EVALUATION BOARD MANUAL

FOR RADIO MODULES

EV Order Code	Module order code	Marketing Name
2614019037001	2614011037000	Erinome-I

VERSION 1.2

JUNE 9, 2020

Revision history

Manual version	HW version	Notes	Date
1.0	2.0	• Initial version	February 2020
1.1	2.0	• Jumper table JP3 updated	March 2020
1.2	2.0	• Jumper table JP3 updated • Chapter 3.5.10 added	June 2020

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Abbreviations and abstract

Abbreviation	Name	Description
BDS	BeiDou navigation System	Chinese satellite navigation system
COM	Communication	
CTS	Clear to send	
ESD	Electro Static Discharge	
FSE	Field Sales Engineer	Your personal sales and support contact person
FTDI	Future Technology Devices International	
Galileo		European satellite navigation system
GLONASS	Global Navigation Satellite System	Russian satellite navigation system
GNSS	Global Navigation Satellite System	
GPS	Global Positioning System	American satellite navigation system
HIGH	High signal level	
IO	Input Output	
LDO	Low-dropout	Linear voltage regulator
LED	Light Emitting Diode	
LOW	Low signal level	
PC	Personal Computer	
RC	Resistor Capacitor	
RF	Radio frequency	Describes everything relating to the wireless transmission.
RTS	Request to send	
RST	Reset	
SWDCLK	Serial Wire Debug Clock	
UART	Universal Asynchronous Receiver Transmitter	Universal Asynchronous Receiver Transmitter allows communicating with the module of a specific interface.
USB	Universal Serial Bus	
VCC	Supply voltage	

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1 Supported radio modules

The evaluation board is exclusively for the Erinome-I module:

Order code	Product Name	Description
2614011037000	Erinome-I	GNSS Module supporting GPS, Galileo, BeiDou and GLONASS Navigation Systems

Order code	Description
2614019037001	Erinome-I module EV-Kit

Table 1: Compatibility

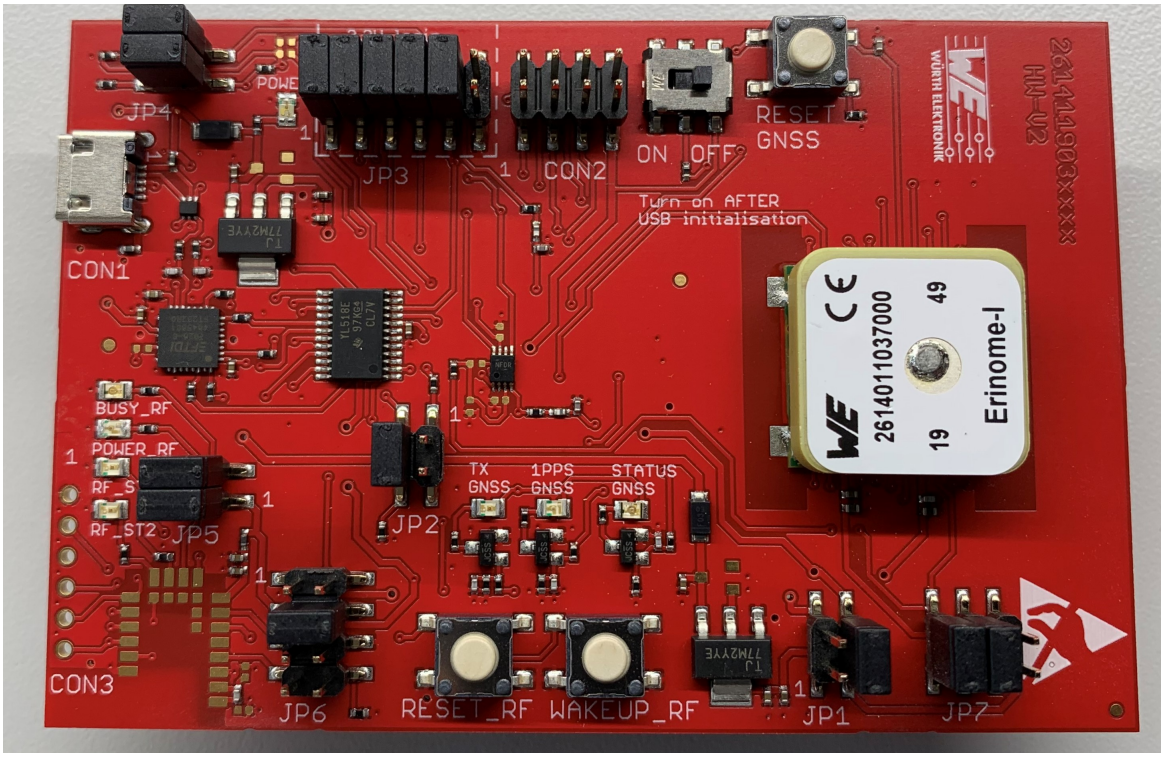


Figure 1: Product image

Kit Content 2614019037001	Quantity
Evaluation board with Erinome-I	1
USB2 A to USB Micro cable	1
Packaging: Cardboard Box, ESD bag	1

Table 2: Content Erinome-I module EV-Kit

2 Functional description

The evaluation board offers the user the possibility to put the compatible GNSS module into operation and to evaluate its features. Furthermore, it represents our reference design for the integration of the compatible GNSS module in an application board.

The evaluation board can be connected to an USB port of a PC. For the connection to a microcontroller system the development board is equipped with a multi-pin connector which gives access to all necessary pins of the GNSS module. Jumpers allow the module to be disconnected from components such as the USB interface which are not required.

2.1 Taking into operation

Before starting to work with the evaluation board make sure that:

- The jumpers on the EV board are placed on the default locations.
- ON/OFF GNSS switch is in 'OFF' position.
- FTDI driver package is installed on the PC. The latest version of the drivers can be downloaded from (*www.ftdichip.com/Drivers/VCP.htm*). Please use the setup executable package or follow the install instructions from FTDI.
- Evaluation board is connected to the PC via USB-cable provided in the evaluation kit.
- Module power supply (VCC) is stable and able to reliably supply the module's static and peak current consumption as specified by the module manual.
- COM port is detected and installed on the PC. The (COM) port name of the evaluation board can be found using the device manager on Windows and the display message (dmesg) on Linux. For example, the evaluation board might appear similar to "COM12" on windows and "/dev/ttyUSB0" on Linux. Once the COM port is detected, USB initialisation is completed.
- Switch the ON/OFF GNSS Button to 'ON' position to switch the module from hibernate to full power state. Please make sure to do this only after the USB initialisation. Switching to 'ON' position before USB initialisation, can cause the PC Device Manager to interpret the GNSS module as Microsoft serial ballpoint mouse. In such event, disconnect the board from the PC and repeat the steps.
- WENSS PC-tool can be used to take the evaluation board into operation and communicate with the module. Once connection to the evaluation board is properly estabilshed, flow of messages from the GNSS module should be visible in the PC-tool. Please refer to the PC-Tool manual for detailed information.

Please refer to the module reference manual to get the detailed module specific information.

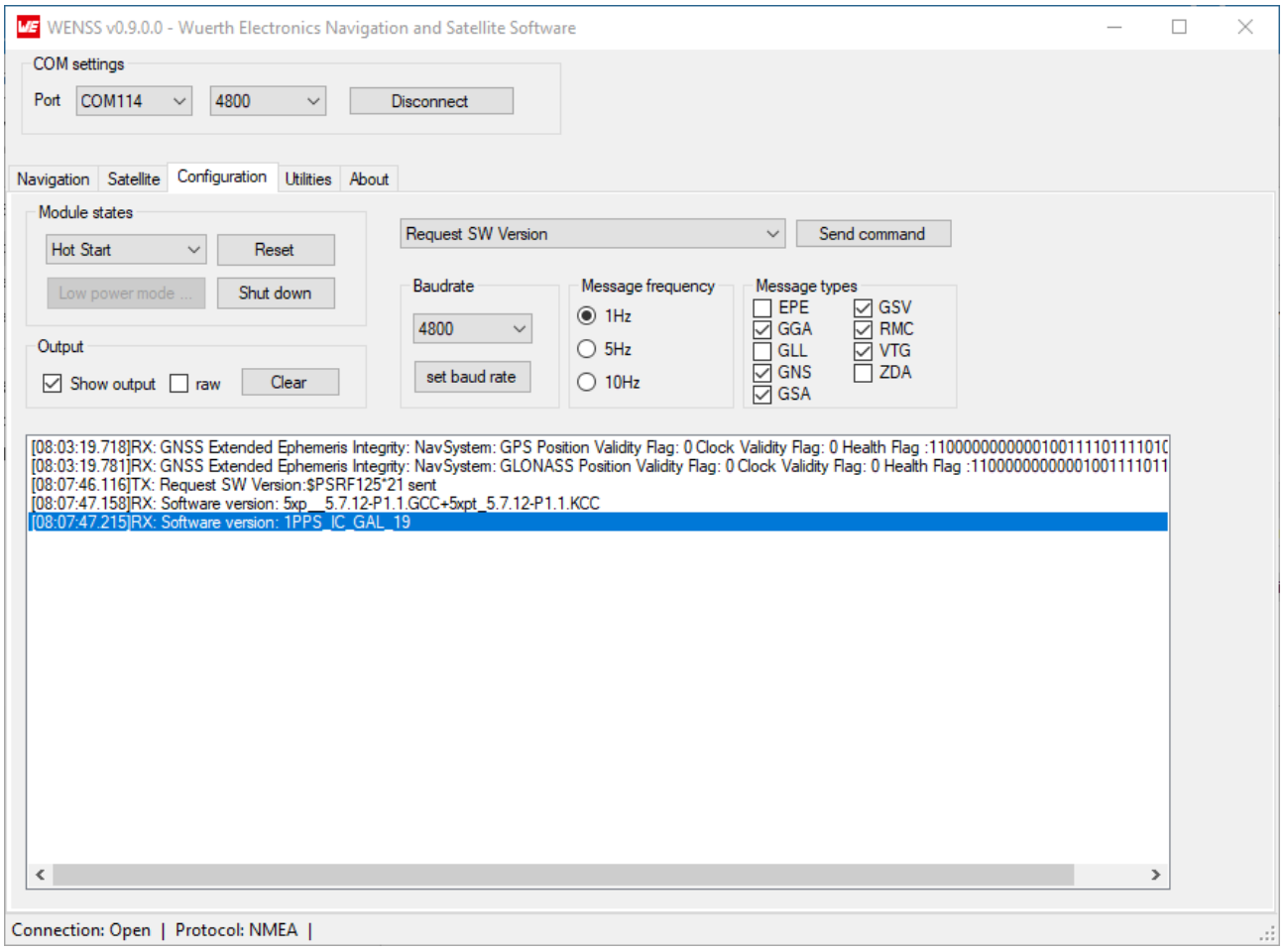
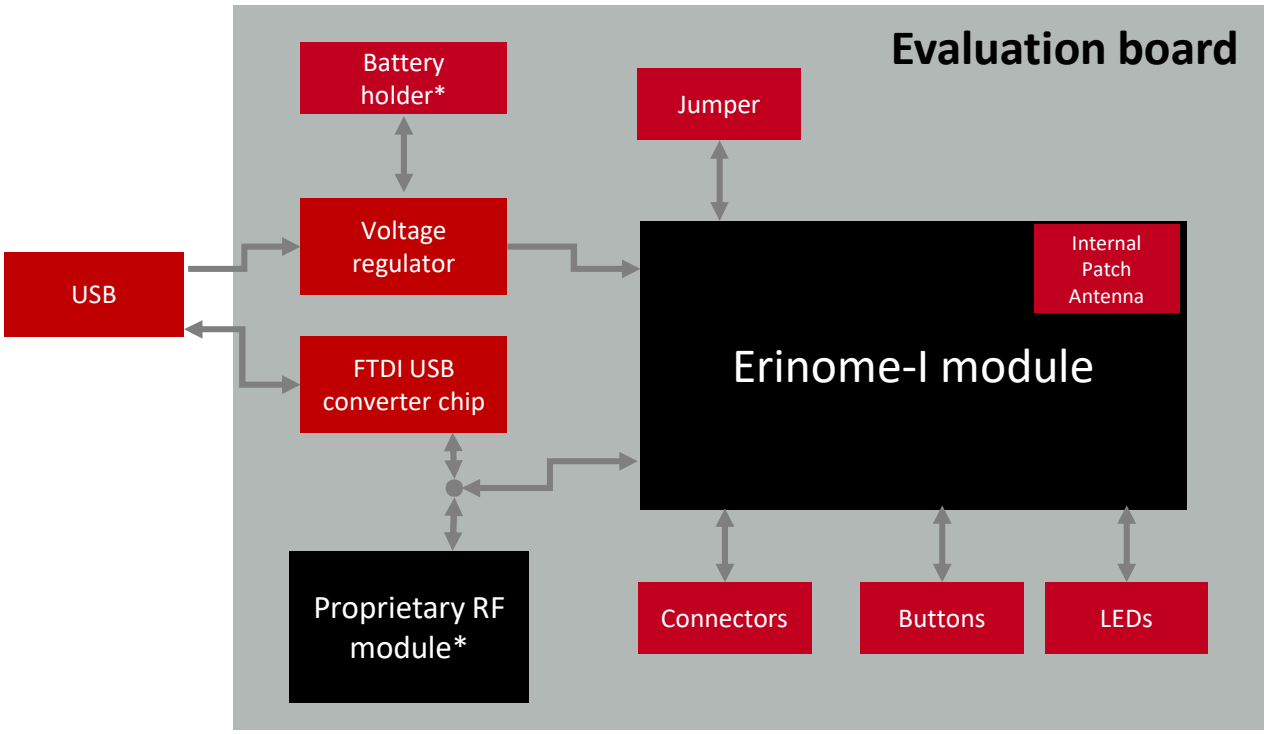


Figure 2: PC-Tool

3 Development board

3.1 Block diagram



*Planned for future Hardware Version

Figure 3: Block diagram

3.2 Jumpers

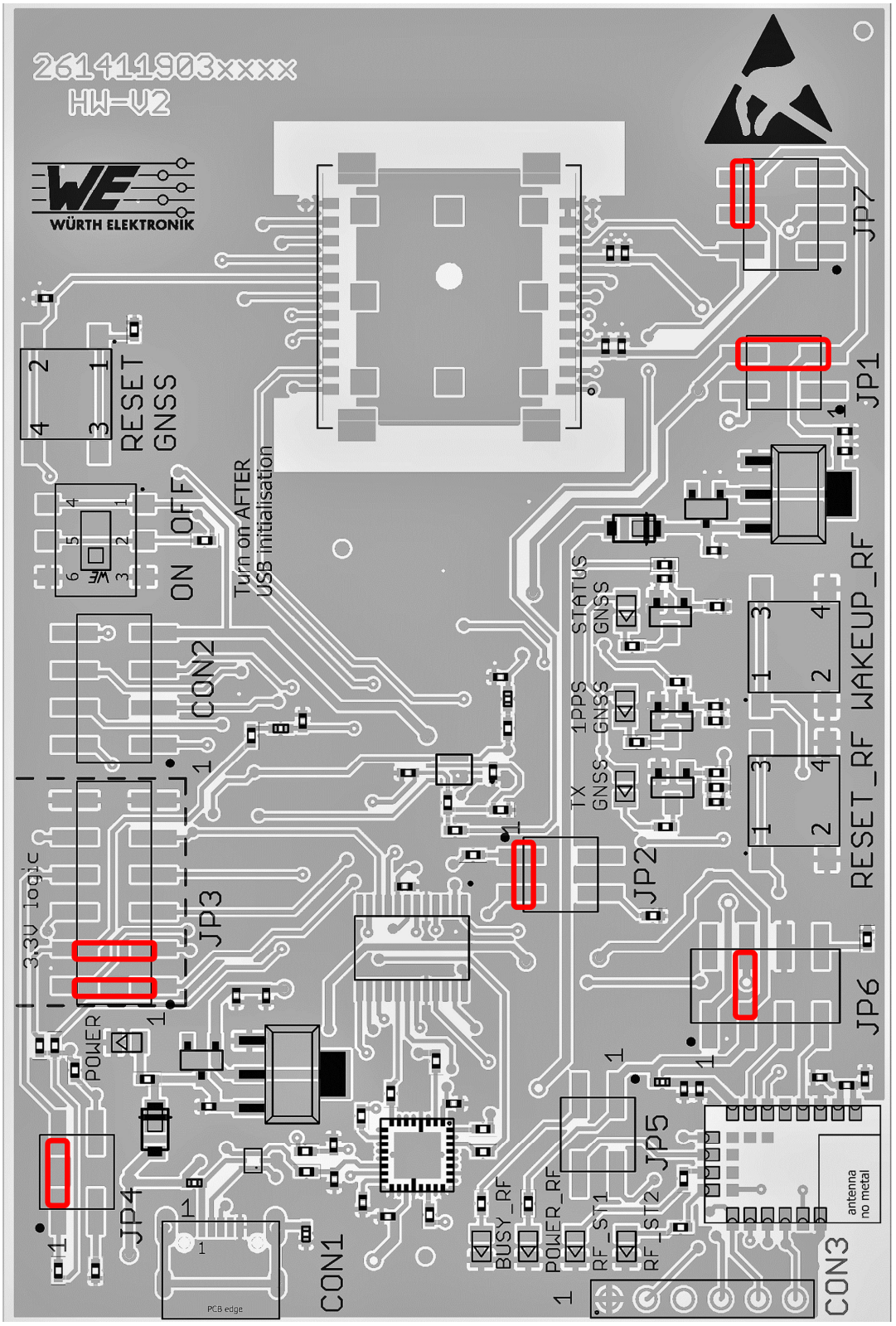


Figure 4: Jumpers - default setting

JP1	Function	Jumper set (default)
1,2	No connection	No
3,4	Power bridge (remove for current measurement)	Yes

JP2	Function	Jumper set (default)
1,3	UART to USB communication	Yes
3,4	UART to proprietary RF communication	No

JP3	Function	Jumper set (default)
1,2	RX UART interface to TX-GNSS module	Yes
3,4	TX UART interface to RX-GNSS module	Yes
5,6	CTS UART interface to RTS-GNSS module	No
7,8	RTS UART interface to CTS-GNSS module	No
9,10	RST-Control UART interface to RST-GNSS module	No
11,12	Ground connection	No

JP4	Function	Jumper set (default)
1,2	CTS pullup	Yes
3,4	RTS pulldown	No

JP5	Function	Jumper set (default)
1,2	Mode set (reserved for future use)	No
3,4	Busy LED (reserved for future use)	No

JP6	Function	Jumper set (default)
1,3	Battery power supply (reserved for future use)	No
3,4	3V LDO power supply	Yes
5,6	Pulldown BOOT_RF (reserved for future use)	No
7,8	Pulldown SWDCLK_RF (reserved for future use)	No

JP7	Function	Jumper set (default)
2,4	V_BACKUP with 1.8V internal supply	No
3,4	V_BACKUP with Battery supply	No
4,6	V_BACKUP with 3.3V LDO supply	Yes

3.3 Connectors

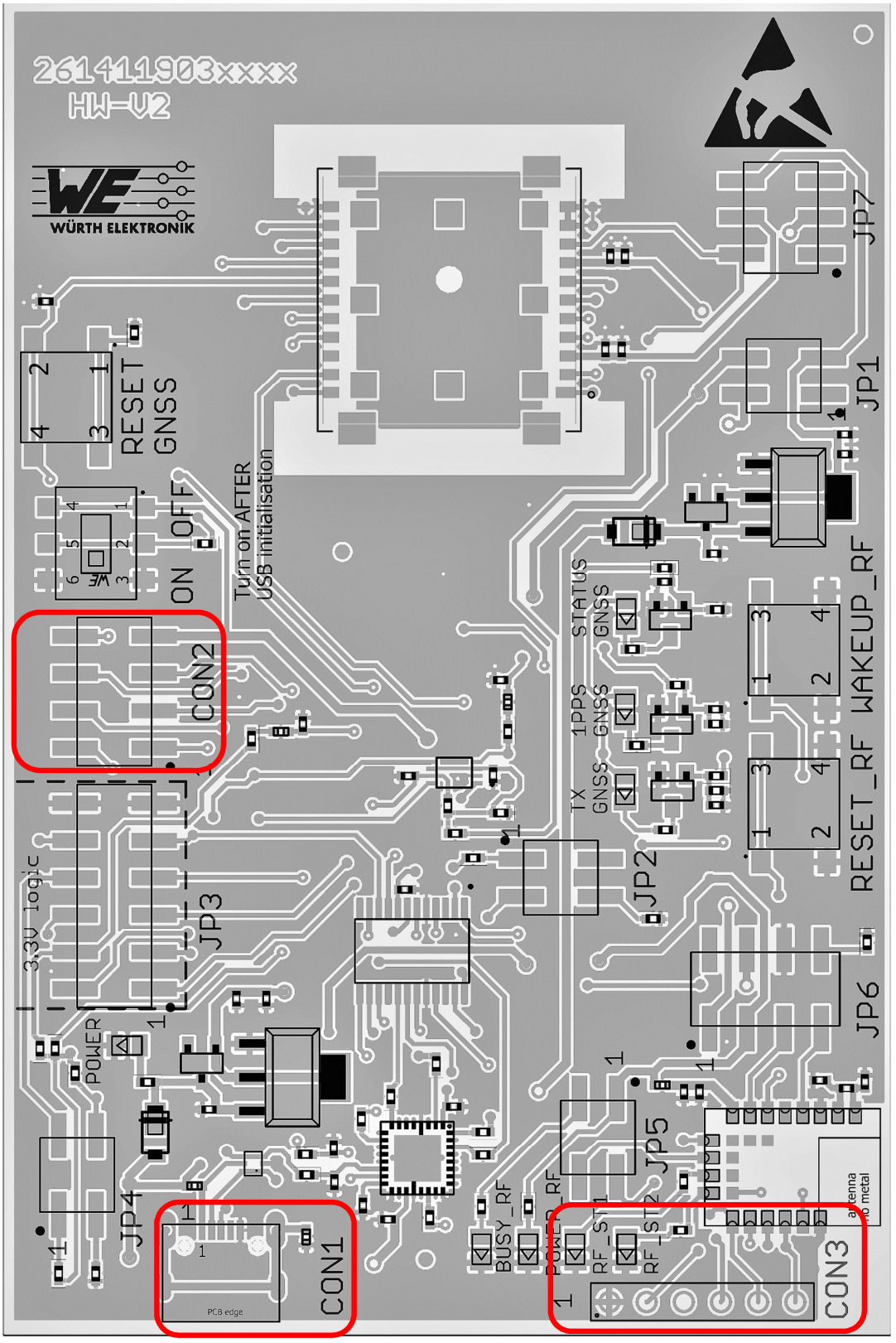


Figure 5: Connectors

Connector	Function
CON1	Micro-USB connector for host connection and VCC bus supply
CON2	GPIO Connection to the GNSS Module
CON3	UART Interface Thyone-I Module (Reserved for future use)

3.3.1 CON1

Connector CON1 is a micro-USB socket that enables connection to PC via standard micro-USB cable and also provides supply voltage to the board during USB powered operation.

CON1	Function
	Micro-USB connector for host connection and VCC bus supply

3.3.2 CON2

Connector CON2 is used to access all the available GPIO Pins of the Module.

CON2	Function
1	GPIO_8
2	GPIO_A
3	EN_GNSS
4	GPIO_B
5	BOOTMODE
6	GPIO_C
7	VCC_GNSS
8	GPIO_2

3.3.3 CON3

Connector CON3 is a standard 2.54mm pin header which is used as the UART interface for the Thyone-I module. This feature is not released in the current evaluation board version and is subject for a future version.

CON3	Function
1	GND
2	RTS_RF signal
3	Not connected
4	RX_RF signal
5	TX_RF signal
6	CTS_RF signal

3.4 Switches and Buttons

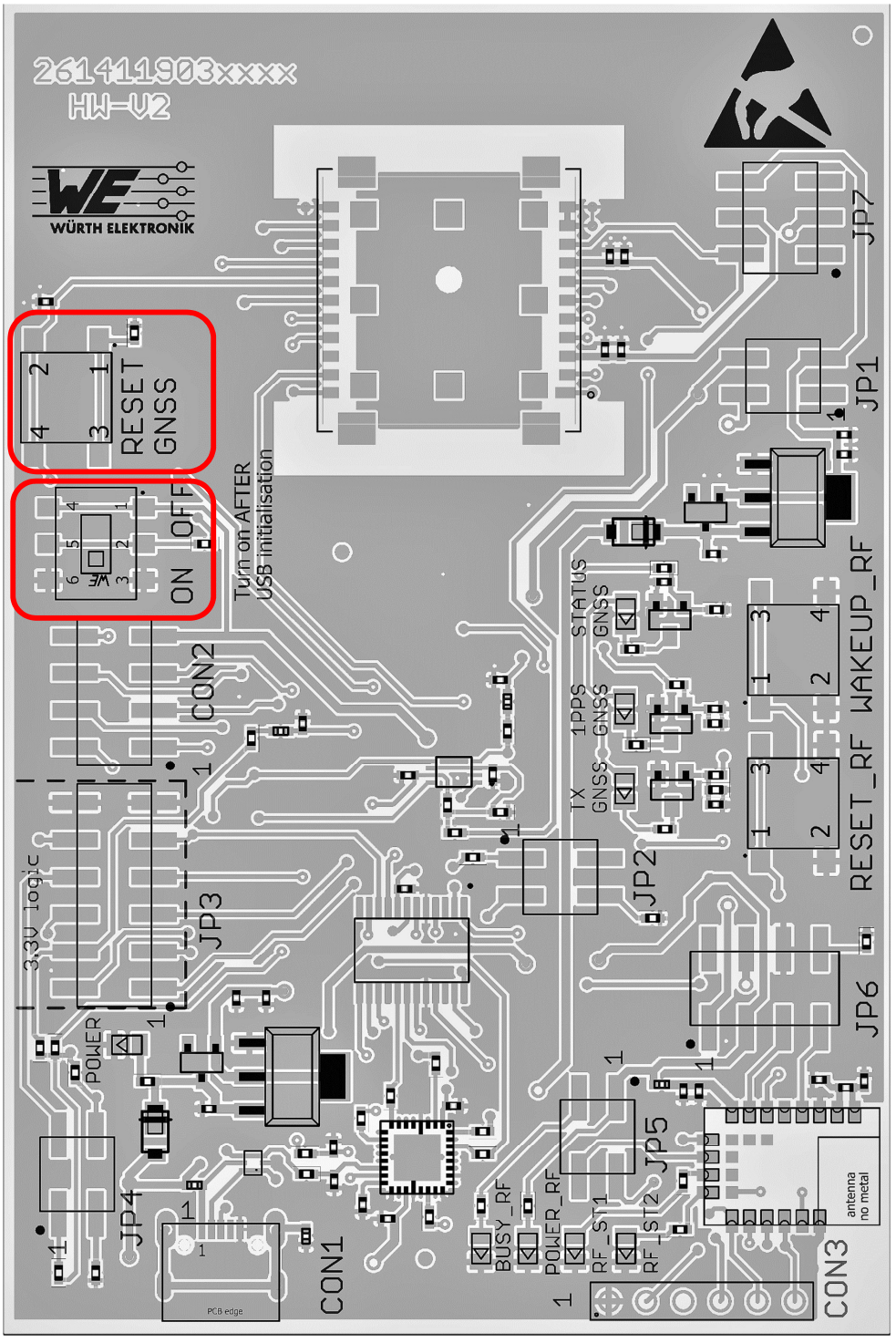


Figure 6: Switches and Buttons

3.4.1 RESET GNSS button

Internally the active low reset input of the micro processor is connected via a RC combination with the power supply to ensure a proper startup of the module. */RESET* pin is connected to this button which provides the possibility for hard reset. Please refer to the module specific manual for detailed information.

3.4.2 ON/OFF Switch

ON/OFF Switch is connected to the module's *ON_OFF* pin. This gives the user the possibility to switch between the operating modes. Please refer to the module specific manual for detailed information.

Before connecting the evaluation board to the PC the ON/OFF switch should be in OFF position (Hibernate mode), only after USB initialisation the ON/OFF switch should be switch to ON position (Full power mode)

3.5 Function blocks

3.5.1 Power supply

3.5.1.1 Bus powered, power supply through USB

The development board can be powered through the micro USB connector. The integrated voltage regulator regulates the connected USB voltage of typ. 5V down to 3.3V and further a dedicated voltage regulator is used to power the module with the proper voltage supply of 3.3V. If the evaluation board is power sourced the *Power LED* lights up. USB power supply can be selected using the jumper *JP6*. By default the jumper *JP6* is set to USB powered operation.

3.5.1.2 Battery powered, power supply through AAA battery

The development board also has optional assembly for battery holders on the bottom to connect two AAA batteries. To power up the board using the AAA batteries *JP6* should be set accordingly. (This feature is reserved for future use)

3.5.2 JP1 - Current Measurement

By default, JP1 is set to 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 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 JP2 - UART Communication Interface Selection

By default, JP2 is bridged for UART communication through USB interface.
The proprietary RF module provides the possibility to support UART communication through radio, which can be established by setting the JP2 respectively. (This feature is reserved for future use)

3.5.4 JP3 - Communication Interface

By default, JP3 is bridged between the TX, RX, CTS, RTS, Reset lines of GNSS module to UART communication interface. In this setting only TX and RX connections are absolute necessity for UART communication. CTS, RTS and Reset connections are optional and provide the possibility to control the relevant module pins using UART interface.
Pins 2, 4, 6 and 8 of the JP3 can also be used to connect GNSS module to any other external interface instead of bridging the jumper JP3. In such case, beware of IO level compatibility as these pins have a IO logic level of 3.3V. The host must obey the values stated in the module's manual. Especially the IO level restrictions must be implemented by a host system (i.e. using a level shifter to support the allowed IO levels).

3.5.5 JP4 - CTS/RTS Pull Resistors

By default, JP4 is bridged to provide external pullup on CTS of the GNSS module to support UART communication interface. For detailed information related to the setup of pull resistors please refer to the module manual.

3.5.6 JP5

Connections of the jumper JP5 are reserved for future use.

3.5.7 JP6 - Power Supply selection

By default, the jumper JP6 is set to USB powered operation. Other connections of the jumper JP4 are reserved for future use.

3.5.8 JP7 - V_BACKUP Voltage Selection

By default, JP7 is bridged to provide 3.3V voltage supply from the voltage regulator from the evaluation board. By setting the JP7 accordingly, V_BACKUP Pin of the module can be supplied with 1.8V from the internal voltage regulator of the module or battery power supply from the evaluation Board, which is a feature reserved for future use.

3.5.9 UART / USB

UART interface of the module can be connected to the USB converter by setting the jumper JP2 and JP3 accordingly. By default, communication takes place through the USB jack.

Using the FTDI-driver the PC tool will show a virtual COM-Port which can be used to communicate with the module.

The USB cable length should not exceed 3 meters.

3.5.10 LED

There are three LEDs available on the evaluation board dedicated to indicate the status of Erinome-I module's functions.

3.5.10.1 STATUS GNSS LED

STATUS GNSS LED is connected to the *WAKE_UP* pin of the Erinome-I module. If the LED is in steady ON state, it indicates that the module is in full power mode. If the LED is in steady OFF state, it indicates that the module is in hibernate mode. Please refer to the module manual for detailed information.

3.5.10.2 1PPS GNSS LED

1PPS GNSS LED is connected to the *1PPS* pin of the Erinome-I module. *1PPS GNSS LED* is triggered through 1PPS signal pulse once the module obtains 3D position fix. Please refer to the module manual for detailed information.

3.5.10.3 TX GNSS LED

TX GNSS LED is connected to the *TX* pin of the Erinome-I module. If the LED is in steady OFF state, it indicates that the module is in hibernate mode. If the LED is in blinking state, it indicates that the module in full power mode and GNSS messages are transmitted by the module. Please refer to the module manual for detailed information.

If the *RESET_GNSS* button on the evaluation board is pressed, the GNSS message transmission is stopped but the *TX GNSS LED* is in steady ON state, this is because of the pull up on TX line by the level shifter used in the evaluation board.

3.5.11 Proprietary RF Block

The evaluation board is prepared to use a proprietary RF-Module *Thyone-I* for UART communication through a radio interface. However, this feature is not released in the current evaluation board version and is subject for a future version.

3.6 Schematic

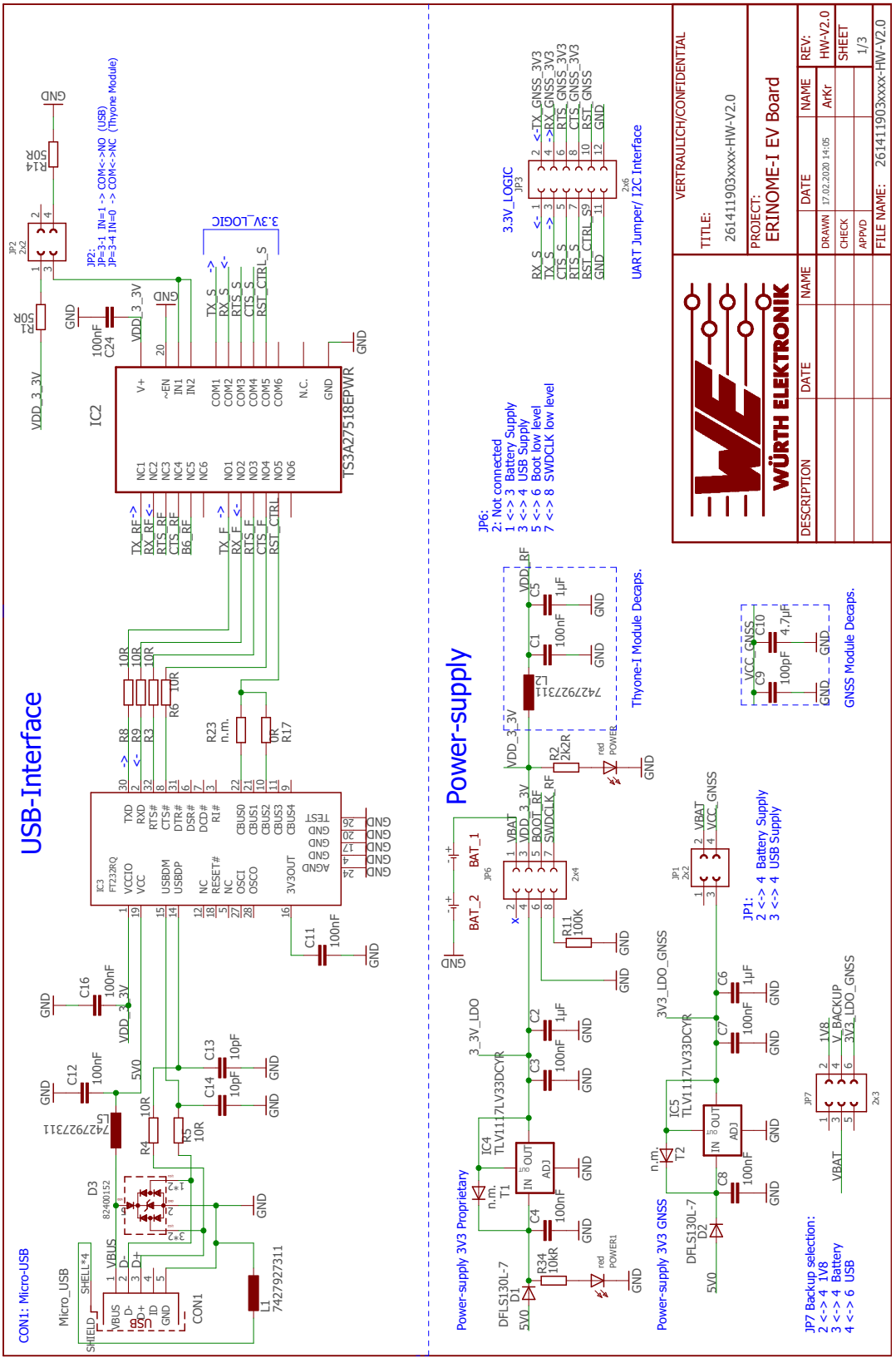


Figure 7: Schematic sheet-1

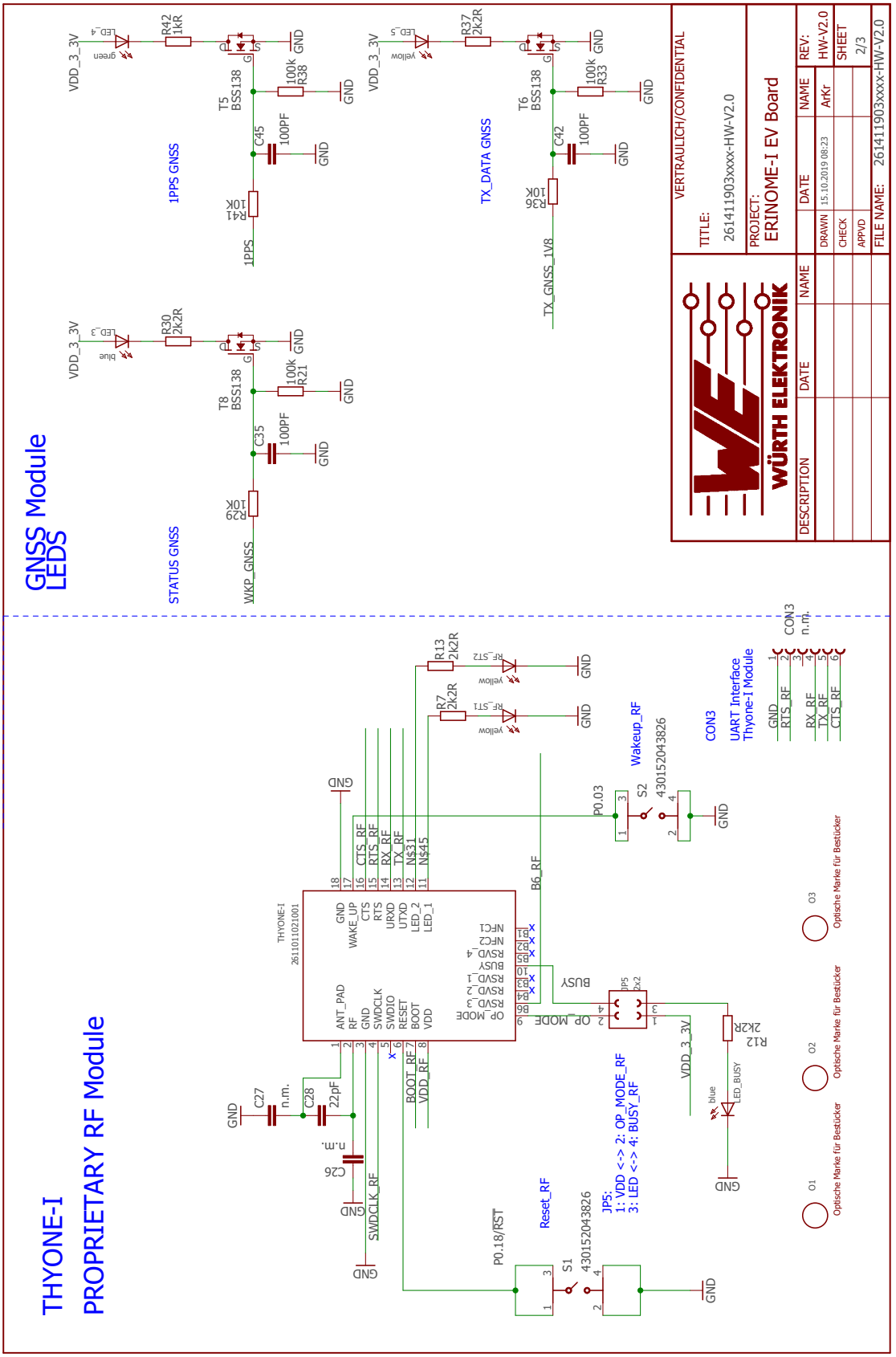


Figure 8: Schematic sheet-2

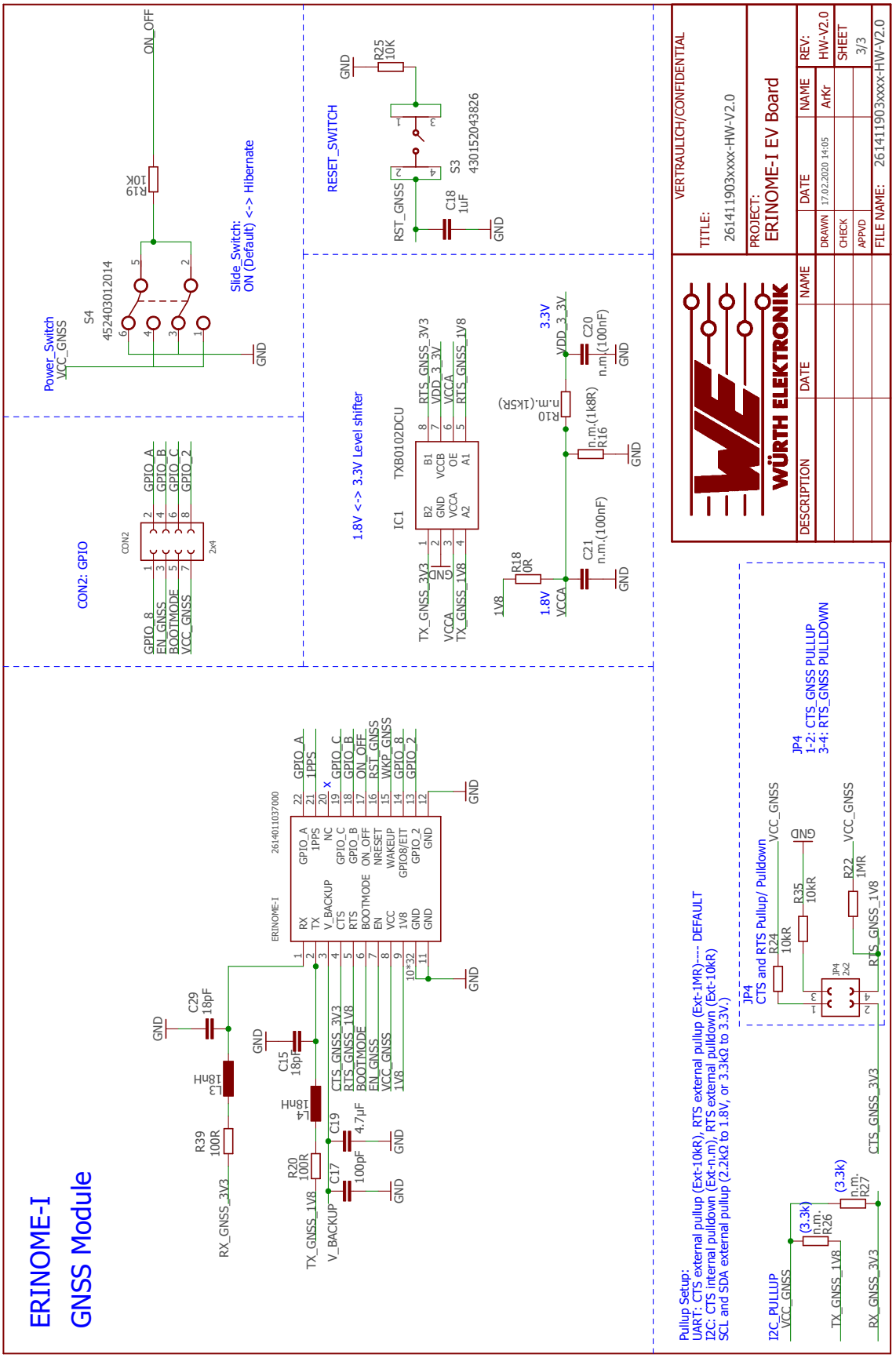


Figure 9: Schematic sheet-3

3.7 Layout

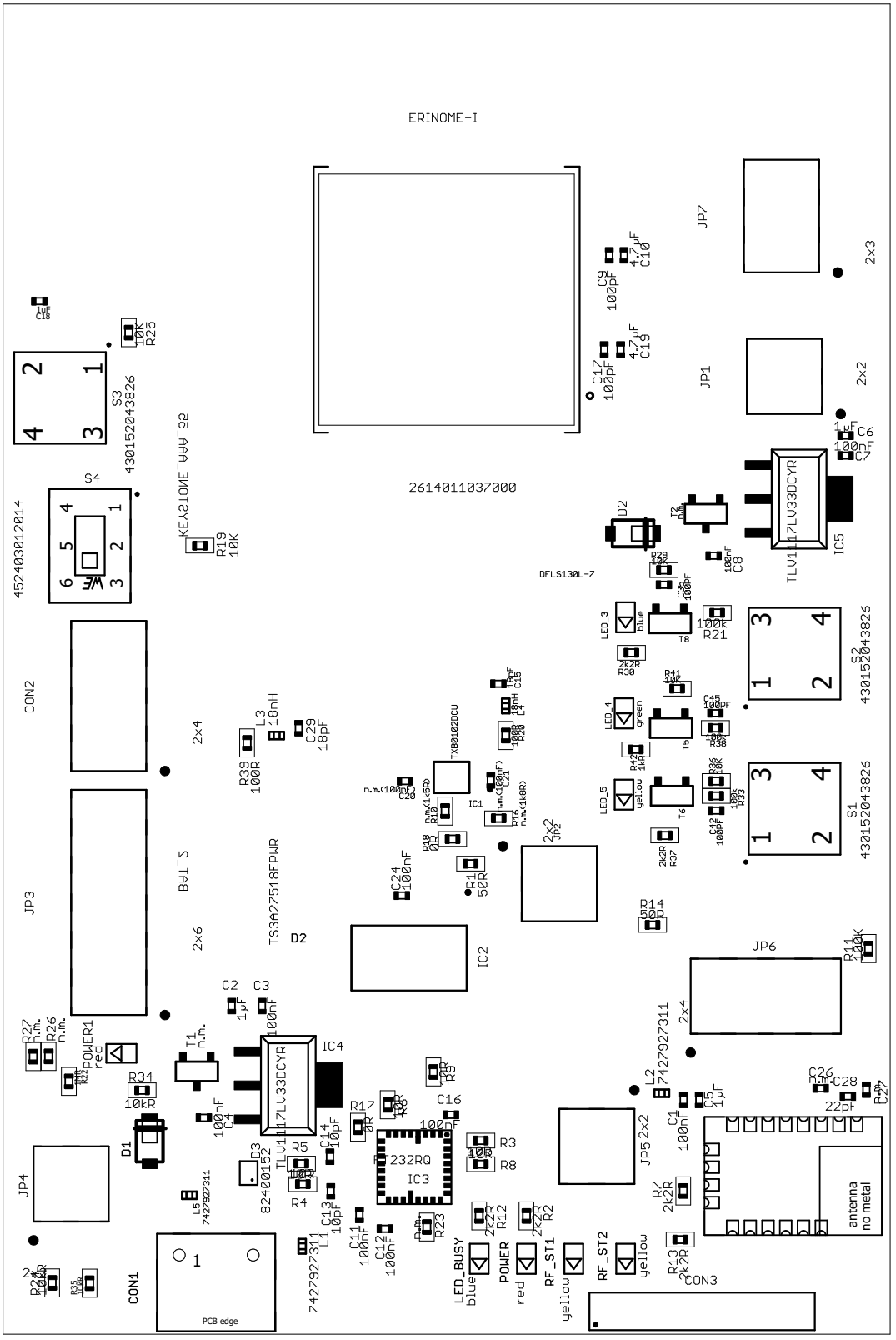


Figure 10: Assembly diagram

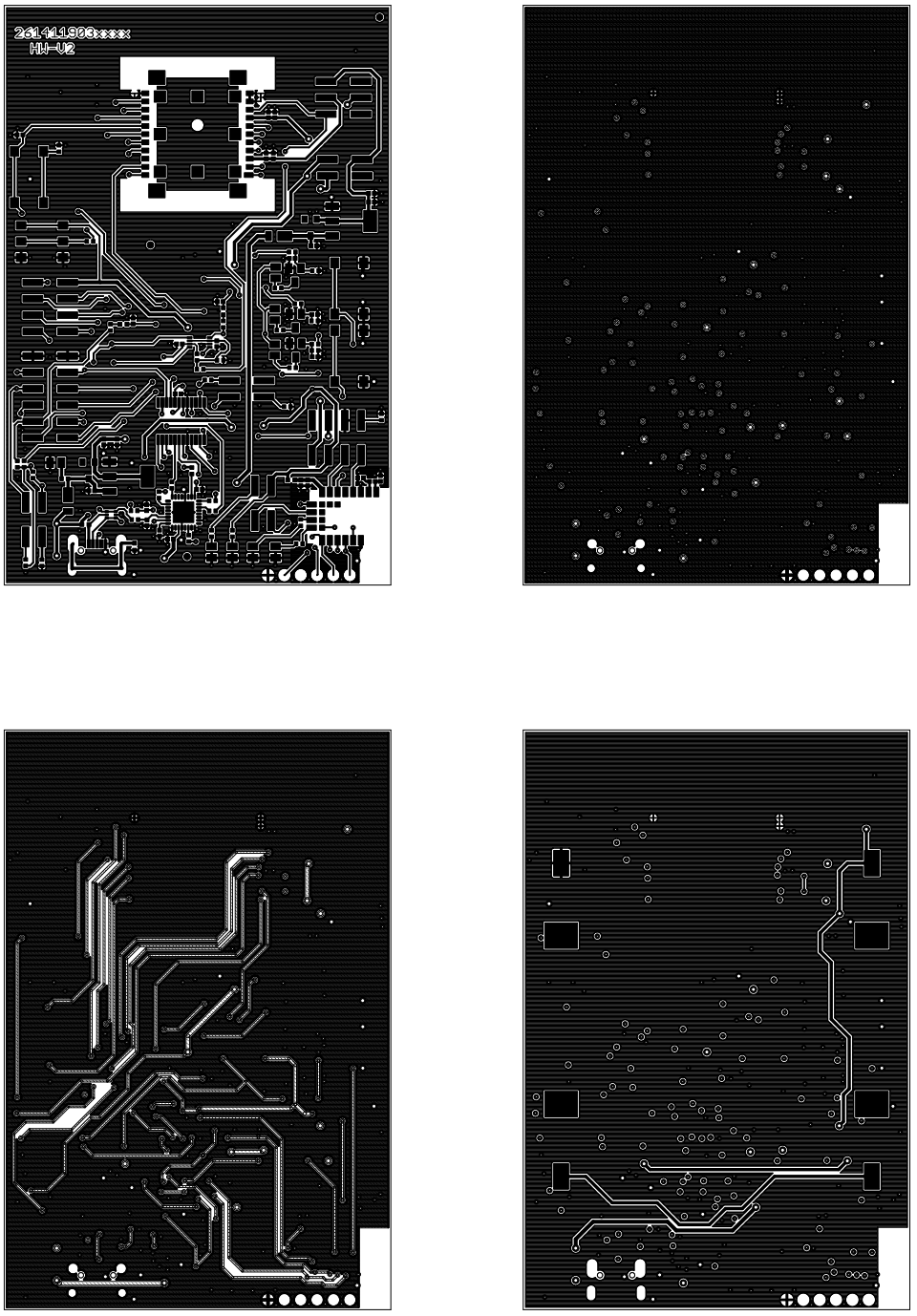


Figure 11: Top,bottom & internal layers

4 Regulatory compliance information

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 destined for professionals to be used solely at research and development facilities for such purposes.

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