



8-PORT SATA-II RAID-ON-CHIP (ROC)

BCM5773 FEATURES

- Industry's first SATA RoC
- **Single-chip solution integrates:**
 - 8-ports of SATA including high-performance 1.5G PHY
 - 266-MHz MIPS® processor with dedicated DMA engine
 - Memory controller with QDMA™ engine
 - XOR engine for RAID5 hardware assist
 - Enterprise-class RAID stack
- **Host interfaces**
 - PCI-X 1.0; PCI Express™ (x4)
 - PCI-E → PCI-X bridge
- **High-performance QDMA™ engine lowers CPU utilization, increases IOPS and throughput**
 - 256 independent command queue entries per port
 - Advanced interrupt coalescing algorithms
- **Automatic status block update**
 - Decrease CPU utilization, increase efficiency of PCI-X bus
- **Integrated BERT generator and monitor**
- **Native Command Queuing (NCQ)**
- **Hot plug support**

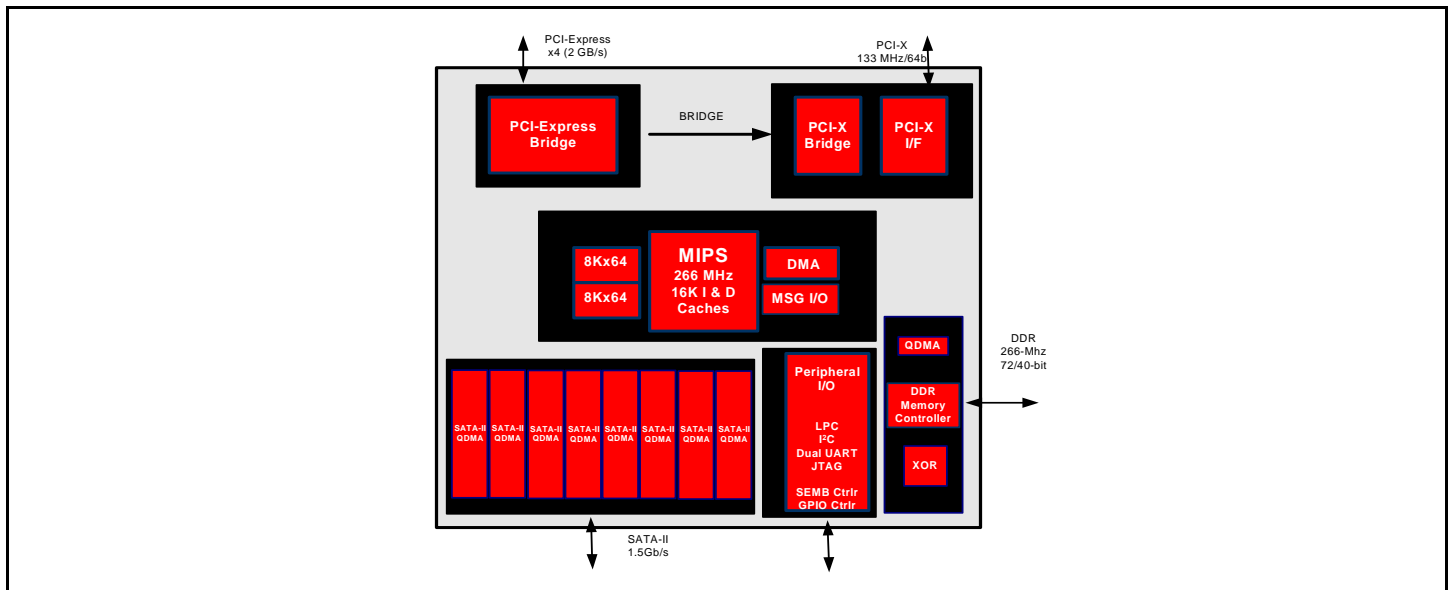
FEATURES

- **Peripheral I/O**
 - LPC for external flash/ROM
 - Dual I²C busses; dual UART; serial GPIO interface; JTAG
- **Power: 4.5W max; 680 PBGA package**
- **XelCore™ Enterprise-class RAID stack**
 - RAID 0, 1, 5, 10, 50, 1n, 10n; split mirroring and hiding for RAID1, 10, 1n, 10n
 - ONLINE: capacity expansion, RAID-level migration, array creation and deletion
 - Controller spanning: spans up to four controllers, 32 drives
 - Hot sparing
 - Drive roaming
 - Windows® and Linux® driver support

APPLICATIONS

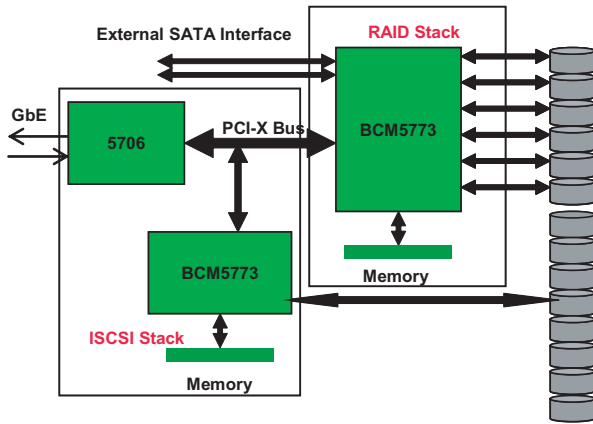
- Embedded on motherboard
- DAS HBA
- High reliability external storage

BCM5773 Block Diagram

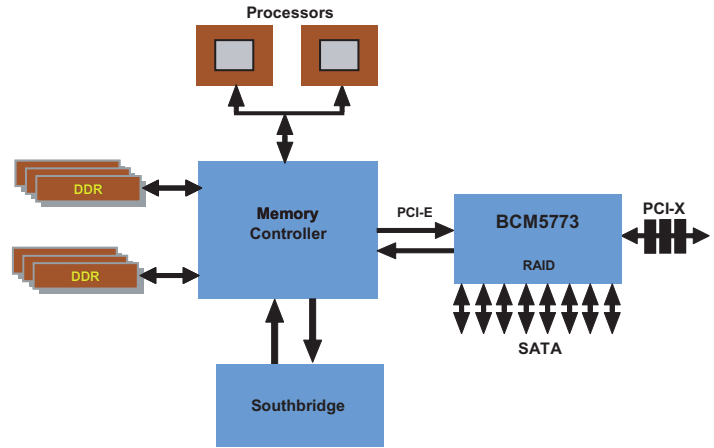


OVERVIEW

External Storage System



Server Storage



BCM5773 Applications

The BCM5773 is a complete SATA-II RAID-on-Chip (RoC) solution that significantly reduces CPU utilization and system design complexity and time. In addition to integrating all hardware necessary to implement high-performance RAID and multiport SATA connectivity, it also integrates a complete RAID Stack that runs on the internal MIPS processor, representing a complete subsystem solution that can be easily integrated into a server or external storage system.

The device communicates with the host using one of two flexible options: a x4 PCI-Express interface, or a PCI-X1.0 interface. A bridging option between the PCI-E and PCI-X interfaces enables extra PCI-X slots to be available for I/O expansion when the PCI-E interface is used as a host interface to the BCM5773. It attaches directly to eight SATA-II disk drive backplanes via a high-performance, integrated SATA PHY that is capable of driving long-length backplanes. Hot-Plug capability is also supported, enabling drives to be inserted/removed without affecting system operation.

A high-bandwidth host arbiter (1 GB/s) decouples the host interface from the SATA ports and embedded processor, enabling maximum throughput for workloads demanding sequential I/O performance.

During a WRITE Operation, Data moves from host memory to the local memory via the QDMA engine embedded in the memory controller unit (MCU). An XOR operation is then (optionally) applied to the data within

the MCU, after which the data is then written to the SATA drives via high-performance QDMA engines embedded in the SATA ports.

During a READ Operation, the SATA QDMA engine can move the data from the drives to either local memory (READ caching) or directly to host memory (uncached).

The BCM5773 provides an interrupt coalescing mechanism to pace the host interrupts it generates. This allows host software to batch-process interrupts efficiently. In addition, the BCM5773 also incorporates a mechanism to reduce IO reads by periodically DMAing the BCM5773 Status Block into host memory. Both of these mechanisms vastly reduce the host CPU utilization by limiting the amount of adaptor accesses that must be performed

A Low Pin Count (LPC) Interface Specification 1.0 compliant interface is available to connect the BCM5773 to an external flash/ROM. Four pins are used to implement an SGIO interface for drive activity and general-purpose I/O. Dual I²C interfaces running is also available to communicate with an external enclosure management device or a Serial EEPROM.

Built-in PRBSs or pseudo-random bit sequence test generators/checkers are available per-port for PHY testing without the use of additional hardware or drives. These are programmed from the in-band PCI-X or PCI-E interfaces.

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