

User Guide: simpleRTK2B Budget

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Product overview

You can use the simpleRTK2B Budget as a standalone board by connecting it to your PC or tablet. Additionally, it can be used as an add-on board for your projects, such as an arduino shield.

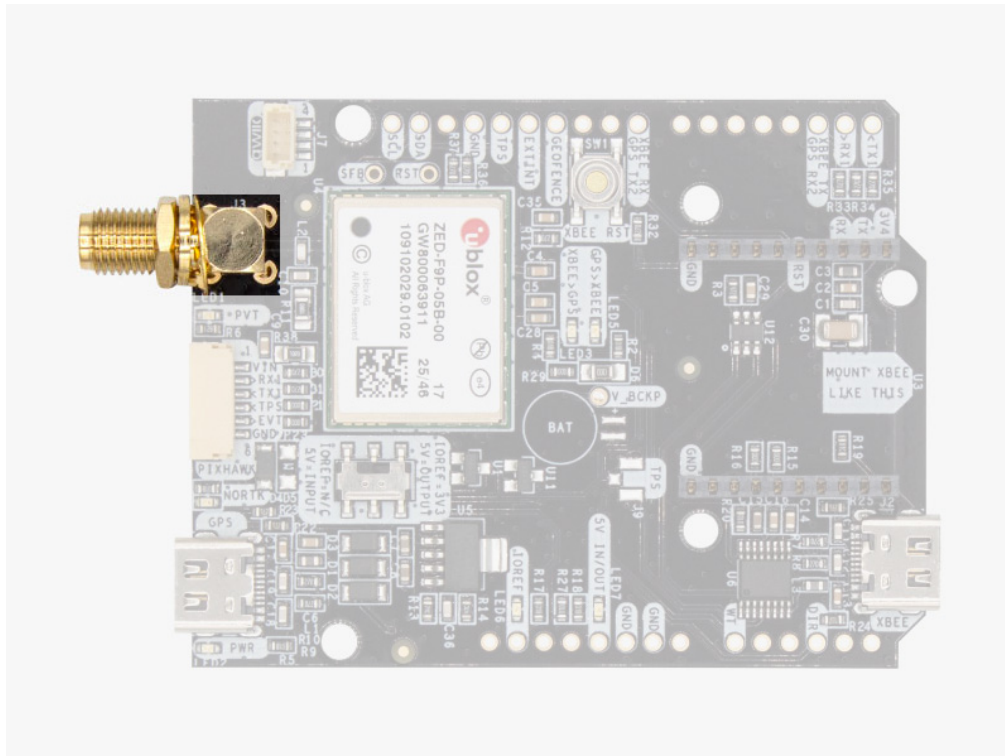
The main component of simpleRTK2B Budget is u-blox ZED-F9P.

Get started

Before start: We recommend not changing any configuration or updating the firmware. Your receiver comes pre-configured as a Rover.

Step A: Connect antenna

1. Connect the GNSS antenna to your receiver.

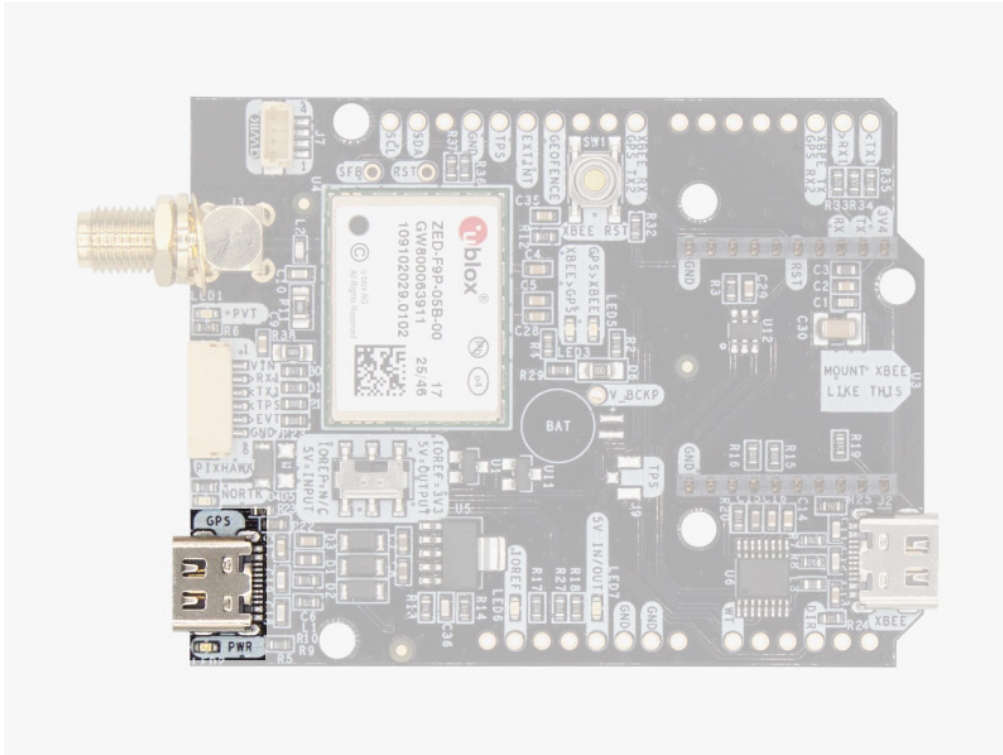


2. Place GNSS antenna outdoors in a place with a good view of the sky for testing functionality. Otherwise, you won't see the satellite view and signal.

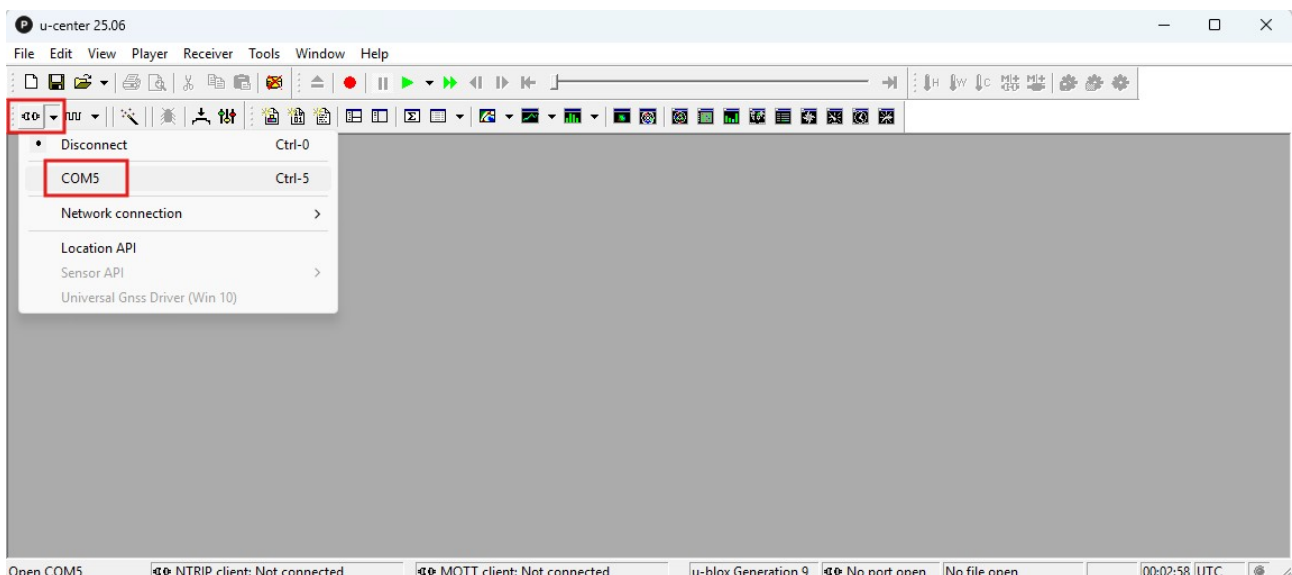
Step B: Connect to PC and u-center

U-center is an evaluation software designed for assessing, analyzing performance, and configuring u-blox GNSS positioning chips and modules. Follow our quick guide to start.

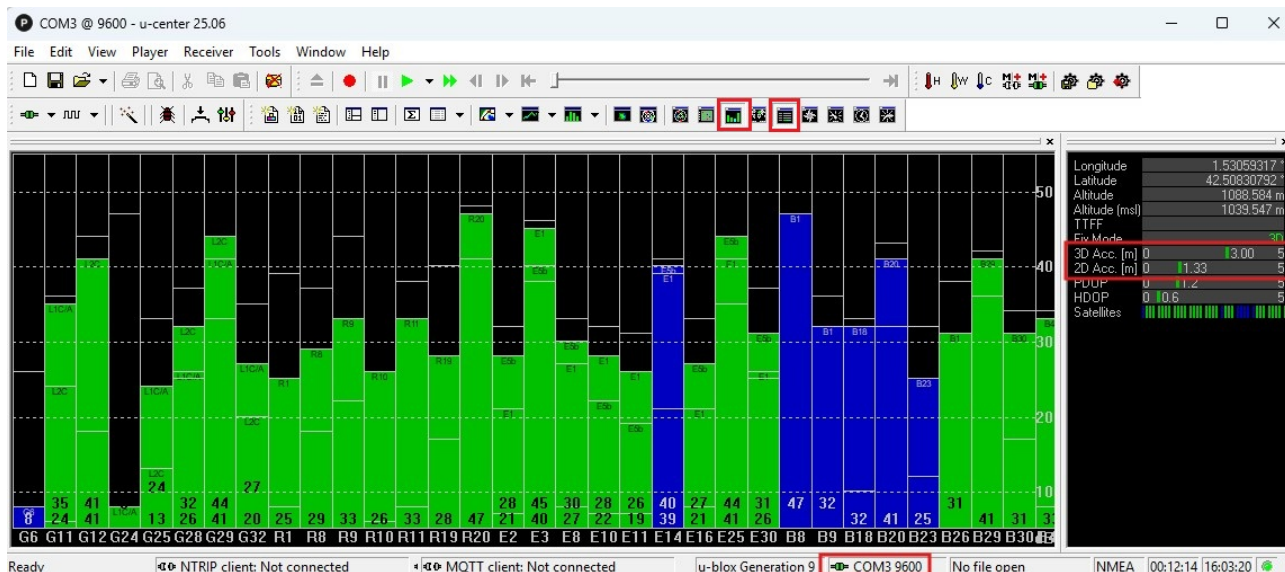
3. Connect the receiver to your PC via the USB port labelled as **POWER+GPS** using USB cable.



4. Open [u-center](#) (for F9, not u-center2). Select the **COM** port to connect your receiver. If you don't know which COM port your receiver is connected, check the Device Manager of your PC.



5. In the views toolbar, you can choose the data you want to visualize. We recommend to enable **GPS data** and **Satellite levels** to check the coordinates and signal strength.



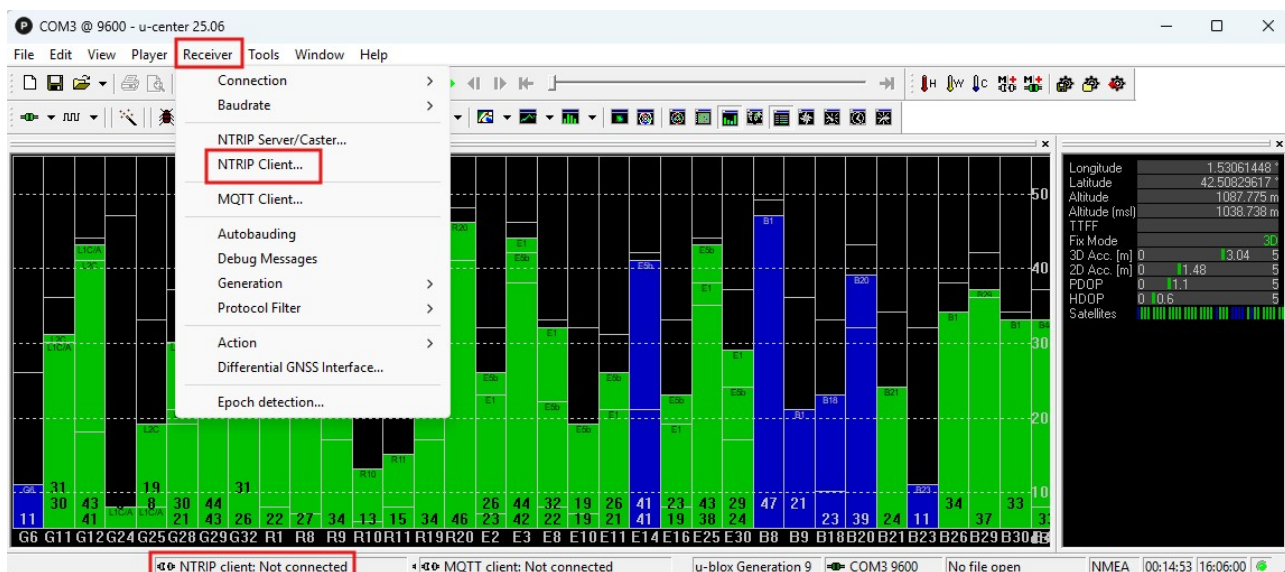
Step C: RTK corrections

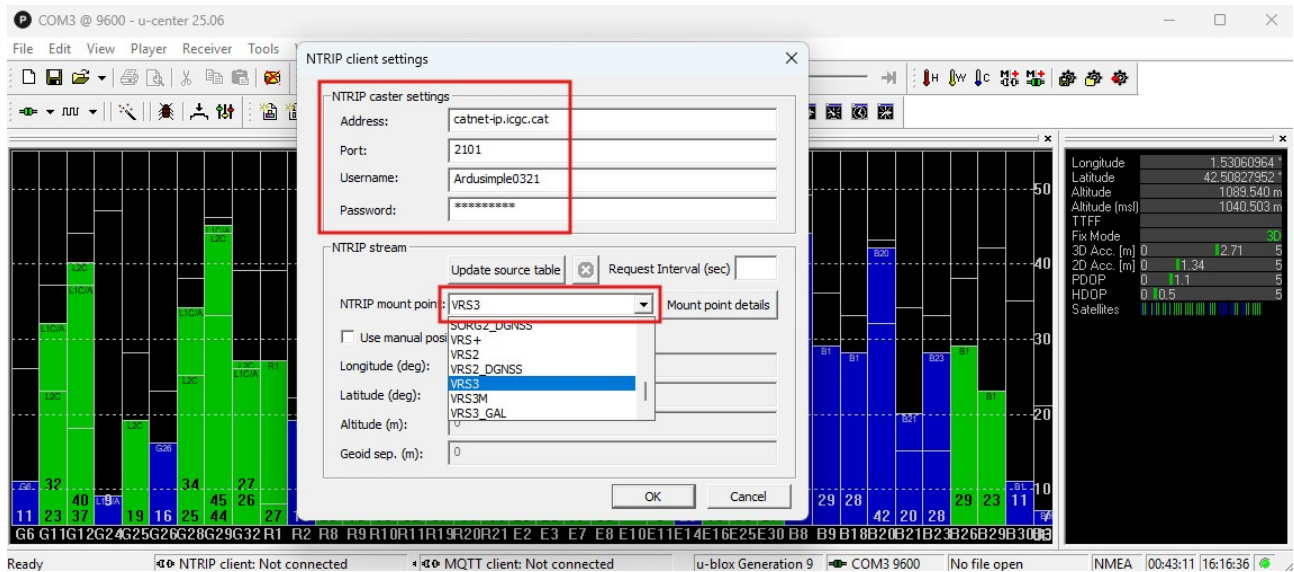
In order to achieve centimeter/millimeter level accuracy with our GNSS receivers, you need to have RTK corrections. The easiest way to get RTK corrections is to use an RTK correction service available in your country. We have prepared a list of [RTK correction services in your country](#) to help you get started.

Before you start:

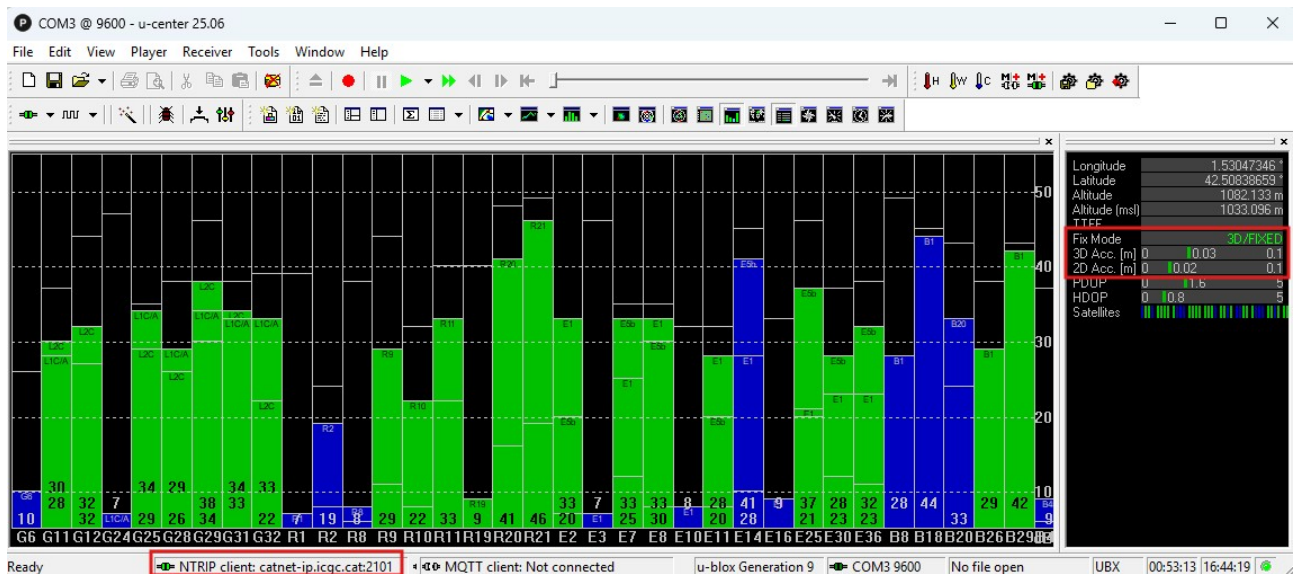
- You registered to the RTK correction service and received credentials (server address, port, user and password) to connect to it.
- Your PC has internet connection in order to connect to NTRIP service.

- At menu bar go to **Receiver**→**NTRIP Client...** and set up the Address, Port, Username, Password and Mount point of your NTRIP. Click **OK**.





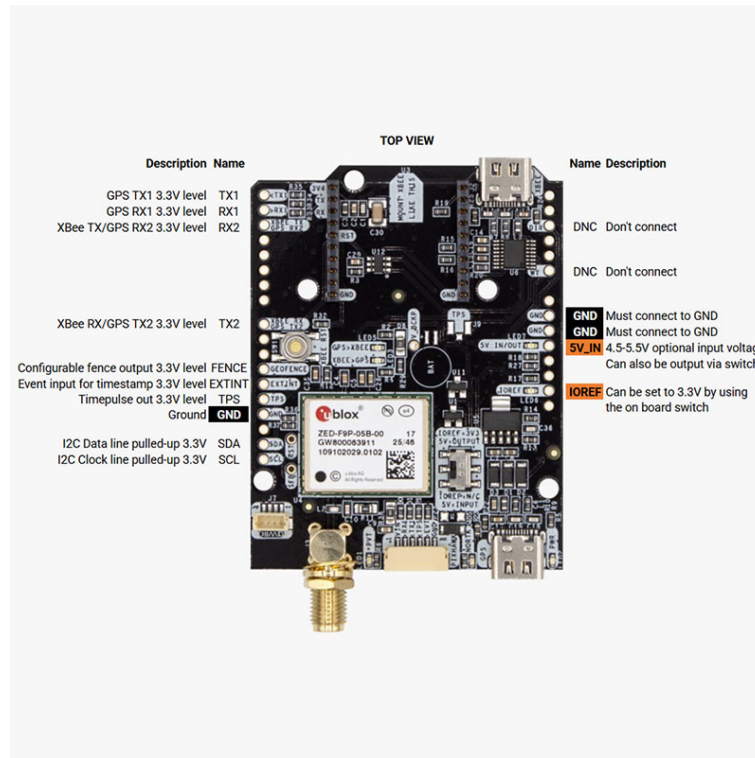
- In a few minutes, you will see the Fix Mode change to **FIXED** or **FLOAT**. With valid **FIXED** you should see the **3D Acc.**(accuracy) and **2D Acc.**(accuracy) is centimeter-level.



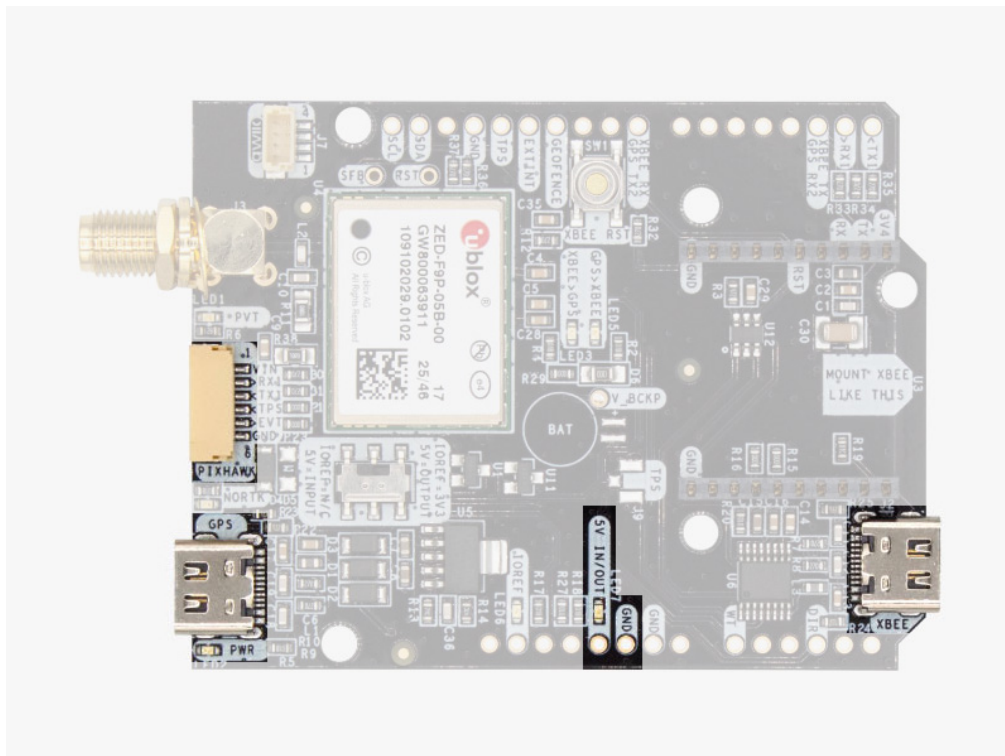
If you need additional information, such as upgrading firmware, configuring the receiver as a base or rover, or connecting to communication plugins like Bluetooth and radio, please refer to the [u-blox ZED-F9P configuration page](#).

Hardware

Pinout



Power

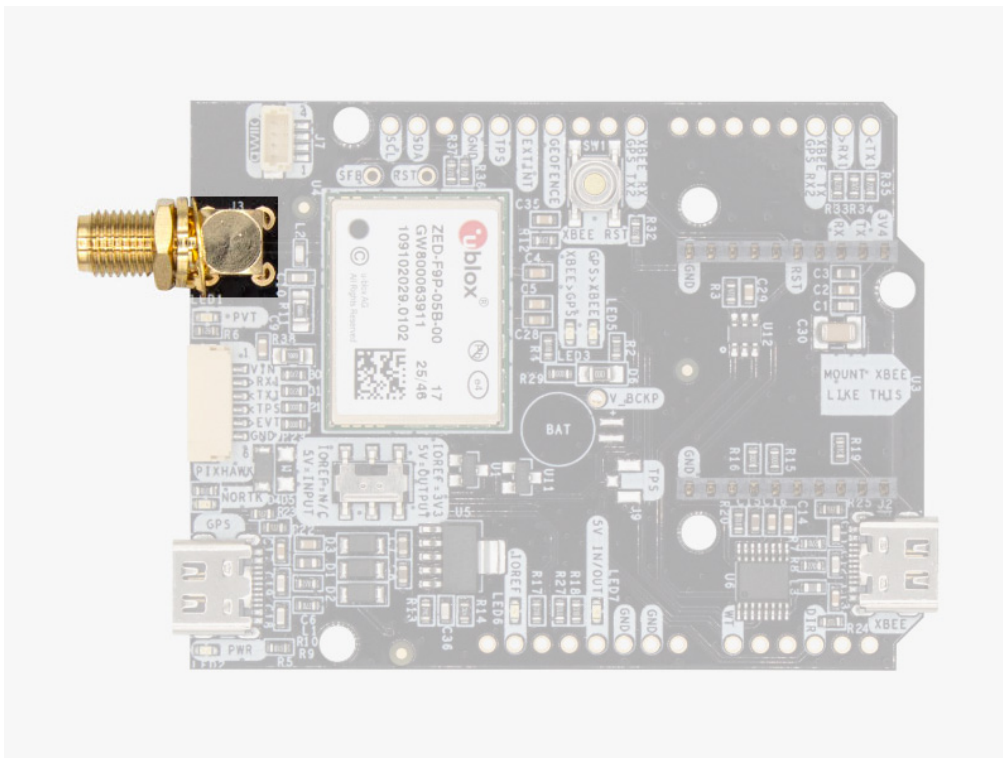


The simpleRTK2B board can be powered from 4 different sources:

- GPS USB port
- XBEE USB port
- Pixhawk connector
- Arduino rail (5V switch set to input)

Only 1 of them is needed to use the board, but you can also connect the 4 at the same time, there's no risk.

Antenna



The simpleRTK2B requires a good quality GPS/GNSS dual band antenna. The board is compatible with both active antennas supporting 3.3V supply and passive antennas. The maximum output current is 75mA @ 3.3V.

If you use it with the traditional cheap GPS antennas widely available, you will not achieve the expected performance.

That being said, just connect the antenna to the SMA connector without using tools (the strength of your fingers is enough).

It is recommended to connect the antenna before powering the board.

The installation of the antenna is also a key point to achieve the best results.

The GPS/GNSS antenna should always be installed with the maximum possible view of

the sky.

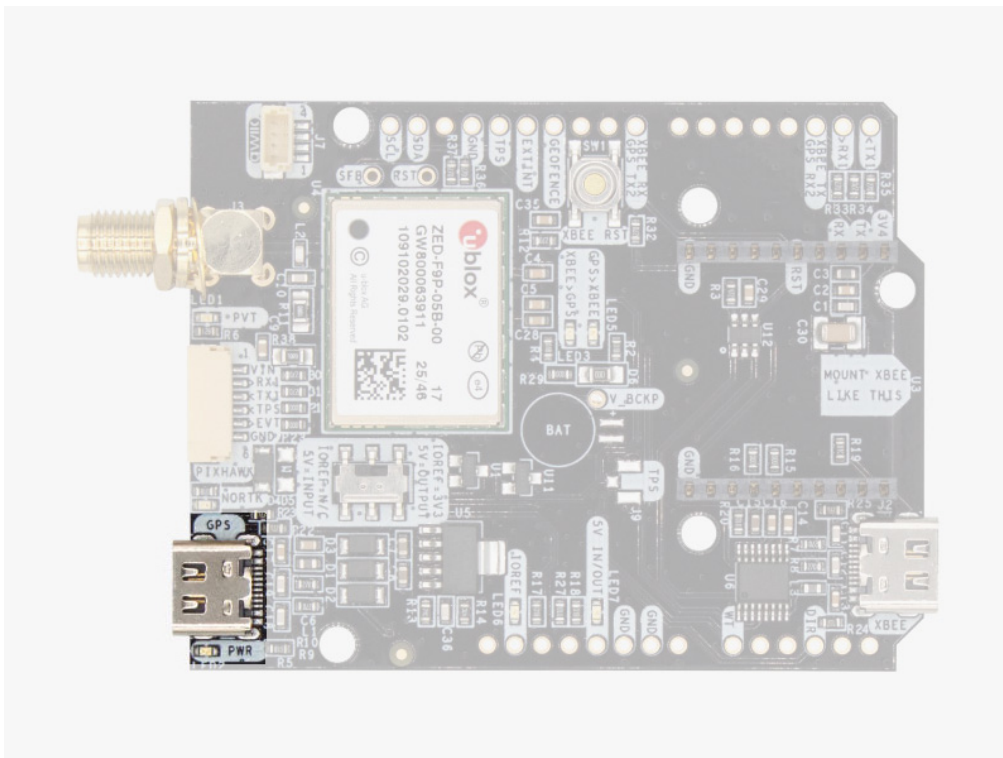
In addition, if possible, it should be installed with a metallic plane behind, e.g. rooftop of the car, on a metal plate bigger than 20cm, etc.

If you want to learn how installation impacts performance, please have a look at our [GPS/GNSS antenna installation guide](#).

Interfaces

simpleRTK2B board has a few interfaces that we will now explain in the following installation guide.

USB GPS



This micro-USB connector gives you access to the native USB from the ZED-F9P module. You can receive NMEA with the position, or have full access to the ZED-F9P using the u-center tool: <https://www.u-blox.com/en/product/u-center>

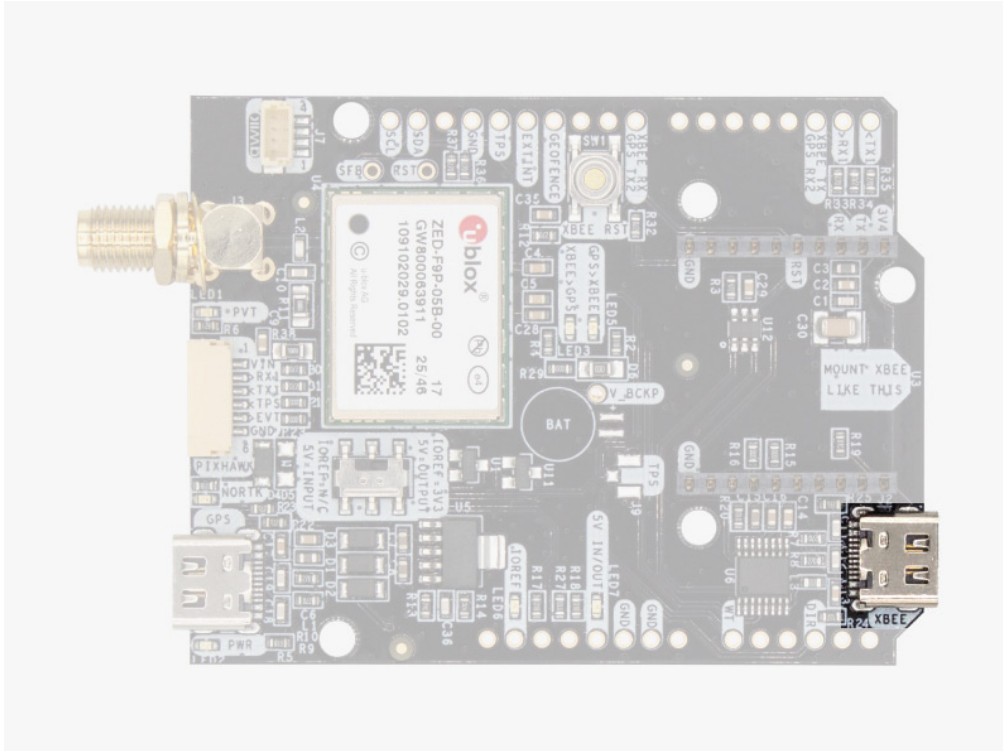
You can connect this interface to your preferred mobile phone, tablet, or PC and start receiving NMEA data.

You can also connect this USB to your mobile phone using our USB on-the-go (OTG) cable cable.

If you use Windows10, no drivers need to be downloaded so ignore the next paragraph ?

If you experience problems with above drivers in Windows 7/8 devices, try with the alternative driver that you can download from this link: <https://www.ardusimple.com/wp-content/uploads/2020/06/zed-ubloxusb.zip>

USB XBee



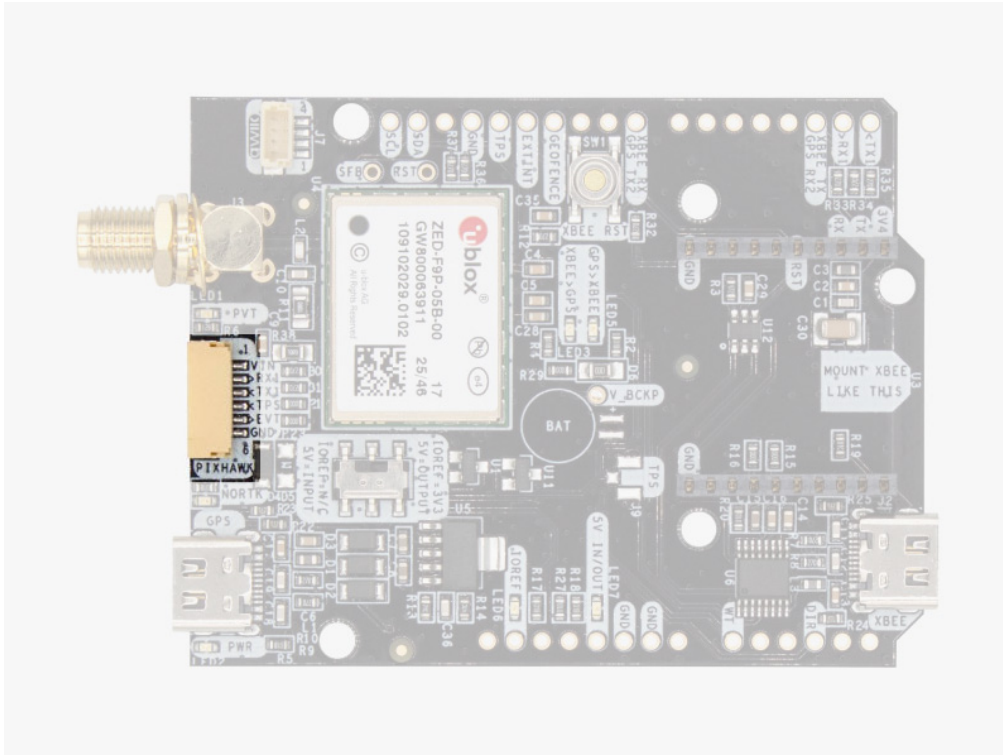
This micro-USB connector gives you access to the UART of the XBEE radio (if you mount one), via an FTDI USB-to-UART converter.

We find very practical to use this connector to power the board, so you can then connect and disconnect the GPS USB as you wish, without removing the power to the board. You can use any USB wall plug adapter you find at home.

To use this connector only as a power source, you don't need any driver. You can use your PC, or connect to your USB wall adapter.

To use this connector to configure an XBee radio, you will need the VCP driver from FTDI: <https://ftdichip.com/drivers/vcp-drivers/>

Pixhawk connector



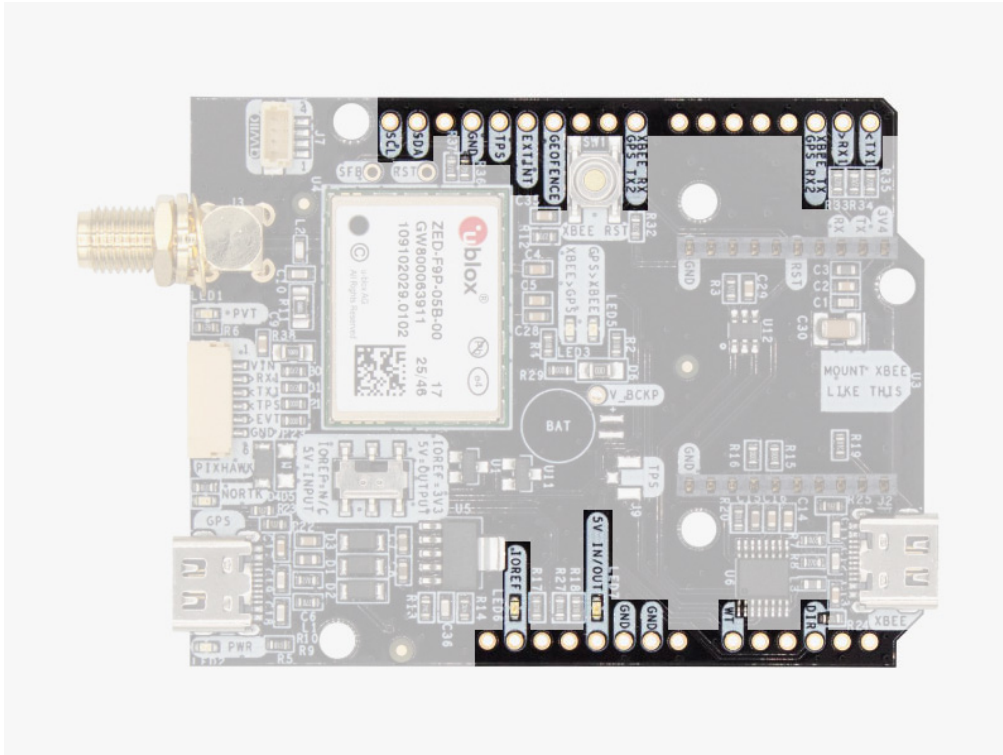
This connector is a standard JST GH that can be used to connect the simpleRTK2B to a Pixhawk autopilot. You can also use this connector to power the board.

The Pixhawk JST-GH connector is following the Pixhawk standard:

- 1: **5V_IN**
- 2: **UART1 RX** (3.3V level)
- 3: **UART1 TX** (3.3V level)
- 4, 5: Not connected
- 6: **GND**

Please note that the board only includes a GPS and doesn't include magnetometer.

Arduino rails

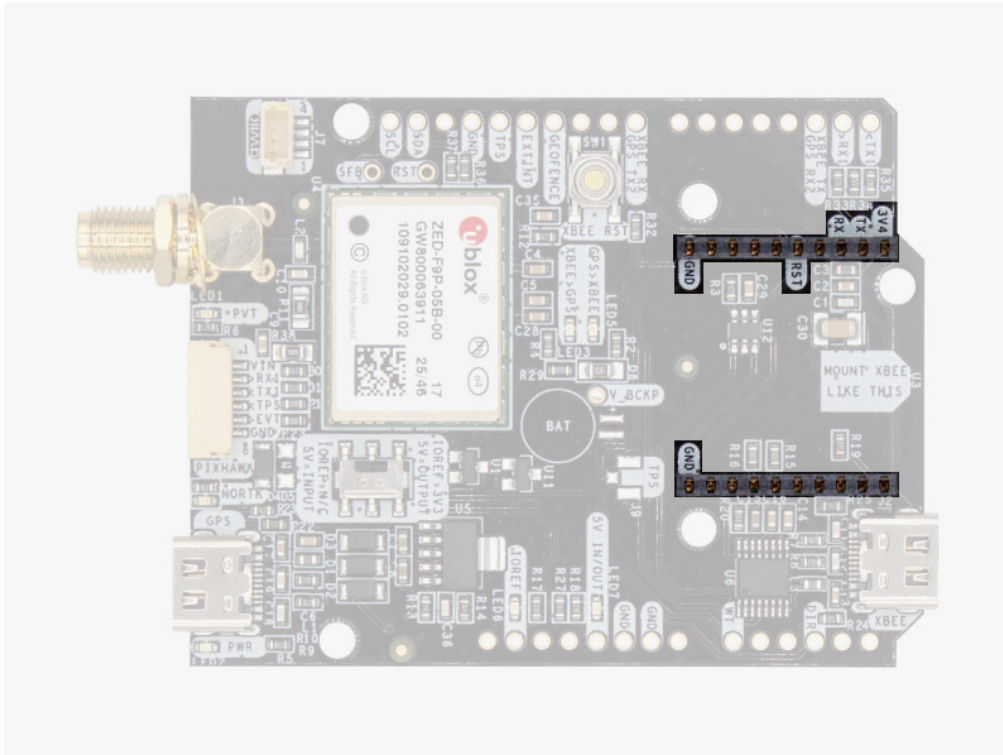


simpleRTK2B has optional rails to connect to other arduino UNO compatible devices.

- **GND:** ground is available in the standard arduino pins. You should always connect this line to your other board.
- **5V_IN:** you can power simpleRTK2B from this pin, compatible with the rest of arduino boards (5V switch set to input).
- **IOREF:** this is an input that will define the voltage levels of the next pins. If you input 1.8V, the next pins will be 1.8V level. It supports from 1.2V to 5.5V.
 - **TX1:** ZED-F9P UART1 TX
 - **RX1:** ZED-F9P UART1 RX
 - **TX2:** XBee UART TX (this pin is also connected to ZED-F9P UART2 RX).
 - **RX2:** XBee UART RX (this pin is also connected to ZED-F9P UART2 TX).

If you are connecting your own hardware to UART1 or UART2, it is mandatory to connect IOREF pin to the voltage required by your hardware, otherwise you may experience problems.

XBee socket

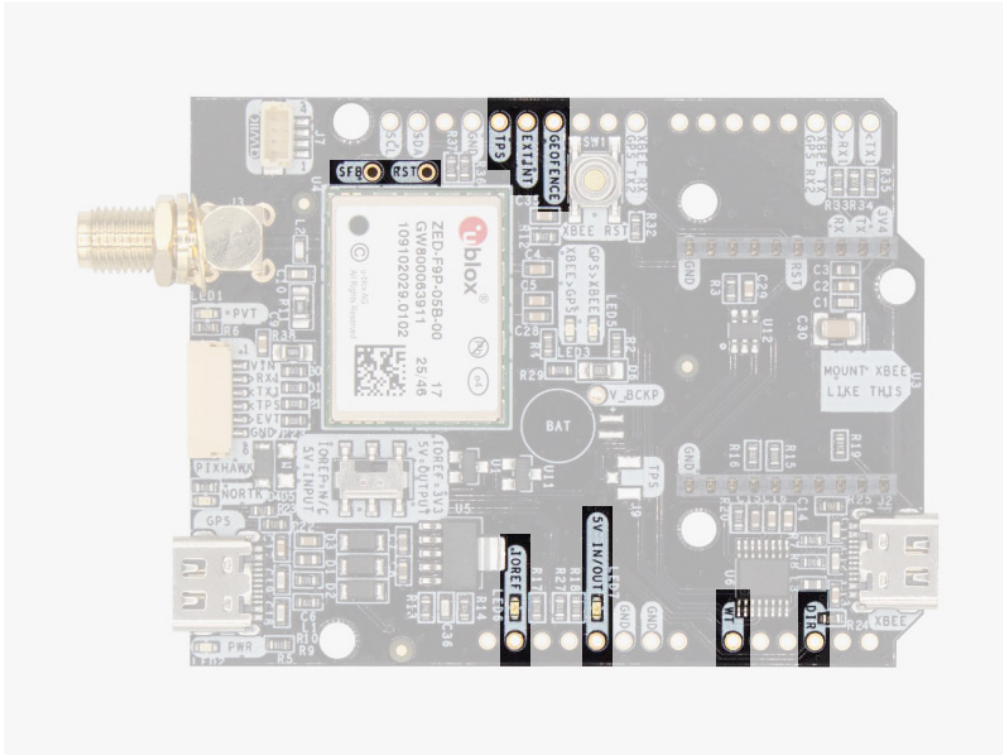


You can use this socket to connect an [XBee compatible plugin](#). The following pins are available:

- **VCC**, which is a 3.3V output with maximum current 750mA.
- **XBee UART RX**, at 3.3V level
- **XBee UART TX**, at 3.3V level
- **GND**

This interface is connected to ZED-F9P UART2.

Special function pins

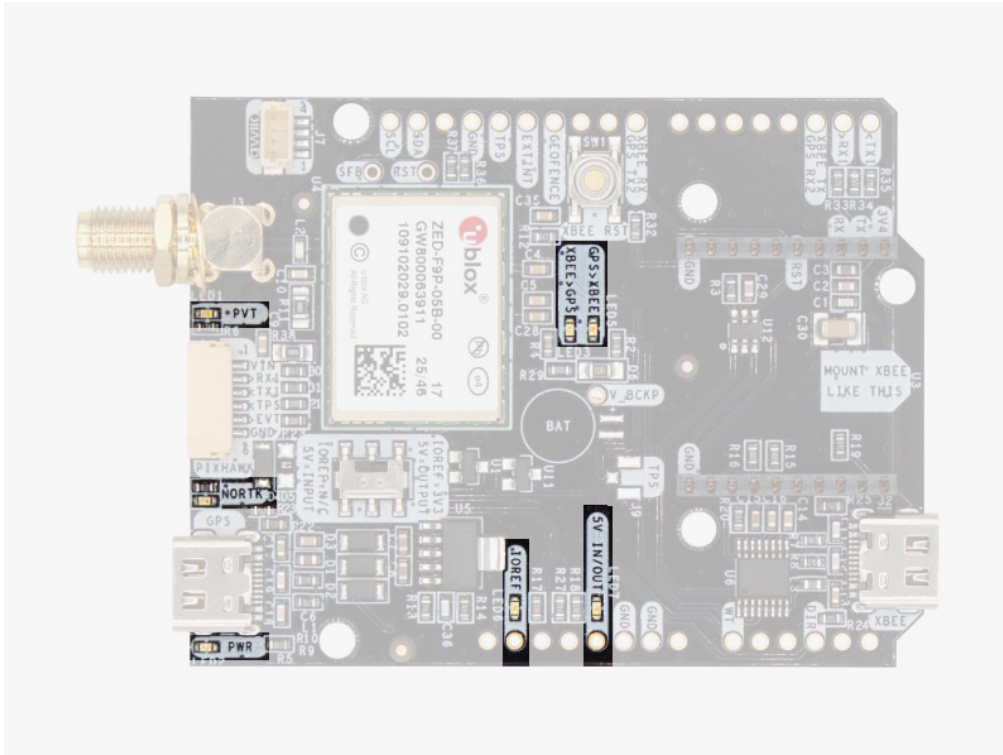


In addition to above, there are also a few additional pins available for the most advanced users:

- **Safeboot**
- **Reset**
- **Timepulse (TPS)**: 3.3V configuration time pulse output
- **EXTINT**: time synchronization input, maximum voltage 3.6V
- **GEOFENCE**
- **IOREF** with a maximum current of 250mA
- **5V IN/OUT** with a maximum current of 100mA
- **Wheeltick (WT)**: Used to feed hardware odometry/speed data
- **Direction (DIR)**: Wheel or vehicle direction

To learn more about these pins, we recommend you to read ZED-F9P integration guide, available here: <https://www.u-blox.com/en/product/zed-f9p-module#tab-documentation-resources>

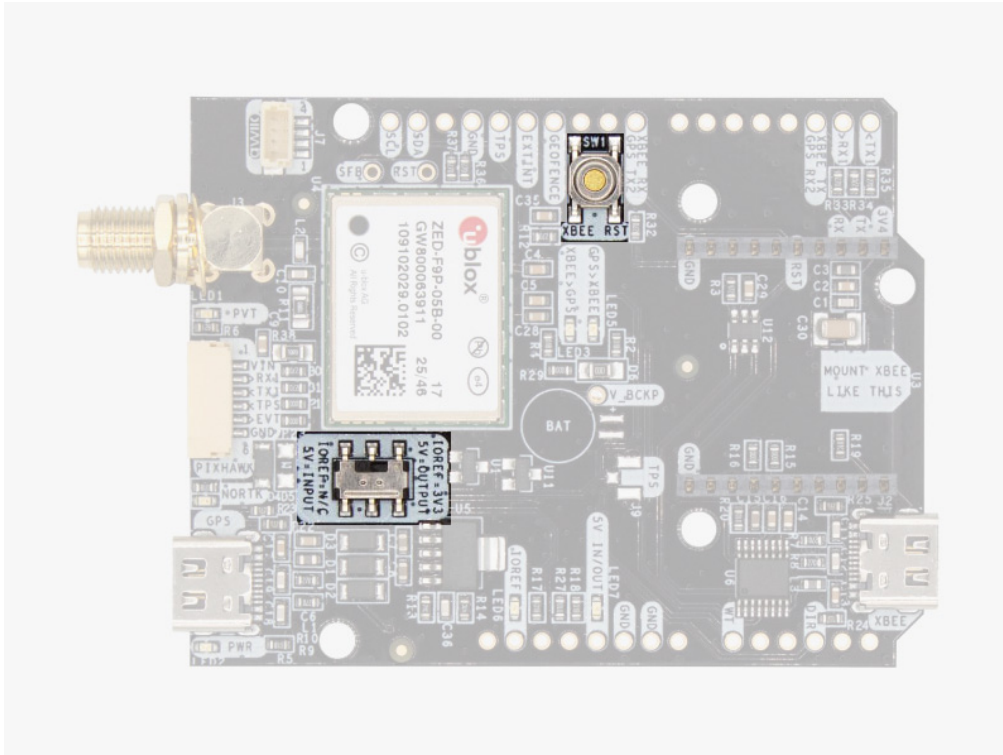
LEDs



The board includes 5 status LEDs, which indicate that:

- **PWR:** the simpleRTK2B board has power.
- **PVT:** u-blox default configuration for TIMEPULSE pin is used: OFF when no fix, 1-pulse-per-second when valid position.
- **NORTK:** u-blox default configuration for RTK_STAT pin is used: ON when no corrections, blinking when receiving RTCM data, and will switch OFF when everything is ok and you have RTK fix.
- **XBEE>GPS:** The XBEE radio is receiving data over the air and sending it to the ZED-F9P.
- **GPS>XBEE:** The ZED-F9P is outputting data that the XBEE radio is receiving and sending over the air.
- **IOREF:** Enabled and supplying or reading the reference voltage.
- **5V IN/OUT:** Tells you if voltage is currently active on that pin in either direction.

Buttons and switches



XBee Reset Button: Used for programming XBee radio modules (e.g. firmware updates). You will likely never need to use it.

IOREF & 5V IN/OUT Switch: Indicates whether the IOREF and 5V Arduino rail pins are set as INPUTS or OUTPUTS. In the second case the board can be used to power external accessories like the Shield for a Second XBee socket.

Accessories

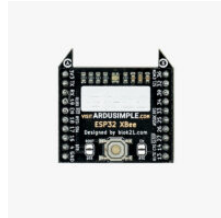
You can add one of these features to your receiver with our XBee plugins:



Plugins
[Radio module
450MHz](#)



Plugins
[WiFi NTRIP
Master](#)



Plugins
[WiFi NTRIP
Master
\(external
antenna
version\)](#)



Plugins
[Radio module
Long Range
\(LR\)](#)



Plugins
[Radio module
eXtra Long
Range \(XLR\)](#)



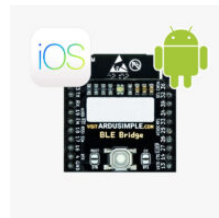
Plugins
[Radio Module
Medium
Range \(MR\)](#)



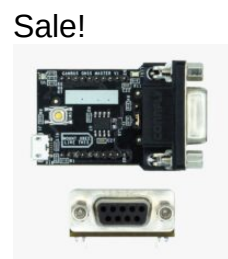
Plugins
[Bluetooth
module](#)



Sale!
[Made in
Europe
Ethernet
NTRIP Master](#)



Plugins
[BT+BLE
Bridge](#)



Sale!
[Plugins
CANBus
GNSS Master](#)



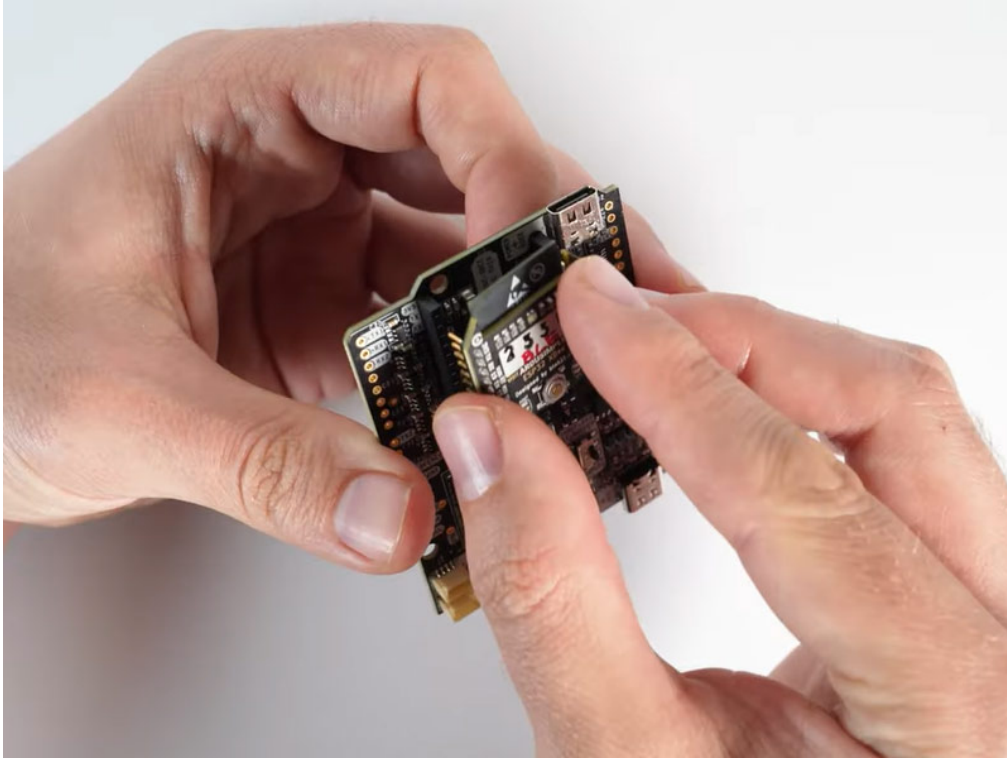
Plugins
[RS232 plugin](#)



Plugins
[Serial
Datalogger to
microSD](#)

How to add plugin

1. To connect the communication plugin to the XBee socket, simply insert it into the XBee connector on the board.



2. To use the plugin, go to the [u-blox ZED-F9P configuration page](#) and load the configuration file 'Send NMEA messages to communication plugin' onto your receiver following the instructions.