



ENABLED BY ENOCEAN®

# perpetuum®

MAINTENANCE-FREE WIRELESS SWITCHES & SENSORS

INTERNATIONAL EDITION

# 08

OCTOBER 08 – FEBRUARY 09

## REVOLUTIONARY

EnOcean Dolphin – the future in flexible system architecture for wireless sensor networks

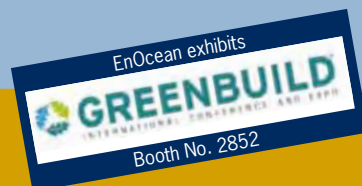
## ENABLED BY ENOCEAN

Greater flexibility for lower installation costs

## NETWORKED

Omnio – energy-autonomous wireless occupancy detector revolutionizes building automation

Masco Launches Verve™ Living Systems



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## Dear readers,

Self-powered wireless sensors have been in use now for more than five years – but why exactly?

To start with there was obviously a desire for flexibility. Changing use of rooms calls for cost-efficient and practical solutions. The answer was seen in EnOcean's maintenance-free wireless, which consequently became very popular.

For the past 18 months or so we've been witnessing motivation of a different kind. Energy conservation is at the forefront of all building and renovation activities.

Buildings have what you might call a standard consumption of energy, just like every automobile consumes a stated average amount of fuel. As everyone knows, the actual consumption of their automobile depends on how they drive it. And in the same way, the energy consumed by buildings depends on how they're used. And – what a surprise! – every user or owner of a building doesn't act in the same way either.

This is where automation comes in, controlling light, heating and air-conditioning according to true demand. The requirement is determined by sensors, the easiest solution self-powered and wireless. Because these can be placed just about anywhere, where they do their job best. Plus, this kind of automation costs up to 20% less because there are fewer leads and cable ducts to be routed.

Now you might ask: Where can I get EnOcean wireless sensors for my building project? Well, EnOcean doesn't deliver sensors for building projects. But it does currently support more than 70 manufacturers of such sensors. These integrate technology enabled by EnOcean into their products, and deliver to the building services market. Many of these customers recently formed the EnOcean Alliance as a platform to promote self-powered wireless as a global standard. In this issue you'll also find an editorial from the chairman of the Alliance, Graham Martin, plus a number of articles by Alliance members.

Apart from that, EnOcean GmbH continues on course. The shareholders have decided to invest another € 4.4 million in further development of the technology. The first visible result is the new Dolphin system architecture. This centers on an ASIC containing the entire functionality of the previous discrete electronics, while also generating new functions – the major ones being bidirectional sensors and actuators, both self-powered of course. An entirely new system environment enables EnOcean customers to integrate their firmware application straight onto the EnOcean module – separate processors are unnecessary in most cases. (Read the article by Armin Anders on pp 8-11.)

Markus Brehler,  
CEO and Founder, EnOcean GmbH



## ENOCLEAN ROOTS



**enoclean®**

*What does a dolphin have to do with self-powered wireless technology? Many of you may have puzzled about that when you first saw the logo of a white dolphin outlined on a blue background. And doesn't the name EnOcean recall the sound of the sea, idyllic desert islands, adventures in a sailing boat? Perhaps it's time for a short refresher on the fundamentals of a technology that was invented more than ten years ago, and which EnOcean has now been marketing for the past seven years.*

*By Andreas Schneider, Executive VP, EnOcean GmbH*

### ENERGY HARVESTERS COMBINE WITH RELIABLE SHORT-RANGE WIRELESS

The basic idea sounds simple: wherever an event is to be detected or measured, there is usually a change of energy in the event itself. A switch is pressed (mechanical energy = force x motion), temperatures alter, it becomes lighter or darker, vibrations and sound waves are other examples. If you want to capture such information and make it available to an intelligent system, it is enough to transmit just the changes in state. Which is where self-powered wireless technology comes in: EnOcean uses an ocean of unused energy to detect information and transmit it wirelessly by extremely reliable short-range radio, entirely without batteries.

By means of what are called energy harvesters, EnOcean converts ambient energy into electrically useful energy. This energy is managed by highly efficient electronic circuitry, and produced on demand for the sensor and wireless technology. Wireless switches use the energy produced by being operated to send a telegram when they are pressed and released. Receivers interpret the wireless signal and can then turn lights on and off or dim them. The reliability of wireless transmission is ensured by multiplexing, checksums and random pauses.

### ENOCLEAN MODULES SIMPLY INTEGRATE SELF-POWERED WIRELESS

EnOcean combines all these features in system modules that manufacturers can easily integrate in their own end-products. A solar sensor module incorporates an optimal solar cell to harvest energy for example, capacitors and timer circuits for energy management, a microprocessor to preprocess signals, and a certified wireless section with a simply manipulated wire antenna.

Systems from different manufacturers become interoperable – the switches, gateways and sensors in their end-products are easily combined. The growing alliance, originally founded by six manufacturers together with EnOcean, promotes standardization of the wireless telegrams in sensor profiles and of the wireless interface, aimed at optimal freedom of choice and a secure future basis for all users.

### INTEROPERABLE WIRELESS STANDARD ENABLED BY ENOCLEAN

Back to the logo. The dolphin is a highly intelligent animal symbolizing many of these features. The shape of its body enables it to move in a very efficient manner. And it communicates similarly to wireless by modulated tones that can be transmitted over considerable distances in the water, in part by other dolphins acting as repeaters. The affinity we feel with the dolphin makes it a good ambassador for the EnOcean wireless standard. In the attractive logo it stands for the interoperability of self-powered wireless sensors, now used primarily in energy-efficient and sustainable building.

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

[www.enoclean-alliance.org](http://www.enoclean-alliance.org)







## ENOCEAN DOLPHIN: REVOLUTIONARY PLATFORM FOR ENERGY HARVESTING IN SECOND-GENERATION WIRELESS SENSORS AND ACTUATORS

The first generation of wireless modules that harvested their own energy, launched by EnOcean in early 2003, demonstrated the reliability and cost effectiveness of this new technology in building automation and industrial sensor applications. More than 500,000 wireless modules have been implemented to date, and in building automation alone there are currently installations up and running in over 10,000 buildings. Figures like these justified the development of an optimized platform with enhanced features specially for energy harvesting applications. Work commenced two years ago, and the result is now ready for the market. The EnOcean Dolphin chip plus essential functions of the specially created operating system.

Frank Schmidt, CTO and Wolfgang Heller, Product Line Manager, EnOcean GmbH

### HARDWARE

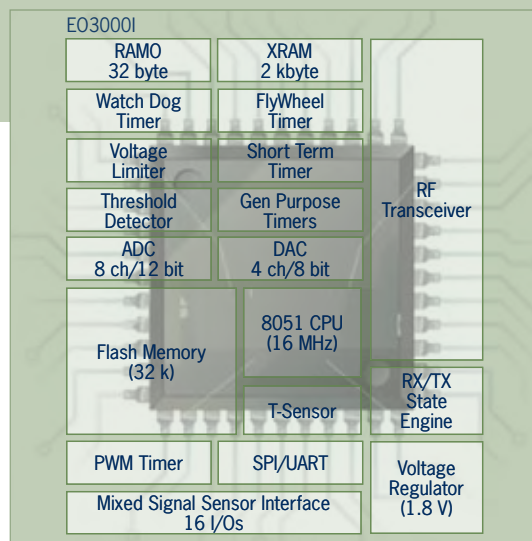
#### ENOCEAN DOLPHIN EO3000I

The essential step in further electronic development consisted in integrating the major wireless, processor control, sensor and energy management functions in a single application-specific integrated circuit (ASIC).



EnOcean Dolphin ASIC EO3000I on a board

This approach, also called a single-chip solution, results in very compact and low-cost components. But on the other hand it is highly sophisticated because fully different technologies such as RF, ultra-low-power and digital have to be created in such a small space and in a single fabrication process.



Block diagram of EnOcean ASIC EO3000I

The block diagram illustrates this complexity, which goes a lot further than discrete implementations to date. All functions are specially optimized for the very specific demands of energy harvesting systems. The chip differs from forerunner systems not only through the excellence of its technical specifications but also, and in particular, through its additional components, needed for safe and extremely low-energy operation, and allowing the user to develop innovative applications.

Only a few extra components, such as a crystal oscillator, an antenna and the energy supply, are necessary to form a complete, bidirectional wireless sensor system. EnOcean is currently developing the next generation of wireless modules with general radio administration approval, based on this chip, and due in early 2009.



## ENERGY MANAGEMENT

Extremely economical use of available energy is the key to dependable functioning of energy harvesting even in difficult conditions. A number of components were consequently newly developed, and all operations were optimized in terms of their energy so that no component is working longer than absolutely necessary.

Examples of the new components are ultra-low-power timers, threshold detectors, voltage limiters and memories. Timers, for instance, must not be turned off (otherwise the system can never wake up again). That calls for extreme optimization of the current demand. The same applies to threshold detectors, which are needed to monitor energy storage or external digital sensors, and for surge voltage protection and measured data storage. All of these components together in the EnOcean module consume less than 80 nanoamperes – a world record! Such a low power demand enables the use of very small and low-cost energy converters, which in turn shows the way to entirely new applications.

## BIDIRECTIONAL WIRELESS

In future all EnOcean modules will be capable of bidirectional communication. This is made possible by an integrated transceiver, which also comes with further improvements: reduced energy consumption, programmable transmitted power and working frequency, plus a digital state engine that ensures energy-saving handling of transmit and receive operations while at the same time taking considerable load off the controller. Of course there is full compatibility with existing wireless products.

The advantages of the frequency bands used to date (little propagation loss and density of assignment) continue to show in practice. So no extra or alternative frequencies are needed, and 868.3 MHz (Europe) and 315.0 MHz (USA, Canada and Asia) will remain in use.

## CONTROLLER AND PERIPHERY

An 8-bit 8051 microcontroller, clocked at 16 MHz, is responsible for controlling all operations. Here, as in the available memory (32 kB flash, 2 kB RAM), a lean concept is implemented – less is more. The aim was to achieve a good balance between the complexity of the tasks, the memory capacity and the energy need for typical actions, while leaving sufficient “potential” for the future.

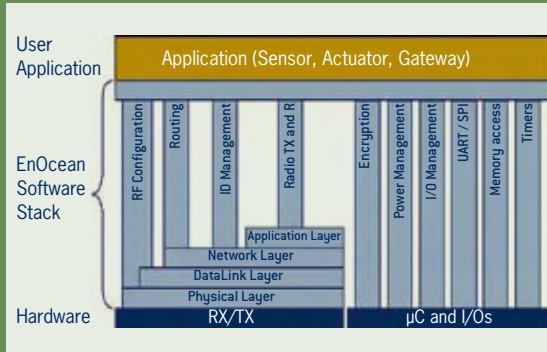
Important components remain 16 freely configurable I/O pins, connectible to an A/D converter (8 channels, 12 bits) and D/A converter (4 channels, 8 bits). An SPI interface and modules for PWM and UART address standard tasks in device development. A specialty is an ultra-low-power 32-byte RAM that needs only 5 nA to retain data, and offers major advantages, in particular unlimited read/write cycles, for buffering measured data in the sleep modes of the module.

The externally applied operating voltage must be between 2.0 and 4.5 V; higher input voltages are automatically limited. Internally an integrated voltage regulator controls the supply voltage to 1.8 V. This voltage is also available externally.

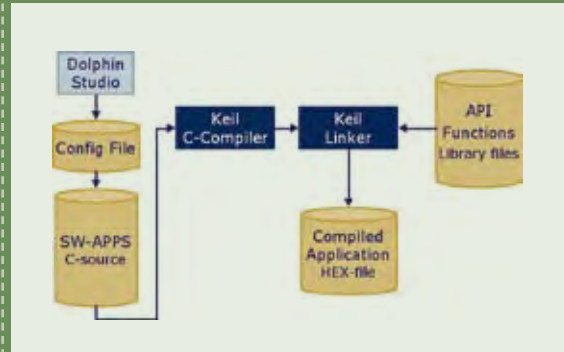
## SOFTWARE

### ENOCEAN API

EnOcean offers an operating system matching the chip with a programming interface (API) that allows application-specific software to be written in next to no time. Detailed microcontroller expertise or laborious study of register settings to activate chip functions are unnecessary. Programming is in the high-level C language. The API is not only restricted to the protocol stack for EnOcean wireless, it also offers many other powerful functions, for the control of energy management for example, use of the digital or analog I/Os, access to flash memory and the continuously powered RAM0, and control of



Overview of API modules (light blue)



Development tools

timer functions. Modules for routing and encryption, for example, will be added later.

The following example of a program shows how easily, with a few lines of code, a receiver can be brought to output all received wireless telegrams on the serial interface:

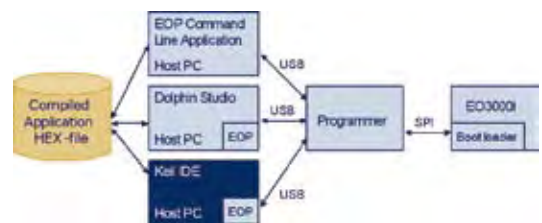
```
void main()
{
uint8 i,u8Ret;
TEL_SERIAL_TYPE sTel;
TEL_RADIO_TYPE rTel;
INIT_EO3000i;
radio_enableRx(1);
while(1)
{
u8Ret = radio_getTelegram(&rTel, 0x00);
if (u8Ret == OK)
{
misc_radioToSerial(&rTel, &sTel);
uart_sendTelegram(&sTel);
}
}
}
```

### DOLPHIN STUDIO DEVELOPMENT ENVIRONMENT

The powerful development environment that comes with the API ensures fast time to develop. Dolphin Studio serves for configuring different API modules. The resulting configuration file is then simply loaded into the C program. Development of the application then uses the widely found development environment from Keil.

Once the program is compiled, it is loaded into the chip by a programming device with a USB interface, which is

also offered by EnOcean. The programming operation is controlled by a command line program in the development environment, but this can also easily be integrated into the fabrication and test engineering of a device manufacturer.



Programming of chip

The development tools and the API can be used both for the Dolphin chip and the modules based on it.

### SUMMARY

The Dolphin platform is unique worldwide as a basis for energy-autonomous wireless systems. It allows especially simple implementation of innovative products by using the extensive tools and large variety of wireless modules.

The large number of users of EnOcean technology can thus develop compatible products of the next generation – with major advantages in cost, size and performance. For small and medium-sized batches the best approach will be to use those modules developed by EnOcean that already come with wireless certification. For very large batches it becomes worthwhile to develop systems of your own using the Dolphin chip.

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





# ENOCHEAN DOLPHIN – THE FUTURE IN FLEXIBLE SYSTEM ARCHITECTURE FOR WIRELESS SENSOR NETWORKS

*Self-powered wireless technology is a ground-breaking innovation that is constantly spreading. Already in use for wirelessly linking hundreds of thousands of energy-autonomous sensors to building automation systems, it can now be witnessed in the expansion of existing applications in building services for energy saving, enhanced comfort and convenience, security and safety, for access control and consumer data acquisition, and in its entry into industrial control and automation systems. EnOcean developed the Dolphin system architecture so that open, non-proprietary systems can meet the constantly increasing demands of very different applications, and are able to grow in functionality and flexibility at the same pace.*

*By Armin Anders, VP Product Marketing, EnOcean GmbH*

## ENOCHEAN – SERVICE-FREE AND DEPENDABLE EVEN IN SYSTEMS WITH THOUSANDS OF SENSORS

EnOcean technology is characterized by efficient energy converters, ultra-low-power electronic circuitries and a reliable wireless protocol. Unique is the freedom from service afforded by energy harvesting, the collection of the tiniest amounts of energy from the environment. In wireless systems with many hundreds or even thousands of sensors there are other aspects that play a role however: cost-attractive components are demanded, and simple, reliable and efficient networking of wireless components from different manufacturers. The EnOcean protocol allows dependable implementation of systems with thousands of wireless sensors, through extremely short wireless telegrams and sophisticated transmission intelligence (see perpetuum 8). Evidence of this is the Espacio Tower in Madrid, in which more than 4000 EnOcean wireless components are installed.

## ENOCHEAN WIRELESS – OPTIMALLY SUITED FOR BUILDINGS WORLDWIDE

Because of the physical properties of radio waves, for applications in a building, where walls and other objects have to be penetrated, you need frequencies below 1 GHz. Regulation of wireless is not the same worldwide, but is increasingly following the directives of the R&TTE (Europe) and FCC (America), in Asia too. Consequently EnOcean technology, currently using short telegrams on the two frequencies 868 MHz (Europe) and 315 MHz (America), will probably be able to service the whole world. A list of certification possibilities for EnOcean wireless in major nations can be obtained from EnOcean.

## DOLPHIN SYSTEM ARCHITECTURE – TO MATCH CONSTANTLY GROWING DEMANDS

Open, non-proprietary systems must match constantly growing demands of very different applications, manufacturers and customers, and be able to grow in their functionality. The EnOcean system architecture was developed to meet these futuristic goals. This sophisticated architecture called Dolphin will be continuously expanded. Dolphin presents numerous new functionalities, accompanied by full downward compatibility with EnOcean devices and system components already established on the market. Dolphin is an open and flexibly expandable hardware and software architecture that in particular matches the increasing demands and ambitions of building services.

## DOLPHIN HARDWARE – AND THE NEW EO3000I KERNEL

The new hardware kernel of Dolphin is the EO3000I chip that is currently being developed. On a single silicon chip it holds a bidirectional transceiver, extensive peripherals for measurement and control purposes, a microprocessor, an application-programmable memory, plus the unique EnOcean ultra-low-power energy management for batteryless wireless sensors. An energy-autonomous sensor can be powered by a whole number of different energy converters – electrodynamic, solar or for differences in temperature, vibration and rotation. That marks an enormous step towards reducing energy use compared to all other solutions found on the market.

Based on the Dolphin chip, modules will be provided that allow simple installation and system integration with their





wide-ranging application functions. Time and cost to develop are thus very much reduced. No RF engineering expertise is called for. Interoperability of the modules lowers the market entry threshold because manufacturers do not have to develop the entire product spectrum for their own system solution – equipment manufacturers are already making very intensive use of this kind of sourcing.

### DOLPHIN SOFTWARE – ALLOWS SIMPLE SYSTEM STARTUP AND EASY APPLICATION PROGRAMMING

EnOcean modules have already implemented extensive firmware, among other things for basic system functions switching, dimming and metering. The modules can consequently go straight into an application without programming. For simple implementation of more complex

Easily integrated EnOcean modules allow fast and low-cost equipment development

#### SELF-POWERED SWITCHES:

- ▶ wall switch
- ▶ remote control
- ▶ dimmer
- ▶ blinds switch
- ▶ scene switch
- ▶ pull switch
- ▶ etc

#### SELF-POWERED SENSORS:

- ▶ temperature
- ▶ light
- ▶ humidity
- ▶ movement
- ▶ damp
- ▶ gas
- ▶ current
- ▶ contact
- ▶ flow rate
- ▶ pressure
- ▶ etc

#### ACTUATORS:

- ▶ light
- ▶ shade
- ▶ HVAC
- ▶ security

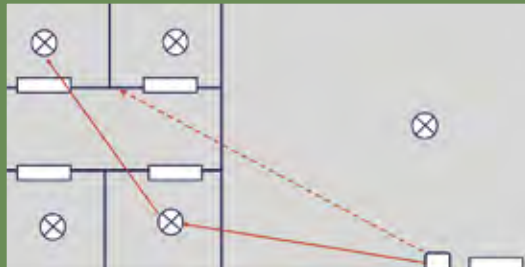
#### GATEWAYS, REPEATERS & ROUTINGS





## REVOLUTIONARY

With the new Dolphin modules every actuator can assume a repeater function (SMART ROUTING)



system functions, for example connection of a display, the Dolphin software library allows very straightforward programming of applications in the high-level C language by sample programs and given basic routines. So the user need not worry about interoperable wireless communication for instance, ID administration, energy management, repeating or data encryption. They just integrate the given function macros in their program, which they later save to the Dolphin hardware. Extensive, properly matched development tools allow very simple startup, programming and system integration.

### SMART ACK – ALLOWS BIDIRECTIONAL SELF-POWERED WIRELESS SENSORS AND ENERGY-AUTONOMOUS WIRELESS ACTUATORS

Dolphin system architecture goes a lot further than ready established, self-powered wireless switches and unidirectional wireless sensors. Batteryless bidirectional sensors can now be implemented, for example remote controls and room sensors with a display to show return messages. Even actuators without cables and batteries are a possibility, for instance centrally and wirelessly controlled heating valves as a simple retrofit in a single room. How that works with the SMART ACK software library function was shown in the last issue (perpetuum 12).

### SMART ROUTING – ALLOWS EASY RANGE EXTENSION

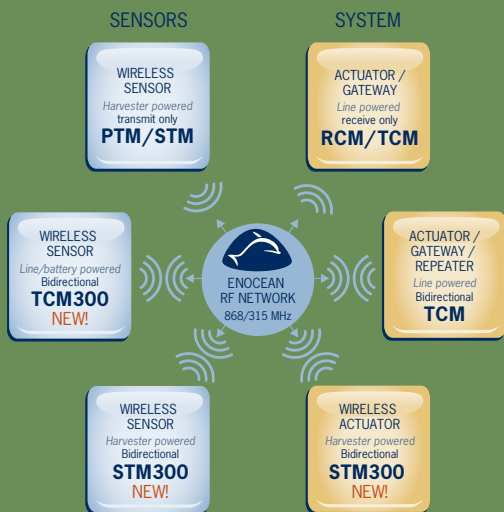
Wireless gateways produce connectivity with established automation systems like EIB/KNX, LON, DALI, BACnet, TCP/IP. As a continuation repeaters are the ideal way

to increase wireless range in a building: plug&play installation without any learning procedure and the availability of redundant wireless routes in realtime without bothersome switchover are the obvious benefits of repeaters. This is essential especially in the case of mobile wireless nodes such as remote controls. Previously repeaters were always separate devices, retrofitted when needed. In future every line-powered receiver will be able to assume this function, reducing system costs and very much simplifying any retrofit. EnOcean calls this concept SMART ROUTING.

### DOLPHIN ROADMAP

TCM 300, which is currently being developed, is a bidirectional plug&play module for Dolphin wireless systems. This module offers a number of ready programmed operating modes for switching and dimming. A repeater function can additionally be activated. The bidirectional serial interface serves for integration with external logic or an automation system. The processor of the module is user-programmable, also in-system. 3 V technology, among other things, has more than halved the standby power requirement compared to predecessor TCM 120. TCM 300 will be available for sampling in February 2009:

- 8051 CPU, 16 MHz, 32 k flash, 2 kB RAM
- EnOcean unidirectional and bidirectional wireless communication (EnOcean wireless protocol, 125 kbps/ASK)
- 1- and 4-channel switching function or 1-channel dimming function
- Optional repeater function activated by pin



REVOLUTIONARY

TCM 310 –  
EnOcean  
bidirectional

TCM 300 –  
EnOcean  
bidirectional



Dolphin system concept expands in function with new EnOcean modules

- 10-bit A/D converter, 8-bit D/A converter
- Low-power supply 2.5 to 3.3 V, Rx approx. 30 mA, Tx approx. 15 mA
- Simple programming in the application and in the field (API), complex software functions can be integrated as ready macros (e.g. SMART ACK, encryption, routing)
- TCM 300/300C (868 or 315 MHz): SMD modules for flexible connection of different antennas
- TCM 310/320C: modules for vertical mounting with ready fitted wire antenna (868/315 MHz)

One quarter later the bidirectional STM 300 module for energy-autonomous sensor applications is due:

- Basic hardware of TCM 300
- Plus extensive ultra-low-power energy management for energy-autonomous wireless sensors (unidirectional and bidirectional wireless communication) and energy-autonomous wireless actuators (threshold switch, voltage limiter, wakeup circuit)
- Basic software of STM 110
- Universal harvester interface (prepared for Harvester Library)
- STM 300/300C (868 or 315 MHz): SMD modules for flexible connection of different antennas and energy storage mechanisms
- STM 320/320C: modules with integrated antenna, connector and energy storage mechanism

As of February 2009 the EO3000I chip is planned to be available in quantities for high-volume applications. From the end of 2009 further software functions are to be developed to match demand, for example data encryption capability or routing algorithms for synchronous networks or line-independent repeaters. The EnOcean roadmap also foresees application-specific temperature, rotation and vibration generators. On top of that, EnOcean product planning is driven by miniaturization and cost reduction.

## ENOCEAN – THE WIRELESS STANDARD FOR SUSTAINABLE BUILDINGS

The EnOcean Alliance was founded in April 2008 to promote development and dissemination of the wireless standard for sustainable building, to inform and network users, and to ensure interoperability and user-friendliness of the products. Dolphin is the ideal technical system platform for worldwide standardization because it creates interoperability, downward compatibility, maximum flexibility and security for the future.

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





# OVERVIEW OF ENOCEAN MODULES 868 MHz FOR GENERAL APPLICATIONS



Modules with 868 MHz frequency are suitable for Europe and other countries adopting R&TTE.

## TRANSMITTER MODULES & COMPONENTS

### PTM 200 – THE ULTRATHIN MINIATURIZED SWITCH MODULE

- ▶ Maintenance-free powering by finger pressure
- ▶ Optionally 1 or 2 rockers or up to 4 push-buttons
- ▶ Dimensions 40 x 40 x 11.2 mm
- ▶ Actuating travel 1.8 mm
- ▶ Actuating force approx. 7 N



### ECO 100 – ENERGY CONVERTER FOR LINEAR MOVEMENT

- ▶ Qualified for powering PTM 230
- ▶ Voltage approx. 5 V at 19 µF
- ▶ Dimensions 33 x 22 x 11 mm
- ▶ Actuating travel approx. 2 mm
- ▶ Actuating force approx. 2 N



### PTM 230 – RADIO TRANSMITTER MODULE

- ▶ 2 digital inputs
- ▶ Dimensions: 20 x 25 x 6 mm
- ▶ Operation with ECO 100 or external energy source



### STM 110 – THE SENSOR MODULE

- ▶ Maintenance-free sensor module
- ▶ Powered by mini-solar cell, 13 x 35 mm
- ▶ Dimensions 21 x 40 x 9 mm
- ▶ Operates for several days in total darkness
- ▶ Periodic presence signals
- ▶ 3 A/D converter inputs
- ▶ 4 digital inputs
- ▶ Replaces STM 100



## RECEIVER AND TRANSCEIVER MODULES

### RCM 110/120/130/140/150 – THE RECEIVER MODULES

- ▶ Wireless receiver module and actuator control module for receiving and decoding EnOcean wireless transmitter signals
- ▶ Dimensions 18 x 42 x 5.5 mm
- ▶ 5 Vdc voltage supply
- ▶ 25 mA current consumption
- ▶ Basic functions: switch, blinds control, dimming and serial interface for bus systems
- ▶ Simple teaching of up to 30 wireless transmitters
- ▶ Memory function (for light and blinds scenes)



### TCM 110/120/130 – ENOCEAN BIDIRECTIONAL

- ▶ 5 Vdc voltage supply
- ▶ 33 mA current consumption
- ▶ Dimensions 24 x 42 x 5 mm
- TCM 110:** ▶ Single- and two-level repeater for EnOcean wireless telegrams
- TCM 120:** ▶ Bidirectional wireless
- ▶ Serial interface
- TCM 130:** ▶ Software API for TCM 120 module
- ▶ Programmable in C
- ▶ Bidirectional radio
- ▶ Bidirectional serial interface
- ▶ Single- and two-level repeater functionality
- ▶ Power saving modes
- ▶ 4 D/A inputs, 4 digital outputs



### TCM 300/310 – ENOCEAN BIDIRECTIONAL

- ▶ Unidirectional serial communication
- ▶ Bidirectional serial communication
- ▶ 1-channel/ 4-channel relay mode
- ▶ 1-channel dimming mode
- ▶ 1- and 2-level repeater functionality
- ▶ Programmable by API software
- ▶ Available: 2nd quarter 2009

NEW IN 2009







## OEM PRODUCTS

### PTM 250 ENOCEAN EASYFIT – UNIVERSAL SWITCH INSERT

- ▶ Surface mounting without casing
- ▶ Switch program frame flat on the wall
- ▶ Compatible with following designs with 55 x 55 mm rocker:
  - BERKER S1, B1, B3, B7 glass
  - GIRA Standard 55, E2, Event, Esprit
  - JUNG A500, Aplus
  - MERTEN M-Smart, M-Arc, M-Plan
- ▶ Single or serial rocker
- ▶ Colors: white, aluminum, anthracite, structured, high-gloss pure white



### STM 250 – WINDOW/DOOR CONTACT

- ▶ Maintenance-free powering by daylight
- ▶ Operates for several days in total darkness
- ▶ Immediate signal transmission as soon as window closes or opens, triggered by window magnet
- ▶ Periodic life signal
- ▶ Contact monitor (110 x 19 mm, height 15 mm) attachable to all frame profiles



### RCM 250/255 – UNIVERSAL SINGLE-CHANNEL SWITCH ACTUATOR

EnOcean easyfit switch actuator for wireless switching of very different 230 V (RCM 250)/110 V (RCM 255) loads, e.g. incandescent lamps, high-volt halogen lamps or low-power motors. Up to 30 EnOcean PTM wireless switches or up to 2 EnOcean STM 250 wireless window contacts can be teached. Simple connection of the line voltage and load by screw terminals.



## ACCESSORIES

### EPM 100 LEVEL METER / EPM 200 RADIO TEST SET



**EPM 100 LEVEL METER:**  
The electrician's installation tool for EnOcean wireless components – for range analysis and simple detection of signal quality and sources of interference.



**EPM 200 RADIO TEST SET** contains EPM 100 and PTM 250 EnOcean easyfit switch.

### EVA 100 EVALUATION KIT



**TEST BOARD** for simple startup of EnOcean wireless modules.

### EVA 120 EVALUATION KIT



**TEST BOARD** for quick startup with STM 110.

### ECT 100 EVALUATION KIT



EnOcean has developed a thermal energy harvester that is able to power wireless sensor nodes from temperature differences of only a few Kelvin.



# OVERVIEW OF ENOCEAN MODULES 315 MHZ FOR GENERAL APPLICATIONS



Modules with 315 MHz frequency are suitable for North America and other countries adopting FCC specification.

## TRANSMITTER MODULES

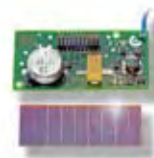
### PTM 200C – THE ULTRATHIN MINIATURIZED SWITCH MODULE

- ▶ Maintenance-free powering by finger pressure
- ▶ Optionally 1 or 2 rockers or up to 4 push-buttons
- ▶ Dimensions 40 x 40 x 11.2 mm
- ▶ Actuating travel 1.8 mm
- ▶ Actuating force approx. 7 N



### STM 110C/112C – THE SENSOR MODULE

- ▶ Maintenance-free sensor module
- ▶ Powered by mini-solar cell, 13 x 35 mm
- ▶ Dimensions 21 x 40 x 9 mm
- ▶ Operates for several days in total darkness
- ▶ Periodic presence signals
- ▶ 3 A/D converter inputs
- ▶ 4 digital inputs



## TRANSCEIVER MODULES

### TCM 200C/220C – ENOCEAN BIDIRECTIONAL

- ▶ Bidirectional transceiver modules
- ▶ 5 V (TCM 200C) / 3 V (TCM 220C) supply voltage
- ▶ Basic functions: receiver with serial interface and integrated repeater
- ▶ Programmable in C using software API
- ▶ 6 digital or analog inputs, 5 digital outputs
- ▶ Dimensions 18 x 36.6 x 5 mm



### TCM 300C/320C – ENOCEAN BIDIRECTIONAL

- ▶ Unidirectional serial communication, backward compatible with TCM220C
- ▶ Bidirectional serial communication
- ▶ 1-channel/ 4-channel relay mode
- ▶ 1-channel dimming mode
- ▶ 1- and 2-level repeater functionality
- ▶ Programmable by API software
- ▶ Available: 2nd quarter 2009

NEW IN 2009



## ACCESSORIES

### EPM 100C – LEVEL METER

The electrician's installation tool for EnOcean wireless components – for range analysis and simple detection of signal quality and sources of interference.



### EDK 100C – DEVELOPERKIT

Developer kit for quick startup with EnOcean wireless modules PTM 200C, TCM 200C, and STM 110C/112C, including API software for TCM 200C.





*Wireless systems offer maximum flexibility and much more convenience, as well as involving less investment in planning, compared to their wired counterparts. Less cabling and faster installation mean less cost. Self-powered wireless transmitters do away with maintenance and service. A frequent question asked is that of the benefit/cost ratio in wireless systems. Here you can read about when and how the use of wireless systems proves itself in building practice.*

*By Armin Anders, VP Product Marketing, EnOcean GmbH*

## INTEGRATING WIRELESS SYSTEMS IN BUILDING ENGINEERING

### PART 2: BENEFIT AND COST

#### ENORMOUS ENERGY SAVING POTENTIAL FROM BUILDING AUTOMATION

Global warming is increasingly becoming a serious challenge. Buildings, accounting for some 40% of total energy needs, represent significant potential for saving (transport 28%, industry 33%, residential building 21%, functional building 17%). The International Energy Agency calculates that the global requirement for electric energy will have more than doubled by the year 2030. That boosts the importance of energy efficiency as an alternative energy source.

A recent study conducted by Biberach University of Applied Sciences (Prof. Martin Becker) looked at best and worst cases in the type and scope of room and building automation functions. It showed that up to 20% of the heating energy requirement, up to 45% of the cooling energy requirement, and even as much as 60% of the lighting energy requirement can be saved in conjunction with constant light regulation, daylight use and louvre tracking by control as a function of location, time and presence. That makes building automation a central focus for extensive energy economies and reduced operating costs.

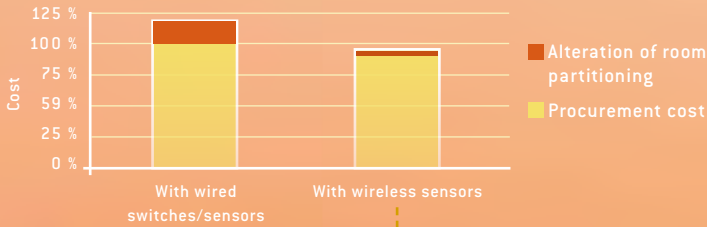


Wireless sensors are flexible and can be placed where they are most effective.

#### WIRELESS TECHNOLOGY AS KEY TO EFFICIENT BUILDING AUTOMATION

Wireless technology enables the necessary number of sensors, their optimal functioning and flexibility. Wireless sensors can be placed where they are most effective because they are not bound by cables sticking out of a wall. Wireless technology means less planning effort, cuts the time needed for installation, and reduces the system costs of building automation.

In addition to substantial energy savings, building automation helps to implement increasing demands for security and safety, comfort and convenience. Satisfying all these wishes calls for very many more building sensors



Wireless technology reduces the cost of investing in building automation (cost including work and commissioning).

accompanied by minimal wiring and flexible placement – wireless technology in other words.

### WIRELESS TECHNOLOGY REDUCES COST OF PROCURING BUILDING AUTOMATION

At first-time installation already, wireless technology can drastically cut the implementation cost of building automation. Just compare installation costs at the input end of an automation system between traditional switch wiring and wireless, and the difference is appreciable – even if the interior of a building has hollow walls. For the conventional solution you must install a wired switch and a blinds switch in each room. Two round holes for the switch receptacles are bored in the hollow wall next to the door, and about three meters of empty tubing are laid up to the installation shaft in the ceiling. The cable ducts for the switch leads in the ceiling must be appropriately dimensioned. Wireless technology, doing away with the many control leads, means that a smaller cable duct can be fitted, with cost benefits that you notice even in smaller buildings. Automating the conventional way, you must draw in and connect two control leads for light and blinds from the switch receptacles to the field bus node. Finally, on the automation station, you need control inputs – four channels for each room, i.e. two for the light (on/off) and two for the blinds (up/down). The wireless solution requires no inputs on the field bus node, just a single wireless receiver and antenna. The cabling outlay on the control cabinet is substantially reduced.

The result is a sizeable cost saving of about 10% on the entire building automation system through wireless technology when it is first installed. The saving is even greater if the system is later rededicated – some 80% of rebuilding costs. And quite often the first conversion comes with the appearance of the first tenant.

### SELF-POWERING IS A MUST IN LARGER INSTALLATIONS

System error rate as a result of poor batteries increases drastically with the number of batteries, as does the cost of servicing and disposal. Self-powered wireless technology is environment-friendly, ecologically safe in buildings and saves resources.

Batteryless energy converters avoid disposing of millions of batteries used in wireless transmitters in years to come. Batteryless wireless switches also emit one hundred times less high-frequency radiation than conventional light switches (source: ECOLOG Institute), and reduce electrosmog. Batteryless wireless technology is consequently already in use in hospitals and kindergartens, and even nature- and health-conscious feng shui adherents employ the technology in the buildings they design.





Torre Espacio, Madrid

World's tallest building to use wireless technology throughout: more than 4,200 self-powered wireless nodes on 55 floors and 223 meters in height.

MultiMedia Center, Hamburg



South-German Plastics Center, Würzburg



## WHEN DOES WIRELESS TECHNOLOGY PAY OFF?

Take the simplest case where you only have a ceiling lamp to turn on and off by a switch on the wall, and the room will stay as it is and not be reconfigured in any way. Classic wiring upon first-time installation is unbeatable in terms of cost.

But things look different if a building or rooms are likely to be converted, for a different purpose or for extra functionality. With the first conversion wireless surface-mounted switches can be had at no extra cost compared to conventional switches. If central or comfort functions are wanted, the cost of procuring the necessary building automation is reduced by wireless technology because of the otherwise considerable wiring effort. For open-plan room arrangements, or attachment of switches and sensors to glass, concrete or the walls of landmarked property, there is no alternative to wireless technology.

In residential building wireless technology saves money even for local alterations like subsequently adding switch functions to the lighting in a staircase. It avoids cutting a slit in the wall, fitting branching boxes, laying cables in a sheath, and painting over the top of everything. Plus there is no dust and dirt, no noise.

## COST OF WIRELESS SYSTEMS – EXPERIENCE FROM BUILDING PRACTICE

The South-German Plastics Center in Würzburg was inaugurated in 2004. This is a new, concrete building. Some 500 self-powered wireless switches control DALI light actuators through 17 field bus nodes of a decentral building automation system. The contracting planner IBZ carried out a cost comparison in advance, showing 15% savings through the use of wireless sensors and DALI actuators versus conventional wiring.

Another example is the MultiMedia Center in Hamburg, which opened its doors in 2006. Wireless room sensors and window contacts from EnOcean allow efficient regulation of individual room climate. Planner HSGP also compared the cost – 20% savings by using wireless sensors versus conventionally wired sensors.

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





## WIRELESS SENSORS GUARD AGAINST ROCKFALL

*Avalanches, landslides and rockfall are frequent occurrences in the Alps and elsewhere in mountainous regions. Accidents resulting in injured persons and fatal casualties can be the result. In May 2006 two persons from Baden-Württemberg in Germany were killed when a huge boulder dislodged and crashed onto their car as they were driving past. A tragic incident but perhaps less possible in future now that Protect Sentinel in Friedrichshafen has developed a sensor system to transmit signals warning of rockfall.*

*By Dr. Thomas Meisel, CEO, INGLAS GmbH & Co. KG*

### RUGGED TECHNOLOGY FOR YEARS IN THE OPEN

An inconspicuous item this sensor, but it has all it takes to transmit data by electronic means. You are struck by the compact, robust form and the lack of connecting cables and batteries. The yellow cast-iron case is not even as big as your fist, and you can make out a transmitting antenna, a solar cell to deliver its energy, and a cable clamp. By this clamp the sensor is attached to the guy wire of a protection net or in the net itself. Here it can register changes in the guying or hefty movement of the net caused by rockfall when it impacts. The nets are often difficult of access, and external cables for powering are ruled out, so wireless transmitters with EnOcean technology in the sensors are an attractive alternative. The system harvests its energy from the sun and the

mechanical energy produced by a rockfall. Even the vibration of a dislodging rock is enough to activate the sensor. Installation is extremely simple, which is important because the terrain is very steep of course. When you are climbing one of these nets, you can barely afford to work with one hand.

### DEPENDABLE DATA TRANSMISSION

You must be able to rely on secure data, e.g. close to the catenary wires of a railroad line. Passing electric locomotives generate strong interference that must not result in malfunctions or false alarms. This is where the triply repeated wireless telegram of the sensors is an advantage. In especially safety-critical cases a redundant configuration of the sensors is implemented to prevent false alarms.





Impact Sentinel is a wireless supported system used by Swiss Federal Railways to observe rockfall.

The receiving station, line- or solar-powered, with its data logger collects the wireless telegrams and assesses the acuteness of an event from their frequency and type. Within a matter of seconds an alarm is triggered, a relay is switched, SMS alarms are sent out and data are transmitted on the internet. A number of persons, no matter where, can thus be informed in a flash. The internal relay will already have switched a signal to halt a train or road traffic.

The cyclic presence signal from EnOcean wireless transmitters in the sensors allows permanent monitoring of the operativeness of such a system. Any failures are immediately detected.

### SWISS FEDERAL RAILWAYS SAFEGUARDS CRITICAL STRETCHES

These sensors are already working to monitor rockfall protection nets and thus make traffic routes safer at a number of locations in the Alps, but also as far away as Sicily. Such a system, because of its mobility, is also an efficient electronic means of protection at building sites. Following storm damage on the line from Berne to Lausanne in summer 2007 for example, Swiss Federal Railways integrated Impact Sentinel into its operations to safeguard building sites and then continue in place to monitor the rail route.

Protect Sentinel, a division of INGLAS GmbH & Co. KG in Friedrichshafen, developed the Impact Sentinel system in 2004, cooperating with the Swiss company Geobrugg AG, a producer of rockfall protection nets.

[www.protect-sentinel.com](http://www.protect-sentinel.com)



LETTER FROM THE CHAIRMAN



**enocean® alliance**

No Wires. No Batteries. No Limits.

*Graham Martin,  
Chairman & CEO  
EnOcean Alliance, Inc.  
[www.enocean-alliance.org](http://www.enocean-alliance.org)*

We are pleased to deliver news and updates about EnOcean Alliance ongoing activities related to the advancement of self-powered interoperable wireless building control systems. Alliance innovations create interoperable standard solutions, helping to make buildings more energy-efficient.

The market opportunities for EnOcean standard technology are rapidly growing. For example, the cost of raw materials such as copper wire as well as energy has doubled over the past two years. Adding complexity to this entire equation are increasing competition, tightening construction deadlines, rising labor costs, and an increasing need for flexibility. Across the globe the necessity to save costs, raw materials and energy gains an ever-increasing momentum with individuals, companies, institutes, public offices and governments all playing their active part.

These issues converging together set the perfect scene to deploy EnOcean standard technology across the globe. Wireless and battery-less maintenance-free products can save between 30 and 70 percent on cabling, which results in significant construction time savings, and reduces building mess and rework necessity, while providing limitless flexibility in initial placement of switches and sensors and during any subsequent retrofit. In addition building automation systems, using EnOcean-based products can save about 30 percent in energy costs by in-

telligently controlling lighting, heating or air-conditioning. All in all, EnOcean-based products contribute to a major reduction in carbon footprints, costs and quality of living or work space.

The EnOcean Alliance founded in April by Masco, MK-Honeywell, Distech Controls, Thermokon, EnOcean, Leviton and Omnio to promote the wireless standard for sustainability, to educate and network the user community and to ensure the interoperability and user-friendliness of the products has already attracted over 60 active members. There are over 300 interoperable products available from over 60 different companies, with tens of thousands of buildings already enjoying the benefits of the technology - "No Wires. No Batteries. No Limits."

We hope you will continue to support us in making our world a better, safer, more comfortable and energy-efficient place.





# OVERVIEW OF INTEGRATION PARTNERS (OEMS) USING ENOCEAN TECHNOLOGY

[www.enocean-alliance.org/products](http://www.enocean-alliance.org/products)



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a Honeywell Business

[www.mkelectric.co.uk](http://www.mkelectric.co.uk)



[www.omnio.ch](http://www.omnio.ch)

thermokon  
Sensortechnik GmbH

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

## ENOCEAN PARTICIPANTS

<a href="http://www.embedded-intelligence.de">www.embedded-intelligence.de</a>	<a href="http://www.echoflexsolutions.com">www.echoflexsolutions.com</a>	<a href="http://www.adhokelectronics.com">www.adhokelectronics.com</a>	<a href="http://www.bk-electronic.de">www.bk-electronic.de</a>	<a href="http://www.bootup.ch">www.bootup.ch</a>
<a href="http://www.hoppe.com">www.hoppe.com</a>	<a href="http://www.illumra.com">www.illumra.com</a>	<a href="http://www.eltako.com">www.eltako.com</a>	<a href="http://www.funkstuhl.de">www.funkstuhl.de</a>	<a href="http://www.hautau.de">www.hautau.de</a>
<a href="http://www.lightingcontrols.com">www.lightingcontrols.com</a>	<a href="http://www.lonmark.org">www.lonmark.org</a>	<a href="http://www.insys-tec.de">www.insys-tec.de</a>	<a href="http://www.Jaeger-Direkt.com">www.Jaeger-Direkt.com</a>	<a href="http://www.kieback-peter.de">www.kieback-peter.de</a>
<a href="http://www.regulvar.com">www.regulvar.com</a>	<a href="http://www.sauter-controls.com">www.sauter-controls.com</a>	<a href="http://www.osram.de">www.osram.de</a>	<a href="http://www.peha.de">www.peha.de</a>	<a href="http://www.probare.biz">www.probare.biz</a>
<a href="http://www.automation.siemens.com">www.automation.siemens.com</a>	<a href="http://www.steute.de">www.steute.de</a>	<a href="http://www.schulte.com">www.schulte.com</a>	<a href="http://www.sensordynamics.com">www.sensordynamics.com</a>	<a href="http://www.servodan.dk">www.servodan.dk</a>
<a href="http://www.vicos.at">www.vicos.at</a>	<a href="http://www.wago.com">www.wago.com</a>	<a href="http://www.sylvania.com">www.sylvania.com</a>	<a href="http://www.texas-instruments.de">www.texas-instruments.de</a>	<a href="http://www.unitronic.de">www.unitronic.de</a>
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## ASSOCIATE MEMBERS



 ENABLED BY ENOCEAN

## GREATER FLEXIBILITY FOR LOWER INSTALLATION COSTS

*Phoenix Contact, a major player in industrial automation, which recently also moved into building automation, has opened its new Innovation Center Electronics (ICE) in Bad Pyrmont. After initial tests by Phoenix Contact's building services department the site was chosen to be enabled by EnOcean technology because of the unsurpassed flexibility and the possibilities to adapt fast and easily to varying workplace requirements.*

*By Frank Neudecker, Export Manager, Thermokon Sensortechnik GmbH and Vice Chairman Europe, EnOcean Alliance Inc.*

### CLASSIC UNIDIRECTIONAL WIRELESS TRANSMISSION

In September 2007 more than 1000 employees of the automation systems and interface divisions moved into their new premises offering 45,000 sqm space for offices and development labs, seminar and conference rooms for all kinds of events, and for recruitment of additional personnel as the company grows. The inhouse building services department was in charge of planning, programming and realization of the building automation in the ICE using Phoenix Contact's own software solution called Automationworx.

Industrial Ethernet forms the backbone that links the different services to the building services management system. Routers connect the offices to the building automation network so that building services personnel can easily access the management system from a PC. Each of the five floors of the new building has two information centers including the controller for electrical and for

HVAC services. Inline controllers (ILCs) from the Phoenix range are connected via the OPC server of the Automationworx system to the building services control system, to which totally some 6000 data points are linked.

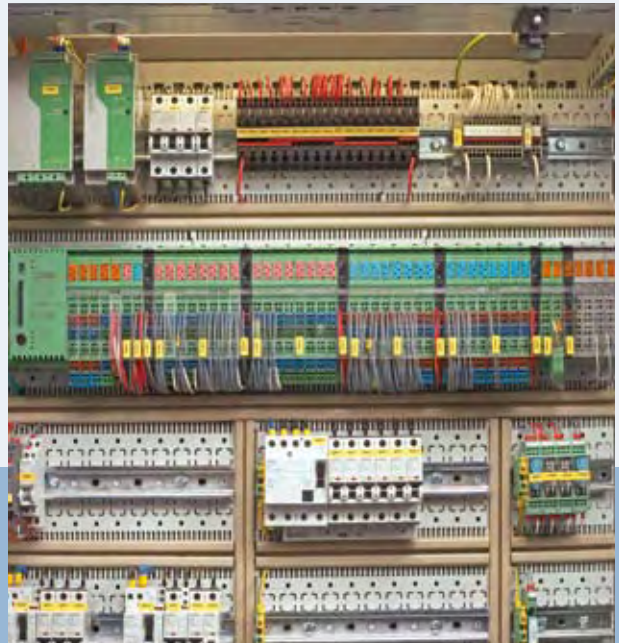
### INDIVIDUAL LIGHTING

Inhouse building services already had experience in installing and using EnOcean technology in a number of projects. At the Blomberg site for example, EnOcean enabled sensors control the blinds, room temperature and lighting of a 6,250 sqm workshop and offices complex where exhibitions are produced and warehoused. The people working there were extremely pleased with the solution, so lighting and shading in the new ICE were also implemented using the self-powered wireless technology. In this case building services opted for Easysens wireless switches from Thermokon Sensortechnik so that the employees can arrange them individually exactly where they want them to be at their workplace to control ceiling lighting and adjacent window blinds.

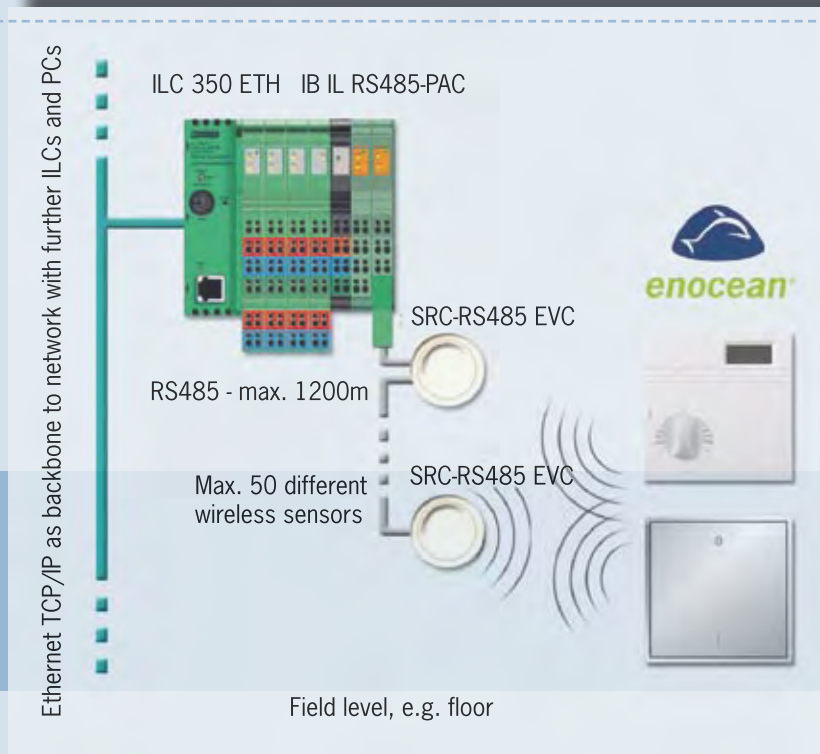
Photo left: the new workshop and offices in Blomberg, featuring EnOcean technology for building services, where show exhibits are produced and warehoused.

Photo right: the RS485 communication interfaces to link Thermokon's SRC-RS485 EVC receiver

Photo below: conveniently located wireless switches for individual lighting and blinds control at each workplace.



Each of Thermokon's wireless receivers SRC RS485 EVC collects the signals from as many as 50 transmitters. Up to five receivers are connected to the inline controller's RS485 communication terminal, controlling the lighting (photo top right). Automationworx enables the collection of receivers in a free topology up to a maximum distance of 1,200 m. "Fast, easy and low-cost installation to the inline system with no problem at all, even on floors where 50 switches are installed", recalls the project manager for electrical services at Phoenix Contact. "For installation of the wireless receivers we used common J-Y(St)Y 2x2x0.8 telephone cable. No special leads were needed, which resulted in a big reduction in installation costs." If conversions to the building will be made in future, all that will be necessary will be to change the assignment of the wireless switches to the receivers through the software. There will be no need for rewiring or adding cables.



Lighting control using Thermokon's SRC RS485 EVC wireless receivers connected to IB IL RS485-PAC inline communication interface .

## INTELLIGENT SHADING

In the ICE, with a few exceptions, there is no central control of shading during working hours. Where automated shading is in place active protection against wind and storm damage is included. If the wind velocity exceeds the preset threshold of the wind monitor, all outside blinds are moved to their secure position. Furthermore, the windows of "sensitive" working and manufacturing areas, which are visible from the outside, are shaded for security reasons after sunset. During the weekend the blinds are integrated into the room control concept.

In summer the blinds reduce the solar energy being captured by the windows so that less cooling is necessary. In winter times the shading also isolates and prevents excessive cooling, especially during the nighttime. As a consequence, the energy consumption for air-conditioning or heating is reduced.

## SUMMARY

For building automation Phoenix Contact implemented their own components, creating an integrated solution for electrical and HVAC services that is simple to program, to work and to service. The extensive use of EnOcean technology in the new Innovation Center Electronics in Bad Pyrmont allows convenient control of conditions at the workplace by personnel, and flexible plus low-cost installation.

[www.thermokon.de](http://www.thermokon.de)





ENABLED BY ENOCEAN

## UNWIRED – INNOVATIVE HOME AUTOMATION

By Martin Weber, Managing Director,  
Martin Weber Elektroanlagen GmbH



time switch to simulate presence while you are away from the house.

### LOW-COST SOLUTION

The cost saving compared to conventional installations offering a comparable scale of automation is about 25 percent. A further bonus is the possibility of flexibly integrating more switches and actuators into the system. Planning and performance were carried out by Martin Weber Elektroanlagen, which specializes in refitting residential and business premises using EnOcean technology.

[www.mw-elektroanlagen.de](http://www.mw-elektroanlagen.de)

### CONVENIENT CONTROL FUNCTIONS

Especially convenient is control by a central switch and switches allocated to the individual blinds. Integrating a wireless time switch from PEHA (4514 FU-TS ST Easyclick timer) into the system enables fully automatic control of the blinds. The system is completed by light switch actuators that are also driven by the wireless

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## Ready to Receive!



- Switch actuator in DIN-rail mountable enclosure for individual application in distribution/switch cabinets
- Universal 4-channel radio receiver for battery-free and wireless EnOcean industrial sensors and EnOcean radio switches
- Available with relay outputs as 4-make or 4-changeover contact version



For more information please go to

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## ENOCEAN TECHNOLOGY GOES INTO NEW DESIGN OF PHILIPS SHOWROOM IN BRAZIL

*In the new "My Space" showroom of Philips in São Paulo, EnOcean's Brazilian partner ASP Automação installed a modern, computer-controlled lighting system, with more than 500 light sources, designed by Mingrone Iluminação, a highly reputed name in this field in Brazil. The project was coordinated by Fennardus Manuel de Rooji, Real Estate Officer of Philips in Latin America.*

*By Oskar Pzillas, Managing Director, ASP Automação*



### USER-FRIENDLY AND GRAPHICAL PROGRAMMING OF SYSTEM

The nucleus of the system is the myHome Control software from Switzerland's BootUp GmbH, which handles the entire control tasks of the 52 switching and 44 dimming circuits, including automatic selection of as many as 12 light scenes, each with 87 contributors. A central computer sends control commands direct to the actuators through a bidirectional wireless gateway from Omnio. At the same time the control signals of the wireless switches are received and processed. Programming of the system is very user-friendly, supported by clear menu prompting. The functions of the actuators are simple to parameterize in dialog boxes (see image top right). The configuration of the graphical interface is highly flexible, allowing integration of temperature regulation, shading by GPS data, trends, presence simulation, e-mail and telephone communication with little effort.

### SIMPLE DISPLAY AND HANDLING BY MYHOME CONTROL

Setting and saving light scenes is very simple and straightforward. Through the central computer or a tablet PC with a WLAN link, the operator in the showroom can set the wished light scene and save it on a key. Depending on demand and situation, preset light scenes can then be recalled by a single key.

In this installation 18 light boxes with as many as 28 dimmable ECGs of 1 to 10 V are each driven by a switching/dimming actuator from Omnio. The actuator serves a number of purposes, including reception of the dimming and turn-on commands for the ECGs. The 150 halogen spots are driven by dimmer actuators and dual-quad in-line receivers.



myHome Control user interface.

Photo left:  
the new Philips  
showroom in  
São Paulo, Brazil.

Photo right: inline  
actuator from Omnio.

Cooperation in this project between ASP (planning), Omnio (hardware) and BootUp (software) was very successful, and further joint projects are consequently on the board.

[www.aspcontrol.com.br](http://www.aspcontrol.com.br)

[www.omnio.ch](http://www.omnio.ch)

[www.bootup.ch](http://www.bootup.ch)

[www.myhomecontrol.ch](http://www.myhomecontrol.ch)



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## Ready to Receive!



Radio receiver integrated into the WAGO-I/O-SYSTEM for building and industrial automation applications

Communicates with a large variety of freely programmable WAGO controllers, such as BACnet, KNX IP, LON<sup>®</sup>, ETHERNET, PROFIBUS, MODBUS TCP, ...

Universal receiver for all battery-free and wireless EnOcean radio sensors



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## CENTURY-OLD LANDMARK RETROFITTED WITH DMX THEATER LIGHTING CONTROLS

By Shawn Pederson, President, Echoflex Solutions



### TALL CEILINGS? IMPENETRABLE WALLS? NO PROBLEM!

St. Andrew's Cathedral sits in beautiful Victoria, BC, Canada. Built in 1892, this spectacular structure houses an active congregation today. Recently, the aged lighting control solution began malfunctioning and the manufacturer no longer offered replacement parts. The church received estimates of US \$40,000 to replace the lighting controls. St. Andrew's contacted Luella Enterprises of Squamish BC, a specialist in theatrical and architectural lighting, to inquire about cost-saving alternatives. Bruce McIntyre, of Luella Enterprises, teamed with Echoflex Solutions, a leading developer of wireless lighting controls, on a wireless DMX solution based upon the EnOcean standard. The primary goals for the project included:

- Minimize invasion and new wiring in the cathedral
- Simplified, single button scene control to replace the complex programming of the prior system
- Reliable radio coverage throughout the cathedral (through walls)
- Cost efficiency



### UNIQUE CHALLENGES

The cathedral presented several challenges.

- It's large size (70 ft. high ceiling).
- Rigid walls (running wires would require visible conduit).
- Complex programming (prior lighting controls required programming, which was confusing for novice users).
- Multi-location control requirement (lighting controls must be operable from different locations within the cathedral for various events).
- McIntyre proposed a wireless lighting control system with excellent RF range, more flexibility without additional wiring, and, best of all, the final cost was only 35% of a replacement system.

#### COST TO INSTALL LIGHTING CONTROL



ENABLED BY ENOCEAN



Left: two handheld quad switches with four preprogrammed light scenes

Top right: EnOcean > DMX gateway

Bottom right: four wall-mounted duplex switches to actuate eight zones



## THE SOLUTION

Luella Enterprises and Echoflex Solutions designed DMX lighting controls based on the EnOcean standard of wireless sensors and switches self-powered by energy harvesting.

The first benefit was the ability to locate the switches in an optimal location, not where there were wires. The church desired one switch in a new location, installation entailed simply screwing to a wall. St. Andrew's requested preset scenes that were programmed once and then made unchangeable since the old complicated to program system caused many problems for end-users. Pressing a single button invokes a scene throughout the cathedral.

"System installation was very easy and commissioning the system went very smoothly giving the church the control points, both fixed and mobile, that it required.

The church particularly liked the four-button handheld remotes that were programmed for All On, All Off, daily mass scene, and visitor scene."

Bruce McIntyre, Luella Enterprises

## COST

The cost for a fully installed solution came to US \$14,000, significantly less than other options. The church placed the order. According to Bruce McIntyre, "The cathedral system cost less to install, provides more flexibility, took less time, and best of all, it performs flawlessly."

Lucas Coldicutt, St. Andrews's building engineer, says, "The new wireless lighting control system performs perfectly and we find it much simpler to operate than the old system."

[www.luellaenterprises.ca](http://www.luellaenterprises.ca)  
[www.echoflexsolutions.com](http://www.echoflexsolutions.com)



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## Ready to Receive!



- Switch actuator in WINSTA® connector system for fast, pluggable and cost-saving electrical installations
- Universal receiver for all battery-free and wireless EnOcean radio switches (PTM)
- Available as 4-channel light control or 2-channel sunblind control



For more information please go to

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

**WAGO**®  
 INNOVATIVE CONNECTIONS



## ENOCEAN WIRELESS STANDARD FOR A HEALTHY CLIMATE IN THE HOME

# SELF-BUILD SPECIALIST WEBERHAUS SETS ECOLOGICAL AND ECONOMICAL BUILDING INSTALLATION BENCHMARKS WITH ENOCEAN WIRELESS TECHNOLOGY

WeberHaus, a German-based eco construction company with reference sites throughout the UK and Ireland, is implementing new installation concepts in sustainable homes using EnOcean wireless sensor technology. WeberHaus is offering four home automation models that can be combined to match specific self-build specifications and requirements. These include single room and central control of lighting, underfloor heating, blinds and window monitoring, door entry security and central monitoring. By Markus Trojan, Sales Building Automation, EnOcean GmbH

Klaus-Dieter Schwendemann, marketing manager of WeberHaus, comments on the substantial benefits of integrating EnOcean technology, saying “the result is very high-quality, intelligent home control with significant value-add in ecological terms.”

## INTEROPERABILITY OF THE VERY BEST

WeberHaus homes have an extremely low heating requirement and consequently need sensitive means of underfloor heating control. The EnOcean-enabled system consists of solar-powered sensors that constantly gauge room temperature through an individually positioned thermostat, which sends commands through the EnOcean system to the receiver on the heating circuit distributor. As the sensors are powered by solar cells no maintenance is required (the energy accumulator is scaled for 60 hours). Also, the system's central programming functions make it highly convenient and easy to use.

### LOWER ENERGY NEED WITH ENOCEAN

Room temperature control can also be combined with the supervision of windows so that the heating is regulated appropriately if windows are open. This supervision takes the

form of window handles featuring integrated transmitter modules that send a signal to the monitoring center when they are opened or closed for the convenience of someone leaving the house.

## ENOCEAN AUTOMATION MODELS FROM WEBERHAUS

The door entry phone is the central monitoring and control system for home lighting, blinds, windows and doors. Functions include indoor/outdoor communication station with voice or video, depending on customer requirements, all lighting on/off via a central switch, central or group blind open/close, and door/window status. The basic system has an integrated display with 10 LEDs and pushbuttons, which can be extended to 30, and all functions are freely programmable. For the customer, this means complete, central control of their home network at a glance.

The electrical systems automation model monitors and controls all the blinds, lighting and heating, as well as other energy-efficiency, comfort and security functions. The comfort function includes an automatic timer module for control of blinds and lighting, which is useful for simulating home occupancy while residents are on holiday. Extra handheld remote controls are obtainable, and switches can be mounted anywhere allowing for flexible room configuration and easy retrofit without any drilling or cabling.





For every lighting circuit one receiver is necessary. These are all ceiling mounted and connectable so it is possible to work with prefabricated cables and distributors. Receivers for the blinds are located in close proximity to the blind motor, either in a housing or distribution box on the outer wall. All receivers for lighting, blinds and heating require a 230 V power supply, which enables easy installation and simple connection of more receivers with one electric circuit. Every receiver is equipped with two pushbuttons and users are able to “teach” a switch to the receiver with no software or training.

The wide selection of interoperable EnOcean-enabled products is what really makes attractive installation concepts for the home possible. To date, home control systems of comparable sophistication have mainly been implemented through EIB automation systems, which incur very high cost and extensive wiring effort. With EnOcean technology, no batteries or wires are required resulting in greater energy efficiency and unlimited flexibility at the lowest investment and operational cost.



In addition to the ecological impacts of battery use, such as unfriendly disposal, a frequent

argument used against wireless technologies is the radiation they produce. This is where the extremely short transmission times of EnOcean wireless present a further substantial advantage. The ECOLOG Institute found the high-frequency fields produced by self-powered EnOcean switches to be a hundred times weaker than those of conventional switches. This means the radiation pulse (electrosmog) dissolves in the air and low-frequency (50/60 Hz) electromagnetic emissions are also reduced.

[www.weberhaus.de](http://www.weberhaus.de)





# LONMARK INTERNATIONAL AND ENOCEAN ALLIANCE ENTER STRATEGIC PARTNERSHIP AGREEMENT TO DELIVER MORE ENERGY-EFFICIENT INTELLIGENT CONTROL SYSTEMS

*By Graham Martin, Chairman & CEO, EnOcean Alliance Inc.*



LONMARK International (LMI), a non-profit trade association, announces its newly established, collaborative agreement with the EnOcean Alliance: a consortium of companies working to formalize EnOcean self-powered, wireless technology as the interoperable wireless standard for sustainable buildings. LONMARK is recognized as the industry authority for certification, education, and promotion of interoperability standards for the benefit of manufacturers, integrators and end-users.

The partnership will provide a platform for bringing LONMARK'S open, interoperable device-level protocol for wired and unwired networks together with EnOcean's RF end-device solution for low/no-power devices. By leveraging shared marketing channels, the two industry-leading providers anticipate that the agreement will drive new growth opportunities for both organizations.

Wireless devices provide an ideal solution in areas where wired devices are impractical or too costly to install. EnOcean's unique technology requires no battery maintenance and is designed to work seamlessly with established, interoperable network technologies. As such, LONMARK-EnOcean interfaces have existed in the marketplace for some time now. New, cost-effective solutions will help deliver even more energy-efficient, intelligent control systems.

"The technical, education, and marketing teams from both LONMARK and EnOcean are committed to pursuing common, open, interoperable integration standards," said Ron Bernstein, Executive Director of LONMARK International. "We look forward to working together as our two organizations bring enhanced solutions to the market."

"The EnOcean Alliance is proud to be working in conjunction with LONMARK International to present new interoperable solutions to the market", says Graham Martin, EnOcean Alliance Chairman and CEO. "We see great synergy between our two organizations and are excited about the opportunity to work together."

"The combination of both technologies offers multiple advantages for integrators and end-users in the building automation industry", said Harald Zygan, Managing Director of Thermokon. "For years, we have deployed EnOcean's battery-less, wireless technology as an intelligent addition to LonWorks networks, with thousands of systems already installed worldwide. As a long-term LONMARK Germany member and EnOcean Alliance promoter, this agreement now confirms this proven strategy."

LONMARK offers a significant base of over 100 million installed devices, over 740 certified products, an existing valuable brand, and worldwide support. With EnOcean's RF technology acting as an extension, the combined resources of the two organizations will address the significant needs in the current market, thereby providing members from both organizations with a unique and reliable set of solutions.

**[www.enocean-alliance.org](http://www.enocean-alliance.org)**  
**[www.lonmark.org](http://www.lonmark.org)**



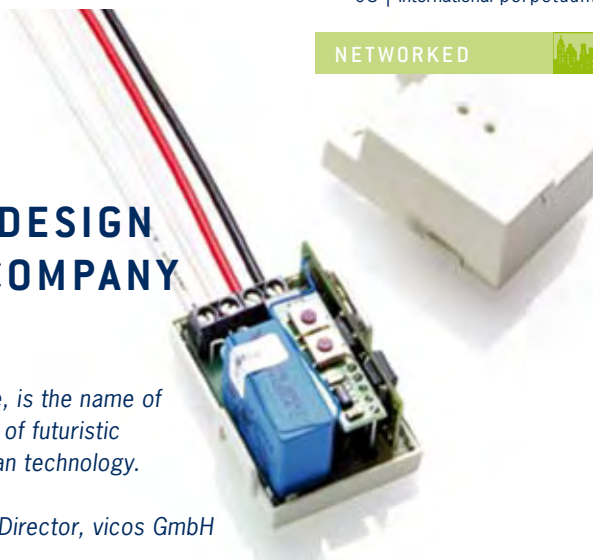




## VICOS – THE ENOCEAN DESIGN AND MANUFACTURING COMPANY

*Vicos, a founder member of the EnOcean Alliance, is the name of the company to turn to for series implementation of futuristic and sustainable product ideas enabled by EnOcean technology.*

*By Thomas Rieder and Wolfgang Klier, Managing Director, vicos GmbH*



In its role as a unique and independent EnOcean Design and Manufacturing Company, vicos offers its customers the entire range of performance of an OEM partner. From verification of the product idea through development and design to industrialization and series manufacture, products enabled by EnOcean can benefit from vicos expertise. Interoperability to the EnOcean standard is automatically invested in all development projects. In addition to system integration and testing, vicos will assume entire responsibility for EnOcean-based subsystems consisting of sensors, actuators and gateways.

### DESIGN COMPETENCE FROM START TO FINISH

The experience and expertise of vicos range from designing in-device antennas and hermetically sealed transmitters and receivers through to implementing multimedia controllers with touch displays and integrated EnOcean bidirectional communication. Documented EnOcean profiles are used as much as possible. When innovative applications call for it, vicos gets together with its customers to define optimized profiles and present these to the EnOcean Alliance for standardizing. Vicos implements electronics with hardware and software precisely to match the product idea. Where needed, vicos can undertake the mechanical engineering and casing to create a complete series product. Cooperating with an experienced industrial designer, ergonomics also flows into product design. Any necessary certification, for example EN, IEC, UL/CSA, and assurance of European CE conformity is a speedy and straightforward service that vicos additionally offers its customers.

### FAST TIME TO MARKET AND LOW COST TO DEVELOP

Customers served by vicos are free to decide whether their cooperation with the EnOcean Design and Manufacturing Company should be publicized. That is one of the reasons why companies possessing ample competence of their own to familiarize with EnOcean technology and develop products are vicos customers. They appreciate the benefits of a competent OEM partner in implementing their product ideas – in terms of fast time to market and the substantially lower investment in both time and money compared to a pure inhouse development. Products enabled by EnOcean and recently created by vicos include:

- RCM 250/255 – the smallest obtainable flush-mounted receiver (see photo top)
- Watertight and dustproof receiver with integrated controller and power switching stages
- Touch terminal for building automation

### ENOCEAN DOLPHIN EXPERTISE READY TO GO

Dolphin, EnOcean's new bidirectional platform, is already going into development projects at vicos, and in early 2009 will result in energy-autonomous products with performance features hardly thought possible. Initial EnOcean profiles fully supporting the bidirectional capability of the Dolphin chip are in the final phase of definition, and will fully meet user expectations. They will see EnOcean products with very much expanded functionality plus miniaturization plus reduced series cost.

[www.vicos.at](http://www.vicos.at)







## ENOCAN MODULE SHIPMENTS OF WIRELESS SENSORS TO REACH \$1.4 BILLION IN 2013, SAYS WTRS



*George West,  
President and Senior Analyst,  
West Technology Research Solutions, LLC.*

“EnOcean has rapidly emerged as a significant competitor in the wireless sensor network arena”, according to Kirsten West PhD, principal analyst with WTRS. “The combination of significant adopters, battery-less operation, and a mature and robust wireless sensor network protocol provide the market drivers required to succeed in today's market conditions. Given these and other factors, we forecast that EnOcean module shipments will reach \$1.4 billion in 2013.”

The newly released „WTRS EnOcean Emerging Technology Report, Summer 2008“ covers the emerging EnOcean wireless sensor network technology and compares it to competitive protocols including IEEE 802.15.4, Z-Wave, Wavenis, and ZigBee. The report tracks the formation of the EnOcean Alliance, development of standards, analyzes the potential market opportunities for component OEMs, describes initial versus long-range drivers in the market, and analyzes potential partnership opportunities and existing alliances.

This market report includes analysis of EnOcean technology and alliance development, as well as an evaluation of current patent, technology, and corporate developments. The report analyzes six market segments likely to adopt EnOcean technology. The report includes global and regional market trends and forecasts, regulatory issues, standards development, economic effects, and strategic developments.

### STRENGTHS

- Simple network
- Strong green play (no new copper)
- Energy harvesting replaces battery-powered devices
- Easy to deploy
- Reduces installation and materials costs
- Reliable and robust
- Good mix of existing high volume and startup semi suppliers and end-product companies

### OPPORTUNITIES

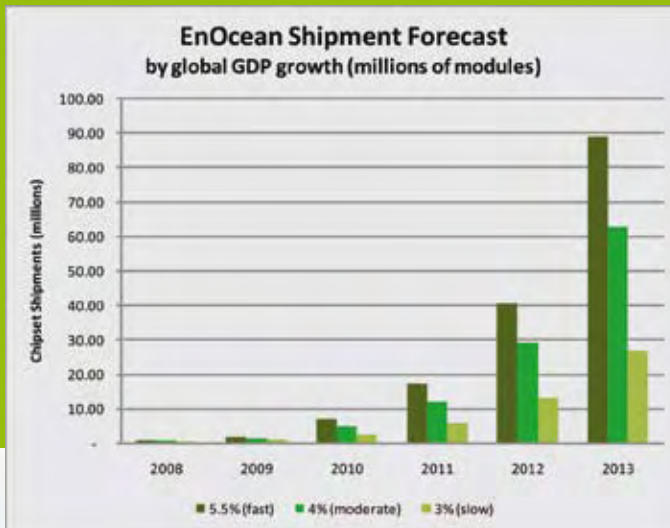
- Alliance membership is positioned to grow the market rapidly
- Technology is well positioned to take advantage of continued growth of “green” awareness

### EXTRACTS FROM REPORT ENOCAN ANALYSIS

The EnOcean network is above all a simple network that is designed to be highly energy-efficient, enabling the transmit only end nodes to be powered by energy harvesting technologies. Overall, EnOcean is designed to be reliable and robust enough to suit applications as diverse as hospitals and milk production facilities. The EnOcean Alliance, founded to standardize the EnOcean protocol, includes a strong group of end-product companies as well as high volume and startup semiconductor vendors. Thus the strengths of the EnOcean protocol lead to products that are simple to maintain, low-cost, and easy to deploy.

### ENOCAN ALLIANCE

The EnOcean Alliance is a group that was formed in April of 2008 and is dedicated to the standardization and advancement of self-powered wireless monitoring and control solutions.



Source: WTRS, July 2008

The EnOcean Alliance has an opportunity to more securely establish itself as a global industry standard through involvement with international standards bodies. Groups like the ISO, ECMA, and ISA offer EnOcean the possibility of being accepted as an international standard, beyond the efforts of the EnOcean Alliance by itself. This strategy worked very well for the WiMedia Alliance with their UWB standard that was incorporated into ECMA TC48. Standardization beyond the scope of the IEEE, traditionally the first stop for standardization by groups in the past, has become increasingly important as companies recognize the advantage to issuing one product across broad geographic regions.

### SPECTRUM ADVANTAGE

EnOcean technology currently runs at 868 MHz (Europe) and 315 MHz (US). These frequencies offer better range than 2.4 GHz, used by much of its competition. Competition for the 2.4 GHz frequency ranges from a microwave oven to a portable phone and a WiFi network. The interference at 2.4 GHz is becoming more of an issue, as the spectrum becomes popular as a global frequency that enables companies to ship one product SKU internationally. Thus, EnOcean technology has a lower probability of interference from other transmitting devices than Zig-Bee (at 900 MHz and 2.4 GHz) or Z-Wave (at 900 MHz) and can function as a simple network without the overhead required by other technologies such as frequency, or channel, agility.

The other advantage to sub-GHz frequencies, beyond interference issues, is increased range. At 315 MHz, a device will transmit the same signal power at up to four times the distance.

### TECHNOLOGIES FOR ENERGY HARVESTING

EnOcean technology is designed to be powered by energy harvesting techniques. EnOcean, the company, has spent as much more effort developing suitable energy harvesting technologies as developing the low-power wireless network protocol. Energy harvesting techniques employed today include mechanical, solar, and thermal, with additional vibration and rotational energy generation available as well. While there are other companies developing energy harvesting technologies and there are other companies developing wireless implementations designed to be powered by energy harvesting technologies, there are no other companies that have developed the energy harvesting and the wireless protocol optimized for it.

The report also details sales volume, unit shipments, and average selling price by vertical market segment as well as by geography, all segmented into three global GDP growth scenarios.

WTRS (West Technology Research Solutions) is a California based research, publishing and consulting company focused on emerging wireless technologies.

[www.wtrs.net](http://www.wtrs.net)





## ENERGY-AUTONOMOUS WIRELESS OCCUPANCY DETECTOR REVOLUTIONIZES BUILDING AUTOMATION

*At the Light+Building show 2008 Omnio presented the world's first energy-autonomous wireless occupancy detector with an integrated brightness sensor. The eagle PM101 is enabled by EnOcean technology and allows extremely simple building automation as a function of presence or occupancy. The spectrum ranges from intelligent lighting control through to air-conditioning on demand, helping the operator to achieve significant energy savings.*

*By Christian Genter, CEO, Omnio AG*

In countless rooms of buildings the lights are often and unnecessarily left on for hours in the evenings, if not the whole night. And even when there is adequate sunlight, many people working in offices forget to turn off the lights. Even more energy is wasted by heating a room full blast in the winter and air-conditioning it in the summer when it is not being used. This all puts up the energy costs besides emitting considerably more CO<sub>2</sub> in the process. The alternative to such intolerable waste is the use of room occupancy detectors and intelligent automation systems. To date these detectors had to be wired, meaning planning and installation overheads.

### SERVICE-FREE WIRELESS OCCUPANCY DETECTOR

Omnio has solved all these problems in its new self-powered and service-free eagle PM101 wireless occupancy detector. The extremely compact motion sensor is screwed or adhered in no time at all to a wall or ceiling for example, and needs no connecting cables. It harvests its energy fully autonomously through an integrated solar cell. When it detects the presence of persons, it reports wirelessly direct to a switching actuator for room lighting or over a wireless gateway to a building automation system. Depending on where it is installed, the motion detector has a range of up to eight meters, and can even register slow movements. With its large solar cell, the sensor can also work in rooms that are only softly lit, and its integrated energy storage mechanism makes it ideal for operation around the clock – background brightness of at least 50 lux for just five hours is enough to create an operating reserve of 36 hours.



The 20 mm flat eagle PM101 wireless occupancy detector is entirely energy-autonomous and automatically reports the presence of persons to switching actuators or building automation systems. Occupancy detection can also work as a function of a preset light threshold. The eagle PM101 can be used with every receiver (RCM110,120,TCM120) based on EnOcean Technology.



### **BIDIRECTIONAL COMMUNICATION IDEAL FOR OPEN-PLAN OFFICES**

Development of this sensor was made possible by highly energy-efficient wireless technology from EnOcean, operating in a telemetry frequency band at 868 MHz. The extremely short wireless telegrams are not only barely measurable in terms of electrosmog, they also enable hundreds of wireless sensors and switches to work in the tightest of spaces without collision of their signals. The eagle PM101 wireless occupancy detector comes in a rugged and compact ABS case (120 x 100 mm), and is flat enough (20 mm) to make it quite unobtrusive in an office or residential environment. Unlike other wireless occupancy detectors, the eagle PM101 not only functions passively as a motion sensor, it also incorporates programmable intelligent onboard electronics. This allows individual matching of both the after-run time and the light threshold. The Omnio wireless occupancy detector is also ready configured for bidirectional master/slave communication, making it ideal for use in open-plan offices.

### **FUNCTIONAL DIVERSITY**

The eagle PM101 operates in five different modes. In the simplest case it sends a wireless telegram to turn lights or air-conditioning on or off as a function of room occupancy. Two more modes only send the switching command if a preset light threshold is underrun. Finally the concrete transmission of measured brightness is possible for operation in conjunction with an automation system. In its fully automatic mode the eagle PM101 turns on loads (light, heating) when a person enters a room, and off when they leave the room or a given light threshold is exceeded. In semiautomatic mode only the user can turn on the loads – the job of the PM101 is then to make sure the loads are turned off when there is nobody left in the room.

For operation of the solar-powered eagle PM101 wireless occupancy detector, Omnio offers a wide selection of switching actuators plus wireless gateways with common automation solutions such as EIB, KNX or PC/PLC. Omnio has also developed the Ratio® wireless bus system that works on the basis of an ultracompact miniature PC (with embedded Windows XP) and can be configured intuitively with the PC mouse. In this way it is possible to simply implement convenient automation solutions for an entire house.







## MASCO LAUNCHES VERVE™ LIVING SYSTEMS

By Dianne Pisarek,  
Vice President responsible for  
Verve™ Living Systems



### GROUND-BREAKING LIGHTING CONTROL SYSTEM IS CHANGING THE WAY HOMES ARE BUILT

Verve Living Systems is a new brand within Masco, one of the world's leading manufacturers of home improvement and building products. The Verve system will initially include a ground-breaking, whole-house lighting control system that dramatically improves the way developers, builders, architects and trades people design and build homes.

With unprecedented lighting control features, the Verve system also dramatically improves the way homebuyers comfortably live inside their homes and how they responsibly interact with the world outside their homes.

### ENERGY HARVESTING EFFECT

The Verve lighting control system relies on EnOcean's energy harvesting technology. The Masco team immediately recognized the potential of this breakthrough to radically alter the dynamics of home control. Through a partnership with EnOcean, Masco engineers have developed a whole-house lighting control system that offers homebuilders and homebuyers advantages that were never before available.

### MERITS OF THE SYSTEM

Verve Living Systems' first application is a remarkable energy-harvesting, radio frequency based lighting control system that reduces the cost and complexities of installations and gives homeowners personalized control of every light in their home from a series of self-powering switches. Among the benefits of the system are the following:

- Homeowners can use the system to raise or lower the intensity level of every light in their home from any switch or combination of switches, thereby creating home environments that support and enhance their state of mind.

- The Verve lighting control system offers installation advantages by simplifying the install method, lowering labor costs and reducing materials required relative to conventional installations.
- The 100% whole-house dimming functionality provides dramatic energy saving benefits and extended bulb life.
- Because all switches are 100% movable, homeowners can change switch locations any time they want or need to.

### MARKET OPPORTUNITY

EnOcean has developed a truly ground-breaking self-powered wireless technology that will change the face of residential, commercial and industrial building construction for years to come. This has created a greater opportunity for companies worldwide by enabling a broad range of interoperable wireless monitoring and control products, and we are proud to be one of the founding promoters of the Alliance. The Verve Living Systems inaugural offering of self-powered wireless solutions, provides homebuilders and homeowners with innovative and energy-saving lighting controls. While homebuilders and alike benefit from simpler installations and lower costs, homeowners enjoy personalized lighting control from whole-house dimming and pathway lighting to creating lighted "scenes" throughout the house. The Verve systems make it possible to use their lighting to support and enhance their mood and lifestyle. The Verve wireless and battery-less switches are also completely movable; homeowners can easily change switch locations to accommodate changes in their lives and homes. The dimming functionality reduces energy consumption and extends bulb life.

The Verve Living Systems energy-harvesting, radio frequency technology is currently being used to develop additional applications in HVAC monitoring and control, whole-house environmental monitoring and home security.

**[www.VerveLivingSystems.com](http://www.VerveLivingSystems.com)**





## DISTECH CONTROLS RELEASES EC-GFXPROGRAM GRAPHICAL PROGRAMMING INTERFACE

*Distech Controls, a leading provider of innovative building automation solutions, released its graphical programming interface, the EC-gfxProgram for use with its programmable controllers. Distech Controls' programmable controllers, with a variety of point counts and features, can be programmed to suit any air handling and terminal unit application as well as other building automation applications, such as lighting, refrigeration and power measurement.*

*By Caroline Cadieux, Marketing Manager, Distech Controls, Inc.*



The EC-gfxProgram is a user-friendly block based programming interface that simplifies programming, reduces programming time and helps minimize programming errors and facilitate troubleshooting. Available free of charge for custom programming for both LNS and EC-Net (powered by the Niagara AX Platform) platforms, EC-gfxProgram features include:

- Wide array of built-in basic and advanced programming blocks with features such as fan-in, PID loops, time delay, schedules, realtime clock, optimum start, stage sequencing, logical gates, mathematical and comparator functions, psychometric functions, persistent values, etc.
- Support of the programmable controllers' 62 network variables of which 34 are of changeable type and length
- Support for all network variables of 1 and 2 bytes including structured SNVTs
- Support for high-precision integers with two decimal places

- Ability to create custom blocks, for specific applications, or repetitive sequences
- Offers realtime debug mode through dynamic view of the data flows
- Generates error and other statistic reports such as memory used, number of PIDs used, etc.
- Easy-to-use interface with toolbars, drag and drop creation, moveable boxes, window views, color coding and simple link creation, providing a clear view of your code

The EC-gfxProgram also enables additional features on the programmable controllers, such as the support of EC-Smart-Sensors and the configuration of wireless, battery-less devices on ECP models enabled with wireless receivers.

**[www.Distech-Controls.com](http://www.Distech-Controls.com)**

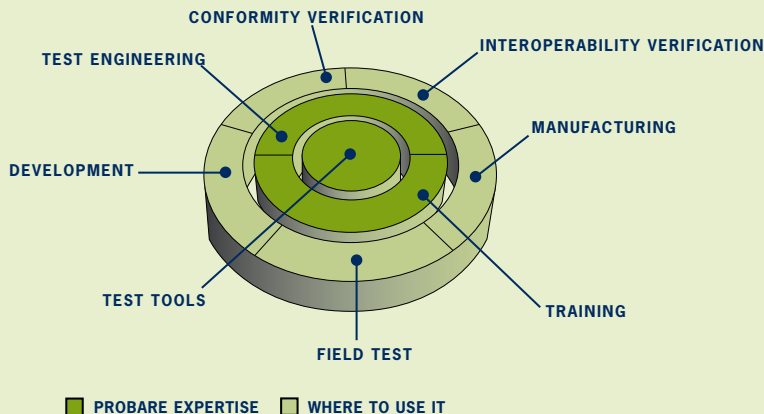




## PROBARE – TESTING WITH A PASSION

The word “probare” comes from Latin and means to examine or test something for its worthiness or fitting. The PROBARE company bears this name because of its outright dedication to testing.

By Thomas Rieder,  
Managing Director, PROBARE



### TEST TOOLS AND TEST ENGINEERING FROM A SINGLE SOURCE

PROBARE is a member of the EnOcean Alliance, playing an active role to ensure interoperability of EnOcean-enabled products. It designs and markets test tools, implements test engineering, documents and analyzes test results and trains users. Its name stands for quality in individual test systems, test processes and test methods for products incorporating EnOcean technology.

PROBARE is able to present suitable solutions when test competence and test tools are called for in development, verification of conformity, in manufacturing and in the field. In addition to the right test tools, PROBARE supplies its customers with the test engineering necessary to create complete test stations for volume manufacturing of EnOcean-based products. Or the right training of customer staff to ensure they can efficiently handle test missions in the field. Or hands-on training in the planning of wireless networks for EnOcean systems.

### FIRST STEPS IN SYSTEM INTEGRATION MADE EASY

For system integrators starting out into the world of EnOcean technology, PROBARE offers the testing of installations and thus verification of system planning in the form of a service that does not require immediate investment in test tools and personnel training. The system integrators can fully focus on their core competence and on implementing it successfully in the framework of EnOcean technology. The testing of system installations can be learnt in a second step and expanded into an additional core competence.

This innovative concept is based on many years of in-depth experience in analog and digital radiocommunications, network topologies, antenna integration in enclosures, the propagation of radio signals, and the installation and diagnosis of commercial radio networks for frequencies up to 2.5 GHz.

tion, network topologies, antenna integration in enclosures, the propagation of radio signals, and the installation and diagnosis of commercial radio networks for frequencies up to 2.5 GHz.

### ENOCEAN DOLPHIN EXPERTISE IN PLACE

In its PRO series PROBARE offers its customers solely test tools that fully support EnOcean's new Dolphin platform, optimized for use in the field plus stationary employment in development and manufacturing:

#### Field Application Tester PRO300

a small and lightweight tool with LC display for speedy testing.

#### Field Application Analyzer PRO500

a handy tool with touch display, band scope and extensive logging capability.

#### Manufacturing and R&D Tester PRO700

a stationary device with LabView and database interfaces.

PRO300, PRO500 and PRO700 all work in the 315 MHz and 868 MHz frequency bands and are fully bidirectional capable.

The PRO series will be available from the end of 2008. Software upgrades and options will keep it in tune with future features of Dolphin and thus will secure investment made today.

[www.probare.biz](http://www.probare.biz)





# EASYCLICK TIMER – THE ALLROUNDER OF THE WIRELESS SYSTEM

*The new Easyclick timer in its plug-in case is the perfect addition to the Easyclick wireless system. All Easyclick receivers can be switched or controlled by set time functions.*

By Werner Petritz, Product Manager,  
PEHA Paul Hochköpper GmbH & Co. KG



- **8 programmable wireless channels** each with 5 channel options:  
Automatic  
Party => 1 x disabling of automatic function  
Vacation => random timing  
National holiday => Sunday timing  
Manual
- **95 time switches** for individual assignment to wireless channels
- **Automatic winter/summer changeover**
- **Integrated repeater** function for greater wireless range to Easyclick transmitters

All entries are made by a few buttons and shown on an LC display. That automates the operation of lights or roller blinds at preset times, while manual operation by buttons on the Easyclick timer is also possible.

## SURPRISINGLY SIMPLE

- Flush-mounted receivers with a base plate and button face can be used for local control, as a simple replacement for conventional roller blind switches.
- That saves costs because a wireless transmitter is no longer necessary here.
- With the flush-mounted receiver you can set individual switching times through the Easyclick timer and control roller blinds automatically.
- That helps to save energy in the winter months, by automatically closing roller blinds to guard against cold from the outside.

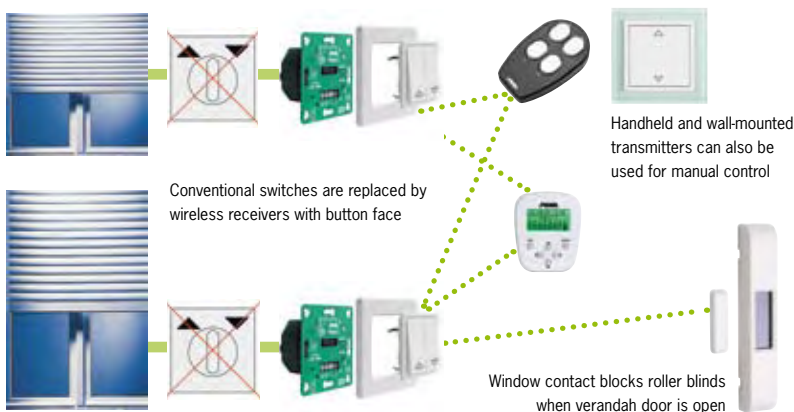
- A roller blind block with a window contact for open verandah doors is an extra safeguard against being accidentally shut out.
- A self-powered handheld transmitter enables convenient control of roller blinds while seated on a sofa for example.

The Easyclick timer is also optimal for simulating presence. Hardly anything can be more inviting – to the wrong persons – than permanently closed roller blinds, especially when you are on vacation. The Easyclick timer from PEHA consequently has a vacation function so that all automatic commands can be randomly varied by up to 15 minutes. A house then makes the impression of

being inhabited and unwelcome visitors are deterred.

Lights can also be integrated in the simulation of presence of course. Using an Easyclick adapter plug and a standard lamp for example, light can automatically be turned on and off as programmed.

[www.peha.de](http://www.peha.de)



The Easyclick system used to control roller blinds with Easyclick timer and window contact.





## MODERN WINDOW HARDWARE MEETS INNOVATIVE BUILDING INSTALLATION

*Comfortable living is becoming an increasingly significant focus. Greater demand is emerging for individual solutions within people's own four walls, together with the wish for simplification or automation of daily chores.*

*By Udo Diesmann, Building Systems Division Manager, HAUTAU GmbH*

Photo below: "Window open -- Heating off" for efficient energy saving by solar-powered wireless window contacts and electric skylight openers.

There is a parallel demand for energy-efficient buildings, insulated and featuring intelligent systems to prevent unnecessary loss of heat. Through the appropriate legislation, lawmakers in a number of countries are well into producing the right basis so that the construction industry and its suppliers can apply modern methods and systems to the creation of sustainable buildings. Windows, for example, are assuming a key role on façades because they are a determinant factor in how much heat or energy is lost.

Modern window systems already represent a high standard of heat insulation. Innovative profile systems plus high-tech glass and modern window hardware are now producing heat transfer coefficients close to the magic mark of  $1.0 \text{ W/(K}\cdot\text{m}^2)$ . Decisive for the efficiency that is actually achieved, however, especially with windows, are the habits of the building occupant when it comes to ventilating.



HAUTAU, one of Germany's leading window hardware manufacturers, consequently focuses on the right combination of intelligent systems. On the one hand they should ensure wide-ranging functionality and a high degree of security. But they should also support the occupant, through their innovative technology, in creating a comfortable living climate plus efforts to use available energy properly and economically.

Innovative EnOcean technology is becoming increasingly important within the HAUTAU portfolio. Till now, more functionality in and around windows automatically meant more cabling and a bigger installation effort. Retrofitting systems was too big an investment for the private consumer. So new solutions were called for.

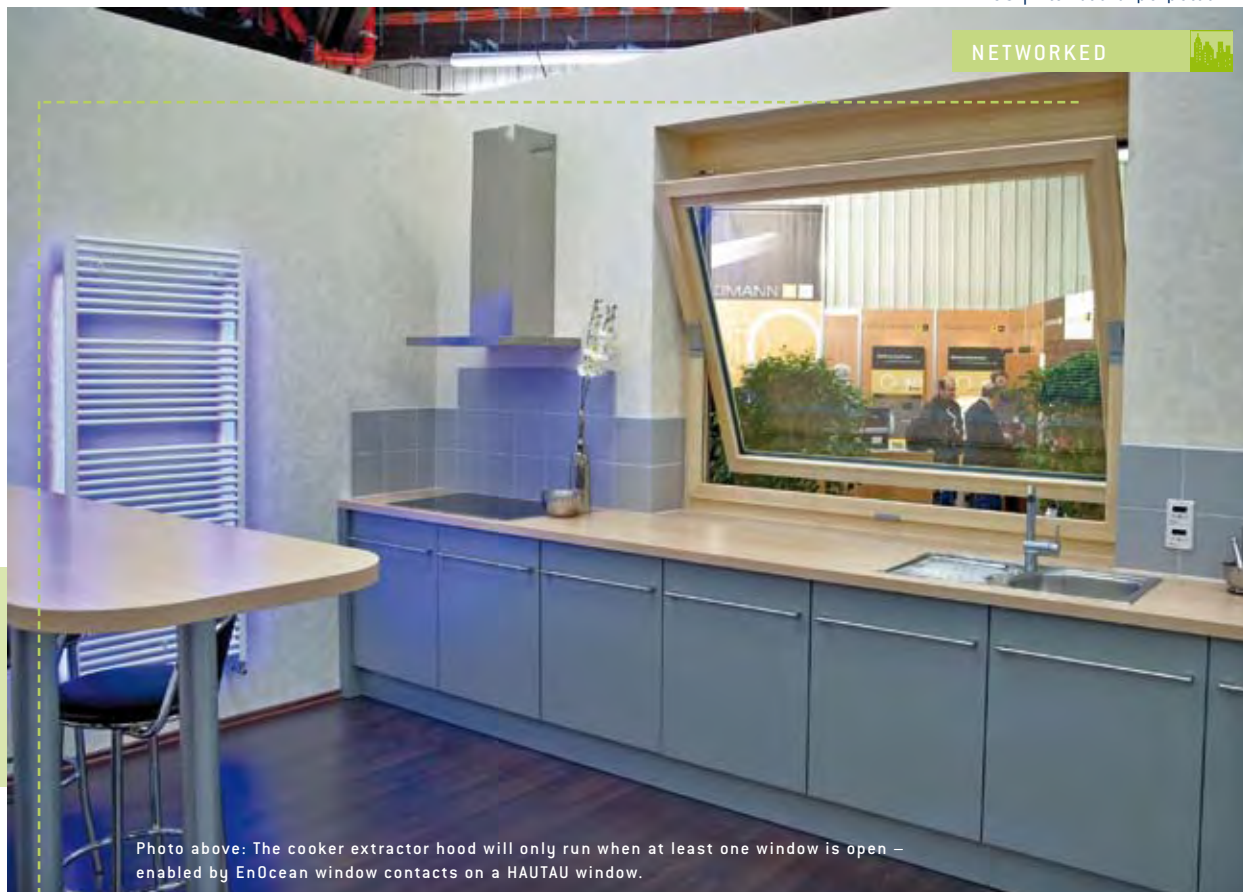


Photo above: The cooker extractor hood will only run when at least one window is open – enabled by EnOcean window contacts on a HAUTAU window.

Perfect harmony between modern window hardware and innovative building services management was demonstrated by HAUTAU at this year's fensterbau+frontale show in Nuremberg in early April. This leading trade event for the international window, façade and hardware industry was the right milieu to illustrate a technically feasible integration of modern systems in a living environment specially devised for the show and titled "Energy, Security, Comfort and Convenience". The target group planners and architects was particularly interested in modern applications without bothersome jumbles of cabling, showing the way to efficient, flexible and more cost-attractive building systems.

Wireless controlled window drives showed what they are capable of by a principle of "Window open – Heating off". Here HAUTAU has implemented autonomous solar-powered EnOcean window contacts with its electromotorized drives so that heating thermostats can be relied on to cut out when windows are opened. In this way intelligent window hardware efficiently saves costly heating energy.

There is another application in the so-called fireplace ordinance for sustainable building safety. This says that cooker extractor hoods may only be operated if one or more windows in a room are open to prevent the creation of a vacuum and high carbon monoxide concentrations. Here too, window contacts deliver the information for protection of persons and property.

At the beginning of 2009 the window hardware specialists from Lower Saxony will be presenting a number of ready products enabled by innovative EnOcean technology at the international BAU show in Munich.

**[www.hautau.de](http://www.hautau.de)**





## WIRELESS SWITCHGEAR FOR INDUSTRY AND MORE

*There are many possibilities of use for wireless switchgear in automated building services engineering. And in many cases you find switchgear developed to industrial standards, and consequently rugged and long-lived. In this comparatively new field of wireless technology, steute offers a broad selection of switchgear that can be used to supervise doors or open and close roller shutters for example.*

*By René Scherer, Product Manager, steute Schaltgeräte GmbH & Co. KG*

A partner of EnOcean for many years already, steute Schaltgeräte is now working in a field that is not so typical of EnOcean technology, with a marked industrial swing. It offers its customers in the machine and plant engineering industry and automation a broad selection of self-sufficient switchgear.

A few examples illustrate that wireless and battery-less signal transmission in this sector can present advantages equal to those in other building services. A manufacturer of machine tools uses door handle switches with EnOcean solar modules on the sliding protective doors of large machining centers (see photo top right). This does away with costly cable trailing devices, which are so subject to wear. In the case of machines operated by foot switches, there are no more cables on the floor that an operator can trip over. Position switches with an autonomous energy generator are easily fitted in areas difficult of access and flexible when it comes to moving them elsewhere.

### STABLE SIGNALING IN AN ADVERSE ENVIRONMENT

EnOcean-enabled switchgear from steute has proven its worth in numerous industrial applications. To begin with, a number of customers regarded the low power of the transmitted signal as critical. It showed, however, that the EnOcean wireless standard can ensure very stable and interference-free transmission even in the adverse conditions of production shops with a great deal of reflection from machine casings and many other wireless automation signals.

With wireless switches it is possible to supervise the position of doors and flaps for example.

### AT THE INTERFACE BETWEEN INDUSTRY AND BUILDING SERVICES

A kind of industrial switchgear with EnOcean technology that is very much in demand is a pull wire switch with an electrodynamic energy generator. Attached to the eye is a wire by which workers on foot and fork-lift truck drivers can open and close roller shutters. This switch – EEx F 95 WH 90° – is frequently used because it avoids laying cable for the signal lead right up to the ceiling, which considerably simplifies installation.

Here you are no longer purely in industrial automation but at the interface between industry and building services. And an additional large market opens up, because you not only find roller shutters in industrial plant but also – and probably in larger numbers – in tradesman enterprises and vehicle workshops for instance. The high level of ingress protection IP67 also enables outside installation of the switches.

### A NEW MARKET FOR ENOCEAN TECHNOLOGY

At the same time further possible applications of industrial switchgear with EnOcean technology have emerged in building services engineering. The idea often resulted through a customer inquiry. It showed, for example, that wireless foot switches of the type KF F are also suitable for remotely controlling doors and gates. With the EF 95 D wireless limit switches it is possible to monitor the position of windows or flaps in ventilating systems without





#### EXAMPLES FOR USE OF INDUSTRIAL WIRELESS SWITCHGEAR IN BUILDING SERVICES

- Windows and doors (supervision)
- Flaps in HVAC (monitoring/position)
- Roller shutters (open/close and position)
- Gates and barriers (open/close, position, unlock)
- Emergency exits, building services (position)

#### AVAILABLE SWITCH TYPES

- Position switch • Pull-wire switch • Foot switch
- Door handle switch • Command device

the need for elaborate cabling. There is a large selection of actuators for these limit switches (plungers, roller plungers, rotary levers, roller levers, parallel levers, etc) so they are easily matched to different applications.

#### ENERGY GENERATOR OR SOLAR MODULE

An alternative in these cases is the EF 41 WK wireless position switch, which comes with an EnOcean solar module. Here too there is a choice of different actuators. In addition to monitoring the position of doors and flaps, an extra application possibility here is querying the position of gates and barriers outdoors. Quite generally, the position switches can be used to query the position of emergency exits or to monitor building services.

An example of general-purpose wireless command devices is the EF 95 RS SW, likewise to open and close

gates. A further application is the transmission of fault messages. One of the advantages here is that the switches allow flexible attachment near the operator. The switchgear is even more flexible again because the actuators of the command devices can subsequently be exchanged, since the body of the switch is connected to the actuator by a bayonet catch. The selection includes pushbuttons with and without a diaphragm, key-operated buttons and twist switches in plastic and stainless steel.

The already mentioned wireless door handle switches with solar modules are used in building services primarily for doors and gates. The handles come in plastic, stainless steel and aluminum, and there are versions with one, two or three switches.

#### BENEFITING FROM INDUSTRIAL DESIGN

Why use wireless switchgear in building services that was originally developed for industrial applications? A major advantage of industrial design is that the user benefits from extremely long service life even in adverse conditions. Such switchgear is manufactured to the highest quality specifications; custom versions are also possible through flexible manufacture. Furthermore, all steute wireless switchgear with an electrodynamic energy generator can also work in an explosive environment. Single- and four-channel receiver units are available for signal decoding; repeaters can be used to bridge longer signal links. There is consequently a broad field of application awaiting this switchgear in building services too – and users frequently suggest projects that show the way to new applications again.

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



#### TEST SET FOR ENERGY-AUTONOMOUS SWITCHGEAR

For easy familiarization with EnOcean technology in industry and building services, steute has developed a test set that can be had as a complete package at a price of 189 euros until November 30, 2008. The set comes in a handy case and includes an energy-autonomous switchgear (optionally with a position switch, a pushbutton and pull-wire switch), a wireless receiver and an antenna. The components only need to be installed; the receiver simply learns the particular switch by pressing a button three times. The entire installation is ready to work in a few minutes, and the user can then try the practical advantages of energy harvesting.







## PROJECT BASED ON ENOCEAN TECHNOLOGY AWARDED SECOND PLACE IN THE MICROSOFT IMAGINE CUP 2008

By Marian Hönsch,  
Faculty of Informatics and Information Technologies,  
Slovak University of Technology in Bratislava

### IMAGINE CUP

The Imagine Cup is a technology competition for students that was established and is financed by the Microsoft Corporation. Microsoft established this competition, because they see the future of modern-day technology in the students, “as they look at the road ahead” and have a “close relationship with technology”.

The Imagine Cup is now in its sixth year and has become “a truly global competition” with the goal of making a difference in the world and finding solutions to the problems of modern society.

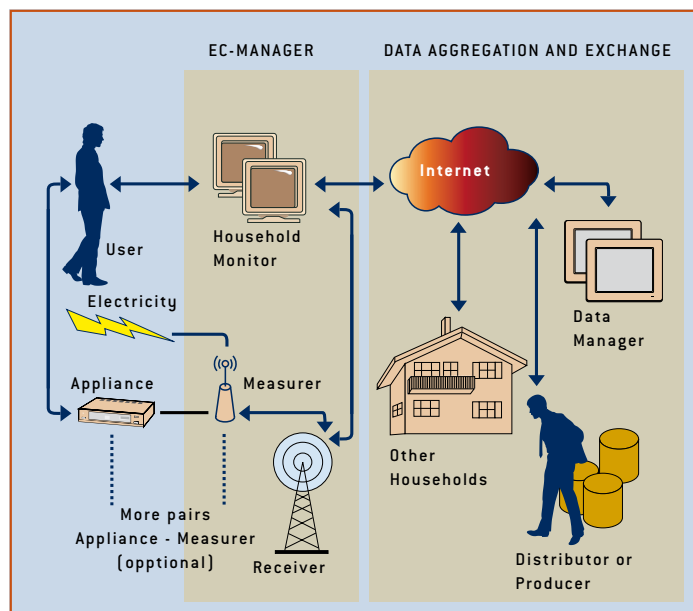
The Imagine Cup is sponsored by Microsoft, BT, Microsoft XNA Team, Microsoft Interoperability Team, Microsoft Windows Live Services, Microsoft Accessible Technology Team, Microsoft Unlimited Potential and Microsoft Learning.

### PROJECT HOUSEKEEPER

This year's second place in the software design competition was awarded to a Slovakian team which focused on energy consumption in homes and ways to keep track of it to eventually reduce it.

As a basis for their invention they used various meters that are already on the market but not efficient enough, and, for transmission of the measured data, EnOcean wireless technology.

Their invention was the ECM, the Energy Consumption Manager, a device that measures how much energy is used by different appliances in the household and sends them to a “Home Monitor” where all data are collected and saved.



System overview



Name	TV	DVD	VRC	Ewer	Microwave	Hairdrier	Fridge
Off	0	0	0	0	0	0	0
On	71	14	14	631	300	571	120
	-	16	23	1156	696	1049	0
	-	-	-	1914	1130	1556	120
Standby	19	-	7	-	22	-	-

Example: Tab. 1. Consumption of some appliances (in W)

The data are collected over a certain amount of time and displayed in the form of a chart that shows the energy consumption when the appliance is turned off, turned on over a certain amount of time, and in standby mode.

Via the Home Monitor and Internet access the ECM also offers the possibility to compare energy consumption to that of other households, yet this is only optional as it includes sending your own information as well. For comparison purposes the ECM also offers the possibility to compare the latest consumption result to earlier ones, so it makes it possible to constantly check your own progress in energy consumption. The ECM is also able to notify the user about “suspicious behavior of appliances” so the user may take action, this however is also optional.

The ECM system is also able to “learn”, the user enters personal information that the system associates with a certain behaviour. Behavioral patterns can be changed by the administrator should they not fit.

The longer the user “interacts” with the system the better “it gets to know him”, meaning the system recognizes the actions of the user and in how far they “correspond to good energy management”, plus the system evaluates the reactions of the user to tips and alters its behavior based on the data, e.g. if the warnings are ignored they become more detailed so the user knows why there is a problem and how to remedy it.

The ECM is applicable in practically every kind of building from private homes through schools and hospitals to giant building complexes and takes a big step towards helping the environment by making it possible for everyone to measure their own contribution to climate change.

<http://csidc.fiit.stuba.sk/2008/project.htm>

<http://imaginecup.com/MyStuff/MyTeam.aspx?TeamID=7938>



## UNPLUGGED



## SOUTHWARDS – ALONG THE ANDES FROM LIMA TO TIERRA DEL FUEGO

*Join me on a journey through South America. A colorful continent of fascinating extremes: from Atacama, the world's driest desert, to the capering, eternally damp weather of the Patagonian inland ice, to the inspiring summits of the Andes. Fantastic and virtually unpeopled virgin landscapes – you soon feel that you are on an expedition. Quite different to the mega cities Lima, São Paulo or Buenos Aires: cultural highlights, exuberant nightlife and the fabulous wealth of the elite – but also bitter poverty in the unchecked spreading slums.*

*By Heiko Noll, Project Manager, EnOcean GmbH*



Even a four-week vacation only allows you a regional visit and impression, comparable to trying to get to know Europe in one week. That is what I was thinking when I told my boss of my long cherished dream of journeying through South America for a number of months. I wanted the chance to immerse more deeply in foreign cultures, to have time for nature, and for waiting – for good weather or the bus to the next place down the road. But first I had to wait almost two years before I could embark on the trip at all. The EnOcean product roadmap took priority.

### PERU

In October 2007 I was able to set out, with three months ahead of me. I landed in Lima, the Peruvian capital and 8-million expanse with a beautiful old center declared a world heritage site. Then I headed for the Andes on a number of trekking tours. Visits to colorful Indio markets and imposing ruins afforded rest but variety while acclimatizing to the altitude. Soon I was in Cuzco, once the capital of the Inca empire, just one of the advanced civilizations that have disappeared in now impoverished

Peru. The world-famous Inca stronghold Machu Picchu is just as impressive as the deep-red sunsets on an island in Lake Titicaca. I spent the night with Indios to whom the official language Spanish is even more foreign than to me. Quetchua, the Inca language, and their quinoa cereal made me feel I was in a different world.

### BOLIVIA

In Bolivia I was met by all the hustle and bustle of the administrative capital La Paz. Hawkers occupy the footpaths, forcing pedestrians out onto the road among loud honking buses and taxis. Towards midnight you can use the paths again. In the sparsely populated south it was quite different – national parks with saltwater lakes, volcanoes and geysers embedded in interesting rock and sand formations that continue into the Atacama Desert on the Chilean side. You need an off-roader and soon find fellow travelers for an intercultural exchange as on the trekking tours. Everyone had stories to tell from their country, as far away as Korea and Australia, but as close as the Netherlands.





From left: rock formation in the Atacama Desert, Machu Picchu, Indio market, reed boat on Lake Titicaca.

Climbing an Andean volcano I was accompanied by someone else from Munich. So I was speaking German again for a while, as long as the thin air permitted. On top the lake in the crater, the world's highest body of water, offers almost extraterrestrial living conditions. We looked at meteorological metering modules, installed here by a NASA expedition – with solar-powered wireless transmission. But unfortunately without the EnOcean

dolphin. The Arctic temperatures reminded me of the upcoming EnOcean ASIC (working down to  $-40^{\circ}\text{C}$ ).

The journey lasted another six weeks, with many exciting experiences. Join me in the next issue of perpetuum.



## JOBS AT ENOCEAN – THINK GREEN, BE SMART, ACT WIRELESS

INQUISITIVE

*EnOcean GmbH, based in Oberhaching near Munich, is the inventor and manufacturer of patented self-powered wireless sensor technology. It currently employs about 40 persons in Germany and at its North American affiliate EnOcean Inc. The company has won many awards, for instance "Technology Pioneer 2006" of the World Economic Forum, and "TopJob" in January 2007 for excellence as an employer.*

We aim to expand our interdisciplinary research & development team in Oberhaching for continuing focus on new energy converters, ASICs and complete modules:

- Development engineer RF
- Senior test/reliability engineer
- Embedded software and applications engineer, full time or part time
- System architect for wireless sensor networks
- ASIC applications engineer
- Project manager

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





## INQUISITIVE

# LC&D WINS LIGHTFAIR INNOVATION AWARD

*By Jon Stachelrodt, VP Marketing/PR/Tech Services, Lighting Control & Design*



## ENOCEAN-ENABLED PHOTOSENSOR WINS BEST OF "CONTROLS, DAYLIGHT INTEGRATION & SYSTEMS" CATEGORY

Lightfair® International (LFI), the largest annual trade show & conference for architectural and commercial lighting, celebrated the industry's most innovative product designs during its 2008 Innovation Award ceremony at the Las Vegas Convention Center. Lighting Control & Design's Wireless Photosensor was honored with a "Best in Category" distinction for Controls as well as Daylight Integration & Systems. The Los Angeles based manufacturer is a pioneer in the field of daylight harvesting.

LFI received 184 submissions for the 2008 program, and each product was judged by an independent panel of renowned lighting professionals. The 2008 LFI Innovation Award and Best in Category award winners were chosen for exemplifying the best in innovative design and thinking.

Lighting Control & Design is the Los Angeles based manufacturer of the 100% digital GR 2400™ lighting control system, along with other digital lighting control products and software. Lighting Control & Design manufactures simple, yet flexible lighting controls.

**[www.LightingControls.com](http://www.LightingControls.com)**



## PHOTOSENSOR FEATURES

- Completely wireless, no power cables and no batteries
- 48 bit unique identification code prevents problems with other items in the system
- Will operate with all GR 2400™ accessories
- Rapid installation
- Immediately populates to a GR2400 wireless receiver



### ■ EnOcean Receives Venture Capital Investment Of €4.5 Million – 22.08.2008

"EnOcean GmbH announced that it has received € 4.5 million for acquisition of new markets worldwide and continued development of its self-powered wireless technology for energy-efficient systems in the building sector. This brings the company's total amount of venture and growth capital since it was founded to over € 20 million. The investors with the largest shares are Wellington Partners GmbH, and 3i Group plc. Venture capital has also been provided by Emerald Technology Ventures AG, Siemens Venture Capital GmbH, Siemens Technology Accelerator GmbH, BayTech Venture Capital Beratungs GmbH, and ATMOS S.p.A."

[www.powerpulse.net](http://www.powerpulse.net)

### ■ EnOcean Wireless Standard for a Healthy Climate in the Home – 30.07.2008

"Self-build specialist WeberHaus sets ecological and economical building installation benchmarks with EnOcean wireless technology. WeberHaus, a German-based eco construction company, is implementing new installation concepts in sustainable homes using EnOcean wireless sensor technology. WeberHaus is offering four home automation models that can be combined to match specific self-build specifications and requirements. These include single room and central control of lighting, underfloor heating, blinds and window monitoring, door entry security and central monitoring."

[www.hbdonline.eu](http://www.hbdonline.eu)

### ■ EnOcean Module Shipments of Wireless Sensors to Reach \$1.4 billion in 2013, Says WTRS – 23.07.2008

"New EnOcean 'energy harvesting' technology enlists 74 members in their month-old EnOcean Alliance, including such names as Distech Controls, Texas Instruments, Masco, Sylvania, Thermokon and more. This new wireless sensor network technology is already installed in over 10,000 buildings. Clearly, it has achieved traction. WTRS completes the first study of this technology and forecasts strong market growth, while evaluating the competitive environment.[...] 'EnOcean has rapidly emerged as a significant competitor in the wireless sensor network arena,' according to Kirsten West PhD, principal analyst with WTRS. 'The combination of significant adopters, battery-less operation, and a mature and robust wireless sensor network protocol provide the drivers required to succeed in today's market conditions. Given these and other factors, we forecast that EnOcean module shipments will reach \$1.4 billion in 2013.'"

[PR-inside.com](http://PR-inside.com)

### ■ EnOcean Alliance Gets Off to Flying Start – 27.06.2008

"The EnOcean Alliance has announced worldwide success in its opening months of operation with over 50 companies pledging their commitment to the development of EnOcean self-powered wireless technology as the standard for sustainable buildings.[...] MK Electric, a Honeywell business, is the first UK-based Alliance promoter to integrate EnOcean technology in its Echo range of wireless switches, launched in April. US semiconductor giant Texas Instruments also recently announced its backing of the EnOcean wireless standard joining other innovators and industry leaders such as Masco, Siemens, Leviton, Osram Sylvania, Distech Controls, Omnio and Thermokon..."

[www.hbdonline.eu](http://www.hbdonline.eu)

### ■ Masco Announces Partnership with EnOcean Alliance for Self-powered Wireless Control Systems – 17.07.2008

"Masco Corporation has partnered with the EnOcean Alliance, a consortium of innovative international corporations with a mission to standardize wireless control systems for sustainable buildings. The partnership aligns EnOcean's energy harvesting wireless control technology with patented technologies developed by Masco to support green building and to deliver forward-looking products to customers.[...] 'EnOcean has developed a truly ground-breaking self-powered wireless technology that will change the face of residential, commercial and industrial building construction for years to come,' said Dianne Pisarek, vice president responsible for Verve Living Systems. 'This has created a greater opportunity for companies worldwide by enabling a broad range of interoperable wireless monitoring and control products, and we're proud to be one of the founding promoters of the Alliance.'"

## DISTRIBUTION

# ENOCEAN AND LAGERCRANTZ – A PARTNERSHIP WITH DEVELOPMENT POTENTIAL

By Stefan Hauf, Director, Unitronic AG

Lagercrantz  
Group

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Distribution elektronischer Komponenten und Module

**NOVATRONIC** GmbH  
Elektronische Bauelemente und Geräte

**SECOS** GmbH  
SEMICONDUCTORS COMPONENTS EMS



First-class development potential of the very best has been working now for more than three years in the partnership between EnOcean GmbH and a number of members of the Lagercrantz Group. The contracted cooperation with Unitronic AG in Düsseldorf, the Swiss Secos GmbH in Muri and Warsaw-based ACTE Sp. z o.o. plus a partnership with Novatronic GmbH in Vienna not only ensure EnOcean wide presence on four major European markets. The high technical competence of the Lagercrantz enterprises, specialized in the sale of innovative solutions, subsystems and modules, is furthermore a guarantee that customers receive the same support as from EnOcean itself, from consulting through design-in to end of product lifetime.

The technical expertise of the Lagercrantz Group and its affiliates not only comes to bear in building automation, they can also count numerous reference projects in industry, whether smart metering, gas sensor technology or optimization of energy-efficient processes.

For this reason the Lagercrantz Group, and Unitronic in particular, joined the EnOcean Alliance. EnOcean develops and manufactures innovative high-end products. Combined with the unique capabilities of Unitronic in wireless technologies and gas sensing, this creates ideal solutions for the industrial market.

Through Unitronic and the Lagercrantz Group customers have access to more than 40 excellently trained development and application engineers, with in-depth experience of almost every conceivable industrial sector. Unitronic has long been developing special software tools for a variety of customers, adapting hardware, conducting performance tests as well as offering a large number of other services.

A combination of logistics partner and system house presents many advantages both for the customer and for technology suppliers such as EnOcean. Customers save the resources for evaluation of the basic technology and can continue to optimize their development cycles. Providers like EnOcean can fully concentrate on their core competence, e.g. the further and new development of innovative technologies. This boils down to a win-win situation for all partners.

EnOcean and the Lagercrantz Group a partnership offering attractive potential for development now and going into the future.

**[www.unitronic.de](http://www.unitronic.de)**  
**[www.lagercrantz.com](http://www.lagercrantz.com)**





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## EVENTS

NOVEMBER	JANUARY
 <p><b>Nov 11-14, 2008:</b> <b>electronica, Munich, Germany</b> EnOcean and EnOcean Alliance exhibit in hall A4, booth 266. Presentations by Armin Anders (EnOcean) and Graham Martin (EnOcean Alliance) <a href="http://www.electronica.de">www.electronica.de</a></p>	<p><b>Jan 24-28, 2009:</b> <b>ASHRAE Chicago, USA</b> EnOcean Inc. exhibits. <a href="http://www.ashrae.org/events/page/1925">www.ashrae.org/events/page/1925</a></p>
<p><b>Nov 12/13, 2008:</b> <b>Wireless Congress, Munich, Germany:</b> Presentation by Graham Martin , EnOcean Alliance, on Nov 13 "Energy Optimization II" <a href="http://www.wireless-congress.com">www.wireless-congress.com</a></p>	<p><b>Jan 25-27, 2009:</b> <b>Global Competitiveness Forum (GCF), Riad, Saudi-Arabia</b> Presentation by Markus Brehler, EnOcean Alliance <a href="http://www.ameinfo.com/138761.html">www.ameinfo.com/138761.html</a></p>
<p><b>Nov 13, 2008:</b> <b>Gebäudesysteme 2008, Frankfurt, Germany</b> EnOcean Alliance exhibits <a href="http://www.gebaeudesysteme2008.de">www.gebaeudesysteme2008.de</a></p>	 <p><b>Jan 26-28, 2009:</b> <b>AHR Expo, Chicago, USA</b> EnOcean Inc. exhibits at booth 3650 <a href="http://www.ahrexpo.com/">www.ahrexpo.com/</a></p>
<p><b>Nov 17/18, 2008:</b> <b>EnOcean Alliance Members Meeting, Boston, USA</b> The Langham Hotel, 250 Franklin Street</p>	<p><b>MARCH</b></p>
<p><b>Nov 17/18, 2008:</b> <b>Working Buildings ME, Abu Dhabi, UAE</b> EnOcean Alliance exhibits at Beckhoff booth <a href="http://www.workingbuildingsme.com">www.workingbuildingsme.com</a></p>	 <p><b>Mar 09-13, 2009:</b> <b>ISH Frankfurt, Germany</b> EnOcean GmbH and EnOcean Alliance exhibit in hall 9.1, booth C41 <a href="http://www.ish.messefrankfurt.com">www.ish.messefrankfurt.com</a></p>
<p><b>Nov 17/18, 2008:</b> <b>BMWi-Konferenz, Berlin, Germany</b> Participation of EnOcean in a conference on the topic "Internet der Dinge - Vernetzte Lebens- und Arbeitswelten" <a href="http://www.nextgenerationmedia.de">www.nextgenerationmedia.de</a></p>	
<p><b>Nov 17/18, 2008:</b> <b>Special event: Energy Harvesting, Essen, Germany</b> Presentation by Frank Schmidt on the topic "Energy Harvesting" <a href="http://www.hdt-essen.de/htd/verein/themenbereiche/energy_harvesting.html">www.hdt-essen.de/htd/verein/themenbereiche/energy_harvesting.html</a></p>	
 <p><b>Nov 19-21, 2008:</b> <b>GreenBuild Expo, Boston, USA</b> EnOcean Inc. exhibits, booth No. 2852. <a href="http://www.greenbuildexpo.org">www.greenbuildexpo.org</a></p>	
<p><b>Nov 26, 2008:</b> <b>Institution of Engineering Technologies, London, UK</b> Paper by Markus Kreitmair, EnOcean GmbH <a href="http://www.theiet.org/events/2008/energy-harvesting.cfm">www.theiet.org/events/2008/energy-harvesting.cfm</a></p>	



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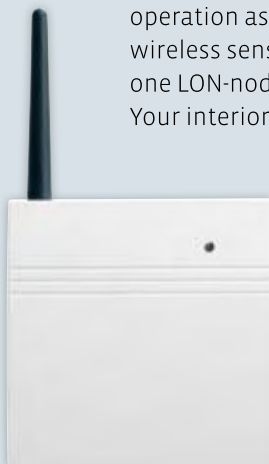
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