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BCM1112
PRODUCT Brief

VOICE OVER IP CPE ENGINE

FEATURES

- **The BCM1112 is the most highly integrated silicon solution for Ethernet Residential Gateway and Stand-Alone Media Terminal Adapter applications.**
- **The BCM1112 Integrates:**
  - 150-MHz MIPS32 CPU (165 DMIPS) with 8K I-cache and 4K D-cache
  - Superscalar 108-MHz ZSP DSP with dual-MAC (216 MIPS), 48K instruction and 32K data RAM
  - Three-port 10/100BASE-T Ethernet switch with 64K buffer memory
  - Two 10/100BASE-T Ethernet PHYs with in-line power over Ethernet support
  - Three wideband audio ADCs and DACs
  - Ethernet status LED driver
  - TDM IOM-2® port
  - Two UARTs
  - Two high-speed serial ports
  - General purpose I/O
  - Interrupt control unit
  - DMA support unit
  - SDRAM interface
  - External Bus Interface
  - IEEE 1149.1 (JTAG)
- **0.18u process technology, 1.8/3.3V**
- **1.1W peak, 0.3-0.8W standby modes**
- **256-PBGA package enables 4-layer PCB designs**
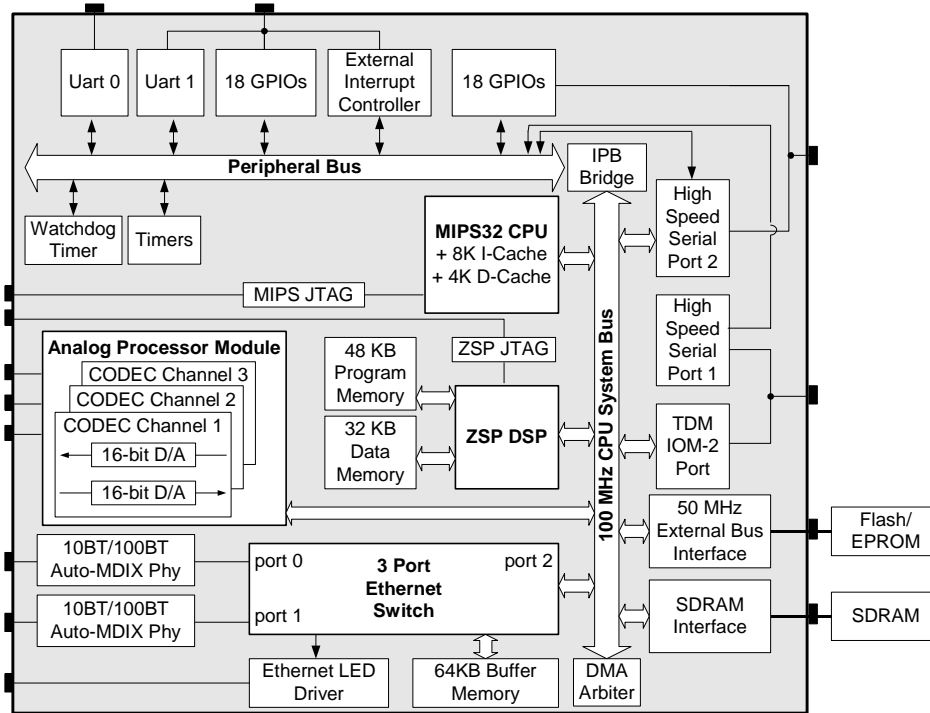- **Pin Compatible with BCM1101**

HARDWARE PLATFORMS

- **BCM91112SMTA Reference Platform**
  - Ethernet Residential Gateway reference design
  - PacketCable SMTA reference design

SUMMARY OF BENEFITS

- **10/100BASE-T Ethernet Switch with 802.1p/Q Support**
  - 802.1p Ensures QoS for voice packets and minimizes latency
  - 802.1Q VLAN support allows for segmenting physical networks into multiple logical networks
  - MIPS32 CPU not burdened by data packet processing, leaving more cycles for application program
  - Enables wire-speed non-blocking operation
  - Blocks unnecessary traffic by learning local MAC addresses
  - Segments network, preventing any restriction on number of hops
- **150-MHz MIPS32 CPU and 108 MHz DSP Support**
  - In VoIP Gateway applications:
    - Full SIP client implementation
    - G.711, G.726, G.729A/AB and G.723.1/A
    - Fax relay (T.38, V.17, V.29, V27ter)
    - Two voice channels, or one voice channel and one fax channel, and a third channel limited to G.711 voice
- **10/100BASE-T Ethernet MACs and PHYs**
  - Integrates support for Modified Link Pulse in-line power specification
  - Compliant with 802.3af power over Ethernet standard
  - Provides Auto MDI/MDIX enabling the use of straight or crossover cables in either port
- **Wideband Audio CODECs**
  - Enables support of emerging wideband vocoding standards

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The Broadcom BCM1112 represents a new level of integration for Ethernet Residential Gateway and Stand-Alone Media Terminal Adapter applications.

Key modules integrated in the BCM1112 include:

- MIPS32 150 MHz processor with 8K 2-way set associative I-cache and a 4K 2-way associative D-cache. This MCU supports the VoIP protocol stacks, jitter buffer management, and application program. Programming is done in C, on top of Broadcom's object-oriented signal processing API.
- ZSP 108 MHz DSP with 48K instruction and 32K data RAM. The DSP supports a wide range of vocoders, fax modems, and a variety of telephony algorithms (e.g., DTMF and Call Progress Tones).
- Analog Codecs. Three ADCs and DACs are integrated, eliminating the need for an analog switch to allow the sharing of a codec between multiple interfaces.

- 10/100BASE-T Ethernet Switch, Media Access Controllers, and Transceivers. The three-port Ethernet switch integrates three full-duplex capable Media Access Controllers (MACs), a Serial Management Port, an address resolution engine, a non-blocking switch controller, 64K of internal switch memory, 802.1p prioritization for voice packets, 802.1Q VLAN tagging support for segmenting physical networks into multiple logical networks, and a set of Management Information Base (MIB) statistics registers. The two transceivers perform all of the functions for 100BASE-T Ethernet in full- or half-duplex mode over Category (CAT) 5 twisted pair cable and 10BASE-T Ethernet in full- or half-duplex mode over CAT 3, 4, or 5 twisted pair cable. They support Auto MDI/MDIX detection to allow the use of any cable type in either port. The transceivers also integrate support for in-line powering over Ethernet.

The BCM1112 integrates all the key silicon components of an Ethernet IP Gateway into a single device, thereby reducing the overall system cost and complexity of Terminal Adapter products, while at the same time increasing their voice quality and the reliability of the network to which they are attached.

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