

Blueprint B204

NINA-B1 USB dongle

Application Note

Abstract

This application note describes the features and design of B204. This design is available to u-blox customers as a blueprint, including the schematics, bill of material, layout, and Gerber data.



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UBX-17060841 - R02

Document Information

Title	Blueprint B204		
Subtitle	NINA-B1 USB dongle		
Document type	Application Note		
Document number	UBX-17060841		
Revision and date	R02		12-Apr-2018
Disclosure restriction			

This document applies to the following products:

Product name	Type number	Software version	PCN reference
B204			

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1 Overview

B204 is a simple USB dongle that uses the u-blox NINA-B1 series module. The blueprint B204 provides a reference for integrating the NINA-B1 Bluetooth® Low Energy (LE) module as a USB dongle.

The PCB has been created to match the size of a USB connector, thus providing the minimum number of components and without any external cables.

This application note provides information about the hardware solutions implemented in B204.

2 Product description

B204 includes a NINA-B1 Bluetooth Low Energy module, an LED, a button, a USB connector and an optional coin cell battery connector. Figure 1 and Figure 2 illustrate the placement of components on B204.

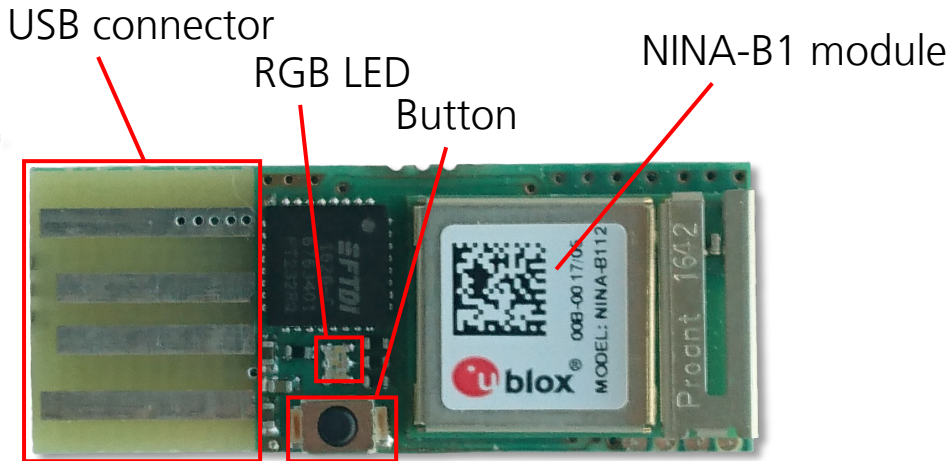


Figure 1: Description of components on B204 (top side)

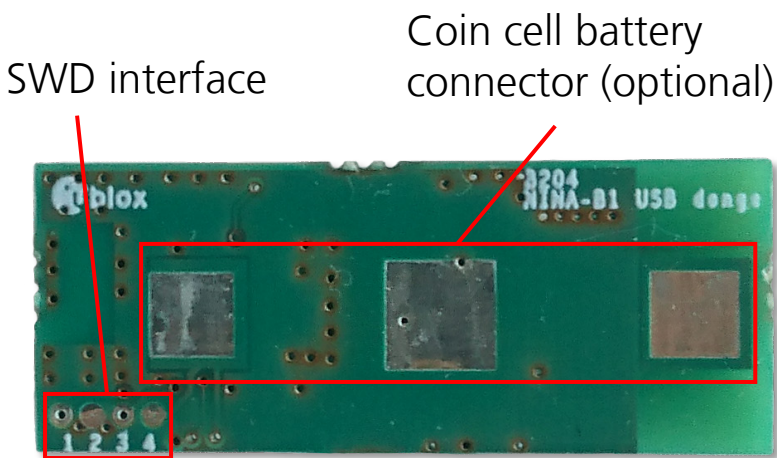


Figure 2: Description of components on B204 (bottom side)

2.1 Block diagram

Figure 3 shows the block diagram of B204.

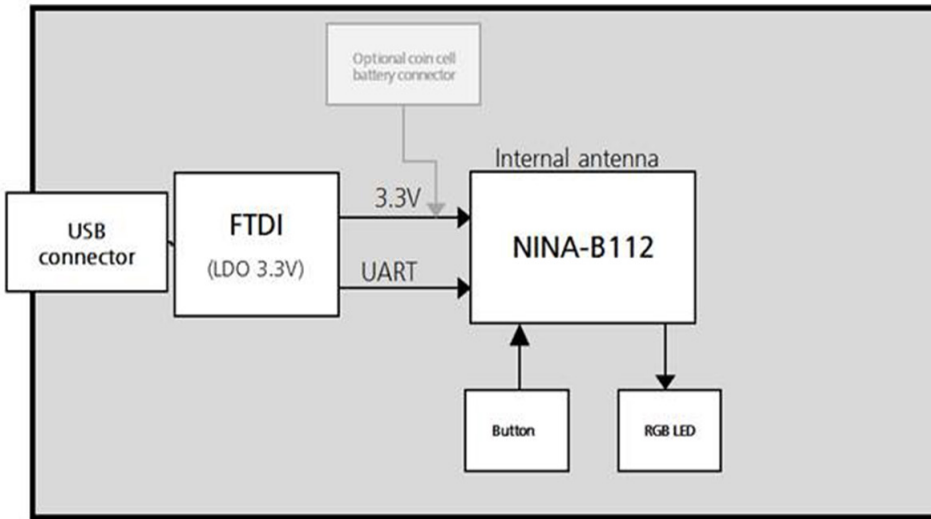


Figure 3: Block diagram of B204

2.2 Mechanical dimensions and PCB information

The form factor of B204 is rectangular with the dimensions - 12 x 54 mm. The width of B204 is selected to match a USB connector.

The PCB has a 2-layer stack-up. Thickness is 2.4 mm.

All the components are placed on the top side of B204. An optional coin cell battery holder can be soldered on the back side.

2.3 Power supply

The power for B204 is supplied by the USB interface. The 5 V supplied to the USB connector is converted to 3.3 V with built-in level shifters in the FTDI chip.

During programming, the 3.3 V power to the NINA-B1 module can be supplied via the Serial Wire Debug (SWD) interface as mentioned in section 2.4.2.

Alternatively, a coin cell CR2032 battery holder (Keystone 3002) can be soldered on the back side of B204 as shown in Figure 4 and Figure 5. See the *NINA-B1 Data sheet [4]* for the electrical specification information.

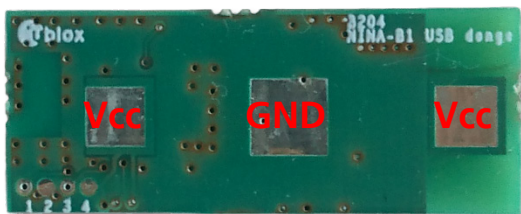


Figure 4: Coin cell battery holder pins

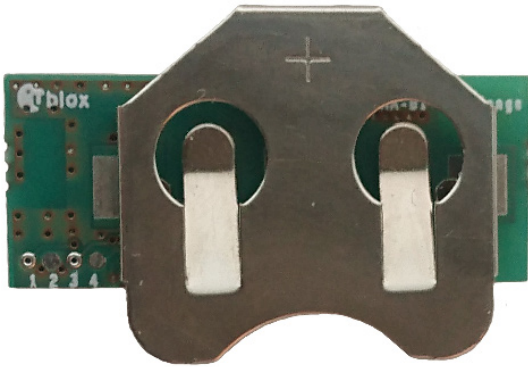


Figure 5: B204 with battery holder

2.4 Data interfaces

2.4.1 USB interface

The thickness of the PCB is specified to enable direct connection to a USB port. The USB connector provides power supply and access to the NINA-B1 UART via an FTDI chip. The USB interface is described in Figure 6 and Table 1.

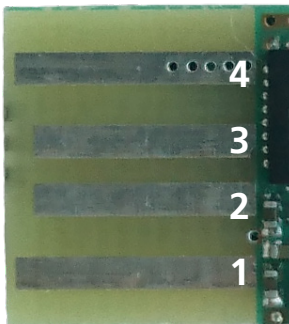


Figure 6: USB interface on B204 (top side)

Pin	USB interface
1	Vcc, 5 V
2	Data-
3	Data+
4	Ground

Table 1: Description of the USB interface pins

2.4.2 SWD interface

The SWD pins in the NINA-B1 module can be accessed via the SWD interface. See Figure 7 and Table 2 for further information.

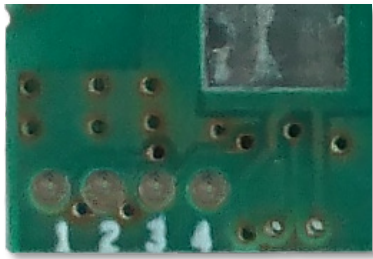


Figure 7: SWD interface of B204 (bottom side)

Test point	NINA-B1 pin	Description
1	11	SWDCLK
2	-	Ground
3	15	SWDIO
4	-	Vcc, 3.3 V

Table 2: Description of the SWD interface test points

2.5 Button and LED

One button and one RGB LED are provided on B204 for indications and manual operation of the unit, as described in Table 3. See System status signals and System control signals sections in the *NINA-B1 series Data sheet [4]* for more information about the button and LED functionality in the u-blox connectivity software.

Name	Element	Description
Button	Button	General function button (SW2) for the u-blox connectivity software
RGB LED	LED	RGB LED shows the status for the u-blox connectivity software

Table 3: Description of the LED and button available on B204

2.6 Antenna interface

B204 uses the internal antenna mounted on the NINA-B112 module.



There is a placeholder for mounting the NINA-B111 module instead, together with a chip antenna, but this has not been tested.

3 Software

B204 supports usage of the NINA-B1 module with u-blox connectivity software pre-flashed. The u-blox connectivity software enables use of the Bluetooth Low Energy functions, controlled by AT commands over the USB interface.

Examples of the supported features in the u-blox connectivity software are u-blox Serial Port Service, GATT server and client, and central and peripheral roles. More information on the features and capabilities of the u-blox connectivity software and how to use it can be found in the *NINA-B1 Getting started guide [2]* and the *u-blox Short Range Modules AT Commands Manual [3]*.

B204 supports different use cases. The SWD interface can be used to program the B204 with a custom software developed with Nordic SDK, Arm Mbed, or Wirepas development environments.

4 Delivered package

The Blueprint B204 delivery package includes the following:

- Schematic files
- BOM files
- Gerber files
- Pick and Place file
- Assembly files
- Board stack-up

Appendix

A Glossary

Name	Definition
BOM	Bill Of Materials
GATT	Generic Attribute Profile
GPIO	General Purpose Input Output
LED	Light Emitting Diode
PCB	Printed Circuit Board
RGB	Red Green Blue
SDK	Software Development Kit
SWD	Serial Wire Debug
UART	Universal Asynchronous Receiver-Transmitter
USB	Universal Serial Bus

Table 4: Explanation of abbreviations used

Related documents

- [1] NINA-B1 Series System Integration Manual, document number UBX-15026175
- [2] NINA-B1 Getting Started guide, document number UBX-16009942
- [3] u-blox Short Range Modules AT Commands Manual, document number UBX-14044127
- [4] NINA-B1 series Data sheet, document number UBX-15019243



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	28-Nov-2017	apet, kgom	Initial release.
R02	12-Apr-2018	apet, mhan, kgom	Updated the product name.

Contact

For complete contact information, visit us at www.u-blox.com.

u-blox Offices

North, Central and South America

u-blox America, Inc.

Phone: +1 703 483 3180
E-mail: info_us@u-blox.com

Regional Office West Coast:

Phone: +1 408 573 3640
E-mail: info_us@u-blox.com

Technical Support:

Phone: +1 703 483 3185
E-mail: support_us@u-blox.com

Headquarters Europe, Middle East, Africa

u-blox AG

Phone: +41 44 722 74 44
E-mail: info@u-blox.com
Support: support@u-blox.com

Asia, Australia, Pacific

u-blox Singapore Pte. Ltd.

Phone: +65 6734 3811
E-mail: info_ap@u-blox.com
Support: support_ap@u-blox.com

Regional Office Australia:

Phone: +61 2 8448 2016
E-mail: info_au@u-blox.com
Support: support_ap@u-blox.com

Regional Office China (Beijing):

Phone: +86 10 68 133 545
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office China (Chongqing):

Phone: +86 23 6815 1588
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office China (Shanghai):

Phone: +86 21 6090 4832
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office China (Shenzhen):

Phone: +86 755 8627 1083
E-mail: info_cn@u-blox.com
Support: support_cn@u-blox.com

Regional Office India:

Phone: +91 80 4050 9200
E-mail: info_in@u-blox.com
Support: support_in@u-blox.com

Regional Office Japan (Osaka):

Phone: +81 6 6941 3660
E-mail: info_jp@u-blox.com
Support: support_jp@u-blox.com

Regional Office Japan (Tokyo):

Phone: +81 3 5775 3850
E-mail: info_jp@u-blox.com
Support: support_jp@u-blox.com

Regional Office Korea:

Phone: +82 2 542 0861
E-mail: info_kr@u-blox.com
Support: support_kr@u-blox.com

Regional Office Taiwan:

Phone: +886 2 2657 1090
E-mail: info_tw@u-blox.com
Support: support_tw@u-blox.com