Version 1.3 2002

PowerDrive HT7520

HyperTransport Tunnel-to-Dual PCI-X Bridge

Features

- 16-bit HyperTransport interface (Side A) offers a maximum bandwidth of 6.4GB/s
- 8-bit HyperTransport interface (Side B) offers a maximum bandwidth of 3.2GB/s
- Connects to the host and a downstream HyperTransport technology-compliant device
- Supports double hosted chains (CPU on each port)
- Each Side supports HyperTransport technology-defined reduced bit widths—8-bit, 4-bit, and 2-bit
- Each side supports transfer rates of 1600, 1200, 800, and 400 mega-transfers per second
- Offers independent transfer rate and bit width selection
- Link disconnect protocol supported
- Two PCI-X bridges (Bridge A and Bridge B) each support the following:
  - A 64-bit data bus
  - PCI-X modes and legacy PCI revision 2.2 modes
  - 133-, 100- and 66MHz transfer rates in PCI-X mode
  - 66- and 33-MHz PCI 2.2 modes
  - Independent transfer rates and operational modes
  - Up to five PCI masters
  - An I/O Advance Programmable Interrupt Controller (IOAPIC) with four redirection registers – legacy interrupt controller and IOAPIC modes supported
  - Hot Plug controller and support
- 829-ball OBGA package

PLX TECHNOLOGY
THE I/O INTERCONNECT SOLUTION

The Most Scalable, Highest Performance HyperTransport Interconnect Bridge

Ever increasing CPU bus clock speeds, coupled with faster peripheral devices, have engendered I/O bottlenecks in high-speed, networked applications such as switches, routers and storage servers. The HyperTransport technology is a fast, non-proprietary, point-to-point link that offers the speed necessary for these advanced systems.

PLX Technology has developed the PowerDrive™ HT7520, a HyperTransport Tunnel-to-Dual PCI-X bridge that interfaces HyperTransport-based devices to PCI-based peripherals. The HT7520 offers flexible connectivity and high performance, enabling today's high-speed embedded systems.

Scalability

PowerDrive devices provide maximum scalability through an onboard bi-directional HyperTransport tunnel interface. The tunnel enables daisy chaining of up to 31 other HyperTransport devices on a single bus. The PowerDrive device couples a HyperTransport tunnel with two PCI-X bridges. The PCI-X bridge provides a connection between HyperTransport based processors and PCI based peripherals. Together, the two PCI-X bridges enable support for connectivity of up to 10 PCI masters. As a result, PowerDrive enables higher capacity systems via connections to multiple PCI-X devices and HyperTransport peripherals.

High Performance

PowerDrive devices significantly increase performance over PCI-only based systems. The HyperTransport Tunnel has a 16-bit interface (Side A) and an 8-bit interface (Side B). PowerDrive also offers a full, 800MHz DDR clock rate. As a result, Side A of the tunnel provides a maximum bandwidth of 6.4 GB/s, a 48X speed up over standard PCI. Side B provides a maximum of 3.2 GB/s, giving a 24X speed up. These high-speed interfaces provide fast peripheral accesses to/from memory.

Performance is also maximized through the PCI-X bridges. Each 64-bit wide bridge is capable of a maximum speed of 133 MHz. In PCI-X mode, 133-, 100- and 66MHz transfer rates are supported. In PCI mode, each bridge supports 66- and 33MHz transfer rates. For optimum performance networks, PowerDrive does not require the highest speed device to be slowed down to the performance of the slowest peripheral. Instead, the PowerDrive device allows high-speed loads to operate on a separate bridge, enabling high-speed traffic to run full tilt. A high bandwidth tunnel and multiple high-speed bridges are the enablers for high-performance embedded applications.

PowerDrive™

Features

The PowerDrive HT7520 is a high-speed device that provides two independent, high-performance PCI-X bridges, integrated with a high-speed HyperTransport technology tunnel. The tunnel function provides connection capability to other downstream HyperTransport technology devices, allowing greater system connectivity. As shown in Figure 1, the front-end HyperTransport interface (Side A) provides a configurable 16-bit wide communication path to the host, offering up to 6.4GB/s of bandwidth. Similarly, the back-end HyperTransport interface (Side B) provides a configurable 8-bit wide communication path to a downstream device, offering up to 3.2GB/s of bandwidth.

Interfaces

HyperTransport

- HyperTransport Tunnel is compliant to the HyperTransport I/O Link Specification, version 1.03
- Side A of the HyperTransport Tunnel is a 16-bit interface; Side B is 8-bit
- Either side of the tunnel can be connected to a host or another downstream HT device
- Supports double hosted chains (CPU on each port)
- Each side of the tunnel has independently programmable 8-bit, 4-bit and 2-bit widths
- Each side supports independently programmable transfer rates of 800, 600, 400 and 200 MHz
- Each HyperTransport link implements TX and RX unidirectional, 1.2V LVDS signaling
- Link disconnect protocol supported

Dual PCI-X

- PCI-X version 1.0a compliant
- 64-bit wide data bus
- Operational modes of PCI-X and legacy PCI Local Bus Specification, Revision 2.2 protocol
- Support for 133-, 100- and 66MHz transfer rates in PCI-X mode
- Support for 66- and 33MHz transfer rates in PCI mode
- Independent transfer rates and operational modes for each bridge
- Support for up to 5 PCI Masters, per bridge, with clock, request, and grant signals
- IOAPIC with up to 12 programmable interrupts; Legacy Interrupt Controller and IOAPIC modes supported
- SHPC-compliant, version 1.1, Hot Plug controller and support

Electrical/Mechanical Features

- 829-pin Organic BGA (OBGA)
  - 37.5 x 37.5 mm
  - Low power 1.8V core
  - 3.3V PCI-X signaling; 1.2V link signaling
  - Commercial temperature range

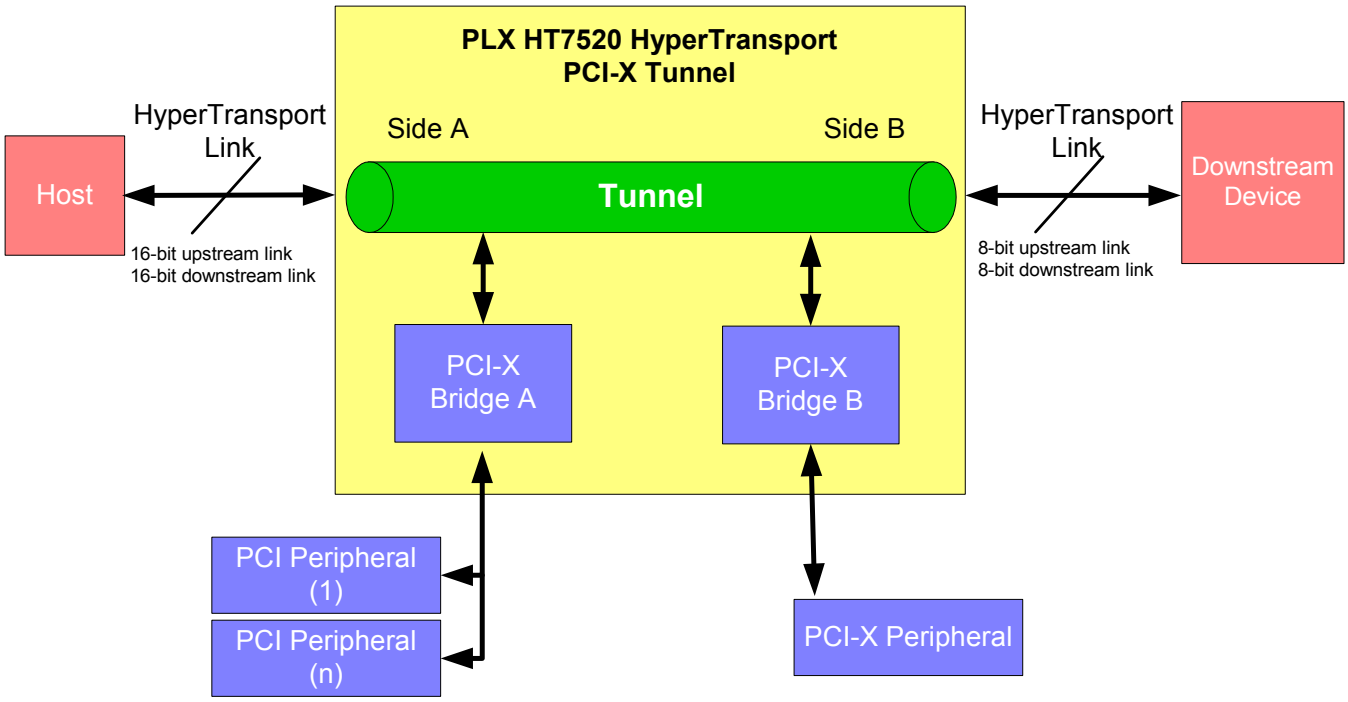

Figure 1. PLX HT7520 HyperTransport™ PCI-X Tunnel

Applications

Switches & Routers

Today's routers and switches process high-speed traffic that are bottlenecked across the I/O bus. Switch and router manufacturers are seeking out new I/O interconnect solutions that address their ever-increasing need for speed, robustness and scalability.

Figure 2 shows the PowerDrive HT7520 implemented in a LAN-to-WAN bridge/router. A point-to-point, high-speed interconnect simplifies the system architecture and dramatically increases the overall performance.

The dual PCI-X bridge provides maximum scalability while maintaining interoperability with legacy PCI components. The PowerDrive HT7520 is a high-performance solution enabling faster, simpler and scalable features for next-generation switches and routers.

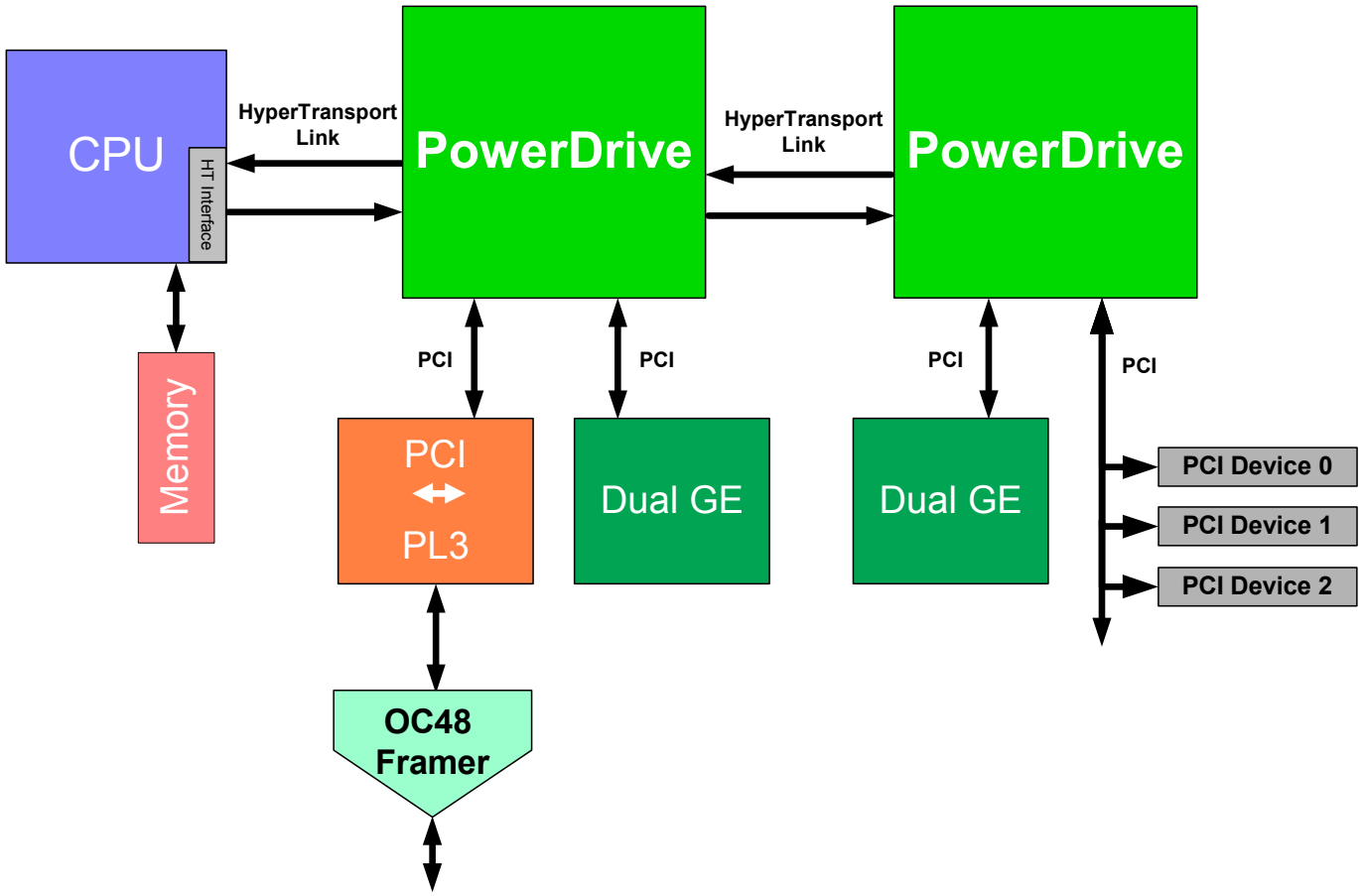

Figure 2. Block Diagram of a LAN-to-WAN Bridge/Router

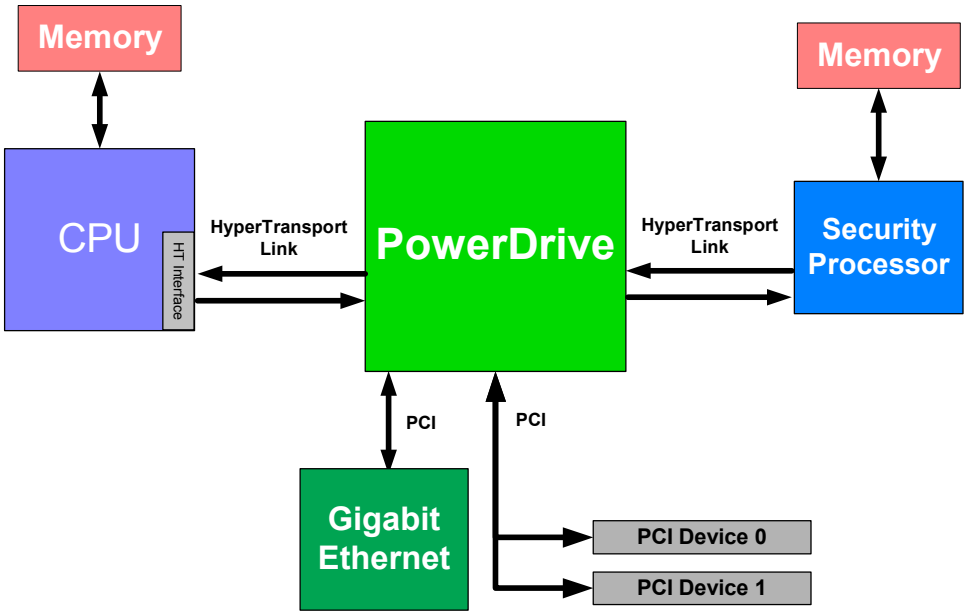

Figure 3. Block Diagram of VPN Gateway

VPN Gateways

Some of the biggest challenges facing hardware designers of VPN equipment include designing efficient encryption/decryption technologies. These technologies must provide increased security and privacy, as well as sender/target authentication, identification and tracking. Current solutions increase security and privacy, but require the trade off of large amounts of data overhead. At low bandwidth speeds, transmitting the payload plus authentication additions slows down data transmission times to a snail's pace. As shown in Figure 3, the PowerDrive HT7520 connects the CPU to a security processor over a 6.4MB/s point-to-point interconnect bus. VPN applications benefit immediately through decreased transmission times of secure, encrypted data.

By adding the PowerDrive device, there is a 48X bandwidth increase over a standard 33 MHz PCI connection. High-speed network connectivity is also enhanced via the availability of two 133 MHz PCI-X bridges. The PowerDrive HT7520 is a high-speed, scalable HyperTransport solution that alleviates VPN interconnect bottlenecks and provides expandability for tomorrow's functionality.

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Product Ordering Information

Part Number	Description
HT7520-BA13BC	PLX PowerDrive HT7520 HyperTransport Tunnel-to-Dual PCI-X Bridge

Please visit the PLX Web site at http://www.plxtech.com or contact PLX sales at 408-774-9060 for sampling.