

User Guide: RTK Portable 2

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Overview

Universal and compact RTK receiver for your centimeter tracking tasks. Fits any type of project, just add your preferred GPS antenna.

Package

The package includes:

- RTK Receiver with u-blox ZED-F9P and Bluetooth + Bluetooth Low Energy connectivity
- Adhesive dock: Useful to attach the receiver to a phone case or any other flat surface.
- Double USB-C right angle cable (15 cm): Used to connect the receiver to your smartphone.
- USB-A to USB-C cable (50 cm): Used to connect the receiver to your PC/laptop.



RTK receiver with ZED-F9P



Self adhesive docking station



Double USB-C right angle cable (15 cm)



USB-A to USB-C cable (50 cm)

GNSS Antenna Important: you will need an antenna to use this product. Choose one from our recommended list below, or use the one that you already have at home from your previous project! Note that antenna must support RTK functionality to achieve centimeter measurements. In case of doubt:

- If you want the best of the best performance, choose the [Budget Survey Multiband GNSS Antenna](#)
- If you need to keep the weight down, select our [Compact Helical Tripleband GNSS Antenna](#)
- And if you are tight on budget, simply go with the [u-blox ANN-MB-00](#)

Unboxing

The RTK Portable 2 can be used in different ways:

- Standalone connected to a PC using the USB cable included in the package.
- By attaching it to your phone case or other flat surface (e.g. car's cabin, drone top plate, ground robot platform) by using the included adhesive dock to it.
- By screwing the receiver to a handgrip or surveying pole (requires the [Portable 2 to survey thread adapter](#)).

Connect antenna

The RTK Portable 2 can be connected to any GNSS antenna, as long as it includes a SMA female connector for connection. Cable antennas are useful if you want to keep the receiver indoor while the antenna is placed outdoors.

1. Align and screw the GNSS antenna SMA connector to the RTK Portable 2 antenna connector by hand, do not use any tools as overtightening it might damage the receiver.

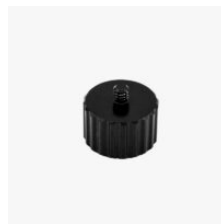




Cables
[Portable 2 dual right angle USB-C OTG 15cm](#)



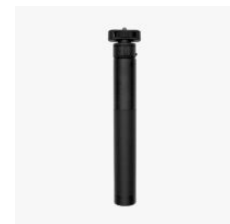
Accessories
[Portable 2 adhesive Dock](#)



Accessories
[Portable 2 to survey thread adapter](#)



Accessories
[Portable 2 handgrip with tripod](#)



Accessories
[Portable 2 handgrip extendable](#)

Power the receiver

The RTK Portable 2 receiver can be provided power from either its USB-C or Pixhawk port.

- USB-C power can come from a PC port, smartphone or tablet, battery power bank or wall adapter.
- Pixhawk port uses the standard 5.2V input and JST connector.

Apple Lighting to USB-C cables do not provide power to the receiver, so only latest iPhone models are able to power it directly. If this is your case consider using a generic power bank or the Portable 2 handgrip with battery.

Use standalone

1. Set the RTK Portable 2 receiver on top of a secured surface and connect to a PC, smartphone or table USB port using the provided USB cable.

Use with a smartphone case

1. Clean the flat surface where you want install the RTK Portable 2 receiver and set the included adhesive dock in place.
2. To attach the RTK Portable 2, align the flat edge of the RTK Receiver case to the adhesive dock, rotate it 90 degrees until it locks in place (a bit of force might be needed to make it slide in).





Use with a handgrip

3. Align the thread hole in the RTK Receiver with the handgrip, pole or static positioned male thread, and screw them together.





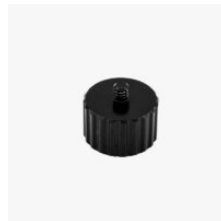
4. Great work! With the assembly complete, your RTK Portable 2 is ready for its first survey.



Cables
[Portable 2
dual right
angle USB-C
OTG 15cm](#)



Accessories
[Portable 2
adhesive
Dock](#)



Accessories
[Portable 2 to
survey thread
adapter](#)



Accessories
[Portable 2
handgrip with
tripod](#)



Accessories
[Portable 2
handgrip
extendable](#)

Getting started

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

Connect your RTK receiver to a GNSS antenna and your mobile device, in an open location with good view of the sky or near a window for testing its functionality.

In order to get centimeter accurate measurements, you will need to gain credentials to an NTRIP service to get RTK corrections. If you need help finding one, check the list of [RTK Correction Services in your Country](#) which we have prepared for you.

on Android

There are numerous Android GIS applications that are compatible with ArduSimple RTK receivers, but **SW Maps** is our preferred one.

In this step-by-step tutorial we will explain how to connect your new RTK receiver to your Android device using SW Maps. This can be done using either the provided USB-C OTG cable or by a Bluetooth Low Energy (BLE) connection.

- The USB-C OTG cable included in the package is the recommended method to connect to an Android device, as it powers the RTK receiver and transmits data at the same time, and the connection is more stable.
- There is an option to use a Bluetooth Low Energy connection instead, but then the receiver would need to be powered by an external power supply. In this case, we recommend ordering the [handgrip with built-in battery](#), which will not only power your kit reliably but also give you a much more ergonomic setup compared to carrying an external power bank.

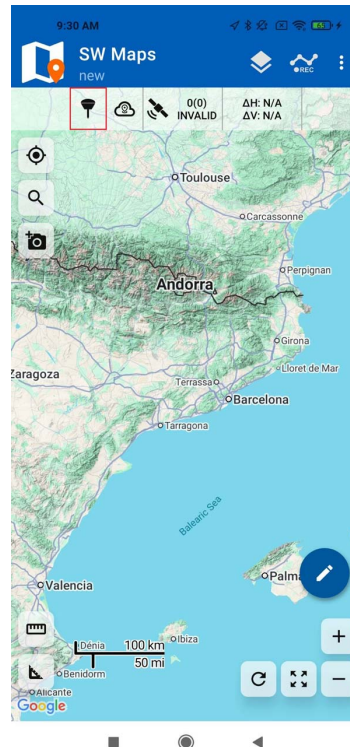
1. Install SW Maps app on your Android device from the [Google Play Store](#).
2. Open the app and grant permissions (first time only).

Connect via a USB-C OTG cable
(recommended)

Connect via Bluetooth LE

Connect via a USB-C OTG cable (recommended)

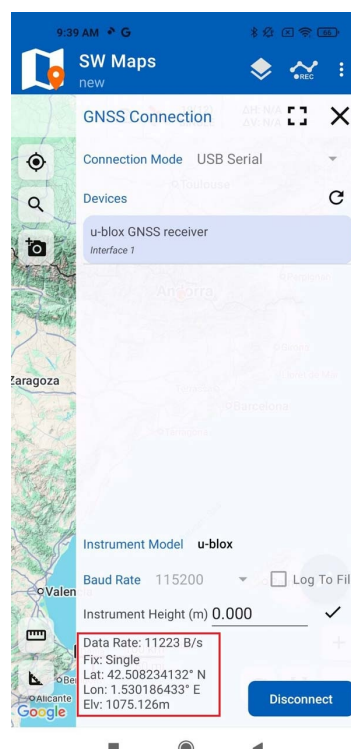
3. Connect RTK receiver with your Android device with USB OTG cable.
4. Click on the antenna icon to show the connection menu.



5. Choose USB Serial as **Connection Mode**. Under **Devices**, tap u-blox GNSS receiver and set **Baud Rate** to 115200 bps.
6. **Instrument Height** refers to the expected receiver elevation from the ground.
 - If you are using the RTK receiver attached to a handheld device, set the instrument height to 0 since elevation measurements will not be precise due to natural hand movement.
 - If you are using the kit with a surveying pole, set the instrument height to the exact height of the pole.
7. Press **CONNECT**.

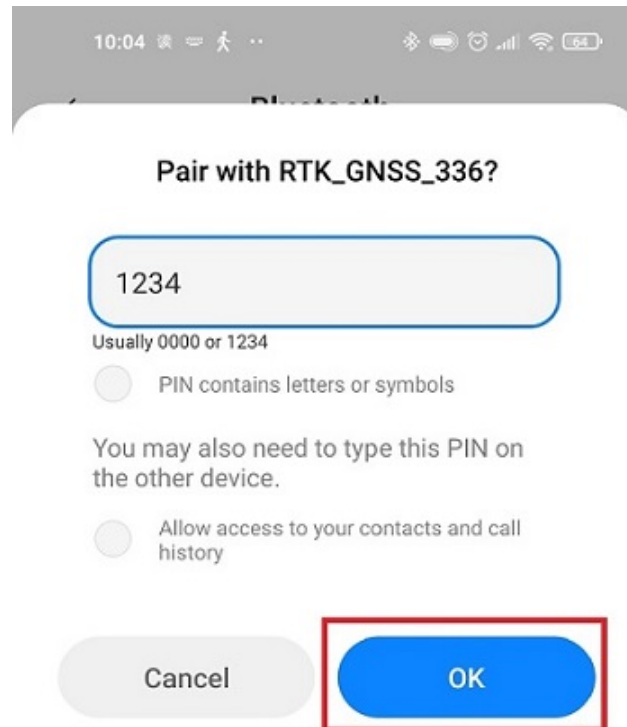


8. You should now see a GNSS receiver successful connection and data transfer.

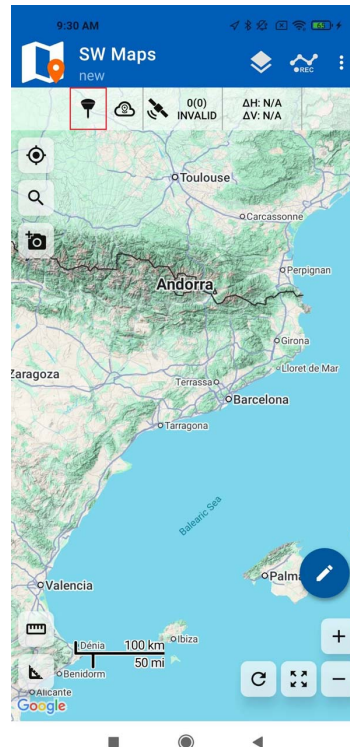


Connect via Bluetooth LE

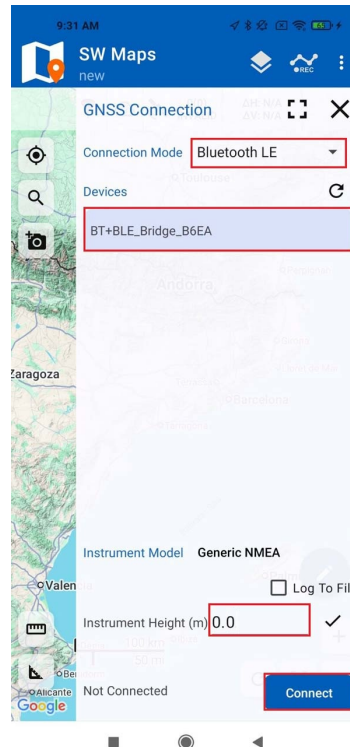
3. Power your RTK receiver by connecting USB cable to the power supply (smartphone/tablet/compatible powerbank). If you get any popup message to connect the USB device with any app, you can ignore it.
4. Enable your smartphone/tablet Bluetooth, and pair it with your RTK receiver. When pairing your device, notice that it will appear as **BT+BLE_Bridge_******. The password is always **1234**.
The pairing only needs to be done once.



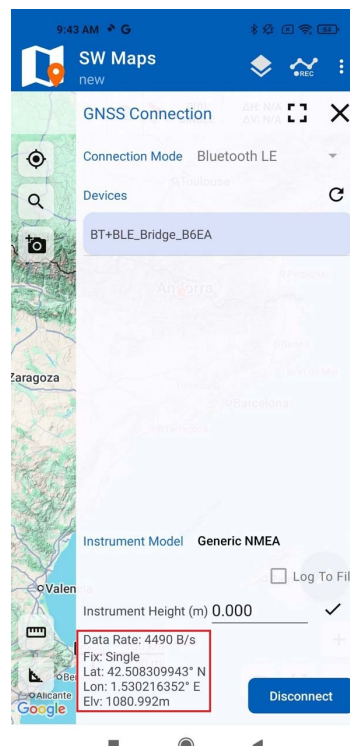
5. Tap the antenna icon to show the **GNSS Connection** menu.



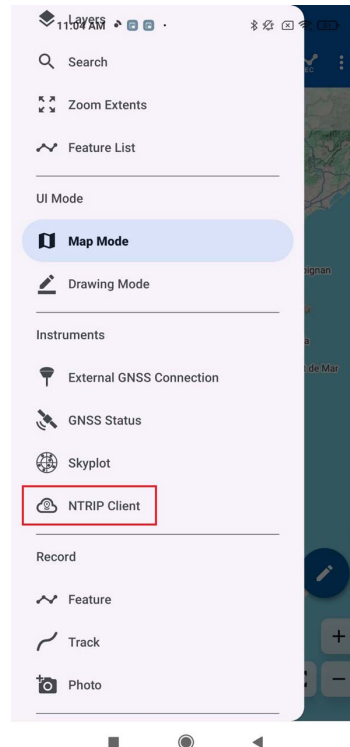
6. Set **Connection Mode** to Bluetooth LE, and under **Devices** select the one you paired in step 4. **Instrument Height** refers to the expected receiver elevation from the ground.
 - If you are using the RTK receiver attached to a handheld device, set the instrument height to 0 since elevation measurements will not be precise due to natural hand movement.
 - If you are using the kit with a surveying pole, set the instrument height to the exact height of the pole.
7. Press **CONNECT**.



8. You should now see a GNSS receiver successful connection and data transfer.



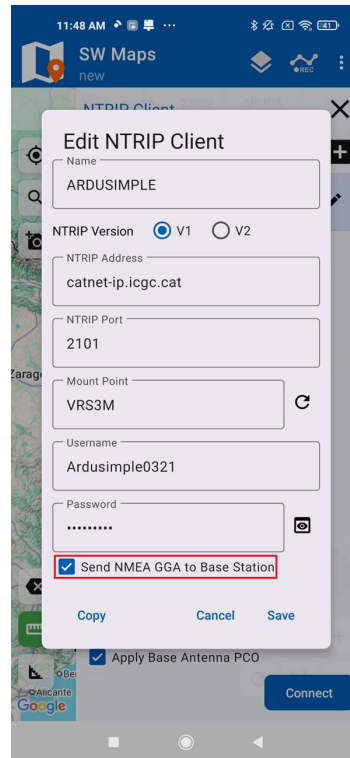
9. Go back to SW Maps main menu and select **NTRIP Client**.



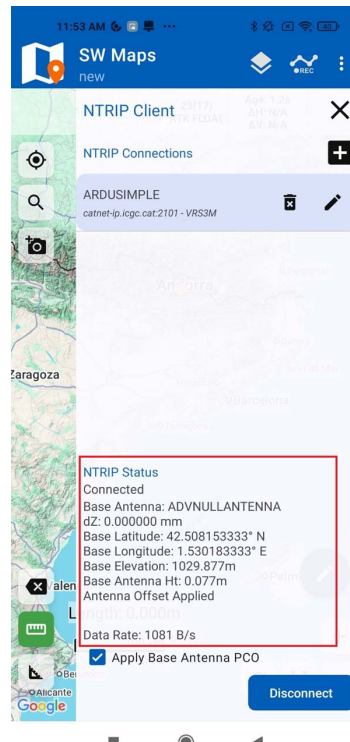
10. Enter your **NTRIP Client** credentials:

- **Name:** A custom name you choose to save the NTRIP connection account.
- **NTRIP Caster Address and NTRIP Port:** This information should be provided to you by the NTRIP service when you set up your account.
- **Mount Point:** Choose the closest mount point to the area you are going to operate from.
- **User Name and Password:** This should be provided to you when you set up your account.
- We recommend enabling **Send NMEA GGA to Base Station** option to send your location to the NTRIP caster.

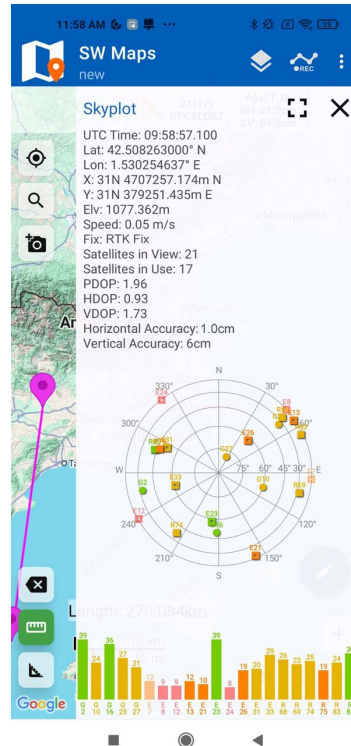
11. Press **SAVE**.



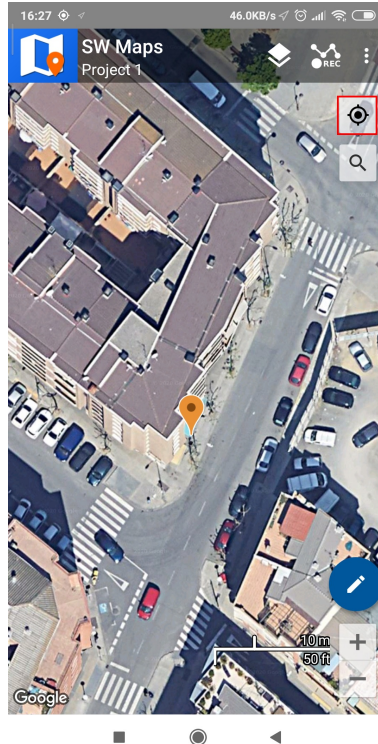
12. Press **CONNECT**. At **NTRIP Status** you will see a successful connection and data streaming to your device.



13. Go back to SW Maps main menu and select **Skyplot**. You should now see the available satellites at your position, **Fix** set to either RTK Float or RTK Fix, and centimeter level **Horizontal and Vertical Accuracy**.



14. To re-center the map on your location, click the icon highlighted in red. The pointer indicating your location will dynamically switch its color based on the receiver **Fix** status:
 - Orange when the status is **RTK Float** with slightly less accuracy.
 - Green when the status is **RTK Fix** with full centimeter accuracy.



For further information on how to use this application please follow the [SW Maps user guide](#).

The kit supports a wide range of third-party integrations. Use the table below to learn which apps you can use with your kit and how to do that.

If you cannot find your preferred app in the list, please [contact us](#) and we will test it for you.

App	Android
SurvX	supported
Surpad	Check out the tutorial
Lefebure	supported
SW Maps	supported
Mapit GIS	supported
Field Navigator	Check out the tutorial
AgriBus Professional	supported
FieldBee	Check out the tutorial
PinPoint GIS	Check out the tutorial

App

Field Maps

Google Maps

QField

LocusGIS

Mobile Topographer

Kizeo Forms

ODK Collect

MicroSurvey FieldGenius

Mergin Maps

Aplitop TcpGPS

PointMan

OCAD Sketch App

X-Survey

Tersus GNSS NUWA

Arcoda Next

Arcoda 3D Photo Survey

3Dsurvey SiteScan

3Dsurvey RTK Videogrammetry

3D geotag scanner

Avenza Maps

Iphigénie

Agro Measure Map Pro

ColDonAgro

GeoSpot GNSS

Android

supported

supported

supported

[Check out the tutorial](#)

supported

supported

supported

supported

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[Check out the tutorial](#)

[Check out the tutorial](#)

[Check out the tutorial](#)

supported

supported

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App

ArcGIS Fieldmaps

Other Android apps

Android

supported

[Check out our tutorial](#)

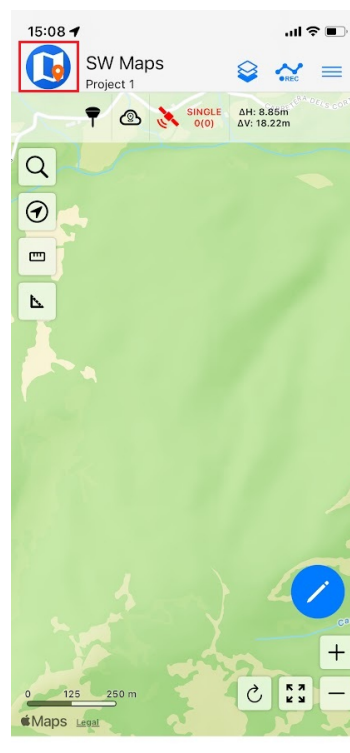
on iOS

The recommended app to use ArduSimple RTK receiver kits on an Apple iOS device is **SW Maps** using a Bluetooth Low Energy (BLE) connection.

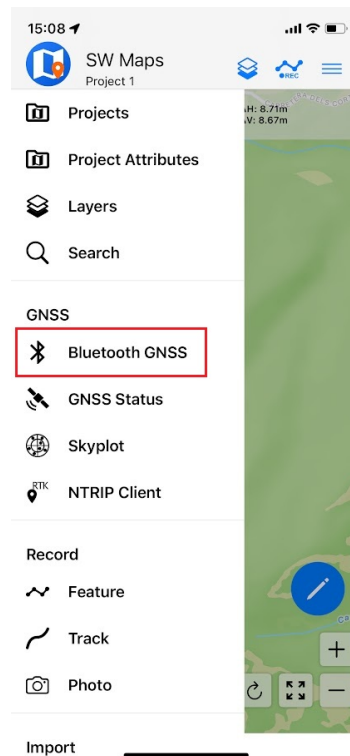
Note:

- If your iOS device has USB-C connector you will use USB-C OTG cable included in the package to power your RTK receiver.
- If your iOS device has a Lightning connector it cannot be used to power the RTK kit. In this case, we recommend ordering the [handgrip with built-in battery](#). It will not only power your kit reliably but also it will be a much more ergonomic setup compared to carrying an external power bank.

1. Install SW Maps app on your iOS device from the [Apple Store](#).
2. Open the app and grant permissions (first time only).
3. Click on the SW Maps icon to show the app menu.



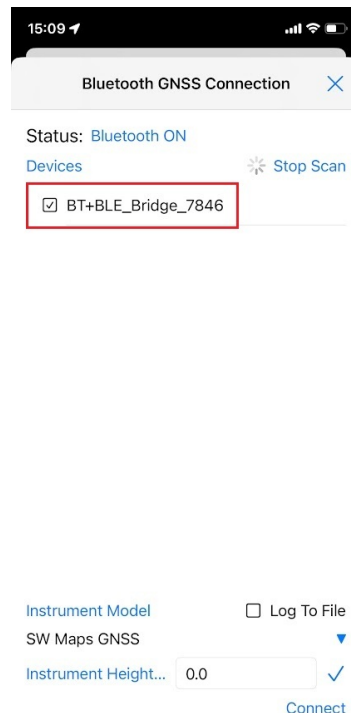
4. Select **Bluetooth GNSS** option.



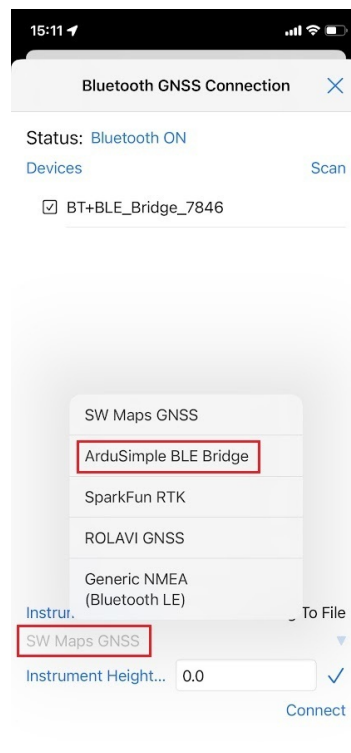
5. Press **Scan** to search for Bluetooth devices.



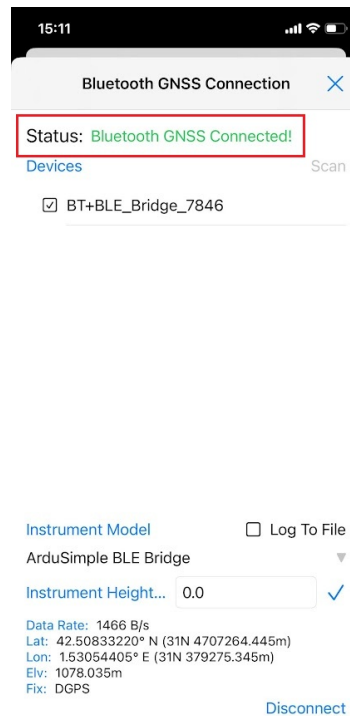
6. **BT+BLE_Bridge_XXXX** device will appear if your phone is close enough to the receiver. Select its checkbox and stop scanning.



7. From dropdown menu **SW Maps GNSS** select **ArduSimple BLE Bridge** option.

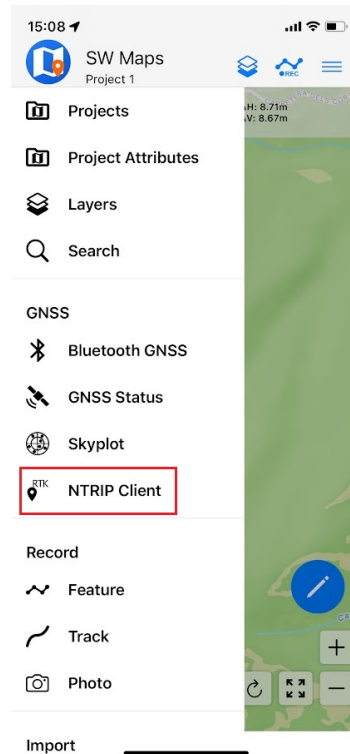


8. **Instrument Height** refers to the expected receiver elevation from the ground.
 - If you are using the RTK receiver attached to a handheld device, set the instrument height to 0 since elevation measurements will not be precise due to natural hand movement.
 - If you are using the kit with a surveying pole, set the instrument height to the exact height of the pole.
9. Press **Connect**. You should see a “Bluetooth GNSS connected!” message and data streaming from the receiver.



To get centimeter accurate measurements, it is needed to connect to a NTRIP service to get RTK corrections. If you need help finding one, check the list of [RTK Correction Services in your Country](#) which we have prepared for you.

10. Tap SW Maps menu and select the **NTRIP Client** option.



11. Enter your NTRIP credentials:

- **Name:** A custom name you choose to save the NTRIP connection account.
- **NTRIP Caster Address and NTRIP Port:** This information should be provided to you by the NTRIP service when you set up your account.
- **Mount Point:** Choose the closest mount point to the area you are going to operate from.
- **User Name and Password:** This should be provided to you when you set up your account.
- We recommend enabling **Send NMEA GGA to Caster** option to send your location to the NTRIP caster.

15:14

+ Save Add NTRIP Client X

Name

NTRIP Caster Address

Address

NTRIP Port

2.101

Mount Point

Mount Point Get

User Name

User Name

Password

Password

NTRIP Version V1

Send NMEA GGA to Caster

Save

12. Once connected, you will see the data streamed from the NTRIP service.

15:18

+ NTRIP Client X

Select NTRIP Credentials

Myntrip
194.158.95.189/RTCM32

Apply Base Station Antenna PCO

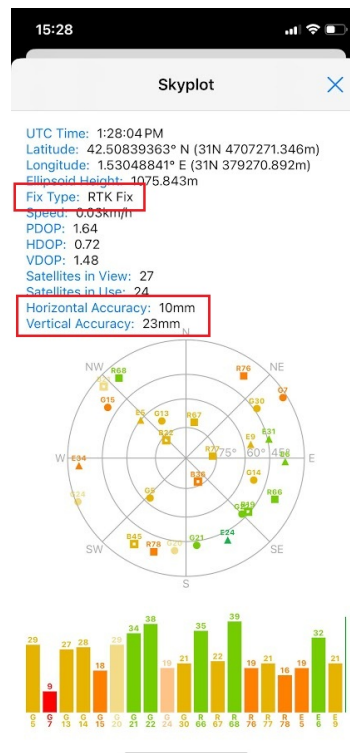
Antenna: LEIAS10 NONE
Z Offset: 58.3mm
Antenna Offset Not Applied

Base Latitude: 42.50490060° N
Base Longitude: 1.51948088° E
Base Elevation: 1077.667m
Baseline Length: 983.711m

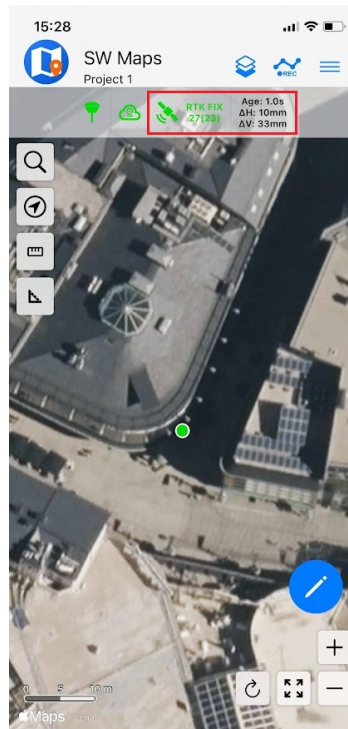
Connected: 1081 B/s Disconnect

13. To verify that you are getting precise position, tap **SW Maps** menu and select **Skyplot** option. You will see an **RTK Fix Type**, and **Horizontal Accuracy** and

Vertical Accuracy confirming that you are now working with centimeter level accuracy GNSS positioning.



14. To re-center the map on your location, click the arrow icon highlighted in red. The pointer indicating your location will dynamically switch its color based on the receiver **Fix Type** status:
 - Orange when the status is **RTK Float** with slightly less accuracy.
 - Green when the status is **RTK Fix** with full centimeter accuracy.



For further information on how to use this application please follow the [SW Maps user guide](#).

on Microsoft Windows PC

Before start We recommend not changing any configuration settings or updating the firmware, unless you need to.

Connect the antenna

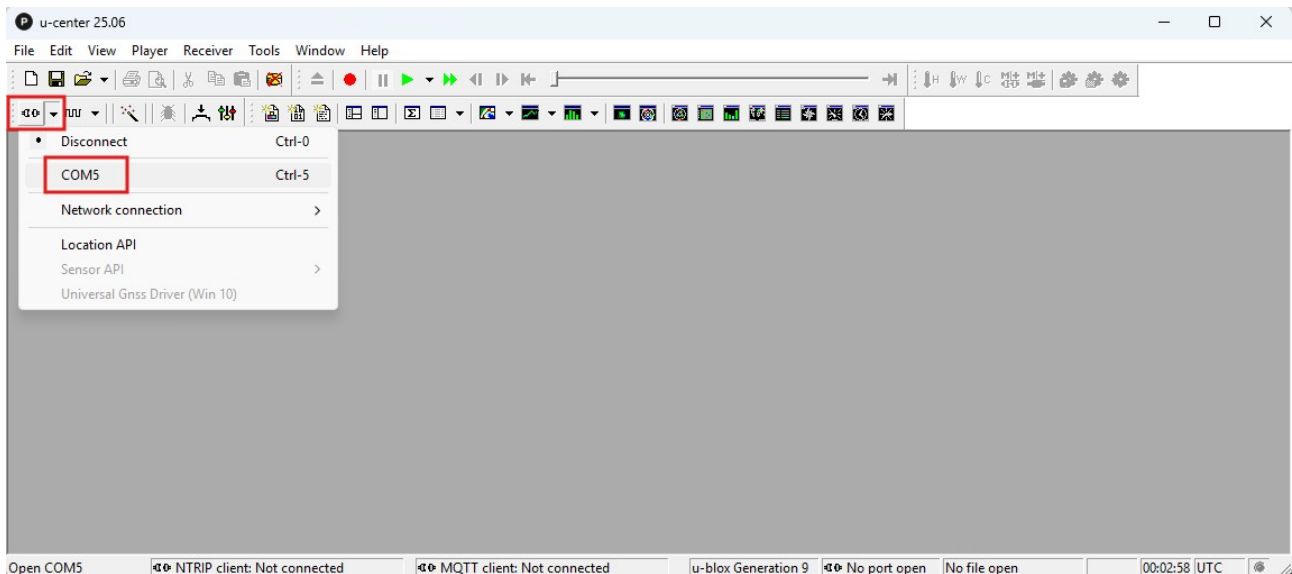
1. Connect the GNSS antenna to your receiver.
2. Place the RTK receiver or just the GNSS antenna outdoors (if the antenna has a cable extension) in a place with a good view of the sky for testing functionality. Otherwise, you won't see the satellite view and signal.

Connect to PC and u-center

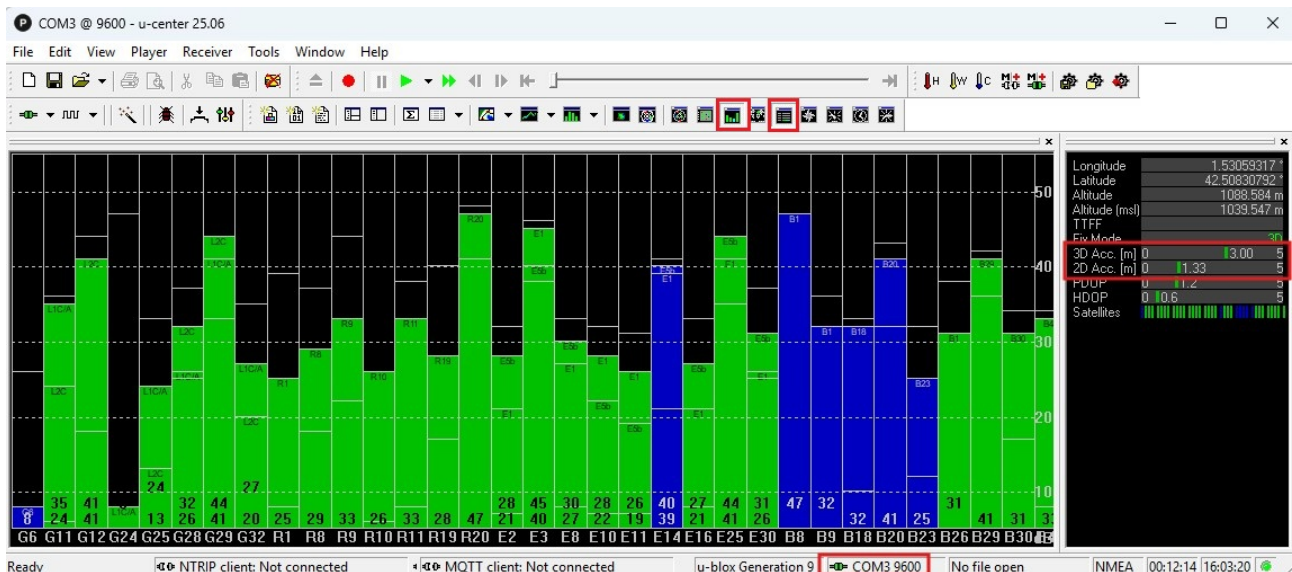
U-center is an evaluation software designed for assessing, analyzing performance, and configuring u-blox GNSS positioning chips and modules. Follow our quick guide to start.

3. Connect the receiver to your PC via the USB-C port using the provided 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.



Get RTK corrections

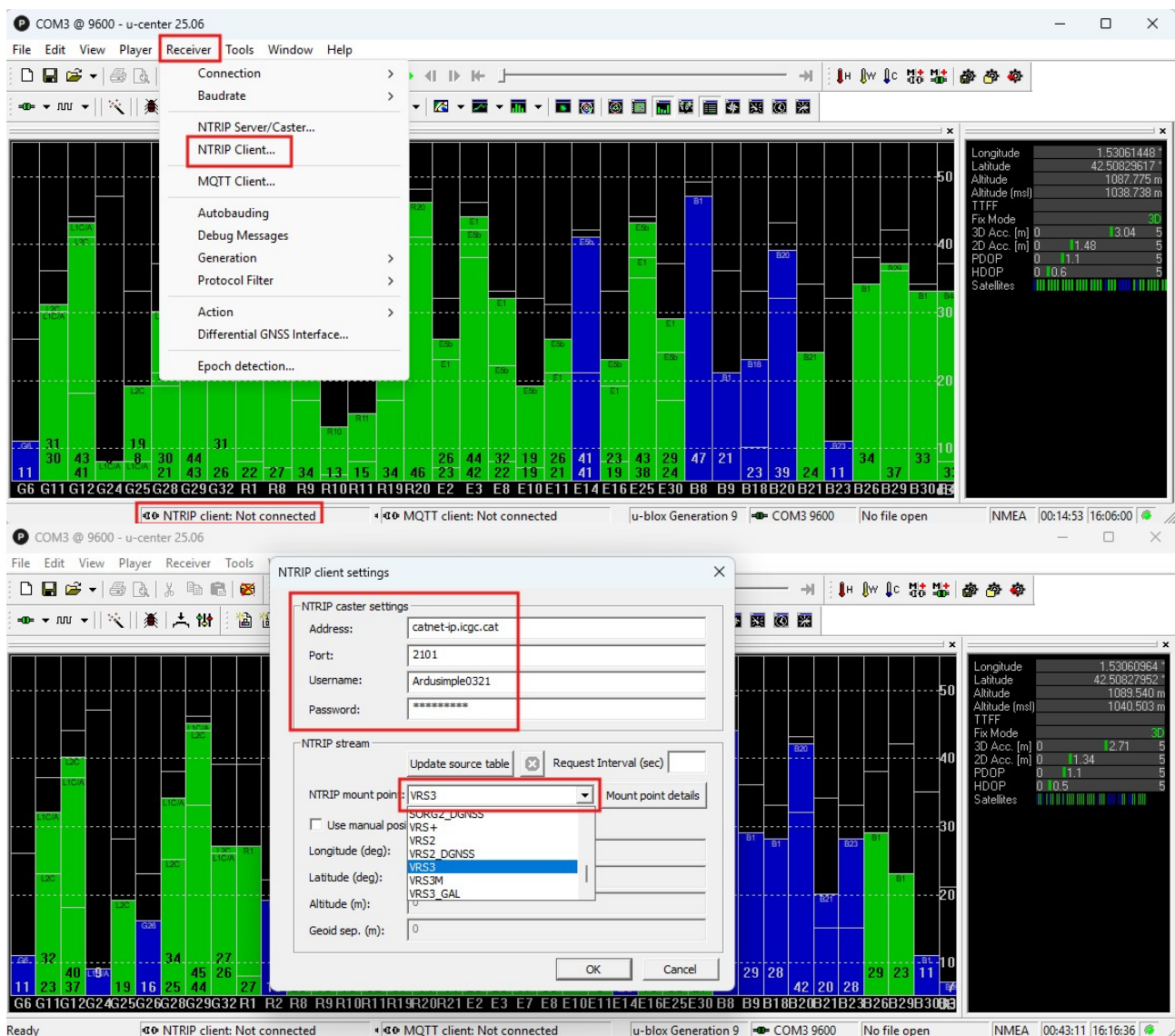
In order to achieve centimeter/millimeter level accuracy with our GNSS receivers, you need to have RTK corrections. The easiest way to get RTK corrections is to use an RTK

correction service available in your country. We have prepared a list of [RTK correction services in your country](#) to help you get started.

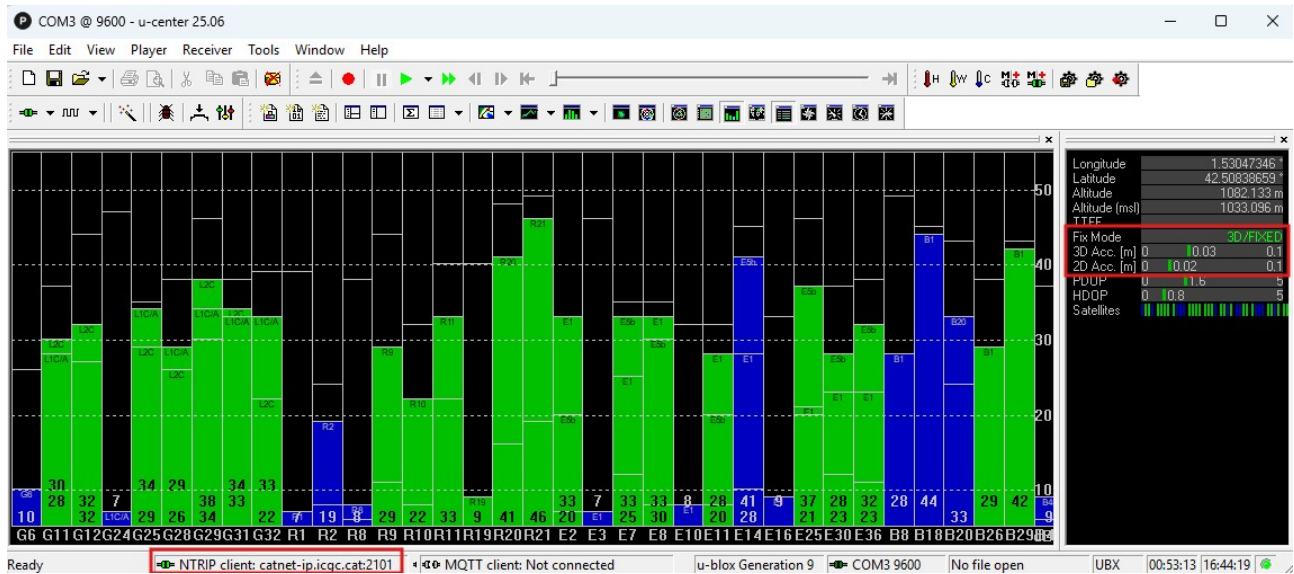
Before you start:

- 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.

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



7. 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.



on Linux PC

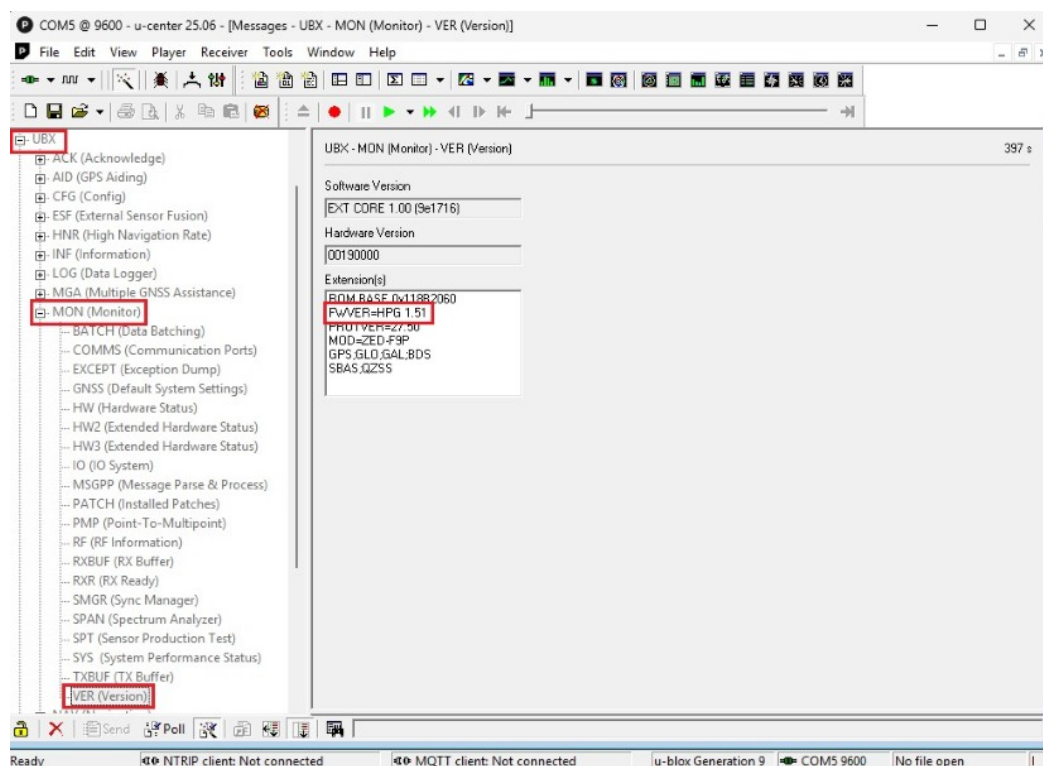
Linux documentation in progress, please [contact us](#) if you need help.

Reset to factory settings

We recommend not changing any configuration setting. But if you changed configuration of the kit here you have the steps to revert back to default.

The RTK receiver is pre-configured to send NMEA data simultaneously via Bluetooth and USB. If you change any settings and the product stops working, you can revert to factory setting by following these steps:

1. Connect the receiver to your computer or PC via USB.
2. Run u-blox u-center (you can download it [here](#)) and connect to the proper COM port.
3. Go to **View -> Message View** and navigate to **UBX->MON->VER**.
4. You can read the firmware version in the window:



5. Download the configuration file for [Rover 1Hz with Bluetooth BLE plugin FW1.51](#).
6. In u-center **Open Tools -> Receiver Configuration**, pick your file that you download on the previous step and click **Transfer File -> GNSS** button.
7. Once the configuration is done, go to **Receiver->Action->Save Config** to save the configuration on the RTK receiver.

Related tutorials

- [How to connect low cost RTK kit to Carlson SurvPC for archaeological surveying](#)
- [How to use centimeter GPS with any Android app \(mock location\)](#)
- [How to connect ArduSimple kit to Mergin Maps for centimeter-accurate mapping](#)
- [Mock location with USB OTG](#)
- [How to configure your simpleRTK2B receiver on your Android smartphone via GNSS master?](#)
- [How to export your survey work from your Android device to QGIS and AutoCAD](#)
- [How to use custom geoid for orthometric height measurements in Android with Mapit GIS or Mapit Spatial](#)
- [How to use ArduSimple products with SW Maps on Android smartphones/tablets](#)

Accessories and spare parts

Here you can find affordable accessories for your kit.



Cables
[Portable 2 dual right angle USB-C OTG 15cm](#)



Accessories
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Accessories
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Accessories
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Portable 2
[Portable 2 SP Connect universal phone holder](#)



Accessories
[Portable 2 handgrip with battery](#)



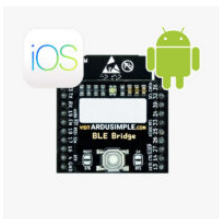
Portable 2
[Portable 2 plastic case](#)



Portable 2
[Portable 2 mainboard](#)



[Made in Europe](#)
Accessories
[Waterproof Transport Case IP67](#)



Plugins
[BT+BLE Bridge](#)



[Made in Europe](#)
RTK2B Boards
[simpleRTK2B Micro](#)