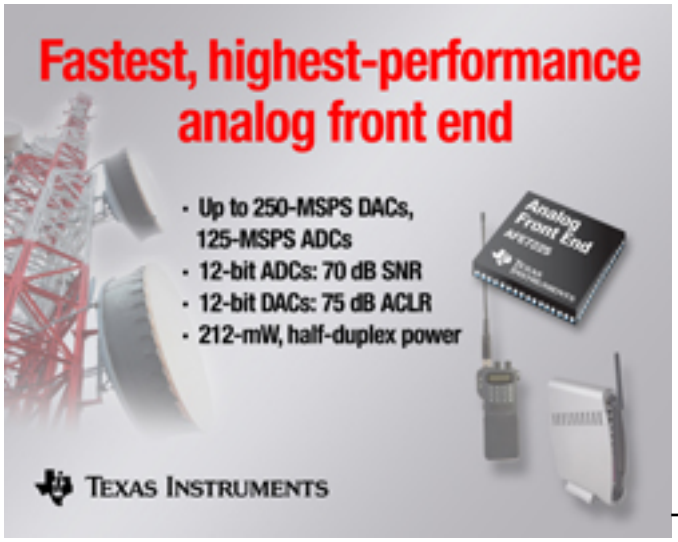
AFE for Femtocell Base Stations and Portable SDRs is Presented as Industry's Fastest



Texas Instruments introduced what it asserts is the industry's fastest, highest-performance analog front end (AFE) for femtocell base stations and portable software-defined radio (SDR) applications. The low-power, 12-bit AFE7225 integrates a dual 125-MSPS analog-to-digital converter (ADC) and dual 250-MSPS digital-to-analog converter (DAC). It operates 25-percent faster than the competition, according to the company while increasing the signal-to-noise ratio (SNR) by 2 dB and providing up to five times the DAC output current. In addition to the AFE7225, the 12-bit AFE7222 is available for lower bandwidth, power-sensitive applications. It integrates a dual 65-MSPS ADC and dual 130-MSPS DAC and uses only 398 mW in full-duplex or 212 mW in half-duplex receive mode at full speed. The mixed-signal AFEs offer independent transmit and receive, 32-bit numerically controlled oscillators (NCOs), serialized LVDS input/output options, and independent transmit/receive quadrature modulation correction for gain, phase and offset imbalances.

Key features and benefits of the AFE7225 and AFE7222

Low power consumption: Consumes only 12 mW of power in deep-sleep mode with a wake-up of only 13 us, or as little as 120 mW in light-sleep mode with 5-us wake-up time.

High performance for clearer signals: Dual ADC achieves 70 dB SNR, while the dual DAC achieves an adjacent channel leakage ratio of 75 dB with a 3G W-CDMA cellular signal.

Signal processing reduces FPGA gate count requirements, interface speed and cost: Both feature independent transmit and receive digital block up- and down-conversion with 2x to 4x interpolation, 2x decimation, coarse and 32-bit NCO frequency mixers; digital correction of gain, phase and offset for quadrature modulation receive and/or transmit; and a peak/rms power meter.

Integration reduces system cost: Dual 12-bit auxiliary DAC and dual-input 12-bit auxiliary ADC eliminate the need for a separate monitoring and control device, reducing board space, power and cost.

Flexibility for designers: Digital DAC inputs and ADC outputs can be configured for serial LVDS to save pin/trace-count and aid long-trace signaling; or multiplexed 12-bit CMOS for a low-power interface, supporting full-duplex over two buses or half-duplex from one or two digital buses.

The AFE7225 and AFE7222 can be used in heterodyne or direct-conversion radio architectures. For heterodyne radios, a single DAC channel in the AFEs can be used to create an intermediate frequency up to approximately 100 MHz for transmit, and a single ADC channel can be used to capture IFs of more than 300 MHz, with the unused channels shut down to conserve power. For femtocell base stations, the AFEs provide macro-cell performance when combined with high-quality RF components.

Texas Instruments
800-477-8924, www.ti.com [1]

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[1] http://www.ti.com