USER MANUAL

EVALUATION BOARD/KIT FOR RADIO MODULES METIS-E, OLIS-E AND TARVOS-E

2609059281001, 2609059282001, 2609059283001

VERSION 1.1

JUNE 17, 2025

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

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MUST READ

Check for firmware updates

Before using the product, make sure you use the most recent firmware version, data sheet, and user manual. This is especially important for Wireless Connectivity products that were not purchased directly from Würth Elektronik eiSos. A firmware update on these respective products may be required.

We strongly recommend including the possibility of a firmware update in the customer system design.

Revision history

Manual version	HW version	Notes	Date
1.0	1.0 [1]	• Initial version	September 2024
1.1	1.0 [2]	• Added information for Olis-e and Tarvos-e	June 2025

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[1]The table shows hardware version of the EV-Board. For the actual version of the module refer to [1].

[2]The table shows hardware version of the EV-Board. For the actual version of the module refer to [1] or [2].

Abbreviations

Abbreviation	Name	Description
COM Port	Communication Port	
EV (Board)	Evaluation (Board)	
ESD	Electro Static Discharge	
FTDI	Future Technology Devices International	USB to serial converter chip
GND	Ground	Ground signal level that corresponds to 0 V
GPIO	General Purpose Input/Output	
HIGH	High signal level	Digital voltage level that is detected as high by the module
JTAG	Joint Test Action Group	Flash und debug interface
LDO	Low Dropout	Low dropout voltage regulator
LED	Light Emitting Diode	
LFCLK	Low frequency clock	
LFXO	Low frequency crystal oscillator	
LOW	Low signal level	Digital voltage level that is detected as low by the module
PC	Personal Computer	
PCB	Printed Circuit Board	
RF	Radio frequency	Describes everything relating to the wireless transmission
SMA	Sub Miniature version A	
SWD	Serial Wire Debug	Flash und debug interface
UART	Universal Asynchronous Receiver Transmitter	Serial communication with the radio module
USB	Universal Serial Bus	
VDD	Voltage Drain Drain	Supply voltage

Contents

1 Supported radio modules

The EV-Board described in this manual can be used to evaluate the following products:

WE order code	Description
2609051183000	Metis-e radio module
2609051182000	Olis-e 868MHz radio module without FW
2609051181000	Tarvos-e Radio module

Table 1: Compatibility

The EV-Kit can be ordered using the following order code:

WE order code	Description
2609059283001	EV-Kit Metis-e
2609059282001	EV-Kit Olis-e
2609059281001	EV-Kit Tarvos-e

Table 2: Order Codes

Kit Content 2609059283001	Quantity
Evaluation board with Metis-e	2
868 MHz antenna (2600130086)	2
USB data cable USB-C	2
Packaging: cardboard box, ESD safe cover	1

Table 3: Content Metis-e EV-Kit

Kit Content 2609059282001	Quantity
Evaluation board with Olis-e	2
868 MHz antenna (2600130086)	2
USB data cable USB-C	2
Packaging: cardboard box, ESD safe cover	1

Table 4: Content Olis-e EV- Kit

Kit Content 2609059281001	Quantity
Evaluation board with Tarvos-e	2
868 MHz antenna (2600130086)	2
USB data cable USB-C	2
Packaging: cardboard box, ESD safe cover	1

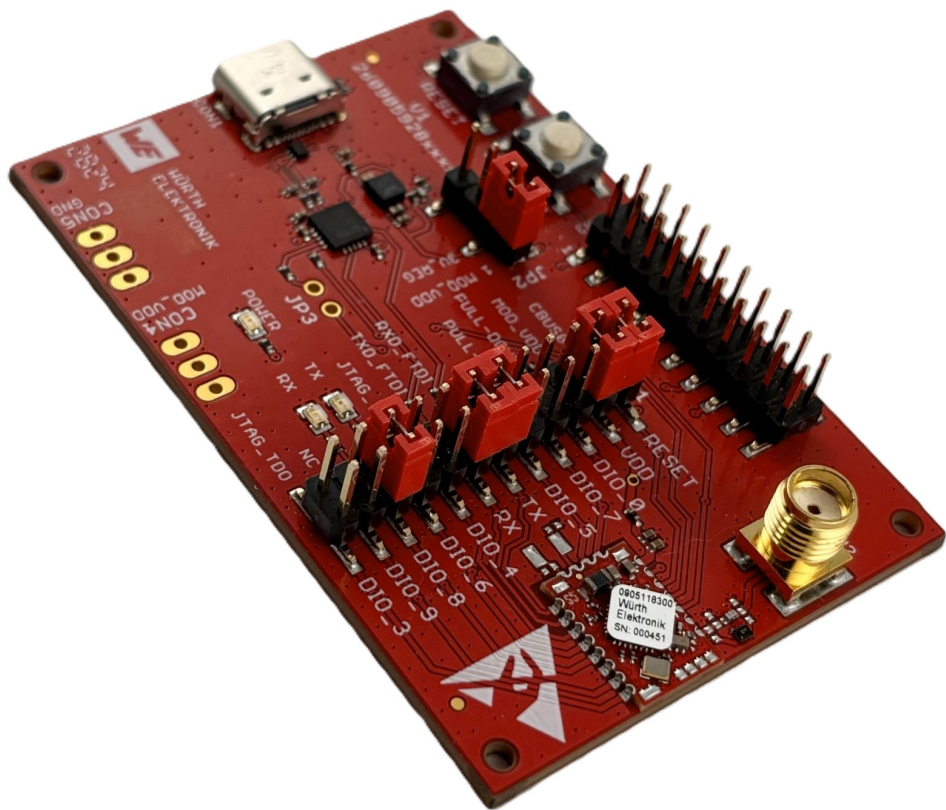Table 5: Content Tarvos-e EV- Kit

Figure 1: Photo of the EV-Board

2 Functional description

The EV-Board offers the user the possibility to develop hard- and software for the mounted radio module. It can be connected to a USB port of a PC.

For the connection to a microcontroller system, the development board is equipped with a multi-pin connector, which is connected to all pins of the radio module. Jumpers allow the module to be disconnected from components, such as the USB interface, when they are not required.

Refer to our YouTube channel:
www.youtube.com/user/WuerthElektronik/videos for video tutorials, hands-on activities, and webinars related to our products.

2.1 Taking into operation

> **!** When using the Olis-e EV-Board, the USB connector supplies power to the board. Communication with the module is not possible because the module does not have firmware.

To run the EV-Board, the jumpers must be placed on the default location as shown in figure 3. This helps to connect the module's UART to the FTDI USB-to-UART converter.

The corresponding FTDI driver package *FTDI driver package* has to be installed on your PC.

The next step is to connect the EV-Board to the PC via a USB cable. This will allow a COM port to be detected and installed on the PC. Check the Device Manager to find the COM port name of the EV-Board. A typical designation could be "COM12" on Windows systems or "/dev/ttyUSB0" on Linux systems.

The WE UART Terminal PC tool [3] or any other serial terminal program (like *Hterm* for Windows) must be executed and the corresponding COM port to be opened using the default settings of the mounted radio module. After the module has been powered through the USB jack or an alternative power supply, the reset button should be pressed to ensure a clean start-up of the module.

Refer to the Metis-e module's user manual for detailed, module specific quick start instructions [1].

Refer to the Tarvos-e module's user manual for detailed, module specific quick start instructions [2].

Refer to the Olis-e module's user manual for detailed, module specific information [4].

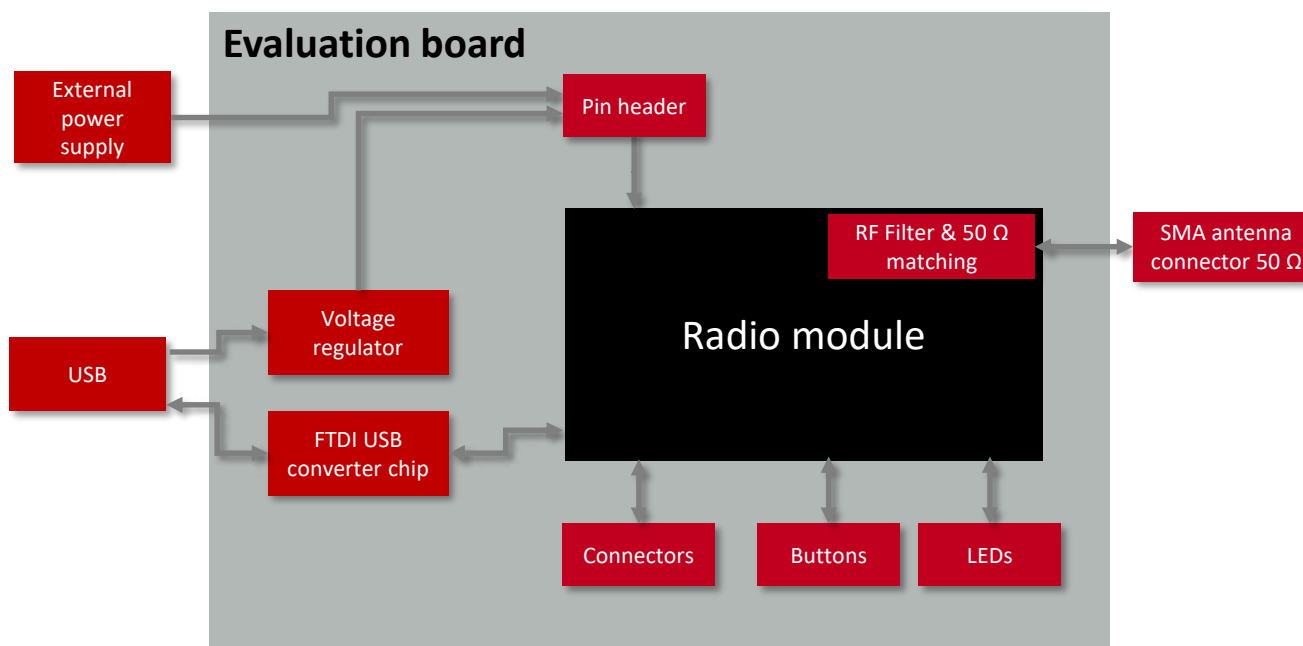# 3 Development board

3.1 Block diagram

Figure 2: Block diagram

(!) No antenna is integrated in the module. The EV-Kit contains an antenna that fits the SMA connector on the EV-Board.
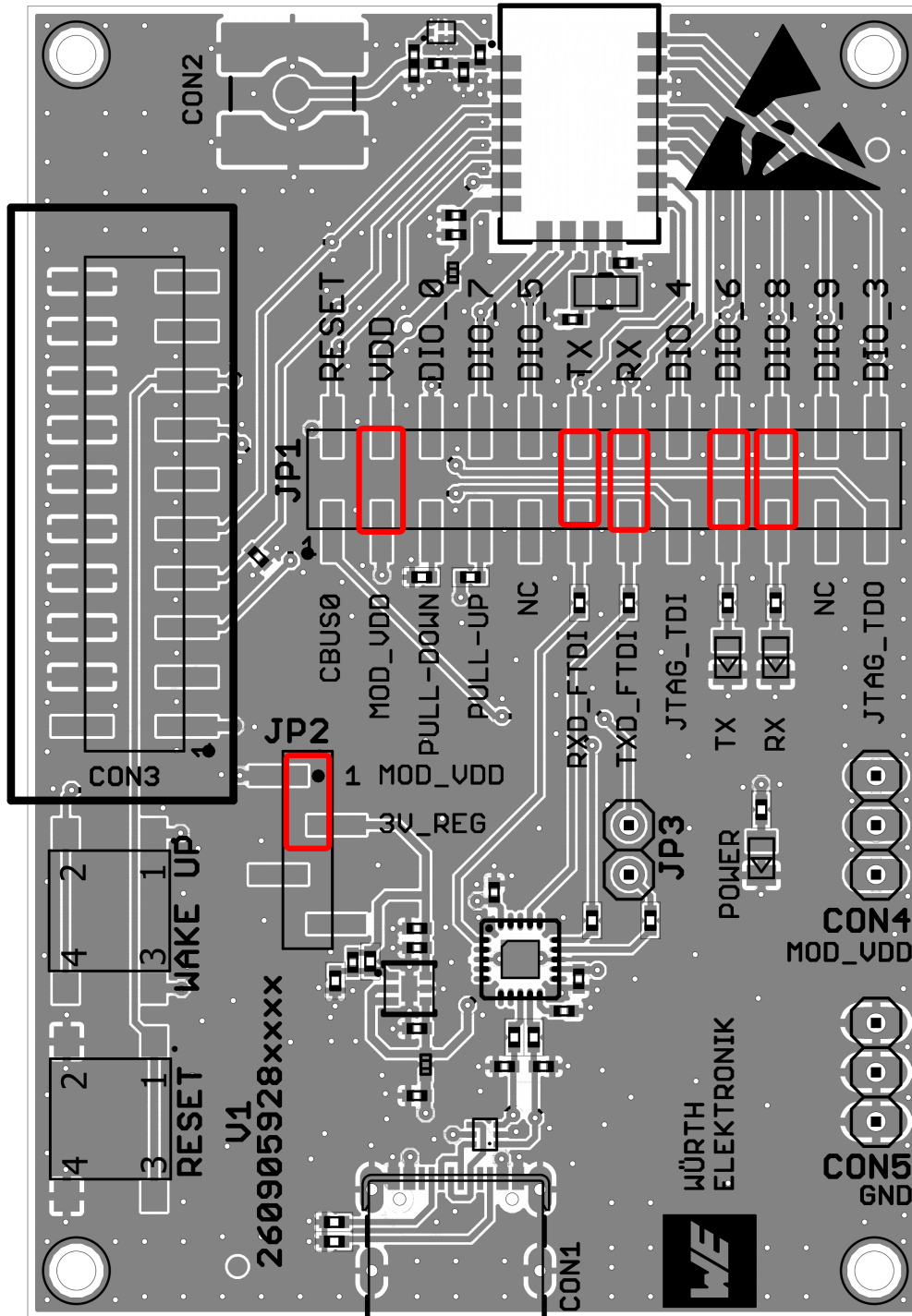
3.2 Jumpers

Figure 3: Jumpers, default placement

JP1 Pin	Function	JP1 Pin	Module function (pin)	Jumper set (default)
1	CBUS0-FTDI	2	*/RESET* (5)	No
3	JP2 Pin1 (LDO out or CON4) current measurement	4	VDD module (7)	Yes
5	Pull down	6	*DIO_0* (6)	No
7	Pull up	8	*DIO_7* (8)	No
9	Not conneted	10	*DIO_5* (9)	No
11	RXD-FTDI	12	*DIO_2/UTXD* (12)	Yes
13	TXD-FTDI	14	*DIO_1/URXD* (13)	Yes
15	CON3 Pin5	16	*DIO_4* (14)	No
17	LED1	18	*DIO_6* (15)	Yes
19	LED2	20	*DIO_8* (16)	Yes
21	Not connected	22	*DIO_9/WAKEUP* (18)	No
22	CON3 Pin13	23	*DIO_3* (19)	No

Table 6: Jumper JP1: Module pins available and connectable to some standard functions

In table 6 the initial pin names of the chipset are used (and the pin number of the module). As this EV-Board is used for several firmware variants of the module, the functions are not fixed.

JP2 Pin	Function	JP2 Pin	Module function (pin)	Jumper set (default)
1	JP1 Pin3 toward VDD module and CON4	2	LDO output	Yes
3	Not connected	4	Not connected	No

Table 7: Jumper JP2: LDO separable

> **!** When using external power supply, Jumper JP2 Pin 1-2 shall be removed to avoid applying voltage to the output of the LDO. Pin headers CON4 and CON5 shall be used to source the EV-Board.
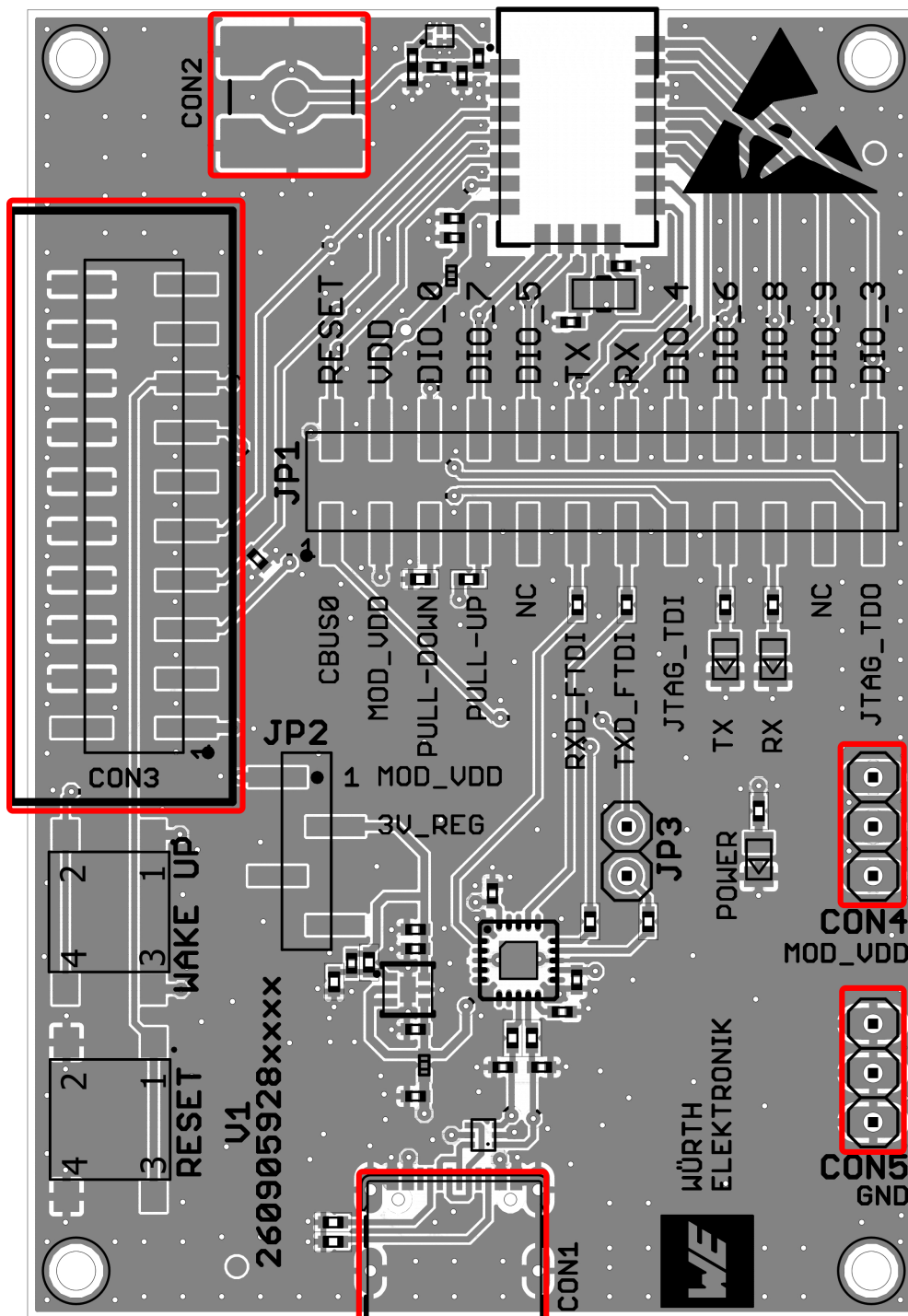
3.3 Connectors and pin headers

Figure 4: Connectors

Connector	Function
CON1	Micro-USB connector for host connection and VDD bus supply
CON2	SMA connector for external antenna
CON3	2×10 JTAG/SWD connector
CON4	External power supply VDD (not mounted)
CON5	External power supply GND (not mounted)

Table 8: Connector overview

> When using external power supply Jumper JP2 Pin 1-2 shall be removed to avoid applying voltage to the output of the LDO. Pin headers CON4 and CON5 shall be used to source the EV-Board.

> By default, CON4 and CON5 are not mounted.

3.3.1 CON1

Connector CON1 is a USB C connector which enables a connection to PC via standard USB C cable.

CON1	Function
	USB C connector for host connection and VDD bus supply

3.3.2 CON2

Connector CON2 (SMA connector) is used to connect an external antenna. For example, the 868 MHz antenna Hermippe-III *2600130086* can be used.

CON2	Function
Inner	RF signal
Outer	GND

The EV-Board allows the possibility to either connect directly to an antenna, or to go through a SAW filter. In delivery state, the filter is bypassed by C6, directly connecting CON2, as shown in figure 5.
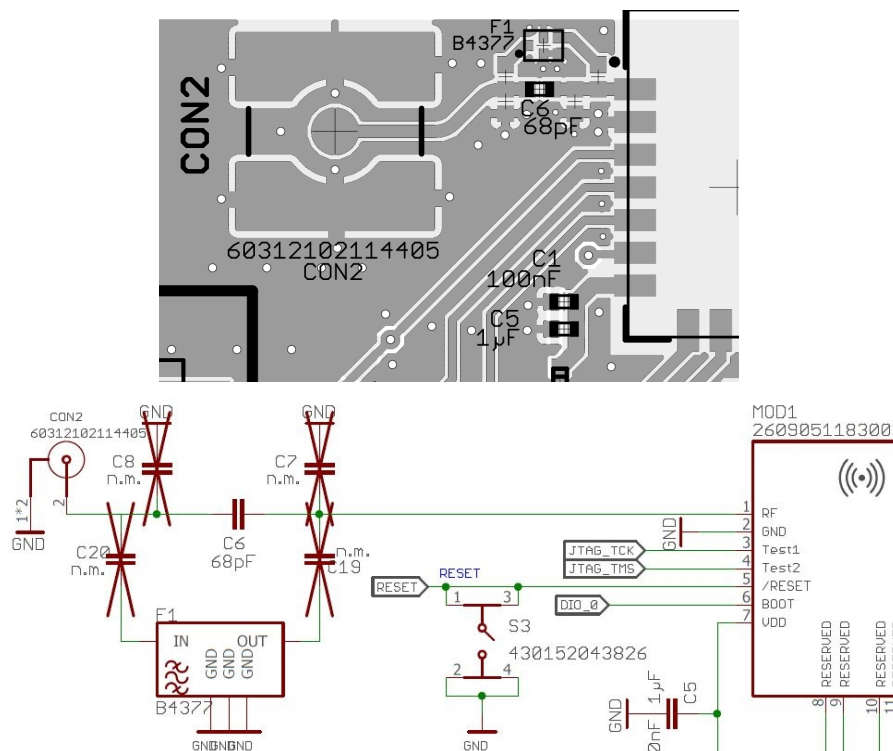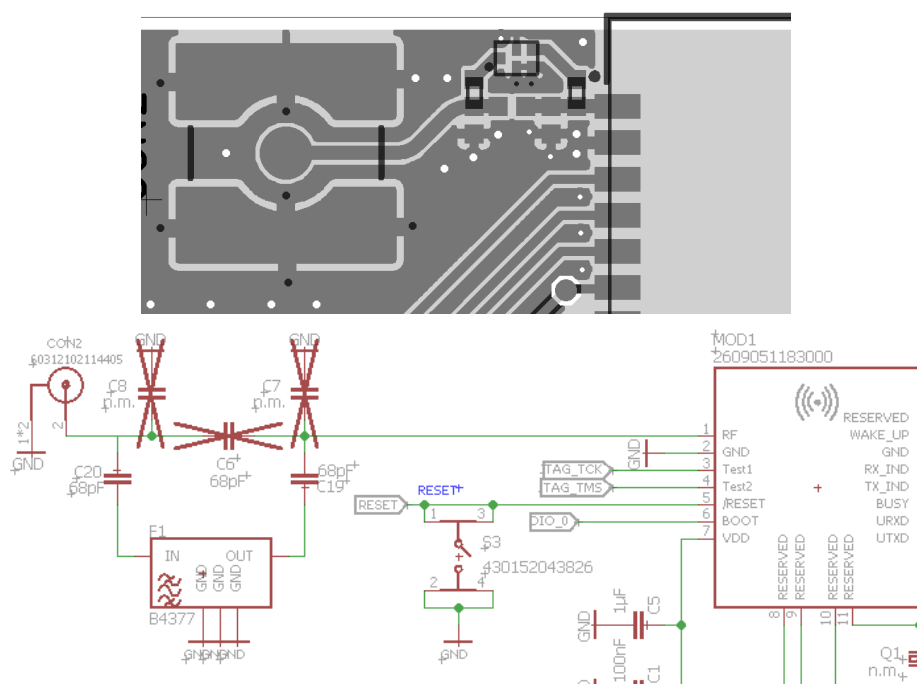

Figure 5: Example without filtering

To facilitate testing with additional filtering, a SAW filter is already assembled. Some soldering is needed to remove C6 and place C19 and C20 as shown in figure 6.

Figure 6: Example with filtering

3.3.3 CON3

Connector CON3 is the JTAG debugging interface.

CON3 Pin	CC1310	Function
1		*VDD*
7	*JTAG_TMS*	*Test2*
9	*JTAG_TCK*	*Test1*
15	RESET_N	*/RESET*
4,6,8,10,12,14,16,18,20		*GND*
2,3,5,11,13,17,19		Not connected

Table 9: Connector CON3

3.3.4 CON4

Pin header CON4 is a 3x1 pin header with 2.54 mm grid connected to *MOD_VDD* in the PCB. CON4 shall be used for external power supply.

3.3.5 CON5

Pin header CON5 is a 3x1 pin header with 2.54 mm grid connected to *GND* in the PCB. CON5 shall be used for external power supply.
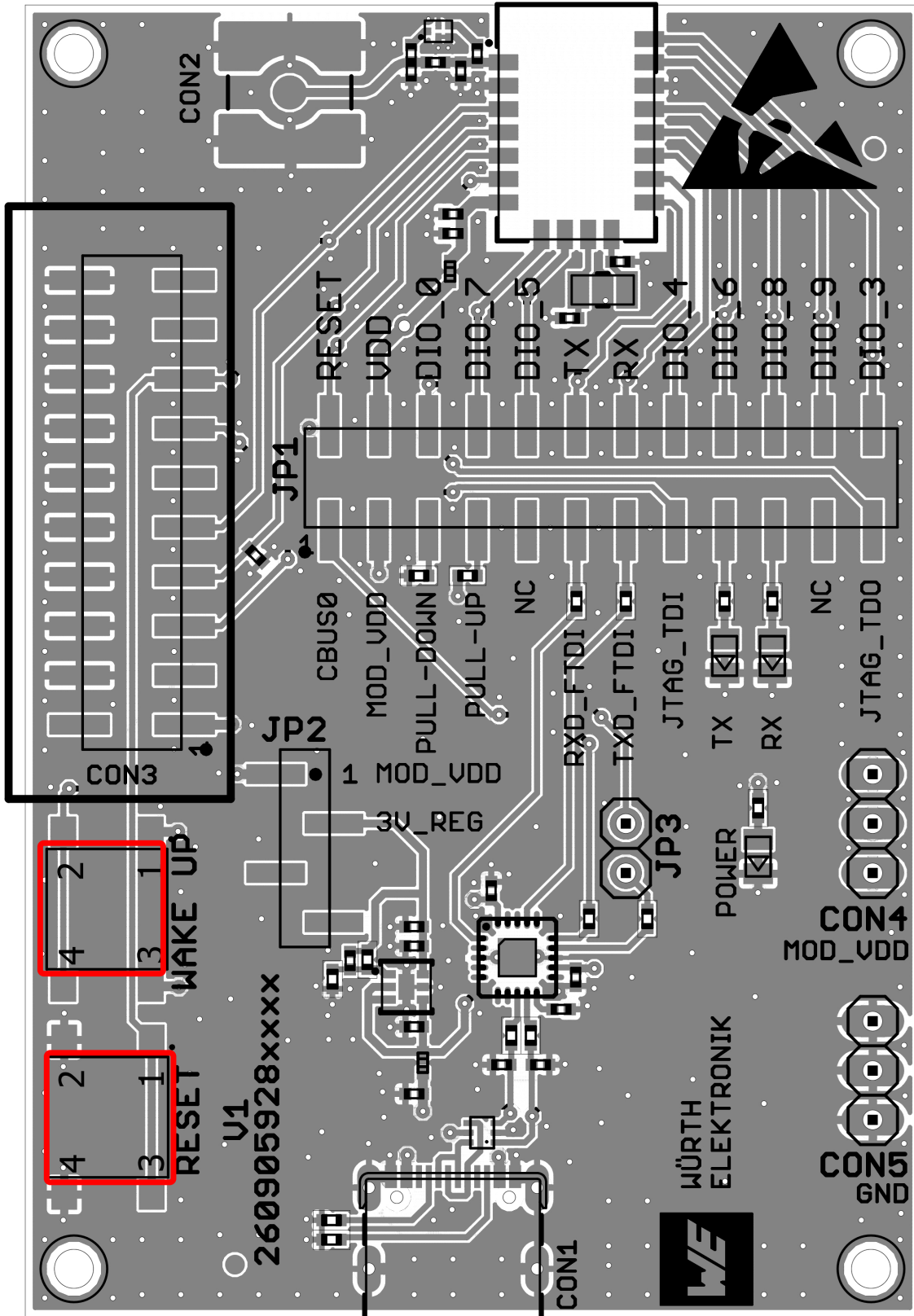
3.4 Buttons

Figure 7: Buttons

3.4.1 RESET button

Internally, the active low reset input of the microprocessor is connected via an RC combination with the power supply to ensure a proper startup of the module. The module provides this */RESET* pin. On the EV-Board it is connected to button S3, marked as *RESET* on the PCB so that the module can be restarted properly by hand.

3.4.2 Wake up button

Internally, the wake up input of the microprocessor is pulled down (modules with firmware). On the EV-Board, the push button S1 connects this pin to modules positive power supply, generating a falling edge when releasing the button, which is needed to wake up the module. On the EV-Board the button is marked as *WAKE UP*.

3.5 Function blocks

3.5.1 Power supply

3.5.1.1 Bus powered, power supply through USB

The development board can be run via USB. The integrated voltage regulator reduces the connected USB voltage 5 V down to 3 V and supplies the remaining parts of the circuit. If the EV-Board is powered, the *Power LED* lights up.

3.5.2 JP1 - Current measurement

By default, the jumper JP1 pin 3-4 is set for normal operation. If a current meter is connected in place of the jumper, the power consumption of the radio module can be measured.
If the meter is not attached and the bridge is not set, the module will not receive a supply voltage. However, the power *Power LED* may be active, as it is connected prior to the current measurement bridge in order not to distort the module's power consumption.

3.5.3 UART via USB

The UART of the module can be connected to the USB converter by setting the bridge P1. In this case, it is available on the USB jack. With help of the installed FTDI-driver, the PC will provide a virtual COM port which can be used to communicate with the module.

> ! The USB cable length must not exceed 3 meters.

3.5.4 UART direct

If a microcontroller is to be connected to the module, remove the jumpers 11-12,15-16, 17-18 on P1. The UART of the host microcontroller can be attached directly on the pin header P1 (all even numbered pins). The module *RXD* line must be handled accordingly by your host (i.e.

pulled up while inactive and during module boot-up). The host must adhere to the I/O level compatibility values stated in the module's manual.

3.5.5 LFXO crystal

The standard Metis-e, Tarvos-e firmware does not use an external low-frequency crystal. Nevertheless, it is possible to mount one on the EV-Board. A 32.768 kHz (LFXO) crystal, 3.2 ×1.6 mm package, for example *WE-XTAL_WATCHCRYSTAL (830009706)*, can be placed on the EV-Board to position $Q1$. The needed load capacitance can be reached with capacitors $C15$ and $C17$, 0402 package. As these pins support no functionality besides LFXO, these pins are not connected to a pin header.
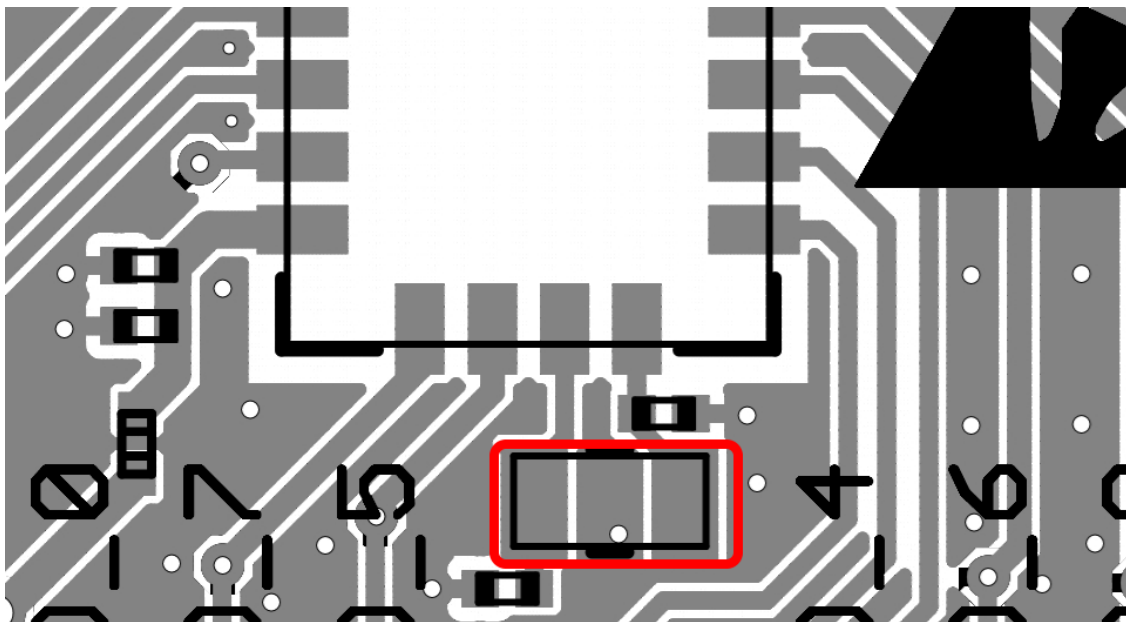

Figure 8: LFXO mounting

> When using standard firmware with Metis-e, Tarvos-e, the external crystal is not needed. To enable use of the LFXO a custom firmware is required.

3.5.6 Programming interface

The EV-Board with CON3 provides a 2×10 pin connector to connect directly to a JTAG flash adapter, supporting JTAG 2 wire or JTAG 4 wire, used for development. Pin1 is marked on the PCB for correct mounting of the flash adapter. The recommended flash adapter is one of the "Segger J-Link" family.
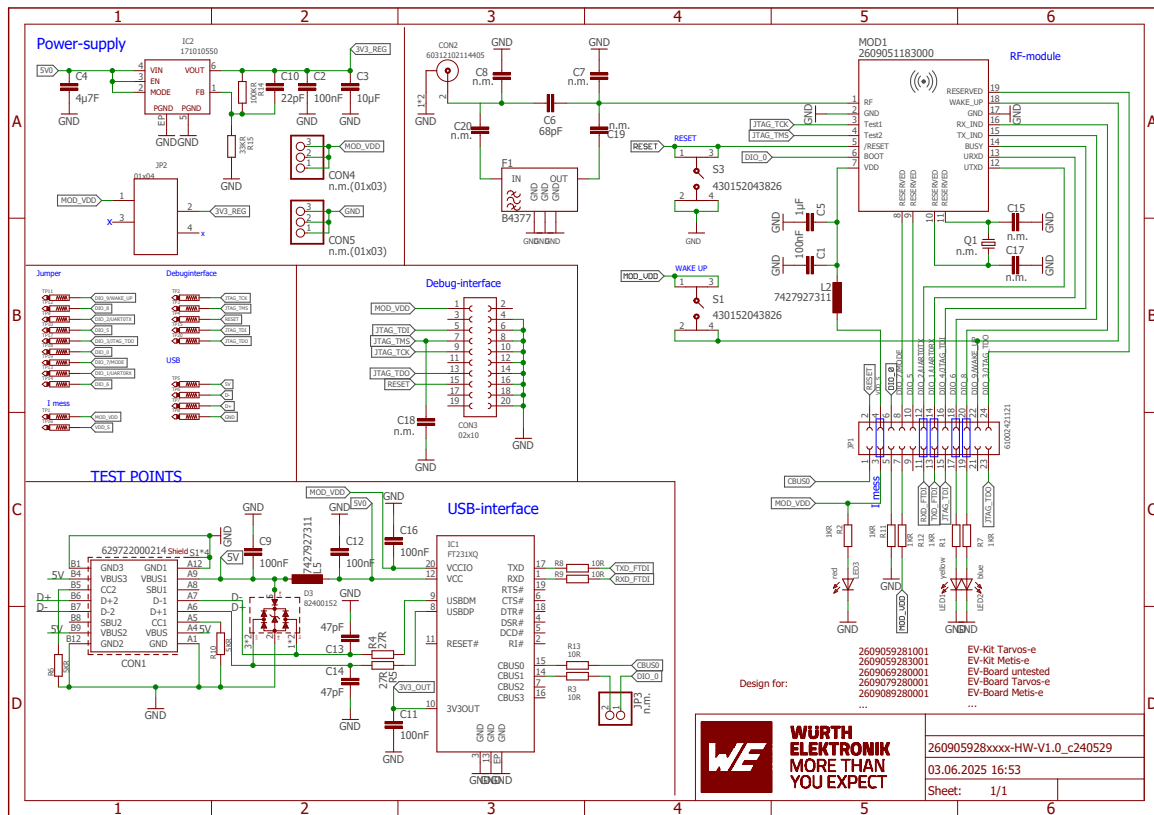
3.6 Schematic
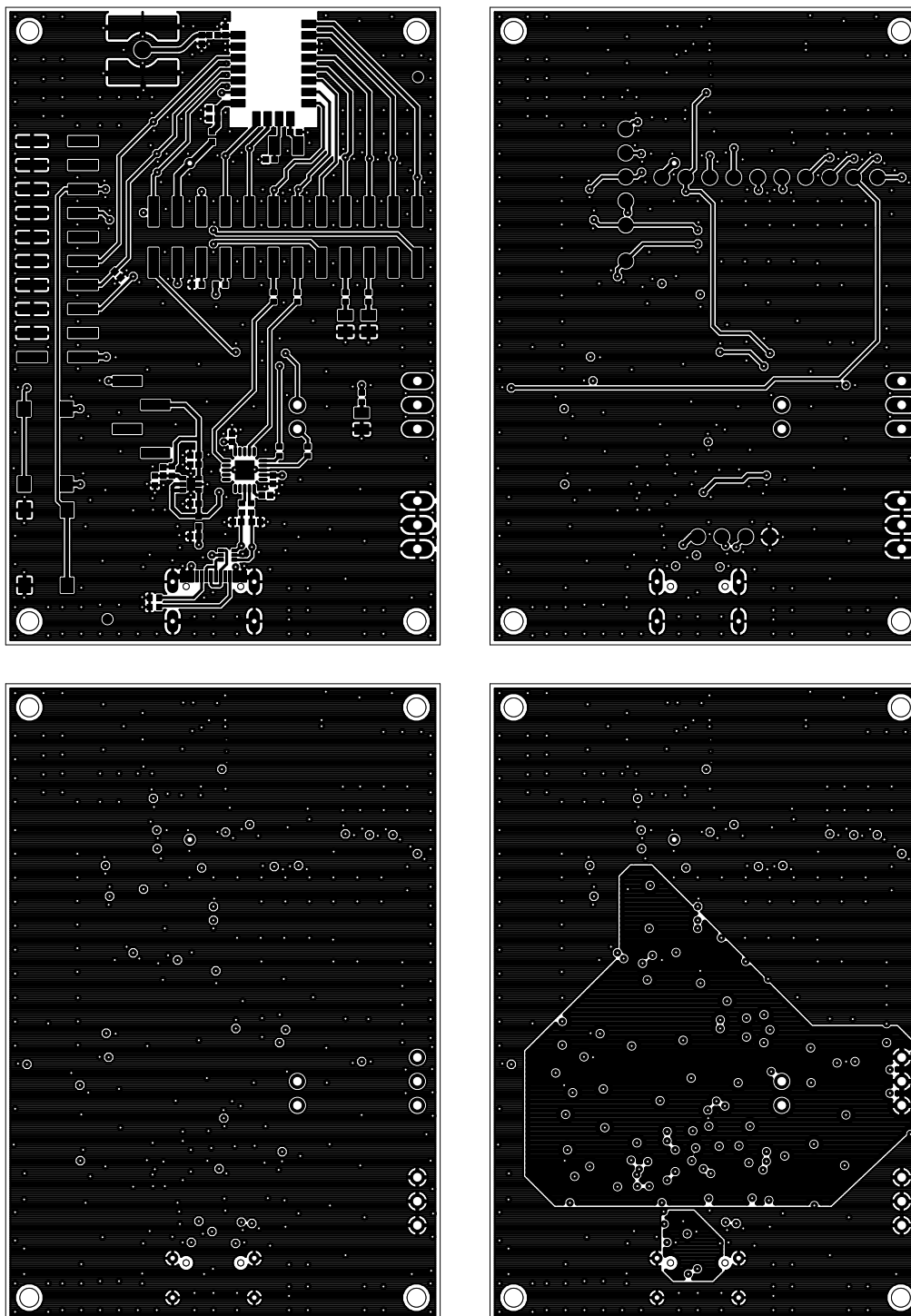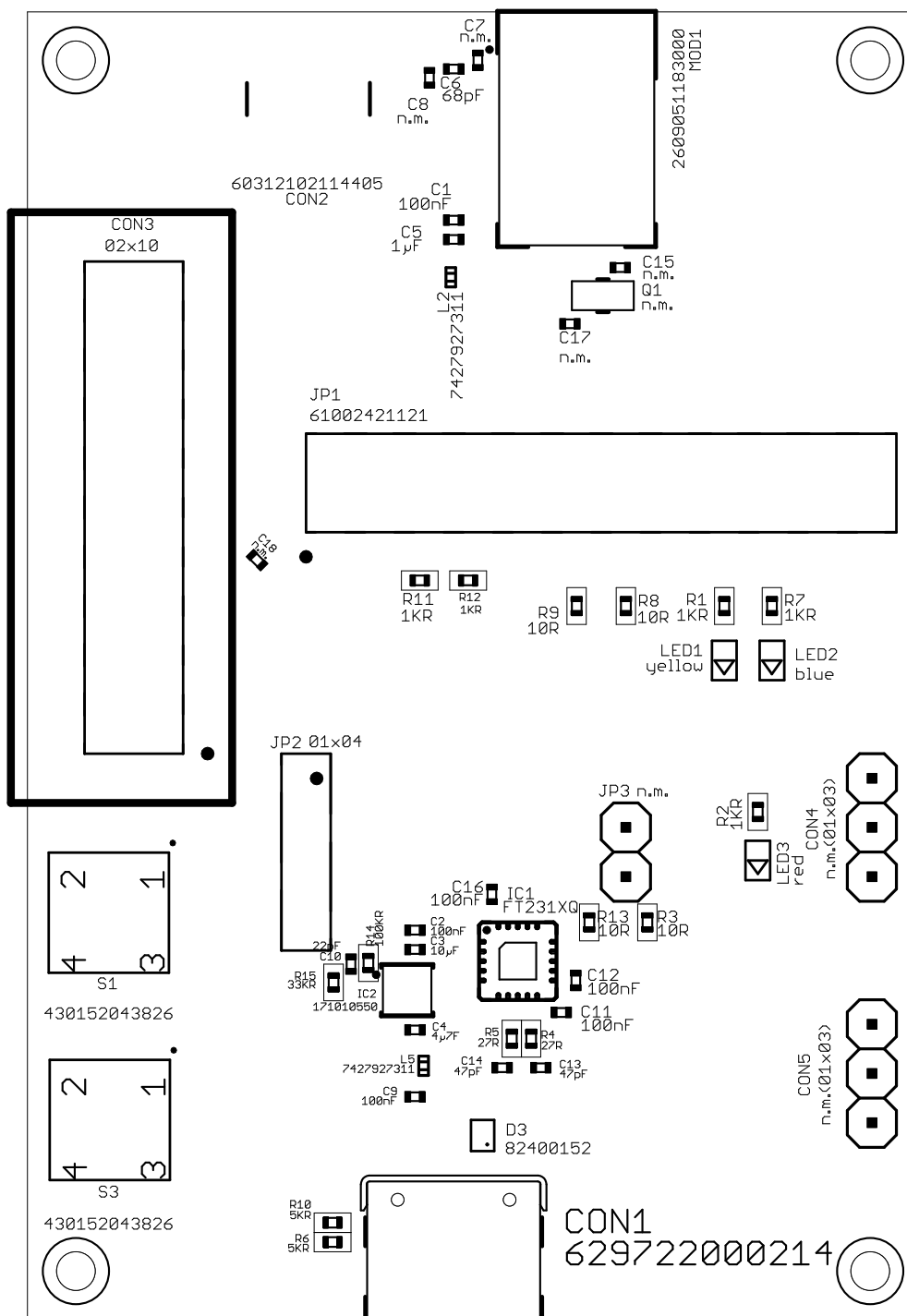

Figure 9: Reference design: Schematic

3.7 Layout

Figure 10: From left to right and from up to down : Top layer, bottom layer, 2nd Layer, 3rd Layer

Figure 11: Assembly diagram

3.8 Bill of materials

Part	Value	PACK	NR	MANUFACTURER
C1	100 nF	0402	885012205037	Würth Elektronik eiSos
C2	100 nF	0402	885012205037	Würth Elektronik eiSos
C3	10 µF	0402	885012105020	Würth Elektronik eiSos
C4	47 µF	0402	885012105008	Würth Elektronik eiSos
C5	1 µF	0402	885012105012	Würth Elektronik eiSos
C6	68 pF	0402	885012005030	Würth Elektronik eiSos
C7	n.m.	0402		
C8	n.m.	0402		
C9	100 nF	0402	885012205037	Würth Elektronik eiSos
C10	22 pF	0402	885012005057	Würth Elektronik eiSos
C11	100 nF	0402	885012205037	Würth Elektronik eiSos
C12	100 nF	0402	885012205037	Würth Elektronik eiSos
C13	47 pF	0402	885012005059	Würth Elektronik eiSos
C14	47 pF	0402	885012005059	Würth Elektronik eiSos
C15	n.m.	0402		
C16	100 nF	0402	885012205037	Würth Elektronik eiSos
C17	n.m.	0402		
C18	n.m.	0402		
C19	n.m.	0402		
C20	n.m.	0402		
CON1	629722000214		629722000214	Würth Elektronik eiSos
CON2	60312102114405		60312102114405	Würth Elektronik eiSos
CON3	02x10	SMD	61002021121	Würth Elektronik eiSos
CON4	n.m.(01x03)	THT		Würth Elektronik eiSos
CON5	n.m.(01x03)	THT		Würth Elektronik eiSos
JP1	61002421121		61002421121	Würth Elektronik eiSos
JP2	01x04	SMD	61000418221	Würth Elektronik eiSos
JP3	n.m.			
R1	1 KR	0402	RC0402FR-071KL	Yageo

Table 10: Bill of materials

Part	Value	PACK	NR	MANUFACTURER
R2	1 KR	0402	RC0402FR-071KL	Yageo
R3	10 R	0402	RC0402FR-0710RL	Yageo
R4	27 R	0402	RC0402FR-0727RL	Yageo
R5	27 R	0402	RC0402FR-0727RL	Yageo
R6	5 KR	0402	RC0402FR-075KL	Yageo
R7	1 KR	0402	RC0402FR-071KL	Yageo
R8	10 R	0402	RC0402FR-0710RL	Yageo
R9	10 R	0402	RC0402FR-0710RL	Yageo
R10	5 KR	0402	RC0402FR-075KL	Yageo
R11	1 KR	0402	RC0402FR-071KL	Yageo
R12	1 KR	0402	RC0402FR-071KL	Yageo
R13	10 R	0402	RC0402FR-0710RL	Yageo
R14	100 KR	0402	RC0402FR-07100KL	Yageo
R15	33 KR	0402	RC0402FR-0733KL	Yageo
S1	430152043826	SMD	430152043826	Würth Elektronik eiSos
S3	430152043826	SMD	430152043826	Würth Elektronik eiSos
D3	82400152	WE-TVS_SOT563	82400152	Würth Elektronik eiSos
F1	B4377	SMD	B39871B4377P810	Qualcomm
IC1	FT231XQ	QFN	FT231XQ-R	FTDI
IC2	171010550	SMD	171010550	Würth Elektronik eiSos
L2	7427927311	0402	7427927311	Würth Elektronik eiSos
L5	7427927311	0402	7427927311	Würth Elektronik eiSos
LED1	yellow	0805	150080YS75000	Würth Elektronik eiSos
LED2	blue	0805	150080BS75000	Würth Elektronik eiSos
LED3	red	0805	150080RS75000	Würth Elektronik eiSos
MOD1	2609051183000	SMD	2609051181000	Würth Elektronik eiSos
Q1	n.m.		830009706	Würth Elektronik eiSos

Table 11: Bill of materials cont.

4 Marking

4.1 Lot number

The 15 digit lot number is printed in numerical digits as well as in form of a machine readable bar code. It is divided into 5 blocks as shown in the following picture and can be translated according to the following table.
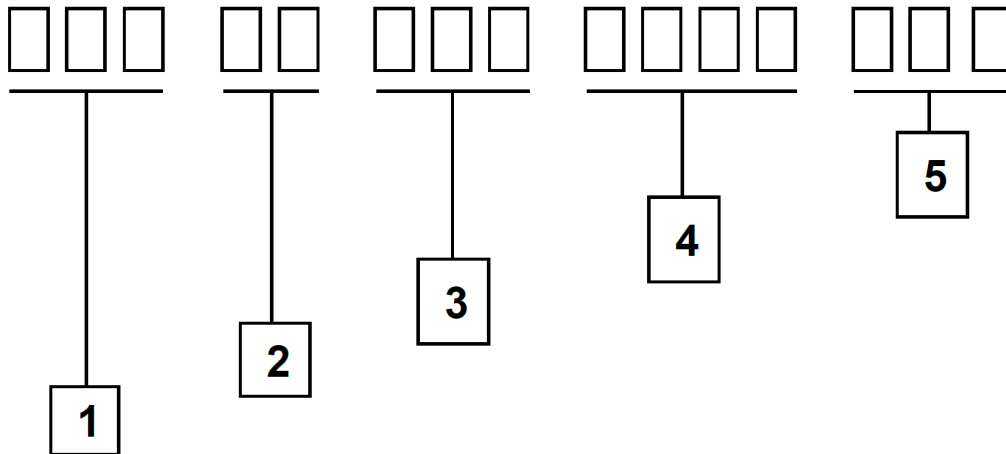

Figure 12: Lot number structure

Block	Information	Example(s)
1	eiSos internal, 3 digits	438
2	eiSos internal, 2 digits	01
3	Radio module hardware version, 3 digits	V2.4 = 024, V12.2 = 122
4	Date code, 4 digits	1703 = week 03 in year 2017, 1816 = week 16 in year 2018
5	Radio module firmware version, 3 digits	V3.2 = 302, V5.13 = 513

Table 12: Lot number details

As the user can perform a firmware update the printed lot number only shows the factory delivery state. The currently installed firmware can be requested from the module using the corresponding product specific command. The firmware version as well as the hardware version are restricted to show only major and minor version not the patch identifier. Block 5 is not applicable for products without firmware.

5 Regulatory compliance information

5.1 European Conformity

Pursuant to Article 1 (2.) of the EU directive 2014/53/EU, Article 1 (2.) the directive does not apply to equipment listed in Annex I (4.): custom-built evaluation kits designed for professionals to be used solely at research and development facilities for such purposes.

5.2 FCC

Pursuant to §2.803 (c) of Title 47 Chapter I Subchapter A Part 2 Subpart I, the evaluation kit falls under the FCC exception. Therefore it is marked as "For evaluation only; not FCC approved for resale".

5.3 Exemption clause

Relevant regulation requirements are subject to change. Würth Elektronik eiSos does not guarantee the accuracy of the before mentioned information. Directives, technical standards, procedural descriptions and the like may be interpreted differently by the national authorities. Equally, the national laws and restrictions may vary with the country. In case of doubt or uncertainty, we recommend that you consult with the authorities or official certification organizations of the relevant countries. Würth Elektronik eiSos is exempt from any responsibilities or liabilities related to regulatory compliance.

Notwithstanding the above, Würth Elektronik eiSos makes no representations and warranties of any kind related to their accuracy, correctness, completeness and/or usability for customer applications. No responsibility is assumed for inaccuracies or incompleteness.

6 References

[1] Würth Elektronik. Metis-e user manual. `https://www.we-online.de/katalog/de/manual/2609051183000`.

[2] Würth Elektronik. Tarvos-e user manual. `https://www.we-online.de/katalog/de/manual/2609051181000`.

[3] Würth Elektronik. WE UART Terminal PC tool (Smart Commander). `https://www.we-online.de/wcs-software`.

[4] Würth Elektronik. Olis-e user manual. `https://www.we-online.de/katalog/de/manual/2609051182000`.

7 Important notes

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Customer responsibility related to specific, in particular safety-relevant applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software source code and firmware parts contained in or used with or for products in the wireless connectivity and sensor product range of Würth Elektronik eiSos GmbH & Co. KG. In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

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Any product-specific data sheets, manuals, application notes, PCNs, warnings and cautions must be strictly observed in the most recent versions and matching to the products revisions. These documents can be downloaded from the product specific sections on the wireless connectivity and sensors homepage.

Customer support for product specifications

Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the Business Development Engineer (BDM) or the internal sales person in charge should be contacted who will be happy to support in this matter.

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Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes. In case of further queries regarding the PCN, the Business Development Engineer (BDM), the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 7 and 7 remains unaffected.

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