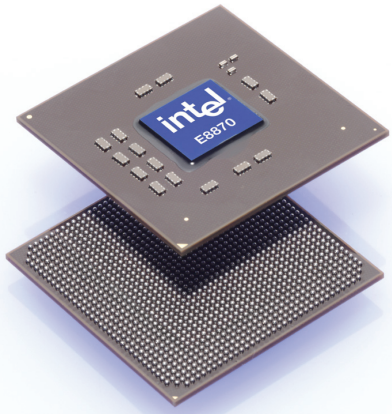
Intel® E8870 Chipset

Scalable Architecture Optimized for the Intel® Itanium® 2 Processor



Platform Overview

The Intel® E8870 chipset is the first of a new generation of chipset architecture, specifically designed to meet the needs of high-end 2-way and 4-way server platform segments. The Intel E8870 chipset, optimized for the Intel® Itanium® 2 processor, provides new levels of performance, scalability, and enhanced error detection, correction and containment.

The Intel E8870 chipset-based server platform takes full advantage of the Intel Itanium 2 processor to deliver unparalleled compute power and value for large database, business intelligence, Enterprise Resource Planning (ERP) and other high-end, heavy load applications. The processor system bus can support up to four processors with 400 Mega Transfers per second (MT/sec) peak data transfer rate, providing up to 6.4 Gigabytes per second (GB/sec) bandwidth. With an 800 MHz channel frequency and 6.4 GB/sec in bandwidth, the memory bus provides higher throughput, headroom and improved scalability. Two scalability ports connect the scalable node controller (SNC) to the server input/output hub (SIOH) providing 6.4 GB/sec per port. This balanced bus architecture provides for lower latency between transactions delivering higher clock speeds and greater throughput for demanding server workloads.

Functional Overview of the Intel E8870 Chipset Components

The Intel E8870 Chipset Scalable Node Controller (SNC) is the central component in the processor/memory sub-system, with interfaces to the processor, the memory subsystem, firmware and two scalability ports for access to I/O and remote memory.

The SNC connects to four DDR memory hubs via four links providing a peak memory bandwidth of 6.4 GB/sec. The SNC can buffer up to eight kilobytes of write data to prioritize reads over writes, and implements interleaving and re-ordering to improve bandwidth and reduce latency. Each DDR memory hub connects to two branch channels and supports up to four DDR SDRAM DIMMs per channel. Up to 128 GB of memory is supported using thirty-two 4 GB DDR SDRAM DIMMs.

The scalability port, or SP, provides simultaneous, bidirectional signaling with 3.2 GB/sec peak bandwidth per direction or an aggregate bandwidth of 6.4 GB/sec per port. Two SP ports per SNC provide a maximum bandwidth capability of 12.8 GB/sec. Together, these advanced features of the SNC deliver balanced, high-bandwidth throughput across the processors, memory and I/O.

The E8870DH DDR Memory Hub (DMH) bridges data transfers between the SNC and two DDR memory channels. Each DMH delivers a maximum throughput of 1.6 GB/sec supporting up to eight single- or double-density registered DIMMs. This provides up to 16 GB of DDR memory when configured with one gigabit memory devices.

The E8870IO Server Input/Output Hub is the central component of the I/O subsystem for Intel E8870 chipset-based servers. This component provides the connection between four hub interface 2.0 ports and two scalability ports. Each hub interface has a peak bandwidth of 1 GB/sec. The aggregate peak bandwidth of the SIOH with four hub interfaces is 4 GB/sec. The SIOH has internal mechanisms to optimize data throughput on all interfaces and has a pre-fetch engine and internal read cache to deliver full bandwidth on data return. The SIOH also offers a hub interface 1.5 connection to legacy I/O and firmware via the I/O Controller Hub (ICH4).

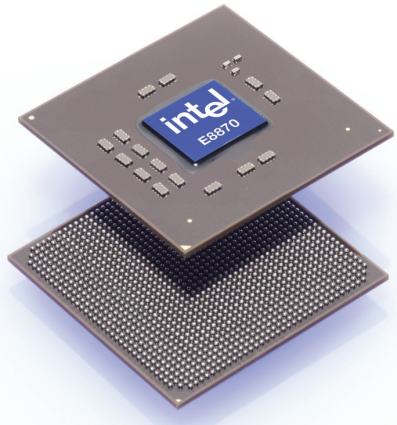
Features that Maximize Performance and Balance the Platform

- The optimized 128-bit wide Itanium 2 processor system bus operating at 400 MT/sec provides up to 6.4 GB/sec of available bandwidth.
- Four high-speed memory channels operate in lock step providing up to 6.4 GB/sec of aggregate memory bandwidth.
- Two scalability ports deliver 12.8 GB/sec maximum bandwidth to provide headroom for future expansion.
- Four hub interface 2.0 connections provide 4 GB/sec maximum aggregate I/O bandwidth offering flexibility and performance.
- System bus, memory and I/O throughput are well balanced, resulting in optimized performance for the entire platform.

The Intel® 82870P2 64-bit PCI/PCI-X Controller Hub 2 (P64H2) introduces the high-performance PCI-X bus to the enterprise server market. This second-generation component provides bridging functions between the SIOH and the latest PCI-X peripherals. The P64H2 connects to the SIOH through one of the four hub interface 2.0 ports, delivering a maximum throughput of 1 GB/sec on each connection. Each P64H2 contains two independent high-performance 64-bit PCI/PCI-X interfaces capable of up to133 MHz operation. The P64H2 also integrates two hot-plug controllers, one for each interface. A fully populated platform configuration using four P64H2 components can support up to eight 64-bit, 133 MHz PCI-X devices.

The P64H2 allows I/O configuration flexibility through the addition of the Intel® 82544GC Gigabit Ethernet controller and the Intel® I/O processor. The Intel Gigabit Ethernet controller provides the high network throughput of Intel's Gigabit Ethernet products in a single, integrated component. The Ethernet controller incorporates a 133 MHz, 64-bit wide PCI-X interface that matches the I/O bandwidth of the P64H2 component. The small size and low power consumption of this Ethernet controller make it ideal for LAN on motherboard platform implementations.

The Intel® 82801DB I/O Controller Hub (ICH4) connects to the SIOH through the hub interface 1.5 port. The ICH4 contains the legacy I/O interfaces required by a system. Flash memory, keyboard, USB, and IDE are typical I/O devices attached to the ICH4. The ICH4 offers a two-channel Ultra ATA/100 bus master IDE controller, a USB 2.0 controller supporting up to six USB ports, a 32-bit PCI 2.2 compliant interface and a system manageability (SM) bus controller for system manageability.



The Intel® E8870 Chipset

FEATURES	BENEFITS
Balanced Chipset Architecture	• Delivers optimal system performance through well aligned bandwidths (system bus, memory, SP & I/O bandwidths are well balanced)
400 MHz, 128-bit System Bus Capability	• 6.4 GB/s system bus supports up to four Intel® Itanium® 2 processors for optimal system performance
High Memory Capacity	• The DMH provides a maximum of eight DIMM slots with an aggregate of thirty-two memory slots enabled per processor node. Maximum capacity supported per node is 128 GB using 4 GB DIMMs
Two High Bandwidth Scalability Ports	• Provides sufficient headroom for single-node or multiple-node configurations
Four Hub Interface 2.0 Connectivity	• Delivers 1 GB/sec bandwidth per connection, providing multiple I/O configuration options and offering both flexibility and performance
I/O Pre-fetch Engine and Built-in Cache	• Delivers full bandwidth on data return
High Performance PCI/PCI-X Bridge Support	• Provides support to all PCI/PCI-X I/O devices, from legacy PCI to higher performance PCI-X at 133 MHz
Advanced Platform RASUM	• Features such as hot-plug modules for processor and memory, ECC protection and correction, memory scrubbing, Memory Device Failure Recovery (MDFR), multiple redundant I/O paths and error logging combine to yield a more reliable platform, reducing downtime for repair and ensuring data integrity across all interconnects and busses

Products		Package
E8870	Scalable Node Controller (SNC)	1357-pin Organic LAN Grid Array-2B 12L (OLGA)
E8870DH	DDR Memory Hub (DMH)	567-pin Organic LAN Grid Array-1 6L (OLGA)
E8870IO	Server Input Output Hub (SIOH)	1012-pin 10 Layer Organic LAN Grid Array-2B (OLGA)
E8870SP	Scalability Port Switch (SPS)	1012-pin 10 Layer Organic LAN Grid Array-2B (OLGA)
82870P2	64-Bit PCI/PCI-X Controller (P64H2)	567-pin Flip Chip Ball Grid Array-6L (FCBGA)
82801DB	I/O Controller Hub (ICH4)	421-pin Micro Ball Grid Array (uBGA)
82802AC	FirmWare Hub (FWH)	32-pin Plastic Leaded Chip Carrier (PLCC)

Intel Access

Intel® E8870 Chipset Home Page
http://developer.intel.com/design/chipsets/e8870

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