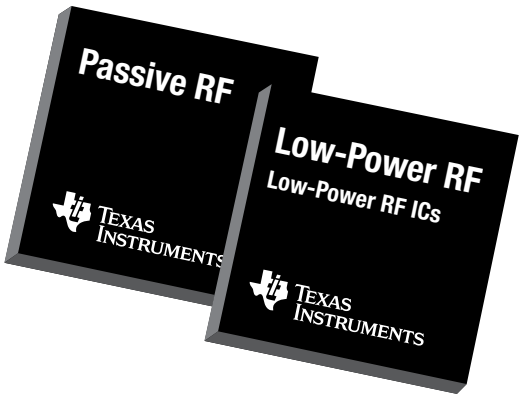

Low-Power RF and Passive RF Devices

Texas Instruments

The Texas Instruments (TI) portfolio of Low-Power RF and Passive RF devices are an ideal fit for low-power and passive (non-battery operated) wireless networks, including standard-based IEEE 802.15.4, ZigBee®, proprietary networks or ISO18000-2 networks. TI's RF devices help RF designers achieve best-in-class read range and reliable performance at a competitive price.

Active Standard-Based Networks

- IEEE 802.15.4 – A wireless radio frequency standard for low-power and short-range applications. This standard is ideal for point-to-point or point-to-multipoint networks. Systems that start with an 802.15.4-based proprietary network can later be upgraded with new software and evolve to a ZigBee-compliant system. TIMAC software and packet sniffer free of charge.

- ZigBee – A low-power wireless network standard that offers mesh networking as well as interoperability between different vendors' products. ZigBee is a network layer on top of the IEEE 802.15.4 standard (PHY and MAC layers). The new Advanced Metering Infrastructure (AMI) profile and the Home Automation profile are a perfect fit for a powerful combination of smart metering and home automation services – based on a worldwide standard. Z-Stack™ software and packet sniffer free of charge.

Active Proprietary Networks

- SimpliciTI™ Network Protocol – This free software code, an excellent start for building a network, is battery operated and uses TI Low-Power RF System-on-Chips or the MSP430 and an RF transceiver. SimpliciTI network protocol is a simple and versatile solution, combining MSP430+CC1101/2500, CC1110/2510 and DSSS parts, and offering applications such as alarm systems, smoke detectors and active RF-ID applications. Free packet sniffer.

Passive Standard-Based Networks

- ISO 18000-2 – This Passive RF air-interface protocol enables short-range two way communication without the need of a battery by scavenging the RF energy transmitted from a base-station. It is ideal for data-logging applications (configuring a device without the need of a battery), for medical applications (non-battery operated bio-sensors) and as a method for recharging batteries while enabling two way communications. The TMS37157 (PaLFI – passive low frequency interface) can also be used in combination with the active low power device to wake up the active device and thus conserve the battery life. In wake up mode (only one way communication), the PaLFI device can have up to a 1.5 meter wake up read range.

Low-Power RF and Passive RF Selection Table

	Active Standard-Based Network		Active Proprietary Network		Passive Standard-Based Network
	IEEE 802.15.4	ZigBee PRO	SimpliciTI		ISO 18000-2
	CC2520/CC2530	CC2520 with TIMAC and Z-Stack software	Sub-1 GHz CC1101/CC1110/CC1150, CC102x/CC1070	2.4 GHz CC2500/CC2510/ CC2550	134.2KHz TMS37157
Baud Rate	250 kbits/s	250 kbits/s	up to 500kbits/s, 153.6kbits/s	up to 500 kbits/s	8kbits/s
Read Distance	400m	400m	up to 2000m	400m	< 0.5meter
Battery	Yes	Yes	Yes	Yes	**NO**
RF Energy Scanvanging	No	No	No	No	**YES**
Microcontroller Interface	4-Wire SPI	4-Wire SPI	4-Wire	4-Wire	4-Wire SPI

System-on-Chip Solutions

The CC430 is the industry's highest performance, single-chip, low-power RF solution. It is based on the new 5xx generation of ultra-low-power MSP430 microcontrollers, with a high level of peripheral integration, outstanding analog performance and ease of use. The 5xx core is paired with the flexible CC1101 sub-1GHz transceiver to deliver the sensitivity and blocking performance required to achieve a robust communication link in any RF environment. The CC430 enables the user to minimize RF power, size, and cost requirements while still maintaining superior application performance. TI also offers 8051-based System-on-Chip solutions. For IEEE 802.15.4 and ZigBee networks, use CC2530; for sub-1 GHz use CC1110/1111 and for 2.4 GHz, CC2510/2511 is recommended.

Application Specific Product Recommendations

Active Standard-Based Network		Active Proprietary Network		Passive Standard-Based Network
IEEE 8002.15.4	ZigBee PRO	SimpliciTI		ISO 18000-2
CC2520/CC2530	CC2520 with TIMAC and Z-Stack software	Sub-1 GHz CC1101/CC1110/CC1150 CC102x/CC1070	2.4 GHz CC2500/CC2510/CC2550	134.2 KHz TMS37157
Utility Meters Building Automation PC Peripherals Medical (Non-Implants)	Utility Meters Building Automation PC Peripherals Medical (Non-Implants)	Alarm and Security Utility Meters Wireless Sensor Networks Building Automation Home and Leisure Equipment Medical (Non-Implants)	Wireless Sensor Networks Building Automation PC Peripherals Home and Leisure Equipment Medical (Non-Implants)	Data Logger Wireless Sensor Networks Medical (Implants and Non-Implants) Energy Harvesting Wake-up Sensor

Hardware and Software Resources

Part Number	Description	Web Link
Passive RF EMKs	The kit comes with an eZ430 MSP430F1612 USB development stick, and an MSP430 Target board including an MSP430F2274 plus the TMS37157 PaLFI. A battery board for active operation in addition to an RFID Base station reader/writer provide the infrastructure for various evaluation set ups.	**www.ti.com/ez430_tms37157**
MSP-EXP430FG4618	The MSP430FG4618/F2013 Experimenter Board, together with low-power RF EMKs, are an ideal platform for beginning development with these devices. The Experimenter Board features selected MSP430 devices, plug-in header for low-power RF evaluation modules and additional hardware components for easy system evaluation and prototyping	**www.ti.com/msp430wireless**
Low-Power RF EMKs	Low-Power RF EMKs are designed to enable the easy evaluation of products, allowing for RF measurements and the development of a prototype.	**www.ti.com/lprf**
MSP430 Code Library for Low-Power RF Devices	Code Library provides functions to facilitate the interfacing of an MSP430 device to CC1100/CC2500 devices.	FREE DOWNLOAD: **www.ti.com/ccmsplib**
SimpliciTI™ Network Protocol	A Low-Power RF network protocol perfect for small RF networks.	FREE DOWNLOAD: **www.ti.com/simpliciti**
TIMAC IEEE 802.15.4 MAC Software	IEEE 802.15.4 medium access control (MAC) software stack for CC2520 and MSP430.	FREE DOWNLOAD: **www.ti.com/timac**
Z-Stack™ Software ZigBee® Protocol Stack	Z-Stack software is compliant with the ZigBee 2006 specification, the 2007 specification and ZigBee PRO. It supports multiple platforms including the CC2520 and MSP430 platform and CC2430 System-on-Chip. The Z-Stack protocol stack has been awarded the ZigBee Alliance's golden unit status by the ZigBee test house TÜV Rheinland.	FREE DOWNLOAD: **www.ti.com/z-stack**

In addition, TI has partnered with various companies offering a variety of hardware and software tools for developing RF solutions with the MSP430 and Low-Power RF devices. Please visit ***www.ti.com/lprfnetwork*** *for a complete listing.*

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