



## HT-1000 HyperTransport™ System I/O™ Hub

### FEATURES

- **The HT-1000 integrates:**
  - 8x HyperTransport™ bus
  - Integrated South Bridge
  - PCI-X® 64 bus/133 bus
  - PCI 32 bus/33 bus
  - Four-port SATA II
  - Four-port USB 2.0
  - Single-channel ATA 100 IDE
  - SMBus
  - ACPI
  - Interrupt controller
  - Floppy DMA
  - LPC bus
- **The HyperTransport features include:**
  - 8x HyperTransport interface
  - Scalable individual link width and clock speed
  - Split-transaction protocol eliminates retries, disconnects, and wait states
  - CRC error generation and checking
  - Programmable error handling
  - System management capable
  - HyperTransport link supports transfer rates of 1600 Mbps, 1200 Mbps, 800 Mbps, and 400 Mbps per wire
  - Link disconnect protocol supported
  - HyperTransport interrupt control supported
  - HyperTransport I/O Link specification, revision 1.05 compliant
- **The PCI-X Bus Bridge features include:**
  - Allows concurrency between HyperTransport and PCI-X buses
  - Eight-deep outbound request queue (HyperTransport-to-PCI-X transactions)
  - Eight-deep HyperTransport-to-PCI-X memory write posting
  - Eight-deep PCI-X-to-HyperTransport request queue (PCI-X-to-main memory transactions)
  - Parity protection on the PCI-X bus
  - Integrated PCI-X bus arbitration that supports five PCI-X bus masters
  - PCI-X bus error reporting
  - Up to 133 MHz support
- **SATA II paired with XelCore™ software features include:**
  - Xelcore-based RAID5 provides highest I/O performance
  - Controller spanning provides simple expansion path to more storage, future I/O
  - Tiered feature/pricing model allows for field upgrades

### SUMMARY OF BENEFITS

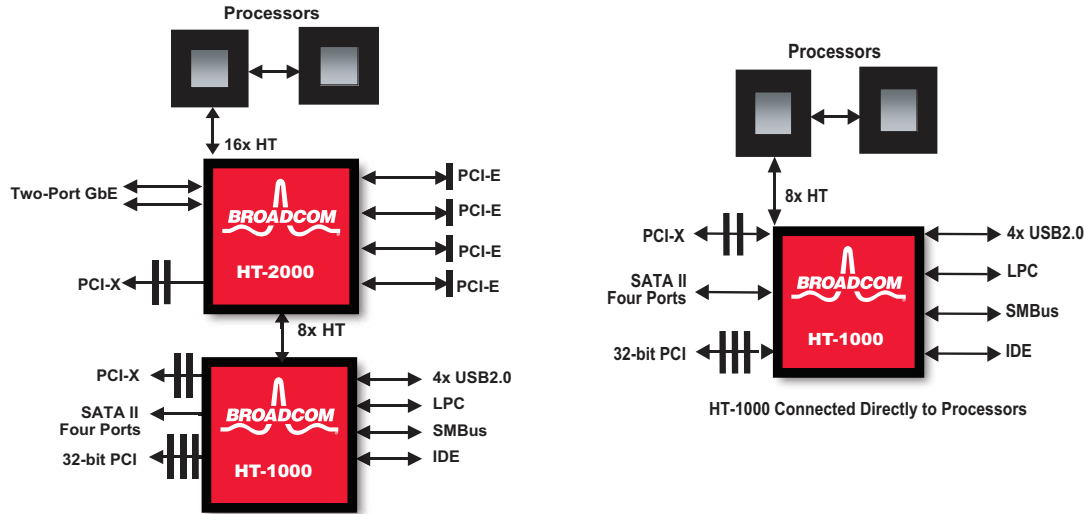
- **Multiprocessing System I/O™ controller for the HyperTransport-enabled processors**
- **Performance, reliability, availability, scalability, and modularity**
- **Best-in-class 64-bit performance**
  - HyperTransport-based architecture reduces I/O bottlenecks and improves overall system performance
  - Integrated processor memory controller minimizes latency, yielding better application performance
  - Best-in-class 64-bit and 32-bit performance
- **Industry-proven reliability and availability**
  - Reusable design methodology used with industry-proven functional blocks
  - Designed for 24/7 enterprise computing uptime
  - Advanced error detection and correction
- **Extensive scalability**
  - HT multiprocessor architecture allows superior per-processor scalability compared to similar x86 architectures
  - Individual HT link widths and clock speeds easily suit cost/ performance targets
  - Multiple HT-1000 System I/O controllers deliver plenty of I/O devices and 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 keep costs low without sacrificing functionality
  - Modular design allows more freedom to differentiate from competition
- **The HT-1000 utilizes the HyperTransport to interconnect to the CPU/host bridge and I/O bridge solutions. This building block approach enables OEMs to tailor systems to their applications**

### TARGET APPLICATIONS

- Uni servers, dual servers, and server blades
- Storage products (NAS)

### ORDERING INFORMATION

- SWCHT1000S07: PBGA 544LD Leaded
- SWCHT1000S07-LF: PBGA 544LD Lead-Free



Two-Way Multiprocessing Server Configuration

The HT-1000 is targeted at the volume server/blade and desktop market with the capability to efficiently span from 1–2 CPUs without incurring large latencies.

The HT-1000 is a highly-scalable SystemI/O solution for the 64-bit/32-bit processors that can be configured to meet OEMs’ needs for a variety of product segments. The dual processor configuration shown above uses HT-2000 as a tunnel to the processors. By combining HT-1000 with HT-2000, servers can support four PCI Express® masters, an additional PCI-X 64/133 bus, and native dual GbE Broadcom controllers—but HT-1000 can be used to connect directly to the processors, as shown in the graphic on the right. This provides all the features needed for cost-effective volume servers, blades, and desktop systems. These features include 8x HT bus, PCI-X 64/133, SATA II, USB 2.0, 32-bit PCI, LPC, IDE, and SMBus.

The 8x HT port can operate at a frequency of 800 MHz double-data rate in both transmit and receive directions to aggregate up to a total bandwidth of 3.2 GBps.

The PCI-X bus supports up to five bus masters and deep transaction queues, and enables designers to implement the right balance between performance and slot count as required by their systems. The PCI-X bus is capable of supporting all modes up to 133 MHz.

The SATA interface supports four ports, each of which are SATA 1.0 compliant. The controller can be programmed to operate completely either in legacy mode or high-performance mode. In addition, the integrated SATA ports can be used with XelCore software to add the following features:

- Online capacity expansion—Add/expand capacity without

- interruption to I/O
- Online RAID-level migration—Change RAID levels without interrupting user I/O
- Controller spanning—Up to four HT-1000 per server appear in the management GUI as a single 16-port drive interface for large array support
- Mirror splitting—Split and hide array mirrors for enhanced protection from viruses, user error, and disk failure
- Distributed sparing—Add reliability without sacrificing economy or performance
- Multiple RAID levels of RAID0, 1, 1+N, 10, 10+N, 5, 50, and JBOD—A broad range of RAID protection and performance features to meet the most sensitive data needs, and allow full use of high-drive counts
- Online array creation and deletion—Create or remove arrays without interrupting user I/O
- Multiple array types per drive—Achieve maximum utilization of mixed drive size arrays, and tailor array to workload, data integrity, and high performance needs
- INT13 control—Turn off int13 BIOS loading for maximum compatibility
- Hot swap and drive roaming support—Detection and support for drive removal/insertion on running system; drives can be moved between channels and cards
- 64-bit I/O block number support—Create arrays larger than 2 terabytes
- Programmable staggered drive spin-up—Reduce initial power demand by drives by adjusting the timing of drive spin-up

The USB host controller is compliant with the *Universal Serial Bus Specification 2.0*, *Open Host Controller Interface for USB Revision 1.0a*, and *Enhanced Host Controller Interface for USB Revision 0.95*.

Multiple HT-1000 devices can be added to a system to scale to larger multi-CPU servers.

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