

# MC13191 RF Transceiver

## Overview

Freescale Semiconductor's MC13191 RF transceiver provides a cost-effective solution for simple proprietary wireless networks. The MC13191 is designed to operate in the 2.4 GHz frequency band and has 16 selectable channels, two internal timers and seven general-purpose input/output (GPIO) ports to reduce the resources required by the baseband MCU. The MC13191 provides a robust feature set that lends itself to a wide range of simple wireless applications.

For applications that require long battery life, Freescale offers a family of low-power HCS08 8-bit microcontrollers that can be seamlessly integrated with the MC13191 transceiver via a standard four-wire serial peripheral interface (SPI). The Simple Media Access Controller (SMAC) example software is available with the MC13191 to demonstrate point-to-point and star networks. This software layer provides a buffer to enable transceiver control without

the need to directly manipulate register settings internal to the device. Simple commands initiate transmit, receiver and idle sequences. The SMAC software is available in source code and has been optimized for the HCS08 family of microcontrollers; however, the software can be modified for use in virtually any MCU. The MC13191 transceiver, HCS08 MCU and SMAC software provide a low-cost, comprehensive solution for simple wireless networks.

## Applications

For designs that need a simple wireless solution, the MC13191 RF transceiver can be implemented for the following proprietary applications:

- > Security—wireless security systems
- > Health Care—patient monitoring
- > PC Peripherals—keyboard, mice, joysticks, etc.
- > Toys—interactive and intelligent toys
- > Remote Controls—media gateways
- > Vertical Applications—diagnostics

## MC13191 Features

- > Operates with 16 selectable channels in the 2.4 GHz band
- > Rx sensitivity of -91 dBm at 1% PER, well above specification
- > 0 dB (typical) output power programmable over a 20 dB range
- > Low power modes
- > 2.0V–3.4V operating voltage with on-chip regulator
- > Packet mode data processing
- > Programmable clock output available for use by MCU
- > Standard four-wire SPI to MCU
- > Seven GPIO ports
- > -40°C to +85°C temperature range
- > 5 mm x 5 mm QFN-32 Pb-free package

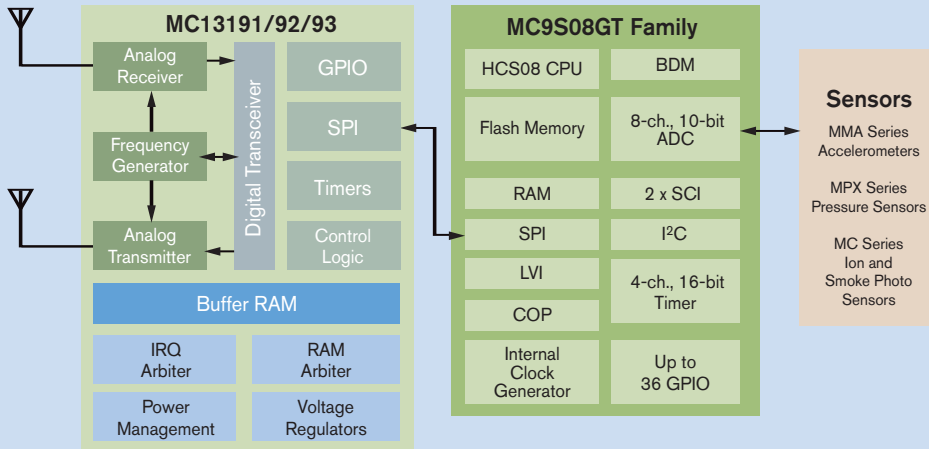
## SMAC Features

- > Small memory footprint
- > Optimized for the HCS08 family of low-power microcontrollers
- > Written in C and available as source code
- > Can easily be targeted to virtually any MCU
- > Very easy to use
- > Sample applications available



## FREESCALE'S ZIGBEE™-COMPLIANT PLATFORM SOLUTION

### Example Block Diagram for a Sensor Application



### MC13191 Benefits

- > Simple, cost-effective solution for fast time to market
- > Enables simple wireless connectivity for existing wired and wireless applications
- > Smaller stack size for reduced complexity and system cost
- > Pin-compatible with MC13192 and MC13193 for network scalability
- > On-chip regulator enables battery flexibility
- > 2.4 GHz allows global deployment
- > 16 selectable channels allow for interference and coexistence protection
- > Programmable output clock reduces external components cost
- > Doze and hibernate power-saving modes decrease system power consumption
- > Extended temperature range supports industrial applications
- > Additional GPIO increases system capabilities

### ZigBee Technology

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

### PRODUCT DOCUMENTATION

MC1319x Brochure	Summary of Freescale's MC13191, MC13192 and MC13193 transceivers Order Number: BRMC131919293
MC13191 Reference Manual	Detailed description for the MC13191 architecture and command interface Order Number: MC13191RM
MC13191 Data Sheet	Electrical and timing specifications, package and pin descriptions Order Number: MC13191

### ORDERING INFORMATION

MC13191FC	MC13191 in tray
MC13191FCR2	MC13191 in tape-and-reel

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