

USB 300 / USB 300C / USB 300U (OEM)
USB Gateway for EnOcean Radio



Important Notes

This information describes the type of component and shall not be considered as assured characteristics. No responsibility is assumed for possible omissions or inaccuracies. Circuitry and specifications are subject to change without notice. For the latest product specifications, refer to the EnOcean website: <http://www.enocean.com>.

As far as patents or other rights of third parties are concerned, liability is only assumed for modules, not for the described applications, processes and circuits. EnOcean does not assume responsibility for use of modules described and limits its liability to the replacement of modules determined to be defective due to workmanship. Devices or systems containing RF components must meet the essential requirements of the local legal authorities. The modules must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value. Components of the modules are considered and should be disposed of as hazardous waste. Local government regulations are to be observed.

USB 300, USB 300C and USB 300U are designed and produced as OEM products. They will be brought to market by local OEM manufacturers. They are not considered to be finished end products in terms of WEEE (electronic waste regulation) and CE. Product warranty, labelling, WEEE and CE declarations are covered by the local OEM.

Packing: Please use the recycling operators known to you. By agreement we will take packing material back if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or that we are not obliged to accept, we shall have to invoice you for any costs incurred.

Important notice for users in Japan: This product is not certified as conforming to technical regulations of radio law of Japan. If you use this kit in Japan, you are required by Radio Law of Japan to follow the instructions below with respect to this product: Use this product in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on sub-section 1.1 of article 6 of the "Rule for Enforcement of Radio Law of Japan". Use this kit only after you obtained the license of "Test Radio Station" as provided in Radio Law of Japan with respect to this product, or use of this product only after you obtained the technical regulations conformity certification as provided in radio law of Japan with respect to this product. Do not transfer this product, unless you give the same notice above to the transferee. Please note that if you could not follow the instructions above, you will be subject to penalties of Radio Law of Japan.

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1 Introduction

USB 300 is a small USB stick which connects PC's or smart home servers (e.g. Raspberry Pi) to the world of EnOcean based radio products.



USB 300 is equipped with the TCM 310 transceiver module and the gateway controller software. It provides bidirectional EnOcean radio protocol to devices with USB interface. Radio messages are sent and received through a virtual serial interface (FTDI Virtual COM Port). USB 300 provides additional information like signal strength (RSSI).

Control commands can be sent, e.g. to configure repeater functionality. Further information about supported commands and the software features can be found within the TCM 310 user manual:

http://www.enocean.com/en/enocean_modules/tcm-310

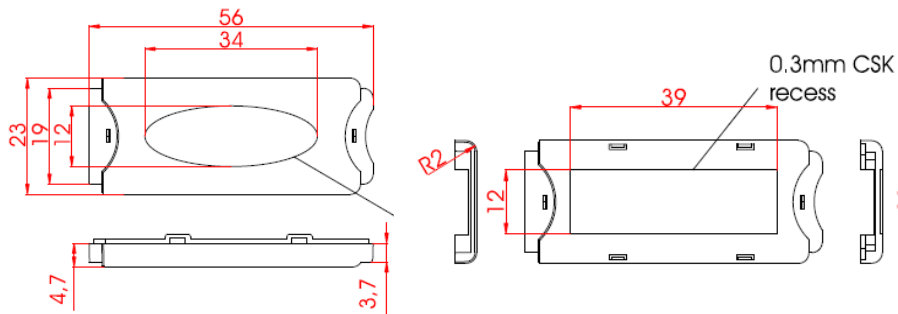
USB 300 is available for 868 MHz, 315 MHz and 902 MHz:

- USB 300 (868MHz) has been CE certified and fulfils R&TTE EU directive on radio equipment
- USB 300C (315MHz) and USB 300U (902MHz) fulfils FCC / IC requirements

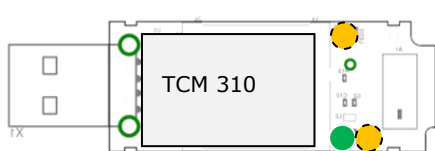
2 Technical Data & Environmental Conditions



Dimensions:	66 x 23 x 9mm (incl. transport cap 70 x 23 x 9mm)
OEM label area:	39 x 12mm
Weight:	12g
Operation temperature:	0°C - +50°C
Storage temperature:	-25°C - +70°C
Operation humidity:	0% - 90% r.h., no condensation
Storage humidity:	0% - 93% r.h., no condensation
USB contact durability:	500 cycles
Max. ripple USB voltage:	50 mVpp
868 MHz version:	Chip antenna (R&TTE EN 300 220)
315 MHz / 902 MHz version:	Whip antenna (FCC CFR-47 Part15)
CE declaration:	yes
RoHS:	yes

Housing:

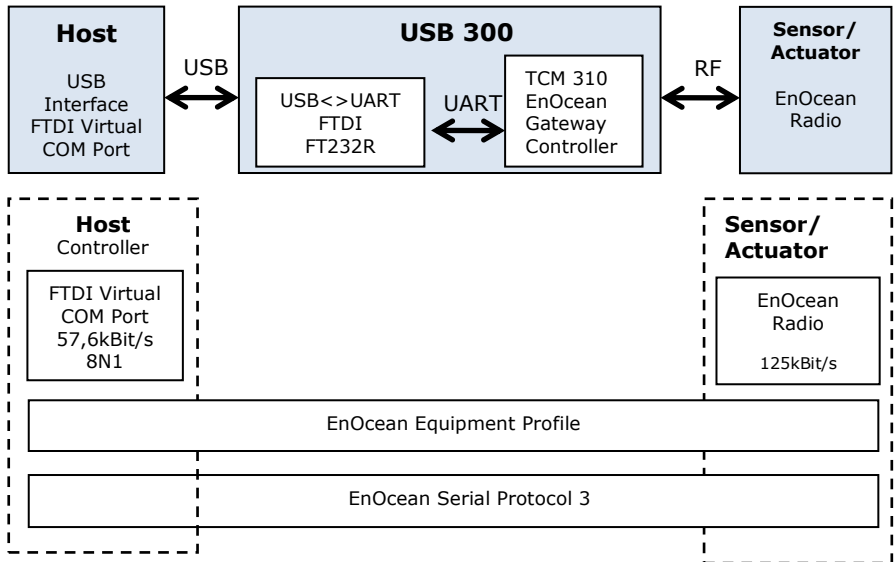


PCB:



-  USB activity LED, positions depends on HW variant
-  Power LED

3 Block Diagram and Protocol Layers



4 Documentation of Protocols and EnOcean Profiles

- **Plug'n play device drivers** are available from USB chip manufacturer FTDI Limited for the operating systems Microsoft Windows, Linux and Apple Mac OS: <http://www.ftdichip.com/FTDrivers.htm>
- If you want to develop for **other host platforms**, you can use or adapt available C-source code for Linux OS from FTDI Website: <http://www.ftdichip.com/Drivers/VCP.htm>
- Smart Home Server with Raspberry Pi and USB 300: http://www.enocean.com/fileadmin/redaktion/pdf/white_paper/wp_Raspberry_talks_EnOcean.pdf
- USB 300 uses EnOcean Serial Protocol 3 for **control commands and data communication**. A description of ESP 3 is available at: <http://www.enocean.com/en/knowledge-base/>
USB 300 is based on a TCM 310 radio module, specific features and commands are described at: http://www.enocean.com/en/enocean_modules/tcm-310/
- The content of EnOcean radio telegrams is standardized by the EnOcean Alliance. You will find the latest definition of **EnOcean Equipment Profiles** (EEP) at: <http://www.enocean-alliance.org/>

5 Additional Features of USB 300

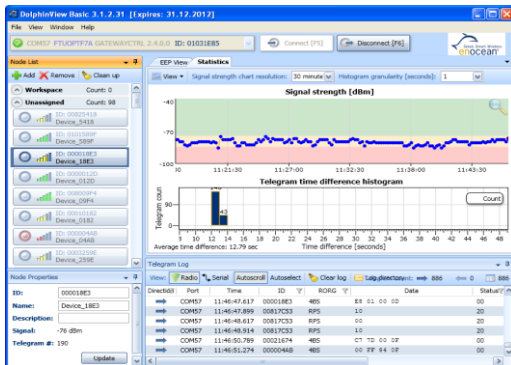
- USB 300 can be used as **repeater** of EnOcean telegrams; this will expand the range of radio devices. Repeater command has to be sent after every power up. For details see ESP3 command description of CO_WR_REPEATER within the ESP3 description:
- USB 300 can **filter** EnOcean telegrams; this can avoid heavy data load for the host system. For details see ESP3 command description of CO_WR_FILTER_ADD within the ESP3 description.
- USB 300 supports **remote management** of self-powered radio nodes. For details see TCM 310 and ESP3 command description of REMOTE_MAN_COMMAND within the ESP3 description.
- USB 300 supports **smart acknowledge** of self-powered radio nodes. This feature enables bidirectional communication for self-powered radio nodes. For details see TCM 310 and ESP3 command description of SMART_ACK_COMMAND within the ESP3 description.
- USB 300 commands are defined within TCM 310 Gateway Controller and ESP3 documentation is available at:
<http://www.enocean.com/en/knowledge-base/>

Hint:

For advanced analysis and protocol debugging we recommend EnOcean Developer Kit EDK 350 with DolphinView Advanced and Sniffer Software on TCM 3x0.

6 First Steps with USB 300 and DolphinView Basic

1. Register download and install DolphinView Basic:
<http://www.enocean.com/en/download/>
2. Plug USB 300 into free USB port the PC.
3. Start DolphinView Basic and connect to COM port
4. Press self-powered switch or learn button of sensor, DolphinView Basic will display telegram



7 Restrictions and Hints

- USB 300 should not be exposed to rapid temperature changes shortly before or during operation. Condensation of moisture might damage the device.
- USB 300 is not intended to be used in rough environment with heavy vibrations or mechanical shocks.
- The USB front cap is used as handling protection during delivery.
- USB 300C and USB 300U version:
In order to optimize radio performance you have to stretch out whip antenna. Please do not cut of, coil up, brake or bend frequently.
- USB 300C
Some PCs, notebooks or set top boxes might emit electromagnetic noise in the frequency band of 315MHz. EnOcean recommends the usage of USB extension cord ($\geq 30\text{cm}$) to reduce noise level of PCs.
- Installation location of radio nodes should be carefully planned. Application note AN001 at <http://www.enocean.com/en/application-notes/> will explain basic rules.

- Any USB 300 configurations done by ESP3 commands (e.g. repeater on, filter, maturity time) will be lost in case of power off. If you need these configurations permanent, make sure USB 300 has continues power or re-send commands after power down.
- USB 300 has been designed for usage with DolphinView Basic. For advanced protocol analysis and debugging we recommend the usage of EnOcean Developer Kit EDK 350 with DolphinView Advanced and Sniffer Software on TCM 3x0.
- USB 300 has been optimized for cyclic sending/receiving status values and not for continuous data communication; therefore the radio interface is limited to receive approx. 90 telegrams per second. Higher traffic can lead to telegram loss.
- Microsoft Windows increases the COM port number for every installed USB 300 (FTDI virtual COM port device). If the number reaches 255, you have to reset the device driver and follow the instructions from the company FTDI.

8 Legal issues and approvals

8.1 CE and R&TTE conformity (European Union)

USB 300 (868Mhz) conforms to CE and to the R&TTE EU directive on radio equipment. The device conforms to the European and national requirements of electromagnetic compatibility. The conformity has been proven and the according documentation has been deposited at EnOcean. The device can be operated without notification and free of charge in the area of the European Union and in Switzerland.

Important notice for original distributors:

Original distributors have to take care about legal issues of selling products to the European market. At least following issues have to be considered:

- Labeling according to CE and WEEE
- Fulfillment of country specific registration and recycling regulations of electronic waste and packaging material

8.2 FCC (US)

USB 300C (315Mhz) and USB 300U (902MHz) are based on the EnOcean STM 300C / STM 300U radio module. This hardware has a limited modular approval according to FCC. The conformity has been proven and the according documentation has been deposited at EnOcean.

Contains FCC ID: SZV-STM300C

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (i.) this device may not cause harmful interference and*
- (ii.) this device must accept any interference received, including interference that may cause undesired operation.*

Contains FCC ID: SZV-STM300U

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (i.) this device may not cause harmful interference and*
- (ii.) this device must accept any interference received, including interference that may cause undesired operation.*

8.3 IC (Canada)

USB 300C (315Mhz) and USB 300U (902MHz) are based on the EnOcean STM 300C / STM 300U radio module. This hardware has a limited modular approval according to FCC. The conformity has been proven and the according documentation has been deposited at EnOcean.

Contains IC: 5713A-STM300C

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (i.) this device may not cause harmful interference and*
- (ii.) this device must accept any interference received, including interference that may cause undesired operation.*

Contains IC: 5713A-STM300U

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (i.) this device may not cause harmful interference and*
- (ii.) this device must accept any interference received, including interference that may cause undesired operation.*

ENOCEAN

EnOcean is the originator of patented energy harvesting wireless sensor technology. The company manufactures and markets maintenance-free wireless sensor solutions for use in buildings and industrial installations. EnOcean solutions are based on miniaturized energy converters, ultra-lowpower electronic circuitry and reliable wireless. Combining these elements enables EnOcean and its product partners to offer sensor systems that are fundamental for energy-efficient buildings and innovative industry.

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