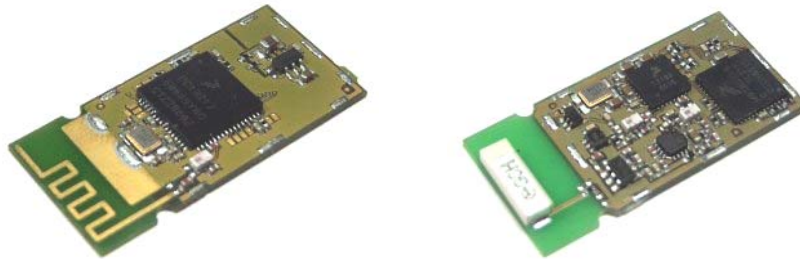


ZEBRA 24XX SM

ZigBee™ Enabled Board for Radio Applications

Product Information 1.7: 2007/05/16



Module Hardware Features:

- Wireless communication module for use in embedded applications
- Worldwide available 2.4 GHz frequency band: 2.4000 - 2.4835 GHz
- 16 channels with 5 MHz spacing (not overlapping)
- DSSS (Direct Sequence Spread Spectrum)
- Gross data rate 250 kbps
- Antennas integrated on the module
- Freescale MC13192 RF or MC13213 front end
- Freescale HCS08 base band controller with 60 kByte flash
- 50 pins HIROSE connector or BGA SMT footprint
- Operating voltage 2.0 - 3.4 V
- Mechanical dimensions 16 mm x 33 mm with metallic shielding
- Starter kit available
- Several software options, including ZigBee™ network stack

ZEBRA 240X:

- RF output power 0 dBm (1 mW)
- Receive sensitivity of -92 dB (typical)
- Link range up to 100 m (depending on the actual environment)

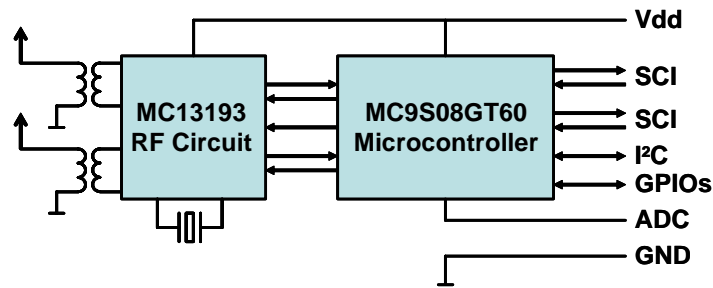
ZEBRA 241X:

- PA on board, RF output power max. of 10 dBm (10 mW),
- LNA on board, receive sensitivity of -97 dB (typical)
- Link range up to 1000 m (depending on the actual environment)

Typical Applications:

- Wireless sensor networks
- Automation and industrial control
- Measurement equipment and data logging
- Medical devices and applications

ZEBRA Module Block Diagram:



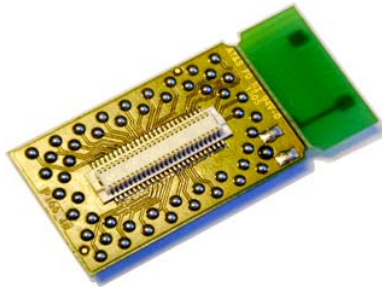
Software Options:

Option	Features
SMAC Simple Media Access Control (standard)	Simple data frame structure No storage of data packets, no retransmission Bi-directional or peer-to-peer operation Very little resources required No licenses or royalties
IEEE 802.15.4 TM PHY and MAC software (delivery option)	Standardized protocol for reliable delivery of data Storage and retransmission of data packets CSMA-CA radio channel access Optional superframe structure with beacons Optional guaranteed time slots All devices have unique 64-bit IEEE addresses Star or cluster-tree wireless network No licenses or royalties
ZigBee TM network stack (delivery option)	Based on the IEEE 802.15.4 data transfer mechanism Standard user profiles offer interoperability Cluster-tree and mesh networks Security and data encryption ZigBee TM software stack license required

The ZEBRA Module is delivered with the SMAC (Simple Media Access Control) and example software. The SMAC requires only very little resources and leaves plenty of space for a customer specific application software. An embedded boot loader allows easy reload of the customized application.

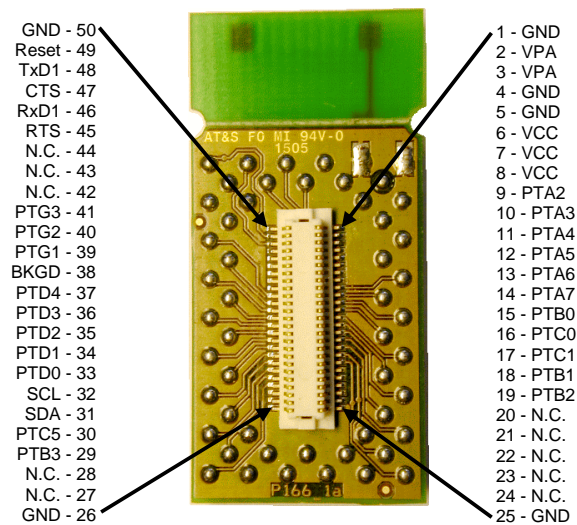
As a delivery option the ZEBRA Module can be loaded with a ZigBeeTM network stack. This enables interoperability due to standardized application profiles. To implement a true ZigBeeTM application, the user has to obtain a license for the ZigBeeTM software stack and the appropriate compiler. Alternatively, senTec Elektronik is able to develop the ZigBeeTM application based on the customer's specification, since we are experienced in wireless networking software and IEEE 802.15.4.

ZEBRA Module Connector Layout:



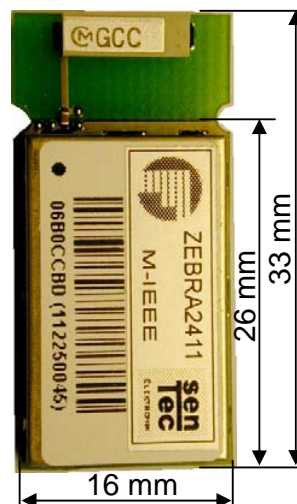
50-Pin HIROSE Receptacle: DF12C (3.0)-50DS-0.5V (standard delivery).

ZEBRA Module Pin-Out Options:



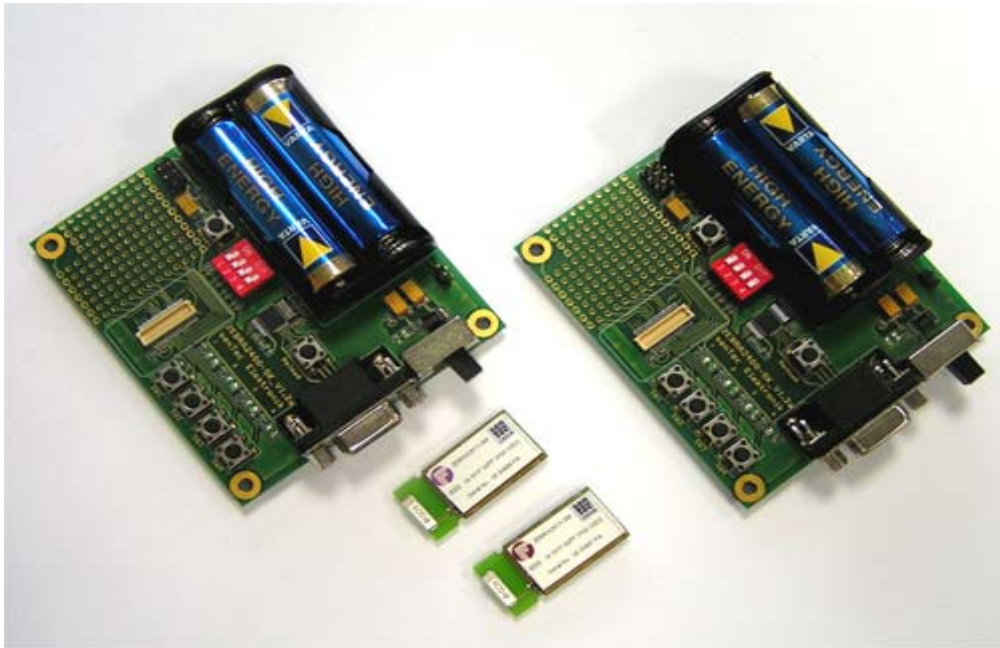
The SMT BGA footprint is a delivery option, pin-out is available on request.

ZEBRA Module Mechanical Dimensions:



ZEBRA Module Starter Kit:

Contains 2 modules, 2 base boards, demo software and detailed documentation



Ordering Information:

ZEBRA2401-SM: Module with 50-pin receptacle

ZEBRA2402-SM: Module with SMT BGA footprint

ZEBRA2411-SM: Module with PA / LNA and 50-pin receptacle

ZEBRA2412-SM: Module with PA / LNA and SMT BGA footprint

ZEBRA2400-SK: Starter Kit

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Product status: development finished, product available