

# EnOcean 2 click

PID: MIKROE-2521



**EnOcean 2 click** carries the TCM 515Z transceiver, based on the **2.4 GHz** IEEE 802.15.4 radio standard. The click is designed to run on a 3.3V power supply. It communicates with the target microcontroller over UART interface.

This low-powered wireless module is intended for use together with EnOcean's range of energy harvesting modules. These are miniaturized converters that harness energy from motion, light or temperature differences, that come in the form of self-powered, battery-free wireless switches, sensors and actuators.

## TCM 515Z

TCM 515Z enables the realization of line-powered actuators, controllers, and gateways communicating based on the 2.4 GHz **IEEE 802.15.4 radio standard**.

It provides a transparent radio link between EnOcean 2.4 GHz devices and an external host connected via the standardized ESP3 interface (EnOcean Serial Protocol V3).

TCM 515Z works on a 2.4 GHz frequency for ZigBee systems.

## EnOcean Serial Protocol 3.0 (ESP3)

ESP3 is a Point-to-Point protocol with a packet data structure.

The maximum size of transferred data is 65535 bytes. Compared with ESP2.0, that has the maximum of 25 bytes, it's a considerable improvement.

## Onboard antenna

TCM 515Z receives and transmits data based on a **50Ω whip antenna** connected to its ANTENNA input.

## Key features

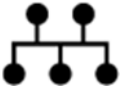
- TCM 515Z module
  - o Frequency: 2.4 GHz ZigBee systems
  - o Receiver sensitivity (typ, at 25°C): -95 dBm
  - o Transmit power (typ, at 25°C): +2 dBm
  - o Default radio channel: IEEE 802.15.4 radio channel 11
- UART interface
- 3.3V power supply

## SPECIFICATION

|                  |                                                                                                          |
|------------------|----------------------------------------------------------------------------------------------------------|
| Product Type     | RF 2.4GHz                                                                                                |
| Applications     | Incorporate battery-free wireless energy harvesting modules into your designs                            |
| On-board modules | TCM 515Z                                                                                                 |
| Key Features     | the 2.4 GHz IEEE 802.15.4 radio standard, EnOcean Serial Protocol 3.0, 3.3V power supply, UART interface |
| Key Benefits     | Communicates with battery-free switches, sensors and actuators. Onboard chip antenna                     |
| Interface        | UART                                                                                                     |
| Power Supply     | 3.3V                                                                                                     |
| Compatibility    | mikroBUS                                                                                                 |
| Click board size | L (57.15 x 25.4 mm)                                                                                      |

## Pinout diagram

This table shows how the pinout on **EnOcean 2 click** corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes         | Pin          | <br>mikroBUS™ |      |     |    | Pin            | Notes         |
|---------------|--------------|------------------------------------------------------------------------------------------------|------|-----|----|----------------|---------------|
| Not connected | NC           | 1                                                                                              | AN   | PWM | 16 | NC             | Not connected |
| Not connected | NC           | 2                                                                                              | RST  | INT | 15 | NC             | Not connected |
| Not connected | NC           | 3                                                                                              | CS   | TX  | 14 | <b>UART_TX</b> | UART transmit |
| Not connected | NC           | 4                                                                                              | SCK  | RX  | 13 | <b>UART_RX</b> | UART receive  |
| Not connected | NC           | 5                                                                                              | MISO | SCL | 12 | NC             | Not connected |
| Not connected | NC           | 6                                                                                              | MOSI | SDA | 11 | NC             | Not connected |
| Power supply  | <b>+3.3V</b> | 7                                                                                              | 3.3V | 5V  | 10 | NC             | Not connected |
| Ground        | <b>GND</b>   | 8                                                                                              | GND  | GND | 9  | <b>GND</b>     | Ground        |

## Jumpers and settings

| Designator | Name       | Default Position | Default Option | Description                                                                                             |
|------------|------------|------------------|----------------|---------------------------------------------------------------------------------------------------------|
| JP1        | TURBO MODE | Right            | Disable        | Change the default ESP3 interface speed at power up from 57600 Bit per second to 460800 Bit per second. |

## Programming

Code examples for EnOcean 2 click, written for MikroElektronika hardware and compilers are available on Libstock.

The library implements EnOcean Serial Protocol 3. It can be used for communication between a host and an EnOcean module. Received packets, if valid, are forwarded to a user via the callback function.

The demo demonstrates the library functionality using EnOcean 2 click and PTM215ZE Pushbutton Transmitter Module. When the user pushes the button, a corresponding LED is turned on or off.

#### *Code snippet*

The code snippet shows how to use library packet type and send command to an EnOcean module.

```
01 static void read_version()
02 {
03     esp3_packet_t cmd_packet;
04     uint8_t cmd_packet_buffer[1];
05
06     cmd_packet.data_length = 1;
07     cmd_packet.option_length = 0;
08     cmd_packet.type = ESP3_TYPE_COMMON;
09     cmd_packet.data_buffer = cmd_packet_buffer;
10     // Command code.
11     cmd_packet_buffer[0] = ESP3_CO_RD_VERSION;
12
13     esp3_send(&cmd_packet);
14 }
```