

MICA

WIRELESS MEASUREMENT SYSTEM

- ▼ 2nd Generation, Tiny, Wireless Smart Sensors
- ▼ TinyOS - Unprecedented Communications and Processing
- ▼ AA/Year Battery Life
- ▼ Small Form Factor
- ▼ Wireless Communications
- ▼ Light, Temperature, Acceleration/Seismic, Acoustic, and Magnetic Sensors
- ▼ Developed for DARPA NEST Program

Applications

- ▼ Wireless Sensor Networks
- ▼ Security, Surveillance, and Force Protection
- ▼ Environmental Monitoring
- ▼ Large Scale Wireless Networks (1000+ points)
- ▼ Distributed Computing Platform



MICA

The MICA Mote is a second generation mote module used for research and development of low power, wireless, sensor networks. The MICA mote was developed by UC Berkeley's research group on wireless sensors. It consists of:

- Plug-in sensor boards
- TinyOS (TOS) Distributed Software Operating System.
- Atmega 128L processor
- 916MHz or 433MHz transceiver
- Attached AA(2) battery pack

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 and software development tools are publicly available at:

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

TOS includes:

- Radio messaging
- Message hopping from mote to mote
- Low power modes
- Sensor measurements and signal processing

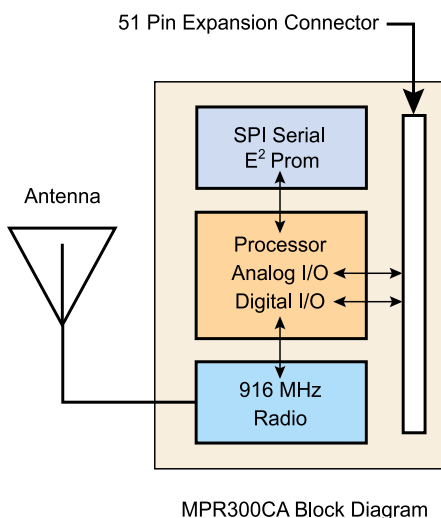
Processor and Radio Platform (MPR300CB):

The MPR300CB is based on the Atmel ATmega 128L. The ATmega 128L is a low power microcontroller which runs TOS from its internal flash memory. The 128L has been selected for its low power and other features. The MPR300 (MICA) uses an ISM band radio transceiver module for wireless communication.

Sensor Boards:

Various sensor boards are available from Crossbow and other sources. These boards connect onto the MICA through a surface mount 51-pin connector. The 51-pin connector supports Analog Inputs, I2C, SPI, UART, and a multiplexed Address/Data bus. These interfaces make it easy to connect to a wide variety of external peripherals. Crossbow supplies the following sensor boards:

- MTS101CA Photo diode/ Thermistor/Proto and Experiment Board
- MTS300CA Photo diode, Thermistor, Microphone, and Sounder
- MTS310CA Same as MTS300CA but also including Magnetic and Acceleration Sensor



MPR300CA Block Diagram

Processor/Radio Board	MPR300CB	Remarks
Speed	4MHz	
Flash	128K bytes	
SRAM	4K bytes	
EEPROM	4K bytes	
Serial Comms	UART	
A/D	10 bit ADC	8 channel
Processor Current Draw	5.5 mA	active current, typ
	<20uA	sleep mode, typ
Serial Flash	4Mbit	permanent ID 64 bits
Radio Frequency	916 MHz	ISM band (See Note)
Data Rate	40 Kbits/sec	max
Power	0.75 mW	
Radio Current Draw	12mA	transmit current, typ
	1.8 mA	receive current, typ
	<1uA	sleep current, typ
Radio Range	100 feet	programmable (See Note)
Power	2X AA batteries	attached pack
External Power	3 Volts	connector provided
User Interface	3 LEDs	user programmable
Expansion Connector	51 pin	connector for plug-in sensor boards

Notes: 433 MHz ISM band radio alternate is available - MPR310CA
Radio range dependent on antennae configuration. External antennae improves range.

Base Station/ Interface Board:

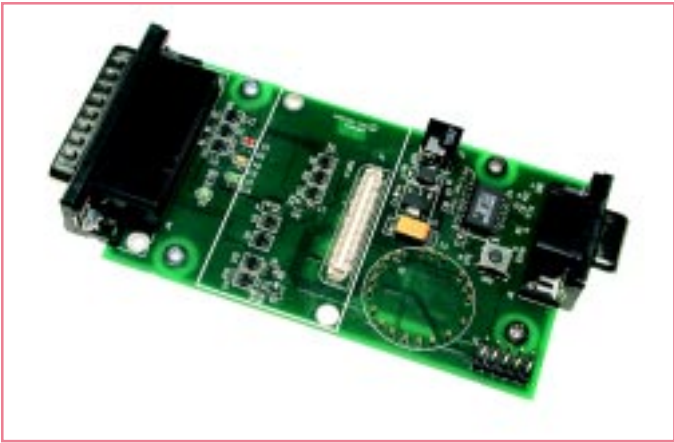
The base station allows the aggregation of sensor network data onto a PC or other computer platform. The MICA architecture is unique in that any sensor node (MPR300CB) module can function as a basestation by plugging the MPR300CB processor/radio board into a basic interface board, known as the Mote interface board.



▼ MTS310CA Sensor Board



▼ MIB500CA Mote Interface Board



Model	Description
MOTE-KIT301	Multipoint Developer's Kit (3X MPR300CB, 2X MTS300CA, 1X MIB300CA)
MOTE-KIT311	Advanced Multipoint Developer's Kit (4X MPR300CB, 3X MTS310CA, 1X MIB300CA)
MTS101CA	Light, Temp, and Prototype Sensor Board
MTS300CA	Light, Temp, Acoustic, and Sounder Sensor Board
MTS310CA	Same as MTS300CA but also includes Magnetic and Acceleration
MPR300CB	916 MHz Processor/Radio Board
MPR310CA	433 MHz Processor/Radio Board
MIB500CA	Mote Interface Board

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