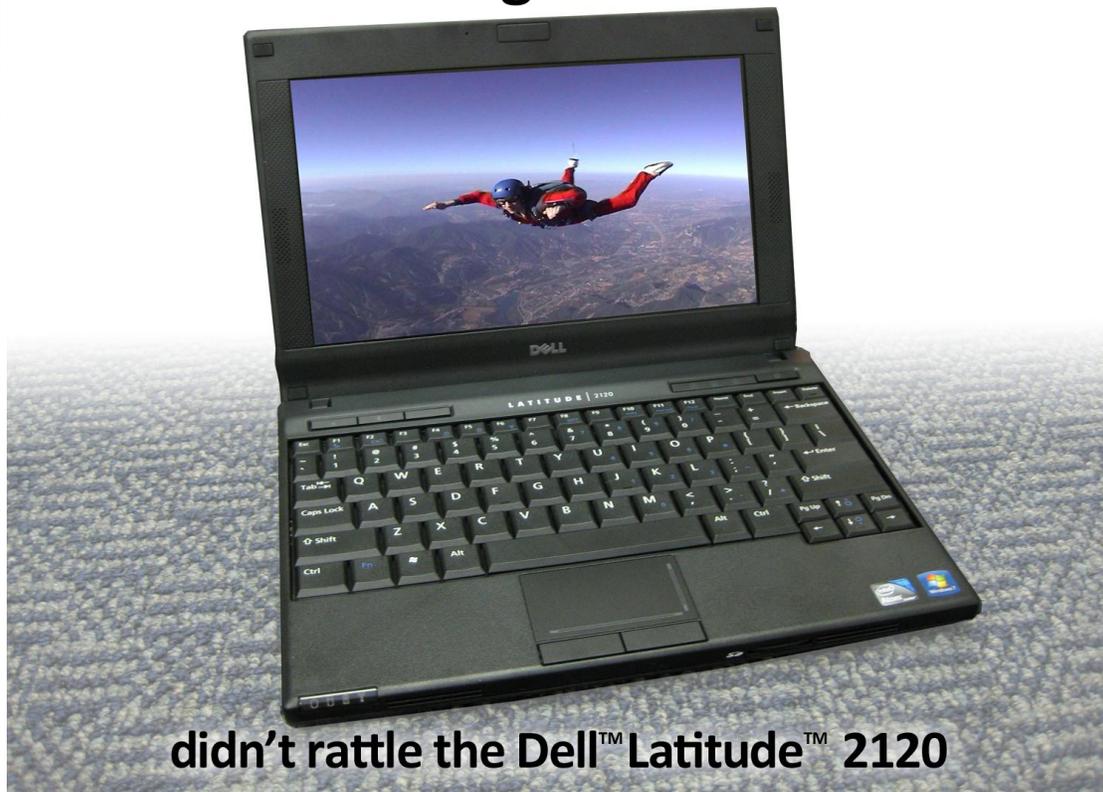


Falls that damaged other netbooks



INTRODUCTION

As technological advances make educational information easier to access electronically, school systems strive to provide students with the most appropriate and effective tools to use both in the classroom and at home. Netbooks are an ideal choice: they are easy to transport, they build on the familiarity many students have with PCs, and, most importantly, they provide these benefits at a fraction of the cost of a traditional notebook PC.

With so many netbooks on the market, how does an educational institution decide which to buy? Because students will be transporting them and using them in all kinds of settings, sometimes carelessly, durability is essential; the systems must continue to look good and function properly throughout their lifespan. In the labs at Principled Technologies, we tested the ability of 10 leading netbook systems to withstand sudden drops. Of the netbooks we tested, the Dell Latitude 2120 proved the most durable, experiencing almost no damage after sustaining three 29-inch drops.

PROJECT OVERVIEW

Students who use school-provided netbooks do not always handle these systems with appropriate care. A student transporting his or her netbook day after day is likely to accidentally drop the netbook at one time or another. To see how well they withstood such accidents, we tested the following netbooks from leading vendors:

- Acer® Aspire® One 533
- ASUS Eee PC™ 1015 PEM
- ASUS Eee PC 1016P
- ASUS Eee PC 1018P
- ASUS Eee PC 1215N
- Dell Latitude 2120
- HP Mini 100e
- HP Mini 2102*
- Lenovo® IdeaPad® S10-3*
- Lenovo IdeaPad S10-3t*

To test the drop resistance of each netbook, we performed up to three 29-inch flat drops onto commercial-grade carpet while the netbook was open and running MAXON CINEBENCH R10. After each drop, we measured how well each system had protected its data using HD Tune Pro 4.01 and HDDScan 3.2, tests that assess hard drive damage. After a system failed to boot, we conducted no further testing on that system.

WHAT WE FOUND

Prior to the first drop, we performed a baseline run of HD Tune Pro 4.01 and HDDScan 3.2. All 10 systems achieved an HD Tune Pro damaged blocks percentage of 0.0% and an HDDScan 3.2 bad blocks score of 0, indicating that their hard drives were all in perfect condition.

Figures 1 through 3 show the HD Tune Pro and HDDScan 3.2 results for the test systems for each drop, along with our notes, which describe any cosmetic or functional damage we observed. The Dell Latitude 2120 had minimal cosmetic damage, which we were able to correct easily, and showed only 135 bad blocks according to HDDScan after three drops. We present the systems in order from least damaged to most damaged. Note that the systems that stopped functioning after the first drop test in Figure 1 are greyed out in the second and third drop test results in Figures 2 and 3. Note that the position of each system in these tables is determined by overall ranking.

* Please note that PT tested the systems marked with an asterisk in June 2010. In this report, we compare the systems we tested in February 2011 to these previously published results, which we reproduce here and are available at http://www.principledtechnologies.com/clients/reports/Dell/Latitude2110_netbook_durability0610.pdf.

System	HD Tune Pro 4.01 damaged blocks percentage	HDDScan 3.2 bad blocks	Notes
Dell Latitude 2120	0.6%	122	<ul style="list-style-type: none"> Middle screen bezel detached from screen. We were able to pop both parts back into position for the following drop.
ASUS Eee PC 1215N	0.2%	13	<ul style="list-style-type: none"> Middle screen bezel detached from screen. The top section of the body separated at the right back corner, near the screen hinge. We were able to pop both parts back into position for the following drop.
ASUS Eee PC 1018P	0.1%	26	<ul style="list-style-type: none"> Middle screen bezel detached from screen. The back of the screen separated from the front of the assembly as the back bottom corners. We were able to pop both parts back into position for the following drop.
ASUS Eee PC 1015PEM	0.1%	26	<ul style="list-style-type: none"> No cosmetic damage.
Lenovo IdeaPad S10-3t*	1.1%	724	<ul style="list-style-type: none"> Upon contact with the floor, the system rebooted.
HP Mini 2102	12%	1,287	<ul style="list-style-type: none"> There were points of separation on the display at the bottom center. System failed to boot into the OS and did not recognize the presence of the hard drive. BIOS returned an error that stated, "Hard Drive Does Not Exist."
Lenovo IdeaPad S10-3*	1.4%	N/A	<ul style="list-style-type: none"> After scanning the system for several hours the system went to a blue screen and would not boot into the OS. System repair failed. When trying to pull the results for HDD Scan 3.2, the system froze and would not boot back into the CD. Assembly separation at the bottom center of the display.
ASUS EeePC 1016P	1.5%	537,824	<ul style="list-style-type: none"> After running both scans successfully after the first drop, the system froze when we attempted to shut it down. When we attempted to boot, the system instructed us to reboot with proper boot device.
HP Mini 100e*	42.4%	43,135	<ul style="list-style-type: none"> System returned a SMART Hard Disk Error warning of imminent failure with the instruction to immediately run a Hard Disk Test. When we did so, we were directed to reinstall Windows® on the system.
Acer Aspire One 533	73.0%	N/A	<ul style="list-style-type: none"> After the first drop, the system was able to run HD Tune. After we closed HD Tune, the system failed to identify the hard disk. Our attempts to boot resulted in a blank black screen.

Figure 1: Drop test results for the systems after Drop 1.

System	HD Tune Pro 4.01 damaged blocks percentage	HDDScan 3.2 bad blocks	Notes
Dell Latitude 2120	0.6%	126	<ul style="list-style-type: none"> No cosmetic damage.
ASUS Eee PC 1215N	0.2%	13	<ul style="list-style-type: none"> The same damage occurred in the same places as for the first drop. The back left section also separated in this drop. After the second drop, we were not able to pop the bezel back into position.
ASUS Eee PC 1018P	0.1%	26	<ul style="list-style-type: none"> The same damage occurred in the same places as for the first drop. After the second drop, we were not able to pop the bezel or the left separation at the hinge back into position.
ASUS Eee PC 1015PEM	1.0%	26	<ul style="list-style-type: none"> Middle screen bezel detached from screen. The front-left corner of the body separated. We were able to pop both parts back into position for the following drop.
Lenovo IdeaPad S10-3t*	2.0%	860	<ul style="list-style-type: none"> Upon contact with the floor, the system rebooted. LCD damage: the left half of the screen was dimmer than the right half.
HP Mini 2102			
Lenovo IdeaPad S10-3*			
ASUS EeePC 1016P			
HP Mini 100e*			
Acer Aspire One 533			

Figure 2: Drop test results for the systems after Drop 2.

System	HD Tune Pro 4.01 damaged blocks percentage	HDDScan 3.2 bad blocks	Notes
Dell Latitude 2120	0.7%	135	<ul style="list-style-type: none"> Boots into the operating system No cosmetic damage
ASUS Eee PC 1215N	2.6%	1,788,325	<ul style="list-style-type: none"> The same damage occurred in the same places as for the first and second drops. The separation of the top of the body was more severe, and we were not able to pop the bezel back into position. After the third drop, the CINEBENCH test running on the system froze. HD Tune showed 2.6% damage. Attempts to boot resulted in a cursor on a black screen after the Windows loading splash screens.
ASUS Eee PC 1018P	5.0%	1,900,118	<ul style="list-style-type: none"> The same damage occurred in the same places as for the first and second drops. After the second drop, we were not able to pop the bezel or the left separation at the hinge back into position. After the third drop, the system indicated that it had entered "performance mode" and froze. The system was no longer able to boot, and displayed the option to either launch Windows or to run the Repair utility. Both options went to a Windows Boot Error message saying that a component could not be located.
ASUS Eee PC 1015PEM	96.2%	1,907,802	<ul style="list-style-type: none"> The same damage occurred in the same places as for the first drop. Middle screen bezel detached from screen, and the front-left corner of the body separated. We were able to pop both parts back into position after the drop. After the third drop, the CINEBENCH test running on the system froze. The system booted to Windows error recovery, and displayed the option to either launch Windows or to run the Repair utility. Both options went to a Windows Boot Error message saying that a component could not be located.
Lenovo IdeaPad S10-3t			
HP Mini 2102			
Lenovo IdeaPad S10-3*			
ASUS EeePC 1016P			
HP Mini 100e*			
Acer Aspire One 533			

Figure 3: Drop test results for the systems after Drop 3.

HOW WE TESTED

Preparing Windows 7 for testing

1. Set the test resolution:
 - a. Right-click the desktop.
 - b. Select Screen Resolution.
 - c. Set the resolution to the maximum supported resolution.
 - d. Click OK.
2. Turn off Windows Automatic Updates:
 - a. Click the Windows Start button.
 - b. Right-click Computer, and select Properties.
 - c. Click Windows Update in the left column.
 - d. Click Change settings.
 - e. Select Never check for updates, check Receive recommended updates the same way you receive important updates, and Allow standard users to install updates on this computer.
 - f. Click OK.
3. Turn off the screensaver and power-management options on each system by doing the following:
 - a. Right-click the desktop.
 - b. Select Personalize.
 - c. Click Screensaver.
 - d. Select None from the drop down menu, and click Apply.
 - e. Click Change power settings.
 - f. Under Balanced, click change plan settings.
 - g. Select Never from the drop-down menus next to Dim the display, Turn off the display, and Put the computer to sleep.
 - h. Click Save changes.
 - i. Close any open windows.
4. Leave all services in their default state.
5. Ensure that each system is set to the default power scheme, which is the 'Balanced' power scheme for Windows 7. If the system is not, set it to that scheme.
6. Do not minimize the taskbar.
7. Turn off System Restore. Doing so prevents system restores from occurring during testing and affecting results.
 - a. Click Start, and right-click on Computer.
 - b. Select Properties.
 - c. Click System protection under Tasks in the left panel.
 - d. Select drive C:, and click Configure.
 - e. Under Restore Settings, select Turn off system protection.
 - f. Click Apply, click OK, and close both windows.
8. Disable Security notifications:
 - a. Click the Windows Start button.
 - b. Click Control Panel.
 - c. Click System and Security.
 - d. Click Change Action Center settings.

- e. Uncheck all monitoring alert messages, and click OK.
9. Change User Account Control settings:
 - a. Click the Windows Start button.
 - b. Click Control Panel.
 - c. Click System and Security.
 - d. Click Change User Account Control settings.
 - e. Move the slider bar to Never notify, and click OK.
 - f. In the User Account Control dialog box, click Yes.
10. Run the Windows Experience Index on the system.
11. Leave Aero Glass at the setting Windows 7 decides is appropriate.
12. Ensure Search indexing is enabled (default).
13. Leave the brightness at the default level.
14. Check the state of the following hardware items and disable each one if it is not already off:
 - Wireless (use the physical switch if one is available)
 - Bluetooth
 - IR
15. Disconnect any external devices.
16. Do not plug in the network adapter.
17. Add headphones, and set the volume to the midpoint.
18. Capture a sector disk image with Symantec's Ghost product.

Setting up CINEBENCH R10

1. Download CINEBENCH R10 from http://www.techpowerup.com/downloads/697/CINEBENCH_v10.html.
2. Install CINEBENCH:
 - a. Right-click the CINEBENCH ZIP file, and choose Extract All.
 - b. In the Select a Destination and Extract Files window, click Browse, click Desktop, and click OK.
 - c. Click Extract.

Running CINEBENCH R10

1. Launch CINEBENCH R10 by double-clicking the CINEBENCH R10.exe file in the CINEBENCH R10 folder.
2. Enter the MHz frequency of the processor in the MHz (real freq.) field.
3. Click Start all tests.

Measuring physical data protection—the drop test

This test measures the damage that the impact from a drop of 29 inches inflicted upon an open netbook running MAXON CINEBENCH R10. We used a Lansmont PDT56ED Precision Drop Tester, and dropped each netbook onto commercial carpet. We opened the netbook so that the screen and keyboard formed a 120-degree angle, and then placed the netbook flat on the platen. Orienting the netbook in this way resulted in a flat drop. (Figure 4 shows our test setup.)

To allow us to scan the netbooks identically, we booted both to BartPE boot CDs and installed the hard disk scanning software to the Microsoft® Windows® XP virtual machine's RAMDISK. Running the scanning software from RAM, we scanned the hard disk with HD Tune Pro 4.01 and HDDScan for Windows 3.2, and recorded the number of bad sectors and blocks before and after the drop test. We also recorded any other physical defects, such as cracks or breaks in the display, as well as separated hinges or displaced screws, which the impact of the drop caused. Refer to Appendix B for the drop test checklist. We took still photographs of the netbooks before and after each drop. We dropped each netbook once, using this process:

1. Reset the netbook to the base image using Symantec's Ghost product.
2. Install MAXON CINEBENCH R10 onto the test netbook, as we outline above.
3. Run EFD Software's HD Tune Pro 4.01 and HDDScan 3.2 to get baseline data on the state of the hard disk. Boot the system using a WinPE boot disc.
 - a. Install HD Tune Pro 4.01:
 - i. Insert a USB flash drive containing the HD Tune Pro installation executable, and click once on My Computer.
 - ii. Navigate to the USB drive, and double-click the hdtunepro_401_trial.exe installation file to install the application.
 - iii. At the welcome screen, click Next.
 - iv. Click the I accept the agreement radio button, and click Next.
 - v. In the Select Destination Location window, click Browse.
 - vi. Click the RAMDisk drive once to select it, and click OK.
 - vii. Click Next in the next two windows.
 - viii. Leave check box empty for Create a desktop icon, and click Next.
 - ix. Click Install.
 - x. Leave the check box checked for Launch HD Tune Pro, and click Finish.
 - b. Run the HD Tune Pro 4.01 Error Scan:
 - i. Select the Error Scan tab.
 - ii. Click Start in the right hand pane.

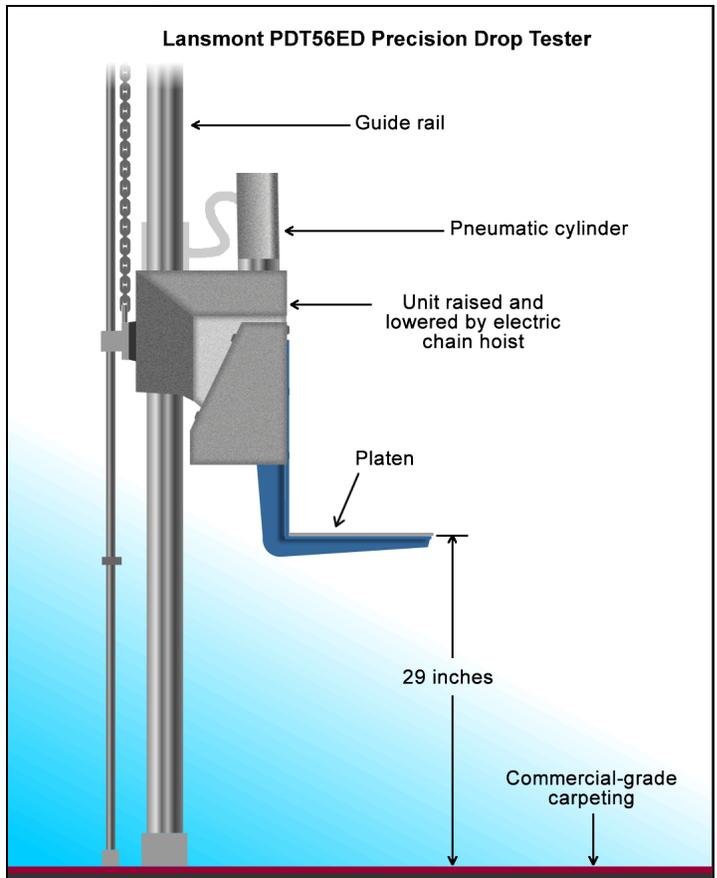


Figure 4: Our physical data protection test setup.

- Note:** The Error Scan is complete when the Start button changes from grey to black.
- c. Save the Error Scan Results:
 - i. Click the Copy screenshot to clipboard button on the upper right hand menu bar.
 - ii. Click the Save screenshot button on the menu bar.
 - iii. Save the screenshot by system name and test name.
 - d. Click the Copy information to clipboard button on the upper right hand menu bar (it is the first button on the left):
 - i. Open a new text file by clicking Start→Run, typing `notepad`, and clicking OK.
 - ii. In the Notepad window, click Edit→Paste.
 - iii. Click File→Save As, enter an appropriate filename using a .txt extension, and choose the location to save the file (we saved ours to a USB flash drive). Click Save.
 - e. Save the relevant log files:
 - i. Click the Health tab.
 - ii. Click Log in the bottom right hand corner.
 - iii. In the Attribute pane, click (01) Raw Read Error Rate, and click Export.
 - iv. Enter an appropriate filename using a .txt extension, choose a location to save the file, and click Open.
 - v. Repeat steps 3c and 3d for (05) Reallocated Sector Count and (07) Seek Error Rate.
 - f. Close the HD Tune Pro 4.01 Hard Disk Utility.
 - g. Scan the netbook's hard drive with HDDScan for Windows version 3.2:
 - i. Copy the HDDScan folder to the WinPE RAMDisk.
 - ii. Open the HDDScan folder, and double-click the HDDScan.exe executable file to run the application.
 - iii. Click Tasks→Surface Tests to open the Test Selection window.
 - iv. Select Verify from the list of tests, and click Add Test.
 - v. At the conclusion of the run, double-click the VR-Verify test id in the Test Manager window to open up the results.
 - vi. Select the Report tab, and copy and paste the test results into Notepad.
 - vii. Save the results as a text file.
4. Set the height of the platen on the Lansmont Precision Drop Tester to 29 inches above the surface of the 28 oz. commercial carpeting.
 5. Place the fully charged netbook on the platen of the drop tester, with the netbook's base flat on the platen and the screen facing forward, open at a 120-degree angle.
 6. Launch CINEBENCH.
 7. Unplug the netbook, and drop the netbook onto the commercial carpeting.
 8. Wait until the netbook is completely still.
 9. If the battery or any other components come off the system, inspect them for damage, and reinstall them if possible.
 10. Complete the checklist in Appendix B, including the latest version available of Dell Diagnostics, if applicable.
 11. Take digital pictures of the netbook from all angles after completing the checklist.
 12. Stop CINEBENCH.
 13. Reconnect the netbook's AC Adapter.

14. Run HD Tune Pro 4.01 and HDD Scan 3.2 using the process in Step 3, and record the results as the netbook's post-test disk status.

IN CONCLUSION

One of the most important factors an educational institution can consider when selecting netbooks to purchase for students is system durability. Budgets do not allow for poor purchasing decisions that require schools to replace netbooks that appear old and damaged and that stop functioning properly before the end of a typical lifecycle.

In our hands-on tests, the Dell Latitude 2120 withstood the most drops with the least damage, making it an excellent netbook for schools to offer their students.

APPENDIX A – SYSTEM CONFIGURATION INFORMATION

Figures 5 through 7 present the system configuration information for the test systems, which we list alphabetically. System configuration information for the systems we tested previously is available at http://www.principledtechnologies.com/clients/reports/Dell/Latitude2110_netbook_durability0610.pdf.

System	Acer Aspire One 533
	
General	
Number of processor packages	1
Number of cores per processor	1
Number of hardware threads per core	2
System power management policy	Balanced
Processor power-saving option	Enhanced Intel® SpeedStep® Technology
System dimensions (length x width x height)	10" x 7-1/2" x 1-3/4"
System weight	2 lbs. 10 oz.
CPU	
Vendor	Intel
Name	Atom™
Model number	N475
Stepping	B0
Socket type and number of pins	Socket 437 FCBGA8
Core frequency (GHz)	1.83
Bus frequency	667 MHz
L1 cache	24 KB + 32 KB
L2 cache	512 KB
L3 cache	N/A
Platform	
Vendor	Acer
Motherboard model number	AO533
Motherboard chipset	Intel NM10
BIOS name and version	Acer v1.02 (05/07/2010)
Memory module(s)	
Vendor and model number	Samsung M471B2873FHS-CH9
Type	PC3-10600
Speed (MHz)	1,333
Speed running in the system (MHz)	667
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-12

System	Acer Aspire One 533
Size (MB)	1,024
Number of memory module(s)	1
Chip organization (single-sided/double-sided)	Double-sided
Channel (single/dual)	Single
Hard disk	
Vendor and model number	Hitachi HTS545025B9A300
Number of disks in system	1
Size (GB)	250
Buffer size (MB)	8
RPM	5,400
Type	SATA 3.0 Gb/s
Controller	Intel NM10
Driver	Intel 8.9.0.1023 (06/04/2009)
Operating system	
Name	Windows 7 Starter 32-bit
Build number	7600
Service Pack	N/A
File system	NTFS
Kernel	ACPI x86-based PC
Language	English
Microsoft® DirectX® version	DirectX 11
Graphics	
Vendor and model number	Intel GMA 3150
Type	Integrated
Chipset	Intel Graphics Media Accelerator 3150
BIOS version	1818.0
Total available graphics memory (MB)	250
Dedicated video memory (MB)	0
System video memory (MB)	64
Shared system memory (MB)	186
Resolution	1,024 x 600
Driver	Intel 8.14.10.2117 (04/19/2010)
Sound card/subsystem	
Vendor and model number	Realtek High Definition Audio
Driver	Realtek 6.0.1.6066 (03/22/2010)
Ethernet	
Vendor and model number	Atheros® AR8152 PCI-E Fast Ethernet Controller
Driver	Atheros 1.0.0.29 (04/21/2010)

System	Acer Aspire One 533
Wireless	
Vendor and model number	Broadcom® 802.11n Network Adapter
Driver	Broadcom 5.60.350.6 (03/22/2010)
Modem	
Vendor and model number	N/A
Driver	N/A
USB ports	
Number	3
Type	2.0
Other	Multimedia card reader
Monitor	
LCD type	WSVGA
Screen size	10.1"
Refresh rate (Hz)	60
Battery	
Type	Acer UM09H51 Lithium-ion
Size (length x width x height)	8" x 2" x 1-1/4"
Rated capacity	4,400mAh / 10.8V (48Wh)
Weight	10 oz.

Figure 5: System configuration information for the Acer Aspire One 533 netbook.

System	ASUS Eee PC 1015PEM	ASUS Eee PC 1016P	ASUS Eee PC 1018P	ASUS Eee PC 1215N
				
General				
Number of processor packages	1	1	1	1
Number of cores per processor	2	1	1	2
Number of hardware threads per core	2	2	2	2
System power management policy	Balanced	Balanced	Balanced	Balanced
Processor power-saving option	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology	Enhance Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology

System	ASUS Eee PC 1015PEM	ASUS Eee PC 1016P	ASUS Eee PC 1018P	ASUS Eee PC 1215N
System dimensions (length x width x height)	10-1/4" x 7" x 7/8"	10-1/3" x 7" x 1-1/3"	10-1/4" x 7-1/4" x 1"	11-5/8" x 8" x 1-1/8"
System weight	2 lbs. 13 oz.	2 lbs. 13 oz.	2 lbs. 8 oz.	3 lbs. 6 oz.
CPU				
Vendor	Intel	Intel	Intel	Intel
Name	Atom	Atom	Atom	Atom
Model number	N550	N455	N455	D525
Stepping	B0	B0	B0	B0
Socket type and number of pins	Socket 437 FCBGA8	Socket 437 FCBGA8	Socket 437 FCBGA8	Socket 437 FCBGA8
Core frequency (GHz)	1.50	1.66	1.66	1.83
Bus frequency	667	667 MHz	667 MHz	800 MHz
L1 cache	24 KB + 32 KB (per core)	24 KB + 32 KB	24 KB + 32 KB	24 KB + 32 KB (per core)
L2 cache	1 MB (512 KB per core)	512 KB	512 KB	1 MB (512 KB per core)
L3 cache	N/A	N/A	N/A	N/A
Platform				
Vendor	ASUSTek	ASUSTek	ASUSTeK	ASUSTeK
Motherboard model number	1015PE	1015PE	1018P	1215N
Motherboard chipset	Intel NM10	Intel NM10	Intel NM10	Intel NM10
BIOS name and version	American Megatrends Inc. 0801 (10/06/2010)	American Megatrends Inc. 0801 (10/06/2010)	American Megatrends Inc. 0502 (08/25/2010)	American Megatrends Inc. 0503 (09/07/2010)
Memory module(s)				
Vendor and model number	Hynix HMT112S6TFR8C-H9	Hynix HMT325S6BFR8C-H9	Hynix HMT112S6TFR8C-H9	Hynix HM112S6TFR8C-H9
Type	PC3-10600	PC3-10600	PC3-10600	PC3-10600
Speed (MHz)	1,333	1,333	1,333	1,333
Speed running in the system (MHz)	667	667	667	800
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-12	5-5-5-12	5-5-5-12	6-6-6-15
Size (MB)	1,024	2,048	1,024	1,024

System	ASUS Eee PC 1015PEM	ASUS Eee PC 1016P	ASUS Eee PC 1018P	ASUS Eee PC 1215N
Number of memory module(s)	1	1	1	2
Chip organization (single-sided/double-sided)	Double-sided	Double-sided	Double-sided	Double-sided
Channel (single/dual)	Single	Single	Single	Single
Hard disk				
Vendor and model number	Seagate ST9250315AS	Seagate ST9320325AS	Seagate ST9250315AS	Seagate ST9250315AS
Number of disks in system	1	1	1	1
Size (GB)	250	320	250	250
Buffer size (MB)	8	8	8	8
RPM	5,400	5,400	5,400	5,400
Type	SATA 3.0 Gb/s	SATA 3.0Gb/s	SATA 3.0 Gb/s	SATA 3.0 Gb/s
Controller	Intel NM10	Intel NM10	Intel NM10	Intel NM10
Driver	Intel 8.9.0.1023 (06/04/1023)	Intel 8.9.0. 1023 (06/04/2009)	Intel 8.9.0.1023 (06/04/2009)	Intel 8.9.0.1023 (06/04/2009)
Operating system				
Name	Windows 7 Starter 32-bit	Windows 7 Professional 32-bit	Windows 7 Starter 32-bit	Windows 7 Home Premium 32-bit
Build number	7600	7600	7600	7600
Service Pack	N/A	N/A	NA	N/A
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 11	DirectX 11	DirectX 11	DirectX 11
Graphics card #1				
Vendor and model number	Intel GMA 3150	Intel GMA 3150	Intel GMA 3150	Intel GMA 3150
Type	Integrated	Integrated	Integrated	Integrated
Chipset	Intel Graphics Media Accelerator 3150			
BIOS version	1933.0	1933.0	1933.0	2001.0
Total available graphics memory (MB)	251	256	251	256

System	ASUS Eee PC 1015PEM	ASUS Eee PC 1016P	ASUS Eee PC 1018P	ASUS Eee PC 1215N
Dedicated video memory (MB)	0	0	0	0
System video memory (MB)	64	64	64	64
Shared system memory (MB)	187	192	187	192
Resolution	1,024 x 600	1,024 x 600	1,024 x 600	1,366 x 768
Driver	Intel Corporation 8.14.10.2117 (04/19/2010)	Intel 8.14.10.2117 (04/19/2010)	Microsoft 6.1.7600.16385 (06/21/2006)	Intel 8.14.10.2117 (04/19/2010)
Graphics card #2				
Vendor and model number	N/A	N/A	N/A	NVIDIA ION automatic switchable graphics
Type	N/A	N/A	N/A	Discrete
Chipset	N/A	N/A	N/A	NVIDIA ION
Resolution	N/A	N/A	N/A	1,366 x 768
Sound card/subsystem				
Vendor and model number	Realtek High Definition Audio	Realtek High Definition Audio	Realtek High Definition Audio	Realtek High Definition Audio
Driver	Realtek 6.0.1.6066 (03/13/2010)	Realtek 6.0.1.6066 (03/13/2010)	Realtek 6.0.1.6077 (03/26/2010)	Realtek 6.0.1.6186 (08/24/2010)
Ethernet				
Vendor and model number	Atheros AR8132 PCI-E Fast Ethernet Controller	Atheros AR8131 PCI-E Gigabit Ethernet Controller	Atheros AR8131 PCI-E Gigabit Ethernet Controller	Atheros AR8152 PCI-E Fast Ethernet Controller
Driver	Atheros 1.0.0.29 (04/21/2010)	Atheros 1.0.0.29 (04/21/2010)	Atheros 1.0.0.23 (12/22/2009)	Atheros 1.0.0.34 (07/29/2010)
Wireless				
Vendor and model number	Broadcom 802.11n Network Adapter	Broadcom 802.11n Network Adapter	Broadcom 802.11n Network Adapter	Atheros AR9285 Wireless Network Adapter
Driver	Broadcom 5.60.350.11 (05/07/2010)	Broadcom 5.60.350.11 (05/07/2010)	Broadcom 5.60.350.11 (05/07/2010)	Atheros 8.0.0.238 (10/05/2009)
Modem				
Vendor and model number	N/A	N/A	N/A	N/A
Driver	N/A	N/A	N/A	N/A

System	ASUS Eee PC 1015PEM	ASUS Eee PC 1016P	ASUS Eee PC 1018P	ASUS Eee PC 1215N
USB ports				
Number	3	3	3	3
Type	2.0	2.0	3.0	2.0
Other	Multimedia card reader	Multimedia card reader	Multimedia card reader	Multimedia card reader
Monitor				
Type	WSVGA	WSVGA	WSVGA	WXGA
Screen size	10.1"	10.1"	10.1"	12.1"
Refresh rate (Hz)	60	60	60	60
Battery				
Type	ASUS A32-1015 Lithium-ion	ASUS A32-1015 Lithium-ion	ASUS C22-1018 Lithium-ion	ASUS A32-1015 Lithium-ion
Size (length x width x height)	8" x 1-7/8" x 3/4"	8" x 1-7/8" x 3/4"	9-3/4" x 2-1/2" x 1/2"	8" x 1-7/8" x 3/4"
Rated capacity	5,600mAh / 11.25V (63Wh)	5,600mAh / 11.25V (63Wh)	6,000mAh / 7.4V (44Wh)	5,200mAh / 10.95V (56Wh)
Weight	11 oz.	11 oz.	10 oz.	11 oz.

Figure 6: System configuration information for the ASUS netbooks.

System	Dell Latitude 2120	HP Mini 100e
		
General		
Number of processor packages	1	1
Number of cores per processor	1	1
Number of hardware threads per core	2	2
System power management policy	Dell	Balanced
Processor power-saving option	Enhanced Intel SpeedStep Technology	Enhanced Intel SpeedStep Technology
System dimensions (length x width x height)	10-1/4" x 7-1/4" x 1-1/2"	10-5/8" x 9-3/4" x 1-3/8"
System weight	2 lbs. 14 oz.	3 lbs. 7 oz.
CPU		
Vendor	Intel	Intel
Name	Atom	Atom
Model number	N455	N455

System	Dell Latitude 2120	HP Mini 100e
Stepping	B0	B0
Socket type and number of pins	Socket 437 FCBGA8	Socket 437 FCBGA8
Core frequency (GHz)	1.66	1.66
Bus frequency	667 MHz	667 MHz
L1 cache	24 KB + 32 KB	24 KB + 32 KB
L2 cache	512 KB	512 KB
L3 cache	N/A	N/A
Platform		
Vendor	Dell	Foxconn
Motherboard model number	OYY3FH	1586
Motherboard chipset	Intel NM10	Intel NM10
BIOS name and version	Dell A00 (10/27/2010)	Hewlett-Packard F.02 (07/29/2010)
Memory module(s)		
Vendor and model number	Micron® 4JSF12864HZ-1G4D1	Samsung M471B2873FHS-CH9
Type	PC3-10600	PC3-10600
Speed (MHz)	1,333	1,333
Speed running in the system (MHz)	667	667
Timing/Latency (tCL-tRCD-tRP-tRASmin)	5-5-5-12	5-5-5-12
Size (MB)	1,024	1,024
Number of memory module(s)	1	1
Chip organization (single-sided/double-sided)	Double-sided	Double-sided
Channel (single/dual)	Single	Single
Hard disk		
Vendor and model number	Western Digital WD2500BEVT-75A23T0	Western Digital WD1600BEVT-22A23T0
Number of disks in system	1	1
Size (GB)	250	160
Buffer size (MB)	8	8
RPM	5,400	5,400
Type	SATA 3.0 Gb/s	SATA 3.0 Gb/s
Controller	Intel NM10	Intel NM10
Driver	Intel 8.9.4.1004 (10/13/2009)	Intel 8.9.4.1004 (10/13/2009)
Operating system		
Name	Windows 7 Home Premium 32-bit	Windows 7 Starter 32-bit
Build number	7600	7600
Service Pack	N/A	N/A
File system	NTFS	NTFS
Kernel	ACPI x86-based PC	ACPI x86-based PC

System	Dell Latitude 2120	HP Mini 100e
Language	English	English
Microsoft DirectX version	DirectX 11	DirectX 11
Graphics		
Vendor and model number	Intel GMA 3150	Intel GMA 3150
Type	Integrated	Integrated
Chipset	Intel Graphics Media Accelerator 3150	Intel Graphics Media Accelerator 3150
BIOS version	1933.2	2001.0
Total available graphics memory (MB)	250	250
Dedicated video memory (MB)	0	0
System video memory (MB)	64	64
Shared system memory (MB)	186	186
Resolution	1,024 x 600	1,024 x 600
Driver	Intel 8.14.10.2117 (04/19/2010)	Intel 8.14.10.2117 (04/19/2010)
Sound card/subsystem		
Vendor and model number	Realtek High Definition Audio	Realtek High Definition Audio
Driver	Realtek 6.0.1.6201 (09/14/2010)	Realtek 6.0.1.6088 (04/13/2010)
Ethernet		
Vendor and model number	Broadcom NetXtreme® Gigabit Ethernet	Realtek PCIe FE Family Controller
Driver	Broadcom 14.2.0.5 (05/21/2010)	Realtek 7.17.304.2010 (03/04/2010)
Wireless		
Vendor and model number	DW1501 Wireless –N WLAN	Realtek RTL8191SE
Driver	Broadcom 5.60.48.35 (01/21/2010)	Realtek 2011.0.204.2010 (02/04/2010)
Modem		
Vendor and model number	N/A	LSI HDA Modem
Driver	N/A	LSI 2.2.99.0 (12/03/2009)
USB ports		
Number	3	2
Type	2.0	USB 2.0
Other	Multimedia card reader	Multimedia card reader
Monitor		
LCD type	WSVGA	WSVGA
Screen size	10.1"	10.1"
Refresh rate (Hz)	60	60

System	Dell Latitude 2120	HP Mini 100e
Battery		
Type	Dell F079N Lithium-ion	HP HSTNN-LB1W Lithium-ion
Size (length x width x height)	8" x 1-1/2" x 3/4"	10-1/4" x 2-3/4" x 3/4"
Rated capacity	2,500mAh / 11.1V (28Wh)	4,400mAh / 10.8V (47Wh)
Weight	6 oz.	11 oz.

Figure 7: System configuration information for the Dell Latitude 2120 and HP Mini 100e netbooks.

APPENDIX B – DROP TEST CHECKLIST

TEST: _____ UNIT S/N: _____

DELL Diagnostics revision number: _____

Pre-drop disk scan results: _____

Post-drop disk scan results: _____

HDD

- Verify that HDD is functional

RMS devices

- Verify that all internal removable media storage (RMS) devices (FDD, CD-ROM, etc.) are functional

LCD

- Abrasion or buffing on the LCD from the keyboard
- Loss of pixels at any color layer
- Appearance of lines, bars, brightness change, etc.
- Broken or deformed parts
- Loose or partially unseated connectors

Keyboard

- Broken, deformed, or unseated keys
- Loss of functionality of any key, Touch Pad, TouchPad buttons, PointStick, PointStick buttons

External connectors

- Broken, deformed, or unseated connectors
- Loss of functionality of any connector

Latch

- Verify that all latches (display, battery, memory door, etc.) are fully functional

Battery

- Verify that the battery is fully functional

Cracks or breakage

- Cracks, breakage, deformation, or separation at any point on the display assembly and the base assembly

Paint degradation

- Scratches or chipping on painted parts

Floatlines/seams

- Separation between LCD back and bezel at any point around display, and between palm rest and base

Hinge caps

- Separation or misfit of hinge caps

Doors

- Verify that all doors (HDD door, memory door, FDD door, etc.) are fully functional

Screws

- Verify that screws are set at their original screw setting

Rubber feet

- Movement or dislodging of any rubber (stationary) foot on netbook

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