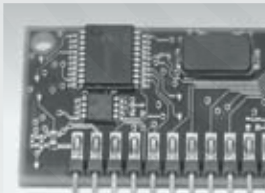
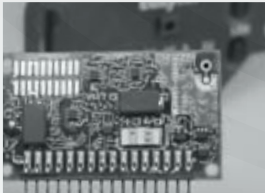


## OTHER ENOCEAN MODULES



RCM 120 Receiver Module



TCM 110 Repeater Module



PTM 200 Switch Module

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The extremely power saving RF transmitter module STM 100 of EnOcean enables the realization of wireless and maintenance free sensors. Power supply is provided by a small solar cell. An integrated energy store allows unrestricted functionality for several days in total darkness.

Three 8 bit A/D converter inputs and 4 digital inputs facilitate multifunctional detector systems, based on application specific passive sensing components. This allows easily and comfortable monitoring of position, temperature, illumination, pressure, etc. – or simply supervising voltages or currents.

The STM 100 module serves the 868 MHz air interface protocol of EnOcean. Together with the receiver module RCM 120 this module can be easily implemented into operation and control units for realization of different application specific system solutions.

## TECHNICAL DATA

<b>Power Supply:</b> .....	by Solar Cell or external (3.0-4.0 V)
<b>Antenna:</b> .....	pre-installed 9 cm whip antenna
<b>Frequency / Modulation type / Transmission power:</b> .....	868.3 MHz / ASK / max. 10 mW
<b>Data rate / Channel bandwidth / Transmission range:</b> .....	120 kbps / 280 kHz / 300 m free field
<b>Input Channels:</b> .....	4 x digital inputs, 3 x analog inputs (8 bit resolution)
<b>Sleep mode power consumption:</b> .....	≈ 25 nA
<small>A change of WAKE PIN status will instantly force the module to check all actual analogue and digital input values. In addition an user programmable CYCLIC WAKE UP is provided (every 1, 10 or 100 sec.). After wake up a radio telegram (input data, unique 32 bit sensor ID, checksum) will be transmitted in case of a change of any digital input value compared to the last sending or in case of a significant change of measured analogue values (&gt;1.5% of AD_1 input, &gt;2% of AD_0 or &gt;5% of AD_2). In case of no relevant input change a PRESENCE SIGNAL is sent after an user configurable number of wake ups (every wake up, every 10th or every 100th) to announce all actual measured values nevertheless (sign of life).</small>	
<b>Operation start up time with empty energy store:</b> .....	< 10 min @ 400 lx
<b>Illumination time for loading empty energy store to 14h operation in total darkness:</b> .....	≈ 6 h @ 400 lx, ≈ 1.5 h @ 1000 lx*
<b>Illumination time for reloading energy store from module working limit to 14h operation in total darkness:</b> .....	< 1 h @ 400 lx, < 15 min @ 1000 lx*
<small>*Wake up every 100 s and RF signal transmission every 17 min. on average</small>	
<b>Operation time during total darkness:</b> .....	e.g. ≈ 90 h**
<small>** Energy storage cell is filled up @ 1000 lx, wake up every 100 s and RF signal transmission every 17 min. on average</small>	
<b>Ext. Power Supply Output:</b> .....	2.2–5.0 V, 1 mA max. †, > 2 ms (during wake up time)
<b>Ext. Voltage Reference Output:</b> .....	2.048 V ± 1%, 1mA max. †, > 2 ms (during wake up time) † total current of both outputs 1 mA max
<b>Input sample time after wake up:</b> .....	1.7 ms
<b>Transmitting indication output (LED):</b> .....	2.2–5.0 V, 2 mA max., ≈ 3x1 ms within 70 ms
<b>Dimensions of discrete Solar Cell:</b> .....	exposed area 11 x 20 mm, frame 13 x 28 mm
<b>Dimensions of PCB:</b> .....	21 x 40 x 9 mm (incl. energy store and wiring pins)
<b>Operating Temperature:</b> .....	-25 up to +65 °C
<b>EnOcean Ordering Code:</b> .....	S3001-C100

This product is CE certified and conforms the R&TTE EU-Directive on radio equipment

## ENERGY HARVESTING

THE POWER TO GENERATE ENERGY FROM ALMOST NOTHING.

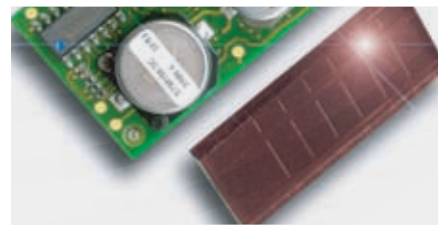
EnOcean is the first company in the world to offer commercial solutions for operating energy-autonomous, wireless link sensors for indoor applications. We employ a technology known as energy harvesting, that converts process energy into useful electrical power, enabling self-contained wireless, sensor modules. The smallest changes in temperature, vibration, pressure, light, or motion all produce energy that can be gathered to operate a sensor, and send a signal. This energy is just enough to operate wireless links in low ambient indoor light, or using energy sources that are alternatives to light. EnOcean's 50,000 installed systems prove the enormous advantages of wireless technology in building automation: greater design flexibility, fast, easy, low-cost installation, reduced maintenance, and enhanced aesthetics.



[www.enocean.com](http://www.enocean.com)

## THE IDEAL SOLUTION FOR BATTERY-FREE, NO-MAINTENANCE WIRELESS SENSING APPLICATIONS.

EnOcean's wireless sensing technology is now being used in a variety of process and environmental monitoring applications, freeing designers and building engineers from the batteries and maintenance problems that plague other wireless technologies. EnOcean offers the world's only system that integrates energy harvesting, sensors, and RF communication in a single, powerful solution. Wireless sensors install quickly, and in virtually any location. They're wireless, so they simplify networking, eliminate cabling, are easily relocated. They're battery-free, so they deliver flexibility for the most demanding building/factory automation, and environmental monitoring applications.



The heart of the EnOcean solution is the STM100 solar-powered sensor module.

## STM100: THE HEART OF THE SYSTEM

The STM100 module is the first and only technology that can deliver wireless sensing capability without relying on line voltage or batteries. The STM platform supports a wide variety of sensors (temperature, gas, humidity, illumination, location, presence, and others). This capability enables mobile, maintenance-free monitoring and control of buildings, factories, logistics—even vehicles.

STM represents a fundamental breakthrough in the creation, storage and management of power. It's comprised of a solar cell energy source, an energy reservoir, analog and digital sensor connections, a microprocessor for sensor control and a radio transmitter – all in 0.8 x 1.6 x 0.4 inch footprint (2 x 4 x 1 cm). The solar cell serves two purposes: one provides quick startup energy, while the other charges an onboard energy reservoir. Designed to operate indoors, the STM requires a remarkably low 200 lux light to generate energy. In normal operation, only a single hour of office-intensity light provides sufficient energy to operate for 14 hours of darkness.

The STM100 is user-programmed to wake automatically at 1, 10 or 100 second intervals or upon status change of the Wake pin. Then, an onboard controller instantly checks all 3 analog and 4 digital input values. If there is a relevant value change from the prior reading a radio telegram comprised of all sensor values and unique radio ID is transmitted, otherwise the STM goes back to sleep. Periodically after a user programmable (1, 10 or 100) wake cycles, STM transmits a presence signal. STM100 sleep mode power consumption is approximately 25 nAmps.

EnOcean devices are multipoint-to-multipoint architecture; many transmitters can communicate with many receivers, for exceptional flexibility in designing sensor networks.

# STM100



## RF TRANSMISSION THAT'S LONG-RANGE, AND ULTRA RELIABLE.

EnOcean radios are low energy—not low power. Outputting up to 10 mW, with just 50  $\mu$ Ws, a standard EnOcean transmitter can send a signal 300 meters outdoors, and 30 meters indoors through walls. The secret is in the signal duration. The entire process is initiated, undertaken and completed in approximately 1/1,000 of a second. The proprietary radio technology is approved for use in Europe (ETSI), US (FCC) and Canada (IC).

Sophisticated RF protocols and integrated technology assure communications reliability: RF protocols include:

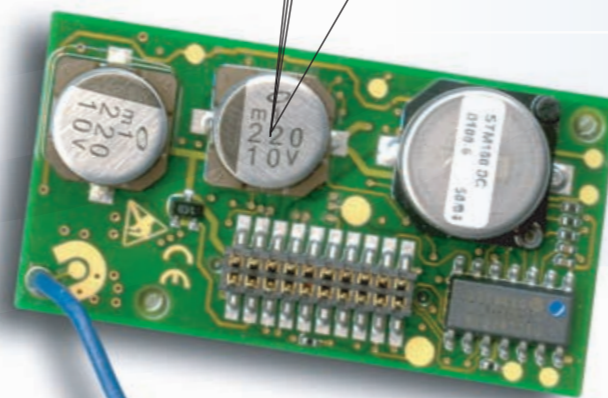
- 1. Multiple broadcasts:** Each RF event transmits an identical data telegram three times at random intervals to avoid collisions and interference.
- 2. Fast (120 kbps) data rates:** Signal transmission time is around a millisecond to minimize the possibility of interference.
- 3. Error checking:** Each packet must pass checks to validate integrity before initiating action.
- 4. Unique addressing:** Each radio transmitter has a unique, 32-bit address, making it possible to co-locate large numbers of EnOcean devices.

### Key features of EnOcean RF technology are:

- Minimal energy requirements
- Supports hundreds of senders within close proximity
- Maximum transmission reliability
- Wide transmission range
- Easy extensibility
- Suitable for uni- and bi-directional communication
- Flexibility data structures and data quantities
- Data encryption option



actual size



## STM100 THE END-TO-END WIRELESS SOLUTION FOR VIRTUALLY ANY APPLICATION

<b>Building Automation</b>	Temperature Sun blind control HVAC Security Access control Adjustable lighting
<b>Logistics</b>	Asset tracking Cool chain monitoring Container security Impact/Damage monitoring
<b>Industrial Control</b>	Process control Preventative maintenance Energy management Position & Proximity Voltage & Current status
<b>Home Automation</b>	Lighting control HVAC Security Access control Irrigation
<b>Automated Meter Reading</b>	Heat flow Gas Water Electric
<b>Environmental</b>	Weather stations Chemical Gas Flow Agricultural monitoring

## INTEGRATES READILY WITH EXISTING SENSORS AND INDUSTRY-STANDARD NETWORKS.

- The STM100 enables manufacturers of lighting, security and HVAC sensor equipment to quickly and cost-effectively develop wireless sensing networks.
- Three analog (8-bit) plus four digital inputs and sophisticated management routines simplify sensor integration. OEMs can quickly create a completely self-powered, functioning, communicating device for remote installation.
- An STM100 plus 7 parts are all it takes to develop a thermostat. (see schematic, below)
- For sensor power, the STM100 provides 1 mA, 2.048V external output. Sensor values are read 1.7 milliseconds after wakeup.

