EFIX eBase GNSS

USER GUIDE

Survey & Engineering | Feb 2023

Stronger signal, easy to fix

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Preface

Copyright

Safety Warnings

The Global Positioning System (GPS) is operated by the U.S. Government, which is solely responsible for the accuracy and maintenance of the GPS network. Accuracy can also be affected by poor satellite geometry and obstructions, like buildings and heavy canopy.

1 Introduction

The eBase GNSS Receiver User Guide describes how to set up and use the EFIX eBase GNSS receiver. In this manual, “the receiver” refers to the eBase GNSS receiver unless otherwise stated. Even if you have used other Global Navigation Satellite Systems (GNSS) products before, EFIX recommends that you spend some time reading this manual to learn about the special features of this product.

1.1 Safety Information

1.1.1 Warnings and Cautions

An absence of specific alerts does not mean that there are no safety risks involved.

A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

WARNING - A Warning alerts you to a potential misused or wrong setting of the equipment.

CAUTION - A Caution alerts you to a possible risk of serious injury to your person and/or damage to the equipment.

1.2 Regulations and Safety

The receivers contain a built-in wireless modem for signal communication through Bluetooth® wireless technology or through external communication datalink. Regulations regarding the use of the wireless modem vary greatly from country to country. In some countries, the unit can be used without obtaining an end-user license. However, in some countries, the administrative permissions are required. For license information, consult your local dealer. Bluetooth® operates in license-free bands.

Before operating an eBase GNSS receiver, determine if authorization or a license to operate the unit is required in your country. It is the responsibility of the end-user to obtain an operator's permit or license for the receiver for the location or country of use.

1.2.1 Use and Care

This receiver is designed to withstand the rough environment that typically occurs in the field. However, the receiver is high-precision electronic equipment and should be treated with reasonable care.

CAUTION - Operating or storing the receiver outside the specified temperature range will cause irreversible damage.

1.3 Technical Support

If you have a problem and cannot find the information you need in this manual or EFIX website (www.efix-geo.com), contact your local EFIX dealer from which you purchased the receiver(s).

If you need to contact EFIX technical support, please contact us by email (support@efix-geo.com) or Skype (support@efix-geo.com).

1.4 Disclaimer

Before using the receiver, please make sure that you have read and understood this User Guide, as well as the safety information. EFIX holds no responsibility for the wrong operation by users and for the losses incurred by the wrong understanding about this User Guide. However, EFIX reserves the rights to update and optimize the contents in this guide regularly. Please contact your local EFIX dealer for new information.

1.5 Your Comments

Your feedback about this user guide will help us to improve it in future revision. Please email your comments to support@ efix-geo.com.

2 Getting Started with eBase

2.1 About the Receiver

The ebase GNSS receiver is a professional GNSS base station. The working performance is close to GNSS receiver with external radio, but user no need to carry heavy external battery, external radio, and radio antenna. 5W internal radio ensures that the end user can reach 8km work range. It supports the radio interference checking technology, judge the radio signal real time, make sure user can select the most suitable channel to use.

The LCD panel enables user to check satellite-tracking status, internal battery status, Wi-Fi status, working mode, data logging status and basic receiver information. Bluetooth and Wi-Fi technology provides cable-free communication between the receiver and controller.

The receiver can be used as the part of an RTK GNSS system with eField software.

To configure the receiver for performing a wide variety of functions, you can use the web interface by connecting the receiver with PC or smartphone through Wi-Fi.

2.2 Parts of the Receiver

The operating controls are all located on the front panel. Battery compartment and SIM card slot are on the bottom. Serial port is located on the bottom of the unit. The radio antenna port is located on the top of the unit.

2.2.1 Front Panel

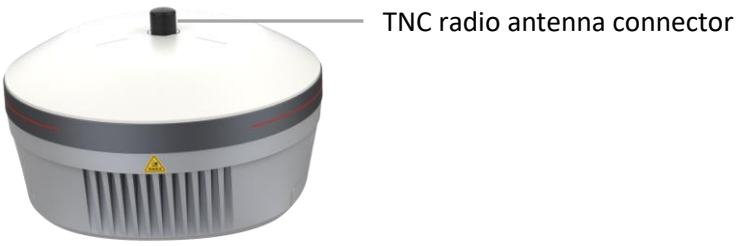
The following figure shows a front view of the receiver.

The front panel contains two indicator LEDs and one button.

Name	Description
Correction LED (Orange)	• Indicates whether the receiver is transmitting differential data. • The green LED flashes once per second when As a Base station: successfully transmitting differential data. As a Rover station: successfully receiving differential data from Base station.
Satellite LED (Blue)	• Shows the number of satellites that the receiver has tracked. • When the receiver is searching satellites, the blue LED flashes once every 5 seconds. • When the receiver has tracked N satellites, the blue LED will flash N times every 5 seconds.
Fn button	• Move to next line of the menus or options. • Move to next character of the value that you want to make change. • Cancel the change you make on a function.
Power button	• Works as a Power button: • Press and hold this button for 3 seconds to turn on or turn off the receiver. • Works as a Confirm button • Hold Fn button and press this button for 5 times continuously to reset the mainboard.

2.2.2 Lower housing and ports

The lower housing contains one SIM card slot, two battery compartments, one communication and power port, one 5/8-11 threaded insert, and one nameplate.



Port	Name	Description
	IO port	• This port is a 7-pin LEMO connector that supports RS-232 communications and external power input. • Users can use a 7-pin cable to transmit differential data to an external radio.
	Radio antenna connector	• Connect a radio antenna to internal radio of the receiver. And this connector is not used if you are using an external radio.

2.3 Batteries and Power

2.3.1 Internal Batteries

The receiver has two rechargeable Lithium-ion batteries, which can be removed for charging.

2.3.2 Charging the Battery

The rechargeable Lithium-ion battery is supplied partially charged. Charge the battery completely before using it for the first time. To charge the battery, first remove the battery from the receiver, and then place it in the battery charger which is connected to AC power.

WARNING – Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment can cause an explosion or fire and can result in personal injury and/or equipment damage.

To prevent injury or damage:

•Do not charge or use the battery if it appears to be damaged or leaking.

•Charge the Lithium-ion battery only in a EFIX product that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.

•Discontinue charging a battery that gives off extreme heat or a burning odor.

•Use the battery only in EFIX equipment that is specified to use it.

•Use the battery only for its intended use and according to the instructions in the product documentation.

2.3.3 Battery Safe

WARNING – Do not damage the rechargeable Lithium-ion battery. A damaged battery can cause an explosion or fire and can result in personal injury and/or property damage.

To prevent injury or damage:

•Do not use or charge the battery if it appears to be damaged. Signs of damage include, but are not limited to discoloration, warping, and leaking battery fluid.

•Do not expose the battery to fire, high temperature, or direct sunlight.

•Do not immerse the battery in water.

•Do not use or store the battery inside a vehicle under hot weather condition.

•Do not drop or puncture the battery.

•Do not open the battery or short-circuit its contacts.

WARNING – Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive and contact with it can result in personal injury and/or property damage.

To prevent injury or damage:

•If the battery leaks, avoid with the battery fluid.

•If battery fluid gets into your eyes, immediately rinses your eyes with clean water and seek medical attention. Please do not rub your eyes!

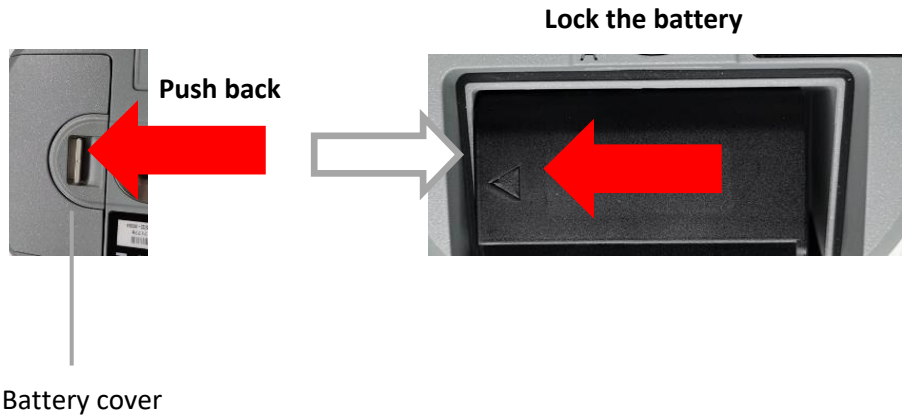
•If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

2.4 Inserting Battery and SIM Card

(1) Inserting battery:

(a) Push down the spring-loaded button on the battery cover to open the cover.

(b) Put the battery into the eBase slot, lock the battery as the picture shows like below.



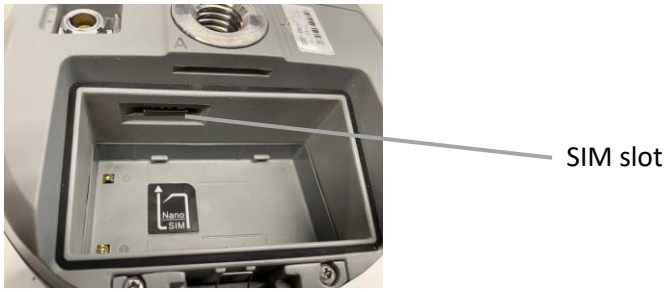
(c) Close the battery cover to prevent water immersion.

(d) To remove the battery, unlock the battery from the slot first.

(2) Inserting SIM card:

(a) Push down the spring-loaded button on the battery cover to open the cover.

(b) Insert the SIM card with the contacts facing downward, as indicated by the SIM card icon on the battery slot.



(c) Close the battery cover to prevent water immersion.

(d) To eject the SIM card, slightly push it in to trigger the spring-loaded release mechanism

Insert the SIM card with the contacts facing upward, as indicated by the SIM card icon next to the SIM card slot.

To eject the SIM card, slightly push it in to trigger the spring-loaded release mechanism.

Tip – The SIM card is provided by your cellular network service provider.

2.5 Product Basic Supply Accessories

Item	Picture
eBase GNSS Receiver	
UHF Bar Antenna (450-470 MHz)	
Lithium Battery	
H.I. Tape	
Extension pole	
C300 Pedestal charger	
C300 Power Adapter with Cord	
Tribrach adaptor	

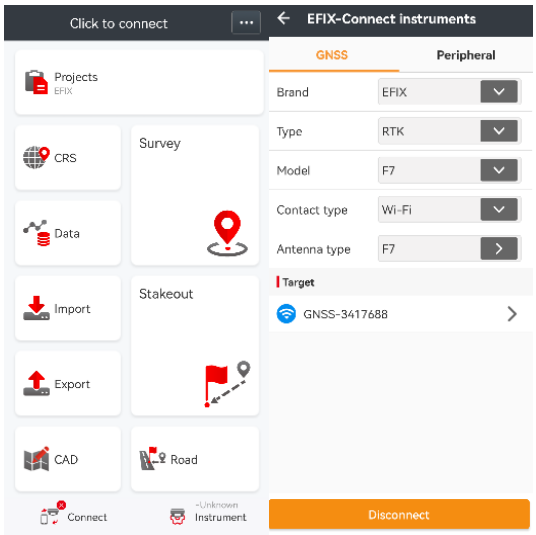
Tribrach with optical plummet	
Auxiliary H.I. Tool	
Transport Hard Case	

2.6 Connecting to a Controller

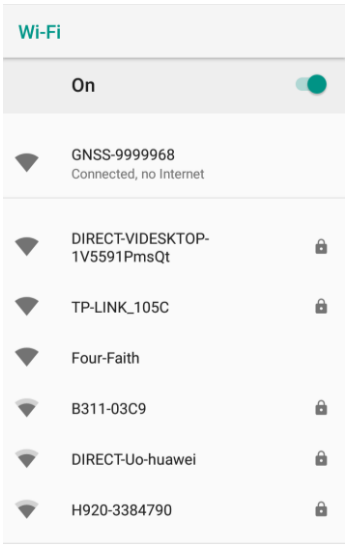
2.6.1 Connecting via Wi-Fi with eField Software

Turn on the controller → run eField → tap **Connect**.

In the *Connect* screen, select EFIX for the *Brand* field, **eBase** for *Model* field, **WIFI** for *Contact type* field.



Tap the WiFi icon to select the hot spot → Switch on the WiFi module by the top switch → select the target device in the list.



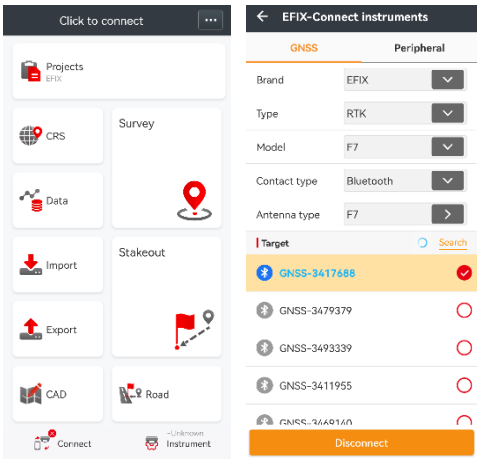
Tap the **Connect** button to build the connection.

2.6.2 Connecting via Bluetooth with eField Software

Turn on the controller → run eField → tap **Connect**.

In the *Connect* screen, select EFIX for the *Brand* field, **eBase** for *Model* field, **Bluetooth** for *Contact type* field.

Tap the **Search** icon and turn on the **Bluetooth** function to search Bluetooth device around → select(pair) the target device in the list → Tap back button → select the target device in the target list.



Tap the **Connect** button to build the connection.

2.7 Downloading Logged Data

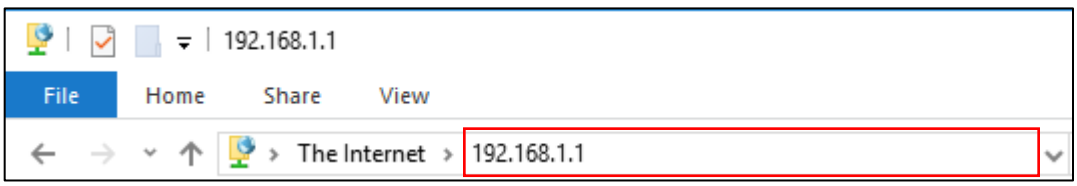
Data logging involves the collection of GNSS measurement data over a period at a static point or points, and subsequent post-processing of the information to accurately compute baseline information. Data logging using receivers requires access to suitable GNSS post-processing software such as the eOffice Software.

2.7.1 FTP Download

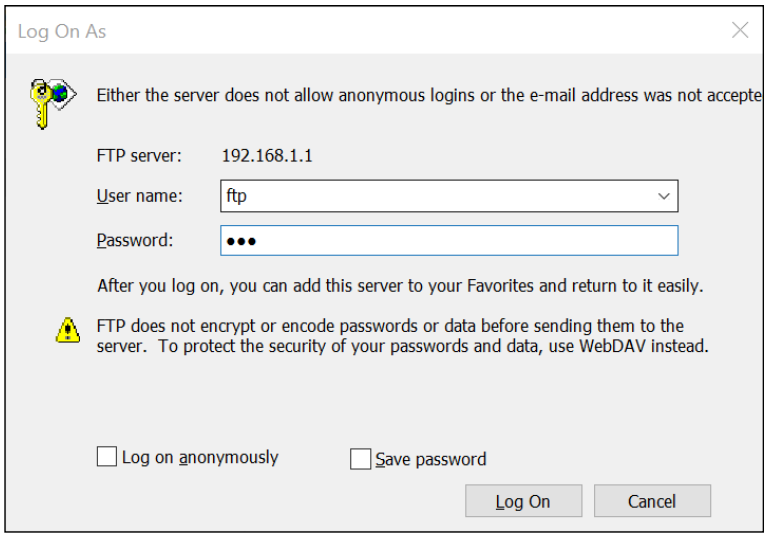
The procedures of downloading logged data through FTP are as follows:

(1) Switch on the receiver, search its Wi-Fi in the computer and connect.

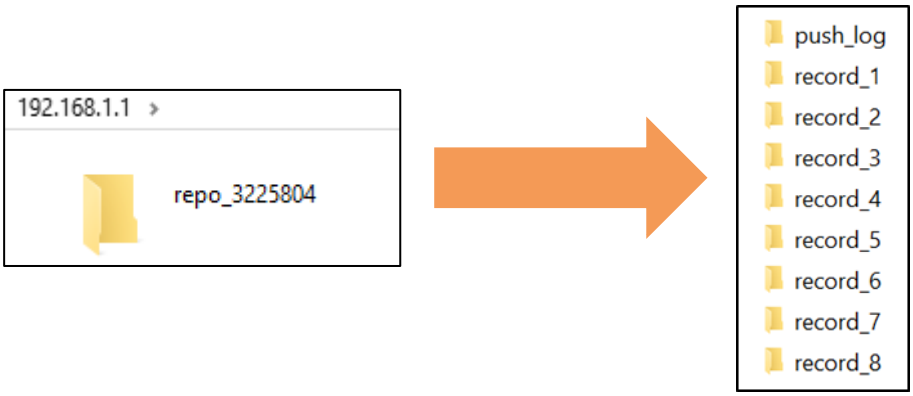
(2) After the successful connection, open the file manager in the computer and input “ftp:\\192.168.1.1” in the address box.



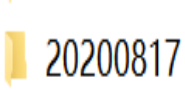
(3) Input user name and password, the default user name and password are “ftp”.



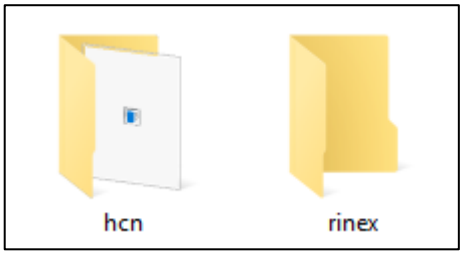
(4) Double click the folder "repo_receiver SN" (take 3225804 as example), you will see 9 folders. The "push_log" folder is used to save the log files, and the other 8 folders represent different logging sessions and are used for store static data.



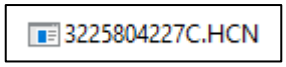
(5) Double click the folder that you have configured to store the static data, you will see the folder(s) created by the eBase system automatically and named by the date which is decide by GPS time when you start to log data.



(6) Select the destination folder and double click it, two folders named as different data format (hcn and rinex) will be displayed.



(7) Select the data format that you configured to save the static data, you will find the static raw data.



Notes: For hcn files, the name of the file is represented as XXXXXXDDDNN, where XXXXXX is the SN of the receiver, DDD is day of year, and NN is the recording session.

WARNING – The static data will be saved in the first logging session, the "record_1" folder, by default. Old files will be deleted if the storage space is full. If you configure not to auto delete old files when the memory is low, the receiver will stop data logging.

2.7.2 Web Server Download

The procedures of downloading logged data through web server refer to 5.4.4 Data Download Submenu.

3 Front Panel Operation

The front panel contains one LCD screen, two indicator LEDs, and two buttons. The operating controls are all located on the front panel.

3.1 Main Operation Menus

The top-level menu of the front panel includes 6 parts: Status, mode, static and info. Status shows satellites, receiver solution and the power percentage. Mode is the important part which illustrate the work mode and users can select the mode according to their needs. Static is used to set static mode. Info is the basic information of firmware such as SN, PN, etc.

The details of main operation are as follows and they are concluded two tables. The first table includes 5 parts: Info, SV, Power, Data and Set and the second table displays details of Data.

Top-level Menu	Second-level Menu	Description
Status	Satellites	Indicate the total number of satellites that have been tracked and the number of satellites tracked of each constellation, where G represents GPS, R represents GLONASSS, C represents BeiDou, S represents SBAS, and E represents Galileo.
	Power	Indicates the remaining power of the battery inserted in the left (B) and right (A) battery compartment.
	WIFI ON/OFF	Press Enter to turn on or turn off WIFI

	Network status		displays the if a SIM card inserts the RTK
	Back		Press Enter to back to last page
Mode	Ultra Base Base External UHF Base Internal UHF Base APIS Base External UHF & APIS Rover APIS Rover UHF Rover NTRIP Back		• Press Enter button to enter the configuration screen of the selected working mode. • More operation information, see 3.2 Configure the Working Mode.
Static	Set on/off		Press Enter button to switch static measurement on or off.
	Recording		Display the time of recording
	Advanced	Sample	Press Enter to change sample interval (1s, 2s, 5s, 10s, 15s, 30s, 1m)
		Elev Mask degree	Press Enter button to change the mask degree from 0 degree to 90 degrees.
		Duration	• Press **Enter** button to enter Duration Time Setting screen. • In the Duration Time Setting screen, press **Fn** button to move to the character of the duration time value user want to make change, and then press **Enter** button to change from 0 to 9. After the change has been done, user can press **Fn** button to move to OK field, and then Press **Enter** button to save the change and back to the second-level menu; or press **Fn** button to move to Cancel field and press **Enter** button to cancel the change and back to the second-level menu.

		Measurement phase Center	Press **Enter** button and switch height between oblique, vertical, phase center.
		Antenna Height	Press **Enter** button and input the measured antenna height.
		Back	Press **Enter** button to back to the last menu.
	OK		Press Enter to complete settings.
	Back		Press **Enter** button to back to the top-level menu.
Info	SN PN Register Sleep Time Version IMEI Language Back		Describe the main information of this machine. SN displays the Serial Number of the receiver. PN displays the Part Number of the receiver. Register displays the expiry date of registration code. Press Enter to select sleep time including 5s, 10s, 30s, 1min, 30min. Version displays the firmware version. IMEI is International Mobile Equipment Identity which is used to identify the RTK. Press Enter to change languages. Press back to go back to the previous menu.

3.2 Configure the Working Mode

7 working modes are provided for quickly setting up an RTK base station or rover station. Users can configure each working mode through the front panel as follows:

Top-level Menu	Second-level Menu	Description
Ultra Base	/	Reserved for the Ultra Base mode.
Base External UHF	Mode Base External UHF	The title of this configuration screen.
	Format	Press **Enter** to select correction format (RTD, CMR, RTCMv2.3, RTCMv3 and RTCMv3.2).

	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Base Internal UHF	Mode Base External UHF	The title of this configuration screen.
	Protocol	Press **Enter** to select current protocol (EFIX, Transparent, TT450s)
	Channel	Press **Enter** to change the channel
	Baud	Press **Enter** to select Baud (4800, 9600 and 19200)
	Power	Press **Enter** button to change the transmitting power (0.5w,1w,2w,5w).
	Format	Press **Enter** to select correction format (RTD, CMR, RTCMv2.3, RTCMv3 and RTCMv3.2).
	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Base APIS	Mode Base APIS	The title of this configuration screen.
	Format	Press **Enter** to select correction format (RTD, CMR, RTCMv2.3, RTCMv3 and RTCMv3.2).

	IP	Press **Enter** to enter third-level menu to select IP or press Customized IP to customize your own IP
	Port	Press **Enter** button to change the port from 9901 to 9920.
	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Base External UHF & APIS	Mode Base External UHF & APIS	The title of this configuration screen.
	Way External UHF+APIS	Display the way of base station combination.
	Format	Press **Enter** to select correction format (RTD, CMR, RTCMv2.3, RTCMv3 and RTCMv3.2).
	IP	Press **Enter** to enter third-level menu to select IP or press Customized IP to customize your own IP
	Port	Press **Enter** button to change the port from 9901 to 9920.
	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Rover APIS	Mode Rover APIS	The title of this configuration screen.
	Base ID	Press **Enter** to enter third-level menu to change Base ID

	IP	Press **Enter** to enter third-level menu to select IP or press **Customized IP** to customize your own IP
	Port	Press **Enter** button to change the port from 9901 to 9920.
	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Rover UHF	Mode Rover UHF	The title of this configuration screen.
	Protocol	Press **Enter** to select current protocol (EFIX, Transparent, TT450s)
	Channel	Press **Enter** to change the channel
	Baud	Press **Enter** to select Baud (4800, 9600 and 19200)
	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Rover NTRIP	Mode Rover NTRIP	The title of this configuration screen.
	Status	Indicates the login status.
	OK	Press **Enter** button to save the settings and back to the top-level menu, and then this working mode can take effect.

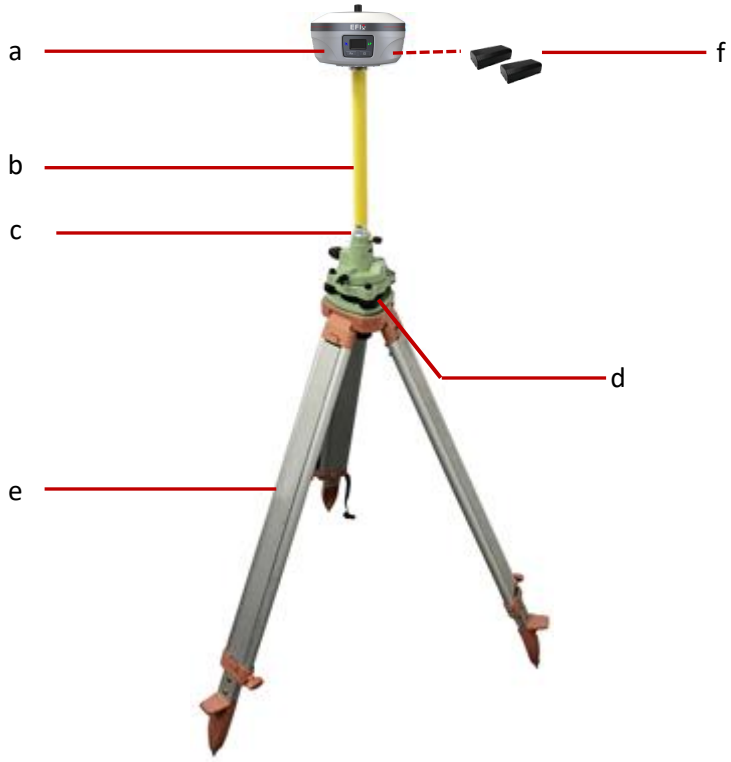
	Cancel	Press **Enter** button to cancel the settings and back to the second-level menu.
Back		Press **Enter** button to back to the top-level menu.

4 Equipment Setup and Operation

4.1 Post-processing Base Station Setup

For good performance, the following base station setup guidelines are recommended:

Components:



No.	Name
a	eBase GNSS receiver
b	Extension pole (30 cm)
c	Tribrach adaptor
d	Tribrach w/ Opti
e	Aluminum tripod
f	Lithium battery

Steps:

(1) Put tripod in the target position, center and level it roughly.
(2) Place and lock the tribrach in the tripod.
(3) Insert the batteries into the receiver.
(4) Screw the receiver onto the tribrach.
(5) Center and level the receiver more precisely.
(6) Connect the receiver to external battery by using external power cable if necessary.
(7) Connect the receiver to external storage disk by using USB cable if necessary.
(8) Turn on the receiver by pressing the power button for 3s.
(9) Measure the antenna height by using H.I. tape and auxiliary H.I. tool.
(10) Press the function button to select Data to start recording static raw.

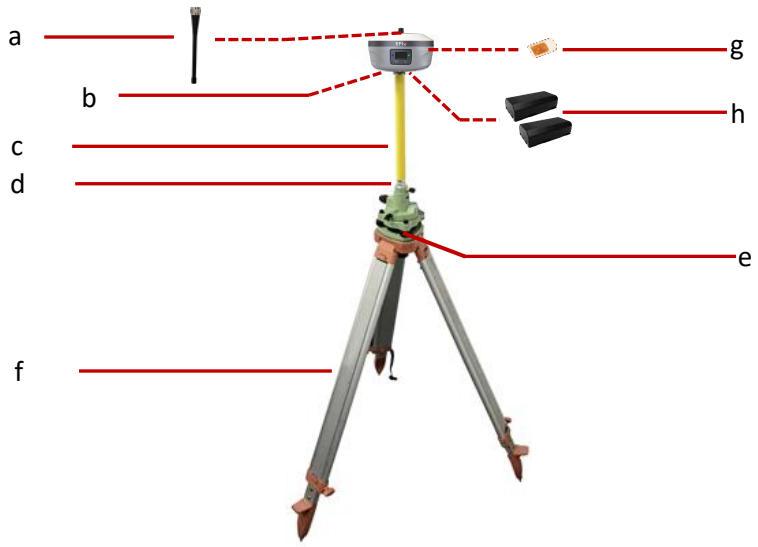
If work with a data controller:

(11) Switch on the data controller and connect it to the receiver.
(12) Use software to configure the receiver as static mode.

4.2 Real-Time Base Station Setup

For good rover operation, the following base station setup guidelines are recommended:

Components:



No.	Name
a	UHF whip antenna
b	eBase GNSS receiver
c	Extension pole (30 cm)
d	Tribrach adaptor
e	Tribrach w/ Opti
f	Aluminum tripod
g	Nino SIM card (12 mm x 9 mm)
h	Lithium battery

Steps:

(1) Put tripod in the target position, center and level it roughly.
(2) Place and lock the tribrach in the tripod.
(3) Insert the batteries into the receiver.

If work as a cellular base station, the SIM card need to be inserted before the batteries.

(4) Screw the receiver onto the tribrach.
(5) Center and level the receiver more precisely.

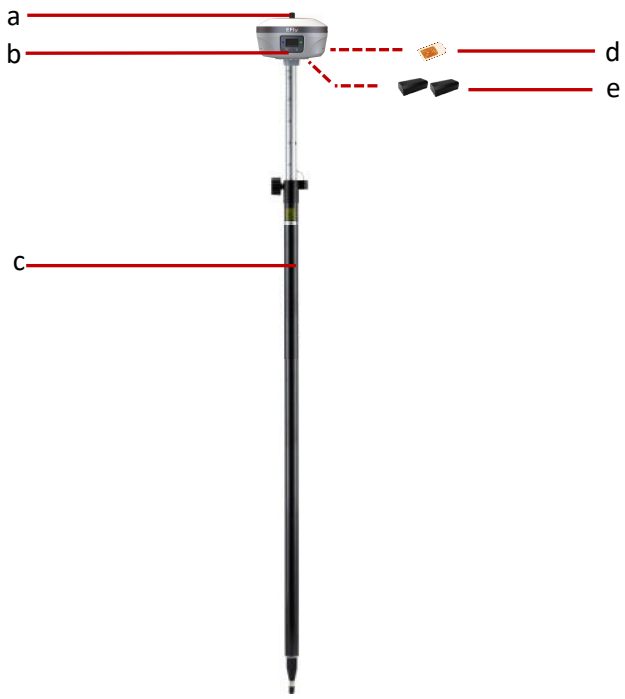
If work as a UHF base station, the UHF whip antenna need to be connected to the receiver.

(6) Connect the receiver to external battery by using external power cable if necessary.
(7) Connect the receiver to external storage disk by using USB cable if necessary.
(8) Turn on the receiver by pressing the power button for 3 s.
(9) Measure the antenna height by using H.I. tape and auxiliary H.I. tool.
(10) Switch on the data controller and connect it to the receiver.
(11) Use software to configure the receiver as cellular base or UHF base mode.

4.3 Real-Time Rover Station Setup

For good performance, the following rover station setup guidelines are recommended:

Components:



No.	Name
a	whip antenna
b	eBase GNSS receiver
c	2M range pole w/bag
d	Micro SIM card (12 mm x 15 mm)
e	Lithium battery

Steps:

(1) Insert the batteries into the receiver.

If work as a cellular rover station, the SIM card need to be inserted before the batteries.

(2) Screw the receiver onto the pole.

If work as a UHF rover station, the UHF whip antenna need to be connected to the receiver.

(3) Turn on the receiver by pressing the power button for 3 s.
(4) Switch on the data controller and connect it to the receiver.
(5) Use software to configure the receiver as cellular rover or UHF rover mode.
(6) Center and level the receiver more precisely.
(7) Use software to start survey.

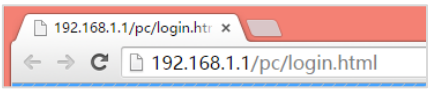
5 Configuring Through a Web Browser

Supported browsers:

- Google Chrome
- Microsoft Internet Explorer® version 10, or higher

To connect to the receiver through a web browser:

1. Turn on the Wi-Fi of the receiver.
2. Search the wireless network named as GNSS-XXXXXXX (the SN of your receiver) on your computer, and then establish the connection.
3. After the successful connection between your computer and the receiver, enter the IP address (192.168.1.1) of the receiver into the address bar of the web browser on your computer:



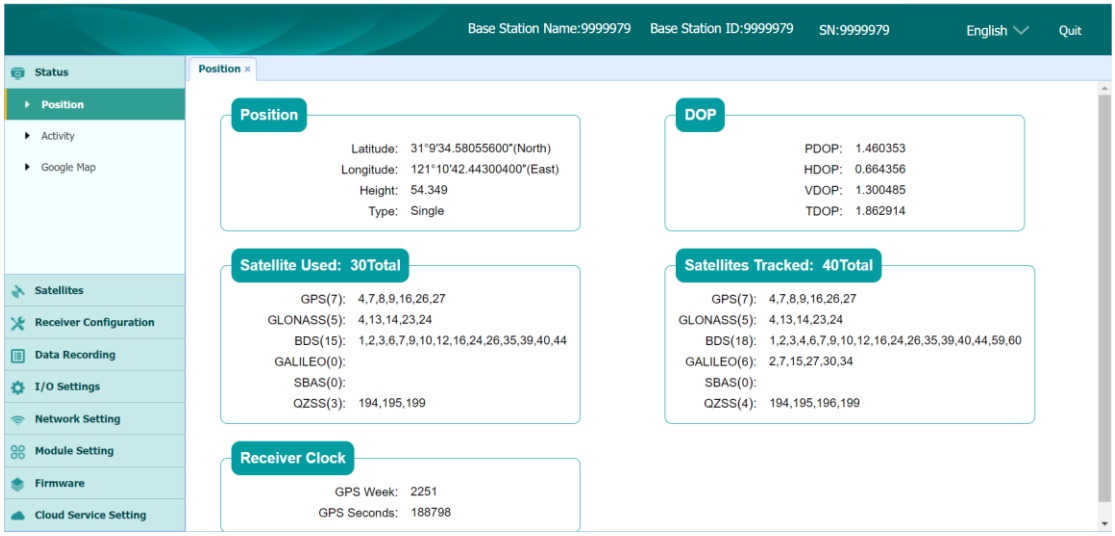
4. The web browser prompts you to enter a login account and password:

The default login account for the receiver is:

- Login Account: admin
- Password: password

Note – Tick **remember me** option, and then the browser will remember the Login Account and Password you entered.

5. Once you log in, the web page appears as follows:



This web page shows the configuration menus on the left of the browser window, and the setting on the right. Each configuration menu contains the related Submenus to configure the receiver and monitor receiver performance.

This chapter describes each configuration menu.

To view the web page in another language, select the corresponding language name from the dropdown list on the upper right corner of the web page.

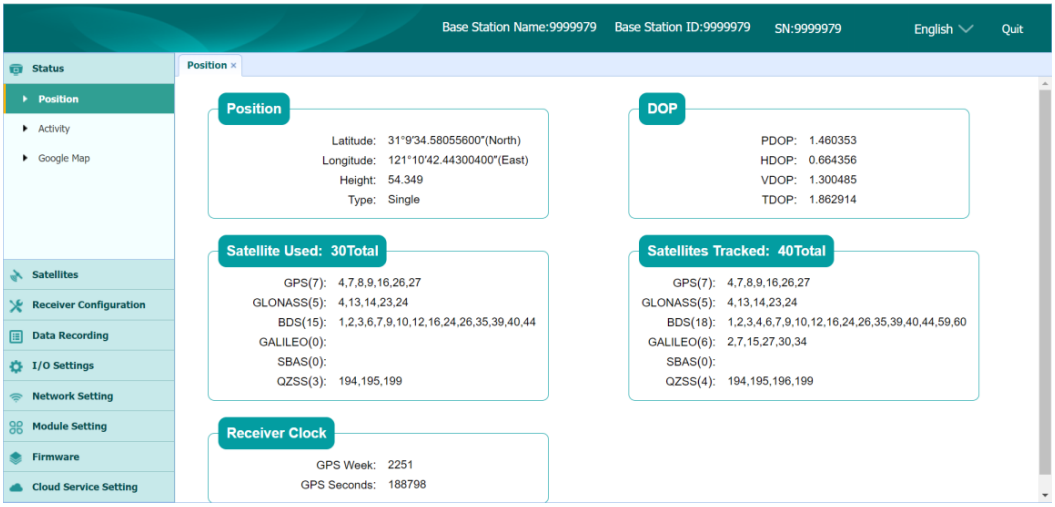
Currently, six languages are available:

5.1 Status Menu

This menu provides a quick link to review the receiver's position information, satellites tracked, runtime, current data log status, current outputs, available memory, and more.

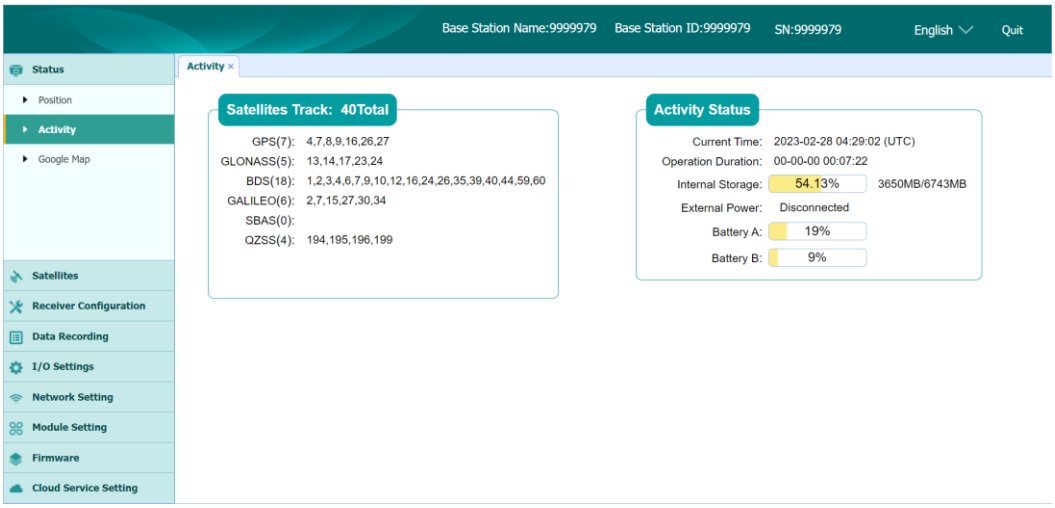
5.1.1 Position Submenu

This page shows the relevant position information about the receiver's position solution which including the position, DOP values, satellites used and tracked, and the receiver clock information.



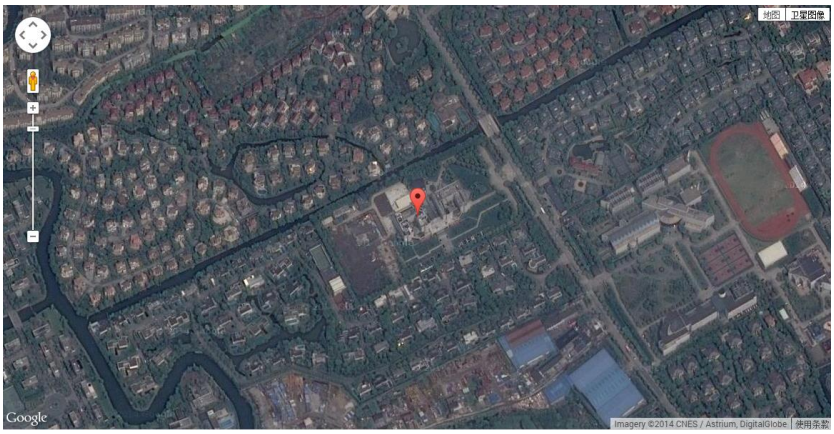
5.1.2 Activity Submenu

Lists several important items to help you understand how the receiver is being used and its current operating condition. Items include the identities of currently tracked satellites, internal and external storage usage rate, how long the receiver has been operational, state of the internal battery, power source state. With this information, it is easy to tell exactly what functions the receiver is performing:



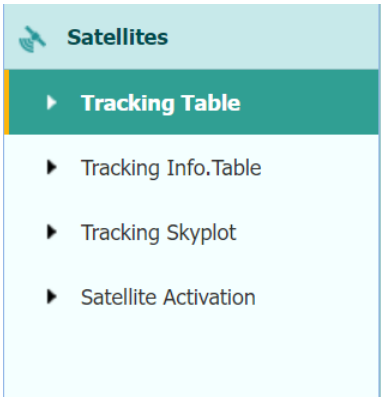
5.1.3 Google Map Submenu

Tap this submenu to show the location of the receiver on Google map.



5.2 Satellites Menu

Use the Satellites menu to view satellite tracking details and enable/disable GPS, GLONASS, BDS and Galileo constellations. These menus include tabular and graphical displays to provide all required information on satellite tracking status.



5.2.1 Tracking Table Submenu

Provides the status of satellites tracked in general, such as the satellite ID, satellite type, attitude angle, azimuth angle, L1 SNR, L2 SNR, L5 SNR and enable/disable status of each one.

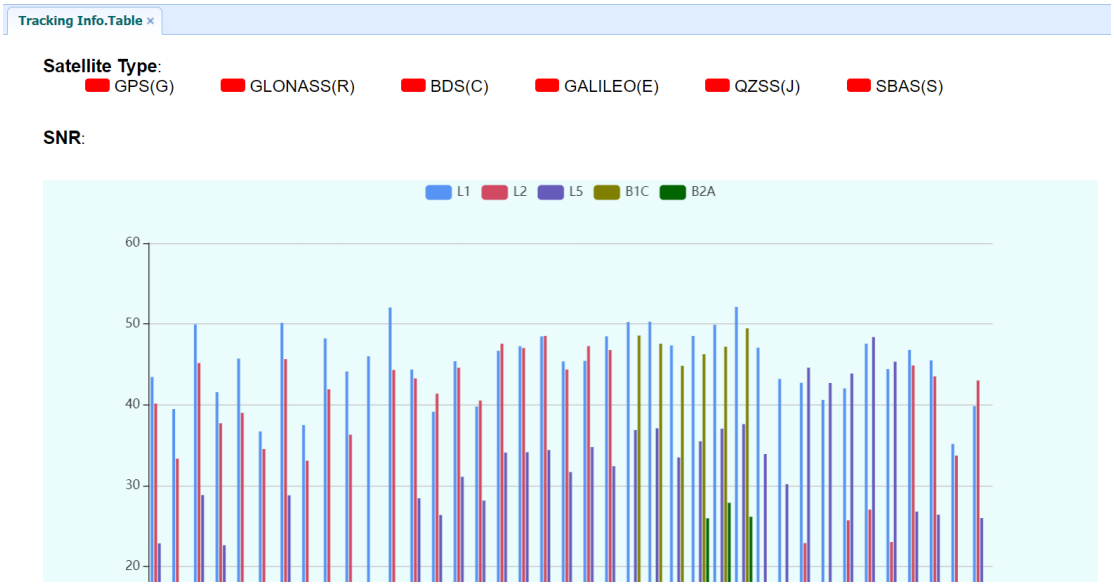
Tracking Table ×

All ◉ GPS ○ GLONASS ○ BDS ○ GALILEO ○ SBAS ○ QZSS ○

SV	Type	Elevation Ang	Azimuth Angl	L1 SNR	L2 SNR	L5 SNR	B1C SNR	B2A SNR	Enabled
4	GPS	39	233	42.950	39.740	22.770	0.000	0.000	Yes
7	GPS	25	317	39.080	32.840	0.000	0.000	0.000	Yes
8	GPS	69	240	49.430	44.810	28.400	0.000	0.000	Yes
9	GPS	33	277	41.420	37.490	23.080	0.000	0.000	Yes
16	GPS	48	39	44.490	39.240	0.000	0.000	0.000	Yes
26	GPS	23	75	36.250	34.180	0.000	0.000	0.000	No
27	GPS	71	30	50.490	45.220	28.640	0.000	0.000	Yes
13	GLONASS	37	76	36.470	33.750	0.000	0.000	0.000	Yes
14	GLONASS	46	350	47.230	42.490	0.000	0.000	0.000	Yes
17	GLONASS	23	185	43.620	37.990	0.000	0.000	0.000	Yes
23	GLONASS	39	40	45.310	0.000	0.000	0.000	0.000	Yes
24	GLONASS	64	128	51.420	45.020	0.000	0.000	0.000	Yes

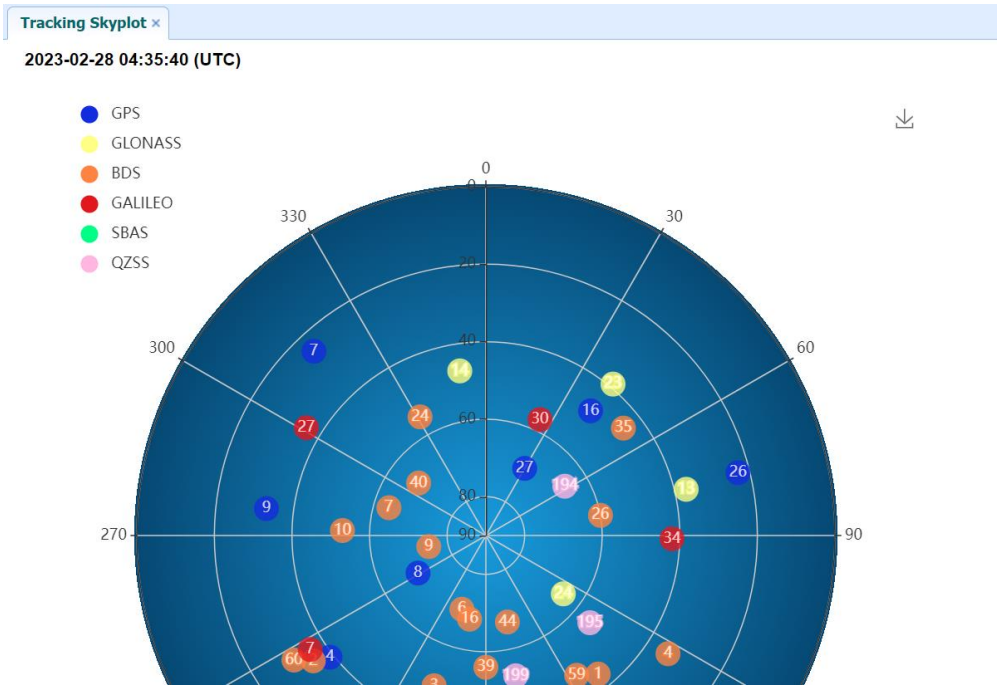
5.2.2 Tracking Info. Table Submenu

The following figure is an example of satellite track diagram page. Users can determine the satellite types and the corresponding SNR of L-band carriers to be displayed in any combination.



5.2.3 Tracking Skyplot Submenu

The following figure is an example of Skyplot page.

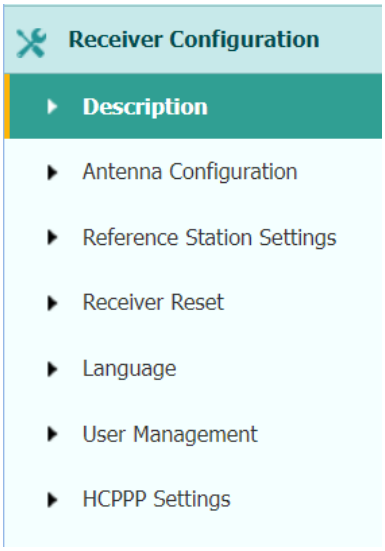


5.2.4 Satellite Activation Submenu

Use this menu to enable or disable satellites.

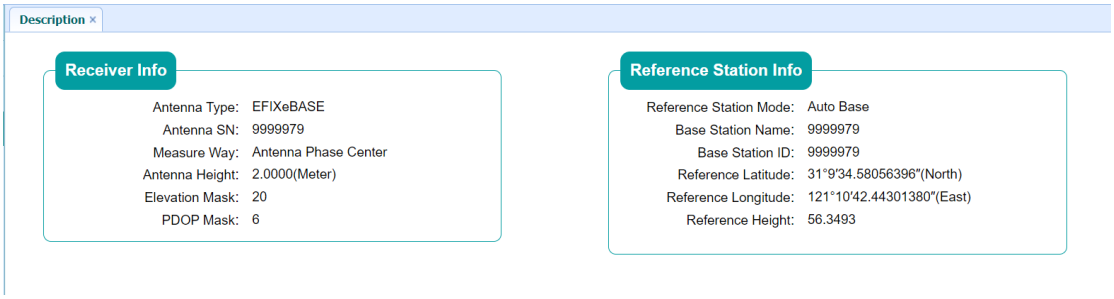
5.3 Receiver Configuration Menu

Use this menu to configure settings such as the antenna type and height, elevation mask and PDOP setting, the reference station coordinates, receiver resetting and web interface language:



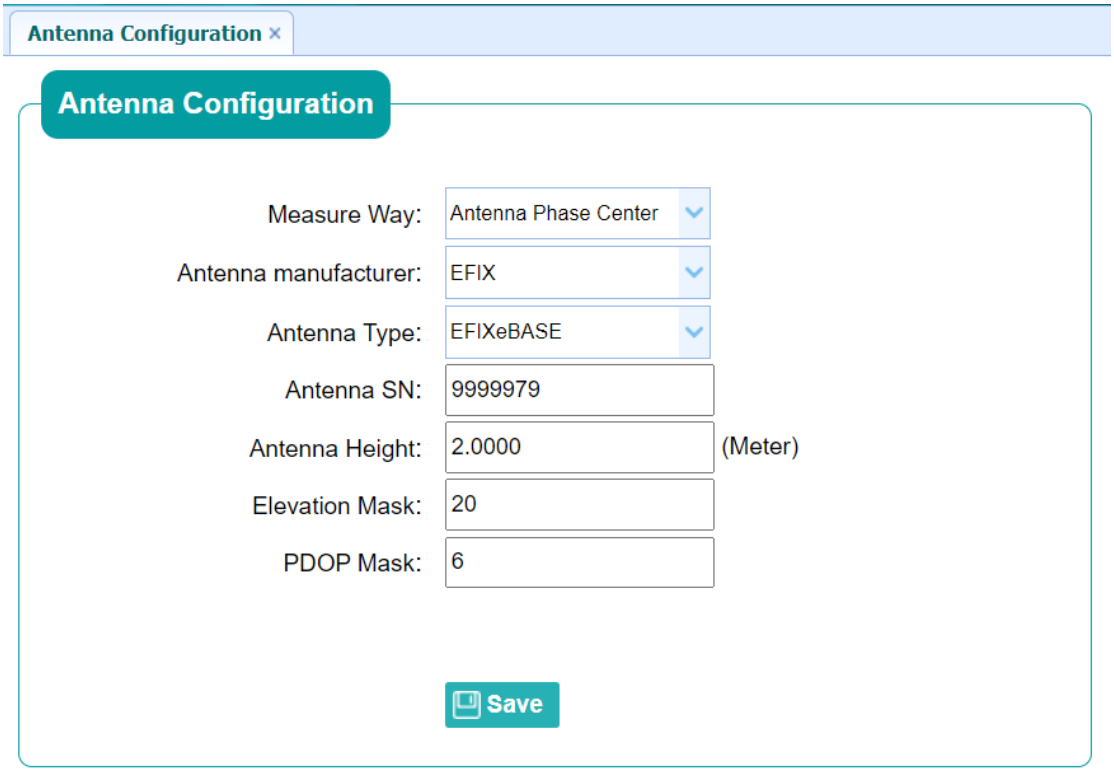
5.3.1 Description

This submenu shows the receiver information and reference station information, including antenna related information, elevation mask angle, reference station work mode and position, etc.



5.3.2 Antenna Configuration Submenu

Use this screen to configure all the items related to the GNSS antenna. You must enter the correct values for all antenna-related fields, because the choices you make affect the accuracy for logged data and broadcast correction data significantly:



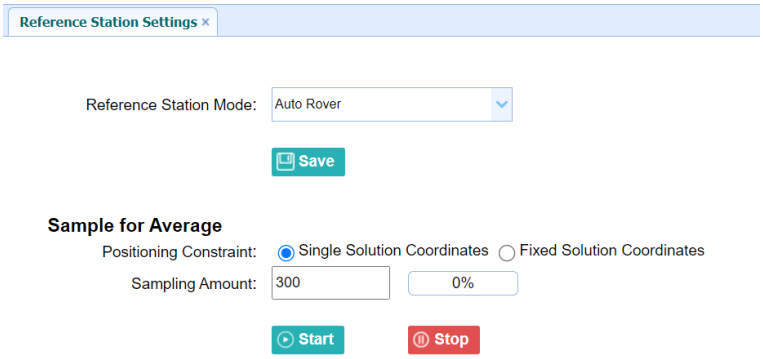
5.3.3 Reference Station Settings Submenu

Use this screen to configure settings such as the station coordinates and the broadcast station identifiers. You must enter accurate information in these fields, as this data affects the accuracy of logged data files and broadcast correction data significantly:

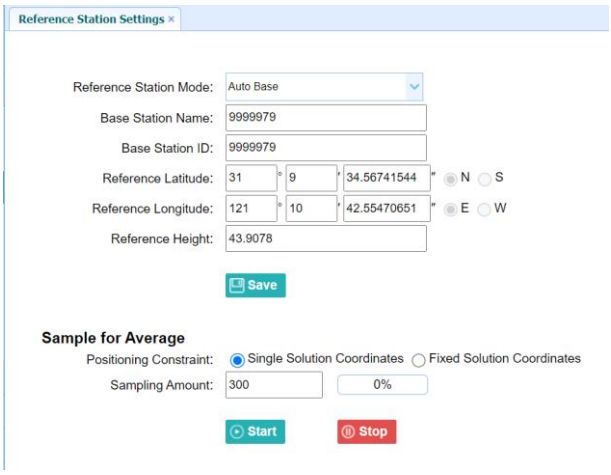
For **Reference Station Mode**:

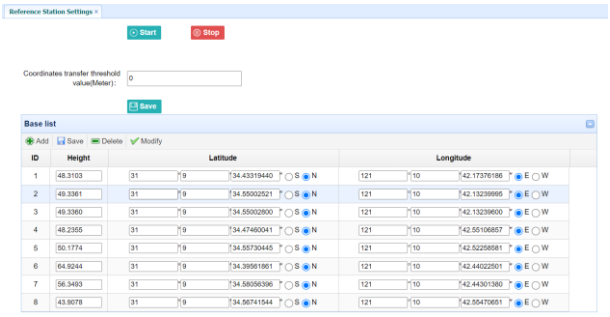
There are three modes available:

a) **Auto Rover:** The receiver will serve as a rover after this mode is enabled, and then receive correction data through the working mode set last time.

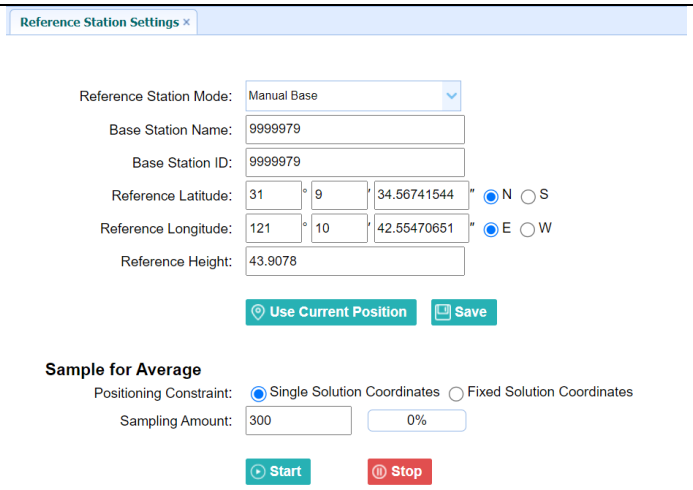


b) **Auto Base:** The receiver will serve as a base after this mode is enabled, and then broadcast correction data based on coordinate inputted by user or obtained through autonomous positioning automatically.





c) **Manual Base:** The receiver will serve neither as a base nor a rover after this mode is enabled. Users need to configure the receiver manually.



For **Reference Latitude** and **Reference Longitude**:

There are mainly three methods to enter the reference coordinates and shown as follows:

a) **Acquire Current Position**: Click this button to acquire current position obtained through autonomous positioning automatically.
b) **Manual Input**: Manually input the coordinate of a control point.
c) **From CORS**: After the receiver logging in CORS, the software can record the coordinate of current position based on fix solution.

For **Sample for Average**:

Users can determine the positioning limit and sampling amount. The positioning limit falls into two types:

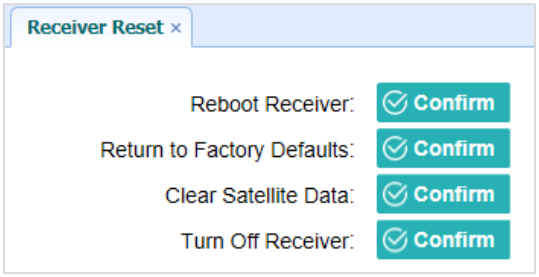
a) **Single Solution Coordinates**: Collect the coordinates of receiver obtained through autonomous positioning.
b) **Fixed Solution Coordinates**: Only collect coordinates of receiver with a fixed solution.

After the configuration of positioning limit and sampling amount, click Start to carry out sampling and averaging → the progress bar will show the progress → the result will be served as the coordinate of current position.

If users need to save the changes, please tap Save button.

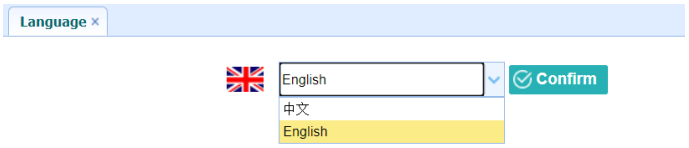
5.3.4 Receiver Reset Submenu

Use this screen to completely or partially reset the receiver:

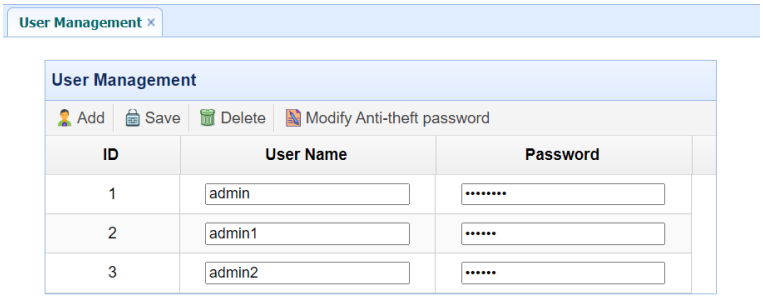


5.3.5 Languages Submenu

Use this screen to select the web interface language:

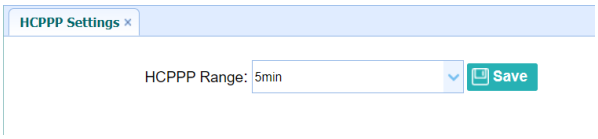


5.3.6 User Management Submenu



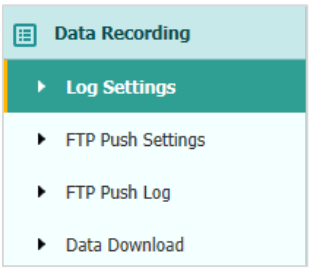
5.3.7 HCPPP Settings

Reserved menu.



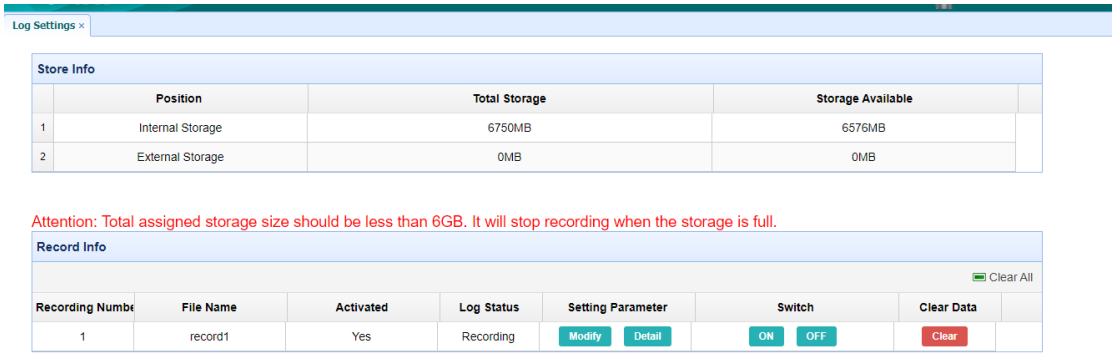
5.4 Data Recording Menu

Use the Data Logging menu to set up the receiver to log static GNSS data and to view the logging settings. You can configure settings such as observable rate, recording rate, continuous logging limit, and whether to auto delete old files when memory is low. This menu also provides the controls for the FTP push feature:

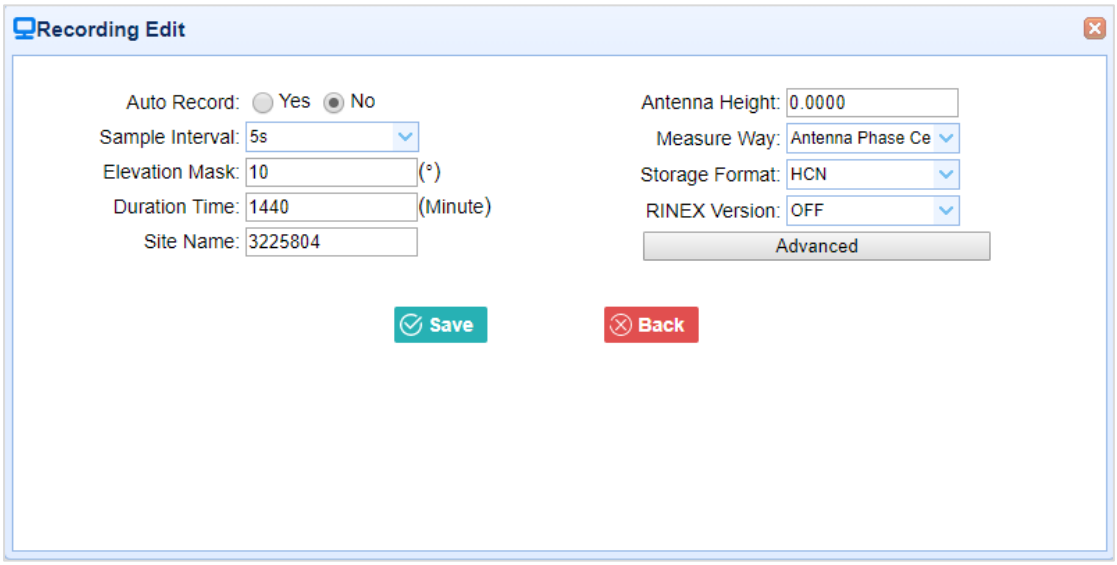


5.4.1 Log Settings Submenu

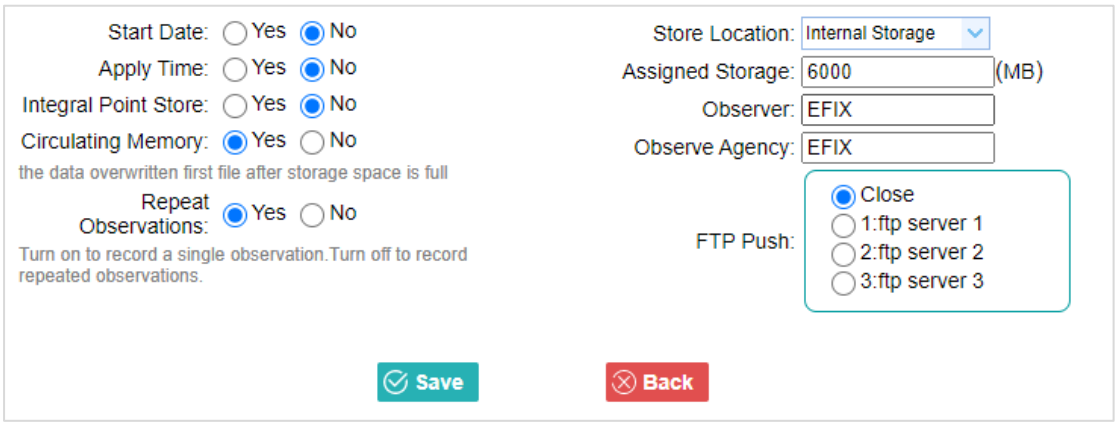
Here shows the data logging status, including internal and external storage usage and data logging status of each session. Also, users can configure the data logging settings for each session, including recording name, store location, storage limit, store formats, start time, etc.



To edit the settings of each session, click the **Modify** button to the right of the required session, and then the *Recording Edit* screen appears:



Click advanced to see more settings.



In this screen, you can configure all the data logging parameters, and determine whether the recording files will be affected by the FTP Push. The parameters are mainly as follows:

- **Auto Record**: on or off.
- **Sample Interval**: Select the observable rate from the dropdown list.
- **Elevation Mask**: Enter the elevation mask.
- **Duration Time**: Set the duration of data logging.
- **Site Name**: Enter the name of the site.
- **Antenna Height**: the measured height value.
- **Measure way**: Antenna Phase Center, Vertical Height, Slant Height
- **Storage Format**: Select the format of the data store.
- **RINEX Version**: OFF, 3.02, 2.11
- **Start Date:** Select **Yes** or **No** option to determine whether to auto record start date.

- **Apply Time:** Select **Yes** or **No** option to determine whether to auto record apply time.
- **Integral Point Store:** Select **Yes** or **No** option to determine whether to allow receiver to save data every hour.
- **Circulating Memory**: Select **Yes** or **No** option to determine whether to auto delete old files if the storage space is full.
- **Repeat Observations:** Select **Yes** or **No** option to determine whether to turn on to record a single observation.
- **Store Location:** Internal Storage, External Storage.
- **Assigned Storage:** The assigned memory size of current thread(for example, Record 1) is 10000MB
- **Observer:** Enter the name of observer.
- **Observer Agency:** Enter the name of observer agency.
- **FTP Push**: Decide whether to push the stored files to the FTP server of your choice.

Tap Save button to save the settings and back to the *Log Settings* screen. Also, users can click Back to abandon the changed settings and back to *Log Settings* screen.

Note – To modify data logging parameters, make sure the data logging session is switched off.

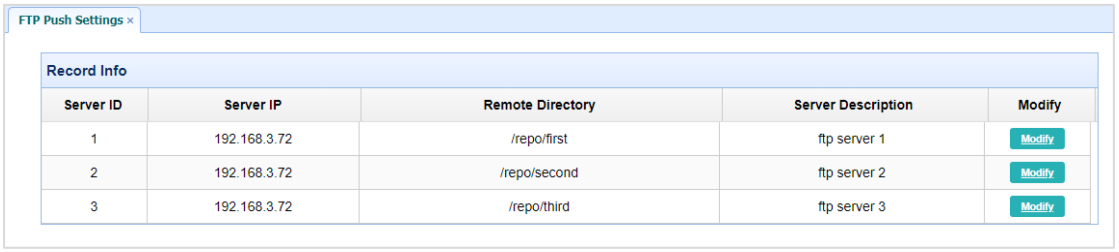
To switch on or off **ANY** data logging session, tap the **ON** or **OFF** button on the right of the required session.

To delete the recorded files of **ANY** data logging session, tap the **Clear** button on the right of the required session.

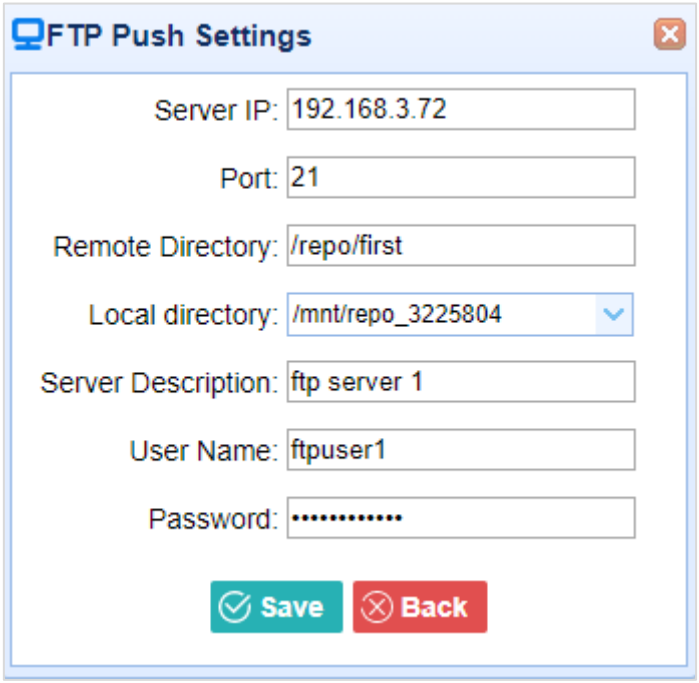
To delete the recorded files of **ALL** data logging sessions, tap the **Clear ALL Accounts** button.

5.4.2 FTP Push Settings Submenu

Use this screen to configure the receiver to push stored files to the FTP server of your choice. Only files that are configured to use FTP push are transmitted.

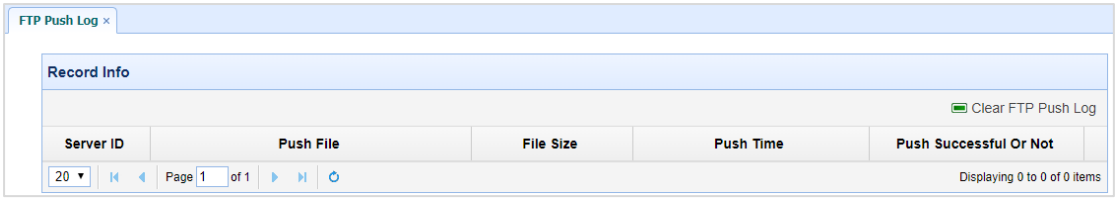


Tap **Modify** button on the right of the required FTP server and the *FTP Push Settings* screen appears:



5.4.3 FTP Push Log Submenu

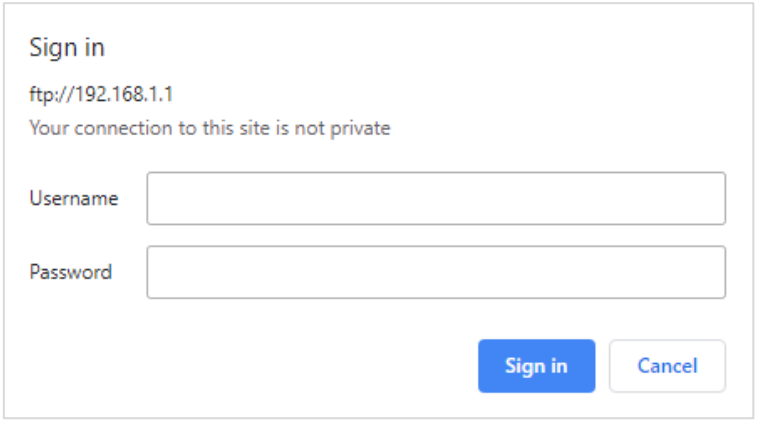
Shows the related information about the recorded filed that be pushed. And users can tap **Clear Ftp Send Log** button in the upper right corner to clear the log of FTP Push operations.



5.4.4 Data Download Submenu

In this submenu, users can download the data files that recorded in the internal storage through the internal FTP site.

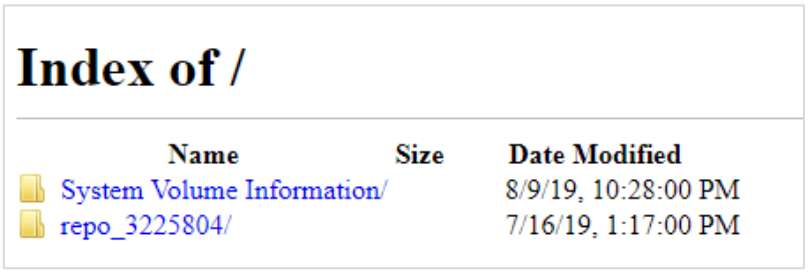
1. Click this submenu, and then the log on dialogue box will prompt you to enter a user name and password:



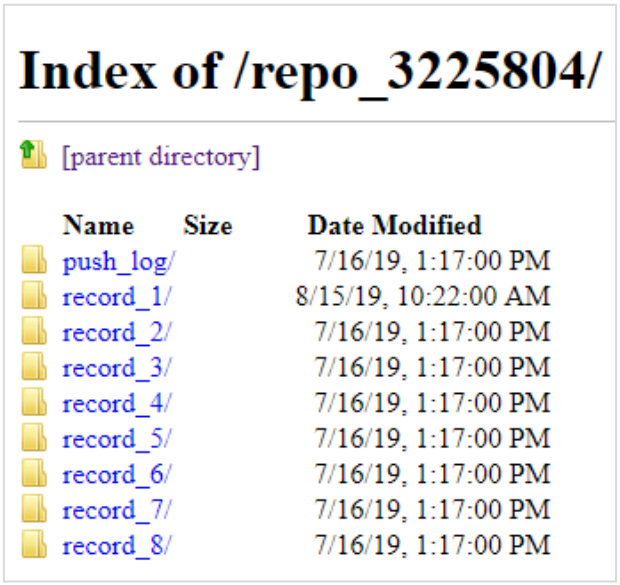
The default logon account for the internal FTP site is:

- User name: ftp
- Password: ftp

2. Click the directory named as “repo” to view and download the files currently stored on the receiver:



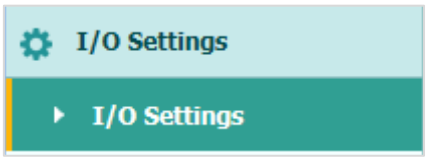
3. To find the file need to be downloaded, click the name of data logging session → the date of file that be recorded → the format of the file → the name of the target file.



4. To download a file, left-click the name of the target file → download the file according

to the prompts.

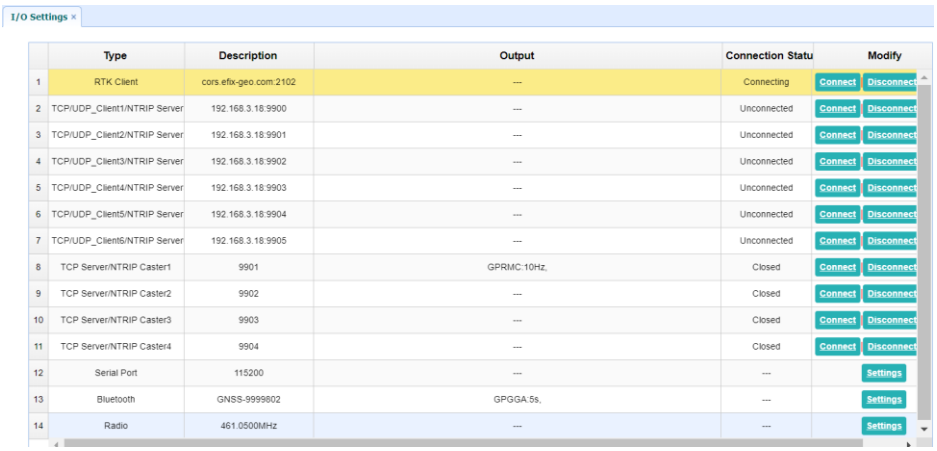
5.5 IO Settings Menu



Use the IO Settings menu to set up all receiver outputs and inputs. The receiver can output CMR, RTCM, Raw data, Ephemeris data, GPGGA, GPGSV, on TCP/IP, UDP, serial port, or Bluetooth ports.

5.5.1 IO Settings Submenu

The following figure shows an example of the screen that appears when you select this submenu. (Serial port setting is reserved menu)



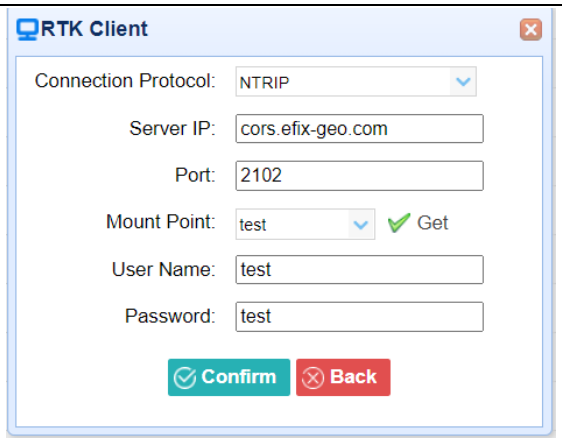
	Type	Description	Output	Connection Statu	Modify
1	RTK Client	cors.efix-geo.com:2102	---	Connecting	Connect Disconnect
2	TCP/UDP_Client1/NTRIP Server	192.168.3.18:9900	---	Unconnected	Connect Disconnect
3	TCP/UDP_Client2/NTRIP Server	192.168.3.18:9901	---	Unconnected	Connect Disconnect
4	TCP/UDP_Client3/NTRIP Server	192.168.3.18:9902	---	Unconnected	Connect Disconnect
5	TCP/UDP_Client4/NTRIP Server	192.168.3.18:9903	---	Unconnected	Connect Disconnect
6	TCP/UDP_Client5/NTRIP Server	192.168.3.18:9904	---	Unconnected	Connect Disconnect
7	TCP/UDP_Client6/NTRIP Server	192.168.3.18:9905	---	Unconnected	Connect Disconnect
8	TCP Server/NTRIP Caster1	9901	GPRMC:10Hz,	Closed	Connect Disconnect
9	TCP Server/NTRIP Caster2	9902	---	Closed	Connect Disconnect
10	TCP Server/NTRIP Caster3	9903	---	Closed	Connect Disconnect
11	TCP Server/NTRIP Caster4	9904	---	Closed	Connect Disconnect
12	Serial Port	115200	---	---	Settings
13	Bluetooth	GNSS-9999802	GPGGA:5s,	---	Settings
14	Radio	461.0500MHz	---	---	Settings

In this submenu, users can configure 6 types of input and output settings.

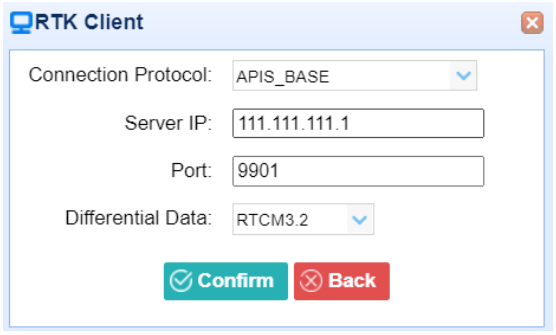
1. RTK Client

After configuring the settings of RTK client, users can log on CORS or APIS. Tap the **Connect** button to the right → the *IO Settings* screen will appear → choose one of the connection protocols among the NTRIP, APIS_BASE, APIS_ROVER and TCP → configure the related parameters → click Confirm to log on CORS or APIS.

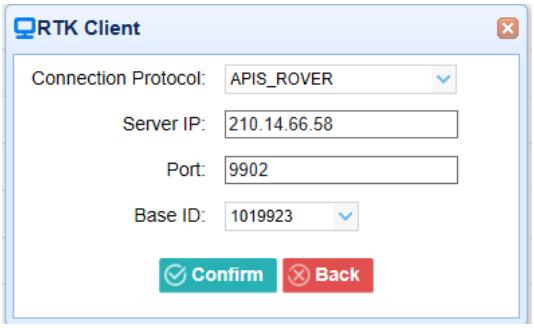
- Connection Protocol: NTRIP



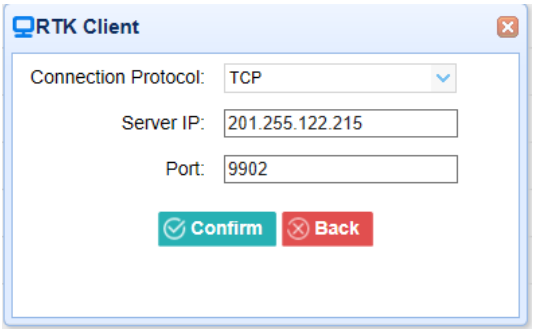
- Connection Protocol: APIS_BASE



- Connection Protocol: APIS_ROVER



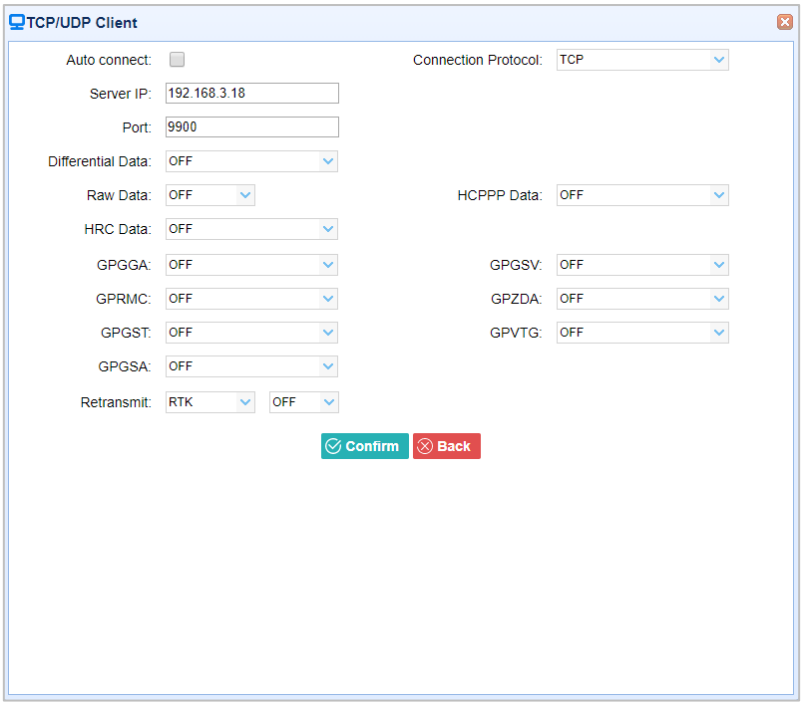
- Connection Protocol: TCP



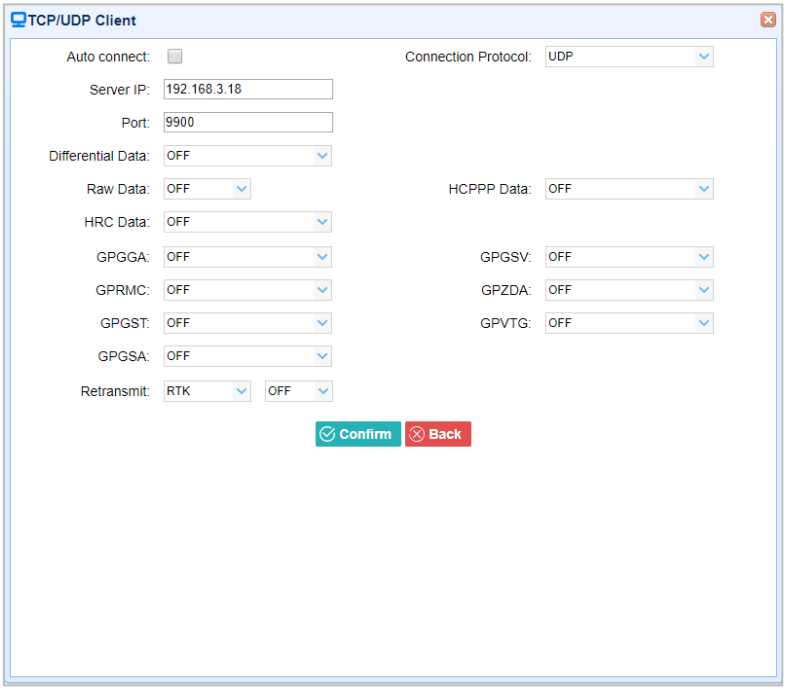
2. TCP/UDP_Client/NTRIP Server

Tap the **Connect** button on the right of required TCP/UDP Client → the *IO Settings* screen will appear → select the connection protocol from TCP, UDP, NTRIP1.0 and NTRIP2.0 → enter the IP and Port of the target server → configure messages that you want to output to the target server → click Confirm to save and complete the connection.

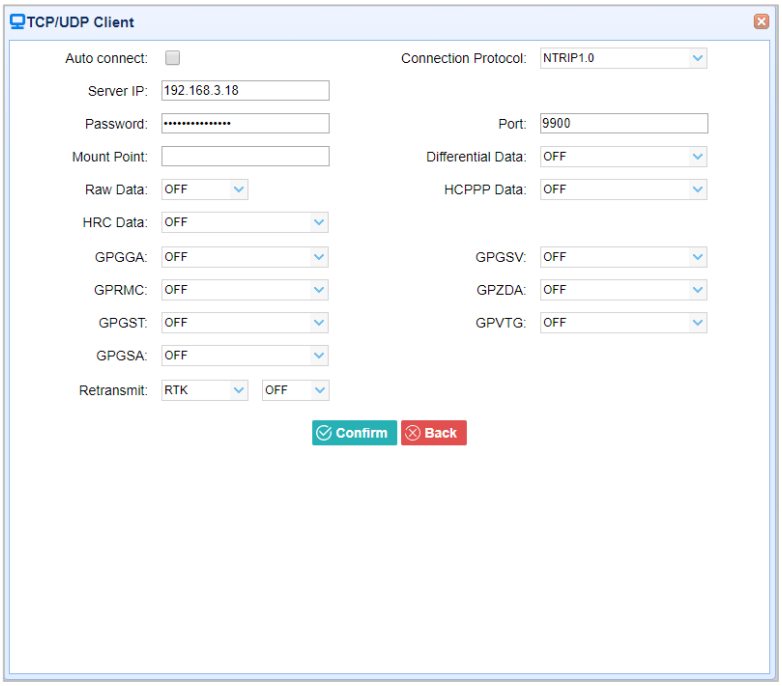
- Connection Protocol: TCP



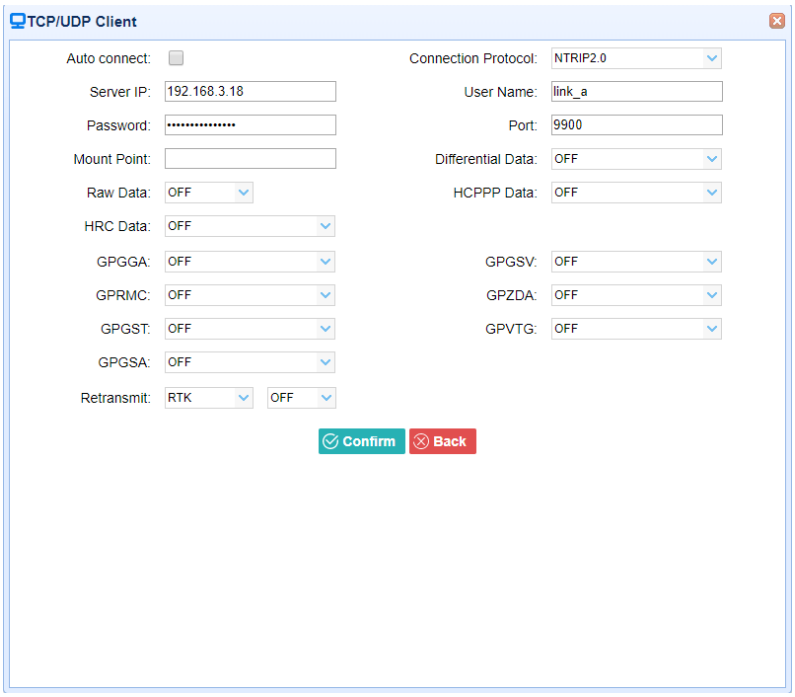
- Connection Protocol: UDP



- Connection Protocol: NTRIP1.0



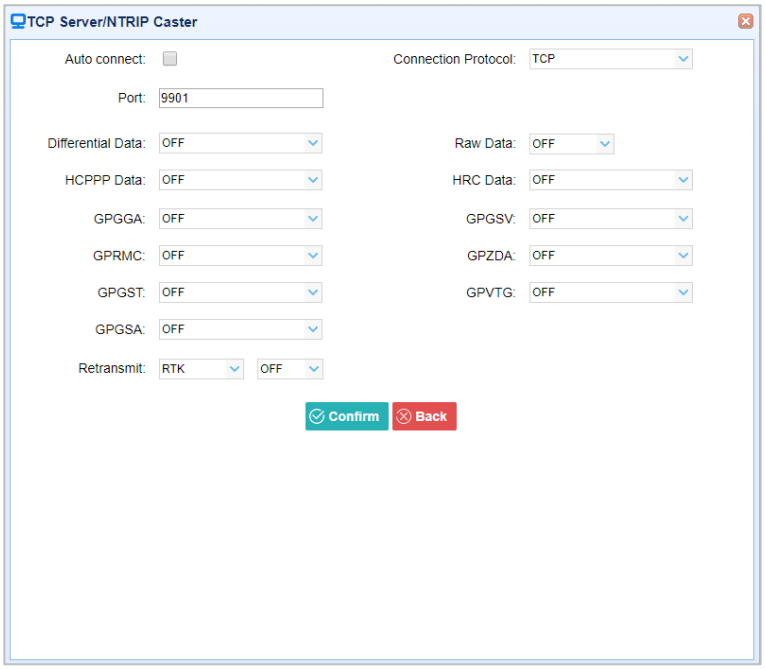
- Connection Protocol: NTRIP2.0



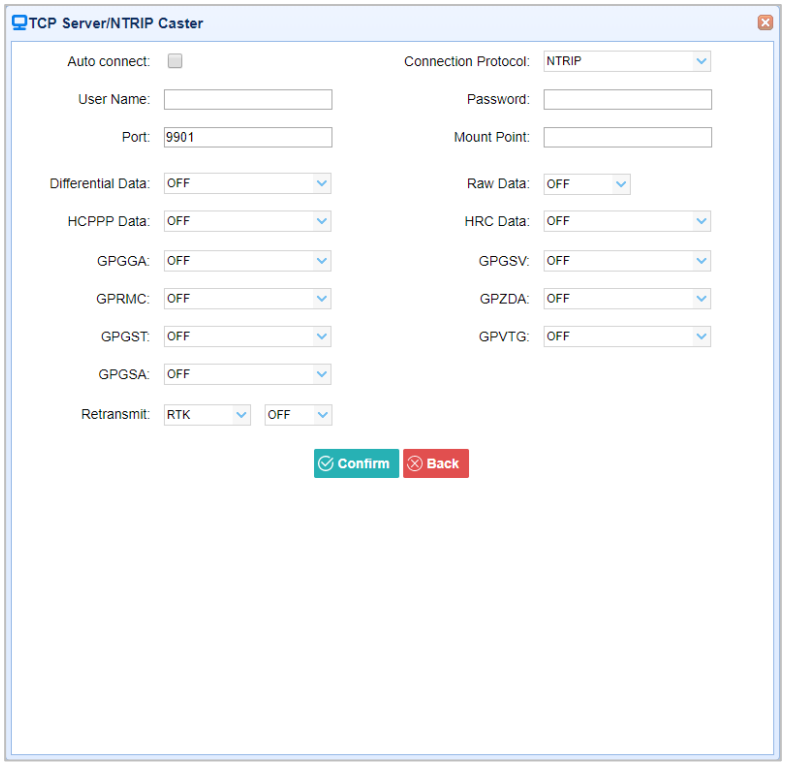
3. **TCP Server/NTRIP Caster**

Tap the **Connect** button to the right of required TCP Server/NTRIP Caster→ the **IO Settings** screen will appear → select one of the connection protocols between NTRIP and TCP → configure the other related parameters → click Confirm to save the settings and open the server.

- Connection Protocol: TCP

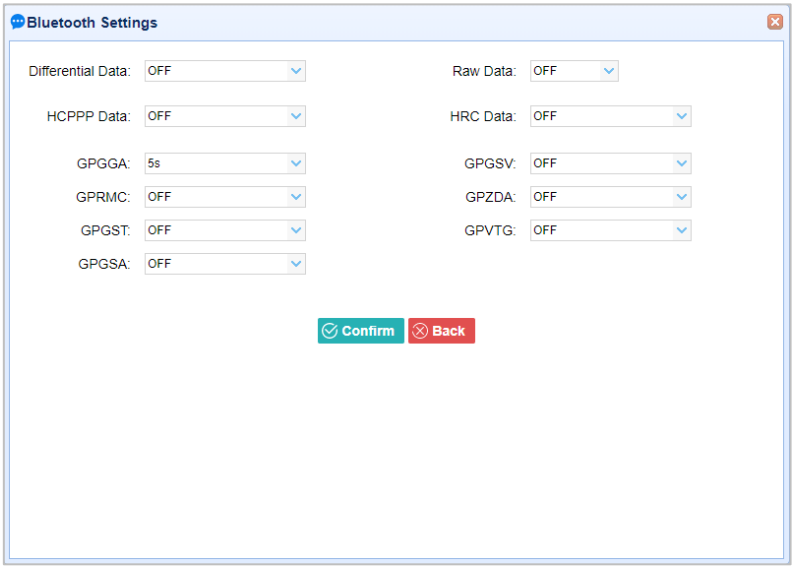


- Connection Protocol: NTRIP



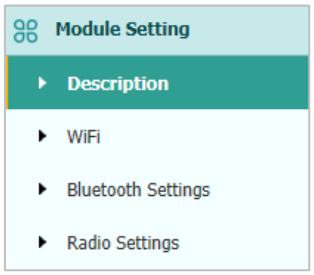
4. Bluetooth

Tap the **Settings** button to the right of Bluetooth → the *Bluetooth Set* screen will appear → configure the messages that you want to transmit through Bluetooth → click Confirm to save the settings and start to transmit.



5.6 Module Setting Menu

Use this menu to check module information, configure WiFi, bluetooth, radio related settings.

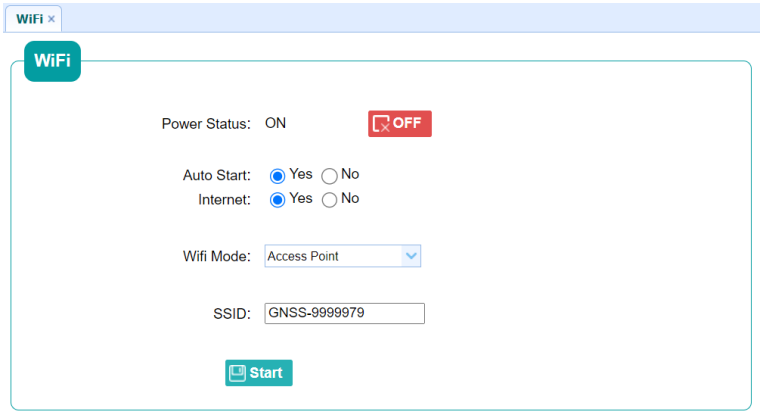


5.6.1 Description Submenu

Use this submenu to check the information of WiFi module, bluetooth module and radio module.

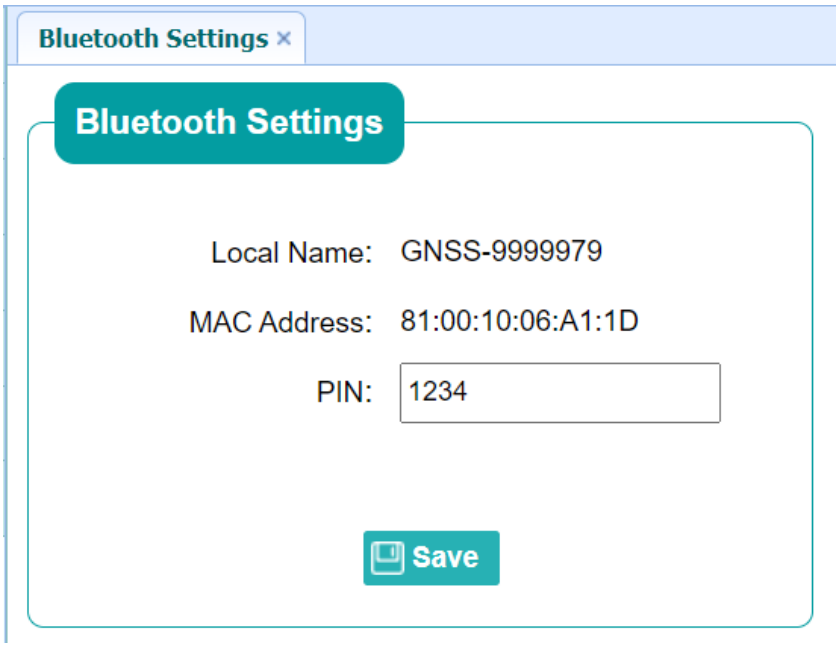
5.6.2 WiFi Submenu

Use this submenu to turn on/off WiFi function and modify password.



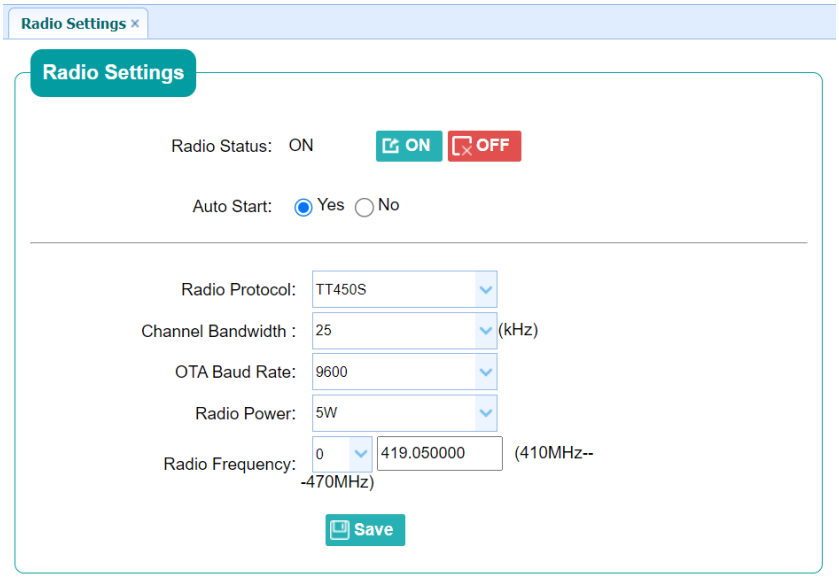
5.6.3 Bluetooth Settings Submenu

Use this submenu to turn on/off bluetooth function and modify PIN number.



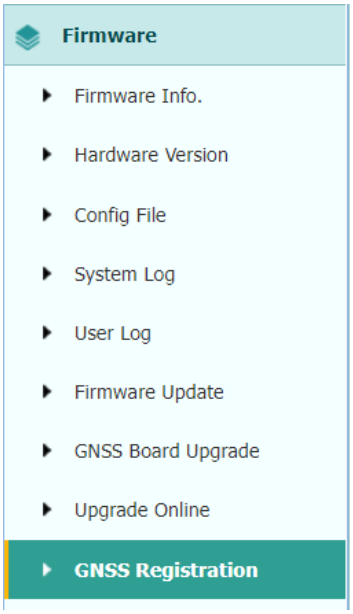
5.6.4 Radio Settings Submenu

Use this submenu to turn on/off radio function and configure radio parameters.



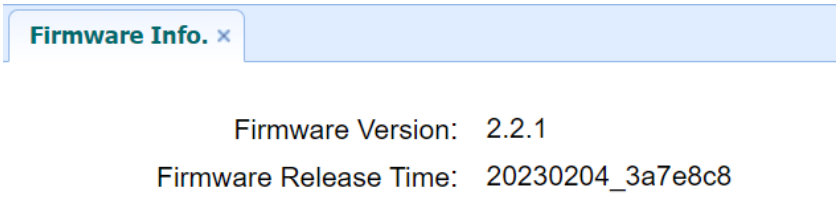
5.7 Firmware Menu

Use this menu to check the current firmware information, download the system log, update the receiver firmware, download, or update the configuration file and register the receiver, and more:



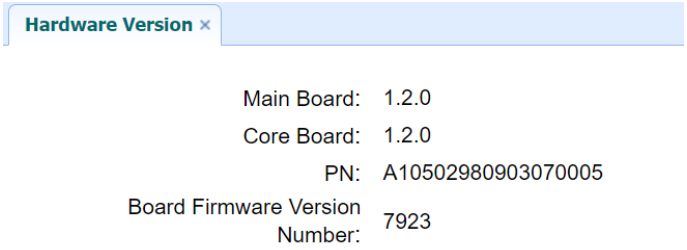
5.7.1 Firmware Info Submenu

Use this submenu to check the current firmware information. The following figure shows an example of the firmware information.



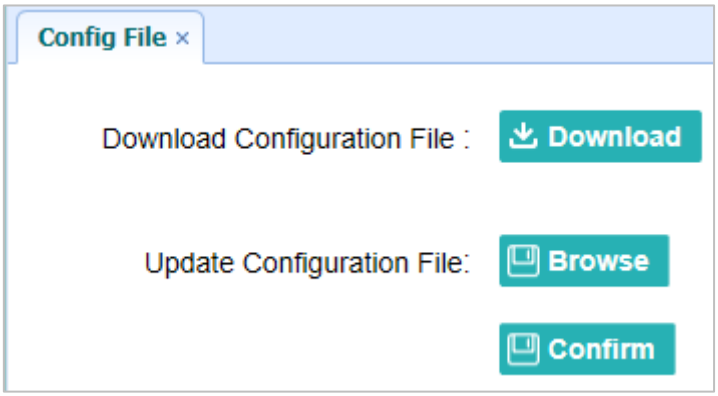
5.7.2 Hardware Version Submenu

Use this submenu to check the hardware information, including main board version and core board version:



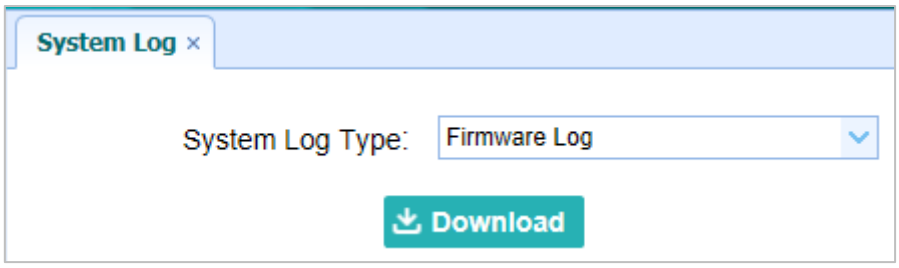
5.7.3 Config File Submenu

Use this submenu to update Configuration File.



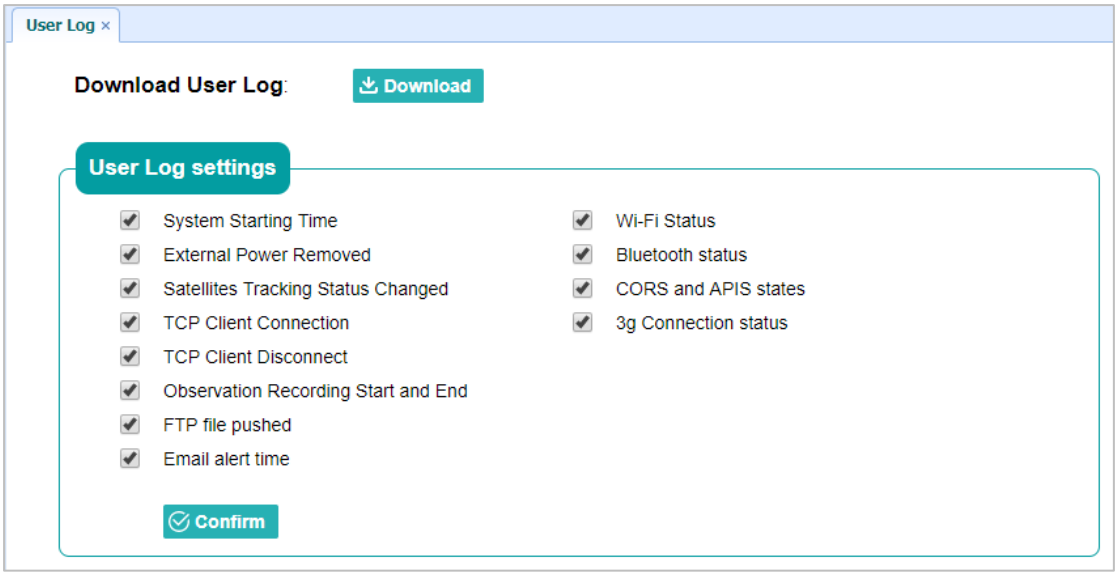
5.7.4 System Log Download Submenu

Use this submenu to download the system log of the receiver.



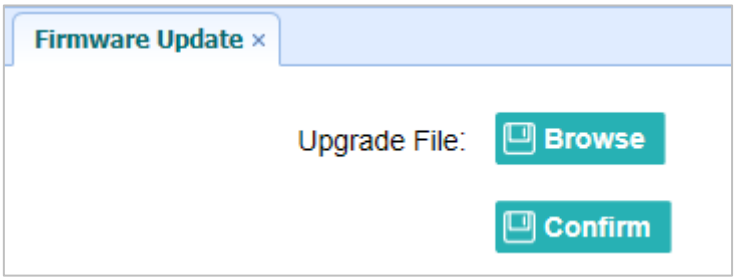
5.7.5 User Log Submenu

Use this submenu to download the user log. Tap **Download** to download current user log; Tick items that you want to see on the user log and tap confirm button to confirm selected user log.



5.7.6 Firmware Update Submenu

Use this submenu to load new firmware to the receiver across the network. Tap the **Browse** button to locate the upgrade file → tap **Confirm** button to confirm the selected upgrading file and start upgrading.

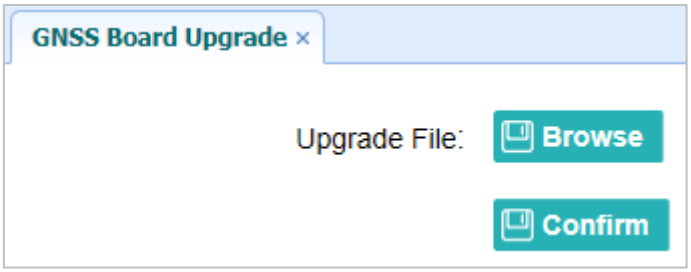


Notes

- It may take about 3 or 4 minutes to complete the firmware upgrading. Do not touch the power button or unplug the power until the upgrading process finishes, or damage will be caused to the receiver.
- The receiver will restart after the firmware upgrading is done, so users need to reconnect the receiver with your computer via Wi-Fi, and then log-in the receiver through a web browser to continue the configuration.

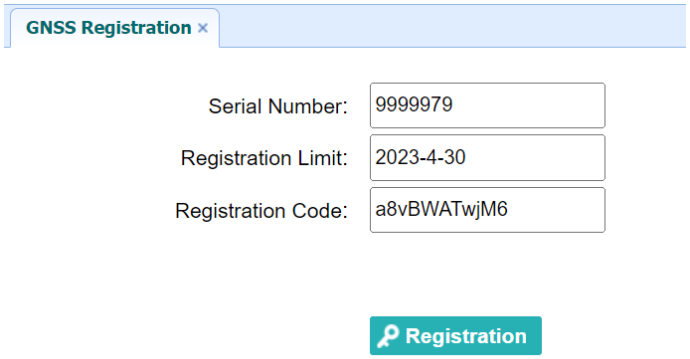
5.7.7 GNSS Board Upgrade Submenu

Use this submenu to upgrade GNSS Board. Use this submenu to load new board to the receiver across the network. Tap the **Browse** button to locate the upgrade file → tap **Confirm** button to confirm the selected upgrading file and start upgrading.



5.7.8 GNSS Registration Submenu

Use this submenu to register the receiver. Paste or enter the registration code to the *Registration Code* field → tap **Registration** button to complete the registration.



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Website: www.efix-geo.com

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 80cm between the radiator & your body.