THE I/O INTERCONNECT SOLUTION

PEX 8604

Interoperability Test Report

Version 2.0

June 2009

Website:	**www.plxtech.com**
Technical Support:	**www.plxtech.com/support**

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1 Purpose

This test report details interoperability procedures and results for the PEX 8604 Rapid Development Kit (RDK).

2 Product Information

The ExpressLane™ PEX 8604 device offers 4 PCI Express Gen 2 (5.0 GT/s) lanes, which supports up to four ports. The switch conforms to the PCI Express Base Specification, rev 2.0. The PEX8604 is the industry's smallest 4-lane Gen 2 device and it enables users with the ability to connect multiple PCI Express endpoints which are used in a variety of consumer and embedded applications including Multi-Function Printers, wireless ethernet modules, IO expansion modules, Express Card applications as well as other low power applications. The PEX 8604 boasts unsurpassed performance with its non-blocking architecture, capable of supporting both host-centric as well as true peer-to-peer traffic on its ports. The PEX 8604 supports x2 port width natively on the upstream port which allows it to interface directly and seamlessly to embedded processors commonly used in such applications. The PEX 8604 also features an on-chip Non-Transparent port for dual-host and failover applications, supports dual-clock domain operation by virtue of support for Spread Spectrum Clock (SSC) isolation as well as two Virtual Channels for enhanced QoS. The device is hardware configurable and/or software programmable, allowing users to tailor their port configurations and QoS operating characteristics to suit their application requirements. The PEX 8604 is offered in a 15 x 15mm 196-ball PBGA. This device is available in both leaded and lead-free packaging.

3 Scope

3.1 Test Phases

There are three test phases as defined below:

Phase 1: *Motherboards and System BIOS Testing* – This phase ensures the PEX 8604 RDK is properly detected in different operating systems and works with different motherboard chipsets, CPUs, BIOS, and drivers. Preference is given for testing with PCI Express Gen 2 systems.

Phase 2: *Endpoints Testing* – This phase consists of testing with endpoint devices, such as video adapter cards, Ethernet network cards, storage controllers and TV tuners.

Phase 3: *WHQL Certification* – This phase tests primarily focuses on the PCI compliance and IO stress tests of the DTM certification test suite.

The following Microsoft operating systems can be used as the software platforms:
- Windows XP Professional with Service Pack 3
- Windows XP Professional, Standard and x64 bit
- Windows Server 2003 with Service Pack 2
- Windows Vista with Service Pack 1 (Ultimate, Enterprise, x64 bit)
- Fedora Linux versions 8, 9, 10
- Red Hat Linux 5.1
- Apple Mac X (Leopard version)
- Windows Server 2008 (Standard and x64 bit Enterprise)
- Windows 7 RC1 Build 7100, dated 4-30-2009

Note: *It is not possible to test every combination of endpoints, BIOS versions, motherboard chipsets and drivers. However, the test cases below are selected carefully to ensure the widest interoperability coverage of our RDKs. Refer to the test checklists attached for the exact configurations and actual test results.*

3.2 Test Omissions and Assumptions

The following RDK features are not tested as part of interoperability.

1. *Hot-Plug Tests* - Hot-Plug functionality of the switch RDK is tested by the validation teams. Currently, most system BIOS, device drivers and operating systems (including Windows Vista) together do not always fully support seamless Hot-Plug at the interoperability level. The interoperability lab will retest this key function as better support becomes available.

2. *Serial EEPROM Tests* – In-depth serial EEPROM tests are tested as by the validation teams. For interoperability, the EEPROM functions are used and tested within the context of the PEX Device Editor software.

3. *JTAG Header* - JTAG is not used for interoperability.

4. *Configuration modules* – Interoperability testing covers default modules received with the RDK kit only. Not all possible combinations will be tested.

5. *Non-Transparent bridging (NT) and Spread Spectrum Clock Isolation (SSC)* – These advanced features are beyond the scope of typical interoperability testing. They are tested by the validation teams.

6. *Advanced SDK features* – Probe mode and measuring SerDes Eye Widths features are beyond the scope of interoperability testing.

4 Pretest Requirements

4.1 Collaterals

As a minimum, the following items are required to complete the tests.

1.	PEX 8604 RDK	- See Hardware Reference Manual and Quick Start Guide
2.	SDK 6.1	- Low-Level Application Software for Bridge/Switch Devices
3.	System Platforms	- See Motherboards and Systems List
4.	Video Adapters	- NVIDIA 8800 GTS PCI Express (Gen 2) - Diamond Radeon HD 3850 PCI Express (Gen 2) - Matrox Millenium P650 PCI Express - NVIDIA NVS 440 PCI Express - ATI Radeon Pro x1600 PCI Express - PNY FX 3700 (Gen 2)
5.	Ethernet Adapters	- Intel Gigabit Ethernet PCI Express (Ophir) - Broadcom Nextreme x5715 PCI Express - SysKonnect 9E21D PCI Express
6.	SCSI HBAs	- LSI Logic 22320 PCI Express
7.	FC HBAs	- Qlogic QLA2432 PCI Express
8.	TV Tuners	- Avermedia TV Tuner AverTV Combo PCI Express

4.2 Other Documentation

The test procedures assume the tester has fully read the following documentation first:

1. Hardware Reference Manual

2. PEX SDK Release Notes

3. PEX 8XXX -- PLX Switches/Bridges RDK Interoperability Design Note

4. Installation guides of the endpoints. See the manufacturers' latest product updates.

4.3 Software and Identification Information

Proper interoperability testing requires documenting test environments and setups. Some key information includes: software and driver versions, system BIOS settings, RDK configurations (jumpers and switch settings), PCBs identifications, chip markings and auxiliary software utilities.

Use the attached Software and Hardware Identification Information sheet and completely fill out the exact hardware and software used.

4.4 System BIOS Settings

Modern PC test systems have system BIOS that allows configuring specific settings. These settings, ranging from video displays to power management allow taking advantage of powerful hardware features.

It is critical that the system BIOS is properly configured. RDKs may not work at all, or work in an unpredictable manner if the settings are incorrect or sub-optimal. See the Design Note PEX 8XXX -- PLX Switches/Bridges RDK Interoperability for more information.

To access the system BIOS, reboot the system and either hit the ESCAPE key or F1 key or F2 key or DELETE key (different BIOS have different access keys) BEFORE the Windows operating system loads. Verify that the BIOS parameters are set to the values below.

After changing the BIOS parameters, remember to SAVE THE SETTINGS (typically select the F10 key). Reboot the system to reinitialize the BIOS which then loads Windows normally.

4.5 Physical Layout of RDK

The following diagram shows the PEX 8604 plug-in card.
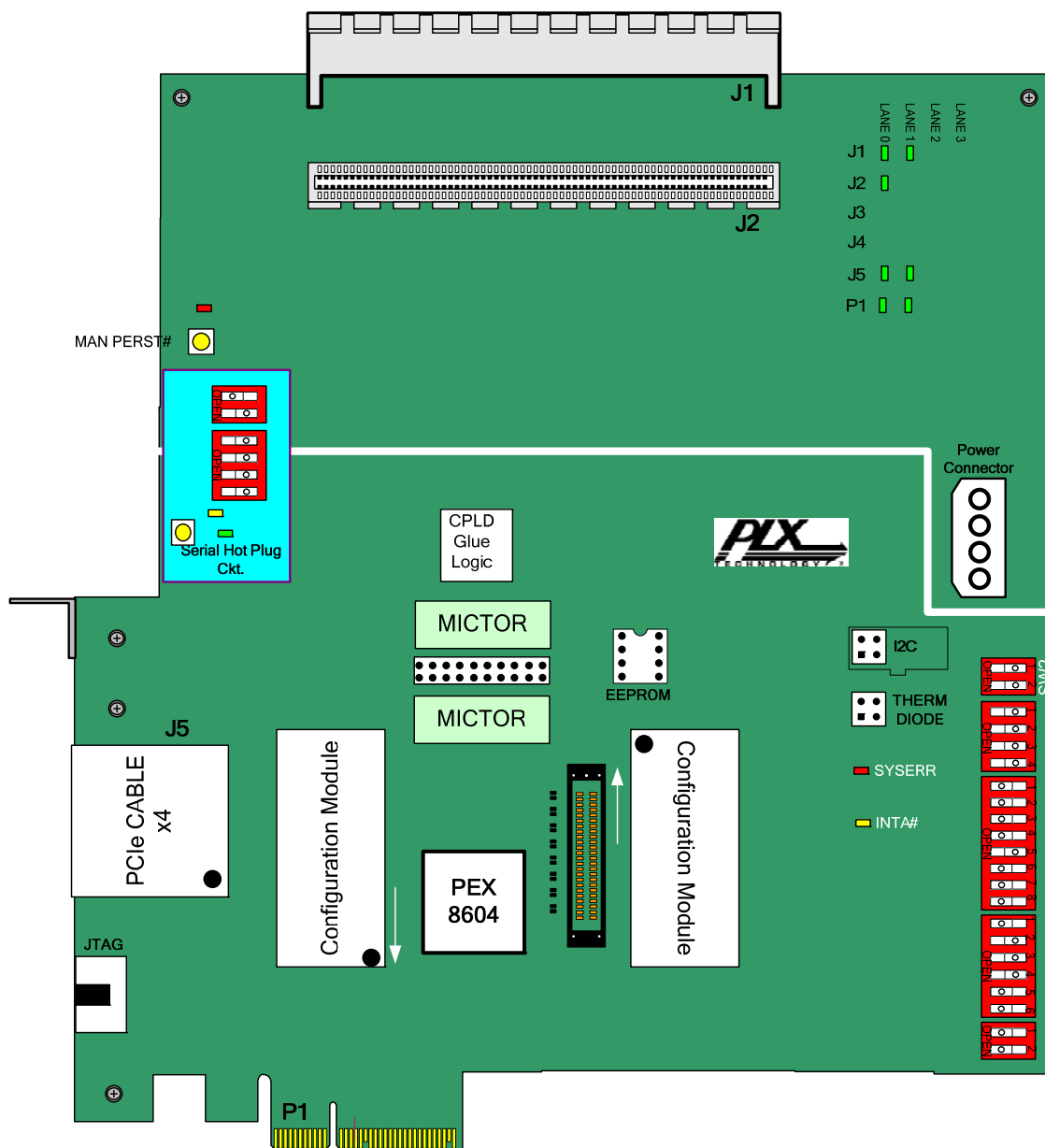
Figure 1. PEX 8604 Plug-in RDK

5 Test Descriptions and Procedures

Test the following categories in the default modes.

5.1 Motherboards and System BIOS

The goal is to ensure that the RDKs and SDKs, together, perform fundamental functions interfacing with motherboard root complexes. Root complexes include Northbridge and/or Southbridge chipsets and system interrupt controllers.

In this phase, only the PEX 8604 RDK is tested in motherboard slots. No endpoints are used. The focus is the root complex interface and BIOS/motherboard detection of the PLX hardware only.

The general methodology is:

1. Reserve the test system. See the attached list of Motherboards and System BIOS.

2. The PC should already be preconfigured with the necessary hardware and software:

   - Windows operating system (Windows XP or Windows Server 2003 or Windows 64-bit Server 2003 or Windows Vista)

   - Formatted and partitioned internal ATA hard disk with at least 40 Gigabytes

   - At least 1 Gigabytes of memory and a Pentium 4 or higher CPU

   - PEX SDK software

3. Install the RDK board (using its default switch and jumper settings) into the system and connect the power connector.

4. Boot up the system into Windows and check that the RDK is correctly detected and enumerated.

5. Run the interoperability procedures against motherboards, chipsets, BIOS, endpoints (video adapters, Ethernet adapters, SCSI/FC HBAs or TV tuners).

6. Record all findings and work with engineering groups to resolve problems found.

5.1.1 Visual Link-Up Tests

See the Hardware Reference Manual of the bridge or switch product for exact locations and functions of the LEDs.

1. Select a test system that has PCI Express slots. See the Motherboards and System BIOS list.

2. Make sure the system is fully powered OFF first.

3. Install the RDK into an available PCI Express slot. Connect the power connector.

4. Turn on the system and monitor the RDK's LEDs. When lighted green, these indicators show lanes or port linkup status. Verify the LEDs against their functional assignments from the Hardware Reference Manual.

5.1.2 Operating System Installation and Device Detection Tests

Install one of the following operating system:

1. Microsoft operating system: This may include Windows XP Professional (standard or 64-bit version), or Windows Server 2003 or Windows Vista.

2. Apple operating system: Use OS X Leopard version

3. Fedora operating system: Use version 9

Depending on the operating system, use Device Manager, System Profiler or UNIX's lspci command to show the detected devices.

5.1.3 Device Manager Detection Tests

These tests verify RDK detection at the operating system level.

1. Go into Control Panel → System → Device Manager. Select the View tab; right click to choose DEVICE BY CONNECTION.

2. Under "System Devices", verify that a category called "PCI standard PCI-to-PCI Bridge" appears.

3. Under the system's name, there should be a category called ACPI Multiprocessor PC. Click on it and traverse through the hierarchical tree Microsoft ACPI-Compliant System → PCI Bus → Intel ® xxxx PCI Express Root yy. There could be multiple roots of the PCI Express ports so continue to check each branch until the "PCI standard PCI-to-PCI Bridge" appears.
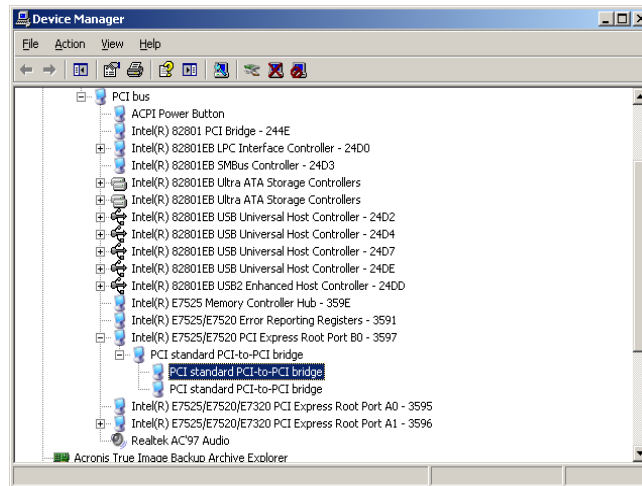
Figure 2. Device Manager Detection of Switch

Move the cursor over the "PCI standard PCI-to-PCI Bridge" item, and right click. A small menu box appears. Select "Properties" and then a screen below displays.
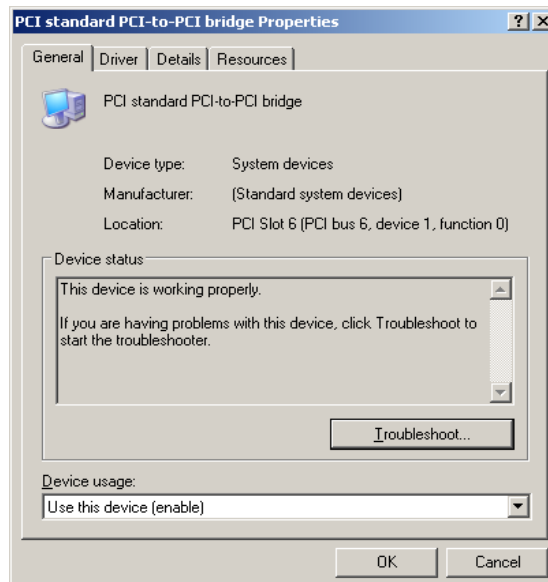
Figure 3. Routing Information of Switch Device

This window shows the "PCI standard PCI-to-PCI device" and lists its routing information in the LOCATION field:

- PCI slot number
- Bus number
- Device number
- Function number

Record this information before proceeding further. Next, move the cursor to the "Details" tab (the third tab), and click it.

Figure 4 shows sample product information.
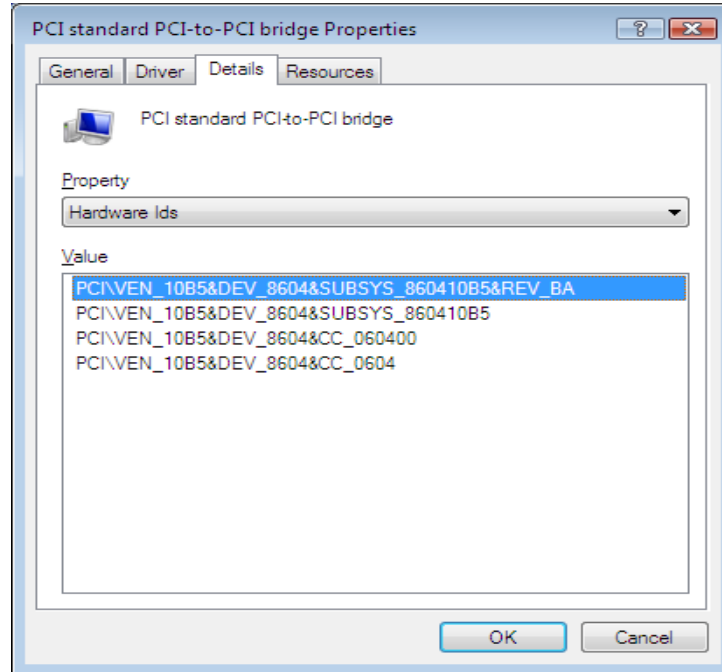
Figure 4. Vendor ID and Chip ID of Switch

Verify that the vendor ID is 10B5 and the chip ID is 8604.

5.1.4   Slot Tests

Different PC systems support different numbers and types of PCI Express slots, ranging from x1 to x2, x4, x8 or x16 lane widths.

Test all different lane widths that the system supports. If there are multiple slots having the same lane widths, then select and test with one slot only. For example, if the system has multiple x1 slots, then test with one x1 slot only.

The recommended sequence is to test the x1 slot first, then x2, then x4, and so on.

1. Make sure the system is fully powered OFF.

2. Insert the RDK into the PCI Express x1 slot if the RDK is the Forward board. Insert into the PCI-X slot if the RDK is the Reverse board.

3. Run the following tests for each slot:

   a. Visual Link-Up tests

   b. Device Manager tests

4. Record all findings.

5. Repeat the above for x2, x4, x8, and x16 slots, if they are available.

5.1.5 Lane Reversals

The PEX 8604 chip supports lane reversals for both upstream and downstream ports. These tests verify the lane reversal function.

1. Insert one x8 lane reversal adapter between the system slot and the upstream edge connector of the RDK. Insert the RDK, including the lane reversal adapter, into a PCIe system slot. Power on the system and check for proper OS boot-up. Use Device Manager to verify that the PCI-to-PCI bus adapter is correctly detected and enumerated.

2. Insert the x8 lane reversal adapter into one of the downstream ports of the RDK. Insert an endpoint such as a network adapter, a video adapter, or a HBA adapter as an endpoint on top of the lane reversal adapter. Plug both the RDK and the lane reversal combination into a PCIe system slot. Power on the system and check for proper OS boot-up. Use Device Manager to verify that the PCI-to-PCI bus adapter is correctly detected and enumerated.

5.1.6 PEX Device Editor Tests

The PEX Device Editor is a graphical interface provided as part of the SDK software to configure, control, and get status of the RDK hardware.

 The PEX Device Editor portal serves two key functions:

1. Examine low-level device information (such as Dev ID, Bus, Device Number, Link width, port),
2. Read and write configuration registers, memory-mapped register, execute block reads

Even though the GUI offers other tools, such as comparing EEPROM images and loading them, interoperability testing does not cover these advanced features.

To begin, go into Programs → PLX PEXSDK → PEX Device Editor.

5.1.6.1 Detection

See the highlighted item in Figure 5. On the left pane is a smaller box showing the detected device. Check the device ID, Vendor ID, Revision, Bus, Function, Slot and Mode, and Chip Type. Record this information and compare it against the slot number /bus number/ device number/ function number recorded earlier from the Device Manager Tests.
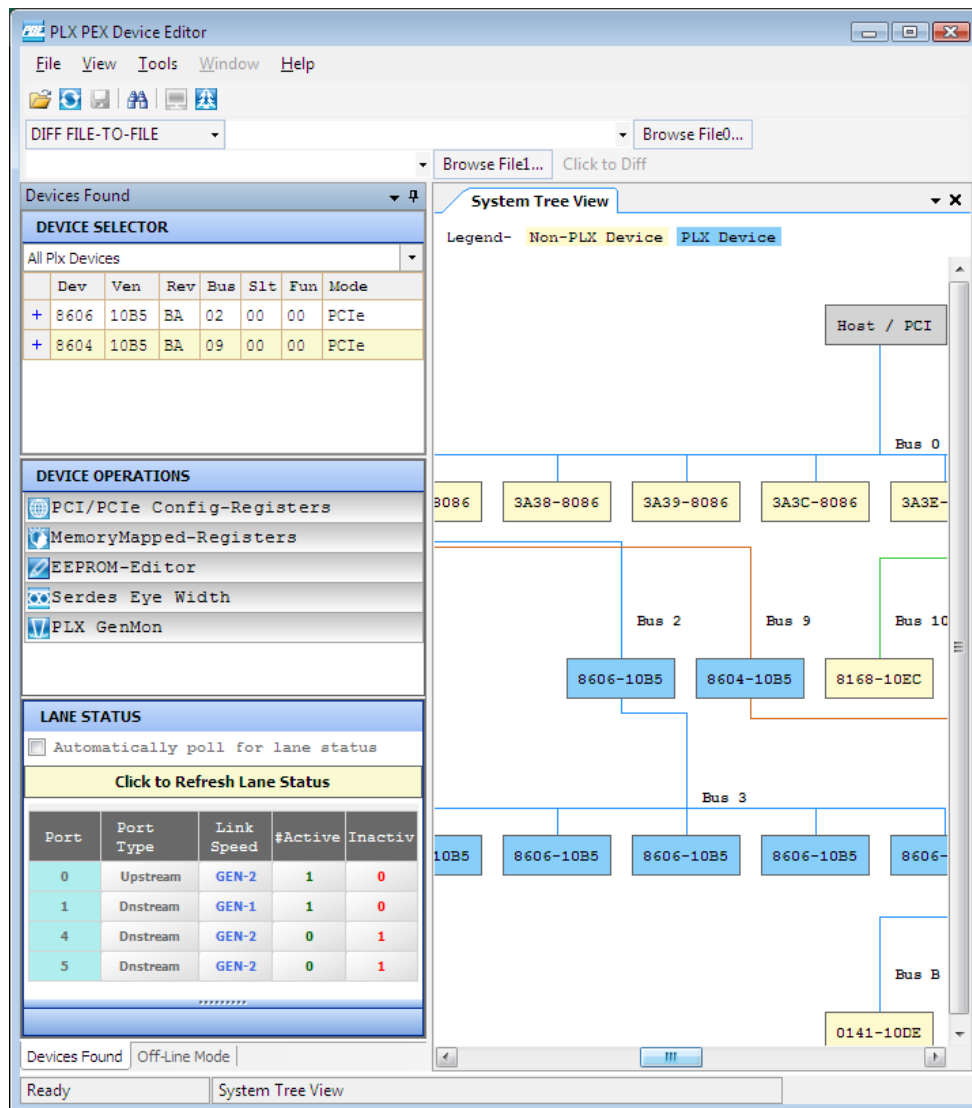
Figure 5. PEX Device Editor Display of Switch

Note: The PEX Device Editor software should display all the active and inactive upstream and downstream ports and their number of lanes found during the enumeration process. Count the total of these ports and lanes. This number should equal to the total number of ports and lanes supported by the RDK.

5.1.6.2   EEPROM Tests

Run the following tests only if the EEPROM is enabled (set by jumpers or switches on the board). Skip these tests if the EEPROM is not used.

1. *Read PCI/PCIe Configuration Registers*

   a. Look at the middle box of the screen above, labeled "PCI/PCIe Configuration Registers". Click to select. A new window should be displayed on the right screen.

   b. The Port, Configuration Address and Value drop-down boxes will appear. Select Port 0, Configuration Address 0.
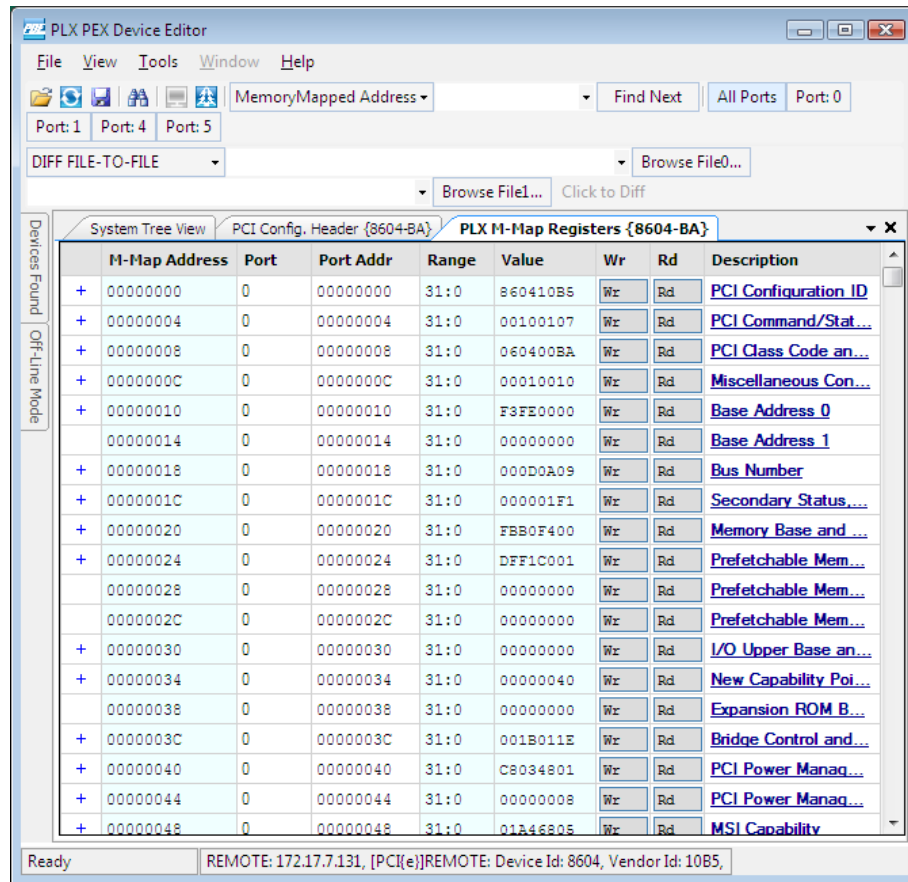
Figure 6. PCI / PCIe Configuration Registers of Switch

c. Click Rd (grayed out button). This process reads the CSR (Configuration Status Registers) and then displays the offset addresses [typically from 0000 to xxxx] and data.

d. Check to ensure the four bytes show "860410B5" and "Read successful". Change the offset addresses and the block size to read different ranges. There is no need to verify all the bytes displayed. The goal is just to be able to read and dump the EEPROM contents for display only.

2. *Read Memory-Mapped Registers*

a. Look at the middle box of the screen above, labeled "Memory Mapped Registers". Click to select. A new window should be displayed on the right screen.

b. Click on the tab label "PLX-M Map Registers {8604-BA}".

c. The Port, Configuration Address and Value drop-down boxes will appear. Select Port 0, Configuration Address 0.
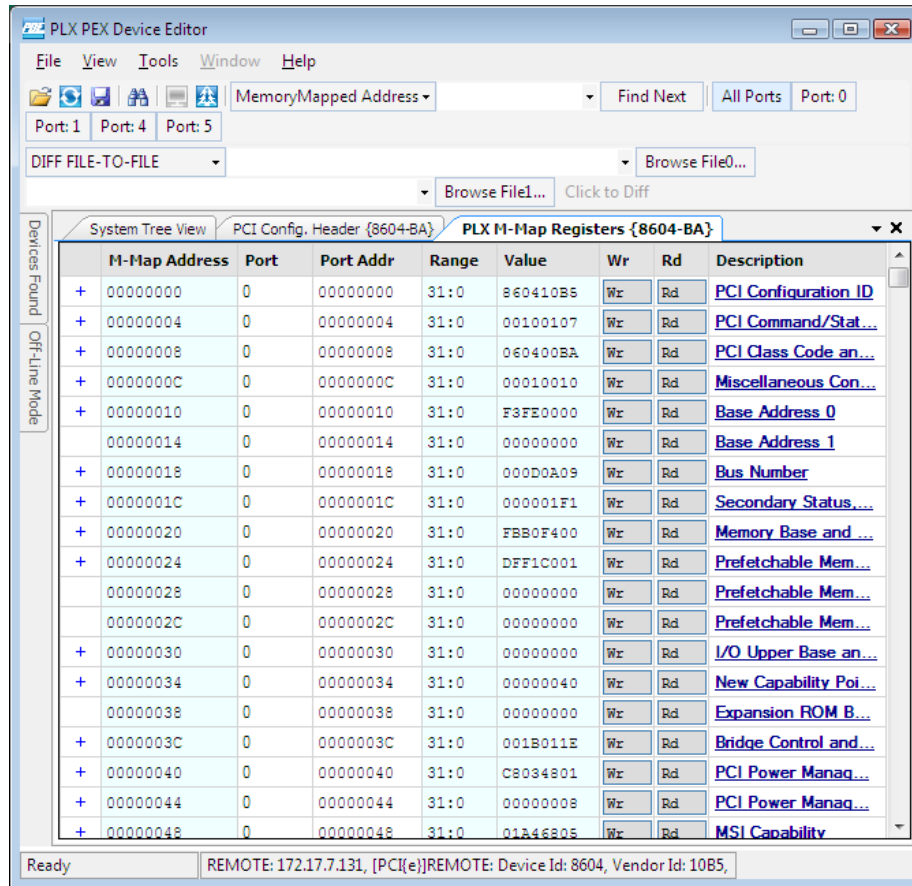
Figure 7. PCI / PCIe Memory-mapped Registers of Switch

d. Click Rd (grayed out button). This process reads the memory-mapped registers and then displays the offset addresses [typically from 0000 to xxxx] and data.

e. Check to ensure the four bytes show "860410B5" and "Read successful".

f. Change the offset addresses and the block size to read different ranges. There is no need to verify all the bytes displayed. The goal is just to be able to read and dump the EEPROM contents for display only.

3. *EEPROM Editor*
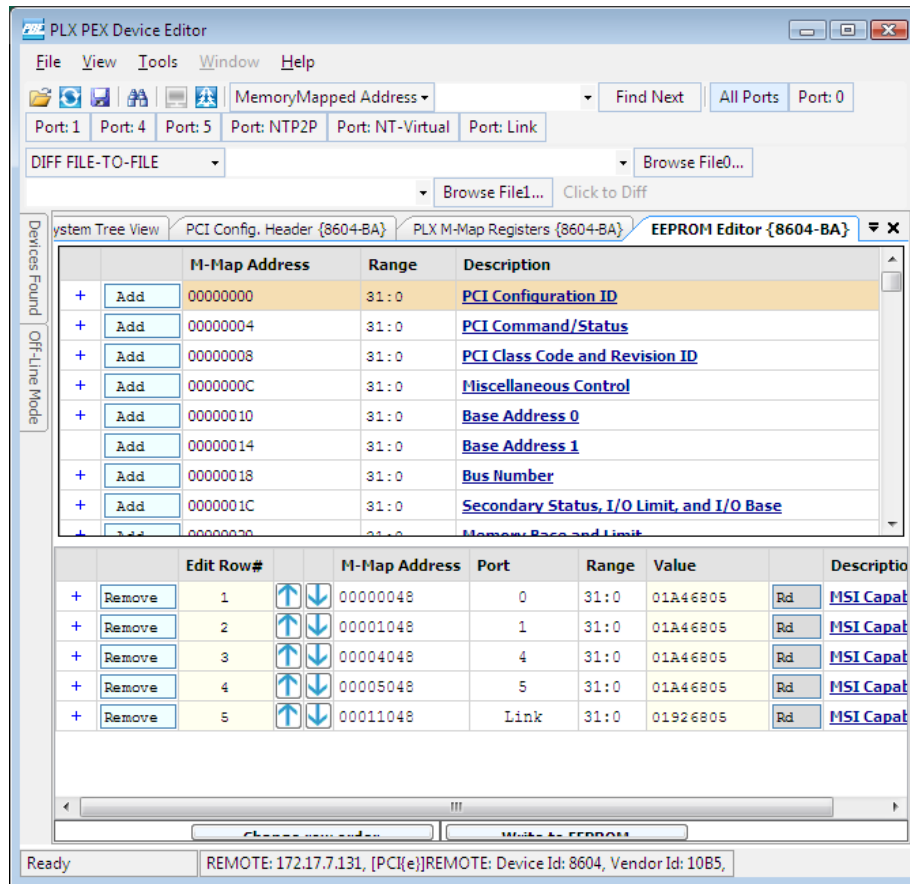
Figure 8. EEPROM Editor

5.2 Endpoints

Gen 2 PCI Express devices are currently limited to several video cards and Ethernet adapters. Therefore, the bulk of interoperability testing will include Gen 1 PCI Express devices as well. As more Gen 2 devices become available, we will include them in the testing.

Endpoint testing requires using both the PEX 8604 RDK and a specified endpoint together as a unit. An endpoint can be a video adapter, an Ethernet adapter or a SCSI Host Bus Adapter.

Select and test the endpoints behind the switch or bridge in all provided port modes (x1, x4, and x8). Depending on whether the device is a bridge or a switch, FORWARD and REVERSE modes may apply. See the list of Endpoint Devices and Connectivity Kits.

The general methodology for testing endpoints is as follows:

1. Insert the RDK into one of the PCI Express slot. Connect external power to board.

2. Connect one (1) endpoint device into the PCI Express slot of the RDK. Reboot the system and install device drivers for the endpoint. Some endpoints such as video adapters have embedded drivers as part of the operating system in which case no drivers may be needed. However, it is highly recommended to use the latest manufacturer-supplied drivers from the CD or by downloading the latest drivers from the internet.

3. Reboot the system. Check the device driver under CONTROL PANEL → DEVICE MANAGER.

4. Run specific tests related to the endpoint. For example, if the device is an Ethernet adapter card, connect to a specific internet Website, such as www.plxtech.com. If the device is a video adapter card, check for visual displays on the screen monitor.

SPECIAL NOTE: Do not connect multiple endpoint devices to the PEX 8604 RDK. The focus is to qualify each endpoint component independently and individually. As a result, test with only one (1) endpoint at a time only. Testing multiple endpoints is done in fully-loaded configurations, which are part of phase 3.

5.2.1 Video Adapter Tests

Standard PC systems have embedded graphics support or come with an existing video adapter. PCI Express video cards present a new class of video devices to the BIOS and operating system that must be redetected and re-enumerated along with the existing video devices.

In most cases, PCI Express video devices can coexist with other video devices. However, the system BIOS may require disabling the embedded graphics support and/or removing the existing video card in order for the PCI Express video card to work.

1. Make sure the system is completely powered OFF.
2. Perform the following steps:
   a. Select a PCI Express video card from the list of video cards to be tested.
   b. Insert the RDK into a free (unpopulated) motherboard's PCI Express slot.
   c. Connect the Power Connector to the RDK.
   d. Insert the video card in any one of the PCI Express slots of the RDK.
   e. Connect one end of the monitor cable to the output connector of the video card. Some video cards require special DVI-OUT adapters to convert between 15-pin SVGA and DVI-OUT connections. Use the adapters as appropriate.

Some motherboards support primary and secondary graphics, depending on the PCI or PCI Express modes. Re-verify the proper settings in the system BIOS (see System BIOS settings list) before running the tests below.

5.2.1.1 Video display on the monitor

Turn on the monitor and the system. Check for visual display. Be default, the Windows OS should load standard VGA drivers automatically or detect a new device and request for a driver.

Note: If no manufacturer's video drivers are available, Windows automatically loads the generic "standard video adapter" driver.

5.2.1.2 Driver installation and Updates

Manufacturer-supplied drivers allow enhanced performance beyond standard video driver supplied by the Windows operating system. If available, always install the driver software.

5.2.1.3 Driver detection

Check Device Manager → Display Adapters to make sure the new driver is loaded. There should be no yellow bangs, or red crosses next to the driver name. Otherwise, there are either resource conflicts or the driver does not detect or load properly or the driver is disabled.
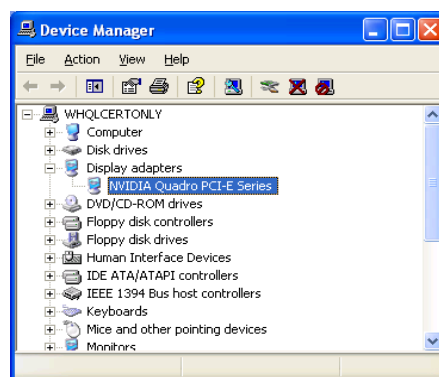
Figure 9. Device Manager Detection of NVIDIA Video Card

If it is necessary to update the drivers from the CD or the internet, right-click the item and select "UPDATE DRIVER".

5.2.2   Ethernet Adapter Tests

Standard PC systems have embedded graphics support or preinstalled Ethernet adapters. Some PCI Express endpoints may only work by disabling the embedded graphics support and/or removing the existing adapter completely.

5.2.2.1   Driver installation

Manufacturer supplied drivers allow enhanced performance beyond standard network card driver supplied by the Windows operating system. If available, always install the driver software

5.2.2.2   Driver installation and Updates

Check Device Manager → Network Adapters to make sure the new driver is loaded. There should be no yellow bangs, or red crosses next to the driver name. Otherwise, there are either resource conflicts or the driver does not detect or load properly or the driver is disabled.

Figure 10 shows how an Intel network adapter card is detected and displayed.
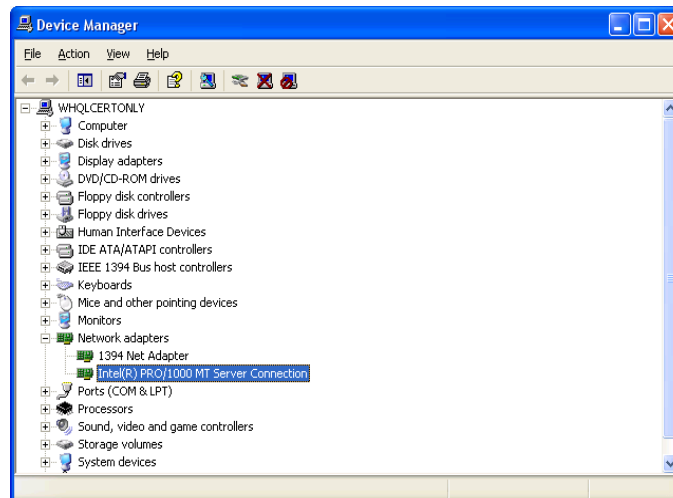
Figure 10. Device Manager Detection of Intel Network Card

To update the drivers from the CD or the internet, right-click and select "UPDATE DRIVER".

5.2.2.3   Web-page access

Open the Internet Explorer browser. Type an internet URL address, such as www.plxtech.com. Check to see if the Website is accessible. Within the Website, click on several different links such as company or products information ensure network downloads are accessible.

5.2.3   SCSI or Fibre Channel HBA Tests

5.2.3.1   Driver installation

Manufacturer supplied drivers allow enhanced performance beyond standard SCSI or Fibre Channel storage controller driver supplied by the Windows operating system. If available, always install the driver software.

5.2.3.2 Driver detection

Check Device Manager → SCSI and RAID controllers to make sure the new driver is loaded. There should be no yellow bangs, or red crosses next to the driver name. Otherwise, there is either resource conflicts or the driver does not detect or load properly. Figure 11 illustrates the LSI Logic SCSI Raid Controller detection.
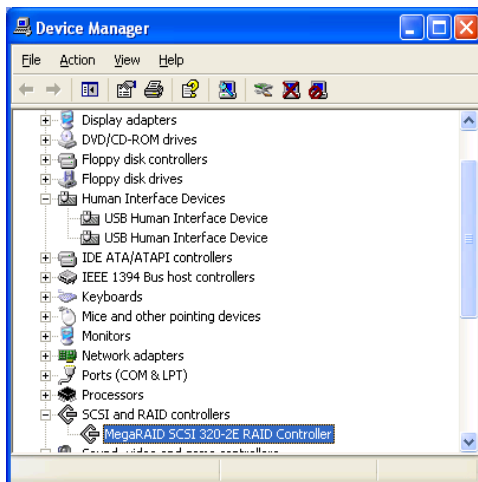
Figure 11. Device Manager Detection of LSI SCSI HBA

If the Fibre Channel HBA is used, the driver installation and detection is similar to the SCSI HBA. It is also displayed in the same SCSI and RAID controller category.

Figure 12 illustrates the Emulex Fibre Channel HBA detection.
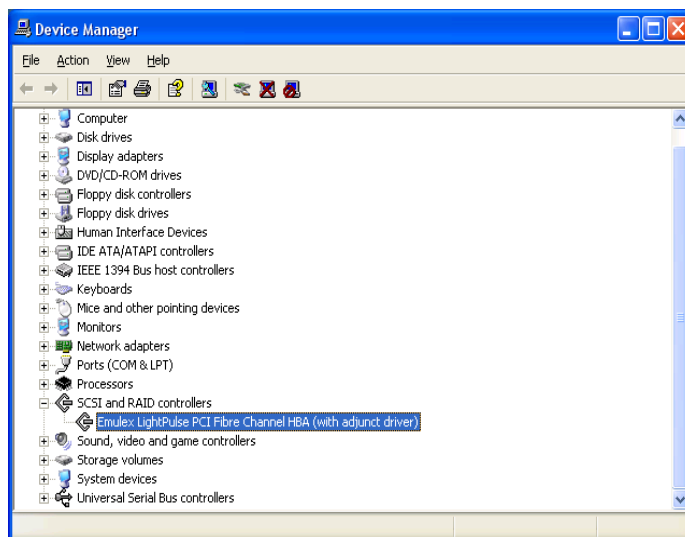
Figure 12. Device Manager Detection of Emulex Fibre Channel HBA

5.2.3.3 Read/Write data files

Modern HBAs have their own BIOS. After powering up the system, the SCSI or Fibre Channel BIOS, together with the system BIOs, automatically enumerate and display the connected devices. For example, if an LSI Logic MegaRaid adapter is installed, the BIOS displays its own BIOS version, lists SCSI/FC devices detected, and momentarily pauses with the CTRL-M prompt to allow the user to configure HBA's BIOS settings.

Refer to the manufacturer's documentation to set the HBA BIOS properly. The Windows operating system does not detect and enumerate properly if the HBA BIOS settings are set incorrectly.

Once the HBA BIOS is set up correctly, Windows should also detect the HBA, its connected drives and assign them drive letters. Refer to Microsoft's DISK MANAGEMENT utility to partition and format the drives.

One formatted the drives are available to read and write files. Run tests below.

1. Create special directories within the SCSI or Fibre Channel drives, say TEMP.
2. Copy some directories from the internal ATA drives over to the SCSI or Fibre Channel drives.
3. Switch to the SCSI or Fibre Channel drive and verify that the new folders and files are fully copied over.

5.2.4 TV Tuner Cards

TV tuners cards are devices emulating TV devices or other display devices such as cameras or camcorders through adapter cards. TV tuners typically offer both video and sound features and may have sophisticated download and uploading features through TV antennas or satellites or networked sources.

Interoperability testing focuses on simple capture and display features only

TV tuner cards install similarly to video cards or Ethernet card or SCSI/FC cards. However, TV tuner cards require an external power source, so use the correct adapter and connect to power jack on the back of the card.

5.2.4.1 Driver installation

Install the manufacturer-supplied drivers for Windows from the CD. For more updated drivers, download from the internet at the vendor's Website. For example, the Win TV 2000 TV tuner driver downloads are available at www.hauppauge.com in the Support section.

5.2.4.2 Driver detection

Check Device Manager → Sound, video and game controllers to make sure the new driver is loaded properly. There should be no yellow bangs, or red crosses next to the driver name. Otherwise, there are resource conflicts or the driver is disabled or does not load properly. Figure 13 illustrates the Win TV 2000 TV tuner card.

Figure 13. Device Manager Detection of Hauppauge TV Tuner

5.2.4.3 Video Capture and Display

TV tuners require video capture and display software. For example, Hauppauge TV tuners require proprietary Hauppauge WinTV 2000 software. Do not mix and match video capture and display software from other TV tuner vendors. They may not be compatible.

1. Install the Win TV 2000 software from the CD. The software may have separate video and audio components, resulting in multiple detection passes by Windows.
2. Once fully installed, the application resides in PROGRAMS as Microsoft application software. Launch it by double-clicking the application.
3. A new screen box appears as shown below.

Figure 14. Sample Launch Pad of WinTV Application

4. Click on the first button (TV Mode) and the camera starts the capture.

Record all results and observations.

5.3 WHQL DTM Certification and Other Advanced Tests

5.3.1 DTM Certification

WHQL tests are highly dependent on the exact type and configurations of the system and endpoints. The unclassified driver mode in DTM allows the user to select just the bridge device itself for testing. DTM automatically mounts the appropriate tests to determine if the device meets this minimum WHQL driver certification.

Figure 15 shows test classes for a bridge device.
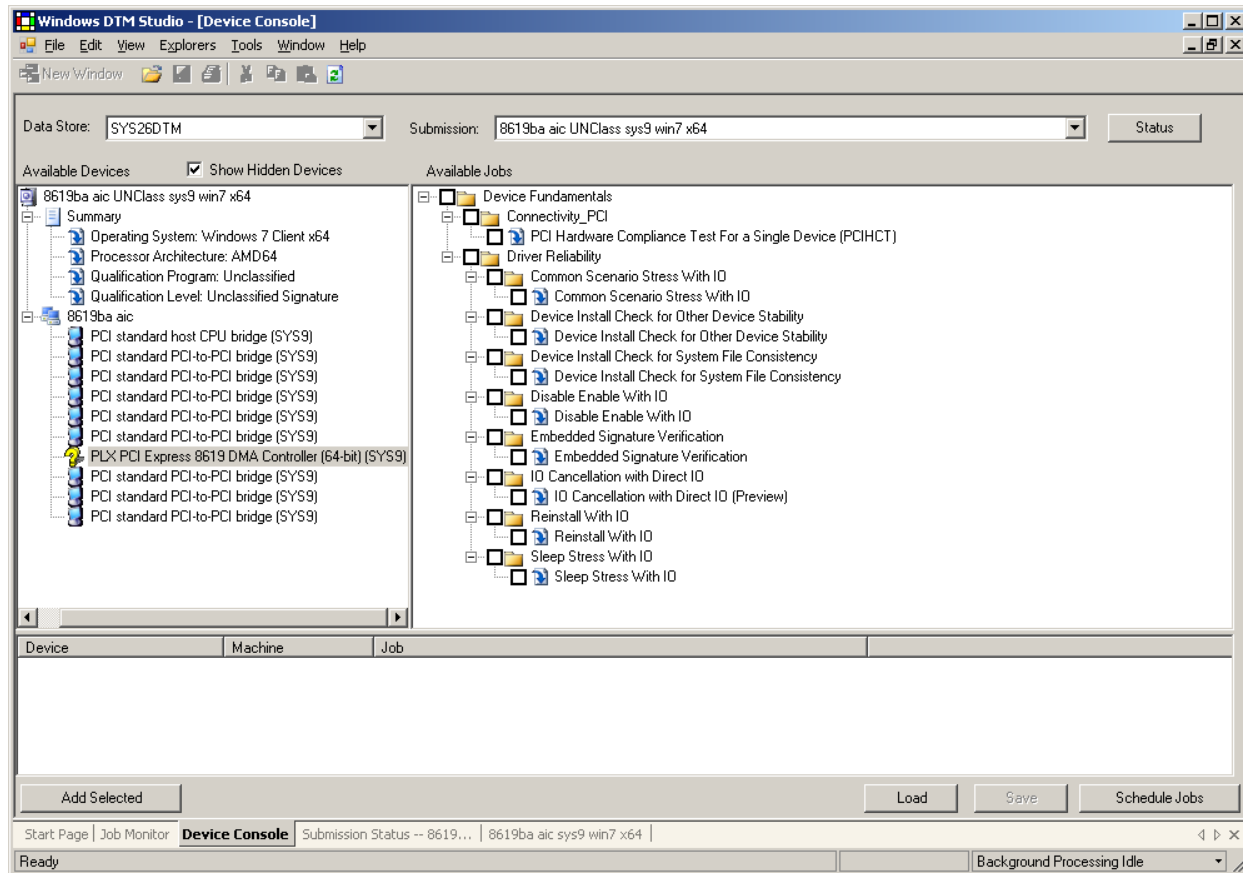
Figure 15. Sample DTM Studio Test Selections

Click to select the following tests. The following are exact test descriptions from Microsoft.

5.3.1.1 Common Scenario Stress with IO

The Common Scenario Stress with IO job ensures that the device-under-test accepts and correctly handles numerous Plug-and-Plays (PnP) and power management state change scenarios, including disable/enable and suspend/hibernate/wake scenarios. Additionally, this job ensures that the device is still functional after these state changes through Simple IO stress testing.

5.3.1.2 Disable Enable with IO

The Disable Enable with IO job ensures that the device can be disabled and enabled without error. Additionally, this job tries to ensure that the device is still functional after these changes in state through Simple IO stress testing.

5.3.1.3   Sleep Stress with IO

The Sleep Stress with IO job ensures that the device under test permits the system to be cycled through all supported sleep states. Additionally, it ensures that the device is still functional after these state changes through Simple IO stress testing.

5.3.1.4   PCI Compliance

The section tests for compliance to PCI Express 2.0 specifications.

5.3.2   Chip-to-Chip Interoperability

These section tests multiple plug-in RDKs together in a single motherboard slot.

5.3.2.1   PEX 8604 Switch RDK and PEX 8114BD Forward Bridge RDK

1. This test checks for chip-to-chip interoperability between a Gen 2 switch and a PCI-to PCIe bridge.
2. Select a target system. Make sure the system is completely powered OFF.
3. Install the PCI Express adapter PEX 8604 RDK into a free (unpopulated) motherboard PCI Express.
4. Connect the PEX 8114BD Forward RDK into one of the enabled port slot of the PEX 8604 RDK (the slot must match against the supported Configuration Modules of the PEX 8604 RDK). Use clamp stands, if needed, to secure and hold the RDKs in a secured, stable fashion. Connect power connectors onto the RDKs.
5. Reboot the system and run the following tests:
   a. Visual Link-Up Tests
   b. Device Manager Tests
   c. Video adapter Tests (connect the card to the PEX 8114BD RDK slot)
6. Record all test results and observations.

5.3.2.2   PEX 8604 Switch RDK and PEX 8532 RDK

1. This test checks for chip-to-chip interoperability between a Gen 2 switch and a Gen 1 switch.
2. Use the same procedures as with testing section 1 above.

5.3.3   Board-to-Board Interoperability

This section tests multiple plug-in RDKs in different motherboard slots.

5.3.3.1   PEX 8604 Switch RDK and PEX 8114BD Bridge RDK

1. This test checks for board-to-board interoperability between a Gen 2 switch and a PCI-to PCIe bridge.
2. Select a target system. Make sure the system is completely powered OFF.
2. Install the PCI Express adapter PEX 8604 RDK into a free (unpopulated) motherboard PCI Express.
3. Insert the second PEX 8114BD Forward Bridge RDK into a separate system that has a free PCI Express slot.
4. Connect the power connector to each RDK.
5. Reboot the system and run the following tests:
   a. Visual Link-Up Tests
   b. Device Manager Tests
6. Record all test results.

5.3.3.2   PEX 8604 RDK and PEX 8532 Switch RDK

1. This test checks for board-to-board interoperability between a Gen 2 switch and a Gen 1 switch.
2. Repeat the same procedures in section 1 above.

5.3.4   Fully-Loaded Configurations

This test loads as many different types of endpoints (which may include other PLX RDKs) as possible into the PEX 8604 RDK slots and stresses the board by running simultaneous traffic. Typically, video adapters, Ethernet adapters, and SCSI or Fibre Channel adapters are used together.

Fully-loaded configurations use multiple endpoints together, which individually have been qualified and passed with the RDK already. That is, the endpoints selected should have passed Phase 2 of the Endpoints tests.

1. Select and record the exact name and model of the selected endpoint (see Endpoints and Connectivity Kits list).

2. Fully load all the slots of the PEX 8604 plug-in RDK with endpoints. As a minimum, populate the RDK with one video adapter, one Ethernet adapter and one SCSI or FC controller adapter

3. Connect the video monitor to the video adapter endpoint, the Ethernet cable to the Ethernet endpoint and SCSI/FC disk drives to the SCSI/FC controller endpoint.

4. Power up the system and run the following tests:
   a. Visual Link-Up Tests
   b. Device Manager Tests
   c. Endpoints Tests
      o Video adapter tests
      o Ethernet adapter tests
      o SCSI/FC adapter tests

5. Record all observations and results.

SPECIAL NOTE: *Do not test each endpoint at a time. All endpoints (which should already be qualified individually in the Endpoints Test Section) must be connected to the PEX 8604 RDK at the same time and tested together as a unit.*

6 Test Results

Before testing begins, log all the equipment, and setup information. See the Software and Hardware Identification Information checklist attached. During testing, take detailed notes of all observations, symptoms, workarounds or other useful information for the follow-up or debug process.

6.1 Attachment A – Software and Hardware Identification Information

Fill in the table below with exact labels, versions used by the hardware and the software.

Table 1. Software and Hardware ID Information

Name	Version	Other Identification Information
PEX SDK	6.1	

RDK (board+chip)
   - PEX 8604 AIC
	- Board Serial No: 8604BAA-15090002
	   Chip markings: PEX8604-BA50BC
	                 0908
	                 N6A532.00EC-ES Taiwan	

Operating Systems
  - Windows XP
    Professional
  - Windows Server
    2003
  - Windows Vista
  - Fedora Linux
  - Red Hat Linux
  - Mac OS
  - Windows Server
  2008
  - Windows 7
	- Standard with Service Pack 3 (volume license)
	   with latest updates
	- Standard version with SP2 (volume license)
	
	- Standard and x64 bit Enterprise
	- Versions 8, 9, 10
	- Version 5.1 Server x86 DVD
	- Version X (Leopard) ver 10.4.11
	- Standard and x64 bit Enterprise
	
	- Release Candidate, Build 7100 04-30-2009	

WHQL test suites
  - Driver Test
    Manager (DTM)
	- WLK 1.2 with DTM Version 1.2.6475.0
	- WLK 1.4 with DTM Version 1.4.7100.000	

6.2 Attachment B – Motherboards and System BIOS

Table 2. Test Results Matrix for Motherboards and System BIOS

Test Category	System Number (Refer to Motherboards and Systems List Attachment) : Fill in Pass or Fail (P or F) For explanation details, refer to the Note Number after P or F below. NA = Not Available NT = Not Tested																			
	1	**2**	**4**	**5**	**11**	**12**	**14**	**15**	**21**	**23**	**24**	**27**	**28**	**31**	**32**	**35**	**36**	**37**	**38**	**39**
Visual Link-Up Test	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
OS Installation																				
• **Windows XP Pro**	P	P	P	P	P	P	P	P		P	P		P			P	P	P	P	P
• **Windows Server 2003**	P				P		P	P	P						P					
• **Windows 7 RC**				P												P	P			
• **Vista**	P	P			P			P	P		P			P						P
• **Mac X OS (Leopard)**														P						
• **Linux Fedora, Red Hat**	P		P		P		P	P	P		P					P	P			
• **Windows Server 2008**			P3		P					P			P							
- Windows: Device Mgr Detection	P	P	P		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
- Apple: Sys Profiler Detection														P		P				
- Linux: LSPCI Device Detection	P		P		P		P	P	P		P					P				
Slot Tests	P	P	P	P	P2	P	P	P	P	P1	P	P	P	P	P	P	P	P	P	P
PEX Editor Detection Tests	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Power Options under Win XP, or Vista or Win 7 RC																				
○ **Restart**	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
○ **Standby/Sleep**	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
○ **Hibernation**	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
○ **Shutdown**	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Notes: (Explain clearly below if there are any failures, exceptions or special notes from the matrix above.)

1. P1 Dell Precision 290: When the RDK is inserted into the light blue x16 PCIe slot, there is no video beep and no sign-on using with the existing PCIe video card. This is most likely a resource conflict issue. There is no problem with the other slots.

2. P2 ASUS P5N32-E SLI: This system reboots constantly when the RDK is inserted in the blue x16 PCIe slot. This is a known system resource issue when any card is inserted into the slot.

3. P3 ASUS Maximus: Windows Server 2008 does not boot unless the user hits F8 to disable driver signature enforcement.

6.3   Attachment C - Video Adapters

Table 3. Test Results Matrix for Video Adapters

Test Category	System Number (Refer to Motherboards and Systems List) : Fill in Pass or Fail (P or F) For explanation details, refer to the Note Number after P or F below. NA = Not Available NT = Not Tested															
	1	**4**	**5**	**6**	**7**	**11**	**12**	**14**	**15**	**19**	**20**	**21**	**24**	**26**	**31**	**34**	**35**
Video Adapter Tests																
Card Name & Model: NVIDIA 8800 GTS (Gen 2)																
Video display on the monitor		P1					P1			P1							P1
Driver installation		P1					P1			P1							P1
Driver detection (See Note 2 below)		P1					P2			P1							P1
Card Name & Model: ATI Diamond Radeon HD 3850 (Gen 2)																
Video display on the monitor							P1			P1							P1
Driver installation							P1			P1							P1
Driver detection							P1			P1							P1
Card Name & Model: ATI x1950 Pro Radeon																
Video display on the monitor							P1			P1							P1
Driver installation							P1			P1							P1
Driver detection							P1			P1							P1

Notes: (Explain clearly below if there are any failures, exceptions or special notes from the matrix above.)

1. P1 Disable onboard graphics – Modern system BIOS allow disabling or setting priority preference for PCI versus PCI Express video cards. To test PCI Express video cards, we disable the embedded graphics support of the system and/or give the highest priority to PCI Express devices.

2. P2 NVIDIA 8800 GTS – This video is first detected as Gen 1 PCIe mode until the driver is installed, which then upgrades the adapter to Gen 2 mode.

6.4 Attachment D - Ethernet Adapters

Table 4. Test Results Matrix for Ethernet Adapters

Test Category	System Number (Refer to Motherboards and Systems List): Fill in Pass or Fail (P or F) For explanation details, refer to the Note Number after P or F below. NA = Not Available NT = Not Tested																		
	1	**4**	**5**	**6**	**8**	**9**	**11**	**12**	**14**	**15**	**18**	**19**	**20**	**21**	**24**	**26**	**31**	**34**	**35**
Ethernet Adapter Tests																			
Intel Pro/1000 PT Dual Port Server																			
Driver installation							P2	P			P			P					P
Driver detection							P2	P			P			P					P
Web-page access							P2	P			P			P					P
DLINK – 560T																			
Driver installation							P2	P1	P1		P1			P1	P1				P1
Driver detection							P2	P1	P1		P1			P1	P1				P1
Web-page access							P2	P1	P1		P1			P1	P1				P1
Broadcom 5708 NEXTREME																			
Driver installation							P2	P			P				P				P
Driver detection							P2	P			P				P				P
Web-page access							P2	P			P				P				P
Intel 10 Gig XFSR Dual Port																			
Driver installation							P2	P	P		P				P				P
Driver detection							P2	P	P		P				P				P
Web-page access																			

Notes: (Explain clearly below if there are any failures, exceptions or special notes from the matrix above.)

1. P1 DLINK -560 Network Card – This video card is Gen 1 compliant and does not meet Gen 2 PCIe specs. The switch RDK must be put in Gen 1 mode by setting the RSV_17# switch for this adapter to work.

2. P2 ASUS P5N32-E SLI – System BIOS cannot enumerate all devices, citing "Not enough resources". This is a known BIOS limitation.

6.5 Attachment E - SCSI/FC HBAs and TV Tuners

Table 5. Test Results Matrix for SCSI/FC HBAs and TV Tuners

Test Category	System Number (Refer to **Motherboards and Systems List**): Fill in Pass or Fail (P or F) For explanation details, refer to the Note Number after P or F below. NA = Not Available NT = Not Tested																		
	1	**4**	**5**	**6**	**8**	**9**	**11**	**12**	**14**	**15**	**18**	**19**	**20**	**21**	**24**	**26**	**31**	**34**	**35**
SCSI/FC Storage HBA Tests																			
LSI SCSI 320-2E RAID Controller																			
Driver installation		P					P	P			P	P							P
Driver detection		P					P	P			P	P							P
Read/Write data files		P					P	P			P	P							P
Qlogic QLA-2462																			
Driver installation		P					P	P			P	P							
Driver detection		P					P	P			P	P							
Read/Write data files								P				P							
TV Tuner Tests																			
KWorld TV Tuner PVR-TV PE210																			
Driver installation		P						P			P	P							
Driver detection		P						P			P	P							
Video capture & display																			
Avermedia TV Tuner Combo																			
Driver installation		P						P			P	P							
Driver detection		P						P			P	P							
Video capture & display		P						P				P							

Notes: (Explain clearly below if there are any special notes, exceptions or failures in the test cases in the matrix above.)

6.6   Attachment F - WHQL Certification and Other Advanced Tests

Table 6. WHQL Certification and Other Advanced Tests

Test Category	System Number (Refer to **Motherboards and Systems List**): Fill in Pass or Fail (P or F) For explanation details, refer to the Note Number after P or F below. NA = Not Available NT = Not Tested																
	1	**4**	**5**	**6**	**8**	**9**	**11**	**12**	**14**	**15**	**18**	**19**	**20**	**21**	**24**	**26**	**31**	**34**
WHQL Certification	PASS. Use a single dedicated, Dell 670 WHQL-certified system . See detailed results in next section.																
Chip-to-Chip Interoperability																	
Configuration#1: 8604 & 8114																	
PEX Device Editor Detection	P							P	P		P	P		P	P			
Device Manager Detection	P							P	P		P	P		P	P			
Video Card (as endpoint) detection	P							P	P		P	P		P	P			
Configuration#1: 8604 & 8532																	
PEX Device Editor Detection	P							P	P		P	P		P	P			
Device Manager Detection	P							P	P		P	P		P	P			
Video Card (as endpoint) detection	P							P	P		P	P		P	P			
Board-to-Board Interoperability																	
Configuration #1 : 8604 & 8114	P							P	P		P	P		P	P			
Configuration #2: 8604 & 8532	P							P	P		P	P		P	P			
Fully-loaded Configuration																	
Video adapter: NVIDIA 8800 GTS							P	P				P						
Video adapter: NVIDIA Quadro NVS 290							P	P				P						
Video adapter: ATI VisionTek 9250							P	P				P						
Video adapter: ATI VisionTek 9250							P	P				P						
Ethernet adapter: Intel Pro100/1000							P	P				P						
SCSI/FC adapter: LSI Ultra320 SCSI 2000 series							P	P				P						

6.7   Attachment F - WHQL Certification Results for PEX 8604 RDK

Table 7. WHQL Certification Results for PEX 8604 RDK

RDK Manufacturer: PLX Technology   **Other Notes:** DTM 1.2.6475.0 _and 1.4.7100.000_____

Type (PCIe): PCI Express interface with 8604 Revision BA_____

Board Revision: 8604BA-17090001_Add-In Card_____

Controller System : Dell Precision 670, Xeon 2.8 GHz, 1 Gigabytes memory, Windows Server 2003_____

Client System: Dell T7400, Intel Xeon CPU E5405, 1 Gigabytes DDR2, Vista Ultimate_____

Test Category	Pass/Fail Results	Notes
Common Scenario Stress With I/O	PASS	Run in automated mode
Disable Enable With IO	PASS	Run in automated mode
Sleep Stress With IO	PASS	Run in automated mode
PCI compliance Test Suite	PASS	Run in automated mode

Notes: (Explain clearly below if there are any special notes, exceptions or failures in the test cases in the matrix above.)

7 Test Equipment

7.1 Motherboards and System BIOS

Table 8. List of Motherboards and their Key Information

System #	Motherboard	Root Complex	CPU	BIOS	PCI Express Slots	Operating System
1	**ASUS (Gen 2)** M3A32-MVP Deluxe AMD X2 2 GB DDR2, PC2-5300	AMD Northbridge RD790 Southbridge SB600	AMD	**AMI** Version: 0603 11/26/2007	4- x16	Windows XP Pro SP3 Vista Enterprise
3	**ASUS (Gen 2)** Maximus Formula 512 MB DDR2 PC2-6400	Intel Northbridge X38 rev. 01 Southbridge 82801 (ICH9 rev. 01)	INTEL	**AMI** Version: 0505 10/12/2007	2- x16 3- x1	Windows XP Pro SP3 Vista Enterprise
4	**ASUS (Gen 2)** Maximus Formula 512 MB DDR2 PC2-6400	Intel Northbridge X38 rev. 01 Southbridge 82801 (ICH9 rev. 01)	INTEL	**AMI** Version: 0505 10/12/2007	2- x16 3- x1	Windows XP Pro SP3 Vista Enterprise Fedora Core Linux 8 Windows 2008 Server
5	**ASUS (Gen 2)** P6T Intel Core i7 CPU 920 @2.67GHz 12 GB DDR3	Intel Northbridge X58 rev.12 Southbridge 82801JR (ICH10R) rev. 00	Intel	**AMI** Version: 0507 04/28/2009	3- x16 1- x1	Windows XP Pro SP3 Vista Ultimate with SP1 Windows 7
6	**GIGABYTE** GA-P35-DS3L Duo Core E6420 2 GB DDR2 SDRAM 333	Intel Northbridge P35/G33/G31 rev. 02 Southbridge ID2918 rev. 02	INTEL	**PHOENIX AWARD** Version: BIOS F5 09/07/2007	3- x1 1-x16	Windows 2003 Server SP2 Standard and Enterprise Fedora Core Linux 8
7	**HP** Proliant ML 115 G1 Dual Core Opteron 1210 1 GB DDR2 300	Nvidia Northbridge nForce 570 SLI rev. A2 Southbridge nForce 570 SLI rev. A3	AMD	**HP** Version: 011 03/10/2007	2-x8 1-x16	Windows 2003 Server SP2 Windows 7
11	**ASUS** P5N32-E SLI Core 2 Duo E6600 DDR2, PC2-6400, 4 Gigabytes	Intel Northbridge nForce 680i SLI SPP rev. A2 Southbridge 680i SLI MCP rev. A2	INTEL	**PHOENIX** Version: 1002 03/28/2007	3-x16 1-x1	Windows XP Pro SP3
12	**ASUS P5E (Gen 2)** Intel Core 2 Duo E6850 2 GB DD2 PC2-5300	Intel Northbridge X38 rev. 01 Southbridge 82801Ib (ICH9) rev. 02	INTEL	**AMI** Version: 0203 10/11/2007	2- x16	Windows XP Pro SP3 Vista Enterprise
13	**ASUS** P5WDG2 WS Pro Intel Pentium 4 530 2 GB DDR2	Intel Northbridge i974X rev. C0 Southbridge 82801GB (IXH7) rev. 01	INTEL	**AMI** Version: 0803 03/01/2007	2-x16	Windows XP Pro SP3
14	**AMD (Gen 2)** Shiner 512MB DDR2 PC2-4300	AMD Northbridge ID9600 rev. 00 Southbridge ID 439D rev. 00	INTEL	**AMI** Version: 080014 12/07/2007	2- x16 1- x1	Windows XP Pro SP3 Vista Enterprise Windows 2008 Server
15	**AMD (Gen 2)** Hammerhead 4 GB DDR2, PC2-4300	AMD Northbridge RD790 Southbridge AIT SB600	AMD	**AMI** Version: 080014 08/14/2007	4- x16 1-x1	Windows XP Pro SP3 Vista Enterprise Fedora Core Linux 8

System #	Motherboard	Root Complex	CPU	BIOS	PCI Express Slots	Operating System
18	**MSI (Gen 2)** K9N2 Diamond Athlon 64 X2 Dual Core 3600+ 8 GB DDR2	Nvidia Northbridge nForce 780a SLI SPP rev. A2 Southbridge nForce 780 SLi MCP rev. A2	AMD	**AMI** Version: 2.0 04/10/2008	3- x16 1- x1	Windows XP Pro SP3 Vista Ultimate SP1
19	**AMD** Platform Tigris Bali Mobile Reference Platform S2g3 dual core AMD 64 processor 4 GB DDR3, PC2-6400	AMD North bridge RD880M rev A11 Southbridge SB710 rev A14	AMD	**PHOENIX** Version: PBA1128a 11/28/08	1- x1 3- PCIe minicard	Vista Ultimate SP2 Windows 7
20	**ASUS (Gen 2)** Rampage Formula Intel Core2 Quad CPU Q9550 @ 2.8GHz, Socket 775 LGA, Yorkfield	Northbridge Intel X48 rev.01, Southbridge Intel 82801R (ICH9R) rev.02	INTEL	**AMI** 04/03/08	2- x16 2- x1	Windows XP Pro SP3 Vista Ultimate SP1 Vista Ultimate x64 SP1
21	**HP** Workstation XW 8200 Intel Xeon, 3.2 GHz Cranford 5GB SDRAM	Intel Northbridge E7525 Southbridge 82801EB (ICH5) rev. 0C	INTEL	**HP** Version: 786B8 v2.10 5/31/2006	1- x16 1- x1	Windows Server 2003 (Standard and Enterprise) Windows Server x64 for 2003 Fedora Core Linux 9 Red Hat Linux 5.1
23	**DELL** Precision 690 Xeon 5110 Woodcrest 4 Gigabytes	Intel Northbridge 5000X rev. 12 Southbridge 6321ESB rev. 09	INTEL	**DELL** Version : A05 05/24/2007	3-x8 1-x16	Windows XP Pro x64 Windows Server 2008
24	**GIGABYTE** GA-965P-S3	Intel Northbridge 965P Southbridge ICH8	INTEL	**PHOENIX AWARD** Version F6, 10/12/2006	1- x16 3- x1	Windows XP Pro SP3 Fedora Core Linux 8
26	**ASUS** P5W64 WS	Intel Northbridge 975X Southbridge ICH7R	INTEL	**AMI** Version: 02.58	4- x16	Windows XP Pro SP3
27	**INTEL (Gen 2)** Tylersburg B2 PDK platform Socket 775 LGA, 1600 MHz DDR3 PC3-6400E (400Mhz) Elpida	Intel Northbridge Intel ID3400 rev.00 Southbridge Intel 82801B (ICH9) rev.02	INTEL	**INTEL** Version: TCV023_CRB	1- x16 3- x8	Windows Server 2008 x64
29	**DELL** PowerEdge 2900 Xeon 5150 Woodcrest 7 GB DDR2	Intel Northbridge Intel 5000X rev. 11 Southbridge Intel 6321ESB rev. 09	INTEL	**DELL** Version: 1.1.3 08/21/2006	4-x8	Windows Server 2003 SP2
31	**APPLE** Mac Pro Xeon 5130 Woodcrest 4 BG DDR2	Intel Northbridge 5000X rev. 31 Southbridge 632ESB rev. 09	INTEL	**APPLE** Version: MP11.88Z.005D.B00.0709141354 09/14/2007	4-x16	Apple Mac OS X (Leopard) Vista Ultimate
35	**DELL (Gen 2)** T7400 1 GB DDR2	Intel Northbridge ID4003 rev. 20 Southbridge 6321ESB rev. 09	INTEL	**DELL** Version: A00 11/05/2007	2-x16 1-x8	Vista Ultimate SP1 Windows Server 2008

System #	Motherboard	Root Complex	CPU	BIOS	PCI Express Slots	Operating System
36	**HP (Gen 2)** Workstation XW4600 1 Gigabytes	Intel Northbridge X38 rev. 00 Southbridge 82801IB (ICH9) rev. 02	INTEL	**HP** Version: 786F3 v1.06 01/29/2008	2-x16 1-x8 1-x1	Vista SP1 Windows XP Pro SP3 Windows 7
38	**GIGABYTE (Gen 2)** Gigabyte GA-EP45-DS3R/DS3 Intel core 2 Duo CPU E4500 @ 2.20GHz, Socket 775 LGA, Conroe	Intel Northbridge ID2E20 rev. 02 Southbridge ID3A16 rev.00	INTEL	**Phoenix Award** Version: F4 05/28/2008	2-x16 3-x1	Windows XP Pro SP3
39	**PORTWELL** Nano 8044 Intel Atom CPU Z510@ 1.10 GHz Socket 437 FCBGA8	Intel Northbridge ID8100 rev. 06 Southbridge ID8119 rev. 06	INTEL	**AMI** Version: 080015 10/28/2008	1-x1	Windows XP Pro SP3 Vista Ultimate SP1
40	**AMCC** Power PC 460EX Evaluation Kit (up to 1.067 GHz), 512 MB DDR2 SDRAM	AMCC Power PC	AMCC	**Software Support:** Resource CD, Denx CD	1-x1 1-x4	Embedded Linux
41	**FREESCALE MCEVALHPCN-8641D** Power PC 1.0 GHz to 1.5GHz DDRII 600 MHz ECC Compatible 4GB of RAM	Freescale MPC8641D (dual core) South Bridge: ULI 1575	FREESCALE	**Software Support**: U-Boot bootloader, CodeWarrior Development Studio v8.8 Rev D Build 80229, Linux BSP, and DINK Debugger	1-x16	GNU/Linux Kernel 2.6.23
42	**FREESCALE PPCEVAL-DS-8572B** Dual e500 Core Power PC 1.5 GHz	Freescale MPC8572B	FREESCALE	**Software Support**: U-Boot bootloader, CodeWarrior Development Studio v8.8 Rev D Build 80229, Linux BSP, and DINK Debugger	2-x16	GNU/Linux Kernel 2.6.23
43	**FREESCALE –DS-8536** E500 Core Power PC 1.5 GHz	Freescale MPC8536	FREESCALE	**Software Support**: U-Boot bootloader, CodeWarrior Development Studio v8.8 Rev D Build 80229, Linux BSP, and DINK Debugger	3-x16	GNU/Linux Kernel 2.6.23
44	**FREESCALE MPC8544DS** E500 Core Power PC 1.067 GHz	Freescale MPC8544DS	FREESCALE	**Software Support:** U-Boot bootloader, CodeWarrior Development Studio v8.8 Rev D Build 80229, Linux BSP, and DINK Debugger	2-x16	GNU/Linux Kernel 2.6.23
46	**AMD (Gen 2)** Pufferfish AMD Phenom II X4 910 Processor @ 2600.0 MHz 2 GB DDR3 memory, PC3-10700H 667 MHz	AMD Northbridge ATI ID5A11 rev. 00 Southbridge ATI SB700 rev. 00	AMD	**AMI** Version: 080014 10/31/2008	2-x16 1-x4	Vista Ultimate SP1 Windows XP Pro SP3
47	**CAVIUM NETWORKS** EBH Octeon CN5650 -NSP Pass 2.1 Core clock: 800 MHz, DDR clock: 399 MHz DRAM: 4096 MB Flash: 8 MB	Cavium Networks CN 5650 processor	Cavium Networks	**Cavium Networks** U-Boot 1.1.1	1-x1	Fedora Core Linux 8 Fedora Core Linux 10

7.2 Endpoint Devices and Connectivity Kits

Table 9. List of Endpoint Devices and Connectivity Kits

Device Category	Product Manufacturer	Model Name/Number	Product Details	System Interface	Software Drivers and/or Drivers
Graphics adapters	BFG Technology	GeForce 8800 GTX	575 MHz core clock; 900 MHz memory clock; support for both Microsoft® DirectX 10 and DirectX 9; PureVideo™ HD[2] technology	PCI Express	ForceWare Release 158 Version: 158.22 Release Date: May 17, 2007
	NVIDIA (Gen 2)	GeForce 8800 GTS Alpha Dog Edition	NVIDIA graphics card PCI Express 2.0 512 DDR3, Order code PV-T88G-YDF4, GF 88000GTS 650M 512MB DDR3 DUAL PCI TV PCI-E, S/N.IXF229432	PCI Express	Driver CD xfx Play Hard version 169.06, s/n door card, DVI adapter, quick install guide, Company of heros cd game pak.
	Kaser	GeForce 6600	NVIDIA CineFX 30 engine; 256 MB ; Duall 400 MHz RAMDACs; OpenGL support	PCI Express	NVIDIA ver N.5.II.I
	Kaser	Radeon x300SE	ATI Radeon (VPU) ; 128 MB system memory; 15 VGA connector; S-Video/composite connector, DVI connector	PCI Express	International Installation CD ver A5.7.1
	PNY Technologies	GeForce 6600	NVIDIA SLI Ready and CineFX 3.0 Engine; 300 MHz core clock, 128-bit DDR memory interface 256 MB DDR; VGA + DVI+HDTV/S-Video Outputs	PCI Express	Verto GDRV-7777
	ATI	Diamond Stealth Radeon X300SE	ATI Radeon; 128 MB /Mo Hypermemory; requires 420 W power supply or higher; Dual monitor Display	PCI Express	ATI Catalyst drivers v 6.0
	NVIDIA	Quadro NVS-280	Microsoft-certified component; integrated component of Dell Precision 670	PCI Express	Nv4-disp.dll Ver 6.14.0010.6127
	NVIDIA	PCI Express 6200	GeForce 6 Series Turbocache	PCI Express	ForceWare Release 80 Ver 84.21
	NVIDIA	Quadro NVS-440	256 DDR3 memory, 4 x DVI-I , 1920x1200; BIOS ver 5.43.02.88.03	PCI Express	Drivers CD ver 81.67
	NVIDIA	Quadro FX 3700	512MB, 256-bit, 112 CUDA processor cores, Dual-link DVI, PCIe 2.0 support, SLI technology	PCI Express	Drivers Release 182 Version: 182.65 Release Date: 05-04-2009
	Matrox	Millenium P650 P65-MDDE128F	128 MB memory	PCI Express	Matrox Parhelia Series & Matrox P-Series
	Matrox	M9125	512 MB memory	PCI Express	Windows XP Driver: 2.08.00.074 SE U WHQL, dated Jun. 5, 2009
	Connect 3D	ATI Radeon X1600 series. C3D 3050	512MB GDDR2+DVI+TV	PCI Express	CD=Connect 3D, Graphics card driver Version 10.4
	ATI	X1950 Pro 256 MB	Dual GPU PCIe x16 Video card with two DVI-I and one S-Video connector outputs. Requires 6-pin external power.	PCI Express	CD 100 180-G01513-100 ATI Catalyst Software
	ATI	ATI Radeon x700 series.	One DVI output and one VGA output; ASIC type RV410 with x16 card edge	PCI Express	Display driver for Windows XP; version 7.8, August 13, 2007

Device Category	Product Manufacturer	Model Name/Number	Product Details	System Interface	Software Drivers and/or Drivers
	ATI (Gen 2)	Diamond Radeon HD 3850 Gen 2 PCIe x16 Video cards AMD/ATI ASIC is RV670	GPU PCIe x16 Video card with two DVI-I and one S-Video connector outputs. Does require a 6 pin external power connecter.	PCI Express	CD version 3.0 p/n.34083, with Quick Start guide., 1 ATI Crossfire cable, 1 s-video to rca out connector adapter, 1 s-video to rca composite video out adapter, 2 DVI to VGA adapters.
	AMD (Gen 2)	Diamond Radeon HD 4870 Gen 2 PCIe x16 video cards	Dirext 10.1, CrosfireX Ready, 512 MB , GDDR5, 2560 x1600 maximum resolution	PCI Express	AMD Catalyst Software Suite version 8.9
	S3 (Gen 2)	Chrome 540GTX 256MB GDDR3 DVI/HDMI	PCIe Gen 2 x16, Chromotion™ Video Engine, DirectX® 10.1, Shader Model 4.1, 1920x1080p HD resolution	PCI Express	Microsoft Certified Driver 6.14.10.0270 April 30, 2009
Ethernet Cards	HP	Broadcom NetXtreme	Gigabit PCI-E	PCI Express	Broadcom NetXtreme Ethernet drivers v 8.1
	Broadcom	BCM5708A0804F long low profile	Single port. 10/100/1000Base-T	PCI Express	Broadcom NetXtreme Ethernet drivers v10.12.01, 3/13/2007
	Broadcom	BCM5751PKFBG	Single port. 10/100/1000Base-T SP #393626-001 Short low profile cards.	PCI Express	Broadcom NetXtreme Ethernet drivers v10.24D, 2/1/2007
	Dlink	DGE-560T	Gigabit PCI-E Ethernet adapter; support 10/100/1000 Mbps transfer rate; low-profile; 256 MB memory	PCI Express	Wired Ver 1.00
	SysKonnect	SK-9E21D SK-9E22	10/100/1000Base-T Adapter; auto-detect, 802.3ab, u, ad, 802.1pq; ACPI 2.0 compatible; up to 133 MHz Bus Speed; PCI 2.3 compliant Dual-port version	PCI Express	Installation CD V 4.33
	Silicom	BCM5714CKPBG	Single-port, x1 lane, Low profile	PCI Express	Installation CD PxGx rev 9.0.5
	Intel	Pro/1000 Dual Port PT	Gigabit copper for servers	PCI Express	Intel Ophir drivers
	Intel	10 Gig XFSR	Dual Port Server Adapter	PCI Express	Intel 10 Gig drivers
	Silicom	Dual-port 10 Gigabit Ethernet (SR)	Intel® 10 Gigabit XF SR Dual Port Server Adapter	PCI Express	Intel 10 Gigabit XF SR Ethernet Version 13, 4/10/2008
TV Tuner Cards	KWorld	TV Tuner PVR-TV PE210	PCI- Dual Hybrid _ LP; Philip SAA 7162E/G; Dual Analog Card PVR	PCI Express	PCI-E Dual Version F; CD Software Hypermedia KW v1.01; SoundMAX Digital Audio v5.12.1.3620 5/27/2003
	Avermedia	TV Tuner AverTV Combo	NTSC/ATSC Combo Desktop TV	PCI Express	Avermedia Driver Installation XP v2.5; Aver TV AP6 Application ver 6.0.7
HBAs & Storage Controllers	Qlogic	QLA-2432	PCI Express Gigabit Fibre channel adapter; using FW 4.00.12	PCI Express	SAN Surfer Management Suite (SMS) ver 2006
	Emulex	LP1050EX-F2	PCI Express Single Port Fibre Channel adapter	PCI Express	CD- Technical Information and Drivers 04-334 07/2004 FC1061802-00R
	Emulex	LP11002	PCI Express Dual Port Fibre Channel adapter	PCI Express	Windows 2003 Server Driver 5.2.41a1-1b
	Emulex (Gen 2)	LPE12000	PCI Express Single Port Fibre Channel adapter; 8 Gig/sec FC data rate; 5 Gig/sec at PCIe 2.0 with x4 lanes	PCI Express	Storport Minidriver v. 2.00a12 for Windows Vista FC port driver 2.42a0 for Windows Server 2003
	SIIG	SATA II PCIe RAID	SATA II PCIe RAID adapter ; compliant to PCI-e base spec 1.0a; low-profile; uses Silicon Image SIL 3132	PCI Express	SIIG SATA II PCIe RAID v12.3.1
	LSI Logic	LSI22320 MegaRaid	Ultra-320 SCSI Host Bus Adapter	PCI Express	Driver 1.20.18 for Win XP

Device Category	Product Manufacturer	Model Name/Number	Product Details	System Interface	Software Drivers and/or Drivers
	Fusion IO	FS1-001-081-ES-0001	80 GB x4 PCIe RAM Disk Drive; Single Level Cell NAND	PCI Express	Driver r1.2.5 for Windows XP – 64 bit
Connectivity Devices and Kits	DLink	DGS-1008D	8-port gigabit switch; 10/100/1000Mbps switched ports; IEEE 802.3 flow control for full duplex	Not applicable	Not Applicable
	Linksys	EXHUB12S	Stackable Ethernet 100Base TX-12-Port Hub	Not applicable	Not Applicable