S680N GNSS Network RTK Receiver

User Manual

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Chapter Ⅰ Brief Introduction

1.1. Preface

Welcome to Guangdong Kolida Instruments Co., Ltd, which is China's leading surveying instrument production and sales enterprises, including GNSS products and TS, has been committed to spread the international advanced GPS mapping survey techniques and products to the users. To know more information about KOLIDA, please visit our official website http://www.kolidainstrument.com/

1.2. Introduction

This manual takes KOLIDA new compact GNSS network RTK receiver –S680N for example, to explain what new features achieved on this compact and miniaturizing unit, and how to install, set up and uses the RTK system as well as the use of the accessories. We recommend that you read these instructions carefully before using the instrument.

This kind of receiver is the product we made a comprehensive upgraded for hardware and system on the basis of original model S680, which according to long period time market research and user demand research, greatly improves the stability of product performance, as well as to the user experience.

1.3. Main Features

1.3.1. Smart platform

Embedded Linux operating system and KOLIDA intelligent cloud platform, S680N receiver is no more a simple and compact RTK receiver, now it is a complete intelligent operation system with web UI management platform.
The smart internal web UI management platform allows users to monitor working status of receiver and configure the equipment with the help of WIFI connection or USB connection to PC.

1.3.2. WiFi performance

According to current trend of RTK surveying, WiFi is the brand-new and useful technology to RTK measurement that makes effective use of GNSS receiver, which greatly improves the working efficiency and the flexibility.
The WiFi of S680N is not only able to be a wifi hotspot that allows users to connect it and access to the web UI management of S680N, but also can work as datalink that makes S680N have a quick connection to internet for corrections from CORS network.

1.3.3. Intelligent storage ability

KOLIDA S680N is equipped with 8GB Solid State Disk that make sure enough storage space for data collection, as well as to the stability of data recording speed.
With the smart storage technology, S680N is able to connect an external storage for data collection or downloading data to this external storage directly.
Base on the intelligent platform, S680N supports STH, Rinex2.x and Rinex3.x format data storage, and the sampling rate can be up to 20Hz.
The automatic circular storage performance can remove the primary data automatically once the memory is full, which makes sure instrument has enough space for next job.

1.3.4. Full satellite constellation support

Equipped with most advanced GNSS board, 220 channels and unmatched GNSS multi-constellation tracking performance, KOLIDA S680N is able to track most signals from all kinds of running satellite constellations. And this compact device owns the ability of enable or disable constellation tracking .

1.3.5. Outstanding protection capability

This compact unit is built with magnesium alloy material to make sure it can work in extremely tough conditions like heavy rain, and the rubber ring can protect the instrument from dropping onto concrete.

Chapter Ⅱ Hardware Component

In this chapter, the appearance of S680N will be presented in detail, you can grasp detail information about each component as your expectation.

2.1. Main Structure

S680N receiver is similar to a flat structure box with concave-convex texture upper cover. Concentrate on the protective property, the main body of S680N is made by magnesium alloy material which is applied to aviation industry, it makes overall the S680N be more rugged and durable

The upper cover is designed with concave-convex texture structure, perfect combination of fashionable design and industrial aesthetics.

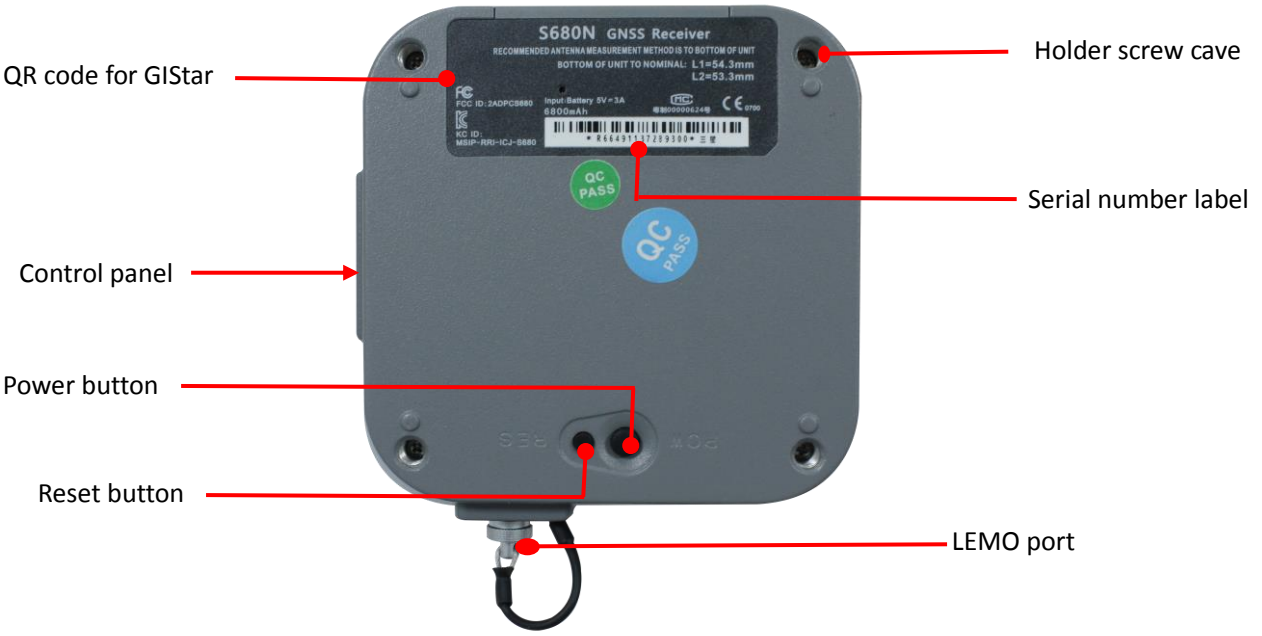
2.2. Front Control Panel

The control panel of S680N adopts the LED design to indicate working status and charging state, which are intuitive to understand well. There is detail description for each indicator in following table.

Items	Description
	1. Glows in green to indicate there is enough power supply for instrument after switching it on. 2. Flashes in green to indicate that the battery is low in power. 3. Glows in red to indicate that the instrument is under charging after plugging on charger.
	1. If this indicator glows in green, that means the Bluetooth connection has established between receiver and controller. 2. If it is glows in green in charging mode, that means the battery has been full charged.
	1. If the indicator flashes in green, that means the receiver begins searching satellites, the number of times flashing indicates the quantity of satellites the receiver searches.
	1. In Rover mode, if this indicator flashes in green, the meaning is that correction is coming from reference station. 2. In Static mode, the indicator flashes in green to indicate that the static observation data is being recorded. 3. In Base mode, this indicator flashes in green to indicate that correction is being transmitting by the WIFI connection to internet.

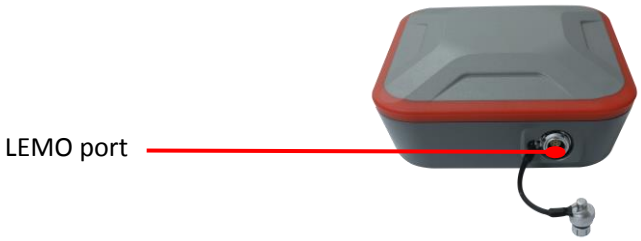
2.3. Bottom Component

At the bottom component, a lot of information is contained on the label attached to the receiver, including instrument model, L1/L2 information, serial number of the device and a QR code for GIStar software downloading. The other components include power button, reset button and screw caves for fixing with holder.



2.4. User Interface

This part is mainly to introduce the communication port which is mainly used for data downloading and battery charging. However, except the function we mentioned, there is an additional function which allows users access its internal web UI server with the help of L7U50 cable.



Chapter Ⅲ Hardware Operation

3.1. Switch ON/OFF

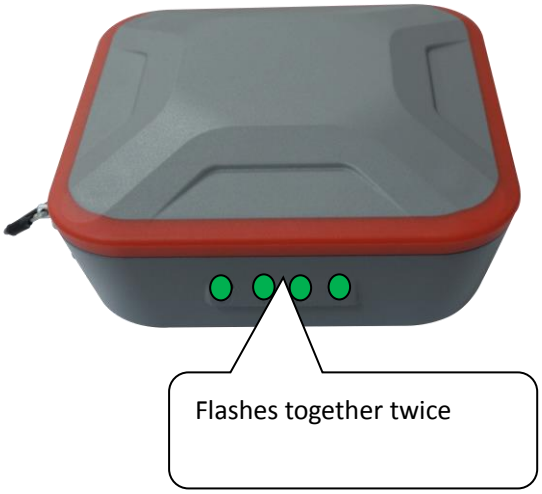
3.1.1. Switch ON

To switch on the receiver, you only need to press the power button for short time until you can hear beeping from receiver once and all indicators light up, at this moment, release the power button and the receiver will switch on.

Then the receiver will complete initialization automatically around 8 seconds, and the unit starts to work in normal situation.

3.1.2. Switch OFF

To switch off the receiver, hold on power button for several seconds until you can hear 3 beeping sounds, then release the power button, the receiver will switch off after all of indicators flash together twice.



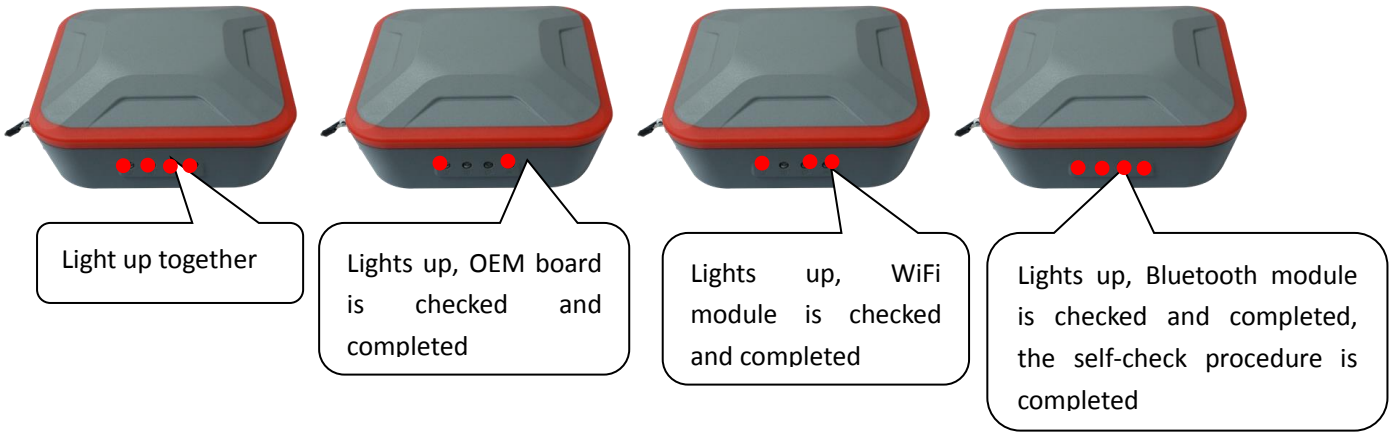
3.2. Reset

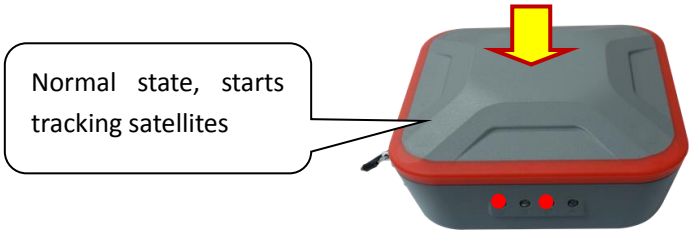
At the bottom of S680N receiver, there is a small key besides to Power button, that is the Reset key mainly used to force turning off receiver if there is something block with power button to switch off the receiver.
For example, if the receiver can't be switched off by power button, use this key to force switching off receiver, then restart the unit in normal way.

3.3. Self-check

Self-check is an important operation for KOLIDA receiver during its use on the field. If there is something abnormal on receiver or the receiver doesn't work properly, performing self-check operation for receiver will be helpful on judging roughly what happen to the receiver.

Self-check operation is easy to perform on S680N receiver, keep pressing power button for a while (about 8 seconds) until all of indicators light up together, at this moment, release power button and the receiver is performing self-check procedure, then the indicator will light up one by one from right to left, after that the self-check is completed and the receiver will get into normal state, starts to track satellites.





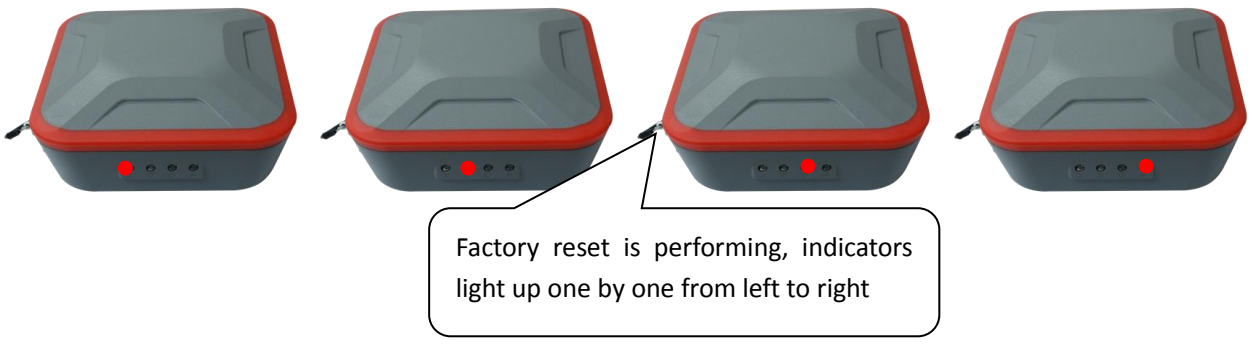
The meaning of all indicators during self-check

Items	Description
	Glows in green to indicate the enough power supply for receiver If this indicator glows in green during self-check procedure, it represents the Bluetooth module is checked and completed. If this indicator glows in green during self-check procedure, it represents the WIFI module is checked and completed. If this indicator glows in green during self-check procedure, it represents the OEM board is checked and completed.

3.4. Factory Reset

Factory reset is a new interactional operation on S680N receiver, it is mainly used to bring internal configuration of receiver back to factory default setting. Such as reset the function of LEMO port from normal USB to Ethernet function, and reset the WIFI function from **client mode** to **AP mode** (WiFi hotspot).

Factory reset is similar to the operation of self-check, keep pressing power button for a while (after self-check entrance) until the indicators flash one by one from left to right, at this moment, release power button and the receiver gets into factory reset procedure. This procedure would take about 10 seconds, after that the receiver will switch off automatically.



3.5. Charging

S680N GNSS Network RTK receiver adopts built-in 6800mAh huge capacity battery, typically can last 8 hours continuous work or more. Equipped with a specified charging socket and charger, ensure the safety of equipment during charging. This unit is also able to be charged with phone charger and L7U50 cable, or recharge with a portable power source.

While the power indicator flashes in green, this status indicates that the battery is low in power, and the receiver really needs to charge within 10 minutes.

Before the use, please recharge the equipment first, and please take in mind that make sure the charging time reach 6-8 hours at the first several times, and fully discharged, so that to maximize the battery capacity and extend the battery life at the same time.

When plug charger to S680N, the power indicator lights up all the time during charging, after the Bluetooth indicator lights up, that means the battery is full charged.

Chapter Ⅳ Internal Web UI Operation

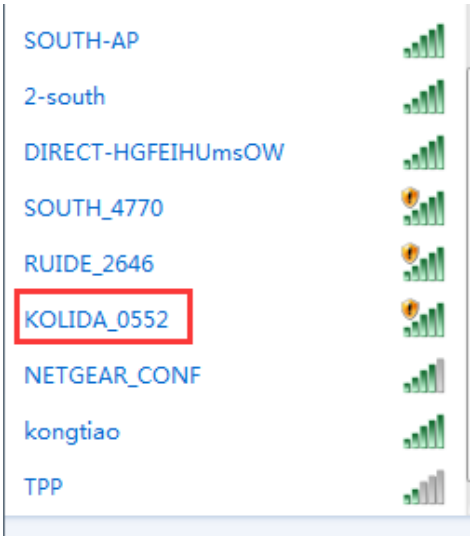
4.1. Overview

Because of using the smart embedded Linux operating system and KOLIDA intelligent cloud technology, S680N is allowed configuring and monitoring the status of itself in real-time on internal web UI. And the accessing way not only supports the WIFI connection, but also supports the USB connection to computer with the help of LEMO port.

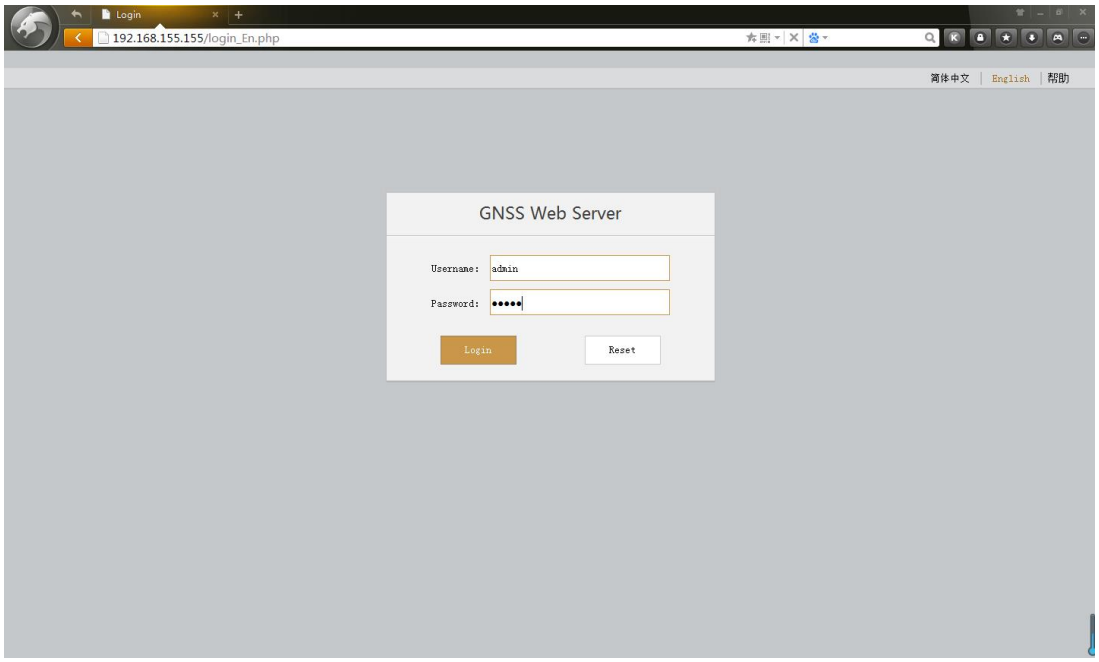
4.1.1. WIFI hotspot connection mode

First of all, the WIFI hotspot is default broadcasted by S680N, search the WIFI hotspot with the name of KOLIDA_xxxx using smartphone, tablet or laptop, then establish the WIFI connection and input the default IP (10.1.1.1) into explorer, apply the default username and password for login.

For example, search the WIFI hotspot broadcasted by a S680N receiver using laptop PC, choose the WIFI hotspot and click on connect button to establish the connection without password.



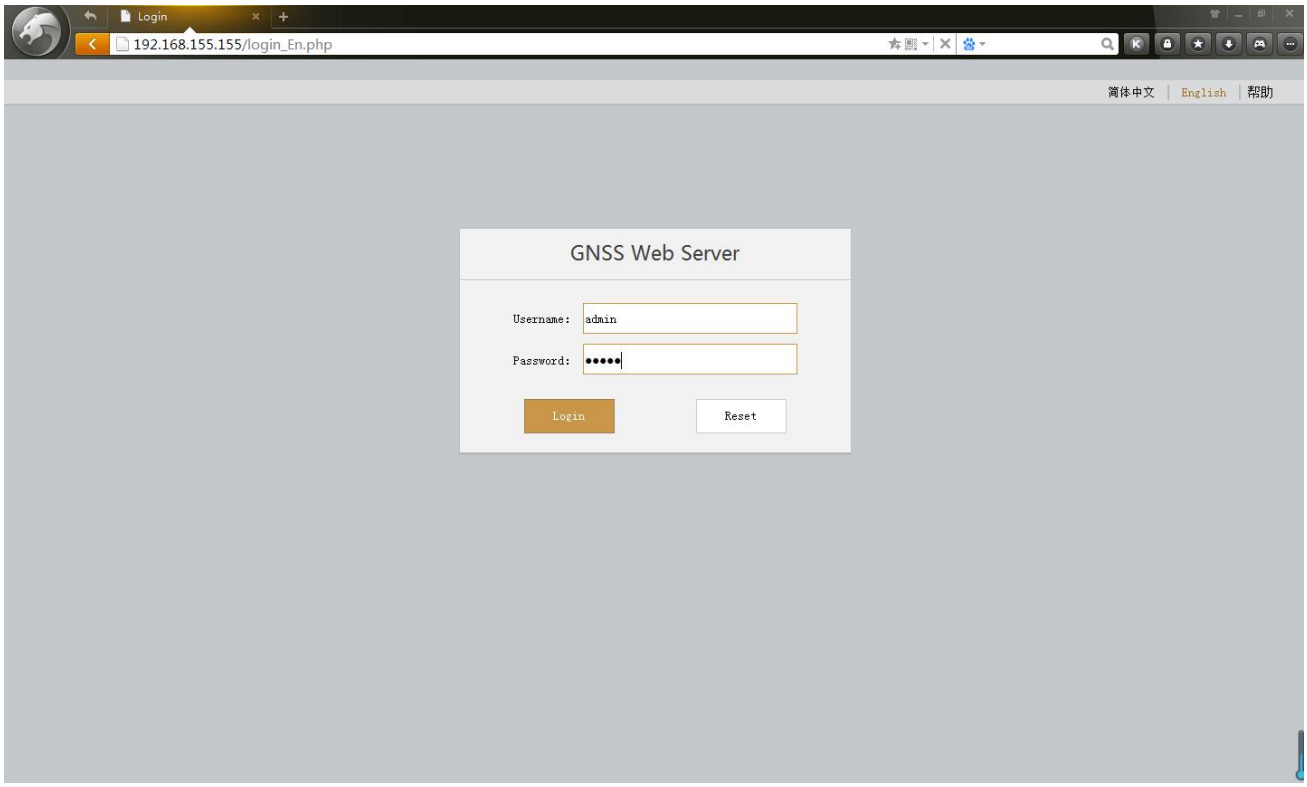
After that, run IE explorer on computer and input the default IP into address bar, after a while, the system login interface is refreshed, then apply the default username and password for login.



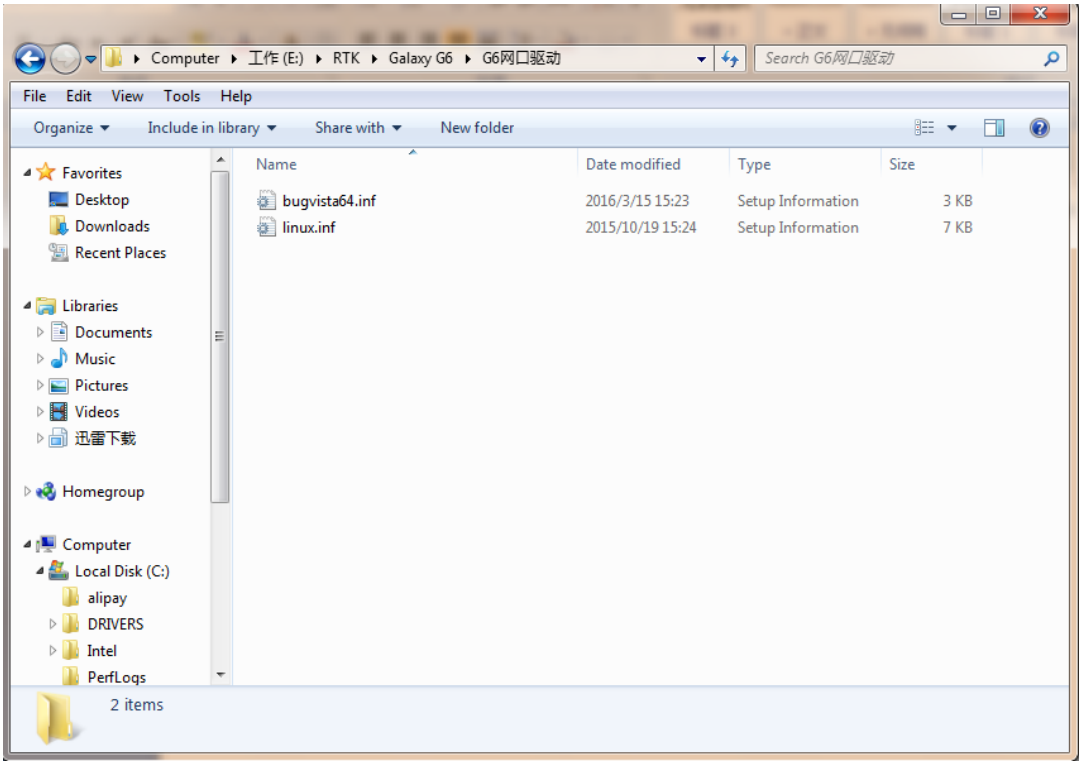
4.1.2. USB connection mode

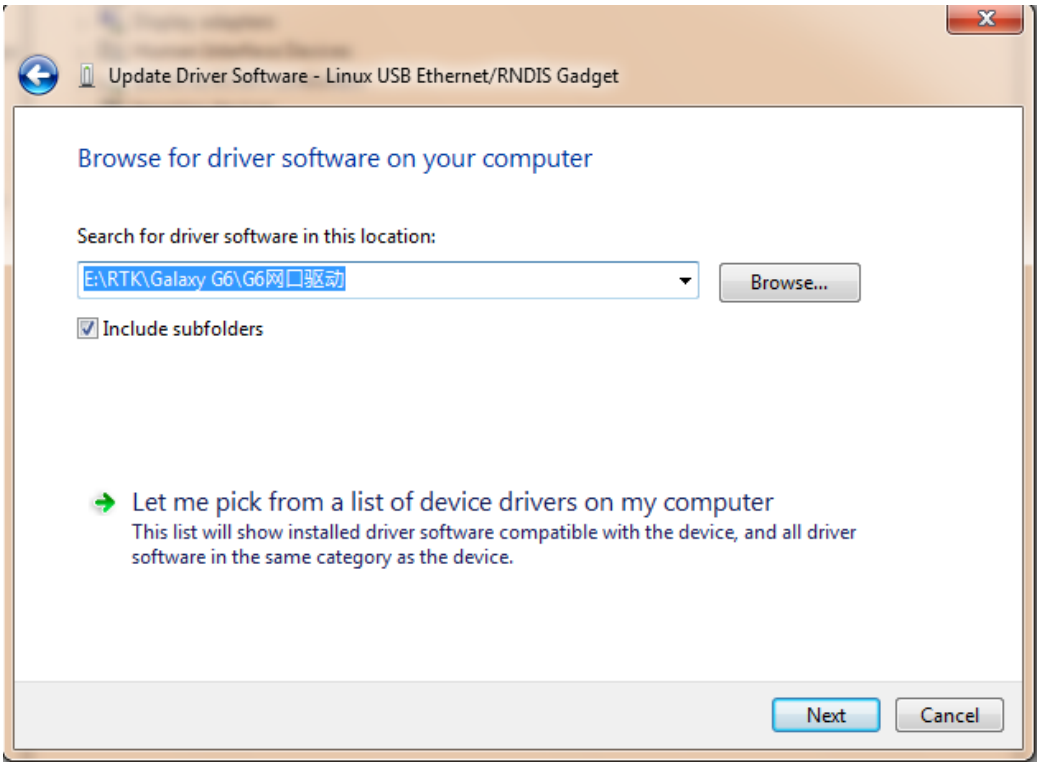
On this mode, the LEMO port of S680N must work as an Ethernet port, then internal web UI shall be accessed via L7U50 cable connects to computer.

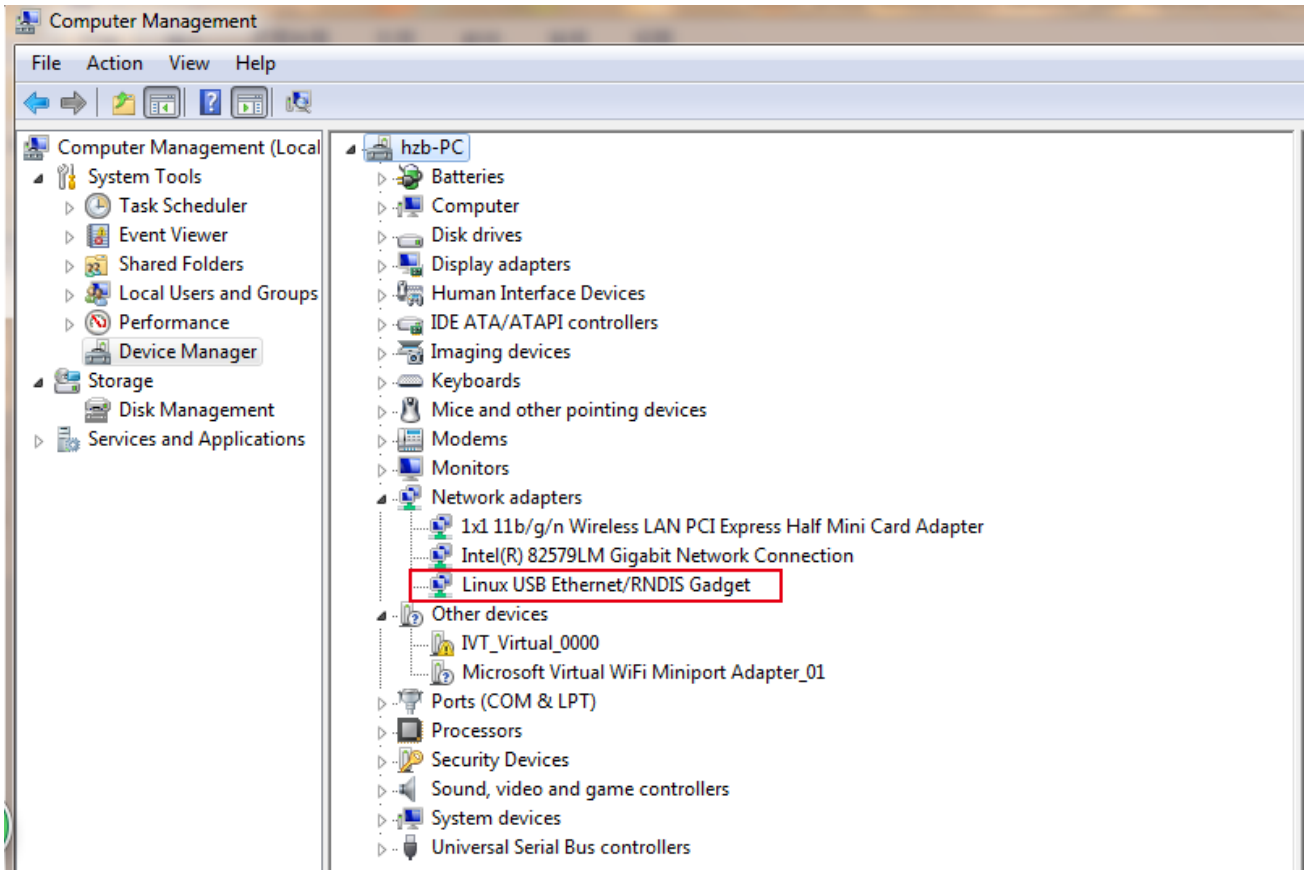
The LEMO port of S680N is default set as Ethernet function, then connect S680N receiver to computer via L7U50 cable. Run the IE explorer on computer and type IP 192.168.155.155 into IP address bar, then input the default username (admin) and password (admin) for login.



At the first time to connect to a computer, a corresponding driver is required to install to the computer, then this function could be activated.

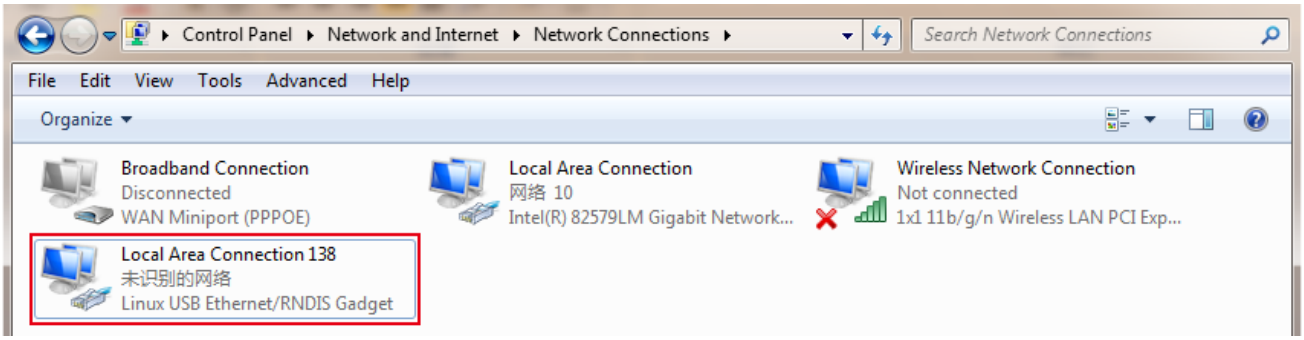




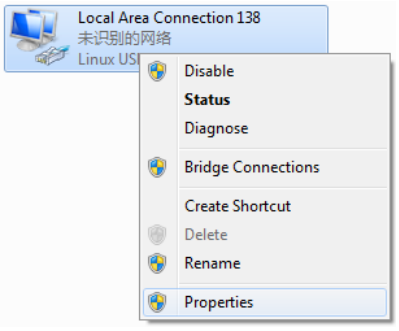


NOTE: *The driver can be downloaded from official website automatically or please contact with us for more supports.*

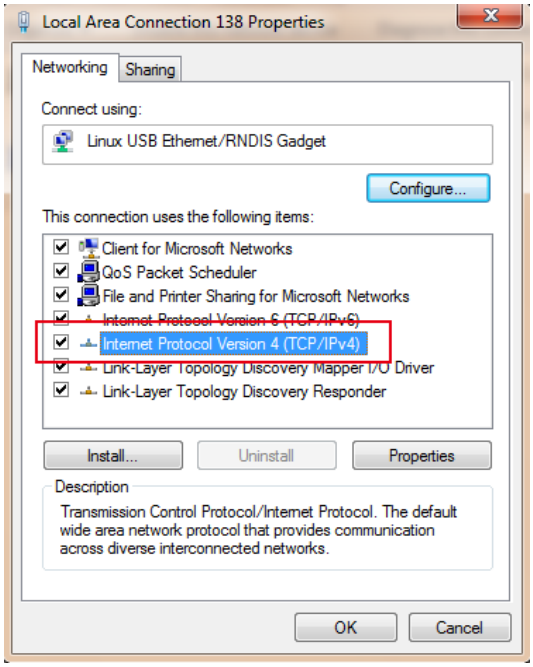
If the driver has been successfully installed, the LEMO port of S680N will be recognized as **Linux USB Ethernet/RNDIS Gadget**, and a local area connection will generate in **Network Connections** on the computer. For example, Local Area Connection 138 generates after connecting S680N receiver to computer via LEMO Ethernet port.

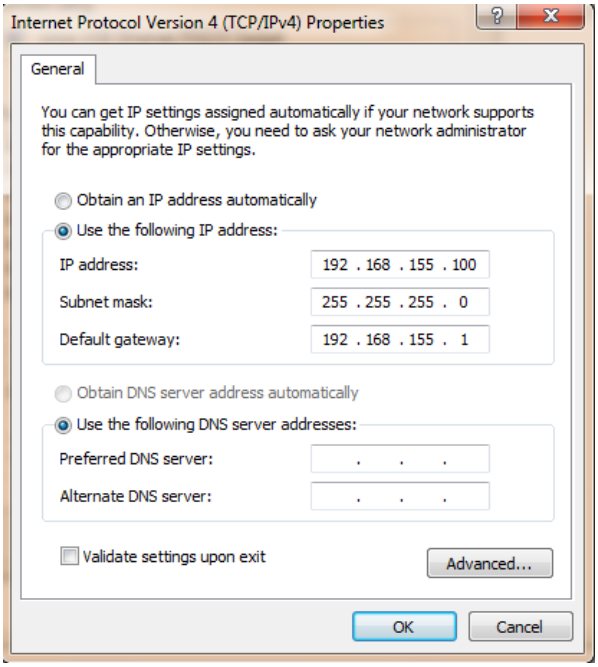


However, sometimes the computer cannot detect the receiver by LEMO Ethernet port because there is something wrong with acquiring IP automatically, therefore, we need to do something to avoid such problem, we can set a fixed LAN IP for the connection: right click on the local area connection which is new generated, 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.



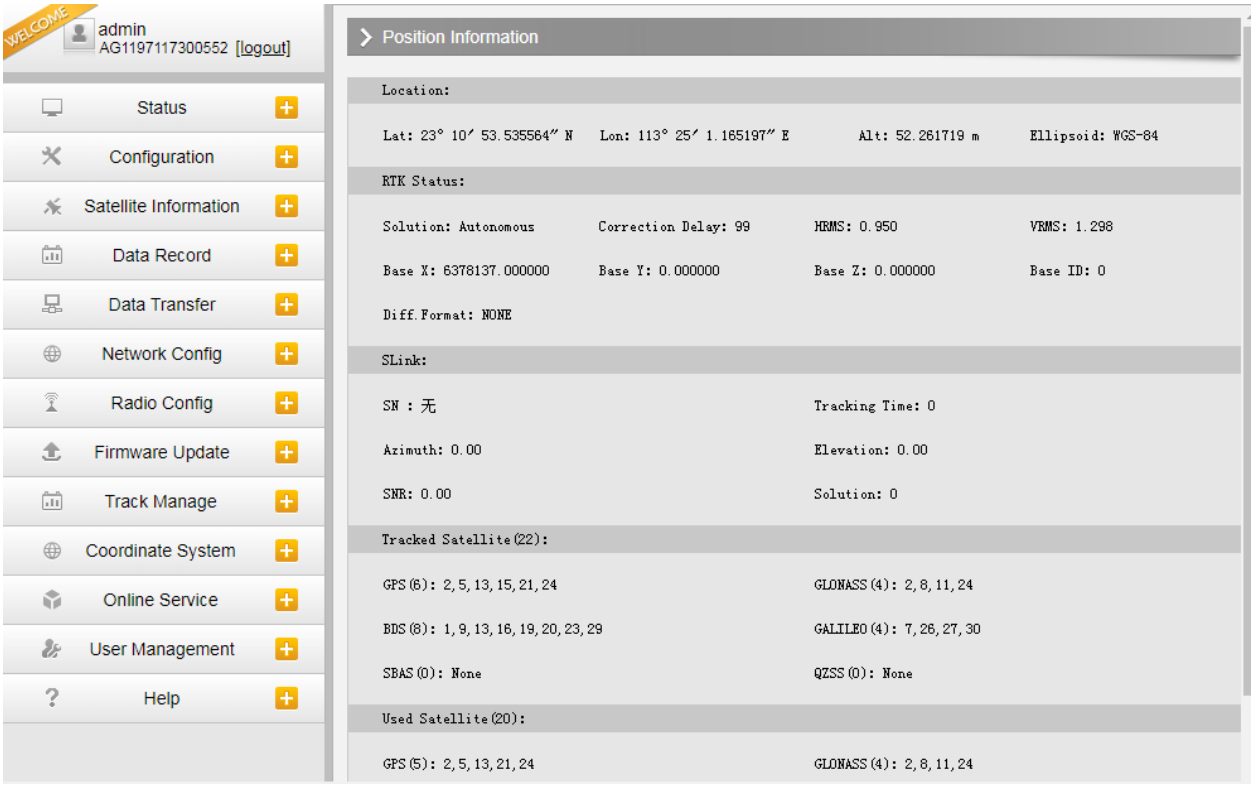


4.2. Web UI Main Interface

As shown in the following screenshot, this is the main interface of web UI of S680 while login, it contains the common used operation menu and the information window including detail information and settings.

For example, the operation menu is listed at the left column that includes Status, Configuration, Satellite Information, Data Record, Data Transfer, Network Config, Firmware Update, User Management and Help. At the right information window, there is Position Information includes Location coordinates, RTK Status, Tracked Satellite, Used Satellites and so on.

Click on the menu, the corresponding information or settings will be displayed at the right information window, it is very intuitive and easy to understand, as well as to the operation.



The table below is the instruction for the menu listed at the left side of main interface, take a reference to this table, you will grasp the main points of each item.

Some associated sub-items are contained under each main menu, click on the icon or the main menu to unfold the sub-items.

Ref	Component	Description
	Status	Positioning information, satellite tracking and the others will be displayed in this page

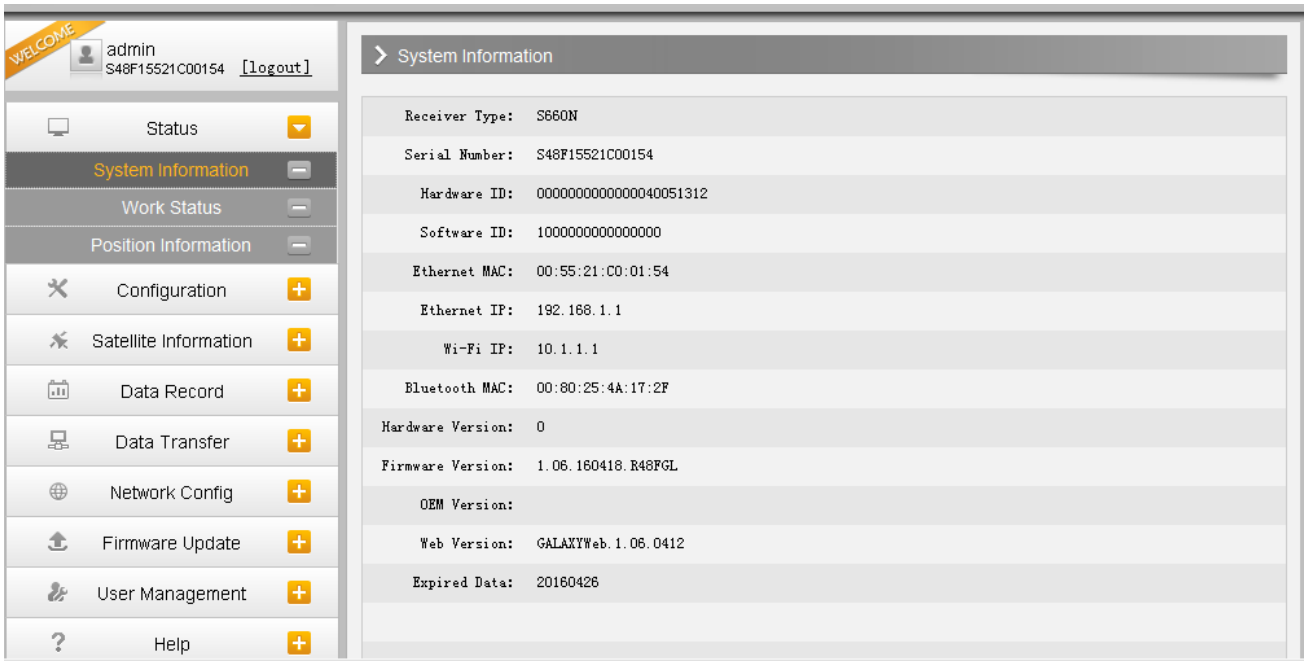
	Configuration	It contains general operation on receiver, base configuration, antenna setting, satellite configuration, receiver control and system setting.
	Satellite Information	Display and control the satellites used or not
	Data Record	Configure the parameters for static mode and raw data download
	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
	Firmware Update	It is used to upgrade the firmware for receiver
	User Management	Add and manage the Web UI users
	Help	Offer solutions

4.2.1. Status

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

System Information

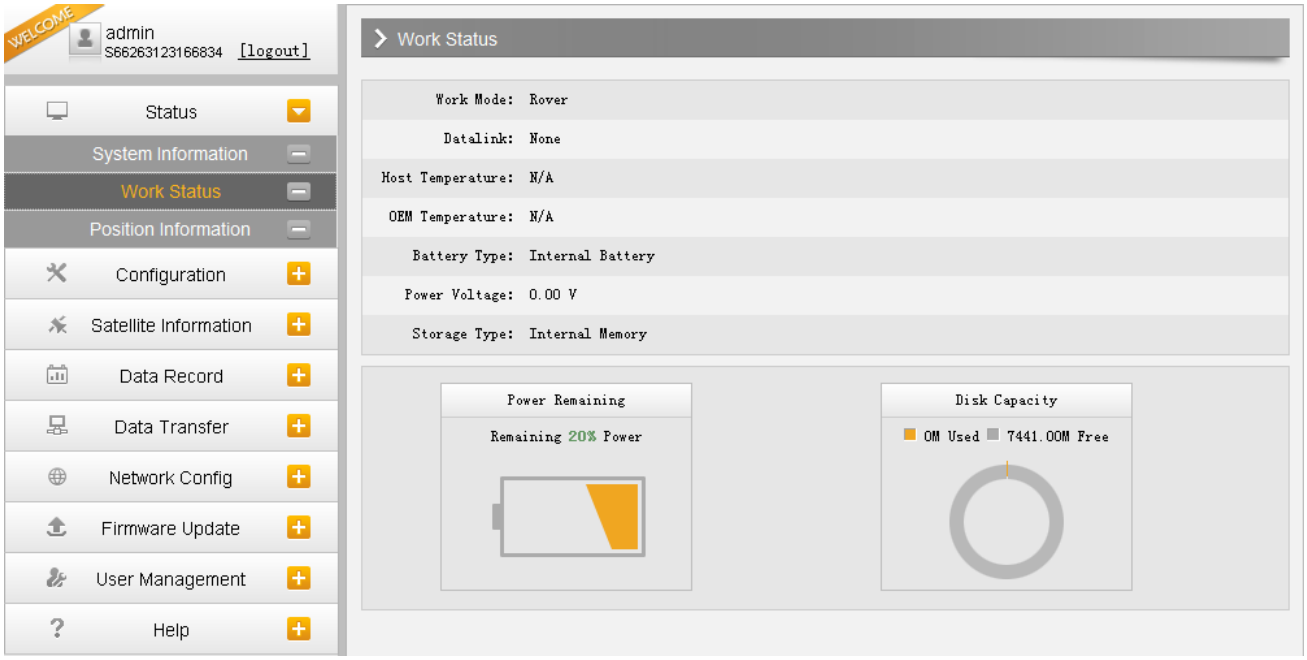
In this page, all the information of S680N is diplayed such as serial number, hardware ID, MAC address, firmware version, registation information and so on.



Work Status

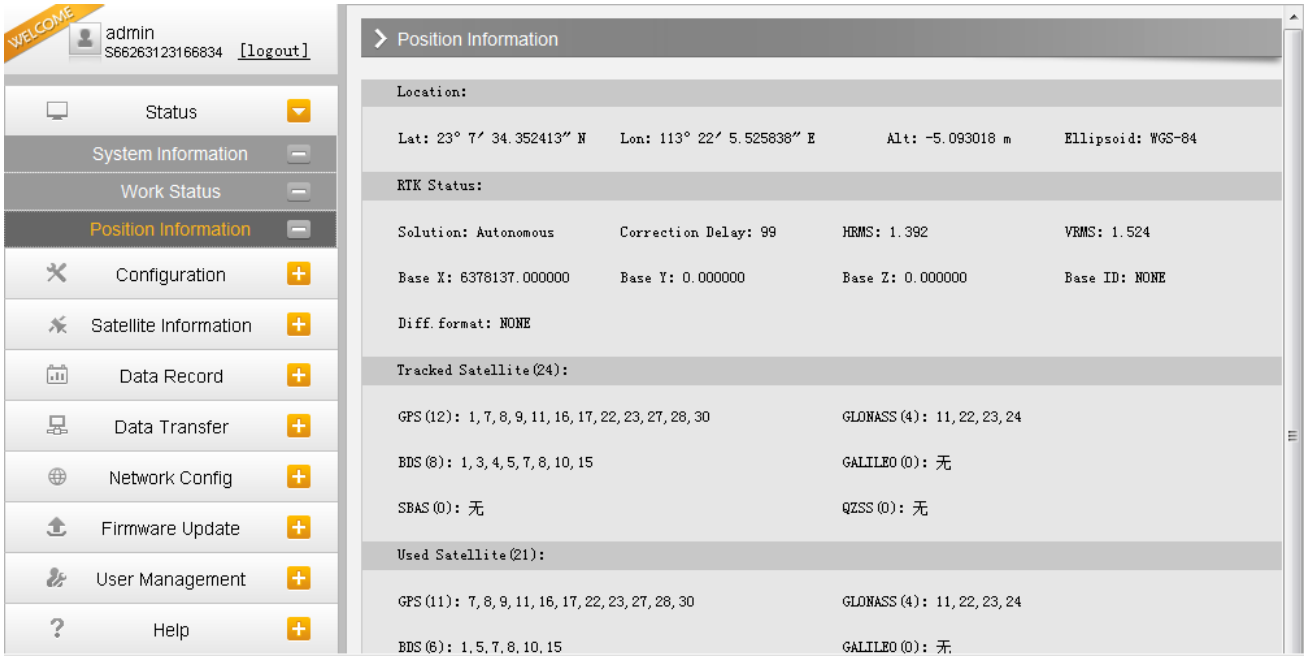
The physical state of S680N is displayed at the right field including working mode, battery type, storage type, remaining power and the free memory.

The datalink, host temperature, OEM temperature are not supported displaying because of the hardware design and the OEM board performance.



Position Information

As mentioned at the beginning of this chapter, the positioning information is displayed on this page, including locating coordinates, RTK status, tracked satellites, as well as to used satellites, users can be clear at a glance on this page to grasp the main information.

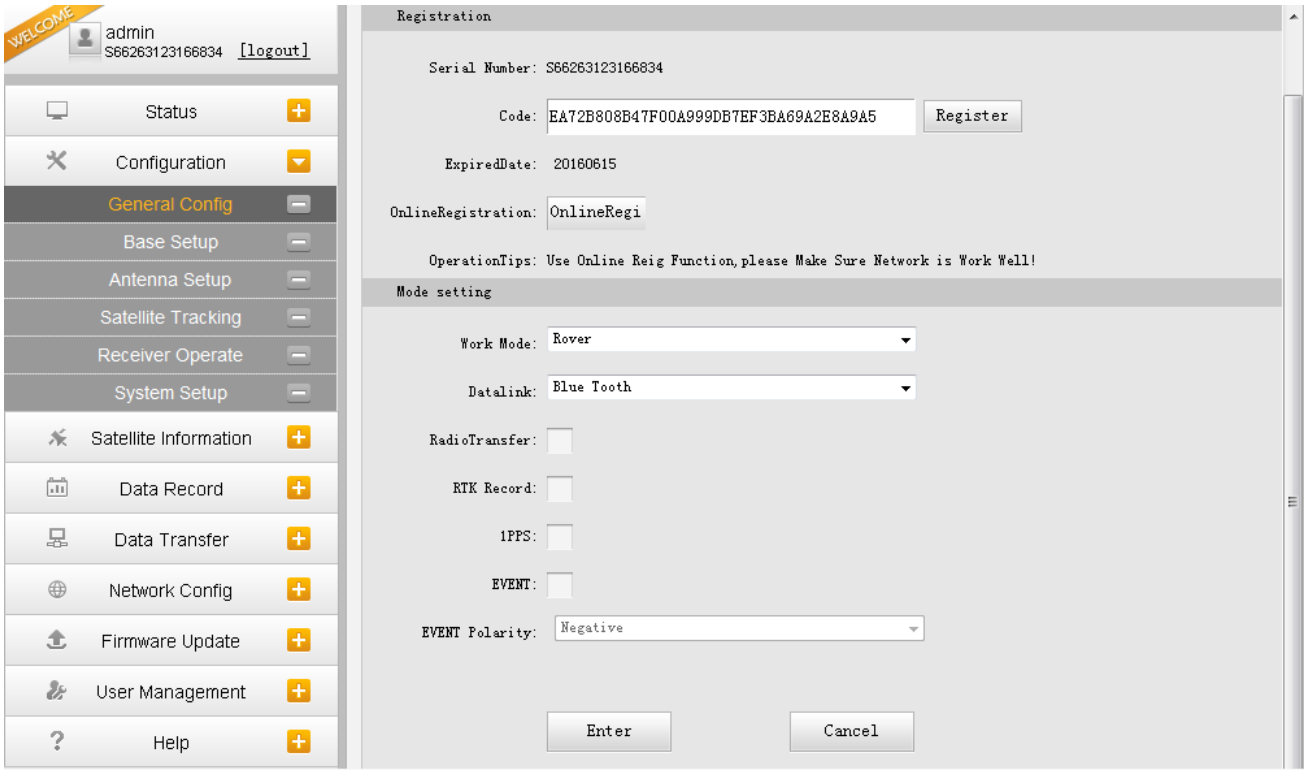


4.2.2. Configuration

General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operate and System Setup are contained under Configuration menu. Users are able to configure all kinds of parameters for S680N under Configuration menu, and all the settings are immediate effect after saving.

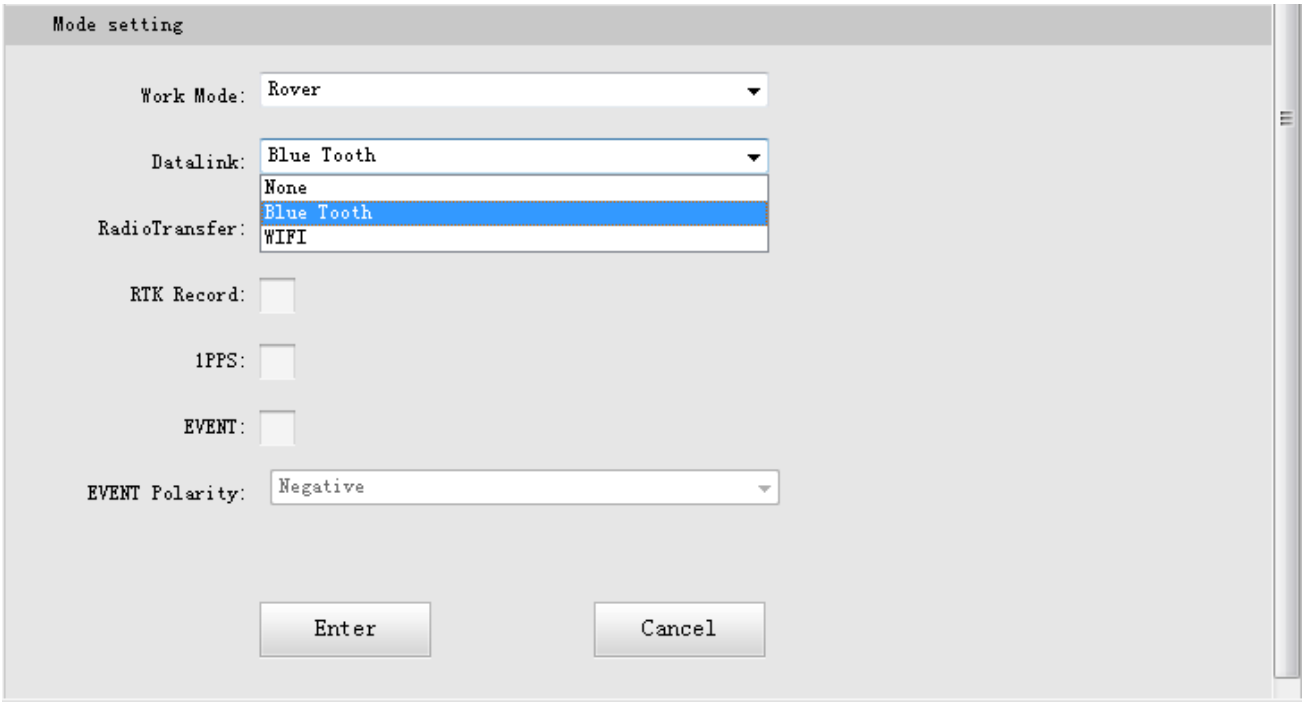
General Config

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



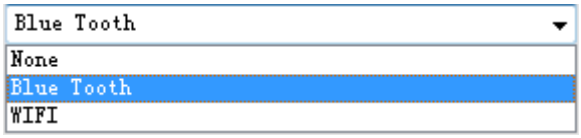
If the code of S680N has expired or is going to be run out, please provide the serial number of your S680N receiver for us, then we will supply another available code, then apply the code to receiver by inputting the code into the blank or register the receiver online.

S680N is allowed setup the working mode and datalink from Web UI that only need the mobile phone or tablet PC which is able to connect the wifi hotspot of S680N.



Work Mode: There are Rover, Base and Static options contained in this dropdown list, S680N now owns the ability to work as Base because of the WIFI module integrated on receiver.

Datalink: Pull down the list, there are only two options for datalink, Bluetooth and WIFI, because unlike traditional RTK receiver, S680N is without any other datalink module inside except Bluetooth and WIFI module.



Tips: *Under Base mode, there is only WIFI available in datalink, because it is the only way for data transmission from base.*

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

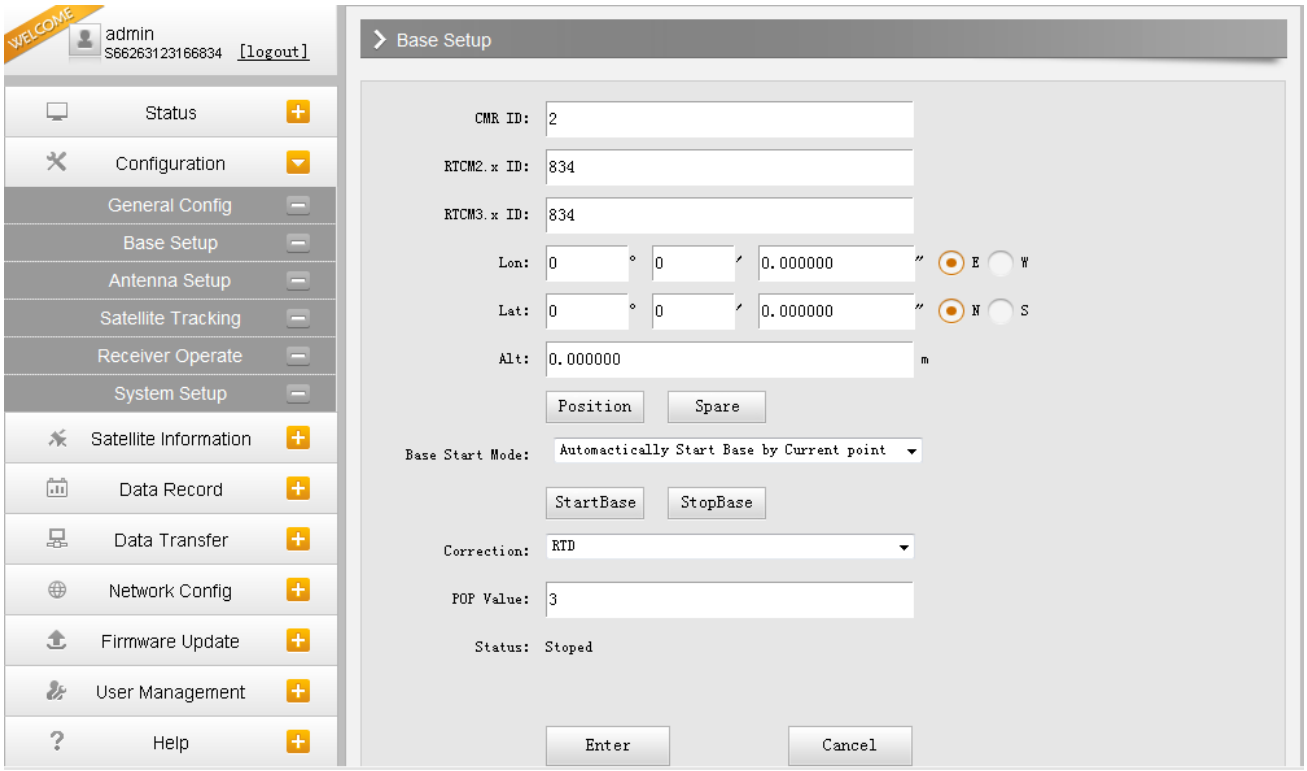
1 PPS: This option is for the 1 pulse per second output

EVENT: This option is for the EVENT marker input

EVENT Polarity: EVENT input method.

Base Setup

Due to the WIFI module is equipped on S680N receiver, this unit is able to work as Base, then transmits corrections via WIFI connection. Therefore, 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, they are easy to understand from the literal meaning.

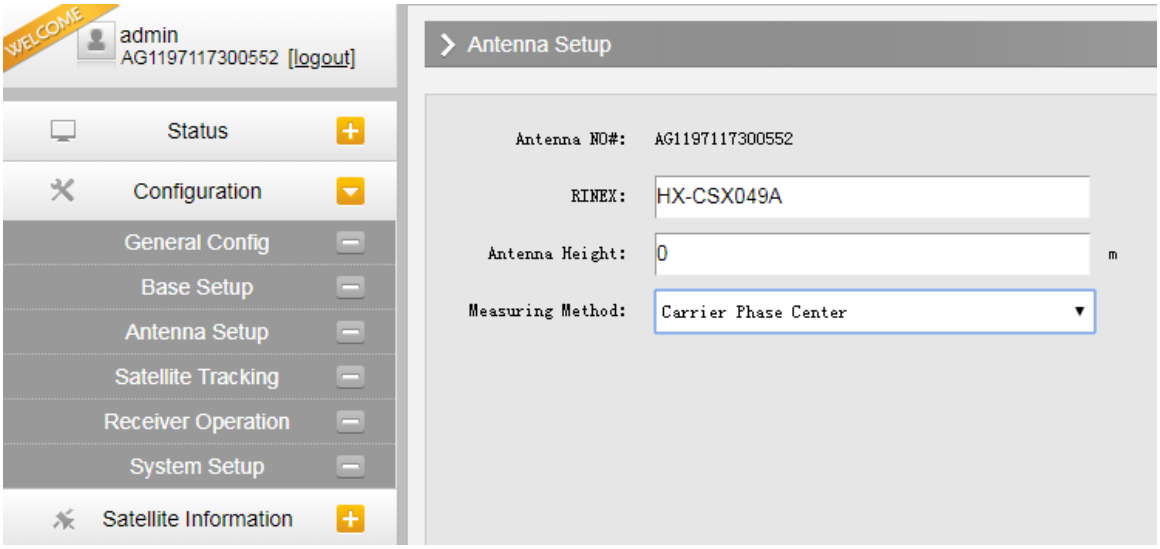
Correction: Here contains the global general used correction formats including RTD,RTCM23, RTCM30, RTCM32, CMR and SCMRx

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

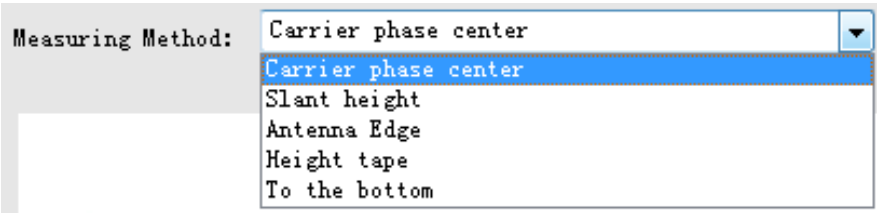
Status: Here will display the status for base in real-time.

Antenna Setup

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

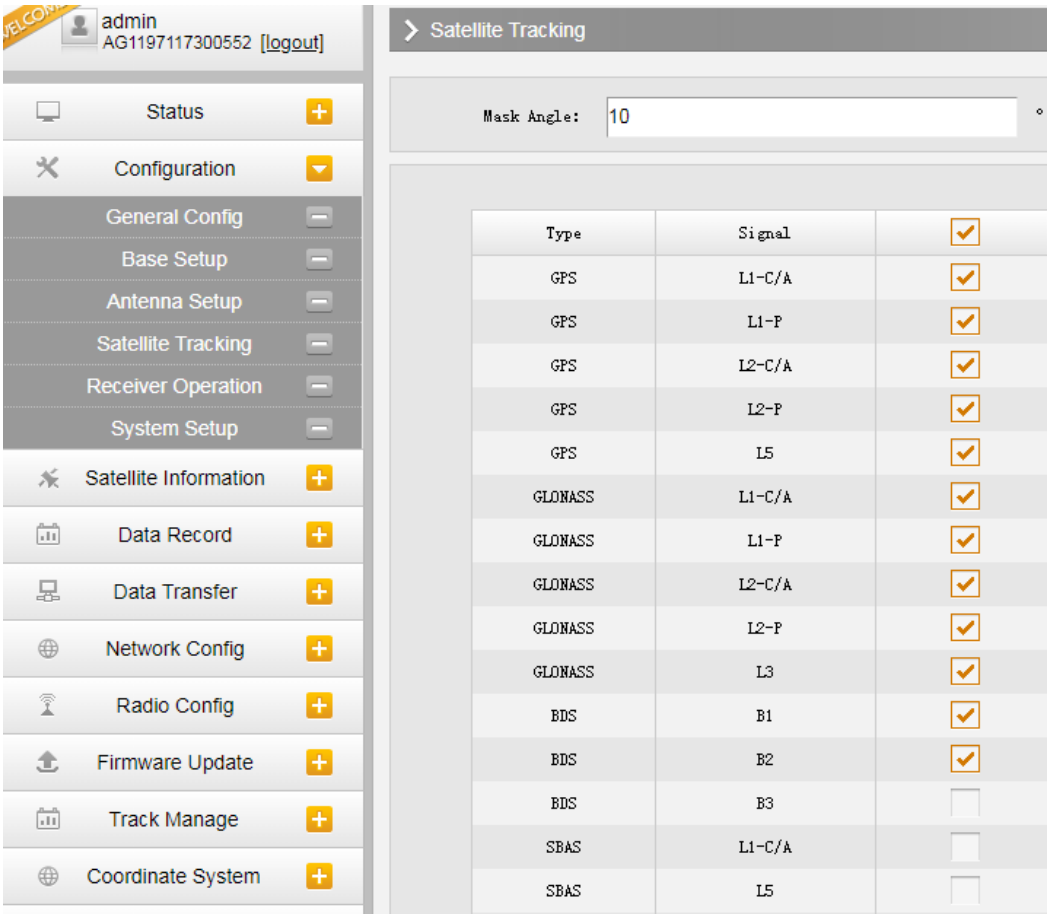


Antenna Height: This is the value for height of antenna while surveying.
Measuring Method: Here provides several methods for measuring the antenna height such as carrier phase center, slant height, antenna edge, height plate and to the bottom.



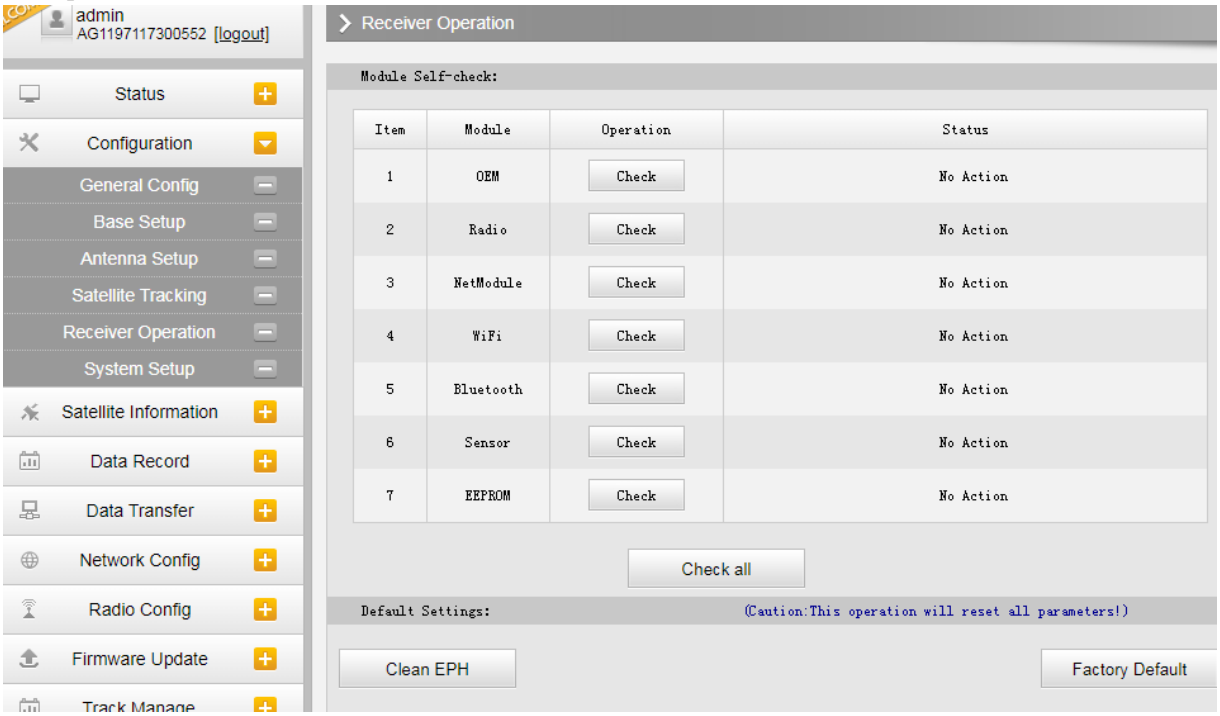
Satellite Tracking

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



Receiver Operate

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

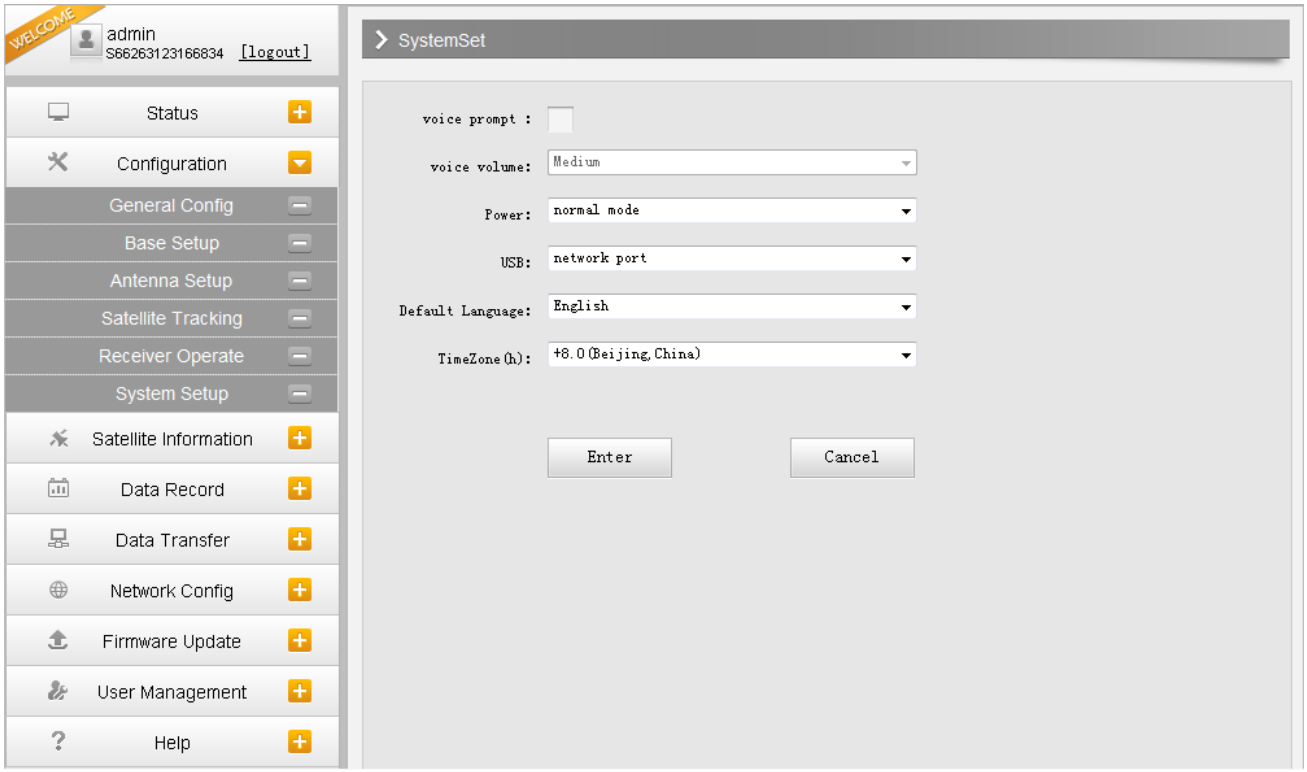


Self-check: Users can also do the self-check from this configuration page, click on the Check all button to check all the modems or click on the check button corresponding to the modem to check one by one.
Clean EPH: Click this button to clear the remaining epochs to let recever track the satellites better.
Factory Default: Click this button to bring the receiver back to factory default setting.
Power Off: Click this button to power off the receiver.

Reboot: *This is not supported on S680N receiver, that is why this button is not activated (grey).*

System Setup

This page is used to control power saving, USB mode, default language for internal web UI and timezone.



Power: Configure the receiver to use the power saving mode or not.
USB: This is used to configure S680N receiver what kind of mode output from LEMO port when connect the receiver with computer via L7U50 cable. USB and network port for optional.
Default Language: Configure the default language for S680N internal web UI.
TimeZone: This is mainly to setup the timezone for receiver.

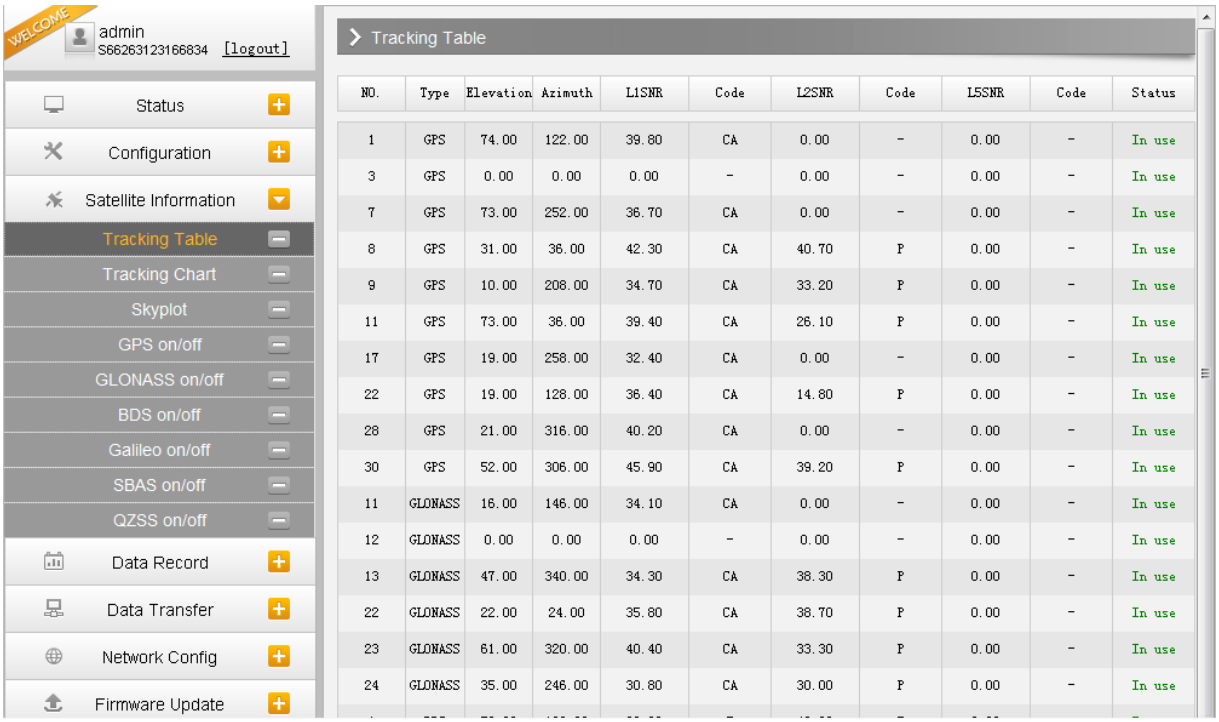
Tips: *because S680N receiver doesn't support the voice prompt, the option Voice Prompt and Voice Volume are displayed in grey.*

4.2.3. 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

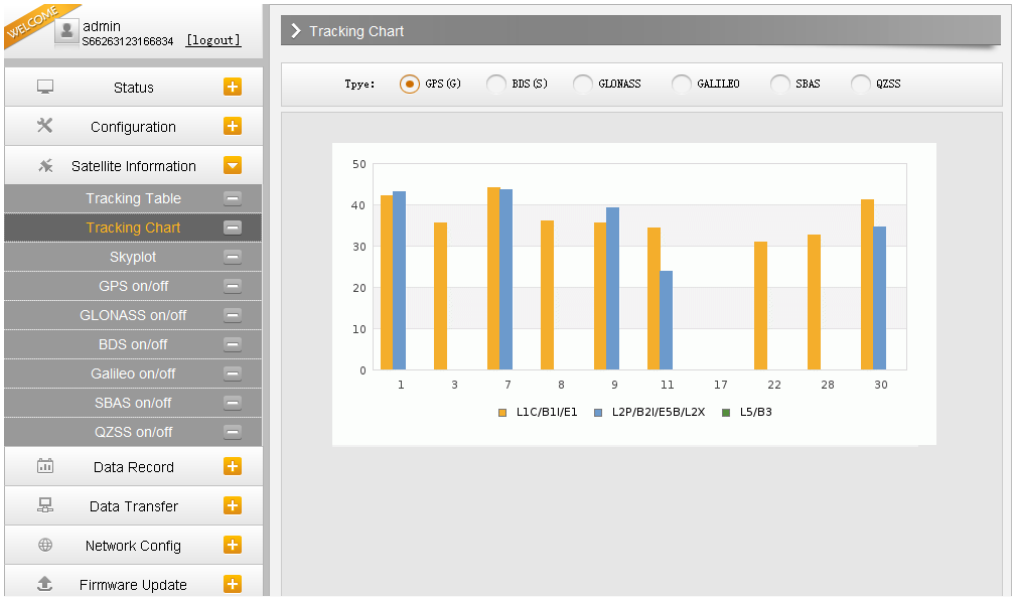
Here is the table to list all current used satellites and the other information for these satellites.



NO.	Type	Elevation	Azimuth	L1SNR	Code	L2SNR	Code	L5SNR	Code	Status
1	GPS	74.00	122.00	39.80	CA	0.00	-	0.00	-	In use
3	GPS	0.00	0.00	0.00	-	0.00	-	0.00	-	In use
7	GPS	73.00	252.00	36.70	CA	0.00	-	0.00	-	In use
8	GPS	31.00	36.00	42.30	CA	40.70	P	0.00	-	In use
9	GPS	10.00	208.00	34.70	CA	33.20	P	0.00	-	In use
11	GPS	73.00	36.00	39.40	CA	26.10	P	0.00	-	In use
17	GPS	19.00	258.00	32.40	CA	0.00	-	0.00	-	In use
22	GPS	19.00	128.00	36.40	CA	14.80	P	0.00	-	In use
28	GPS	21.00	316.00	40.20	CA	0.00	-	0.00	-	In use
30	GPS	52.00	306.00	45.90	CA	39.20	P	0.00	-	In use
11	GLONASS	16.00	146.00	34.10	CA	0.00	-	0.00	-	In use
12	GLONASS	0.00	0.00	0.00	-	0.00	-	0.00	-	In use
13	GLONASS	47.00	340.00	34.30	CA	38.30	P	0.00	-	In use
22	GLONASS	22.00	24.00	35.80	CA	38.70	P	0.00	-	In use
23	GLONASS	61.00	320.00	40.40	CA	33.30	P	0.00	-	In use
24	GLONASS	35.00	246.00	30.80	CA	30.00	P	0.00	-	In use

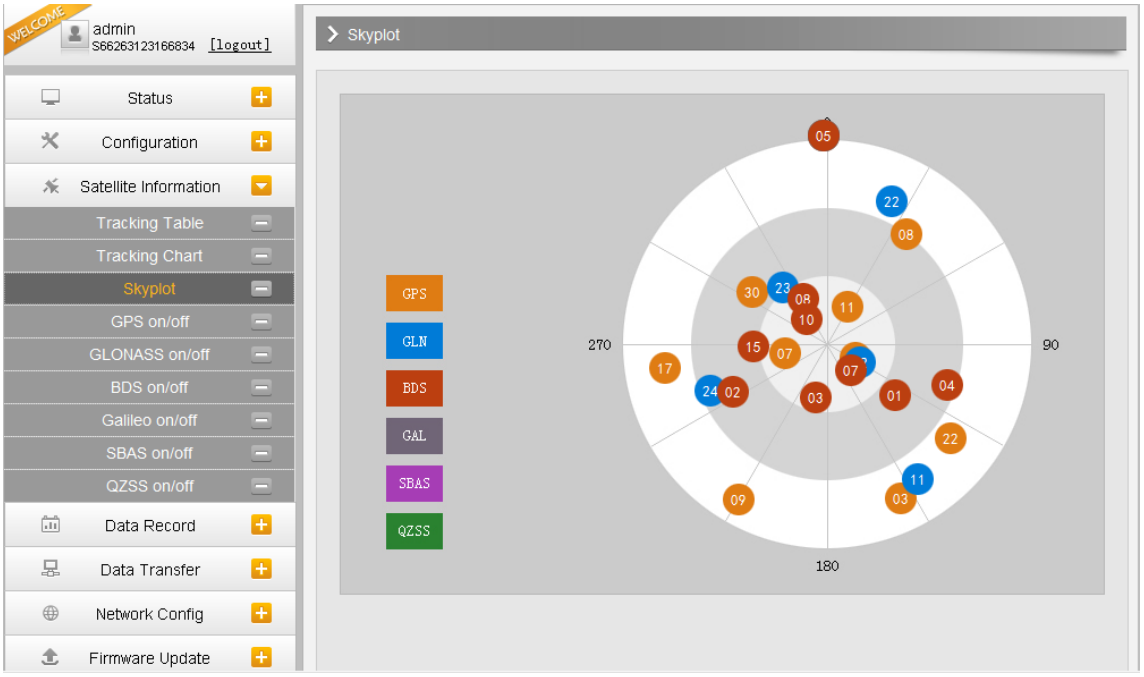
Tracking Chart

In this page, the histogram will indicate the signals from those used satellites, and allow to check each constellation separately.



Skyplot

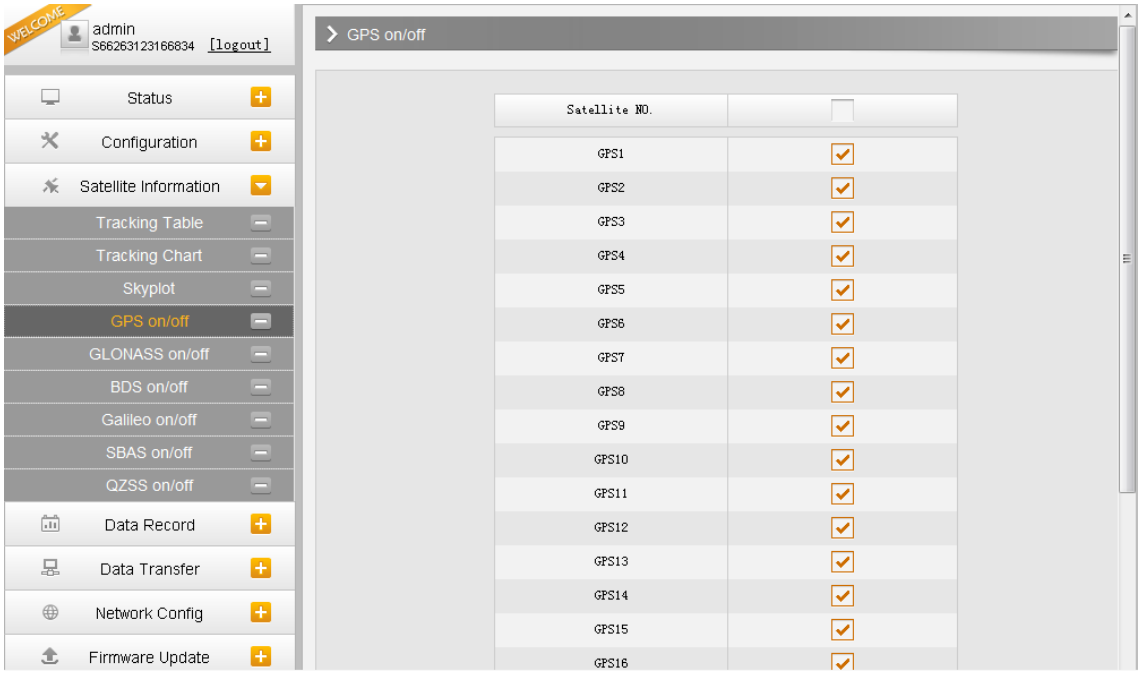
In this page, all the tracking satellires are shown on the skyplot, this let users intuitively view and know where the current position of satellite is.



GPS on/off

For all the running GNSS constellations or the augmentation system, S680N 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.

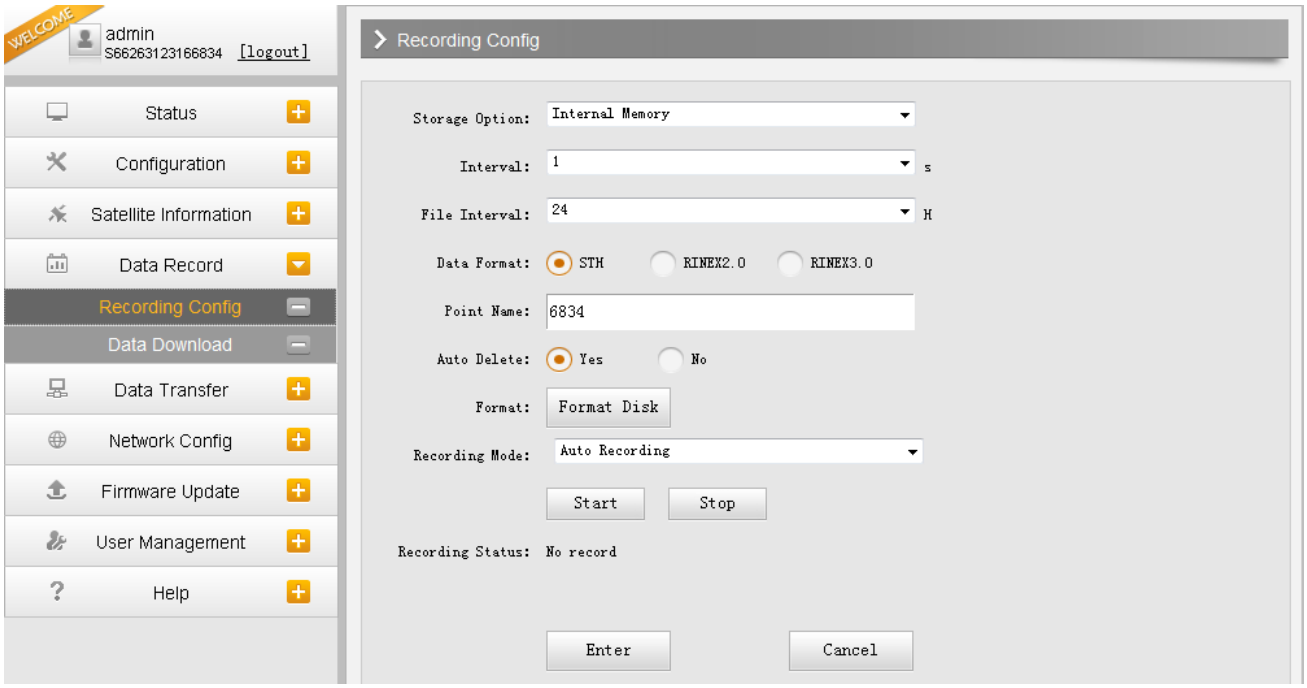


4.2.4. Data Record

The “Data Record” performance is mainly used to configure all the parameters for receiver in static mode. Much more operations can be done on S680N receiver 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 (OTG function).

Interval: This is the sampling interval for data storage, 20Hz(0.05s) sampling interval now is supported on S680N.

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

Data Format: Here are 3 options to select for S680N 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 configure S680N to delete the previous data files automatically if the memory is full.

Format: Click this button to format the internal memory for S680N receiver.

Recording Mode: Here are 2 options to configure S680N to record raw data automatically or not if it achieves the sampling conditions.

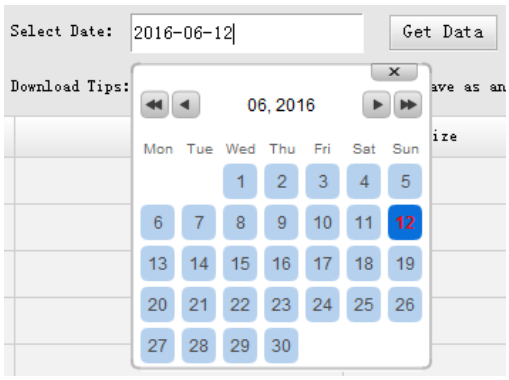
Start/Stop: Click these buttons to start recording or stop recording the raw data.

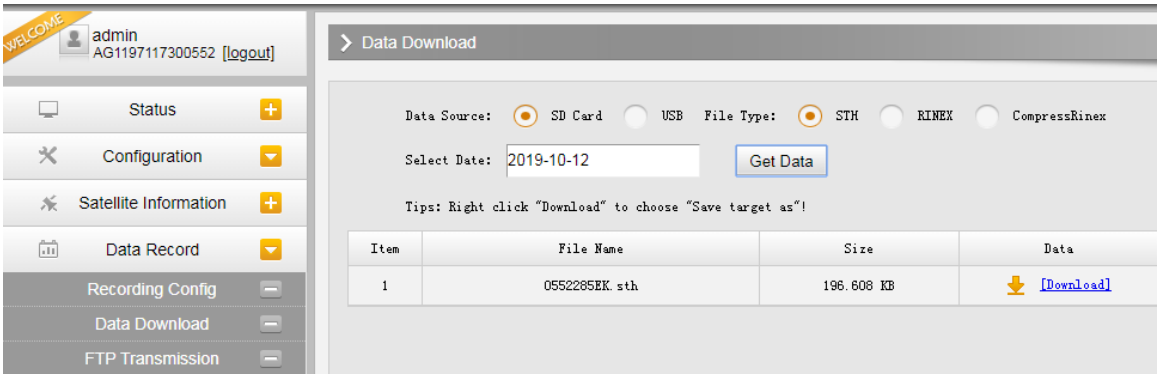
Recording Status: Here shows the status of static data storage.

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 that date you choose will show in the table, tap download button to download the data files.



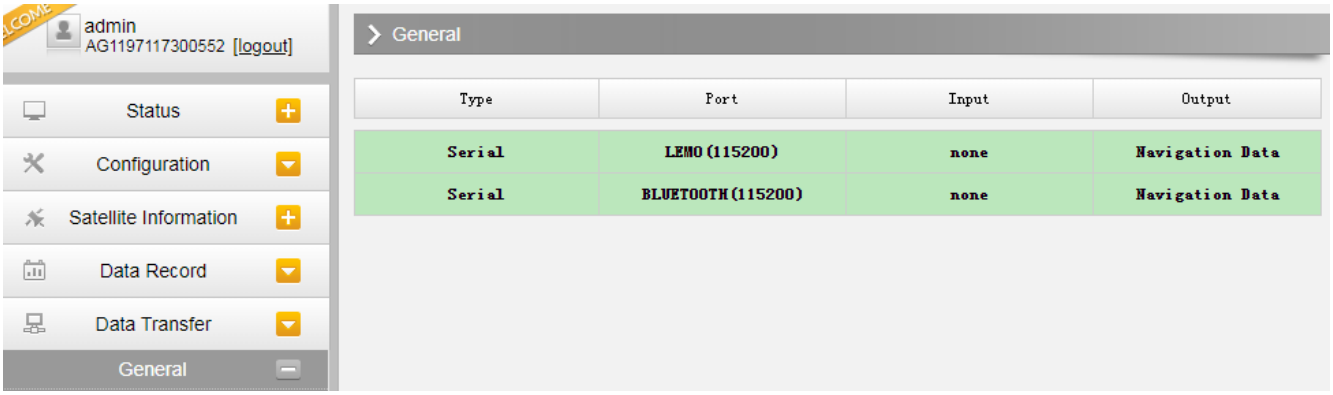


4.2.5. Data Transfer

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.

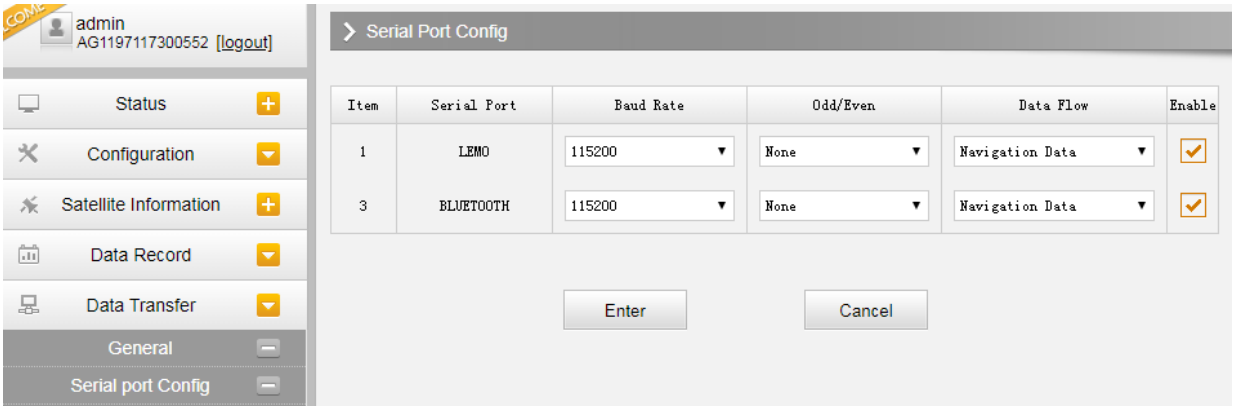
General

This page shows the service condition and the output contents of the ports, if the port items display in green, that means the port is available for use, and on the contrary, if the port is not used while the items display in red.



Serial port Config

This page is allowed to configure the baud rate, odd-even check and the data flow for LEMO port and Bluetooth.



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

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

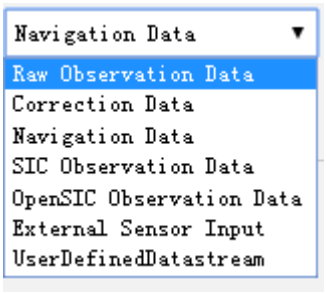
Raw observation data: This is the raw observation data straight from OEM board.

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 KOLIDA.

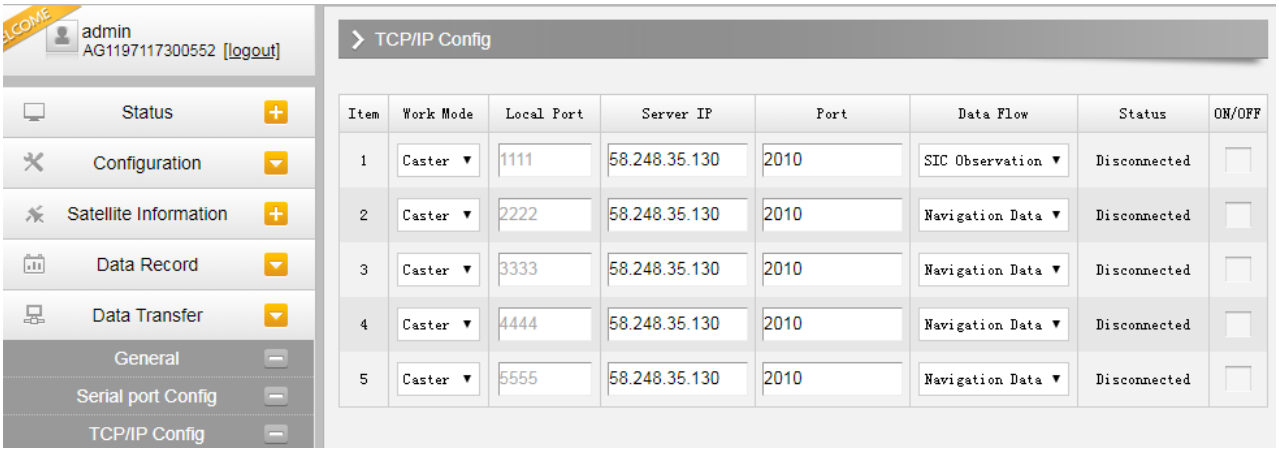
OpenSIC Observation Data: This is the open version of KOLIDA user-defined format observation data for secondary development.



TCP/IP Config

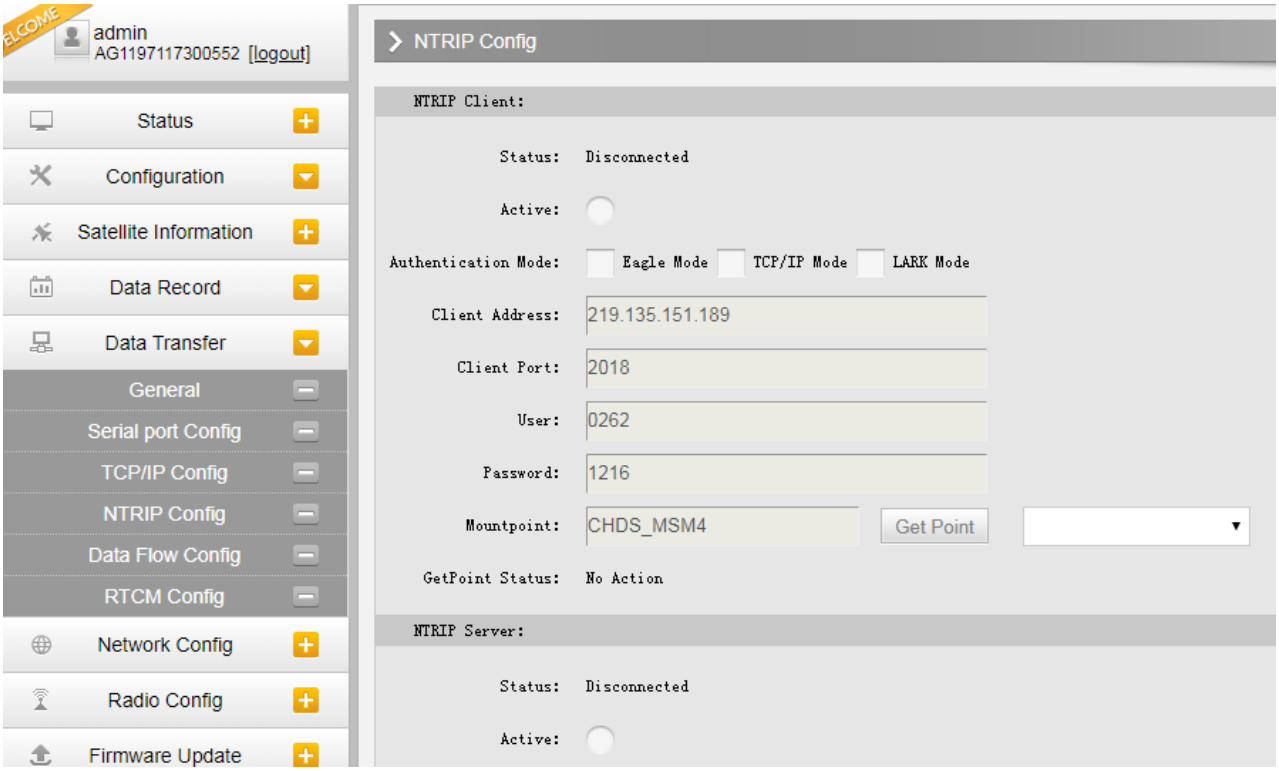
This is used to configured the raw data or navigation data to be uploaded or transferred to a server. And there are Caster and Server working mode for this performance.

Caster: If this working mode is selected, S680N will be a client to upload the data to a specify server if it connects to the internet by WIFI connection. 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: S680N receiver 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 S680N through the IP from receiver.



NTRIP Config

This is used to configure the NTRIP performance while receiver is going to connect to internet. S680N supports complete NTRIP performance including NTRIP Client, NTRIP Server and NTRIP Caster.



NtripClient

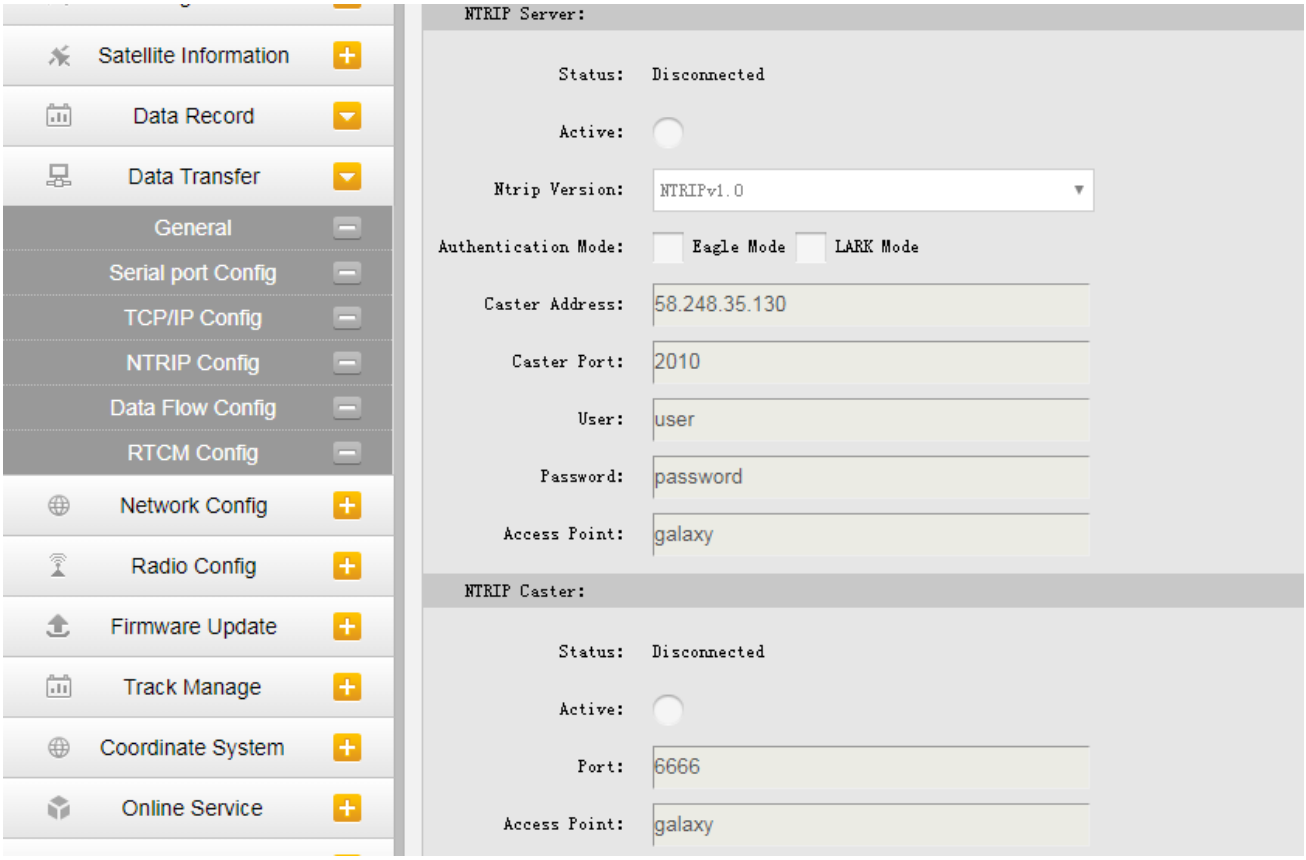
This is the general used function for rover set in WIFI mode. At the field of NtripClient, the specify IP address, access port of reference station, as well as the assigned username and password shall be input for the NTRIP connection.

Status: This field will display the status of NTRIP connection, connect or disconnect.

Active: Check on this circle to activate this function.

Authentication Mode: These three modes use different protocol standard for the connection, **Eagle Mode** is KOLIDA standard mode, and **TCP/IP Mode** is for private network use, usually, choose the Eagle mode for the default setting. **LARK Mode** is a totally new communication mode for network connection, it is similar to the CSD function that establishes connection between Base and Rover via GPRS network type, rather than GSM. However, S680N is without the GPRS module inside, this function is not supported on S680N receiver.

The next fields are the standard configuration for NTRIP connection, IP, port, username and password, after these information is input into the corresponding field, click on Get Point button to download the source table from server, then choose a proper mountpoint to access.

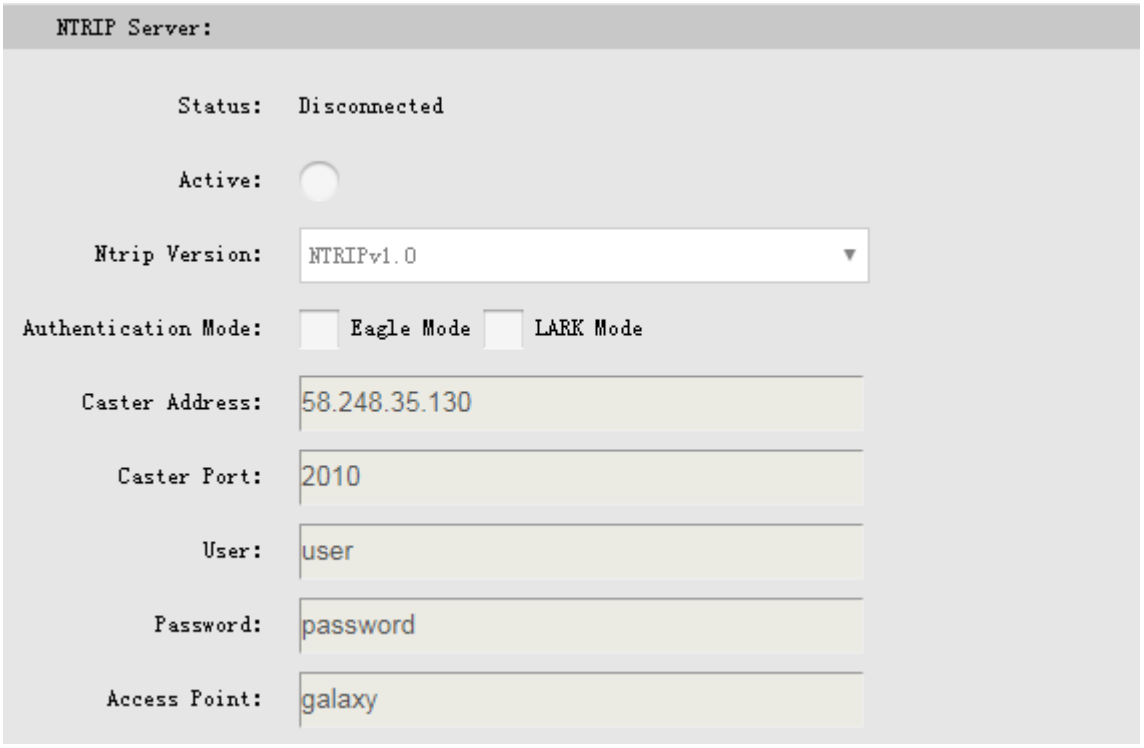


NtripServer

This configuration is used in Base+WIFI mode that Base station will transfer its correction onto the server as long as it connects to internet, then Rover can download the base's correction from server for use.

Ntrip Version: This field provides NTRIPv1.0 and NTRIPv2.0 for optional.

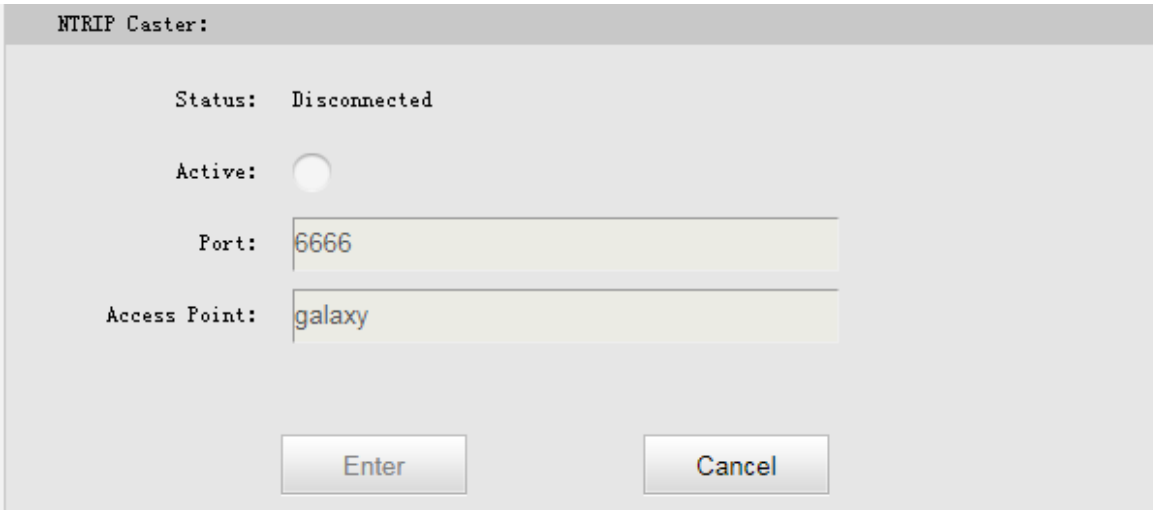
Access Point: This field is allowed to user-defined the correction format which base will transfer to the server, such as HHHH_RTCM30



NtripCaster

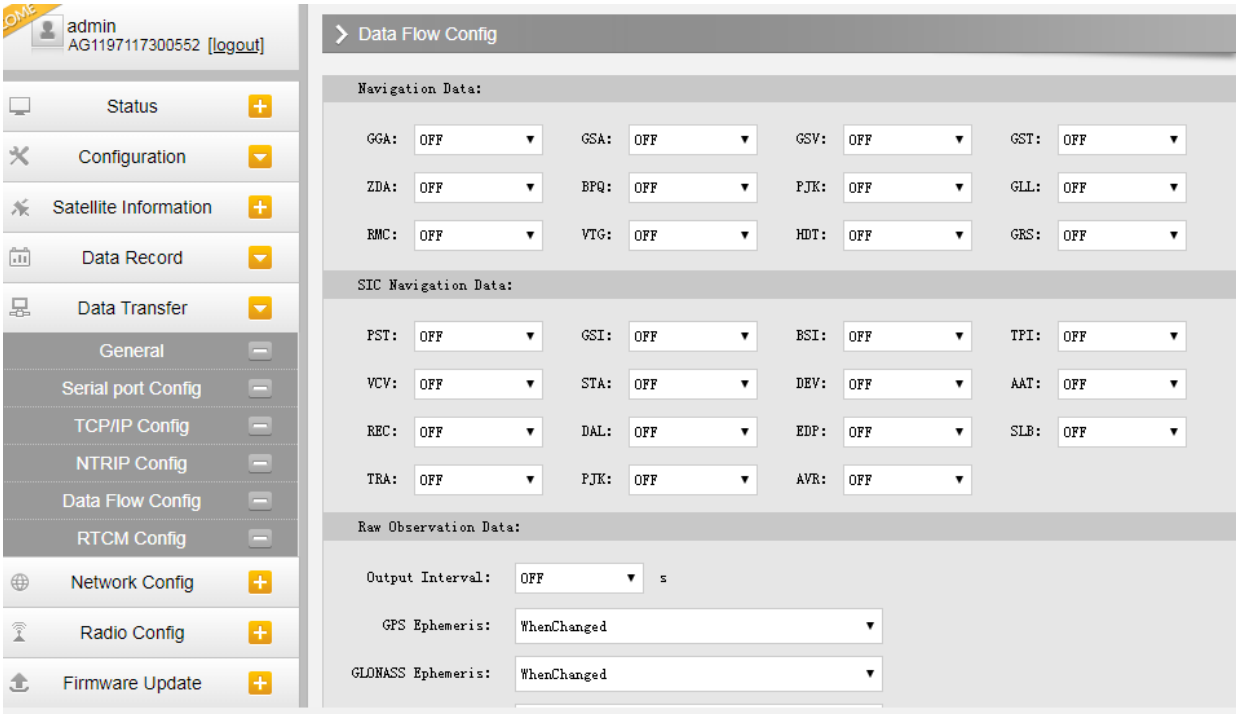
This feature is realized on S680N as well, the receiver is equivalent to a CORS system that it generates and broadcasts the user-defined correction for rover if S680N connects a static IP address.

Port: This is the specify port for the access.
Access Point: This is mountpoint which can be user-defined.



Data Flow Config

In this page, users can freely 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.



4.2.6. Network Config

The “Network Config” is able to configure the ways and the contents for internet access of S680N. WIFI Config, Bluetooth Config, Port Forwarding, Router and Network Testing are included under the list of Network Config.

WIFI Config

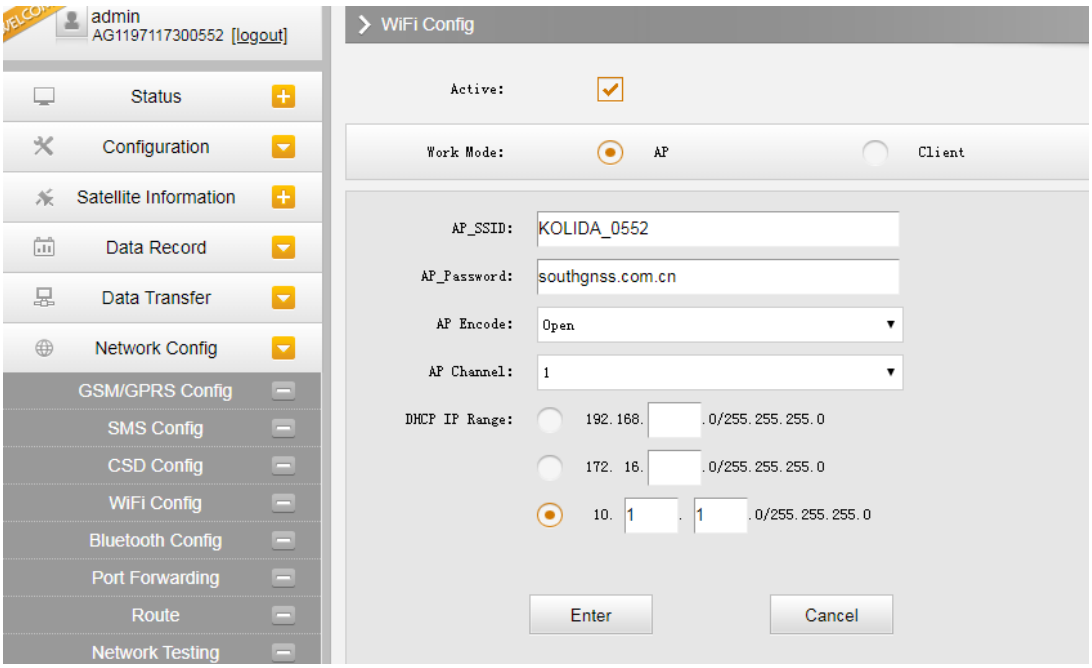
This is mainly used on the WIFI configuration for S680N, there are AP mode and Client mode for optional.

AP:

This is used to enable the WIFI hotspot for S680N receiver 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 S680N, 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.



Client:

This option enables S680N 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.

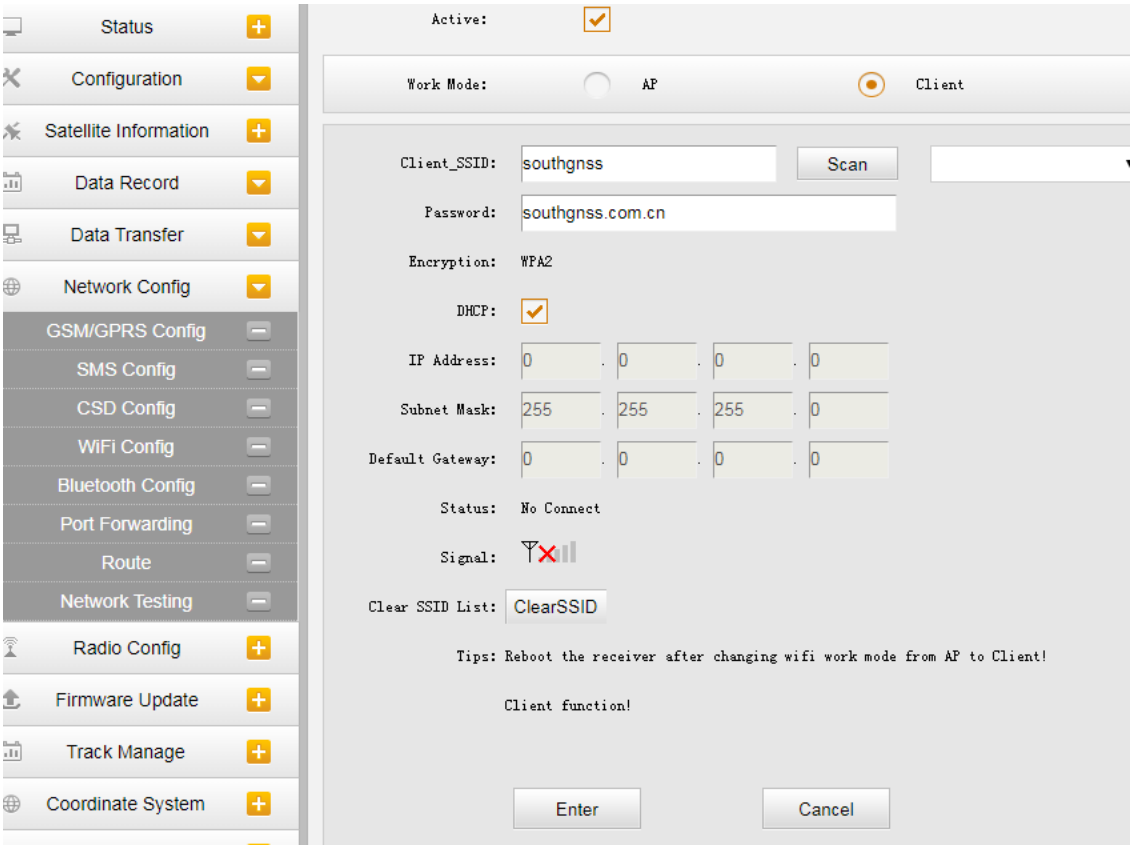
Client_SSID: This is the WIFI hotspot which S680N is going to connect

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

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

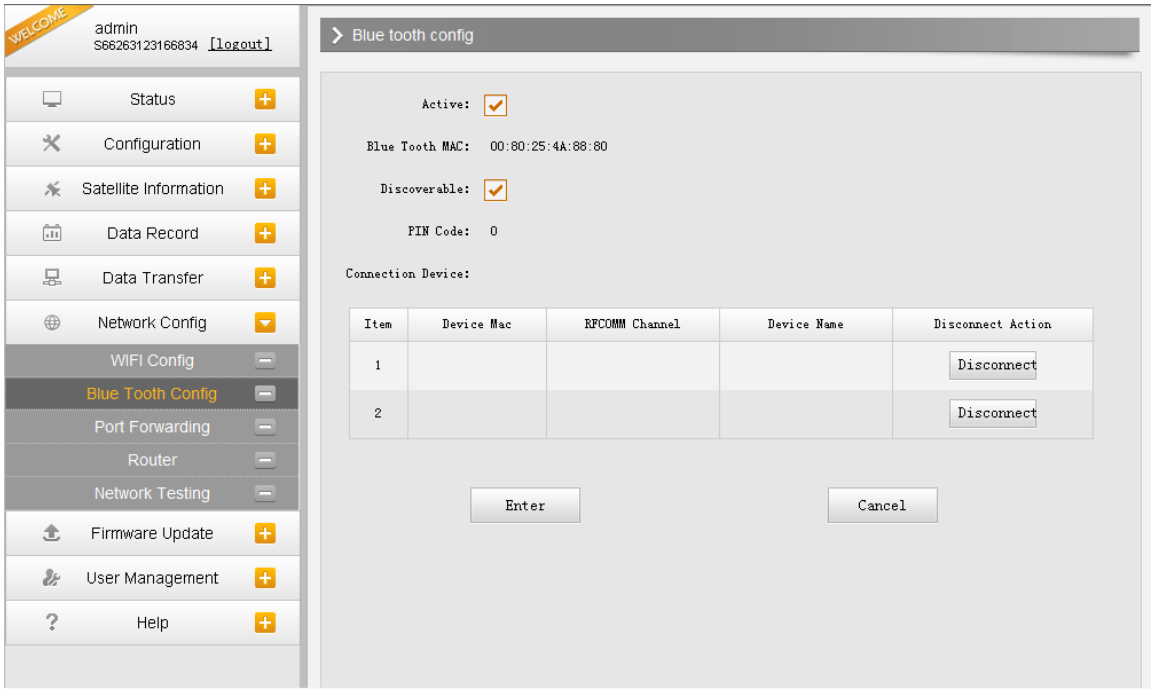
IP fields: If S680N successfully connects to the WIFI, there will be an LAN IP address generated by S680N itself.

ClearSSID: Click this button to clear the SSID list.



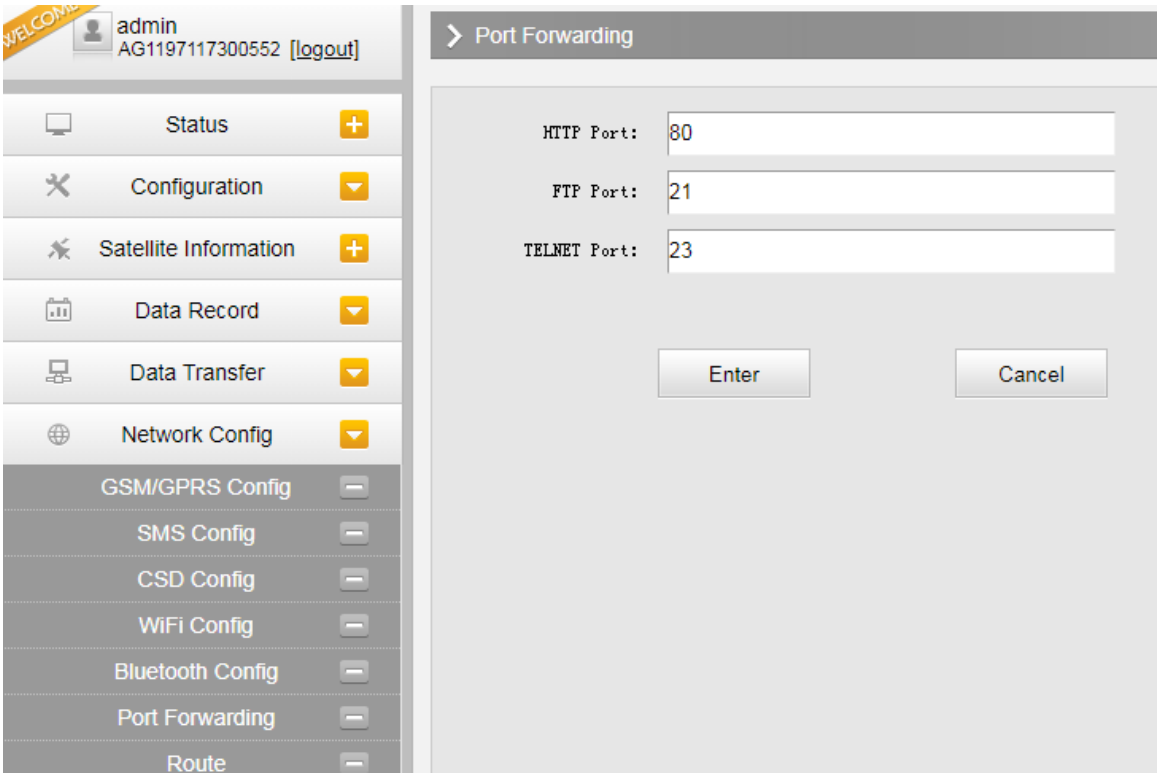
Bluetooth Config

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



Port Forwarding

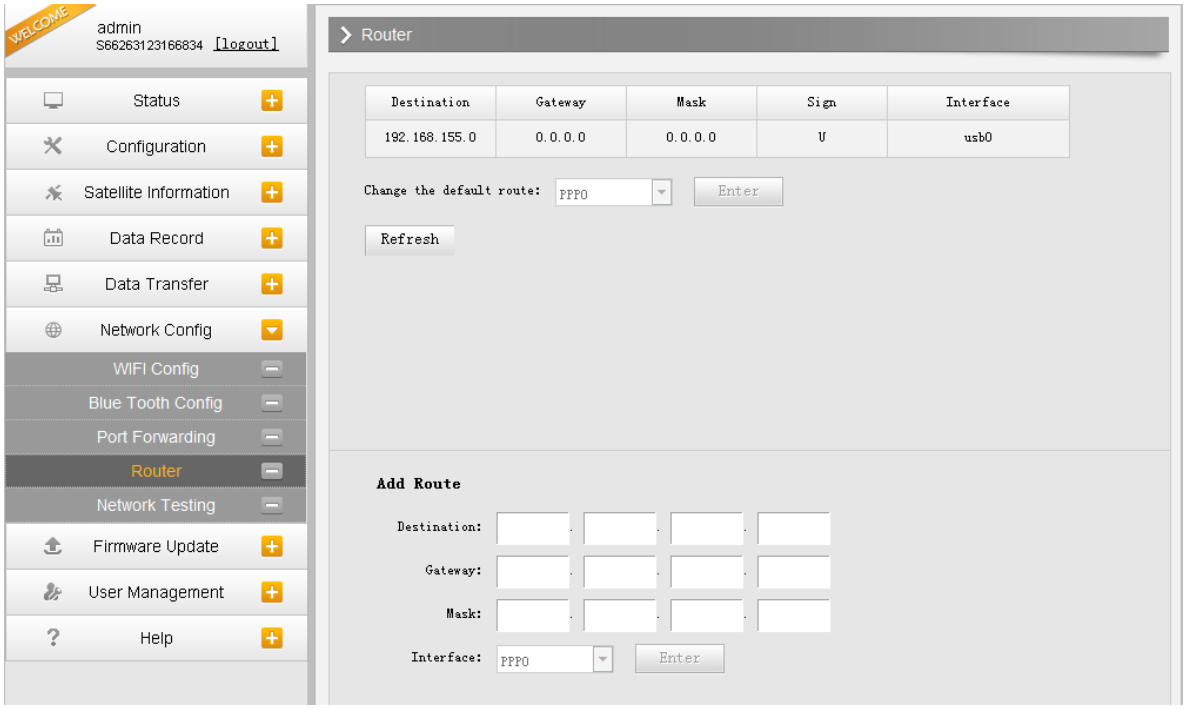
This page is mainly used to view and configure the internet transmission port for S680N, customize and debug receiver.



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

Router

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

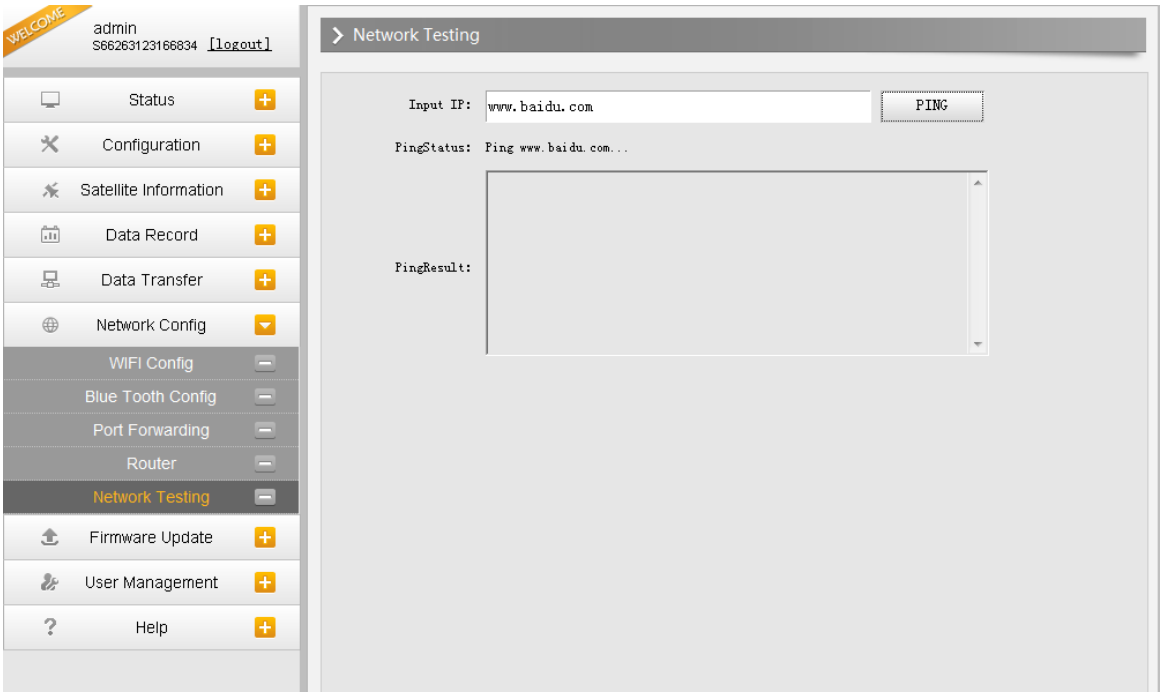


NOTE: Usually we will keep the default setting in this page, if you would like to modify it, please contact with KOLIDA technician for more supports.

Network Testing

This function is mainly used to test network status for S680N after logging on the internet via WIFI connection.

How to do: Input an IP address into, then click PING button, the testing information will be displayed in the PingResult window.

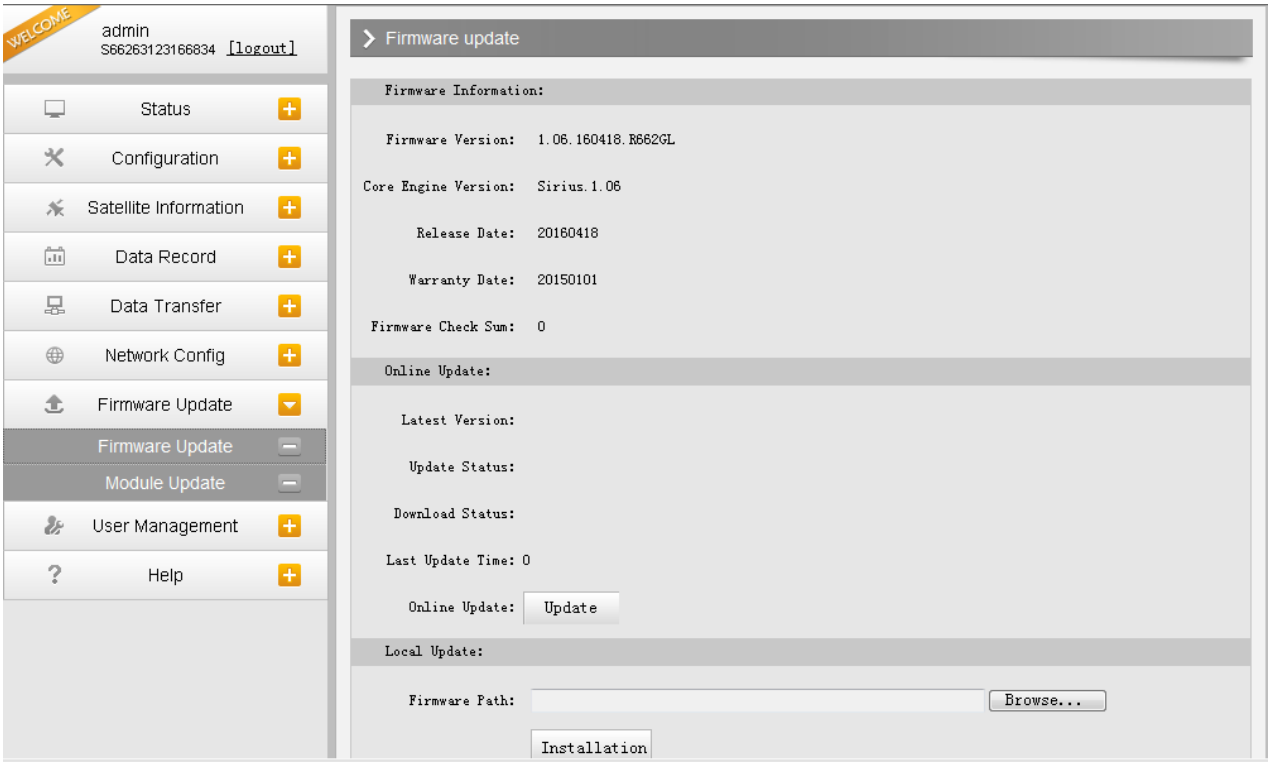


4.2.7. Firmware Update

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

Firmware Update

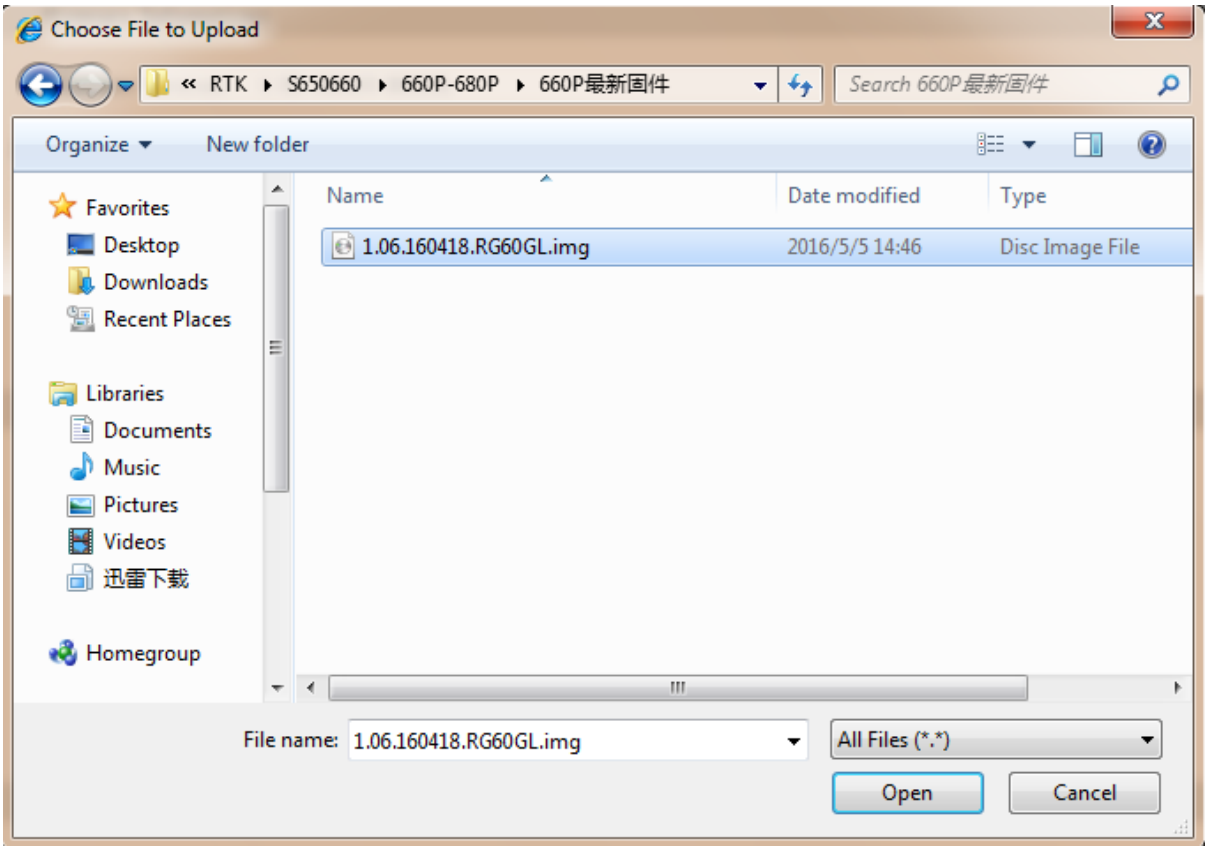
This page displays all the information of the firmware which current installed on S680N, and allows to update the latest version firmware for receiver. To get latest version firmware please contact with KOLIDA technician.



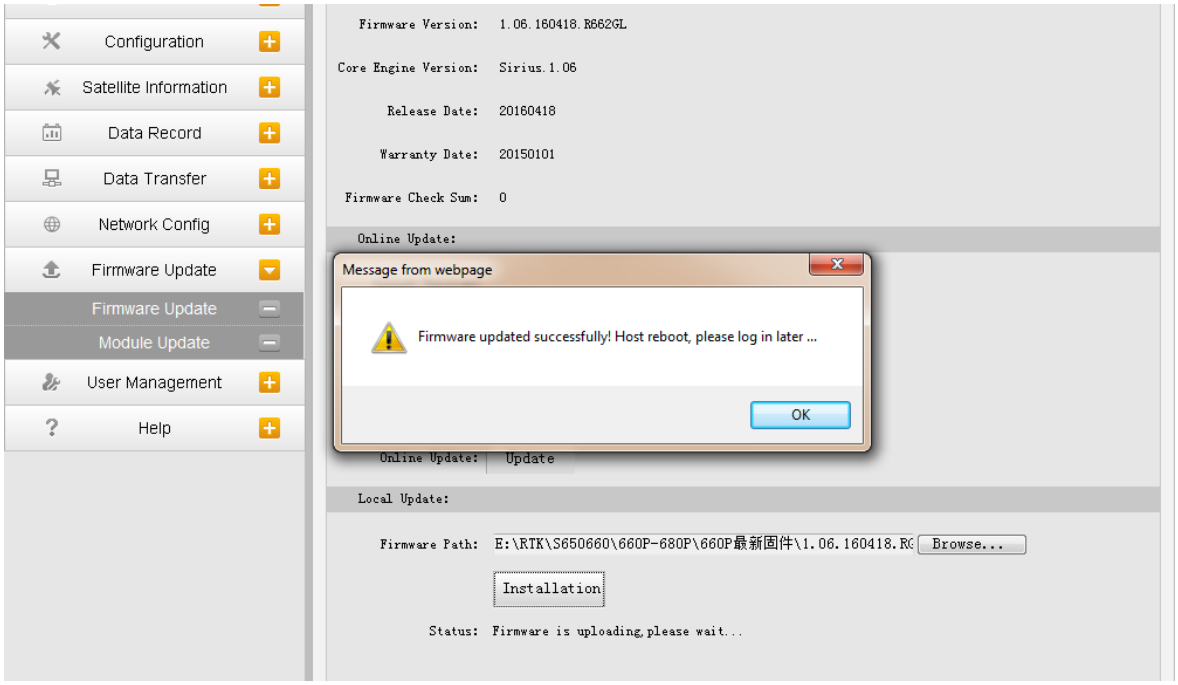
Online Update: S680N supports to update the firmware online anytime if there is something update or optimized.
Local Update: Update the latest firmware by using a firmware file.

How to upgrade the firmware with Local Update

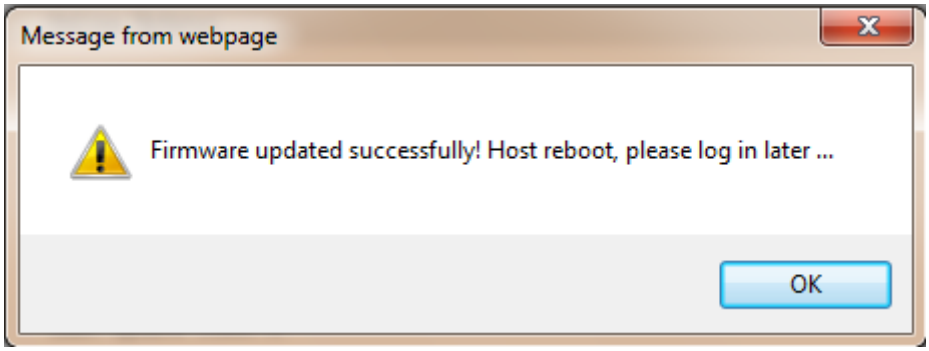
1. Click on “Browse” button to load firmware file (Please take in mind that the firmware is ended with .img as the extension name).



2. And then click “Installation” button to start upgrading.



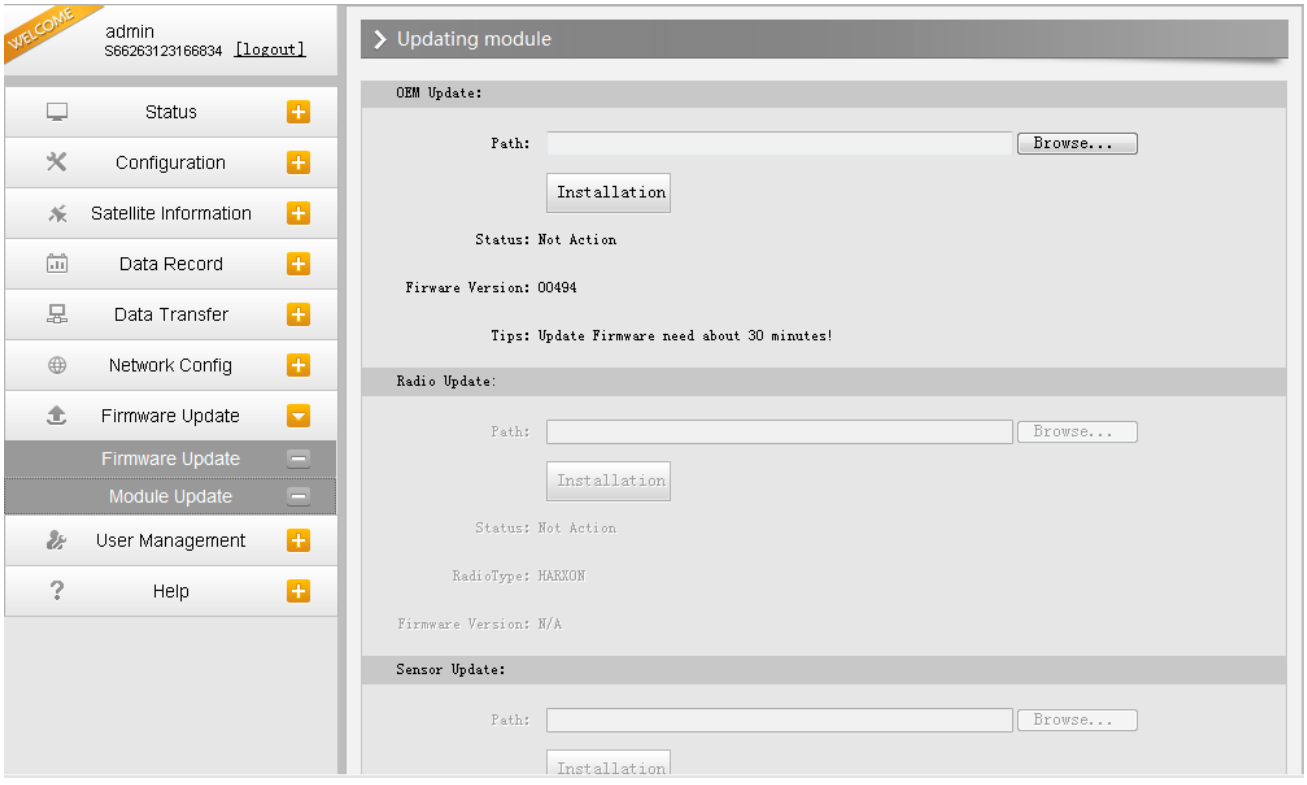
3. After the firmware is upgraded, a dialog will appear with saying "Firmware updated successfully! Host reboot, please log in later…", then the receiver will restart automatically.



SPECIAL REMIND: S680N doesn't support to update the firmware with any extra, in the future, update the firmware for S680N shall be done through the Web UI.

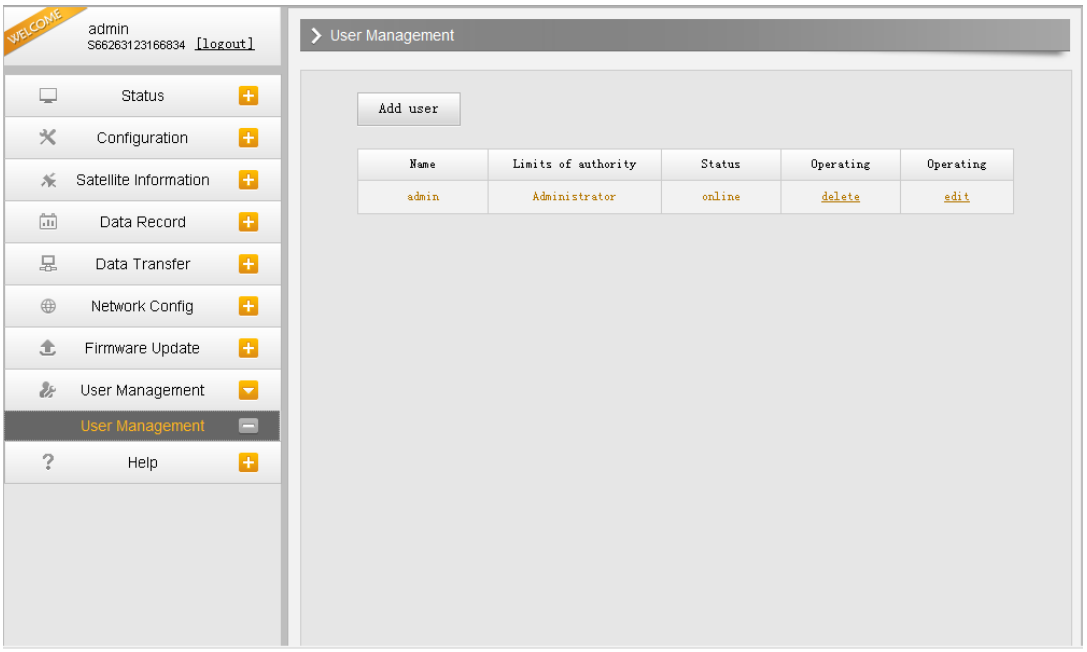
Module Update

This page is used to update the firmware for corresponding modem such as OEM board, for S680N, there is only the OEM board firmware can be updated on Module Update page, the others module are not available for S680N.



4.2.8. User Management

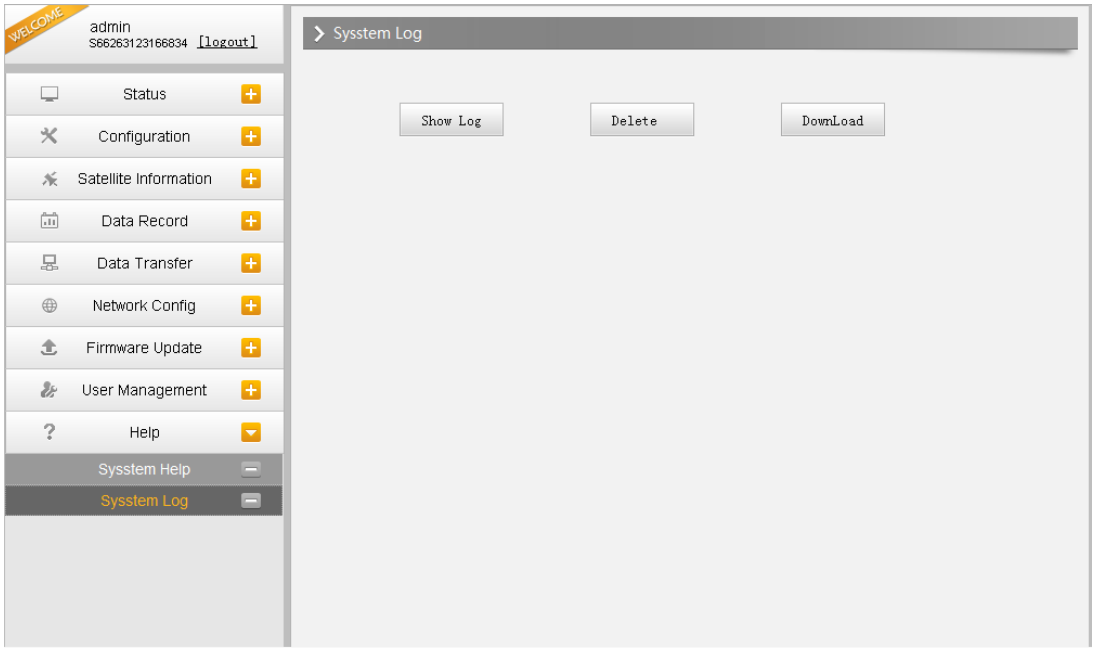
This page is used to manage the authority of login Web UI for users, including the username, password and add users.



4.2.9. Help

In this page, users can get help and check the 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.*



Chapter Ⅴ How to achieve the WIFI functions

Equipped with the most advanced WIFI module, this technology help S680N receiver not only can work as a WIFI broadcaster that allows users to connect it and access to the web UI management of S680N, but also can work as a datalink that makes S680N have a quick and stable connection to internet for corrections from CORS network.

In this chapter, you will learn more about how to achieve these both WIFI function on S680N.

5.1. WIFI Hotspot (AP)

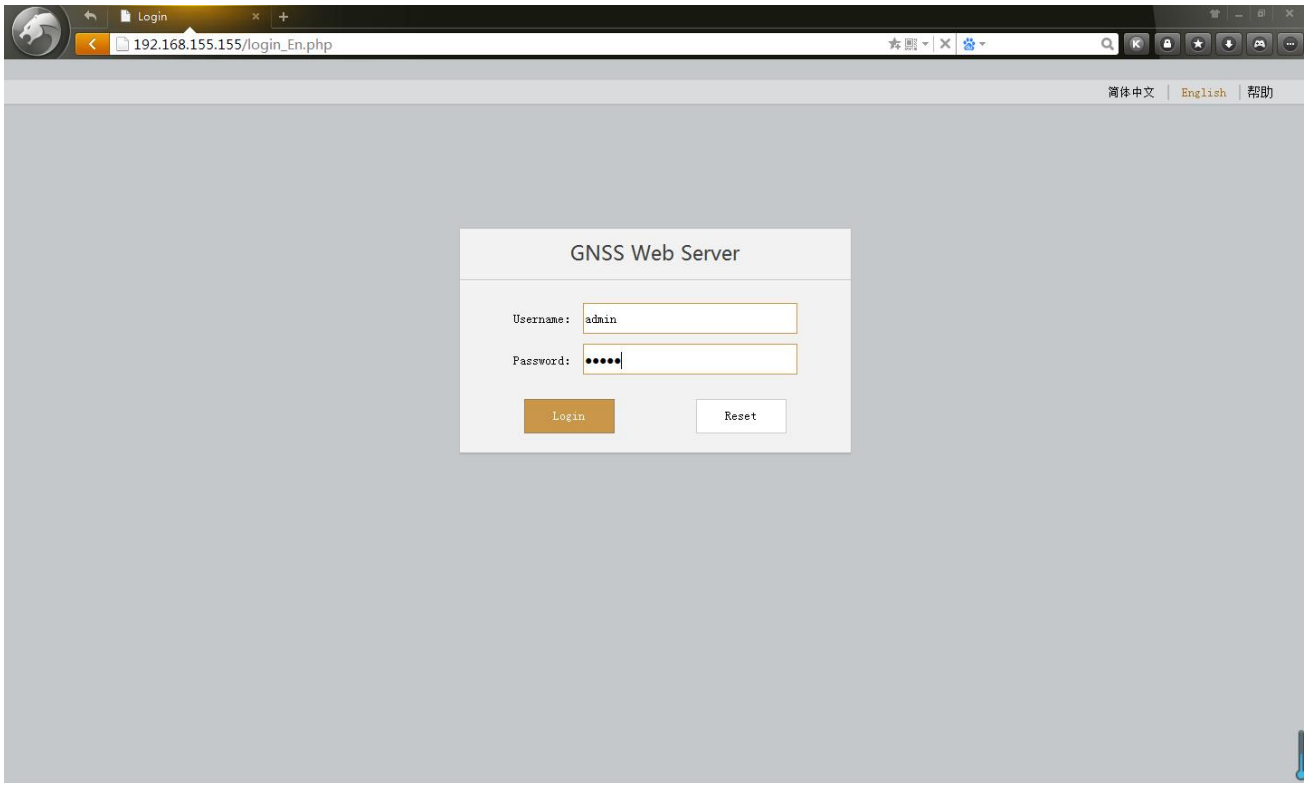
The WIFI hotspot means S680N receiver is able to broadcast its own WIFI hotspot with the integrated WIFI module, therefore, most of the mobile terminal can connect with this hotspot and access to the internal web UI page of S680N, then users are able to do a lot of operation on this web UI page, such as configure working mode, register, upgrade firmware, download raw data and the other additional functions.

Switch on S680N receiver in normal way, the WIFI hotspot is default to be broadcasted, and the SSID of the WIFI hotspot displays as KOLIDA_xxxx (xxxx is the last 4 characters number of SN), then use tablet PC, smartphone or laptop to search this WIFI SSID.

1, Using laptop

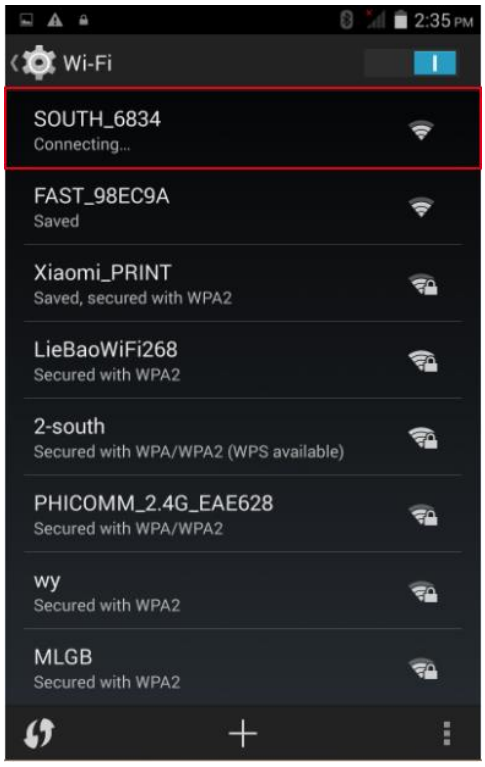
Search the WIFI SSID with a laptop, then click on "Connect" button to establish connection between laptop and S680N receiver, the password is not necessary on establishing the WIFI connection. But if there is necessary, define a password for this connection after login to the web UI page, then it will ask you to input the password you defined before every time you connect the WIFI hotspot.

After the connection is established, then run IE browser on laptop and type the IP address 10.1.1.1 into address bar, the login dialog will appear and requires the login info.

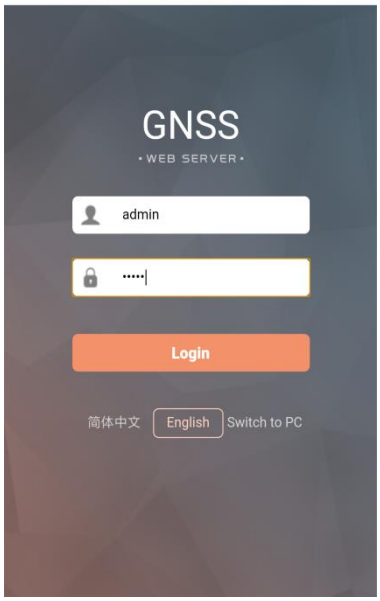


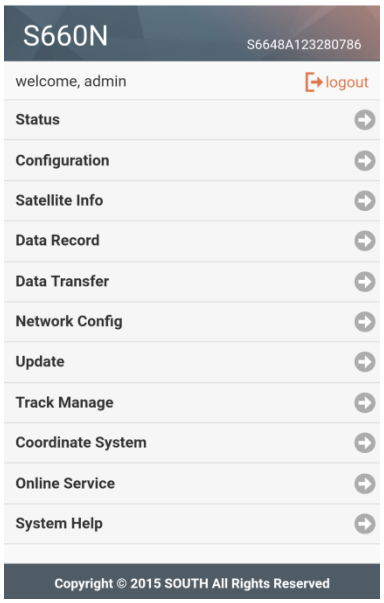
2, Using tablet PC

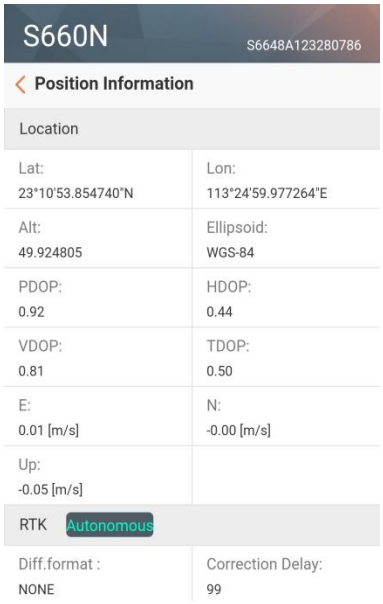
Search the WIFI SSID with a tablet PC, then click on the correct WIFI SSID, such as KOLIDA_6834, after the connection is established, run a browser on tablet PC and input the accessing IP address into the address bar.



Input the username and password into corresponding field after the login interface appears, the menu is listed on the tablet screen, tap on the menu and start to operate on this web UI.







5.2. WIFI Client (Datalink)

WIFI client means the WIFI function will work as a datalink for receiver that it is able to connect to the other hotspot and access to the internet, captures corrections from CORS station. Here we will introduce how to setup the WIFI client on S680N in two methods.

5.2.1. Configure on Web UI

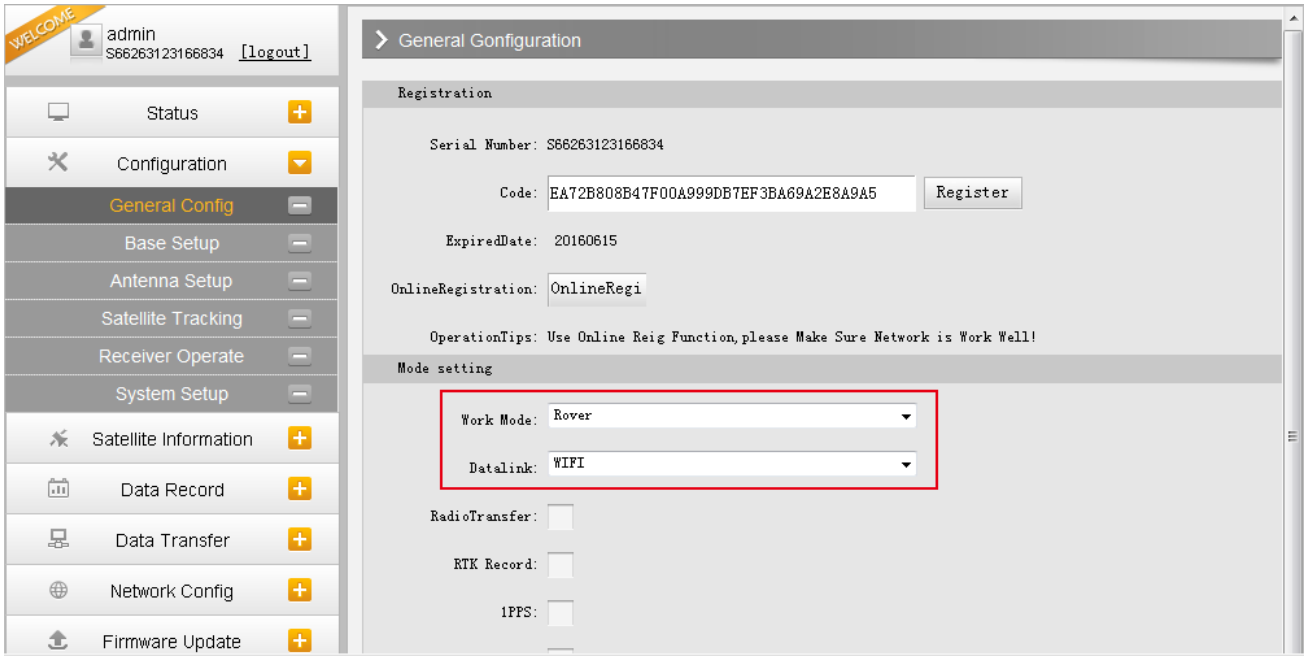
Due to the WIFI hotspot (AP) is the default WIFI mode on S680N receiver, and the WIFI AP mode and WIFI client mode can't exist at the same time, therefore, WIFI client mode must be switched into from WIFI AP mode, and switch the datalink into WIFI for S680N receiver.

Login the web UI of S680N via L7U50 cable, input IP 192.168.155.155 into address bar of IE browser, then input username and password for login to the server.

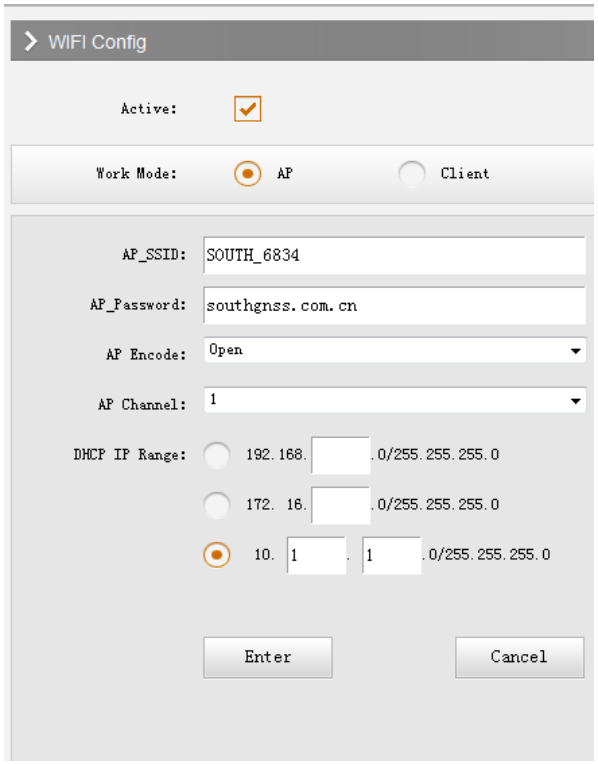
Go to Configuration—General Config, switch the working mode into Rover or Base, and datalink as WIFI, click on

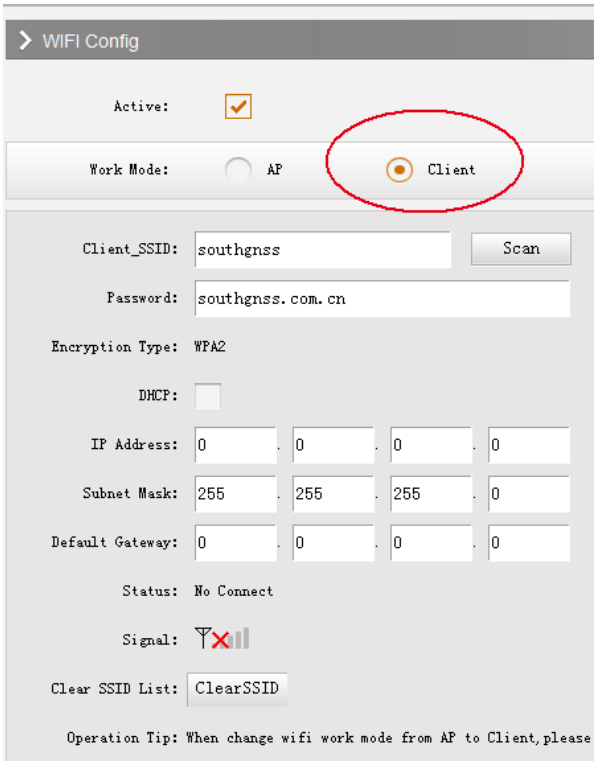
button to confirm the settings. In this section, Rover + WIFI mode and Base + WIFI mode are respectively introduced.

Rover + WIFI mode

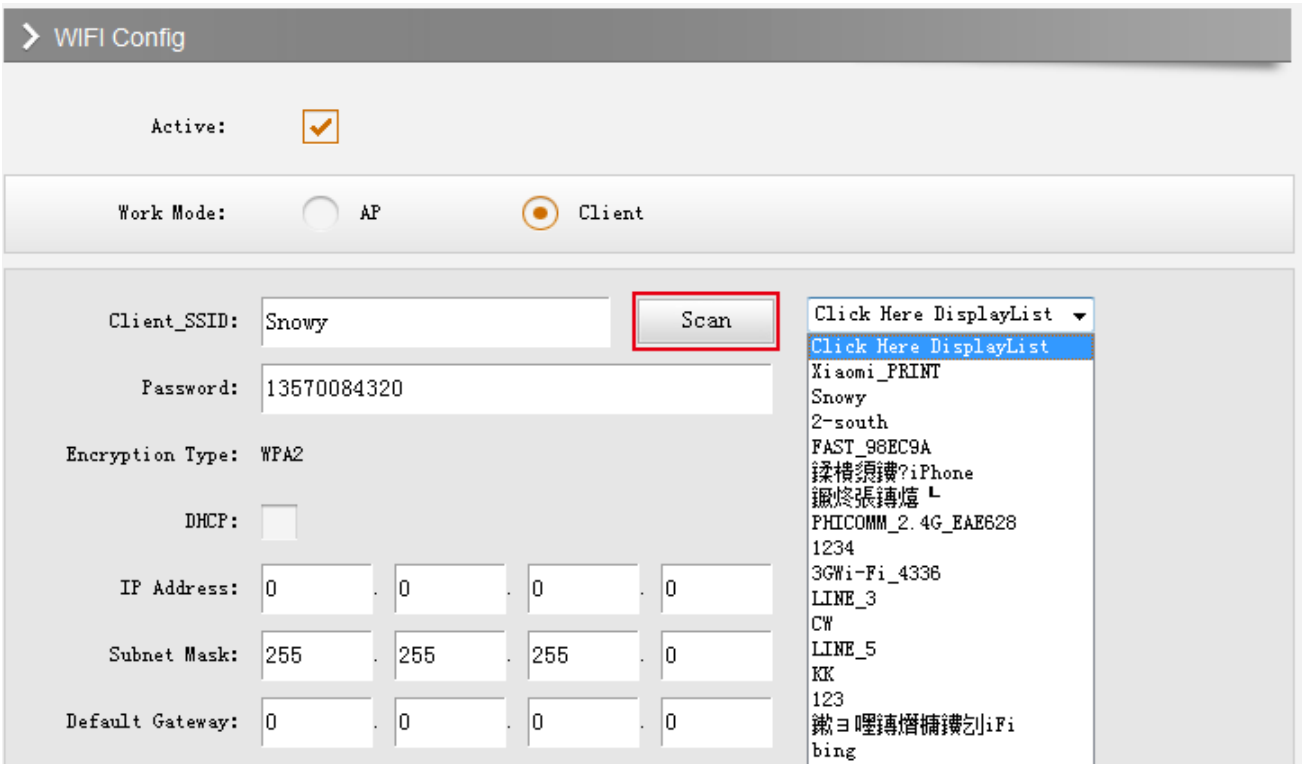


Unfold the sub-menus under Network Config, and go to WIFI Config, switch the WIFI working mode from AP into Client, then click on Enter button to make sure the WIFI working mode is successfully switched.

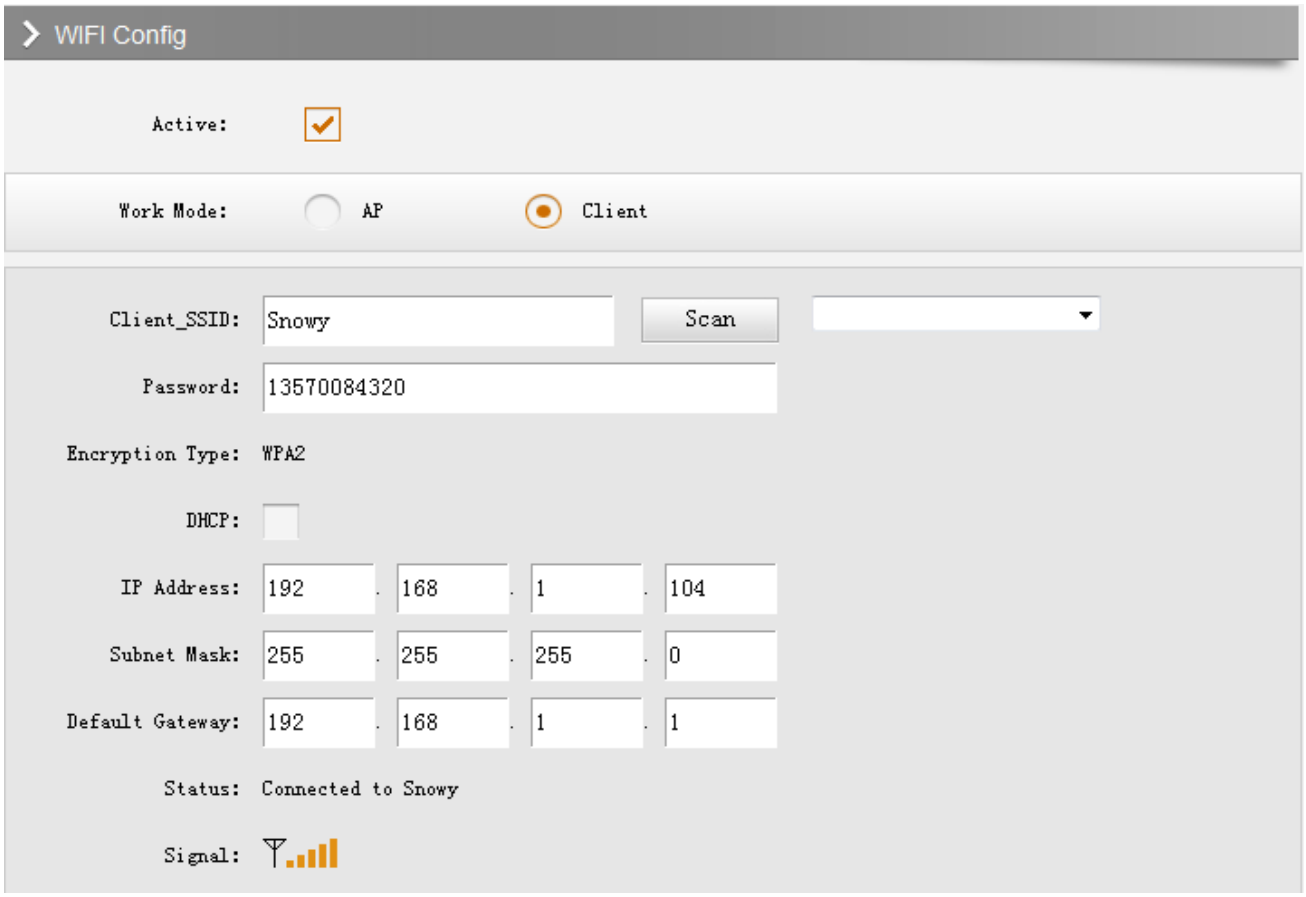




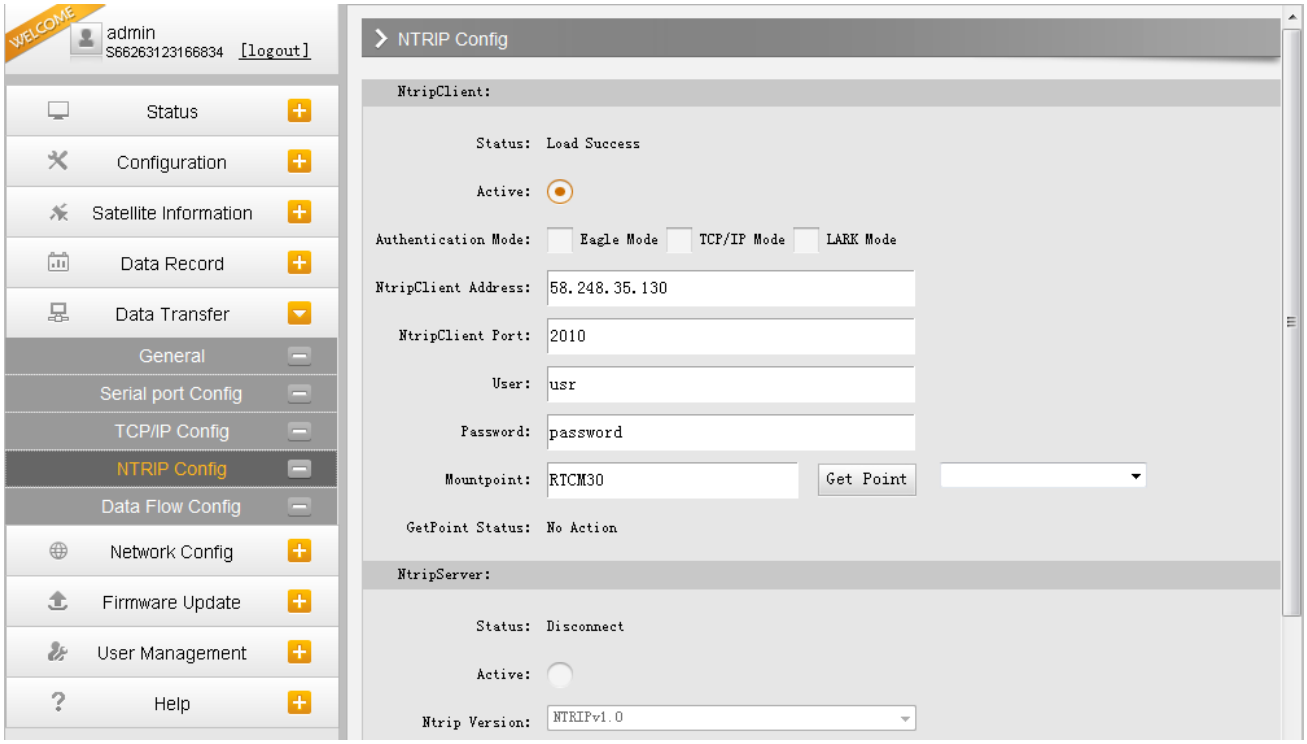
At this moment, click on Scan button to search the surrounding WIFI hotspot, once finish searching the hotspots, choose one of the proper access point and enter the access password if required, then click on Enter button to confirm the settings on this page.



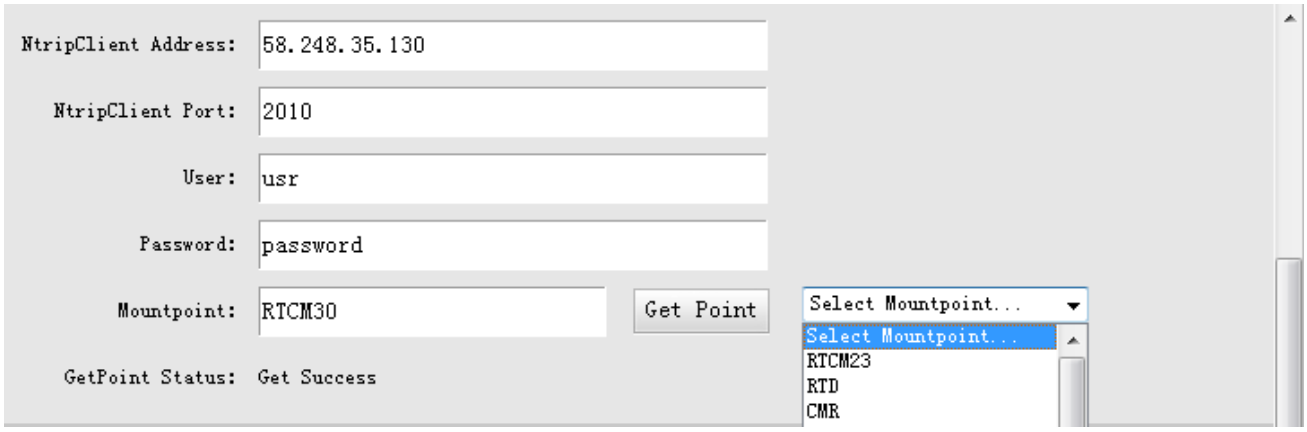
After a while, the WIFI signal bar appears and a LAN IP address is obtained, that indicates that S680N has connected to the WIFI and had an access to internet already.



After that, move steps to Data Transfer—NTRIP Config, on this page, make sure if NtripClient is activated, then input the CORS accessing information into corresponding fields, click on Get Point button to download the mount points from CORS server.

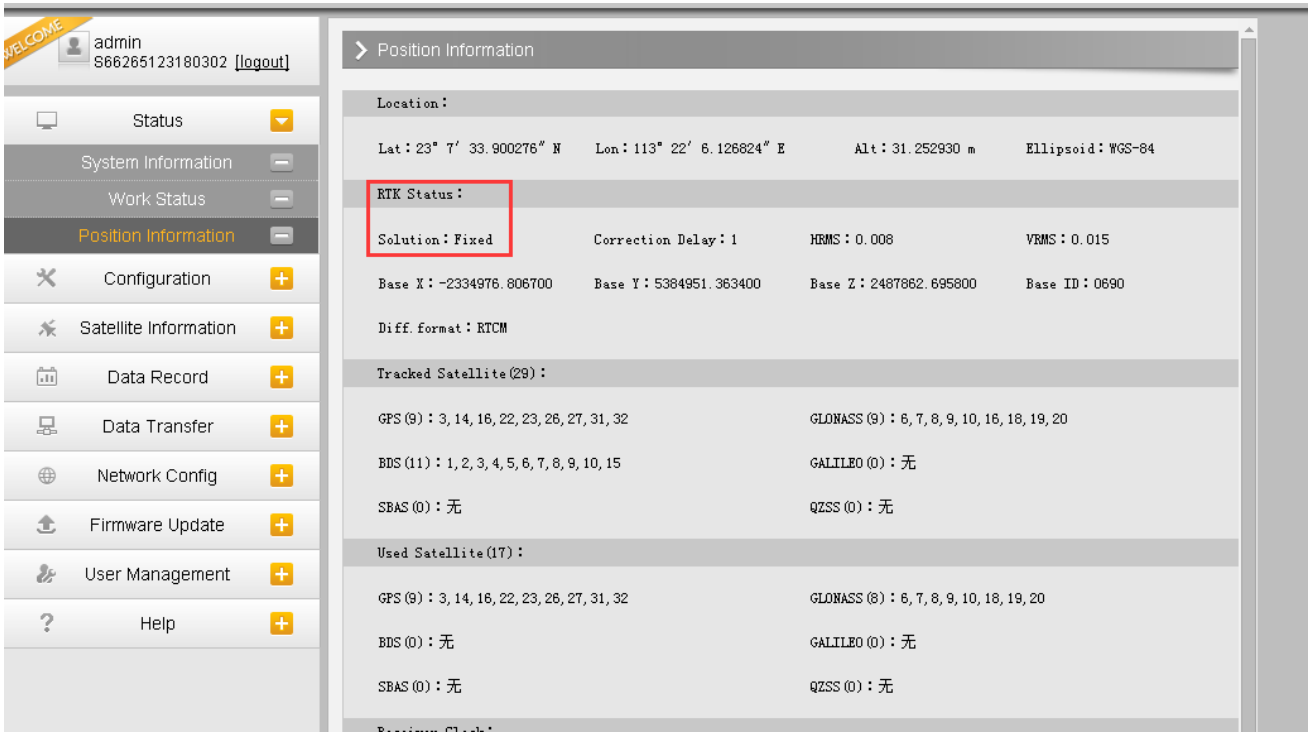


List out the mount points and choose a proper one, then click on Enter button to confirm all settings, and the receiver begins to connect and logon server, receive correction from CORS station.



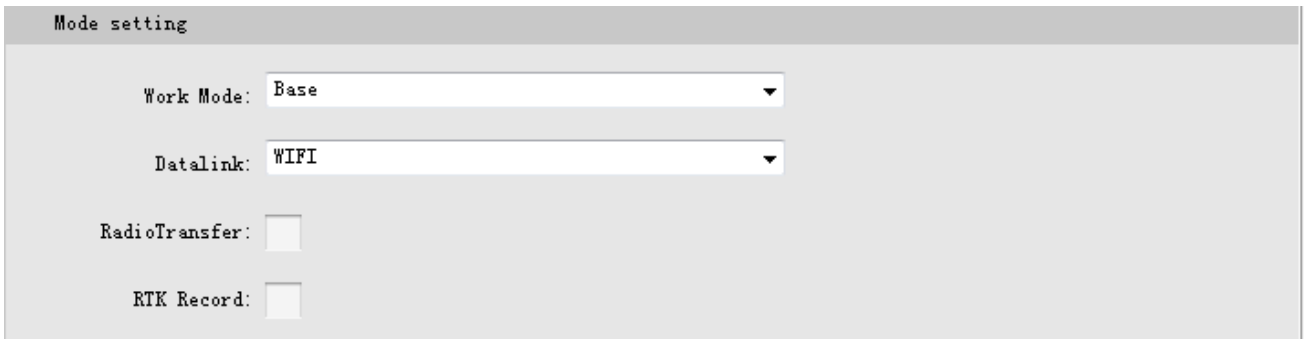
Return to Status—Position Information page, on this page, all the information will be displayed, including coordinates, solution, correction format, as well as to the correction delay. if the receiver has connected to internet and obtained correction from CORS server, there will be Fixed displays for the solution.

At this time, connect receiver to controller software, you don't need to do anything for configuration, then use the combination to work directly.



Base + WIFI mode

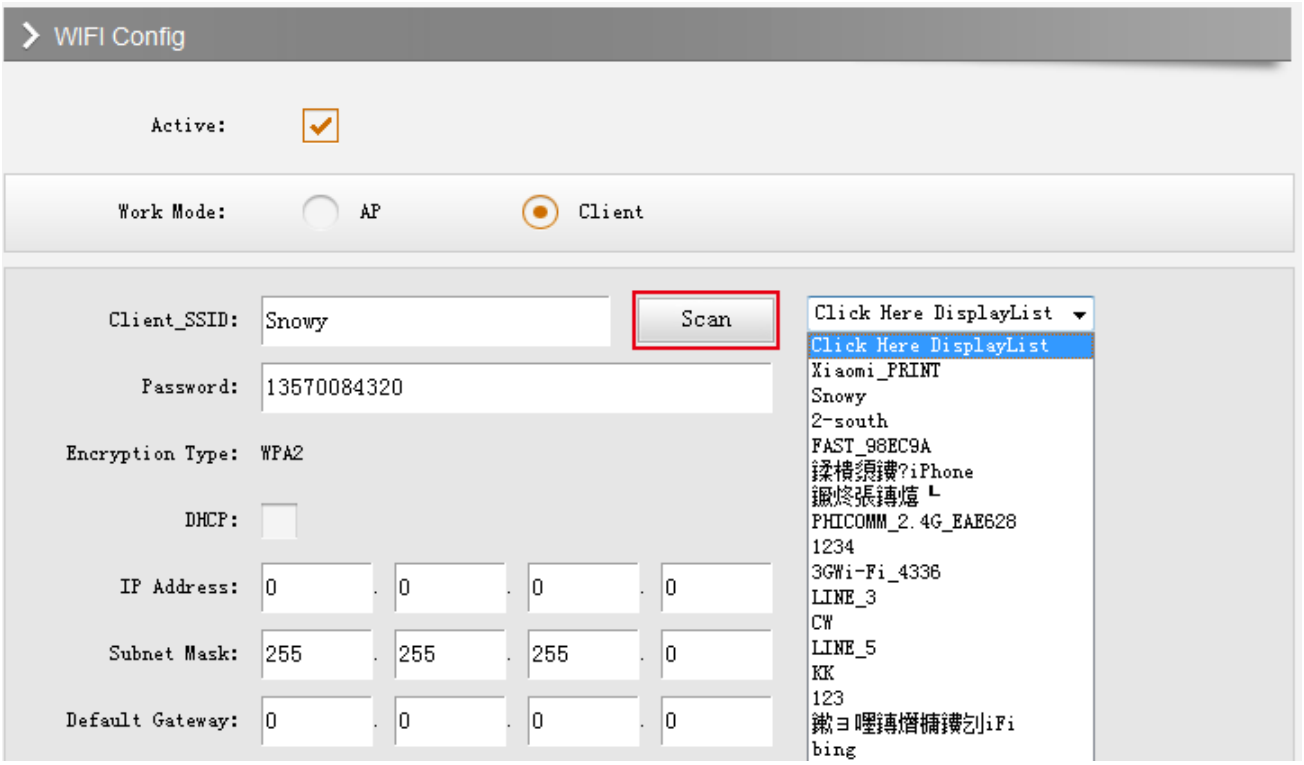
The operation on this mode is similar to Rover, go to Go to Configuration—General Config, switch the working mode into Rover or Base, and datalink as WIFI, click on Enter button to confirm the settings.



Unfold the sub-menus under Network Config, and go to WIFI Config, switch the WIFI working mode from AP into Client, then click on Enter button to make sure the WIFI working mode is successfully switched.

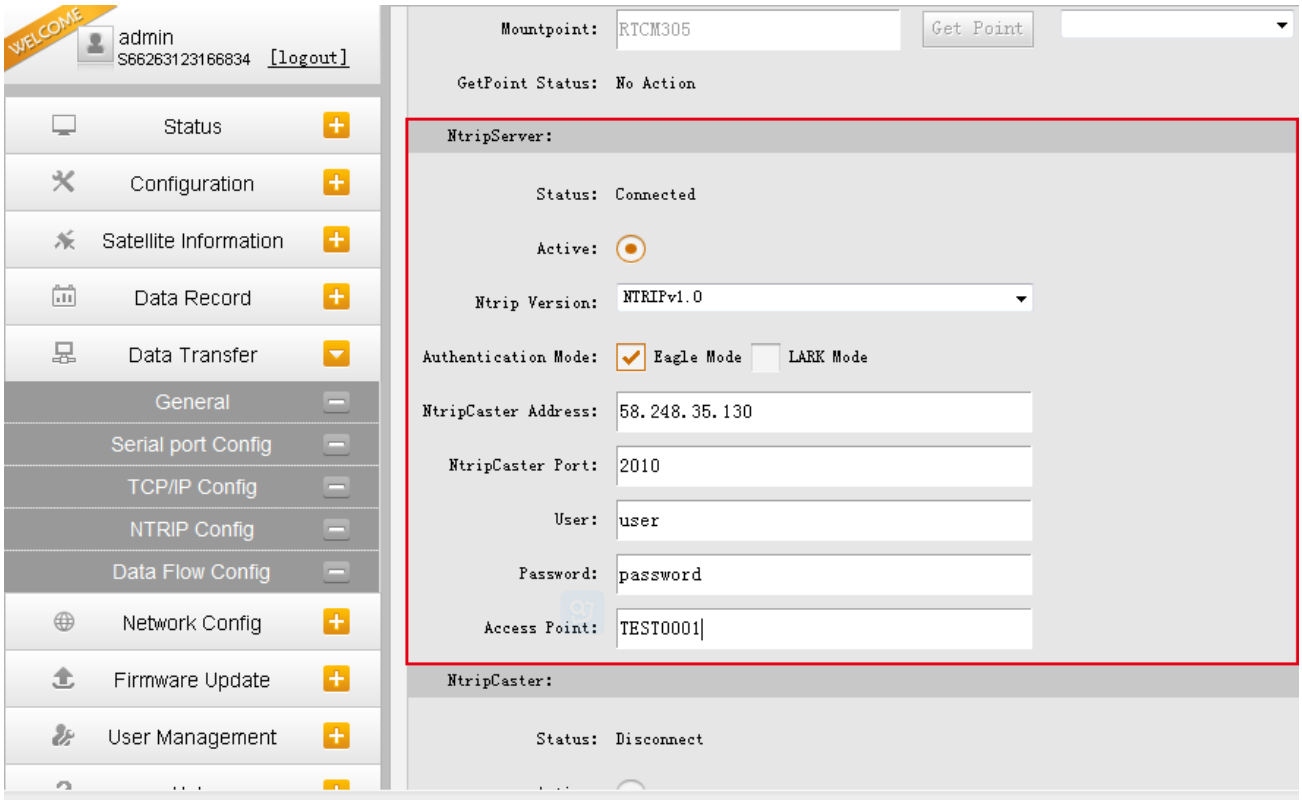
At this moment, click on Scan button to search the surrounding WIFI hotspot, once finish searching the hotspots, choose one of the proper access point and enter the access password if required, then click on Enter button to confirm the settings on this page.

After a while, the WIFI signal bar appears and a LAN IP address is obtained, that indicates that S680N has connected to the WIFI and had an access to internet already.

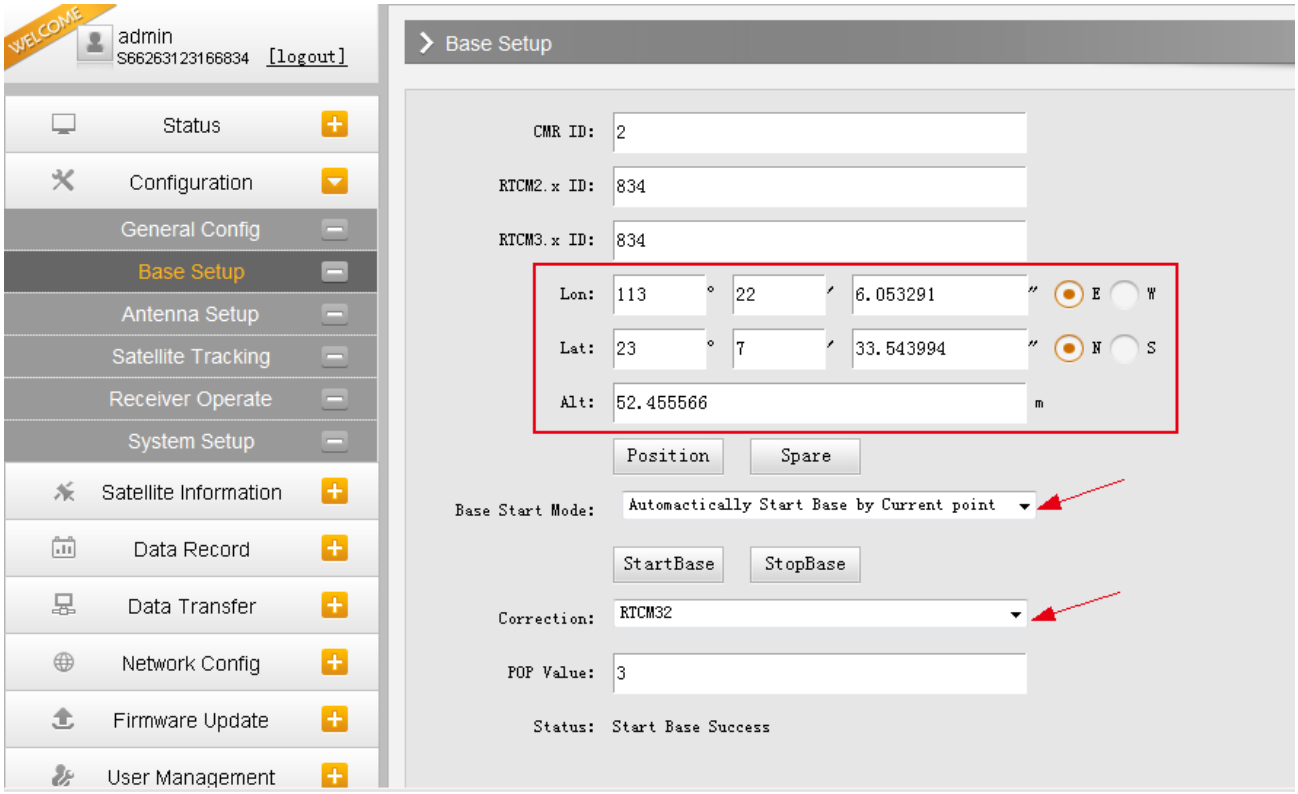


After that, move steps to Data Transfer—NTRIP Config, on this page, make sure if **NtripServer** is activated, then check the option of **Eagle Mode** and input the CORS accessing information into corresponding fields, and predefine a mount point for Access Point, such as TEST0001, click on

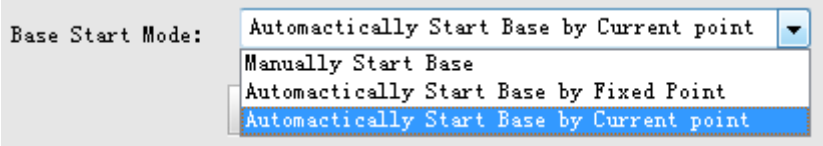
button to confirm all the settings.



And the next step is to configure parameters for Base, move to Configuration—Base Setup page, input the coordinates for base with known point or capture the current position for base by clicking on Position button, as shown at the red frame circle in below screenshot.



And move to Base Start Mode, choose the starting mode for base station. In dropdown list, there are 3 options for starting mode, **Manually Start Base**, **Automatically Start Base by Fixed Point**, and **Automatically Start Base by Current Point**.

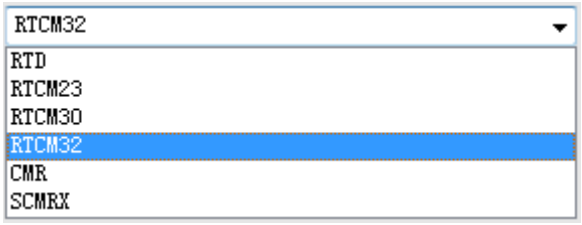


Manually Start Base: If this mode is chosen, the base will not start even though the transmitting condition achieves, it needs to click on StartBase button or StopBase button to start the base or stop the base whenever you want if the base is ready.

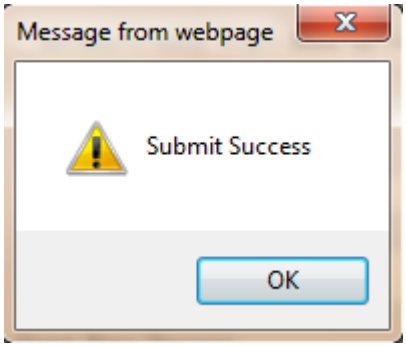
Automatically Start Base by Fixed Point: Choose this mode to make the base start automatically with a fixed point once the transmitting condition achieves, pressing StartBase button is not needed.

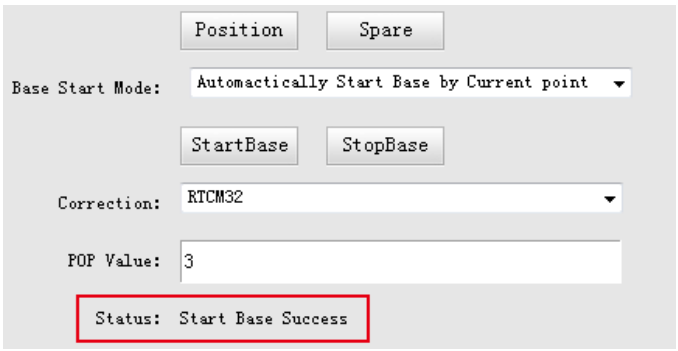
Automatically Start Base by Current Point: Choose this mode to make the base start automatically with the current position once the transmitting condition achieves, pressing StartBase button is not needed. Click on Position button to capture the coordinates for current position.

After the starting mode is chosen, then choose the correction type for transmitting such as RTD, RTCM30, RTCM32, CMR and SCMRX. Open the dropdown list belongs to the correction field, then choose one of the proper one correction type for the Base.

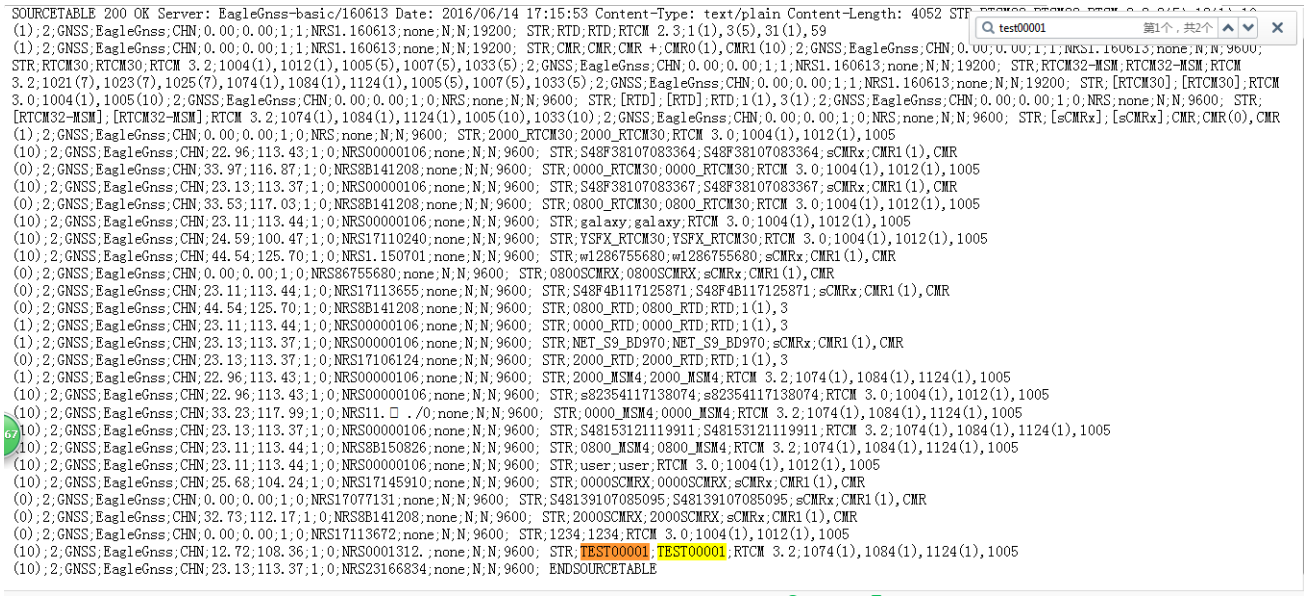


If all the parameters are completed, click on Enter button to confirm the settings, after a dialog pop-up to prompt “Submit Success” message, click on OK button, the Base is ready to start. If the automatically start mode is selected, then the Base starts transmitting correction if appears the message “Start Base Success” at **Status** field.





At this moment, observe the fourth indicator on receiver, check if it is flashing at this time, and input server's IP address onto the browser to check if there is the predefined mount point locates among the mount points.



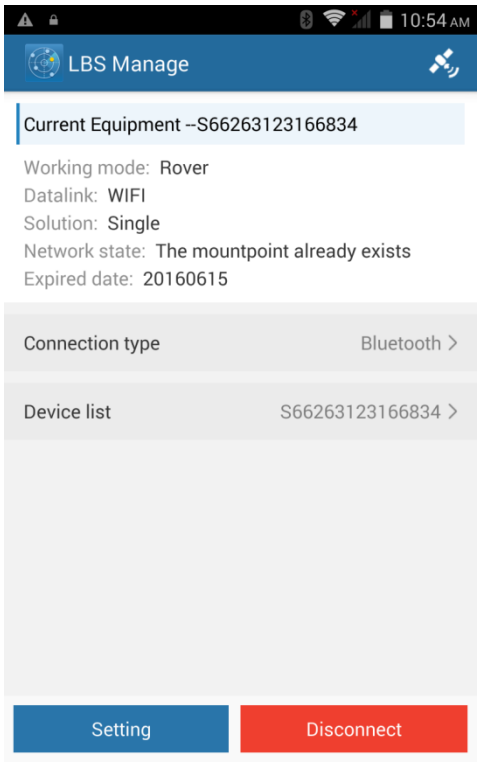
5.2.2. Configure on Controller Software

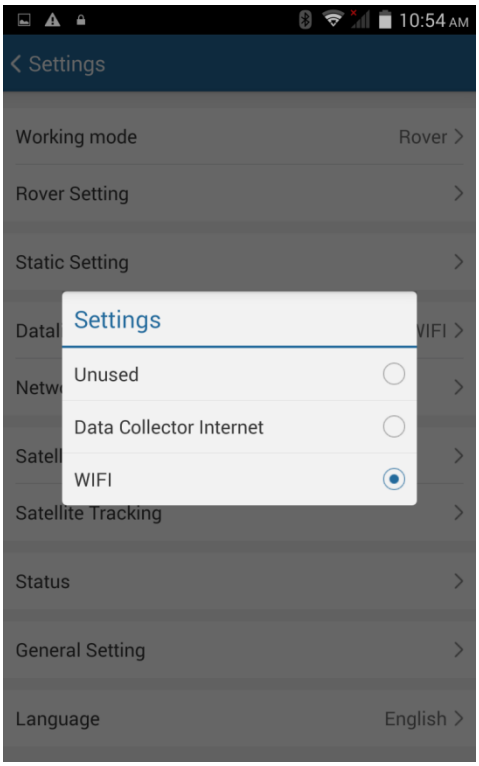
The other way is to use our own software (LBS Manage) works on Android system, all the configurations can be done on the software after establishing Bluetooth connection between receiver and Android devices.

The first step is to establish the Bluetooth connection between receiver and Android device, then click on Setting button to get into setting interface, set the working mode for receiver as Base or Rover. Next we are going to introduce Rover+WIFI mode and Base+WIFI mode respectively.

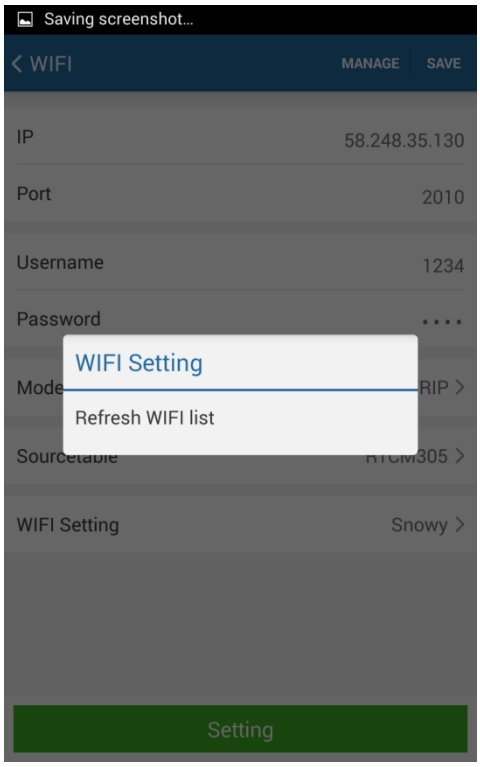
Rover+WIFI mode

After establishing the Bluetooth connection, switch the working mode into Rover on setting interface, then go to Datalink option and set the datalink as WIFI.

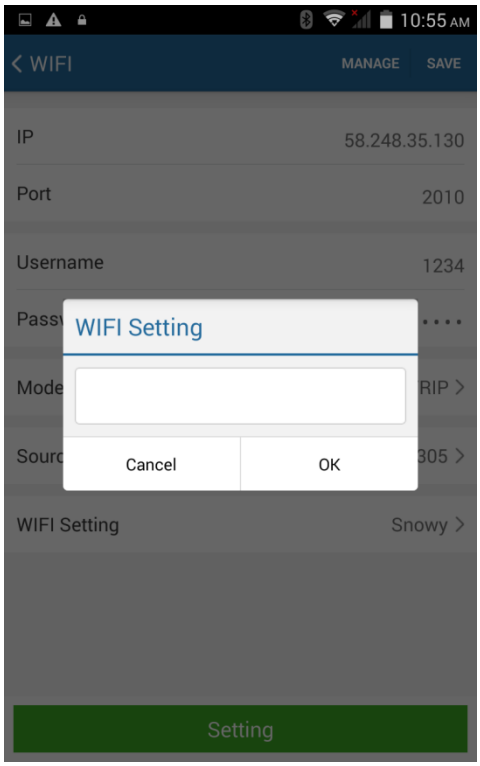


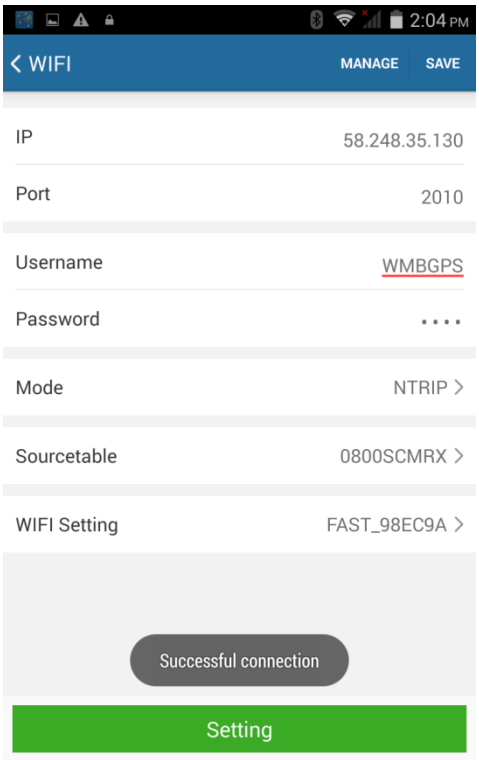


Tap on Network Setting option to configure receiver to internet and access to CORS server. The first step is to make receiver successfully connect to WIFI. The WIFI Setting option locates at last option, tap on this option and a dialog pop-up, tap on **Refresh WIFI list** to search the surrounding WIFI hotspot, after the message of **Refresh WIFI list successfully** appears, tap on **WIFI Setting** again to pick up one of the proper hotspot from the list to connect.

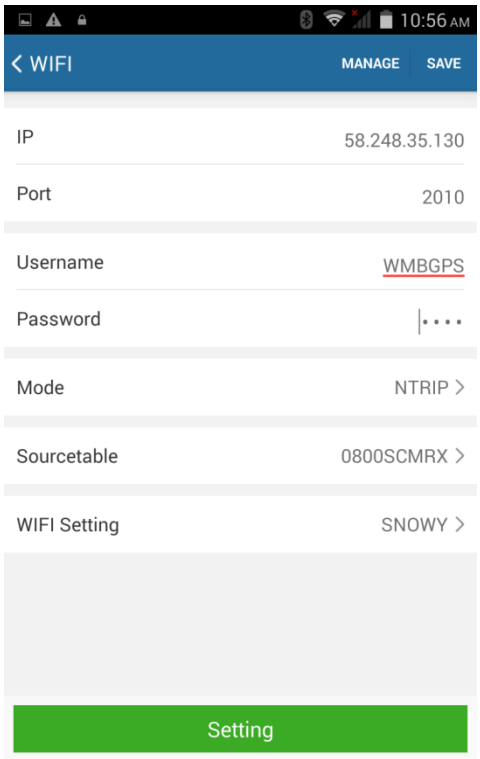


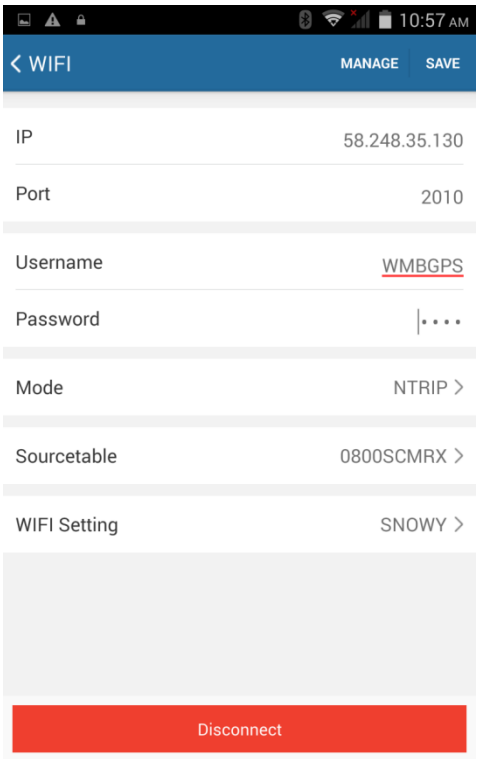
Input the access password for WIFI connecting if it is required, then click on ok, after the “Successful connection” message appears, that means S680N has successfully connected to WIFI and access to internet.



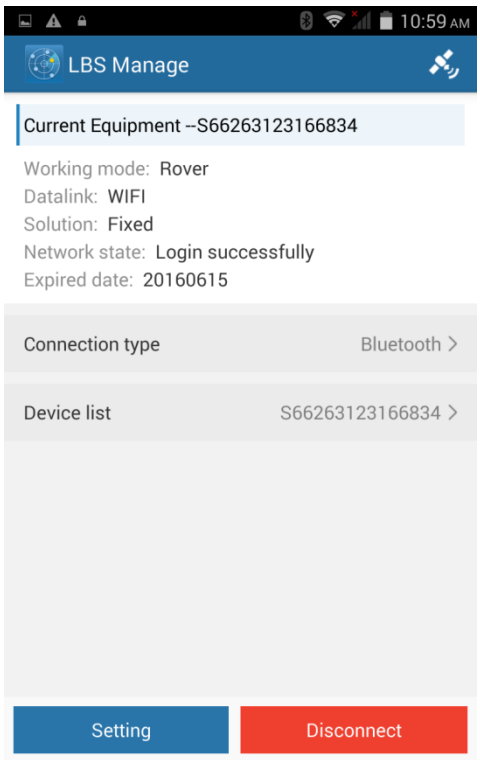


After that, input the information of accessing local CORS station, and tap on Sourcetable option to obtain the mount point list from CORS server, choose one of them and return to network setting interface, then tap on the setting button at the bottom of this interface, once appears the message “Successful Setting”, and the button turns to red and shows disconnect, it means S680N successfully logins CORS server and begins to obtain correction.



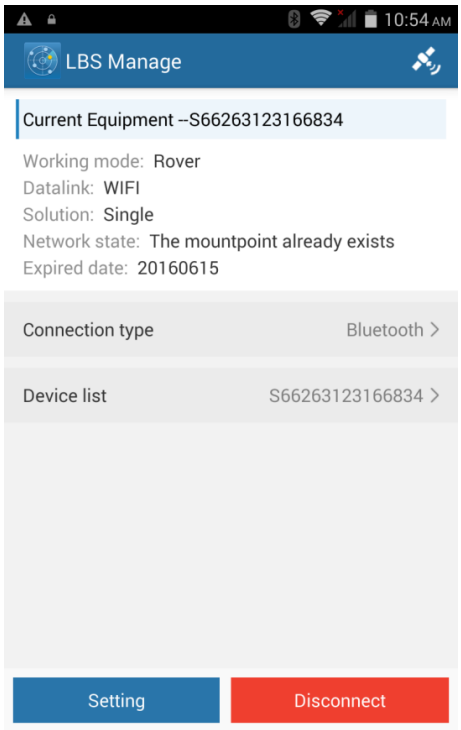


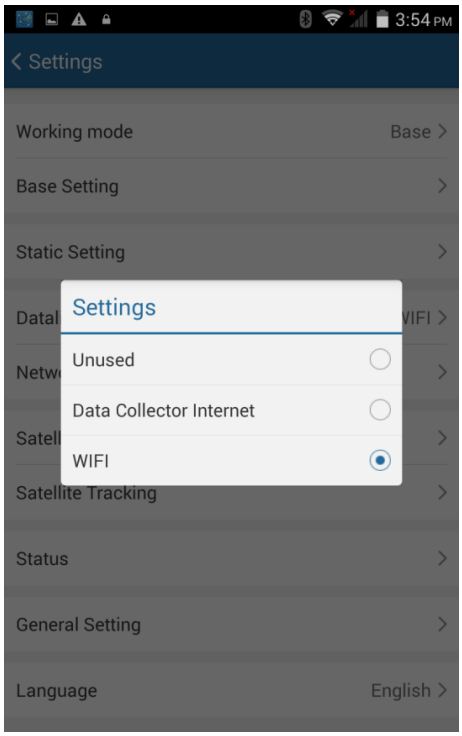
At this time, return to the main interface of LBS Manage program, there will be fixed display for solution type.



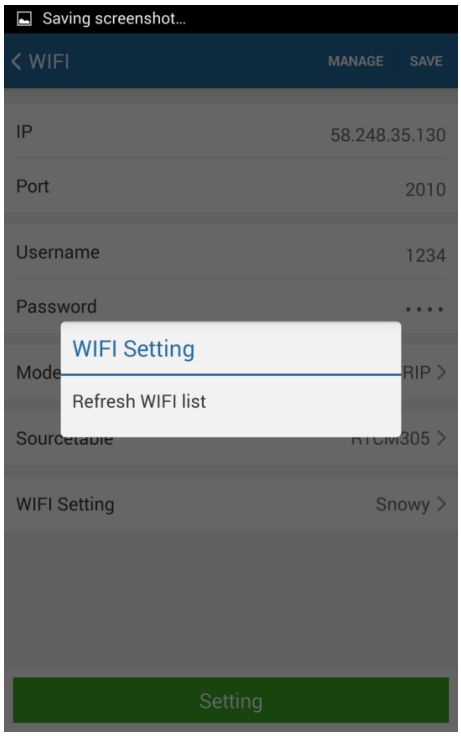
Base+WIFI mode

As same to Rover setting, after establishing the Bluetooth connection, switch the working mode into **Base** on setting interface, then go to Datalink option and set the datalink as WIFI.

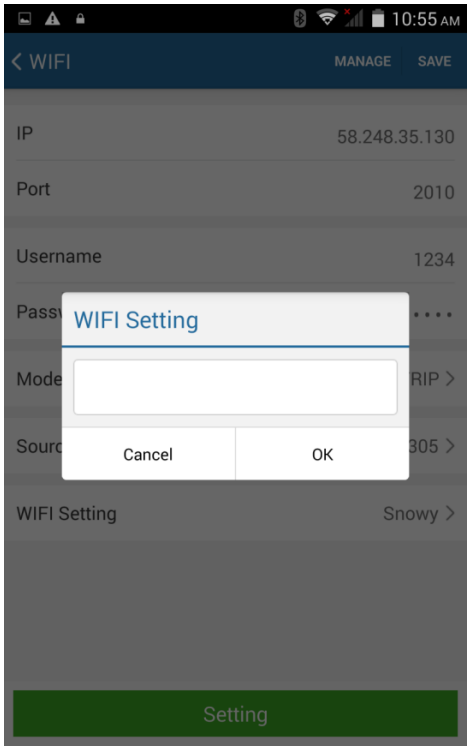


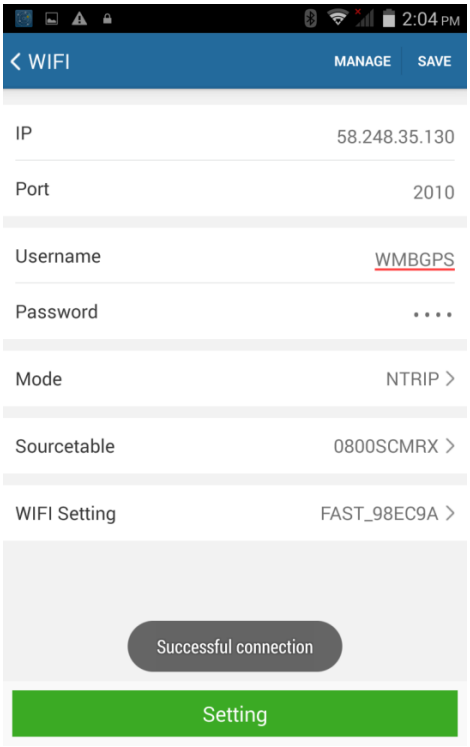


Tap on **Network Setting** option to configure receiver to internet and access to CORS server. The first step is to make receiver successfully connect to WIFI. The **WIFI Setting** option locates at last option, tap on this option and a dialog pop-up, then tap on **Refresh WIFI list** to search the surrounding WIFI hotspot, after the message of **Refresh WIFI list successfully** appears, tap the **WIFI Setting** again to pick up one of the proper hotspot from the list to connect.

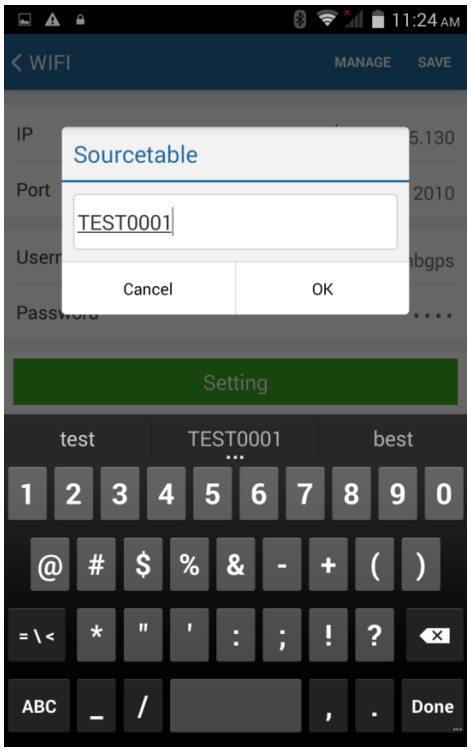


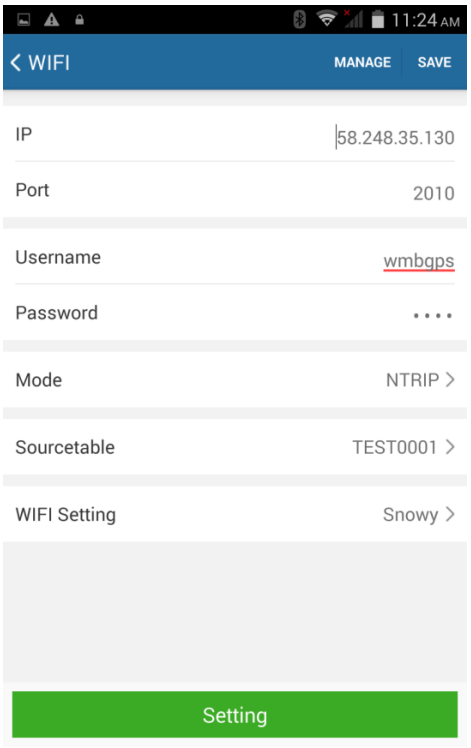
Input the access password for WIFI connecting if it is required, then click on ok, after the "Successful connection" message appears, that means S680N has successfully connected to WIFI and access to internet.



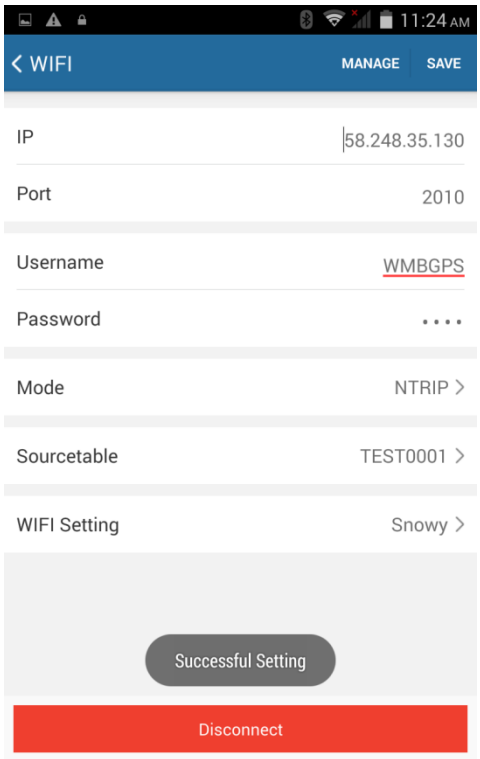


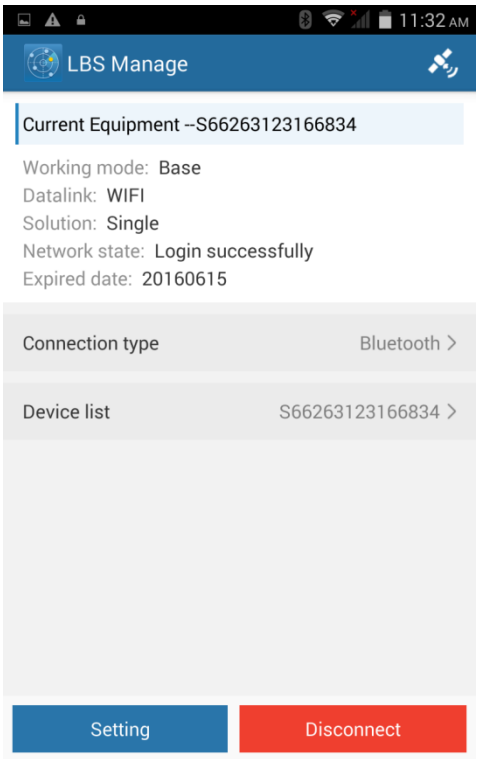
After that, input the information of accessing local CORS station, and go to Sourcetable option to predefine a mount point, then tap on the Setting button locates at the bottom of this interface.





When appears the message "Successful Setting", and the button turns into red and shows disconnect, it means S680N successfully logins CORS server and begins to transmit correction through the internet. At this time, return to the main interface of LBS Manage program, and observe the status of last indicator.





Chapter Ⅵ RTK Measurement

RTK is the abbreviation of Real-Time Kinematic measurements.

RTK technology is the real-time dynamic differential carrier phase positioning technology, combining global satellite navigation and positioning technology with data communication technology which includes base station and rover station. Base station transmits the data by radio or network to the rover station, which will perform differential analysis, thus providing real-time coordinates of the measurement point in the specified coordinate system.

Depending on the design of S680N, the receiver only can obtain correction through the internet. According to such performance, S680N is able to work in Bluetooth mode and WIFI mode. In this chapter, we will emphatically introduce how to do RTK measurement with S680N receiver in Bluetooth mode.

Tips: To get more information about how to do RTK measurement in WIFI mode, please refer to chapter Ⅴ.

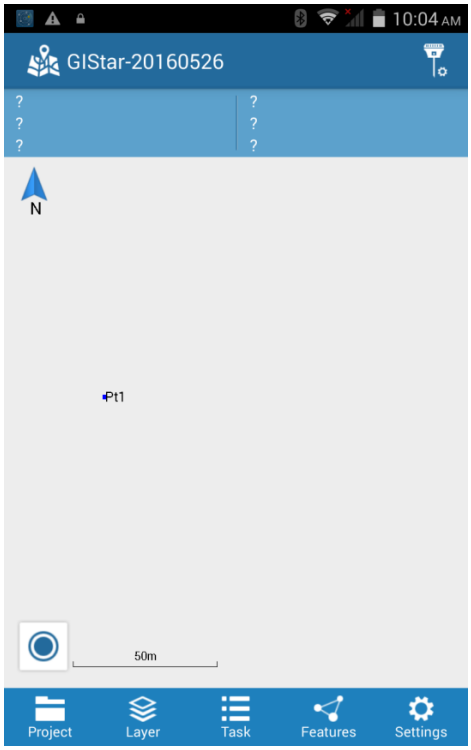
Rover + Bluetooth (Data Collector Internet)

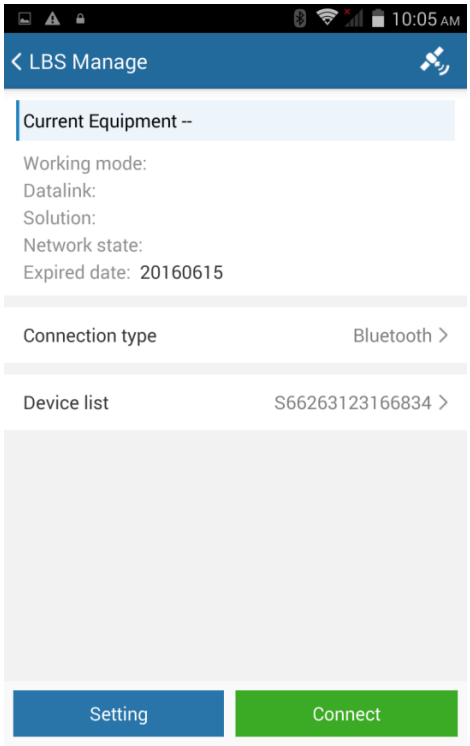
6.1. How to connect with GIStar for Android

This chapter will introduce you how to connect S680N receiver with KOLIDA GIStar program works on Android devices. Before connecting the receiver, please make sure that the GIStar program has been installed on your Android device.

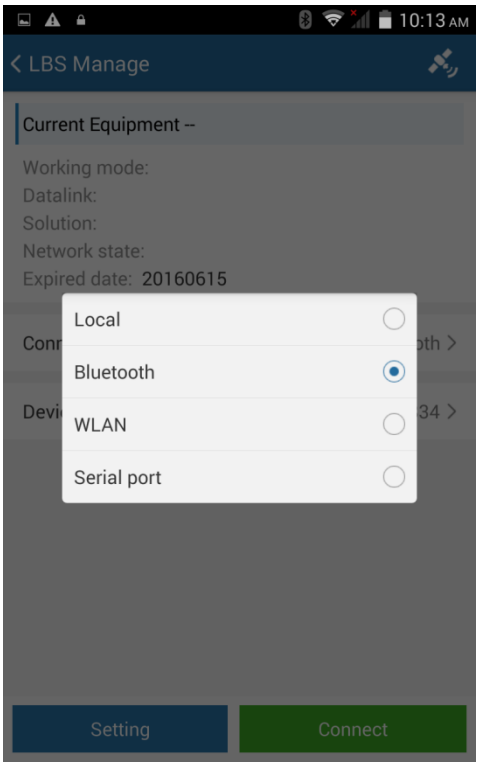
1) Run GIStar program on your Android device, and power on S680N receiver.

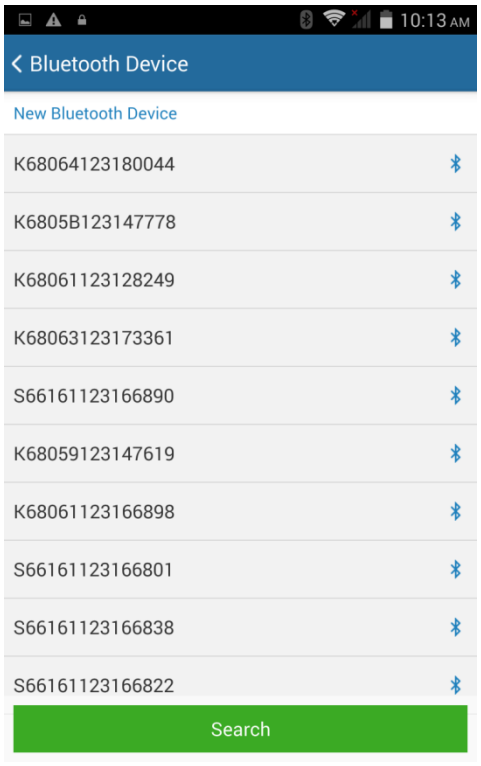
2) Tap the instrument symbol locates at the upper right corner of main interface and get into KOLIDAGnssServer (LBS Manage) main interface.



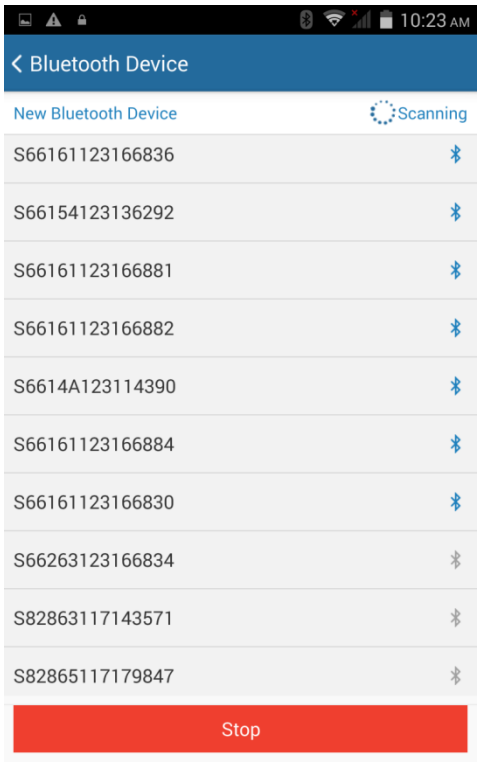


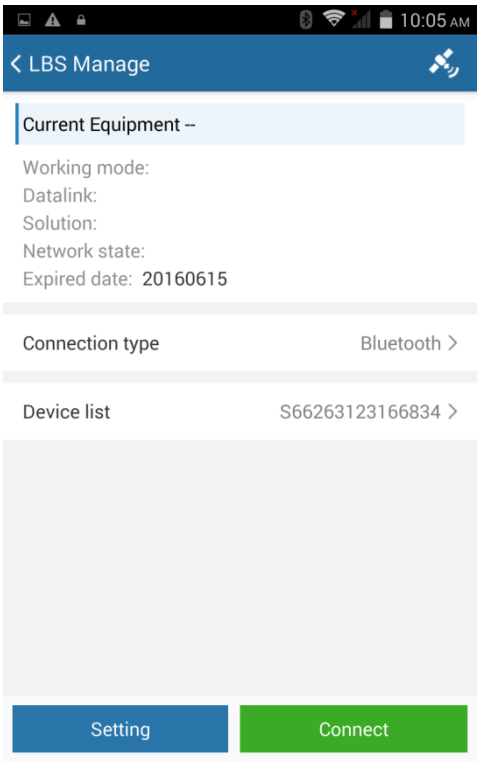
3) Tap on connection type and select the connection mode as Bluetooth, then next go to Device list, enter Bluetooth Device interface, tap on search button, the Android device will search the surrounding Bluetooth devices.



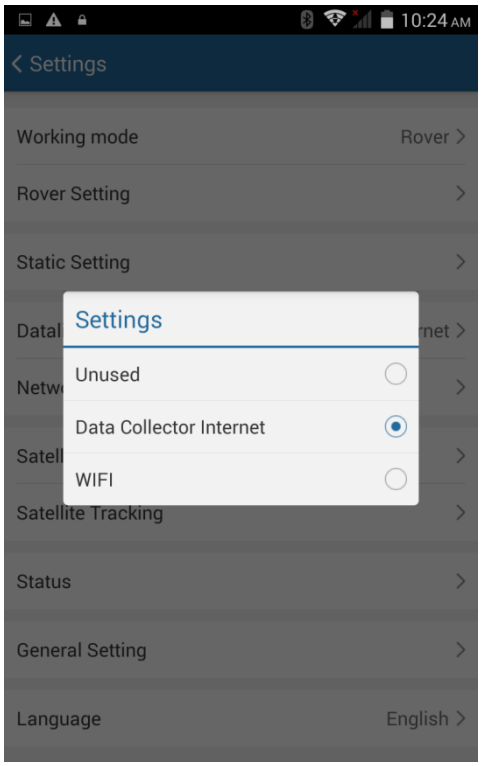


4) Choose the correct Bluetooth device SN and return to KOLIDAGnssServer (LBS Manage) main interface, tap on Connect button to establish Bluetooth connection between S680N receiver and controller, at this point, the Bluetooth indicator lights up on receiver.

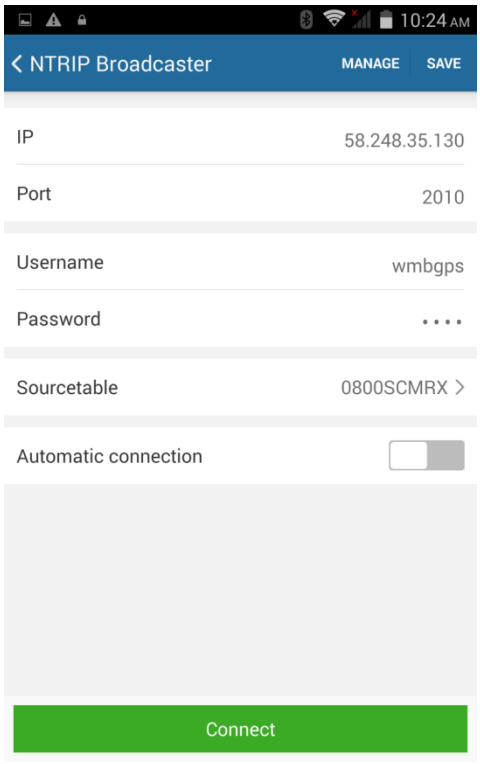


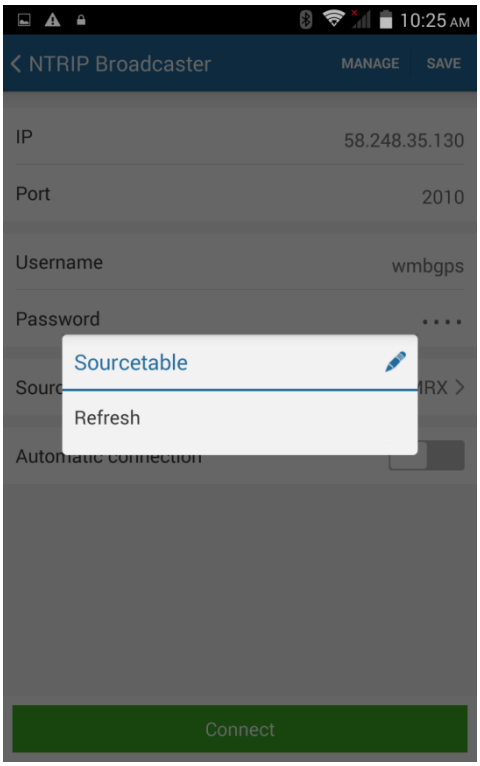


5) Enter setting interface to switch working mode of receiver into Rover and choose the datalink as Data Collector Internet.

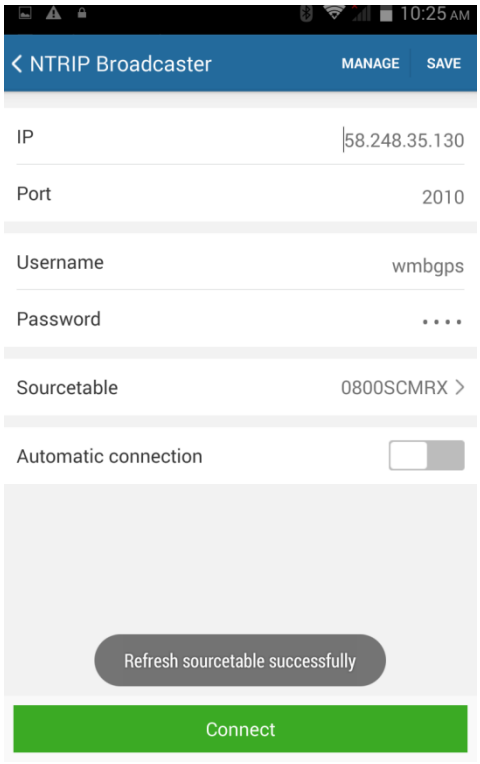


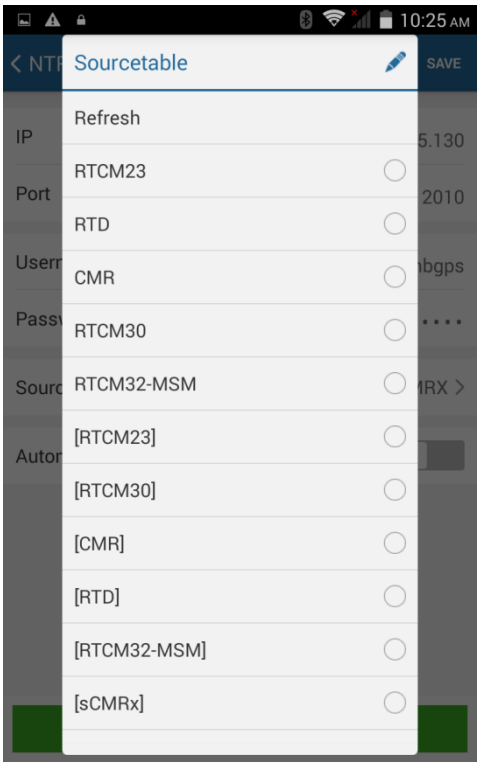
6) Get into NTRIP Broadcaster interface by tapping on Network option, then input the CORS network IP address and port, assigned username and password, then tap **Sourcetable** and **Refresh** to request the source table.



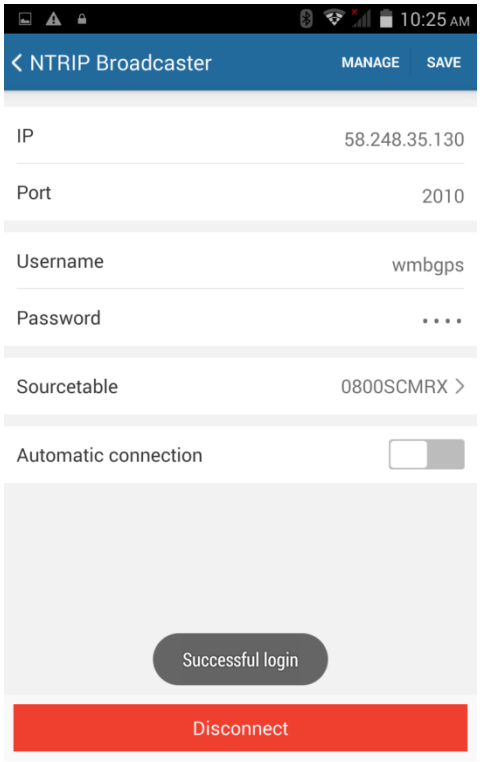


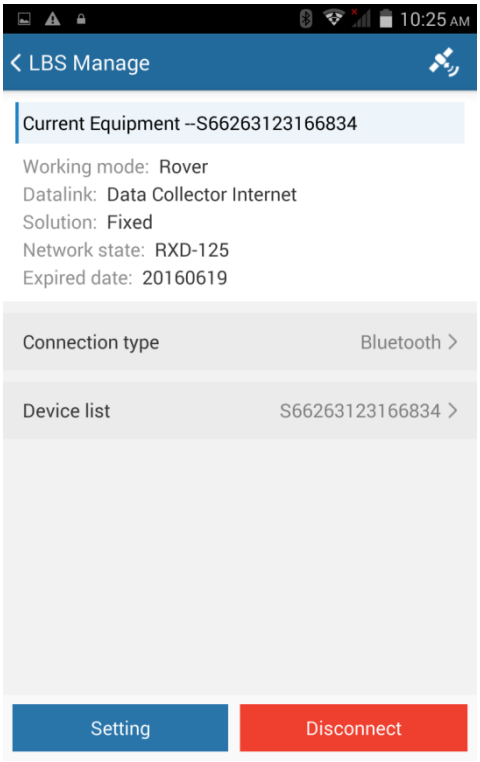
7) After "Refresh sourcetable successfully" message appears, tap again on **Sourcetable** option to select a proper mount point and tap on connect button.



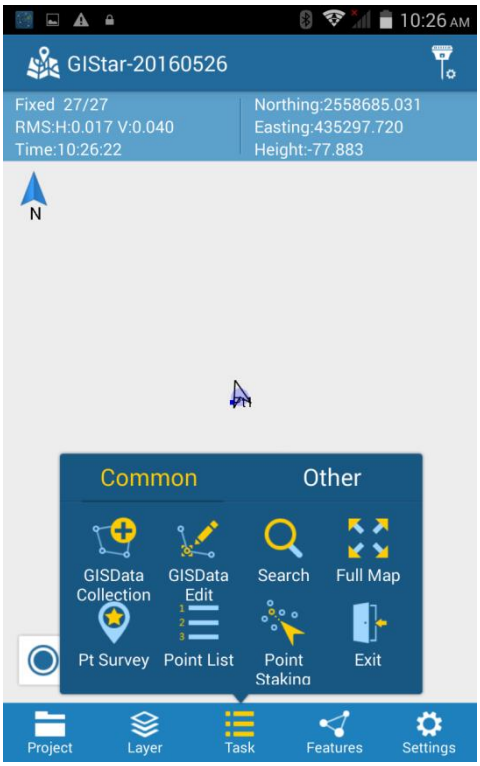


8) At this time, if there appears successful connection and successful login messages, that means the receiver has successfully connected to server and begins to get correction from CORS server. Return to LBS Manage main interface and observe the fourth indicator on S680N receiver if it is flashing.

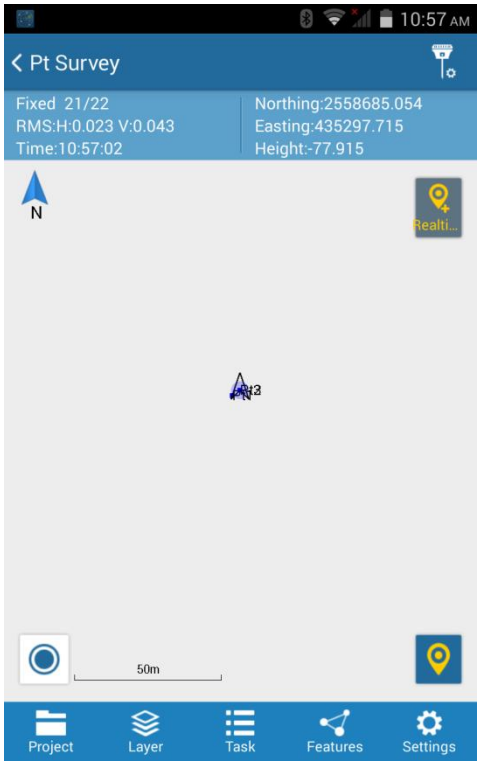


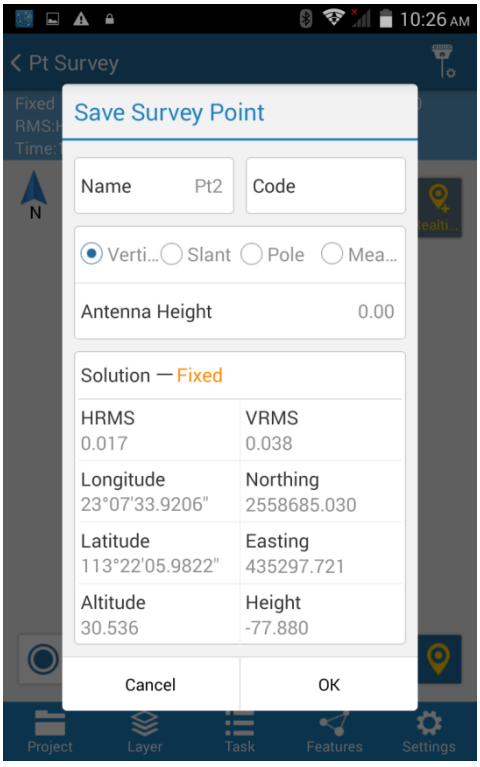


9) Return to GIStar main interface and there you will have high accuracy coordinates with fixed solution, now start a new job. If all the configurations of new job are completed, that is to say, the Rover system is ready to do the RTK measurement. Click on **Task** menu and get into **Pt Survey** interface.



10) make sure that the instrument is leveling on a point, and the coordinates are stable at this position, tap on button to collect the coordinates for this position.

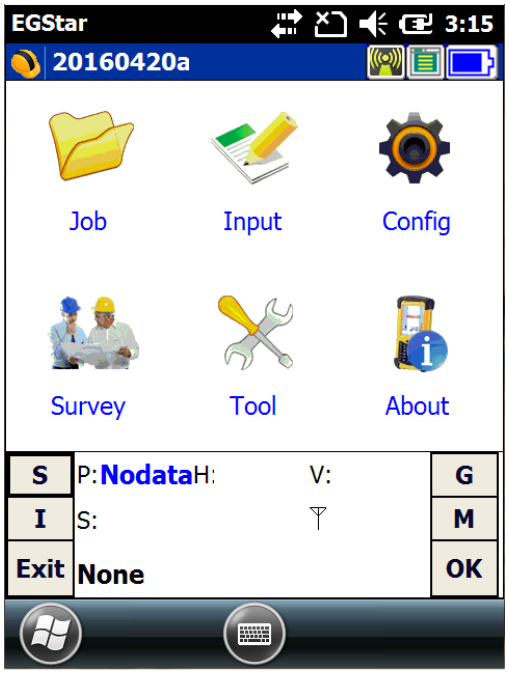




6.2. How to connect with EGSTAR

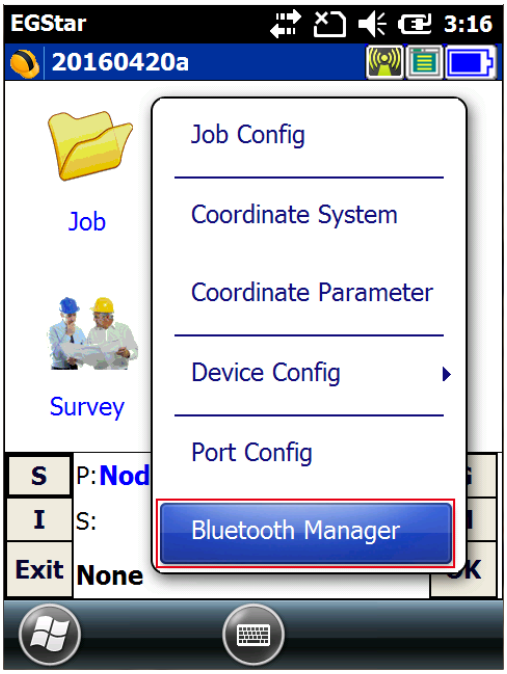
In this section we will teach you how to connect S680N with the latest version of EGStar. First of all, establish an ISP connection on controller and make sure that the controller is able to access to internet successfully.

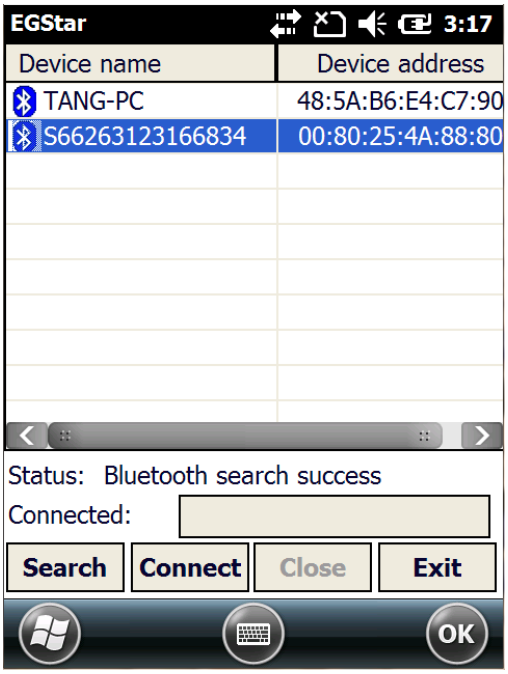
1) Run EGStar program on controller. The following screenshot is the main interface of latest version of EGstar.



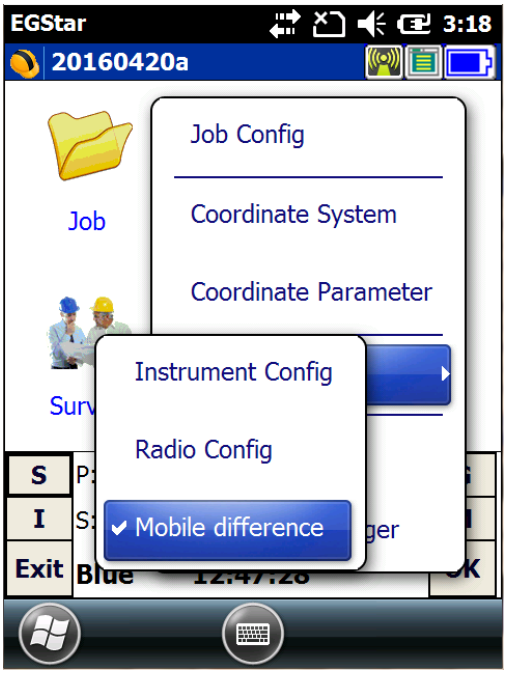
2) Create a new job and setup local coordinate system for current project.

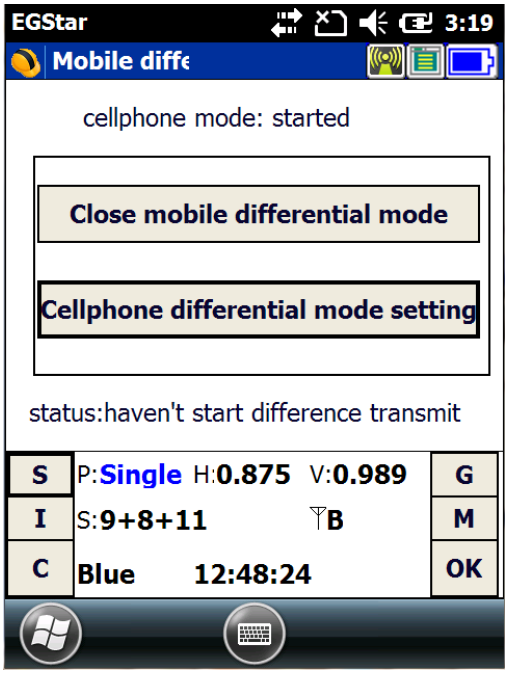
3) Enter **Config/ Bluetooth Manager** interface. Click on "Search" button to search the surrounding Bluetooth devices and pick a correct serial number of S680N, then click on "Connect" to establish the Bluetooth connection with S680N. As shown on following figures.



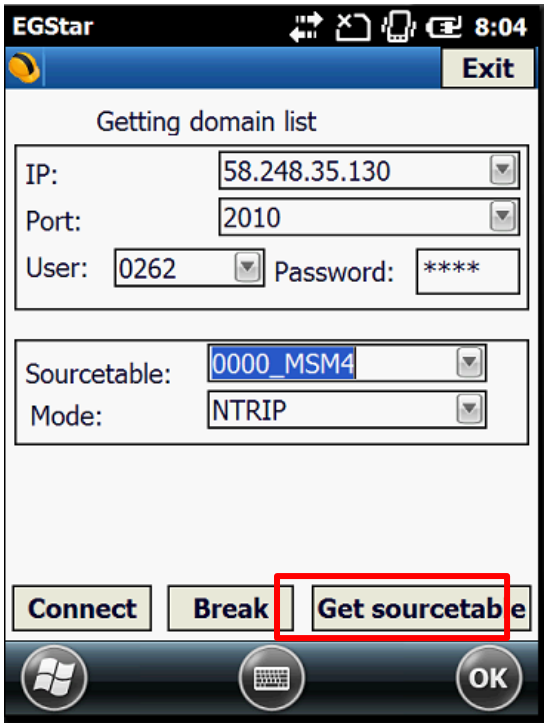


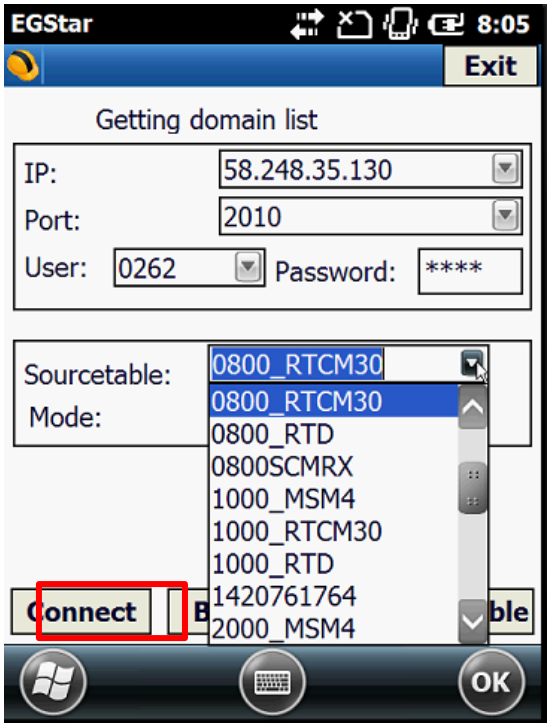
4) Go to **Config/Mobile difference** interface, then click on "Open mobile differential mode" to activate this function, move to "Cellphone differential mode setting" and go into parameter configuration interface.



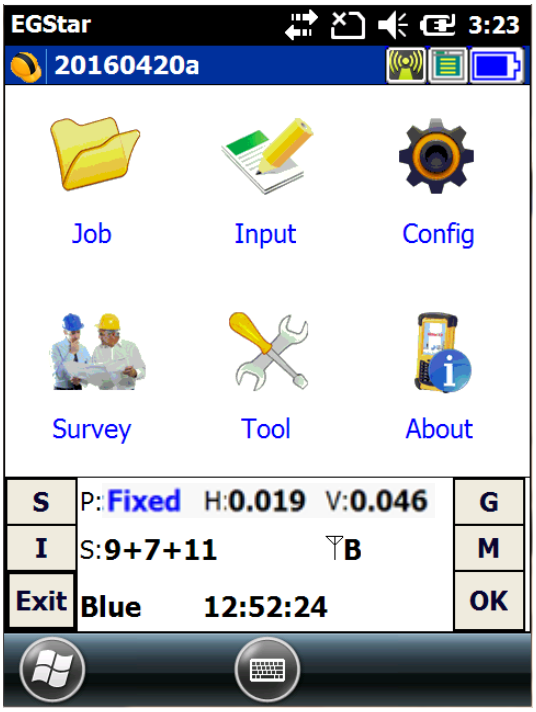


5) Enter the IP address of network, the port, the assigned name and password, after that click on "Get sourcetable" button to obtain mount point list from server, and select a proper one then click on "Connect" button to access.





6) After getting the available *Fixed* solution, you can start your job.

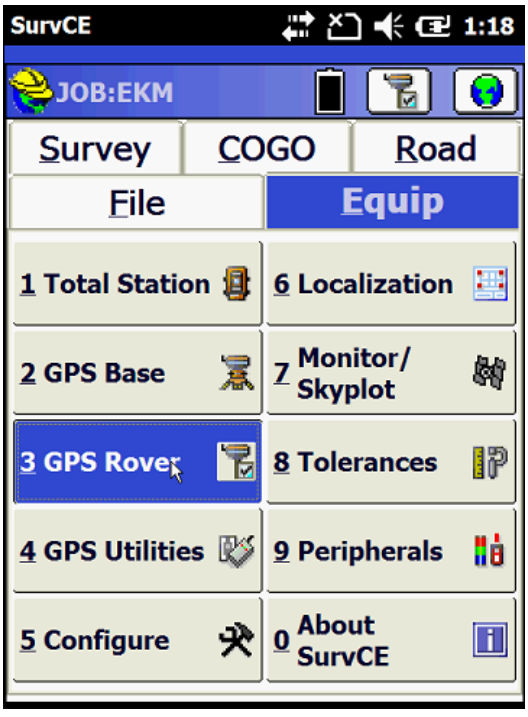


6.3. How to connect with SurvCE

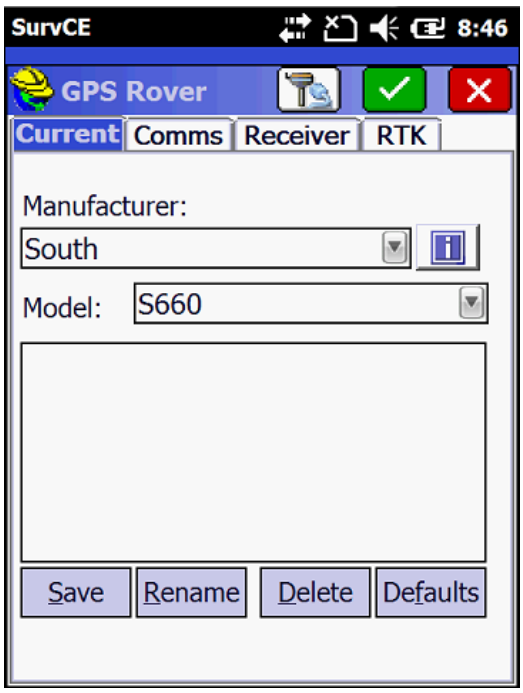
In this section, you will get the method of how to use SurvCE to connect with S680N and configure parameters for it. First, install SurvCE software onto controller (Ver.4.04 or higher version is recommended). Then run Carlson SurvCE program on controller.

1) Create a new job and setup your local coordinate system for current project.

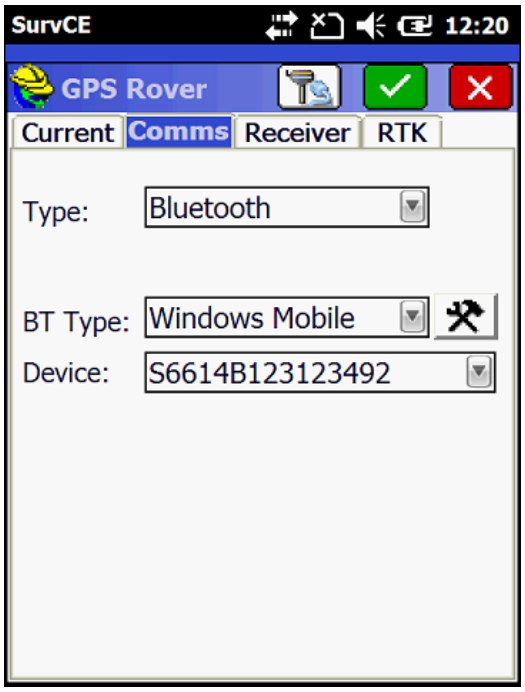
2) Tap on "GPS Rover" in **Equip** sub-menu.

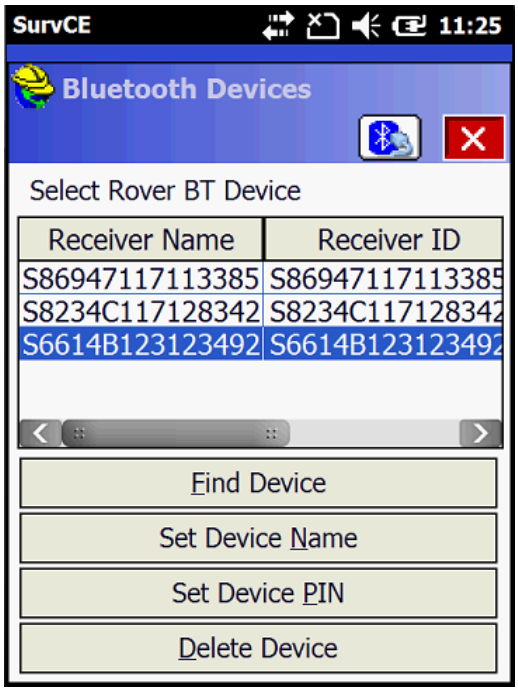


3) In **Current** tab, select KOLIDA in Manufacturer dropdown list and choose S680 driver to use on S680N receiver. The driver of S680 is suitable to S680N receiver as well.

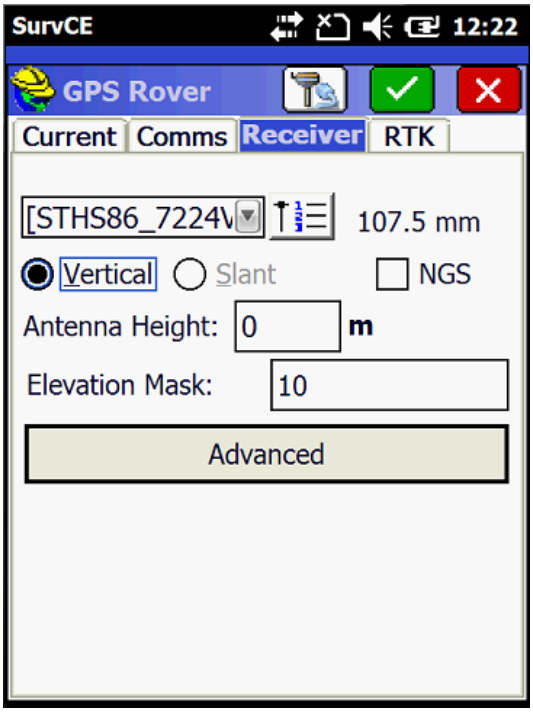


4) Move to **Comms** tab and pick *Bluetooth* in **Type** box. Use *Windows Mobile* in **BT Type** then tap on icon to enter Bluetooth device dialog, select the correct serial number of your device or tap on **Find Receiver** to search all nearby Bluetooth devices, pick up a correct one then tap on the icon at the top of interface to bond with. When you are back in **GPS Rover** interface, tap on icon to confirm the connection, after "Successful Connection" message appears and the second indicator is on, that indicates Bluetooth connection between receiver and controller has successfully established.

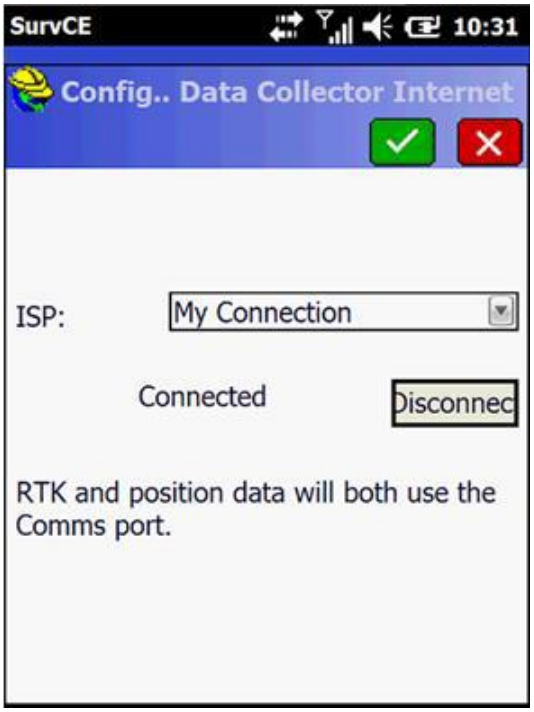




5) Configure more settings in **Receiver** tab, which involve Antenna Height, Elevation Mask, etc.

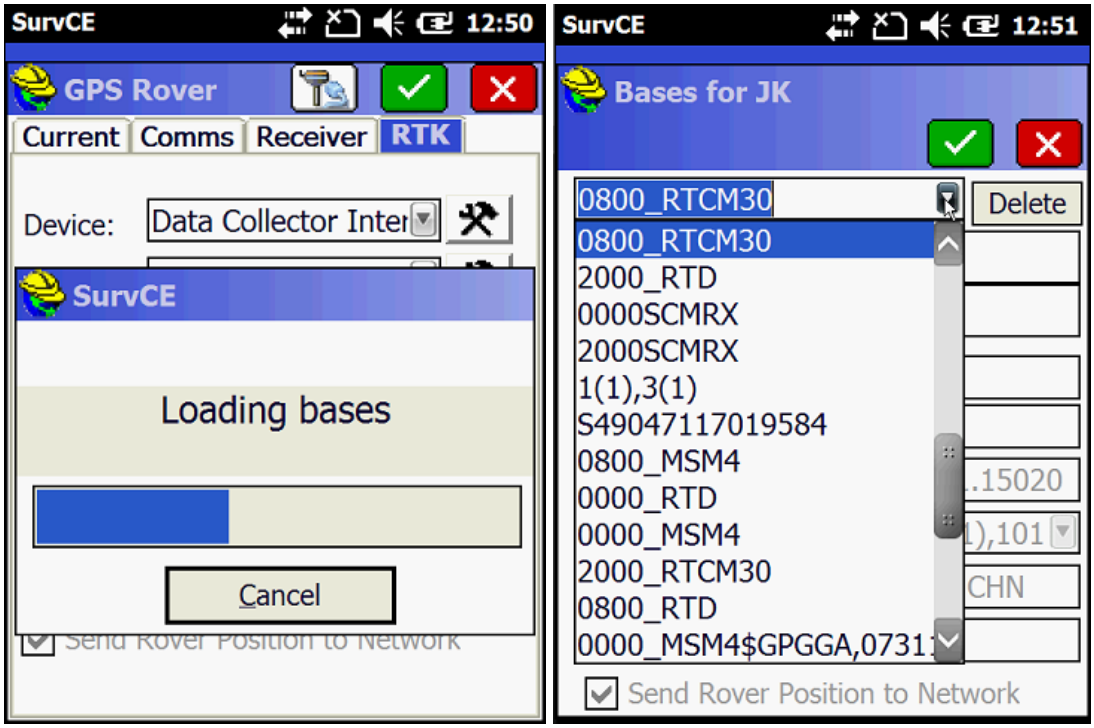


6) Move to **RTK** tab, select **Data Collector Internet** in Device box, then click on icon , in ISP box, select the connection previously defined in Windows menu (eg. ***My connection***), check that if it shows connected. On the contrary push Connect, then confirm with icon.



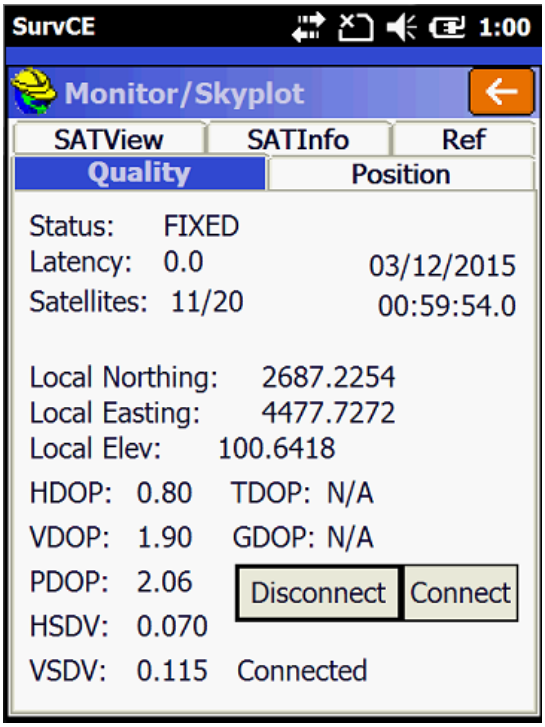
7) Select **NTRIP** in Network box. Click on icon at the right. Create a name for the network, enter the IP address of network, the port, the assigned name and password, after that confirm the configuration in the usual way.

8) Then the internet connection will start, and the available services/mount points for corrections will be downloaded to your controller, select the suited service and confirm.



9) Choose a proper mount point you intend to access, click on icon to confirm. Then there appears a series of prompt messages which indicates connecting procedure, that means the receiver will start the connection with CORS network, and obtain correction from CORS server, at this time, keep an eye on the fourth indicator on receiver if it is flashing at the same time.

10) Tap on **Monitor/Skyplot** option to check data quality.

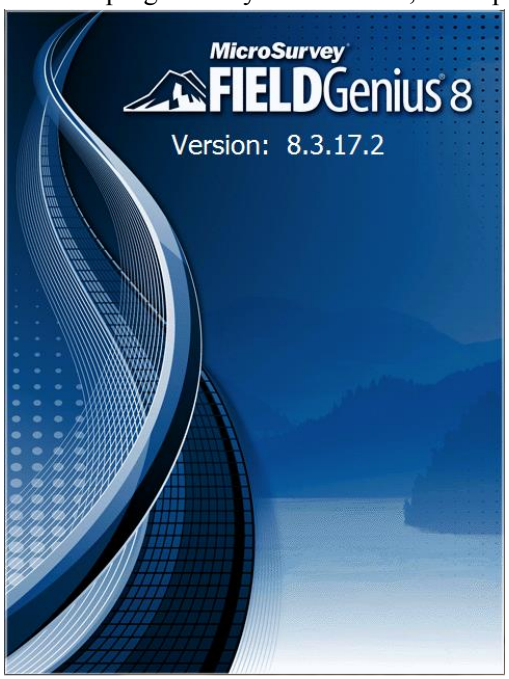


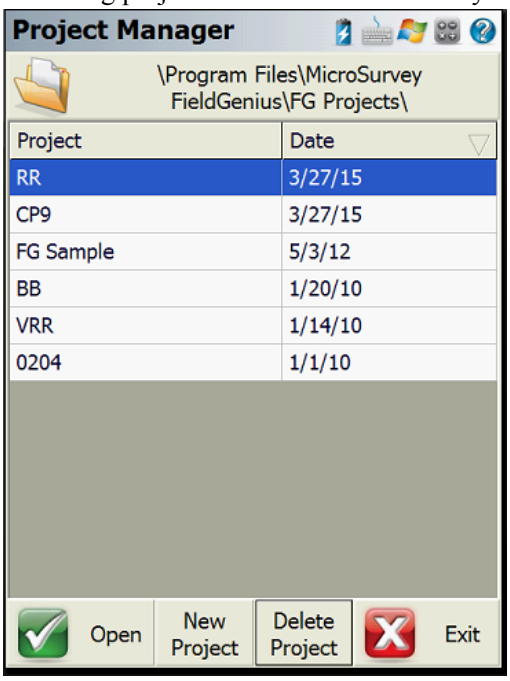
11) When you get the available FIXED solution, you can start your job.

6.4. How to use FieldGenius to configure S680N

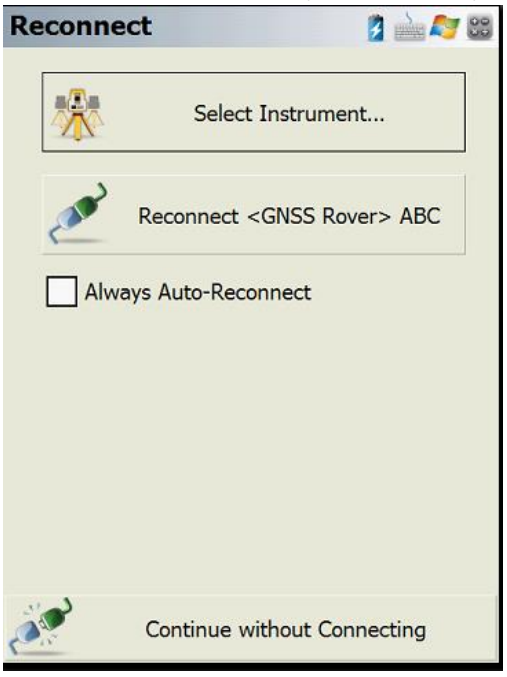
As FieldGenius version 7.2.12.14 released, the S680 driver was built and we are able to configure S680N with this driver as well in latest version of FieldGenius. In this section, we will take version 8.3.17.2 for example. Next you will get the method how to use FieldGenius on S680N receiver.

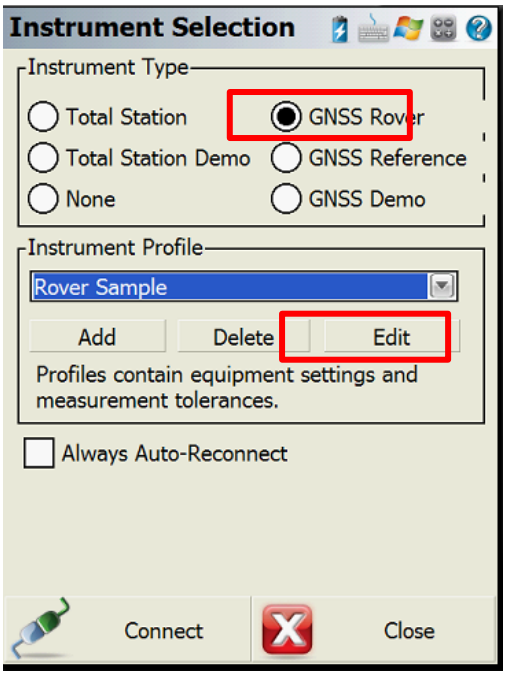
1) Run FieldGenius program on your controller, then open an existing project or create a new one for your job.



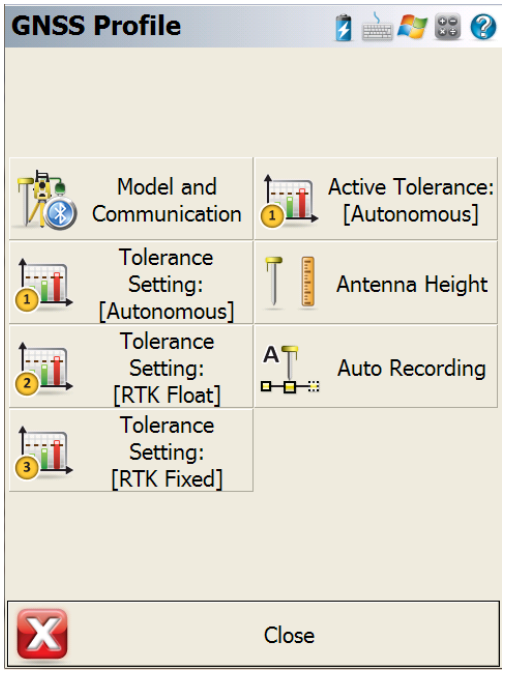


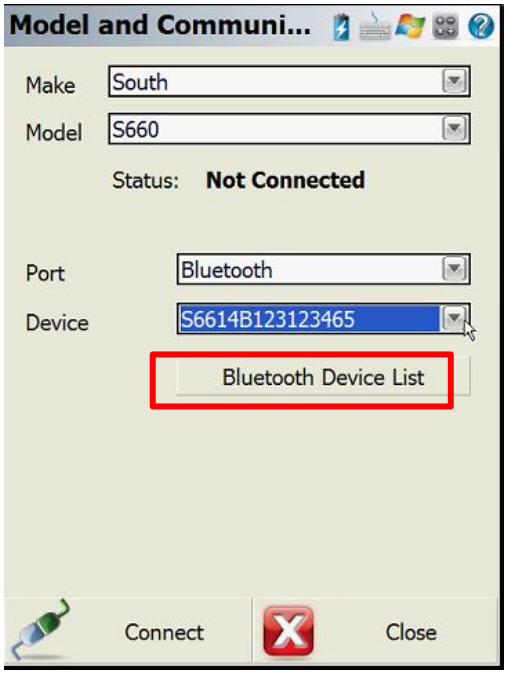
2) After completing your project configuration, then establish the Bluetooth connection between controller and S680. Tap on "Select Instrument…" button to go into **Instrument Selection** interface, mark on the checkbox of GNSS Rover option, then click on "Edit" button to go on. If you ever connected the device before, please tap on "Recoonect <GNSS Rover>"directly to reconnect your device.



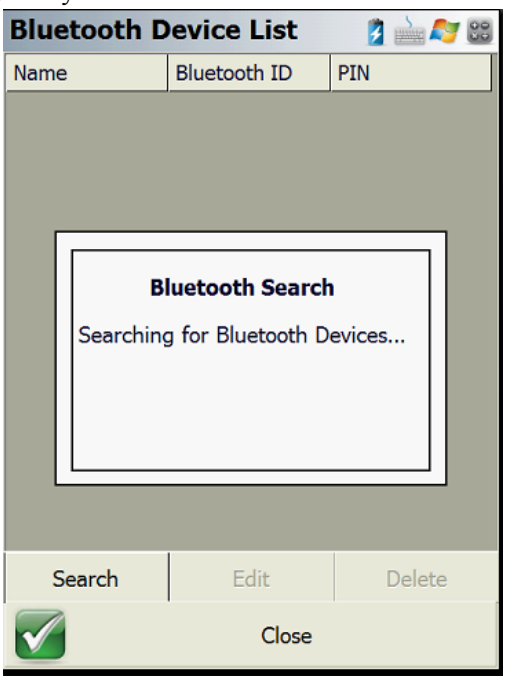


3) Select "**Model and Communication**" option and get into this interface, select KOLIDA in **Make** dropdown list and choose S680 driver to use on S680N receiver.

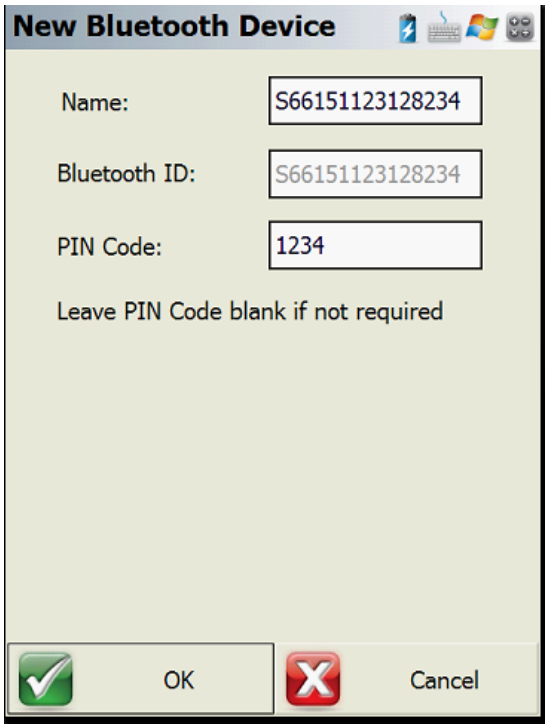


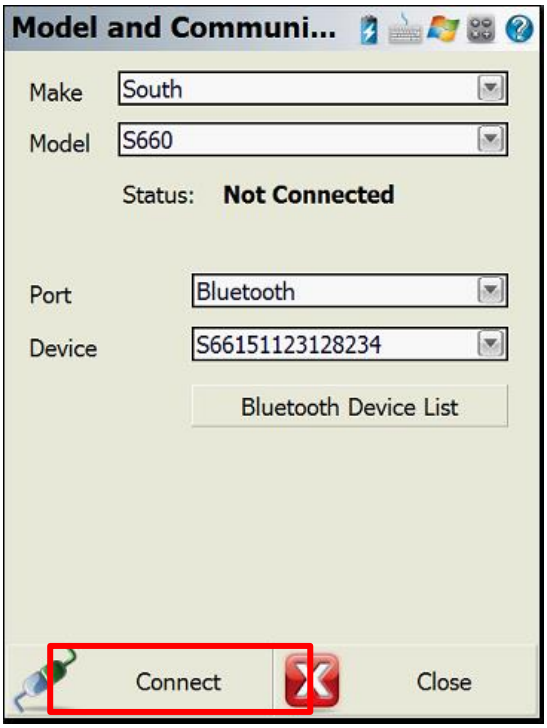


4) And select "**Bluetooth**" in Port dropdown list, and choose the correct serial number of S680N has been stored in Device box, and then click on "**Connect**" button to bond with the Bluetooth. If it is the first connection, click on "**Bluetooth Device List**" and search all the nearby Bluetooth devices, select the correct serial number of S680N receiver, verify that and then start the connection.

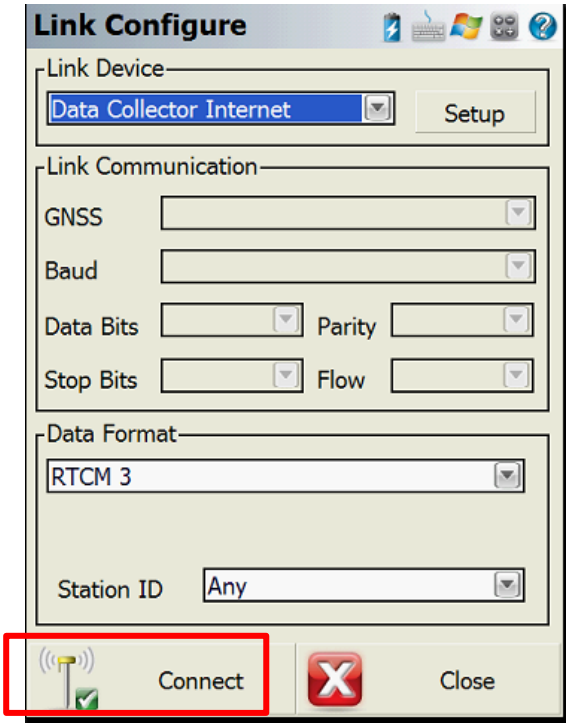


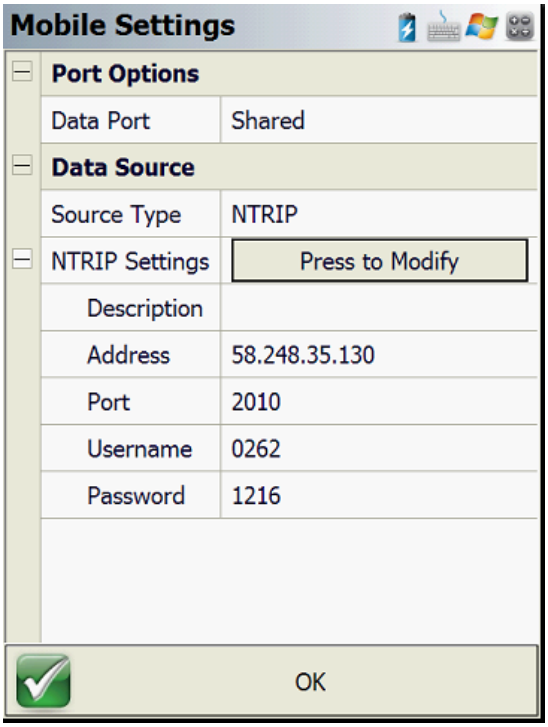
5) If the PIN code is required, please input 1234 or 0000, then back on **Model and Communication page**, click on "**Connect**" button to complete the connection. Meanwhile, please check the second indicator on receiver if it is lit up.



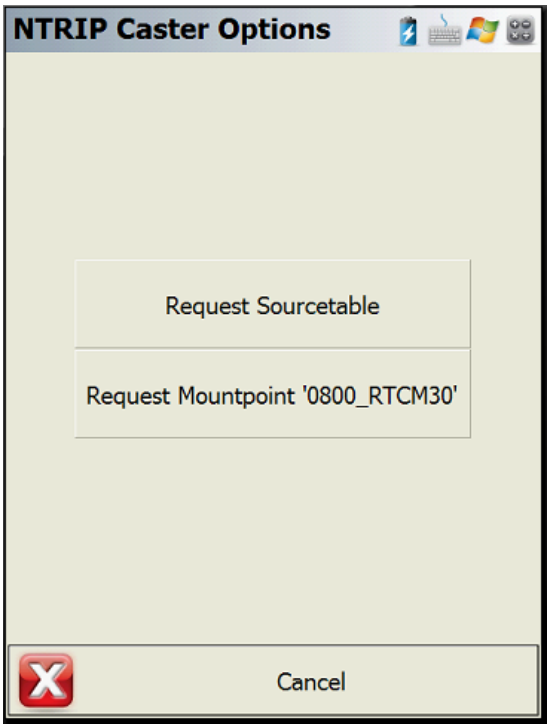


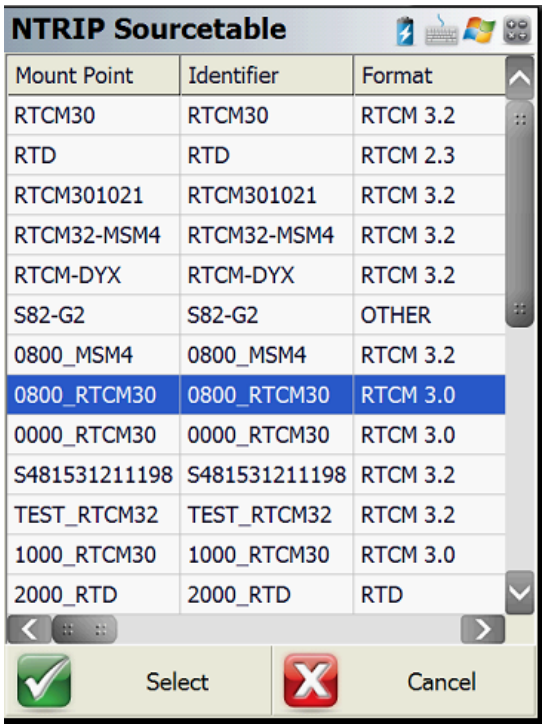
6) Choose "**Date Collector Internet**" as your link device and click on "**Setup**" to go on. Verify that the Data Port of Port Options is **Shared**, then enter the IP address, port, assigned name and password for NTRIP connection, after that, when you back on Link Configure page then click "**Connect**" again to start the NTRIP connection.



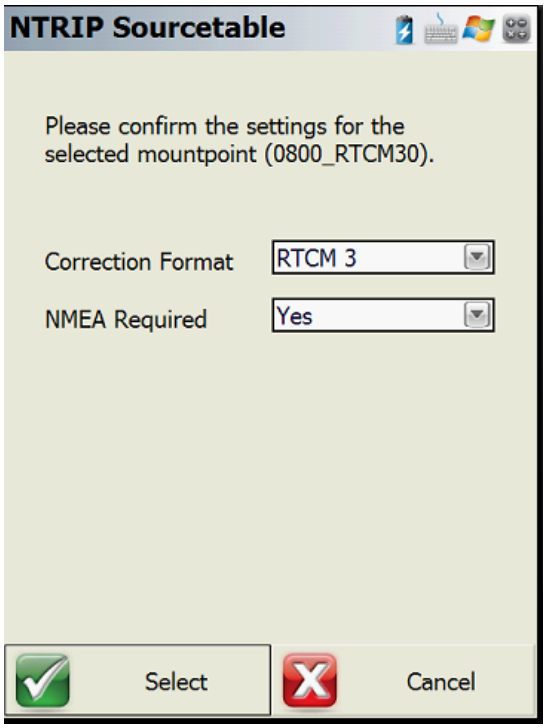


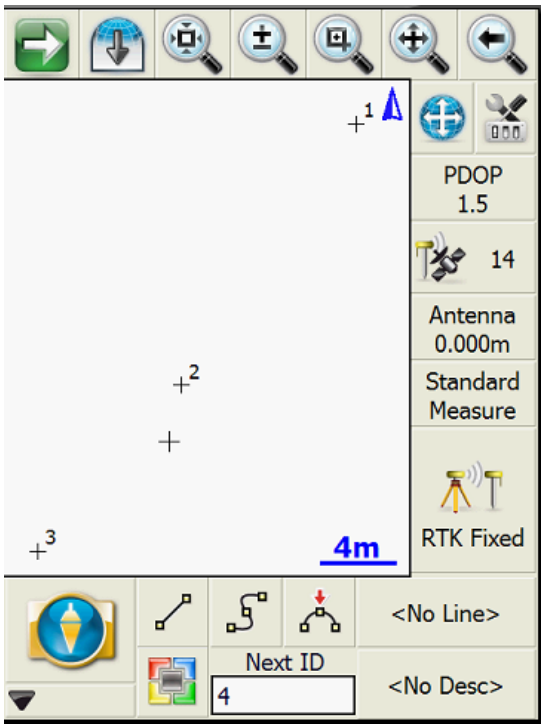
7) If the receiver connected to a mount point before, reconnect directly this mount point which has been stored on handheld. Or request the whole sourcetable if you first time to connect the NTRIP broadcaster. Tap on "**Request Sourcetable**" and the available mount points for corrections will be downloaded to your handheld.





8) Choose a proper correction format and click on "Select" button to confirm, then return to Link Configure page and click on "Connect" button to process the final step, and the receiver will start accessing to internet and obtain correction from CORS server, at this moment, pay your attention to the fourth indicator on receiver, check if it is flashing at the same time, then check the data quality on the right side of main interface.





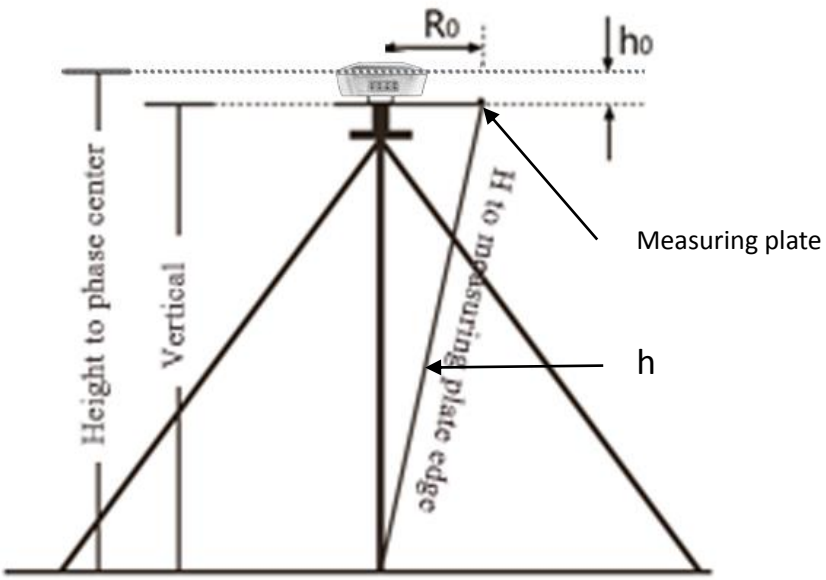
Chapter Ⅶ Static Measurement

GPS positioning measurement by installed three (or more) GNSS receivers to perform simultaneous observation and determine the relative position between the stations.

In this chapter, we are going to introduce how to do Static measurement with S680N receiver.

7.1. Antenna Height Measuring

After fixed the instrument, user should measure antenna height at the beginning and the end of every period of time to ensure the accuracy "mm" level. We usually measure from the center point on the ground to the center waterproof loop of antenna. That is an inclined height. Please refer to the following figure.



We use a formula to calculate antenna height.

$$H = \sqrt{h^2 - R_0^2} + h_0$$

"h" is the inclined height that measure from point on the ground to the measuring plate edge.

R_0 is the distance from middle of antenna to the edge of measuring plate.

h_0 is the distance from antenna phase center to the bottom of receiver (measuring plate).

H is the calculation result. We usually measure antenna height twice and adopt the average.

Attention: *We input the inclined height as the antenna height, which is the inclined distance from point on the ground to the waterproof loop of antenna.*

7.2. Field operation procedure

1. Set up a tripod on the control point, leveling and centering strictly on the measuring point.
2. Measure the instrument height three times, the difference of the results shall not be more than 3 mm, and average the results. The instrument height should be measured from the center of the control point to the mark line on the instrument.(Refer to 7.1.)
3. Record instrument number, point name, instrument height, and start time.
4. Power on receiver, confirm the static mode, the mainframe begins to search satellites and satellite lights begin to flash. Recording condition reached, the status light flashes in accordance with the set sampling interval, flashing once indicates the acquisition of an epoch.

7.3. Mode Configuration

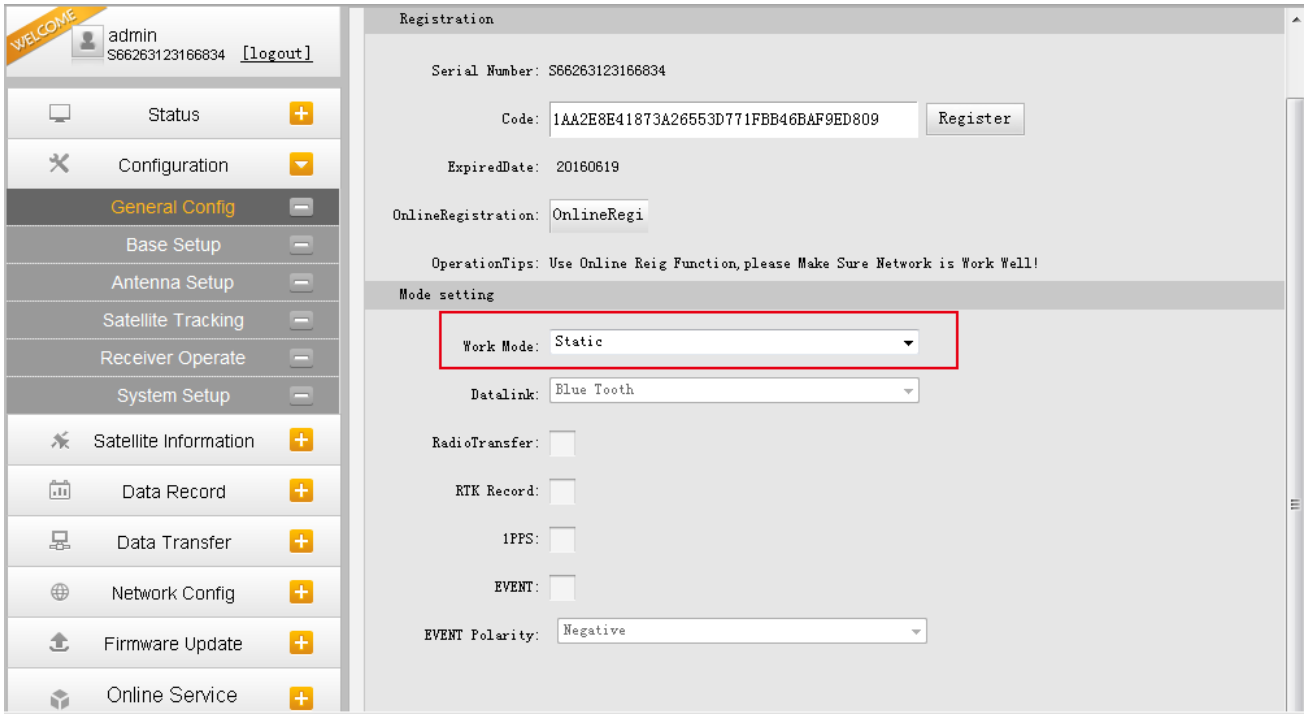
Static mode of S680N receiver is able to be set on internal web UI or on controller software (eg.GIStar for Android). In this section, we will respectively introduce how to configure static mode on web UI and controller software (GIStar).

Configure on Web UI

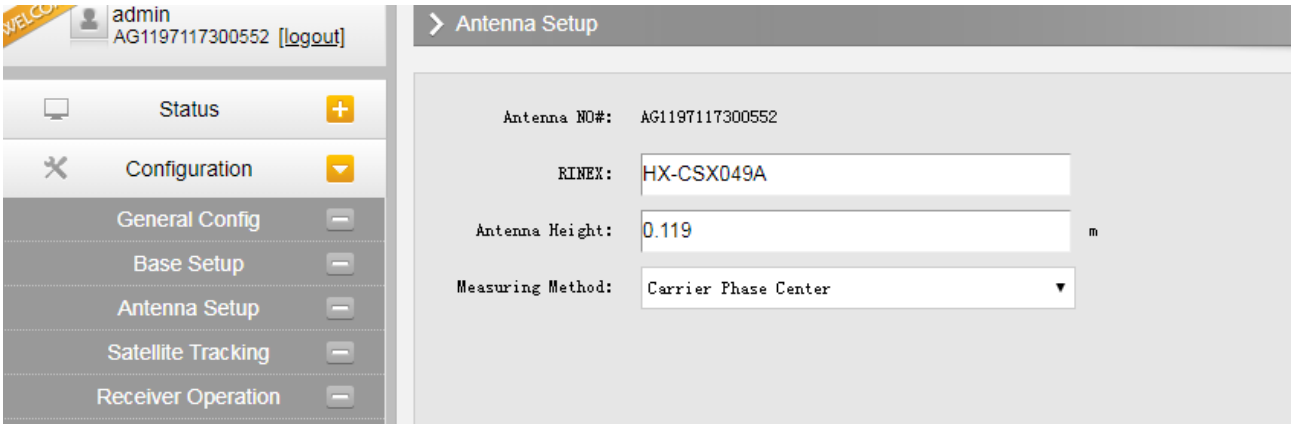
Switch on S680N receiver in normal way, then connect receiver to computer via LEMO Ethernet port, or connect receiver to tablet or smartphone via WIFI connection. Input admin for both username and password to login the web UI server.

Go to Configuration—General Config, switch the working mode into Static, click on

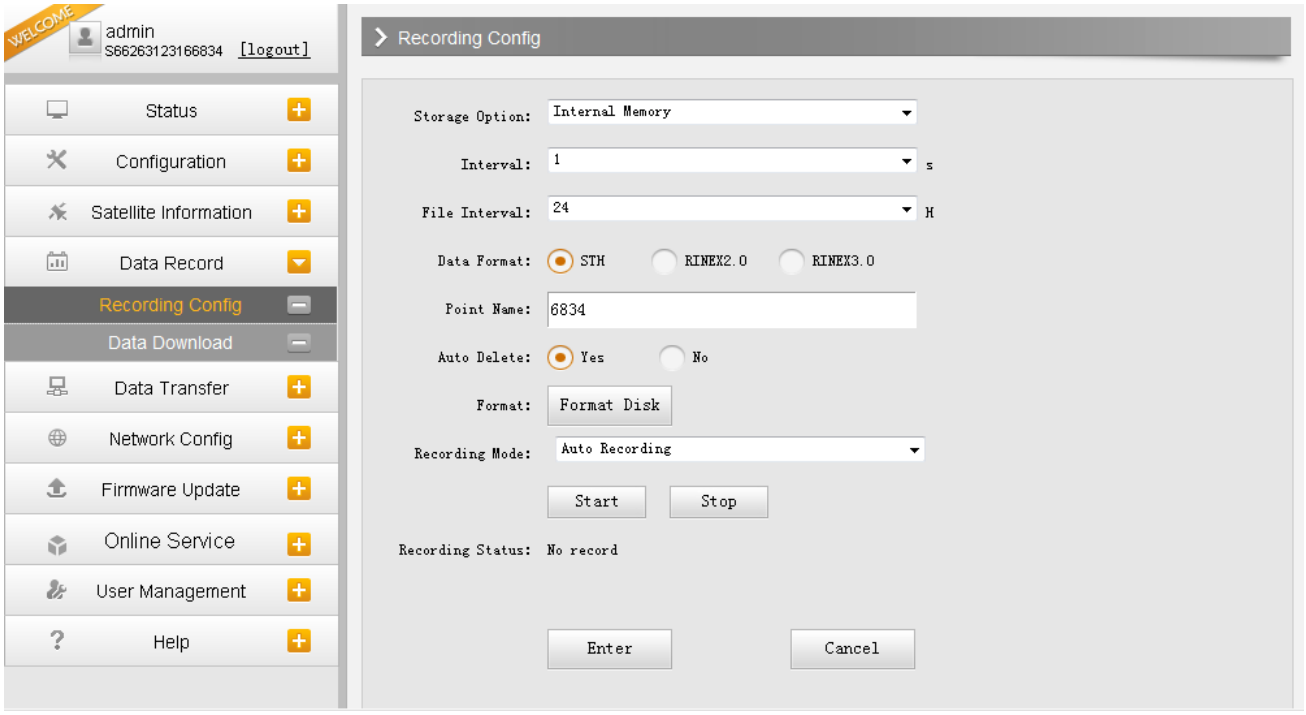
button to confirm the settings.



Input the measured antenna height on Antenna Setup interface.



Move to Data Record and get into Recording Config interface, choose the storage type, setup the sampling interval, file interval, static file format, then choose the recording mode automatic record or manual record. After all the parameters are set, click on Enter button to confirm and then click on Start button to start recording. At this time, observe the status of the indicators on receiver.

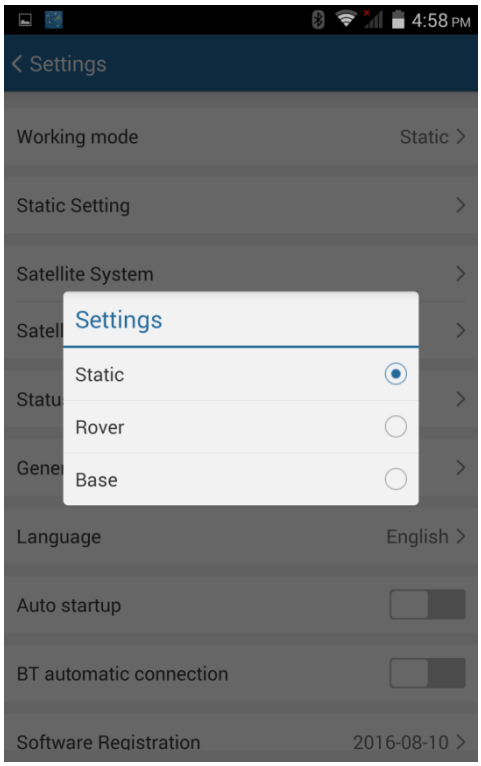


To stop static recording, switch off the receiver directly or click on

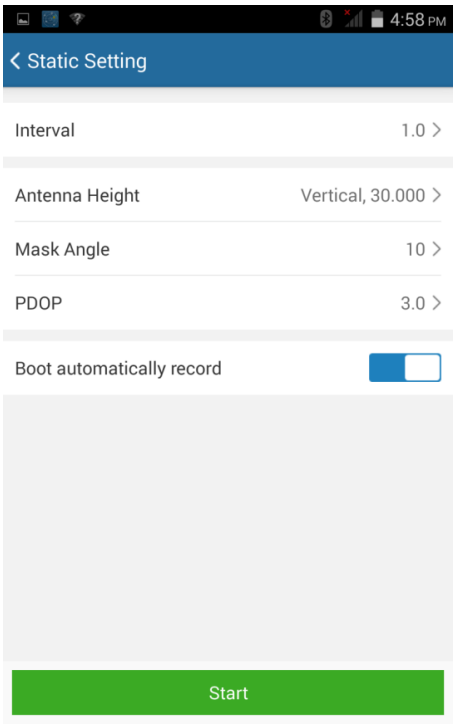
button on web UI, the static data file will be recorded and saved in internal memory of S680N.

Configure on GIStar

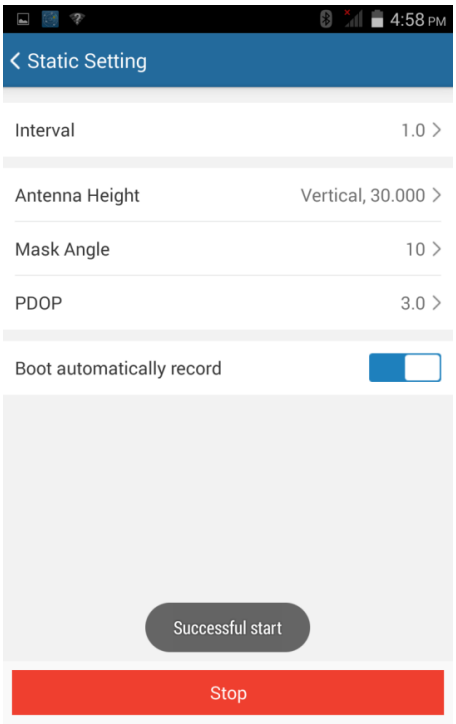
Switch on S680N receiver and establish Bluetooth connection between S680N and controller which has GIStar program installed, then get into Setting interface and switch working mode of receiver into Static.



After the working mode is set, move to Static Setting and set up all the parameters for S680N receiver, such as sampling interval, antenna height, mask angle, PDOP, as well as to set automatic record mode for receiver by tapping on the switch.



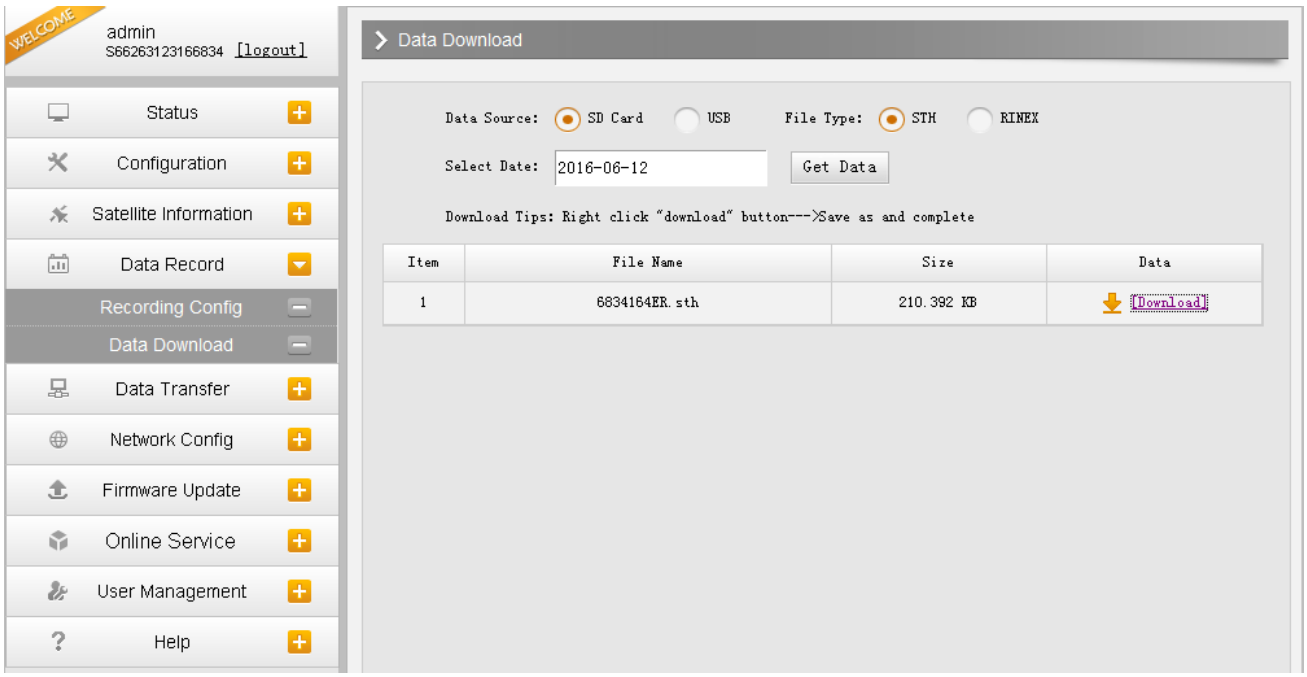
After all the parameters are completed, click on **Start** button at the bottom of interface to start recording raw data onto memory of receiver, at this moment, pay attention to the fourth indicator on receiver, check if it is flashing at the same time.



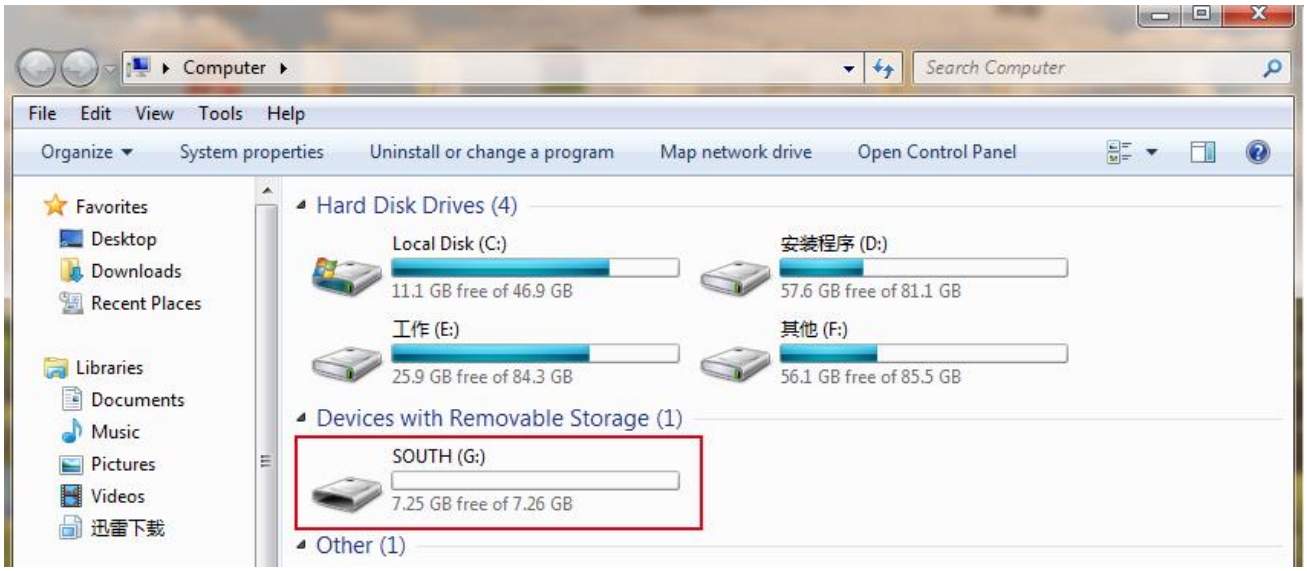
Tips: If the switch of "Boot automatically record" is on, the receiver will record raw data file automatically after starting up and achieving the recording condition.

7.4. Data Download

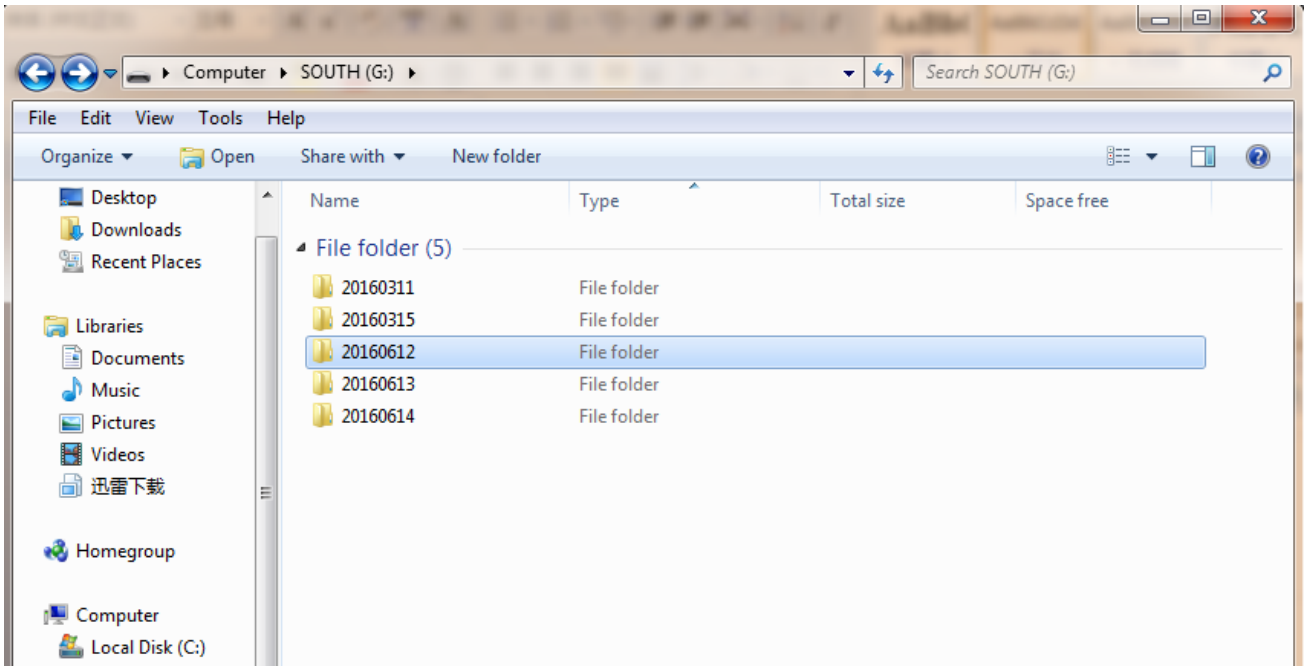
While the static job is done, go back to office and download the static data from web UI. Set the LEMO port of S680N receiver into Ethernet mode, then connect to computer via L7U50 cable and login web UI on IE browser. Go to Data Record—Data Download, choose the correct file format and the date when the static data was recorded, tap on button to refresh the static data files, after few seconds, click on download button related to the static file, and download the files to computer.

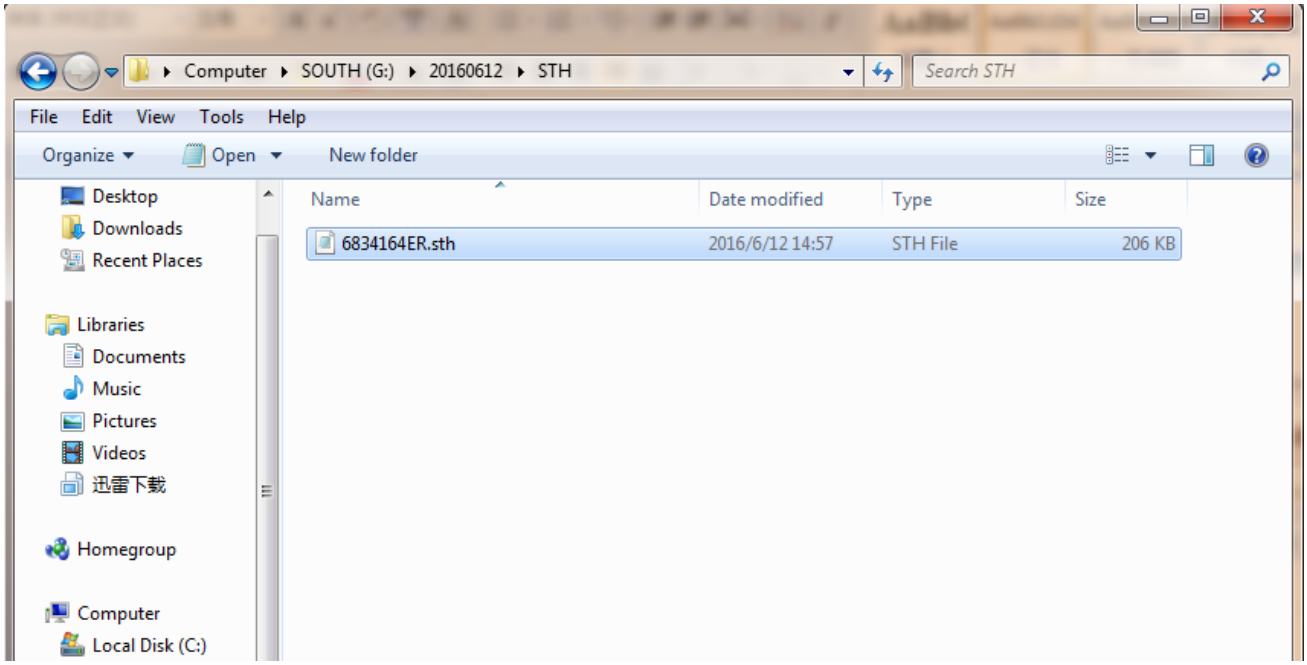


The other way is to switch the LEMO port of S680N receiver into normal USB port, connect the receiver to computer, it will be recognized as a removable disk.



Open the disk and look for the folder of recording date, then copy the data file from folder to computer.

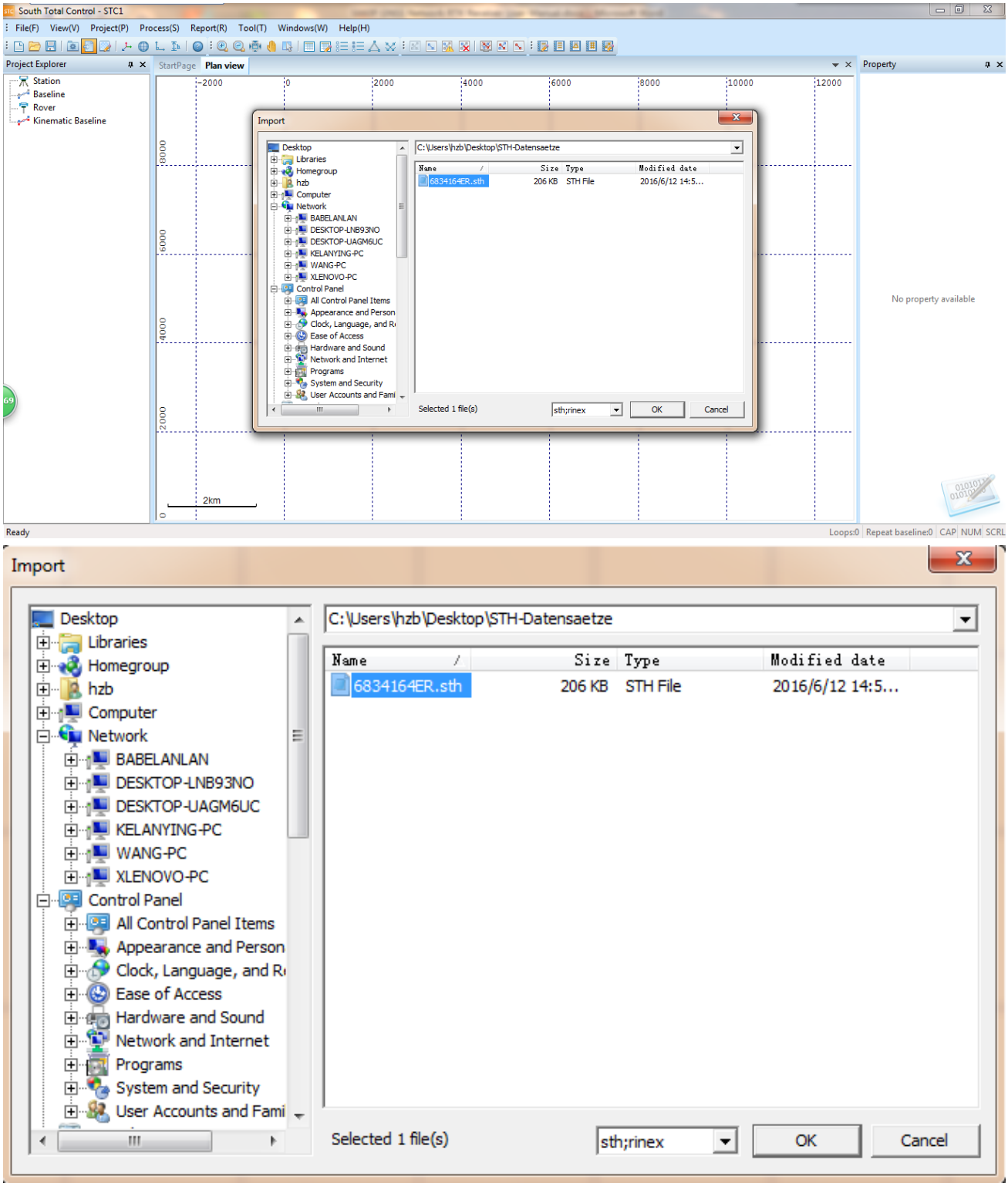




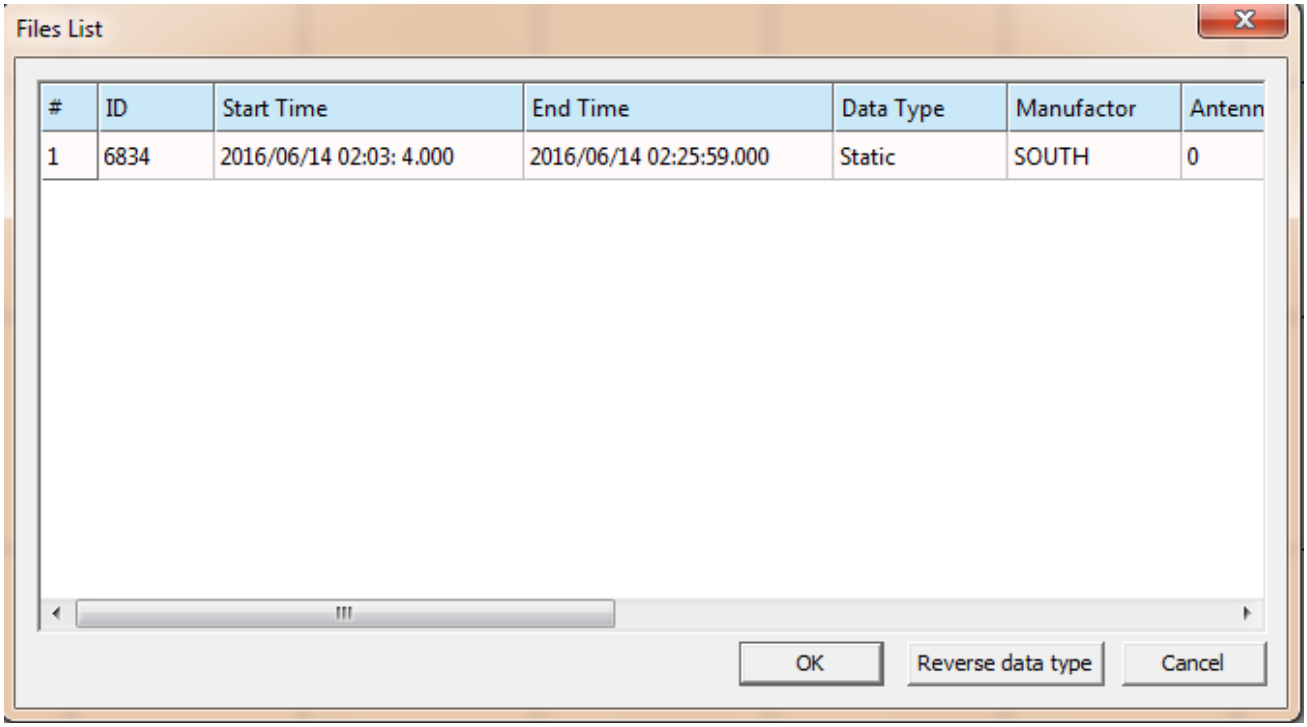
7.5. Data Processing

In this section, we will take KOLIDA Total Control (STC) program for example, to introduce how to simply process the static data from S680N receiver.

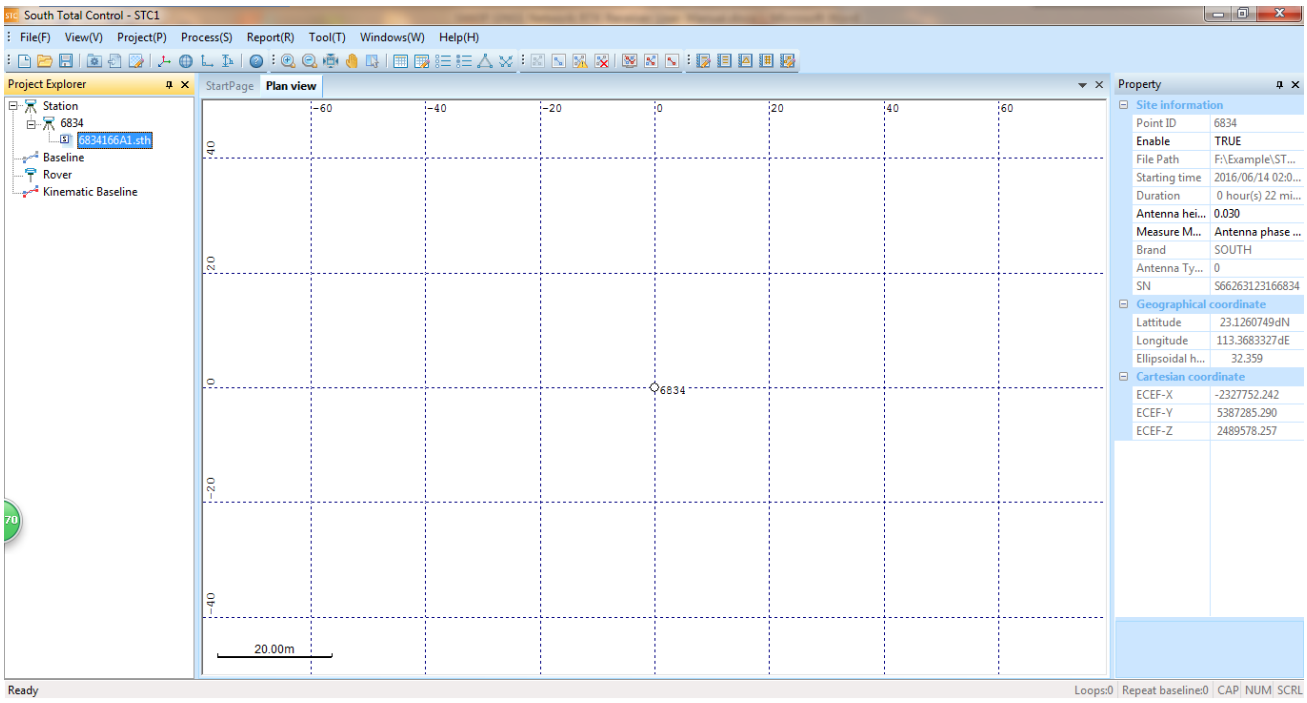
Processing static data from S680N is same to normal static data processing as usual, run STC program on computer, and set up the coordinate system parameters for processing, then click on button to load observation raw data to the program.



Choose the files and click on OK button, a window pop-up along with the information of the static data, including point ID, start time, end time, data type (Static or Kinematic), manufacturer, antenna height and the others. Verify if all the information is correct, then click on OK button to finish loading data.



If there are the other data files loaded at the same time, then click on button to process baselines combined with the observation stations.



Tips: To get more information about static data processing, please refer to KOLIDA Total Control user manual.

Chapter Ⅷ Standard Configuration

Item No	Name	model name	Quantity
1	Receiver host	S680N	1
2	Data cable	L7U50	1
3	Holder	TP-S650	1
4	Adapter	PSAI10R-050Q	1
5	Packaging box		1

1. Receiver host

(2)USB cable

(3) Holder

(4)Adapter

(5) Packaging box

1) This receiver host is integrated with high precise GNSS antenna inside, market proved OEM board, battery and Bluetooth4.0 module.

2)This USB cable is used to charge the receiver, and access to internal web UI as well.

3) Holder, firmly fix receiver on carbon fiber pole, easy to unload.

4) Adapter, connect with USB cable to charge the receiver.

5) Packaging box is a very nice box which is used to pack all accessories including receiver host.

Chapter Ⅸ Technical Specification

GNSS	
Channels	336
GPS	L1 C/A, L2E, L2C, L5, with carrier phase smoothing
GLONASS	L1 C/A, L2 C/A
BDS	B1, B2
Galileo	E1, E5A, E5B, E5AltBOC
QZSS	L1 C/A, L1 SAIF, L2C, L5
SBAS	L1 C/A, L5
Data Output	NMEA-0183, TSIP
I/O Protocol	RTCM, RTCA, CMR
Update Rate	1Hz~20Hz
Reacquisition	<1s
Cold Start	<30s
ACCURACY	
Single point positioning	2m
SBAS	Horizontal: 0.5m Vertical: 0.85m
DGNSS	Horizontal: 0.25m+1ppm Vertical: 0.50m+1ppm
Single Baseline RTK(<30 km)	Horizontal: 0.008m+1ppm Vertical: 0.015m+1ppm
Static	Horizontal: 0.003m+0.5ppm Vertical: 0.005m+0.5ppm
COMMUNICATION	
Data Interface	Mini USB2.0 (Ethernet port and OTG)
Bluetooth	Bluetooth V2.1/ Bluetooth V4.0, support EDR
WIFI	802.11 b/g standard
DATA STORAGE	
Memory	8GB SSD (Solid State Disk) internal memory
Static data format	STH, Rinex2.x, Rinex3.x
Sampling rate	1Hz, 2Hz, 5Hz,10Hz, 20Hz
ELECTRICAL	
Battery	6800mAh, Li-ion battery built in, 3.7V
Battery life	Typically 8 hrs or more
ENVIRONMENTAL	
Operating temperature	-20℃～+60℃
Storage temperature	-30℃～+70℃
Shockproof	Withstand drop from 1.5m to concrete
Waterproof/Dustproof	Test to IP67 standard
PHYSICAL	
Dimensions(mm)	115(L)×115(W)×4(h)
Weight	540 g