# Imote2 Hardware Bundle

## FOR WIRELESS SENSOR NETWORKS

The Imote2 Hardware Bundle (WSN-IMOTE2) provides users with a comprehensive and cost-effective platform for the evaluation and development of advanced wireless sensor network applications. This bundle of hardware provides users with the components needed to set-up and deploy a basic network of Imote2 nodes. The Imote2 is an advanced wireless sensor platform. It is built around the low power PXA271 XScale CPU and also integrates an 802.15.4 compliant radio.

- Marvell PXA271 XScale® Processor at 13 – 416MHz and Wireless MMX DSP Coprocessor

- 256kB SRAM, 32MB FLASH, 32MB SDRAM

- Integrated 802.15.4 Radio

- Integrated 2.4GHz Antenna

- Multi-color Status Indicator LED

- USB Client With On-board mini-B Connector and Host Adapters

- Rich Set of Standard I/O: 3xUART, 2xSPI, I2C, SDIO, GPIOs

- Application Specific I/O: I2S, AC97, Camera Chip Interface, JTAG

- Compact Size: 36mm x 48mm x 9mm

## Applications

- Intrusion Detection & Object Tracking

- Digital Image Processing

- Condition Based Maintenance

- Industrial Monitoring and Analysis

- Seismic and Vibration Monitoring

### IPR2400 Imote2 Platform

The Crossbow Imote2 platform brings a new level of performance and capability to the processor and radio platform for wireless sensor networks; breaking the computational and memory limitations of current platforms and enabling low-power operation for battery-powered sensor network applications. The Imote2 is aimed at applications involving data-rich computations, where there is a need for both high performance and high bandwidth, which require greater processing capability and low-power operation with a low duty cycle to achieve longer battery-life. In applications such as equipment condition monitoring, the Imote2 is capable of performing the complete machine analytics, while using the wireless sensor network strictly for reporting the results of its analysis.

### ITS400 Sensor Board

The ITS400 sensor board contains a three-axis accelerometer, an advanced temperature/ humidity sensor, a light sensor and a 4 channel A/D converter. The ITS400 allows stacking with other extension boards. This versatile sensor board provides multiple sensing capabilities for the Imote2 in a wide variety of applications ranging from environmental monitoring to vibration detection.

### IMB400 Multimedia Board

The IMB400 adds multimedia capabilities to the Imote2 platform. It offers a compact, power efficient solution due to its integration of camera, audio and motion detection functionality into one platform. Instead of using compute intensive image analysis to detect motion, the Imote2 Multimedia Board uses a Passive InfraRed (PIR) sensor to pick up movement, which then activates the camera allowing for its operation as a low-power device. In addition to the PIR sensor, key subsystems include a color image and video camera chip along with an audio capture and playback CODEC. This sensing capability provides users with the ability to set-up low-power wireless camera networks and conduct visual tracking of objects and people.
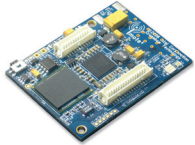
### IIB2400 Interface Board

The IIB2400 is designed to provide dual USB serial ports and a JTAG interface for the Imote2. The interface board connects directly to the Imote2 using an advanced connector set, and can be connected to a USB host via the mini-B USB connector. The interface board provides USB Bus Power and offers debugging capability of advanced sensors boards with a the second set of pass-through connectors. The interface board with an attached Imote2 can also be powered using the USB connection.

Crossbow®
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**IPR2400**
**Imote2 Processor/ Radio Board**

**ITS400**
**Basic Sensor Board**

**IMB400**
**Multimedia Sensor Board**

**IIB2400**
**Interface Board**

**IBB2400**
**Battery Board**

The Imote2 is a modular stackable platform that can be expanded with extension boards to customize the system to a specific application. Through the extension board connectors, sensor boards can provide different analog or digital interfaces. The extension board connectors are stackable, enabling a variety of configurations of the Imote2 and additional boards. A battery board is provided to supply system power; alternatively the system can be powered via its integrated USB client interface.

## Software Support

Several operating systems are available for the Imote2 including TinyOS, Linux and SOS which is available from the Open Source community. Please note that the Imote2 is an open-source research platform. This advanced hardware platform is available from Crossbow and all software support is available through the resources listed below.

For the latest operating systems, please refer to the 'Resources' section here-
http://www.xbow.com/Products/productdetails.aspx?sid=253

Information on using the Imote2 platform with TinyOS is available here -
http://tinyos.cvs.sourceforge.net/viewvc/tinyos/tinyos-1.x/contrib/imote2/

Information on using the Imote2 platform with Linux is available here -
http://imote2-linux.sourceforge.net/

Looking for help related to Imote2 hardware and software; connect to the Imote2 User's forum for information and technical support.
http://tech.groups.yahoo.com/group/intel-mote2-community/

*Please note that the WSN-IMOTE2 Hardware Bundle does not contain the firmware to run the .NET Micro Framework. The .Net Edition of the Imote2 is available through a purchase of the WSN-IMOTE2.Builder kit which includes the IPR2410 (Imote2 .Net Edition) and comes with .NET Micro Framework preinstalled from the factory. The IPR2400 and IPR2410 cannot be used together.*

Kit Contents

| Description/Model |
|---|
| 3 Imote2 Processor/ Radio Boards (IPR2400) |
| 1 Imote2 Basic Sensor Board (ITS400) |
| 1 Imote2 Multimedia Sensor Board (IMB400) |
| 1 Imote2 Interface Board (IIB2400) |
| 2 Imote2 Battery Boards (IBB2400) |

Ordering Information

| Model | Description |
|---|---|
| WSN-IMOTE2 | Imote2 Hardware Bundle |
| IPR2400CA | Imote2 Processor/ Radio Board (includes Battery Board) |