

CDMA



## RX IF/BASEBAND PROCESSOR

IFR3500™

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CDMA Technologies  
Enabling the future of communications.™

### OVERVIEW

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

The IFR3500™ device is a fully integrated IF-to-baseband processor performing all CDMA and GPS receive (Rx) signal processing functions required between the IF output from QCT's RFR3100™ or RFR3300™ Rx front-end devices and at baseband with Mobile Station Modem (MSM™) devices for IS-95 CDMA-only and ARIB-53 (Japan) J-CDMA applications. The IFR3500 device leverages previous IFR3300™ circuit designs, including GPS, and provides significant advantages in size and cost for single-mode CDMA or single-mode plus

gpsOne™ - enabled handsets. In conjunction with RFR3100 or RFR3300 devices, a complete two-chip Rx radio implementation for CDMA handsets with GPS position location capability is realized with minimum circuitry.

The IFR3500 device includes IF AGC amplifiers, IF VCO, selectable frequency divider for IF LO, a quadrature IF-to-baseband downconverter, in-phase (I) and quadrature (Q) baseband filters, and Analog-to-Digital Converters (ADCs). Used in conjunction with QCT's RFR3500™ device, the IFR3500 device accommodates sharing

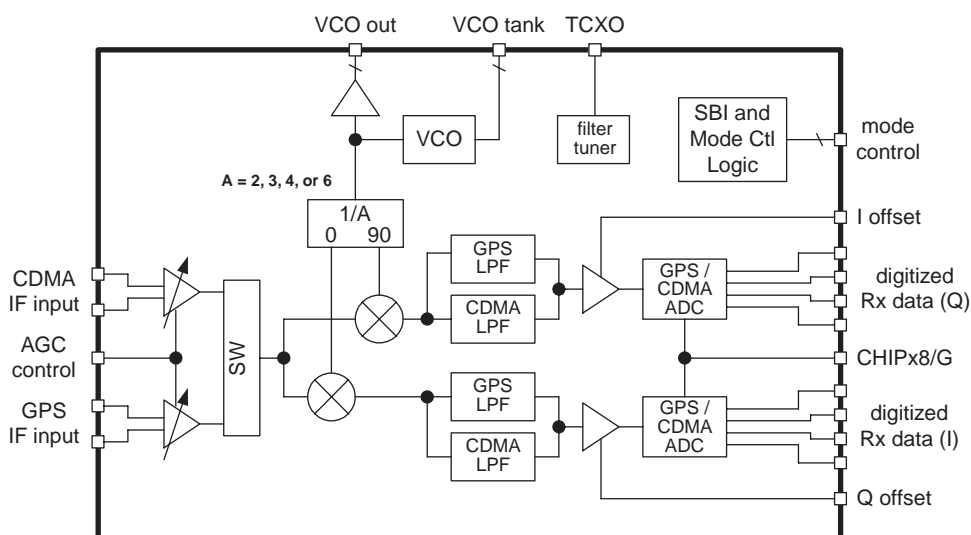
of the IF LO synthesizer to enable simplified frequency plans and reduced cost.

The range of supply voltage is from 2.7 V to 3.0 V, which provides operating compatibility for platforms utilizing a single-cell Li-Ion battery design. CDMA and GPS mode selection, gain control, IF LO frequency divide, and selective power-down modes which permit optimized power savings are controlled directly from the MSM device and system software. The IFR3500 device is provided in a 32-pad BCC++ plastic package that includes an exposed center ground slug for

improved RF grounding, mechanical strength, and thermal continuity.

As with all QCT products, the IFR3500 device features the unparalleled customer support you have come to expect from your partner of choice for complete wireless communications solutions. QCT is committed to providing innovative multi-mode, multi-network chipsets, system software and development tools that will help ensure your competitive success in the wireless communications marketplace for 3G and beyond.

Figure 1. IFR3500 Functional Block Diagram



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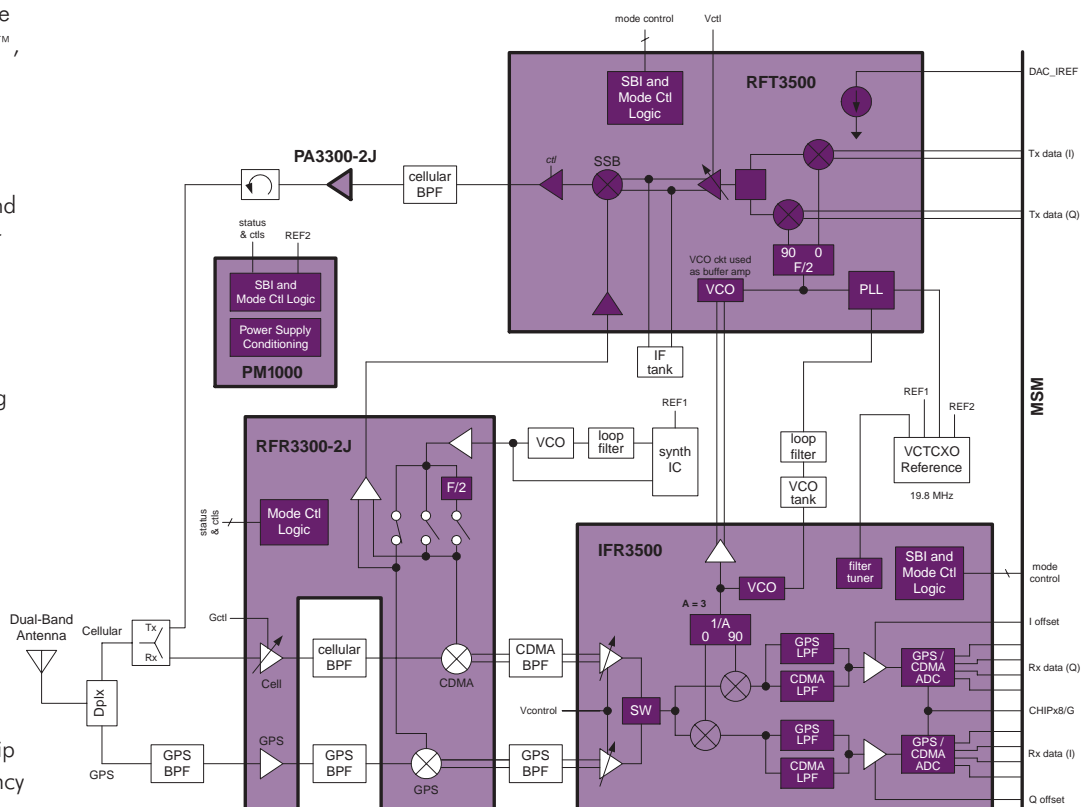
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### FEATURES

- Dual-mode operation includes CDMA and GPS
- Rx digital baseband interface compatible with MSM3100™, MSM3300™, MSM5105™, MSM5100™, and MSM5500™ devices
- IF LO synthesizer can be shared between IFR3500 and RFT3500 devices for easier frequency planning and reduced cost
- Rx power control through 90 dB dynamic range VGA
- IF mixer for down-converting IF to analog baseband for CDMA and GPS
- Low-pass filtering for CDMA and GPS I- and Q-component baseband signal demodulation
- 4-bit ADCs convert CDMA or GPS I and Q analog baseband components to digital baseband
- IF LO circuits include on-chip VCO with selectable frequency divide ratios (2, 3, 4, 6)
- I- and Q-channel DC offset control inputs drive baseband DC voltage offset to zero in CDMA and GPS signal paths
- Selective programming modes to extend handset power savings

- MSM-controlled operation via serial bus interface (SBI)
- Supply voltage from 2.7 V to 3.0 V
- 32-pin BCC+ package (5 mm x 5 mm x 0.8 mm)

**Figure 2. IFR3500 as Part of QUALCOMM'S Chipset Architecture (J-CDMA Phone with gpsOne configuration shown)**



**Table 1. IFR Selection Guide**

Part Number	Functionality
IFR3000	CDMA, AMPS IF-to-baseband receiver
IFR3300	CDMA, AMPS, GPS IF-to-baseband receiver
IFR3500	CDMA, GPS IF-to-baseband receiver

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