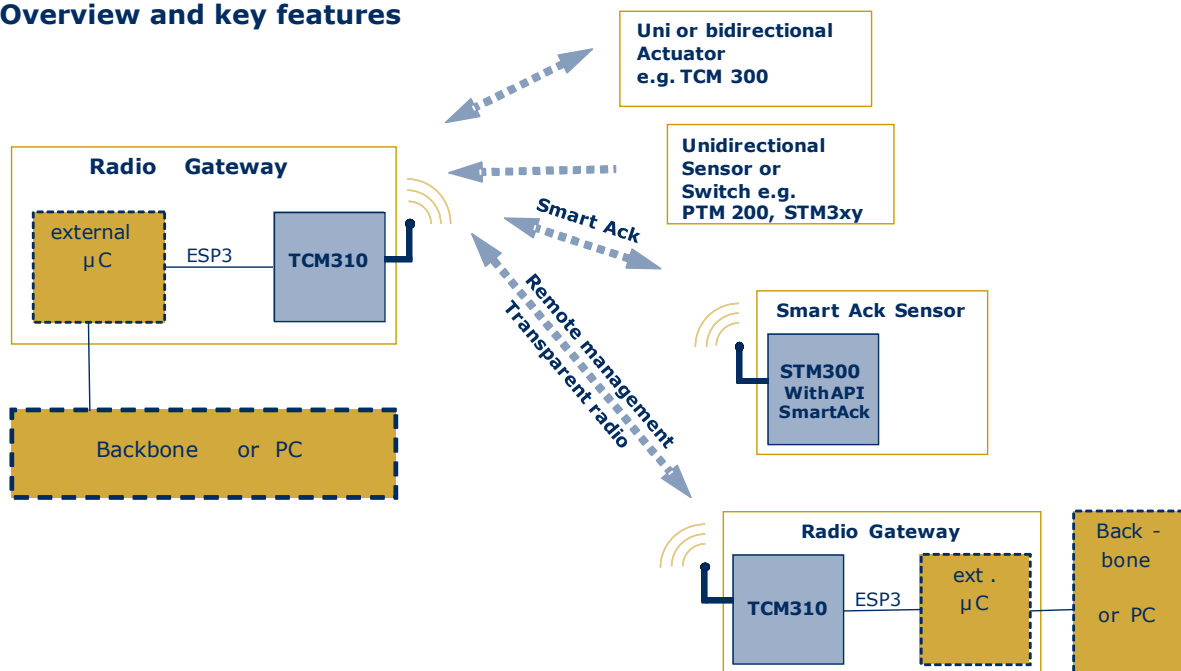


## TCM 310 Bidirectional Gateway Controller

TCM 310 enables the realization of gateways for the EnOcean 315, 868 MHz and 902 MHz radio systems. It provides a bi-directional radio interface at one end and a bi-directional serial interface at the other end. Radio messages are sent transparently through the serial interface in both directions from and to an externally connected host processor or host PC. In addition control commands can be sent from the host, e.g. to configure the repeater functionality or to manage the Smart Ack functions. TCM 310 can act as postmaster for up to 20 bi-directional sensors using Smart Ack technology.

### Overview and key features



### EnOcean Serial Protocol 3

TCM 310 is the first product to use the new version of EnOcean's serial protocol ESP3. ESP3 is a bi-directional serial protocol between the TCM 310 module and an external host. It provides a transparent channel for radio messages and an interface to control the module from the host. Compared to the previous serial protocol ESP2 which has been used in the past, ESP3 adds several new features, such as:

- Transmission of the received radio signal strength (RSSI), and number of the received sub-telegrams
- Improved data security and consistency by CRC8 data verification
- Higher serial data rate
- Support for longer telegrams with more data
- Support for EnOcean Equipment Profiles according to EEP2.0, EEP2.1, and EEP2.5
- High flexibility for future requirements

	ESP 2.0	ESP 3.0
Subtelegram count	--	•
Receive signal strength (RSSI)	--	•
Upward compatible with 'Optional Data'	--	•
Data verification	Checksum	CRC8
UART Synchronization (packet detection)	2 bytes	6 bytes
Max. number of ESP packet types	8	256
Types of data	Radio, Command	Any type of data
Max. size of transferred data	28 bytes	65535 bytes
Communication speed	9600 baud	57600 baud

In order to simplify the interpretation of EnOcean Equipment Profiles, EnOcean has recently introduced EnOcean Link – a middleware which converts the bits and bytes of an EnOcean telegram directly into data values. In doing so, the middleware automatically takes into account all specifications of the EnOcean protocol stack and the EnOcean Equipment Profiles (EEPs) and Generic Profiles (GP) of the EnOcean Alliance as well as encryption mechanisms. This means EnOcean Link provides all wireless applications with a ready-made key to the energy harvesting wireless world. Since the software interprets all data, it also ensures the interoperability of equipment from different manufacturers. More information on EnOcean Link can be found at <http://www.enocean.com/de/enOcean-software/enOcean-link/>.

### Repeater functionality

TCM 310 provides integrated repeater functionality for EnOcean radio telegrams. Via serial commands the repeater can be switched on and off, and the repeater level can be set. One and two level repeating is possible which means that original telegrams and - in case of two level repeating - also 1x repeated telegrams will be repeated. It is also possible to read the repeater setting via the serial interface.

### Smart Ack controller functionality

With the latest generation of radio sensors based on STM 300 it is also possible to build self-powered bi-directional sensors. Switching on the receiver continuously consumes a lot of energy. Therefore message synchronization scheme called Smart Ack is used. That means that a sensors sends its data and expects an acknowledge message in a predefined very short time slot. Only during this time sensor's receiver is active. This message tells the sensor that its telegram has been received and in addition provides information for the sensor. If there are repeaters within the installation these could cause unknown time delays and synchronization therefore would not work. To eliminate this problem Smart Ack uses mail boxes at line powered devices with direct contact to the autarkic device. The mail box is like a letter box for the sensor. Acknowledges from controllers are stored in the mail box and the sensor can fetch the data from there. Due to the direct connection between the mail box and the sensor (without a repeater between them) the line powered device with mail box – also called postmaster – can answer immediately when the sensor requests the data. This allows keeping the time the sensor's receiver needs to be activated below 3 milliseconds. TCM 310 can act as postmaster for up to 20 sensors. This time critical

postmaster function is handled automatically without involving the external host microprocessor.

### **Applications**

TCM 310 is ideally suited for use in gateways to building automation systems like LON, BACNET, or KNX. The host microcontroller bridges between EnOcean protocol and the building automation system. Another application of TCM 310 is the implementation into home automation controllers in residential homes where the user can monitor and control the status of the home. In addition it can be used in optional radio extensions of wired control systems to include wireless remote controls.