EVK-NINA-W13

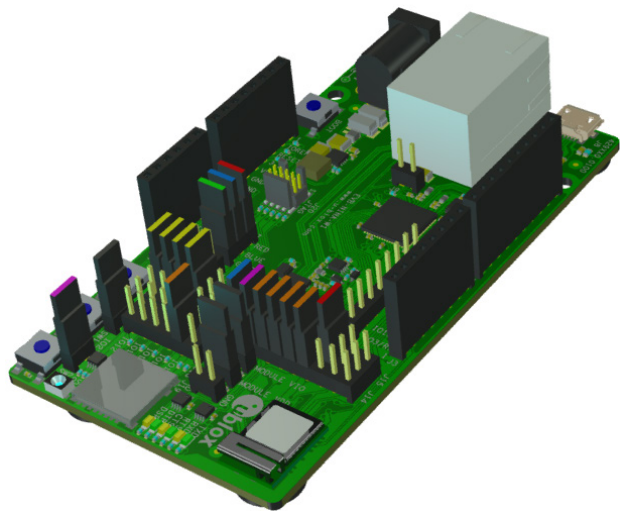## Evaluation Kit for NINA-W13 modules

User Guide

Abstract

This document describes how to set up the EVK-NINA-W13x evaluation kits to evaluate NINA-W13 series stand-alone Wi-Fi modules. It also describes the different options for debugging and the development capabilities included in the evaluation board.

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UBX-17011007 - R04

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Document Information

Title	**EVK-NINA-W13**
Subtitle	Evaluation Kit for NINA-W13 modules
Document type	User Guide
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Revision, date	R04 12-Mar-2018
Disclosure restriction	

This document applies to the following products:

Product name	Type number	Software version	PCN reference
EVK-NINA-W131	EVK-NINA-W131-00	1.0.0	-
EVK-NINA-W132	EVK-NINA-W132-00	1.0.0	-

Contents

1 Product description

1.1 Overview

The EVK-NINA-W13 evaluation kit includes an evaluation board, which can be used as a reference design for the NINA-W13 series Wi-Fi modules, a quick start guide and a USB cable. For the NINA-W131 module, the evaluation board is prepared with a U.FL coaxial connector for connecting the external antenna. The NINA-W132 module has an onboard antenna; thus the EVK-NINA-W132 evaluation board does not have a U.FL connector.

The main features of the EVK-NINA-W13 are:

- Available in two variants - NINA-W131 and NINA-W132
- All of the NINA-W13 module pins are available at connectors or jumpers
- Can be powered through USB (J8) or external power supply (J23)
- Equipped with a Quad High Speed USB to Multipurpose UART/MPSSE IC (FT4232) that allows serial communication and flashing over USB.

The EVK-NINA-W13 evaluation kits are available in the following two variants, depending on which NINA-W13 module is mounted on the EVK:

- EVK-NINA-W131 – Evaluation kit for NINA-W131 module, RF port available on U.FL connector (J21)
- EVK-NINA-W132 – Evaluation kit for NINA-W132 module with onboard antenna

This section describes the main connectors and settings that are required to get started. Figure 1 and Figure 2 show the two variants of the EVK-NINA-W13 evaluation board - EVK-NINA-W131 and EVK-NINA-W132.
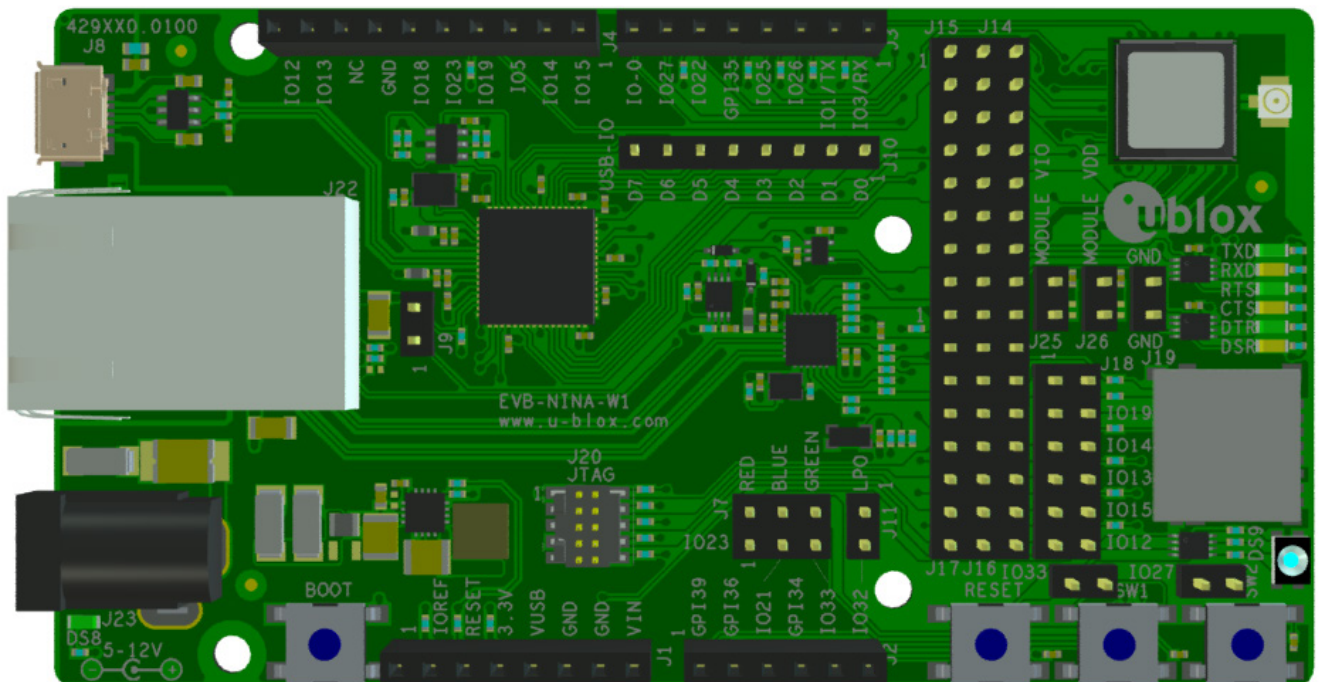
Figure 1: EVK-NINA-W131 evaluation board
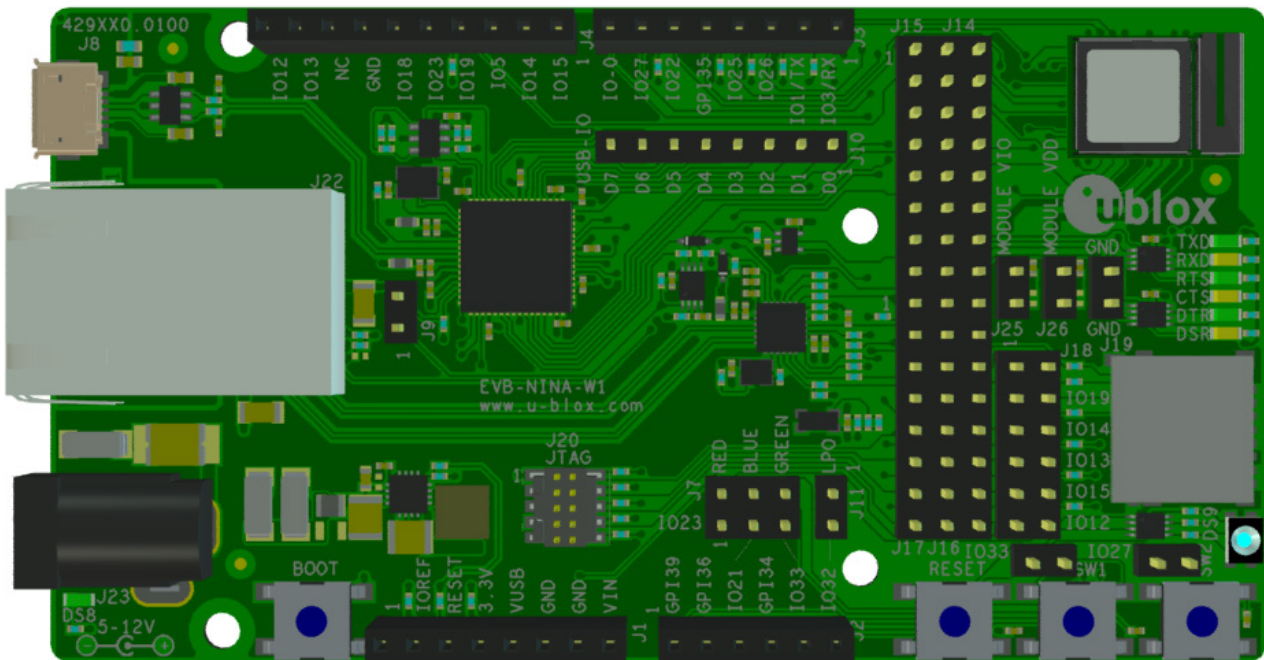
Figure 2: EVK-NINA-W132 evaluation board

⚠️ **Take care while handling the EVK-NINA-W132. Applying force to the NINA-W132 module might damage the internal antenna.**

1.2 Kit includes

1.2.1 EVK-NINA-W131

The EVK-NINA-W131 evaluation kit includes the following:

- EVK-NINA-W131 evaluation board
- 2.4 GHz foldable antenna (Ex-It 2400) with reverse polarity SMA connector
- RP-SMA - U.FL cable assembly, 100 mm length
- USB cable
- Quick Start guide

1.2.2 EVK-NINA-W132

The EVK-NINA-W132 evaluation kit includes the following:

- EVK-NINA-W132 evaluation board
- USB cable
- Quick Start guide

1.3 Jumper description

| Parameter	Description	Name	Default
Enable SW1	Jumper at J5-1_J5-2 connects switch 1 to module pin-7	J5	☑
Enable SW2	Jumper at J6-1_J6-2 connects switch 2 to IO-27 (Jumper at J14-15_J14-16 must be populated to connect IO27 to module pin-18)	J6	☑
Enable RGB-LED	Jumper at J7-1_J7-2 connects RED LED to IO-23 (Jumper at J15-3_J14-5 must be populated to connect IO23 to module pin-1)	J7-1_2	☑
	Jumper at J7-3_J7-4 connects BLUE LED to IO-21 (Jumper at J16-1_J16-2 must be populated to connect IO21to module pin-8)	J7-3_4	☑
	Jumper at J7-5_J7-6 connects GREEN LED to IO-33	J7-5_6	☑
IO/Interface select	Module pin to IO/Interface distribution	J14	See Table 3
IO/Interface select	Module pin to IO/Interface distribution	J15	See Table 3
IO/Interface select	Module pin to IO/Interface distribution	J16	See Table 3
IO/Interface select	Module pin to IO/Interface distribution	J17	See Table 3
IO/Interface select	Module pin to IO/Interface distribution	J18	See Table 3
Enable VCC_IO	Connects EVK internal 3.3 V to module pin-9 to supply module VCC_IO	J25	☑
Enable VCC	Connects EVK internal 3.3 V to modle pin-10 to supply module VCC	J26	☑

Table 1: EVK-NINA-W13 jumper descriptions
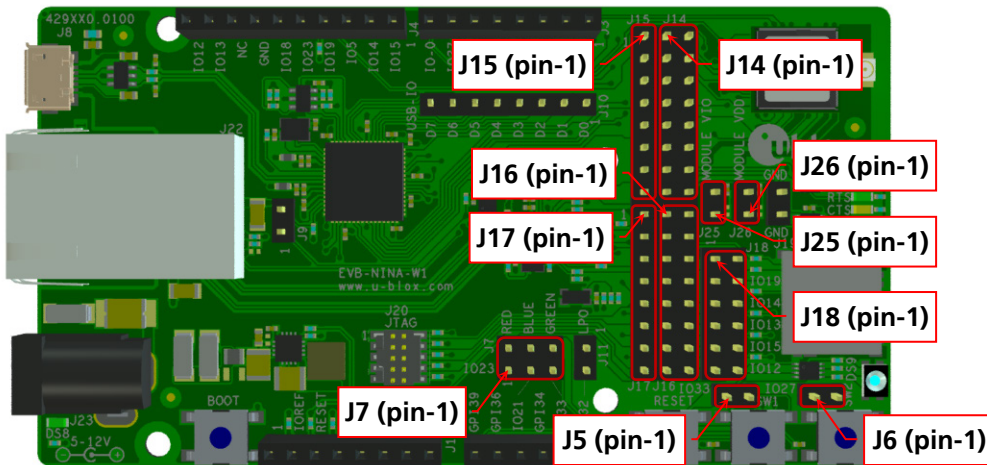
Figure 3: Jumper positions on the EVK-NINA-W13

Middle row jumper pin	Connected to
J14-1	Module pin-28
J14-3	Module pin-29
J14-5	Module pin-1
J14-7	Module pin-21
J14-9	Module pin-20
J14-11	Module pin-16
J14-13	Module pin-17
J14-15	Module pin-18
J16-1	Module pin-8
J16-3	Module pin-27
J16-5	Module pin-25
J16-7	Module pin-24
J16-9	Module pin-31
J16-11	Module pin-35
J16-13	Module pin-32
J16-15	Module pin-36

Table 2: Available module pins at the middle row of jumpers J14 and J16

Connected to	Left row jumper pin	Middle row jumper pin	Right row jumper pin	Connected to	Default
IO-5, J4 pin-3	J15-1	J14-1	J14-2	SPI_CS, U5-PB-3	[J15-1_J14-1]
IO-18, J4 pin-6	J15-2	J14-3	J14-4	SPI_CLK, U5-PB-0	[J15-2_J14-3]
IO-23, J4 pin-5	J15-3	J14-5	J14-6	SPI_MOSI, U5-PB-1	[J15-3_J14-5]
reserved	J15-4	J14-7	J14-8	J18 pin-1_3	[J14-7_J14-8]
reserved	J15-5	J14-9	J14-10	IO-22, J3 pin-6 (RTS)	[J14-9_J14-10]
reserved	J15-6	J14-11	J14-12	IO-25, J3 pin-4 (DTR)	[J14-11_J14-12]
reserved	J15-7	J14-13	J14-14	IO-26, J3 pin-3 (DSR)	[J14-13_J14-14]
reserved	J15-8	J14-15	J14-16	IO-27, J3 pin-7	[J14-15_J14-16]
reserved	J17-1	J16-1	J16-2	IO-21, J2 pin-3	[J16-1_J16-2]
reserved	J17-2	J16-3	J16-4	IO-0, J3 pin-8	[J16-3_J16-4]
reserved	J17-3	J16-5	J16-6	reserved	
reserved	J17-4	J16-7	J16-8	reserved	
Reserved	J17-5	J16-9	J16-10	J18 pin-5	[J16-9_J16-10]
Reserved	J17-6	J16-11	J16-12	J18 pin-7	[J16-11_J16-12]
Reserved	J17-7	J16-13	J16-14	J18 pin-9	[J16-13_J16-14]
Reserved	J17-8	J16-15	J16-16	J18 pin-11	[J16-15_J16-16]

Table 3: IO-allocation via jumpers J14, J15, J16, and J17

Connected to	Left row jumper pin	Right row jumper pin	Connected to	Default
J14-8	J18-1	J18-2	SPI_MISO, U5-PB-2	
J14-8	J18-3	J18-4	IO-19, J4 pin-4 (CTS)	[J18-3_J18-4]
J16-10	J18-5	J18-6	IO-14, J4 pin-2	[J18-5_J18-6]
J16-12	J18-7	J18-8	IO-13, J4 pin-9	[J18-7_J18-8]
J16-14	J18-9	J18-10	IO-15, J4 pin-1	[J18-9_J18-10]
J16-16	J18-11	J18-12	IO-12, J4 pin-10	[J18-11_J18-12]

Table 4: IO-allocation via jumper J18

1.3.1 Default jumper configuration

Mod pin-21 to J18-3
Mod pin-20 to IO22 (RTS)
Mod pin-16 to IO25 (DTR)
Mod pin-17 to IO26 (DSR)
Mod pin-28 to IO5
Mod pin-29 to IO18
3.3V to Mod pin-9
3.3V to Mod pin-10
Mod pin-18 to IO27
J18-4 to IO19 (CTS)
Mod pin-27 to IO0
J18-6 to IO14
J18-8 to IO13
Mod pin-31 to J18-5
Mod pin-35 to J18-7
J18-10 to IO15
Mod pin-32 to J18-9
J18-12 to IO12
Mod pin-36 to J18-11
SW1 to IO33
SW2 to IO27
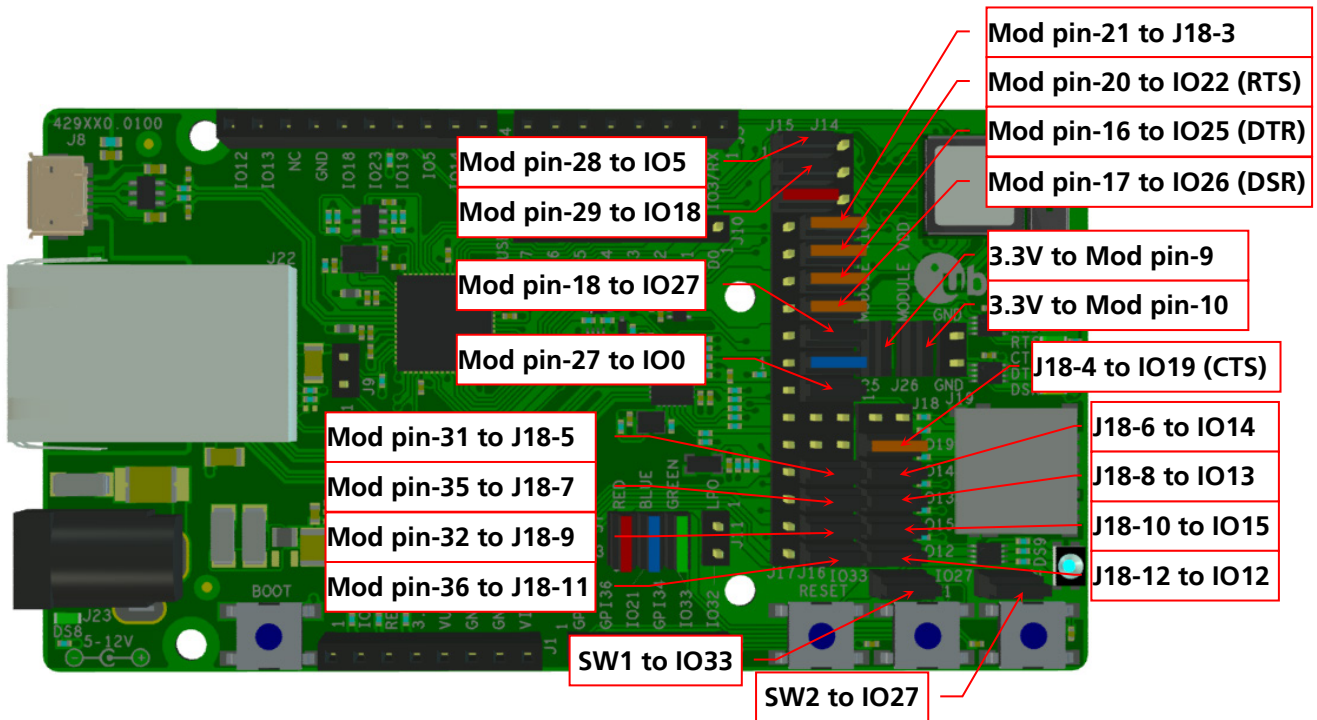
Figure 4: Jumper configuration to enable UART, IOs, and switches 1 and 2

1.3.2 RGB-LED Jumper configuration

IO33 to GREEN LED
IO21 to BLUE LED
IO23 to RED LED
Mod pin-1 to IO23
Mod pin-8 to IO21
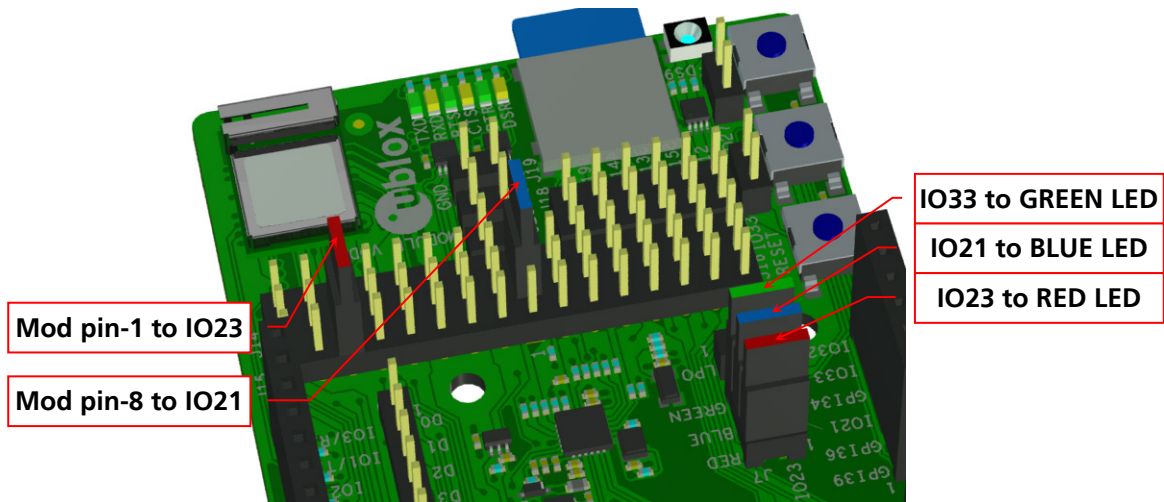
Figure 5: RGB-LED to IO signals jumpers

1.4 LEDs

Function	Description	Name	Color
Power LED	Supplied from the EVK 3.3 V DC/DC converter	DS8	Green
UART TxD	Flashing LED indicates UART Tx activity (output from NINA-W1)	DS2	Green
UART RxD	Flashing LED indicates UART Rx acitivty (input to NINA-W1)	DS3	Amber
UART RTS	LED indicates UART RTS status (output from NINA-W1)	DS4 [1]	Green
UART CTS	LED indicates UART CTS status (input to NINA-W1)	DS5 [1]	Amber
UART DTR	LED indicates UART DTR status (output from NINA-W1)	DS6 [1]	Green
UART DSR	LED indicates UART DSR status (input to NINA-W1)	DS7 [1]	Amber
status	RGB LED to present module satus	DS9 [1]	RGB

Table 5: EVK-NINA-W13 LEDs description

☞ [1] To control the LEDs, the corresponding signal jumper(s) must be populated.
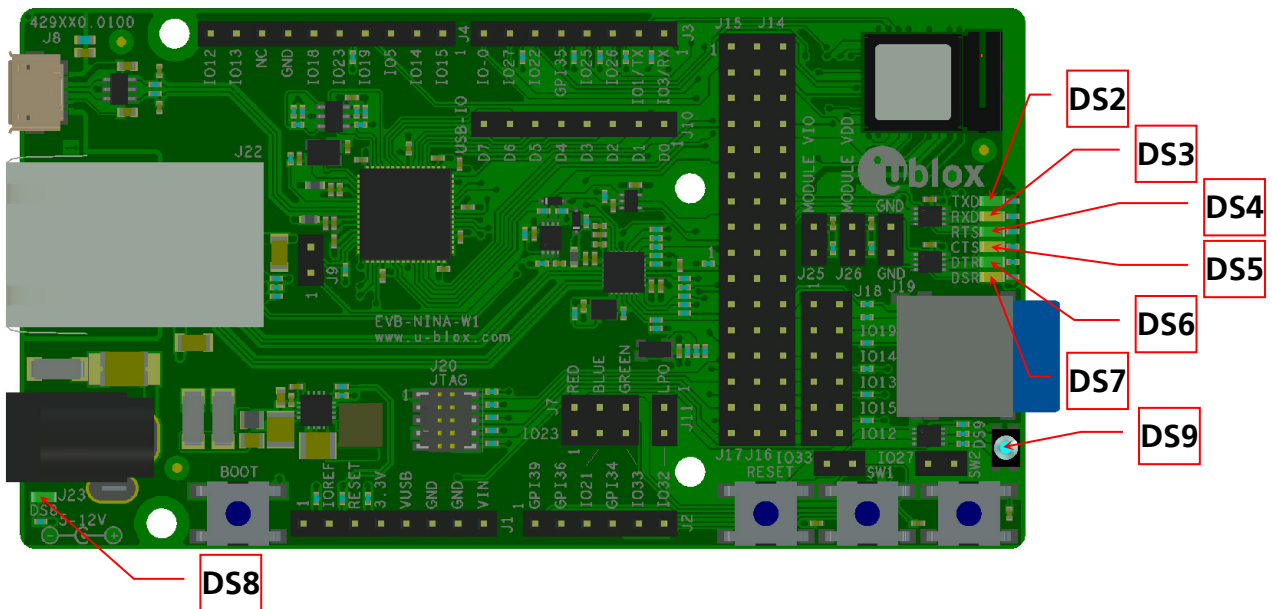

Figure 6: Position of LEDs on EVK-NINA-W132 and EVK-NINA-W131

1.5 Connectors

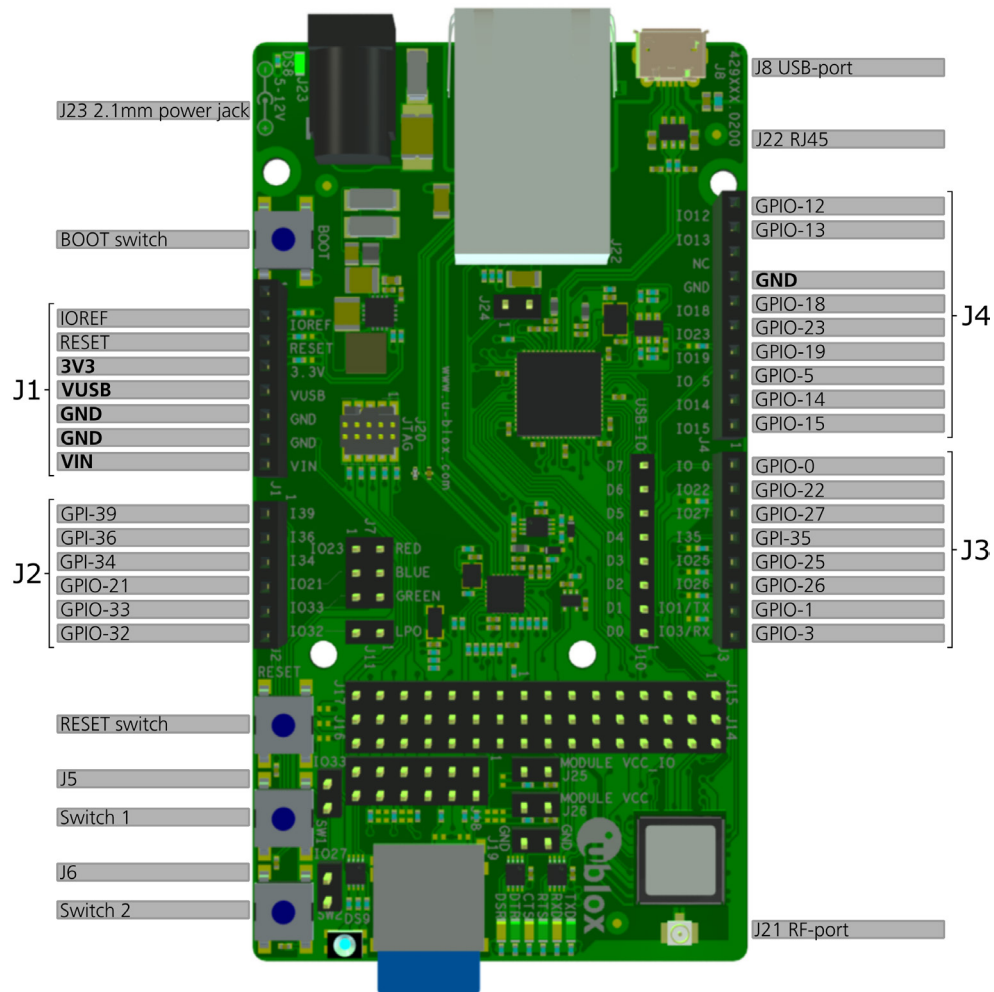The available connectors on the EVK-NINA-W13 evaluation board are shown in Figure 7.

Figure 7: EVK-NINA-W13 connectors

Connector	Description
J1, J2, J3, J4	Connectors for accessing the NINA-W1 IO signals (GPIO)
J8	USB connector; type Micro-B
J10	Reserved
J21	RF-port at U.FL coaxial connector for external antenna (connector J21 is not populated on EVK-NINA-W132)
J22	RJ45 connector, reserved for future use (RMII to PHY)
J23	2.1 mm Power jack, positive center pin, 5 – 12 V

Table 6: EVK-NINA-W13 connector descriptions

1.6 Buttons

The EVK-NINA-W13 evaluation board has four buttons as explained in Table 7. Two of them can be connected to NINA-W1 pins via jumper configuration.

Button	Description
RESET	Reset button, triggers the reset logic that pulls module pin-19 low
BOOT	If reset is asserted pressing BOOT-switch will pull module pin-27 low
SW1	General function button connected to jumper J5 pin-2
SW2	General function button connected to jumper J6 pin-2

Table 7: EVK-NINA-W13 buttons descriptions

1.7 Configuration options

Module pin number	IO-signal	Primary function	Accessible at Jumper/Connector	Module pin number	IO-signal	Primary function	Accessible at Jumper/Connector
1	GPIO-23		J14-5, [J4-5, J7-1] [1]	20	GPIO-22	UART_RTS	J14-9, [J3-7] [1]
2	GPI-34		J2-3	21	GPIO-19	UART_CTS	J14-7, [J4-4] [1][2]
3	GPI-39		J2-1	22	GPIO-1	UART_TXD	J3-2
4	GPI-36		J2-2	23	GPIO-3	UART_RXD	J3-1
5	GPIO-32		J2-6, J11-2	24	GPIO-4		J16-7
6,12, 14	GND		J1-6,-7, J4-7, J12-1,-2	25	GPIO-2		J16-5
7	GPIO-33		J2-5, J5-1, J7-5	26, 30	GND		J1-6,-7, J4-7, J12-1,-2
8	GPIO-21		J16-1, [J2-4, J7-3] [1]	27	GPIO-0		J16-3, [J3-8] [1]
9	VCC_IO		J25-2	28	GPIO-5		J14-1, [J4-3] [1]
10	VCC		J26-2	29	GPIO-18		J14-3, [J4-6] [1]
13	RF-port	Antenna	J21	31	GPIO-14		J16-9, [J4-2] [1][2]
16	GPIO-25	UART_DTR	J14-11, [J3-4] [1]	32	GPIO-15		J16-13, [J4-1] [1][2]
17	GPIO-26	UART_DSR	J14-13, [J3-3] [1]	34	GPI-35		J3-5
18	GPIO-27		J14-15, [J3-6, J6-1] [1]	35	GPIO-13		J16-11, [J4-9] [1][2]
19	RESET-N	RESET	(J1-3 via logic)	36	GPIO-12		J16-15, [J4-10] [1][2]

Table 8: Module pin to IO signal conversion

☞ (1) Connector/jumper placed inside the brackets indicates that a jumper must be positioned at the corresponding position of the IO distribution jumpers J14 – J17 if the IO-signal is to be presented at the designated connector/jumper as mentioned in Table 3.

☞ (2) These IO signals require a second jumper to be positioned at the IO distribution jumper J18 as mentioned in Table 4.

1.7.1 Power supply

The supply voltage to the EVK-NINA-W13 evaluation board can be sourced from the following connectors:

- USB (J8)

☞ Depending on your USB source, the USB supply current may be insufficient.

- External power supply (J23): The external supply voltage must be in the range 5 – 12 V

2 Setting up the evaluation board

2.1 Evaluation board setup

The EVK-NINA-W1 is delivered with the u-blox connectivity software installed on the module.

Before connecting the module, download and install the latest u-blox s-center evaluation software from the u-blox website.

Plug in external supply power at connector J23 or connect J8 (USB type Micro B) to a USB host using the USB cable. The status light (DS8) will turn green, indicating that the internal EVK 3.3 V is on.

⚠️ **When using the EVK-NINA-W131, before powering up the EVK, ensure that you have connected the 2.4 GHz antenna with the U.FL antenna connector (J21). Failing to do so may cause undesired operation. The EVK-NINA-W132 has an onboard antenna.**

⚠️ **Be careful to check polarity before connecting external power supply to the EVK-NINA-W13 evaluation board. Center conductor is positive (+) and the ring is negative (-).**

⚠️ **The current consumption during startup of the EVK can be high.**

The operating system will install the correct COM port drivers automatically. The drivers will need to be installed only when you connect the unit to a new computer for the first time. For more information about the COM ports and their configuration, see the *FTDI FT4232H Datasheet [3]*.

One COM port will automatically be assigned to the unit by the Windows OS. To view the assigned COM ports on Windows 7, follow the steps mentioned below:

- Open the **Control Panel** and click **Hardware and Sound**.
- Click **Device Manager** in **Devices and Printers**. This will open the Device Manager window where you can view the assigned COM ports.

2.2 Starting up

Perform the following steps to enable communication with the module:

1. Start the u-blox s-center evaluation software.
2. Use the default baud rate 115200, 8N1 with flow control.
3. You will now be able to communicate with the module through AT commands.

For a list of available AT commands, see the *u-blox Short Range AT Commands Manual [2]*.

2.3 Getting the latest software

Send an email to the support team email address for your area as listed in the Contact section for information about the latest available software.
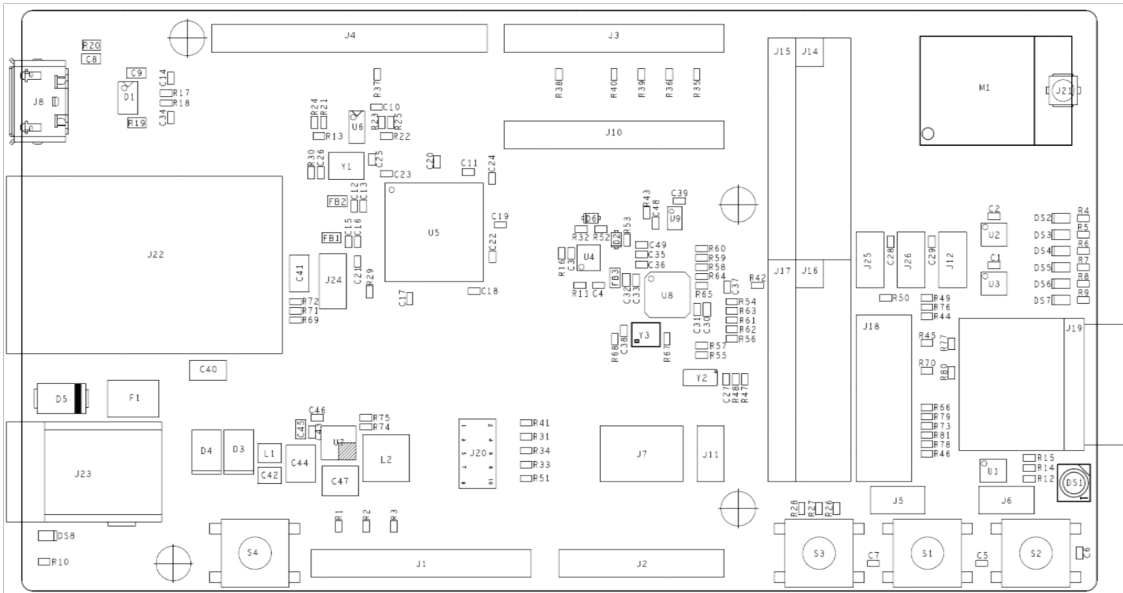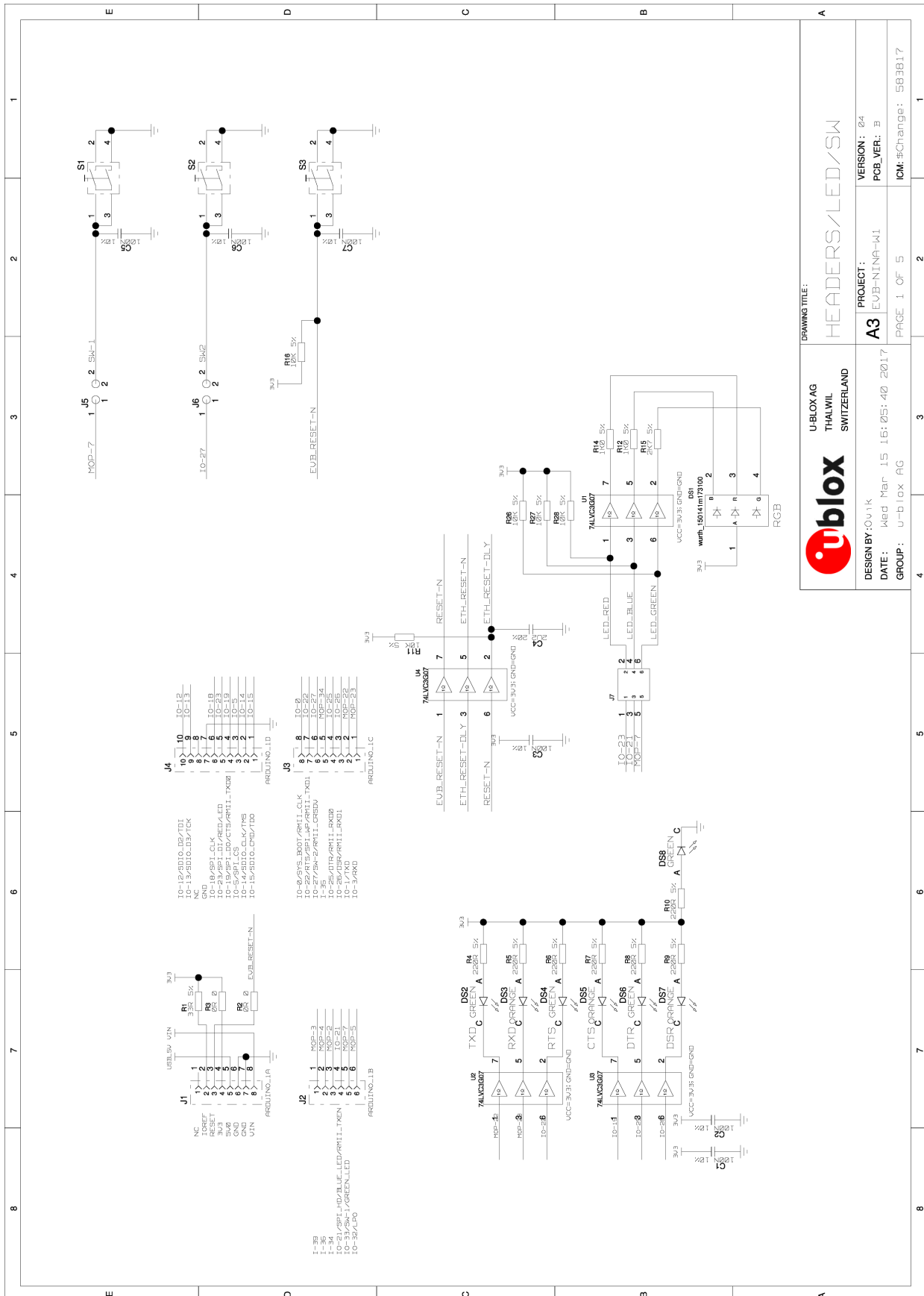
Appendix

A Layouts

Figure 8: Primary and secondary side layouts of EVK-NINA-W13

B Schematic drawings

POWER & ETHERNET

DRAWING TITLE:

PROJECT: EVB-NINA-W1

VERSION: 04
PCB_VER.: B
ICM: $Change: 583817

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DATE: Thu Mar 16 16:19:10 2017
GROUP: u-blox AG

C Glossary

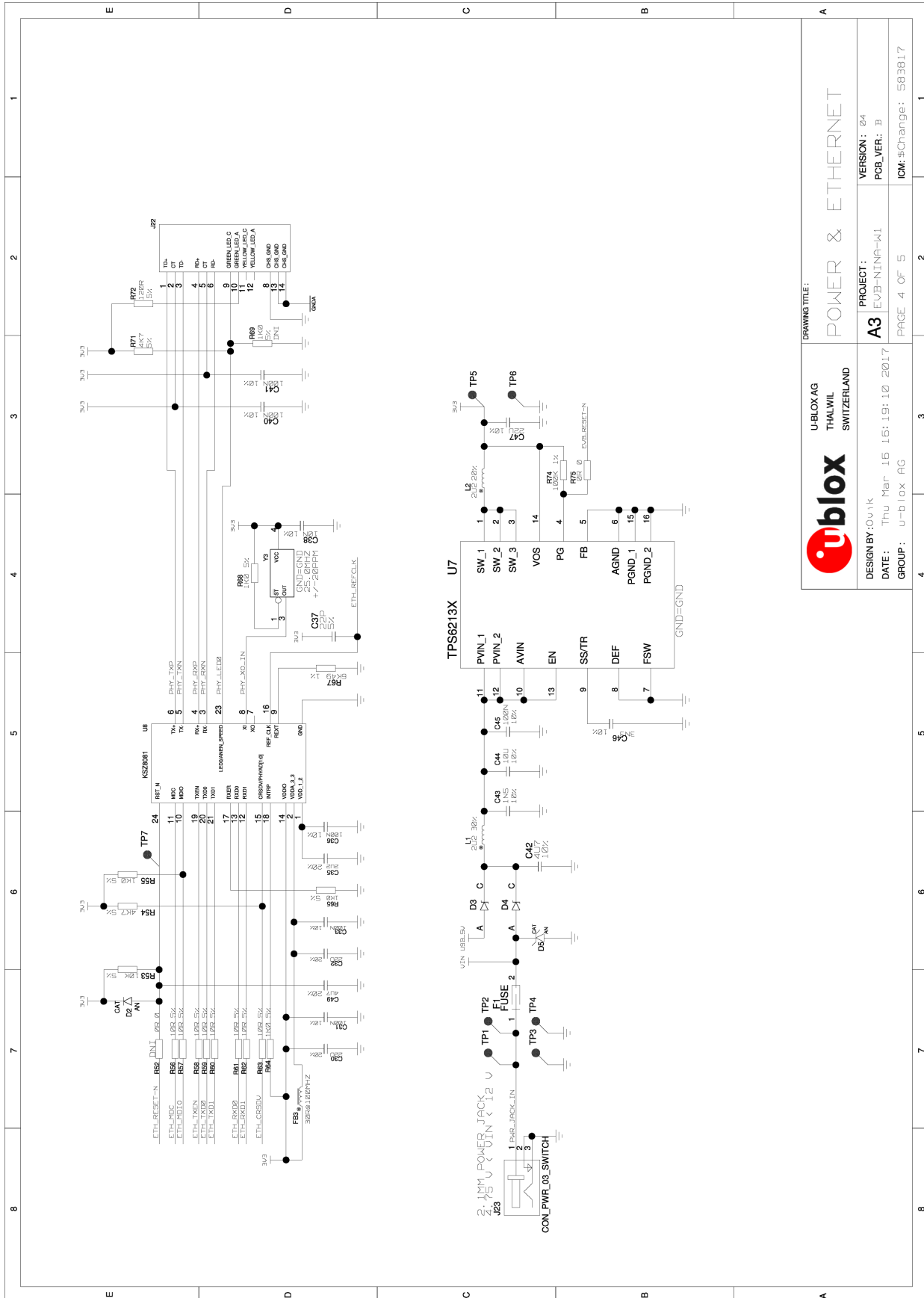| Name	Definition
COM	Communication
CTS	Clear To Send
DSR	Data Set Ready
DTR	Data Terminal Ready
EVK	Evaluation Kit
GND	Ground
GPI	General Purpose Input
GPIO	General Purpose Input/Output
IO	Input-Output
LED	Light-Emitting Diode
PHY	Physical layer
U.FL	Miniature coaxial RF connector
USB	Universal Serial Bus
RF	Radio frequency
RMII	Reduced Media-Independent Interface
RTS	Request To Send
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VCC	IC power-supply pin

Table 9: Explanation of abbreviations used

Related documents and links

[1]   NINA-W13 Data Sheet, document number UBX-17006694

[2]   u-blox Short Range AT Commands Manual, document number UBX-14044127

[3]   FTDI FT4232H QUAD HIGH SPEED USB TO MULTIPURPOSE UART/MPSSE IC Datasheet - http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT4232H.pdf

[4]   NINA-W1 System Integration Manual, document number UBX-17005730

☞   For regular updates to u-blox documentation and to receive product change notifications, register on our homepage (http://www.u-blox.com).

Revision history

Revision	Date	Name	Comments
R01	22-May-2017	ovik, kgom	Initial release.
R02	04-Jul-2017	ovik, mwej	Updated Figure 7 and Table 8 due to pin swap on connectors J2 and J3. Updated Figure 8 and schematic drawing (Appendix B). Updated assigned COM ports in section 2.1.
R03	09-Nov-2017	kgom	Renamed this document as EVK-NINA-W13 User Guide and updated the content due to the availability of a separate user guide for the EVK-NINA-W10x evaluation kits (UBX-17057549).
R04	12-Mar-2018	cmag	Updated the software version to 1.0.0 in the last table on page 2 and the "Related documents and links" section

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