

# MC13192 RF Daughter Card

## **Overview**

Freescale Semiconductor offers a comprehensive, end-to-end platform solution enabled by ZigBee™ technology, beginning with the MC13192 RF data modem. The MC13192 supports the 2.4 GHz band of the IEEE® 802.15.4 standard, and is a cost-effective solution that offers low-power, low-data-rate RF connectivity for a wide range of applications. The MC13192, together with Freescale's low-power HCS08 family of 8-bit microcontrollers, example simple MAC (SMAC), IEEE 802.15.4 MAC software and our future Z-Stack ZigBee networking software, make up a comprehensive, scalable platform solution. In addition to the MC13192 RF data modem, Freescale's portfolio includes MCUs, sensors, analog devices, development tools and other processors.

## **MC13192 RF Modem Daughter Card**

The MC13192 RF modem daughter card is a low-cost development board that provides a simple interface to Freescale's MC13192 transceiver. The board can be connected directly to any of Freescale's low-power HCS08 development systems or your own hardware through a simple header interface. The RF daughter card includes SMA connectors that provide an interface to test custom antennae or that can be connected

directly to test equipment via coaxial cable. If developing custom antennae is not necessary for your application, two dipole antennae are included in the development kit to allow over-the-air testing and network development.

The MC13192 RF daughter card enables the development of simple point-to-point through sophisticated ZigBee-enabled networks. The RF daughter card can be used with Freescale's IEEE 802.15.4 standard-compliant MAC or example SMAC software, as well as our future Z-Stack ZigBee networking software and tool suite. The SMAC software allows for the development of simple proprietary point-to-point and star network topologies. Included with the MC13192 RF daughter card, the SMAC has been optimized for Freescale's HCS08 family of low-power microcontrollers; however, the SMAC software is available in source code and thus can target nearly any processor. Standards-based peer-to-peer and star networks can be developed using Freescale's IEEE 802.15.4 MAC and an HCS08 development system. The IEEE 802.15.4 MAC provides the flexibility for developing sophisticated standards-based networks and is the foundation for solutions enabled by ZigBee technology.

## **MC9S08GB60 Development Board**

The MC13192 RF daughter card can be connected directly to Freescale's MC9S08GB60 evaluation board via the onboard expansion header. The MC9S08GB60 development system includes all the necessary tools needed to enable the development of software for the MC13192 RF transceiver. Included with the development system is Metrowerks' CodeWarrior™ Integrated Development Environment (IDE), that provides a comprehensive tool suite to develop software that enables the microcontroller to communicate and control the RF IC.

## **ZigBee Technology**

The IEEE 802.15.4 specification is a cost-effective, low-data-rate (<250 kbps), 2.4 GHz and 868/915 MHz wireless technology designed for personal-area peer-to-peer and star networks. The 802.15.4 standard is the basis of an application and network layer protocol known as ZigBee technology. The ZigBee Alliance is an association of companies working together to create a specification for mesh networking (expected release in 4Q04) and application profiles; they also perform interoperability and certification testing. The alliance's Web site is [www.ZigBee.org](http://www.ZigBee.org).

## PRODUCT DOCUMENTATION

MC13191x Brochure	Summary of Freescale's MC13191 and MC13192 transceivers Order Number: BRMC1319192FAM
MC13191x Reference Manuals	Detailed description for the MC13191 and MC13192 architecture and command interface Order Number: MC13191RM, MC13192RM
MC1319x Data Sheets	Electrical and timing specifications, package and pin descriptions Order Number: MC13191, MC13192

## ORDERING INFORMATION

MC13192RF Daughter Card	13192RFC-A00
MC9S08GB60 Evaluation Board	M68EVB908GB60

### MC13192 Applications

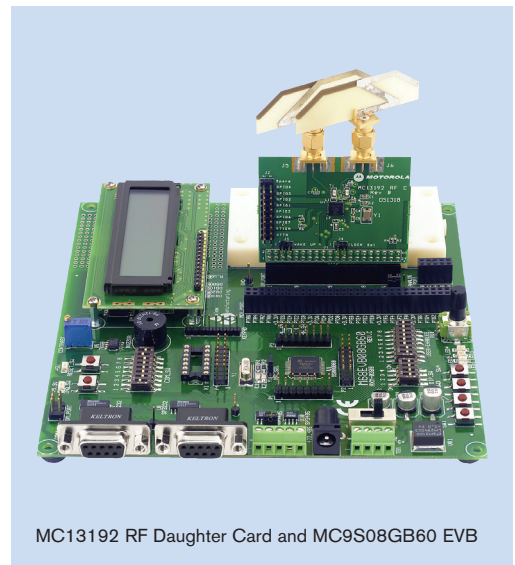
- > Residential/Commercial Automation
    - Lighting control
    - Security
    - Access control
    - Heating, ventilation, air conditioning (HVAC)
  - > Industrial Control
    - Asset tracking and monitoring
    - Homeland security
    - Process management
    - Environmental monitoring and control
    - HVAC
    - Automated meter reading (AMR)
  - > Health Care
    - Patient monitoring
    - Fitness monitoring
  - > Consumer
    - PC peripherals
    - Intelligent toys
    - Remote controls
- > Low number of external components. Includes on-chip low-noise amplifier, 1.0 mW power amplifier, voltage controlled oscillator, full spread-spectrum encoding and decoding compatible with the IEEE 802.15.4 standard
  - > Engineered to support 250 Kbps O-QPSK data in 2.0 MHz channels, per the IEEE 802.15.4 specification
  - > Sixteen dynamically selectable channels
  - > Low power consumption
  - > Multiple power-down modes enabling standard alkaline battery lifetimes from months to years
  - > Power supply range: 2.0V to 3.4V operating voltage with on-chip regulator
  - > Data and control interface via standard serial peripheral interface (SPI)
  - > Programmable clock output that can be used by MCU
  - > Extended temperature operation range: -40°C to +85°C
  - > 5 mm x 5 mm QFN-32 Pb-free package

### RF Data Modem Key Features

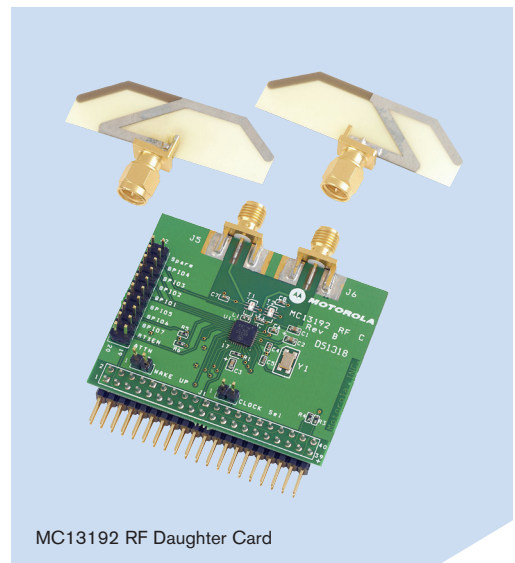
- > Compliant with the IEEE 802.15.4 standard and ZigBee technology-ready
- > Operates in the 2.4 GHz frequency band
- > Comprehensive transceiver data modem with fully packetized data out

### ZigBee Technology

Visit our Web site at:  
[www.freescale.com/ZigBee](http://www.freescale.com/ZigBee).



MC13192 RF Daughter Card and MC9S08GB60 EVB



MC13192 RF Daughter Card

**Learn More:** For more information about Freescale products, please visit [www.freescale.com](http://www.freescale.com).