

Keywords: CDMA, FM, cellular, PCS, low-noise amplifier, LNA, 85MHz IF, IF SAW filter, IP2, TDMA, GSM, EDGE, WCDMA

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REFERENCE DESIGN 453 INCLUDES: ✓Tested circuit ✓Schematic ✓BOM ✓Board available

REP005: Tuned Front End for Dual-Band CDMA for Use with Low-Cost 85MHz IF SAWs

Abstract: This reference design (RD) is for a dual-band, triple-mode CDMA front-end IC tuned for use with IF SAW filters. The RD modifies the FM/cellular/PCS mixers to a common 85MHz IF. The design uses a low-noise amplifier (LNA) with mixer, the MAX2320, that is also useful for TDMA, GSM, and EDGE applications. Schematics and bill of materials are shown.

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Rapid Engineering Prototypes are real circuits that Maxim application engineers have built and measured in our labs. They can provide a starting point for new RF designs. They are not available as evaluation kits.



Objective: To verify the performance of this dual-band triple-mode CDMA front-end IC using a common, digital, 85MHz IF SAW filter and an 85MHz AMPS FM IF SAW filter.

This project entailed custom-tuning to modify the FM/cellular/PCS mixers all to a common 85MHz IF. This was required because of access to low-cost IF SAW filters. A compromise in -1dB performance at the PCS band resulted, because the RF receive-image filter and the duplexer didn't provide sufficient band-edge rejection. Nonetheless, the design proved surprisingly robust because of the high IP2 of the digital PCS mixer.

The [MAX2320](#) low-noise amplifier (LNA) plus mixer is designed for dual-band CDMA cellular-phone handsets, but it can also be used in dual-band TDMA, GSM, EDGE, or WCDMA applications. It offers two LNA gain states to meet the required CDMA dynamic range, with a switchover hysteresis margin. There are three mixers: one for the analog cellular path and two for the digital modulation paths at the cellular and PCS bands. The digital path mixers have a common IF output, as they can provide sufficient spurious and image rejection with a single IF. This capability eliminates one IF filter. The MAX2320 has separate cellular-band and PCS-band buffered VCO inputs and outputs, eliminating the need for extra transmit upconverter VCO buffers.

[Schematic of the MAX2320 evaluation kit \(PDF, 52kB\)](#)

[Bill of materials, part 1](#)

[Bill of materials, part 2](#)

Related Parts

[MAX2320](#) Adjustable, High-Linearity, SiGe, Dual-Band, LNA/Mixer ICs -- [Free samples](#)

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