

USB BASED ENOCEAN RECEIVER / TRANSCEIVER – Easy Realization of an EnOcean/PC Gateway

Easy to realize USB Radio Gateway

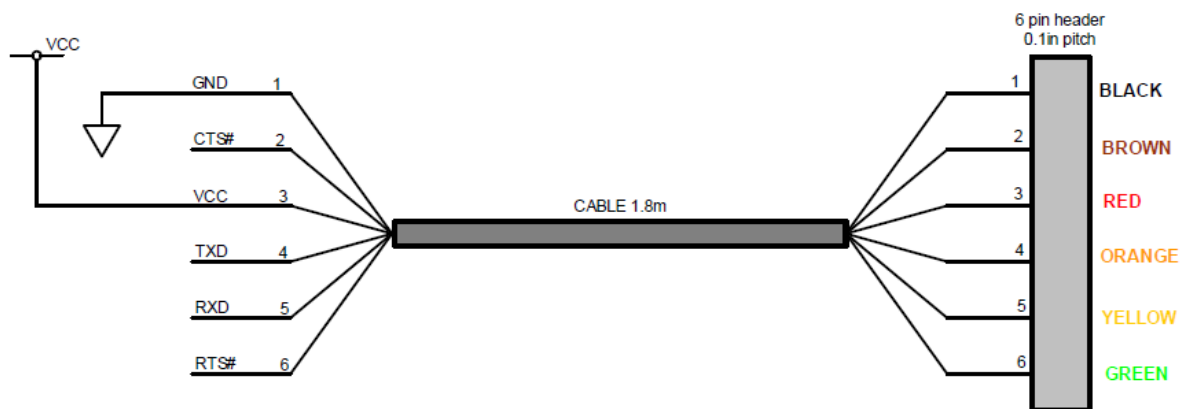
Using a FTDI USB to TTL Serial Cable (Part number TTL-232R-3V3), and an EnOcean TCM 120 / 2x0C / TCM 3x0(C) devices, it is very easy to realize a compact USB based EnOcean wireless device.

Drivers are available for Mac, Linux and PC, allowing you to develop control and monitoring applications on your preferred platform. This device works as P&P device also with the free EnOcean evaluation tools WinEtel and Dolphin View. Therefore you need no extra driver.

Realization steps:

1. All TCM devices:

Please make sure that the supply voltage rail is noise free. Additional capacitors, at least 22 μ F Tantalum and 0.1 μ F ceramic should be added to smooth out EMI added by the PC USB connector providing the voltage supply. Depending on the used TCM device connect the **FTDI USB to serial Cable Type TTL-232R-3V3** header wires described below as follows:



TTL-232R-3V3, 6 Way Header Pin Out

Note: the Green and Brown wires (Handshake signals) are thereby not used, (NC)

- All TCM 120 / 2x0C / 3x0(C): Pin 7 (In) -> TXD – Orange
- All TCM 120 / 2x0C / 3x0(C): Pin 8 (Out) -> RXD – Yellow
- All TCM 120 / 2x0C / 3x0(C): Pins 1, 16 (GND) -> GND - Black
- **TCM 120 / 200C only, see below:** Pin 15 (Vcc) -> +5V – Red (END)



The FTDI USB converter supply voltage (Red wire) delivers +5V, suitable for **TCM 120 / 200C only** (see above).

TCM 220C / 3x0(C) devices require however e.g. +3V supply voltage, so an additional linear 3V LDO (e.g. **LP2950CZ-3.0**, TO-92) regulator must be therefore inserted serial between Red wire (+5V output) and TCM 220C / 3x0(C) Pin 15 (VCC / VDD=3V), see also next step and example circuit below!

2. Additional only TCM 3x0(C) devices with standard FW*:

The TCM 3x0(C) standard FW requires an additional coding network R1 || C / R2 / R3 at ADIO0 according to the selected Operation Mode (Function) to work, see TCM 3xy user manual tables and circuit example below, in this case according MODE 1, bidirectional serial interface: R1=1k2, R2=15k, R3=150k (C=100p can be omitted)

2.5 Operating modes

Mode	Function	Output signal description
0	Unidirectional serial interface compatible with TCM 220C, no teach-in capability	SER_TX: UART output, supplies standard data blocks of information from all received EnOcean radio telegrams (9600 bps; 8 data bits, no parity bit, one start bit, one stop bit). For further information see chapter A.1
1	Bidirectional serial interface, teach-in capability for up to 30 entries ²	SER_RX, SER_TX: Asynchronous bidirectional Interface, supplies standard data blocks of information from all received EnOcean radio telegrams (9600 bps; 8 data bits, no parity bit, one start bit, one stop bit). For further information see chapter A.1 LRN_TOGGLE: Learning mode status indicator

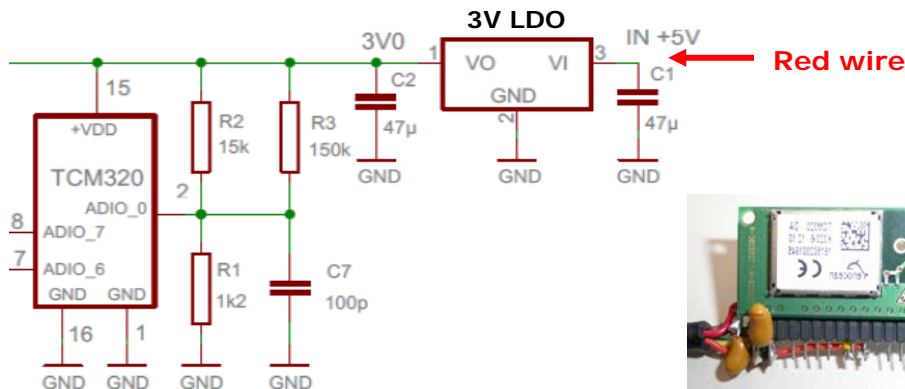
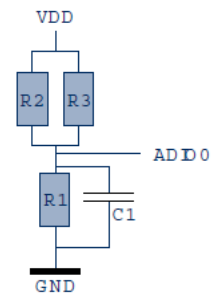
2.6 Mode selection

The operating mode is defined at start-up of the module via a measurement of the voltage at ADIO0.



As long as IDs are stored in ID memory, the operating mode can only be changed after deleting all IDs from memory, e.g. via CLR!

Mode	ADIO0 (MODE_SEL) input voltage range	Proposed component values
0	0% to 3.99% VDD	R1: 0 Ohm R2: leave open R3: leave open C1: leave open
1	4% to 11.99% VDD	R1: 1k2 ±1% R2: 15k ±1% R3: 150k ±1% C1: 100p
2	12% to 19.99% VDD	R1: 2k2 ±1% R2: 12k ±1% R3: 270k ±1% C1: 100p
3	20% to 27.99% VDD	R1: 3k9 ±1% R2: 15k ±1% R3: 68k ±1% C1: 100p
4	28% to 35.99% VDD	R1: 4k7 ±1% R2: 12k ±1% R3: 56k ±1% C1: 100p
5	36% to 39.99% VDD	R1: 5k6 ±1% R2: 10k ±1% R3: 56k ±1% C1: 100p



***NOTE:** If you use for the TCM 3x0(C) instead of the standard FW e.g. the Gateway controller FW (refer to our Gateway controller, Dolphin View Tool and ESP3 documentation) you don't need the coding network mentioned above anymore, see also realization pictures, while having additional useful new (Dolphin View) ESP3 based features, e.g. RSSI level display.

3. Important: TCM 2x0C standard FW: only receiver function, similar to RCM 120

Further Details:

The complete electronic can be housed in a small appropriate Box, e.g. see example picture. All mentioned parts are available e.g. by Farnell: TTL-232R-3V3 (#1329311), 3V LDO voltage regulator (e.g. #9493484), Box (e.g. #1539205), as well as Capacitors and Resistors.

REVISION HISTORY

The following major modifications and improvements have been made to the first version of this document:

No	Major Changes
Dec 2008	Initial version
Dec 2010	Extended with Dolphin based modules TCM 3x0C

Disclaimer

The information provided in this document describes typical features of the EnOcean radio system and should not be misunderstood as specified operating characteristics. No liability is assumed for errors and / or omissions. We reserve the right to make changes without prior notice. For the latest documentation visit the EnOcean website at www.enocean.com.