

Features

RapidIO Interface

- 250 MHz (4 Gbit/s) or 500 MHz (8 Gbit/s)
- Full-duplex, 8-bit data and 34-bit addressing
- Supports mailbox messages
- *RapidIO Interconnect Specification 1.1* compliant

PCI/X Interface

- 50–133 MHz on a PCI-X bus
- 25–66 MHz on a PCI bus
- 32/64-bit data and addressing
- Transparent and non-transparent modes of operation
- Supports multi-threading (four threads) in PCI-X Interface
- PCI/X bus arbiter with support for seven external masters
- *CompactPCI Hot Swap Silicon* compliant
- *PCI Local Bus Specification (Rev. 2.2)*, *PCI-X Addendum (Rev. 1.0a)*, and *PCI-to-PCI Bridge Specification (Rev. 1.1)* compliant

The Tsi400 connects RapidIO devices to multi-drop devices based on PCI and PCI-X.

Other Device Capabilities

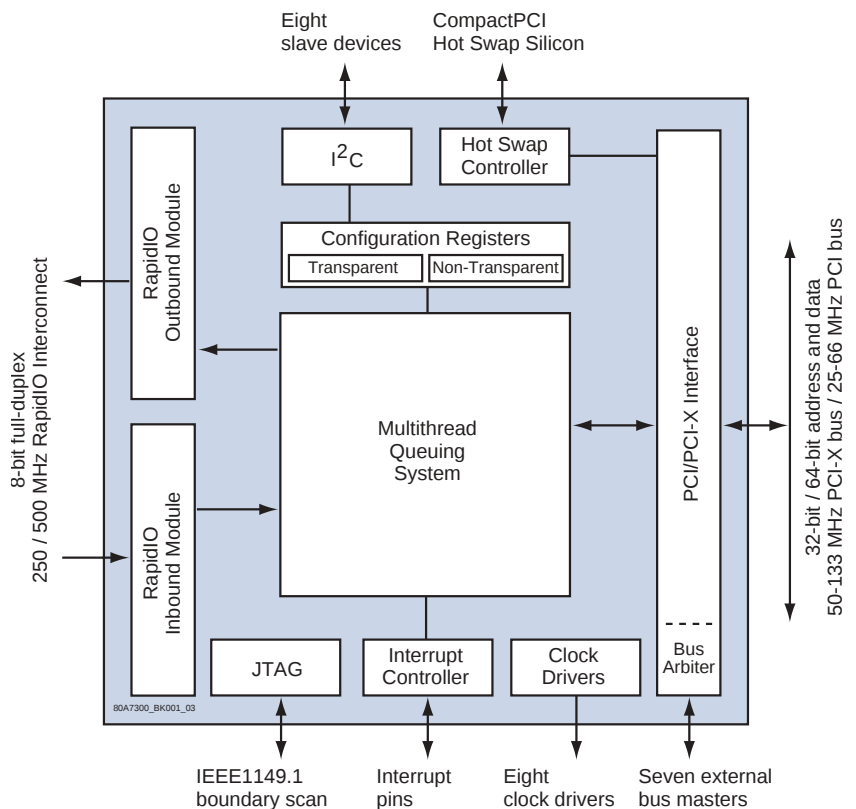
- Supports *tunneling* of PCI/X transactions across a RapidIO switching fabric
- I²C/EEPROM Interface
- Interrupt controller that supports RapidIO messages and PCI/X interrupts
- JTAG support (Boundary Scan)

The Tsi400 Advantage

The Tundra Semiconductor Corporation (Tundra) Tsi400™ is a high-performance bus bridge that connects RapidIO devices to multi-drop devices based on PCI and PCI-X (see Figure 1). RapidIO is a new point-to-point, packet-switched interconnect protocol that meets the needs of current and future embedded applications.

An advanced *multithread queuing system (MQS)* forms the core of the Tsi400, as illustrated in Figure 1. The MQS translates RapidIO transactions so that devices connected to the PCI/X Interface can process them. The MQS performs the same transaction mapping from its PCI/X Interface for devices connected directly, or indirectly, to its RapidIO Interface.

Figure 1: Tsi400 Block Diagram



When used in combination with a RapidIO switching fabric device, such as the Tundra Tsi500™, the Tsi400 provides a seamless PCI/X-to-PCI/X connectivity across a RapidIO architecture (see Figure 2). Investments in current PCI and PCI-X applications, are therefore maintained, while new intra-system interconnects can be based on the faster and more reliable, RapidIO technology.

Benefits

Performance

- Supports transparent and non-transparent (embedded) modes, and multiple operating frequencies and datawidths
- Supports low overhead and low latency through packet-data transfers
- Eliminates bus contention on RapidIO port through its peer-to-peer architecture

Reliability

- Maximizes hardware error detection and recovery methods

Compatibility

- Operates virtually transparent of system software
- Backward compatible with PCI and PCI-X protocols

Cost

- Offers a smaller footprint and fewer signal pins, which results in simpler designs

Typical Applications

Communications

- Premise, datacom, and mobile infrastructure

Servers

- PC servers, Storage Area Networks, and high-performance workstations

Ordering Information

Part number: Tsi400-500IJZ

Contact Information

Tundra Semiconductor Corporation
603 March Road, Ottawa
Ontario Canada, K2K 2M5
(613) 592-0714 or 1-800-267-7231
Fax: (613) 592-1320

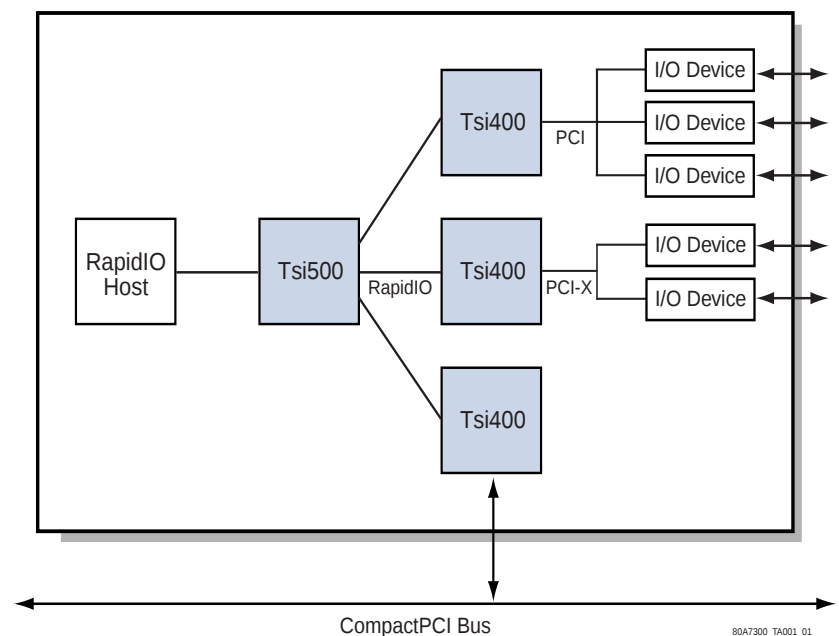
Another powerful Tsi400 feature is its support for transparent and non-transparent (embedded) modes of operation. For example, when configured in transparent mode the Tsi400 provides standard PCI/X bus bridging support through its base and limit registers. This is particularly effective in systems that must achieve near 100 percent software transparency, or that use RapidIO to build a PCI backplane replacement.

When configured in non-transparent mode, the Tsi400 uses its base address registers to provide address translation for PCI/X applications. This mode of operation is normally used in systems where multiple host processors communicate over multiple PCI/X interconnects.

Typical Application: I/O Sub-system Controller

The Tsi400 can function as a bridge between multi-drop devices and the higher-performance, point-to-point devices based on RapidIO, as illustrated in Figure 2.

Figure 2: I/O Sub-system Controller



The RapidIO standard eliminates the throughput bottleneck associated with current systems by allowing I/O sub-system devices to operate at a higher speed, thereby improving overall system performance. Another advantage of the Tsi400 — especially when used with the Tsi500 — is its support for multiple operating frequencies. This feature enables designers to use the Tsi400 in systems configured with RapidIO, PCI, and PCI-X devices.