

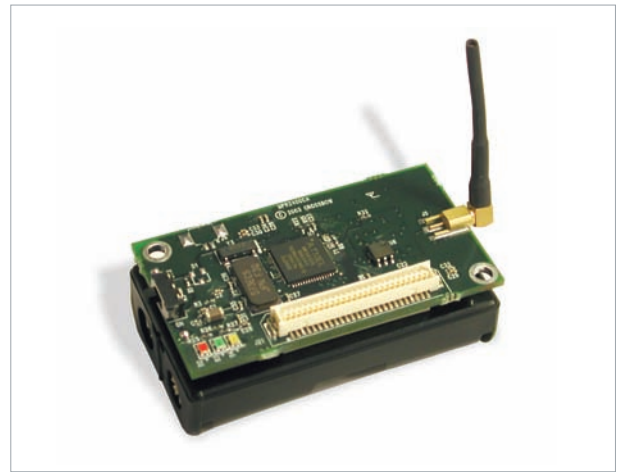
MICAz

WIRELESS MEASUREMENT SYSTEM

- IEEE 802.15.4, Tiny, Wireless Measurement System
- Designed Specifically for Deeply Embedded Sensor Networks
- 250 kbps, High Data Rate Radio
- Wireless Communications with Every Node as Router Capability
- Expansion Connector for Light, Temperature, RH, Barometric Pressure, Acceleration/Seismic, Acoustic, Magnetic and other Crossbow Sensor Boards

Applications

- Indoor Building Monitoring and Security
- Acoustic, Video, Vibration and Other High Speed Sensor Data
- Large Scale Sensor Networks (1000+ Points)
- ZigBee Compliant Systems and Sensors



MICAz

The MICAz is a 2.4 GHz, IEEE 802.15.4 compliant, Mote module used for enabling low-power, wireless, sensor networks. The MICAz Mote features several new capabilities that enhance the overall functionality of Crossbow's MICA family of wireless sensor networking products. These features include:

- IEEE 802.15.4/ZigBee compliant RF transceiver
- 2.4 to 2.4835 GHz, a globally compatible ISM band
- Direct sequence spread spectrum radio which is resistant to RF interference and provides inherent data security
- 250 kbps data rate
- Runs TinyOS 1.1.7 and higher, including Crossbow's reliable mesh networking stack software modules
- Plug and play with all of Crossbow's sensor boards, data acquisition boards, gateways, and software

TinyOS is a small, open-source, energy-efficient, software operating system developed by UC Berkeley which supports large scale, self-configuring sensor networks. The source code software development tools are publicly available at:

<http://webs.cs.berkeley.edu/tos>

Processor & Radio Platform (MPR2400CA)

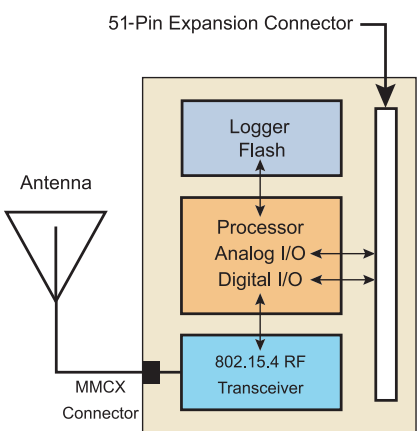
Using TinyOS, a single processor board can be configured to run your sensor application/processing and the mesh networking radio stack simultaneously. The MICAz (MPR2400CA) IEEE 802.15.4 radio offers both high speed (250 kbps) and hardware security (AES-128). The MICAz 51-pin expansion connector supports Analog Inputs, Digital I/O, I2C, SPI and UART interfaces. These interfaces make it easy to connect to a wide variety of external peripherals.

Sensor Boards

Crossbow offers a variety of sensor and data acquisition boards for the MICAz Mote. All of these boards connect to the MICAz via the standard 51-pin expansion connector. Custom sensor and data acquisition boards are also available. Please contact Crossbow for additional information.

Base Stations

A base station allows the aggregation of sensor network data onto a PC or other computer platform. Any MICAz Mote can function as a base station by



MPR2400CA Block Diagram

| Processor/Radio Board | MPR2400CA | Remarks |
|------------------------------|------------------------------|---------------------------------------|
| Processor Performance | | |
| Program Flash Memory | 128K bytes | |
| Measurement (Serial) Flash | 512K bytes | > 100,000 Measurements |
| Configuration EEPROM | 4K bytes | |
| Serial Communications | UART | 0-3V transmission levels |
| Analog to Digital Converter | 10 bit ADC | 8 channel, 0-3V input |
| Other Interfaces | Digital I/O,I2C,SPI | |
| Current Draw | 8 mA | Active mode |
| | < 15 μ A | Sleep mode |
| RF Transceiver | | |
| Frequency band ¹ | 2400 MHz to 2483.5 MHz | ISM band, programmable in 1 MHz steps |
| Transmit (TX) data rate | 250 kbps | |
| RF power | -24 dBm to 0 dBm | |
| Receive Sensitivity | -90 dBm (min), -94 dBm (typ) | |
| Adjacent channel rejection | 47 dB | + 5 MHz channel spacing |
| | 38 dB | - 5 MHz channel spacing |
| Outdoor Range | 75 m to 100 m | 1/2 wave dipole antenna, LOS |
| Indoor Range | 20 m to 30 m | 1/2 wave dipole antenna |
| Current Draw | 19.7 mA | Receive mode |
| | 11 mA | TX, -10 dBm |
| | 14 mA | TX, -5 dBm |
| | 17.4 mA | TX, 0 dBm |
| | 20 μ A | Idle mode, voltage regular on |
| | 1 μ A | Sleep mode, voltage regulator off |
| Electromechanical | | |
| Battery | 2X AA batteries | Attached pack |
| External Power | 2.7 V - 3.3 V | Molex connector provided |
| User Interface | 3 LEDs | Red, green and yellow |
| Size (in) | 2.25 x 1.25 x 0.25 | Excluding battery pack |
| (mm) | 58 x 32 x 7 | Excluding battery pack |
| Weight (oz) | 0.7 | Excluding batteries |
| (grams) | 18 | Excluding batteries |
| Expansion Connector | 51-pin | All major I/O signals |

Notes

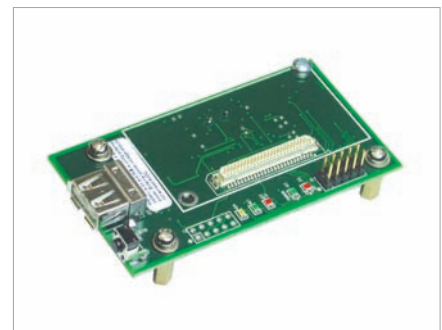
¹5 MHz steps for compliance with IEEE 802.15.4/D18-2003.

Specifications subject to change without notice

plugging the MPR2400CA Processor/Radio Board into an MIB510CA/ MIB520CA serial/USB interface board. The MIB510CA provides an RS-232 serial interface while the MIB520 provides a USB interface for both programming and data communications. Crossbow also offers a stand-alone gateway solution, the MIB600CA for TCP/IP-based Ethernet networks.



MIB600CA Mote Interface Board



MIB520CA Mote Interface Board

Ordering Information

| Model | Description |
|----------------|---|
| MOTE-KIT2400CB | 2.4 GHz MICAz Developer's Kit (8x MPR2400CA, 4x MTS310CA, 3x MTS300CA, 1x MDA300CA, 1x MIB600CA, 1x MIB510CA) |
| MPR2400CA | 2.4 GHz Processor/Radio Board |