internet Security Console.
30. At the Norton AntiVirus Definition Alert screen, select Notify me again in 14 days, and click OK.
31. At the Easy Internet Sign-up screen, select No, please do not remind me anymore, and click Next.
32. At the Extended Service Plan screen, select I've already purchased one, and click Next.

OEM 3

Note: The systems booted directly into Windows Vista Home Premium.

1. At the CyberLink Power2Go registration screen, fill out the information and uncheck Yes, I would like to receive a newsletter and Yes, I would like to receive product information.
2. Click Register Now.

Capturing an image of the hard drive

We used Symantec's Ghost product to capture an exact image of the hard disk. Each time we ran a new benchmark or test on a machine, we used the Ghost image to return that machine to its original configuration. After re-imaging, we installed the software necessary to run each test and rebooted. We followed this process to capture the image:

1. Restart the computer.
2. Insert a bootable network CD.
3. Press the Escape key, at the Current Configuration dialog screen, to accept the automatic network options.
4. At the DOS command prompt, use the net use command to map a network drive to the dedicated Ghost image server, i.e., type `net use z: \\ghostserver\ghost` and press Enter.
5. Type `z:` to change to the mapped drive.
6. Type `ghost`, and press Enter.
7. At the Symantec Ghost screen, click OK.
8. Select Local→Disk→To Image.
9. Click OK.
10. Select the Primary disk, and click OK.
11. Click Save.
12. Select Fast at the Compress Image dialog.
13. Select Yes at the Proceed dialog.

14. When the ghost image is complete, click OK, and exit Ghost.
15. Reboot the computer.

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Setting up the test

1. Reset the system to the base test image.
2. Turn off the wireless network adapter by using the external toggle switch.
3. Turn off User Account Control.
 - a. Click Start→type user accounts into the quick search field→Click Turn User Account Control on or off.
 - b. At the User Account Control dialog, click Continue.
 - c. Uncheck Use User Account Control to help protect your computer.
 - d. Click OK.
 - e. Click Restart Now.
4. Turn off Screen Saver and Power settings.
 - a. Right-click desktop→Personalize→Screen Saver→Select None from the drop-down menu, and click Apply.
 - b. Click Change power settings.
 - c. Click Change plan settings.
 - d. Select Never to the Turn off the display and Put the computer to sleep options.
 - e. Click Change advanced power settings.
 - f. Under Battery options set:
 - i. Critical battery action to Shut down.
 - ii. Low battery level to 0%.
 - iii. Critical battery level to 0%.
 - iv. Low battery notification to Off.
 - v. Low battery action to Do nothing.
5. Under Display options set:
 - a. Adaptive Display to Off.
 - b. Display brightness to above 60 nits. (This is a MobileMark 2007 requirement.)
6. Purchase and install MobileMark 2007 v1.02 with default settings from:
<https://www.bapcostore.com/store/product.php?productid=16173&cat=250&page=1>.
 - a. At the Welcome to InstallShield Wizard screen, click Next.
 - b. At the License Agreement screen, select I accept the terms in the License Agreement, and click Next.
 - c. At the Destination Folder screen, leave the default, and click Next.
 - d. At the Ready to Install the Program screen, click Install.
 - e. A screen will appear indicating that the installation was successful. Click Finish to reboot the system.
7. Reboot the system.

Running the test

1. Launch MobileMark 2007 by clicking the MobileMark 2007 desktop icon.
2. Select Productivity on the left side of the benchmark display.
3. Enter a name for that run, and click Next.
4. At the Benchmark check screen, click Next.
5. At the Hibernation Check screen, click yes to turn off Hibernation.
6. At the Preparing a new test screen, click Next.
7. Unplug the notebook when the benchmark instructs you to begin running it.
8. When the notebook turns off plug the notebook back in.
9. Record the Performance Qualification and Battery Life results.

Appendix A – Price information

Figures 2 through 4 present the price information for the test systems at the time of purchase.

OEM 1	System 1A	System 1B	System 1C	System 1D
Processor	AMD Athlon 64 X2 Dual-Core Mobile TK-55	Intel Core 2 Duo T5250	AMD Turion 64 X2 Dual-Core Mobile TL-64	Intel Core 2 Duo T7500
Processor frequency	1.8 GHz	1.5 GHz	2.2 GHz	2.2 GHz
Price at time of purchase (October 8, 2007)				
Unit price	\$879.00	\$929.00	\$1,079.00	\$1,104.00
Instant rebate	0.00	0.00	0.00	0.00
Total we paid	\$879.00	\$929.00	\$1,079.00	\$1,104.00

Figure 2: Price information for the test notebook PCs from OEM 1.

OEM 2	System 2A	System 2B	System 2C	System 2D
Processor	AMD Athlon 64 X2 Dual-Core Mobile TK-55	Intel Core 2 Duo T5250	AMD Turion 64 X2 Dual-Core Mobile TL-60	Intel Core 2 Duo T7500
Processor frequency	1.8 GHz	1.5 GHz	2.0 GHz	2.2 GHz
Price at time of purchase (August 31, 2007)				
Unit price	\$953.99	\$943.99	\$1,003.99	\$1,093.99
Instant rebate	0.00	-100.00	0.00	-100.00
Total we paid	\$953.99	\$843.99	\$1,003.99	\$993.99

Figure 3: Price information for the test notebook PCs from OEM 2.

OEM 3	System 3A	System 3B
Processor	AMD Turion 64 X2 Dual-Core Mobile TL-60	Intel Core 2 Duo T7500
Processor frequency	2.0 GHz	2.2 GHz
Price at time of purchase (October 5, 2007)		
Unit price	\$1,231.23	\$1,218.69
Instant rebate	0.00	0.00
Total we paid	\$1,231.23	\$1,218.69

Figure 4: Price information for the test notebook PCs from OEM 3.

Appendix B – Test system configuration information

This appendix provides detailed configuration information about each of the test notebook PCs.

OEM 1	System 1A AMD Athlon 64 X2 TK-55 1.8GHz	System 1B AMD Turion 64 X2 TL-64 2.2GHz	System 1C Intel Core 2 Duo T5250 1.5GHz	System 1D Intel Core 2 Duo T7500 2.2GHz
General				
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P2C2L / MP	1P2C2L / MP	1P2C2L / MP	1P2C2L / MP
Number of physical processors	1	1	1	1
Single/Dual Core processors	Dual	Dual	Dual	Dual
System power management policy	Manufacturer recommended	Manufacturer recommended	Manufacturer recommended	Manufacturer recommended
Processor power-saving option	AMD PowerNow! Technology	AMD PowerNow! Technology	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	14" x 10½" x 1½"	14" x 10½" x 1½"	14" x 10½" x 1½"	14" x 10½" x 1½"
System weight	6 lbs. 7 oz.	6 lbs. 7 oz.	6 lbs. 7 oz.	6 lbs. 7 oz.
CPU				
Vendor	AMD	AMD	Intel	Intel
Name	Athlon 64 X2	Turion 64 X2	Core 2 Duo	Core 2 Duo
Model number	TK-55	TL-64	T5250	T7500
Stepping	1	1	D	A
Socket type	Socket S1	Socket S1	Socket P	Socket P
Core frequency (GHz)	1.8	2.2	1.5	2.2
Front-side bus frequency	1,600 MHz HyperTransport Technology	1,600 MHz HyperTransport Technology	667 MHz	800 MHz
L1 cache	64 KB + 64 KB (per core)	64 KB + 64 KB (per core)	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	512 MB (256 KB per core)	1 MB (512 KB per core)	2 MB (shared)	4 MB (shared)
Platform				
Motherboard model number	Manufacturer 0GU163	Manufacturer 0GU163	Manufacturer 0KY767	Manufacturer 0KY767
Motherboard chipset	ATI RS690M	ATI RS690M	Intel 965GM	Intel 965GM
Motherboard revision number	00	00	C0	C0
System serial number	4LZPWD1	2KZPWD1	JY5QWD1	G94QWD1
Bios name and version	Manufacturer A03	Manufacturer A03	Manufacturer A03	Manufacturer A03
BIOS settings	Default	Default	Default	Default
Memory module(s)				
Vendor and model number	Hyundai Electronics HYMP512S64CP8-Y5	Hyundai Electronics HYMP512S64CP8-Y5	Hyundai Electronics HYMP512S64CP8-Y5	Hyundai Electronics HYMP512S64CP8-Y5

OEM 1	System 1A AMD Athlon 64 X2 TK-55 1.8GHz	System 1B AMD Turion 64 X2 TL-64 2.2GHz	System 1C Intel Core 2 Duo T5250 1.5GHz	System 1D Intel Core 2 Duo T7500 2.2GHz
Type	PC2-5300	PC2-5300	PC2-5300	PC2-5300
Speed (MHz)	667	667	667	667
Speed running in the system (MHz)	333	333	333	333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-15	5-5-5-15	5-5-5-15	5-5-5-15
Size	2,048 MB	2,048 MB	2,048 MB	2,048 MB
Number of memory module(s)	2 x 1,024 MB	2 x 1,024 MB	2 x 1,024 MB	2 x 1,024 MB
Chip organization (single-sided, double-sided)	Double-sided	Double-sided	Double-sided	Double-sided
Channel (single/dual)	Dual	Dual	Dual	Dual
Hard disk				
Vendor and model number	Toshiba MK8037GSX	Toshiba MK8037GSX	Toshiba MK8037GSX	Toshiba MK8037GSX
Size	80 GB	80 GB	80 GB	80 GB
Buffer size	8 MB	8 MB	8 MB	8 MB
RPM	5,400	5,400	5,400	5,400
Type	SATA 300 Mb/s	SATA 300 Mb/s	SATA 300 Mb/s	SATA 300 Mb/s
Controller	ATI SB600	ATI SB600	Intel 82801HBM (ICH8-ME)	Intel 82801HBM (ICH8-ME)
Driver	Microsoft 6.0.6000.20580	Microsoft 6.0.6000.20580	Intel 8.2.0.1011	Intel 8.2.0.1011
Operating system				
Name	Windows Vista Home Premium	Windows Vista Home Premium	Windows Vista Home Premium	Windows Vista Home Premium
Build number	6000	6000	6000	6000
File system	NTFS	NTFS	NTFS	NTFS
Kernel	ACPI x86-based PC	ACPI x86-based PC	ACPI x86-based PC	ACPI x86-based PC
Language	English	English	English	English
Microsoft DirectX version	DirectX 10	DirectX 10	DirectX 10	DirectX 10
Graphics				
Vendor and model number	ATI Radeon X1270 HyperMemory	ATI Radeon X1270 HyperMemory	Intel GMA X3100	Intel GMA X3100
Type	Integrated	Integrated	Integrated	Integrated
Chipset	ATI Radeon X1200 Series	ATI Radeon X1200 Series	Intel 965 Express Chipset Family	Intel 965 Express Chipset Family
BIOS version	BK-ATI VER010.044.000.0 02.025007	BK-ATI VER010.044.000.0 02.025007	1466	1466
Total available graphics memory	959 MB	959 MB	358 MB	358 MB
Dedicated video memory	256 MB	256 MB	0 MB	0 MB
System video memory	0 MB	0 MB	128 MB	128 MB
Shared system memory	703 MB	703 MB	230 MB	230 MB

OEM 1	System 1A AMD Athlon 64 X2 TK-55 1.8GHz	System 1B AMD Turion 64 X2 TL-64 2.2GHz	System 1C Intel Core 2 Duo T5250 1.5GHz	System 1D Intel Core 2 Duo T7500 2.2GHz
Resolution	1,280 x 800	1,280 x 800	1,280 x 800	1,280 x 800
Driver	ATI 8.351.4.0	ATI 8.351.4.0	Intel 7.14.10.1272	Intel 7.14.10.1272
Sound card/subsystem				
Vendor and model number	SigmaTel High Definition Audio	SigmaTel High Definition Audio	SigmaTel High Definition Audio	SigmaTel High Definition Audio
Driver	SigmaTel 6.10.0.5407	SigmaTel 6.10.0.5407	SigmaTel 6.10.0.5511	SigmaTel 6.10.0.5511
Ethernet				
Vendor and model number	Broadcom 440x 10/100	Broadcom 440x 10/100	Broadcom 440x 10/100	Broadcom 440x 10/100
Driver	Broadcom 4.60.0.0	Broadcom 4.60.0.0	Broadcom 4.60.0.0	Broadcom 4.60.0.0
Wireless				
Vendor and model number	Wireless 1490	Wireless 1490	Intel PRO/Wireless 3945ABG	Intel PRO/Wireless 3945ABG
Driver	Broadcom 4.102.15.61	Broadcom 4.102.15.61	Intel 11.1.1.22	Intel 11.1.1.22
Modem				
Vendor and model number	Conexant HDA D330 MDC V.92	Conexant HDA D330 MDC V.92	Conexant HDA D330 MDC V.92	Conexant HDA D330 MDC V.92
Driver	Conexant 7.59.0.0	Conexant 7.59.0.0	Conexant 7.59.0.0	Conexant 7.59.0.0
Optical drive(s)				
Vendor and model number	Sony CRX880A	Sony CRX880A	Sony CRX880A	Sony CRX880A
Type	DVD-ROM / CD-RW	DVD-ROM / CD-RW	DVD-ROM / CD-RW	DVD-ROM / CD-RW
USB ports				
Number	4	4	4	4
Type	USB 2.0	USB 2.0	USB 2.0	USB 2.0
Other	Media card reader	Media card reader	Media card reader	Media card reader
IEEE 1394 ports				
Number	1	1	1	1
Monitor				
LCD type	WXGA	WXGA	WXGA	WXGA
Screen size	15.4"	15.4"	15.4"	15.4"
Refresh rate	60 Hz	60 Hz	60 Hz	60 Hz
Battery				
Type	Manufacturer GK479	Manufacturer GK479	Manufacturer GK479	Manufacturer GK479
Size (length x width x height)	8¼" x 2" x 1 7/8"	8¼" x 2" x 1 7/8"	8¼" x 2" x 1 7/8"	8¼" x 2" x 1 7/8"
Rated capacity	5,000 mAh / 11.1V (56Wh)	5,000 mAh / 11.1V (56Wh)	5,000 mAh / 11.1V (56Wh)	5,000 mAh / 11.1V (56Wh)
Weight	11 oz.	11 oz.	11 oz.	11 oz.

Figure 5: Detailed system configuration information for the test notebook PCs from OEM 1.

OEM 2	System 2A AMD Athlon 64 X2 TK-55 1.8GHz	System 2B AMD Turion 64 X2 TL-60 2.0GHz	System 2C Intel Core 2 Duo T5250 1.5GHz	System 2D Intel Core 2 Duo T7500 2.2GHz
General				
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P2C2L / MP	1P2C2L / MP	1P2C2L / MP	1P2C2L / MP
Number of physical processors	1	1	1	1
Single/Dual Core processors	Dual	Dual	Dual	Dual
System power management policy	Manufacturer recommended	Manufacturer recommended	Manufacturer recommended	Manufacturer recommended
Processor power-saving option	AMD PowerNow! Technology	AMD PowerNow! Technology	Enhance Intel SpeedStep Technology	Enhance Intel SpeedStep Technology
System dimensions (length x width x height)	14" x 10" x 1 7/8"	14" x 10" x 1 7/8"	14" x 10" x 1 7/8"	14" x 10" x 1 7/8"
System weight	5 lbs. 16 oz.	5 lbs. 16 oz.	5 lbs. 16 oz.	5 lbs. 16 oz.
CPU				
Vendor	AMD	AMD	Intel	Intel
Name	Athlon 64 X2	Turion 64 X2	Core 2 Duo	Core 2 Duo
Model number	TK-55	TL-60	T5250	T7500
Stepping	1	1	D	A
Socket type	Socket S1	Socket S1	Socket P	Socket P
Core frequency (GHz)	1.8	2.0	1.5	2.2
Front-side bus frequency	1,600 MHz HyperTransport Technology	1,600 MHz HyperTransport Technology	667 MHz	800 MHz
L1 cache	64 KB + 64 KB (per core)	64 KB + 64 KB (per core)	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)
L2 cache	512 MB (256 KB per core)	1 MB (512 KB per core)	2 MB (shared)	4 MB (shared)
Platform				
Motherboard model number	Quanta 30CF	Quanta 30CF	Quanta 30CC	Quanta 30CC
Motherboard chipset	NVIDIA nForce 630M	NVIDIA nForce 630M	Intel 965GM	Intel 965GM
Motherboard revision number	85.17	85.17	79.1D	79.1D
System serial number	CNF73664QP	CNF73664QR	CNF73635R7	CNF7361M5R
Bios name and version	Manufacturer F.06	Manufacturer F.06	Manufacturer F.22	Manufacturer F.22
BIOS settings	Default	Default	Default	Default
Memory module(s)				
Vendor and model number	Hyundai Electronics HYMP512S64CP8-Y5	Hyundai Electronics HYMP512S64CP8-Y5	Hyundai Electronics HYMP512S64CP8-Y5	Hyundai Electronics HYMP512S64CP8-Y5
Type	PC2-5300	PC2-5300	PC2-5300	PC2-5300
Speed (MHz)	667	667	667	667

OEM 2	System 2A AMD Athlon 64 X2 TK-55 1.8GHz	System 2B AMD Turion 64 X2 TL-60 2.0GHz	System 2C Intel Core 2 Duo T5250 1.5GHz	System 2D Intel Core 2 Duo T7500 2.2GHz
Speed running in the system (MHz)	333	333	333	333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-15	5-5-5-15	5-5-5-15	5-5-5-15
Size	2,048 MB	2,048 MB	2,048 MB	2,048 MB
Number of memory module(s)	2 x 1,024 MB	2 x 1,024 MB	2 x 1,024 MB	2 x 1,024 MB
Chip organization (single-sided, double-sided)	Double-sided	Double-sided	Double-sided	Double-sided
Channel (single/dual)	Dual	Dual	Dual	Dual
Hard disk				
Vendor and model number	Toshiba MK8037GSX	Toshiba MK8037GSX	Toshiba MK8037GSX	Toshiba MK8037GSX
Size	80 GB	80 GB	80 GB	80 GB
Buffer size	8 MB	8 MB	8 MB	8 MB
RPM	5,400	5,400	5,400	5,400
Type	SATA 300 Mb/s	SATA 300 Mb/s	SATA 300 Mb/s	SATA 300 Mb/s
Controller	NVIDIA nForce 630M	NVIDIA nForce 630M	Intel 82801HBM (ICH8-ME)	Intel 82801HBM (ICH8-ME)
Driver	Microsoft 6.0.6000.16386	Microsoft 6.0.6000.16386	Intel 7.0.0.1020	Intel 7.0.0.1020
Operating system				
Name	Windows Vista Home Premium	Windows Vista Home Premium	Windows Vista Home Premium	Windows Vista Home Premium
Build number	6000	6000	6000	6000
File system	NTFS	NTFS	NTFS	NTFS
Kernel	ACPI x86-based PC	ACPI x86-based PC	ACPI x86-based PC	ACPI x86-based PC
Language	English	English	English	English
Microsoft DirectX version	DirectX 10	DirectX 10	DirectX 10	DirectX 10
Graphics				
Vendor and model number	NVIDIA GeForce Go 7150M	NVIDIA GeForce Go 7150M	Intel GMA X3100	Intel GMA X3100
Type	Integrated	Integrated	Integrated	Integrated
Chipset	GeForce Go 7150M	GeForce Go 7150M	Intel 965 Express Chipset	Intel 965 Express Chipset
BIOS version	5.67.32.16.7	5.67.32.16.7	1436	1436
Total available graphics memory	559 MB	559 MB	358 MB	358 MB
Dedicated video memory	64 MB	64 MB	0 MB	0 MB
System video memory	0 MB	0 MB	128 MB	128 MB
Shared system memory	495 MB	495 MB	230 MB	230 MB
Resolution	1,280 x 800	1,280 x 800	1,280 x 800	1,280 x 800
Driver	NVIDIA 7.15.11.147	NVIDIA 7.15.11.147	Intel 7.14.10.1244	Intel 7.14.10.1244

OEM 2	System 2A AMD Athlon 64 X2 TK-55 1.8GHz	System 2B AMD Turion 64 X2 TL-60 2.0GHz	System 2C Intel Core 2 Duo T5250 1.5GHz	System 2D Intel Core 2 Duo T7500 2.2GHz
Sound card/subsystem				
Vendor and model number	Conexant High Definition Audio	Conexant High Definition Audio	Realtek High Definition Audio	Realtek High Definition Audio
Driver	Conexant 4.18.0.0	Conexant 4.18.0.0	Realtek 6.0.1.5384	Realtek 6.0.1.5384
Ethernet				
Vendor and model number	NVIDIA nForce Networking	NVIDIA nForce Networking	Realtek RTL8101	Realtek RTL8101
Driver	NVIDIA 65.6.5.0	NVIDIA 65.6.5.0	Realtek 6.191.305.2007	Realtek 6.191.305.2007
Wireless				
Vendor and model number	Broadcom 4321AG	Broadcom 4321AG	Intel 4965AGN	Intel 4965AGN
Driver	Broadcom 4.102.15.61	Broadcom 4.102.15.61	Intel 11.1.0.86	Intel 11.1.0.86
Modem				
Vendor and model number	HDAUDIO Soft Data Fax Modem with SmartCP	HDAUDIO Soft Data Fax Modem with SmartCP	Motorola SM56 Data Fax	Motorola SM56 Data Fax
Driver	CXT 7.61.0.0	CXT 7.61.0.0	Motorola 6.12.4.0	Motorola 6.12.4.0
Optical drive(s)				
Vendor and model number	Pioneer DVR-K17B	Pioneer DVR-K17B	TSSTcorp TS-L632M	Matshita UJ-851S
Type	DVD-RW	DVD-RW	DVD-RW	DVD-RW
USB ports				
Number	3	3	3	3
Type	USB 2.0	USB 2.0	USB 2.0	USB 2.0
Other	Media card reader	Media card reader	Media card reader	Media card reader
IEEE 1394 ports				
Number	1	1	1	1
Monitor				
LCD type	WXGA	WXGA	WXGA	WXGA
Screen size	15.4"	15.4"	15.4"	15.4"
Refresh rate	60 Hz	60 Hz	60 Hz	60 Hz
Battery				
Type	HSTNN-OB46	HSTNN-OB46	HSTNN-LB46	HSTNN-LB46
Size (length x width x height)	8 ¼" x 2" x 7/8"	8 ¼" x 2" x 7/8"	8 ¼" x 2" x 7/8"	8 ¼" x 2" x 7/8"
Rated capacity	5,000 mAh / 10.8V (55Wh)	5,000 mAh / 10.8V (55Wh)	5,000 mAh / 10.8V (55Wh)	5,000 mAh / 10.8V (55Wh)
Weight	11 oz.	11 oz.	11 oz.	11 oz.

Figure 6: Detailed system configuration information for the test notebook PCs from OEM 2.

OEM 3	System 3A AMD Turion 64 X2 TL-60 2.0GHz	System 3B Intel Core 2 Duo T7500 2.2GHz
General		
Processor and OS kernel: (physical, core, logical) / (UP, MP)	1P2C2L / MP	1P2C2L / MP
Number of physical processors	1	1
Single/Dual Core processors	Dual	Dual
System power management policy	Balanced	Balanced
Processor power-saving option	AMD PowerNow! Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	12" x 9¾" x 1¾"	12" x 9¾" x 1¾"
System weight	4 lbs. 9 oz.	4 lbs. 9 oz.
CPU		
Vendor	AMD	Intel
Name	Turion 64 X2	Core 2 Duo
Model number	TL-60	T7500
Stepping	1	A
Socket type	Socket S1	Socket P
Core frequency (GHz)	2.0	2.2
Front-side bus frequency	1,600 MHz HyperTransport Technology	800 MHz
L1 cache	64 KB + 64 KB (per core)	32 KB + 32 KB (per core)
L2 cache	1 MB (512 KB per core)	4 MB (shared)
Platform		
Motherboard model number	MSI MS-1222	MSI MS-1221
Motherboard chipset	ATI RS690M	Intel 965GM
Motherboard revision number	1.000	1.000
System serial number	1222-B001USK0705000239	1221-B001USK0706000233
Bios name and version	American MegaTrends A1222AG6 V3.02	American MegaTrends A1221IG6 V1.1
BIOS settings	default	default
Memory module(s)		
Vendor and model number	Kingston 9905295-015	Kingston 9905295-015
Type	PC2-5300	PC2-5300
Speed (MHz)	667	667
Speed running in the system (MHz)	333	333
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-15	5-5-5-15
Size	2,048 MB	2,048 MB
Number of memory module(s)	2 x 1,024 MB	2 x 1,024 MB

OEM 3	System 3A AMD Turion 64 X2 TL-60 2.0GHz	System 3B Intel Core 2 Duo T7500 2.2GHz
Chip organization (Single-sided, Double-sided)	Double-sided	Double-sided
Channel (Single/Dual)	Dual	Dual
Hard disk		
Vendor and model number	Hitachi HTS541080G9SA00	Hitachi HTS541080G9SA00
Size	80 GB	80 GB
Buffer size	8 MB	8 MB
RPM	5,400	5,400
Type	SATA 150 Mb/s	SATA 150 Mb/s
Controller	ATI SB600	Intel 82801HBM (ICH8-ME)
Driver	Microsoft 6.0.6000.16386	Microsoft 6.0.6000.16386
Operating system		
Name	Windows Vista Home Premium	Windows Vista Home Premium
Build number	6000	6000
File system	NTFS	NTFS
Kernel	ACPI x86-based PC	ACPI x86-based PC
Language	English	English
Microsoft DirectX version	DirectX 10	DirectX 10
Graphics		
Vendor and model number	ATI Radeon X1270	Intel GMA X3100
Type	Integrated	Integrated
Chipset	ATI Radeon X1200 Series	Intel 965 Express Chipset Family
BIOS version	BK-ATI VER010.044.000.0000000	1471
Total available graphics memory	831 MB	359 MB
Dedicated video memory	128 MB	0 MB
System video memory	0 MB	128 MB
Shared system memory	703 MB	231 MB
Resolution	1,280 x 800	1,280 x 800
Driver	ATI 8.362.0.0	Intel 7.14.10.1322
Sound card/subsystem		
Vendor and model number	Realtek High Definition Audio	Realtek High Definition Audio
Driver	Realtek 6.0.1.5423	Realtek 6.0.1.5397
Ethernet		
Vendor and model number	Realtek RTL8168 Gigabit	Realtek RTL8168 Gigabit
Driver	Microsoft 6.1837.926.2006	Microsoft 6.1837.926.2006
Wireless		
Vendor and model number	802.11g Mini Card Wireless	Intel PRO/Wireless 3945ABG
Driver	Ralink 3.0.2.0	Microsoft 10.6.0.15

OEM 3	System 3A AMD Turion 64 X2 TL-60 2.0GHz	System 3B Intel Core 2 Duo T7500 2.2GHz
Modem		
Vendor and model number	Agere Systems HDA Modem	Agere Systems HDA Modem
Driver	Microsoft 2.1.69.0	Microsoft 2.1.69.0
Optical drive(s)		
Vendor and model number	Optiarc AD-7530A	LG GSA-T20N
Type	DVD-RW	DVD-RW
USB ports		
Number	3	3
Type	USB 2.0	USB 2.0
Other	NA	NA
IEEE 1394 ports		
Number	0	0
Monitor		
LCD type	WXGA	WXGA
Screen size	12.1"	12.1"
Refresh rate	60 Hz	60 Hz
Battery		
Type	BTY-S27 Lithium Ion	BTY-S27 Lithium Ion
Size (length x width x height)	11" x 2 7/8" x 1 1/2"	11" x 2 7/8" x 1 1/2"
Rated capacity	4,800 mAh / 14.4V (69Wh)	4,800 mAh / 14.4V (69Wh)
Weight	15 oz.	15 oz.

Figure 7: Detailed system configuration information for the test notebook PCs from OEM 3.



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