



HIGH-PERFORMANCE, INTEGRATED 64-BIT MULTIPROCESSOR

FEATURES

- **Two scalable 64-bit MIPS CPUs**
 - 600 MHz–800 MHz
 - 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 CPU
 - 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

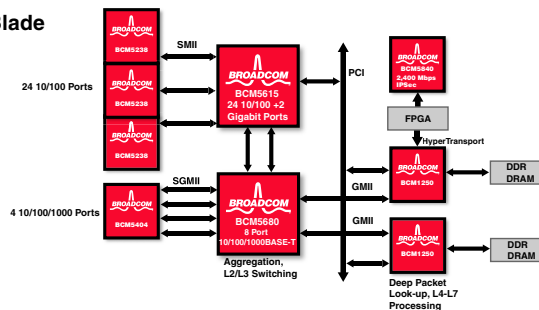
- **Industry-leading performance**
 - Processing speed of up to 10 Mpps*
 - 128-Gbps on-chip bus bandwidth; 50-Gbps memory bandwidth, 30-Gbps total I/O bandwidth
- **Low power dissipation of 8–10W (@ 800 MHz)**
- **High functional integration**
- **Programming ease and flexibility based on MIPS64® Instruction 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.

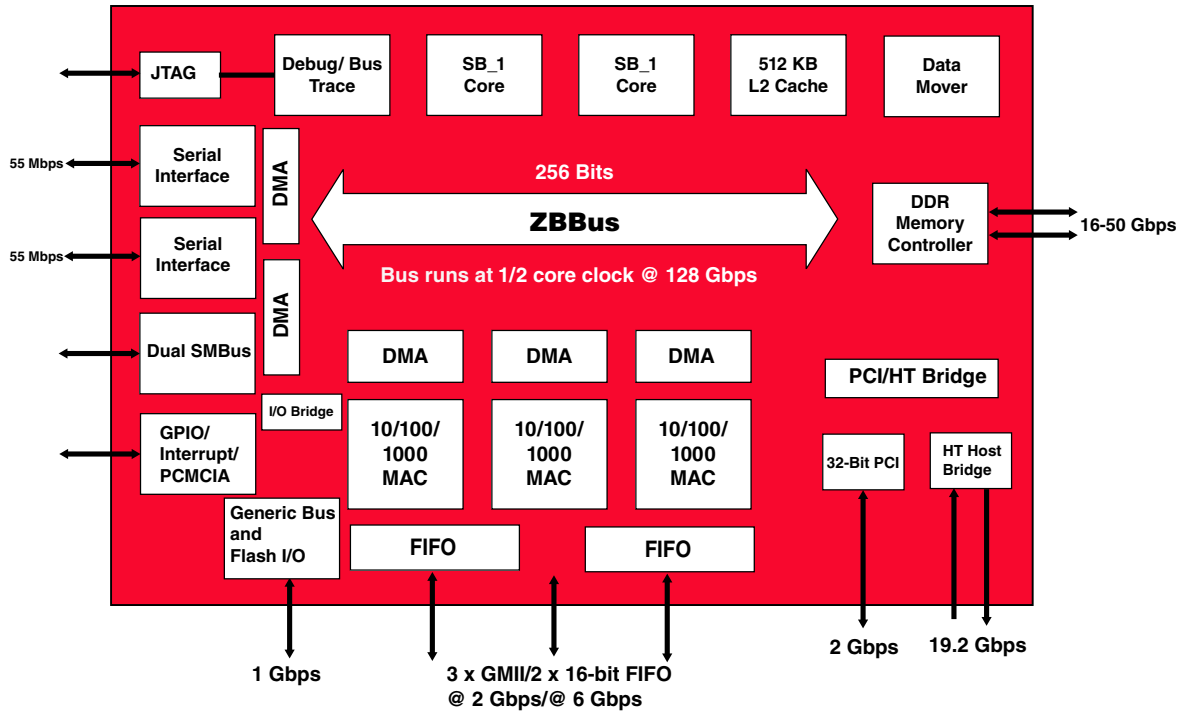
APPLICATIONS

- **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

Packet Processing Blade



OVERVIEW



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, 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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everything®



BROADCOM CORPORATION
16215 Alton Parkway, P.O. Box 57013
Irvine, California 92619-7013

Phone: 949-450-8700
Fax: 949-450-8710
E-mail: info@broadcom.com
Web: www.broadcom.com

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