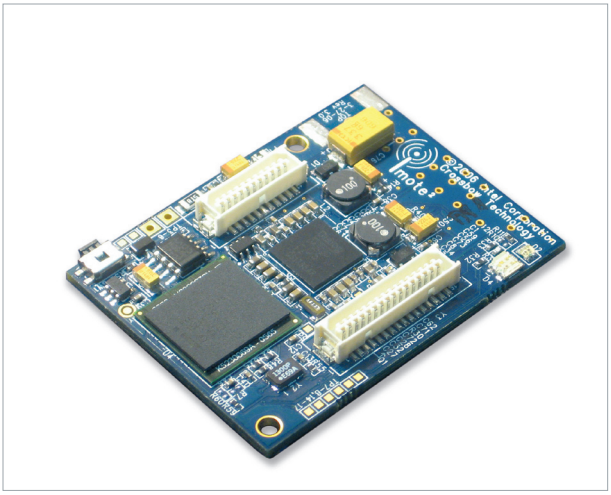
Imote2

HIGH-PERFORMANCE WIRELESS SENSOR

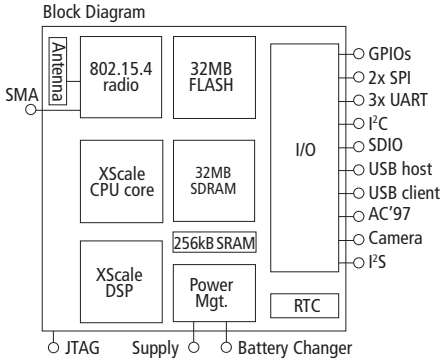


- Marvell PXA271 XScale® Processor at 13 – 416MHz
- Marvell Wireless MMX DSP Coprocessor
- 256kB SRAM, 32MB FLASH, 32MB SDRAM
- Integrated 802.15.4 Radio
- Integrated 2.4GHz Antenna, Optional External SMA Connector
- Multi-color Status Indicator LED
- USB Client With On-board mini-B Connector and Host 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

- Digital Image Processing
- Condition Based Maintenance
- Industrial Monitoring and Analysis
- Seismic and Vibration Monitoring

Block Diagram



Imote2

The Imote2 is an advanced wireless sensor node platform. It is built around the low-power PXA271 XScale CPU and also integrates an 802.15.4 compliant radio. The design is modular and stackable with interface connectors for expansion boards on both the top and bottom sides. The top connectors provide a standard set of I/O signals for basic expansion boards. The bottom connectors provide additional high-speed interfaces for application specific I/O. A battery board supplying system power can be connected to either side.

Processor

The Imote2 contains the Marvell PXA271 CPU. This processor can operate in a low voltage (0.85V), low frequency (13MHz) mode, hence enabling very low power operation. The frequency can be scaled from 13MHz to 416MHz with Dynamic Voltage Scaling. The processor has a number of different low power modes such as sleep and deep sleep. The PXA271 is a multi-chip module that includes three chips in a single package, the CPU with 256kB SRAM, 32MB SDRAM and 32MB of FLASH memory. It integrates many I/O options making it extremely flexible in supporting different sensors, A/Ds, radios, etc. These I/O features include I²C, 2 Synchronous Serial Ports (SPI) one of which is dedicated to the radio, 3 high speed UARTs, GPIOs, SDIO, USB client and host, AC97 and I²S audio codec interfaces, a fast infrared port, PWM, a Camera Interface and a high speed bus (Mobile Scaleable Link).

The processor also supports numerous timers as well as a real time clock. The PXA271 includes a wireless MMX coprocessor to accelerate multimedia operations. It adds 30 new media processor (DSP) instructions, support for alignment and video operations and compatibility with Intel MMX and SSE integer instructions. For more information on the PXA271, please refer to the Marvell datasheet.

Radio & Antenna

The Imote2 uses the CC2420 IEEE 802.15.4 radio transceiver from Texas Instruments. The CC2420 supports a 250kb/s data rate with 16 channels in the 2.4GHz band.

The Imote2 platform integrates a 2.4GHz surface mount antenna which provides a nominal range of about 30 meters. For longer range a SMA connector can be soldered directly to the board to connect to an external antenna.

Power Supply

The Imote2 can be powered by various means:

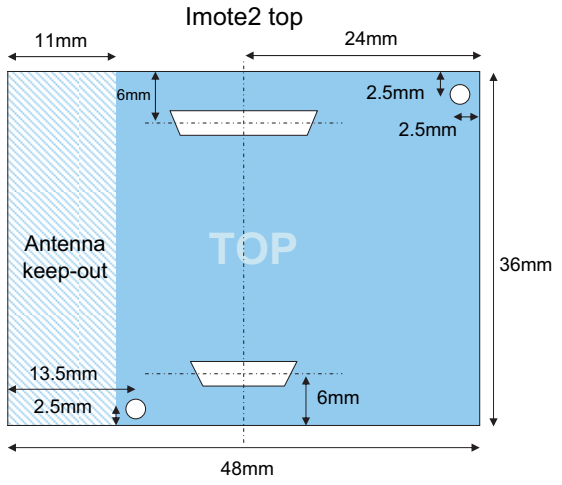
Primary Battery: This is typically accomplished by attaching a MEMSIC Imote2 Battery Board to either the basic or advanced connectors.

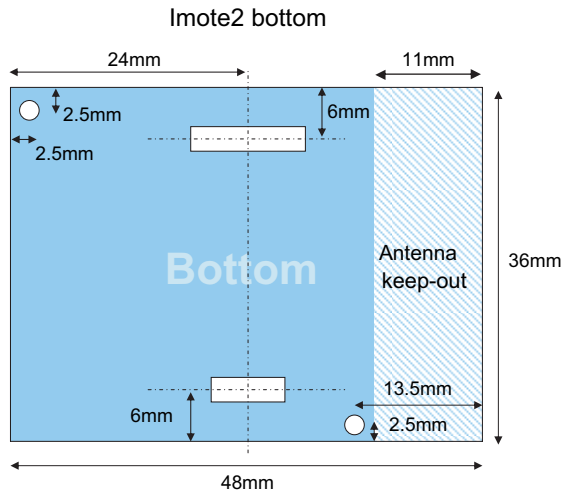
Rechargeable Battery: This requires a specially configured battery board attached to either the basic or advanced connectors. The Imote2 has a built-in charger for Li-Ion or Li-Poly batteries.

USB: The Imote2 can be powered via the on-board mini-B USB connector. This mode can also be used to charge an attached battery.

Processor/Radio Board	IPR2400	Remarks
CPU		
Processor	Marvell PXA271	
SRAM Memory	256 kB	
SDRAM Memory	32MB	
FLASH Memory	32MB	
POWER CONSUMPTION		
Current Draw In Deep Sleep Mode	390 µA	
Current Draw In Active Mode	31 mA	13MHz, radio off
Current Draw In Active Mode	44 mA	13MHz, radio Tx/Rx
Current Draw In Active Mode	66 mA	104MHz, radio Tx/Rx
Radio		
Transceiver	TI CC2420	
Frequency Band (ISM)	2400.0 – 2483.5 MHz	
Data Rate	250 kb/s	
Tx Power	-24 – 0 dBm	
Rx Sensitivity	-94 dBm	
Range (line of sight)	~30 m	With integrated antenna
I/O		
USB Client (mini-B), USB Host		
UART 3x, GPIOs, I^2C, SDI0, SPI 2x, I^2S, AC97, Camera		
Power		
Battery Board	3x AAA	
USB Voltage	5.0 V	
Battery Voltage	3.2 – 4.5 V	
Li-Lon Battery Charger		
Mechanical		
Dimensions Imote2 Board	36mm x 48mm x 9mm	
Weight	12g	

Battery Pads: A suitable primary battery or other power source can be connected via a dedicated set of solder pads on the Imote2 board.





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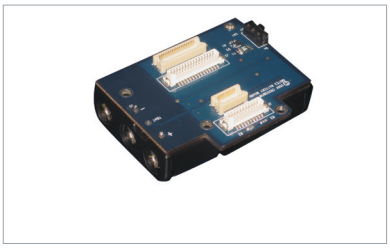
Imote2
Battery Board

The universal battery board is designed to power the Imote2 using 3 primary AAA cells. Alternatively, rechargeable cells such as AAA NiMH can be used if charged separately.

The battery board can accommodate a plugged-in Imote2 via either the basic connectors (top) or the advanced connectors (bottom).

A mechanical switch on the side provides manual power shut-off. The battery board is fused for 500mA maximum current.



Battery Board	IBB2400CA
Batteries	3x AAA
Maximum Current	500mA Fused
Size	52mm x 43mm x 18mm
Weight with 3 AAA Batteries	51g
Weight without Batteries	14g

Imote2 Third Party Software

Several operating systems are available for Imote2 including TinyOS, Linux and SOS. Additional system software is available from Open Source.

For the latest operating systems and additional third party accessories please visit www.memsic.com.

Ordering Information

Model	Description
IPR2400CA	Imote2 Board plus the Battery Board (included)
IBB2400CA	Imote2 Battery Board (stand-alone)
IIB2400CA	Imote2 Interface Board