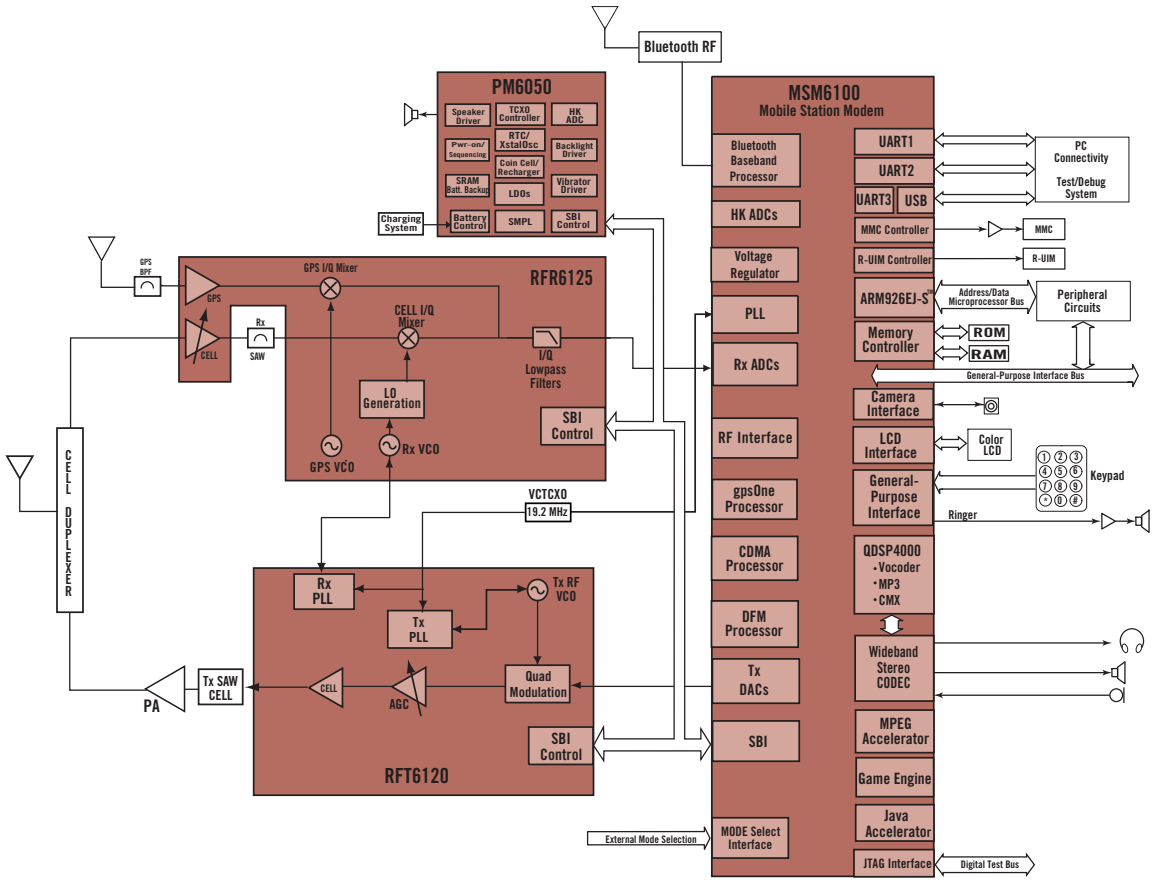
radioOne™ ZIF SINGLE-BAND CELLULAR CHIPSETS



Single-Band plus gpsOne™ Architecture with MSM6100™

Overview

QUALCOMM CDMA Technologies (QCT), strives to constantly improve the indispensable communication tools used every day. QCT creates state-of-the-art chipsets, system software, development tools and products — such as the Launchpad™ suite of wireless technologies and software — that support the most advanced digital features and functionality available for wireless devices and base stations — while continually reducing complexity, cost and board-space requirements.

The RFR6120™ and RFR6125™ RF-to-baseband receive processors and the RFT6120™ baseband-to-RF transmit processor are highly integrated cellular CDMA single-band devices. The RFR6125 chip adds QUALCOMM's gpsOne™ position location capabilities to the RFR6120 device. All three devices use QUALCOMM's radioOne™ Zero Intermediate Frequency (ZIF) architecture, which eliminates the need for IF components, including IF integrated circuits (ICs), IF Surface Acoustic Wave (SAW) filters and IF voltage control oscillators (VCOs). Elimination of these parts reduces circuit-board area and bill-of-materials (BOM) costs, enabling more cost-effective multimode, multiband handsets and other wireless devices.

radioOne Technology

The radioOne solution offers a revolutionary technology for CDMA radios that use ZIF, or direct conversion, architecture for the wireless handset market. Using advanced techniques developed by QCT to enable high-dynamic-range receivers, the radioOne technology solves the problem of stringent interference specifications with which CDMA phones must comply. QCT's radioOne technology also incorporates the frequency synthesis and passive elements used in converting baseband signals to and from the RF.

This radioOne single-band solution uses two chips to perform the radio functions that formerly required three chips. The inaugural generation of quad-mode ZIF devices needed a separate low-noise amplifier (LNA) chip as part of the receive chain. However, the RFR6120 and RFR6125 devices include an integrated LNA for a complete single-chip receive chain. This second-generation ZIF architecture integrates all of the active circuitry needed for CDMA receive and transmit functionality (except for the power amplifier). For single-band cellular applications, these improvements result in a more than 50-percent space savings as well as significant BOM and design-cost savings over QUALCOMM's first-generation RFR6000™, RFL6000™ and RFT6100™ chipsets.

RFR6120/RFR6125 Device Description

The RFR6120 and RFR6125 chips, optimized specifically for single-band cellular receive operation, include an integrated CDMA LNA/mixer and UHF VCO. The RFR6125 device also includes an integrated GPS LNA/mixer and GPS VCO. The CDMA LNA performs all of the required gain, NF, IP2, IP3 and back isolation for local signal leakage. The integrated UHF VCO covers both cellular and J-CDMA bands, and is controlled by the receive (Rx) PLL integrated in the RFT6120 chip. The RFR6120 and RFR6125 chips are offered in 6 mm x 6 mm 40-pin Quad Flat No-Lead (QFN40) packages.

RFR6120/RFR6125 Device Features

- Compatibility with all CDMA2000® 1X members of the QUALCOMM MSM6xxx™ family of Mobile Station Modem™ (MSM™) chips
- Full direct downconversion — RF to baseband
- Supports full-international cellular band operation for Japan, China, India, Latin America, Korea and the United States
  - Supports GPS band operation (RFR6125 only)
  - Supports CDMA and AMPS modes
  - Supports GPS mode (RFR6125 only)
- Supports full international CDMA2000 1X cellular band
- Receive path circuitry includes:
  - High dynamic range baseband filter
  - Cellular LNA and mixer
  - GPS LNA and mixer (RFR6125 only)
  - On-chip UHF VCO
  - On-chip GPS VCO (RFR6125 only)
- Integrated LNA with programmable gain steps
  - Two LNA AMPS gain settings
  - High reverse isolation
- Individual circuit power on/off controls
- Power reduction feature control extends handset standby time
  - Selective circuit power-down
  - Gain and bias controls
- QUALCOMM's efficient three-line serial bus interface (SBI)
- Low-power supply voltage (2.7 to 3.0 V)
- Compatible with lower MSM voltage (1.8 to 3.0 Vdd)
- Available in small, thermally efficient package (QFN40)

RFT6120 Device Description

The RFT6120 chip, tailored specifically for single-band cellular transmit operation, consumes lower current than its quad-mode predecessor, the RFT6100 device, and is offered in a 5 mm x 5 mm 32-pin Quad Flat No-Lead (QFN32) package.

RFT6120 Device Features

- Compatibility with all CDMA2000 1X members of the QUALCOMM MSM6xxx family of MSM chips
- Full direct upconversion — baseband to RF
- Supports full-international cellular band operation for Japan, China, India, Latin America and the United States
- Supports full international CDMA2000 1X cellular band*
- Transmit path circuitry includes:
  - Baseband amplifier
  - One set of quadrature modulators/upconverters
  - RF AGC amplifier
  - Driver amplifer with on-chip RF matching
- Integration of LO generation circuit
- Entire transmit synthesizer on-chip (transmitter PLL and VCO)
- On-chip receiver PLL to control UHF VCO
- Greater than 85 dB transmit power control range
- Power reduction feature via MSM control extends handset talk time
  - Optimized for low DC power consumption versus RF output level
  - Transmit puncturing
  - Selective circuit power-down
- QUALCOMM's efficient three-line SBI
- Low-power supply voltage (2.7 to 3.0 V)
- Available in small, thermally efficient package (QFN32)

The MSM6xxx Chipset Solutions

The radioOne devices are designed to support the MSM6xxx family of chipset solutions as part of QUALCOMM's complete wireless solution.

Each of the MSM6xxx chipset solutions supports a select feature set of QUALCOMM's Launchpad suite of technologies, encompassing advanced multimedia, connectivity, position location, user interface and removable storage capabilities. QUALCOMM's MSM6xxx chipsets and system software closely match the specific functionality and cost-target objectives agreed upon in joint product planning with manufacturers and wireless service operators worldwide.

The MSM6xxx solution also includes QUALCOMM's BREW™ system. QUALCOMM's BREW system provides products and services that connect the mobile marketplace value chain, which includes application developers, publishers, content providers, device manufacturers, operators and consumers.

QUALCOMM's Complete Solution — Our Commitment to our Partners

QUALCOMM CDMA Technologies is enabling the future of communications. We work closely with our manufacturer and operator partners to develop solutions that meet market needs today and provide the technology foundation for the wireless communications of tomorrow. Our world-class CDMA engineers create detailed reference designs to accelerate testing and deployment for our partners. And our chipsets and system software are fully integrated and able to bring advanced features and functionality to today's wireless devices. With QUALCOMM CDMA Technologies, manufacturers and operators can offer sophisticated wireless solutions that succeed in the global marketplace.

*For CDMA with AMPS requirements, the RFT6100 is recommended.

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