

iSense Modules & Devices: Outstanding Extensibility

Made in Germany

iSense Wireless Sensor Network Modules

The iSense modular wireless sensor network tool box provides unmet flexibility in building sensor nodes. The system is centered around the so-called Core Module. It hosts the wireless micro controller, voltage regulation and real time clock as well as various connectors. Together with different sensor modules, interface modules and power sources, application specific sensor nodes can be easily plugged together.

Besides the selected modules shown below, a series of professional housings and mounting systems is offered. In addition, starter kits and classroom kits are available.



Core Module (CM30x):

- Features: see next page
- Antenna options: integrated PCB antenna (CM30I), μ FI connector (CM30U, not depicted), power amplifier and μ FI connector (CM30HP, not depicted)



Weather Sensor Module (WM10-11)

- Temperature sensor
- Relative Humidity sensor
- Barometric pressure sensor



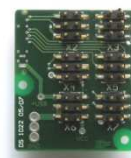
Security Sensor Module (SM10A)

- 3-axis accelerometer with a limit of 2g or 6g and wake on movement
- Optional passive infra red sensor with an 110° angle, up to 10m range and wake on detection (SM10AP only)



Environmental Sensor Module (EM10)

- Temperature sensor ranging from -20°C to 75°C, supporting wake on overheat
- Human eye perception light sensor



Extension Module (MM10)

- Provides all pins of the ultra-compact inter-module connector
- For easy debugging and development



Vehicle Detection Sensor Module (VDM10)

- Based on an anisotropic magneto-resistive (AMR) sensor, 2 amplifier stages, control and compensation circuitry
- up to 7m detection range

Solar Power System (SPM10HE6C)

- Years of autonomous operation
- Automatic power management
- 6Ah rechargeable battery
- IP65 protective housing
- Different solar panel options



2xAA battery holder (PM10AA)

Wall Mount Power Adapters (not depicted)

1/2AA battery holder (PM10SC)

- coulomb counter
- for extremely compact systems

LiIon rechargeable battery (PM10S2C)

- charge controller for in-system charging
- coulomb counter

GPS Module (GPSM10)

- Based on the SirfStar III chipset
- Buffer battery

RS232/USB Interface Module (GM10x)

- Provides interconnection with other systems such as PCs
- Power supply to other modules via USB (including the Lithium-Ion Rechargeable Battery Module)

USB Interface Module (GM20)

- Provides interconnection with other systems such as PCs
- Power supply to other modules via USB (including the Lithium-Ion Rechargeable Battery Module)

USB Stick (USB10-2400J-I)

- IEEE 802.15.4 2.4 GHz, 250kBit/s
- Integrated antenna, sensitivity: -91dBm, output power: -1.5dBm
- 32 Bit RISC Controller, up to 32MHz
- 128kB RAM, 512kB serial flash
- Freely programmable

Coming in 2012:

- Wireless IPv6 Routers
- Core Modules supporting 700/800/900 MHz IEEE 802.15.4 radio communication
- GPRS interface module



iSense Wireless Sensor Network Devices

Ethernet Gateway (NET10-2400J-HP-SC)

- IEEE 802.15.4 2.4 GHz, 250kBit/s, integrated power amplifier and antenna, sensitivity: -98dBm, output power: 10dBm.
- IEEE 802.3i 10BaseT 10Mbit full-duplex Ethernet interface
- 32 Bit RISC Controller, up to 32MHz, 128kB RAM, 512kB serial flash
- MicroSD slot,
- ultra-stable real time clock
- Freely programmable or with pre-installed IPv6 router software



iSense Core Module: Outstanding Performance

The iSense Core Module provides the basis of the iSense modular hardware platform for all kinds of wireless sensor networking applications:

- IEEE 802.15.4 compliant radio: 250 kbit/s, hardware AES encryption
 - Single chip solution of controller and radio: no need to transfer the AES key over an unsecure SPI bus
 - Time-of-flight ranging engine
 - Up to 600kbit/s in high data rate modes
 - 3 antenna options: integrated PCB antenna (CM30I), μ FL connector (CM30U), power amplifier with μ FL connector (CM30HP)
- Outstanding computational power:
 - 32-bit RISC Controller,
 - Up to 32MHz, true 32DMIPS,
 - 128kB RAM, 512 kB serial Flash
- Rich peripherals: I2C, SPI, a 4 channel 12-bit ADC, two 10-bit DACs, two UARTs
- Ultra stable (10ppm¹⁾) real time clock
- Software controllable voltage regulator: can be disabled in software when not required to omit regulator losses
- Expansion connectors for all kinds of other modules and energy sources



	Memsic ⁴⁾			coalesenses		
	micaZ	IRIS	TelosB	iSense CM30I	iSense CM30U	iSense CM30HP
CPU type	ATmega128L	ATmega128I	MSP430F	JN5148		
	8-bit RISC	8-bit RISC	16-bit RSIC	32-bit RISC		
Frequency (Typical) [MHz]	4 ²⁾	4 ²⁾	4	16		
max	8	8	8	32		
RAM [kB]	4	8	10	128		
internal Flash [kB]	128	128	48	0		
external Flash [kB]	512	512	1024	512		
RF Frequency [GHz]	2.4	2.4	2.4	2.4		
ADC resolution [bit]	10	10	12	12		
ADC channels	8	8	8	4		
DACs	-	-	2	2		
DAC resolution	-	-	12	12		
Data rate [kBit/s]	250	250	250	250		
RF output power Min. [dBm]	-24	-24	-24	-36	-32	-16.5
RF output power max. [dBm]	0	0	0	-1.5	+2.5	+18
RF sensitivity [dBm]	-94	-94	-94	-91	-95	-98
min. input voltage (w/ regulator)	-	-	-	2		
min. input voltage (w/o regulator)	2.7	2.1	2.1	2		
max. input voltage (w/ regulator)	-	-	-	5.5		
max. input voltage (w/o regulator)	3.6	3.6	3.6	3.7		
sleep current (w/ regulator) [uA]	-	-	-	30 ³⁾		
sleep current (w/o regulator) [uA]	< 16	8	6.1	3.75		
Operating current (uA @ f _{typ} , RX mode) [mA]	27.7	24	24.8	22	22	27.5

1) -10°C to +60°C, holds for Core Module 3 (CM30x), coming in 2011, Core Module 2 (CM20x) offers approx. 100 ppm

2) Not clearly defined in memsic data sheets

3) Holds for Core Module 3 (CM30x), coming in 2011, Core Module 2 (CM20x) requires approx. 60uA

4) Data taken from the memsic data sheets, as well as from the data sheets of the controller and radio chips, and may hence not reflect the actual memsic product characteristics in all regards

iSense Core Module 3

Preliminary product brief

Product

The iSense Core Module 3 provides the basis of the iSense modular hardware platform for all kinds of wireless sensor networking applications:

- IEEE 802.15.4 compliant radio, 250 kbit/s, hardware AES Encryption, Time of Flight ranging engine
- 32 Bit RISC Controller, 4-32 MHz
- High accuracy (typ. 6 ppm) real time clock
- Software controllable voltage regulator
- Expansion connectors for all kinds of other modules and energy sources
- integrated PCB antenna, μ Fl connector or μ Fl connector with power amplifier

The iSense Core Module 3 gives way to high performance and low power sensor networks. Its JN5148 wireless controller provides superior computational capabilities, and offers a large number of peripheral interfaces including I2C, SPI, a four channel 12-bit ADC, two 12-bit DACs, two UARTs etc. In addition a IEEE 802.15.4 compliant, Zigbee-ready radio is included, offering high data rates at ranges of up to 600 m while providing hardware AES encryption. As the world's first IEEE 802.15.4 radio, it supports distance measurements to neighboring devices using time of flight ranging. The Core Module 3 also comprises a highly accurate hardware clock that enables precisely timed sleep and wakeup periods while requiring only infrequent resynchronization. The switchable voltage regulator can be bypassed when not required but is available when the supply voltage drops.

Ordering Information

CM30I	Core Module 2 with integrated antenna
CM30U	Core Module 2 with μ Fl connector
CM30HP	Core Module 2 with μ Fl connector and power amplifier



Processor

RAM ¹	128 kB
Serial Flash ¹	512 kB
Current draw operation	~6 mA
Current draw sleep mode	~3 μ A

RF Transceiver

Frequency	2.4 GHz
Data rate	250- 667 ⁴ kbit/s
Channels	16
Transmit power ³	2.5 dB
Receive sensitivity ^{3,4}	-95 dB
Current consumption ³	~16 mA

Electromechanical

Supply voltage ²	2.0 V-5.5 V
Dimensions	45 mm x 30 mm
Temperature range	-20 to 70°C

This product brief shows the specification of a product in planning or in development. The functionality and electrical performance specifications are target values and may be used as a guide to the final specification. 1) Shared for program and data 2) With voltage regulator in use 3) Separate values for CM30HP, see datasheet for details 4) only IEEE 802.15.4 compliant at 250 kbit/s, reduced sensitivity at higher data rates

Applications

- Factory automatization
- Building monitoring and security
- Environmental and structure monitoring
- Large scales wireless sensor networks

iSense AA Battery Holder

Preliminary product brief

Product

The iSense Battery Holder connects two standard AA Batteries to the iSense Core Module.

Like this, low cost systems that nevertheless are supplied by high capacity batteries can be realized.

The iSense Battery Holder supplies its power to the regulator, offering a maximum of application safety and allowing to drain batteries completely.

To enhance safety, the iSense AA Battery Holder comprises a diode that prevents backward current flows into the battery.



Battery Holder	
Battery Type	2 x AA
Dimensions	68 x 33 x 19 mm
Connector cable length	60 mm
Weight	~10 g
Temperature range	-20 to 70°C

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iSense Environmental Sensor Module

Preliminary product brief

Product

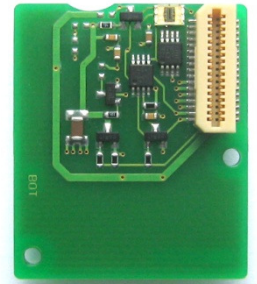
The iSense Environmental Sensor Module combines a thermometer and a light sensor for environmental monitoring. Both sensors are accessed via the I2C serial interface.

The thermometer provides a configurable interrupt threshold value as well as a hysteresis value. Like this it can wake up the device if given temperatures are exceeded.

The light sensor provides two light values, one delivered by a sensor sensitive to all kinds of light, and another by an infrared light sensor. Their difference yields the luminance considering human visible light only.

Applications

- Building automation
- Lighting and air condition control
- Intelligent agriculture applications



Thermometer	
Sensitivity	1°C
Frequency	10Hz
Range	-55 to 125°C
Current draw operation	~250µA
Current draw sleep mode	~1µA
Light Sensor	
Range	tbd
Frequency	1Hz
Current draw operation	~35µA
Current draw sleep mode	~10µA
Electromechanical	
Supply voltage	3.3 V
Dimensions	35mm x 30mm
Weight	4g
Temperature range	-20 to 70°C

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iSense Measurement Module

Preliminary product brief

Product

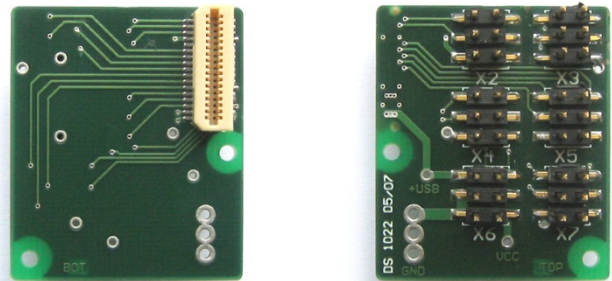
The iSense Measurement Module provides convenient access to all pins of the 34 pin expansion connector. It is intended for signal measurements, for debugging and rapid sensor board development.

On the one hand it can be used to track hardware behavior as well as software functionality by measuring signals with an oscilloscope. On the other, new sensors can be quickly attached to the iSense platform by just plugging them to the measurement board.

It provides access to both UARTs, the DACs and the ADC, the SPI and I2C bus, supply voltage and ground, the reset signal, as well as to 9 general purpose I/O pins.

Applications

- Debugging of hardware and software
- Rapid module development
- Attachment of external sensors



Pin layout

DAC 1 ●	● ADC 3	Uart 1 RX ●	● Uart 0 TX
DAC 2 ●	● ADC 2	Uart 1 TX ●	● Uart 0 RX
AGND ●	● ADC1	GND ●	● VCC
SDA ●	● DIO 18	DIO 10 ●	● DIO 4
SCL ●	● SPI Sel 1	DIO 11 ●	● DIO 8
GND ●	● DIO 16	GND ●	● DIO 9
VUSB ●	● Reset	SPI Sel 3 ●	● SPI MOSI
GND ●	● DIO 5	SPI Sel 4 ●	● SPI MISO
GND ●	● VCC	GND ●	● SPI Clock

Mechanical Specification

Pin spacing	2.54mm
Dimensions	35mm x 30mm
Weight	6g
Temperature range	-20 to 70 °C

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iSense Gateway Module 2

Preliminary product brief

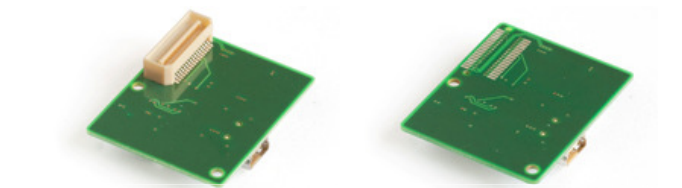
Product

The iSense Gateway Module 2 (GM20) provides connection to other systems such as personal computers using USB. It enables data exchange as well as serial programming of connected core modules. The USB connector can also be used to power other attached iSense modules, including charging the Rechargeable Battery Module.

The iSense Gateway 2 does not obsolete the Gateway Module 1 (GM10), but complements it by in particular targeting experimental, research and educational use.



Two cable variants are available: By default, the iSense Gateway Module 2 ships with a robust MiniUSB cable (see image on the left). Optionally, a proprietary USB cable that also allows for the use of IP65 conforming cable glands is available (right, compatible to the Gateway Module 1).



By default, the iSense Gateway Module 2 (GM20-2P, left) is delivered with two 34 pin connectors (one at each side) for attaching it to other iSense modules. Variants with a connector only on the top side (GM20-1P, right) are available upon request.

Ordering Information

GM20-2P	iSense Gateway Module 2 with two 34 pin connectors, incl. MiniUSB cable
GM20-1P	iSense Gateway Module 2 with one 34 pin connector, incl. MiniUSB cable
CUSB180M	1800mm Mini USB cable
CUSB90	iSense USB cable 900mm for use with GM10 & GM20



Gateway Module 2

Maximum baud rate 115200 kb/s

Max. supply current (USB) 500 mA

Current draw operation 0 mA

Electromechanical

Mini-USB cable length ~1800 mm

Proprietary USB cable length ~800 mm

Dimensions 36 x 30 mm

Weight ~5 g

Temperature range -20 to 70 °C

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Applications

- Wireless sensor network gateways
- Wireless network base stations
- Wireless network analyzers
- Interconnection to other equipment
- Over-the-air programmer

iSense Security Sensor Module

Preliminary product brief

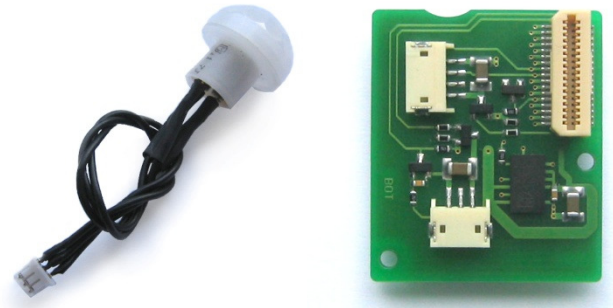
Product

The iSense Security Sensor Module series features a passive infrared (PIR) sensor and/or a 3-axis accelerometer. In addition, a camera module can be attached.

The PIR Sensor can be used to detect moving objects that feature a temperature different from the environment (such as humans) in distances of up to 10 meters. The sensor offers a wide range of 110° for comprehensive monitoring.

The 3-axis accelerometer can be configured to cover accelerations of $\pm 2g$ or $\pm 6g$. In addition to delivering acceleration values via a digital interface, it can generate interrupts on movement, direction change or free fall.

In addition, a camera module that can take color pictures with a mega pixel resolution can be attached. The images are preprocessed, so they can be scaled down to lower resolutions and compressed according to the JPEG standard.



Applications

- Building monitoring and security
- Automated lighting control
- Structure monitoring
- Valuable goods monitoring

Accelerometer	
Range	$\pm 2g$ or $\pm 6g$
Frequency	40Hz or 640 Hz
Current draw operation	$\sim 650\mu A$
Current draw sleep mode	$\sim 1\mu A$
Passive Infrared Sensor	
Range	$\sim 10m$
Angle (hor./vert.)	93°/110°
Current draw operation	$\sim 300\mu A$
Current draw sleep mode	0 μA
Electromechanical	
Supply voltage	3.3 V
Dimensions	35mm x 30mm
Weight	8g
Temperature range	-20 to 70°C

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iSense Vehicle Detection Module

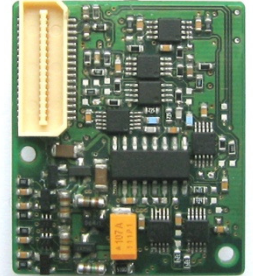
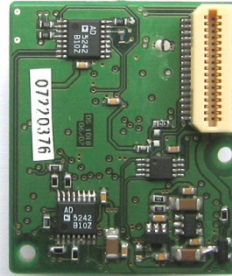
Preliminary product brief

Product

The iSense Vehicle Detection Module is based on a two-axis anisotropic magneto-resistive (AMR) sensor that is combined with two cascaded amplifier stages and additional control and compensation circuits. In combination with an iSense Core Module it can be used to detect large metal objects such as cars moving by.

In order to offer a wide detection range of up to 7 meters, the module provides two sensitivities. The accompanying software incorporates automatic de-gaussing as well as earth magnetic field and sensor offset compensation for convenient sensing.

As a side effect, the module can also be used as a compass, detecting the orientation of the module.



Applications

- Traffic monitoring and control
- Automated gates and bars
- Security and defense applications

AMR Sensor	
Range	~5m
Current draw operation	tbd
Current draw sleep mode	0 μ A
Electromechanical	
Supply voltage	3.3 V
Dimensions	35mm x 30mm
Weight	6g
Temperature range	-20 to 70°C

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iSense Solar Power Harvesting System

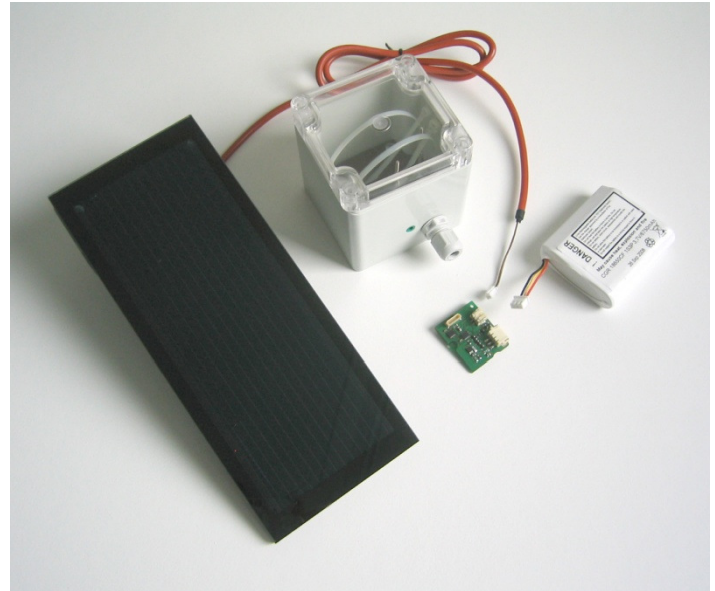
Preliminary product brief

Product

The iSense Solar Power Harvesting System is an out-of-the-box solution for running self-powered wireless sensor networks. By harvesting solar energy and storing it in a rechargeable battery, it allows to operate sensor nodes all-time autonomously.

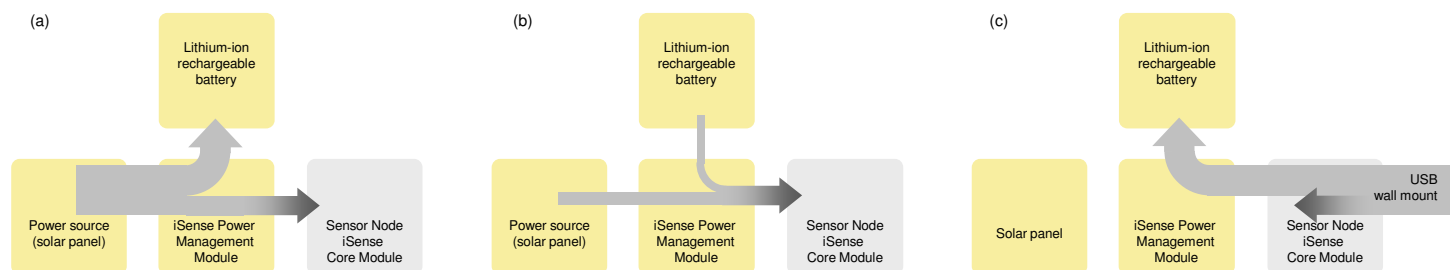
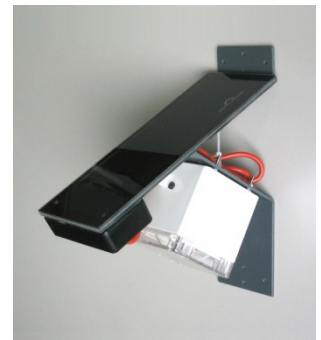
The iSense Solar Power Harvesting System consists of a solar panel, an ultra-high capacity lithium ion rechargeable battery, a power management module and a sensor node housing.

The power management module distributes the power provided by the solar panel in an intelligent way. If the panel can deliver more power than the sensor node requires, it charges the lithium ion battery (a). Otherwise, it reduces the battery drainage by partially supplying the node with the solar power (b). When power is supplied to the connected iSense Core Module via USB or a wall mount adapter, the battery is automatically charged (c).



Components of the iSense Solar Power Harvesting System: solar panel, housing, power management module and rechargeable lithium-ion battery

Solar Power Harvesting System including its wall mounting facility.

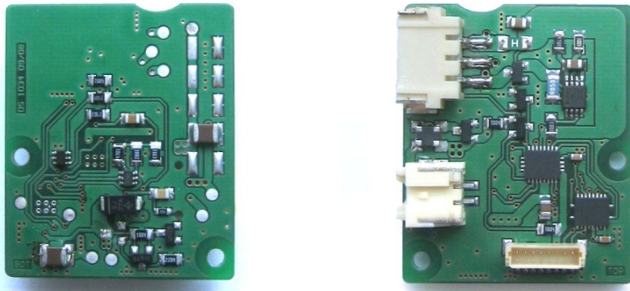


Different current flows through the iSense Solar Power Harvesting System

The iSense Power Management Module does not only control current flows, additionally an integrated battery monitor provides precise information on the energy currently stored in the battery, accumulating both charging and discharging cycles, as well as

iSense Solar Power Harvesting System

Preliminary product brief



Top and bottom view of the iSense Power Management Module

information regarding the battery voltage, the current consumption and temperature.

Combined with an iSense Core Module and iSense Sensor Modules, self-powered sensor nodes for years of autonomous operation can be plugged together.

Ordering Information

Solar Power Harvesting System SPS10HES6C

consisting of

Solar Power Management Module	SPM10
Solar Panel 1.6W	SP10W16
Li-ion-Battery 6750mAh	BLI6
Solar housing	H10SPS
Power cable	CP6
Wall holder	WH10

Power Management Module

Standby Current	75 μ A
Input Voltage	4.35 to 12 V
Output Voltage	2.5 to 5.0 V
Weight	8 g
Dimensions	30 x 37 mm
Temperature range	-20 to 70°C

Housing

Dimensions	81 x 82 x 87 mm
Protection Level	IP 66
Weight	206 g

Battery

Nominal Voltage	3.7 V
Nominal Capacity	6750 mAh
Cable Length	~ 45 mm
Dimensions	67 m 59 x 19 mm
Weight	136 g
Charge temperature	2 to 44°C
Discharge temperature	-25 to 70°C

Solar Panel

Nominal Power	1.6 W
Current at MPP	250 mA
Voltage at MPP	6 V
Open Circuit Voltage	8 V
Cable Length	~ 0.9 m
Dimensions	100 x 240 mm
Weight	460 g
Temperature range	-40 to 85°C

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iSense GPS Module

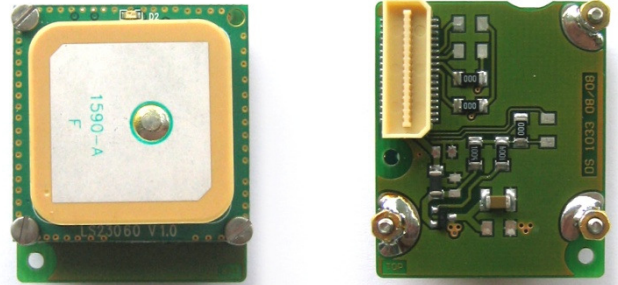
Preliminary product brief

Product

The iSense GPS Module supplies position information to iSense sensor nodes in all outdoor deployments. Like this, nodes equipped with the this module can not only serve as anchors for location protocols, but can also provide continuous location updates for mobiles sensor nodes

The iSense GPS Module is based on the SiRF Star 3 chipset. Due to its 200,000 correlators and 20 channel support it is known for its outstanding accuracy and sensitivity. It is capable of SBAS (WAAS, EGNOS, MSAS), and combines low power consumption with extremely fast fixing times.

The module features a high-performance patch antenna, a build-in micro battery to preserve system data for rapid satellite acquisition and an LED for GPS fix indication.



GPS Receiver	
Chipset	SiRF Star 3 GSC3f
Channels	20
Update rate	1 Hz
Acquisition time (open sky)	
Hot start	< 2 s
Cold start (typical)	30 s
Accuracy	
Autonomous	< 10 m (2D RMS)
SBAS	< 5 m (2D RMS)
Electrical specification	
Supply voltage	3.3 V
Current draw operation	~ 50 mA
Current draw sleep mode	0 mA
Mechanical specification	
Dimensions	36 mm x 30 mm
Height (w/o plug)	13 mm
Weight	~ 18 g
Temperature range	-20 to 70°C

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iSense Weather Sensor Module

Preliminary product brief

Product

The iSense Weather Sensor Module provides high precision information on

- temperature,
- relative humidity and
- barometric pressure.

With a standby current of less than 1µA, it is well suited for battery powered applications that require years of battery life.

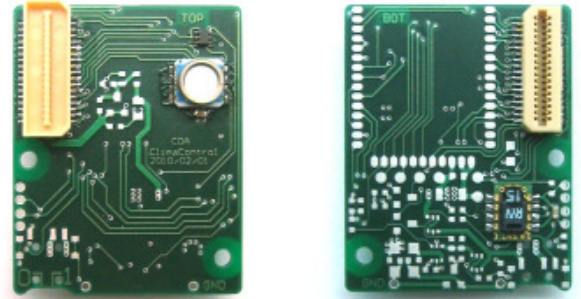
This module is part of the iSense hardware platform for wireless sensor networks. With its two 34 pin connectors, it can easily be plugged to other modules such as the iSense Core Module.

Applications

- Building automation and air condition control
- Intelligent agriculture applications
- Weather forecasting
- Altimeters

Ordering Information

WM10-11 iSense Weather Sensor Module



Temperature and relative humidity	
Accuracy (t/rh)	1°C/3%
Resolution (t/rh)	0.1°C/0.1%
Range (t/rh)	-20 .. +70°C/0..100%
Current draw operation	~800µA
Current draw standby	~0.5µA
Barometric pressure	
Range	10..1100 mbar
Resolution	0.1 mbar
Accuracy	1.5mbar
Frequency	1Hz
Current draw operation	~1mA
Current draw standby	<0.1µA
Electromechanical	
Supply voltage	2.4..3.6 V
Dimensions	38mm x 30mm
Weight	6g
Temperature range	-20..+70°C

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iSense Primary Battery Module

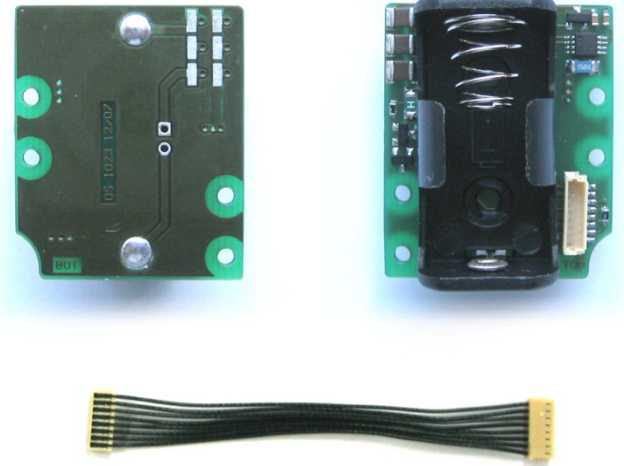
Preliminary product brief

Product

The iSense Primary Battery Module combines a 1/2AA battery holder and a digital battery monitor.

It is intended for building extremely compact systems that still run for a long time. Meanwhile the battery monitor provides precise information on the energy currently stored in the battery.

Although nearly as compact as coin cells, 1/2AA batteries can easily deliver the peak current that sensor nodes require and provide a high capacity of up to 800mAh.



Applications

- Wireless sensor networks
- Portable devices

Battery Module	
Current draw operation	~ 70 μ A
Current draw sleep mode	~1 μ A
Dimensions	30 x 35 x 16 mm
Connector cable length	60 mm
Weight	2g
Temperature range	-20 to 70°C

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iSense Lithium-Ion Battery Module

Preliminary product brief

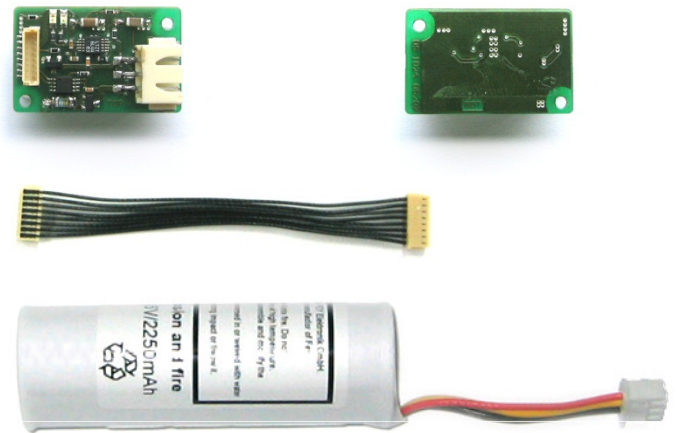
Product

The iSense Lithium-Ion Battery Module combines a digital battery monitor, a charge controller and a high capacity lithium-ion rechargeable battery.

This module enables in-system charging just by connecting the system to a wall mount adapter or connecting it to a USB port via a iSense Gateway Module. Like this it significantly eases the handling of battery powered sensor systems. The battery monitor provides precise information on the energy currently stored in the battery, accumulating both charging and discharging cycles.

Applications

- Wireless sensor networks
- Portable devices
- Power-disconnection tolerant appliances



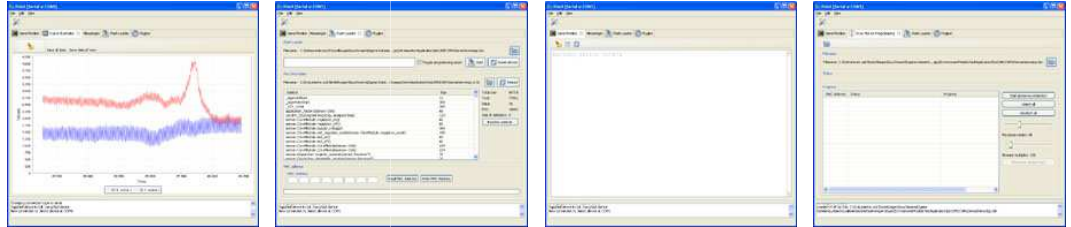
Charger Module	
Maximum charge current	~380mA
Current draw operation	~ 70µA
Current draw sleep mode	~1µA
Dimensions	30 x 19 mm
Connector cable length	60 mm
Weight	2g
Temperature range	-20 to 70°C
Battery	
Nominal voltage	3.6 V
Nominal capacity	2250 mAh
Dimensions	66 x 21 x 18 mm
Weight	48g
Temperature range	-20 to 70°C

This product brief shows the specification of a product in planning or in development. The functionality and electrical performance specifications are target values and may be used as a guide to the final specification.

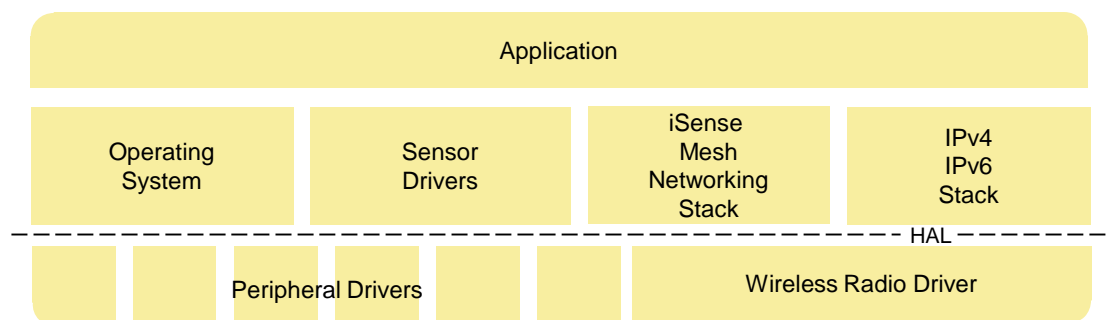
iSense Software: True C++ Development

Tool Chain

Open-source GCC-based C++ compiler
Eclipse Development
Java Flashing, Debugging, Logging and Visualization Tool iShell



Firmware



Firmware Features

C++ object oriented programming
Dynamic memory allocation
Modular Structure for lean implementations
Integrated Scientific Sensor Network Simulator SHAWN

2 Networking Stacks

iSense Mesh Networking Stack

- 6 unicast routings
- 2 transport protocols
- 2 flooding protocols
- Tree routing protocol
- Time synchronization
- Over-the-air programming

IPv4/IPv6 Stack

- 6LoWPAN incl. neighbour discovery, header compression and fragmentation
- IPv6 incl. fragmentation, neighbour discovery, stateless auto-configuration
- IPv4 incl. DHCPv4, ARP
- UDP, TCP
- HTTP & CoAP (incl. Observe) servers

Platform independence

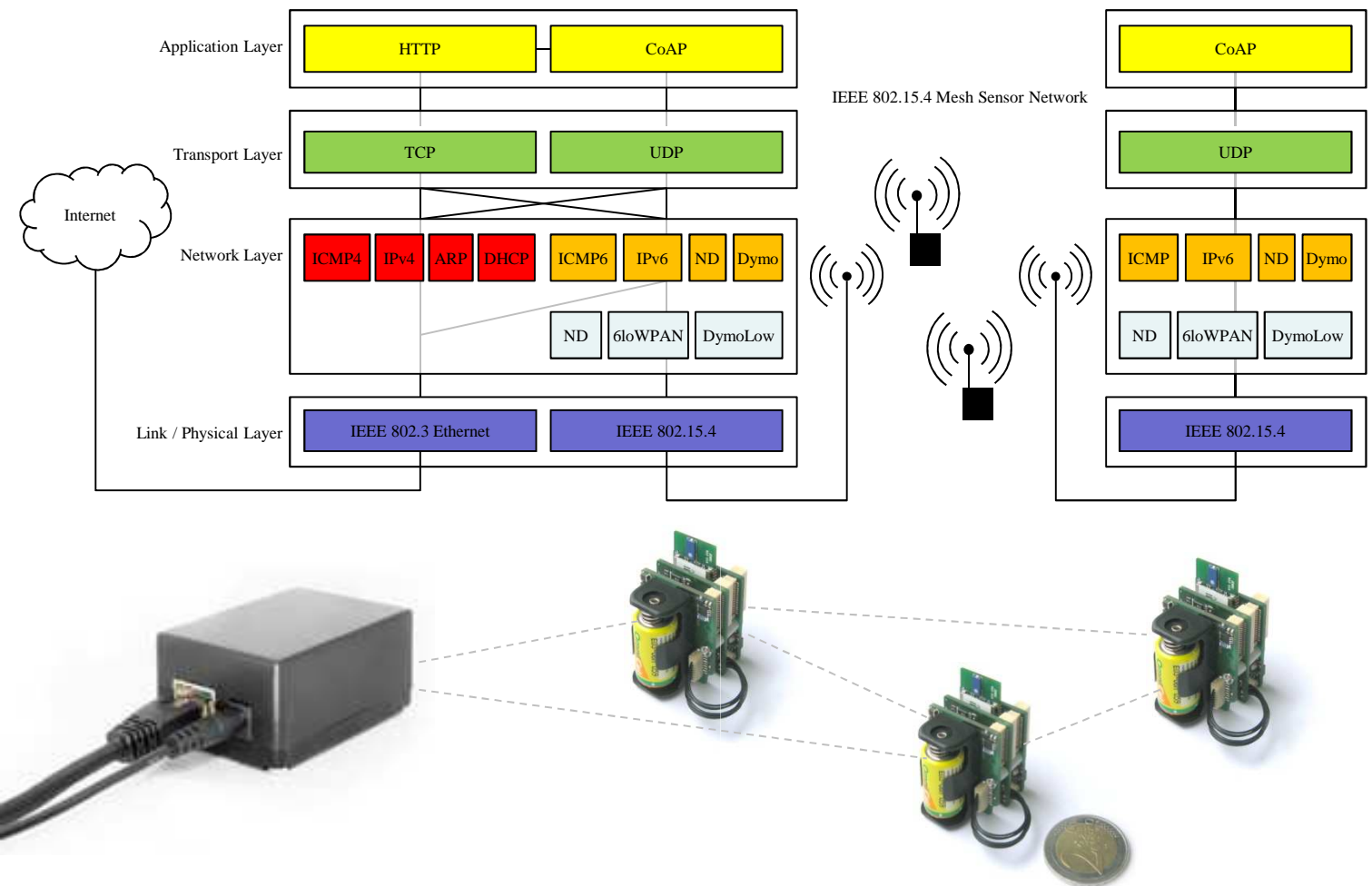
All software components above the hardware abstraction layer (HAL) are platform independent, only peripheral and radio drivers differ from platform to platform.

Existing platform ports include:

- iSense 2.4GHz,
- iSense 700-900MHz,
- Pacemate¹⁾,
- TelosB¹⁾,
- Sensor Network Simulator SHAWN

¹⁾ Ported and supported by University of Luebeck, not officially supported by coalesenses

IPv4 and IPv6 Stack



Coalesenses offers an IPv4 and IPv6 dual network stack to easily integrate wireless sensor nodes into the internet. Based upon the iSense OS and Networking Firmware, it comprises all functionality required for connecting wireless sensor networks with existing Ethernet installations using the internet protocol family.

Within the sensor network, the 6LoWPAN protocol suite (including implementations of neighbour discovery, header compression and fragmentation) is used to transmit IPv6 datagrams over the IEEE 802.15.4 link layer radio interface. The stack supports both the route-over and mesh-under mode in the sensor network. The well-known Dynamic MANET On-demand (DYMO) routing protocol is available in the route-over configuration for multi-hop routing. If the mesh-under configuration is chosen, a variant of DYMO called DymoLow is used. Comprehensive functionality for routers within the network as well as for 6LoWPAN border routers is included.

Besides UDP and TCP, a simple HTTP server is part of the stack. In addition, it provides a full-featured Constrained Application Protocol (CoAP) server (including the Observe draft). Hence, the stack is ready to offer Restful Web Services within your wireless network.