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BCM2121
# PRODUCT Brief

GPRS/GSM SINGLE-CHIP BASEBAND PROCESSOR

FEATURES

- **Single 200-pin FBGA device (13 mm × 13 mm)**
- **GSM voice handset capabilities: FR/EFR/AMR/HR**
- **Data capability (one to five slots, up to four RX/4 TX slots)**
  - GPRS (multislot Class 10) up to 84.4 Kbps
  - HSCSD (multislot Class 10) up to 57.6 Kbps
  - GSM single slot up to 14.4 Kbps
- **Multivoltage SIM, PCMCIA, and IrDA compliant interfaces**
- **GSM850, E-GSM900, GSM1800, and GSM1900 bands**
- **Extremely low-power design: 3V I/O and 2V core**
- **Three UART serial ports for data/fax/testing**
- **Flexible RF transceiver control interface:**
  - Integrated PA controller
  - APC DAC with ramping RAM
  - Support straight or multiplexed I and Q
  - Schedule-based programmable serial control
- **Power/cost-flexible audio circuitry**
  - Noise suppression and echo cancellation for speakerphone and car phone environments
  - Sidetone/microphone amplification control
  - High-output speaker driver
- **Flexible clock rates for processors (0 to 52 MHz)**
- **Real-time clock and alarm**

SUMMARY OF BENEFITS

- **Comprehensive GPRS/GSM handset software**
  - Layer 2/3 and user interface software
  - For bar-type and flip-type GPRS/GSM handsets
  - Multiple color LCD panels (black and white to 65K color)
  - Polyphonic ringer interface
  - Multicolored LED notifications/backlight
  - Type-approved Phase 2+ multiband protocol stack
  - Fully functional GSM handset user interface
  - Foreign language fonts, including Chinese
  - Startup animations, songs, games, and ring tones
  - Unicode SMS and full EMS messaging
  - SIM Application Toolkit (SATK)
- **Fully integrated Layer 1, including all drivers**
- **AT commands (7.05 and 7.07)**
- **Phase 2+ supplemental services**
- **Error correction: Radio Link Protocol (RLP)**
- **Compression: IP header for GPRS and V.42bis in all modes**
- **Complete development system available**

GPRS/GSM Handset Terminal Using BCM2121

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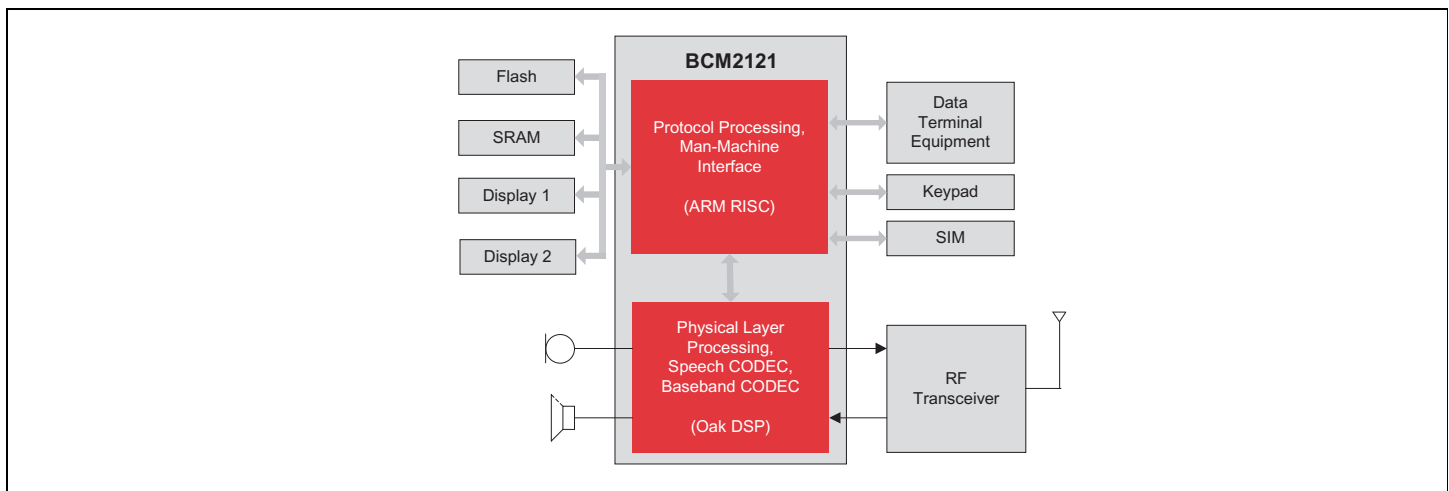
GPRS/GSM Handset Functional Block Diagram
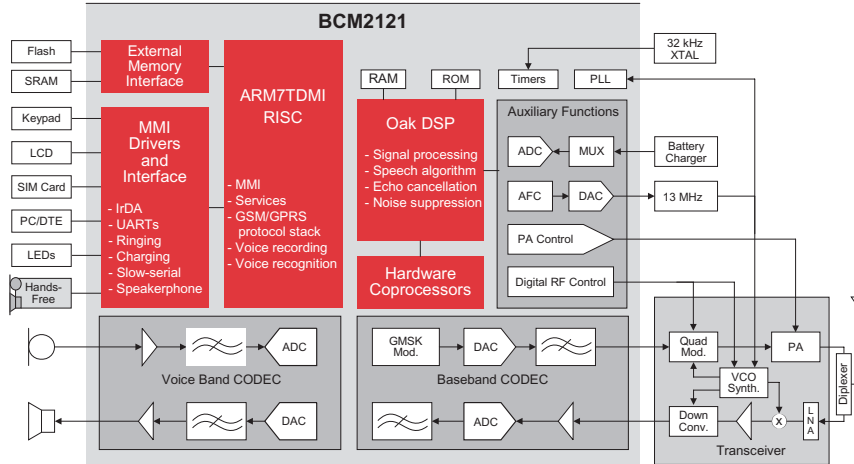
The **BCM2121** GPRS/GSM baseband processor offers a high level of system integration, performance, and features for next-generation handsets and radio cards. The **BCM2121** is a single-chip baseband device that is applicable for wireless handsets and speakerphones.

The integration of the PA controller and speaker/car phone audio circuitry adds key GPRS handset features while reducing overall system cost.

The **BCM2121** contains all analog and digital GSM and multislot GPRS baseband processing functions on a single silicon substrate. Interface functions and drivers are integrated to enable auxiliary components such as microphone, speaker, displays, keypad, data terminal equipment, and SIM to connect directly to the chip. A flexible baseband control interface supports a wide range of transceivers including GSM850, E-GSM900, GSM1800, and GSM1900 frequency bands.

To accelerate our customers' product development cycle and to enable high-volume manufacturing, the **BCM2121** also offers handset system solutions, including:

• Complete handset and modem software, evaluation boards, reference designs, and integration support
• GSM Certification Forum (GCF) and interoperability testing (IOT)
• Worldwide network field testing

To further reduce overall component count and BOM cost, the **BCM2121** integrates a number of typical PCB circuit functions such as a PA controller, echo cancellation, noise suppression, and hands-free answer sensing.

In addition, features such as the peripheral serial bus interface, integrated 1.8V/3V SIM, and multiplexed I and Q channels add flexibility when connecting to other onboard components.

On-chip hardware accelerators work in concert with HSCSD and GPRS software to allow user data speeds up to 57.6 Kbps and 84.4 Kbps. In addition to these multislot capabilities, the **BCM2121** contains legacy GSM voice circuitry (adding all of the AMR modes) for voice applications. On the ARM, the V.42bis compression yields up to a 4× rate increase for GPRS and HSCSD traffic.

The ARM7TDMI processor runs the high-level application software, such as the SATK, WAP browser, voice recognition/recording, and user interface. The processor can interface with various polyphonic ringer chips and control two black and white or color LCD panels for high-end handsets.

The Oak DSP performs the GSM physical layer functions, including voice and baseband codecs, speech coding, channel coding and interleaving, and RF interface transceiver control. To minimize power consumption, the Oak DSP uses hardware coprocessors for computation-intensive processing functions. Echo cancellation and noise suppression software is also included on the DSP to target speakerphone and other noisy environments.

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