



ALPS2

USER MANUAL

Version 1.0

SOUTH SURVEYING & MAPPING TECHNOLOGY CO., LTD

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Chapter 1 Preface

Read this chapter, you will have a brief knowledge of SOUTH Company and ALPS2 measurement system.

§1.1 Introduction

Welcome to SOUTH Surveying Instruments Co., Ltd, which is China's leading manufacturer of surveying equipment including GNSS receivers and Total Stations. To know more about SOUTH, please visit our official website <https://www.southinstrument.com//>

This manual takes the new ALPS2 positioning system for example, to explain how to install, set up and use the RTK system as well as the use of the accessories. We recommend that you read these instructions carefully before using the instrument.

§1.2 Applications

Control Survey: dual-band (dual-frequency) system static measurements can accurately complete the high-precision deformation observation, photo-control point measurement.

Highway Survey: quickly complete the encryption of the control points, road topographic mapping, cross-section measurement, profile measurement with Survstar

CORS Application: provide more stable and convenient data link for field operations. It is seamlessly compatible with all types of domestic CORS applications.

Data acquisition measurement: perfect match South's various measurement software to do quick and easy data acquisition.

Stakeout shot: large-scale point, line, plane lofting.

Electric Power Measurement: power line measurement orientation, ranging, angle calculation.

Marine application: oceanographic research, dredging, piling, inserted row, making the marine operations convenient and easy.

§1.3 Main Features

AR Stakeout

Augmented Reality (AR) stakeout revolutionizes conventional surveying methods by integrating various sensory modalities, including visual and auditory. This approach eliminates the

proficiency gap between experienced surveyors and novices by providing real-time visual guidance within authentic environments. Additionally, voice prompts are employed when nearing designated targets. This streamlined process allows surveyors to stake out targets without the need for leveling the pole, relying on visual and auditory guidance for precise stakeout each time.

Laser Survey

Laser survey is an instrument that accurately measures the distance to a target by modulating a certain parameter of the laser. Pulse laser ranging involves emitting a brief pulse or sequence of pulses towards the target during operation, with the photodetector receiving the reflected laser beam from the target. The timer measures the time it takes for the laser beam to travel from emission to reception, allowing for calculation of the distance from the rangefinder to the target. Point acquisition is carried out according to the position of the laser point.

BDPPP: Keep working in remote areas with no CORS network coverage

ALPS2 can receive B2b signal of BDS GEO satellites(Asian Pacific area), and E6- B signal from GALILEO. After waiting 20 min in open environment, ALPS2 can achieve 10-20cm horizontal accuracy and 20-40cm vertical accuracy. If you have specific needs, please contact us.

Intelligent Platform

New generation of embedded Linux operating system platform improves RTK performance and work efficiency. Its operating efficiency is higher; a unique core processing mechanism which can respond to more than one command at one time; it starts faster and more responsive in real time. While the stability of system is much higher, it can be adapted to the job of longer uninterrupted power.

The "Fast" IMU: More Fast, More Stable and More Accurate

ALPS2 is integrated with a new generation IMU module that it only needs 2-5s of shaking or walking to complete the initialization, and the maximum tilt compensation angle can be 60 degrees. it can ignore magnetic interference while RTK receiver works in such a magnetic environment. This professional IMU module can keep the tilt effect for about 40s if RTK receiver stays on a point without moving.

Internal Web UI management

Embedded Web UI management platform supports WIFI and USB mode connection. Users can monitor the receiver status and configure it via the internal Web UI management platform.

WiFi

As a feature and technology adopted on ALPS2, it not only can be used as data link to access to internet, but also can be as a hotspot which can be accessed by any other smart devices to configure the receiver.

Advanced UHF module

ALPS2 adopts new and excellent datalink system, which is compatible with current radio protocols in the market, and realizes the random switching of the radio range 410MHZ-470MHZ and the power level as well.

Intelligent Interaction

Support to access the internal web UI manage page of receiver with WiFi and USB connection, monitor host state real-time, configure receiver freely.

Electronic Bubble & Tilt Compensation

Integrated with a new generation IMU module which makes tilt measurement more stable, accurate and fast that without strict leveling the receiver to measure the point at will.

NFC Function

The internal NFC module can make the complicated Bluetooth communication easy and simple.

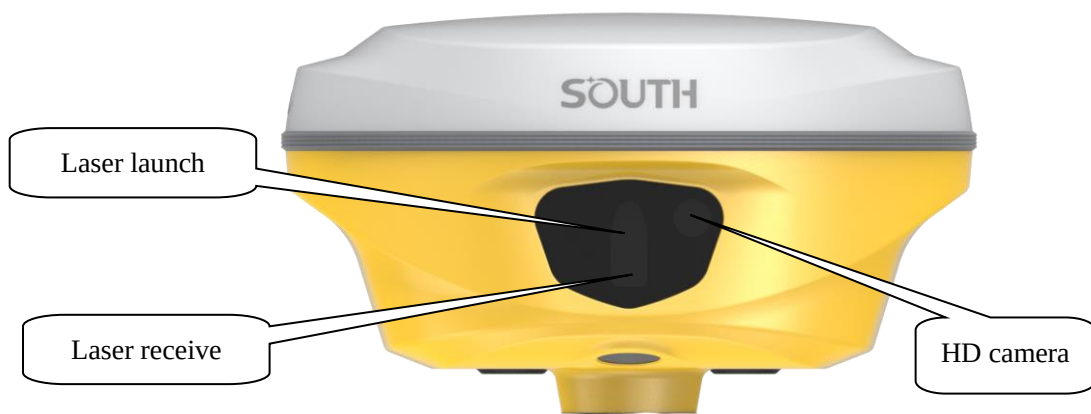
Chapter 2 ALPS2 receiver introduction

§2.1 Receiver components

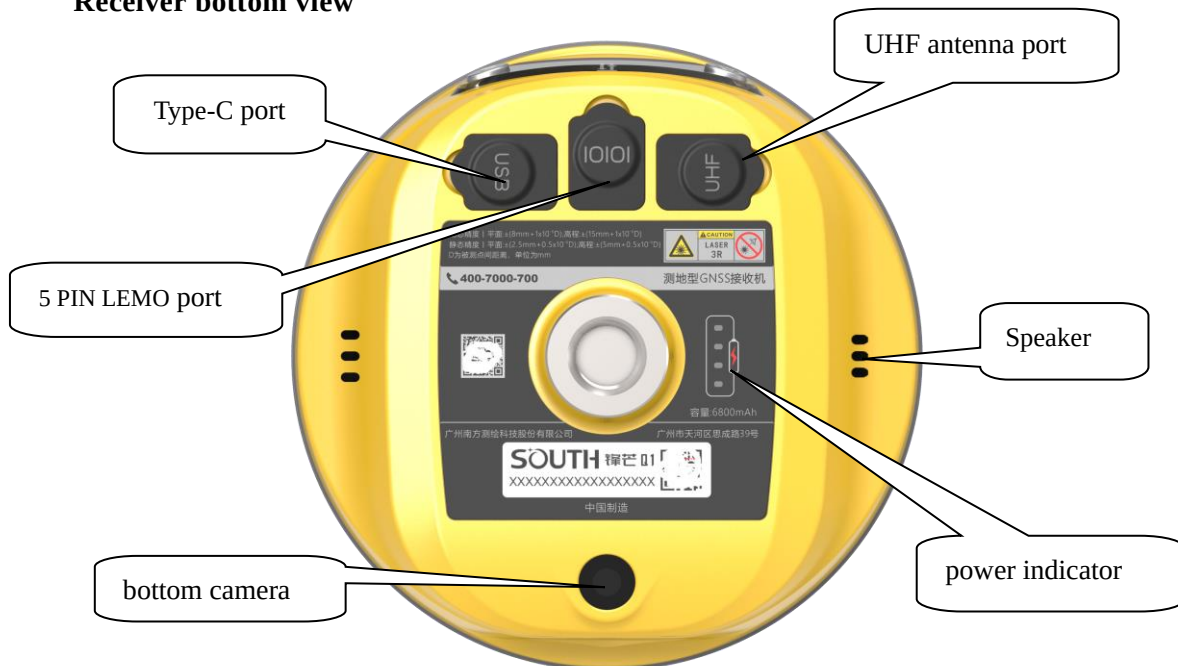
Receiver front view



Receiver back view



Receiver bottom view



- **Type-C port:** for static data downloading, OTG (for external storage) and charging.
- **5-Pin port:**
 - 1) As a power port connected with an external power supply device.
 - 2) As a differential transmission port connected with an external radio.
 - 3) As a serial port to check data output and debug.
- **Power indicator light:** Displays the current battery, with one bar representing 25% charge.
- **Speaker:** Voice broadcast.
- **UHF antenna port:** Install UHF antenna.

§2.2 Receiver screen menu

§2.2.1 Main display interface



Ref	Component	Description
	Power Button	1) Power on/off 2) Select menu
	power Button	Indicates the status of the device
	Data Indicator	Keep yellow when turn on. Flash green when Fixed solution. Flash red when not Fixed with the correction signal.

§2.3 Hardware Operation

Power on

After pressing the power button for three seconds, the instrument can be turned on and used normally.

Power off

Press the power button and hold for a while, after 3 beeps and the “Power off” voice prompt at the third beeping, release power button, the instrument will switch off.

Check working mode

Press the power button for once in the state of power-on, the instrument will prompt with voice message about current working mode (for example, “Rover, internal radio mode”).

Self-check

Self-check is an useful operation to simply check the main hardware components if the instrument is abnormal or not working properly.

Press and hold the power button for about 10 seconds and pass over the state of power off and mode selection (do not release the button even the instrument says power off and start to set work mode), then ALPS2 will say “start to self-check”, at this moment, release power button, the instrument will perform self-check automatically for the modules one by one.

The sequence of modules checking is:

OEM board checking

UHF module checking

Sensors checking

WiFi module checking

Bluetooth module checking

EPPROM checking

If all the modules are normal during self-check, the instrument will get into the state of power-on.

Factory reset

Press and hold the power button for about 15 seconds and pass over the foregoing states (power off, mode selection, self-check, USB mode setting), ALPS2 will get into factory reset progress with voice message saying “start to restore factory default”, at this moment, release power button, the instrument is performing the factory reset automatically. After this progress complete, the instrument will restart automatically with the factory default settings.

Charging

Charging state, in the middle of the charging process, the red light will turn green when full. Lamp power display current power, each light on represents 25% power.

In charging 

Full charged 

Chapter 3 Web UI Management

§3.1 Overview

Because of using the smart embedded Linux operating system and SOUTH intelligent cloud

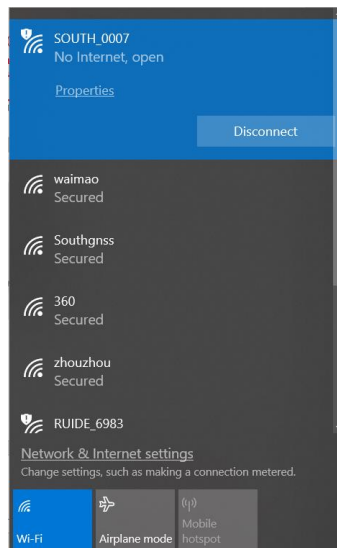
technology, the web UI allows users to configure and monitor the status of ALPS2 in real-time. The accessing way is not only by WiFi connection, but also can be USB mode.

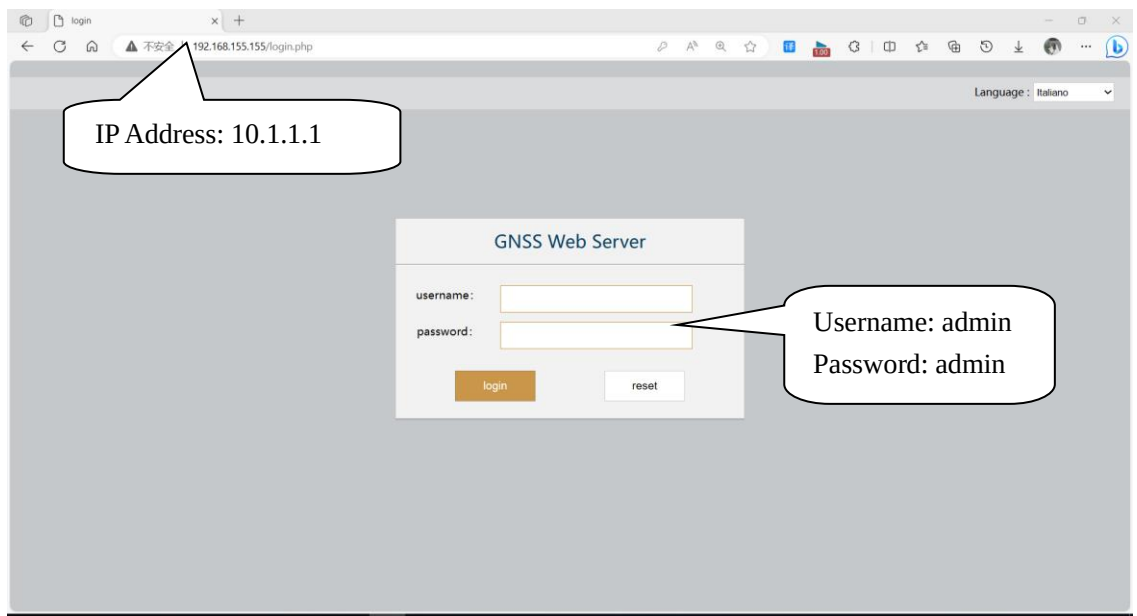
§3.2 Access by WiFi

The WIFI hotspot is default broadcasted by ALPS2, search the WIFI hotspot which named with SOUTH_xxxx using smartphone, tablet or laptop, then establish the WIFI connection, input the **default IP (10.1.1.1)** into browser, on the login interface, apply “admin” for the username and password.

For example, search the WIFI hotspot broadcasted by a ALPS2 receiver using a laptop PC, choose the WIFI hotspot and click on connect button to establish the connection without password.

Run IE browser on computer and input the **default IP (10.1.1.1)** into address bar, after a while, the system login interface is refreshed, then apply “**admin**” for username and password to login.



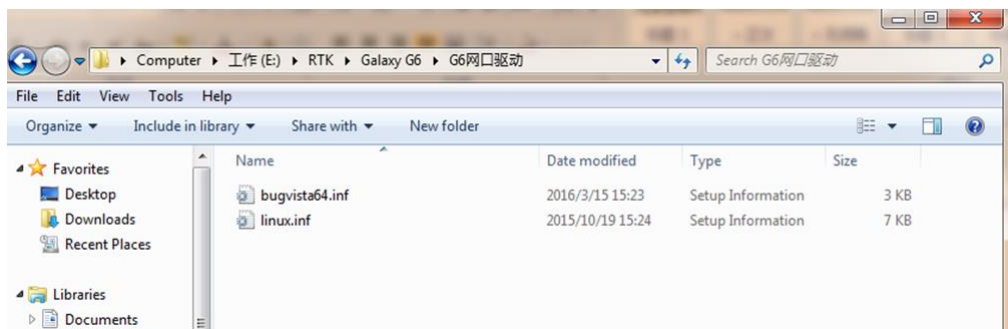


§3.3 Access by USB

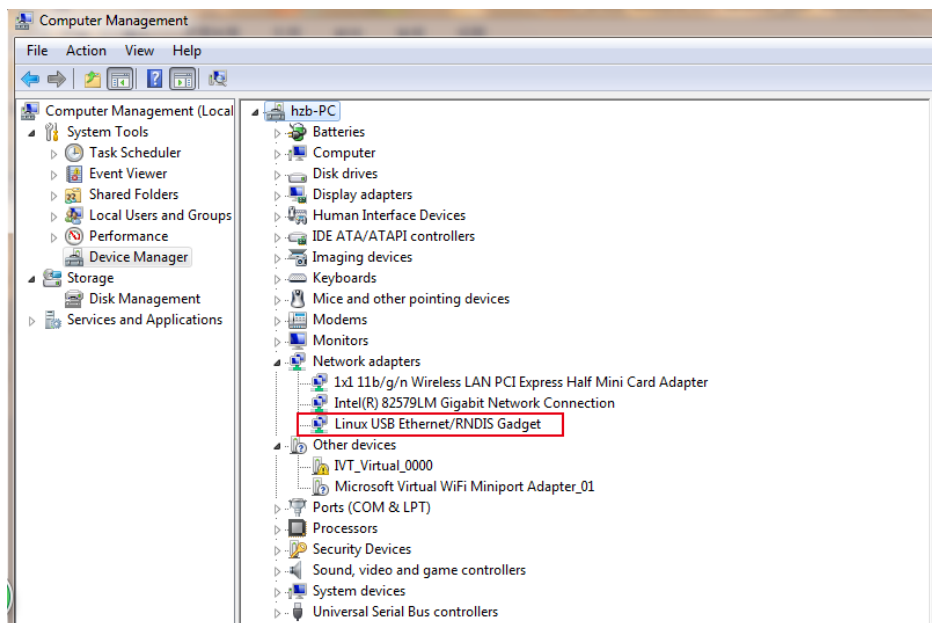
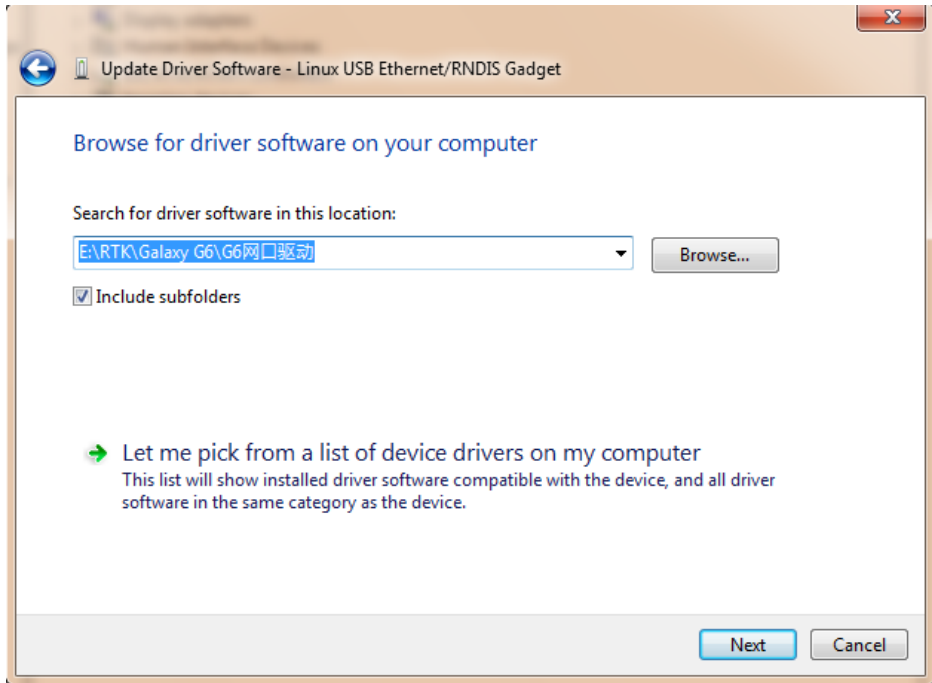
On this mode, the Type-C USB port of ALPS2 must work as an Ethernet port, then internal web UI shall be accessed via USB cable connection with computer.

First of all, a corresponding driver is required to install to the computer, then this function could be activated.

Due to different operating system is installed on computer, the drivers should be applied to a suitable one. The file [bugvista64.inf](#) is applied to 64bit operating system, and [linux.inf](#) is for 32bit operating system.



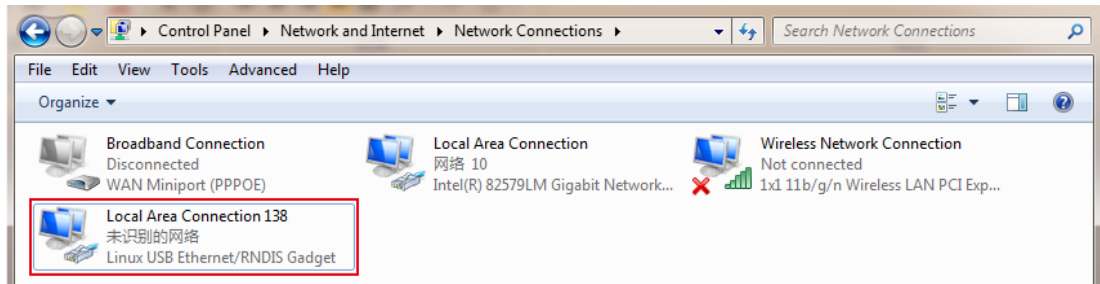
Choose the folder which contains the drivers



NOTE: The driver can be downloaded from official website automatically or please contact with us for more supports.

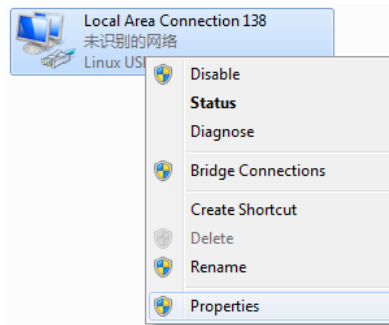
If the driver has been successfully installed, the USB port of ALPS2 will be recognized as **Linux USB Ethernet/RNDIS Gadget**, and a local area connection will generate in **Network**

Connections on the computer. For example, Local Area Connection 138 generates after connecting ALPS2 receiver to computer via USB network interface.

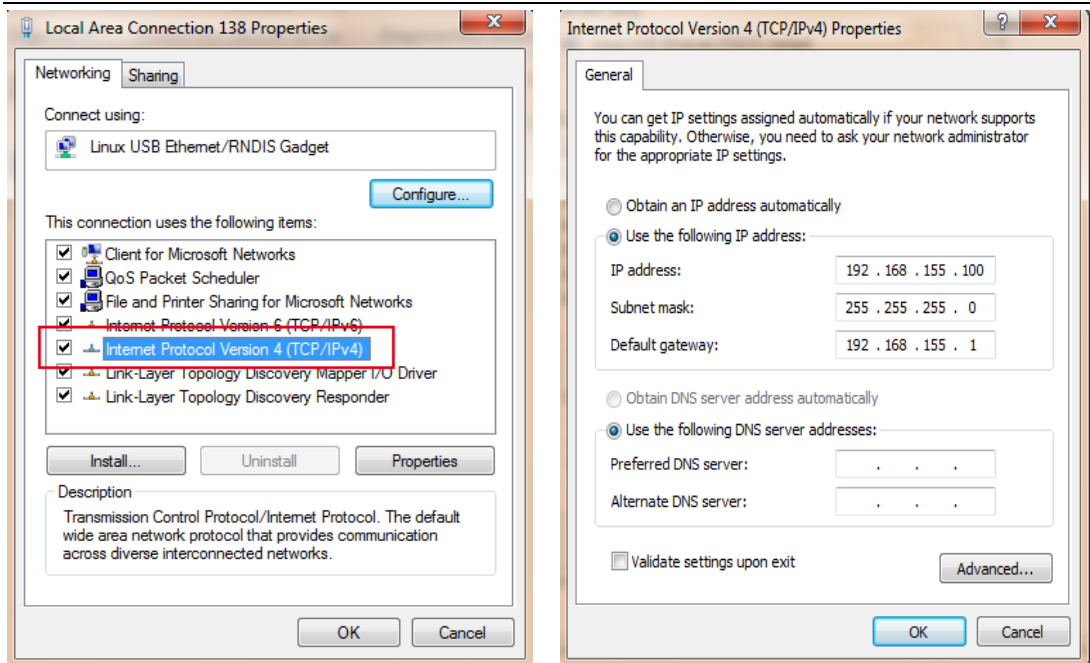


However, sometimes the computer cannot detect the receiver by USB network interface because there is something wrong with acquiring IP automatically, therefore, we need to do something to avoid such problem, that is to set a fixed LAN IP for the connection:

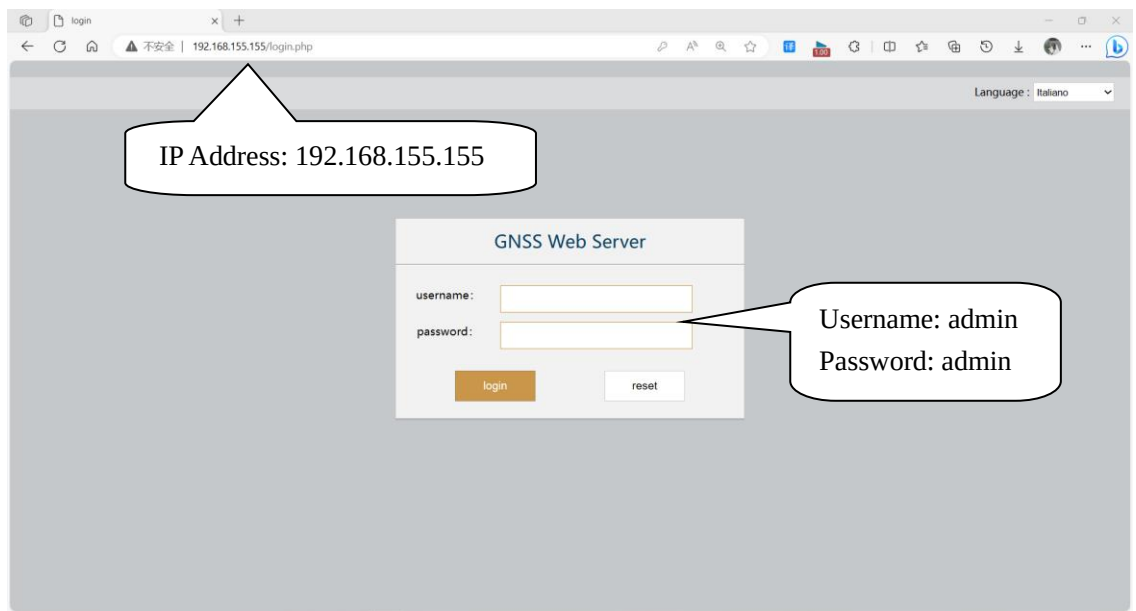
Right click on the local area connection which newly generates, choose properties to call out the local area connection properties window.



Then double click on Internet Protocol Version 4 (TCP/IPv4) option or click on properties button to call out Internet Protocol Version 4 (TCP/IPv4) properties window, set the fixed LAN IP address as shown in following, then click OK button and confirm the settings, return to the IE browser and use the IP address 192.168.155.155 to access the internal web UI.

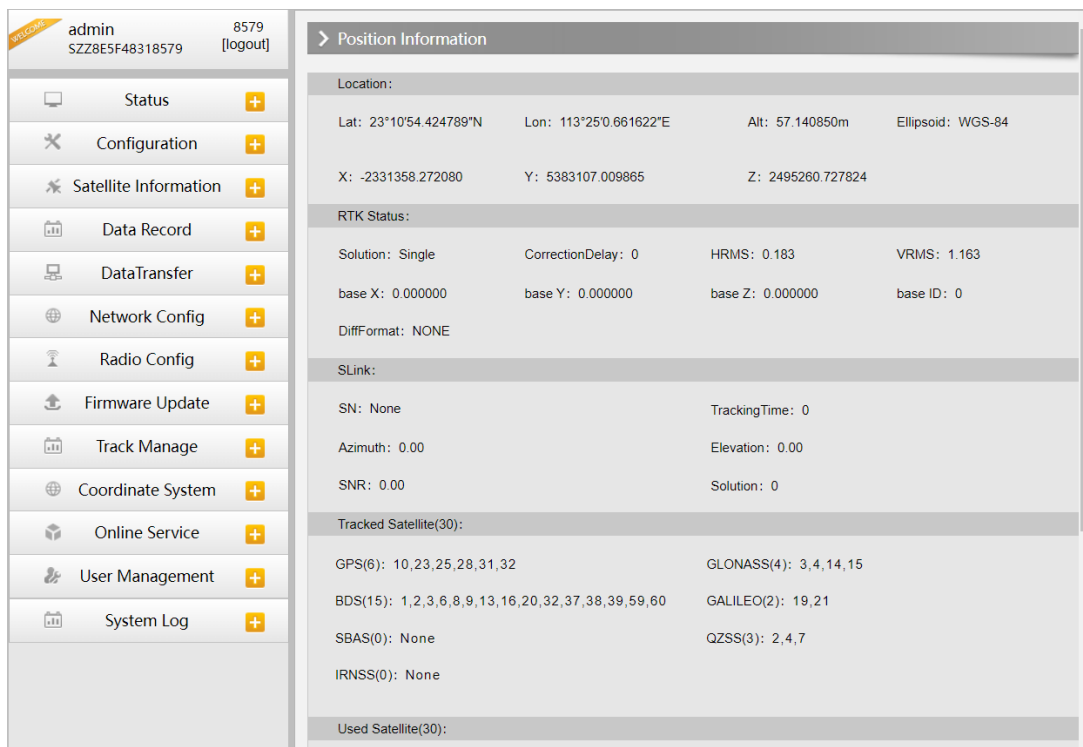


Run IE browser on computer and input the **default IP (192.168.155.155)** into address bar, after a while, the system login interface is refreshed, then apply **“admin”** for username and password to login.



§3.4 Web UI main interface

After login the Web UI management of ALPS2 by WIFI or USB connection, the main interface appears with displaying configuration items and positioning. As shown at following figures.



In the Web UI home page, the configuration items are listed at left side. And the positioning information including coordinates information and satellites are displayed at right side

Ref	Component	Description
	Status	Positioning information, satellite tracking and the others will be displayed in this page
	Configuration	It contains registration for receiver, base configuration, antenna configuration, satellite configuration, receiver configuration and system configuration.
	Satellite Information	Display and control the satellites are used or not
	Data Record	Configure the parameters for static mode and raw data download
	Data Transfer	Contains NTRIP configuration, TCP/IP configuration and data transferring with PC
	Network Config	Contains network parameters configuration, WIFI configuration and the other functions

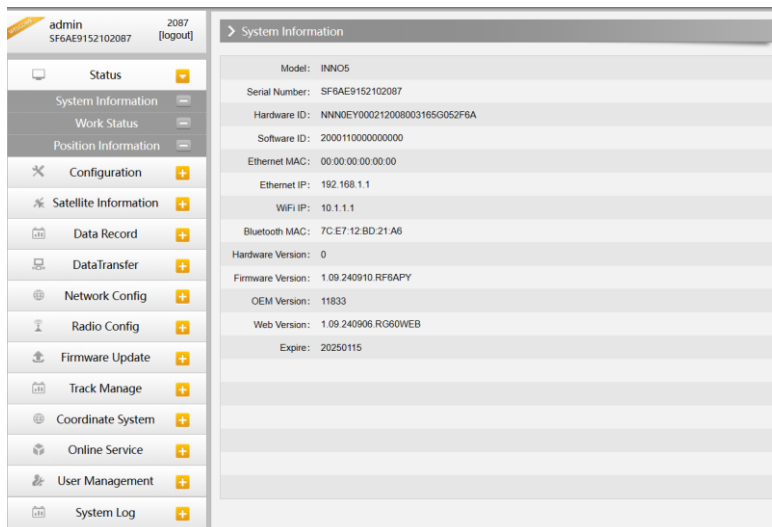
	Radio Config	Configure the parameters and frequency for radio modem
	Firmware Update	It is used to upgrade the firmware for receiver and each modem
	Track Manage	Record track file while doing measurement
	Coordinate System	Setup a local coordinate system forALPS2
	Online Service	Upload data onto a server in real-time
	User Management	Add and manage the Web UI users
	System Log	System and data log

§3.4.1 Status

System Information, Work Status and Position Information are listed under Status menu.

System Information

In this page, all the information of ALPS2 is displayed such as serial number, hardware ID, MAC address, firmware version and so on.



Work Status

The physical state of ALPS2 such as working mode, datalink, host temperature, remaining power and the free memory is obtained from this page

admin

SZZ8E5F48318579

8579

[logout]

Status

System Information

Work Status

Position Information

Configuration

Satellite Information

Data Record

DataTransfer

Network Config

Radio Config

Firmware Update

Track Manage

Coordinate System

Online Service

User Management

System Log

Work Status

Work Mode: Rover

Datalink: Bluetooth

Host Temperature: 62.20 °C

OEM Temperature: N/A

Power Type: Internal Battery

ExtPower Voltage: 4.69 V

BatteryVoltage: 7.80 V

Storage Type: Internal Memory

WorkTime: 00:35:00 HH:mm:ss

Battery Remaining

Battery Remaining80%

Disk Capacity

0M Used1498M

Free2586.00M

Position Information

In this page, users can be clear at a glance on current position information and satellite information

admin

SZZ8E5F48318579

8579

[logout]

Status

System Information

Work Status

Position Information

Configuration

Satellite Information

Data Record

DataTransfer

Network Config

Radio Config

Firmware Update

Track Manage

Coordinate System

Online Service

User Management

System Log

Position Information

Location:

Lat: 23°10'54.428356"N

Lon: 113°25'0.665185"E

Alt: 56.671202m

Ellipsoid: WGS-84

X: -2331358.176340

Y: 5383106.533784

Z: 2495260.643804

RTK Status:

Solution: Single

CorrectionDelay: 0

HRMS: 0.181

VRMS: 1.112

base X: 0.000000

base Y: 0.000000

base Z: 0.000000

base ID: 0

DiffFormat: NONE

SLink:

SN: None

TrackingTime: 0

Azimuth: 0.00

Elevation: 0.00

SNR: 0.00

Solution: 0

Tracked Satellite(30):

GPS(6): 10,23,25,28,31,32

GLONASS(4): 3,4,14,15

BDS(15): 1,2,3,6,8,9,13,16,20,32,37,38,39,59,60

GALILEO(2): 19,21

SBAS(0): None

QZSS(3): 2,4,7

IRNSS(0): None

Used Satellite(30):

§3.4.2 Configuration

General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operate and Default Language are contained under Configuration menu. Users are able to configure all kinds of parameters for ALPS2 under Configuration menu, and all the settings are immediate effect after saving.

General Config

The registration for receiver working mode setting can be completed in this general configuration page.

The screenshot displays the 'General Config' web interface. On the left is a sidebar menu with various system management options. The main panel is titled 'General Config' and is divided into two primary sections: 'Register' and 'Mode Setting'.

Register Section:

- Serial Number:** SZZ8E5F48318579
- Code:** 87A5FFF7BCEFB5541A46348B8BAF8E5254E (with a 'Register' button)
- ExpiredDate:** 20240925
- OnlineRegistration:** OnlineRegi (with a 'Register' button)
- OEMRegisterCode:** 0 (with a 'Register' button)

Mode Setting Section:

- Work Mode:** Rover (dropdown menu)
- Datalink:** Bluetooth (dropdown menu)
- Radio Router:** None (dropdown menu)
- Radio Transfer:** ☐
- RTK Record:** ☐
- xFillEnable:** ☐
- 1PPS:** ☒
- WiseLinkRoute:** ☐
- EVENT:** ☒
- EVENT Polarity:** Positive (dropdown menu)

If the code of ALPS2 has expired or is going to be run out, please provide the serial number of your ALPS2 for us to apply for another available code, then input the code into the blank or register the receiver online.

> General Config

Register:

Serial Number: SZZ8E5F48318579

Code:

ExpiredDate: 20240925

OnlineRegistration:

OEMRegisterCode:

ALPS2 allows users to setup the working mode and datalink from this Web UI that only need the mobile phone or tablet PC is able to connect the wifi hotspot of ALPS2.

Mode Setting:

Work Mode:

Datalink:

Radio Router:

Radio Transfer: ☐

RTK Record: ☐

xFillEnable: ☐

1PPS: ☒

WiseLinkRoute: ☐

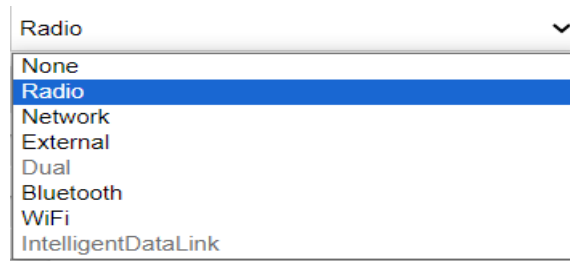
EVENT: ☐

EVENT Polarity:

BDSPPP:

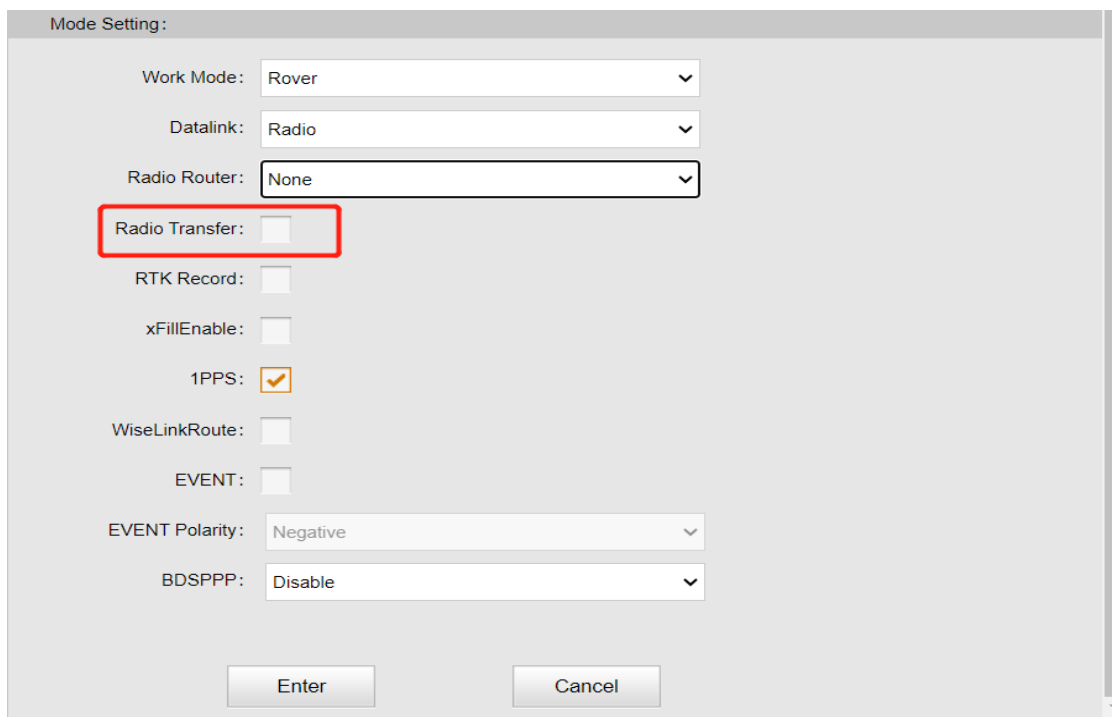
Work Mode: There are Rover, Base and Static contained in this dropdown list

Datalink: Pull down the list, there will be all kinds of options for datalink, such as radio, Network, External, Bluetooth, WIFI.



A dropdown menu with a grey header bar containing the text "Radio" and a downward arrow. The menu is open, showing a list of options: "None", "Radio" (highlighted in blue), "Network", "External", "Dual", "Bluetooth", "WiFi", and "IntelligentDataLink".

RadioTransfer: This is the function that ALPS2 is able to transfer the correction from Base station to the other rovers with the internal UHF, definitely,ALPS2 can work as a radio transfer (radio repeater).



A "Mode Setting" dialog box with a grey header bar. It contains several configuration options:

- Work Mode: Rover (dropdown)
- Datalink: Radio (dropdown)
- Radio Router: None (dropdown)
- Radio Transfer: ☐ (checkbox, highlighted with a red rectangle)
- RTK Record: ☐ (checkbox)
- xFillEnable: ☐ (checkbox)
- 1PPS: ☒ (checkbox)
- WiseLinkRoute: ☐ (checkbox)
- EVENT: ☐ (checkbox)
- EVENT Polarity: Negative (dropdown)
- BDSPPP: Disable (dropdown)

At the bottom are two buttons: "Enter" and "Cancel".

Operation:

1, check the box of "RadioTransfer" on "General Config" dialog for Base station.

Mode Setting:

Work Mode: Base ▼

Datalink: Radio ▼

Radio Router: None ▼

Radio Transfer: ☒

2, open the same function for Rover in critical status (when the Rover is close to working distance of Base internal UHF).

Mode Setting:

Work Mode: Rover ▼

Datalink: Radio ▼

Radio Router: None ▼

Radio Transfer: ☒

3, configure the datalink of the other rovers into internal UHF mode, then make sure the channel, protocol and frequency point are same as “Repeater” rover.

Note: please take in mind that the “Repeater” rover should keep away from Base station to avoid signal interference.

RTK Record: This is used to enable raw data recording in base mode or rover mode for post-processing

xFillEnable: the “Fixed-keep” function, to allow ALPS2 keep the centimeter-level accuracy when the correction is missing

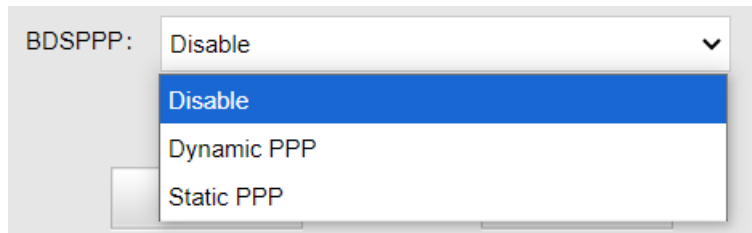
1 PPS: This option is for the 1 pulse per second output

WiseLinkRoute: receivers first priority to use internet transmit and receive corrections (a internet server is needed), if lost the internet signals, then receivers will use radio transmit and receive corrections

EVENT: This option is for the EVENT marker input

EVENT Polarity: EVENT input method.

BDSPPP: Disable BDSPPP function, Dynamic PPP(rover) and Static PPP(static).



Base Setup

When ALPS2 works as a base, the basic configuration for base can be setup in this page. Users can input the correct coordinates or capture a current position for the base. Also users can define what kind of correction format is transmitted.

CMR ID/RTCM2.X ID/RTCM3.X ID: Users can specify the ID for transmitting correction.

Position: Click this button to capture the coordinates for current position

Spare: This is used to the repeat station

Base Start Mode: Here contains 3 methods to start the Base, manually start base, automatically start base by fixed point, automatically start base by current point.

SLink Base Accuracy: Here contains 3 methods to make sure the Base accuracy, L, M, H. Choose different methods according to different needs.

Correction: Here contains the global general used correction formats including RTD, RTCM23, RTCM30, RTCM32, CMR and SCMRx

DifferInterval: Base differential transmit interval (seconds/once)

PDOP Value: This value is setup for the PDOP limitation.

Status: Here will display the status for base in real-time.

Antenna Setup

The antenna parameters are configured in this page including the antenna height, measuring method.

The screenshot displays the 'Antenna Setup' configuration window. On the left is a sidebar menu with icons and labels for various system settings. The main panel on the right is titled 'Antenna Setup' and contains several input fields: 'Antenna NO#' with the value 'SF6AE9152102087', 'Antenna Height' set to '2.000' with a unit 'm', 'MeasuringMethod' set to 'Height Tape', 'Model' set to 'INNO5-B', 'RINEX' set to 'INNO5-B', 'AntennaR' set to '0', 'AntennaHL1' set to '710.04', and 'AntennaHL2' set to '738.52'. At the bottom of the main panel are 'Enter' and 'Cancel' buttons.

Antenna Height: This is the value for height of antenna while surveying.

Measuring Method: Here provides several methods for measuring the antenna height such as carrier phase center, slant height, antenna edge, height plate and to the bottom.

This is a close-up of the 'MeasuringMethod' dropdown menu. The menu is open, showing a list of options. The first option is 'To The Bottom'. The second option, 'Carrier Phase Center', is highlighted with a blue background. Below it are 'Slant Height', 'Antenna Edge', 'Height Tape', and another 'To The Bottom' option. The dropdown arrow is visible on the right side of the menu header.

Satellite Tracking

In this page, users can define the mask angle for satellite tracking, and check on the box of corresponding band from the constellation that to use this band or not

Type	Signal	Selection
GPS	L1-C/A	☒
GPS	L1-P	☒
GPS	L2-C/A	☐
GPS	L2-P	☒
GPS	L5	☒
GLONASS	L1-C/A	☒
GLONASS	L1-P	☐
GLONASS	L2-C/A	☐
GLONASS	L2-P	☒
GLONASS	L3	☐
BDS	B1	☒
BDS	B2	☒
BDS	B3	☒
BDS	B2A	☒
SBAS	L1-C/A	☐
SBAS	L5	☐
GALILEO	E1	☒

Receiver Operation

The page provides all kinds of operations to control the receiver such as self-check operation, clean epochs, factory reset, reboot and power off.

Item	Module	Operation	Status
1	OEM	<button>Check</button>	No Action
2	Radio	<button>Check</button>	No Action
3	NetModule	<button>Check</button>	No Action
4	WiFi	<button>Check</button>	No Action
5	Bluetooth	<button>Check</button>	No Action
6	Sensor	<button>Check</button>	No Action
7	EEPROM	<button>Check</button>	No Action

Check all

Default Settings: (Caution: This operation will reset all parameters!)

Clean EPH Factory Default

Restore Default : Ethernet IP: 192.168.1.1 Subnet Mask: 255.255.255.0 Default Gateway: 192.168.1.1
 WiFi mode: AP WiFi IP: 10.1.1.1 Web port: 80
 WiFi SSID: galaxy WiFi Code: None User and Password: admin

Self-check: Users can also do the self-check from this configuration page, click on the Check all button to check all the modems or click on the check button corresponding to the modem to check one by one.

Clean EPH: Click this button to clear the remaining epochs to let receiver track the satellites better.

Factory Default: Click this button to bring the receiver back to factory default setting.

Reboot: Click this button to restart the receiver.

Power Off: Click this button to power off the receiver.

Reset OEM(cold): to reset OEM, and receiver will restart.

Reset OEM(hot): to reset OEM, receiver will not need to restart.

System Setup

This page is used to control Voice prompt, volume of voice, power saving, USB mode and the default language for receiver.

The screenshot displays the 'System Setup' web interface for the ALPS2 receiver. The left sidebar contains a navigation menu with the following items: Status, Configuration, General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operation, System Setup, Receiver Security, Satellite Information, Data Record, Data Transfer, Network Config, Radio Config, Firmware Update, Track Manage, Coordinate System, and Online Service. The main content area is titled 'System Setup' and includes the following configuration options:

- Voice:** ☒ (checked)
- OEMUserDefEnable:** ☐ Yes ☒ No
- RTKEngine:** ☐ Yes ☒ No
- Volume:** Medium (dropdown menu)
- Power Mode:** Normal (dropdown menu)
- USB:** (dropdown menu)
- Default Language:** English (dropdown menu)
- Time Zone(h):** +8.0(Beijing China) (dropdown menu)
- FixedMode:** Narrow (dropdown menu)
- NmeaHeader:** GN (dropdown menu)
- SelfDefine Module:** NULL (dropdown menu)
- Authority Zone:** Global-20991215
- RTXSatellite:** Auto (dropdown menu)
- Satellites View Mode:** Solving Satellite (dropdown menu)
- Satellite System:** All (dropdown menu)
- Enhanced Positioning:** Disable (dropdown menu)
- ITRFEpoch:** 2005 (dropdown menu)

Voice: Check on this box to turn on the voice guide for ALPS2, uncheck it to turn off the voice guide.

OEMUserdefEnable: check “No” for ALPS2.

RTKEngine: check “No” for ALPS2.

Voice Volume: Define the voice volume for ALPS2’s speaker.

Power Mode: Configure the receiver to use the power saving mode or not.

USB: Now ALPS2 supports the USB mode and Network interface at the same time through the usb type-c cable.

Default Language: Configure the default language for ALPS2 which associates with voice guide.

TimeZone(h): Use this to setup the corresponding time zone for your country or area.

FixedMode: Some receiver has the option for fixed mode narrow or wide, but this option is not

working on ALPS2.

NMEAheader: Choose the output data header in GN, GP or HE format.

Self-defense module: To set a user-defined work mode and output mode for receiver. Usually please choose NULL.

Authority zone: Default means the default area. Global-20991215 means it can work in all around the world.

Authority Zone: Default-20231127

Authority Zone: Global-20991215

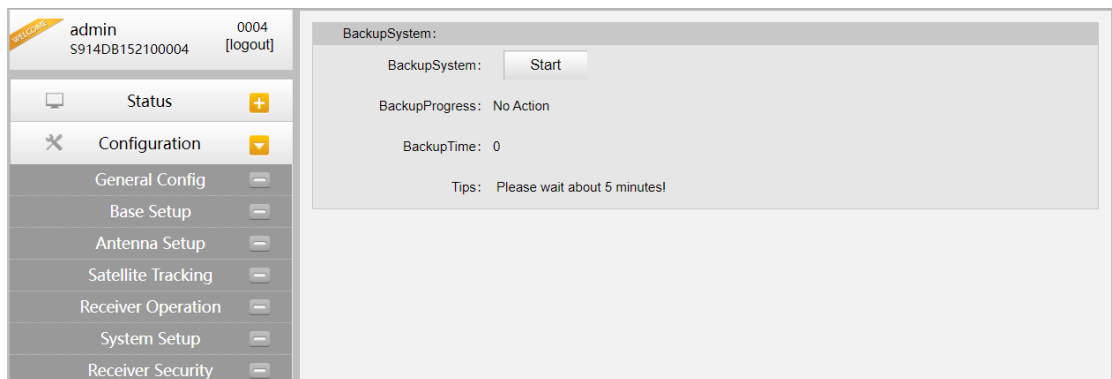
Satellites View Mode: There are two methods, Solving Satellite and Common Visible Satellite.

Satellites System: You can choose the different satellite systems in here.

Enhanced Positioning: It has a big influence for RTK when the ionosphere is active, so you can try turn on this feature.

ITRFEpoch: epoch selection, select an epoch at a different time based on the update time.

Receiver security: to backup the receiver system, so that we can use the backup system if the receiver has any problem.



§3.4.3 Satellite Information

The “Satellite Information” provides all kinds of tables, graph and the skyplot to view the information of tracking satellites. And it is allowed to configure to use which satellite in constellation on/off page by checking on the corresponding box.

Tacking Table

Here is the table to list all current used satellites and the other information for these satellites.

admin
S914DB152100011

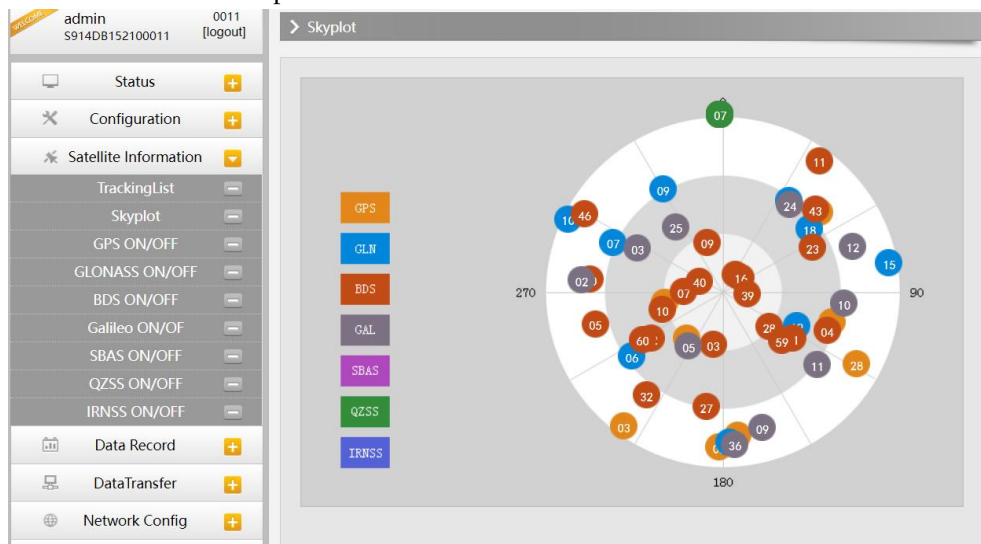
0011
[logout]

TrackingList

SN	Type	Elevation	Azimuth	L1SNR	Code	L2SNR	Code	L5SNR	Code	Status
2	GPS	8.12	180.63	39.00	CA	33.00	P	0.00	-	In Use
3	GPS	4.13	215.07	33.00	CA	33.00	P	37.00	I	In Use
4	GPS	61.03	256.92	46.00	CA	48.00	P	49.00	I	In Use
7	GPS	5.75	312.49	30.00	CA	0.00	-	0.00	-	In Use
8	GPS	58.83	212.97	49.00	CA	47.00	P	49.00	I	In Use
9	GPS	35.17	302.11	44.00	CA	43.00	P	45.00	I	In Use
16	GPS	41.10	26.18	45.00	CA	37.00	P	0.00	-	In Use
21	GPS	13.59	173.41	41.00	CA	35.00	P	0.00	-	In Use
26	GPS	26.25	51.60	41.00	CA	40.00	P	40.00	I	In Use
27	GPS	74.77	51.19	48.00	CA	48.00	P	50.00	I	In Use
28	GPS	10.90	118.74	38.00	CA	40.00	P	41.00	I	In Use
31	GPS	30.61	106.02	44.00	CA	40.00	P	0.00	-	In Use
6	GLONASS	33.74	232.72	37.00	CA	0.00	-	0.00	-	In Use
7	GLONASS	30.29	294.23	49.00	CA	46.00	P	0.00	-	In Use
9	GLONASS	30.63	330.10	46.00	CA	46.00	P	0.00	-	In Use
10	GLONASS	4.46	294.69	33.00	CA	0.00	-	0.00	-	In Use
15	GLONASS	3.26	80.54	26.00	CA	24.00	P	0.00	-	In Use
16	GLONASS	32.42	36.97	48.00	CA	44.00	P	0.00	-	In Use
18	GLONASS	34.93	56.22	46.00	CA	44.00	P	0.00	-	In Use

Skyplot

In this page, all the tracking satellites are shown on the skyplot, this let users intuitively view and know where the current position of satellite is.



GPS on/off

For all the running GNSS constellations or the augmentation system,ALPS2 allows to configure to use which satellite or not.

In gnss on/off page, all the running satellites are listed, and unselect the box corresponding to the satellite to not use it.

admin 0011
S914DB152100011 [logout]

> GPS ON/OFF

SN	
GPS1	☒
GPS2	☒
GPS3	☒
GPS4	☒
GPS5	☒
GPS6	☒
GPS7	☒
GPS8	☒
GPS9	☒
GPS10	☒
GPS11	☒
GPS12	☒
GPS13	☒
GPS14	☒
GPS15	☒
GPS16	☒
GPS17	☒
GPS18	☒
GPS19	☒

Status +
 Configuration +
 Satellite Information -
 TrackingList -
 Skyplot -
 GPS ON/OFF -
 GLONASS ON/OFF -
 BDS ON/OFF -
 Galileo ON/OFF -
 SBAS ON/OFF -
 QZSS ON/OFF -
 IRNSS ON/OFF -
 Data Record +
 DataTransfer +
 Network Config +
 Radio Config +
 Firmware Update +
 Track Manage +

GLONASS on/off: to check and uncheck the satellites for tracking

BDS on/off: to check and uncheck the satellites for tracking

GALILEO on/off: to check and uncheck the satellites for tracking

SBAS on/off: to check and uncheck the satellites for tracking

QZSS on/off: to check and uncheck the satellites for tracking

IRNSS on/off: to check and uncheck the satellites for tracking

§3.4.4 Data Record

The “Data Record” performance is mainly used to configure all the parameters for receiver in static mode. Much more operations can be done on ALPS2 such as storage path, interval, data format and data files download.

Recording Config

The page provides more practical operations for raw data storage.

Storage Option: Here are the options to be selected for where the raw data will be stored, internal memory or external memory.

Interval: This is the sampling interval for data storage, 50Hz (0.02s) sampling interval now is available for ALPS2.

File Interval: This is used to defined the data storage time for the static file.

Data Format: Here are 3 options to selected for ALPS2 to store what kind of format data, STH, Rinex2.0 and Rinex3.0.

Point Name: A point name is required, the last 4 digits of SN is default setting for the point name.

Auto Delete: This is used to configured ALPS2 to delete the previous data files automatically if the memory is full.

Format: Click this button to format the internal memory for ALPS2.

Recording Mode: Here are 2 options to configure ALPS2 to record raw data automatically or not if it achieves the sampling conditions.

Once Record Enable: to set a Timer for static recording, for example if set 5 minutes, then the receiver will only record 5 minutes, after that receiver will stop record static data.

Recording Status: Here shows the status(time) of static data storage.

Data Download

This page provides the data files to download.

Choose the storage where the static data recorded, and file type, then click on the blank of “Select Date” to choose what date the data was recorded and click “Get Data” button, all the files recorded in the date you choose will show in the table, tap download button to download the data files.

Item	Size	Data
1		[Download]
2		[Download]
3		[Download]
4		[Download]
5		[Download]
6		[Download]
7		[Download]
8		[Download]
9		[Download]
10		[Download]
11		[Download]
12		[Download]
13		[Download]

FTP Transmission

FTP is a file transfer protocol.

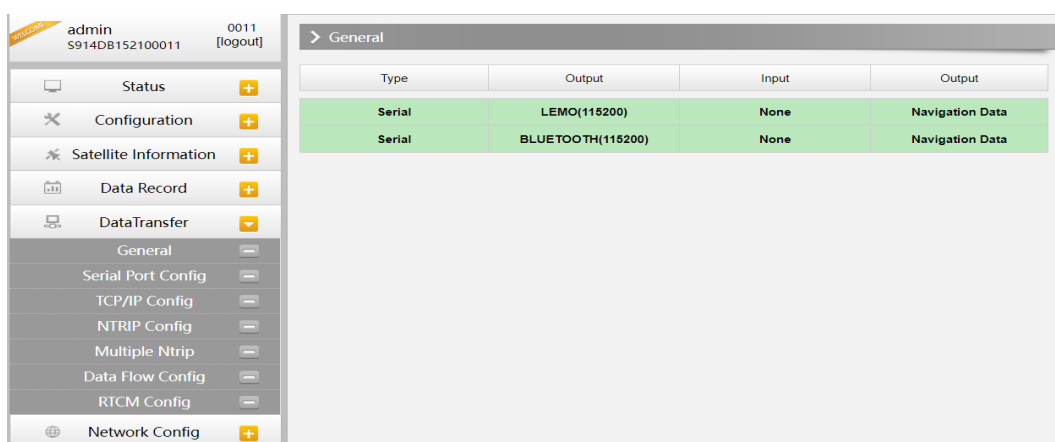
ALPS2 via FTP protocol, as ftp client mode to automatically send static and dynamic files on receiver disks to the ftp server.

§3.4.5 Data Transfer

This performance contains General, Serial Port Config, TCP/IP Config, NTRIP Config and Data Flow Config. The “Data Transfer” allows to configure the output mode for raw observation data and differential data, as well as to the NTRIP performance configuration.

General

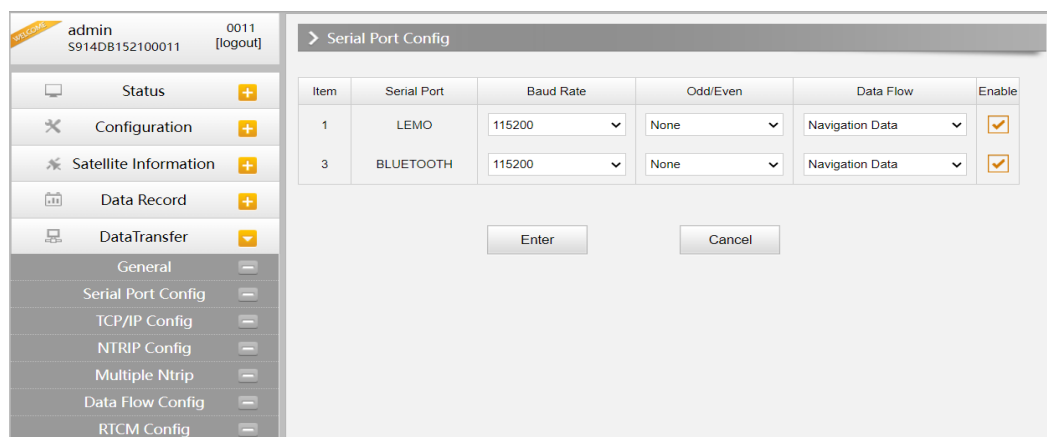
This page shows the service condition and the output contents of the ports, if the port item display in green, that means the port is being used, and the port is not used while the item display in red.



Type	Output	Input	Output
Serial	LEMO(115200)	None	Navigation Data
Serial	BLUETOOTH(115200)	None	Navigation Data

Serial port Config

This page is allowed to configure the baud rate, odd-even check and the data flow for serial port (5-pin port) and Bluetooth.



Item	Serial Port	Baud Rate	Odd/Even	Data Flow	Enable
1	LEMO	115200	None	Navigation Data	☒
3	BLUETOOTH	115200	None	Navigation Data	☒



CAUTION: do not change the default value in this page for each item, if you want to change the settings, please contact with SOUTH technician for further support.

In the dropdown list of data flow, there shows 4 items for selection.

Raw observation data: This is the raw observation data straight from OEM board.

Correction Data: This is the correction data straight from OEM board.

Navigation Data: This is the navigation data output from receiver such as NMEA-0183, GSV, AVR, RMC and so on. It is configured in Data Flow Config page.

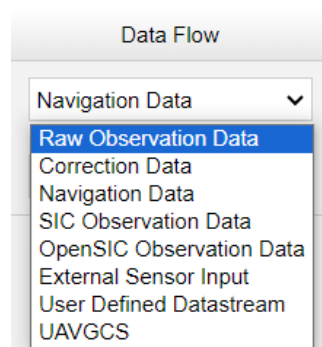
SIC Observation Data: This is the user-defined format observation data from SOUTH.

OpenSIC Observation Data: This is the open version of SOUTH user-defined format observation data for secondary development.

External Sensor Input: The Data that input via an external sensor.

User Defined Datastream: You can choose this option when you want to defined datastream.

UAVGCS: UAV data format.



TCP/IP Config

This is used to configured the raw data or navigation data to be uploaded or transferred to a server. And there are Caster and Server working mode for this performance.

Caster: If this working mode is selected, ALPS2 will be a client to upload the data to a specify server if it connects to the internet by WIFI. Input the specified IP and port for server, and the data format what is uploaded. Then users are able to see the uploaded data on server.

Server: ALPS2 will upload the data onto internet by the static WIFI if server is selected, then users are able to obtain its dynamic data by accessing to ALPS2 through the IP from receiver.

Item	Work Mode	Local Port	Server Ip	Server Port	Data Flow	Time Out	SM	Status	Enable
1	Caster	1111	58.248.35.130	2010	Navigation Data	0		Disconnected	
2	Caster	2222	58.248.35.130	2010	Navigation Data	0		Disconnected	
3	Caster	3333	58.248.35.130	2010	Navigation Data	0		Disconnected	
4	Caster	4444	58.248.35.130	2010	Navigation Data	0		Disconnected	
5	Caster	5555	58.248.35.130	2010	Navigation Data	0		Disconnected	
6	Caster	6661	58.248.35.130	2020	Navigation Data	0		Disconnected	
7	Caster	7771	58.248.35.130	2020	Navigation Data	0		Disconnected	
8	Caster	8881	58.248.35.130	2020	Navigation Data	0		Disconnected	
9	Caster	9991	58.248.35.130	2020	Navigation Data	0		Disconnected	
10	Caster	9911	58.248.35.130	2020	Navigation Data	0		Disconnected	

NTRIP Config

This is used to configure the NTRIP performance while receiver is going to connect to internet. ALPS2 supports complete NTRIP performance including NTRIP Client, NTRIP Server and NTRIP Caster.

NTRIP Client:

Status: Disconnected

Enable: ☐

Mode: ☐ Eagle ☐ TCP/IP ☐ LARK ☐ WiseLink ☐ CMCC

Address: 219.135.151.189

NtripClientPort: 6600

username: 0262

password: ****

Access Point: 0800_MSM4

GetPoint Status: Not acquired

NTRIP Server:

Status: Disconnected

Enable: ☐

Version: NTRIPv1.0

Mode: ☐ Eagle ☐ LARK ☐ WiseLink

Address: 58.248.35.130

NtripCasterPort: 2010

Multiple Ntrip

To transmit corrections to different server at the same time through Ntrip protocol

admin
S914DB152100004

0004
[logout]

Status

Configuration

Satellite Information

Data Record

DataTransfer

General

Serial Port Config

TCP/IP Config

NTRIP Config

Multiple Ntrip

Data Flow Config

RTCM Config

Network Config

Radio Config

Firmware Update

Track Manage

Coordinate System

Multiple Ntrip (Note: timeout refers to setting the timeout duration of interactive heartbeat in seconds)

Item	NtripVersion	Server Ip	Port	username	password	MountPoint	Data Flow	Time Out	Status	Enable
1	NTRIPv2.C	192.168.1.1	1110	0	0	0	Raw Observ	0	Disconnected	
2	NTRIPv2.C	192.168.1.1	2220	0	0	0	Raw Observ	0	Disconnected	
3	NTRIPv2.C	192.168.1.1	3330	0	0	0	Raw Observ	0	Disconnected	
4	NTRIPv2.C	192.168.1.1	4440	0	0	0	Raw Observ	0	Disconnected	
5	NTRIPv2.C	192.168.1.1	5550	0	0	0	Raw Observ	0	Disconnected	
6	NTRIPv2.C	192.168.1.1	6660	0	0	0	Raw Observ	0	Disconnected	
7	NTRIPv2.C	192.168.1.1	7770	0	0	0	Raw Observ	0	Disconnected	
8	NTRIPv2.C	192.168.1.1	8880	0	0	0	Raw Observ	0	Disconnected	
9	NTRIPv2.C	192.168.1.1	9990	0	0	0	Raw Observ	0	Disconnected	
10	NTRIPv2.C	192.168.1.1	9900	0	0	0	Raw Observ	0	Disconnected	

Enter

Cancel

Data Flow Config

In this page, users can optionally to configure the content and the update rate of data flow that to output or not to output what kind of data format.

Click on the dropdown list for each data format to define the update rate

admin
S914DB152100011

0011
[logout]

Status

Configuration

Satellite Information

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DataTransfer

General

Serial Port Config

TCP/IP Config

NTRIP Config

Multiple Ntrip

Data Flow Config

RTCM Config

Network Config

Radio Config

Firmware Update

Track Manage

Coordinate System

Online Service

Data Flow Config

Navigation Data:

GGA: OFF GSA: OFF GSV: OFF GST: OFF
ZDA: OFF BPQ: OFF PJK: OFF GLL: OFF
RMC: OFF VTG: OFF HDT: OFF GRS: OFF
TRA: OFF GGK: OFF

SIC Navigation Data:

PST: 1 GSI: 5 BSI: 10 TPI: OFF
VCV: OFF STA: 30 DEV: WhenChanged AAT: OFF
REC: OFF DAL: 10 EDP: OFF SLB: OFF
TRA: OFF PJK: OFF AVR: OFF TCM: OFF
SDF: OFF

Raw Observation Data:

Output Interval: 1 s
GPS Ephemeris: WhenChanged
GLONASS Ephemeris: WhenChanged
BDS Ephemeris: WhenChanged
GALILEO Ephemeris: WhenChanged

RTCM Config

In this page, users can set different differential signal formats.

admin 0613
S911C2148620613 [logout]

RTCM Config

Enable: ☐

RTCM32:

RTCM1004: OFF	RTCM1005: OFF	RTCM1006: OFF
RTCM1007: OFF	RTCM1008: OFF	RTCM1012: OFF
RTCM1019: OFF	RTCM1020: OFF	RTCM1033: OFF
RTCM1074: OFF	RTCM1084: OFF	RTCM1094: OFF
RTCM1124: OFF	RTCM1042: OFF	RTCM1046: OFF
RTCM1045: OFF	RTCM1230: OFF	RTCM1044: OFF
RTCM1114: OFF		

RTCM23:

RTCM1819: OFF

RTD:

RTCM1: OFF

Enter Cancel

§3.4.6 Network Config

The “Network Config” is able to configure the ways and the contents for internet access of New ALPS2 plus. GSM/GPRS Config, CSD Config, WIFI Config, Bluetooth Config, Port Forwarding, Router and Network Testing are under the list of Network Config

GSM/GPRS Config

ALPS2 does not support SIM card, so network settings are not introduced here.

GSM/GPRS Config

Status:

Signal:

ModuleMode: SC20-E

ModuleIMEI: 868022043131288

SIM IMSI: 0

SIM Card Status: Checking SIM Card...

Registration Status: Unregist

Connection Type: None

PPP Dial Status: Ununited

IP Address: 0.0.0.0

Parameter Config:

Enter: ☐

APN:

APN User Name:

APN Password:

ConnectType:

simCard:

SMS Config

On this configuration dialog, input a phone number into the blank, New ALPS2 plus will send text message onto the phone which number is written.

SMS Config

Status:

Signal:

SIM Card Status: Checking SIM Card...

Registration Status: Unregist

Parameter Config:

SMSEnable: ☐

SMSReport: ☐

*SMSReportNumber:

*PhoneNumber:

whiteList:

Enter Cancel

WIFI Config

This is mainly used on the WIFI configuration for ALPS2, there are AP mode and Client mode for optional.

AP: This is used to enable the WIFI hotspot for ALPS2 to broadcast for mobile terminals such as smartphone or tablet to connect and access the Web UI.

Check the box of AP in Work Mode to enable the WIFI hotspot for ALPS2, and define the SSID, password, encryption method and broadcasting channel for WIFI connection.

DHCP IP Range: This is allowed to user-defined the IP for Web UI login.

The screenshot displays the 'WIFI Config' interface. At the top, there's a header with 'admin', 'S914DB152100011', and '0011 [logout]'. The left sidebar lists various configuration options. The main content area is titled '> WIFI Config'. It includes an 'Enable' checkbox which is checked. Below it, 'Work Mode' has two radio buttons: 'AP' (selected) and 'Client'. The configuration fields for AP mode are as follows:

- AP_SSID: SOUTH_0011
- AP_Password: southgnss.com.cn
- APEncode: Open (dropdown)
- APChannel: 7 (dropdown)
- DHCP IPRange: Three radio buttons are present. The first is selected, corresponding to the IP range 10.1.1.0/255.255.255.0 (Default).

At the bottom of the configuration area, there are 'Enter' and 'Cancel' buttons.

Client:

This option enables ALPS2 to search and connect the other WIFI hotspot which connects to the internet, the receiver is able to download and use the mountpoint from reference station.

Client_SSID: This is the WIFI hotspot which ALPS2 is going to connect

Scan: Click this button to search the surrounding available WIFI hotspot.

Password: This is the password which the WIFI hotspot requires.

IP fields: If ALPS2 successfully connects to the WIFI, there will be an LAN IP address generated by ALPS2.

ClearSSID: Click this button to clear the SSID list.

admin
S914DB152100011

0011
[logout]

Status

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Satellite Information

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Network Config

GSM/GPRS Config

SMS Config

CSD Config

WIFI Config

Bluetooth Config

PortForwarding

Route

Network Testing

Radio Config

Firmware Update

Track Manage

Coordinate System

WIFI Config

Enable: ☒

Work Mode: ☐ AP ☒ Client

Client_SSID: southgnss

password: southgnss.com.cn

Encode: WPA2

DHCP: ☒

IP Address: 0 0 0

Subnet Mask: 255 255 255 0

Default Gateway: 0 0 0

Status: Ununited

Signal:

Clear SSID List: This action will clear all connection records, please be careful

Tips: Reboot the receiver after changing wifi work mode from AP to Client!

Bluetooth Config

In this page, users can view the information and connection status of Bluetooth, such the MAC of Bluetooth, discoverable or not, the PIN code, and the connection devices in following table.

The advanced Settings module enables Bluetooth search.

admin
S914DB152100011

0011
[logout]

Status

Configuration

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Network Config

GSM/GPRS Config

SMS Config

CSD Config

WIFI Config

Bluetooth Config

PortForwarding

Route

Network Testing

Radio Config

Bluetooth Config

Bluetooth Config:

Enable: ☒

Bluetooth MAC: B4-ED:D5:56:C9:CF

Discoverable: ☒

PIN Code: 0

Connected Device:

Item	Device Mac	RFCOMM Channel	Device Name	Disconnect Action
1				Disconnect
2				Disconnect

Port Forwarding

This page is mainly used to view and configure the internet transmission port for ALPS2, customize and debug receiver.

The screenshot shows the 'PortForwarding' configuration page. On the left is a sidebar menu with options: Status, Configuration, Satellite Information, Data Record, DataTransfer, Network Config (expanded), GSM/GPRS Config, SMS Config, CSD Config, WIFI Config, Bluetooth Config, PortForwarding, Route, and Network Testing. The main content area is titled 'PortForwarding' and contains the following fields:

- HTTP Port: 80
- FTP Port: 21
- TELNET Port: 23
- FTP Password:

At the bottom of the main area are 'Enter' and 'Cancel' buttons.



NOTE: Usually we will keep the default setting in this page, if you would like to modify it, please contact with SOUTH technician for more supports.

Route

This is mainly used to view and configure the parameters for router, only under the condition of customize and debug receiver.

The screenshot shows the 'Route' configuration page. The sidebar menu is identical to the previous page. The main content area is titled 'Route' and contains the following elements:

- A table showing a single route:

Destination	Gateway	Mask	Sign	Interface
192.168.155.0	0.0.0.0	0.0.0.0	U	bridge0
- 'Change the default route:' section with a dropdown menu set to 'PPP0' and an 'Enter' button.
- A 'Refresh' button.
- 'Add Route' section with input fields for:
 - Destination: [][][][]
 - Gateway: [][][][]
 - Mask: [][][][]
 - Interface: PPP0 (dropdown) with an 'Enter' button.

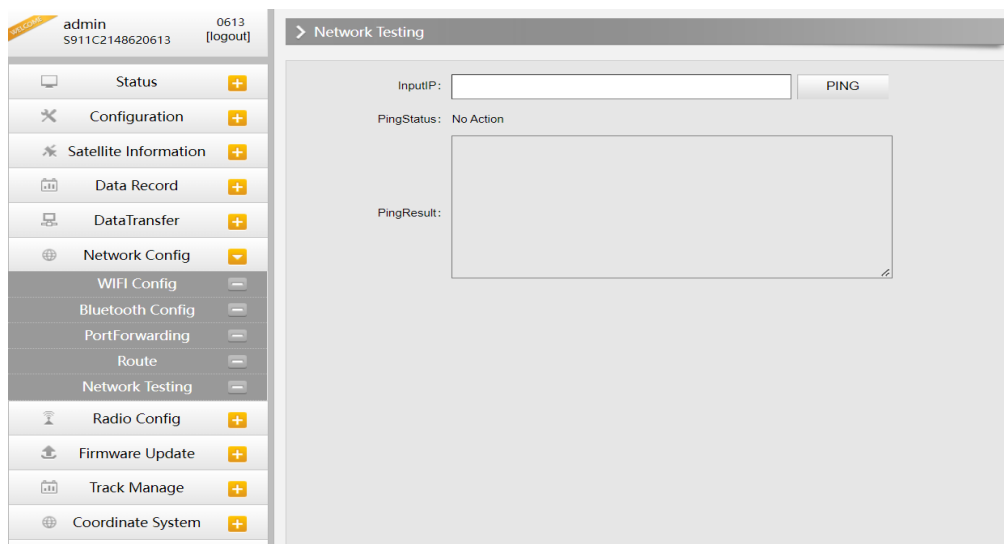
At the bottom of the main area are 'Enter' and 'Cancel' buttons.



NOTE: Usually we will keep the default setting in this page, if you would like to modify it, please contact with SOUTH technician for more supports.

Network testing

In this page , after entering the IP address, the user can query the network status.

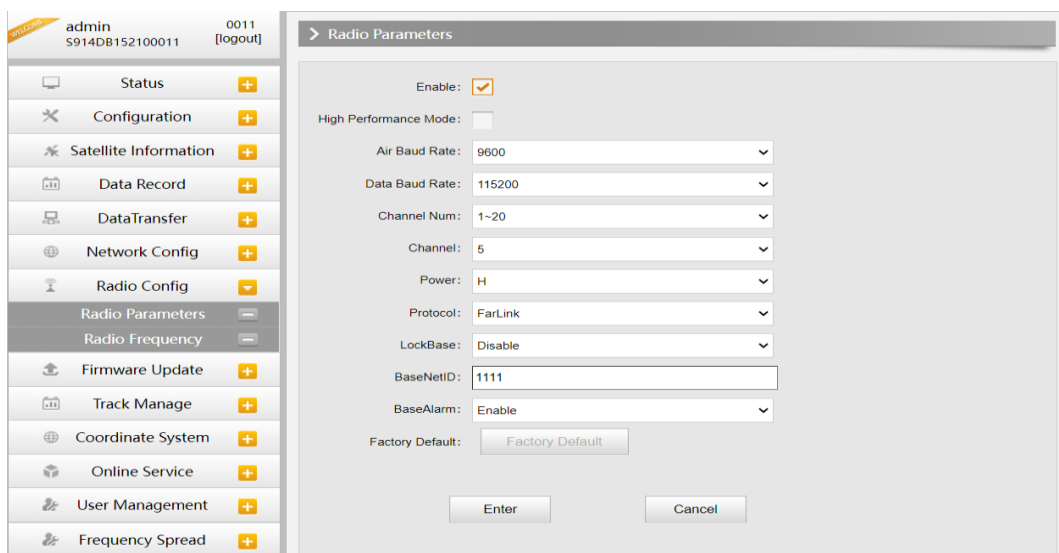


§3.4.7 Radio Config

As the name implies, the parameters of radio can be done in “Radio Config”, it is divided into Radio Parameter and Radio Frequency.

Radio Parameter

This page is mainly used to configure the parameters for internal radio module of ALPS2.



High performance mode: To increase the radio performance in the forest and harsh environment, both Base and Rover should enable this function at the same time, and the protocol should be farlink. If Rover doesn't support Farlink protocol, then the Base should

disable this function, otherwise Rover cannot get fixed solution. Usually we suggest clients disable this function.

Air Baud Rate: This represents the data transmission rate in the air of internal radio, the higher value, the bigger of data size transmitted per second, usually keep the default setting with 9600.

Data Baud Rate: This represents the rate of data transmission port of internal radio. The rate should be the same in both Base and Rover. In general, the data baud rate of SOUTH radio module has been unified to be 19200, keep it as default.

Channel: This is the communication channels for internal UHF, the value of the channel must be the same both in Base and Rover.

Power: This appears only in Base mode, the radio transmitting power is allowed to define in High, Middle or Low power.

Protocol: This is radio communication protocol for data transmission, SOUTH (SOUTH) , Farlink and TRIMTALK are optional in this page and SOUTH is the default setting, if it is changed, Base and Rover must use the same protocol for communication.

LockBase: If users choose FarLink protocol, the signal sent when the base station connects to the mobile station will be locked and will not be interfered by other base stations.

BaseNetID: If enable the LockBase, then you can input the ID of the Base you will receive.

BaseAlarm: If Base receiver moves(by some unexpected reasons), rover will receive a notification about the base movement.

Factory Default: Click this button to restore the factory default for internal UHF module.

Radio Frequency

For ALPS2, the powerful internal radio module supports much more radio channels apply to the legal frequency in different countries or areas.

There are 16 radio channels listed in this page after clicking on radio frequency. Users are able to change the frequency freely in the channel spacing, click Restore button to bring the frequency of each channel back to default setting.

§3.4.8 Firmware Update

Update the latest firmware for receiver or for corresponding modems can be done in “Firmware Update”.

Firmware Update

This page displays all the information of the firmware which current installed on ALPS2, and allows to update the latest version firmware for receiver. To get latest version firmware please contact with SOUTH technician.

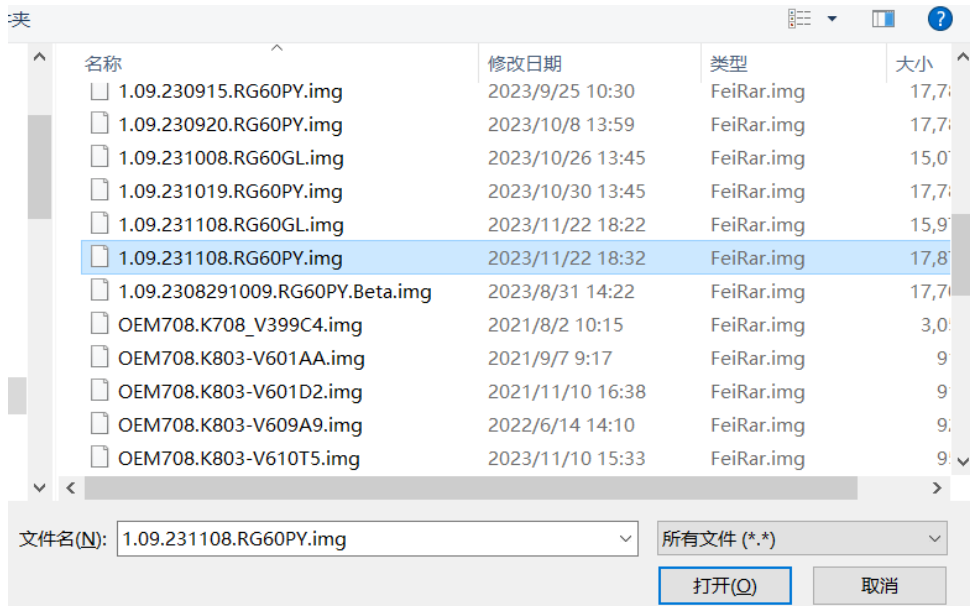
Online Update:ALPS2 supports to update the firmware online anytime if there is something

update or optimized.

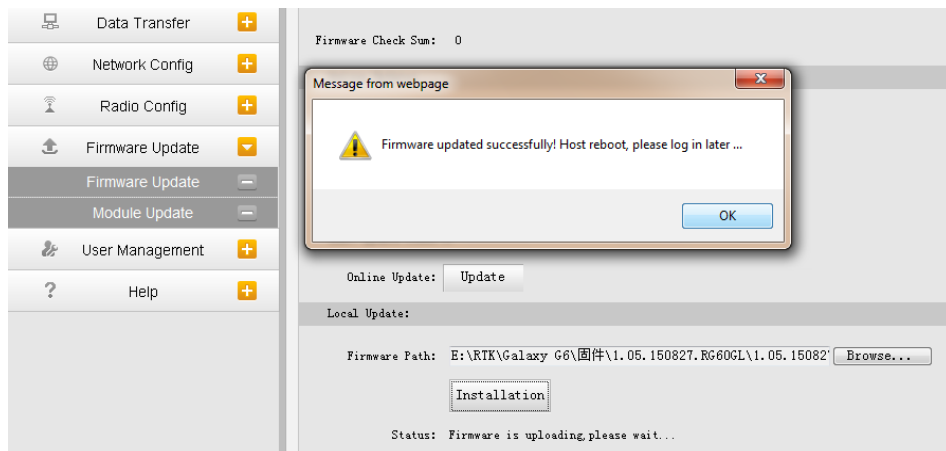
Local Update: Update the latest firmware by using a firmware file.

How to upgrade the firmware with Local Update

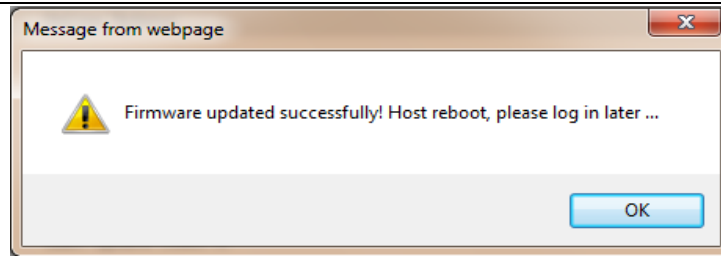
- a) Click on “Browse” button to load firmware file (Please take in mind that the firmware is ended with .img as the extension name).



- b) And then click “Installation” button to start upgrading.



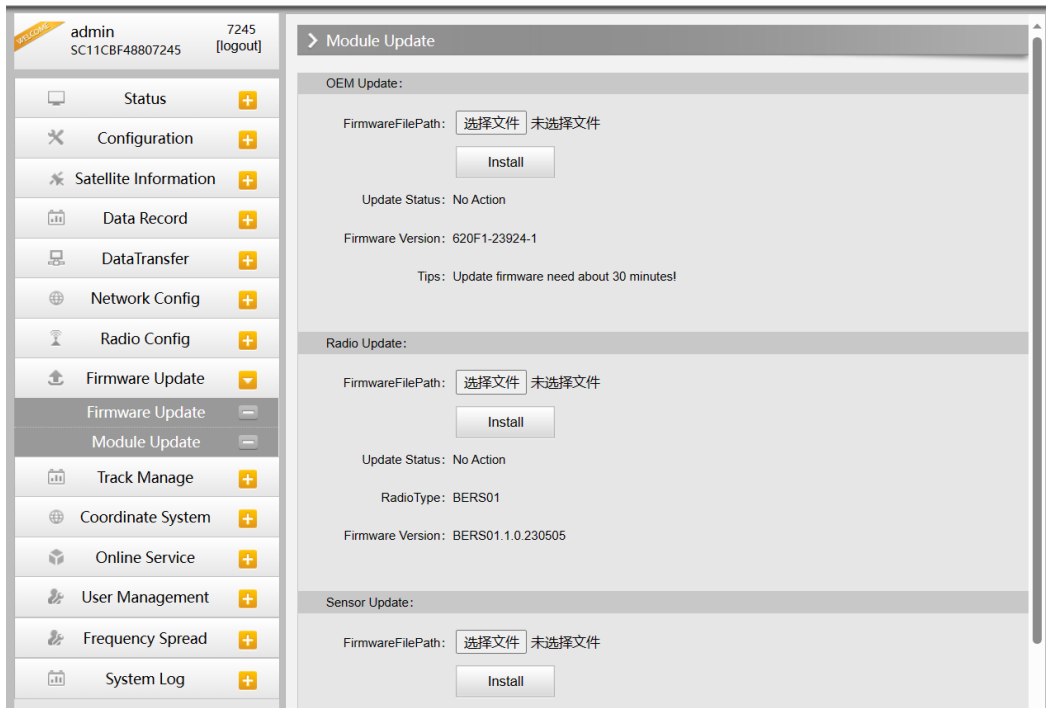
- c) After the firmware is completed upgrading, a dialog will appear saying “Firmware updated successfully! Host reboot, please log in later...”, then the receiver will restart automatically.



SPECIAL REMIND:ALPS2 doesn't support to update the firmware with the help of INstar program any more, in the future, update the firmware for ALPS2 shall be done through the Web UI.

Module Update

This page is used to update the firmware for corresponding modem such as OEM board, radio module and sensor.



§3.4.9 Track Manage

ALPS2 now supports to record the track while doing measurement, and upload the data onto the server.

Parameter Setting

Parameter Config

Recording Config:

Enable: ☐

Interval: 1 s

Recording Status: No Record

Echo Setting:

Status: Disconnected

Enable: ☐

Service Protocol: OFF

Server Ip: 58.248.35.130

Server Port: 2010

username: USER

password: PSWD

Enter Cancel

Record Setting

Check on the box of “Record Enable” to activate track recording function, and choose a proper recording interval in dropdown list of “Record Interval”.

Recording Config:

Enable: ☐

Interval: 1 s

Recording Status: No Record

EchoEnable Setting

This configuration dialog is used to upload the recording data to a server in real-time.

Echo Setting :

Status: **Disconnected**

Enable: ☐

Service Protocol: **OFF** ▼

Server Ip: **58.248.35.130**

Server Port: **2010**

username: **USER**

password: **PSWD**

Enter **Cancel**

Data Download

On this page, users can download the track data file from receiver. Choose the recording date and click “Get Data” to load all the data files recorded at that day, then choose the files and click download button.

The screenshot shows the ALPS2 web interface. On the left is a sidebar with a navigation menu. The main content area is titled 'Data Download'. A 'Select Date' field has a calendar pop-up showing the date 12, 2023. Below the date selector is a table with 15 rows, each representing a data item. Each row has a 'Download' button. The table has columns for 'Item', 'Size', and 'Data'.

Item	Size	Data
1		[Download]
2		[Download]
3		[Download]
4		[Download]
5		[Download]
6		[Download]
7		[Download]
8		[Download]
9		[Download]
10		[Download]
11		[Download]
12		[Download]
13		[Download]
14		[Download]
15		[Download]

§3.4.10 Coordinate System(reserve)

ALPS2 allows users to setup the local coordinate system on internal web UI management. The instrument would output the local coordinates according to this coordinate system.

§3.4.11 Online Service(reserve)

This function is to upload the data onto a server real-time, including Navigation data, raw observation data, correction data, SIC observation data and open SIC observation data, basic information data.

§3.4.12 User Management

This page is used to manage the authority of login Web UI for users, including the username, password and add users.

User Management

Add User

username	Jurisdiction	Status	Operating	Operating
admin	Administrator	Online	Delete	Edit
Administrator	Administrator	Offline	Delete	Edit
Auditor	Administrator	Offline	Delete	Edit
User1	Administrator	Offline	Delete	Edit

§3.4.13 System log

System log

In this page, users can download the system log book of receiver (the log book can help to backtrack the working status of receiver).

NOTE: Only the administrator can modify any parameters for receiver and manage users, and the ordinary users only have the right to view the relative parameters.

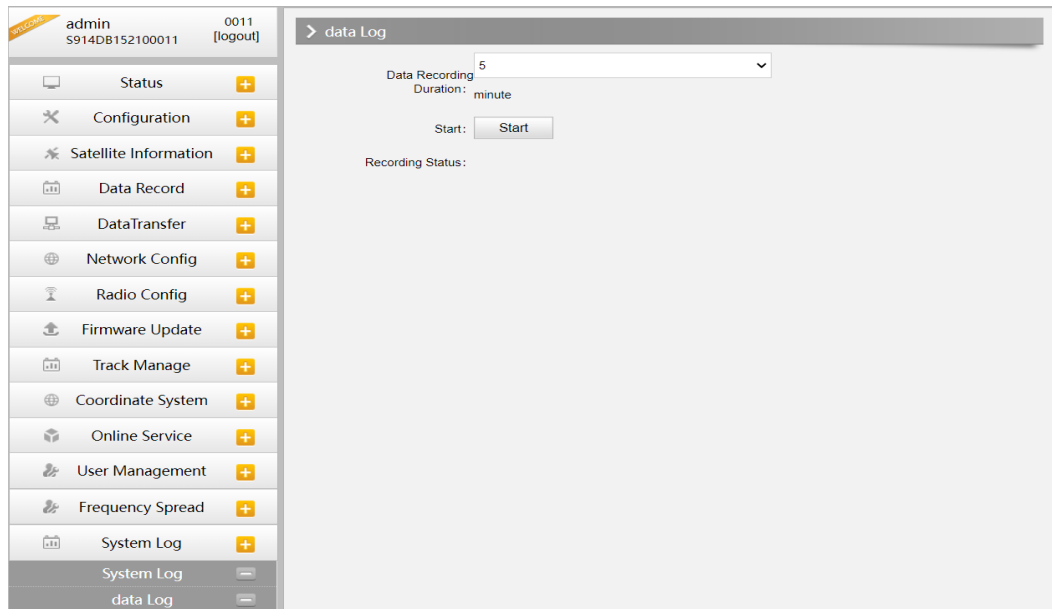
System Log

SystemLogEnable: ☐

DownLoad:

Data log

In this page, users can record data and choose duration.



Chapter 4 New functions

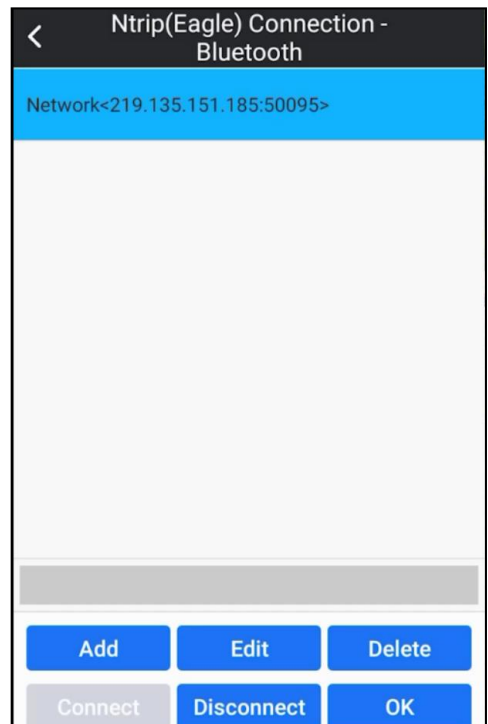
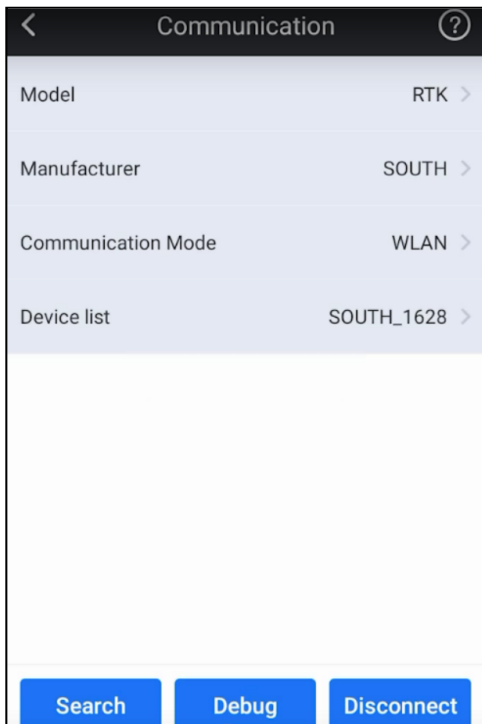
§4.1 AR Stakeout

Augmented Reality (AR) stakeout revolutionizes conventional surveying methods by integrating various sensory modalities, including visual and auditory. This approach eliminates the proficiency gap between experienced surveyors and novices by providing real-time visual guidance within authentic environments. Additionally, voice prompts are employed when nearing designated targets. This streamlined process allows surveyors to stake out targets without the need for leveling the pole, relying on visual and auditory guidance for precise stakeout each time.

This function must be tilt survey initialization. After completing the tilt survey initialization, select the point to be lofted, click the [AR] icon on the right side of the screen, and then lofted according to the direction and position displayed on the interface. (Note that the direction of the device camera is the same as the direction of the controller)

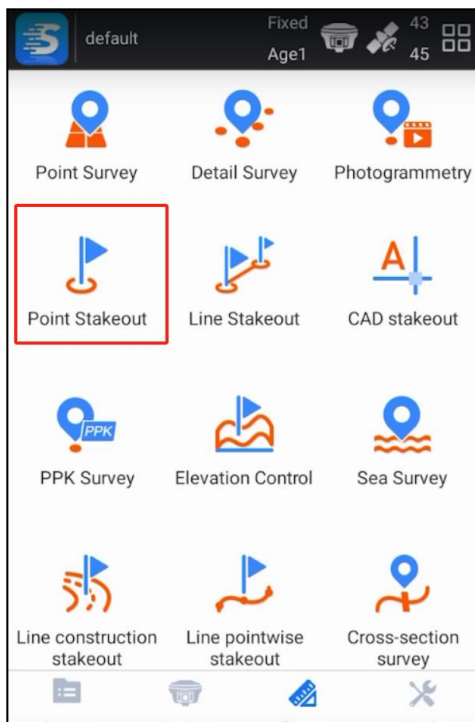
WIFI connect

Use wifi connection to connect to the device. The device is connected to CORS to achieve a fixed solution.

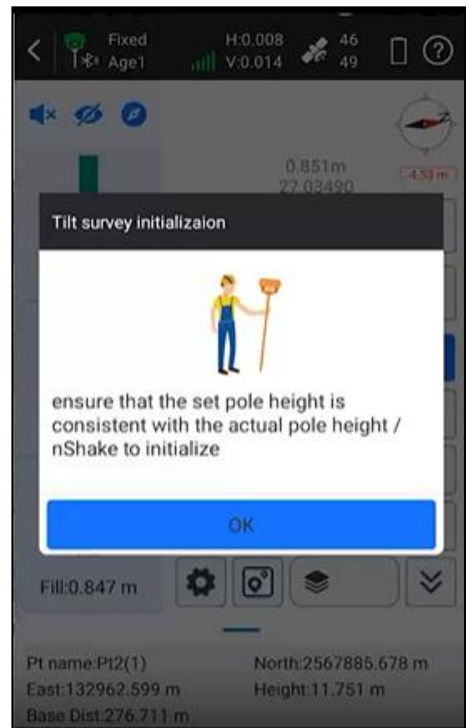


IMU activation

Click the "Point stakeout" function, select a point and turn on the tilt survey function. Shake the device as prompted to initialize the tilt survey. (Note that the pole height is consistent with the actual pole height)

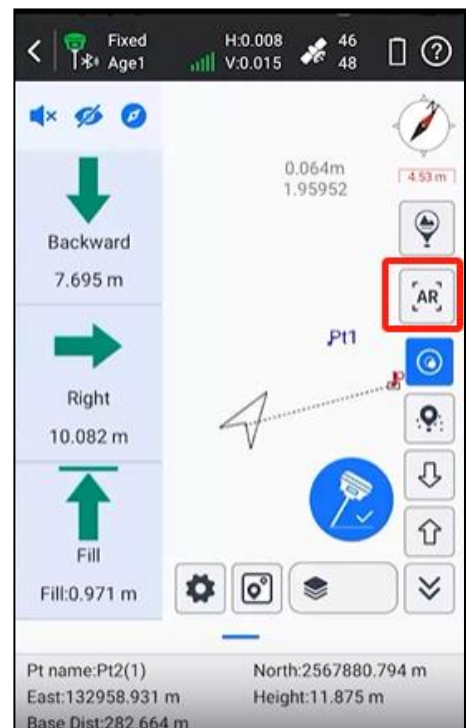


After the initialization page is displayed, perform initialization as prompted. After the initialization succeeds, the tilt measurement icon is displayed as follow.

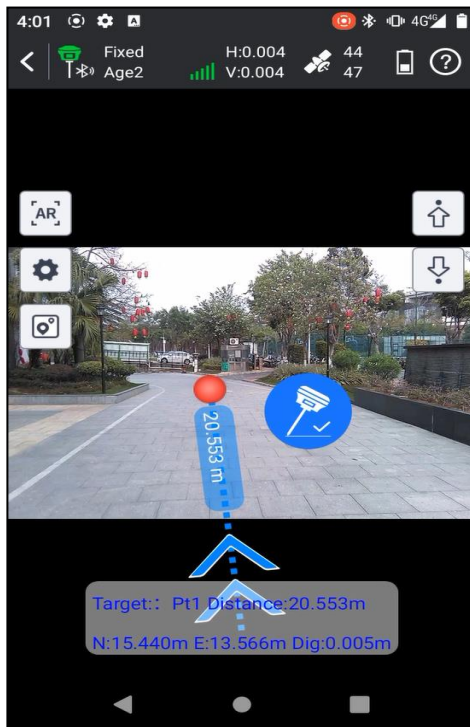


Choose point and open AR

Click the AR icon to realize the real scene lofting.



Over 10 meters (default) use the rear camera for orientation, after approaching to switch the bottom camera real scene to find points;



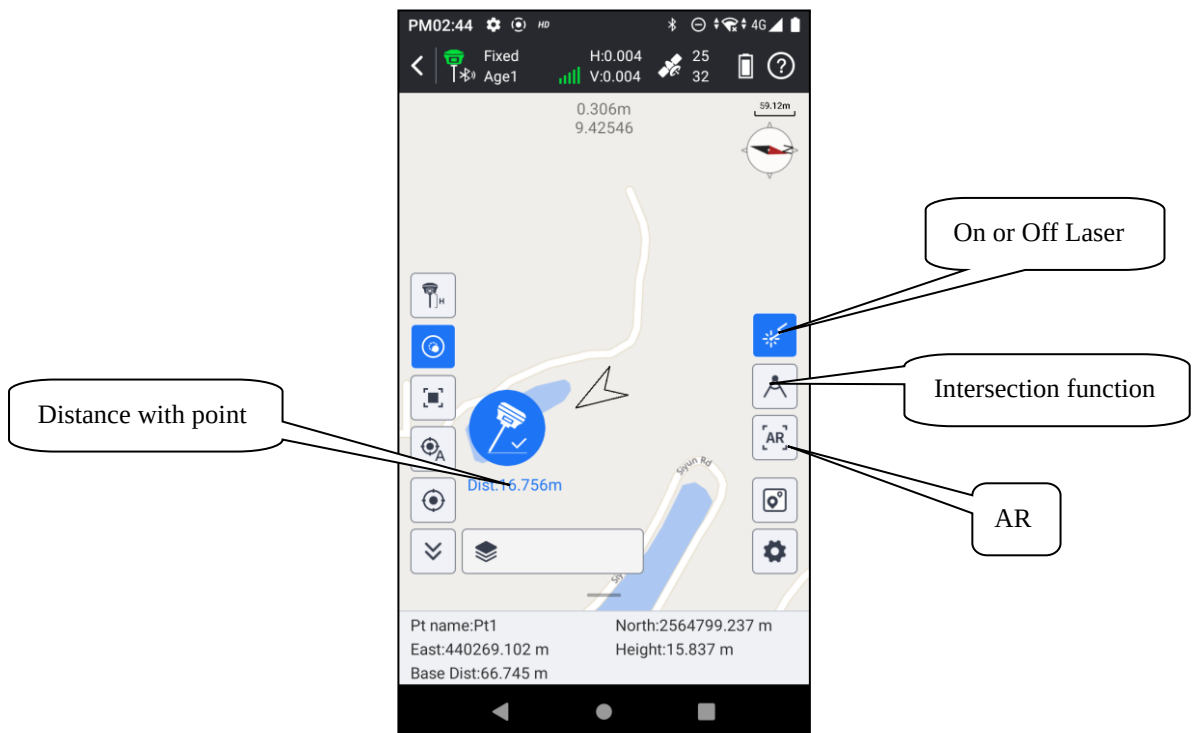
§4.2 Laser Survey

Laser survey is an instrument that accurately measures the distance to a target by modulating a certain parameter of the laser. Pulse laser ranging involves emitting a brief pulse or sequence of pulses towards the target during operation, with the photodetector receiving the reflected laser beam from the target. The timer measures the time it takes for the laser beam to travel from emission to reception, allowing for calculation of the distance from the rangefinder to the target. Point acquisition is carried out according to the position of the laser point.

Features:

- 1) Laser distance survey(indoor, outdoor)
- 2) Laser points survey
- 3) Laser AR(connect the ALPS2 WiFi)
- 4) Laser Intersection feature to improve the accuracy of laser survey(Direct rendezvous, Point library rendezvous)
- 5) Laser stake out

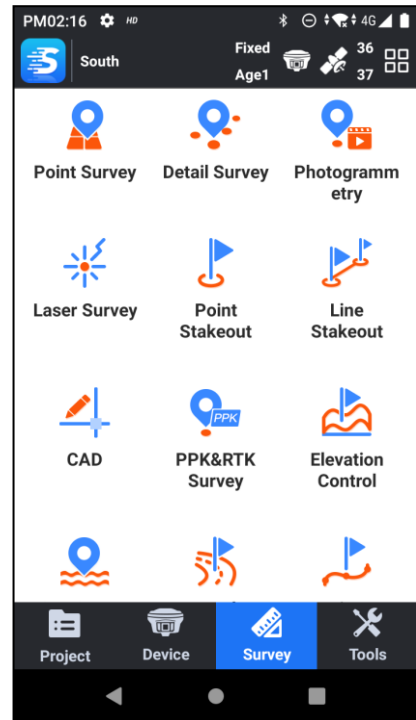
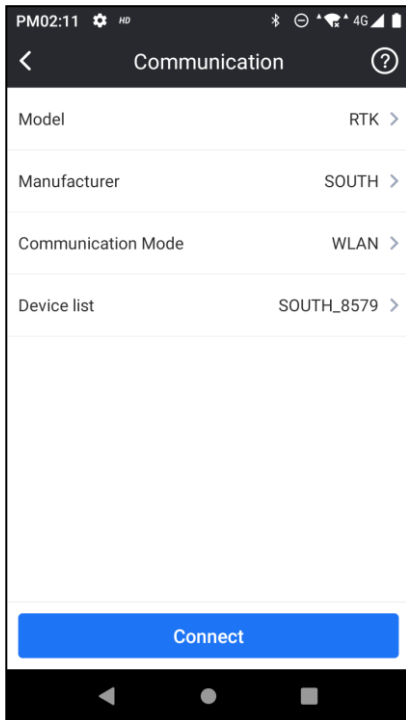
Functional main interface.



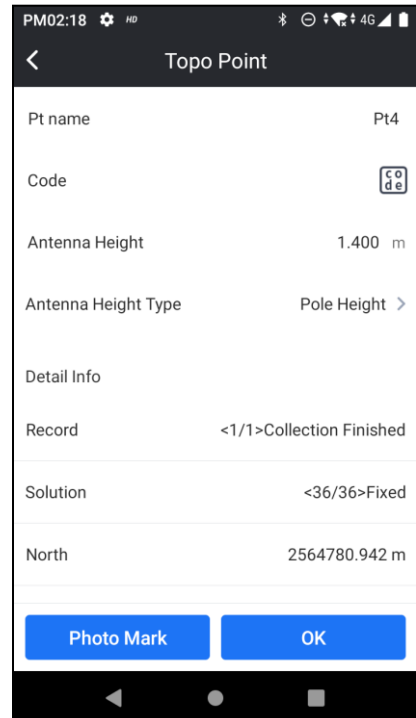
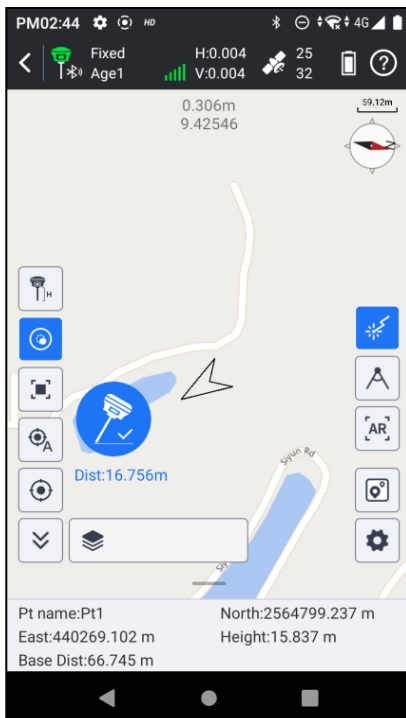
Laser distance and points survey

Connect the ALPS2 Bluetooth or WiFi(if use the Laser AR) by SurvStar, choose Laser survey in

Survey.



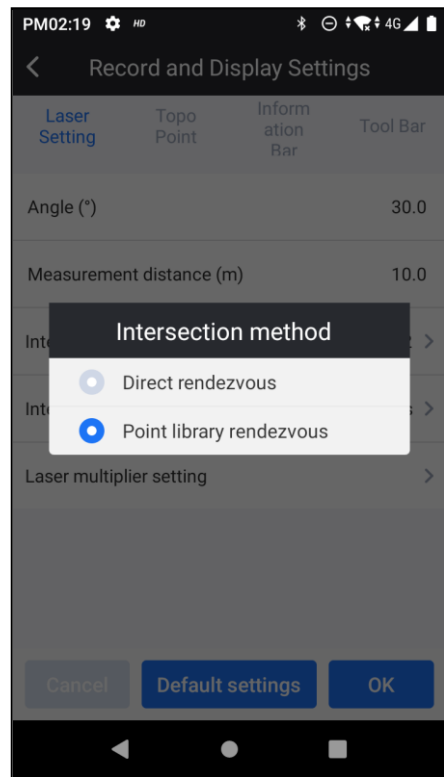
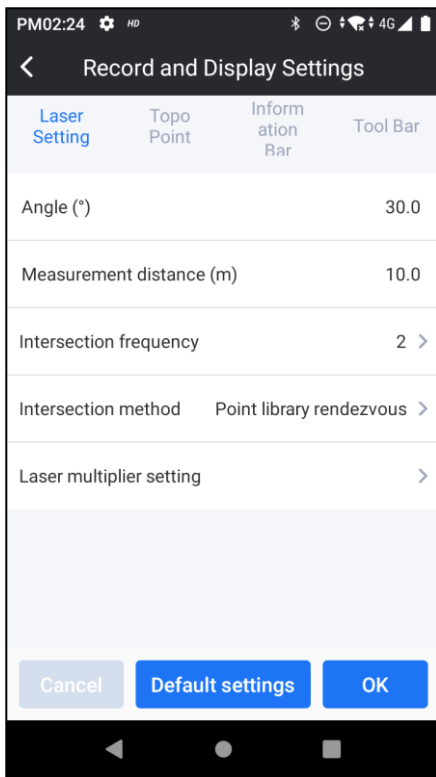
Make sure the IMU available then turn on the laser function, the laser is shone onto the selected point. When you got a stable with the laser point, you can collect points now.



Intersection function

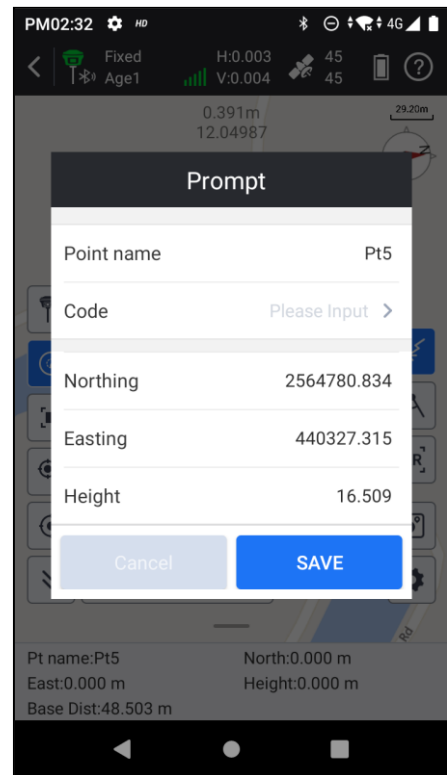
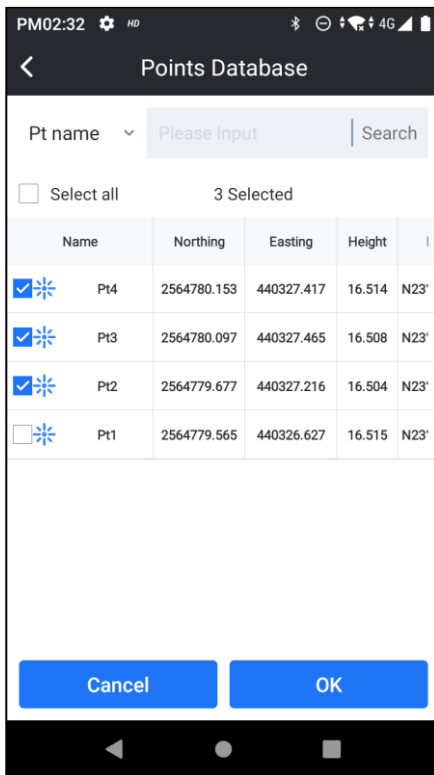
By intersecting two or more points, you will get more accurate point coordinate.

Click the setting menu, choose the intersection method.



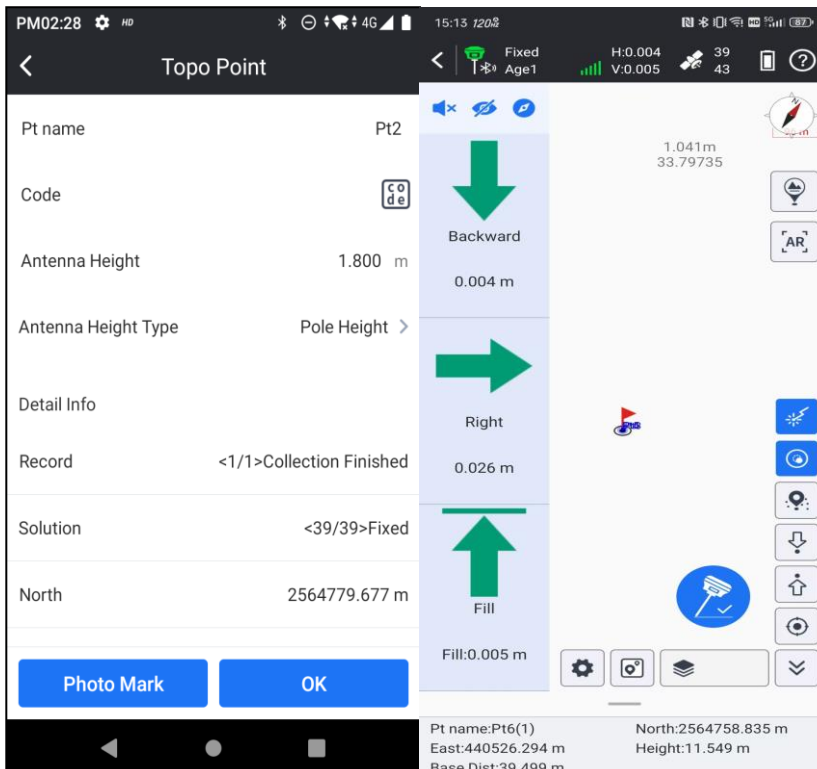
Direct rendezvous is when the points are collected, you will directly obtain directly the coordinates of the intersection points.

Point library rendezvous is choose the points in point database, then obtain the coordinates of the intersection points.



Laser point stake out

After the laser collect point, enter the point stake out mode, select the point to stake out.



Chapter 5 Accessories

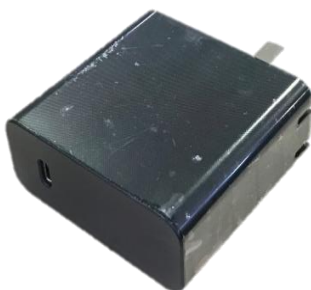
§5.1 Instrument Case



The instrument case for ALPS2 contains two layers of packing: the inner layer is filled with anti-collision foam, the host and other accessories can be dispersed and embedded; the outer layer is a hard instrument case, sealing-strong, wear-resistant anti-wrestling. Compact, durable, can effectively prevent the impact, easy to clean.

§5.2 Charger & Adapter

ALPS2 is equipped with a rechargeable internal battery, it uses a type-c cable and a PD adapter for the charging.



§5.3 Differential Antennas



The differential antennas are as shown above;

The UHF differential antenna is required to install to the interface at the bottom of receiver if ALPS2 is set up into internal UHF mode.

§5.4 Cables

Type-C cable

This cable is used to connect the receiver with computer for static data transmission, Web UI accessing and firmware update.



§5.5 Other Accessories

Other accessories include carbon fiber pole, controller bracket, connector, tribrach, etc.

The model and type of instrument accessories will change with the upgrade of the instrument.

The specific configuration can refer to accessories list.

reference received, including interference that may cause undesired operation.

ALPS2 Specifications

SPECIFICATIONS

GNSS Features

Channels.....	1698
GPS.....	L1C, L1C/A, L2C, L2P(Y), L5
GLONASS.....	G1, G2, G3
BDS.....	B1I, B2I, B3I, B1C, B2a, B2b
GALILEOS.....	E1, E5a, E5b, E6, AltBOC*
SBAS.....	L1*
IRNSS.....	L5*
QZSS.....	L1, L2C, L5*
MSS L-Band.....	Reserve
Positioning Output Rate.....	1Hz~20Hz
Initialization Time.....	< 10s
Initialization Reliability.....	> 99.99%

Positioning Precision

Code differential GNSS positioning.....	Horizontal: 0.25 m + 1 ppm RMS Vertical: 0.50 m + 1 ppm RMS
GNSS Static.....	Horizontal: 2.5 mm + 0.5 ppm RMS Vertical: 3.5 mm + 0.5 ppm RMS
Static (Long Observation).....	Horizontal: 2.5 mm + 0.1 ppm RMS Vertical: 3 mm + 0.4 ppm RMS
Rapid Static.....	Horizontal: 2.5 mm + 0.5 ppm RMS Vertical: 5 mm + 0.5 ppm RMS
PPK.....	Horizontal: 3 mm + 1 ppm RMS Vertical: 5 mm + 1 ppm RMS
RTK(UHF).....	Horizontal: 8 mm + 1 ppm RMS Vertical: 15 mm + 1 ppm RMS
RTK(NTRIP).....	Horizontal: 8 mm + 0.5 ppm RMS Vertical: 15 mm + 0.5 ppm RMS
SBAS Positioning.....	Typically<5m 3DRMS
RTK Initialization Time.....	2~8s
IMU Accuracy.....	8mm+0.7 mm/°tilt
IMU Tilt Angle.....	Optimal accuracy within 60°

Hardware Performance

Dimension.....	134mm(φ)×79mm(H)
Weight.....	860g (battery included)
Material.....	Magnesium aluminum alloy shell
Operating Temperature.....	-45℃~+75℃
Storage Temperature.....	-55℃~+85℃
Humidity.....	100% Non-condensing
Waterproof/Dustproof.....	IP68 standard
Shock/Vibration.....	Withstand 2 meters pole drop onto the cement ground naturally
Power Supply.....	6-28V DC, overvoltage protection
Battery.....	Inbuilt 7.4v 6800mAh rechargeable Lithium-ion battery
Battery Life.....	25h (static) 20h (rover mode, optimal condition)

Communications

I/O Port.....	5-PIN LEMO interface (external power port + RS232) Type-C interface (charge+OTG+Ethernet) UHF antenna interface
Internal UHF.....	2W Radio Tx&Rx
Frequency Range.....	410-470MHz
Communication Protocol.....	Farlink, Trimtalk, SOUTH

Communication Range.....	Typically 8-10km with Farlink protocol, (12-15km in optimal condition)
Bluetooth.....	Bluetooth 5.0, Bluetooth 3.0/4.2 standard, Bluetooth 2.1 + EDR
NFC Communication.....	Support
Modem.....	802.11 b/g/n standard

Data Storage/Transmission

Storage.....	16GB SSD internal storage Support automatic cycling storage Support external USB storage (OTG) The customizable sample interval is up to 20Hz
Data Transmission.....	Plug and play mode of USB data transmission Supports FTP/HTTP data download
Data Format.....	Static data format: STH, Rinex2.01, Rinex3.02, etc. Differential data format: RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2 GPS output data format: NMEA 0183, PJK plane coordinate, Binary code Support: VRS, FKP, MAC, fully support NTRIP protocol

Sensors

IMU.....	Built-in IMU module, calibration-free, 60°
Camera.....	Camera: 8MP (can be used in AR stakeout) AR stakeout camera: 2MP
Laser.....	3R green laser, 30m working range
Electronic Bubble.....	Controller software can display electronic bubble, checking leveling status of the carbon pole in real-time
Thermometer.....	Built-in thermometer sensor, adopting intelligent temperature control technology, monitoring and adjusting the receiver temperature

User Interaction

Operating System.....	Linux
Buttons.....	Dual buttons
Indicators.....	Satellites, data and power indicators
Web Interaction.....	With access to Web UI via WiFi or USB connection, users can monitor the receiver status and change the configurations
Voice Guidance.....	Chinese/English/Korean/Spanish/Portuguese/Russian/Turkish/French/Italian/Arabic
Secondary Development.....	Provides secondary development package, and opens the OpenSIC observation data format and interaction interface definition
Cloud Service.....	The powerful cloud platform provides online services like remote management, firmware updates, online registers, etc.

*Reserve for future upgrade.

Remarks: Measurement accuracy and operation range might vary due to atmospheric conditions, signal multipath, obstructions, observation time, temperature, signal geometry and number of tracked satellites. Specifications subject to change without prior notice