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HT-2100
PRODUCT Brief

HYPERTRANSPORT™ SYSTEMI/O™ CONTROLLER

FEATURES

- **The HT-2100 integrates:**
  - 24 PCIe links with support for up to five bus controllers
  - Two 16x HyperTransport™ ports with integrated tunnel

- **The HyperTransport features include:**
  - 2-GHz (1-GHz, 2X) HyperTransport bus interface
  - CRC generation and error checking
  - Programmable error checking and handling
  - Scalable clock speeds as well as support for reduced bit widths of: 8 bits, 4 bits, and 2 bits
  - 16x HyperTransport transfer rates of 2000 Mbps, 1600 Mbps, 1200 Mbps, 1000 Mbps, 800 Mbps, and 400 Mbps, per wire
  - Link disconnect protocol support
  - HyperTransport interrupt control and system management support
  - HyperTransport I/O link specification, Revision 2.0 compliant

- **The PCI-Express® features include:**
  - Configurable I/O with 24 serial links and five masters operating at 2.5 GHz with differential, low-voltage signaling
  - Supports a x16 port for workstation implementation
  - Recoverable CRC errors with hardware link-level retransmission
  - 64-bit addressing support
  - Advanced error-detection, error-transmission on destination bus
  - Integrated bit-error generator and monitor function
  - PCI-Express V1.0 and 1.0a compliant
  - Supports 36-bit addressing using 64-bit semantics
  - Native hot-plug support
  - Lane reversal
 - Autoconfiguration of lanes

SUMMARY OF BENEFITS

- **Multiprocessing SystemI/O™ controller for the HyperTransport-enabled processors offering integration, performance, reliability, availability, scalability, and modularity**

- **Best-in-class 64-bit performance**
  - HyperTransport-based architecture reduces I/O bottlenecks and improves overall system performance
  - Best-in-class 64-bit and 32-bit performance

- **Industry proven reliability and availability**
  - Reusable design methodology used with field-proven functional blocks
  - Designed for 24/7 enterprise computing uptime
  - Advanced error detection and correction

- **Extensive scalability**
  - HyperTransport multiprocessor architecture allows superior per processor scalability compared to similar x86 architectures
  - Individual HyperTransport link widths and clock speeds easily suit cost/performance targets
  - Multiple HT-2100 SystemI/O controllers deliver plenty of bandwidth and I/O slots

- **Modular architecture**
  - Modular building blocks allow platform designs that scale from the low-end all the way to high-end
  - System I/O modularity keeps costs low without sacrificing functionality
  - Modular design allows more freedom to differentiate from competition

- **The HT-2100 utilizes the HyperTransport interconnect to the CPU/host bridge and to a variety of South Bridge and I/O bridge solutions. This building block approach enables OEMs to tailor systems to their applications.**

TARGET APPLICATIONS

- Uni, dual, and quad socket servers
- Workstations
- Server clusters
- Storage systems (NAS, SAN, Blades)

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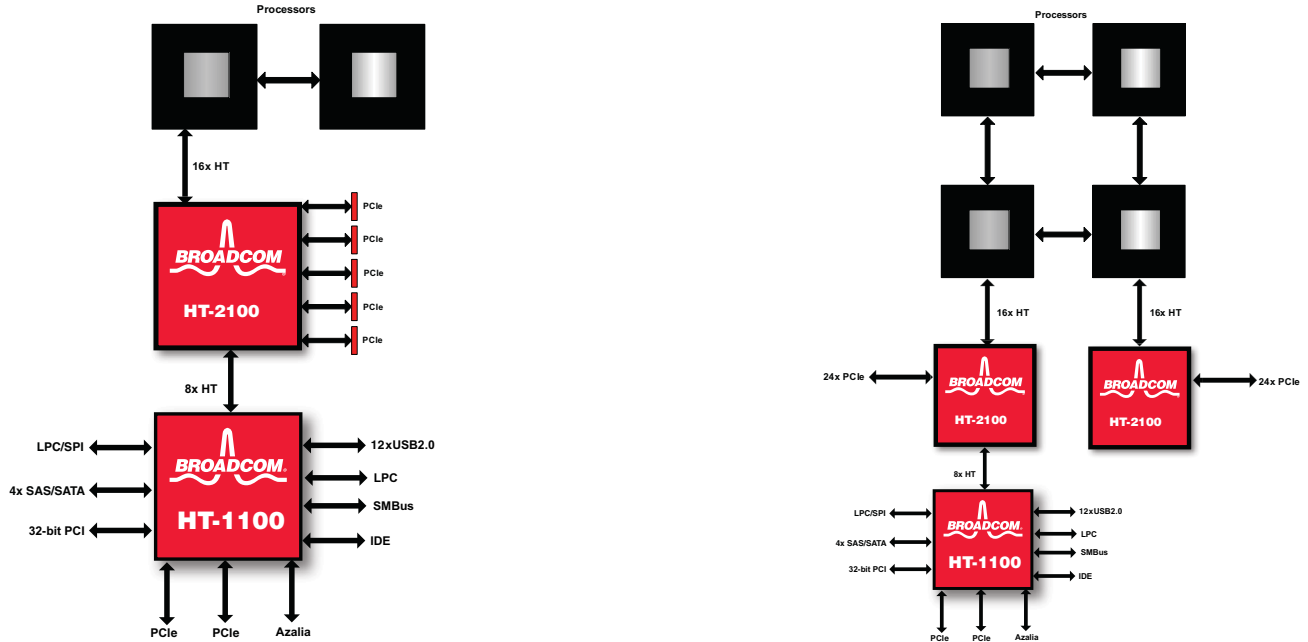
Multiprocessing SystemI/O Configurations

The HT-2100 is targeted at the volume server and workstation market with the capability to efficiently span from one-to-eight sockets without incurring large latencies.

The HT-2100 is a highly-scalable SystemI/O solution for 64-bit/32-bit processors that can be configured to meet OEMs' needs for a variety of product segments. The dual socket configuration shown above can be used for mainstream tower and rack server, as well as high-end workstations. Additional HT-2100 devices can be added to a system to scale to larger multisocket servers.

The HT-2100 is a high-performance HyperTransport to PCIe bridge, capable of tunneling the data between the two HyperTransport ports. The HyperTransport tunneling enables an efficient quad-socket system as shown above (on the right), where a base configuration can be created with fewer devices.

The HT-2100 takes I/O bandwidth, configurability, and scalability to unprecedented levels. The two 16x HyperTransport host ports can operate at a frequency of 1-GHz double-data rate in both the transmit and receive directions to aggregate up to a total bandwidth of 8 GBps. This bandwidth is available to communicate with devices such as the processor or a host bridge.

Likewise, the x16 downstream HyperTransport port can operate at a frequency of 1-GHz double-data rate in both directions and aggregate up

to a total bandwidth of 8 GBps as well. This bandwidth is available to communicate with HyperTransport I/O Hubs such as the HT-1000.

For low-latency, high-bandwidth I/O interconnect PCI-Express, the HT-2100 offers an array of choices to match the bandwidth needs of the device as well as number of devices that need to be supported on the platform. The 24 serial links operating at 2.5 GHz can be configurable to five PCI-E masters. Some sample configurations that are possible are x16 + x8, x8 + x8 + x8 or x16 + x4 + x4, or x8 + x8 + x4 + x4 or x8 + x4 + x4 + x4 + x4. Combinations of link widths that are lower than the ones mentioned are possible. No other device in the marketplace matches this level of flexibility for PCIe.

The HT-2100 supports the MSI mechanism for interrupts. Additionally, it will also support the legacy mechanism by virtualizing the PCI INTx interrupts. The incoming MSIs from PCIe are sent upwards by mapping them to HyperTransport Interrupt packets.

Multiple HT-2100 devices can be used to scale out the system in terms of processors and I/O connectivity for building higher-end multiprocessor systems.

The high levels of integration, enterprise server features, the I/O flexibility, and device scalability make the HT-2100 the best-in-class SystemI/O solution in the market for building the servers.

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