

PLX Technology

The Leading Supplier of PCI Express and Standard I/O Interconnect Silicon

PRODUCT GUIDE
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PLX Technology, Inc. is the leading supplier of PCI Express and standard I/O interconnect silicon to the communications, server, storage, embedded-control, and consumer industries. With an ever increasing number of I/O and bus standards in the marketplace, PLX provides solutions to bridge, isolate, expand, and switch.

We support a vast array of standards including PCI Express*, PCI, PCI-X, USB 2.0 as well as local or generic buses.

The PLX solution includes a complete combination of high-performance silicon, hardware and software design tools, supported by partnerships throughout the industry.

These innovative solutions are designed to enable our customers to develop systems with legacy and industry-leading, cutting-edge products.

PLX has been developing I/O interconnect products since 1986.

PLX is publicly traded (NASDAQ: PLXT) and headquartered in Sunnyvale, CA, USA. PLX's European operations are based in the United Kingdom; its Asian operations in China and Japan.



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PEX 8111

PCI Express-to-PCI Bridge



The World's Smallest PCI Express Bridge

The PLX Technology ExpressLane PEX 8111 is a high performance bridge that enables designers to migrate legacy PCI bus interfaces to the advanced serial, PCI Express architecture.

The **tiny BGA package** and **low power** consumption make it the ideal bridge for applications with limited board space and power budget.

The PEX 8111 is equipped with an **integrated PCI Express PHY** that provides a x1 link at 2.5 Gbps. Supporting standard PCI Express signaling compliant to the 1.0a specification, the integrated PHY delivers high bandwidth at a low pin count (4-pins) using LVDS technology.

The single parallel bus segment supports the latest PCI bus protocol. With a 32-bit wide parallel data path running at 66MHz, the standard PCI interface accommodates a broad range of legacy applications.

Forward and Reverse Bridging

The PEX 8111 can be configured to support either **forward** or **reverse** bridging operation as defined by the PCI Express to PCI/PCI-X Bridge Specification 1.0. As a reverse bridge, the PEX 8111 allows conventional PCI CPU subsystems to configure and control downstream PCI Express devices. This feature facilitates the bridging of high performance PCI Express native silicon into legacy PCI systems. The PEX 8111 includes provisions for reverse bridging such as reverse configuration and interrupt handling.

Interfaces	Description
PCI Express Link Width	Single link of x1
PCI Express Lane Speed	2.5 Gbps TX and RX lanes
PCI Express Port	R1.0a compliant, polarity reversal
PCI Bus Type	PCI r3.0, 32-bit, 66MHz
Electrical Characteristics	Description
Core Voltage	1.5V
SerDes reference	1.5V
PCI I/O	3.3V (5V tolerant)
Packaging	Description
Package Type*	144-ball, Plastic BGA 161-ball, fine-pitch, Plastic BGA
Package Size	13mm x 13mm 10mm x 10mm (fine-pitch)
Operating Temperature Range	Commercial Grade 0° to +70° C
Power Dissipation	0.4W Maximum
Features	Description
Bridge Modes	Forward and Reverse
PCI Arbitration	Up to four (4) external master devices
JTAG	Yes
EEPROM	Yes
GPIO	Four (4)
Rapid Development Kits	PEX 8111RDK-F Forward Mode RDK PEX 8111RDK-R Reverse Mode RDK
Shared RAM	Internal 8kbyte

* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

PEX 8114

PCI Express to PCI/PCI-X Bridge



The most flexible, high performance PCI Express Bridge

The PLX Technology ExpressLane PEX 8114 is a high performance bridge that enables designers to migrate legacy PCI and PCI-X bus interfaces to the advanced serial PCI Express architecture.

This two(2) port device is equipped with a standard, but flexible **PCI Express PHY** that scales to provide up to one Gigabyte per second of maximum throughput per transmit and receive direction.

The single parallel bus segment supports the advanced PCI-X protocol. With a 64-bit wide parallel data path running at 133MHz, the standard PCI-X interface can reach a matching bandwidth of one Gigabyte per second. For legacy PCI applications, the bus segment also supports conventional PCI bus protocols.

Forward and Reverse Bridging

The PEX 8114 can be configured to support either **forward** or **reverse** bridging operation as defined by the PCI Express to PCI/PCI-X Bridge Specification 1.0. As a reverse bridge, the PEX 8114 allows conventional PCI/PCI-X CPU subsystems to configure and control downstream PCI Express devices. This feature facilitates the bridging of high performance PCI Express native silicon into legacy PCI systems. The PEX 8114 includes provisions for reverse bridging such as reverse configuration, root functions, interrupt handling, and advanced error reporting.

Non-Transparent Bridging

The PEX 8114 can also be configured as a **non-transparent bridge**, allowing distinct processor and memory domains to exist on both primary and secondary sides of the device. Non-Transparent Bridging can be used for **intelligent adapter designs** as well as in **dual or multi-host environments**.

Interfaces	Description
PCI Express Link Width	Single link of x4, x2 or x1
PCI Express Lane Speed	2.5 Gbps TX and RX lanes
PCI Express Port	R1.0a compliant, lane reversal, polarity reversal
PCI/PCI-X Bus Type	PCI-X, 64-bit, 133-, 100-, 66 MHz PCI, 64-bit, 66/50/33/25 MHz PCI r2.3
Electrical Characteristics	Description
Core Voltage	1.0V
SerDes reference	1.5V
PCI/PCI-X I/O	3.3V
Packaging	Description
Package Type *	256-ball, Plastic BGA
Package Size	17mm x 17mm
Operating Temperature Range	Industrial Grade -40° to +85° C
Power Dissipation	2W Maximum, no heat sink
Features	Description
Bridge Modes	Forward and Reverse
Transparency Modes	Forward Transparent, Forward Non-Transparent and Reverse Transparent
PCI/PCI-X Arbitration	Up to four(4) external master devices
JTAG	Yes - 1149.1/1149.6
EEPROM	Yes
Secondary PCI/PCI-X Clock Outputs	Four (4)
Rapid Development Kits	PEX 8114RDK-F Forward Mode RDK PEX 8114RDK-R Reverse Mode RDK

* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

PEX 8311

ExpressLane - PCI Express to Generic Local Bus Bridge

The multi-purpose and feature rich PCI Express Bridge offers generic local bus to PCI Express (PCIe) bridging capability enabling users to add scalable high bandwidth interconnection to a wide variety of applications. Many embedded system designs utilizing PCI today can easily migrate to PCIe. The bridge offloads the computational tasks associated with transferring data between a generic local bus and a PCIe port.

Complete Conversion from PCI Express Signaling

The PEX 8311 provides complete local bus to PCIe translation. Full PCIe packet generation and decoding combined with local/PCIe address translation, MSI interrupt handling, and WAKE#/Beacon signals are supported.

Highly Flexible Generic Local Bus

The PEX 8311 offers a highly flexible yet low overhead "generic" local bus which provides a direct connection to two generic industry-standard interconnect buses. The bus protocol can be set to the non-multiplexed address and data "C-Mode" or multiplexed address/data "J-Mode". This bus can be directly connected to many processors with minimal or no glue logic. Up to six loads including memory, FPGAs, FIFOs and other devices can be simultaneously placed on this bus. With its 32-bit, 66MHz operation, the local bus can transfer zero wait state bursts up to 264MB/sec.

Dual Independent Full Feature DMA Channels

The PEX 8311 provides two data transfer channels with support for block, scatter-gather, ring management, and demand modes. These channels provide independent data transfers with the bridge initiating both the PCIe and local bus. Deep FIFO buffers and read ahead with programmable read pre-fetch counters optimize throughput.



Root Complex and EndPoint Modes

The PEX 8311 bridge supports both Root Complex and EndPoint modes of operation. This flexibility allows a Root Complex system designer to utilize the part as a type of "north bridge" whereby multiple Local Bus components present including a processor, memory, DSP, etc., can communicate with each other as well with downstream PCIe devices.

Interfaces	Description
PCI Express Lane/Local Bus	1 lane to 8/16/32-bit 66 MHz Local Bus Bridge
PCI Express Lane Speed	2.5 Gbps per lane
PCI Express Port	R1.0a Compliant, polarity reversal
Electrical Characteristics	Description
Core Voltage	1.5V and 2.5V
SerDes reference	1.5V
Hot Plug & I/O	3.3V/5V Tolerant
Packaging	Description
Package Type *	337-pin, plastic BGA
Package Size	21mm x 21mm
Operating Temperature Range	0°C to +70° C
Power Dissipation	1.0W, no airflow or heat sink required
Features	
EEPROM	Yes
I2O Messaging Unit	Yes
General Purpose I/O pins	Yes-Four plus 1 GPI, 1 GPO
Development Tools	Description
PEX 8311RDK	Hardware, SW drivers, API, GUI and design guide

* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

PEX 8548, PEX 8532, PEX 8524, and PEX 8516

Versatile PCI Express Switches

PLX Technology ExpressLane switch consists of high performance, multipurpose, highly configurable devices compliant with the PCI Express Base specification. These switches can be used in wide variety of applications such as **fan-out**, **aggregation**, **peer-to-peer**, **fabric backplane**, and **intelligent I/O** module applications.

Flexible Port Configurations

The ExpressLane Switches offer highly configurable ports. For example, with the PEX 8532, in a fan-out application one may configure the upstream port as x8 and the downstream ports as six x4 ports; two x8 and two x4 ports; three x8 ports; or any other combination that does not exceed the maximum number of lanes or ports. For a peer-to-peer application, all eight ports can be configured as x4. In a port aggregation application, four x2 or x4 ports can be aggregated into one x8 or x16 port.

Quality of Service

The ExpressLane Switch family provides end-to-end CRC protection (ECRC) and Poison-bit support to enable designs that require guaranteed error-free packets. These features are optional in the PCI Express specification, but PLX provides them across our entire PCI Express product line. The PEX 8532, 8524 and 8516 offer two full-featured Virtual Channels (VCs). In addition, these devices offer user-selectable Virtual Channel arbitration algorithms to enable fine tuning of the Quality of Service (QoS) required for a specific application.

Non-Transparent Bridging

The PEX 8532, 8524 and 8516 support full Non-Transparent Bridging functionality to allow implementation of multi-host systems and intelligent I/O modules in communications, storage, & blade server applications.

Low Power with Granular SerDes Control

All ExpressLane Switches provide low power capability that is fully compliant with the PCI Express power management specification. In addition, the SerDes physical links can be configured for low, typical, or high power, or turned off when unused for even lower power.

Hot Plug for High Availability

Each downstream port of the ExpressLane switches (excluding the PEX 8548 which supports 3 total) includes a Standard Hot Plug Controller that acts as a master to manage Hot-Plug events. The upstream port is a fully compliant Hot Plug client, allowing it to be used on hot-pluggable adapter cards, backplanes and fabric modules.

Interfaces	
PCI Express Lane/Port count	PEX 8548: 48 lanes with 9 configurable ports PEX 8532: 32 lanes with 8 configurable ports PEX 8524: 24 lanes with 6 configurable ports PEX 8516: 16 lanes with 4 configurable ports
PCI Express Lane Speed	2.5 Gbps per lane (per LVDS pair)
PCI Express Lanes	Lane / Polarity reversal & lane status pins
Electrical Characteristics	
Core Voltage	1.0V
SerDes reference	1.5V
Hot-plug & I/O	3.3V
PEX 8548	
Package Type*	736-ball, Plastic BGA
Package Size	37.5mm x 37.5mm
Operating Temperature Range	-40° to +85°C
PEX 8532	
Package Type *	680-ball, Plastic BGA
Package Size	35mm x 35mm
Operating Temperature Range	-40° to +85° C
PEX 8524	
Package Type *	644-ball Plastic BGA
Package Size	31mm x 31mm
Operating Temperature Range	-40° to +85° C
PEX 8516	
Package Type *	312-ball, Plastic BGA
Package Size	27mm x 27mm
Operating Temperature Range	-40° to +85° C
Development Tools	
PEX 8548RDK PEX 8532RDK PEX 8524RDK PEX 8516RDK	Available with x16, x8, x4 Connectors Available with x16, x8, x4, x1 Connectors Available with x16, x8, x4, x1 Connectors Available with x4, x1 Connectors

* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

PEX 8508, 8517 and 8518

Economical Low Latency PCI Express Switches

The PLX Technology ExpressLane PEX 8508, 8517 and 8518 are high performance, low latency, multipurpose, and highly flexible switches compliant to the recently released PCI Express specification r1.1. The PEX 8508, 8517 and 8518 devices can be used as fan-out, aggregation, or peer-to-peer switches in a wide variety of cost-sensitive mass market applications ranging from office automation and laptop docking stations to network interface adapters. The PEX 8508 is a perfect fit when used for processor isolation applications in redundant/fail-over boards for servers and storage systems. Operation and port width assignments can be configured through upstream software, an I²C interface, or optional EEPROM.

Flexible Port Configuration

The PEX 8508, 8517 and 8518 switches offer up to five ports each. All three switches can be configured to any legal combination of lanes per port for fan-out, data aggregation, and peer-to-peer switching as long as user does not exceed the devices port per lane limit.

Low Latency and High Performance

The PEX 8508, 8517 and 8518 switches have a cut-through based architecture allowing ingress/egress latency through the switches, under 150ns. Both switches have a fully non-blocking architecture.

End-to-end Packet Integrity

The PEX 8508, 8517 and 8518 provide end-to-end CRC protection (ECRC) and Poison bit support to enable designs that require guaranteed error-free packets. These features are optional in the PCI Express specification, but PLX provides them across its entire PCI Express product line.

Non-Transparent Bridging

The PEX 8508, 8517 and 8518 support full non-transparent bridging functionality to allow implementation of multi-host systems and intelligent I/O modules in applications such as communications, storage, and blade servers. The port chosen to be non-transparent is fully selectable.

Two Virtual Channels

The PEX 8508 supports up to 2 full-featured Virtual Channels (VCs) and full 8 Traffic Classes (TCs). In addition, the device offers user-selectable Virtual Channel arbitration algorithms to enable fine tuning of the Quality of Service (QoS) required for a specific application.

Low Power with Granular SerDes Control

The PEX 8508, 8517 and 8518 provide low power capability that is fully compliant with the PCI Express power management specification. In addition, the SerDes physical links can be configured for low, typical or high power or turned off when unused for even lower power. Vaux, Wake#, and Beacon are supported and allow D³ (cold)

device state support for further power savings.

Hot Plug for High Availability

Each downstream port of the PEX 8508, 8517 and 8518 includes a Standard Hot Plug Controller that acts as a master to manage I/O module Hot-Plug events. The upstream port is a fully compliant hot-plug client, allowing it to be used on hot-plug-gable adapter cards, backplanes and fabric modules.

Interfaces	Description
PCI Express Lane/Port Count	PEX 8508: 8 lanes with 5 configurable ports PEX 8517: 16 lanes with 5 configurable ports PEX 8518: 16 lanes with 5 configurable ports
PCI Express Lane Speed	2.5 Gbps per lane (per LVDS pair)
PCI Express Port	r1.1 Compliant, lane reversal, polarity reversal, and lane status pins
Electrical Characteristics	Description
Core Voltage	1.0V
SerDes Reference	1.5V
Hot Plug & I/O	3.3V
PEX 8518	Description
Package Type *	376-ball, Plastic BGA (standard and lead-free)
Package Size	23mm x 23mm
Operating Temperature Range	-40° to 85°C
Power Dissipation	3.0W, no airflow or heat sink required
PEX 8517	Description
Package Type *	312-ball, Plastic BGA
Package Size	27mm x 27mm
Operating Temperature Range	-40° to 85°C
PEX 8508	Description
Package Type *	296-pin, plastic BGA
Package Size	19mm x 19mm
Operating Temperature Range	-40° to 85°C
Power Dissipation	2.5W, no airflow or heat sink required
Development Tools	Description
PEX 8518RDK	Hardware, SW drivers, API, GUI and design
PEX 8508RDK	Hardware, SW drivers, API, GUI and design

* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

NET 2272, NET 2280, and NET 2282

Hi-Speed USB 2.0 Peripheral Controllers

PLX Technology offers a complete line of USB 2.0 peripheral controller solutions. Our products emphasize superior performance, strict compliance to industry standards, and dramatic power savings. These controllers feature diverse, programmable interfaces to gluelessly connect to various applications. Our PCI-based reference design kits offer easy PC-based development with many application, driver, and firmware examples, supporting Windows, Linux, VxWorks, and WinCE. PLX's USB products are used extensively in printers, portable media players, GPS navigation systems, Notebook and Ultra Mobile PCs, TV tuners, WLAN devices, mobile phones, and digital camcorders.



NET 2272	NET 2280	NET 2282
Local Bus to Hi-Speed USB 2.0 Peripheral Controller	PCI to Hi-Speed USB 2.0 Controller	PCI to Hi-Speed USB 2.0 Peripheral Bridge
<ul style="list-style-type: none">■ Low power and small packaging make it ideal for bus or battery-powered devices■ Fastest sustained transfer rate, up to 40MBytes/sec■ Flexible I/O voltage range from 1.8V to 5V■ Low power process (186mW active, 8.1µW standby)■ Smallest packaging (6x6mm BGA package)■ Dynamic Virtual Endpoint Technology™ actualizes 30 independent USB endpoints■ Configurable CPU interface■ WinXP, Vista, Linux, and WinCE support	<ul style="list-style-type: none">■ PCI 33MHz / 32-bit interface■ Instantly add a Hi-Speed USB 2.0 peripheral port into any PCI-based systems■ USB Duet Technology, add Hi-Speed USB 2.0 peripheral functionality to laptop PCs and Ultra Mobile PCs■ Ideal for PCI embedded systems like printers and test instruments■ 4 DMA controllers with Scatter Gather descriptor capability■ USB Auto-Enumeration■ Firmware available to support many standard USB Classes (Printer, Mass Storage, MTP, Video, Audio, etc.)■ WinXP, Vista, Linux, and WinCE support	<ul style="list-style-type: none">■ Optimized for converting PCI adapters to USB 2.0 devices■ PCI 66MHz/32-bit interface■ PCI Host capability for initializing and configuring the existing PCI chip■ Integrated PCI arbiter to support mastering PCI devices■ Integrated 8051 CPU @ 30MHz■ 32K of Shared RAM for emulating main system memory■ WinXP, Vista, Linux, and WinCE support

NET 2272, NET 2280, and NET 2282

Hi-Speed USB 2.0 Peripheral Controllers Overview

	NET2272	NET2280	NET2282
CPU Interface	Configurable 8/16 bit asynchronous local bus	PCI v3.0 compliant 33MHz / 32 Bits	PCI v3.0 compliant 66MHz / 32 Bits
Sustained Performance	Up to 40MBytes/sec	Up to 40MBytes/sec	Up to 40MBytes/sec
Active Power	186mW	260mW	220.2mW
Suspended Power	8.1μW	0.25μW	316μW
I/O Voltage	1.8V to 5V	3.3V or 5V	3.3V or 5V
Package*	10mm x 10mm 64-Pin TQFP 6mm x 6mm 64-Ball BGA	14mm x 14mm 120-Pin TQFP 8mm x 8mm 121-Ball FPBGA	14mm x 14mm 120-Pin QFP
Applications	Portable media players, GPS systems, mobile phones, PDAs, digital camcorders	USB Duet Port, Notebook PCs, Ultra Mobile PCs, printers, test equipment and other PCI-embedded systems	Convert PCI adapters like TV tuners, video capture cards, and wireless LAN adapters to USB 2.0 devices
Development Kits	NET 2272 RDK-II	NET 2280 EVB NET 2280 EVB-SW	NET 2282 RDK

* Available in lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

Development Environment and Support

Hardware	Software
<ul style="list-style-type: none"> ■ PCI adapter card form factor plugs directly into a PC for Windows, Linux, and WinCE based development ■ Converts any standard PC into a USB 2.0 device or development station ■ Develop your software on proven hardware before your platform is ready ■ Schematics, BOM, and Gerber files ■ Schematic and layout review 	<ul style="list-style-type: none"> ■ Remote PCI (RPCI) simplifies PCI to USB conversion ■ Windows, Linux, VxWorks and WinCE Support ■ API abstracts hardware elements ■ Standard USB Class device support (Printer, Mass Storage, Communications Devices, Video, Audio, MTP, R-NDIS) ■ Reference firmware with source code ■ USB host-side drivers with source code ■ Host-side applications for test and debug engineering



PLX FastLane™ PCI and PCI-X Bridges

Get in the FastLane with the PCI 6000 Series

The PLX FastLane PCI 6000 series has the industry's broadest set of PCI-to-PCI bridges. These bridges allow more devices to be attached to the PCI bus, and provide the ability to include intelligent adapters on a PCI bus. In addition, these bridges allow PCI buses of different speeds to be part of the same subsystem.

The PLX FastLane PCI and PCI-X family of interconnect devices include PCI-to-PCI and PCI-X to PCI-X bridging devices, offering system designers several distinct features along with vastly improved I/O performance. The PLX FastLane PCI 6000 series of PCI-to-PCI bridging products provides designers with support for the entire range of current PCI bus widths and speeds, including 32-bit, 33MHz; 64-bit, 66MHz; and the latest 64-bit, 133MHz PCI-X variety of the standard.

The FastLane PCI 6000 product line is distinguished by featuring the lowest power, highest performance and smallest footprints in the industry. The line includes features such as the ability to clock the PCI bus segments asynchronously to one another and to operate the parts in either transparent or true non-transparent mode. This is crucial when the same module is designed to be used as a host or a peripheral in a system. In addition, all PLX FastLane PCI 6000 series bridges are 5V-tolerant.

These products were designed to provide high-performance interconnect for servers, storage, telecommunications, networking, and embedded applications. Like all PLX interconnect chips, the PCI 6000 series products are supported by PLX's comprehensive reference design tools and the industry-recognized PLX support infrastructure.

P-to-P Bridge Rapid Development Kits (RDK)

The PLX FastLane PCI 6000RDK series includes PCI 6000 series devices on evaluation boards along with documentation to facilitate rapid development of systems using PLX FastLane PCI 6000 series PCI-to-PCI bridges.



Table 1. FastLane PCI and PCI-X Bridges

	PCI 6140-AA33PC PCI 6140-AA33PC G	PCI 6150-BB66BC PCI 6150-BB66PC PCI 6150-BB66BC G PCI 6150-BB66PC G	PCI 6152-CC33BC PCI 6152-CC33PC PCI 6152-CC33BC F PCI 6152-CC33PC G	PCI 6152-CC66BC PCI 6152-CC66BC F	PCI 6154-BB66BC PCI 6154-BB66BC G	PCI 6254-BB66BC PCI 6254-BB66BC G	PCI 6466-CB66BI PCI 6466-CB66BI G	PCI 6520-CB13BI PCI 6520-CB13BI G	PCI 6540-CB13BI PCI 6540-CB13BI G
PCI Bus Type	32-bit 33MHz PCI	32-bit 66MHz PCI	32-bit 66MHz PCI	32-bit 66MHz PCI	64-bit 66MHz PCI	64-bit 66MHz PCI	64-bit 66MHz PCI	64-bit 133MHz PCI-X	64-bit 133MHz PCI-X
PCI Local Bus Support	Rev. 2.1 compliant	Rev. 3.0 compliant	Rev. 2.2 compliant	Rev. 2.2 compliant	Rev. 3.0 compliant	Rev. 3.0 compliant	Rev. 3.0 compliant	Rev. 3.0 compliant	Rev. 3.0 compliant
3.3V and 5V Tolerant I/O	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asynchronous Operation	No	25MHz to 66MHz	No	No	25MHz to 66MHz	25MHz to 66MHz	25MHz to 66MHz	25MHz to 133MHz	25MHz to 133MHz
Power Dissipation	200mW	1.8W	300mW	300mW	2.0W	2.0W	1.0W	2.4W	3.0W
GPIO Interface	No	Four GPIO Pins	Four GPIO Pins	Four GPIO Pins	Four GPIO Pins	16 GPIO Pins	16 GPIO Pins	8 GPIO Pins	16 GPIO Pins
Transparency Modes	Transparent only	Transparent only	Transparent only	Transparent only	Transparent only	Transparent, Non-transparent and Universal modes	Transparent, Non-transparent and Universal modes	Transparent only	Transparent, Non-transparent and Universal modes
CompactPCI Compatible Hot Swap	Friendly	Rev 2.0 with PI=1	Friendly	Friendly	No support	Rev 2.0 with PI=1	Rev 2.0 with PI=1	No support	Rev 2.0 with PI=1
Data FIFO	No	1KB FIFO	No	No	1KB FIFO	1KB FIFO	10KB FIFO	10KB FIFO	10KB FIFO
# of Bus Masters on Secondary Bus	Up to 4	Up to 9	Up to 4	Up to 4	Up to 9	Up to 9	Up to 8	Up to 8	Up to 8
Retry Architecture	Standard	Standard	Performance Optimized	Performance Optimized	Standard	Standard	Standard	Standard	Standard
Programmable Flow-Thru	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Programmable Prefetch	No	Up to 4KB	No	No	Up to 4KB	Up to 4KB	Up to 4KB	Up to 2KB	Up to 2KB
Zero wait state burst	Up to 1KB	Up to 1KB	Up to 4KB	Up to 4KB	Up to 4KB	Up to 4KB	Up to 4KB	Up to 4KB	Up to 4KB
EEPROM support	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vital Product Data Registers	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
D3 Wakeup Power Mgmt	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secondary Clock Outputs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
JTAG Support	No	IEEE 1149.1 compliant	No	No	IEEE 1149.1 compliant	IEEE 1149.1 compliant	IEEE 1149.1 compliant	IEEE 1149.1 compliant	IEEE 1149.1 compliant
Packaging *	PQFP-128	BGA-256 PQFP-208	Tiny BGA-160 PQFP-160	Tiny BGA-160	PBGA-304	PBGA-365	PBGA-380	PBGA-380	PBGA-380
Package Size	23mm x 17mm	17mm x 17mm 31mm x 31mm	15mm x 15mm 32mm x 32mm	15mm x 15mm No PQFP	31mm x 31mm	31mm x 31mm	27mm x 27mm	27mm x 27mm	27mm x 27mm
Rapid Development Kit	PCI 6140RDK	PCI 6150RDK	PCI 6152RDK	PCI 6152RDK	PCI 6154RDK	PCI 6254RDK	PCI 6466RDK	PCI 6520RDK	PCI 6540RDK

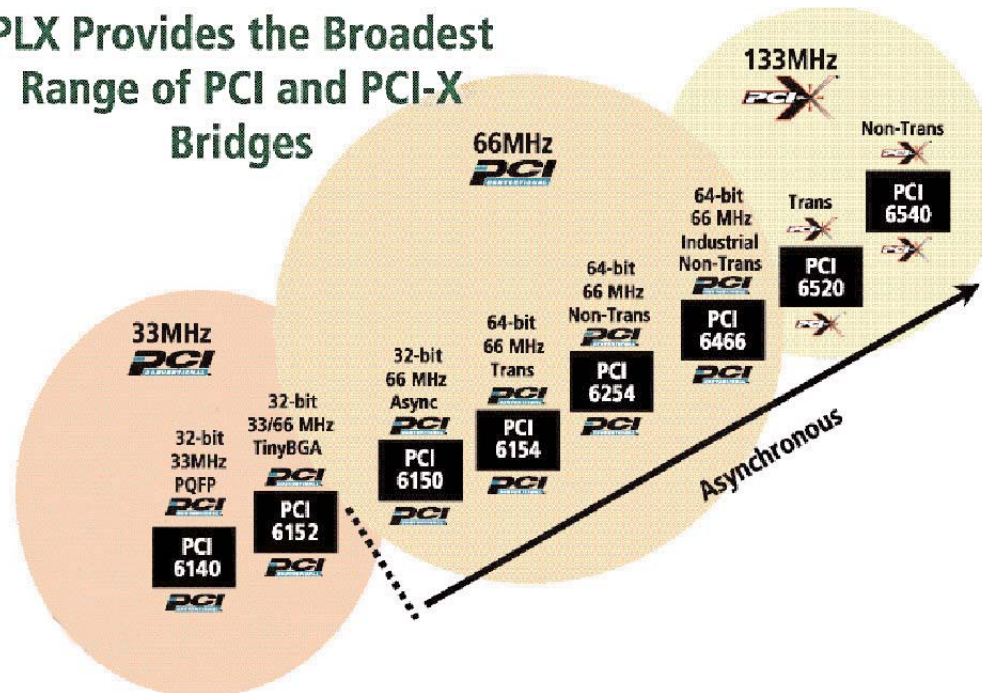
* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

FastLane™ PCI and PCI-X Bridges

Rapid Development Kits (RDKs)

	PCI 6140RDK	PCI 6152RDK	PCI 6150RDK	PCI 6154RDK	PCI 6254RDK	PCI 6466 RDK	PCI 6540RDK
Frequency on Primary	33MHz	33MHz	25MHz - 66MHz	25MHz - 66MHz	25MHz - 66MHz	33MHz - 66MHz	33MHz - 133MHz
Frequency on Secondary	33MHz	33MHz	25MHz - 66MHz	25MHz - 66MHz	25MHz - 66MHz	33MHz - 66MHz	33MHz - 133MHz
PCI rev compliance	r2.1	r2.2	r3.0	r3.0	r3.0	r3.0	r3.0
Number of PCI slots on secondary	5	4	4	5	5	4	4
Asynchronous Mode	No	No	Yes	Yes	Yes	Yes	Yes
EEPROM	No	Yes	Yes	Yes	Yes	Yes	Yes
Optional BNC Connector/ Oscillator for secondary side	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Software support	Yes	Yes	Yes	Yes	Yes	Yes	Yes

PLX Provides the Broadest Range of PCI and PCI-X Bridges



FastLane PCI and PCI-X Bridges vs. Industry-Standards

Standard Bridge	Bridge Type	Fast Lane Bridge Part Number	PKG-PINS	Fast Track Bridge® Advantages
21150-BC	32-bit / 66 MHz transparent	PCI 6150-BB66PC	PQFP-208	<ul style="list-style-type: none"> Asynchronous operation Performance-optimized retry EEPROM Support
GD21150-AC	32-bit / 66 MHz transparent	PCI 6150-BB66BC	PBGA-256	<ul style="list-style-type: none"> Asynchronous operation Performance-optimized retry EEPROM Support
21152-BB	32-bit / 33 MHz transparent	PCI 6152-CC33PC	PQFP-160	<ul style="list-style-type: none"> 66MHz version available from PLX 15mm x 15mm Tiny BGA version available from PLX Lower power dissipation; Performance-optimized retry EEPROM Support
21154-BE	64-bit / 66 MHz transparent	PCI 6154-BB66BC	PBGA-304	<ul style="list-style-type: none"> Asynchronous operation Performance-optimized retry EEPROM Support 5V Tolerant I/O
21554-AA*	64-bit / 66 MHz transparent	PCI 6254-BB66BC	PBGA-365	<ul style="list-style-type: none"> Discontinued by original vendor; supported by PLX
21555-BA*	64-bit / 66 MHz non-transparent	PCI 6254-BB66BC	PBGA-365	<ul style="list-style-type: none"> PCI Rev. 3.0 Compliant

* Functionally compatible

PLX FastLane Bridges Advantages

- Better Performance than Common P-to-P Bridges
 - Large Buffer Sizes
 - Larger Prefetch Sizes
 - Smart Prefetch
 - Performance-Optimized Retry Architecture
 - Programmable Flow-Through
- Enhanced Compatibility
 - Asynchronous Clocking
 - Smaller Packages, Smaller Footprint BGA Versions
 - Lower Power Consumption
 - 5V Tolerant I/O
- Broad tools and customer service support

FastLane Bridges Unique Features

- Non-Transparency
 - Benefit: Allows dual processor designs
 - Better performance, better data availability
- Universal Mode for CompactPCI
 - Allows a card to be system and peripheral card
 - Lowers inventory costs
- CompactPCI Hot-Swap Friendly
 - Simplifies hot swap designs
- EEPROM Support
 - Allows bridge configuration without driver support
- Smallest Packages
- Lowest Power Consumption

PCI I/O Accelerators

PLX offers two types of I/O Accelerators: Targets (Table 1) and Masters (Table 2).

PCI Target I/O Accelerators support Direct Slave operation, PCI bus master devices to access memory and other slave devices on a local bus. They have broad application in adapters and embedded peripheral functions that are controlled from the PCI bus.

PCI Bus Master I/O Accelerators support Direct Slave operation, plus they add support for Direct Master operation, allowing processor/local bus master devices to access memory and other devices on the PCI bus, and they support DMA, allowing masters on either bus to direct the chip to perform data transfers. Mastering devices also provide intelligent messaging units for system control. They have broad application in intelligent peripheral devices and embedded hosts.

Table 1. PCI Target I/O Accelerators

Interfaces	PCI 9052	PCI 9030-AA60PI
		PCI 9030-AA60BI
PCI Bus Type	32-bit, 33MHz PCI r2.1	32-bit, 33MHz PCI r2.2
Local Bus Type(s)	C: Generic, 28-bit Address, 32-bit Data, non-muxed J: Generic, 28-bit Address, 32-bit Data, muxed I: ISA compatible	C: Generic, 28-bit Address, 32-bit Data, non-muxed J: Generic, 28-bit Address, 32-bit Data, muxed
Maximum Local Bus Speed	40MHz	60MHz
Core Voltage	5V	3.3V
I/O Ring Voltage	5V	3.3V
3.3V PCI and Local Bus	-	✓
5V PCI and Local Bus	✓	✓ (Tolerant)
PICMG 2.1 Hot Swap Support	-	r2.0 Hot Swap Silicon Programming Interface 0 (PI=0) Bias Voltage/Early Power
Package Size/Type(s) [pin/ball count, external dimensions (mm), pin/ball pitch (mm), package type] *	160-pin, 31.2mm x 31.2mm, 0.65mm PQFP	176-pin, 26mm x 26mm, 0.5mm PQFP 180-pin, 12mm x 12mm, 0.8mm µBGA
Industrial Temperature Range Operation	✓	✓
Control		
PCI Power Management	-	✓ (Revision 1.1)
PCI r2.2 VPD Support	-	✓
Serial EEPROM Support	1-Kbit, 3-wire devices with sequential read support	2-Kbit, 4-Kbit, 3-wire devices with sequential read support
JTAG Boundary Scan	-	✓
Register Compatibility	Backward compatible with PCI 9050	Backward compatible with PCI 9050
Data Transfer		
Direct Slave Address Spaces	4 General-Purpose 1 Expansion ROM	4 General-Purpose 1 Expansion ROM
Direct Slave Read FIFO Depth	8 Lwords (32 bytes)	16 Lwords (64 bytes)
Direct Slave Write FIFO Depth	16 Lwords (64 bytes)	32 Lwords (128 bytes)
PCI r2.1 Deferred Read Support	✓	✓
Programmable READY# Time Out	-	✓
Programmable Pre-Fetch Counter	✓	✓
Big Endian/Little Endian Conversion	✓	✓

Note: "-" means the product feature is not supported for that device.

* Available in standard and lead-free packaging. See complete list of part numbers on our website at http://www.plxtech.com/products/PCI9xxx_part_no.htm

Table 2. PCI Bus Master I/O Accelerators

Interfaces	PCI 9054-AC50PI PCI 9054-AC50BI	PCI 9056-BA66BI	PCI 9656-BA66BI
PCI Bus Type	32-bit, 33MHz PCI r2.2	32-bit, 66MHz PCI r2.2	64-bit, 66MHz PCI r2.2
Local Bus Types(s)	C: Generic, 32-bit Address, 32-bit Data, non-muxed J: Generic, 32-bit Address, 32-bit Data, muxed M: PowerPC™ PowerQUICC™, 32-bit Address, 32-bit Data, non-muxed	C: Generic, 32-bit Address, 32-bit Data, non-muxed J: Generic, 32-bit Address, 32-bit Data, muxed M: PowerPC™ PowerQUICC™, 32-bit Address, 32-bit Data, non-muxed	C: Generic, 32-bit Address, 32-bit Data, non-muxed J: Generic, 32-bit Address, 32-bit Data, muxed M: PowerPC™ PowerQUICC™, 32-bit Address, 32-bit Data, non-muxed
Maximum Local Bus Speed	50MHz	66MHz	66MHz
Core Voltage	3.3V	2.5V	2.5V
I/O Ring Voltage	3.3V	3.3V	3.3V
3.3V PCI and Local Bus	✓	✓	✓
5V PCI and Local Bus	✓ (Tolerant)	✓ (Tolerant)	✓ (Tolerant)
PICMG 2.1 Hot Swap Support	r2.0 Hot Swap Silicon Programming Interface 0 (PI=0)	r2.0 Hot Swap Silicon Programming Interface 0 (PI=0) Bias Voltage/Early Power Support Initially Not Respond	r2.0 Hot Swap Silicon Programming Interface 0 (PI=0) Bias Voltage/Early Power Support 64-bit Initialization Initially Not Respond
Package Size/Type(s) [pin/ball count, dimensions, pin/ball pitch, package type]*	176-pin, 26mm x 26mm, .5mm PQFP 225-ball, 27mm x 27mm, 1.5mm PBGA	256-ball, 17mm x 17mm, 1.0mm FPBGA	272-ball, 27mm x 27mm, 1.27mm PBGA
Industrial Temperature Range Operation	✓	✓	✓
Control			
Mailbox Registers	Eight 32-bit	Eight 32-bit	Eight 32-bit
Doorbell Registers	Two 32-bit	Two 32-bit	Two 32-bit
I2O Messaging Unit	✓ (Revision 1.5)	✓ (Revision 1.5)	✓ (Revision 1.5)
PCI Arbiter	-	✓ (7 external masters)	✓ (7 external masters)
PCI Type 0/1 Configuration Support	✓	✓	✓
PCI Power Management	✓ (Revision 1.1)	✓ (Revision 1.1)	✓ (Revision 1.1)
D3COLD PME Generation	-	✓	✓
PCI r2.2 VPD Support	✓	✓	✓
Serial EEPROM Support	2-Kbit, 4-Kbit, 3-wire devices with sequential read support	2-Kbit, 4-Kbit, 3-wire devices with sequential read support	2-Kbit, 4-Kbit, 3-wire devices with read support
JTAG Boundary Scan	-	✓	✓
Register Compatibility	Backward compatible with PCI 9080	Backward compatible with PCI 9054	Backward compatible with PCI 9054
Direct Slave Address Spaces	2 General-Purpose 1 Expansion ROM	2 General-Purpose 1 Expansion ROM	2 General-Purpose 1 Expansion ROM

Note: "-" means the product feature is not supported for that device.

* Available in standard and lead-free packaging. See complete list of part numbers on our website at <http://www.plxtech.com/products/leadfree.asp>

Table 2. PCI Bus Master I/O Accelerators (continued)

Data Transfer	PCI 9054-AC50PI PCI 9054-AC50BI	PCI 9056-BA66BI	PCI 9656-BA66BI
Direct Slave Read FIFO Depth	16 Lwords (64 bytes)	32 Lwords (128 bytes)	16 Qwords (128 bytes)
Direct Slave Write FIFO Depth	32 Lwords (128 bytes)	64 Lwords (256 bytes)	32 Qwords (256 bytes)
PCI r2.1 Delayed Read Support	✓	✓	✓
Programmable READY# Time Out	-	✓	✓
Direct Master Address Spaces	1	1	1
Direct Master Read FIFO Depth	16 Lwords (64 bytes)	32 Lword (128 bytes)	16 Qwords (128 bytes)
Direct Master Write FIFO Depth	32 Lwords (128 bytes)	64 Lwords (256 bytes)	32 Qwords (256 bytes)
DMA Channels	2	2	2
DMA Channel 0 FIFO Depth	32 Lwords (128 bytes) Bi-directional	64 Lwords (256 bytes) Bi-directional	32 Qwords (256 bytes) Bi-directional
DMA Channel 1 FIFO Depth	16 Lwords (64 bytes) Bi-directional	64 Lwords (256 bytes) Bi-directional	32 Qwords (256 bytes) Bi-directional
DMA Demand Mode H/W Control	✓ (Channel 0 Only)	✓	✓
DMA EOT Mode H/W Control	✓	✓	✓
DMA Block Mode	✓	✓	✓
DMA Scatter/Gather Mode	✓	✓	✓
DMA Ring Management Mode	-	✓	✓
Programmable Pre-Fetch Counter	✓	✓	✓
Dual Address Cycle Generation	✓	✓	✓
Big Endian/Little Endian Conversion	✓	✓	✓

Note: "-" means the product feature is not supported for that device.

PCI I/O Accelerator Rapid Development Kits

Rapid Development Kits (RDK) are comprehensive PCI development tool packages, which includes the PLX PCI HDK CD-ROM (see below), PCI SDK software CD-ROM, and a PCI or CompactPCI Reference Board.

	PCI 9052	PCI 9030		PCI 9054		PCI 9056		PCI 9656	
Part Number	PCI 9052 RDK-LITE	CompactPCI 9030RDK-LITE	PCI 9030 RDK-LITE	CompactPCI 9054RDK-860	PCI 9054 RDK-LITE	CompactPCI 9056RDK-860	PCI 9056 RDK-LITE	CompactPCI 9656RDK-860	PCI 9656 RDK-LITE
PCI Compliance	PCI r2.1 32-bit, 33MHz	PICMG 2.0 r2.1 PICMG 2.1 r1.0 32-bit, 33MHz	PCI r2.2 32-bit, 33MHz	PICMG 2.0 r2.1 PICMG 2.1 r1.0	PCI r2.2 32-bit, 33MHz	PICMG 2.0 r3.0 PICMG 2.1 r2.0 32-bit, 33MHz	PCI r2.2 32-bit, 66MHz	PICMG 2.0 r3.0 PICMG 2.1 r2.0 64-bit, 66MHz	PCI r2.2 64-bit, 66MHz
Local Bus	Non-muxed 28-bit Address 32-bit Data 40MHz generic (C) Configurable to muxed (J)	Non-muxed 28-bit Address 32-bit Data 60MHz generic (C) Configurable to muxed (J)	Non-muxed 28-bit Address 32-bit Data 60MHz generic (C) Configurable to muxed (J)	32-bit Address 32-bit Data 50MHz PowerQUICC (M)	Non-muxed 32-bit Address 32-bit Data 50MHz generic (C) Configurable to muxed (J)	32-bit Address 32-bit Data 50MHz PowerQUICC (M)	Non-muxed 32-bit Address 32-bit Data 66MHz generic (C) Configurable to muxed (J)	32-bit Address 32-bit Data 66MHz PowerQUICC (M)	Non-muxed 32-bit Address 32-bit Data 66MHz generic (C) Configurable to muxed (J)
CPU	-	User provided Footprints available on board	User provided Footprints available on board	Motorola MPC860 PowerQUICC	User provided Footprints available on board	Motorola PowerQUICC	User provided MPC860T Footprints available on board	Motorola PowerQUICC	User provided MPC860T Footprints available on board
SDRAM	-	-	-	32 Mbytes (8M x 32)	Footprints available	64 Mbytes (16M x 32) on Board	-	64 Mbytes (16M x 32)	-
SRAM	128 Kbytes (32K x 32)	16 Kbytes (8K x 16)	16 Kbytes (8K x 16)	512 Kbytes (128K x 32)	128 Kbytes (32K x 32)	512 Kbytes (128K x 32)	512 Kbytes (128K x 32)	512 Kbytes (128K x 32)	128 Kbytes (32K x 32)
Boot ROM Flash	Socket available on board	Socket available on board	Socket available on board	512 Kbytes (512K x 8)	Socket available on board	512 Kbytes (512K x 8) plus 8Mbytes (8M x 8)	Socket available on board	512 Kbytes (512K x 8) plus 8Mbytes (8M x 8)	Socket available on board
Communication Port(s)	-	RS-232 Serial	RS-232 Serial	RS-232 Serial	RS-232 Serial	RS-232 Serial (2), 10/100 Mbit	RS-232 Serial Ethernet	RS-232 Serial (2), 10/100 Mbit	RS-232 Serial Ethernet
Debug Port(s) Software Included	- PCI SDK	- PCI SDK	- PCI SDK	BDM PCI SDK	PCI SDK	BDM PCI SDK	- PCI SDK	BDM PCI SDK	- PCI SDK
PLX Option Module (POM) Connector	-	✓	✓	✓	✓	✓	✓	✓	✓

Note: "-" means the product feature is not supported for that device.

Hardware Development Kit CD-ROM Collection

The PCI Hardware Development Kit (HDK) CD-ROM Collection is a comprehensive assortment of PLX hardware tools. It includes the contents of the above product HDKs on a single CD-ROM, plus all current Application Notes and the OrCAD Capture Symbol Library. It contains complete hardware design information including OrCAD Schematics, Gerber Layout Files, OrCAD layout source files, Bill of Materials (BOM), Hardware Reference Manuals, Verilog source code (where applicable), PLX chip Data Books, and Product Briefs.

PCI Software Development Kit (SDK)

PLX's PCI SDK 4.4 is an invaluable tool for PCI software developers. The following table details its extensive software components. The PCI SDK 4.4 CD-ROM also contains complete documentation including the PCI SDK User's Manual and PCI SDK Programmer's Reference Manual.

SDK 4.4 Software Component

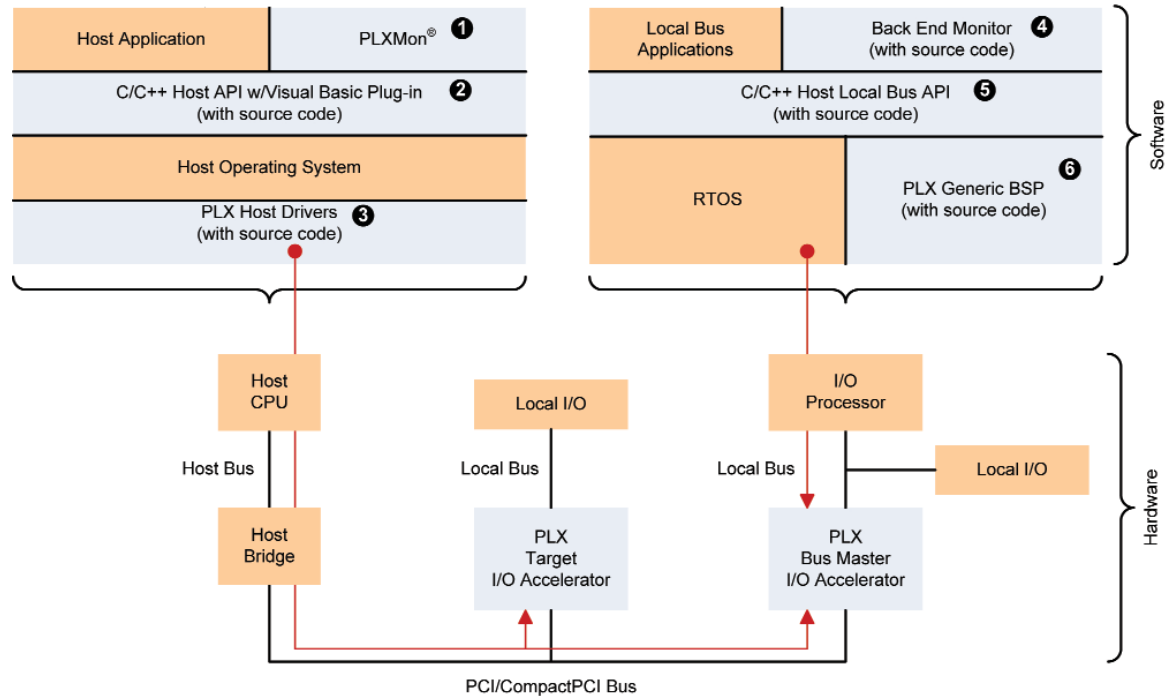
Supported Chips and Rapid Development Kits

	CompactPCI 9030RDK-LITE	CompactPCI 9030RDK-LITE	PCI 9030	PCI 9052RDK-LITE	PCI 9052	CompactPCI 9054RDK-LITE	CompactPCI 9054RDK-LITE	PCI 9054	CompactPCI 9056RDK-860	CompactPCI 9056RDK-LITE	PCI 9056	CompactPCI 9656RDK-LITE	CompactPCI 9656RDK-860	PCI 9656	PCI 9080	PCI 6140 + RDK	PCI 6150 + RDK	PCI 6152 + RDK	PCI 6154 + RDK	PCI 6156 + RDK	PCI 6254 + RDK	PCI 6466 + RDK	PCI 6540 + RDK	PCI 6520	
Windows Applications																									
PLXMon™ Support Interactive Windows-Based GUI	①	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PLXMon Performance Measure	①	✓	✓			✓		✓			✓		✓	✓				*	*	*	*	*	*	*	*
PCI Software Development Support																									
C/C++ API Library Object & Source Files	②	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Source code Using PCI API library, Non-transparent mode, etc.	②	✓																✓	✓	✓	✓	✓	✓	✓	✓
Source Code Examples Using PCI API Library Direct Slave Transfer, Interrupt Event Handling, Scatter/Gather DMA, and more	②	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
MS Windows (32-bit & 64-bit(x64)) Host Drivers with Source Code	③	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linux Kernel 2.4 & 2.6 (32-bit & 64-bit) Host Drivers with Source Code	③	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
Local Bus Software Development Support																									
Back-End Monitor Executable & Source Code Enables Local Bus Communication With PCI Application via the RDK Serial Port	④	✓						✓		✓	✓		✓		✓		✓								
Source Code Examples Using Local Bus API Library Direct Master Transfer, Block Mode DMA, & Scatter/Gather DMA, and more	⑤	✓						✓		✓	✓		✓		✓		✓								
C/C++ API Library Object Files & Source Code Create Local Bus Executables	⑤	✓						✓		✓	✓		✓		✓		✓								
PLX Board Support Package (BSP) Executable & Source Code Generic Local Bus Software Environment	⑥	✓						✓		✓	✓		✓		✓		✓								

*PLX Performance Measure Tool can be used to estimate performance on the PCI 6000 series in conjunction with the PCI 9056RDK-860 and CompactPCI 9656RDK-860 DMA boards.

The figure below illustrates the PCI SDK architecture: the types of software components included, how these components interface with each other, and how they interface with a system that includes one or more PLX PCI I/O Accelerators.

PCI SDK Block Diagram



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