



CHCNAV i85 GNSS

USER GUIDE



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Preface

Copyright

Copyright

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Trademarks

All product and brand names mentioned in this publication are trademarks of their respective holders.

Safety Warnings

GNSS (Global Navigation Satellite System) receivers are electronic devices that use signals from satellites to determine location, speed, and time. While GNSS receivers are generally safe to use, there are some safety considerations that users should keep in mind:

- (1) Do not rely solely on GNSS for navigation: GNSS signals can be disrupted by various factors such as tall buildings, trees, and bad weather. It is important to use other navigation aids such as maps, compasses, and visual landmarks.
- (2) Keep GNSS receivers away from other electronic devices: Electronic devices such as mobile phones, radios, and computers can emit electromagnetic interference (EMI) that can disrupt GNSS signals. Keep GNSS receivers away from such devices to avoid EMI.
- (3) Do not tamper with GNSS receivers: Tampering with GNSS receivers or modifying their software can cause them to malfunction or produce inaccurate readings. Only use GNSS receivers that are certified and authorized for use.
- (4) Follow manufacturer instructions: Follow the manufacturer's instructions regarding the safe use and handling of GNSS receivers. This includes instructions for charging, cleaning, and storing the device.
- (5) CAUTION - Class 3R LASER RADIATION WHEN OPEN AVOID DIRECT EYE EXPOSURE.
- (6) Dispose of GNSS receivers properly: When disposing of GNSS receivers, follow local regulations for electronic waste disposal to avoid harming the environment.

- (7) It is important to use GNSS receivers safely to avoid accidents or injury. If you experience any issues or concerns with your GNSS receiver, contact the manufacturer or a qualified technician for assistance.

FCC Interference Statement

This equipment has been designed to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules in the Portable Mode. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

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.

CE Interference Statement

Declaration of Conformity: Hereby, CHC Navigation Technology Ltd. declares that this i85 is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

Brazil

Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados. Para maiores informações, consulte o site da ANATEL-www.anatel.gov.br.

1 Introduction

The i85 GNSS Receiver User Guide describe show to setup and use the CHCNAV i85 GNSS receiver. In this manual, “the receiver” refers to the i85 GNSS receiver unless otherwise stated. Even if you have used other Global Navigation Satellite Systems (GNSS) products before, CHCNAV recommends that you spend sometime reading this manual to learn about the special features of this product. If you are not familiar with GNSS, go to www.chcnav.com for an interactive look at CHCNAV and GNSS.

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 data link. 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 a i85 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 CHCNAV website (www.chcnav.com) , contact your local CHCNAV dealer from which you purchased the receiver(s). If you need to contact CHCNAV technical support, please contact us by email(support@chcnav.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. CHCNAV holds no responsibility for the wrong operation by users and for the losses incurred by the wrong understanding about this User Guide. However, CHCNAV reserves the rights to update and optimize the contents in this guide regularly. Please contact your local CHCNAV 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@chcnav.com.

2 Getting Started with i85

2.1 About the Receiver

The new CHCNAV i85 GNSS receiver offers integrated IMU-RTK technology to provide a robust and accurate GNSS positioning in any circumstances. Unlike the standard MEMS based GNSS receivers, the i85 GNSS IMU-RTK combines state-of-the-art GNSS RTK engine, calibration-free professional IMU sensor and advanced GNSS tracking capabilities. Survey projects are achieved with high productivity and reliability pushing the boundaries of conventional GNSS RTK survey.

The LED panel enables user to check satellite-tracking status, internal battery status, working mode, and data logging status. 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 CHCNAV LandStar 8 software. And you can download the GNSS data that recorded in the internal memory of receiver to a computer.

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. Type-C port ,SMA port and connectors are located on the bottom of the unit.

2.2.1 Front Panel

The following figure shows a front view of the receiver.

The front panel contains four indicator LEDs and two buttons.





Name	Description
Correction LED (Yellow/Green)	<ul style="list-style-type: none"> Indicates whether the receiver is transmitting/receiving differential data. As a Base station: successfully transmitting differential data, flash yellow light. As a Rover station: successfully receiving differential data from Base station will flash yellow light when it is single or float, flash green light when it is fixed.
Satellite LED (Blue)	<ul style="list-style-type: none"> 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.
Power LED(Red)	<ul style="list-style-type: none"> If the internal battery is $\geq 20\%$, the indicator stays solid green. If the internal battery is $< 20\%$ but $> 10\%$, the indicator stays solid red. If the internal battery is $\leq 10\%$ but $> 0\%$, the indicator flashes red at 1 Hz (one flash per second).
Static LED (Yellow)	<ul style="list-style-type: none"> Flash means static is on.
Power button (White)	<ul style="list-style-type: none"> Press and hold this button for 3 seconds to turn on or turn off the receiver.
Fn button (White)	<ul style="list-style-type: none"> Press and hold this button for 3 seconds to turn on or turn off the static mode.

2.2.2 Lower Housing

The lower housing contains one TNC radio antenna connector(SMA port) and one USB type C communication port.



2.2.3 Receiver Ports

Port	Name	Description
	USB port	<ul style="list-style-type: none"> • This port is a type-C USB connector that supports USB communications. • Users can use USB Cable supplied with the system to download the logged data to a computer but can't upload the data. • USB port can used to charge the i85 GNSS receiver
	Radio antenna connector	<ul style="list-style-type: none"> • 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 Batteries

The receiver has an built-in non-removable Lithium-ion battery.

2.3.2 The Internal Battery

The rechargeable Lithium-ion battery is supplied partially charged.



WARNING – Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized device 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 CHCNAV 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 CHCNAV 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.









2.3.4 External Power Supply


Provide the external power to the receiver by the USB Type-C Cable + Power Adapter. The Power Adapter is connecting with AC power of 100-240V, the output port of the Power Adapter connects with the USB Type-C Cable.



2.4 Product Basic Supply Accessories

2.4.1 Base Kit Basic Supply

Item	Picture
i85 GNSS Receiver	
UHF Whip Antenna	
Power Adapter	
USB Type-C	
H.I. Tape	
Extension pole	
Tribrach with optical plummet	
Auxiliary H.I. Tool	

Transport Hard Case	
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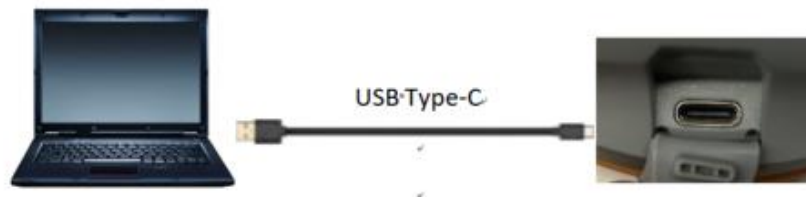
2.4.2 Rover Kit Basic Supply

Item	Picture
i85 GNSS Receiver	
UHF	
Power Adapter	
USB Type-C	
2M Range Pole w/bag	
Auxiliary H.I. Tool	
Transport Hard Case	

2.5 Connecting to an Office Computer

The receiver can be connected to an office computer for serial data transfer or settings via a HCE600 USB Type-C. Before you connect to the office computer, ensure that the receiver is powered on by internal battery or external power.

The following figure show to connect to the computer for serial data transfer or settings:



2.6 Connecting to a Controller

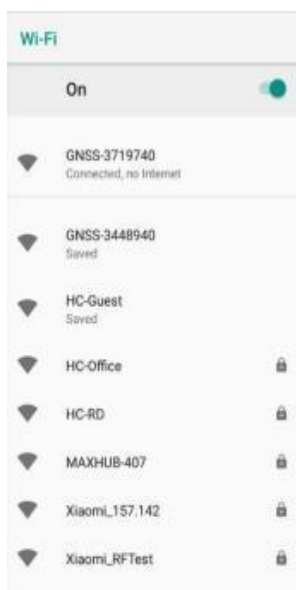
2.6.1 Connecting via Wi-Fi with LandStar 8 Software

Turn on the controller → run LandStar 8 → goto **Config** main menu → tap **Connect**.

In the Connect screen, select **CHC** for the Manufacture field, **i85** for Device Type field, **WIFI** for Connection Type field.



Tap the Wireless Lan icon on the right side to select the hotspot → Switch on the WiFi module by the top switch → select the target device in the list.



Tap **Connect** to link to the hotspot. If the first-time connection to this hotspot, user maytype in the password.



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



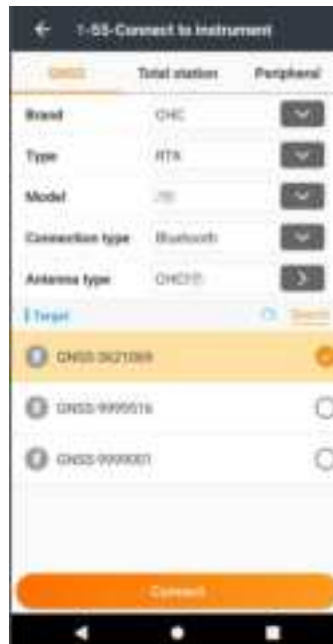
2.6.2 Connecting via Bluetooth with LandStar 8 Software

Turn on the controller → run LandStar 8 → goto **Config** main menu → tap **Connect**.

In the Connect screen, select **CHC** for the Manufacture field, **i85** for Device Type field, **Bluetooth** for Connection Type field.



Tap the **Bluetooth Manager** and turn on the **Bluetooth** function to search Bluetooth device around → select the target device in the list → Tap back button → select the target device in the Bluetooth manager 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 CHC Geomatics Office (CGO) Software.

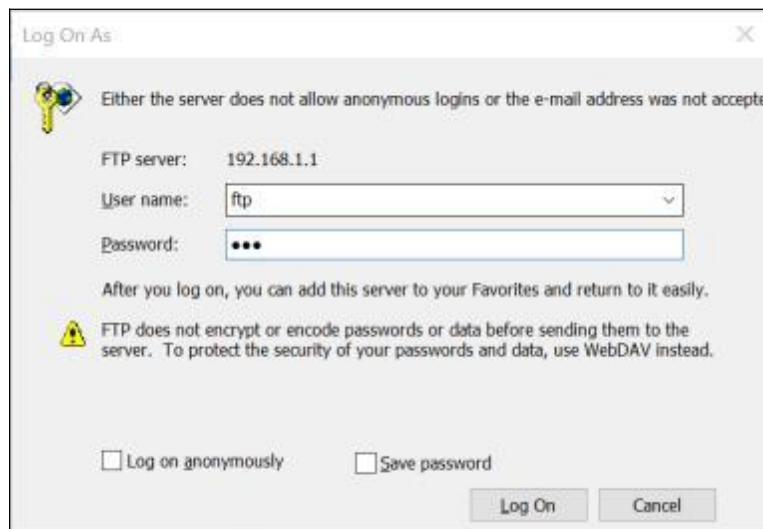
2.7.1 FTP Download

The procedures of downloading logged data through FTP areas follows:

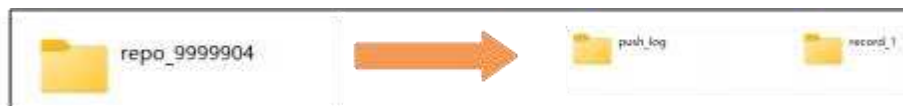
- (1) Switch on the receiver, search its Wi-Fi in the computer and connect.
- (2) After the successful connection, open the file manager in the computer and input “ftp://192.168.1.1” in the address box.



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



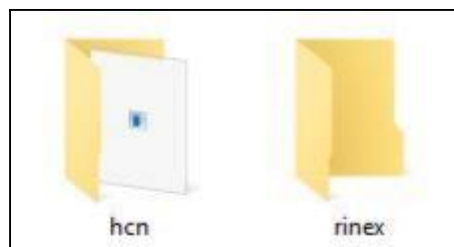
- (4) Double click the folder “repo_receiver SN” (take 3411955 as example), you will see 9 folders. The “push_log” folder is used to save the log files, and the other 8 folders represent different logging sessions and are used for store static data.



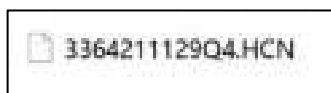
(5) Double click the folder that you have configured to store the static data, you will see the folder(s) created by the i85 system automatically and named by the date which is decided by GPS time when you start to log data.



(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.

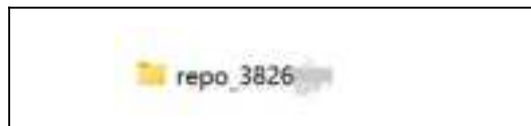
2.7.2 USB Download

The procedures of downloading logged data in the receiver areas follows:

(1) Switch on the receiver and connect it with a computer by Type-C. After the successful connection, a removable disk named as the Serial Number (SN) of the receiver will appear on the computer.



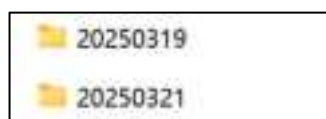
(2) Double click the removable disk and you will see the folder named as “repo”.



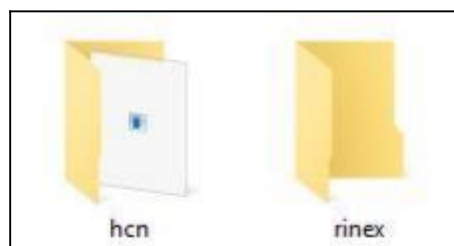
(3) Double click this folder, you will see 9 folders. The “push_log” folder is used to save the log files, and the other 8 folders represent different logging session and are used for store static data.



(4) Double click the folder that you have configured to store the static data, you will see the folder(s) created by the i85 system automatically and named by the date which is decide by GPS time when you start to log data.



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



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



Tip – 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 datalogging.

3 Equipment Setup and Operation

3.1 Base Station Setup

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

Components:



No.	Name
a	i85 GNSS receiver
b	SMA Whip Antenna
c	Extension pole (30 cm)
d	Tribrach adaptor
e	Tribrach w/ Opti
f	Aluminum tripod

Steps:

- (1) Put tripod in the target position, center and level it roughly.
- (2) Place and lock the tribrach in the tripod.

If work as a UHF base station, the SMA Whip Antenna need to be connected to the receiver.

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

3.2 Real-Time Rover Station Setup

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

Components:



No.	Name
a	i85 GNSS receiver
b	2M range pole w/bag

Steps:

- (1) Keep the receiver fully charged.


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

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

3.3 Working with the Tilt Compensation

After enable the tilt survey, the i85 with the Auto-IMU can be ready after a few steps walk or a bit movement automatically.


3.3.1 Operation Steps for first IMU initialization

(1) Open Landstar8-> Tap Point Survey-> Tap  to activate tilt measurement.





(2) Hold the pole vertical for a while and shake according to the procedures in the interface to do initialization.




(3) This icon  will appear when the initialization is successful.



(4) Enter the Name and Antenna, then tap , point will be collected and store to Points automatically.

(5) When this icon  appears, the text will show "IMU is invalid. Need to reinitialize" at the middle of interface.



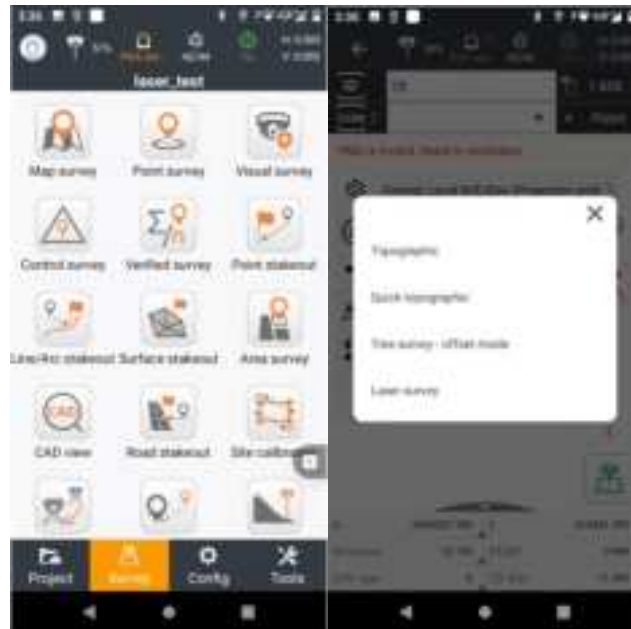
(6) Tap  to close tilt compensation.

3.3.2 Notes of using tilt measurement

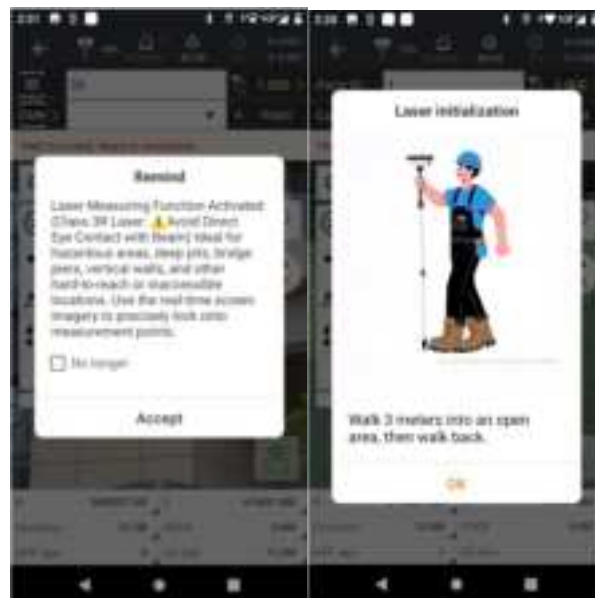
1. At the beginning of initialization, the pole height of the instrument should be the same as that antenna height in the software.
2. In the process of tilt measurement, if the controller shows that “Tilt is not available, please measure in alignment” (red), please shake RTK slightly from left to right or back to front until the reminder disappears.
3. The controller will prompt “Tilt is not available, please measure in alignment” when the receiver is stationary over 30 seconds or the pole hit the ground toughly.
4. The pole cannot be shaken when point is collected.
5. Initialization is required:
 - when the RTK is turned on everytime;
 - when IMU module is turned on everytime;
 - when receiver drops at working;
 - when the pole is tilted more than 65 degree;
 - when the receiver is stationary more than 10 minutes;
 - when the RTK rotates too fast on the matching pole (2 rounds per second);
 - when the pole hit the ground toughly.

3.4 Laser Survey function

(1) To use this function, tap [Point survey] in the Survey interface and select Laser survey.

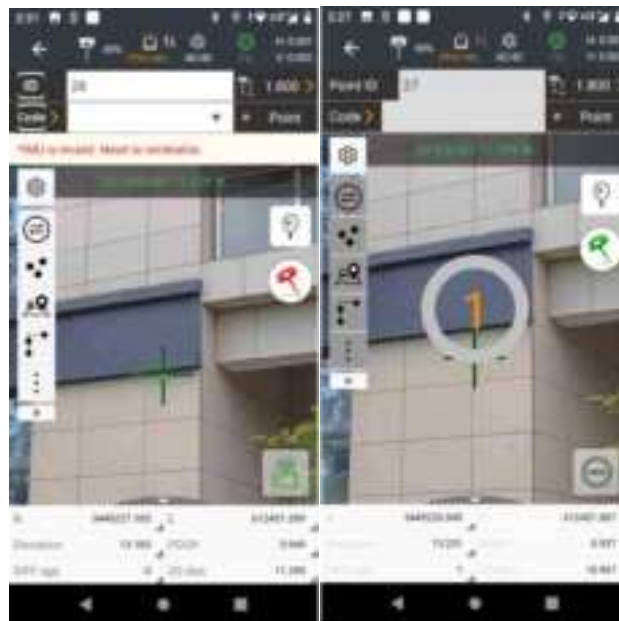


(2) After tapping Laser survey, you'll receive a safety-use notice and a laser initialization prompt. Follow the on-screen instructions to complete the laser initialization



CAUTION - Class 3R LASER RADIATION WHEN OPEN AVOID DIRECT EYE EXPOSURE.

(3) Once initialization is complete, a laser-aiming crosshair appears. Center it on the point to be measured and tap Measure to finish a laser measurement.



3.5 Stakeout functions


3.5.1 Point stakeout

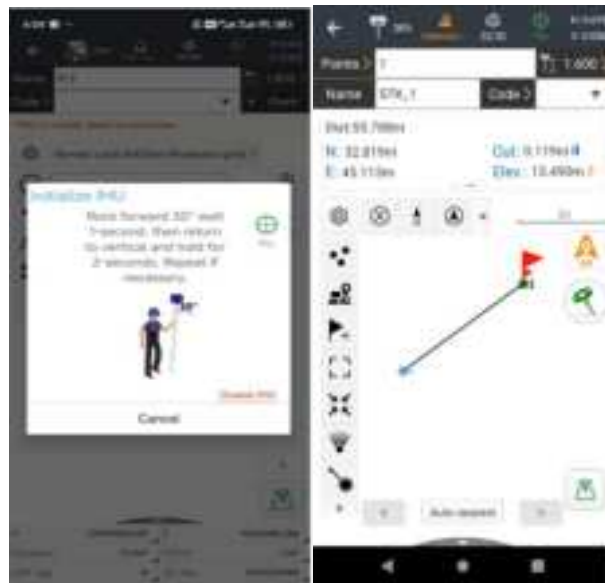
(1) Open the Point Stakeout interface, tap the point-selection icon in the upper-left corner to enter the Point Management screen, choose the point you want to stake out, then tap OK in the lower-right corner. The selected point will appear in the stakeout interface; simply follow the displayed direction and distance to perform the stakeout.



3.5.2 AR stakeout

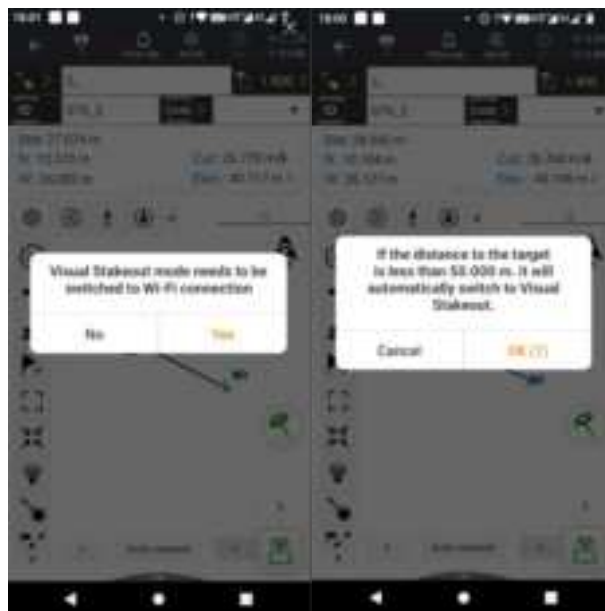
For point stakeout, ensure IMU is initialized. Select the point, tap the “AR” icon on the right, then follow the on-screen direction and distance

(1) Open Point Stakeout, enter the pole height, and tap the Tilt icon to enable tilt compensation. Follow the on-screen prompts to initialize; when successful, the icon turns green .



(2) Tap the AR icon to start AR stakeout.

If the controller is connected via Bluetooth, a prompt will appear: “Vision mode requires Wi-Fi.” Tap OK, switch to Wi-Fi in the connection screen, and reconnect.



(3) In Vision Settings, we can adjust the switch distance: the front camera is used from 50 m to 3 m, and the bottom camera takes over within 3 m.



(4) In the video, the target stakeout point appears as a red dot. When the virtual pole tip touches the dot, you've reached the point. Tap the stakeout icon and the point is automatically saved.



4 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:

192.168.1.1/pc/login.html

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 login, the webpage 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 webpage in another language, select the corresponding language name from the dropdown list on the upper right corner of the webpage.

Currently, seven languages are available:



4.1 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.

4.1.1 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.



4.1.2 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, files being logged, and data streams being output. With this information, it is easy to tell exactly what functions the receiver is performing.



4.1.3 Google Map Submenu

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



4.2 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.



4.2.1 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.

AI GPS GLONASS BDS GALILEO SBAS QZSS

SV	Type	Elevation Angle	Azimuth Angle	L1 SNR	L2 SNR	L5 SNR	B1C SNR	B1A SNR	B2B SNR	Enabled
4	GPS	21	75	34.380	37.280	17.950	0.000	0.000	0.000	No
6	GPS	88	326	29.480	46.810	28.180	0.000	0.000	0.000	Yes
8	GPS	30	111	29.280	40.480	20.910	0.000	0.000	0.000	Yes
11	GPS	34	284	30.580	42.530	25.530	0.000	0.000	0.000	Yes
12	GPS	15	310	33.820	34.750	0.000	0.000	0.000	0.000	No
14	GPS	22	178	27.870	40.880	21.730	0.000	0.000	0.000	No
17	GPS	88	181	30.070	44.820	0.000	0.000	0.000	0.000	Yes
19	GPS	73	26	31.830	38.880	0.000	0.000	0.000	0.000	Yes
22	GPS	49	189	26.070	31.300	0.000	0.000	0.000	0.000	No
7	GLONASS	18	94	28.480	41.280	0.000	0.000	0.000	0.000	Yes
8	GLONASS	49	94	30.230	48.240	0.000	0.000	0.000	0.000	Yes
14	GLONASS	27	282	30.980	37.430	0.000	0.000	0.000	0.000	Yes

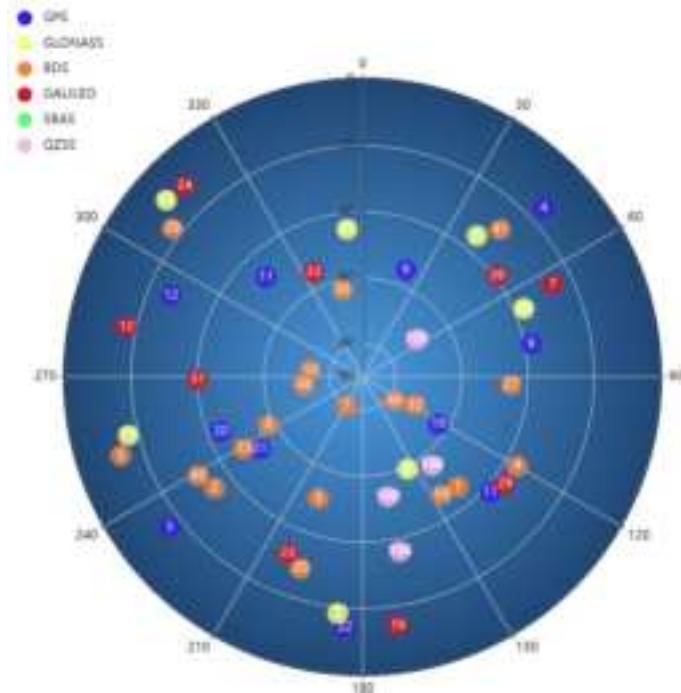
4.2.2 Tracking Info. Table Submenu

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.



4.2.3 Tracking Skyplot Submenu

The following figure is an example of Skyplot page.



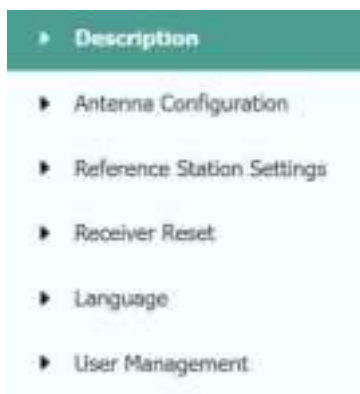
4.2.4 Satellite Activation Submenu

Use this menu to enable or disable satellites.

Satellite Activation			
GPS GLONASS BDS GALILEO QZSS IRNSS			
GPS Enable 30		GLONASS Enable 40	
Satellite Id	Enable	Satellite Id	Enable
1	<input type="checkbox"/>	21	<input type="checkbox"/>
3	<input type="checkbox"/>	4	<input type="checkbox"/>
5	<input type="checkbox"/>	6	<input type="checkbox"/>
7	<input type="checkbox"/>	8	<input type="checkbox"/>
9	<input type="checkbox"/>	10	<input type="checkbox"/>
11	<input type="checkbox"/>	12	<input type="checkbox"/>
13	<input type="checkbox"/>	14	<input type="checkbox"/>
15	<input type="checkbox"/>	16	<input type="checkbox"/>
17	<input type="checkbox"/>	18	<input type="checkbox"/>
19	<input type="checkbox"/>	20	<input type="checkbox"/>
21	<input type="checkbox"/>	22	<input type="checkbox"/>
23	<input type="checkbox"/>	24	<input type="checkbox"/>
25	<input type="checkbox"/>	26	<input type="checkbox"/>
27	<input type="checkbox"/>	28	<input type="checkbox"/>
29	<input type="checkbox"/>	30	<input type="checkbox"/>

4.3 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:



4.3.1 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.

4.3.2 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:

Antenna Configuration ×

Antenna Configuration

Measure Way:

Antenna Phase Center

Antenna manufacturer:

Antenna Type:

Antenna SN:

Antenna Height:

2.0000

(Meter)

Elevation Mask:

10

PDOP Mask:

6

Save

4.3.3 Reference Station Settings Submenu

Reference Station Settings ×

Reference Station Mode:

Auto Rover

Save

Sample for Average

Positioning Constraint:

☒ Single Solution Coordinates
 ☐ Fixed Solution Coordinates

Sampling Amount:

300

0%

Start

Stop

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.

Reference Station Settings

Reference Station Mode: Auto Base

Base Station Name: 3821069

Base Station ID: 3821069

Reference Latitude: 0 0 0.00000000 N S

Reference Longitude: 0 0 0.00000000 E W

Reference Height: 0.0000

Sample for Average

Positioning Constraint: Single Solution Coordinates Fixed Solution Coordinates

Sampling Amount: 300 0%

Coordinates Format: WGS84

Base List

ID	Height	Latitude	Longitude
1	0.0000	0.00000000	0.00000000
2	0.0000	0.00000000	0.00000000

c) **Manual Base:** The receiver will serve neither as a base or a rover after this mode is enabled. Users need to configure the receiver manually.

Reference Station Settings

Reference Station Mode: Manual Base

Base Station Name: 3821069

Base Station ID: 3821069

Reference Latitude: 0 0 0.00000000 N S

Reference Longitude: 0 0 0.00000000 E W

Reference Height: 0.0000

Sample for Average

Positioning Constraint: Single Solution Coordinates Fixed Solution Coordinates

Sampling Amount: 300 0%

Base List

ID	Height	Latitude	Longitude
1	0.0000	0.00000000	0.00000000
2	0.0000	0.00000000	0.00000000

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  to carryout 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  button.

4.3.4 Receiver Reset Submenu

Use this screen to completely or partially reset the receiver:



The screenshot shows the 'Receiver Reset' submenu with a title bar 'Receiver Reset X'. Below the title bar, there are four options, each with a green 'Confirm' button:

- Reboot Receiver: Confirm
- Return to Factory Defaults: Confirm
- Clear Satellite Data: Confirm
- Turn Off Receiver: Confirm


4.3.5 Languages Submenu

Use this screen to select the web interface language:



The screenshot shows the 'Language' submenu with a title bar 'Language X'. Below the title bar, there is a language selection dropdown menu. The dropdown is currently set to 'English' and is open, showing a list of languages: English, 中文, English (highlighted), Русский, Español, Português, Français, and 日本語. To the right of the dropdown is a green 'Confirm' button.

4.3.6 User Management Submenu

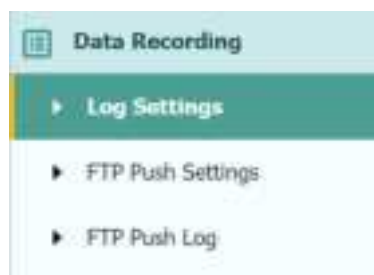


The screenshot shows the 'User Management' submenu with a title bar 'User Management X'. Below the title bar, there are four icons: Add, Save, Delete, and Modify Anti-theft password. Below these icons is a table with three columns: ID, User Name, and Password.

ID	User Name	Password
1	admin	*****
2	admin1	*****
3	admin2	*****

4.4 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:



4.4.1 Log Settings Submenu

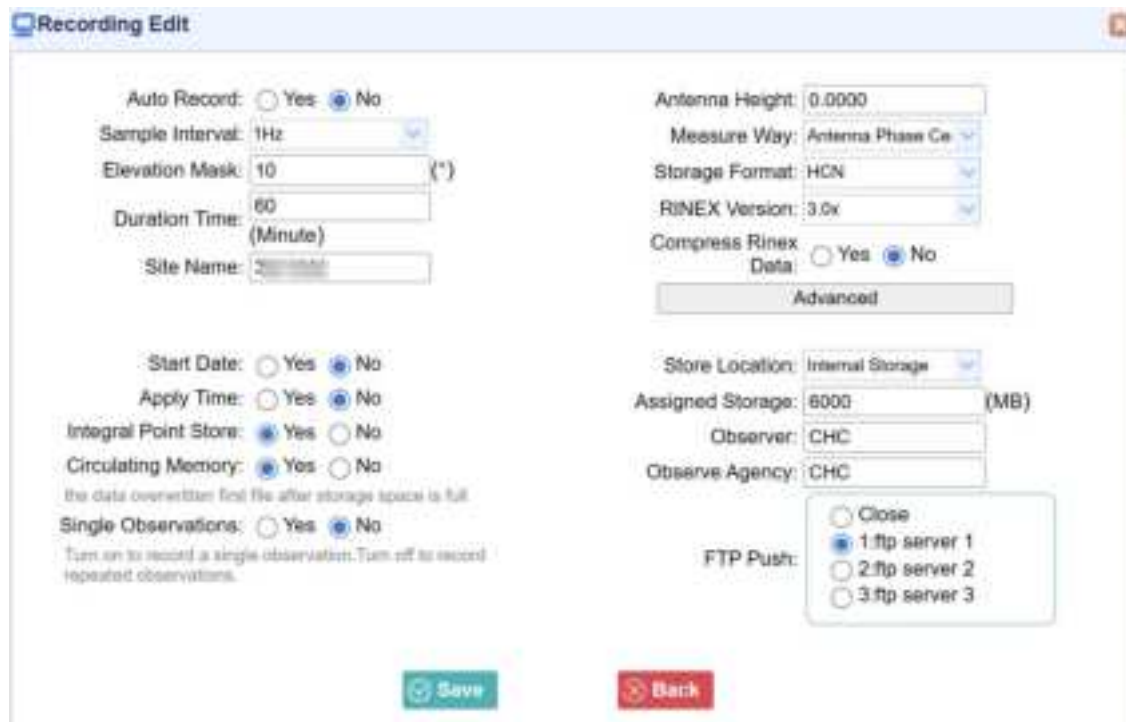
Here shows the data logging status, including internal and external storage usage and data logging status of each session. Also, users can configure the data logging settings for each session, including recording name, store location, storage limit, store formats, start time, etc.



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.





The image shows a 'Recording Edit' window with various configuration options. On the left, there are radio buttons for 'Auto Record' (Yes/No), 'Start Date' (Yes/No), 'Apply Time' (Yes/No), 'Integral Point Store' (Yes/No), 'Circulating Memory' (Yes/No), and 'Single Observations' (Yes/No). Below these are input fields for 'Sample Interval' (1Hz), 'Elevation Mask' (10), 'Duration Time' (60), and 'Site Name'. On the right, there are input fields for 'Antenna Height' (0.0000), 'Measure Way' (Antenna Phase Ce), 'Storage Format' (HCN), 'RINEX Version' (3.0x), and 'Compress Rinx Data' (Yes/No). Below these are 'Store Location' (Internal Storage), 'Assigned Storage' (6000 MB), 'Observer' (CHC), and 'Observe Agency' (CHC). At the bottom right, there is an 'FTP Push' section with radio buttons for 'Close', '1:ftp server 1', '2:ftp server 2', and '3:ftp server 3'. At the bottom center, there are 'Save' and 'Back' buttons.

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  button to save the settings and back to the Log,Also, users can click  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.

4.4.2 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.



Server ID	Server IP	Remote Directory	Server Description	Modify
1	192.168.3.72	mapdata	ftp server 1	
2	192.168.3.72	mapdata	ftp server 2	
3	192.168.3.72	mapdata	ftp server 3	

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

FTP Push Settings

Server IP: 192.168.3.72

Port: 21

Remote Directory: /repo/first

Local directory: /mnt/repo_3225604

Server Description: ftp server 1

User Name: ftpuser1

Password: *****

Save **Back**

4.4.3 FTP Push Log Submenu

Shows the related information about the recorded file 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.

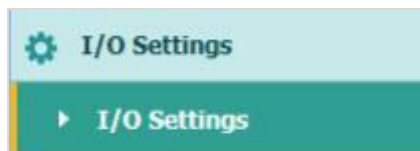
FTP Push Log

Record Info

[Clear FTP Push Log](#)

Server ID	Push File	File Size	Push Time	Push Successful Or Not
-----------	-----------	-----------	-----------	------------------------

4.5 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.

4.5.1 IO Settings Submenu


The following figure shows an example of the screen that appears when you select this submenu.

I/O Settings					
Type	Description	Output	Connection Status	Modify	
1. RTK Client	RTK Client	---	Disconnected	Connect	Disconnect
2. TCP/UDP Client (NTRIP Server1)	192.168.1.10:8000	---	Disconnected	Connect	Disconnect
3. TCP/UDP Client (NTRIP Server2)	192.168.1.10:8001	---	Disconnected	Connect	Disconnect
4. TCP/UDP Client (NTRIP Server3)	192.168.1.10:8002	---	Disconnected	Connect	Disconnect
5. TCP/UDP Client (NTRIP Server4)	192.168.1.10:8003	---	Disconnected	Connect	Disconnect
6. TCP/UDP Client (NTRIP Server5)	192.168.1.10:8004	---	Disconnected	Connect	Disconnect
7. TCP/UDP Client (NTRIP Server6)	192.168.1.10:8005	---	Disconnected	Connect	Disconnect
8. TCP Server (NTRIP Client1)	8001	---	Closed	Connect	Disconnect
9. TCP Server (NTRIP Client2)	8002	---	Closed	Connect	Disconnect
10. TCP Server (NTRIP Client3)	8003	---	Closed	Connect	Disconnect
11. TCP Server (NTRIP Client4)	8004	---	Closed	Connect	Disconnect
12. Serial Port	COM1	---	---	Connect	Disconnect
13. Bluetooth	Bluetooth	BT/RS485	---	Connect	Disconnect
14. Radio	400.000000MHz	---	---	Connect	Disconnect

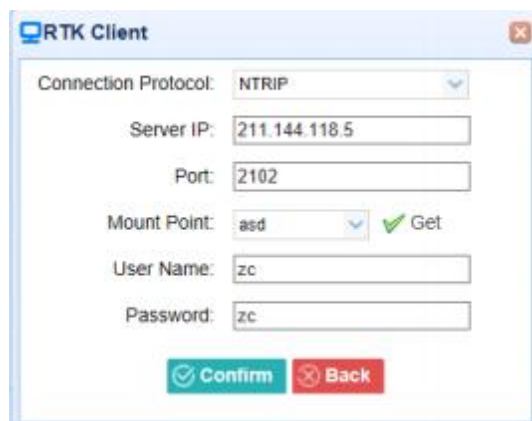
In this submenu, users can configure 6 types of input and output settings.

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 and APIS_ROVER → configure the related parameters

➤ click  to logon CORS or APIS.


➤ Connection Protocol: NTRIP



The screenshot shows the 'RTK Client' window with the following settings:

- Connection Protocol: NTRIP (selected in a dropdown menu)
- Server IP: 211.144.118.5
- Port: 2102
- Mount Point: asd (selected in a dropdown menu) with a green checkmark and a 'Get' button next to it.
- User Name: zc
- Password: zc
- Buttons: Confirm (green) and Back (red).


➤ Connection Protocol: APIS_BASE



The screenshot shows the 'RTK Client' window with the following settings:

- Connection Protocol: APIS_BASE (selected in a dropdown menu)
- Server IP: 111.111.111.1
- Port: 9901
- Differential Data: OFF (selected in a dropdown menu)
- Buttons: Confirm (green) and Back (red).

➤ Connection Protocol: APIS_ROVER




The screenshot shows the 'RTK Client' window with the following settings:

- Connection Protocol: APIS_ROVER (selected in a dropdown menu)
- Server IP: 210.14.66.58
- Port: 9902
- Base ID: 1019923 (selected in a dropdown menu)
- Buttons: Confirm (green) and Back (red).

➤ Connection Protocol: TCP



1. 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  to save and complete the connection.

➤ Connection Protocol: TCP



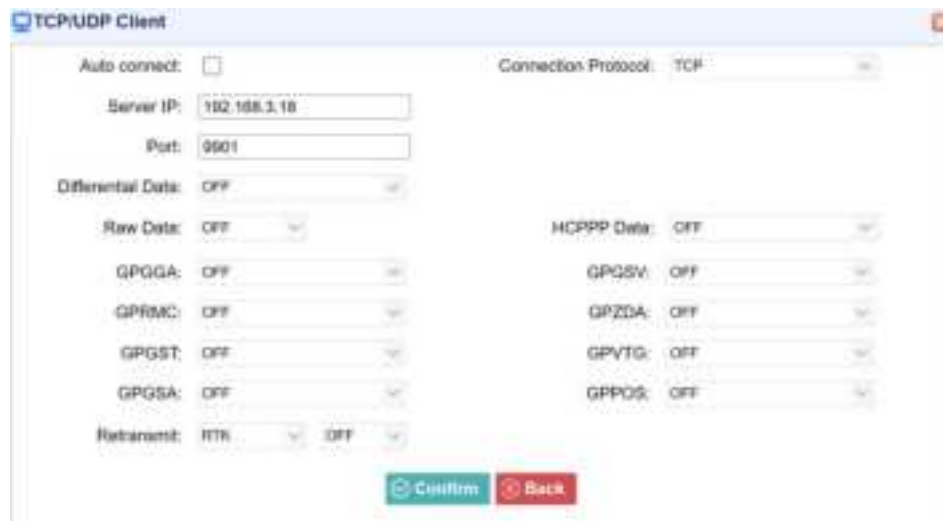
➤ Connection Protocol: UDP

The screenshot shows the 'TCP/UDP Client' configuration window. The 'Auto connect' checkbox is unchecked. The 'Connection Protocol' is set to 'TCP'. The 'Server IP' is '192.168.3.18' and the 'Port' is '9901'. The 'Differential Data' is set to 'OFF'. The 'Raw Data' is set to 'OFF'. The 'HCPRP Data' is set to 'OFF'. The 'GPQGA' is set to 'OFF'. The 'GPSV' is set to 'OFF'. The 'GPRMC' is set to 'OFF'. The 'GPZDA' is set to 'OFF'. The 'GPGST' is set to 'OFF'. The 'GPVTG' is set to 'OFF'. The 'GPGSA' is set to 'OFF'. The 'GPPOS' is set to 'OFF'. The 'Retransmit' is set to 'RTN' and 'OFF'. At the bottom, there are 'Confirm' and 'Back' buttons.

➤ Connection Protocol: NTRIP1.0

The screenshot shows the 'TCP/UDP Client' configuration window. The 'Auto connect' checkbox is unchecked. The 'Connection Protocol' is set to 'TCP'. The 'Server IP' is '192.168.3.18' and the 'Port' is '9901'. The 'Differential Data' is set to 'OFF'. The 'Raw Data' is set to 'OFF'. The 'HCPRP Data' is set to 'OFF'. The 'GPQGA' is set to 'OFF'. The 'GPSV' is set to 'OFF'. The 'GPRMC' is set to 'OFF'. The 'GPZDA' is set to 'OFF'. The 'GPGST' is set to 'OFF'. The 'GPVTG' is set to 'OFF'. The 'GPGSA' is set to 'OFF'. The 'GPPOS' is set to 'OFF'. The 'Retransmit' is set to 'RTN' and 'OFF'. At the bottom, there are 'Confirm' and 'Back' buttons.

➤ Connection Protocol: NTRIP2.0



2. 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




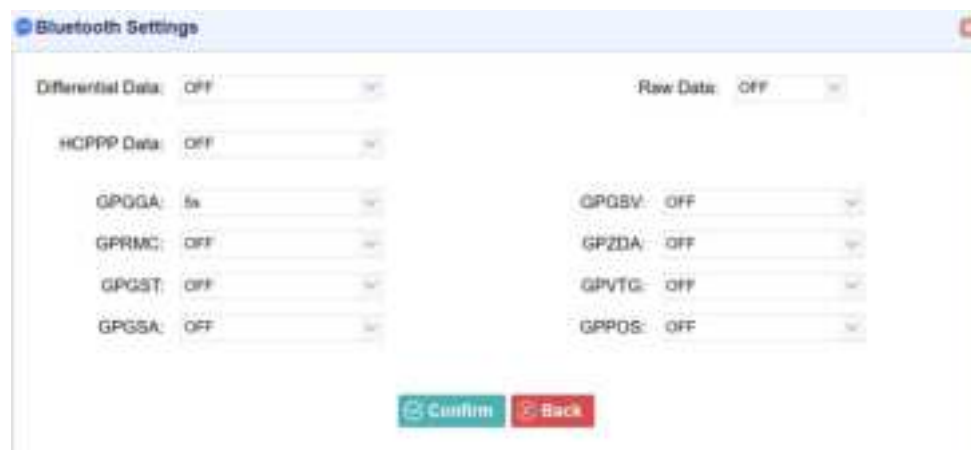
➤Connection Protocol: NTRIP

3. Serial Port

Tap the **Settings** button on the right of Serial Port → the *Serial Port Setup* screen will appear → select Baud Rate used to transmit data → configure the messages that you want to output through the serial port → click **Confirm** to save the settings and start to transmit.


4. Bluetooth

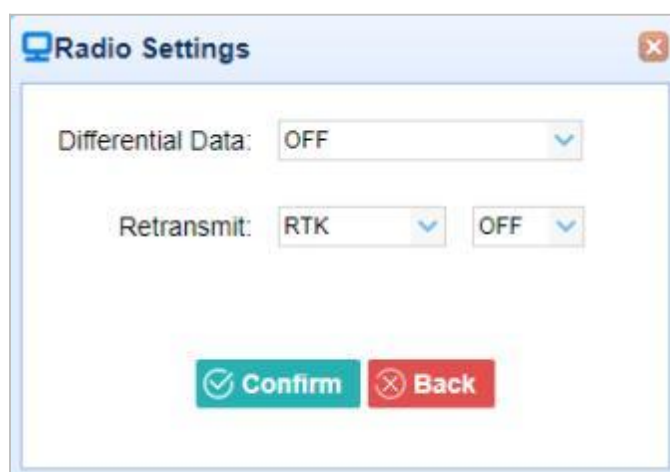
Tap the **Settings** button to the right of Bluetooth → the *Bluetooth Set* screen will appear → configure the messages that you want to transmit through Bluetooth → click  to save the settings and start to transmit.



5. Radio

Tap the **Settings** button to the right of Radio → the *Radio Settings* screen will appear → select the format of differential data that you want to transmit through radio from the dropdown list

➤ click  to save the settings and start to transmit.



4.6 Network Setting Menu

Use this menu to view network information, configure the receiver's mobile network, set email alert for specific situation, configure HTTP or HTTPS port, and the username and password of internal FTP site:



4.6.1 Email Alarm Submenu

Use this to choose which situation of receiver will be alerted and input the email address.

The screenshot shows the "Email Alarm" submenu with three main sections: "TO", "From", and "Email Alert".

- TO:** Contains three input fields for "Email Address 1", "Email Address 2", and "Email Address 3". Each field contains the text "test@EPK.com". There is a "Save" button at the bottom right of this section.
- From:** Contains three input fields for "Account", "Password", and "Server Address". There is a "Save" button at the bottom right of this section.
- Email Alert:** Contains a list of five checkboxes with corresponding labels:
 - ☐ Receiver is powered on
 - ☐ External power is off
 - ☐ Battery level is low
 - ☐ Pkg ports is failed
 - ☐ Receiver(license) will be expired in 7 days
 There is a "Save" button at the bottom right of this section.

4.6.2 HTTP Submenu

Use this submenu to configure HTTP port.



4.6.3 HTTPS Submenu

Use this submenu to configure HTTPS port.



4.7 Module Setting Menu

Use this menu to check module information, configure WiFi, bluetooth, radio related settings, and IMU Setting:



4.7.1 Description Submenu

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



4.7.2 WiFi Submenu

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



4.7.3 Bluetooth Settings Submenu

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



Bluetooth Settings

Local Name: GNSS-9999516

MAC Address: EC:A7:AD:AD:A8:10

PIN: 1234

Save

4.7.4 Radio Settings Submenu

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



Radio Settings

Radio Status: OFF ON OFF

Auto Start: ☐ Yes ☒ No

Radio Protocol: TT450S

Channel Bandwidth: 12.5 (kHz)

OTA Baud Rate: 4800

Radio Power: 1W

Radio Frequency: 1 456.050000 (410MHz—470MHz)

FEC: ☐

Save

4.7.5 IMU Settings Submenu

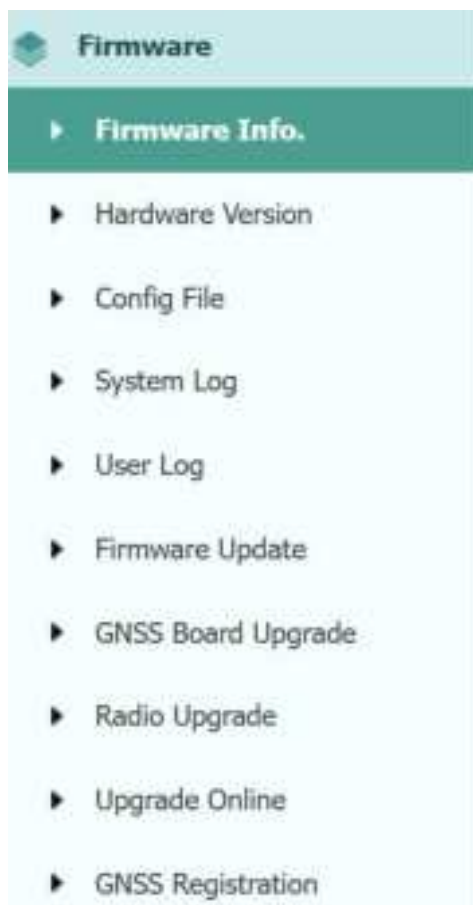
Use this submenu to turn on/off IMU function.



The screenshot shows the 'IMU Setting' submenu. At the top, there is a tab labeled 'IMU Setting'. Below the tab, the 'IMU Status' is set to 'OFF' (indicated by a blue dot next to 'OFF' and an empty circle next to 'ON'). Below this, the 'Antenna Height' is set to '0' in a text input field. A green 'Save' button is located below the input field. A horizontal line separates the settings from the 'IMU Init Status' section, which lists 'Lat:', 'Lon:', 'Alt:', 'Vertical dip:', and 'direction of dip:'.

4.8 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:



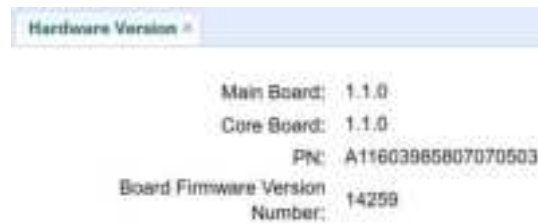
4.8.1 Firmware Info Submenu

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



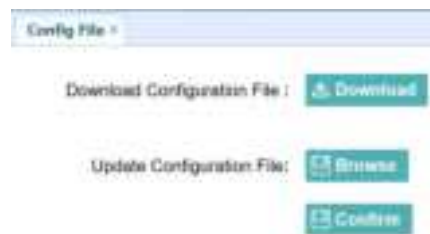
4.8.2 Hardware Version Submenu

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



4.8.3 Config File Submenu

Use this submenu to update Configuration File.



4.8.4 System Log Download Submenu

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



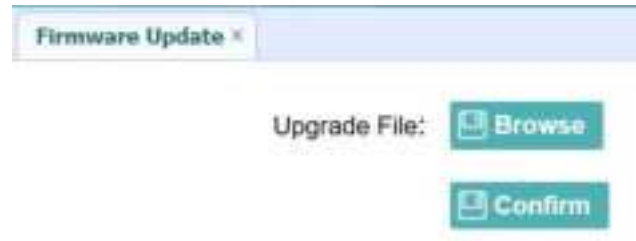
4.8.5 User Log Submenu

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.



4.8.6 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.



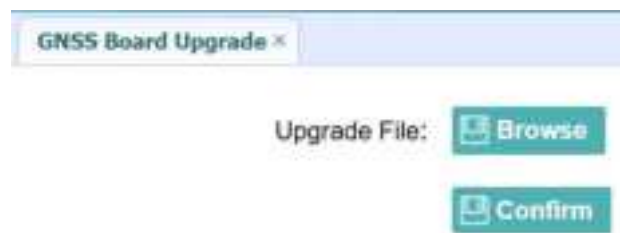
NOTES:

(1)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.

(2)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.

4.8.7 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.



4.8.8 Radio Upgrade Submenu

Use this submenu to browse upgrade file and upgrade radio. Use this submenu to load new radio 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.

Radio Upgrade ✕

Upgrade File:

4.8.9 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.

GNSS Registration ✕

Serial Number:

Registration Limit:

Registration Code:



CHC Navigation

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This document is intended for general information purposes only. It

does not consider the reader's specific circumstances and

environmental constraints of use of GNSS.

Make your work more efficient

FCC warning statements:

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 50cm between the radiator & your body.