

Product: PCI-Express Gen-2 Signal Switch Products

Part Numbers: PI2PCIE2412, PI2PCIE2422

Bandwidth Allocation for PCI Express

PCI Express is a point-to-point technology. The number of lanes to a root complex represents the bandwidth available to peripheral devices. This bandwidth is limited by the system architecture and is usually optimized for a given system configuration. If more bandwidth or flexibility in system configurations is needed, then substantial additional cost can be incurred. Pericom's PCI Express signal switches offer a "bandwidth allocation and signal routing solution for PCI Express" with a minimum latency compared to PCI Express packet switch, and at a very minimum cost.

Pericom PCI-Express Gen-2 Solutions

Pericom's PI2PCIE24xx PCI Express Signal Switches provide a way to allocate PCI Express lanes and bandwidth by allowing the limited PCI Express lanes from the root complex to be dynamically assigned to different slots of a system, thus enabling the allocation of bandwidth at the same time. The conventional Packet Switch does not always include bandwidth allocation features.

The PI2PCIE2412 2:1 Mux/Demux

The PI2PCIE2412 is a 4-differential channel, 2:1 mux/demux) Gen-2 PCI-Express Signal switch. Designed using the latest high-speed broadband switching technology, it provides 5.0Gbps PCI Express Gen-2 physical layer signal processing. The switch supports full speed operation with 16" trace lengths at the PCB motherboard board. The PI2PCIE2412 allows bandwidth allocation of two complete PCI Express lanes, each representing differential pairs of Rx and Tx signals. By designing the switch Ron and Con at the lowest possible factor, there is minimal degradation of margins at the receiver eye opening.

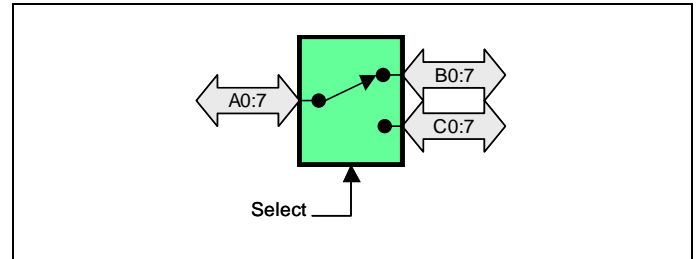


Figure 1. PI2PCIE2412 Block Diagram

The PI2PCIE2422 1:2 Mux with Bypass

The PI2PCIE2422 Signal switch, is a 4-differential channel, 2:1 mux/demux with Bypass feature for Gen-2 PCI-Express applications. The PI2PCIE2422 is a complement to the PI2PCIE2412, and provides all the same performance capabilities including 5.0Gbps PCI Express operation and 16" PCB trace lengths.

The Bypass function of this device enables some unique system applications. Under control of the Select input, the device connects either Port A to D, or Port A to B and Port C to D.

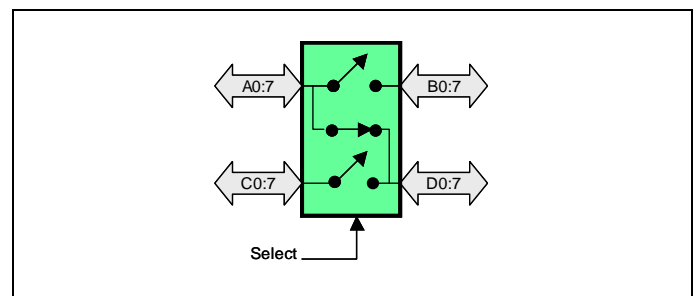


Figure 2. PI2PCIE2422 Block Diagram

Key Features & Specifications

- Single device can offer bandwidth allocation of PCI Express signals of up to 4-Differential channels
- Provides signal transmit and receive capability for two complete PCI Express lanes

- Operating Voltage: 1.8V
- Maximum trace length coverage is 16"
- PCI Express Gen-2, 5.0Gbps performance
- Downward compatible to PCI Express Gen-1
- 42-pad TQFN package (Pb-free & Green)
- Low Ron / Con for maximum signal transfer and low distortion
- Bandwidth: >3GHz
- Crosstalk: -35dB@3GHz
- Isolation: -25dB@ 3GHz
- ESD: 2KV HBM
- For high-performance, differential signal switching applications for PCI Express for:

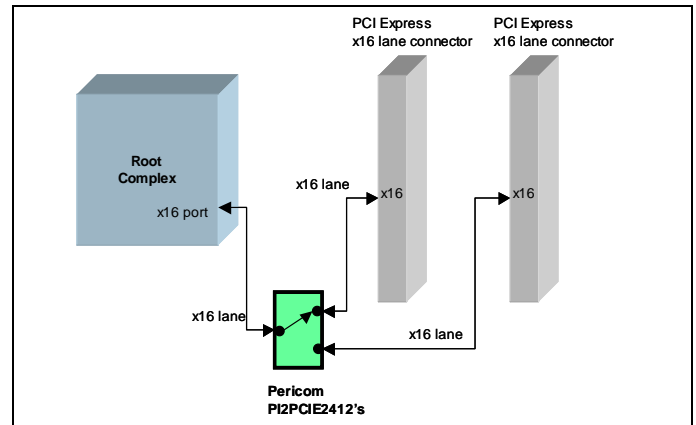


Figure 4: Gaming PCs

Applications of PCI-E Signal Switch

Slot configuration is a popular application of PCI Express signal switches. Figure 3 shows an example where two 8-lane ports on the Root Complex can support either one 16-lane or two 8-lane connectors. Many other similar configurations are possible, such as with multiple 4-lane or single-lane slots combined with wider slots. Workstations, servers and desktop PCs are common platforms using PCI Express slot configuration.

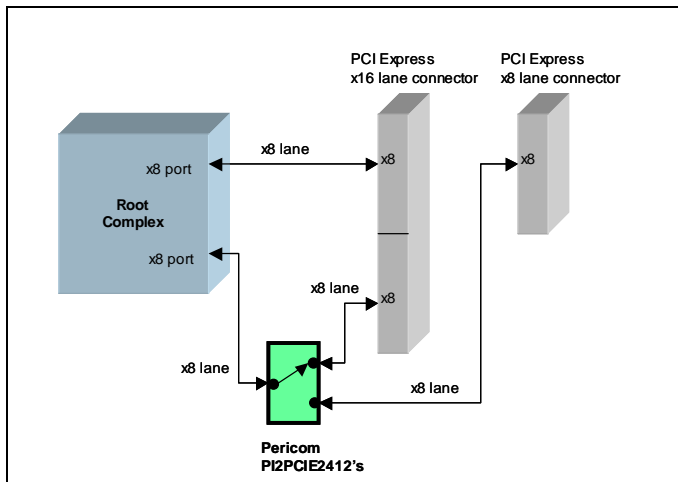


Figure 3: Slot Configuration

Figure 4 shows slot and bandwidth allocation for high-performance gaming stations when dual graphics cards are used to boost performance. The PI2PCIE2412 switch can quickly redirect data from one card to the next and back again in ping-pong fashion, loading data for processing during “off-line” processing.

Notebook docking is another application for PCI Express signal switches, as diagrammed in Figure 5. In this example, the PCI Express lanes are switched between peripherals either inside the notebook, or inside the docking station. For example, the Ethernet, graphics and Express Card ports provided in both are seldom used simultaneously when the notebook is docked.

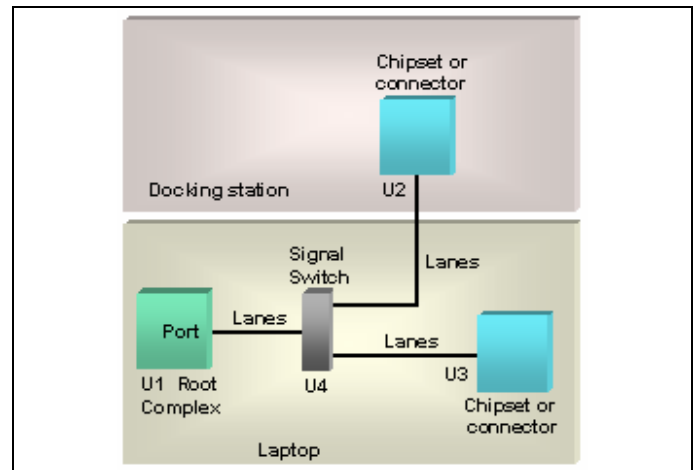


Figure 5: Laptop docking stations

Pericom's PI2PCIE2422 Bypass switch enables connection of multiple sources to multiple destination devices to provide more options for system flexibility. Figure 6 illustrates an application where 9-lanes of PCI Express from the Root Complex, are switched to two connectors that can be configured as either 8-lane plus 1-lane, or dual 4-lane slots.

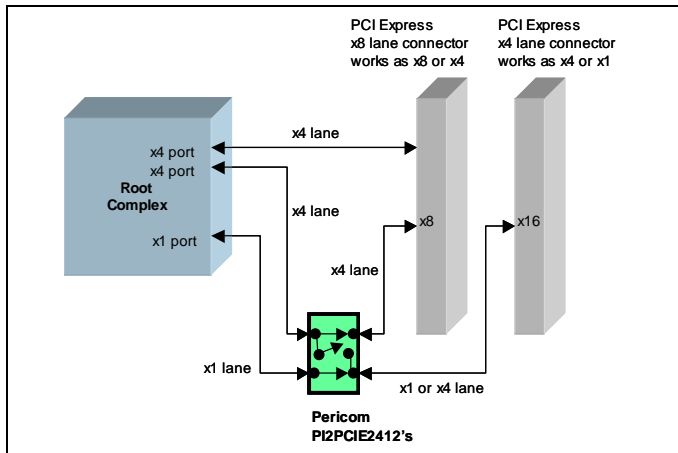


Figure 6 – Lane Configuration with Multiple Sources

Applications environment:

- Gaming desktop PCs
- Servers
- Laptop Docking stations
- Desktop & Mobile PCs

Another application of the PI2PCIE2422 Bypass switch is shown in Figure 7. In this example, the system has a default graphics configuration (as shipped from the factory). An additional, maybe enhanced, graphics device can be added later as an external module or docking device. When combined with a Pericom packet switch as shown, both graphics devices can be simultaneously active. The advantage of this solution is that the expensive packet switch does not need to be included in the basic system, but only when required for the system enhancement. A unique feature of this PI2PCIE2422 is that additional expansion modules can be added in a linked chain, when the switch is added to the module.

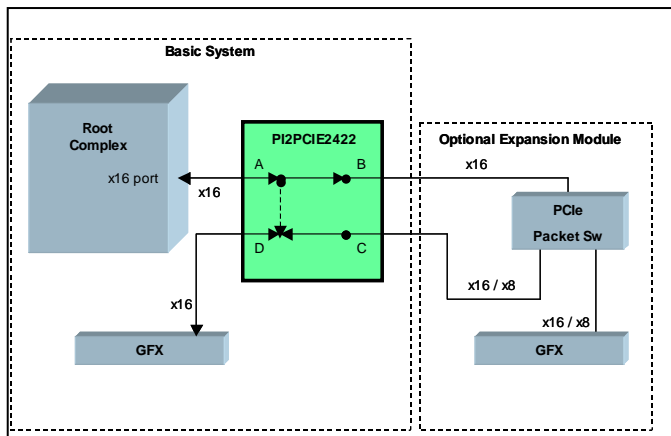


Figure 7 – System Expansion with PCI-E Switch