Radio System-on-chip Combines Data Conversion, RF and 32-bit Processing

Analog Devices today introduced a SoC (system-on-chip) device that integrates all of the RF (radio frequency) transmit and receive functions, data conversion, and processing elements required to enable a fully programmable radio. Designed for a range of remote, battery-powered wireless sensor network (WSN) applications, including utility meters, medical telemetry systems, building automation, asset tracking and security systems, the ultra-low-power ADuCRF101 radio SoC features a 12-bit ADC (analog-to-digital converter), a 32-bit microprocessor core, on-chip SRAM and FLASH memory and an ISM-band radio transceiver. Download the ADuCRF101 radio SoC data sheet.

“By combining converter technology, low-power 32-bit processing, large on-chip memory and high-performance RF communications in a single 9-mm × 9-mm package, the ADuCRF101 provides a radio SoC at a performance level not previously available to battery-powered WSN applications,” said James Caffrey, Converter Group marketing and applications director, Analog Devices. “By delivering a solution based on an open-source ARM Cortex-M3 processor, combined with evaluation hardware and software tools, the Analog Devices platform simplifies design and reduces development time for our customers who are designing wireless data-acquisition products.”

The ADuCRF101 radio SoC extends ADI’s precision analog microcontroller portfolio, which now includes an ultra-low-power offering based on the Cortex-M3 processor, to support the demanding design requirements of today’s remote sensing and measurement applications. Design engineers can visit ADI’s EngineerZone, an open technical support forum where they can ask questions, share knowledge and search

for answers to questions regarding precision analog microcontrollers.

ADuCRF101 Lowers Power in a Wide Range of Applications

The network range and coverage of the ADuCRF101 radio SoC is well suited to applications where data must be captured, measured, and transmitted quickly in noisy environments without taxing battery life.

“With the ADuCRF101 radio SoC, ADI now gives energy metering customers the option of designing with their own processor alongside ADI’s ISM-band transceivers or choosing a fully integrated SoC,” said Ronn Kliger, Energy Group director, Analog Devices. “The new device is an important addition to our energy portfolio, which includes products ranging from single- and poly-phase metering ICs to a variety of integrated RF transceivers. The ADuCRF101 also delivers a single-chip communications solution for the challenging requirements of battery powered gas, water and heat meters.”

In medical patient monitoring systems, a wireless Holter or telemetry monitor worn by the patient needs to be small, operate at low power for extended battery life, and offer the performance level to sustain uninterrupted communication of the patient’s vital signs. The ADuCRF101 enables these applications and also provides a platform upon which patient monitoring outside of the hospital environment can be done.

More About The ADuCRF101 Radio SoC

The ADuCRF101 radio SoC’s 32-bit ARM Cortex-M3 core provides the throughput necessary to support a growing array of sensing and measurement functions, and features serial download and debug, an external watch crystal that functions as a wake-up timer, and a 16-MHz PLL with an 8-way programmable divider. The integrated RF transceiver provides a combination of industry-leading interference blocking performance with very low receive and transmit currents, allowing more robust operation in urban environments where interfering signals are present.

The ADuCRF101 device is supported by a suite of ADI development tools, which include evaluation boards with matching antennae, an emulator board, ADuCRF101-specific compiler, serial-wire program download and debug support, as well as CMSIS (Cortex Microcontroller Software Interface Standard) compliant software libraries to support all peripherals. Also available are a power/battery-life calculator and RF low-level drivers and evaluation tools.

The ADuCRF101 radio SoC supports DASH7 a coalition of organizations promoting a standard for versatile wireless sensor networks at 433 MHz that is based on the ISO-18000-7 standard (originally designed for active RFID in the military). The ADuCRF101 additionally boasts long range, good penetration and low power and also supports 802.15.4-based networks.

ADuCRF101 Radio SoC Key Features

Processor	32-bit ARM Cortex-M3 processor core
Memory	Up to 128 Kbytes of flash memory, 16 Kbytes SRAM
Transceiver frequencies	862 MHz to 928 MHz and 431 MHz to 464 MHz
Data rate	1 kbps to 300 kbps
Transmit power	–20 dBm to +12 dBm
Power efficiency	Total of 6 sleep modes Sleep-mode current with SRAM contents retained: 1.6 microAmps
Operating current	8.7 to 32 mA in transmit mode 12.8 mA in receive mode
Modulation	2 FSK/GFSK/OOK /MSK/GMSK
Receiver sensitivity	–107.5 dBm at 38.4 kbps
Interferer rejection	38 dB adjacent channel (channel spacing 500 kHz, IF BW 300 kHz)

Availability, Pricing, Complementary Products

Product	**Sample Available**	**Flash/ SRAM Memo**	**Price per Unit in qu**	**Package**

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AD uC RF1 01B CPZ 64	NO W	64/ 8 K byt es	$4. 05	64-l ead LFC SP 9 mm × 9 mm
AD uC RF1 01B CPZ 128	NO W	128 /16 Kby tes	$4. 50	64-l ead LFC SP 9 mm × 9 mm

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