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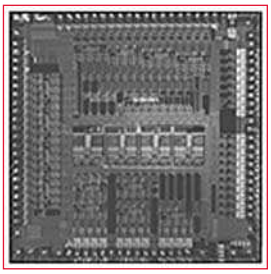
BCM1250 PRODUCT Brief



BCM1250 HIGH-PERFORMANCE, INTEGRATED 64-BIT MULTIPROCESSOR

BCM1250 FEATURES

- **Two 64-bit MIPS CPUs, scalable from 600 MHz–1 GHz**
  - Quad-issue in order pipeline; dual execute, dual memory pipes
  - Enhanced skew pipeline enables zero load-to-use penalty
  - 32-KB instruction cache, 32-KB data cache
  - Advanced branch predictors
- **Fast, on-chip multiprocessor bus**
  - Connects the CPUs, L2 cache, memory controller and I/O bridges
  - Runs at half the CPU core frequency; 256 bits wide
- **On-chip L2 cache**
  - 512 KB, shared by both CPUs
  - 4-way associative, ECC protected
  - Ways can be removed to provide fast on-chip RAM
- **DDR memory controller**
  - Two channels, each with a 64-bit data bus plus optional ECC
  - Runs up to 200 MHz clock rate, 400 MHz data rate
  - Support for DDR SDRAM, SGRAM, and FCRAM
- **High-speed packet interfaces**
  - Three 10/100/1000 Ethernet MACs; 802.3 compliant
  - Option to configure MACs into packet FIFOs
  - Up to two packet FIFOs each capable of OC-48 data rates
- **PCI interface**
  - 32 bits, 33/66 MHz (PCI 2.2)
  - Host bridge or target device
- **HyperTransport™ (formerly LDT) I/O interface**
  - Complies with HyperTransport™ standard for high-speed I/O fabric
  - 500-MHz clock rate, double data rate, for 600 MHz CPUs; 600-MHz clock rate for 800 MHz CPUs
  - Peak bandwidth of 9.6 Gbps in each direction @ 600 MHz
  - Supports double-ended fabrics (to link two BCM1250s)
- **Integrated system I/O**
  - Generic I/O for direct connect to boot ROM, flash
  - Two SMBus serial configuration interfaces
  - PCMCIA control interface
  - Two serial interfaces
- **Extensive, on-chip debug features**
- **8–10W power dissipation @ 800 MHz**
- **Support for leading operating systems including VxWorks®, Linux® and NetBSD**
- **Evaluation board platform available with tools, firmware and software drivers**

SUMMARY OF BENEFITS

- **Industry-leading performance**
  - Processing speed of up to 10 Mpps*
  - 128 Gbps on-chip bus bandwidth; 50 Gbps memory bandwidth, 30 Gbps total I/O bandwidth
- **Low power dissipation of 8–10W (@ 800 MHz)**
- **High functional integration**
- **Programming ease and flexibility based on MIPS64 Instruction Set Architecture (ISA)**
- **Scalable multiprocessor chip and system architecture**
- **Broad tools and system software support**
- **For additional information on the BCM1250 evaluation boards, refer to the BCM91250A and BCM91250E product briefs**

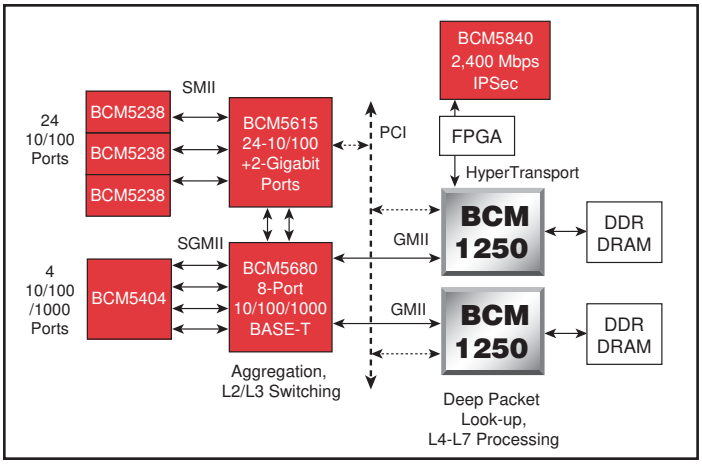
*Based on internal Broadcom benchmark, using BCM1250 for standard IPv4 L3 look-up/switching.

TARGET APPLICATIONS

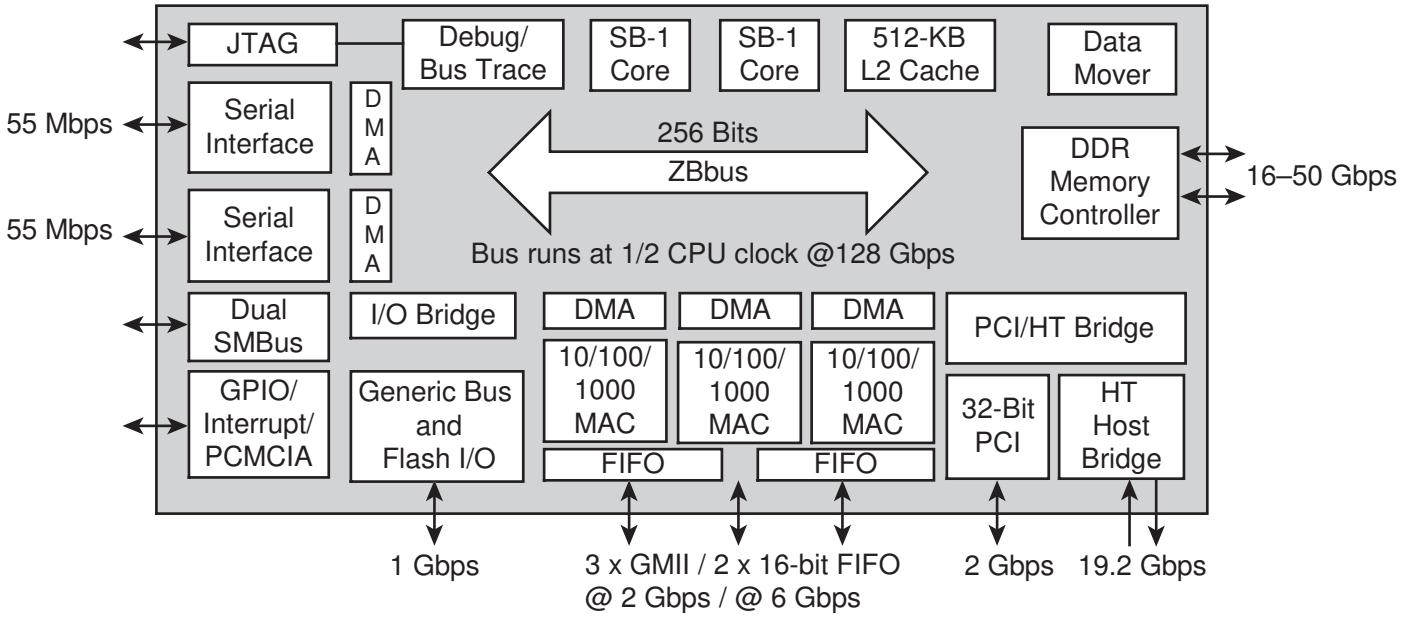
Due to the BCM1250's world-class performance, power efficiency and integration, the processor is ideal for a broad variety of applications including:

- Enterprise workgroup and backbone switches
- VPN switches/routers
- Multiservice access concentrators
- SAN routers/gateway/switches
- IP services/subscriber management platforms
- Web-server switches
- High-end firewall/intrusion detection devices
- Wireless basestations

Example: Packet Processing Blade



BCM1250 Block Diagram



Broadcom's first SiByte™ processor, the **BCM1250**, is a state-of-the-art multiprocessor solution targeted at the fast-growing networking and communications markets.

The **BCM1250** is the first MIPS64™ processor to offer the industry-leading performance, high functional integration, and low power levels required by next-generation networking applications.

The **BCM1250** is an intelligent on-chip multiprocessor system (CMP) consisting of two Broadcom SB-1 high performance MIPS64™ CPUs, a shared 512-KB L2 cache, a DDR memory controller, and integrated I/O. All major blocks of the processor are connected together via the ZBbus, a high-speed, split-transaction multiprocessor bus. The bus implements the standard MESI protocol to ensure coherency between the two CPUs, L2 cache, I/O agents, and memory. Three Gigabit Ethernet MACs (10/100/1000) enable easy interfacing to LANs. To enable higher data rates, or in cases where Ethernet protocol processing is not required, the MACs can be configured as either three 8-bit or two 16-bit packet FIFOs. The high-speed I/O is provided using HyperTransport™ (HT) I/O fabric and a 32-bit PCI (rev 2.2) local bus. Two serial ports are available to use as UARTs for console ports or asynchronous interface for WAN connections at up to T3/OC-1 rates (55 Mbps).

To enable low chip-count systems, the **BCM1250** also includes a configurable generic bus that allows glueless connection of a boot ROM or flash memory and simple I/O peripherals. On-chip debug, trace, and performance monitoring functions assist both hardware and software designers in debugging and tuning the system. The system can be run in either big- or little-endian mode. The **BCM1250** is manufactured in TSMC's 0.13µ process and is available in an 860 BGA package.

Implementation of MIPS64™ ISA

The SB-1 CPU core is a high-performance implementation of the standard MIPS64™ instruction set architecture (ISA), and incorporates the MIPS-3D and MIPS-MDMX application specific extensions (ASEs). The core supports a four-issue enhanced skew pipeline and can dispatch up to two memory and two ALU (Integer, Floating Point, MDMX or MIPS-3D) instructions per cycle.

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