EVK-NORA-W36

Evaluation kit for NORA-W36 series modules

User guide

Abstract

This document describes how to set up the EVK-NORA-W36 evaluation kit to evaluate NORA-W36 series stand-alone modules. It also describes the different options for debugging and the development capabilities included in the evaluation board.

Document information

Title	**EVK-NORA-W36**
Subtitle	Evaluation kit for NORA-W36 series modules
Document type	User guide
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Product status	Corresponding content status	
Functional sample	Draft	For functional testing. Revised and supplementary data will be published later.
In development / Prototype	Objective specification	Target values. Revised and supplementary data will be published later.
Engineering sample	Advance information	Data based on early testing. Revised and supplementary data will be published later.
Initial production	Early production information	Data from product verification. Revised and supplementary data may be published later.
Mass production / End of life	Production information	Document contains the final product specification.

This document applies to the following products:

Product name	Document status	Comment
EVK-NORA-W361	Early production information	
EVK-NORA-W366	Early production information	

☞ Regulatory limitations: The products included in the scope of this document are supplied strictly as "application development platforms" / "evaluation kits" / "evaluation tools" only. These products have not been RF certified with worldwide agencies and may not be offered for sale as an end-user product.

Contents

1 Product description

1.1 Overview

The u-blox EVK-NORA-W36 evaluation kit is a versatile platform that allows quick prototyping of a variety of Internet of Things (IoT), using Bluetooth® LE 5.3 and Wi-Fi 4 (IEEE 802.11 a/b/g/n).

EVK-NORA-W36 boards are available in the following variants that accommodate alternative antenna and software solutions:

- EVK-NORA-W361, with a NORA-W361 module pre-flashed with u-connectXpress software and an antenna pin. The antenna pin is routed to a U.FL connector on the EVK to allow use of different external antennas.
- EVK-NORA-W366, with a NORA-W366 module pre-flashed with u-connectXpress software and an internal PCB trace antenna.

All signals are clearly marked on both top (Figure 1) and bottom (Figure 2) sides.

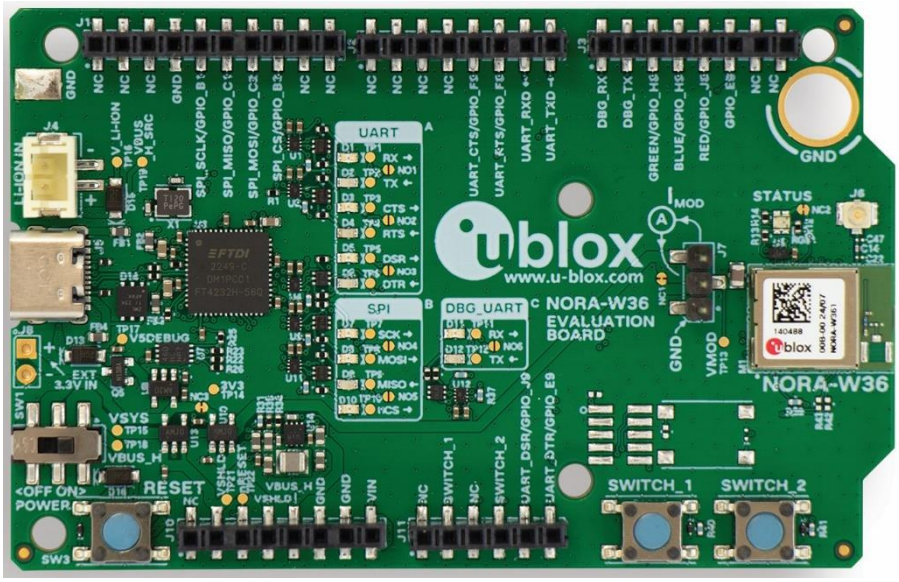


Figure 1: EVK-NORA-W36 top side (EVK-NORA-W361 shown)

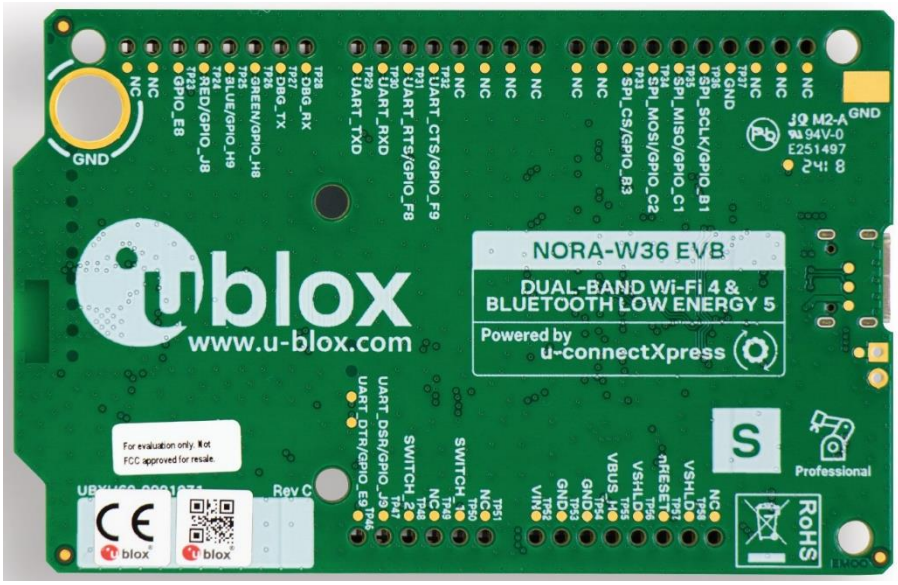


Figure 2: EVK-NORA-W36 bottom side

1.2 Kit includes

1.2.1 EVK-NORA-W361

- EVK-NORA-W36 evaluation board with NORA-W361 module
- USB-C to USB-A adapter cable
- Dual-band – U.FL antenna

1.2.2 EVK-NORA-W366

- EVK-NORA-W36 evaluation board with NORA-W366 module
- USB-C to USB-A adapter cable
- A dual-band integrated antenna (external antenna not supplied)

1.3 Key features

NORA-W36 u-connectXpress modules, based on the Realtek RTL8720DF, provide:

- IEEE 802.11 a/b/g/n protocol Wi-Fi subsystem in 2.4 and 5 GHz bands
- Bluetooth LE subsystem supporting Bluetooth 5.3 in 2.4 GHz band
- Bluetooth LE central, peripheral, and GATT client / server roles
- AT command set eliminates need for expertise in Wi-Fi and Bluetooth protocol stacks
- TLS encryption
- MQTT protocols
- WPA2/WPA3 security
- Wi-Fi enterprise security

EVK-NORA-W36 boards provide:

- Evaluation board for NORA-W361 or NORA-W366 modules
- USB-C peripheral and power connector (USB 2.0 HS)
- USB-Serial interface for connection to host systems
- COM port isolation to remove USB-Serial to allow header use
- One wake source input
- Buttons and status LEDs for user interaction
- Arduino compatible pin socket interface
- Current measurement access points from pin headers and jumpers

1.4 Block diagram

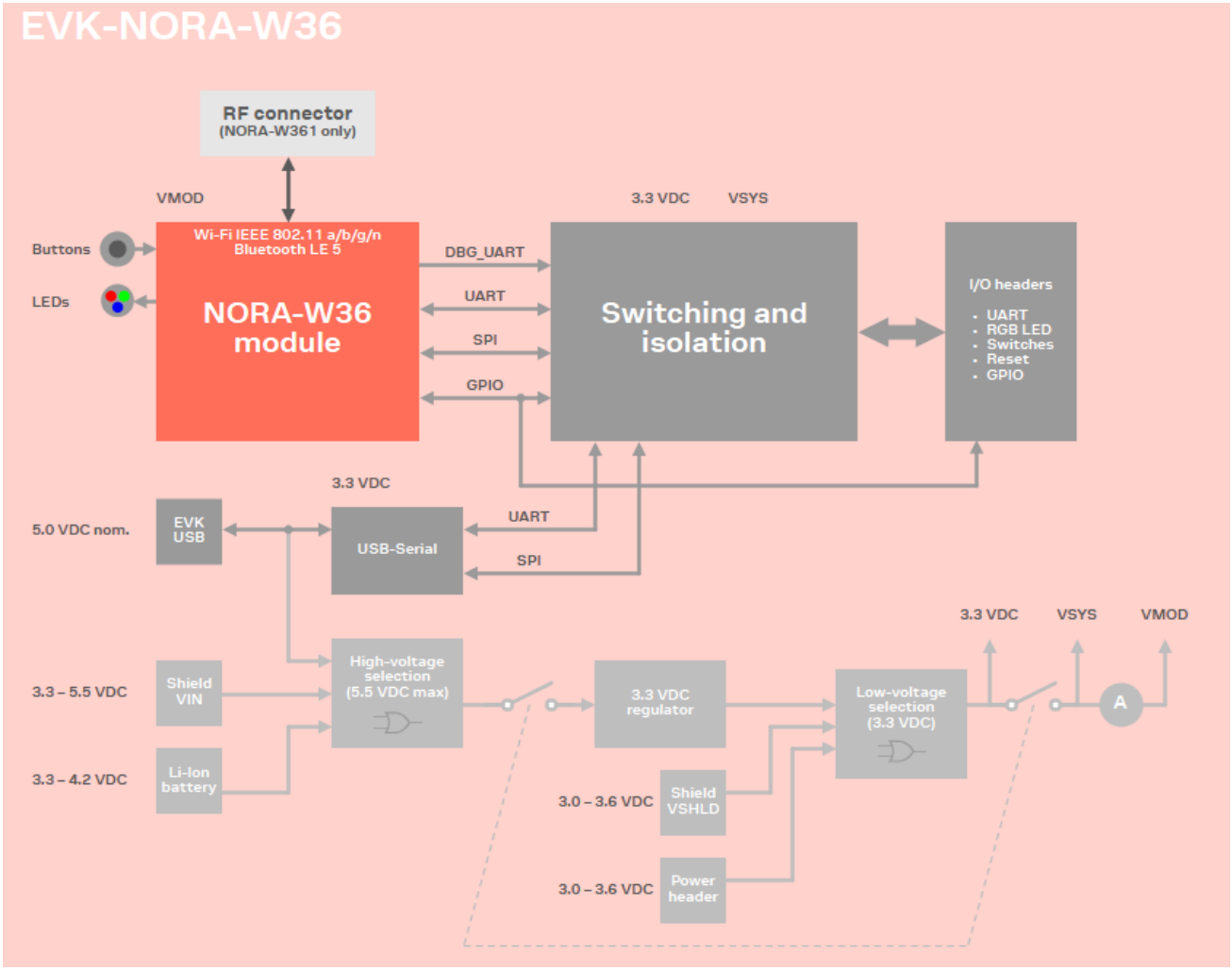


Figure 3: EVK-NORA-W36 block diagram

2 Setting up the evaluation board

EVK-NORA-W36 software and documentation is available at www.u-blox.com/en/product/evk-nora-w36.

2.1 Serial port device drivers

A multi-port USB-Serial interface is provided on the EVK for UART and SPI[1] connectivity. If the development PC is connected to the Internet and the user has sufficient access rights, Windows Update automatically downloads and installs the required device drivers when the EVK is plugged into an available upstream USB port.

If a manual download and installation is required. For example, if the development computer does not have Internet connectivity, the device drivers may be downloaded from the FTDI Chip home page [4].

After installing the serial port device drivers, it is possible to communicate with the EVK using a terminal application using baud rate 115200, 8, N, 1 with no flow control, as shown in Figure 4.

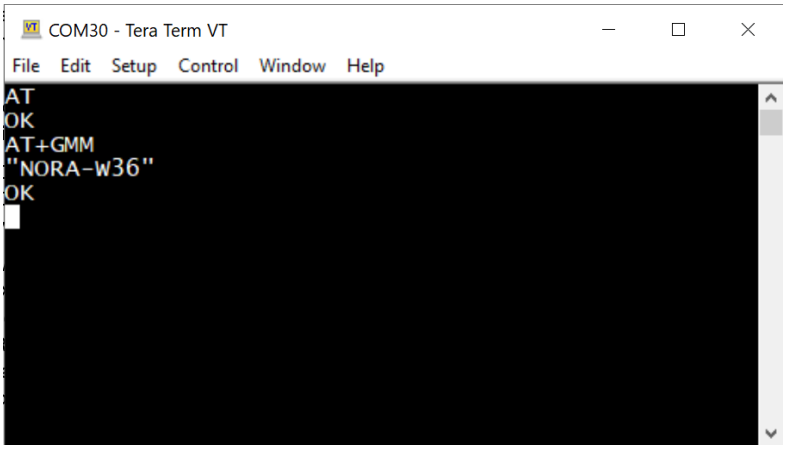


Figure 4: EVK communication using TeraTerm

2.2 s-center 2 evaluation software

s-center 2 is an easy-to-use tool for evaluating, configuring, and testing u-blox short range modules. Running on Windows 10 or newer operating systems, the software allows end users to assess and configure u-blox short range modules using the EVK.

Download and install the s-center 2 software from the u-blox s-center product page [3].

The u-connnectXpress AT commands manual for NORA-W36 can be found on NORA-W36 product page [5].

For more details about the update software and the bootloader, see the NORA-W36 system integration manual [2].

[1] SPI not supported

2.3 Connect external antenna (EVK-NORA-W361 only)

The NORA-W361 module soldered to the EVK-NORA-W361 requires use of the external antenna provided with the kit, or one of the antennas listed in the NORA-W36 system integration manual [2]. Carefully connect the U.FL connector on the antenna or coaxial jumper to U.FL connector near the NORA-W361 module.

Figure 5: U.FL connection

⚠ U.FL connectors are intended for limited connection cycles.

3 Hardware description

The major functions provided by EVK-NORA-W36 are shown in Figure 6.

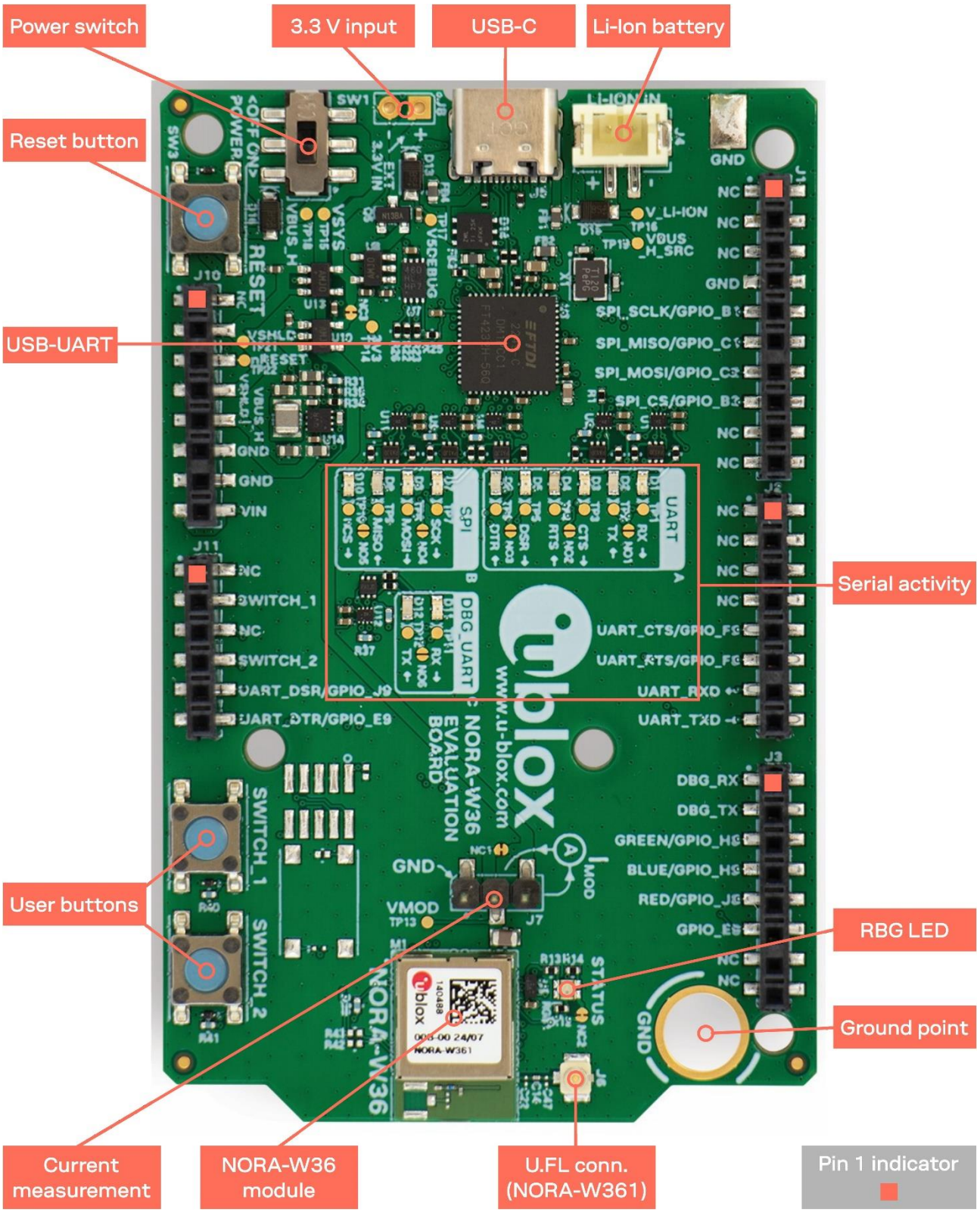


Figure 6: Header and major function locations

3.1 Power

EVK-NORA-W36 can be powered from five sources:

Source	Component / pin	Input range	Remarks
USB-C	J5	5.0 VDC nominal	Power provided by upstream USB port
Li-Ion battery	J4	3.3 – 4.2 VDC	An external charger may be connected during operation
VIN	J10, pin 5	3.3 – 5.5 VDC	Arduino power input
VSHLD	J10, pins 2 and 4	3.0 – 3.6 VDC	Arduino shield power
Power header	J8	3.0 – 3.6 VDC	

Table 1: EVK-NORA-W36 power sources

These power sources are protected from reverse polarity by protection diodes, allowing multiple sources to be present simultaneously.

When powering the EVK from either **VSHLD** or the power header, the Li-Ion battery and USB power sources can be isolated by cutting jumper NC3 as shown in Figure 7. This allows connecting alternative external power sources while still powering the module through J8 or J10, **VSHLD**.

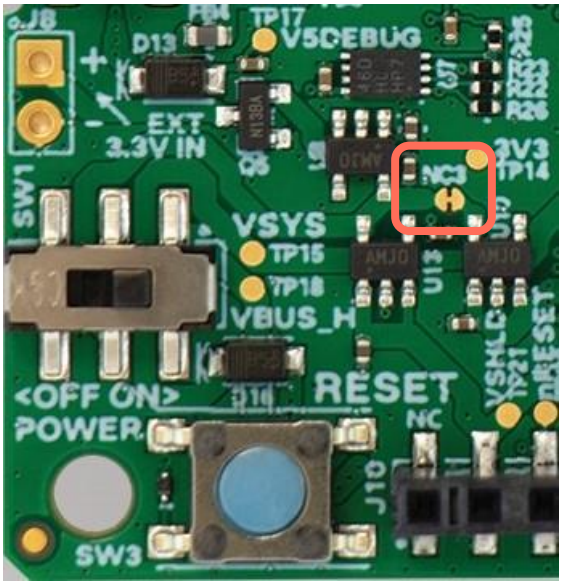


Figure 7: High-voltage power isolation

After applying power to one of the sources, slide SW1 to the ON position to power on the EVK.

3.2 Reset

An active-low reset signal (**nRESET**) is connected to the NORA-W36 module, the Arduino header J10, pin 3, and a momentary button switch. Pressing the switch or driving the signal low resets the NORA-W36. **nRESET** is pulled high internally, so an open-drain source may be used.

Figure 8 shows the reset circuit.

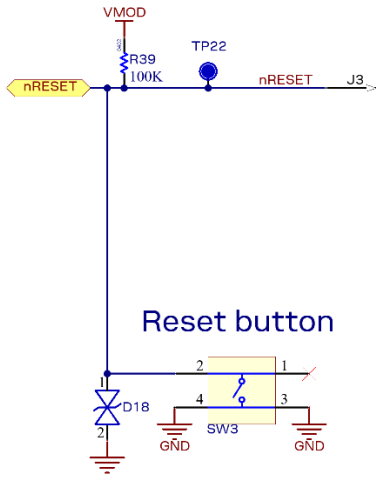


Figure 8: Reset circuit

3.2.1 Automatic bootloader

Two buttons **SWITCH_1** and **SWITCH_2** are used to enter bootloader, as shown in Table 2.

Pin	State during boot	Behavior
SWITCH_1, SWITCH_2	Pressed (0), pressed (0)	Enter bootloader. If this state is kept for more than 10 seconds without sending commands to bootloader over UART, the u-connectXpress application boots. The module settings are then restored to factory default values.
	Pressed (0), not pressed (1)	Boots the u-connectXpress application.
	Not pressed (1), pressed (0)	
	Not pressed (1), not pressed(1)	Default state

Table 2: EVK-NORA-W36 boot mode switches

3.3 Buttons

EVK-NORA-W36 has three momentary push-button switches.

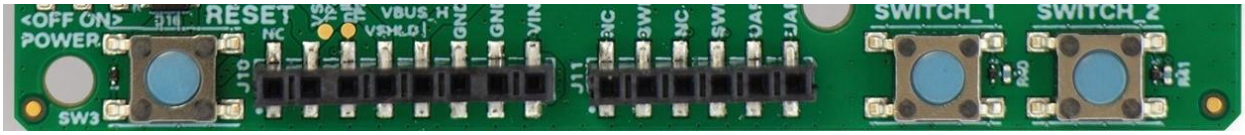


Figure 9: Button locations

Button	Reference designator	Remarks
RESET	SW3	Pressing the button resets module and circuitry connected to J10, pin 3.
SWITCH_1	SW4	Pulled high by module. User button, also bootstrap on power-up for u-connectXpress. See also Automatic bootloader.
SWITCH_2	SW5	Pulled high by module. User button, also bootstrap on power-up for u-connectXpress. See also Automatic bootloader.

Table 3: Button definitions

3.4 LEDs

LED RGB1 shows u-connectXpress status.

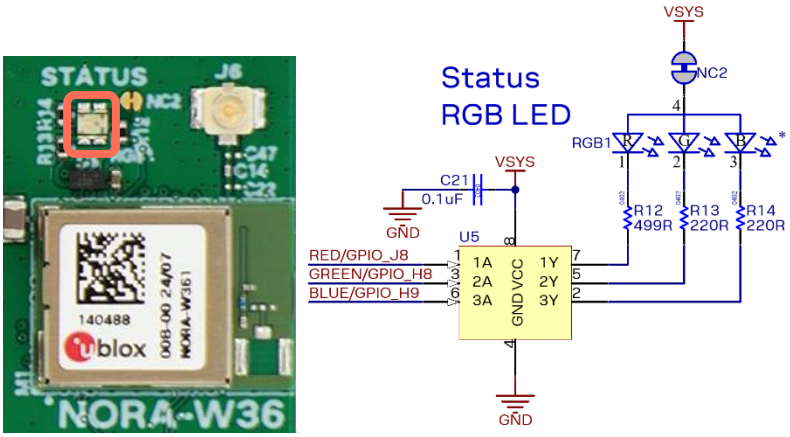


Figure 10: RGB LED and NORA-W36module

Table 4 shows the NORA-W36 module status by LED color. See also the NORA-W36 AT command manual and the NORA-W36 u-connectXpress user guide [5].

RGB LED color	Status
Green	N/A
Orange	Idle
Purple	Connecting (blinking indicates activity)
Blue	Connected (blinking indicates activity)

Table 4: Status RGB LED indications

RGB1 can be disabled by cutting jumper NC2.

The EVK provides several LEDs that indicate the status of communications over UART and SPI[2]. Each signal is active low and flickers to show activity on each signal.

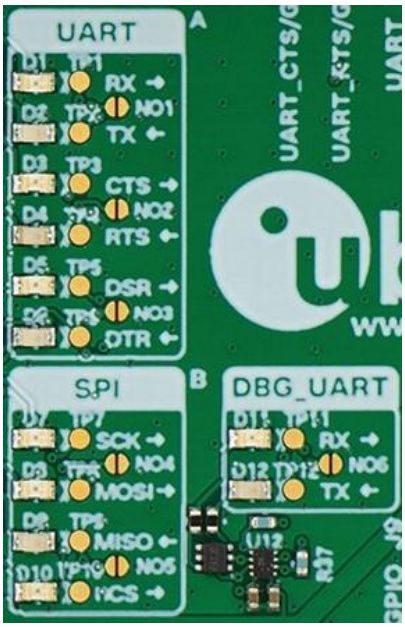


Figure 11: Communication status LEDs

[2] Currently not supported in u-connectXpress

USB-Serial port	LED	Signal	Direction on NORA-W36	Isolation jumper
A	D1	UART_RXD	Input	NO1
	D2	UART_TXD	Output	
	D3	UART_CTS	Input	NO2
	D4	UART_RTS	Output	
	D5	UART_DSR[3]	Input	NO3
	D6	UART_DTR[3]	Output	
B	D7	SPI_CLK[3]	Input	NO4
	D8	SPI_MOSI[3]	Output	
	D9	SPI_MISO[3]	Input	NO5
	D10	SPI_CS[3]	input	
C	D11	RSVD	Input	NO6
	D12	DBG_TX	Output	

Table 5: Communication status LED definitions

3.5 Serial communication

A multi-port USB-Serial converter is connected to an upstream host through USB, J5. Table 6 describes the connections to NORA-W36.

USB-Serial port	Virtual COM port assigned	Description	Remarks
A	Yes (COMn)	u-connectXpress UART communications	Enumerates as Port A in the Universal Serial Bus controllers list and COMn in Ports list. 115,200 bps baud rate, no flow control default.
B	No	SPI communications	Enumerates as Port B in the Universal Serial Bus controllers list. SPI not supported.
C	Yes (COMn+2)	u-connectXpress debug / log UART	Enumerates as Port C in the Universal Serial Bus controllers list and COMn+2 in Ports list. 115,200 bps baud rate, no flow control default. Log RX input to host PC only.
D	No	Not used	Enumerates as Port D in the Universal Serial Bus controllers list.

Table 6: USB-Serial port assignments

The Virtual COM ports (VCP) are identified in Windows Device Manager under “Ports COM & LPT” as “USB Serial Port (COMn)”. The port with the lower number assignment corresponds to port A. Port C has an assignment that is two higher than port A (COMn+2).

The SPI[3] port is identified in Windows Device Manager under the “USB Serial Bus controllers” tree as “USB Serial Converter B”. Entries exist for all four serial converter ports.

The NORA-W36 UART and SPI[3] interfaces may be isolated from the USB-Serial converter by soldering across the normally open jumpers, as described in Table 5.

s-center 2 [3] can be used with ports A (COM port) and C (Log COM port).

[3] Currently not supported in u-connectXpress

3.6 Current sensing header

A single header is provided for measuring the current into the NORA-W36 power supply pins. Cut the normally closed jumper, NC1, to enable use of J7.

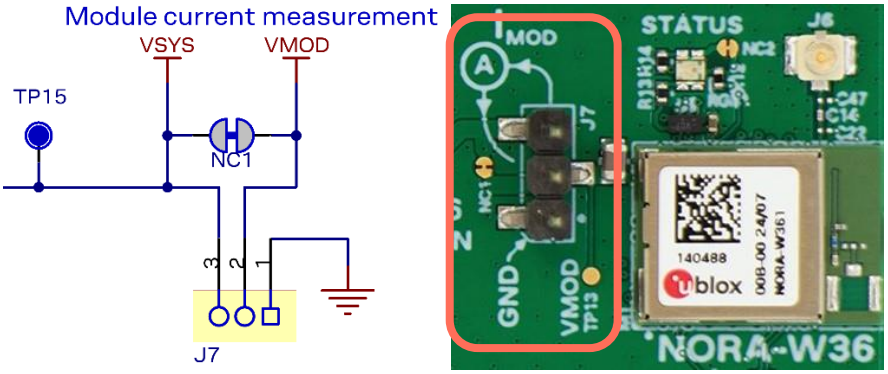


Figure 12: Current measurement

After cutting NC1, place an ammeter or power analyzer in line with pins 2 and 3. Only the current supplied to NORA-W36 through the **VDD** pins is measured. Current sunk by the GPIO pins is not measured.

If NC1 is cut, normal operation can be restored by either soldering across NC1, or by placing a two-pin shunt across pins 2 and 3 of J7. The shunt has 0.635 mm (0.025 in) square post sockets on 2.54 mm (0.1 in) centers. Shunt length is not critical. [4]

Pin 1 of J7 is connected to GND.

[4] Example shunt part number: Sullins SPC02SYAN

3.7 Header pin-out

☞ EVK-NORA-W36 is designed as an Arduino shield.

EVK-NORA-W36 can be used independently with a host PC over USB or wired into a circuit through the jumpers J1, J2, J3, J10, and J11. Long pin jumpers – 0.635 mm (0.025 in) square post on 2.54 mm (0.1 in) centers[5] – can be inserted through the PCB into the bottom of the jumpers to allow use with an Arduino Uno or Arduino Mega type board as a host. Other u-blox EVKs can be used, such as EVK-NORA-B10/-B12 and EVK-NINA-B3.

J1 pin	Direction	Signal	Arduino signal	Remarks
1		n/c	I2C Data	
2		n/c	I2C Clock	
3		n/c	AREF	
4		GND	GND	
5	I	SPI_SCLK	D13	Currently not supported in u-connectXpress
6	O	SPI_MISO	D12	Currently not supported in u-connectXpress
7	I	SPI_MOSI	D11	Currently not supported in u-connectXpress
8	I	SPI_CS	D10	Currently not supported in u-connectXpress
9		n/c	D9	
10		n/c	D8	

Table 7: J1 pin-out

J2 pin	Direction	Signal	Arduino signal	Remarks
1		n/c	D7	
2		n/c	D6	
3		n/c	D5	
4		n/c	D4	
5	I	UART_CTS	D3	Disabled by default in u-connectXpress
6	O	UART_RTS	D2	Disabled by default in u-connectXpress
7	I	UART_RXD	D1 / TXD	
8	O	UART_TXD	D0 / RXD	

Table 8: J2 pin-out

J3 pin	Direction	Signal	Arduino signal	Remarks
1	I	RSVD	D14 / UART out	
2	O	DBG_TX	D15 / UART in	Logging messages only Do not pull or drive low during reset or power-up
3	O	GREEN	D16	
4	O	BLUE	D17	
5	O	RED	D18	
6	I/O	GPIO_J9	D19	External wake up signal Available with u-connectXpress v1.0.0 and later
7		n/c	D20	
8		n/c	D21	

Table 9: J3 pin-out

[5] Example jumper part numbers: Sullins PEC08SFCN (qty. 3), PEC10SFCN (qty. 1), PEC06SFCN (qty. 1)

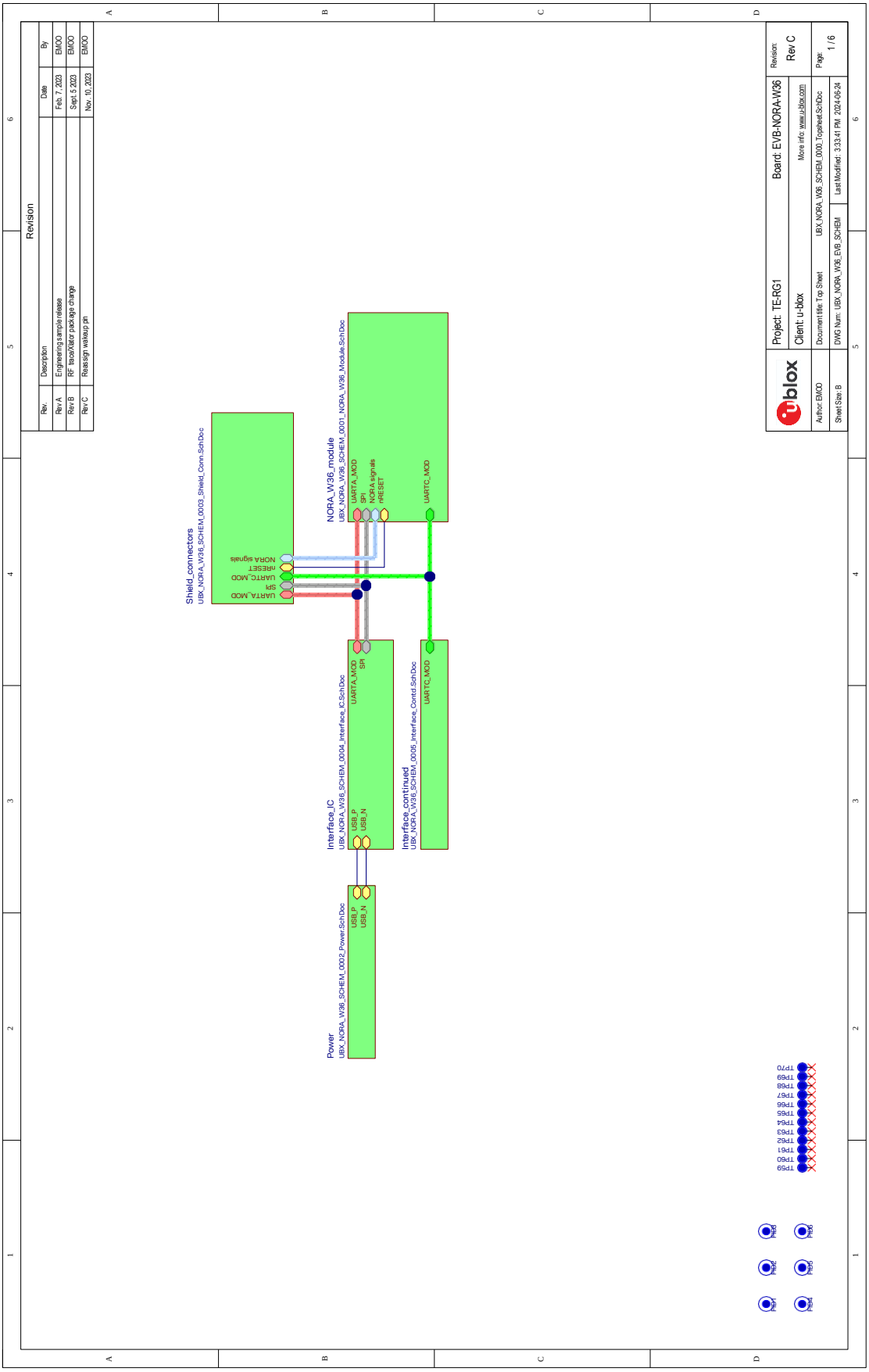
J10 pin	Direction	Signal	Arduino signal	Remarks – see also Power
1		n/c	n/c	
2		VSHLD	IOREF	3.3 VDC nominal
3	I/O	nRESET	RESET	
4		VSHLD	3V3	3.3 VDC nominal
5		VBUS_H	5V	5.0 VDC nominal
6		GND	GND	
7		GND	GND	
8		VIN	5V	5.0 VDC nominal

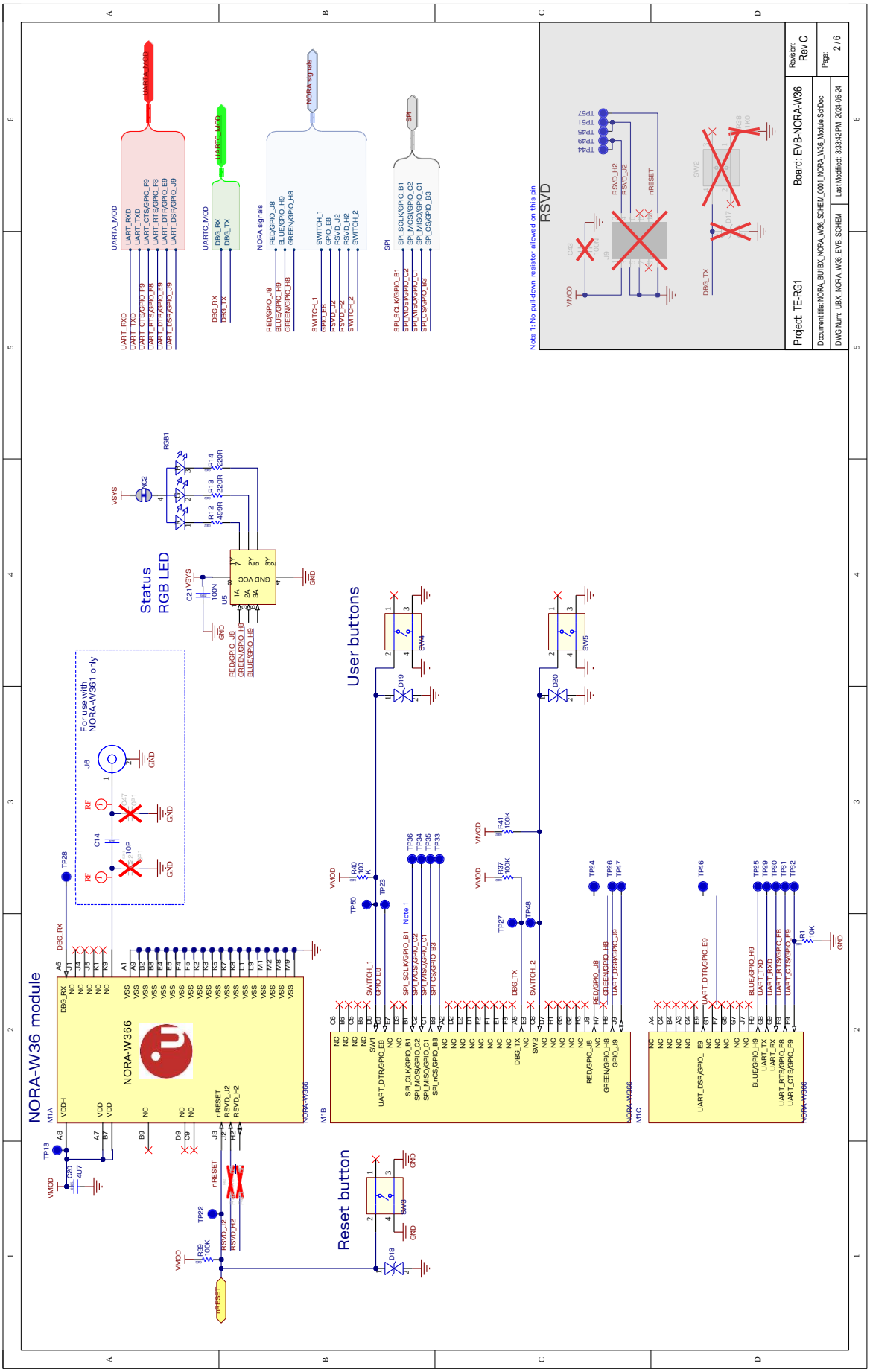
Table 10: J10 pin-out

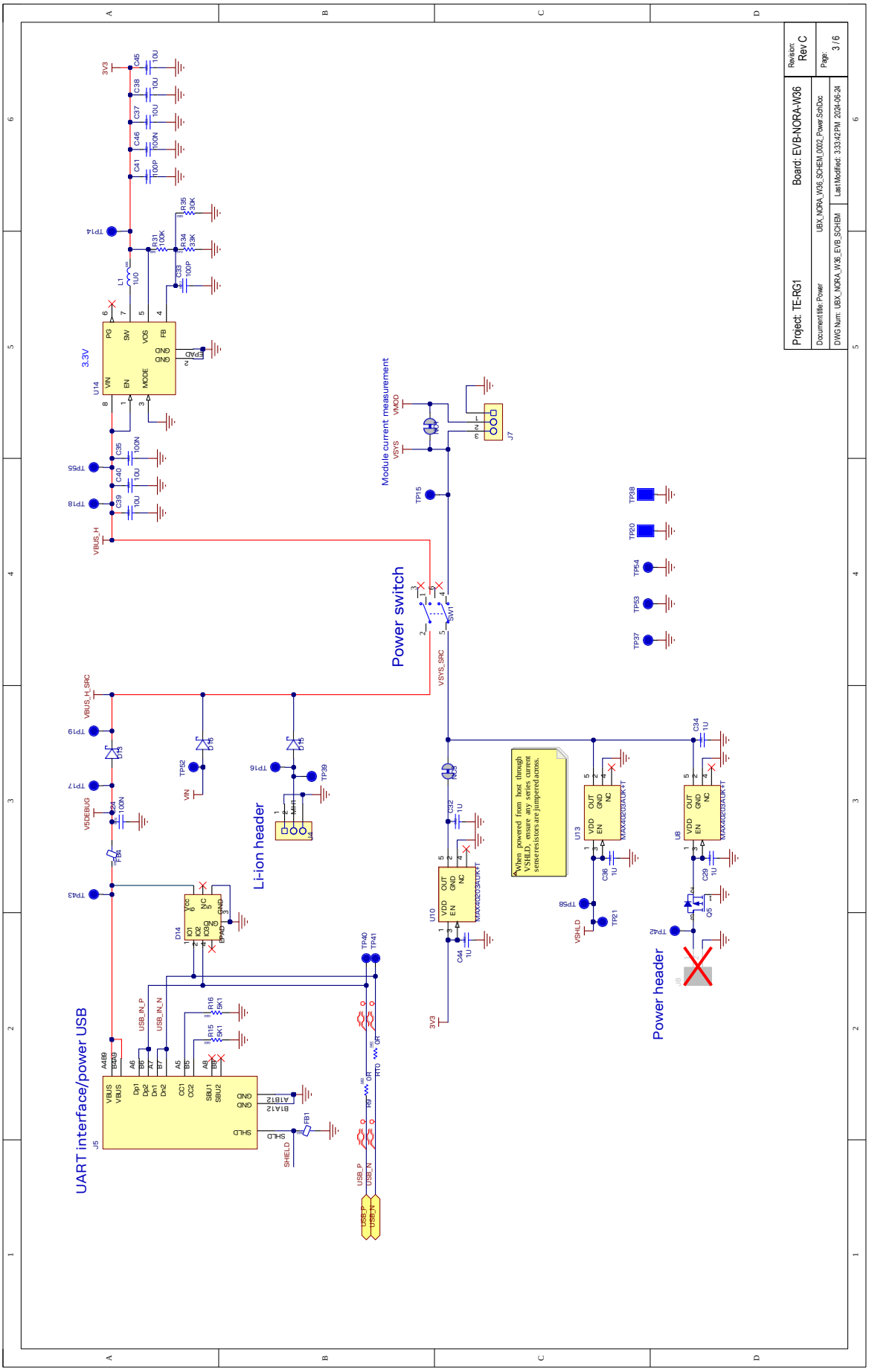
J11 pin	Direction	Signal	Arduino signal
1		RSVD_J2	A0
2	I/O	SWITCH_1	A1
3		RSVD_H2	A2
4	I/O	SWITCH_2	A3
5	I	UART_DSR	A4
6	O	UART_DTR	A5

Table 11: J11 pin-out

4 EVK schematic




NORA-W36 module
NORA-W366
Status RGB LED
User buttons
Reset button
For use with NORA-W361 only
RSVD
Project: TE-RG1
Board: EVB-NORA-W36
Rev C
2 / 6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Board: EVB-NORA-W36
Revision: Rev C
Page: 3 / 6
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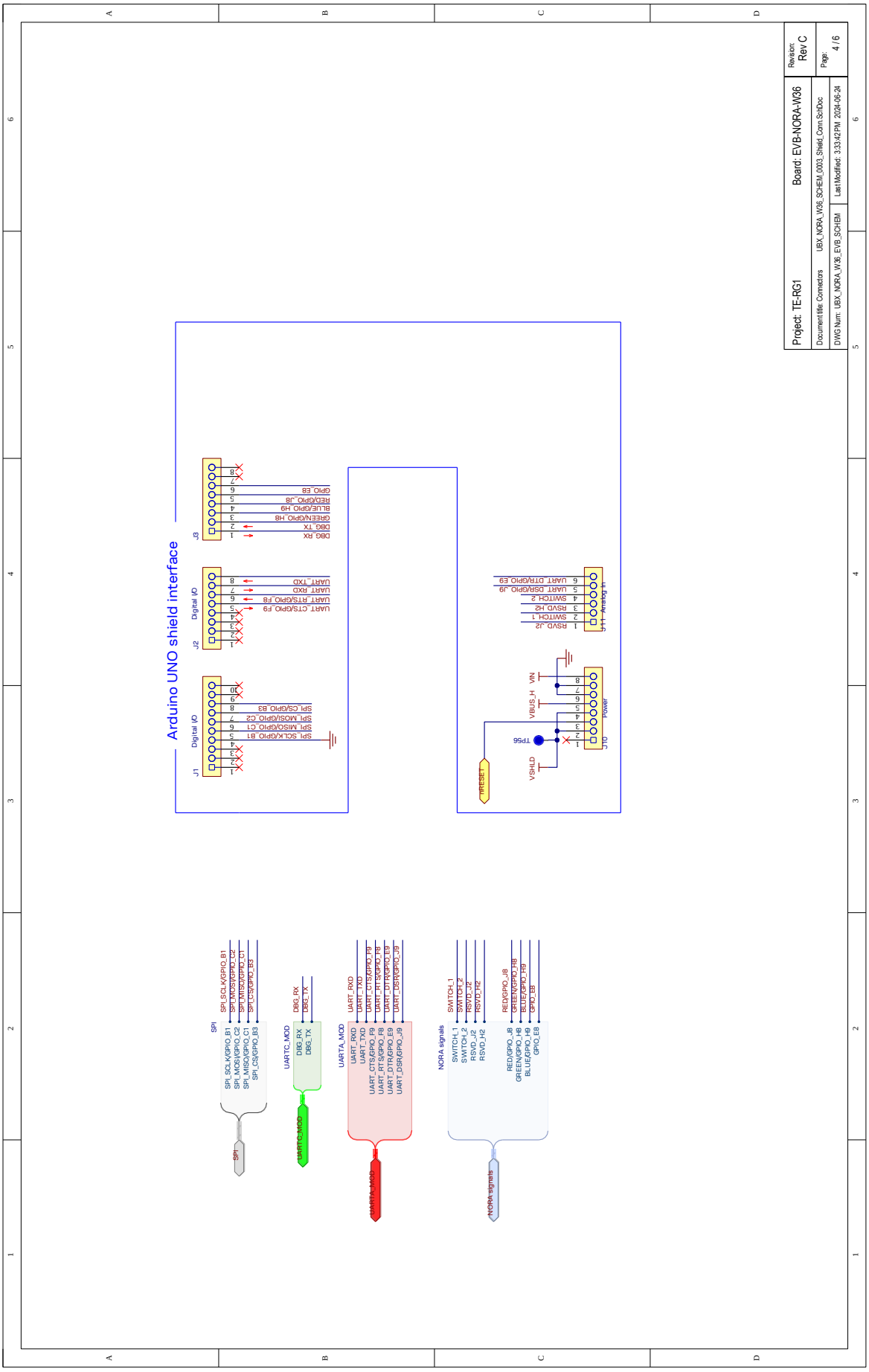
Last Modified: 3:33:42 PM 2024-06-24
DWG Num: UBX_NORA_W36_EVB_SCHEM
3.3V
Module current measurement
Power switch
Li-ion header
Power header
UART interface/power USB
When powered from host through VSHLD, ensure any series current sense resistors are jumpered across.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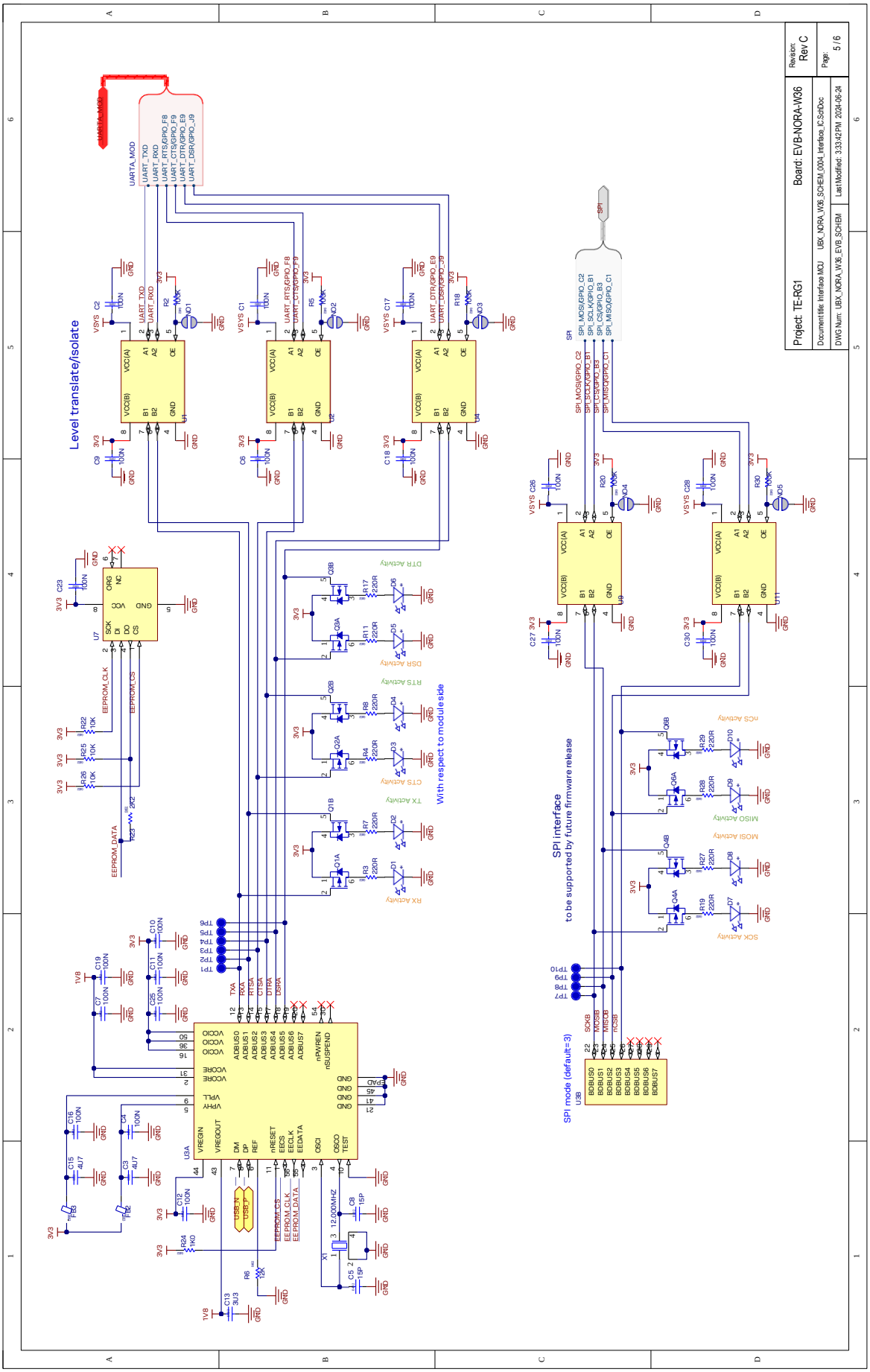
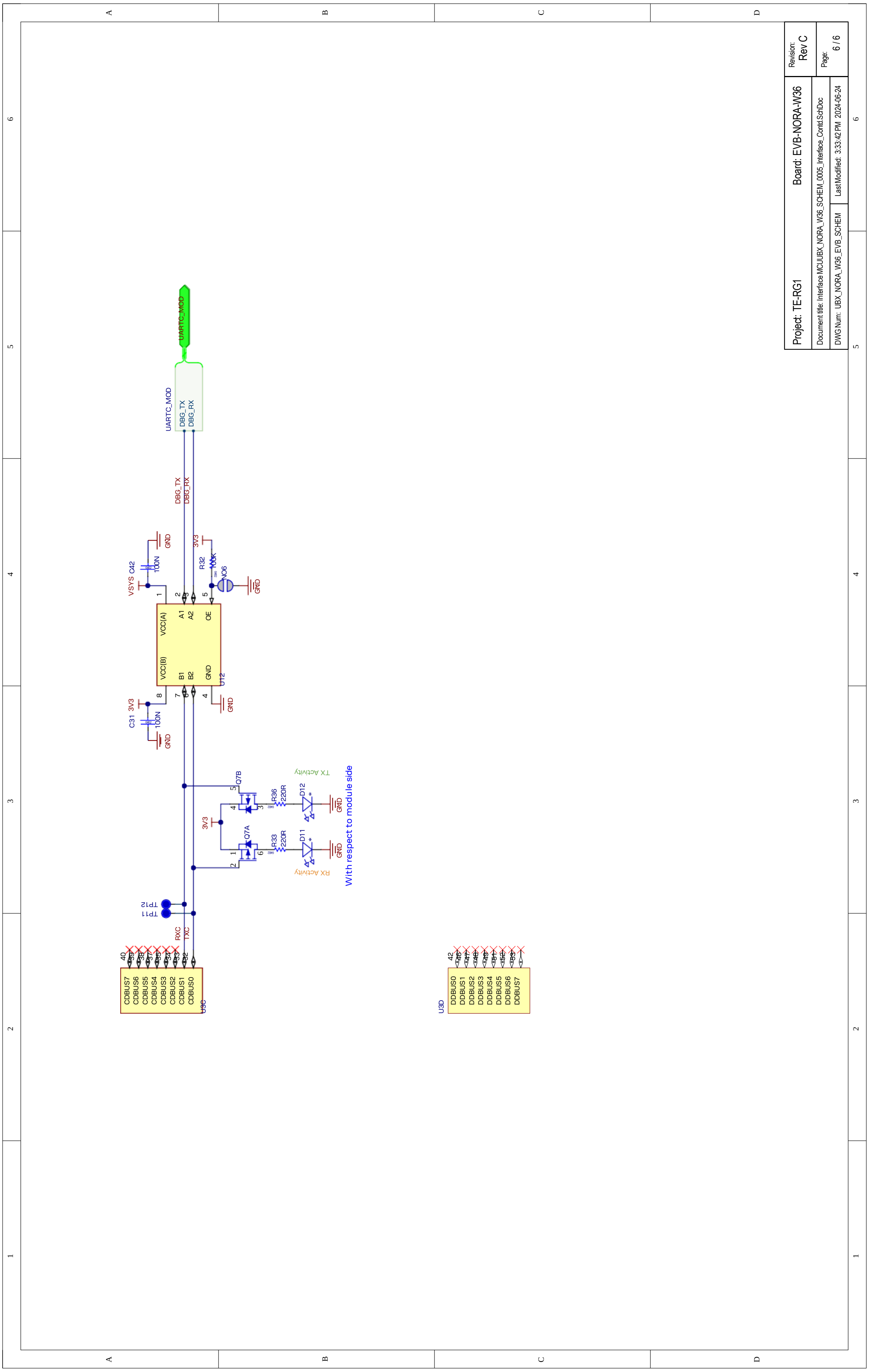
Board: EVB-NORA-W36
Revision: Rev C
Page: 4 / 6
Document title: Connectors
UBX_NORA_W36_SCHEM_0003_Shield_Conn.SchDoc
DWG Num: UBX_NORA_W36_EVB_SCHEM
Last Modified: 3:33:42 PM 2024-06-24
J1
Digital I/O
SPI_SCLK/GPIO_B1
SPI_MOSI/GPIO_C2
SPI_MISO/GPIO_C1
SPI_CS/GPIO_B3
J2
Digital I/O
UART_CTS/GPIO_F9
UART_RTS/GPIO_F8
UART_RXD
UART_TXD
J3
DBG_RX
DBG_TX
GREEN/GPIO_H8
BLUE/GPIO_H9
RED/GPIO_J8
GPIO_E8
J10
power
VIN
VBUS_H
VSHLD
TP56
TRESET
J11
Analog H
RSVD_J2
SWITCH_1
SWITCH_2
RSVD_H2
UART_DTR/GPIO_E9
SPI
UARTC_MOD
UARTA_MOD
NORA signals


Level translate/isolate
With respect to module side
SPI interface
to be supported by future firmware release
SPI mode (default=3)
Project: TE-RG1
Board: EVB-NORA-W36
Revision: Rev C
Page: 5 / 6


Project: TE-RG1
Board: EVB-NORA-W36
Revision: Rev C
Page: 6 / 6
DWG Num: UBX_NORA_W36_EVB_SCHEM
UARTC_MOD
DBG_TX
DBG_RX
TX Activity
RX Activity
With respect to module side

Appendix

A Glossary

Abbreviation	Definition
GPIO	General Purpose Input / Output
I2C	Inter-Integrated Circuit
LDO	Low Drop-Out
LE	Low Energy
MCU	MicroController Unit
MSL	Moisture Sensitivity Level
NMSD	Non-Solder Mask Defined
OEM	Original Equipment Manufacturer
OET	Office of Engineering and Technology (of the FCC)
OTP	One-Time Programmable
PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembly
PWM	Pulse Width Modulation
RF	Radio Frequency
SPI	Serial Peripheral Interface
UART	Universal Asynchronous Receiver Transmitter

Table 12: Explanation of the abbreviations and terms used

Related documentation

[1] NORA-W36 data sheet, UBX-22021118
[2] NORA-W36 system integration manual, UBX-22021120
[3] s-center product page
[4] FTDI Chip home page, https://ftdichip.com
[5] NORA-W36 product page

For product change notifications and regular updates of u-blox documentation, register on our website, www.u-blox.com.

Revision history

Revision	Date	Name	Comments
R01	28-Dec-2023	brec	Initial release
R02	17-Jul-2024	brec	Changed document status to early product information in Document information and added EVK schematics.

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