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USB2224
USB 2.0 Flash Media Controller
**Software Performance and
Compatibility Test Report**

Firmware Version: 438
Windows 98/2000 Driver Version: 2.6.0.0
Report Date: 6/24/2005

Total Test Time Required: 406 Hours

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Test Environment

Hardware:

Test Machine(s): (Include Host Controller Type, Motherboard Model, BIOS Version and Chipset)	Other Hardware:	Chipsets Used for Testing:
<p>Machine 1: LAB-ML01 Bios: PHX Tech:ACPI Rev 1002B006 Mother board: ASUST A7N8X Rev 1002A Chipset: NVIDIA NFORCE 2 Rev A2 EHCI: NVIDIA USB 2.0 EHCI</p> <p>Machine 2: LAB-RR02 Bios: American Megatrends Inc. Ver 1007.001 Mother board: ASUS Tek P4P800 Chipset : Intel i865P/PE/G EHCI: Intel 82801EB</p> <p>Machine 3: LAB-DC2 Bios: PHX Tech:ACPI Rev 1002B006 Mother board:ASUST A7N8X Rev 1002A Chipset: NVIDIA NFORCE 2 Rev A2 EHCI: NVIDIA USB 2.0 EHCI</p> <p>Machine 4: : LAB-EH01 Bios: NVIDIA USB 2.0 EHCI Mother board: GIGABYTE GA-7V/T600 1394 Chipset: VIA KT600 EHCI: VIA PCI to USB EHCI</p> <p>Machine 5: LAB-NJ02 Bios: PHOENIX TECH Rev 1006 Mother board: ASUSTEK A7N8X2.0 Chipset: NVIDIA nForce2 EHCI: NEC PCI To USB EHCI</p>	<p>CF: Memorex 64MB, 128MB CompUSA 16MB, 48MB, 64MB Lexar- 32MB, 48MB, 64MB, 128MB, - 256MB, 512MB, 1GB, 2GB SanDisk 32MB Kingmax 8MB Delkin Devices- 640 IMBMicroDrive: IBM- 340MB, 1GB MS: Lexar- 32MB, 64MB, 128MB SanDisk 64MB Sony- 8MB, 16MB, 32MB, 64MB, 128MB High Speed MS: Sony-32MB, 64MB, 128MB MSPRO: Sony-512MB SanDisk-256MB, 1GB SD/MMC: I-O Data- 64MB SanDisk- 128MB, (64MB MMC) Lexar- 32MB, (16MB, 32MB, 64MB MMC) Panasonic- 512MB PNY-64MB Mini SD: Toshiba-32MB SM: Lexar- 16MB, 32MB, 64MB, 128MB SanDisk- 128MB Memorex 64MB, 128MB Kingston- 64MB Viking Components- 64MB PNY- 128MB XD: Olympus-32MB, 128MB, 256MB, 512MB Fujifilm-64MB</p>	<p>Intel i845E Intel i865P/PE/G Intel i865P/PE/G/i848P Intel 865PE Intel i875P NVIDIA NFORCE 2 Rev A2 SiS648FX VIA KT600 VIA KT400 VIA P4X400(VT8754) Rev3 APPLE</p> <p>3rd Party Readers Used for Testing:</p> <p>ZiO SM, MS readers Dazzle reader I/O Interconnect reader Firewire reader ImationFlashGO! 2.0</p>

Software:

Drivers and Firmware	Application Software	Operating Systems
<p>USB2224.0.438.hex MASS STORAGE CLASS DRIVER WINXP:MS - USBSTOR.SYS 5.1.2600.1243 WIN2K: MS -USBSTOR.SYS 5.00.2195.6655 WINME: MS -USBSTOR.SYS 4.90.3000.1 WIN98SE: SMSC - MASSWDM.SYS 2.5.0.0 USB2228.0.435.hex MASS STORAGE CLASS DRIVER WINXP:MS - USBSTOR.SYS 5.1.2600.1243 WIN2K: MS -USBSTOR.SYS 5.00.2195.6655 WINME: MS -USBSTOR.SYS 4.90.3000.1 WIN98SE: SMSC - MASSWDM.SYS 2.5.0.0 EHCI DRIVER: MS USBEHCI.SYS 5.1.2600.1243 MS USBEHCI.SYS 5.0.2195.6907 SIIG / OMI OUSBHCI.SYS 2.1.4 OWC IUSBHCI.SYS 1.0.3.0 UHCD DRIVER: WINXP: USBHCI.SYS 5.1.2600.1243 WIN2K: UHCD.SYS 5.0.2195.6675 WINME UHCD.SYS 4.90.3000.1 WIN98SE: UHCD.SYS 4.10.2222</p>	<p>SFV32W.EXE version 1.0.350 SetIcon.exe 1.2.1.2 MAC SFV (10x) version 1.3 MacSFV (8x9x) version 1.2 Bundled Software Production Line Descriptor Update Utility version 2.0.0.7 Production Line Test Utility version 1.0.0.5 Quick Test Production Line Utility Using Filter Driverversion 1.0.0.3 Utility to Format MSPRO mediaversion 1.0.0.2 DOSPLTU SMSC VERSION 2.0 USBDM.EXE VERSION 2.0.0.4 98SafeRemoval.exe 1.0.0.5 Automation.exe version 6-9-04 DFU_App Version 2.1(Mac OS 10x) DFU Version 1.1(Mac OS 9x)</p>	<p>WINXP (SP2) WIN2K (SP4) Macintosh OS 9.x, 10.x LINUX 2.4.20 WINCE 5.0</p>

Testing Overview

Standard for Certifying Firmware and Drivers

The USB2224 Test Suite consists of 21 separate functional testing areas designed to fully exercise the capabilities of the USB2224 USB 2.0 Flash Media Controller chip. For a firmware and driver combination to be considered certified by the SMSC QA Test Laboratory, it must receive passing test results in each of the following functional test suites:

<u>Functional Test Suite</u>	<u>Operating Systems</u>
1. Installation	Windows 98, Me, 2000, XP
2. USBCV	Windows 2000 and XP Only
3. Compact Flash / IBM MD	Windows 98, Me, 2000, XP
4. Smart Media	Windows 98, Me, 2000, XP
5. XD	Windows 98, Me, 2000, XP
6. Secure Digital / MMC	Windows 98, Me, 2000, XP
7. Memory Stick / Memory Stick Pro	Windows 98, Me, 2000, XP
8. Multiple Device	Windows 98, Me, 2000, XP
9. Surprise Removal	Windows 2000 and XP Only
10. Load / Unload	Windows 98, Me, 2000, XP
11. Booting from USB	Windows XP Only
12. USB 1.1	Windows 98, Me, 2000, XP
13. WHQL (USB Removable Storage)	Windows XP Only
14. Chapter 9 Current Measurement	Windows XP Only
15. Bundled Software	Windows 98, Me, 2000, XP
16. DFU / Descriptor Update	Windows 98, Me, 2000, XP
17. C3 – Attach on Insert	Windows XP
18. Memory Stick Compatibility	Windows XP Only
19. Macintosh OS Specific	Mac OS 9.2, 10.2, 10.3
20. WinCE OS Specific	WinCE Only

A new firmware – driver combination must pass all test suites, including WHQL for every operating system listed, to be considered certified. Note that this standard does not apply to beta software released for evaluation purposes.

Test Results

Test Technician: Munabo Lwali

Test Technician: Cody Welch

Test Technician: Shilpa Silva

Test Technician: Select One

Test Suite Results Summary

Test Suite	Windows 98	Windows Me	Windows 2000	Windows XP
# 1 Installation	Pass	Pass	Pass	Pass
# 2 USBCV	Not Supported	Not Supported	Pass	Pass
# 3 Compact Flash / IBM MicroDrive	Pass	Pass	Pass	Pass
# 4 Smart Media	Pass	Pass	Pass	Pass
# 5 XD	Pass	Pass	Pass	Pass
# 6 Secure Digital / Multimedia Card	Pass	Pass	Pass	Pass

# 7	Memory Stick / Memory Stick Pro	Pass	Pass	Pass	Pass
# 8	Multiple Device	Pass	Pass	Pass	Pass
# 9	Surprise Removal	N/A	N/A	Pass	Pass
# 10	Load / Unload	N/A	N/A	Pass	Pass
# 11	Bootimg from USB	N/A	N/A	N/A	Pass
# 12	USB 1.1	Pass	Pass	Pass	Pass
# 13	WHQL	N/A	N/A	N/A	Pass
#14	Chapter 9 Current Measurements	N/A	N/A	N/A	Pass
#15	Bundled Software	Pass	Pass	Pass	Pass
#16	DFU and Descriptor Update	Pass	Pass	Pass	Pass
#17	C3 – Attach on Insert	N/A	N/A	N/A	Pass
#18	Memory Stick Compatibility	N/A	N/A	N/A	Pass
		Mac OS 9.2	Mac OS 10.2	Mac OS 10.3	
#19	Macintosh OS Specific	Pass	Pass	Pass	
		WinCE 5.0			
#20	WinCE OS Specific	Pass			

Testing Observations and Comments

Comments: Explanation of any marginal or failing results from the Test Suite Results Matrix above, along with any other comments concerning the results of testing:

Test Completion Dates

The test suites were completed for each operating system on the dates indicated below:

Test Suite		Win98	Testers Initials	WinMe	Testers Initials	Win2K	Testers Initials	WinXP	Testers Initials
# 1	Installation	1/3/05	SS	1/3/05	SS	2/1/05	SS	6/22/05	CW
# 2	USBCV	N/A	N/A	N/A	N/A	1/5/05	SS	6/22/05	CW
# 3	Compact Flash	6/25/04	EH	5/12/04	ML	2/2/05	SS	6/23/05	CW
# 4	Smart Media	8/11/04	MM	5/12/04	ML	2/2/05	SS	6/23/05	CW
# 5	XD	8/11/04	MM	5/12/04	ML	2/2/05	SS	6/23/05	CW
# 6	Secure Digital	8/17/04	MM	5/12/04	ML	2/2/05	SS	6/23/05	CW
# 7	Memory Stick	8/17/04	MM	5/12/04	ML	2/2/05	SS	6/23/05	CW
# 8	Multiple Device	5/12/04	DC	5/12/04	ML	1/7/05	SS	6/22/05	ML
# 9	Surprise Removal	N/A	N/A	N/A	N/A	2/1/05	SS	6/23/05	CW
# 10	Load / Unload	N/A	N/A	N/A	N/A	1/10/05	SS	6/22/05	CW
# 11	Bootimg From USB	N/A	N/A	N/A	N/A	N/A	N/A	6/23/05	CW
# 12	USB 1.1	5/20/04	ML	4/27/04	DC	2/1/05	SS	6/23/05	ML
# 13	WHQL (USB)	N/A	N/A	N/A	N/A	N/A	N/A	6/22/05	ML
#14	Chapter 9 Current Measurement	N/A	N/A	N/A	N/A	N/A	N/A	6/22/05	ML
#15	Bundled Software	1/10/05	SS	1/10/05	SS	1/10/05	ML	1/10/05	ML
#16	DFU and Descriptor Update	9/28/04	ML	9/28/04	ML	9/28/04	ML	6/22/05	CW
#17	C3 – Attach on Insert	N/A	N/A	N/A	N/A	N/A	N/A	1/31/05	CW
#18	Memory Stick Compatibility	N/A	N/A	N/A	N/A	N/A	N/A	12/23/04	SS
		MacOS 9.2	Testers Initials	MacOS 10.2	Testers Initials	MacOS 10.3	Testers Initials		
#19	Macintosh OS Specific	9/28/04	CC	9/28/04	CC	12/23/04	DL		
		WinCE 5.0	Testers Initials						
#20	WinCE OS Specific	1/4/05	SS						

Test Suite #1 - Installation

Overview

This test suite evaluates the installation procedures for the USB2224. In order to pass this suite, the following conditions must be met:

1. The operating system correctly identifies all supported flash media devices on attach.
2. Under Windows Me, 2000 (SP 3 or above) and XP, the OS automatically loads the native Windows Mass Storage Class driver. (Windows 98 and 2000 (SP2 and below) require the user to provide the SMSC MSC driver with multiple LUN support.)
3. All drivers load normally with no blue screens or system freezes before, during or after they are loaded.
4. The system does not request or require a restart after the drivers have been loaded.
5. No devices appear in the device manager with yellow exclamation marks next to them (yellow banded.)
6. The device does not blue screen the host before, during or after a system restart. After a system restart, the device is re-enumerated normally.
7. After installation, all device entries appear correctly in the device manager, showing the correct vendor, date and version information.

Test Suite #1 Results

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>Make sure there are no previous installations of the USB2224 on the host system. For Windows 98 and 2000 (SP2 and below), run the driver installation utility and verify that it completes normally.</p> <p>Self-Powered Pre Plug: With no media inserted in any of the media slots, attach the USB cable to the host and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	Pass	Pass	
2	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Again, with no media inserted in any of the media slots, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	Pass	Pass	

Test Suite #1 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Smart Media (SM) card into the SM slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat the test with a xD card.</p>	Pass	Pass	Pass	Pass	
4	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same SM card inserted in the SM slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat the test with a xD card</p>	Pass	Pass	Pass	Pass	

Test Suite #1 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
5	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Compact Flash (CF) card into the CF slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat the test with an IBM MicroDrive.</p>	Pass	Pass	Pass	Pass	
6	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same CF card inserted in the CF slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat the test with an IBM MicroDrive.</p>	Pass	Pass	Pass	Pass	

Test Suite #1 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
7	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Secure Digital (SD) card into the SD slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
8	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same SD card inserted in the SD slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	

Test Suite #1 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
9	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Multimedia Card (MMC) into the MMC slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MMC card can be read from and written to by transferring a small file from the host to the MMC card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
10	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same MMC card inserted in the MMC slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MMC card can be read from and written to by transferring a small file from the host to the MMC card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	

Test Suite #1 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1 1	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Memory Stick (MS) card into the MS slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat the test with Memory Stick Pro media.</p>	Pass	Pass	Pass	Pass	
1 2	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same MS card inserted in the MS slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat the test with Memory Stick Pro media.</p>	Pass	Pass	Pass	Pass	

Test Suite #1 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1 3	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self Powered Pre Plug: Insert IBM MD, SM, SD, MMC and MS Pro cards into their respective slots, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
1 4	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Leave the same flash media cards inserted in their slots, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
1 5	<p>Eject and Remove- With media inserted in each reader slot, test the Right-Click eject functionality for each device. Check to see that no error message is displayed, and that the host reports no media present when trying to access it after the eject.</p>	Pass	Pass	Pass	Pass	

Test Suite #2- USB Command Verifier (USBCV)

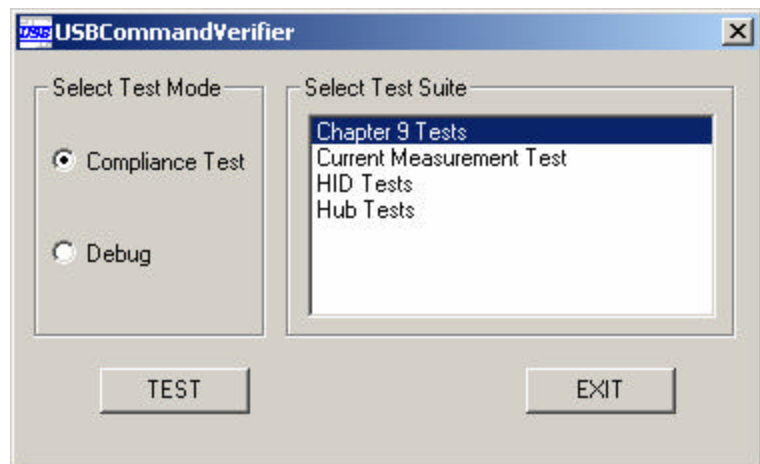
Overview

This test suite utilizes the USB Command Verifier Compliance Tool provided by USB.org, to ensure that the USB2224 complies with Chapter 9 of the USB 2.0 specification. The latest version of the tool is available at <http://www.usb.org/developers/tools.html>. The USBCV is currently only supported under Windows 2000 and XP, so testing under Windows 98 and Millennium is not performed for this test suite. In order for the device to pass this suite, it must successfully pass all Chapter 9 tests.

Test Suite #2 Results

#	Test Standard	Windows 2000	Windows XP	Comments
1	The device passes all Chapter 9 tests of the Compliance Utility. Passing logs are generated showing no failures. Save the .htm test output for inclusion with this test report.	Pass	Pass	

USB Command Verifier Chapter 9 Tests



Test Suite #3- Compact Flash / IBM MicroDrive

Overview

This test suite evaluates the performance and function of the USB2224 with various Type I and II Compact Flash devices, including the IBM Microdrive. All tests below are performed using a USB 2.0 host controller. Each device is checked to verify proper operation with the USB2224 firmware and drivers under normal and abnormal operating conditions. A 690 MB CD test disk is required for these tests. The test disk contains various files ranging in size from 10 bytes to 300 megabytes, with an accompanying SFV file, which contains a calculated checksum (CRC) for each file.

Test Suite #3 Results

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>CF Writes- Insert a 16 MB CF card into the CF slot on the USB2224 board. Verify that the correct capacity is shown for the CF card.</p> <p>Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the CF card. Transfer the files to the CF card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	Pass	Pass	
2	<p>CF Insert/Remove- Double click the2224 CF drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the CF card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	Pass	Pass	

Test Suite #3 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	CF Reads - Using the same CF card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	Pass	Pass	
4	CF Write, Insert/Remove, Read- Repeat tests 1 through 3 for the following devices: 8MB CF, 32MB CF, 64MB CF, 128MB CF, 256MB CF, 512MB CF, 1GB CF, 2GB CF, 340MB IBM MicroDrive, and the 1GB IBM MicroDrive.	8MB CF Pass 64MB CF Pass 256MB CF Pass 1GB CF Pass 340MBMD Pass	32MB CF Pass 128MB CF Pass 512MB CF Pass 2GB CF Pass 1GB MD Pass	8MB CF Pass 64MB CF Pass 256MB CF Pass 1GB CF Pass 340MB MD Pass	32MB CF Pass 128MB CF Pass 512MB CF Pass 2GB CF Pass 1GB MD Pass	

Test Suite #4- Smart Media

Overview

This test suite evaluates the performance and function of the USB2224 with various density Smart Media flash memory cards. All tests below are performed using a USB 2.0 host controller. A 690 MB CD test disk is required for these tests. The test disk contains various files ranging in size from 10 bytes to 300 megabytes, with an accompanying SFV file, which contains a calculated checksum (CRC) for each file.

Test Suite #4 Results

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>SM Writes- Insert an 8 MB SM card into the SM slot on the USB2224 board. Verify that the correct capacity is shown for the SM card.</p> <p>Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the SM card. Transfer the files to the SM card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	Pass	Pass	
2	<p>SM Insert/Remove- Double click the 2224 SM drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the SM card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	Pass	Pass	

Test Suite #4 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	SM Reads - Using the same SM card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	Pass	Pass	
4	SM Write, Insert/Remove, Read- Repeat tests 1 through 3 for the following media: 16MB SM, 32MB SM, 64MB SM, 128MB SM, 256MB SM. Note: If there is not a 256MB SM available, a XD to SM adapter with a 256MB XD card inserted may be used.	16MB SM Pass 32MB SM Pass 64MB SM Pass 128MB SM Pass 256MB SM Pass	16MB SM Pass 32MB SM Pass 64MB SM Pass 128MB SM Pass 256MB SM Pass	16MB SM Pass 32MB SM Pass 64MB SM Pass 128MB SM Pass 256MB SM Pass	16MB SM Pass 32MB SM Pass 64MB SM Pass 128MB SM Pass 256MB SM Pass	
5	SM MPEG Playback Insert a 64 MB SM card into the 2224. From Windows Explorer, perform a Full Format of the media. Copy a MPEG video file that is larger than 15MB to the SM card. Once copy has completed, unplug device. Reattach the device and play the file that was copied to the card. Verify that the file is played back properly. The file should not skip or freeze.	Pass	Pass	Pass	Pass	
5	1-bit ECC Insert a SM card with a 1 bit ECC error on it into the 2224 device. Connect the 2224 to the computer via a 2.0 host controller. Verify that the card contents can be read properly. Inset a SM card with a 2-bit ECC error on it into the 2224 device. Verify that the card contents cannot be read properly. Repeat this step using a 1.1 host controller to connect the 2224 to the computer.	Pass	Pass	Pass	Pass	

Test Suite #4 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
7	<p>CIS Check</p> <p>Set the bit for "Don't Perform Smart Media CIS checking" to 1. (Attribute byte 2, bit 0) This will disable the CIS checking required by the SM spec.</p> <p>Insert a SM card with a corrupt CIS block into the 2224 device. Connect the 2224 to the computer via a 2.0 host controller. Verify that the card contents can be read properly.</p> <p>Clear the bit for "Don't Perform Smart Media CIS checking"(i.e. set it to zero) This will enable the CIS checking required by the SM spec.</p> <p>Insert a SM card with a corrupt CIS block into the 2224 device. Connect the 2224 to the computer via a 2.0 host controller. Verify that the card contents cannot be read.</p>	Pass	Pass	Pass	Pass	
8	<p>SM Write Protect-</p> <p>Enable the write protect on a 32MB SM card, and insert it into the SM slot on the 2224. Check to see that the media is detected properly, and then attempt to copy a file from the host to the SM card. The OS should report that the copy could not be performed.</p> <p>Attempt to format the SM card. The OS should report that the format could not be completed.</p>	Pass	Pass	Pass	Pass	

Test Suite #5 - XD

Overview

This test suite evaluates the performance and function of the USB2224 with various density XD flash memory cards. All tests below are performed using a USB 2.0 host controller. A 690 MB CD test disk is required for these tests. The test disk contains various files ranging in size from 10 bytes to 300 megabytes, with an accompanying SFV file, which contains a calculated checksum (CRC) for each file.

Test Suite #5 Results

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>XD Writes- Insert a 16 MB XD card into the XD slot on the USB2224 board. Verify that the correct capacity is shown for the XD card.</p> <p>Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the XD card. Transfer the files to the XD card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	Pass	Pass	
2	<p>XD Insert/Remove - Double click the2224 SM drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the XD card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	Pass	Pass	

Test Suite #5 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	XD Reads- Using the same XD card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	Pass	Pass	
4	XD Write, Insert/Remove, Read- Repeat tests 1 through 3 for the following media: 32MB XD, 64MB XD, 128MB XD, 256MB XD, 512MB XD.	32MB XD Pass 64MB XD Pass 128MB XD Pass 256MB XD Pass 512MB XD Pass	32MB XD Pass 64MB XD Pass 128MB XD Pass 256MB XD Pass 512MB XD Pass	32MB XD Pass 64MB XD Pass 128MB XD Pass 256MB XD Pass 512MB XD Pass	32MB XD Pass 64MB XD Pass 128MB XD Pass 256MB XD Pass 512MB XD Pass	
5	CIS Check Set the bit for "Don't Perform Smart Media CIS checking" to 1. (Attribute byte 2, bit 0) This will disable the CIS checking required by the SM spec. Insert a XD card with a corrupt CIS block into the 2224 device. Connect the 2224 to the computer via a 2.0 host controller. Verify that the card contents can be read properly. Clear the bit for "Don't Perform Smart Media CIS checking"(i.e. set it to zero) This will enable the CIS checking required by the SM spec. Insert a XD card with a corrupt CIS block into the 2224 device. Connect the 2224 to the computer via a 2.0 host controller. Verify that the card contents cannot be read .	Pass	Pass	Pass	Pass	

Test Suite #6- Secure Digital / Multimedia Card

Overview

This test suite evaluates the performance and function of the USB2224 with various density Secure Digital and Multimedia Card flash memory. All tests below are performed using a USB 2.0 host controller. A 690 MB CD test disk is required for these tests. The test disk contains various files ranging in size from 10 bytes to 300 megabytes, with an accompanying SFV file, which contains a calculated checksum (CRC) for each file.

Test Suite #6 Results

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>SD Writes- Turn off the write protection switch on a 32 MB SD card, and insert the card into the SD slot on the USB2224 board. Verify that the correct capacity is shown for the SD card.</p> <p>Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the SD card. Transfer the files to the SD card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	Pass	Pass	
2	<p>SD Insert/Remove - Double click the2224 SD drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the SD card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	Pass	Pass	

Test Suite #6 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	SD Reads- Using the same SD card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	Pass	Pass	
4	SD/MMC Write, Insert/Remove, Read- Repeat tests 1 through 3 for the following media: 64MB SD, 128MB SD, 256MB SD, 512MB SD, 1GB SD, 2GB SD, 16MB MMC, 32MB MMC, 64MB MMC, 128MB MMC, and 256MB MMC.	128MB SD Pass 512MB SD Pass 1GB SDPass 32MB MMC Pass 128MB MMC Pass 256MB MMC Pass	64MB SD Pass 256MB SD Pass 1GB SDPass 16MB MMC Pass 64MB MMC Pass 256MB MMC Pass	128MB SD Pass 512MB SD Pass 2GB SDPass 32MB MMC Pass 128MB MMC Pass 256MB MMC Pass	64MB SD Pass 256MB SD Pass 2GB SDPass 16MB MMC Pass 64MB MMC Pass 256MB MMC Pass	
5	SD Write Protect- Enable the write protect switch on a 32MB SD card, and insert it into the SD slot on the2224. Check to see that the media is detected properly, and then attempt to copy a file from the host to the SD card. The OS should report that the copy could not be performed.	SD Pass	SD Pass	SD Pass	SD Pass	
6	HS SD/MMC- Insert a HS SD card. Verify the card can be read and written to. CRC the files to insure these is no data corruption. Repeat the test with a HS MMC card	HS SDPass HS MMC Pass	HS SDPass HS MMC Pass	HS SDPass HS MMC Pass	HS SDPass HS MMCPass	

Test Suite #7- Memory Stick / Memory Stick Pro

Overview

This test suite evaluates the performance and function of the USB2224 with various capacity Memory Stick and Memory Stick Pro flash memory cards. All tests below are performed using a USB 2.0 host controller. A 690 MB CD test disk is required for these tests. The test disk contains various files ranging in size from 10 bytes to 300 megabytes, with an accompanying SFV file, which contains a calculated checksum (CRC) for each file.

Test Suite #7 Results

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>MS Writes- Turn off the write protection switch on a 16 MB MS card, and insert the card into the MS slot on the USB2224 board. Verify that the correct capacity is shown for the MS card.</p> <p>Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the MS card. Transfer the files to the MS card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	Pass	Pass	
2	<p>MS Insert/Remove- Double click the 2224 MS drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the MS card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	Pass	Pass	

Test Suite #7 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	MS Reads - Using the same MS card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	Pass	Pass	
4	MS Write, Insert/Remove, Read- Repeat tests 1 through 3 for the following media: 8MB MS, 64MB MS, 128MB MS, 256MB MS, 256MB MS Pro, 512MB MS Pro, 1GB MS Pro.	8MB MS Pass 32MB MS Pass 128MB MS Pass 256MB MS Pro Pass 512MB MS Pro Pass	32MB MS Pass 64MB MS Pass 256MB MS Pass 256MB MS Pro Pass 1GB MS Pro Pass	8MB MS Pass 32MB MS Pass 128MB MS Pass 256MB MS Pro Pass 512MB MS Pro Pass	32MB MS Pass 64MB MS Pass 256MB MS Pass 256MB MS Pro Pass 1GB MS Pro Pass	
5	MS Write Protect- Enable the write protect switch on a 32MB MS card, and insert it into the MS slot on the 2224. Check to see that the media is detected properly, and then attempt to copy a file from the host to the card. The OS should report that the copy could not be performed.	Pass	Pass	Pass	Pass	
6	MS Write Pro Protect- Enable the write protect switch on a 512MB MS Pro card, and insert it into the MS slot on the 2224. Check to see that the media is detected properly, and then attempt to copy a file from the host to the card. The OS should report that the copy could not be performed.	Pass	Pass	Pass	Pass	
7	1-bit ECC Insert a MS card with a 1-bit ECC error on it into the 2224 device. Connect the 2224 to the computer via a 2.0 host controller. Verify that the card contents can be read properly. Insert a MS card with a 2-bit ECC error on it into the 2224 device. Verify that the card contents cannot be read. Repeat this step using a 1.1 host controller.	Pass	Pass	Pass	Pass	

Test Suite #7 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
8	Sony Format Utility (MS)- Install the Sony Format Utility which is located in the \\Austinfs\lgagroup folder. Insert MS media. Open the Sony Format Utility and format the MS.	Pass	Pass	Pass	Pass	
9	Sony Format Utility (MSPro)- Repeat step 8 using MSPro media	Pass	Pass	Pass	Pass	

Test Suite #8- Multiple Device

Overview

This test suite evaluates the performance and function of multiple USB2224 devices attached to a single host. All tests below are performed using a USB 2.0 host controller. The focus of this testing is to ensure interoperability between all devices when more than one USB2224 device is running on the same host.

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>Host to B1, B2- Attach two USB2224 boards to the host via the same host controller. Verify that both boards enumerate properly.</p> <p>Insert CF, SM, SD, and MS cards into both boards. Verify that you can read from and write to all cards individually. Simultaneously transfer a couple large files from the host to the CF cards on both boards. Verify that the transfers complete normally. Repeat this transfer for SM, SD and MS</p> <p>Also test writing to different cards on each board simultaneously (i.e. MS on board 1 and SD on board 2.)</p>	Pass	Pass	Pass	Pass	
2	<p>B1, B2 to Host- Using the same boards and test setup as Test #1 above, simultaneously transfer a large file from each CF card to the host. Verify that the transfer completes normally. Repeat this transfer for SM, SD and MS.</p> <p>Also test reading from different cards on each board simultaneously (i.e. SM on board 1 and CF on board 2.)</p>	Pass	Pass	Pass	Pass	
3	<p>B1 to B2- Again using the same boards and test setup as Test #1, transfer a series of test files (large and small) from the CF card on board 1, to the CF card on board 2. Repeat this transfer for SM, SD, and MS</p> <p>Also test writing to different cards on board 2 (i.e. SM on board 1 to CF on board 2.)</p>	Pass	Pass	Pass	Pass	

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
4	<p>B1 to Host / Host to B2- Using the same test setup, transfer a test file from the CF card on board 1 to the host, while at the same time transferring a separate file from the host to the CF card on board 2. Repeat this transfer for SM, SD, and MS.</p> <p>Also test reading from and writing to different cards on each board (i.e. SM on board 1 to host, host to CF on board 2.)</p>	Pass	Pass	Pass	Pass	
5	<p>B1 to Host / Host to B1- Leave both boards attached to the host, but for this test you will be performing all of the reads/writes on one board only.</p> <p>Copy a large file from the CF to the host, and copy another large file from the host to the SM. Repeat this test using all possible combinations of CF, SM, SD, and MS, for both reads and writes. Ensure that all transfers complete normally.</p>	Pass	Pass	Pass	Pass	
6	<p>All Media types – Repeat steps 1 – 5 of this test suite using IBM-MD, XD, MMC, and MS Pro.</p>	Pass	Pass	Pass	Pass	

Test Suite #9- Surprise Removal

Overview

This test suite evaluates the performance and function of the USB2224 with media and USB cable surprise removals. All tests below are performed using a USB 2.0 host controller. Each device is checked to verify proper operation with the USB2224 firmware and drivers under normal and abnormal operating conditions. A 690 MB CD test disk is required for these tests. The test disk contains various files ranging in size from 10 bytes to 300 megabytes, with an accompanying SFV file, which contains a calculated checksum (CRC) for each file.

Test Suite #9 Results

#	Test Standard	Windows 2000	Windows XP	Comments
1	CF/IBM MD Surprise Removal (USB)- Write- Insert a 512 MB CF card and copy a large (~50 MB) test file from the host to the CF card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the CF can be read from and written to. Complete the transfer of the test file to the CF card. Read- Using the same CF card, copy the test file from the CF card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the CF can be read from and written to. Complete the transfer of the test file to the host.	Write Pass Read Pass	Write Pass Read Pass	

Test Suite #9 Results (cont.)

#	Test Standard	Windows 2000	Windows XP	Comments
2	<p>CF/IBM MD Surprise Removal (Media)-</p> <p>Write- Using the same 512 MB CF card, copy a large (~50 MB) test file from the host to the CF card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the CF card.</p> <p>Read- Using the same CF card, copy the test file from the CF card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
3	<p>CF/IBM MD Surprise Removal (Format)-</p> <p>Using the same CF card, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. . Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly. Attempt to format the media again. The format should complete normally.</p>	Pass	Pass	
4	<p>Other CF/IBM MD Media</p> <p>Repeat steps 1-3 using a 64MB CF card and 1GB IBM Microdrive.</p>	<p>64MB CF Pass</p> <p>1GB MD Pass</p>	<p>64MB CF Pass</p> <p>1GB MD Pass</p>	

Test Suite #9 Results (cont.)

#	Test Standard	Windows 2000	Windows XP	Comments
5	<p>SM/XD Surprise Removal (USB)-</p> <p>Write- Insert a 64 MB SM card and copy a large (~50 MB) test file from the host to the SM card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the SM can be read from and written to. Complete the transfer of the test file to the SM card.</p> <p>Read- Using the same SM card, copy the test file from the SM card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the SM can be read from and written to. Complete the transfer of the file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
6	<p>SM/XD Surprise Removal (Media)-</p> <p>Write- Using the same 64 MB SM card, copy a large (~50 MB) test file from the host to the SM card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the SM card.</p> <p>Read- Using the same SM card, copy the test file from the SM card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Test Suite #9 Results (cont.)

#	Test Standard	Windows 2000	Windows XP	Comments
7	SM/XD Surprise Removal (Format)- Using the same SM card, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. . Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly. Attempt to format the media again. The format should complete normally.	Pass	Pass	
8	Other SM/XD Media Repeat steps 5 - 7 using a 128MB SM card and 256MB XD.	128MB SM Pass 256MB XD Pass	128MB SM Pass 256MB XD Pass	
9	SD/MMC Surprise Removal (USB)- Write- Insert a 64 MB SD card and copy a large (~50 MB) test file from the host to the SD card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the SD can be read from and written to. Complete the transfer of the test file to the SD card. Read- Using the same SD card, copy the test file from the SD card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the SD can be read from and written to. Complete the transfer of the file to the host.	Write Pass Read Pass	Write Pass Read Pass	

Test Suite #9 Results (cont.)

#	Test Standard	Windows 2000	Windows XP	Comments
10	<p>SD/MMC Surprise Removal (Media)-</p> <p>Write- Using the same 64 MB SD card, copy a large (~50 MB) test file from the host to the SD card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the SD card.</p> <p>Read- Using the same SD card, copy the test file from the SD card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
11	<p>SD/MMC Surprise Removal (Format)-</p> <p>Using the same SD, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. . Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly. Attempt to format the media again. The format should complete normally.</p>	Pass	Pass	
12	<p>Other SM/XD Media</p> <p>Repeat steps 9 - 11 using a 256MB SD and 64MB MMC card.</p>	<p>256MB SD Pass</p> <p>64MB MMC Pass</p>	<p>256MB SD Pass</p> <p>64MB MMC Pass</p>	

Test Suite #9 Results (cont.)

#	Test Standard	Windows 2000	Windows XP	Comments
1 3	<p>MS/MS Pro Surprise Removal (USB)-</p> <p>Write- Insert a 64 MB MS card and copy a large (~50 MB) test file from the host to the MS card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the MS can be read from and written to. Complete the transfer of the test file to the MS card.</p> <p>Read- Using the same MS card, copy the test file from the MS card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the MS can be read from and written to. Complete the transfer of the file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
1 4	<p>MS/MS Pro Surprise Removal (Media)-</p> <p>Write- Using the same 64 MB MS card, copy a large (~50 MB) test file from the host to the MS card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the MS card.</p> <p>Read- Using the same MS card, copy the test file from the MS card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3-5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Test Suite #9 Results (cont.)

#	Test Standard	Windows 2000	Windows XP	Comments
15	<p>MS/MS Pro Surprise Removal (Format)-</p> <p>Using the same MS card, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. . Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly. Attempt to format the media again. The format should complete normally.</p>	Pass	Pass	
16	<p>Other SM/XD Media</p> <p>Repeat steps 13 - 15 using a 128MB MS and 512MB MS Pro.</p>	<p>128MB MS Pass</p> <p>512MB MS Pro Pass</p>	<p>128MB MS Pass</p> <p>512MB MS Pro Pass</p>	
17	<p>USB Cable Removal From Host End-</p> <p>Attach a 2224 board to a host computer using a 15ft. USB cable. Fill all slots of the board with media.</p> <p>Write- Copy a large (~50 MB) test file from the host one of the pieces of media in the 2224 board. Once the transfer reaches approximately 50% completion, unplug the USB cable from the host end . Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the media can be read from and written to. Complete the transfer of the test file.</p> <p>Read- Using the same media card, copy the test file from the 2224 board to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable from the host end . Wait 3-5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device reenumerates properly, and the media can be read from and written to. Complete the transfer of the file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Test Suite #10- Load / Unload

Overview

This test suite evaluates the function of the USB2224 under both normal and abnormal conditions, which cause the device to suspend, resume, enumerate or detach from the host. All tests below are performed using a self powered USB2224 attached to a USB 2.0 host controller unless otherwise noted.

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	Remove all media from USB2224 device. After disconnecting the USB cable of a properly enumerated USB2224 device, all entries in the Device Manager associated with that device disappear. The device does not blue screen, freeze or otherwise adversely affect the host in any way.	Not Tested	Not Tested	Pass	Pass	
2	Upon reattaching the USB cable, the entries in the Device Manager reappear, and the device functions normally.	Not Tested	Not Tested	Pass	Pass	
3	After turning off power to the USB2224, all entries in the Device Manager associated with the device disappear. The device does not blue screen, freeze or otherwise adversely affect the host in any way.	Not Tested	Not Tested	Pass	Pass	
4	After turning power to the USB2224 back on, the entries in the Device Manager reappear, and the device functions normally.	Not Tested	Not Tested	Pass	Pass	
5	Upon rebooting the host with the USB2224 enumerated, it does not blue screen, freeze or otherwise adversely affect the host in any way. All entries associated with the USB2224 device appear in the Device Manager, and are not yellow banded.	Not Tested	Not Tested	Pass	Pass	

Test Suite #10 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
6	Suspend the host and wait one minute. Resume the host and verify the device is enumerated and operates properly. Attach a 2 nd USB2224 device to the same host and repeat the test. Verify both boards reenumerate and function properly after being resumed. Remove the 2 nd device.	Not Tested	Not Tested	Pass	Pass	
7	Insert CF, SM, SD, and MS media containing data into the USB2224. Verify that all cards can be read. Suspend the host and wait one minute. Resume the host and verify the device is enumerated and operates properly. Check to see that all cards can be read from and written to.	Not Tested	Not Tested	Pass	Pass	
8	Suspend the host and wait one minute. While host is suspended remove some of the media from the 2224. Resume the host and verify the device is enumerated and operates properly. Check to see that the flash media cards not removed during the suspend can be read from and written to. Verify that the drives for media that was removed during the suspend cannot be accessed.	Not Tested	Not Tested	Pass	Pass	
9	Remove all of the flash media cards from the 2224 and Suspend the host. While the host is suspended, reinsert the CF, SM, SD, and MS cards and then resume the host. Verify that all cards are recognized, and can be read from and written to.	Not Tested	Not Tested	Pass	Pass	
10	Shut down the host. Remove some of the media from the 2224 while host is shut down. Start up the host and verify the device is enumerated and operates properly. Check to see that the flash media cards not removed while the host was shut down can be read from and written to. Verify that the drives for media that was removed while the host was shut down cannot be accessed.	Not Tested	Not Tested	Pass	Pass	

Test Suite #10 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1 1	<p>Remove all of the flash media cards from the2224. Verify that board is properly enumerated.</p> <p>Shut down the host. While host is shut down, insert the same CF, SM, SD, and MS into the 2224. Start up the host.</p> <p>Verify that all cards are recognized, and can be read from and written to.</p>	Not Tested	Not Tested	Pass	Pass	
1 2	<p>Using the same test setup as above, with all cards inserted in the2224 and properly recognized, unplug the USB cable, wait 2-5 seconds and plug the cable back in. Verify that the device enumerates properly.</p> <p>Repeat this test for 20 iterations. Verify the device enumerates correctly each time, and that the media is properly recognized.</p>	Not Tested	Not Tested	Pass	Pass	
1 3	Repeat steps 7-12 using IBM MD, XD, MMC, and MS Pro	Not Tested	Not Tested	Pass	Pass	
1 4	<p>Self-Powered Reboot Endurance -</p> <p>Using the Burn-In Test Pro utility, set a host PC up to continually reboot with a self-powered2224 attached. Allow the test to run overnight. In the morning, check to see that the test is still running.</p> <p>Halt the test and verify that the2224 is enumerated and operating normally.</p>	Not Tested	Not Tested	Pass	Pass	
1 5	<p>Bus-Powered Reboot Endurance -</p> <p>Using the Burn-In Test Pro utility, set a host PC up to continually reboot with a bus-powered2224 attached. Allow the test to run overnight. In the morning, check to see that the test is still running.</p> <p>Halt the test and verify that the2224 is enumerated and operating normally.</p>	Not Tested	Not Tested	Pass	Pass	

Test Suite #11- Booting from USB

Overview

This test suite evaluates the function of the USB2224 booting from media. All tests below are performed using a USB 2.0 host controller. This test needs to be performed on a machine that supports booting from a USB device.

Test Suite #11 Results

#	Test Standard	Windows XP	Comments
1	Boot from CF\IBM MD Configure a USB2224 board to have a single active lun for Compact Flash. Create a Win98 startup boot disk on a CF card. Insert CF card with Win98 s tartup boot disk into test device. Connect test device to test machine. Set up bios to choose USB device as boot option. Restart test machine. Verify that test machine boots off of CF card in test device. Repeat this test using IBM Micro drive.	 CF Pass IBM - MD Pass	
2	Boot from SM\XD Configure a USB2224 board to have a single active lun for Smart Media. Create a Win98 startup boot disk on a SM card. Insert SM card with Win98 startup boot disk into test device. Connect test device to test machine. Set up bios to choose USB device as boot option. Restart test machine. Verify that test machine boots off of SM card in test device. Repeat this test using IBM Micro drive.	 SM Pass XD Pass	

Test Suite #11 Results

#	Test Standard	Windows XP	Comments
3	<p>Boot from SDMMC</p> <p>Configure a USB2224 board to have a single active lun for Secure Digital.</p> <p>Create a Win98 startup boot disk on a SD card.</p> <p>Insert SD card with Win98 startup boot disk into test device.</p> <p>Connect test device to test machine. Set up bios to choose USB device as boot option.</p> <p>Restart test machine.</p> <p>Verify that test machine boots off of SD card in test device.</p> <p>Repeat this test with MMC.</p>	<p>SD Pass</p> <p>MMC Pass</p>	
4	<p>Boot from MSNS Pro</p> <p>Configure a USB2224 board to have a single active lun for Memory Stick.</p> <p>Create a Win98 startup boot disk on a MS card.</p> <p>Insert MS card with Win98 startup boot disk into test device.</p> <p>Connect test device to test machine. Set up bios to choose USB device as boot option.</p> <p>Restart test machine.</p> <p>Verify that test machine boots off of MS card in test device.</p> <p>Repeat this test with MS Pro.</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	

Test Suite #12- USB 1.1

Overview

This test suite evaluates the performance and function of USB2224 devices while attached to a USB 1.1 host controller. All tests below are performed using a USB 1.1 host controller, unless specified otherwise.

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>Make sure there are no previous installations of the USB2224 on the host system. For Windows 98 and 2000, run the driver installation utility and verify that it completes normally.</p> <p>Self-Powered Pre Plug: With no media inserted in any of the media slots, attach the USB cable to the host and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	Pass	Pass	
2	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Again, with no media inserted in any of the media slots, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
3	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Smart Media (SM) card into the SM slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this step using an XD card.</p>	Pass	Pass	Pass	Pass	
4	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same SM card inserted in the SM slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this step using a XD card.</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
5	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Compact Flash (CF) card into the CF slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using an IBM MicroDrive.</p>	Pass	Pass	Pass	Pass	
6	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same CF card inserted in the CF slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using an IBM MicroDrive.</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
7	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Secure Digital (SD) card into the SD slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
8	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same SD card inserted in the SD slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
9	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Multimedia Card (MMC) into the MMC slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MMC card can be read from and written to by transferring a small file from the host to the MMC card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
10	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same MMC card inserted in the MMC slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MMC card can be read from and written to by transferring a small file from the host to the MMC card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1 1	<p>Uninstall the USB2224 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert a Memory Stick (MS) card into the MS slot, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MS Pro media.</p>	Pass	Pass	Pass	Pass	
1 2	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Using the same MS card inserted in the MS slot, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MS Pro media.</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1 3	<p>Uninstall the USB2223 hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug: Insert CF, SM, SD, MMC and MS cards into their respective slots, and power up the eval board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	
1 4	<p>Uninstall the USB2224 hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self Powered Post Plug: Leave the same flash media cards inserted in their slots, power up the eval board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1 5	<p>Surprise Removal Write (USB): Copy one large file from the host to a CF card. Once the transfer has reached 20% complete, disconnect the USB cable and wait 3 to 5 seconds. Close any warning dialog boxes and reattach the USB cable. Verify that the device reenumerates and the card and be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	N/A	N/A	Pass	Pass	
1 6	<p>Surprise Removal Read (USB): Copy one large file from a CF card to the host. Once the transfer has reached 20% complete, disconnect the USB cable and wait 3 to 5 seconds. Close any warning dialog boxes and reattach the USB cable. Verify that the device reenumerates and the card and be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	N/A	N/A	Pass	Pass	
1 7	<p>Surprise Removal Write (Media): Copy one large file from the host to a CF card. Once the transfer has reached 20% complete, remove the CF media and wait 3 to 5 seconds. Close any warning dialog boxes and then reinsert the CF media. Wait a few seconds for the card to be recognized and then verify it can be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	N/A	N/A	Pass	Pass	

Test Suite #12 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
18	<p>Surprise Removal Read (Media): Copy one large file from a CF card to the host. Once the transfer has reached 20% complete, remove the CF media and wait 3 to 5 seconds. Close any warning dialog boxes and then reinsert the CF media. Wait a few seconds for the card to be recognized and then verify it can be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	N/A	N/A	Pass	Pass	
19	<p>Repeat steps 15-18 using IBM MD, SM, XD, SD, MMC, MS, and MS Pro.</p>	N/A	N/A	Pass	Pass	

Test Suite #13- USB WHQL

Overview

This test suite checks to ensure that the USB2224 is able to pass the Windows Hardware Quality Lab (WHQL) certification testing. All tests below are performed in a single LUN configuration under Windows XP using the latest HCT available from Microsoft.

Manual Tests:

#	WHQL Test	Windows XP	Comments
1	Enable/Disable- Device I/O (Storage)	Pass	
2	USB Selective Suspend	Pass	
3	USB Serial Number	Pass	

Automated Tests:

#	WHQL Test	Windows XP	Comments
1	ACPI S1 Stress	Pass	
2	ACPI S3 Stress	Pass	
3	Disk Stress	Pass	
4	FAT- File I/O (Removable)	Pass	
5	Storage Device Stress	Pass	
6	Surprise Removal	Pass	
7	Syscache	Pass	
8	Sysparse	Pass	

Test Suite #14- Chapter 9 Current Measurement Tests

Overview

This test suite checks to ensure that the USB2224 meets all Chapter 9 power requirements for both bus and self powered devices. All tests are run in Windows XP.

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	Unconfigured Current (Bus Powered)- Using the USBCV test utility, check the unconfigured current for the USB2224 bus powered. In order to pass, the device must draw no more than 100mA in an unconfigured state. Once the test is complete, close the USBCV application and verify that the test stack driver is unloaded and that the device is enumerated normally as a mass storage class device.	N/A	N/A	N/A	Pass	
2	Operating Current- Verify that the device is bus powered and enumerated properly. Initiate large file transfers simultaneously on all four LUNs. During the transfer, measure the current being drawn by the2224. In order to pass, the device cannot draw more than 500mA at any time during the operation.	N/A	N/A	N/A	Pass	
3	Suspend Current- Suspend the host. Once the host has stabilized in a suspended state, wait 5 to 10 seconds and then measure the suspended current draw for the2224. In order to pass the test, the device can draw no more than 500uA while suspended.	N/A	N/A	N/A	Pass	

Test Suite #14 Results (cont.)

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
4	<p>Unconfigured Current (Self-Powered)-</p> <p>Using the USBCV test utility, check the unconfigured current for the USB2224 self powered.</p> <p>In order to pass, the device must draw no more than 100mA in an unconfigured state.</p> <p>Once the test is complete, close the USBCV application and verify that the test stack driver is unloaded and that the device is enumerated normally as a mass storage class device.</p>	N/A	N/A	N/A	Pass	
5	<p>Operating Current-</p> <p>Verify that the device is self powered and enumerated properly. Initiate large file transfers simultaneously on all four LUNs. During the transfer, measure the current being drawn by the2224.</p> <p>In order to pass, the device cannot draw more than 100mA from the host at any time during the operation.</p>	N/A	N/A	N/A	Pass	
6	<p>Suspend Current-</p> <p>Suspend the host. Once the host has stabilized in a suspended state, wait 5 to 10 seconds and then measure the suspended current draw for the2224.</p> <p>In order to pass the test, the device can draw no more than 500uA from the host while suspended.</p>	N/A	N/A	N/A	Pass	

Test Suite #15- Bundled Software Application Tests

Overview

This test suite checks to ensure that all of the applications bundled with the USB2224 operate properly in accordance with the user instructions provided in the USB2224 Software Release Notes.

#	Application	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	Cardreader Software Installer	Pass	Pass	Pass	Pass	
2	Cardreader Software Installer Safe Removal	Pass	Pass	Pass	Pass	
3	PLDU	Not Tested	Not Tested	Pass	Not Tested	
4	USBDM	Not Tested	Not Tested	Not Tested	Pass	

Test Suite #16- Device Firmware Upgrade / Descriptor Update

Overview

This test suite checks to ensure that both the device firmware upgrade (DFU) and descriptor update functionality of the USB2224 work properly. Please note that DFU functionality is only available for devices that utilize an external flash ROM.

#	Test Standard	Windows 98	Windows Me	Windows 2000	Windows XP	Comments
1	<p>DFU-</p> <p>Load a2224 eval board with a DFU enabled "both.bin" binary created from the last release version of the2224 firmware.</p> <p>Perform a DFU update to the version of firmware under test. Verify that the operation completes normally.</p> <p>Unplug the device and reattach it to the host. Verify that it enumerates properly. Check the version of the firmware using USBView (looking at the bcdDevice string). Make sure that the version displayed is the version that was uploaded to the device.</p>	Not Tested	Not Tested	Not Tested	Pass	
2	<p>Descriptor Update-</p> <p>Modify an eeprom.dat file and upload it to the device. Once the operation completes, hot plug the device and verify that the eeprom contains the new data. Repeat this test using the "NO.EEPROM" version of the firmware.</p> <p>Continue to use descriptor updates to completely verify the LUN configuration and icon sharing functionality of the device.</p> <p>(Refer to the USB2224 Software Release Notes for information on LUN Configuration and Icon Sharing.)</p>	Not Tested	Not Tested	Not Tested	Pass	

Test Suite #17 - C3 – Attach on Insert

Overview

This test suite checks to ensure that the C3 Attach on Insert functionality works properly. For test steps that require verification that the device suspends properly, measure the suspend current of the test device. All test steps are to be completed with the C3 feature enabled. Begin the test suite by setting the device under test to the default EEPROM.dat file with the exception of setting the C3 bit. The LUN configuration should be the default for the product being tested unless specified otherwise.

Not Tested:

- 1) Various sizes of each media type
- 2) All Lun Configuration options (145 possible combinations)
- 3) 1.1 speeds – extremely limited testing with device running this speed
- 4) 98, ME, 2000, Macintosh
- 5) no.eeprom, both.bin firmware
- 6) All combinations of media inserted (i.e. only MS and SD inserted during restart) (Only a few steps are completed using more than one media inserted)
- 7) Only self-powered testing for USB2224, no bus-powered testing
- 8) Test steps marked **OPTIONAL** are assumed to not be tested unless marked pass
- 9) Tests covered in other test suites (it is assumed that at least the nominal test suite is run in conjunction with this test)

#	Test Standard	Windows XP	Comments
1	Initial Plug-in – no media Connect this test device to the host controller. Verify that the device does not attach.	Pass	
2	Insert of CF Insert a CF card into device. Verify that the device attaches as normal. Icons should be present. Verify that the CF drive can be accessed. Write - Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file. Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written to the computer.	Pass	

#	Test Standard	Windows XP	Comments
3	<p>Initial Plug-in – with CF</p> <p>Detach the test device. Insert a CF card into device.</p> <p>Connect this test device to the host controller.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	
4	<p>Suspend with CF inserted–</p> <p>Insert CF into the test device. Verify that the device is attached.</p> <p>Suspend the device by putting the host in standby. Verify that while the host is in standby that the device does not detach and suspends normally.</p> <p>Wake the host. Verify that the device is still attached.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	

#	Test Standard	Windows XP	Comments
5	<p>Suspend with CF inserted, surprise CF removal during suspend– Insert CF into the test device. Verify that the device is attached.</p> <p>Suspend the device by putting the host in standby. Verify that while the host is in standby that the device does not detach and suspends normally.</p> <p>While the host is suspended, remove the CF card.</p> <p>Wake the host. Verify that the device is no longer attached.</p>	Pass	
6	<p>* DO NOT DO THIS STEP WHEN TESTING BUS POWERED *</p> <p>Suspend with CF inserted, surprise USB removal during suspend– Insert CF into the test device. Verify that the device is attached.</p> <p>Suspend the device by putting the host in standby. Verify that while the host is in standby that the device does not detach and suspends normally.</p> <p>While the host is suspended, detach the USB cable.</p> <p>Wake the host. Verify the cable removal was recognized and the device is not enumerated. Reattach the device.</p>	Pass	
7	<p>Suspend without media inserted – surprise insertion of CF during suspend - Put the host in standby. While the host is suspended, insert a CF card into test device.</p> <p>Wake the host. Verify that the device attaches. Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	

#	Test Standard	Windows XP	Comments
8	<p>Suspend without media inserted – surprise insertion of device + CF during suspend -</p> <p>Remove the device from the computer. Put the host in standby. While the host is suspended, insert a CF card into test device and reattach it to the computer.</p> <p>Wake the host. Verify that the device attaches. Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	
9	<p>Restart with CF inserted–</p> <p>Insert CF into the test device. Verify that the device is attached.</p> <p>Shut down the host. Restart the host computer.</p> <p>Once host restarts, verify that the device is still attached.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	

#	Test Standard	Windows XP	Comments
10	<p>**OPTIONAL**</p> <p>Restart with CF inserted, surprise CF removal during power down— Insert CF into the test device. Verify that the device is attached.</p> <p>Shut down power to the host. While the host is shut down, remove the CF card.</p> <p>Restart the host. Verify that the device is no longer attached.</p>	Pass	
11	<p>**OPTIONAL**</p> <p>Restart with CF inserted, surprise CF removal during power down— Insert CF into the test device. Verify that the device is attached.</p> <p>Shut down power to the host.</p> <p>While the host is shut down, remove the device from the host.</p> <p>Restart the host. Verify that the device is no longer attached.</p>	Pass	
12	<p>**OPTIONAL**</p> <p>Restart without media inserted – surprise insertion of CF during power down -</p> <p>Verify that the device is connected to the host computer, but not attached since there is no media inserted..</p> <p>Shut down the host computer. While the host is powered down, insert a CF card into test device.</p> <p>Restart the host. Verify that the device attaches.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	

#	Test Standard	Windows XP	Comments
13	<p>**OPTIONAL**</p> <p>Restart without media inserted – surprise insertion of device + CF during power down -</p> <p>Remove the device from the host computer. While it is removed insert a CF card.</p> <p>Shut down the host computer. While the host is powered down, attach the device to the host.</p> <p>Restart the host. Verify that the device attaches.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	
14	<p>Media surprise removal during CF write</p> <p>Remove the device under test and reattach it to the host computer. Insert a CF card. Verify that the device attaches and the CF card can be accessed.</p> <p>Begin writing a large file to the CF card. When the write completes approximately 50% remove the CF card.</p> <p>Verify that the device detaches. Reinsert the CF card.</p> <p>Verify that the device attaches and the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	

#	Test Standard	Windows XP	Comments
15	<p>USB surprise removal during CF write</p> <p>Verify the device is attached and the CF card can be accessed.</p> <p>Begin writing a large file to the CF card. When the write completes approximately 50% remove the USB Cable.</p> <p>Verify that the device detaches. Reattach the device.</p> <p>Verify that the device attaches and the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	
16	<p>Media surprise removal during CF read</p> <p>Verify that the device is attached and the CF card can be accessed.</p> <p>Write a large file to the CF card.</p> <p>Copy the same file back onto the host computer. When the read completes approximately 50% remove the CF card.</p> <p>Verify that the device detaches. Reinsert the CF card.</p> <p>Verify that the device attaches and the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	

#	Test Standard	Windows XP	Comments
17	<p>USB surprise removal during CF read</p> <p>Verify that the device is attached and the CF card can be accessed.</p> <p>Write a large file to the CF card.</p> <p>Copy the same file back onto the host computer. When the read completes approximately 50% detach the USB cable.</p> <p>Verify that the device detaches. Reattach the USB cable.</p> <p>Verify that the device attaches and the CF drive can be accessed.</p> <p>Write - Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file.</p> <p>Read - Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC check the file written back to the computer.</p>	Pass	
18	<p>Insertion/removal of other media types during CF write</p> <p>Verify that the device is attached and the CF card can be accessed.</p> <p>Begin writing a large file to the CF card. While the write is in process, insert and remove different types of media until the write completes. Verify that this does not cause any errors to occur during the write. Once the write completes, remove the CF card to clear the cache. Reinsert the CF card. Verify that the device attaches. CRC check the file.</p> <p>Repeat this process until all media types have been inserted and removed at least once during a CF write.</p>	Pass	

#	Test Standard	Windows XP	Comments
19	<p>Insertion/removal of other media types during CF read</p> <p>Verify that the device is attached and the CF card can be accessed.</p> <p>Write a large file to the CF card. Begin copying the file back to the computer. While the read is in process, insert and remove different types of media until the read completes. Verify that this does not cause any errors to occur during the write. Once the read completes, remove the CF card to clear the cache. Reinsert the CF card. Verify that the device attaches. CRC check the file.</p> <p>Repeat this process until all media types have been inserted and removed at least once during a CF read. (MS, MS Pro, SD, MMC, SM, and XD)</p>	Pass	
20	<p>Insertion of other media types during CF write, remove CF after write completes (Verify insertion was detected during write and device is still attached)</p> <p>Verify that the device is attached and the CF card can be accessed.</p> <p>Begin writing a file to the CF card. While the write is in process, insert a different type of media. Verify that this does not cause any errors to occur during the write. Once the write completes, remove the CF card. Verify that the device remains attached. Remove the other media. Verify that the device is now detached. Reinsert the CF card. Verify that the device attaches.</p> <p>Repeat this process until all media types have been inserted during a CF write. (MS, MS Pro, SD, MMC, SM, and XD)</p>	Pass	
21	<p>Insertion of other media types during read, remove CF after write completes, still attached</p> <p>Verify that the device is attached and the CF card can be accessed.</p> <p>Begin writing a file to the CF card. While the write is in process, insert a different type of media. Verify that this does not cause any errors to occur during the write. Once the write completes, remove the CF card. Verify that the device remains attached. Remove the other media. Verify that the device is now detached. Reinsert the CF card. Verify that the device attaches.</p> <p>Repeat this process until all media types have been inserted during a CF write. (MS, MS Pro, SD, MMC, SM, and XD)</p>	Pass	

#	Test Standard	Windows XP	Comments
22	Micro Drive - Repeat these steps 2-23 using a micro drive instead of a CF card.	Pass	
23	Memory Stick - Repeat these steps 2-23 using a Memory Stick instead of a CF card. (For steps that require repeating until all other media is used, use CF, Micro drive, SM, XD, SD, and MMC)	Pass	
24	Memory Stick Pro - Repeat these steps 2-23 using a Memory Stick Pro instead of a CF card. (For steps that require repeating until all other media is used, use CF, Micro drive, SM, XD, SD, and MMC).	Pass	
25	Secure Digital- Repeat these steps 2-23 using a SD instead of a CF card. (For steps that require repeating until all other media is used, use CF, Micro drive, SM, XD, MS, and MS Pro).	Pass	
26	Multi Media Card - Repeat these steps 2-23 using a MMC instead of a CF card. (For steps that require repeating until all other media is used, use CF, Micro drive, SM, XD, MS, and MS Pro).	Pass	
27	Smart Media- Repeat these steps 2-23 using a SM instead of a CF card. (For steps that require repeating until all other media is used, use CF, Micro drive, MS, MS Pro, SD, and MMC).	Pass	
28	xD- Repeat these steps 2-23 using a xD instead of a CF card. (For steps that require repeating until all other media is used, use CF, Micro drive, MS, MS Pro, SD, and MMC).	Pass	

#	Test Standard	Windows XP	Comments
29	<p>Insertion of all media</p> <p>Attach a test device with no media to the host computer. Verify that the device is not attached. Insert one piece of media. The first insertion should cause the device to attach. Verify that this is the only accessible drive. Continue to insert media one at a time. Verify that for each insertion the device remains attached and the drive corresponding to the media inserted becomes accessible.</p> <p>Write - Write a small file from the computer to the each card. Remove the cards once at a time to clear the cache. Verify that for each removal except for the last media card, that the device remains attached and that the slot the media was removed from can no longer be accessed. Verify that after removing the last piece of media that the device detaches. Reinsert all cards. Verify that the device attaches. CRC check the files</p> <p>Read - Copy the same files back to the host. Remove the cards to clear the cache. Verify that the device detaches. Reinsert the cards. Verify that the device attaches. CRC check the files written back to the computer.</p> <p>Repeat this step until all media types are tested(CF, Micro Drive, MS, MS Pro, SD, MMC, XD, SM)</p>	Pass	
30	<p>Initial Plug-in – with all media</p> <p>Detach the test device. Insert media into all available slots in test device.</p> <p>Connect this test device to the host controller.</p> <p>Verify that the all drives can be accessed.</p> <p>Write - Write a small file from the computer to the each card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC check the files.</p> <p>Read - Copy the same files back to the host. Remove the cards to clear the cache. Verify that the device detaches. Reinsert the cards. Verify that the device attaches. CRC check the files written back to the computer.</p> <p>Repeat this step until all media types are tested(CF, Micro Drive, MS, MS Pro, SD, MMC, XD, SM)</p>	Pass	

#	Test Standard	Windows XP	Comments
31	Insertion of all media (USB 1.1 speed) Configure the device under test to be operating at USB 1.1 speeds (either disable the EHCI or attach a full speed hub between the host and device) Repeat step 31 with the device now operating at 1.1 speeds.	Pass	
32	Initial Plug-in – with all media(USB 1.1 speed) Configure the device under test to be operating at USB 1.1 speeds (either disable the EHCI or attach a full speed hub between the host and device) Repeat step 32 with the device now operating at 1.1 speeds.	Pass	
33	CF, SM+SD+MS configuration – Configure the device under test to be configured with CF for the first LUN, and SM, SD, and MS sharing the second LUN. Repeat steps 1-37 using this configuration.	Pass	
34	CF+SM+SD+MS configuration – Configure the device under test to be configured with CF, SM, SD, and MS sharing one LUN Repeat steps 1-37 using this configuration.	Pass	

Test Suite #19- Memory Stick Compatibility Testing

Overview

This test ensures that all tests listed in Sony Corporation's *Memory Stick Implementation Check Procedures* pass with USB2224. Refer to the *Memory Stick Implementation Check Procedures* document for specific instructions on how to perform each individual test listed below. All tests are run using Windows XP.

Chapter 7 of Memory Stick Compatibility test results:

Test #	Test Description	Windows XP	Comments
7001	1.6 Logical / Physical Translation Table Block	Pass	
7002	1.7 Data Write/Read (when W/P SW is turned ON)	Pass	
7003	1.8 Data Read/Write (when W/P SW is turned OFF)	Pass	
7004	1.9 Duplicated Logical Addresses	Pass	
7005	1.10 Alternative Blocks	Pass	
7006	1.11 Disabled Blocks	Pass	
7007	1.12 Digital Read Protected Bit	Pass	
7008	1.13 Block Status/Page Status	Pass	

7009	1.14 Abnormal Boot Block	Pass	
7010	1.15 Boot Area Protection Processing	Pass	
7011	1.16 128MB Support	Pass	
7012	1.17 Alternative Blocks	Pass	

Chapter 8 of Memory Stick Compatibility test results:

Test #	Test Description	Windows XP	Comments
8001	2.6 Mount Processing	Pass	
8002	2.7 Write Processing	Pass	
8003	2.8 Delete and Format Processing	Pass	
8004	2.9 Relating to Archive Bits	Pass	
8005	2.10 Memory Stick formatted by Windows	Pass	

Test Suite #20 Macintosh OS Specific Testing

Overview

This test suite summarizes the testing performed in the Macintosh operating systems.

#	Test Suite	Mac OS 9.2	Mac OS 10.2	Mac OS 10.3	Comments
1	Installation	Pass	Pass	Pass	
2	Compact Flash / IBM MicroDrive	Pass	Pass	Pass	
3	Smart Media/XD	Pass	Pass	Pass	
4	Secure Digital / Multimedia Card	Pass	Pass	Pass	
5	Memory Stick / Memory Stick Pro	Pass	Pass	Pass	
6	Multiple Device	Pass	Pass	Pass	
7	C3 – Attach on Insert	Pass	Pass	Pass	
8	Load/Unload	Pass	Pass	Pass	
9	USB 1.1	Not Required- OS is USB 1.1 Only.	Pass	Pass	

Test Suite #21 WinCE Specific Testing

Overview

This test suite summarizes the testing performed in the WinCE operating systems. The actual test steps are specified in the WinCE Nominal Test Suite.

#	Test Suite	WinCE 5.0	Comments
1	Installation	Pass	
2	Media	Pass	
3	Load/Unload	Pass	
4	C3 – Attach on Insert	Pass	