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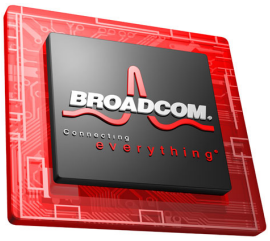
BCM21331 PRODUCT Brief



SINGLE-CHIP 65-nm EDGE BASEBAND + RF + MULTIMEDIA

FEATURES

- **General characteristics**
  - Single-chip, single-die, Class 33, 4-band, EDGE/GPRS baseband processor
  - Complete system-on-a-chip integrating RF transceiver, high-end multimedia, high-speed 480-Mbps USB 2.0 OTG, full mixed-signal support for speakers, Hi-Fi stereo audio amplifiers and USB transceivers, full security and DRM, and high performance 208-MHz ARM9™ processor
  - Utilizes the lowest cost, lowest power 65-nm digital CMOS process
  - Compact 12 mm x 12 mm 389-pin FBGA package for low-cost PCB design
- **Multimedia capabilities**
  - Supports up to a 3.2-Mpixel camera
  - 30-fps full-rate H.264, H.263, WMV9, and MPEG4 at high quality QVGA resolution
  - Supports both encode and decode at H.264 for best quality and memory usage
  - Up to 262K colors, dual-panel display support
  - Extensive graphics, video, and imaging hardware acceleration blocks
- **Extensive mixed-signal integration and advanced audio**
  - On-chip mixed-signal transceivers for 480-Mbps USB2.0 OTG
  - On-chip 400-mW stereo amplifiers for speaker phone or ringer
  - On-chip Hi-Fi stereo audio DACs and 100-mW amplifiers for MP3/ audio
  - On-chip digital audio mixing and 5-band equalizer
  - Integrated 64-tone polyphonic ringer
  - Integrated MP3, AAC, AAC+, eAAC, WMA and W-AMR codecs
  - Downloadable codec capability with on-chip SRAM
- **Signal and voice quality**
  - Self-calibrating on-chip Class 33 EDGE transceiver, automatically adjusts to changing conditions and compensates for manufacturing deviations
  - Broadcom M-Stream technology delivers up to 3dB better signal quality
  - SAIC support for voice, data, echo cancelling, and noise suppression
  - >95-dB SNR for Hi-Fi stereo audio

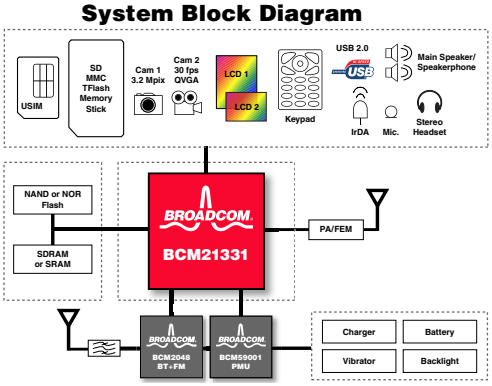
SUMMARY OF BENEFITS

- **Enables the highest performance yet lowest cost EDGE/GPRS handset design**
- **Extended coverage and fewer dropped calls using M-Stream, SAIC, and unique RF design**
- **Lowest power consumption due to advanced 65-nm process and on-chip hardware acceleration architecture**
- **Fastest video, audio, and data download using 480-Mpbs USB 2.0 OTG**
- **Highest quality audio and video capture and playback with H.264 QVGA hardware support**
- **Enables smallest and thinnest design via integrated multimedia, RF, and mixed signal**
- **Extreme flexibility to support optional GPS, Bluetooth®/FM, Wi-Fi®, Mobile TV, or external multimedia processor**
- **High performance 208-MHz ARM9 processor for super fast applications computing speed**
- **Quad-band support for worldwide GSM coverage and roaming ability**
- **Enhanced Interfaces**
  - Flexible memory: NOR/NAND/pSRAM/DDR at 104 MHz
  - USB 2.0 OTG high-speed (480 Mbps)
  - Two high-speed UARTs at 3.6 Mbps
  - One 8-bit SDIOs at 416 Mbps, one 4-bit at 208 Mbps
  - BSC, I^2S, SPI, and PCM interfaces
  - Hard disk (CE-ATA)/SD/MMC and T-Flash, memory stick PRO™
  - USIM controller
  - ETM and JTAG for software debug
  - Bluetooth/FM, Wi-Fi, and GPS support
  - TV out

APPLICATIONS

- **Mobile handsets and smartphones**

System Block Diagram



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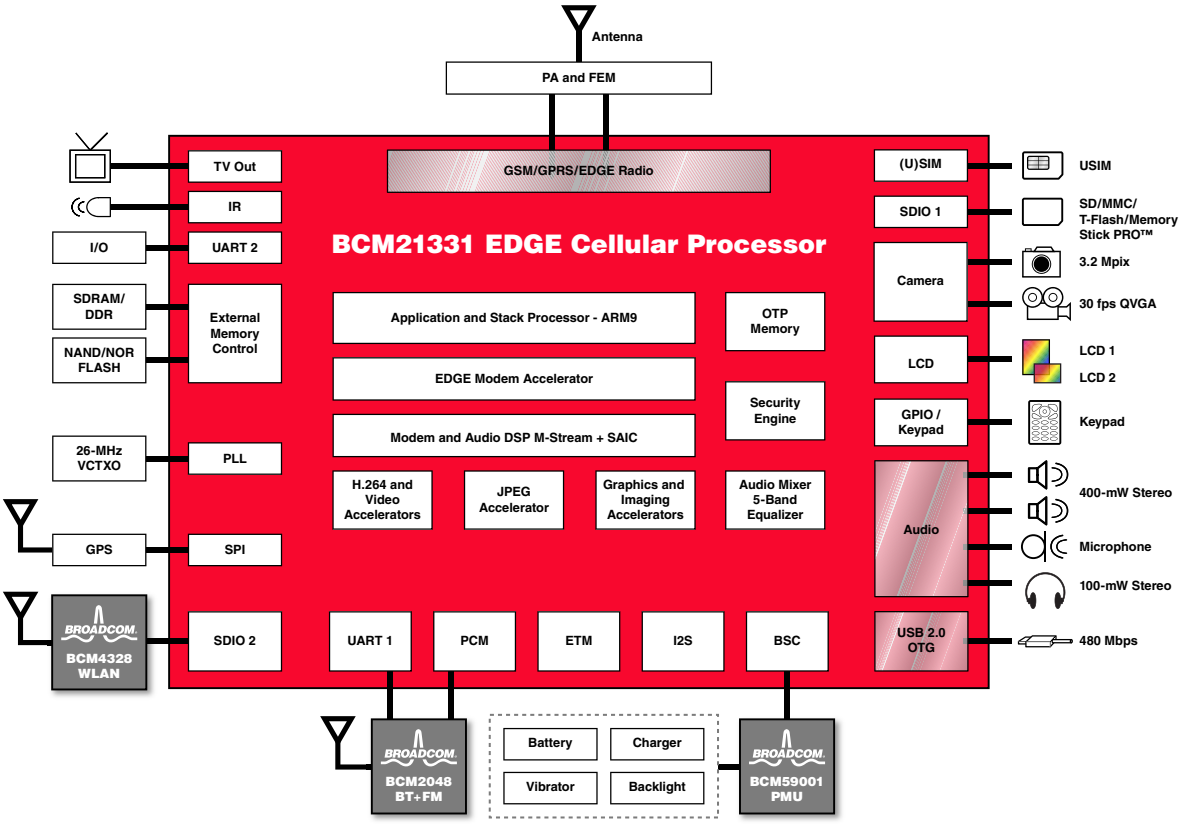
OVERVIEW



Functional Block Diagram

Overview

The BCM21331 is a single-chip EDGE/GPRS/GSM multimedia baseband processor with fully integrated RF transceiver and audio for stereo music. Designed on 65-nm technology, the BCM21331 offers the lowest power consumption, highest integration, and lowest cost EDGE solution.

The modem supports Class 33 EDGE/GPRS and integrates all analog and digital baseband functions on a single, monolithic piece of silicon for lowest cost.

The integrated BCM21331 RF transceiver design delivers the highest RF performance while achieving the lowest power consumption through innovative architecture and circuit design. The RF transceiver draws upon Broadcom's extensive experience in pure digital CMOS radio design and directly leverages Broadcom's BCM2085 CMOS EDGE radio product. Critical radio performance, while using pure digital CMOS for radios, is assured through the use of proprietary, autonomous, real-time calibrations within the radio.

The BCM21331 cellular processor has fully integrated audio support for driving ear piece, ringer, 100-mW stereo headsets, and 400-mW drivers for stereo speakers. An external audio processor chip is not required.

Broadcom's proprietary M-Stream high-performance modem technology and SAIC advanced signal processing technology improve cellular handset reception and voice quality while increasing network capacity without sacrificing call quality.

Connectivity

USB 2.0 HS (480 Mbps) is also supported with fully integrated analog PHY.

Security

The embedded OTP bits allow the software to boot securely and check IMEI security prior to network activation. OTP bits can also be used by high-level applications to verify the integrity of the DRM function.

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