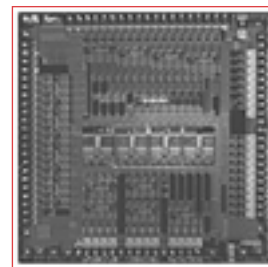# BCM1101

PRODUCT Brief

BCM1101 VOICE OVER IP ETHERNET CPE ENGINE

BCM1101 FEATURES

- **The most highly integrated silicon solution for Voice over IP enterprise phone and Ethernet residential gateway applications**

- **The BCM1101 Integrates:**
  - 100-MHz MIPS32 CPU (110 DMIPS) with 8K I-cache and 4K D-cache
  - Superscalar 140 MHz ZSP DSP with dual-MAC (280 MIPS), 48 KB of instruction and 32KB of data RAM
  - Three-port 10/100BASE-T Ethernet switch with 64 KB of buffer memory
  - Two 10/100BASE-T Ethernet PHYs with inline power over Ethernet support
  - Three wideband audio ADCs and DACs
  - 9x9 keyscan controller
  - 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)

- **0.18µ process technology, 1.8/3.3V**

- **1.1W peak, 0.3-0.8W standby modes**

- **256 PBGA package enables four-layer PCB designs**

HARDWARE PLATFORMS

- **BCM91101 Reference Platform**
  - Complete Ethernet IP Phone reference design in phone plastics

- **BCM91101SMTA Reference Platform**
  - Ethernet Residential Gateway reference design
  - PacketCable SMTA reference design

SUMMARY OF BENEFITS

- **10/100BASE-T Ethernet switch with 802.1p/Q support**
  - Ensures QoS for voice packets and minimizes latency
  - 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
  - 802.1Q VLAN tagging support for segmenting physical networks into multiple logical networks

- **100 MHz MIPS32 CPU support**
  - H.323, H.248/Megaco, SIP, MGCP V1.0 and PacketCable NCS
  - Application program

- **140 MHz DSP support**
  - In IP phone applications:
    - G.711, G.726, G.729A/AB/E, G.723.1/A, G.728, G.722.1 and BroadVoice™
    - Half- and full-duplex speakerphone operation
    - Two- and three-channel conferencing of any mix of vocoders
    - Paging (via a G.711 channel)
  - In VoIP gateway applications:
    - G.711, G.726, G.729A/AB/E, G.723.1/A and G.728
    - 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
  - In PacketCable SMTA applications:
    - G.711, G.726, G.729A/AB/E, G.723.1/A and G.728
    - Two voice channels with complex vocoders

- **10/100BASE-T Ethernet MACs and PHYs**
  - Provides auto-MDI/MDIX, enabling the use of straight or crossover cables in either port
  - Integrated in-line power over Ethernet support

- **Wideband audio CODECs**
  - Enables support of emerging wideband vocoding standards

- **Glueless interface to BCM4210/4100 HPNA MAC and AFE devices**
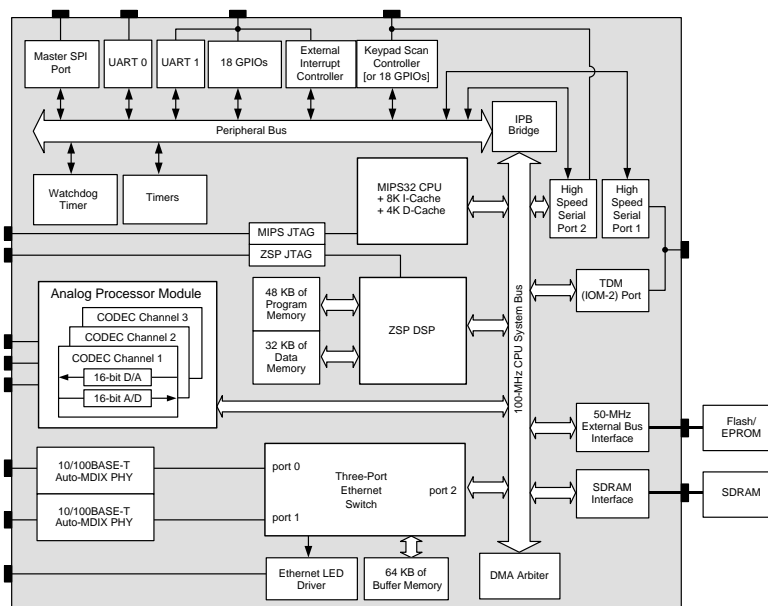
BCM1101 VoIP Ethernet CPE Engine

The Broadcom **BCM1101** represents a new level of integration for enterprise Ethernet IP phone and small gateway applications.

Key modules integrated in the **BCM1101** include:

- MIPS32 100 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 140 MHz DSP with 48K instruction and 32K data RAM. The DSP supports a wide range of vocoders, acoustic echo cancellation for full-duplex speakerphone, 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 **BCM1101** represents the first silicon solution that integrates all the key silicon components of an Ethernet IP Phone into a single device, thereby reducing the overall system cost and complexity of Enterprise IP Phone 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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