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ENABLED BY ENOCEAN®

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MAINTENANCE-FREE WIRELESS SWITCHES & SENSORS

03

INTERNATIONAL EDITION

REVOLUTIONARY
EnOcean routing concept

ENABLED BY ENOCEAN®
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New miniaturized single-channel switch actuator RCM 250 / RCM 255 launched

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Energy harvesting powers true independence for wireless devices

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These symbols will help you to match the content of the articles in the magazine with the various applications of EnOcean technology:

 Automotive

 Building Automation

 Manufacturing

 Medical

 Logistics

 Refers to all applications

The power of unused energy
enocean®

EDITORIAL

Munich, February 2006

Dear readers,

Every year the World Economic Forum (WEF) selects a handful of companies to participate in the forum for three years as technology pioneers. In 2006 EnOcean has now been awarded this honor. In the words of Peter Torreele, managing director of the WEF:
"The creative innovations produced by our Technology Pioneers hold the promise of significantly affecting the way business and society operate. As a global knowledge hub, we see the Technology Pioneer community as key contributors to this dialogue and to the mission of the World Economic Forum."

I'm convinced that only sustainable technologies can contribute to improving the world. Sustainable meaning without consuming resources. A tough challenge that certainly won't always be achievable – but that shouldn't prevent us from going all out for it. And I think we can only be successful through new and innovative technologies.

This distinction by the WEF underscores the success and the potential of innovative batteryless and wireless technology. We have managed to turn an ingenious invention – the combination of small energy converters with unique wireless technology – into a whole new product category. And this is already having a major influence on the way in which sensors are used in buildings. There are now more than 100,000 EnOcean wireless modules working out there, and the annual growth rate is over 100%.

Here's a good illustration of how EnOcean technology creates sustainability. Worldwide more than 300 million new sensors are installed in buildings every year. An average cable to connect a sensor will measure 5 meters in length. In other words, here the use of wireless would mean an annual saving of 1.5 million kilometers of cabling. That's more than 4000 truckloads with rolls of cable that would no longer need to be manufactured, transported, installed and, eventually, disposed of! And only batteryless wireless is sustainable because it does away with (unsustainable) batteries.

Last but not least, the recognition by the WEF is also an indicator of our international success. Read in this issue how the Zumtobel Group (Austria), Servodan (Denmark) and Aqualisa (Britain) are creating new products enabled by EnOcean.

Markus Brehler,
Chief Executive Officer, EnOcean GmbH

REVOLUTIONARY

ROUTING CONCEPT FROM ENOCEAN®

Compared to hardwired systems, wireless systems are much more convenient to install and present more flexibility of course. In some applications you nevertheless come up against the range limits of wireless. This is where routing methods are generally used, in other words the wireless telegrams are conducted to their destination through a network of wireless components. In the simplest case the latter will be repeaters, forwarding all received telegrams, whilst in more complex cases the optimal routes are calculated in advance and held as tables in the memory of the individual wireless nodes.

By Armin Anders, head of product marketing, and Dr Wolfgang Heller, product line manager, EnOcean GmbH

ROUTING PRINCIPLES

Fig. 1 shows possible ways of expanding the coverage of a wireless-based supervision or automation solution. Basically this can be done by means of a gateway to an established, wired automation bus (routing to the data backbone). The other wireless-based routing methods are explained more fully in what follows. An important boundary condition is that all wireless nodes within the range of reception must share the wireless channel. Collision of wireless data "in the air" must be minimized by appropriate system architecture.

MESHNETS for supervising areas larger than 500 sqm

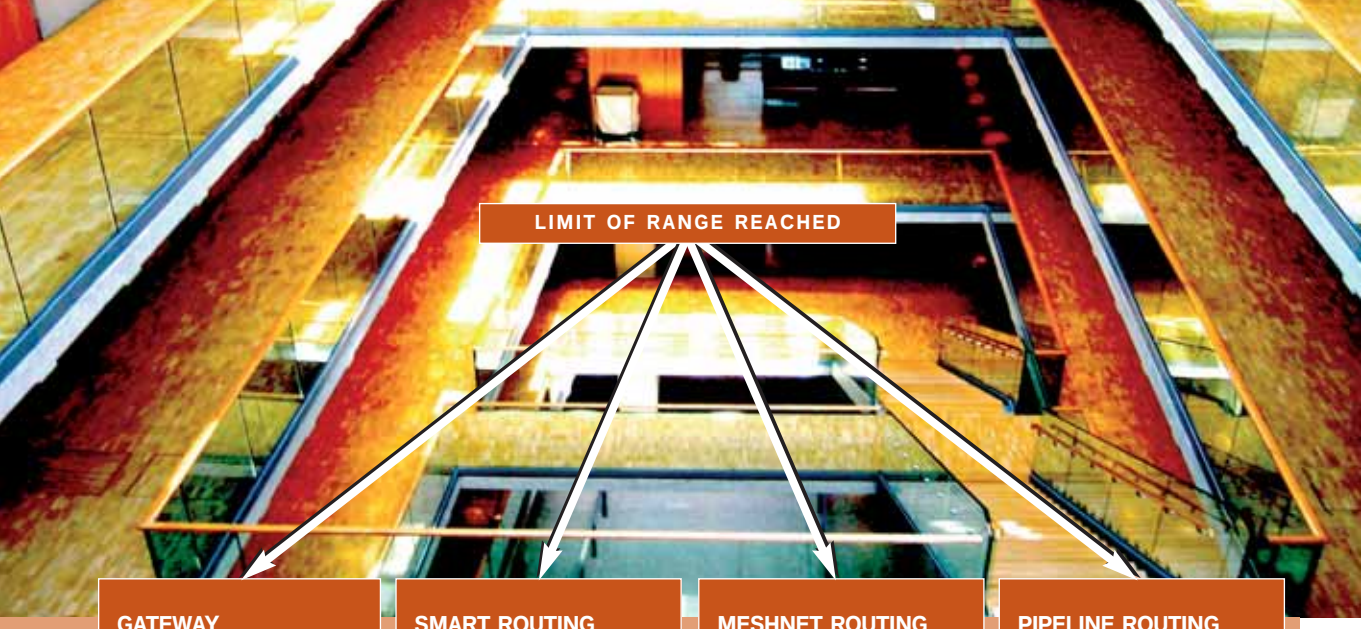
MESHnets originated in the USA from the wish to compensate the poor range and material penetration of 2.4 GHz wireless systems. There is no need for their use in building automation at frequencies below 1 GHz because the signal attenuation is very much less. A practical application for MESHnets on the other hand is the supervision of areas larger than 500 sqm, for example agricultural terrain or airport terminals where a wired automation bus or data backbone is ruled out because of inaccessibility or high retrofit costs. MESHnet routing, the areal arrangement of routing nodes, is restricted to the best wireless routes. This method is necessary to limit the wireless traffic occurring with more than three hops. Because of increasing system complexity, the memory needs of the routing nodes increase considerably with the number of hops. So, in practice, a commercial MESHnet is generally limited to five hops. The system complexity also means that a PC or notebook is always required to both start up and expand a MESHnet, and the software and hardware investment in the routing nodes is comparably high.

PIPELINE ROUTING for meter reading in high-rise buildings

A pipeline, a linear arrangement of routing nodes, may have far more than five hops. The powered sensors or actuators each operate as routers. Typical applications are the actual supervision of pipelines or the billing of heating costs in a high-rise building, where the figures read from upper levels have to be transported down through all levels for registration in the basement. This concept exhibits the longest signal propagation time of all wireless methods, so there should be no special demands for realtime response.

SMART ROUTING for residential building

Smart routing always uses all possible alternative routes for each wireless transmission. All received and valid wireless telegrams are transmitted. This kind of routing is also called repeating, and in smart routing the repeaters also communicate with one another. The method makes sense for one or two routing nodes (three hops) because of the increased risk of telegram collisions with greater wireless traffic. This is where the extremely short EnOcean wireless telegrams are an immense advantage. A major benefit of smart routing is the very simple system startup without a PC or notebook. In solutions with bidirectional



GATEWAY
- To wired automation bus

SMART ROUTING
- Use of all alternative routes (repeaters)
- Very simple startup without PC/notebook

MESHNET ROUTING
- Restriction to best wireless routes (because of wireless traffic)
- Startup with PC/notebook (or more resources in routing nodes)

PIPELINE ROUTING
- Linear linking of routers
- No realtime performance

Fig. 1: Overview of features of different routing methods

actuators the particular repeaters in the system will in future also be able to configure themselves. Consequently the user need not select the repeater nodes manually. That prevents the user from unintentionally degrading system performance true to the motto "doing more helps more". Smart routing is currently the clear favorite for use of EnOcean technology in buildings. The setup effort, the realtime response and the costs are more favorable than complex routing for application in residential and commercial building.

APPLICATION IN COMMERCIAL BUILDING

With almost 100,000 wireless components already installed primarily in commercial buildings, EnOcean has now gathered extensive experience. The wireless range is typically restricted by the solid walls of the fire cut-offs. One or two wireless gateways with the wired automation system (LON, EIB, TCP/IP, etc), centrally placed in a fire compartment, have become an established installation procedure for EnOcean technology. For the alternative, direct driving of wireless actuators by wireless lights or blinds switches, as in use of the WINSTA and gesis systems for example, there is no need to overcome long wireless ranges. In planning to achieve the critical range, a remedy was easily produced by retrofitting repeaters.

APPLICATION IN RESIDENTIAL BUILDING

For applications restricted to one or two rooms, like retrofitting a switch or blind, the direct wireless range is always sufficient. When applications go through the house, you have to differentiate. In small accommodation units with up to three walls to penetrate or a ceiling, i.e. one- or two-room apartments, or one or two town house levels, a signal amplifier is seldom required for wireless coverage. In dwellings, town houses and single-family detached homes up to about 400 sqm, a repeater should be provided upwards of three rooms per unit and three or four levels. The reliability of transmission is much improved by multipath propagation. The positioning of the repeater is not critical but should be central. If the ceiling is heavily reinforced or there is some other kind of shadowing, a second repeater is easily retrofitted. A separate wireless system should be

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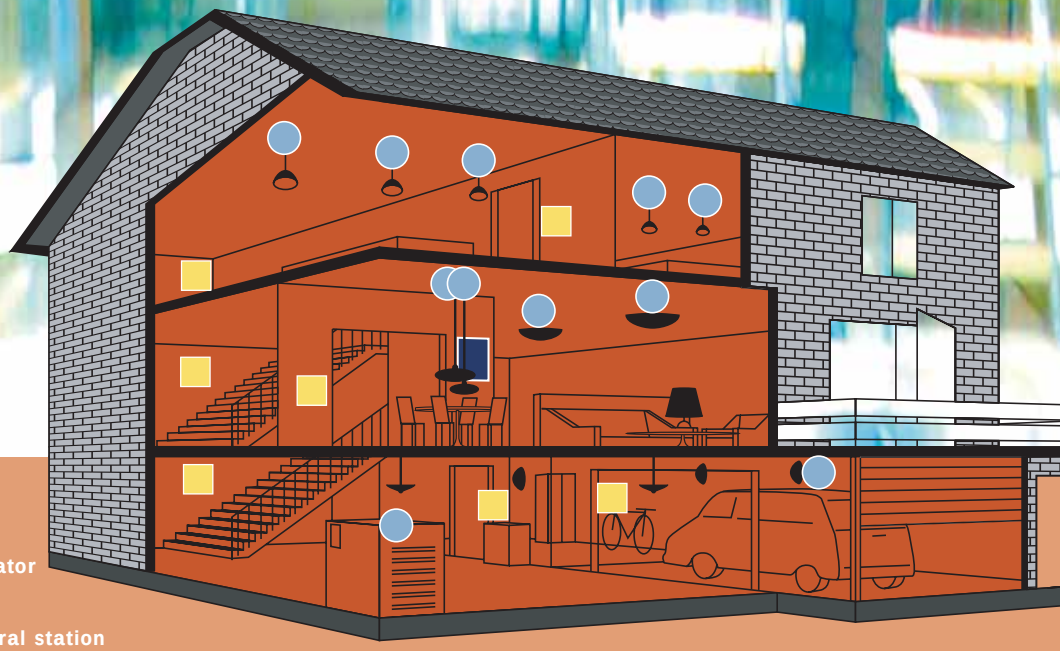


Fig. 2: Each wireless component in the building is max. 10 m from the repeater and separated from it by one concrete ceiling. In extreme cases a second repeater can be used in a building for adequate wireless coverage.

implemented for each unit in apartment houses and high-rise buildings. Gateways may be provided for a link to a superordinate automation system (LON, EIB, TCP/IP, etc).

In short, none, perhaps one, or occasionally two centrally located repeaters or routing nodes may be needed for reliable wireless coverage of a typical accommodation unit.

MORE ROUTING NODES THAN NECESSARY DEGRADE SYSTEM PERFORMANCE

It is important to remember that the performance of a wireless system can degrade seriously if more routing nodes are used than are really necessary:

- Transmission reliability is reduced because more hops increase the wireless traffic and thus the probability of telegram collision.
- Realtime response decreases because more hops extend telegram propagation time.
- Startup of the system becomes more elaborate – upwards of three hops a PC/notebook will be virtually essential because of the complexity of the system.
- More hops mean more computing and memory capability in the routing nodes, which adds to the system costs.

SUMMARY

Of the different routing concepts, EnOcean clearly prefers smart routing for house building. This works with a minimal number of signal amplifiers, and all possible alternative routes are always used for wireless propagation. The EnOcean repeater serves as the routing node. The convenience of startup without a PC or notebook, the assurance of extremely fast response and the cost all speak in favor of smart routing for residential building and commercial building.

INNOVATIVE

OVERVIEW OF ENOCEAN® MODULES FOR GENERAL APPLICATIONS

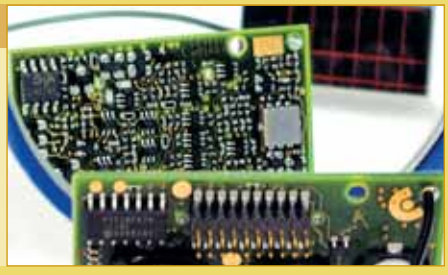
RoHS COMPLIANT 2002/95/EC

PTM 200 – THE ULTRAFLAT MINIATURIZED SWITCH MODULE

- Maintenance-free powering by finger pressure
- Optionally one or two rockers or up to four pushbuttons
- Dimensions 40 x 40 x 11.2 mm
- Actuating travel 1.5 mm
- Actuating force approx. 7 N

STM 100 – THE SENSOR MODULE

- Maintenance-free sensor module
- Powered by a miniature solar cell 13 x 28 mm
- Dimensions 21 x 40 x 9 mm
- Operates for several days in total darkness
- Periodic life signal
- Three A/D converter inputs
- Four digital inputs



RCM 110/120 – THE RECEIVER MODULES

- Wireless receiver module and actuator control module for receiving and predecoding 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 (RS232)
- Power section dimensioned and integrated by user to match requirement
- Simple teaching of up to 30 wireless transmitters
- Memory function (for light and blinds scenes)

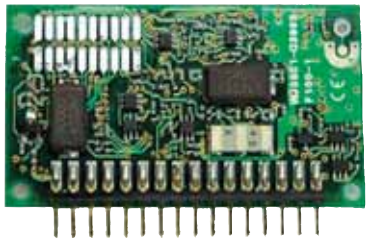
TCM 110/120/130 – ENOCEAN® BIDIRECTIONAL

- 5 Vdc voltage supply
- 30 mA current consumption
- Dimensions 24 x 42 x 5 mm

TCM 110
- Single-level repeater for EnOcean wireless telegrams

TCM 120
- Bidirectional wireless
- Serial interface
- Modem functionality

TCM 130
- Software API for TCM 120 module
- Programmable in C
- Supports bidirectional serial interface
- Four D/A inputs, four digital outputs



INNOVATIVE

RoHS COMPLIANT 2002/95/EC

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

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 two EnOcean STM 250 wireless window contacts can be teached. Simple connection of the line voltage and load by screw terminals.

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.

ANT – ANTENNA PACKAGES

Ready wired antennas for fast and simple installation in locations with restricted reception quality.

EVA 100 – EVALUATION KIT

Test board for simple startup of EnOcean wireless modules.

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ENOCEAN ENABLES THE BATHROOM

perpetuum spoke to Aqualisa's marketing manager, Jan Rowarth.

Innovation is a strong tradition at British shower manufacturer Aqualisa. A quick look back at the company's history reveals an enviable track record of award-winning products, one of the most recent being the revolutionary Digital showering system. Bringing an advanced level of intelligence to the bathroom, Digital showers break away from the usual shower valve configuration, with each Digital shower controlled by a small, compact electronic processor. This processor is situated entirely separatly from the showering area, for example in an airing cupboard, under the bath or in the loft, and is connected to the shower by a simple data cable. Hot and cold water flows into the processor and is then accurately blended to a preset temperature before being delivered directly to the shower.

It is certainly an ingenious product, and one that has been a sales triumph for Aqualisa since its launch in 2001. Since then, tens of thousands of Digital showers have been sold in the UK alone, representing more than £ 76 million in retail sales – impressive by anyone's standards. However, despite Digital's enormous success, Aqualisa's thirst for technology has yet to be quenched. Just months after the debut of the first Digital shower came the gadget that got everyone talking, a remote switch connected to the shower by a cable, enabling the shower to be switched on or off from up to 10 meters away. A huge hit with consumers and plumbers alike, the switch was the perfect combination of innovation and practicality.

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In 2004 a new range of Digital showers, the Axis Collection, was launched. Created in collaboration with the renowned product designers Seymour Powell, the modern, minimalist Axis Collection offered a wider choice of showers and also featured the option of a remote switch. Suddenly, Aqualisa had created a new showering genre. And for the bathroom – which has long languished behind the kitchen in terms of intelligent product solutions – a whole new and very high-tech world could be explored. But, not content with kickstarting such an important trend in showering technology, Aqualisa remained intent on finding how it could, in the words of marketing manager Jan Rowarth, "make the best even better".

Jan explains:
"Digital really began to prove itself a year after it was launched. We'd developed the technology around researching what consumers and installers really want, which is ease of installation and ease of use, and, once the benefits of Digital were understood, sales just soared.

Digital is compatible with virtually all UK domestic plumbing systems – gravity-fed, combi and mains. Thanks to the unique processor configuration a Digital shower can be installed in as little as two hours and there's very little mess or damage to décor during the fitting process. Plus, a Digital shower is so easy to use. It has simple, push-button on/off controls, which are a big bonus for many people. And of course, the option of the remote switch created a real buzz about the technology."

But could Aqualisa make further improvements? Yes, it would seem so – with a little bit of help from EnOcean.

Says Jan:
"We evaluate the performance of all our showers as a matter of course and we were determined that we could still improve the features of our Digital system. By analysing each component of the system, we realised that although the remote switch had proved popular with consumers, its

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reliance upon being connected to the shower by a data cable limited its use in some applications. Fine for a brand new bathroom, where the cable could be hidden by tiling, but not so good for a simple shower refurbishment."

Jan continues:
"We decided to find out what sort of technology would enable the switch to be completely wireless and batteryless."

Which is where EnOcean came in. Aqualisa's inhouse R&D team worked extensively with EnOcean to create a completely wireless switch that is powered by electromagnetic energy. Compatible with all of Aqualisa's Digital showers, no matter what their configuration, the new remote switch is simply attached to the wall by a sticky pad. Pressing the switch generates enough power to activate the switch's transmitter, whilst the switch's receiver is connected to, and powered by, the Digital shower's processor.

Aqualisa's research engineering project manager Glenn Porter says:
"One of the biggest advantages of the new remote switch is the fact that it doesn't require batteries, which people forget to buy and are an extra expense. They also add to the weight of a product – we've all picked up those heavy remote television controls – so from our point of view, EnOcean's technology was perfect."

Easy to add to an existing Digital shower installation, the wireless switch can also be used in conjunction with one of Aqualisa's conventional remote switches, effectively giving the user multiple switch on/off locations. Each switch is also uniquely coded, which, as Glenn Porter emphasizes, is vital for homes with more than one Digital shower.

"Each switch and transmitter has its own code – necessary as many homes will have a Digital shower in both their main, family bathroom and an ensuite bathroom. We obviously needed to ensure the switch would turn on the right shower."

Amusing perhaps, but quite possible considering that Aqualisa's new remote switch will activate a shower from well over 10 meters away.

So, EnOcean enables yet more innovation. Aqualisa is the first company in the UK to use the technology, and it believes the introduction of the latest phase of its Digital showering technology will continue to keep Aqualisa leading the field for even longer.

Jan Rowarth says:
"The new wireless switch is an important part of our Digital showering development schedule. It's also a first for bathrooms in the UK as there's no other product like this currently available to domestic users. EnOcean have really helped us to excel ourselves."

www.aqualisa.co.uk

AQUALISA

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ENOCEAN® easyfit RCM 250/RCM 255 – MINIATURIZED SINGLE-CHANNEL SWITCH ACTUATOR FOR LOW-COST INTEGRATION OF BATTERYLESS WIRELESS TECHNOLOGY

By Andreas Schneider,
executive vice president, EnOcean GmbH

1. RCM 250/RCM 255 is the ideal entry level solution for flexible switching of electrical loads.

2. RCM 255 – the US variant for 120 V grids with matching package.

The simplest form of receiver for batteryless wireless technology is a single-channel switch actuator that is connected direct to line voltage (RCM 250: 230 V/50 Hz; RCM 255: 120 V/60 Hz) and just connects the phase through when it receives a radio signal. As a low-cost entry level solution EnOcean is now marketing easyfit RCM 250 and RCM 255, "wireless relays" with 5 A switching capacity in a minimal sized package.

Square, practical and right for the job, that is the easiest way to describe the devices. Like the other all-inclusive easyfit OEM devices from EnOcean (general-purpose switch insert and wireless window contact), they are designed for integration in as many different solutions as possible and as simply as possible. A major factor here is of course their size of just 48 x 35 x 29 mm for the RCM 250 and 49 x 37 x 33 mm for the RCM 255. They come with screw terminals for max. 1.5 mm^2 cable (N, N, L and switched L). There is a learn and a clear button on top of the package for configuring EnOcean wireless transmitters. Feedback about the learn status is produced by switching of the connected load and acoustic clicking comparable to a flasher relay.

The single-channel switching function can be driven both by wireless switches enabled by EnOcean and by the easyfit STM 250 wireless window contact. As many as 30 wireless switches can be teached into the receiver. The linking of several transmitters corresponds to a two-way circuit allowing the implementation of a central off switch for example. For the window contact mode a maximum of two transmitters can be learnt, the relay then switching as soon as at least one contact is opened.

The device meets KEMA and cCSAus safety requirements in its two voltage variants, and is very easily integrated into different appliances. In the bases of table or floor lamps, for the lights in children's rooms, as a controller for cooker extractor hoods or the circulating pumps of heating installations – the RCM 250 and RCM 255 offer many possibilities of remote control by batteryless wireless technology from EnOcean. The costs pay back fast when loads are cut out to save energy.

EnOcean markets the devices as an OEM solution through established distributors (see page 40/41). An overview of more complex receiver solutions such as dimmers, multi-channel switch actuators, blinds controls or gateways for bus systems can be found in the middle of this issue.

NETWORKED

LITENET flexis

THE NEW LIGHT CONTROL SYSTEM FROM ZUMTOBEL STAFF

This new and highly economical light control system was specially developed for buildings and rooms intended for flexible use. The way it works is as simple as it is ingenious. By mouse click, in other words without having to tamper with wiring and any long interruptions, it is possible to split rooms for different purposes for example, to arrange lights in new groups, and to program light moods. With its intuitive operating concept, LITENET flexis makes space and its use more versatile.

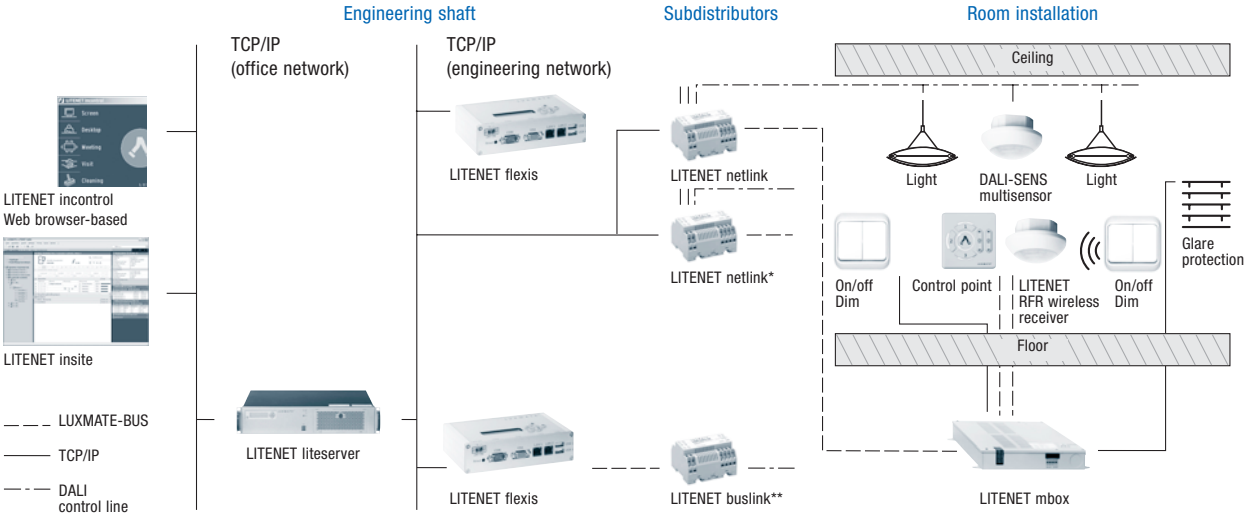
By Dipl. Ing. Thomas E. GOTWALD, product manager, ZUMTOBEL STAFF GmbH, thomas.gotwald@zumtobelstaff.co.at

LITENET flexis is an investment that you put off until it is needed. In other words, the owner of a building decides on the costs for new functions when there is a concrete requirement. For example, when a new tenant moves in and is willing to pay more for a better lighting solution.

The basic functionality of the TCP/IP-based data network of LITENET flexis also includes time and presence management, automated maintenance checks, optimization of consumption, plus integration of emergency and security lighting.

These broad-based functions can be added to further. Among the extra possibilities are comfort dimming, daylight-dependent light management

LITENET topology schematic



Two ways of linking field installation to central infrastructure:

* Direct on engineering backbone network = maximum flexibility

** By 2-wire bus = maximum economy

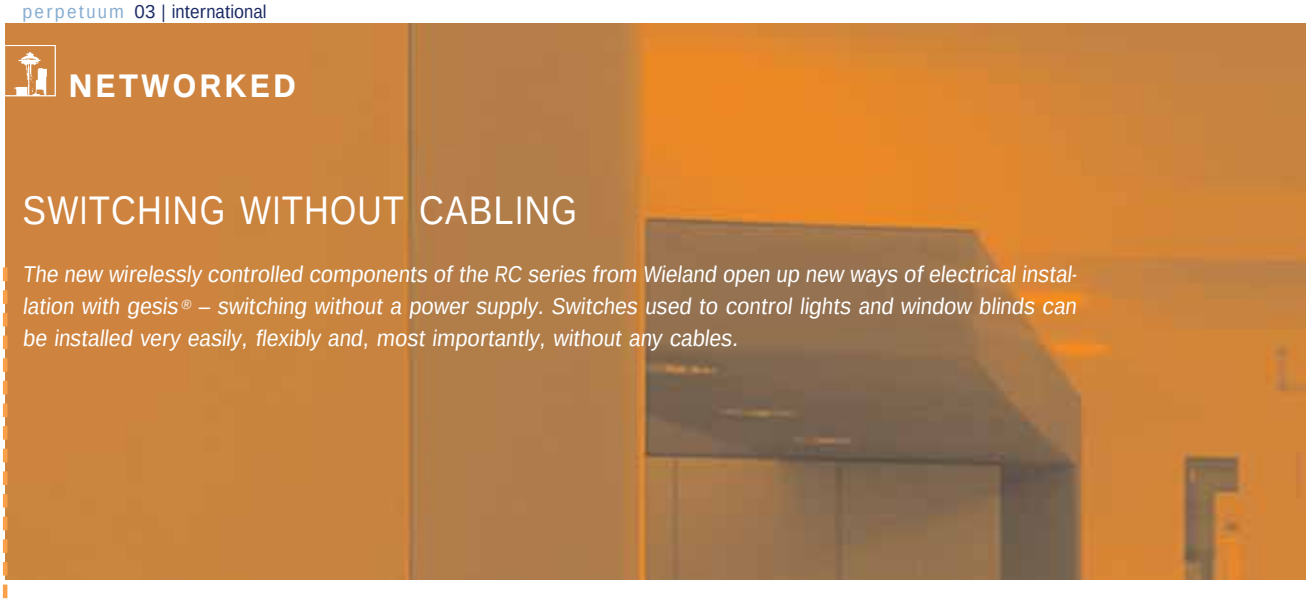
Litenet RFR receiver

and glare protection, standard interfaces, graphics-based supervision and operating alternatives by PCs and the Internet.

New in the operating concept is the LITENET-RFR wireless receiver, allowing the integration of as many as 60 batteryless and maintenance-free EnOcean wireless switches. The use of batteryless wireless technology ensures maximum flexibility in planning, and speeds up installation. In addition to all the flexible enhancement of light control, dispensing with cabling substantially reduces the fire risk.

www.zumtobelstaff.com/litenet

ZUMTOBEL STAFF



NETWORKED

SWITCHING WITHOUT CABLING

The new wirelessly controlled components of the RC series from Wieland open up new ways of electrical installation with gesis® – switching without a power supply. Switches used to control lights and window blinds can be installed very easily, flexibly and, most importantly, without any cables.

With the the gesis® system, extensive wall modifications, the laying of cables and clamping of switches are a thing of the past. The switches of the new Wieland series are wireless-based and do not require their own power supply or any batteries. The required power is generated whenever a switch is operated. Signals are transmitted by EnOcean wireless telegrams to the receiving devices, which can easily be incorporated with gesis® CON into the installation system by simply plugging them in. The transmitted telegrams do not include any instructions – the signals are converted into the appropriate switching command in the receiver itself – so the desired responses and assignment of the receiver to be activated are programmed exclusively in the receiving modules.

In contrast to bus systems in buildings, gesis® RC components can be started up very easily and without any software. The user programs the window adjustments or light merely by pressing the program button and the required switch. Switch or sensor assignment to the receivers can be freely defined within the transmission range.

Switches are installed very easily and quickly: the components are simply screwed or glued to the surface. A flush-type outlet does not need to be installed. With the innovative wirelessly controlled gesis® RC, installations can be implemented with absolute flexibility and at markedly lower costs. Especially in places where, in the past, installations were not possible at all or only on the surface, for example on glass walls, wooden panels or furniture.

A gateway as part of the gesis® EIB V device series is available, bringing the benefits of maintenance-free, wireless switches without batteries for the EIB building automation system too. It is started up at the wireless end by pressing a button, and at the EIB end by means of the EIB tool software. It also includes four independent relay outputs.

www.wieland-electric.com
www.gesis.com

wieland

NETWORKED

EASYSENS® PROMOTION BOX

Sensors for building systems engineering – wireless and batteryless.

By Heike Loh, marketing, Thermokon Sensortechnik GmbH

Batteryless and wireless EnOcean technology is in the meantime very well established in building systems engineering. As part of its EasySens® system, Thermokon is now offering an action box for familiarization with batteryless wireless sensors. The package allows all interested users simple entry into this innovative technology.

The EasySens® promotion box includes a SR04P wireless room temperature sensor, a flush-mounting SRC-DO HA type 1 230 V receiver and a SRW01 wireless window contact. The starter package enables temperature control with an energy stop through a conventional radiator with a motorized two-point actuator. The set is attractively priced at Euro 129.90 plus shipping.

Innovative, solar-powered wireless technology makes use of ambient light for temperature and ventilation control in buildings. EasySens® wireless sensors require neither a battery nor an external power source, making them maintenance-free. Time-consuming chores like wiring or routing cables to the sensors and chiseling ducts in floors or walls are consequently superfluous. Less material and less time contribute to implementing a cost-attractive solution. And this also means flexibility in new buildings and when modernizing. The system reduces cost levels particularly in large salesrooms, industry workshops and exhibition halls because all the elaborate cabling is done away with.

EASYSENS® PROMOTION BOX FOR TESTING

- SR04P wireless room temperature sensor with setpoint control
- SRC-DO HA type 1 230 V flush-mounting receiver
- SRW01 wireless window contact

The batteryless SR04P wireless room temperature sensor with setpoint control serves for regulating temperature and ventilation together with the SRC-DO HA receiver and a superordinate controller system. Wireless telegrams to EnOcean standard are transmitted to the receiver.

The SRC-DO HA type 1 wireless thermostat receiver regulates the temperature in living space. The receiver can learn both the SR04P sensor and as many as ten SRW01 contacts for the energy stop functionality. The thermostat receiver compares the room temperature communicated by the sensor to the setpoint adjusted on the sensor. If it is above or below the setpoint, the relay is energized or deenergized accordingly. The floating relay output can be used for direct driving of thermal two-point valves (thermostat function).

With its integrated reed contact, the **SRW01 wireless window contact** monitors a magnet attached laterally to a window or door frame, for instance, and immediately signals any change in

SUPPLIER (alphabetically)	Light	Shading	HVAC	Industrial	Wall Switch	Remote Control	Position Sensor	Temperature Sensor	Light Sensor	Motion Sensor	Humidity Sensor	Gas Sensor	Switching Actuator	Gateway	Accessories	DESCRIPTION/DESIGN
Balluff				■			■									Industrial position sensors
Balluff				■								■				4 channel Switching Receiver
Beckhoff	■	■	■	■									■			RS485 Wireless Adaptor KL6023 for Busclamp-Controller TCP/IP
BTicino	■	■			■											Switches Modular Design
BTicino	■	■											■			Bus Gateway
CER	■	■	■	■									■			FieldCommander; gateway to EIB, TCP/IP, Modbus or ZigBee
EnOcean	■				■											Universal switch insert EnOcean easyfit, 2 channel, white, anthracite and alu
EnOcean	■				■											Universal switch insert EnOcean easyfit, 4 channel, white, anthracite and alu
EnOcean		■			■											Universal switch insert EnOcean easyfit, 2 channel, white, anthracite and alu
EnOcean		■			■											Universal switch insert EnOcean easyfit, 4 channel, white, anthracite and alu
EnOcean	■		■			■										Door- and window contact STM 250
EnOcean	■											■				1 chanel switching actuator RCM 250
EnOcean	■	■	■	■											■	Field strenght measurement tool EPM 100
Funkstuhl.de	■			■					■							Office chair with presence detector
HardSoft						■										easyTED voting system
HardSoft													■			USB-Receiver
Helios			■		■											Wall switch, neutral design
Helios			■									■				Switching actor for fans
HÜTE - ELECTRONIC		■										■				Shutter control system
Jäger-Direkt	■		■			■										Window contact, white, RAL9010, itemnr. 560.483
Jäger-Direkt	■											■				switch actuator 1-channel 230VAC/13A mains 230VAC, flush mount, itemnr. 560.492
Jäger-Direkt	■											■				switch actuator 1-channel EVG 230VAC/13A mains 30VAC, flush mount, itemnr. 560.493
Jäger-Direkt	■											■				switch actuator 2-channel 230VAC/6A mains 230VAC, flush mount, itemnr. 560.494
Jäger-Direkt	■											■				dimm actuator 1-channel 230VAC/250W mains 230VAC, flush mount, itemnr. 560.495
Jäger-Direkt		■										■				shutter actuator 1-channel 230VAC/6A mains 230VAC, flush mount, itemnr. 560.496
Jäger-Direkt	■											■				switch actuator 4-channel 230VAC/13A mains 230VAC, DIN rail receiver; itemnr. 560.489
Jäger-Direkt	■											■				switch actuator 8-channel 230VAC/6A mains 230VAC, DIN rail receiver, itemnr. 560.484
Jäger-Direkt		■										■				shutter actuator 4-channel 230VAC/6A mains 230VAC, DIN rail receiver, itemnr. 560.487
Jäger-Direkt	■	■	■	■											■	flush mount repeater 230VAC, itemnr. 560.497
Jäger-Direkt	■			■												Opus-wall switch 1-channel I-0, itemnr. 560.480
Jäger-Direkt	■			■												Opus-wall switch 2-channel I-0, itemnr. 560.481
Jäger-Direkt		■		■												Opus-wall switch 1-channel, arrow, itemnr. 560.490
Jäger-Direkt		■		■												Opus-wall switch 2-channel, arrow, itemnr. 560.491
Jäger-Direkt	■	■			■											Remote control R1 2-channel, 4 buttons, black RAL 9005, itemnr. 560.482
MSR										■						Wireless gas sensors
Niko	■	■		■												Easyclick Wall Transmitters
Niko	■	■										■				EasyClick Switching Receivers
Omnio	■	■	■	■											■	Flush-mounted RF repeater 24V UPR24/01
Omnio	■	■	■	■											■	Flush-mounted RF repeater 230V UPR230/01
Omnio	■	■	■													Security sensor SS101 white, grey, black
Omnio	■	■	■													Universal transceiver US 101 white, grey, black
Omnio	■	■	■										■			EIB-Receiver 29V DC REG-EIB/01
Omnio	■	■	■										■			EIB-Receiver 29V DC REG-EIB/02
Omnio	■	■		■												2 channel/Omnium
Omnio	■	■		■												4 channel/Omnium white, grey, alu white, alu grey, black, red, blue, green, gold
Omnio	■	■		■												6 channel/Omnium white, grey, alu white, alu grey, black, red, blue, green, gold
Omnio	■	■		■												8 channel/Omnium white, grey, alu white, alu grey, black, red, blue, green, gold
Omnio	■	■		■												2 channel/Universal cartridge Switzerland
Omnio	■	■		■												4 channel/Universal cartridge Switzerland
Omnio	■											■				Flush-mounted receiver 1 channel
Omnio	■											■				Flush-mounted receiver 2 channel
Omnio	■											■				Flush-mounted dimmer switch
Omnio		■										■				Flush-mounted receiver 1 channel
Omnio		■										■				Flush-mounted receiver 2 channel
Omnio			■					■								Indoor temperature sensor Omnium white, grey, alu white, alu grey, black, red, blue, green, gold
Omnio			■													Heatingvalve controller 4 channel 230V AC/6A REGH230/01
Omnio			■													Heatingvalve controller 4 channel 24V 6A REGH24/01
Omnio			■	■								■				Doorbell
Omnio	■		■			■										Window contact with solarcell
Omnio	■	■	■		■											Remote Control 4 channel
Osram	■			■												Wall Switch
Osram	■											■				Electronic ballast "TOUCH-DIM"
PEHA	■	■	■	■												Easyclick flush-mounted repeater
PEHA	■	■	■										■			EasyClick-PHC-Interface
PEHA	■	■		■												EasyClick wall-transmitter, 2 channel/neutral design
PEHA	■	■		■												EasyClick wall-transmitter, 4 channel/neutral design
PEHA	■	■		■												EasyClick wall-transmitter, 2 channel/"Dialog" white or aluminium design
PEHA	■	■		■												EasyClick wall-transmitter, 4 channel/"Dialog" white or aluminium design
PEHA	■	■		■												EasyClick wall-transmitter, 2 channel /"Aura" white, anthracite and aluminium design
PEHA	■	■		■												EasyClick wall-transmitter, 4 channel /"Aura" white, anthracite and aluminium design
PEHA	■											■				EasyClick flush-mounted receiver 1 channel
PEHA	■											■				EasyClick flush-mounted receiver 2 channel
PEHA	■											■				EasyClick in-ceilling receiver
PEHA	■											■				EasyClick socket receiver (Schuko)
PEHA	■											■				EasyClick socket receiver with grounding bolt
PEHA	■											■				EasyClick socket receiver (SEV)
PEHA	■											■				EasyClick DIN-rail receiver
PEHA		■										■				EasyClick flush-mounted receiver blind controll
PEHA															■	Antenna for DIN-rail receiver
Regent AG	■			■												Wall Switch
Regent AG	■											■				PowerClic™, Lightning control
Servodan A/S	■		■						■							Movement sensor PIR TYP 41-301
Servodan A/S	■							■								Light sensor (outdoor) TYP 43-160
Schlaps & Partner	■	■	■										■			EIB-Gateway
Schunk				■		■										Radio Sensor Gripper RSS
Schunk				■								■				Radio Receiver RSS
Steute				■		■										Door handle switch TGF
Steute				■		■										Position EF 41
Steute				■		■										Pull-wire EF 41 Z
Stuhl Regeltechnik			■				■									Indoor sensor SF10
Stuhl Regeltechnik			■				■									Room controller SF10
Stuhl Regeltechnik			■									■				Adaptor modul SAM
Thermokon	■	■	■	■											■	SRE-Repeater
Thermokon	■	■	■	■									■			Ethernet TCP/IP Receiver 230V AC SRC-Ethernet
Thermokon	■	■	■	■									■			LON-Receiver 24 V SRC-FTT
Thermokon	■	■	■	■									■			RS485 Receiver SRC RS485 Modbus
Thermokon	■	■	■	■									■			RS485 Receiver SAIA-Controller SRC RS485 EVC
Thermokon	■	■	■	■									■			RS485 Receiver standard serial SRC RS485 Gateway
Thermokon			■						■							Door contact with solarcell SRW01
Thermokon			■				■									Room controller/sensor SR04
Thermokon			■				■									Room controller/sensor with set point command SR04P
Thermokon			■				■									Room controller/sensor with set point command and presence device SR04PT
Thermokon			■				■									Room controller/sensor with set point command and presence device and gear ratio level SR04PT
Thermokon			■				■			■						Room controller/sensor with rel. humidity SR04rH
Thermokon			■				■									Outdoor temperatur sensor SR65
Thermokon			■				■									Contact temperatur sensor SR65 VFG
Thermokon			■				■									Duct temperatur sensor SR65 VFG
Thermokon			■				■									Cable temperatur sensor SR65 TF
Thermokon			■										■			RF thermostat actuator SRC-DO HA Typ 1
Thermokon			■										■			Indicator relais 1-channel SRC-DO HA Typ 2
Thermokon			■										■			Hygrostat actuator 1-channel SRC-DO HA Typ 3
Thermokon			■										■			RF receiver actuator with analog output SRC-ADO BCS
WAGO	■		■	■	■								■			I/O-System 750 (EIB/LON/TCP-IP/Modbus) radio clamp 750-642
WAGO	■		■		■							■				DIN rail receiver 4 shutter 789-601
WAGO	■		■		■							■				DIN rail receiver 4 change over contact 789-602
WAGO	■											■				Winsta light control 770-629/101-000
WAGO		■										■				Winsta blind control 770-629/102-000
Warema		■							■			■				Blind control/shading
Wieland	■	■	■										■			gesis EIB V radio gateway, itemnr. 83.020.0220.0)
Wieland	■	■	■										■			gesis EIB RM radio gateway, itemnr. 83.020.0408.0)
Wieland	■	■	■									■				gesis CON Connector System
Wieland	■											■				gesis RC V actuator 4-channel light, itemnr. 83.020.0500.0)
Wieland												■				gesis RC V actuator 2-channel shutter, itemnr. 83.020.0501.1)
Wieland	■	■	■										■			gesis RC radio alarm transmitter, itemnr. 83.020.0502.0)
Wieland	■			■												gesis RC universal switch insert 2-channel white, itemnr. F0.000.0005.6
Wieland	■			■												gesis RC universal switch insert 2-channel anthracite, itemnr. F0.000.0007.5
Wieland	■			■												gesis RC universal switch insert 2-channel alu, itemnr. F0.000.0007.6
Wieland	■			■												gesis RC universal switch insert 4-channel white, itemnr. F0.000.0005.7
Wieland	■			■												gesis RC universal switch insert 4-channel anthracite, itemnr. F0.000.0007.9
Wieland	■			■												gesis RC universal switch insert 4-channel alu, itemnr. F0.000.0008.0
Wieland		■		■												gesis RC universal switch insert 2-channel white, itemnr. F0.000.0005.8
Wieland		■		■												gesis RC universal switch insert 2-channel anthracite, itemnr. F0.000.0007.7
Wieland		■		■												gesis RC universal switch insert 2-channel alu, itemnr. F0.000.0007.8
Wieland		■		■												gesis RC universal switch insert 4-channel white, itemnr. F0.000.0005.9
Wieland		■		■												gesis RC universal switch insert 4-channel anthracite, itemnr. F0.000.0008.1
Wieland		■		■												gesis RC universal switch insert 4-channel alu, itemnr. F0.000.0008.2
Wiesemann & Theis	■	■	■	■									■			Com-Server, 10/100BT, 24V
Zumtobel	■												■			Litenet RFR Receiver, itemnr. 22154466

NETWORKED

WIRELESS ROOM SENSOR SR07 – GENERAL-PURPOSE IN USE

Thermokon has added a newly developed, general-purpose wireless room sensor for flush mounting to its EasySens® range.

By Dirk Debus, head of development, Thermokon Sensortechnik GmbH

This room sensor is designed for temperature detection or adjustment of local settings in controls for single rooms of a building. The sensor sends its metered readings batteryless to appropriate receivers (SRC-x) that process this information or, depending on the configuration, forward it to a central control unit. The sensor comes in different models: in addition to the integrated temperature sensor it may also have a rotary knob for adjustments or a slide switch with two settings.

Different adapters allow integration of the room sensor insert in many switch ranges familiar from household installations. It can also be combined in multiple frames with the EnOcean easyfit switch series.

The SR07 wireless room sensor is compatible with the following designs with 55 x 55 mm inserts:

PEHA	Aura
BERKER	S1, B1, B3, B7 glass
GIRA	Standard 55, E2, Event, Esprit
JUNG	A500, Aplus
MERTEN	M-Smart, M-Arc, M-Plan

The following variants are available in the colors white, anthracite and aluminum:

SR07	Wireless sensor
SR07P	Wireless sensor with setting control
SR07PS	Wireless sensor with setting control, slide switch O/I

The SR07 wireless room sensor fits into the frame designs of various producers.

Use of energy-optimized EnOcean wireless technology in EasySens® sensors, which power themselves by means of a 2 cm^2 solar cell, means that units can work without batteries. This in turn makes them maintenance-free and eco-friendly. Battery powering is also possible for use in dark rooms, for example, and the sensors consequently come ready fitted with a battery receptacle.

For installation the baseplate of the sensor is attached to a wall surface by its adhesive strip, or it can be fitted by dowels and screws. The frame of the particular switch range is then affixed to the baseplate with the intermediate frame (accessory). Finally the sensor is centered in the frame.

To enable a receiver to correctly evaluate the sensor's readings, the receiver has to learn the devices. This is done automatically with the Learn button on the sensor or manually by entering the 32-bit sensor ID and a special teach-in procedure between transmitter and receiver. Details are provided in the software documentation accompanying the receiver.

"Among other products this novelty will be presented at the light+building in Frankfurt from April 23-27, 2006 in Hall 9.1, Stand E21!"

www.thermokon.de

thermokon Sensortechnik GmbH

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HANDHELD WIRELESS TRANSMITTER – THE FOUR-CHANNEL HANDY

Omnio AG has expanded its Ratio® wireless bus system with the addition of the newly developed Handy, a handheld wireless transmitter.
By Christian Genter, CEO, Omnio AG

The extremely small and ergonomic handheld comes in a slim and attractive design. in this way it solves many problems of switch placement. With a fully enclosed case it is designed as a remote control, but is equally suitable for wall attachment by an adhesive pad.

This handheld wireless transmitter is suitable for switching or dimming lamps, lowering and raising blinds, and adjusting the slats, or for opening the garage door when you come home and activating a welcome scenario.

EIB GATEWAY
Also new from Omnio is an EIB gateway, enabling expansion of existing EIB installations by EnOcean® wireless technology. This EIB gateway promises new business for electrical contractors, for example retrofitting of windows with maintenance-free contacts for improved security.

www.omnio.ch

NETWORKED

The EasySens® promotion box is available until March 31, 2006 **at an attractive first-time price.** Just fill in the order form attached to this issue and send it off.

status wirelessly to the climate control (energy stop, access control). A life signal is also sent about every 15 minutes. Transmission to the receiver again uses EnOcean standard wireless telegrams.

The sensor is powered by an integrated 2 cm^2 solar cell and an internal energy buffer. It thus operates without any maintenance, without batteries or an external voltage supply. With the energy buffer fully charged, the sensor can work for about 50 hours in complete darkness. The wireless contact, being so small (19 x 15 mm), is easily attached, and without disturbing optically, to any window or door frame of aluminum, plastic or wood.

Where to order:
www.easysens.de
email@thermokon.de

NETWORKED

enocean alliance

PROFESSIONAL PRODUCTS WITH ENOCEAN® TECHNOLOGY ARE AVAILABLE FROM THE FOLLOWING COMPANIES:

Balluff GmbH Industrial switches **www.balluff.de**	BALLUFF	PEHA Paul Hochköpper GmbH & Co. KG Wireless switches, receivers and building automation systems **www.peha.de**	PEHA
Beckhoff Automation GmbH Building automation systems **www.beckhoff.de**	BECKHOFF	Regent AG Lighting engineering **www.regent.ch**	REGENT
Bticino S.P.A. Wireless switches and receivers **www.bticino.it**	bticino	Servodan A/S Wireless sensors **www.servodan.dk**	SERVODAN
CER Wireless gateways **www.cer.com**	CER	Schlaps & Partner GmbH EIB gateways **www.schlaps-automation.de**	Schlaps & Partner
EnOcean GmbH Universal switch inserts EnOcean® easyfit **www.enocean.com**	enocean	Schunk GmbH & Co. KG Industrial sensors **www.schunk.com**	SCHUNK
HardSoft Voting system **www.easyted.com**	easyTED	steute Schaltgeräte GmbH & Co. KG Industrial switches **www.steute.com**	.steute
Helios Ventilatoren GmbH + Co. Ventilator controls **www.heliosventilatoren.de**	Helios	Thermokon Sensortechnik GmbH Building sensors, receivers, gateways and building automation systems **www.thermokon.com**	thermokon Sensortechnik GmbH
Höte Electronic GmbH Control systems **www.hoete.de**	HÖTE-ELECTRONIC-GMBH	WAGO Kontakttechnik GmbH Building automation systems and pluggable building installation system **www.wago.com**	WAGO
Jäger Direkt GmbH & Co. KG Wireless switches and receivers **www.Jaeger-Direkt.com**	jäger DIREKT	Warema Renkhoff GmbH Sunshade systems **www.warema.de**	warema
Kleine-Kumpmann Funkstuhltechnik Wireless chair technology **www.funkstuhl.de**	Kleine-Kumpmann Funk Technik	Wieland Electric GmbH EIB gateways, pluggable building installation systems, wireless switches **www.wieland-electric.com** | **www.gesis.com**	wieland
MSR Electronic GmbH Gas sensor systems **www.msr-electronic.de**	MSR	Wiesemann & Theis GmbH Ethernet gateways **www.WuT.de**	W&T
Omnio AG Wireless switches, receivers and building automation systems **www.omnio.ch**	omnio	Zumtobel Staff GmbH LUXMATE LITENET flexis **www.zumtobelstaff.com**	ZUMTOBEL STAFF
OSRAM GmbH Luminaire controls **www.osram.com**	OSRAM		

EVERYTHING AT A GLANCE:

FOLD OUT – TAKE OUT – HANG UP: the handy poster from EnOcean.
Here is a complete overview of the applications for which producers offer solutions enabled by EnOcean technology.

INNOVATION FROM SWITZERLAND – REGENT POWERCLIC™

Innovative lighting ideas from Regent have been around since 1908. The company has more than 500 people in Switzerland and elsewhere in Europe, working for one objective: intelligent luminaires and light systems for customers with sophisticated requirements.

By Patricia Müller-Hafner, marketing, Regent Beleuchtungskörper AG

In PowerClic™ Regent has created a further innovation in building installation systems. This batteryless and wireless system, based on EnOcean technology, consists of a transmitter and a control module (receiver), and is ideal for implementing maintenance-free switch, button or dimmer fixtures to operate different lighting installations. PowerClic™ can be used to control single luminaires or whole groups of them. Being very compact, transmitter and control modules can be subsequently integrated in existing systems.

PowerClic™ demonstrates its versatility especially in buildings and facilities where it is difficult or not at all possible to modify the electrical installation. The (wireless) switch is independent of the electricity network, meaning that installation costs can be cut to a minimum. Further benefits of the batteryless and wireless system are the reduced fire load in a building and the avoidance of disturbance such as low-frequency 50 Hz radiation.

PowerClic™ can switch or switch and dim luminaires (if they have a regulated electronic ballast) and also be combined with entire light management systems like SensoDim® and SensoSwitch®.

www.regent.ch

REGENT Lighting

CABLELESS SENSOR TECHNOLOGY – SENSOR SIGNALS SECURELY TRANSMITTED, WIRELESS AND MAINTENANCE-FREE

In its new RSS cableless sensor technology with a long-life battery, SCHUNK of Lauffen/Neckar presents a world first in the end-position sensing of gripper modules. The system is made up of transmitters with two sensors and receivers plus an external antenna. The sensors monitor the travel of the gripper jaw and signal this to the transmitter. This then sends the information wirelessly to the receiver, which is linked to the controller of the overall system.

RSS wireless sensor system and Schunk gripper

By Frank Altmann, marketing automation, SCHUNK GmbH & Co. KG

The RSS system is used in locations to which no cables can be routed, for example in milling or grinding machines, machining centers, or in rotating and tightly spaced applications that will not allow cabling through the axle. This is the case in milling installations where a tool with a sensor is attached to the tip of the spindle. Cableless sensing is also ideal in adverse environments and potentially explosive areas.

The advantages of the system include controlled, more economical handling units and systems through the substitution of breakage-prone cables, doing away with costly cable trailing devices and the absence of cable laying work. Troubleshooting is very much simplified compared to conventional solutions because the status of the wireless transmission can always be read.

The RSS wireless sensor system is primarily intended for use with SCHUNK grippers, but is equally suitable for other applications such as component sensing. The cableless sensor technology is very user-friendly – it is speedily and manually set up, the battery needs no frequent replacement because it is scaled for lifetime of up to ten years. Ranges of up to 30 meters plus highly reliable transmission through multiple conveyance of each message are further benefits of this unique system.

OUTLINE TECHNICAL DATA

Transmission range:
approx. 10 meters in workshops
approx. 30 meters in the open
Receiver power supply:
24 Vdc
500 mA output
Transmitter battery lifetime:
min. 6 years for 2 transmissions/s
min. 8 years for 1 transmission/s
up to 10 years for shorter cycles

www.schunk.com

SCHUNK

VISIONARY

STANDARDIZATION OF SHORT-RANGE WIRELESS NETWORKS – MOTOR OR STUMBLING BLOCK FOR INNOVATION

Standardization has been a mega trend in recent years, in the automobile industry and equally for computer architectures and networks. Particularly affected are the new wireless network protocols for wireless MAN, wireless LAN and short-range wireless networks (SRWNs).

BERUFSAKADEMIE LÖRRACH
University of Cooperative Education

Prof. Axel Sikora, Dr-Ing., Dipl.-Ing., Dipl.-Wirt.-Ing., head of information technology studies at the University of Cooperative Education in Lörrach

ADVANTAGES OF STANDARDIZED SOLUTIONS

The increasing trend to standardization is basically a positive one, allowing production in large batches, broad-based technological development within a community, independence from a single supplier, non-proprietary interoperability of systems plus more differentiation of the market through a larger number of participants focusing on various aspects.

On the other hand, a number of drawbacks go along with standards, in particular:

- Standardized solutions normally call for a harmonization process, which lengthens the time to market.
- Majority-based harmonization processes possibly mean that corporate policy factors influence technical development, which often enough leads to technical solutions that are not optimal. Big names on the market can more easily devote time and effort to standardization committees than small but nevertheless innovative enterprises.
- Standardized products must generally implement functionality that results from their spanning nature but not from the needs of a particular application. Individual solutions can thus take on extra complexity that is not absolutely essential.

It should be emphasized that additional functionalities and services are only made possible by standardized products. Networking or meshing, in particular, and interoperability can be sufficient justification of extra investment.

ADVANTAGES OF PROPRIETARY SOLUTIONS

The above drawbacks mean that you continue to find proprietary solutions, also in SRWNs. Mostly they can be characterized as follows:

- Proprietary approaches allow a customized solution. Very simple, unidirectional wireless systems can be implemented with 2 kbytes of program memory. Standardized bidirectional systems usually require ten times as much if not more.

- The same or similar applies to power dissipation. Extremely low-energy systems, tending in the direction of autonomous networks that can manage entirely without external power from batteries or a power grid for example, often enough set up on very special approaches that could not yet win a majority in standardization committees.
- There is also an important non-technical aspect. When systems become interoperable, you are no longer tied to a particular producer. Even if this aspect loses its significance against a background of relatively increasing costs for standardized systems, it continues to be highly relevant especially at the application level. In Germany in particular, many producers still attempt to maintain technological leadership by a lack of interoperability with the systems of less expensive producers.
- Finally a secondary aspect should not be forgotten. If a standardized protocol is used, compatibility should also be evidenced. This generally places higher demands on development discipline and calls for extra effort through the necessary investigations of compatibility.

STANDARD VARIETY

The situation becomes especially problematic where you find several standards co-existing. The developer or user of a system must then choose between the different standards – and thus in effect make the decision that the standardization committee should make for them on a neutral basis. Two major reasons can be identified for the multiplicity of standards:

- In a standardization committee you often enough find the situation where a single technology cannot win a majority, with the result that, by a "do et des" principle, several technologies are mutually agreed upon and standardized to overcome the stand-off. But in this way standards lose their pacesetting role and the choice is left to the market.
- On the other hand, many independent syndicates have formed with the aim of promoting a certain approach on the market. In many cases, what is behind such a formation is the attempt by producers to lend weight to their proprietary technology with the leverage of a broad-based syndicate. It should be noted that many of these syndicates act independently and freed from the bounds of official standardization committees. Only a few groups subsequently choose to work through the committees. The Standards Association (SA) of the IEEE is one of them. Consequently all standards of working group 802 are also ISO standards of the 8802 family for instance.

The approach of, initially, proprietary development with subsequent standardization nevertheless has positive aspects, because technical development is very much factually based and a positioning on the market is achieved. But it should also be mentioned that not only the independent producer syndicates are responsible for the variety of standards. Within the consolidated syndicates too, like 802, you also find competitive situations, both between working groups – these are the committees at the second level of the hierarchy – for example between 802.11 (WLAN) and 802.16

(WMAN), and between different task groups, for example between 802.15.3 and 802.15.4.

MODULARITY IN SHORT-RANGE WIRELESS NETWORKS

A further aspect enters the scenario when it comes to SRWNs. The parallel network protocols are virtually all modular. As a rule this means, in wireless networks, that both the classic horizontal split of network functionality and vertical differentiation by data and management traffic is given. In addition, practically all SRWNs cover the entire protocol stack however. Here you see that the technologies, to a very large degree, exhibit disjunctive interfaces. This means that the approach of modularity and exchangeability of individual layers, originally propagated in the layer model, has lost its importance. So interconnection of the different components is not possible. For the system integrator there is as good as no difference any longer compared to monolithic protocol implementation.

CONCLUSION

The variety of competing standards is hardly likely to reduce in the near future. Proprietary approaches will maintain their right to exist as long as they can continue to offer better performance or substantially lower cost than standardized protocols.

INQUISITIVE

RECORD NUMBERS ATTEND INTERNATIONAL AUTUMN ROADSHOW

Following on from the successful events in the spring of 2005, the autumn road show, organized by WAGO, took a new route that included four halts in the Netherlands. The response was again very positive, with some 160 visitors in Arnhem, Zwolle, Amsterdam and Veldhoven. The show also stopped over in the German cities of Berlin, Erlangen, Düsseldorf and Sondershausen. This last stop was a fitting climax, staged as it was in a former potassium mine specially refurbished for cultural and conference events. Here alone, 700 meters underground, the show was attended by a record of more than 100 persons.

Speakers from the companies
- **EnOcean** (batteryless radio technology),
- **OSRAM** (Touch DIM remote controls),
- **PEHA** (EasyClick, switching without wires and batteries),
- **Thermokon** (EasySens® room controls),
- **WAGO** (I/O system 750, WINSTA)

presented the interested visitors with new developments and products from the world of batteryless wireless technology. Each of the events concluded with external speakers who reported on experience with batteryless wireless technology in diverse projects.

Given the huge success of the autumn events with some 450 participants, the show will go on the road again in 2006. Planning is already under way for stopovers in Germany and other European countries.

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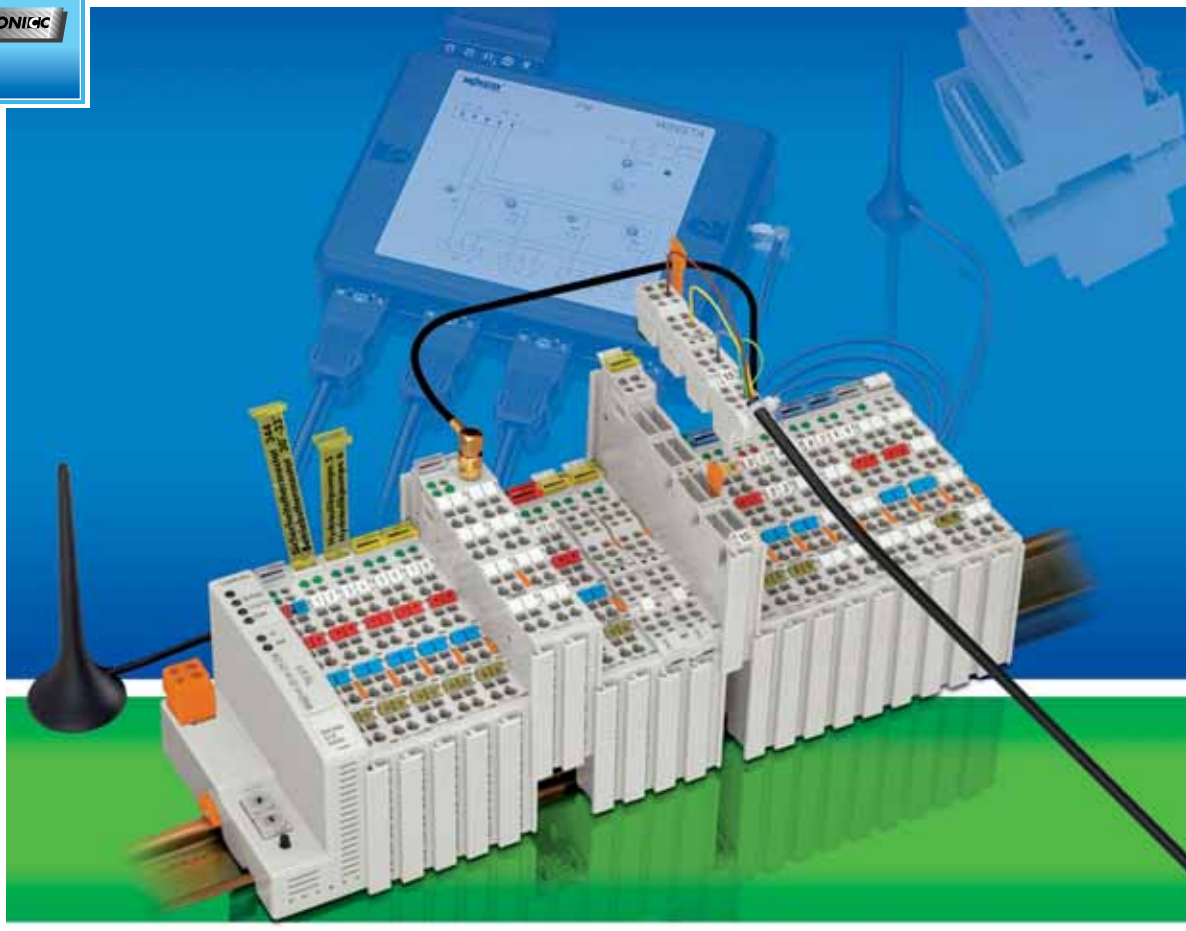

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INQUISITIVE

BATTERIES NOT INCLUDED

Energy harvesting powers true independence for wireless devices.

By Jeff Raimo, product manager, Siemens Building Technologies, USA, and Jim O'Callaghan, vice-president of sales and marketing, EnOcean Inc.

Source: Buildings Magazine August 2005, www.buildings.com

Jim O'Callaghan

TO WIRE OR NOT TO WIRE

The wired vs. wireless dilemma has always been a choice between the lesser of two evils: you could either connect to line power and sacrifice the many benefits inherent to wireless, like flexibility, mobility and ease of installation, or use batteries and cope with the limited life, maintenance and disposal issues that accompany them. As the number of wireless devices available for building applications such as HVAC, lighting and security control grow, so does the challenge of how to power them efficiently and independently.

New energy harvesting technology that scavenges the minuscule amounts of energy present in the environment is quickly being developed to power a variety of wireless networked devices including sensors, switches and the radio electronics necessary to transmit their signals. Cost is also becoming less of a factor, not only because of the economies of scale associated with the growing commercialization of the technology, but also through the savings generated by eliminating batteries and the maintenance associated with battery-powered devices. While it is true that energy harvesting solutions presently cost a few dollars more than battery-powered versions, they should be comparable in cost in two to three years. The cost premium today is typically less than the expense of swapping the battery one time (battery price, labor, etc). So, over an expected lifetime of say 15 years, there would be significant savings from a self-powered sensor.

All the improvements in technology notwithstanding, one fact remains: batteries are problematic for large-scale wireless applications. They have to be monitored for charge, useful life varies depending on the operating environment, and there are labor, stocking and replacement costs to consider as well. What is more, devices must be accessible for battery replacement, and batteries are increasingly considered to be hazardous waste. Energy harvesting provides continuous, renewable and ample energy – meaning you can monitor sensors and transmit more frequently than what is typically permitted by battery-powered devices.

BETTER TECHNIQUES, BETTER YIELD

Light, vibration, temperature gradients or motion – present in the environment around us – all contain energy that can be harvested. Until fairly recently,

WEIGHING UP THE APPLICATION

With batteryless devices there are several things to consider:

1. *Is the application non-mission-critical (where reduced reliability is acceptable, such as in cases where an interrupted signal would be minimal in impact)?*
2. *Is it a low-bandwidth application where only small data packets are transmitted intermittently?*
3. *Are there a large number of wireless devices utilizing batteries where battery maintenance is a significant issue and/or the location of the devices is such that battery exchange is difficult?*
4. *Is the application in a hazardous environment where measures to counter the risk of spark discharge require elaborate and costly measures? The low operating voltages of these devices and lack of cabling may make more sense and provide a simpler solution.*
5. *Is the amount of RF interference in your facility a concern? Because of the ultra-low energy of the radio signal used (a result of the extremely short transmission time), the amount of RF pollution added to the environment is considerably less compared to battery-powered wireless devices.*
6. *Is the application in an area where devices need to be sealed and watertight? This may be easier to accomplish with a device that never needs to be periodically opened up for battery replacement.*

the amount of energy harvested was not sufficient to send a wireless signal any practical distance. However, improvements in techniques, combined with very low-energy electronics, mean that independent, batteryless technologies are a commercially viable reality.

Energy harvesting radios output up to 10 mW compared to 1 mW (typical for battery-powered radios), so range is longer. With existing technologies engineers can now expect transmission distances of up to 30 meters indoors, with signal strengths sufficient to reliably transmit through walls and other structural elements. The key enabling features of these devices are their highly efficient power management and extremely short signal duration. When they are not transmitting, they revert to an ultra-low-energy sleep mode. When signaled however, the devices quickly wake up to transmit a burst of data, and then go back to sleep – all in a little less than a thousandth of a second.

Solar-powered room temperature sensors are the most common application specified today. Wall-mounted light switches that operate off the energy harvested when somebody pushes them are another device gaining acceptance among building system designers. Other applications include solar-powered magnetic contacts in security systems that monitor doors and windows, and solar-powered switches that remotely operate blinds, shutters and awnings.

CAN'T DO IT ALL – YET

By virtue of the necessity to keep the power demands of a given wireless device extremely low, data must be transmitted in short bursts. This is not an issue for applications such as a temperature sensor that intermittently transmits a small packet of data. But for high-bandwidth applications, such as streaming control or system monitoring data over extended periods of time, energy harvesting just cannot generate enough power to handle the job – not yet anyway.
Another concern is reliability: wireless signals are only transmitted one way – there is no acknowledgement that the signal was properly received by the intended device. This, of course, is not likely to be an issue for applications where the user can visually confirm transmission (such as a light turning on or a shade lowering), but for more sophisticated control systems device status is often a critical aspect of overall system or network integrity.

As the technology evolves, fueled by increasing amounts of vendor-supplied development dollars and demand, we can expect to see more complex wireless devices capable of sending larger amounts of data go batteryless. It is equally likely that the number of applications will grow as companies figure out new ways to apply the technology in situations where the absence of wires can generate cost savings and other enterprise-wide facility management benefits.

www.us.sbt.siemens.com
www.enocean.com

INTERNATIONAL

NEW INTERNATIONAL DISTRIBUTION PARTNERS FOR ENOCEAN® PRODUCTS

Supporting the worldwide expansion of EnOcean GmbH, four new distribution partners join those already operating in Germany, Britain, Czech Republic, Denmark, Italy, South Africa and Switzerland.

FRANCE

Pyrecap was established in 1978 and is well-known in the RF and microwave markets. In 2000 it was taken over by Hycosys and is now managed by Sylvaine Goeusse. Pyrecap has since gone on to diversify its activities in the wireless market. The company acts as a distributor for several producers, offering a wide range of equipment from chips through to complete and sophisticated modules.

www.pyrecap.com

BRAZIL

ASP Automação e Segurança Predial is the new EnOcean partner in South America. Managing director Oskar Pzillas has 20 years' experience on the Brazilian market and, in addition to EnOcean wireless modules, will be selling end-products for lighting and climate control.

www.aspcontrol.com.br

ISRAEL

Semix Engineering & Marketing Ltd. was founded in September 2003 with the prime objective of representing and distributing leading electronic companies in the area of ASICs, power, telecommunications, RF and wireless. Semix has rapidly gained an excellent reputation for providing its customers with the highest technical level of design-in support and is today one of the fastest growing technical representative companies in Israel.

www.semix.co.il

RUSSIA

EKSET JSC is headquartered in Moscow. A distribution partner with core competence in industrial and building automation, the company already represents Beckhoff, Omnio, Thermokon and LOC on the Russian and Ukrainian markets. Manager Konstantin Galenko predicts enormous potential for batteryless wireless technology from EnOcean and constantly increasing demand in his region.

www.ekset.ru

ROARING WITH THE LIONS – SOUTH AFRICA

South Africa with its 50 million inhabitants is a land in rapid transition hosting both a first-world and a third-world economy. With stable growth averaging over 3% per annum in the last ten years, it is the economic powerhouse of sub-Saharan Africa.

With the hosting of the Soccer World Cup in 2010, the forecast for the next ten years sees economic growth closer to 5% per annum. The building sector in particular, stimulated by the government, is contributing to the current growth.

ELTEC

Eltec Holdings has been operational since 1960 as a manufacturer and distributor of cable and instrumentation for the automotive, building, defense, electronics, marine and telecom industries. Eltec Holdings and its divisions are strategically sited in all major South African cities and have a high reputation within their different markets. Together with the rapid economic expansion in Southern Africa, the Eltec group is also expanding. Eltec Electronics was formed, as an offshoot, to encompass all activities related to electronics.

ELTEC AND ENOCEAN

Due to its strong ties with Europe Eltec has been, since early 2004, in close contact with several application partners and EnOcean, with the common goal of bringing the company's wireless technology to Southern Africa. This has resulted in its becoming the distributor of EnOcean technology for application partners like Thermokon and PEHA. Eltec Electronics is proud to be at the forefront of introducing this technology to the various markets. It is already cooperating closely with other EnOcean application partners or its representatives in South Africa (e.g. Osram, Beckhoff) and would welcome others.

THE ROARING LION

Next to the booming building industry, South Africa also hosts major chemical engineering, mining, logistics and automotive industries, in which the application of EnOcean technology is of great interest. South Africa is following the growing global trend of incorporating wireless technology solutions in outstanding innovative products. Eltec believes that the synonym for these solutions will be EnOcean, and is proud to be part of its global strategy.

www.eltecsa.co.za

UNPLUGGED

A RABBIT'S TALE

This is the story of the simplest application for EnOcean, which has demonstrated four great benefits.

From Simon Taylor, product manager for TDC, EnOcean's UK distributor

Simon has a garden shed at home that houses two pet rabbits. This wooden shed has an electricity supply, and also contains a junction box to supply further power to the garden pond. Inside the shed was a standard light switch and light. The problem was that, if the light was left on, Simon's wife would make him go down to the shed in the cold and the wet weather to switch it off – not a very acceptable situation.

Simon wanted to fit a remote light switch, but of course this would have meant adding further cabling to the shed to provide a switched circuit, together with the risk of another cable in the garden, and the inflexibility of the final switch position. So, using the permanent electricity supply to power an RCM 250 receiver, the light is controlled inside the wooden building.

Now, the light switch is inside the house (in the warm and dry), with these benefits from the use of EnOcean technology:

- The main operating switch is in a convenient position, not constrained by the location of power cabling.
- Ease of installation – no extra cables had to be run outside.
- Additional switches can be added with ease, internal to the shed or in other locations in the house.
- Safety – no more wet hands near line voltages after walking to the shed in the rain.

If these benefits were translated into normal installation costs, then the price of the switch and the receiver would have been far outweighed by the cost of installation of wiring, drilling and redecoration. Next project for Simon? Upgrading the house's internal lights to EnOcean technology. Which will also produce extra possibilities like computer control, dawn/dusk control in addition to the simple upgrade of the light switches.

simon@tdc.co.uk

PRESS ECHO INTERNATIONAL

■ **CFO issue**
Sensors working overtime - August 2005 issue
Is that warehouse about to collapse? Is that turbine about to throw a blade? Is that oil well going to explode? All good questions, particularly if you happen to be standing nearby. But for managers at asset-intensive businesses, keeping tabs on heavy machinery and vital infrastructure goes beyond the desire to minimize head wounds… Unplugged: three little wonders. *John Edwards*

■ **Sensors – August 2005 issue**
Best of Sensors Expo Awards 2005
In the sensors category there were two gold winners. Being a huge fan of energy harvesting schemes, I was captured by EnOcean's STM 100, a wireless sensor module featuring a small solar cell for battery-free operation. Oh, so it requires a light source, you ask? Well, only an occasional one (and here's the beauty of the design).

■ **Building automation – autumn 2005**
The importance of open connectivity
Open, plug & play hardware components have an important role in the move towards the use of modern building automation technologies and networks, to ensure a future-proofed solution. There are some clear technology trends in building automation today that are demonstrating how the industry and the many stake-holders … are gearing up to face the future.

■ **Time Magazine 12/2005**
A flash of the future – smart sensors, no batteries
At a trade fair four years ago, Markus Brehler found himself in an enviable position for someone contemplating the launch of a company. To investigate demand for a sensor that can generate its own power, Brehler pretended he already had a company: "We were curious to test the response, so we just created a virtual company."
William Boston

■ **Red Herring – December 12, 2005 issue**
Reinventing energy
Germany's Markus Brehler spent years managing products, brands and customers for Siemens before taking the plunge with a startup called EnOcean, a spin-off of the conglomerate. As EnOcean's founding CEO, the electrical engineer has led the company through financing, product development, and commercial introduction of so-called "energy harvesting" sensors.

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EVENTS

JANUARY 2006

January 25-29 – World Economic Forum, Davos, Switzerland
Participation by Markus Brehler, CEO of EnOcean
www.weforum.org

FEBRUARY 2006

February 14-16 – embedded world 2006, Nuremberg, Germany
Hall 12, booth 224
EnOcean will be exhibiting with Unitronic AG

February 28 - March 04 – Interior Light – www.lightexpo.ru
Sokolniki Culture & Exhibition Centre Moscow, Russia
EKSET, distribution Partner Russia, www.ekset.ru

MARCH 2006

March 13-14 – 13th ITG/GMA Conference on Sensors and Measuring Systems
Albert Ludwig University, Freiburg, Germany: paper by Dr Wolfgang Heller (EnOcean product line manager) on March 13 at 13:40 h on the subject "Autonomous energy wireless sensors: from crazy ideas to mass market products". More information at reindl@imtek.de

March 21-23 , RF & HYPER (Europe 2006), CNIT - PARIS LA DEFENSE, France
Hall Albinoni 1 & 2 - Niveau A - booth A 12
Pyrecap, distribution partner France, www.pyrecap.com
www.RFHyper.com

APRIL 2006

April 24-28 – Hannover Fair Industry, Hannover, Germany
EnOcean is exhibiting in hall 009, booth H68

April 23-27 – light + building, Frankfurt, Germany
EnOcean is exhibiting in hall 9.1, booth C41

NOVEMBER 2006

November 14-17 – Electronica 2006, Munich, Germany
New Munich Trade Fair Centre
www.electronica.de

To make an appointment with us at one of these events or for a visitor's ticket, send an e-mail to info@enocean.com.

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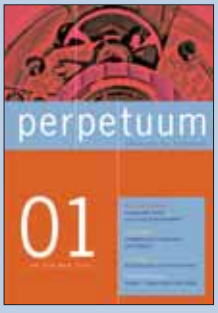

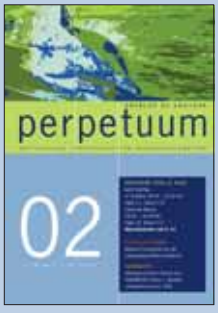

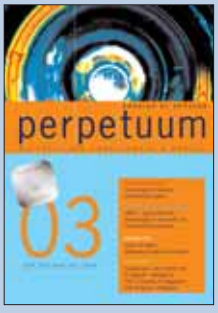

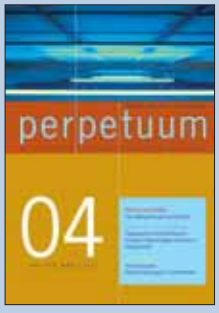

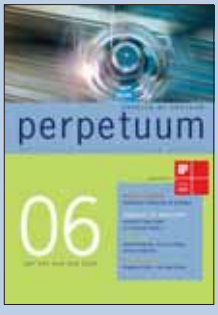

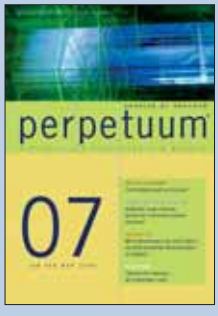

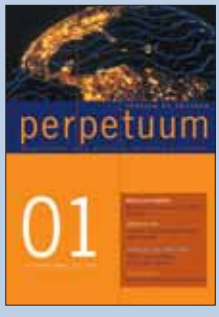

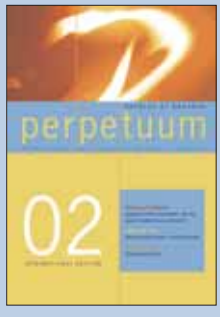

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