PEX 8114BA RDK
Interoperability
Test Procedures

Interoperability Lab

Version 1.1

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PLX Technology, Inc, 870 W. Maude Avenue, Sunnyvale, CA 94085, Phone 408-774-9060, Fax 408-774-2169

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1 PURPOSE

This document details interoperability test procedures for the PEX 8114 bridge RDK (Rapid Development Kit).

2 PRODUCT INFORMATION

The PEX 8114 is a high performance bridge designed to the PCI Express-to-PCI/PCI-X Bridge Specification 1.0 enabling designers to migrate legacy PCI and PCI-X bus interfaces to the new advanced serial PCI Express. This 2-port device is equipped with a standard but flexible PCI Express port that scales to x1, x2 or x4 and a parallel bus segment supporting the advanced PCI-X protocol or conventional PCI operation. The PEX 8114 is capable of operating as a transparent bridge in either forward or reverse mode.

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 8114 RDK is properly detected and works with the different motherboard chipsets, CPUs, BIOS, and drivers.

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

Phase 3: Chip-to-chip Interoperability and WHQL Certification – This phase tests multiple PEX 8114 RDKs, other bridge and switch RDKs. Microsoft WHQL certification for video cards is done as well.

One or more of the following Microsoft operating system are used as the software platform: Windows XP Professional, Windows Server 2003, Windows Server x64 for 2003, or Windows Vista.

Special 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 is tested by the validation teams. By default, hot-plug functionality is not enabled in the RDKs. Also, some endpoints and system BIOS do not support Hot-Plug.

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2. Power Management Tests: Power management is tested as part of Microsoft's WHQL certification.

3. Serial EEPROM Tests – In-depth serial EEPROM tests are tested as by the validation teams. For interoperability, the EEPROM is used and tested within the context of the PEX GUI software.

4. JTAG Header - JTAG is not used for interoperability.

5. Targeted WHQL Certification – WHQL certification is done using one (1) selected video card as an endpoint. System certification and qualifying other endpoints, such as ethernet cards, SCSI and FC HBAs are outside the scope of this document.

6. Linux and other UNIX flavors - there are no industry-standard test suites available for Linux PCI-Express components. Also, Linux flavors require building and compiling separate drivers for specific applications.

4 PRETEST REQUIREMENTS

4.1 Collaterals

The following items are required to complete the tests.

1. PEX 8114 RDKs: - PEX 8114 BA Forward
   - PEX 8114BA Reverse
2. PCI PEX 8xxx SDK: - Low-Level Application Software for Bridge/Switch Devices
3. System Platforms: - See Motherboards and Systems List.
4. Video Adapters: - ATI VisionTek 9250 PCI
   - Matrox Millenium P650 PCI-Express
   - Nvidia NVS 440 PCI-Express
   - Nvidia GeForce MX4000 PCI
   - Nvidia NVS-280 Quadro PCI-Express (WHQL certification only)
5. Ethernet Adapters: - Intel Gigabit Ethernet PCI-Express (Ophir)
   - Intel Gigabit Ethernet PCI-X
   - Broadcom Nextreme PCI-Express,
   - Broadcom Nextreme PCI-X
   - SysKonnect 9E21D PCI-Express
   - SysKonnect 9S21D PCI-X
6. SCSI HBAs: - LSI Logic 22320 PCI-Express
7. FC HBAs: - Qlogic QLA2462 PCI-X
   - Qlogic QLA2432 PCI-Express

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8. TV tuners: - Hauppauge Win TV 2000 TV Tuner
9. Other RDKs - PEX 8111 Rev 3 Reverse
   - PEX 8532 Switch

4.2 Other Documentation

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

1. Hardware Reference Manuals:
   - Forward Mode Ver 2.0 March 2006
   - Reverse Mode Ver 2.0 April 2006
2. PEX SDK User's Manual
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 include: software and driver versions, system BIOS settings, RDK configurations (jumpers and switch settings), PCBs identifications, chip markings and auxiliary software utilities.

The following is an example.

	Version	**Other Identification Information**
PEX SDK	1.2.0	
RDK (board+chip) - 8114BA (Reverse)	- Board Serial No: 0001 Chip markings: PEX8114-BA13BES 0608 L G65349.1 Malaysia EEPROM version: F2P1	 P/N: 90-0051-100-A SMT028705-0014
- 8114BA (Forward)	- Board Serial No: SN 161 Chip markings: PEX8114-BA138BES 0608 L G5349.1 Malaysia EEPROM version: F2P1	P/N 90-0052-100-A SMT025337-0048
Operating Systems - Windows XP Professional - Windows Server 2003 - Windows Server 2003	 - Standard with Service Pack 2 (volume license) - Standard version (volume license) - Standard x64 version (volume license)	 - MSDN product keys - MSDN product keys - MSDN product keys
WHQL Test Suite	- HCT ver. 12.1.01 - DCT ver. 5.3	

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

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4.4 System BIOS Settings

Modern PC test system have system BIOS that allows the user to configure specific settings. These settings, ranging from video displays to power management, work with the operating system to take advantage of powerful features of the hardware components .

It's critical that the System BIOS is properly configured. RDKs may not work at all or work in an unpredictable, if the settings are incorrect or suboptimal. 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.

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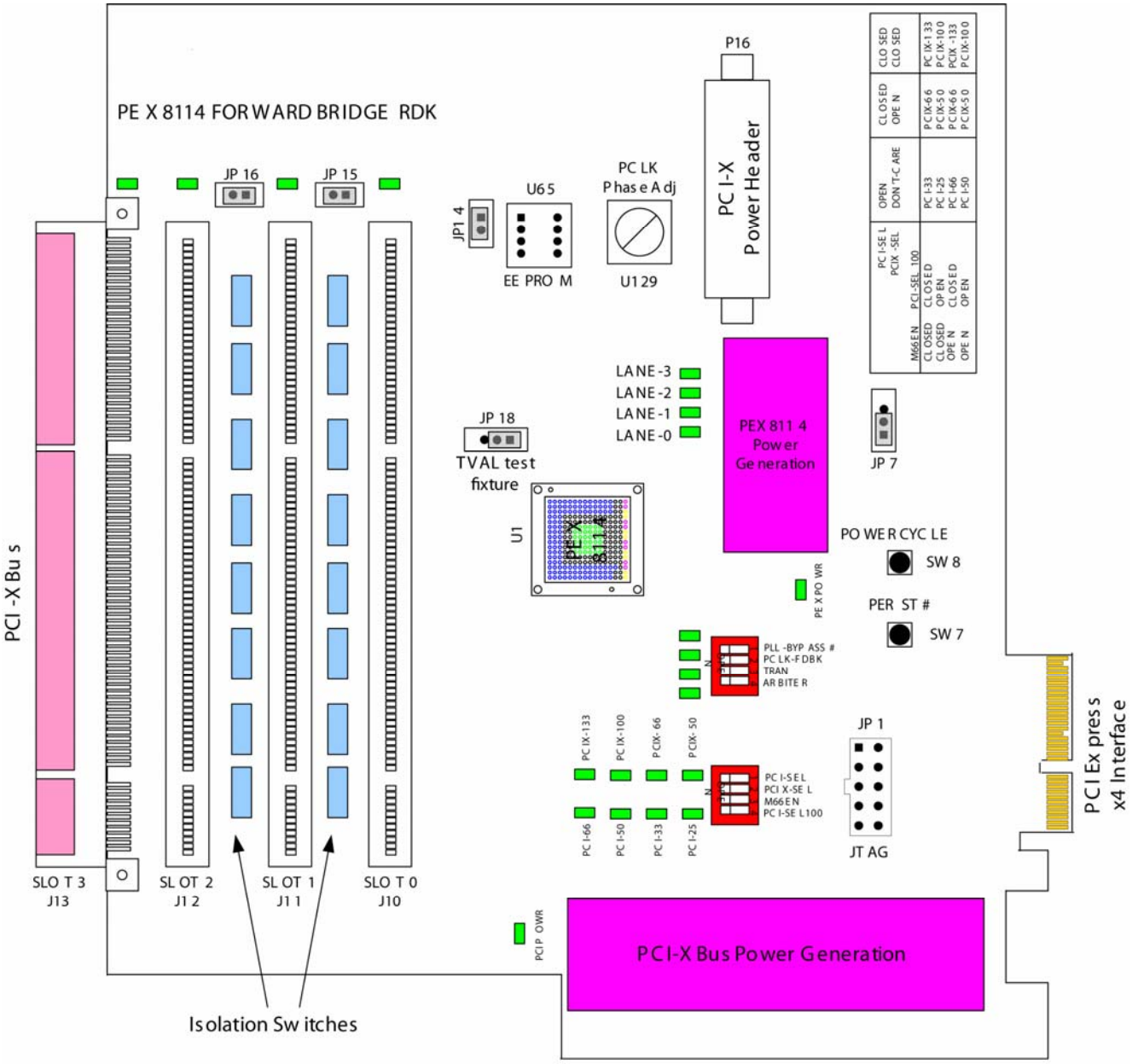
System #	Bios Revision	Category/Subcategory and Parameter Settings
1	Phoenix Award BIOS v6.00PG 7100NMS V3.7 123104	PnP/PCI Configuration → Primary Graphic Adapter [First PCIE] → Maximum Payload Size [128] Cell Menu → PCI-E Spread Spectrum [Disabled] → PCIE Clock [100]
2	Phoenix Server 3 BIOS V6.; X6DAE-G BIOS Revision 1.2	[BIOS settings to be analyzed]
3	Award AX8 BIOS 11 Version: 11K8T890-8237	Advanced Chipset Features → Init Display First [PCI Ex] → PnP/PCI configurations → Max Payload Size [128]
4	Phoenix Award BIOS V6.00PG NVIDIA BIOS V4.9x 4/26/2005-NF-CK804-6A61FS02C-00	Advanced Chipset Features → System Performance [Optimal] → PCI-E Spread Spectrum [Disabled] Integrated Peripherals → Init Display First [PCI Express]
5	AMI BIOS SE7520BD2.86B. P.08.20.0072	Advanced → PCI configuration → Dual Mode Video [Disabled] Integrated Peripherals → Init Display First [PCI Express]
6	AMIBIOS, P5GDC-V Deluxe ACPI BIOS Revision 1011.006	Advanced → Chipset → Graphic Adapter Priority [PCI-Express/ Int–VGA] → PEG buffer length [Auto] → Link latency [Auto] → PEG Root control [Auto] → Slot Power [Auto]
7	Phoenix AWARD BIOS V6.00PG 2/10/05-i925x-W83627-6A79FA19C-20	Advanced Chipset Features → PCI Express Root Port Function → PCI Express Port 1 [Auto] → PCI Express Port 2 [Auto] → PCI Express Port 3 [Auto] → PCIE Compliancy Mode [v1.0a] → Init Display First [PCIEx] PnP/PCI Configurations → Maximum Payload Size [128]
8	Phoenix AWARD BIOS V6.00PG; P8SGA BIOS Revision 1.1; 03/29/2005-Grantsdale-6A79DSX9C-00	Advanced → Advanced Chipset Control → PEG/PnP chip VGA Control [PEG Port] → PnP/PCI Configurations → Init display First [PCI-Exp] → Maximum Payload Size [128] → PCI-Express Root Port Function → PCI Express Port 1 [Auto] → PCI Express Port 2 [Auto] → PCI Express Port 3 [Auto] → PCI Express Port 4 [Auto] → PCI E Compliancy Mode [v1.0a] → Process & Clock Option → Spread Spectrum [Disabled]
9	Phoenix AWARD BIOS V6.00PG; V3.8 07/21/2005	Advanced Chipset Features → LDT & PCI Bus Control → LDT configuration [ENABLED] → Upstream LDT Bus Width [16 bit] → Downstream LDT Bus Width [16 bit] → LDT Bus Frequency [800 MHz] → PCI Reset Delay [Disabled] → Spread Spectrum [Disabled] Integrated Peripherals → Init Display First [PCI-E] PnP/PCI configuration → Maximum Payload Size [128]
10	Phoenix Award BIOS Revision 6.00PG; 1/23/2006-i955-W627EHF-6A79IA1AC-16	Advanced Chipset Features → PCI Express Root Port Function → PCI Express Slot 1 [Auto] → PCI Express Slot 2 [Auto] → PCI Express Compliancy Mode [v1.0a] → PEG Force x1 [Disable] → Init Display First [PCI-e] PnP/PCI Configuration → Maximum Payload Size [128]
11	Phoenix AWARD BIOS	MB Intelligent Tweaker [MIT] → PCI-E Overvoltage Control [Normal]

	V6.00PG; Intel I945 BIOS 8I945P-G2 F10	
12	Phoenix Award BIOS V6.00PG; 04/25/2005-M1695+M1567-6A7400-AC-00	Integrated Peripherals → Init Display First [PCI Express] PnP/PCI Configurations → PCI BAR Above 4 GB [Enabled] → Maximum Payload Size [128] Frequency/Voltage control → Programming Clock Generator [Enabled] → CPU Clock [200] → PCI-E Clock [100] → Spread Spectrum [Disabled]
14	AMI BIOS WPLI751.86P 10/13/2005 SMBIOS v2.3	Chipset → Northbridge configuration → Integrated Graphics Options → Primary Video Device [External PEG] → PCI Express configuration → Northbridge PCI Express → PEG Port [Auto] → PEG Scrambler Bypass [Disabled] → PEG Force x1 [Disabled] → PEG Link Disabled [Disabled] → PEG Isoch Flush Page [Enabled] → PEG Active State PM [Disabled] → PEG Endpoint Active State PM [Disabled] → SERR # on Non-Fatal Error [Disabled] → HNR Stability Algorithm [Enabled] → Southbridge PCI Express → PCI Express PME SC1 Enabled [Enabled] → PCI Express (1-6) [Enabled] → Root Port ASPM [L1/L0s] → DMI Active State PMI [L0s] → VCI for HD Audio [Enabled] → Northway Training W/A [Auto] → Northway S4 W/A [Disabled] → Select System/Device Setup → Select Port to Control [All Ports] → Device Control Register → Correctable Error Reporting [Enabled] → Non-Fatal Error Reporting [Enabled] → Fatal Error Reporting [Enabled] → Unsupported Req Error Reporting [Enabled] → Root Control Register → Correctable Error Reporting [Enabled → Non-Fatal Error Reporting [Enabled] → Fatal Error Reporting [Enabled] → PME Interrupt Enabled [Enabled] → PCI Express Wake [Enabled] → PCI Express SCI [Enabled] → Completion TimeOut (CTD) [Enabled] → VC1/TC MAP [TC7] → Remove Non-POR TCs from VC0 [Enabled] → LOCK PCIe Credits Registers [Disabled]
15	Phoenix Ltd 6.00 PG 10/11/2005 SMBIOS 2.2	PnP/PCI configurations → Init Display First [PCI Express] → Maximum ASPM supported [Los & L1] →Maximum Payload Size [128\ Frequency → Spread Spectrum [Disabled] → Auto Detect PCI Clock [Enabled]
17	DELL Bios Revision A03	
18	Intel BIOS CV92510A.86A.0477	Advanced → PCI Express Configuration → PCIE x16 Link Retrain [Enabled] → Link Stability Algorithm [Enabled] → Compliance Test Pattern [Enabled] → Video Configuration → PCIE Graphics [PEG]

4.5 Physical Layouts of RDKs

PEX 8114 Forward Bridge RDK



Figur e 1. PEX 8114RDK-F – Component Side View

PEX 8114 Reverse Bridge RDK

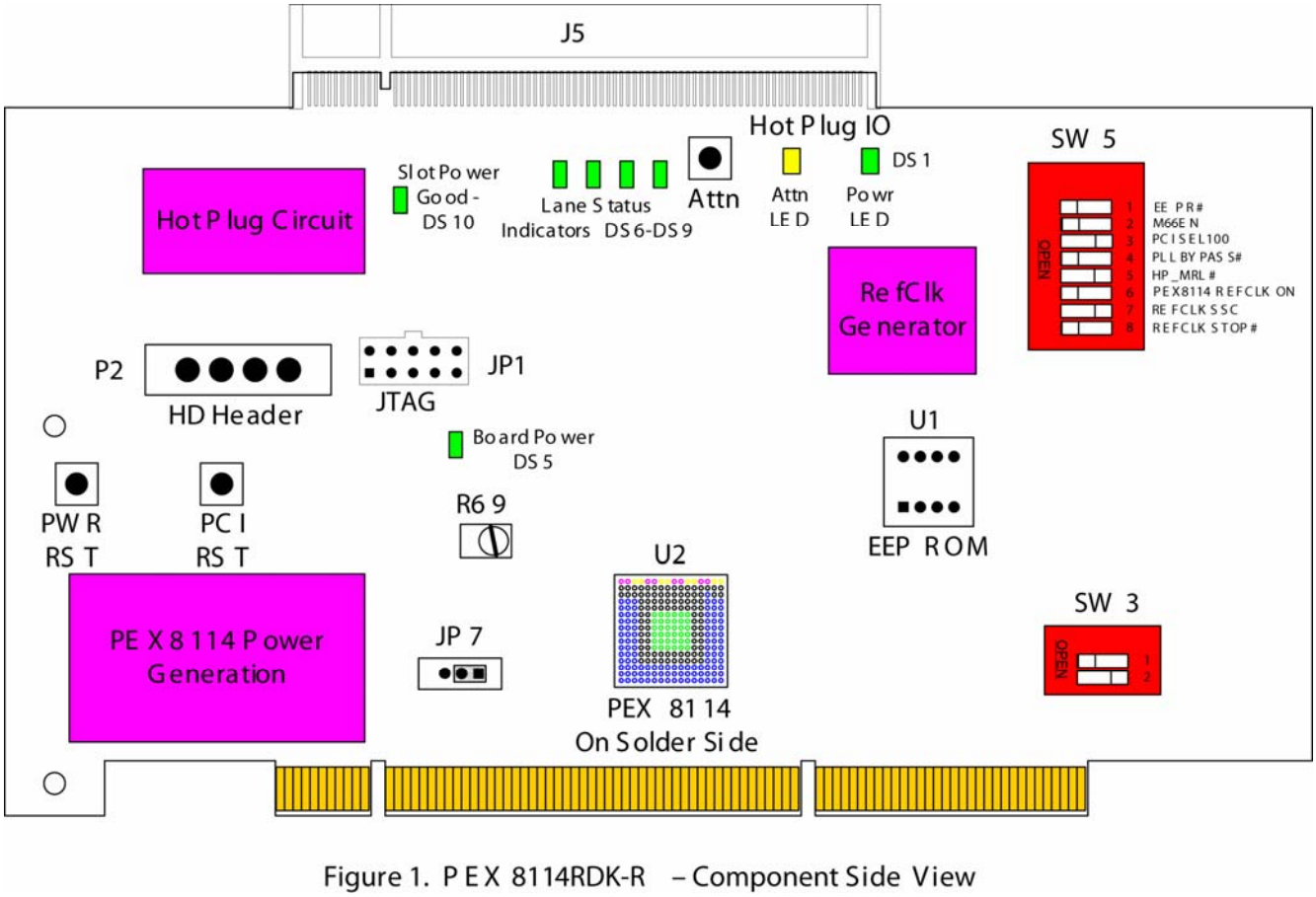


Figure 1. PEX 8114RDK-R – Component Side View

4.6 RDK Default States

(Per the RDK Reference Manual, the following are default states)

Forward PEX 8114 RDK	Reverse PEX 8114 RDK
SW9: PLL BYPASS # = OPEN PCLK-FDBK = OPEN TRAN = OPEN ARBITER = OPEN SW10: PCI-SELl PCIX-SEL M66EN PCI-SEL100	SW5: EE PR# = OPEN M66EN = OPEN PCI SEL100 = CLOSE PLL BYPASS# = OPEN HP_MRL # = CLOSE PEX8114 REFCLK ON = OPEN REFCLK SSC = CLOSE REFCLK STOP # = OPEN
JP14: NO EEPROM PRESENT = NO JUMPER	SW3: (1:2) – OPEN, OPEN -> PCI-X 100/133 (1:2) – OPEN, CLOSED -> PCI-X 66 (1:2) – CLOSED, DON'T CARE -> PCI

	JP7 (2:3) – Last two pins to control V_{TT} value

Unless specified otherwise, default settings are used for all interoperability.

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 8114 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)
   - Formatted and partitioned internal ATA hard disk with at least 40 Gigabytes
   - At least 1 Gigabytes of memory and a Pentium 4 or equivalent CPU
   - PEX 8xxx 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).
6. Record all findings and work with engineering groups to resolve problems found.

Tests for the Forward RDK apply similarly to the Reverse RDK. Unless specified otherwise, the test descriptions below apply to both boards.

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.

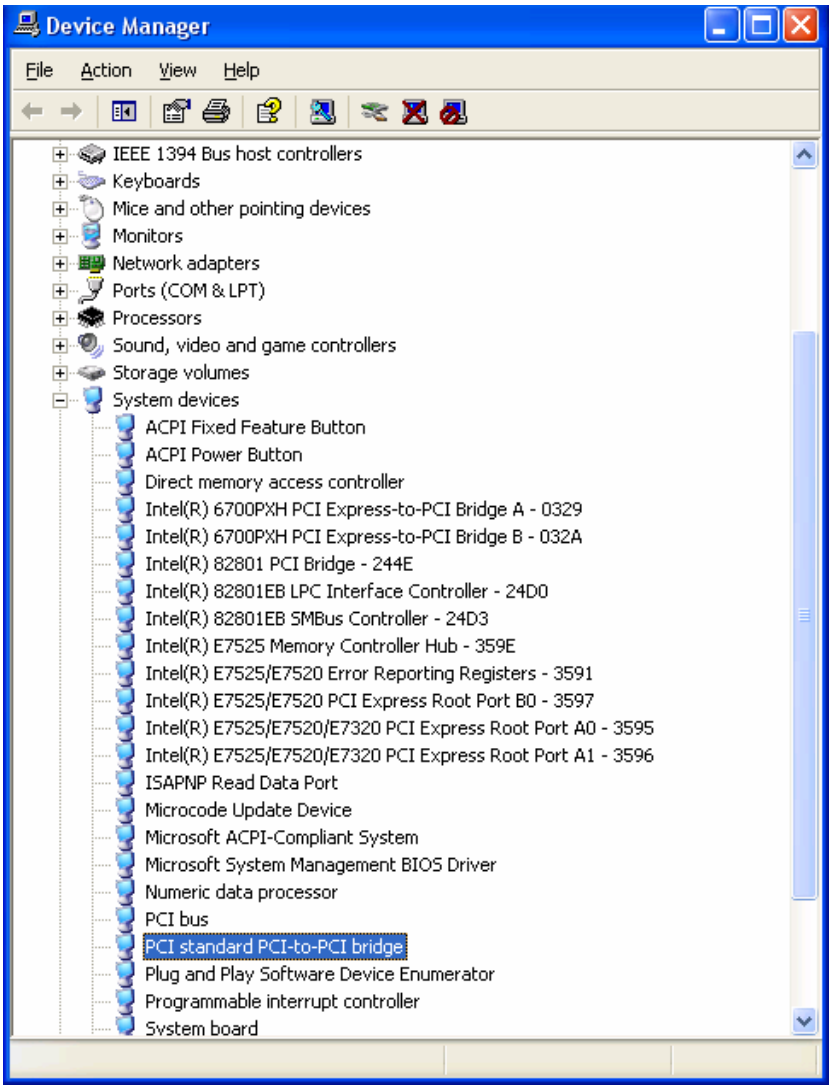
1. If the RDK is a Forward board, test in systems that have PCI-Express slots. If the RDK is a Reverse board, test in systems that have PCI-X slots. See the Motherboards and System BIOS list.
2. Make sure the system is fully powered OFF first.
3. Install the RDK into an available slot. Connect the power connector.

4. Turn on the system and monitor the RDK's LEDs. When lighted green, these diagnostic CLOCK FREQUENCY LEDs indicate proper LINKUP and LANE GOOD status. Verify the LEDs against their functional assignments from the Hardware Reference Manual. Refer to the the silkscreen table stamped on the PCB to quickly change and set the switches and jumpers.

5.1.2 Device Manager Detection Tests

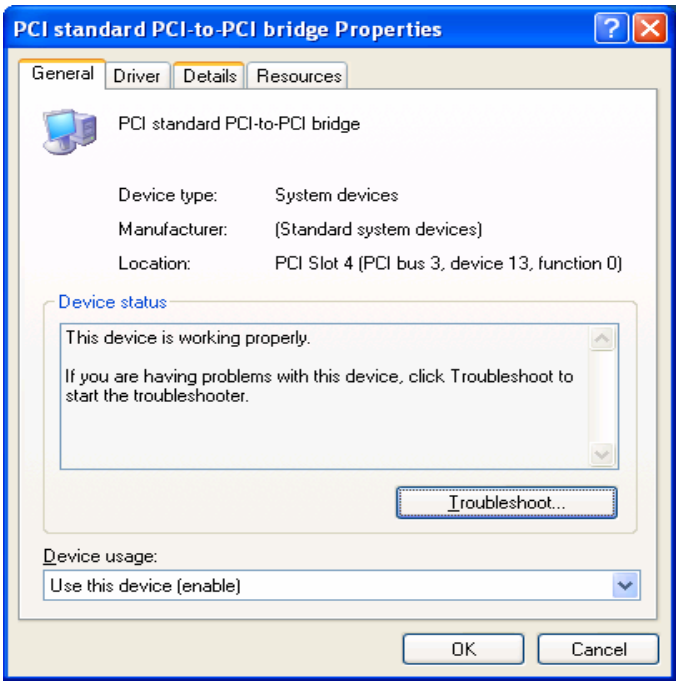
These tests verify RDK detection at the operating system level.

1. Go into Control Panel → System → Device Manager. Select the View tab, right click to choose DEVICE BY TYPE.
2. Under "System Devices", verify that a category called "PCI standard PCI-to-PCI bridge" appears.



Move the cursor over the "PCI standard PCI-to-PCI bridge" item, and right click. A small menu box appears.

Select “Properties” and the following window displays.



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.

The next window displays the following.

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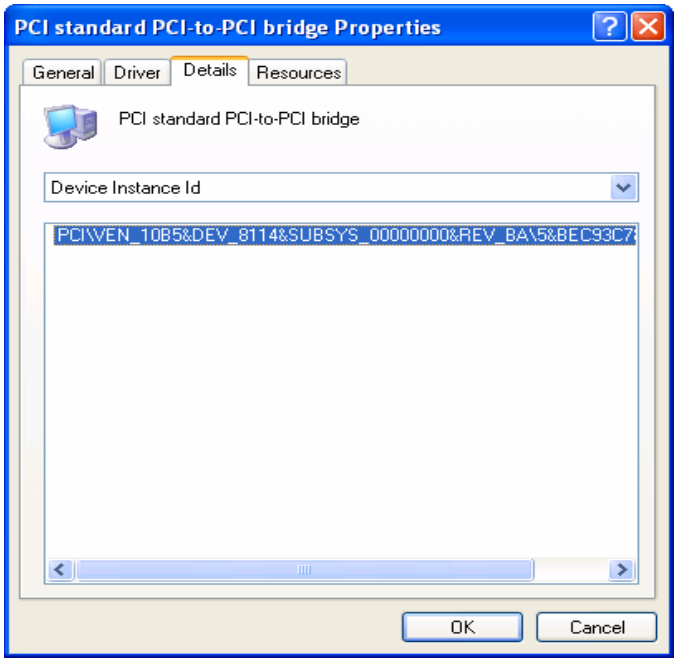


Verify the vendor ID of 10B5 and chip ID of 8114.

5.1.3 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. Note that if there are multiple slots having the same lane widths, 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.

5.1.4 PEX GUI Tests

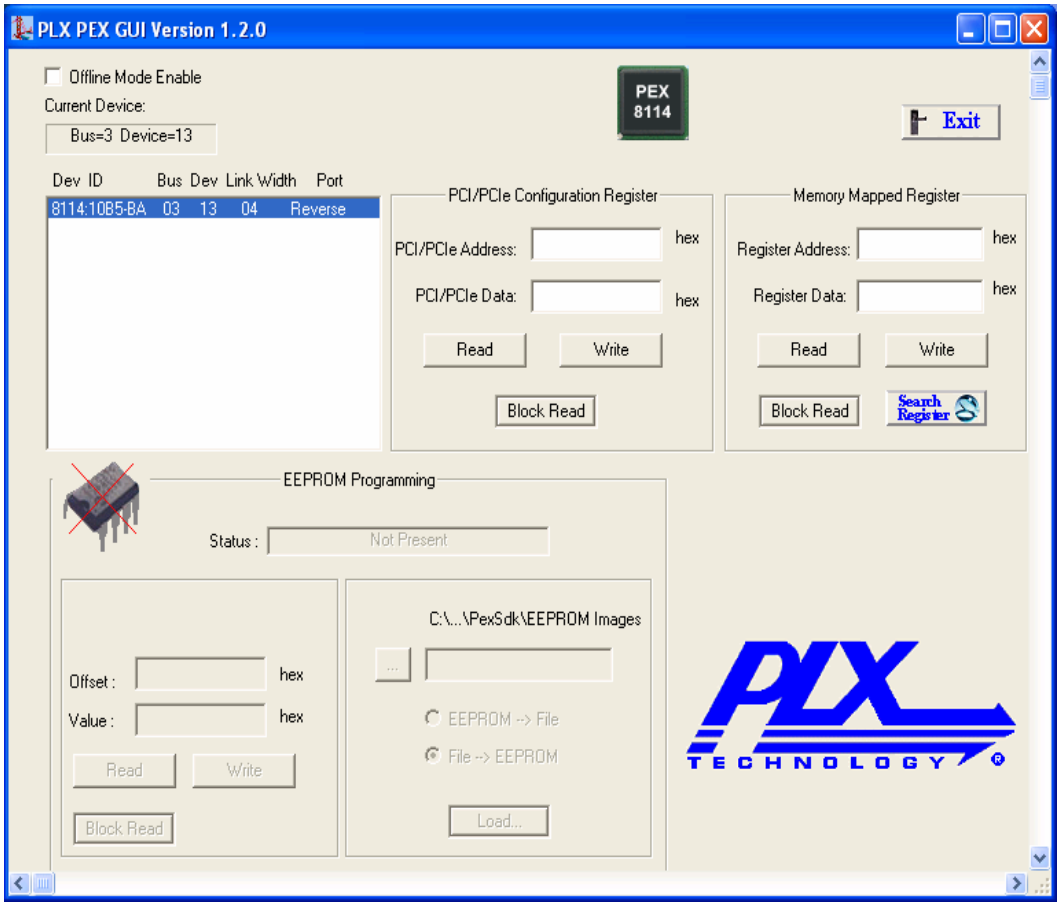
The PEX GUI is a graphical interface provided as part of the SDK software to configure, control, and get status of the RDK hardware.

The PEX GUI 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 8000 GUI to launch the PEX GUI. The following window appears.



Refer to this screen for the tests described below.

A. Detection

See highlighted item in the above. On the left pane is a smaller box showing the detected device. Check the device ID, Bus, Device Number, Linkwidth and port. Record this information and compare it against the slot number /bus number/ device number/ function number recorded earlier from the Device Manager Tests.

Note: The PEX GUI software should display all the upstream and downstream ports it found during the enumerated process. Count the total times these ports are displayed. This number should equal to the total number of ports of the RDK.

B. 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. Block Read PCI/PCIe Configuration Registers

a. Look at the middle box of the screen above, labeled "PCI/PCIe Configuration Registers".
b. Type in "0" in the PCI/PCI-Express Address category.
c. Click on Block Read. 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 first byte shows "8114". 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. Block Read Memory-Mapped Registers

a. Look at the right box of the screen above, labeled "Memory Mapped Registers". Type in "0" in the Memory Mapped Register.
b. Click on Block Read.
c. Check to ensure the first byte shows "8114".
d. Change the offset addresses and the block size and you can 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 Programming Status

a. Regardless of the EEPROM image used, a correctly programmed EEPROM is critical for proper RDK operations.
b. To check the EEPROM Status, look at the "EEPROM Programming" field part of the figure above screen.
c. If the EEPROM is enabled, it should display something similar to "Present, CRC=oxZZZZZZZZ (Good)" with CRC being the Cyclic Redundancy Check. If it's not properly programmed, "Bad CRC" status is displayed.
d. Record any status message displayed.

4. EEPPROM Programming

This utility is shown at the bottom of the screen above. Only test this function if you need to program a new image (from a downloadable network site or saved directory) or save the current one. Simply type in the name of the image; copy the image to a file or vice versa.

5.2 Endpoints

This category requires testing both the PEX 8114 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.

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Select and test the endpoints behind the switch or bridge in all provided port modes (x1, x4, x8, x16). Depending on whether the DUT 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 or PCI-X slot. Connect external power to board.
2. Connect one (1) endpoint device to 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 8114 RDK. The focus is on qualifying 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 System Frequency Tests

The PEX 8114 supports various PCI and PCI-X system frequencies. Proper frequency settings are critical for linkups, slot assignments and system operation. See the Hardware Reference Manual. The table below summarizes the slot operations of the Forward RDK.

Clock Frequency	**RDK Slot Usage (see specific RDK for location)**
100 to 133 MHz	Only Slot 0 is used
66 to 100 MHz	Only Slots 0 and 1 are used
66 MHz and Below	All four slots can be loaded

A. Comprehensive Frequency Tests

The goal is to select one system and thoroughly test out all frequency settings.

1. Record the system number used.
2. Select and record one endpoint (video card or Ethernet card) from the Collaterals List.
3. Connect the endpoint to the PEX 8114 BA bridge and insert the entire unit into an available PC system slot.
4. For the Forward RDK, install entire unit into the x16 PCI-EXPRESS slot. For the Reverse RDK, install the entire unit into any 64-bit PCI-X slot.
5. Reboot the system and run the following tests:
   a. Visual Link-up Test
   b. Device Manager Tests (see procedures below)

c. Video Adapter Tests (see procedures below)
d. Ethernet Adapter Tests (see procedures below)
e. SCSI/FC Adapter Tests (see procedures below)

B. Default Mode Frequency Test

With the PEX 8114 bridge in the default frequency mode (i.e PCI-X 66 MHz), run Phase 1 and Phase 2 across all systems and endpoints.

5.2.2 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 reenumerated 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. For the Forward RDK, do the following:
   a. Select a PCI-X video card from the list of video cards to be tested.
   b. Insert the Forward board into a free (unpopulated) motherboard's PCI-Express slot.
   c. Connect the Power Connector to the Forward Board.
   d. Insert the video card in any one of the PCI-X slot 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.
3. For the Reverse RDK, do the following:
   Insert the board into the PCI-X slot of the motherboard and use the PCI-Express video card. Use DVI-OUT connectors if necessary.

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

A. 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 driver automatically or detects a new device and requests for a driver.

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

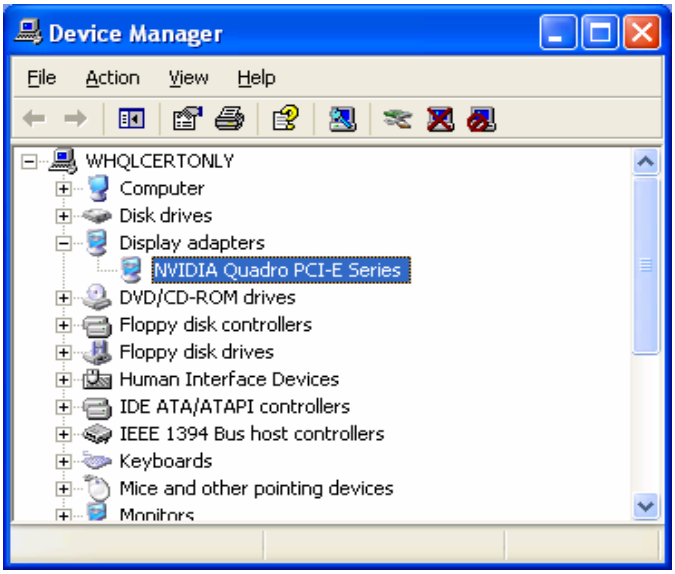
B. Driver installation& updates

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

C. 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.

The following screen shows how a Nvidia video is detected and displayed.



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

5.2.3 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.

A. 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.

B. Driver detection & 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

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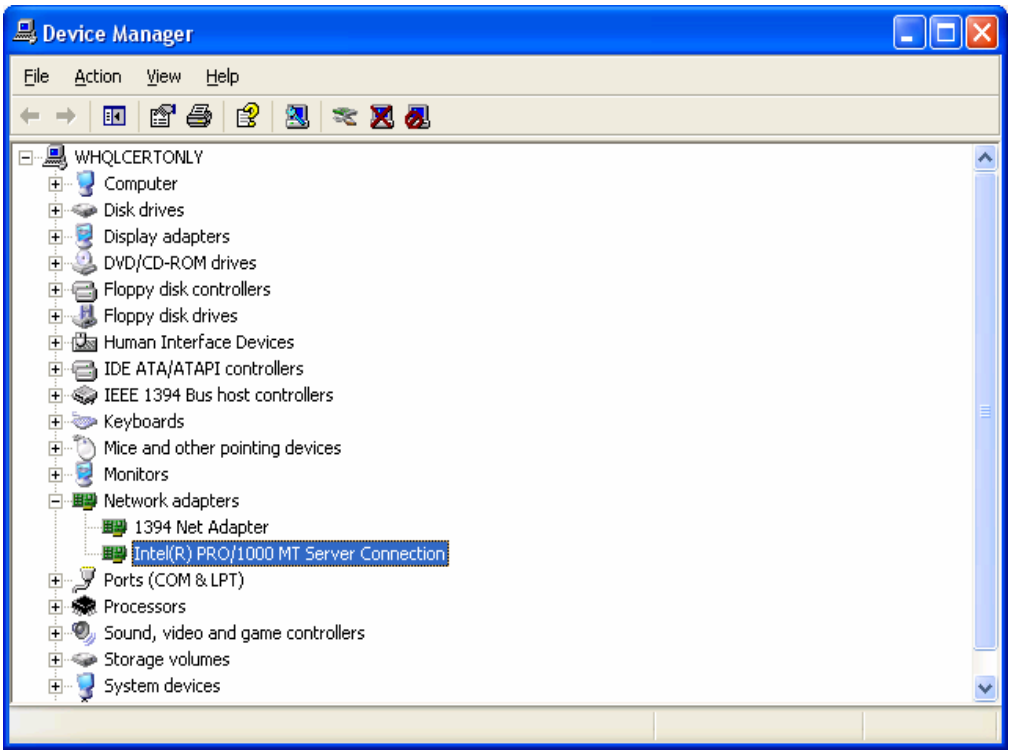
are either resource conflicts or the driver does not detect or load properly or the driver is disabled.



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

C. 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, to ensure network transmission and reception.

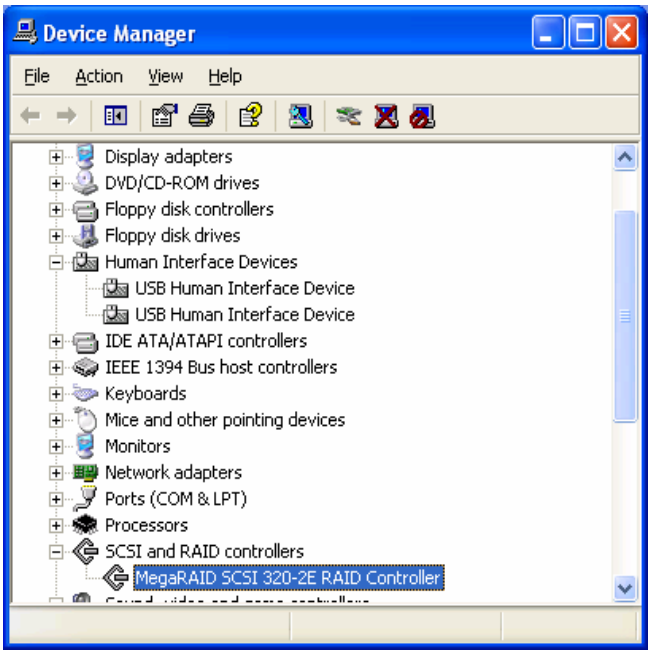
5.2.4 SCSI or Fibre-Channel HBA Tests

A. 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.

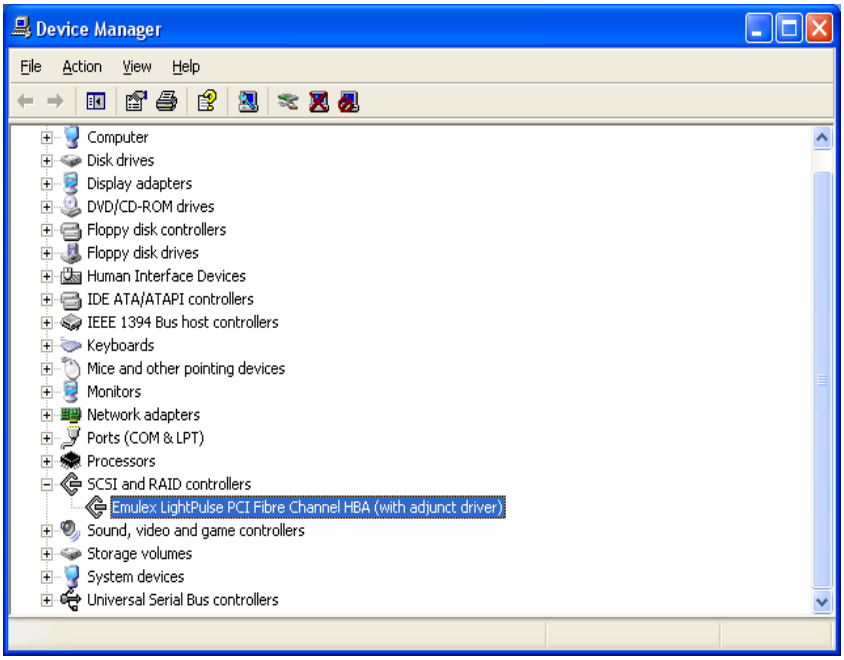
B. Driver detection

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. The following screen illustrates the LSI Logic SCSI Raid Controller detection.



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.

The following screen illustrates the Emulex Fibre-channel HBA detection.



C. 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 properly, 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 for reading and writing files. Run the 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.

D. Automated Stress Tests

1. Use Microsoft WHQL tests to run stress tests. Stress tests continuously run read/write operations and log errors for later review. This is ideal for long-term or overnight testing.
2. Load the HCT 12.1 into the test system. Select either the SCSI or Fibre-channel adapter category. Select STRESS TESTS and launch the RUN TESTS option.
3. Record all test results and observations.

5.2.5 TV Tuner Cards

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

Interoperability testing focuses on simple capture and display features only

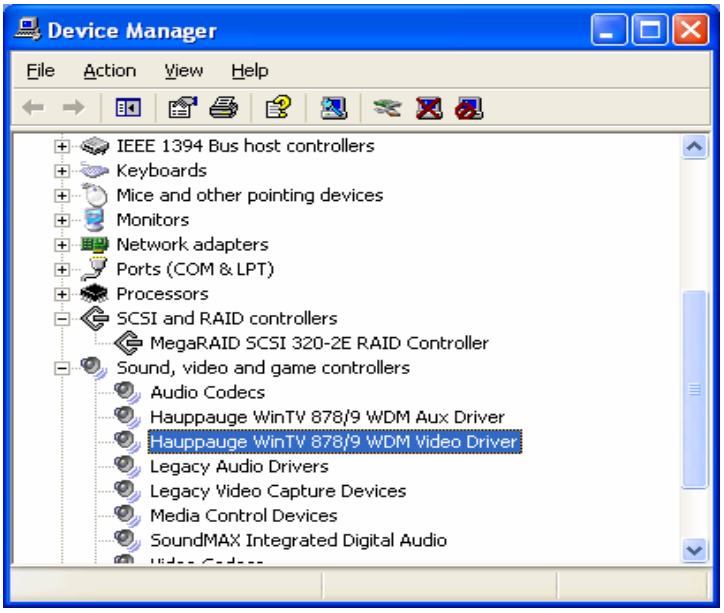
TV tuner cards install similarly to video cards or ethernet card or SCSI/FC cards. However, TV tuner cards require an external power source, so use the correct adapter and connect to power jack on the back of the card.

A. 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.

B. 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. The following screen shot illustrates the Win TV 2000 TV tuner card.



C. Video Capture and Display

TV tuners require video capture and display software. For example, Hauppauge TV tuners requires 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 a Micrsoft application software. Launch it by double-clicking the application.
3. A new screen box appears as below.

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4. Click on the first button (TV Mode) and the camera starts the capture.
5. Record all results and observations.

5.3 WHQL Certification and Other Advanced Tests

This phase focuses on running Microsoft WHQL DCT tests, chip-to-chip and board-to-board interoperability.

WHQL tests are highly dependent on the exact type and configurations of the system and endpoints. As a result, only run the WHQL test suite a certified, dedicated system only. There is no need to run WHQL tests across all systems.

Use a prequalified video adapter as an endpoint. Collect and log the following information using the WHQL Certification checklist:

- System information – CPU, CPU speed, front side bus, memory size, chipsets, operating system and version
- Endpoints information – serial number and model of the card, PCB revision, date code, driver name and version

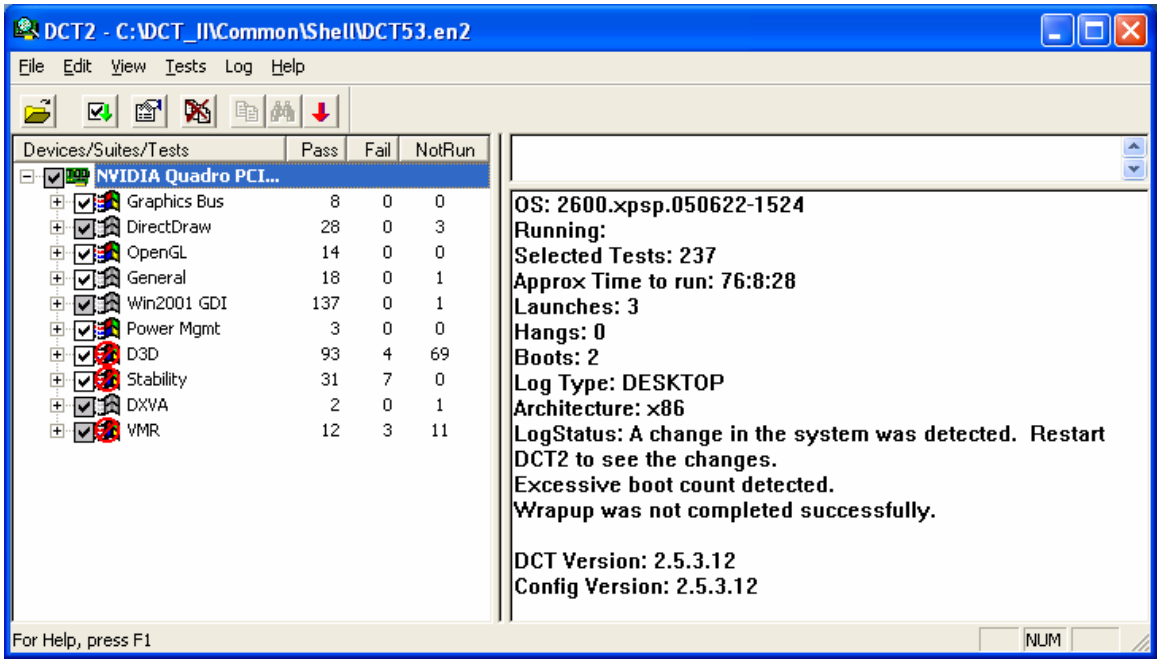
5.3.1 Video Adapter Certification

The WHQL-certified system should be preinstalled with DCT 5.3 (Display Compatibility Software which runs video adapter tests). DCT 5.3 test suite is identified by the DCT II logo installed on the desktop of the machine.

1. To begin, click the “DCT II” logo. All tests, logs and status information are saved in the c:\DCT_II folder. If this is the first time the board is installed, the software executes an overall detection phase to register all the installed component classes of the entire system.
2. Connect the to-be-certified video card (namely, the Nvidia Quadro PCI-Express video card) to the PEX 8114 Reverse RDK. DCT 5.3 allows running automated tests with different video categories. Set the test suite in the automated more and let the test run. The entire test suite runs for approximately 3 days if there are no problems. If there are failures, test logs automatically record them for further analysis.

3. Record all test results and observations.

Analyzing WHQL results requires consideration experience. Consult an experienced engineer to interpret test results.



A. Auto mode

1. Under “Tests” menu, click Select Auto. Use this mode to run all test categories without user intervention. All categories should be checked automatically.
2. Click on “Tests” again, and select “Run Selected Tests”. Once the tests are completed, the left pane shows the numbers of instances of Pass, Fail, Not Run.
3. For all logged failures, rerun those tests without the switch or the bridge board. Testing without the RDK serves as a base reference.
4. Check the Microsoft website or the video card manufacturer’s website to see if the problem is already known or a waiver is in place.
5. Compare failures for those tests run with and without the RDK. If there is a difference, then alert the applications engineer.

B. Manual mode

Only use this mode if running the Auto mode yields failures. To run manual tests, do the following:

1. Under “Tests” menu, click specific tests which have failures.
2. Under the same tab, select the “Run Manual Tests”. This mode only runs those checked tests and starts the log for those tests only. Use this mode for debugging or to rerun specific tests.

5.3.2 Chip-to-Chip Interoperability

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

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A. PEX 8114 Forward Bridge RDK and PEX 8111 Reverse Bridge RDK

1. Select a target system. Make sure the system is completely powered OFF.
2. Insert the PEX 8114 RDK into a free (unpopulated) motherboard PCI-X or PCI-Express x1 slot. Use the Catalyst x1 adapter if needed.
3. Connect the PEX 8111 Reverse RDK into the top port slot of the PEX 8114 RDK. That is, the PEX 8111 RDK is "on-top" of the PEX 8114 RDK. Use clamp stands, if needed, to secure and hold the RDKs in a secured, stable fashion. Connect power connectors onto the RDKs.
4. 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-8111 RDK slot)
5. Record all test results and observations.

B. PEX 8532 Switch and PEX 8114 Bridge

Use the same procedures as with testing the PEX 8111 bridge RDK above.

5.3.3 Board-to-Board Interoperability

This section tests multiple RDKs in different motherboard slots.

A. PEX 8114 Forward Bridge RDK and PEX 8518 Switch RDK

1. Select a target system. Make sure the system is completely powered OFF.
2. Insert the PEX 8114 Forward RDK onto a free (unpopulated) motherboard PCI-Express x1 slot. Use the Catalyst x1 adapter if needed.
3. Insert the PEX 8518 Switch RDK into a separate system that has a free PCI-Express x1 slot.
4. Connect power connector onto the RDKs.
5. Reboot the system and run the following tests:
   a. Visual Link-Up Tests
   b. Device Manager Tests
6. Record all test results and observations.

B. PEX 8114 Forward Bridge RDK and PEX 8111 Bridge RDK

Repeat the same procedures in section A above.

C. PEX 8532 Switch RDK and PEX 8114 Forward Bridge RDK

Repeat the same procedures in section A above.

5.3.4 System-to-System Interoperability

This section tests I/O connectivity between different systems using different PEX-8114 RDKs.

1. Select two different systems, preferable those with different CPUs, chipsets and BIOS versions.
2. Install one PEX 8114 Forward RDK into each system. Each system should already be pre-installed with Windows and PCI SDK software.

3. Select and install a network card as an endpoint for PEX 8114 RDK machine. Run Device Manager Tests to ensure the system detects and enumerates the RDK first.
4. Connect the two systems together using direct network connections or through a hub/router. For direct network connections, one end of the CAT-5 cable mates with the external port ethernet card (an endpoint of the PEX 8114 RDK of the first system) and the other end mates with external port of the second ethernet card (an endpoint of the PEX 8114 RDK of the first system). Do not connect to the embedded ethernet ports of the system.
5. Create a shared, mapped DVD drive. This drive runs a DVD movie continuously from one system and displays on another system. Effectively, this exercises data paths through the RDKs and the endpoints.
6. Consult an experienced engineer for this task since specialized video display drivers and dvd decoders may be needed for proper display. Once the setups are complete, do the following:

    a. Insert the DVD movie in the DVD drive of the first system.
    b. Enable network sharing of the DVD drive.
    c. Go to the second system and check to see if it sees the DVD drive of the first system.
    d. Launch the video application, such as NERO, to run the movie.
    e. Record all results and observations.

5.3.5 Fully-Loaded Configurations

This test loads as many different types of endpoints as possible into the 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 8114 RDK with endpoints. As a minimum, fill the RDK slots using 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
        - Video graphics tests
        - Ethernet adapter tests
        - SCSI/FC adapter tests
5. Record all observations and results

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SPECIAL NOTE: Do not test each endpoint at a time. All endpoints (which should already qualified individually in the Endpoints Test Section) must be connected to the PEX 8114 RDK at the same time and tested together as a unit.

6 TEST CHECKLISTS

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.

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6.1 Attachment A – Software and Hardware Identification Information

	Version	Other Identification Information
PEX SDK		
RDK (board+chip) - 8114BA (Reverse) - 8114BA (Forward)		
Operating Systems - Windows XP Professional - Windows Server 2003 - Windows Server 2003		
WHQL test suite - DCT II - HCT		

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6.2 Attachment B – Motherboards and System BIOS (Forward RDK)

Product Name: _____
Tester Name: _____
Date: _____

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	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**14**	**15**	**WHQL System**
Visual Link-Up Test (DS2, DS4, DS5, DS6)															
Slot Tests															
System Frequencies Tests **A. Test the Following Using 1 Selected System** PCI- X 133 MHz i. Visual Link-up Test ii. Device Manager Tests iii. Video Tests iv. Ethernet Tests v. SCSI/FC Tests PCI-X 100 MHz i. Visual Link-up Test ii. Device Manager Tests iii. Video Tests iv. Ethernet Tests v. SCSI/FC Tests PCI 66 MHz i. Visual Link-up Test ii. Device Manager Tests iii. Video Tests iv. Ethernet Tests															

v. SCSI/FC Tests PCI 33 MHz i. Visual Link-up Test ii. Device Manager Tests iii. Video Tests iv. Ethernet Tests v. SCSI/FC Tests **B. Test the Following Across All Systems**. PCI-X 66 MHz (default) i. Visual Link-up Test ii. Device Manager Tests iii. PEX GUI Tests iv. Video Tests v. Ethernet Tests vi. SCSI/FC Tests															
Device Manager Detection Tests Devices By Type Devices By Connection															
PEX GUI Tests Detection Read Configuration Registers Read Memory-mapped Registers EEPROM Programming Status EEPPROM Programming															

Notes: (Explain clearly below if there are any failures in the test cases in the matrix above.)

1.

2.

6.3 Attachment B – Motherboards and System BIOS (Reverse RDK)

Product Name: _____
Tester Name: _____
Date: _____

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**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**14**	**15**	**WHQL System**
Visual Link-Up Test (DS6, DS7, DS8, DS9)															
Slot Tests															
Device Manager Detection Tests															
Devices By Type															
Devices By Connection															
PEX GUI Tests															
Detection															
Read Configuration Registers															
Read Memory-mapped Registers															
EEPROM Programming Status															
EEPPROM Programming															

Notes: (Explain clearly below if there are any failures in the test cases in the matrix above.)

1.

2.

6.4 Attachment C - Video Adapters (Forward and Reverse RDKs)

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	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**14**	**15**	**WHQL System**
Video Graphic Adapter Tests															
Nvidia NVS 440 (use Reverse RDK)															
Video display on the monitor															
Driver installation															
Driver detection															
ATI VisionTek 9250 (use Forward RDK)															
Video display on the monitor															
Driver installation															
Driver detection															
Matrox Millenium P650 (use Reverse RDK)															
Video display on the monitor															
Driver installation															
Driver detection															
Nvidia GeForce MX4000 (use Forward RDK)															
Video display on the monitor															
Driver installation															
Driver detection															

Notes: (Explain clearly below if there are any failures in the test cases in the matrix above.)

1.

2.

6.5 Attachment D - Ethernet Adapters (Forward and Reverse RDKs)

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	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**14**	**15**	**WHQL System**
Ethernet Adapter Tests															
SYSKONNECT SK-9E21D (Reverse RDK)															
Driver installation															
Driver detection															
Web-page access															
SYSKONNECT SK-9S21D (Forward RDK)															
Driver installation															
Driver detection															
Web-page access															
Intel Gig-E PCI-X adapter (Forward RDK)															
Driver installation															
Driver detection															
Web-page access															
Intel Gig-E PCI-Express adapter (Reverse RDK)															
Driver installation															
Driver detection															
Web-page access															
Broadcom Nextreme Gig-E (Forward RDK)															
Driver installation															
Driver detection															
Web-page access															

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Broadcom Nextreme Gig-E (Reverse RDK) Driver installation Driver detection Web-page access															

Notes: (Explain clearly below if there are any failures in the test cases in the matrix above.)

1.

2.

6.6 Attachment E - SCSI/FC HBAs and TV Tuners (Forward and Reverse RDKs)

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	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**14**	**15**	**WHQL System**
SCSI/FC Storage Controller Tests															
LSI Logic 22320 (use Reverse RDK)															
Driver installation															
Driver detection															
Read/Write data files															
Qlogic QLA-2462 (use Forward RDK)															
Driver installation															
Driver detection															
Read/Write data files															
Qlogic QLA-2432 (use Reverse RDK)															
Driver installation															
Driver detection															
Read/Write data files															
TV Tuners															
LifeView Fly TV Platinum (use Forward RDK)															
Driver installation															
Driver detection															
Visual Capture & Display															

Notes: (Explain clearly below if there are any failures in the test cases in the matrix above.)

1.

2.

6.7 Attachment F - WHQL Certification, Chip-to-Chip and Board-to-Board

Test Category	**System Number** (Refer to Motherboards and System BIOS 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	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**14**	**15**	**WHQL System**
WHQL Certification (use Reverse RDK) Video Graphic Adapter Card Name & Model: _Nvidia NVS-280 Quadro PCI-Express_____ (see full results in WQHL Precert: Video Graphics Adapter section)															
Chip-to-Chip Interoperability Configuration #1: __PEX 8111 Rev 3 (Reverse) and PEX 8114 (Forward)_ PEX GUI Detection Device Manager Detion Video Card (as endpoint) detection Configuration #2: __PEX 8114 (Reverse) and PEX 8532BB_____ PEX GUI Detection Device Manager Detion Video Card (as endpoint) detection															
Board-to-Board Interoperability Configuration #1 : _PEX-8114 Forward_and PEX 8518_____ Configuration #2: _PEX 8111 and PEX 8114 Forward_____ Configuration #3: _PEX 8532 and PEX 8114 Forward_____															
Fully-loaded Enpoints Configuration Video adapter: _ATI VisionTek 9250_____ Ethernet adapter: _Intel Gig-E Adapter (Ophir)_____ SCSI/FC adapter: _Qlogic QLA-2462_____															

Notes: (Explain clearly below if there are any failures in the test cases in the matrix above.)

1.

6.8 Attachment G - WHQL Certification (Video Adapter)

Manufacturer: Nvidia Quadro PCI-Express adapter **Other Notes:** DCT 5.3 Test Suite
Type (PCI or PCI-e): PCI-Express interface NVS-280
Board Revision: Rev A00
Driver version: 6.14.0010.6127 5/29/2004 nv4_disp.dll
System # (see ref): Dell Precision 670
System Information: CPU Xeon 2.8 GigaHertz
Memory size 1 Gigabytes
Operating System Windows XP Professional SP2

Test #	Test Category	Pass/Fail Results	Notes
1	Graphics Bus		Run in automated mode
2	DirectDraw		Run in automated mode
3	OpenGL		Run in automated mode
4	General		Run in automated mode
5	Win2001 GDI		Run in automated mode
6	Power Management		Run in automated mode
7	D3D		Run in automated mode
8	Stability		Run in automated mode
9	DXVA		Run in automated mode
10	VMR		Run in automated mode

7 TEST EQUIPMENT

7.1 Motherboards and System BIOS

System #	Motherboard	Root Complex	CPU	BIOS	PCI Express Slots	Operating System
1	**MSI** K8N Neo4 Platinum SLI; 512MB SDRAM DDR 266/333/400	Nvidia NForce 4 SLI	AMD	**Phoenix Award** BIOS v6.00PG 7100NMS V3.0 123104	2- x16	Windows XP SP2
2	**SUPERMICRO** X6DAE-G; 512MB SDRAM DDR 266/333	Intel E7525 TumWater	INTEL	**Phoenix Server 3** BIOS V6; X6DAE-G BIOS Revision 1.2	1- x16 1- x4	Windows XP SP2
3	**ABIT** AX-8; DDR 400	VIA K8T890/VT8237	INTEL	**Phoenix Award** BIOS 1.0	1- x16 3- x1	Windows XP SP2
4	**NVIDIA** NF4-CRB; 512MB SDRAM DDR 266/333	Nvidia NForce 4	AMD	**Phoenix Award** BIOS V6.00PG NVIDIA BIOS V4.9x 4/26/2005- NF-CK804-6A61FS02C-00	1- x16 2- x1	Windows XP SP2
5	**INTEL** SE7520BD2; 512MB SDRAM DDR 266/333, DDR2 400	Intel E7520 Lindenhurst	INTEL	**AMIBIOS** V2.53; SE7520BD2 22 86B.P.03.10.0052	1- x8 1- x4	Windows 2003 Server
6	**ASUS** P5GDC-V; 512MB SDRAM DDR 400/533	Intel 915G	INTEL	**AMIBIOS** P5GDC-V Deluxe ACPI BIOS Revision 1007	1- x16 2- x1	Windows XP SP2
7	**ABIT** AA8; 1G DDR2 SDRAM 400/533	Intel Alderwood, 800Mhz FSB; Intel 925X and ICH6R Express	INTEL	**Phoenix AWARD** BIOS V6.00PG 2/10/05-i925x- W83627-6A79FA19C-20	1- x16 3- x1	Windows XP SP2
8	**SUPERMICRO** P8SGA; 512MB DDR 400 SDRAM	Intel Pentium 4, 800Mhz FSB; Intel 915G Chipset	INTEL	**Phoenix Award** BIOS V6.00PG; P8SGA BIOS Revision 1.1; 03/29/2005	1 x16 3- x1	Windows XP SP2
9	**MSI** RS480M2-IL	ATI SB400 IXP400	AMD	**Phoenix Award** BIOS v6.00PG; W8093AMSv30B9	1- x16	Windows XP SP2
10	**ABIT** AW8; 1GB SDRAM DDR2 800/667/533	Intel 955	INTEL	**Phoenix Award** BIOS v6.00PG; 5/23/05-i955-W627EHF- 6A79IA1AC-10	1- x16 2- x1	Windows XP SP2
11	**GIGABYTE** GA-8I945P Pro	Intel 945P	INTEL	**Phoenix Award** BIOS v6.00PG	1- x16 2- x1	Windows XP SP2
12	**ULI** EV9567	ULI EV9567	INTEL	**Phoenix Award** BIOS v6.00PG	1- x16 2- x4	Windows XP SP2

System #	Motherboard	Root Complex	CPU	BIOS	PCI Express Slots	Operating System
14	**Intel** Lakeport	Intel TK53tWJ RU	INTEL	**AMI BIOS** WPLI751.86P 10/13/2005 SMBIOS v2.3	1- x16 2- x1	Windows XP SP2
15	**Winfast** 761GXK8MC	SIS SIS964	AMD	**Phoenix** 6.00 PG 10/11/2005 3 PCI, 1 AGP, 1 PCI-e x16	1- x16	Windows XP SP2
17	**Dell** Precision Workstation 470	Intel E7525 Tumwater	INTEL	**DELL** BIOS Revision A03	1- x16 1- x4	Windows XP SP2

7.2 Endpoint Devices and Connectivity Kits

Device Category	Product Manufacturer	Model Name/Number	Product Details	System Interface	Software Drivers and/or Drivers
Graphic adapters	ATI	FireMV 2400	ATI controller; 128 MB DDR; two VHDCI connectors; half height	PCI	Embedded
	ATI	VisionTek Radeon 9250 (Xtasy)	ATI controller; 128 MB DDR graphics accelerator at 400 MHz; VGA, DVI- I, TV-Out	PCI ; 64 bit memory interface	V5.8
	3D Fuzion	GeForce MX 4000	Nvidia controller 128 MB DDR; VGA, S-video out; 275 MHz core clock; Dual RAMDACs 350MHz	PCI;	Nvidia NVDVD v 2.0
	Kaser	GeForce 6600	Nvidia CineFX 30 engine; 256 MB ; Duall 400 MHz RAMDACs; OpenGL support	PCI-Express	Nvidia version N.5.II.I
	ATI	Diamond Stealth S60 ; S60PCI64	Radeon 7000; DVI/TV-Out; 64 MB DDR; dual monitor display	PCI	Stealth Viper v 6.1
	Mad Dog Multimedia	Mad Dog multimedia Prowler V042605	ATI Radeon 7000; 64 MB graphic accelerator	PCI	ATI Catalyst software suite, Direct X and OpenGL support
	Kaser	Radeon x300SE	ATI Radeon (VPU) ; 128 MB system memory; 15 VGA conneceotr; 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 x16 slot	ATI Catalyst drivers v 6.0
	ATI	ATI 7000	64 MB DDR, TV-OUT 64-bit	PCI slot	ATI Catalyst drivers v6.4
	Nvidia	Quadro NVS-280	Microsoft-certified component; integrated component of Dell Precision 670	PCI-Express x16 slot	Nv4-disp.dll Ver 6.14.0010.6127
	Nvidia	PCI-Express 6200	GEForce 6 Series Turbocache	PCI-Express x16 slot	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 x16 slot	Drivers CD ver 81.67
	Matrox	Millenium P650 P65-MDDE128F	128 MB	PCI-Express x16 slot	Matrox Parhelia Series & Matrox P-Series
Ethernet Cards	HP	Broadcom NetXtreme	Gigabit PCI-E	PCI-Express	Broadcom NetXtreme Ethernet drivers v 8.1
	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
	Dlink	DGE-530T	10/100/1000MBps Gigabit Desktop Adapter; IEEE 802.3, 802.3u Fast Ethernet, 802.3ab gigabit and 802.3x flow control802.1Q VLAN support	PCI	Wired Ver. 4.00

Device Category	Product Manufacturer	Model Name/Number	Product Details	System Interface	Software Drivers and/or Drivers
	SysKonnect	SK-9E21D SK-9E22	10/100/1000Base-T Adapter; autodetect, 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
	Intel	Pro/1000 Dual Port PT	Gigabit copper for servers	PCI-Express	Intel Ophir drivers
	Intel	Pro/1000 MT Server Adapter	Gigabit copper connection for servers; low-profile; IEEE 802.3ab, 802.1Q, 802.1p and 802.3x compliant	PCI/PCI-X	Intel Pro/1000 drivers
TV Tuner Cards	LifeView	TV Tuner	Fly TV Platinum Gold; 713 xBDA Analog Capture	PCI-X	AMCAP software
	Hauppauge	TV Tuner	Hauppauge TV GO with Win TV 2000 TV Viewer Application	PCI	Win TV 2000 application; WDM ver 3.49 for 878-based boards
HBAs & Storage Controller	Qlogic	QLA-2462	PCI-X Gigabit Fibre channel adapter	PCI-X	SAN Surfer Management Suite (SMS) ver 2006
	Qlogic	QLA-2432	PCI-Express Gigabit Fibre channel adapter; using FW 4.00.12	PCI-Express	SAN Surfer Management Suite (SMS) ver 2006
	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	Ultra-320 SCSI Host Bus Adapter	PCI-Express	Driver 1.20.18 for Win XP
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