

ZigBee® Solutions



ZigBee®

Control your world

Radiocrafts is the leading supplier of ZigBee® modules for Automatic Meter Reading, Building and Home Automation and Industrial control and monitoring. A wide product range with different form factors and antenna solution give flexibility for end solution. Development of the radio modules is done by some of the most skilled RF engineers in the world, with background from chip vendors and high tech defence electronics. Every radio module is tested and delivered on tape & reel to enable high volumes at an affordable price.

Radiocrafts ZigBee Modules features

- 100% tested modules
- Includes ZigBee® Compliant Platform
- Delivered on tape and reel
- Compact shielded module
- Small size: 12.7 x 25.4 x 3.5 mm
- Available with integrated antenna
- Conforms with world-wide regulations:
 - EN 300 440 and EN 300 328 (Europe)
 - FCC CFR 47, part 15 regulations (US)
 - ARIB STD-T66 (Japan)
- Available as high power version in same footprint
- Pin compatible with RC232™, KNX-RF and wireless M-BUS modules

Form factor and antenna solution

The RC24xx series is a powerful and very flexible platform for developing ZigBee® compliant solutions. The module comes in 3 different variant depending on the space requirement and antenna solution.

RC240x

This is an ultra compact variant measuring only 12.7x25.4mm (0.5" x 1") for limited PCB area usage. This solution is also pin compatible with our wireless M-Bus, KNX-RF and RC232 solution



RC241xAT

The AT variant include an internal chip antenna on the module. This makes the antenna design easy and also very compact.



RC241xCT

The CT variant includes an U.FL compliant connector. This enables the use of an external antenna giving flexibility and also enables the use of high performance whip antennas.

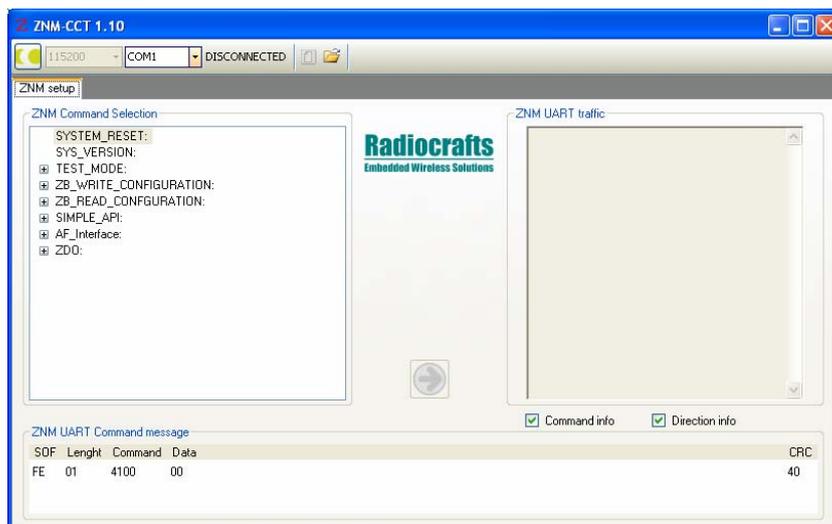
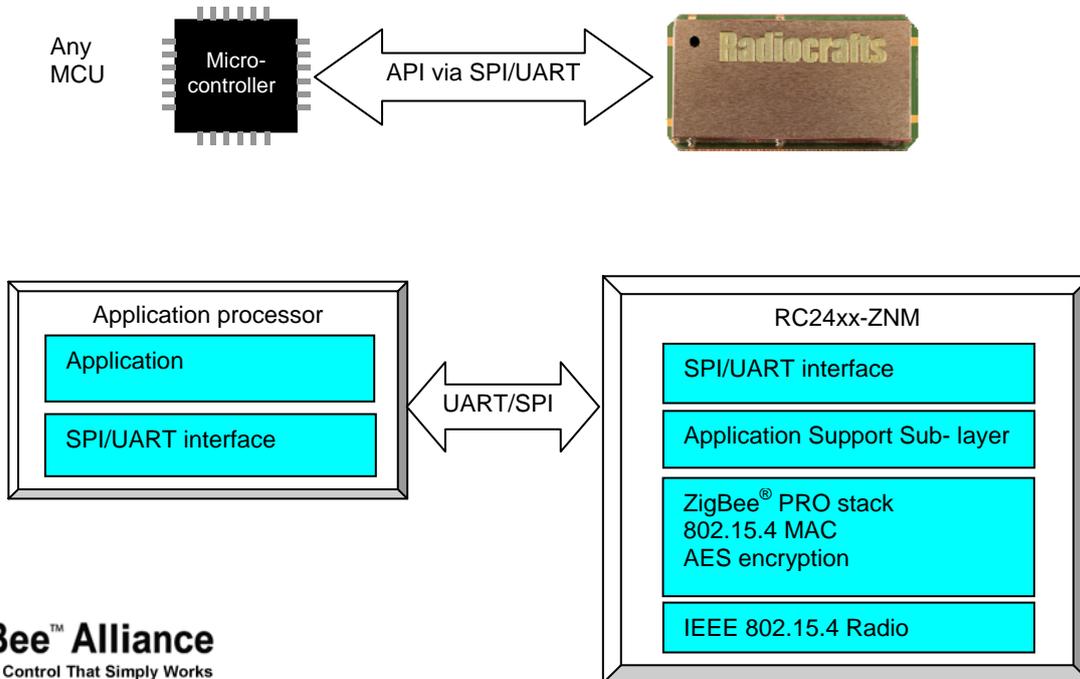


MODULE	Frequency [MHz]	# Channels	Max data rate [kbps]	Pout [dBm]	RX Current [mA]	TX Current [mA]	LOS [m]	Product as HW platform	Product as ZigBee Network Module	Product as Smart Network Energy Module
RC2400	2450	16	250	4	26	34	500	RC2400	RC2400-ZNM	RC2400-ZNM-SE
RC2400HP				20 ¹	29	170	2500	RC2400HP	RC2400HP-ZNM	RC2400HP-ZNM-SE
RC241xAT				4	26	34	350	RC241xAT	RC241xAT-ZNM	RC241xAT-ZNM-SE
RC241xCT				4	26	34	500	RC241xCT	RC241xCT-ZNM	RC241xCT-ZNM-SE
RC241xHP-AT				20 ¹	29	200	2000	RC241xHP-AT	RC241xHP-AT-ZNM	RC241xHP-AT-ZNM-SE
RC241xHP-CT				20 ¹	29	160	2500	RC241xHP-CT	RC241xHP-CT-ZNM	RC241xHP-CT-ZNM-SE

¹ Limited to 10mW/MHz in Europe due to regulations

ZigBee® Network Module (RC24xx-ZNM)

The ZNM series of modules are specially designed to meet the IEEE 802.15.4 standard and ZigBee® PRO specification. It is preloaded with a ZigBee® PRO compliant stack and offers an easy to use API via UART or SPI to an external processor. The external application processor can be of any type or brand, and the development can be done with the tool and platform most convenient to the developer.



ZNM-CCT and Demo Kit

The ZNM-CCT software is a part of Radiocrafts' RCTools PC suite tailored for use with Radiocrafts' RF Modules. Radiocrafts has developed ZNM-CCT, which is designed to demonstrate a system using the RC24xx-ZNM module. The software gives an easy introduction to ZNM messages and how to communicate between sensors, actuators, gateways and media couplers. The ZNM-CCT works together with the Radiocrafts demo boards and communicate via USB

When range matters - HP (High Power)

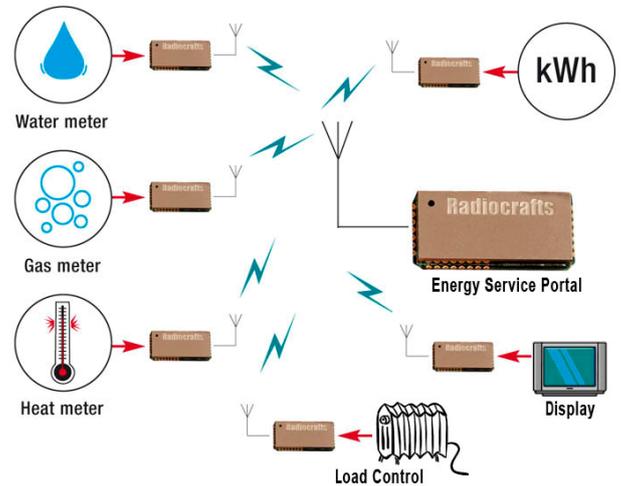
All our ZigBee® modules is available as extended range versions (-HP). These module include both an internal power amplifier in transmit and a low noise amplifier in receive to maximize range. This gives an impressive system value of 119 dB, which indicate a line of sight range of above 2.5 km with a good antenna.

Smart Energy module (RC24xx-ZNM-SE)

ZigBee® Smart Energy is being recognized as a world wide industry standard for wireless AMR. ZigBee Smart Energy offers utilities and energy service providers secure, easy-to-use wireless home area networks (HAN) for managing energy. ZigBee Smart Energy gives these groups and their customers the power to directly communicate with thermostats and other smart appliances. This enables smart demand response and load management and increase customer awareness through display functionality.

Compact module with Smart Energy support

- ZigBee® Network Module concept
- Added support for Certificate Based Key Exchange (CBKE) through the inclusion of Key Establishment Cluster
- Includes Elliptic Curve Cryptology algorithm (ECC) from Certicom embedded in module
- ESI capability, with easy to use UART interface for communication and configuration
- Available on all HW platforms.
- Smart Energy Certificates can be written to module via serial interface for easy handling and logistic



ZigBee® IP stack

Radiocrafts support the ongoing work within the ZigBee® Alliance to develop an IP based stack for Smart Energy. Radiocrafts see the introduction of IP and open standards as a strengthening of ZigBee® standard and plan to support the future standard when released.

Module as HW platform (RC24xx)

For optimal flexibility and control the RC24xx are available as a HW platform. These HW platforms are suitable to use with different protocols.

The module is based on the second generation system on chip (SoC) from Texas Instruments - CC2530. The CC2530 is a true system-on-chip (SoC) solution for IEEE 802.15.4, ZigBee® and RF4CE applications. The CC2530 combines the excellent performance of a leading RF transceiver with an industry-standard enhanced 8051 MCU, in-system programmable flash memory, 8-KB RAM, and many other powerful features. The CC2530 comes in four different flash versions: CC2530F32/64/128/256, with 32/64/128/256 KB of flash memory, respectively. The CC2530 has various operating modes, making it highly suited for systems where ultralow power consumption is required. Short transition times between operating modes further ensure low energy consumption.

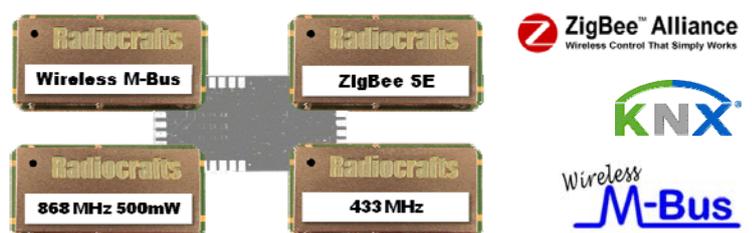
IEEE802.15.4 Software options

All IEEE 802.15.4 compliant HW platforms are capable of running mesh network protocols. This includes existing standards:

- | | |
|-----------------------------------|---|
| • ZigBee® | <i>Mesh network for wireless sensors, smart energy (AMR), home/building automation etc.</i> |
| • 6LoWPAN | <i>IPv6 packets over LoW power Wireless Personal Area Network</i> |
| • RF4CE | <i>The new RF4CE standard - RF for Consumer Electronics</i> |
| • Wireless HART/ISA100.11a | <i>Wireless standards for harsh industrial environments</i> |

One form factor – pin compatible – Different radio technologies

Radiocrafts offers full flexibility for customers who are looking for different radio solutions. It is now possible to make one PCB design and combine several radio protocols and frequencies by only changing the radio module and the antenna length. Only minor adjustments in the host controller firmware are necessary to swap between different radio protocols. The footprint compatible wireless M-Bus solution and the new high power IEEE 802.15.4 platform for ZigBee®, Smart Energy and RF4CE radio module gives a unique flexibility.



High Speed Flashing and Testing

Radiocrafts has implemented a unique solution for high speed volume production. This is an innovative test system for high volume flashing, RF testing and taping of radio modules.. This machine combines all our experience and expertise in radio modules and have the capacity of testing more than 10k modules per day.

Radiocrafts is testing the following parameters on the RC24xx radio module before shipping:

- Freq accuracy (ppm)
- Output power (dBm)
- 2nd harmonic (dBm)
- 3rd harmonic (dBm)
- TX supply current (mA)
- RX supply current (mA)
- Idle supply current (mA)
- Program memory verification
- UART communication

Testing of all these parameters will make further detailed testing unnecessary, and only functional testing needs to be done to ensure that the total application is working properly

Benefits of 100% test coverage:

- Little or no variations on delivered product
- Avoid yield problems, and costs
- Ensure regulations compliancy for every radio module
- No extensive testing needed at later stage

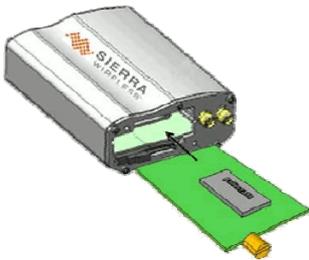
Spurious measurements – important vs qualification

We have experienced customers and competition which are making radio solutions with unknown compliance status versus CE and FCC regulations. This is often based on a lack of knowledge about the different CE regulations and not enough control of process variation. We know by experience it is difficult to confirm to regulations with certain chips and SoC's. This is one of the reasons why we ALWAYS test our radio modules 100% before shipping to customers.



Radiocrafts ATS – Automatic Test Station – module boards

Radiocrafts RF + Sierra Wireless AirLink GSM



Radiocrafts module portfolio is available for the Sierra Wireless AirLink GPRS/GSM/EDGE modem. Sierra Wireless is the leading provider of M2M modems. The combination of Radiocrafts' RF modules and Sierra Wireless GPRS modems makes an easy to use out-of-the-box gateway solution with full TCP/IP capability and processing power for extensive embedded applications. The Xtend directly connects to Radiocrafts I/O on the internal IESM card. The Open AT IDE is easy to use and the development tools are free of charge with extensive application support inside the Open-AT Software Suite. This will give a cost competitive, high performance combination. The slot-in-card works with all types of Radiocrafts modules. From Radiocrafts it is available a free Radio Test Gateway (RTG) software for local connection to the RS232 port of the modem or for enabling transparent GPRS connection via AT-commands.

www.sierrawireless.com



Support and Services

- Custom hardware- and software designs
- Application specific designs
- Standard module modifications
- Turn-key solutions and volume deliveries
- Gateway solutions for GPRS/Ethernet, RS232/RS485 and USB
- Pilot- and demo systems for control and monitoring
- FREE review of customer schematics and PCB layout
- FREE support for optimum antenna design
- Quick support response time
- support@radiocrafts.com

About Radiocrafts

Radiocrafts offers RF modules for operation in the licence-free ISM bands at 300-2450 MHz. The compact modules are easy to integrate and use, for shortest possible time-to-market and lowest total cost of ownership for the end product. Radiocrafts participates actively in the standardization work for radio communication (via the OMS group and the TC 294 committee) and is a member of Figawa and the ZigBee Alliance.

The comprehensive module portfolio can also be further tailored to meet dedicated customer specifications. Radiocrafts makes customer specific solutions, from specification to turn-key deliveries.

