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ML2011
# PRODUCT Brief

GSM SINGLE-CHIP BASEBAND PROCESSOR

FEATURES

- **Single 200-pin FBGA device (13 mm x 13 mm)**
- **GSM voice handset capabilities**
- **Data capability**
  - GSM single slot up to 14.4 Kbps
- **Multi-voltage SIM and IrDA compliant interfaces**
- **GSM850, E-GSM900, GSM1800, and GSM1900 bands**
- **Extremely low power design: 3V I/O and 2V core**
- **Two 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&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 GSM handset software**
  - Layer 2/3 and user interface software
  - For bar-type and flip-type GSM handsets
  - Multiple LCD panels (B&W 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)
- **Complete development system available**

GSM Handset Terminal Using ML2011
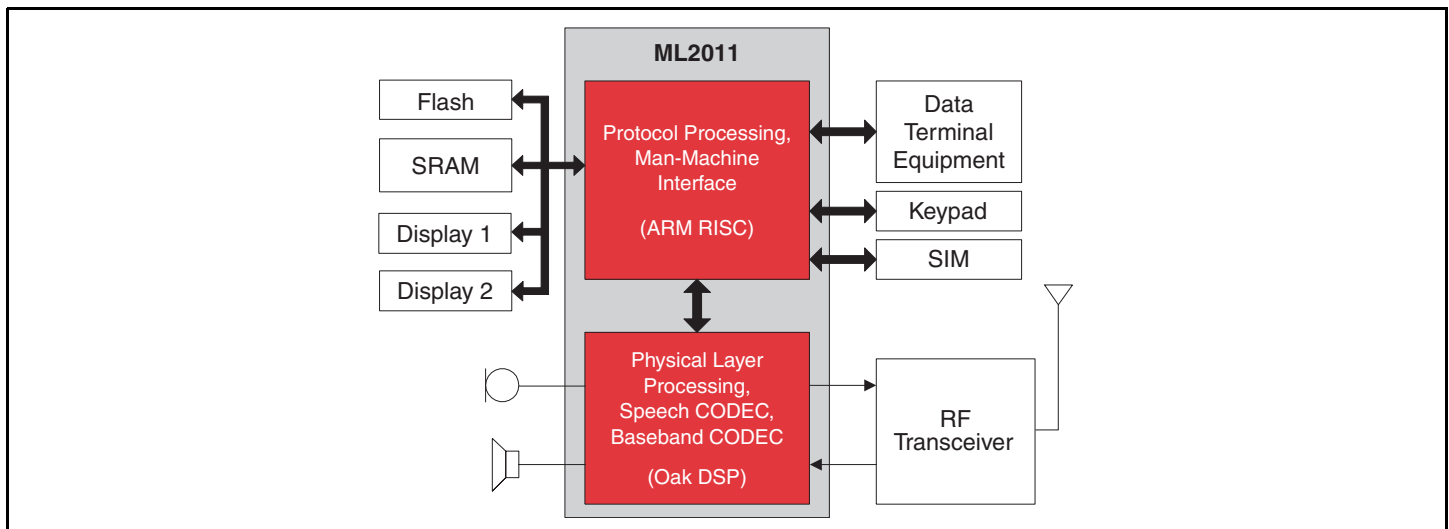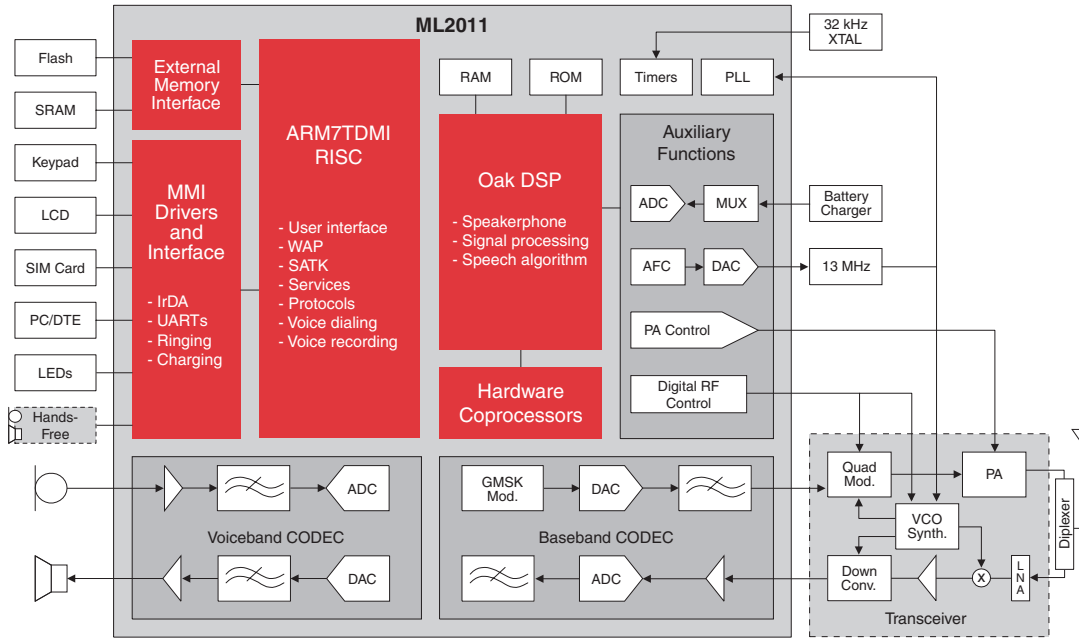
The **ML2011** GSM baseband processor offers a high level of system integration, performance, and features for next-generation handsets and radio cards. The **ML2011** is a single-chip baseband device that is applicable for wireless handsets and speakerphones.

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

The **ML2011** contains all of the analog and digital GSM 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 customer's product development cycle and to enable high-volume manufacturing, Broadcom also offers handset system solutions, including:

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

To further reduce overall component count and BOM cost, the **ML2011** integrates a number of typical PCB circuits, such as a PA controller, echo cancellation chip, noise suppression chip, and hands-free answer sensing.

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

The result is a dramatic reduction in the total system IC count, footprint, cost, and power consumption. The high level of integration also simplifies the handset manufacturing process and enhances reliability because there are fewer system components.

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 to various polyphonic ringer chips and can 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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