

# MC1320x 2.4 GHz

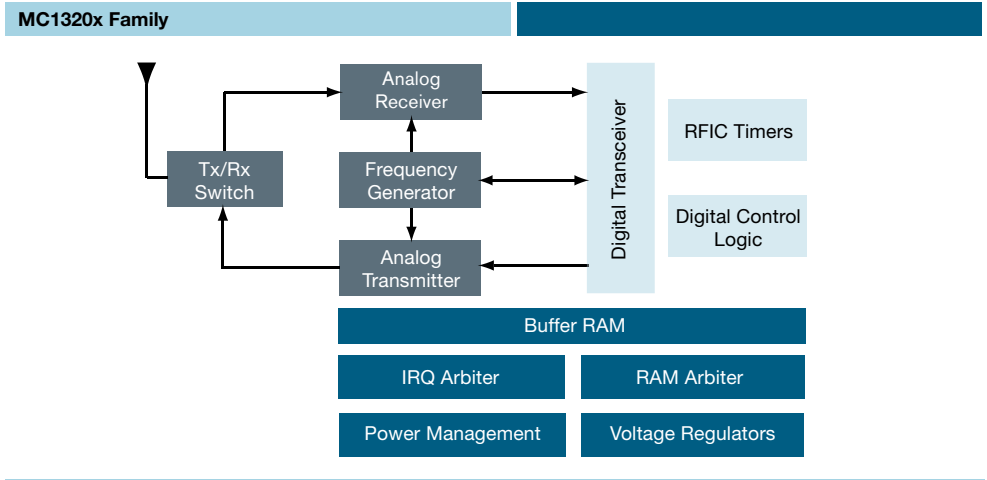
## System in a Package

### Overview

Freescale Semiconductor's second-generation ZigBee™-ready platform is a 2.4 GHz radio frequency transceiver in a 5 x 5 x 1 mm 32-pin QFN package. The MC1320x series is an IEEE® 802.15.4-compliant radio operating in the 2.4 GHz frequency band. This family of radio offerings can scale from simple point-to-point networks to a complete ZigBee mesh network.

The MC13201 in conjunction with our Simple MAC (SMAC) software provides the foundation for an easy to implement proprietary solution. Source code and application examples are available to get you started on implementing wireless solutions immediately.

The MC13202 allows for a larger-scale networking environment. In combination with the Freescale fully compliant IEEE 802.15.4 MAC and an HCS08 or ColdFire® processor with at least 32KB of Flash you can build star or cluster tree networks that match your application requirements. A fully compliant ZigBee platform utilizes the MC13202 paired with a HC9S08 microcontroller with 60 KB of Flash memory and the ZigBee protocol stack. The MC13202 allows for the development of fully ZigBee-compliant networks when used with a Freescale HCS08 MCU and the Freescale BeeStack.



### Applications

All devices in this family are pin-compatible allowing the user to select the device that perfectly fits the application.

- Residential and Commercial Automation
  - Lighting control
  - Security
  - Access control
  - Heating, ventilation and air-conditioning (HVAC) Smart Energy
- Health Care
  - Patient monitoring
  - Fitness monitoring

- Consumer Electronics
  - RF Remote control
  - Electronic toys
  - Keyboard, mice, joysticks, Wireless Gaming
- Industrial Control
  - Asset tracking and monitoring
  - Homeland security
  - Process management—diagnostics
  - Environmental monitoring and control
  - Automated meter reading
  - Lighting control
  - HVAC

## Key Features

- IEEE 802.15.4 compliant
  - 2.4 GHz operating frequency
  - 16 selectable channels
  - Programmable output power
- Integrated transmit/receive switch
- Support for SMAC, IEEE 802.15.4 and BeeStack Zigbee-Compliant
- Multiple power saving modes
- 2.0V to 3.4V operating voltage with on-chip voltage regulator
- -40°C to +85°C temperature range
- Supports a single 16 MHz crystal
- Programmable output clock for use by MCU
- Auto trim feature for crystal accuracy
- Low external component count
- 5 x 5 x 1mm 32-pin (QFN package meets RoHS requirements)

## Software Features

- SMAC
  - Small memory footprint (< 3 KB)
  - Supports point-to-point and star network configurations
- IEEE 802.15.4 compliant MAC
  - Supports star, mesh and cluster tree topologies
  - Supports beaconed networks
  - Supports optional guaranteed time slots (GTS) for improved quality of service
  - Multiple power saving modes (idle, doze, hibernate)
- BeeStack Zigbee compliant
  - Support ZigBee 1.0 specification
  - Supports star, mesh and tree networks
  - Advanced Encryption Standard (AES) 128-bit security

## MC1320x Comparison

	MC13201	MC13202
Supply Voltage V	2.0-3.4	2.0-3.4
Supply Current @ 1% Duty Cycle, CPU @ 2MHz (Typ) mA	30, TX: 37, RX	30, TX: 37, RX
Standby Current (Typ) mA	500	500
Frequency Band GHz	2.4	2.4
Sensitivity @ 1% PER (Typ) dBm	-91	-92
Data Rate (Spec) kbps	250	250
TX/RX Switch	Yes	Yes
Protocol Stack Support	SMAC	SMAC, IEEE® 802.15.4, BeeStack™
Package	5 x 5 mm, 32-pin QFN	5 x 5 mm, 32-pin QFN
Interfaces and Peripherals	SPI	SPI

## RF Features

- Fully compliant IEEE 802.15.4 transceiver
- Integrated transmit/receive switch
- Operates with 16 selectable channels in the 2.4 GHz band
- Rx Sensitivity of <-92 dBm (typical) at 1 percent PER, 20-byte packet, well above IEEE 802.15.4 specification
- -27 dBm to +4 dBm programmable output power
- Support for packet mode and streaming data processing
- Low-power modes for increased battery life—months to years
- Programmable clock output available for use by MCU
- Internal timer comparators reduce MCU resources

## MC1320x Platform

- MC13201—SMAC compatible
- MC13202—SMAC, IEEE802.15.4, and BeeStack

## MC1320x Benefits

- Simple, cost-effective solution for fast time to market
- Enables simple wireless connectivity for existing wired and wireless application
- Smaller stack size for reduced complexity and system cost
- On-chip regulators enables battery flexibility
- 2.4 GHz allows global deployment
- 16 selectable channels allow for interference and coexistence protection
- Doze and hibernate power-saving modes decrease system power consumption
- Extended temperature range supports industrial applications

## Learn More:

For current information about Freescale products and documentation, please visit [www.freescale.com/802154](http://www.freescale.com/802154).