

## APPLICATION NOTE 441

## REP001: AMPS FM Mixer Trades Off IIP3 for Gain

*Abstract: This reference design (RD) for an RF mixer in the FM (AMPS) signal path custom tunes the output matching circuit to optimize the trade-off between IIP3 and the highest gain. The design features the MAX2324 low-noise amplifier (LNA) with RF mixer for cellular-band CDMA, TDMA, GMS, and EDGE applications.*

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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: For the RF mixer in the FM (AMPS) signal path, to optimize the trade-off between best linearity versus highest gain by custom-tuning the output matching circuit.*

The [MAX2320](#) evaluation board was used to characterize the [MAX2324](#), as the MAX2320 contains a superset of the features and will give virtually identical cellular band performance. Note that this IC offers both a digital (CDMA or TDMA) path mixer and an FM (AMPS) path mixer whose outputs are open collector. Varying their load line changes both the gain and the IIP3 performance (inversely proportional). In this application, the output match to the FM mixer was optimized for IIP3.

The MAX2324 low-noise amplifier (LNA) plus mixer is designed for cellular band CDMA cell-phone handsets, but it can also be used in TDMA, GSM, or EDGE applications. It offers two LNA gain states to meet the required CDMA dynamic range, with a switchover hysteresis margin. There are two mixers: one for analog IF output and the other for digital-modulation IF output. The MAX2324 has buffered VCO inputs and outputs, eliminating the need for extra transmit upconverter VCO buffers.

[Schematic of MAX2324 evaluation kit \(PDF, 55kB\)](#)

[Bill of materials, part 1](#)

[Bill of materials, part 2](#)

## Related Parts

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

-- [Free Samples](#)

[MAX2320EVKIT](#) Evaluation Kit for the MAX2320, MAX2321, MAX2322, MAX2324, MAX2326, MAX2327

[MAX2324](#) Adjustable, High-Linearity, SiGe, Dual-Band, LNA/Mixer ICs

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