

**SingularXYZ**



# **SV100 GNSS Receiver**

## **User Manual**

## Introduction

Thank you for choosing the SV100 GNSS receiver. This Getting Started Guide will provide useful information about SV100. It will also guide you through your first step of using SV100 GNSS receiver.

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## Safety Information

Before using the receiver, please make sure that you have read and understood this user manual, as well as the safety requirements.

If you buy a SV100 that including built-in internal Lithium battery (not standard), and a damaged battery can cause personal injury or property damage. Please obey the following regulations:

- Be sure that power off SV100 when delivering
- Do not put the battery in water
- Do not use the damaged battery
- Do not expose the battery to fire or high temperature
- Internal battery can be bought or replaced only at Authorized SingularXYZ distributors.

## Warning and Cautions

An absence of specific alerts does not mean that there are no safety risks involved. A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

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

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

## Use and Care

*SV100 GNSS Receiver User Manual*

The SV100 is designed to with stand the rough environment that typically occurs in the field. However, the SV100 is high-precision electronic equipment and should be treated with reasonable care.

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Support Skype: [Support.SingularXYZ](https://www.skype.com/join/Support.SingularXYZ)

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## 1. Introduction

SV100 is an excellent GNSS receiver, which is designed as a multi-purpose GNSS receiver for a wide range of applications. This chapter will introduce the main features, accessories, appearance, panel, connectors etc.

### 1.1 SV100 Features

#### Full Constellation

SV100 is equipped with a high-precision GNSS engine for simultaneously tracking GPS, BDS, GLONASS, Galileo & QZSS. Embedded with multi-frequency anti-jamming technology, SV100 offers high quality and stable GNSS data.

#### Flexible Configuration

For professional users of reference stations, you can login in the web UI accessed via Ethernet/ WiFi, containing device information , configuration, work management and update. For field users of portable base stations, SingularXYZ also provides an android app connected via Bluetooth, offering smooth and powerful functions in need.

#### 24/7Continuous Operation

Except for the external power supply, SV100 is also optional for a 6600mAh battery to avoid sudden power failure or voltage instability. With a 4G network as the backup for Ethernet, and an MTBF of over 20,000 hours, SV100 guarantees your ultra-stable continuous reference station.

#### Corrections Transmission

When broadcasting correction data as a portable base, users can select to insert the SIM card to transmit via 4G, or connect the UHF antenna to transmit via radio. SV100 supports multiple radio protocols to compatible with your RTK receivers, such as TRIMATLK, TRANSEOT, SATEL, TRIMMARK3, etc.

#### Rugger Housing

The SV100 is protected with magnesium aluminum alloy housing and compact structure to avoid accidental drop damage. IP67 waterproof and dust proof design, it is suitable for outdoor work in all kinds of weather.

Benefit from its powerful abilities, the SV100 can play a important role in positioning


infrastructure, active geodetic network, machine guidance, harbor construction, land surveying, marine surveying or any project that accuracy and reliability matter the most.

## 1.2 Accessories




For different needs of customers, we can provide different antennas.

### Accessories

Accessories	Accessories picture
SV100	
Data cable	
Antenna cable ( 5m )	
Radio antenna ( optional )	
4G antenna	
Charger	
LAN cable	

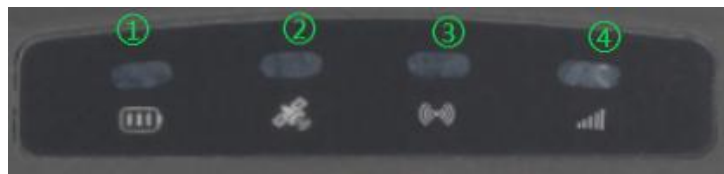
Hooks and screws	
------------------	--

### Antenna

Antenna type	Antenna picture
SA100 geodetic GNSS antenna	
SA500 choke ring antenna	
SA550 3D choke ring antenna	

### Panel

There are 4 LED indicators in front panel, different colors and flash frequency show you the work status of SV100 directly.



- ① Power indicator: It turns red every time when power on, it means it turn on normally, green meas it is in charging.
- ② Satellite indicator: Blue, if your receive N satellites' signal, it flashes N times every 5 seconds, N is the number of tracked satellites
- ③ Data indicator: Green, when set up as base station or rover, it flashes when transmit or receive data
- ④ Network indicator: Yellow, if you insert a SIM card, the indicator always on when get internet. Not for LAN.

### 1.3 Connectors

All connectors are located on the front of the receiver, you can connect other external cables through these connectors.



- ① Master GNSS Antenna Connector: Connect to the GNSS antenna for position.
- ② Slave GNSS Antenna Connector: Connect to the GNSS antenna for heading.
- ③ Radio antenna connector: Connect to radio antenna.
- ④ 4G antenna connector: Connect to 4G antenna.
- ⑤ Power cable connector: Port for external power supply, and internal battery charging of the receiver, this connector can connect to the serial port to send commands and download static data through power cable.
- ⑥ Ethernet Port: Connect to LAN.
- ⑦ SIM card slot: Install SIM card.

#### 1.4 SV100 connection view

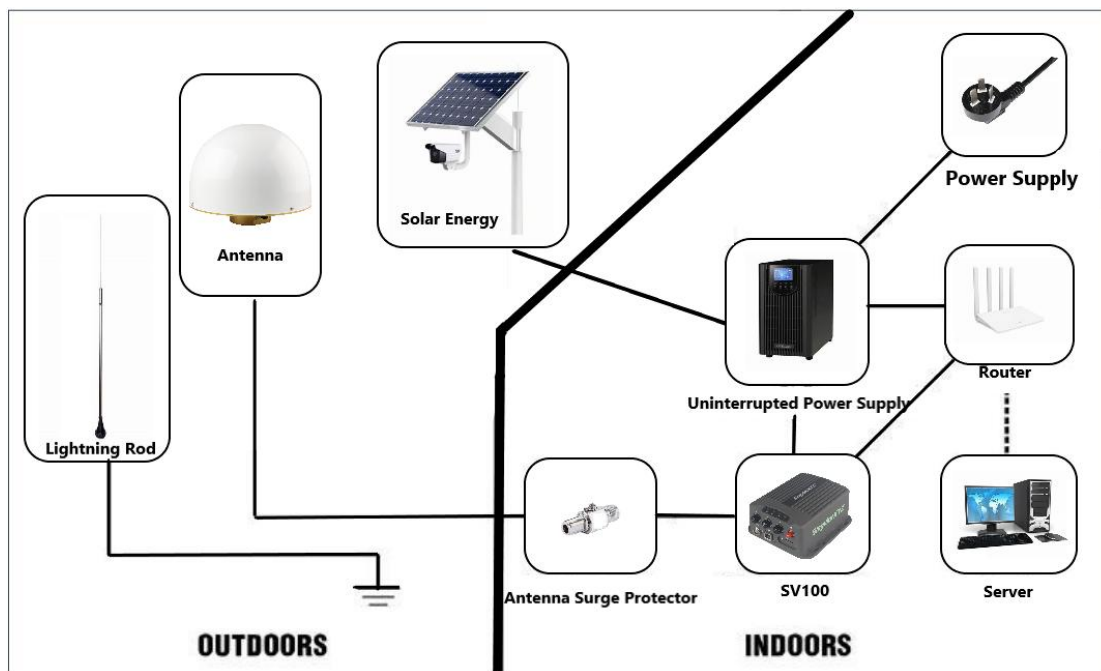
SV100 is mainly used as a base station or CORS reference station, the below figure explains the connection of each equipment.

As a base station to broadcast correction data in a short time, it is easy to use. You just need to prepare GNSS antenna, radio antenna, power supply, tripod, etc.



AS a CORS reference, it is more complicated to install, which usually broadcast correction data unremittingly in a long time through internet. there are indoors part and outdoors part. Outdoors ports include GNSS antenna, lightning rod, solar energy, cement pier, etc. Indoors ports include SV100, router, UPS(uninterrupted power supply), server, etc.

The GNSS antenna and lighting rod are fixed on the ground or top of building, inner devices including the SV100, the power supply and internet, are settled in the office.



## Chapter 2 Connection

For ease of configuration, SV100 has an advanced built-in web server,you can access the

web setting page and do configurations remotely. This section describes how to change receiver's settings through a web server.

## 2. Connection

There are two ways for you to login the web page to configure the receiver when you get it firstly.

### 2.1 WIFI connection

When the device is powered on, the WiFi of the device is enabled by default. You can visit the configuration through WIFI without any cable.

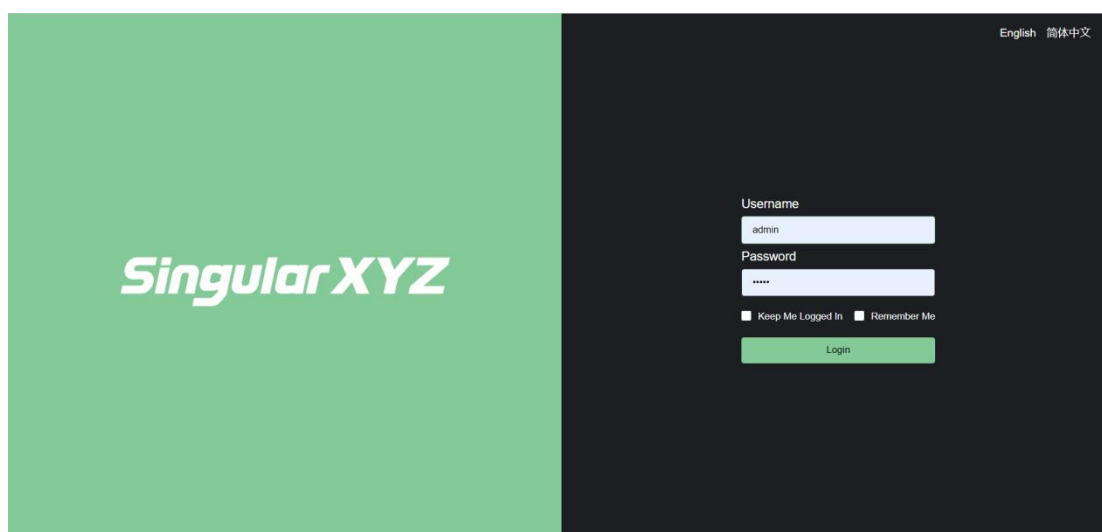
Workflow:

- ① Connect your computer to the WIFI of the device

WIFI Name: the SN number of your device

WIFI Password: 12345678

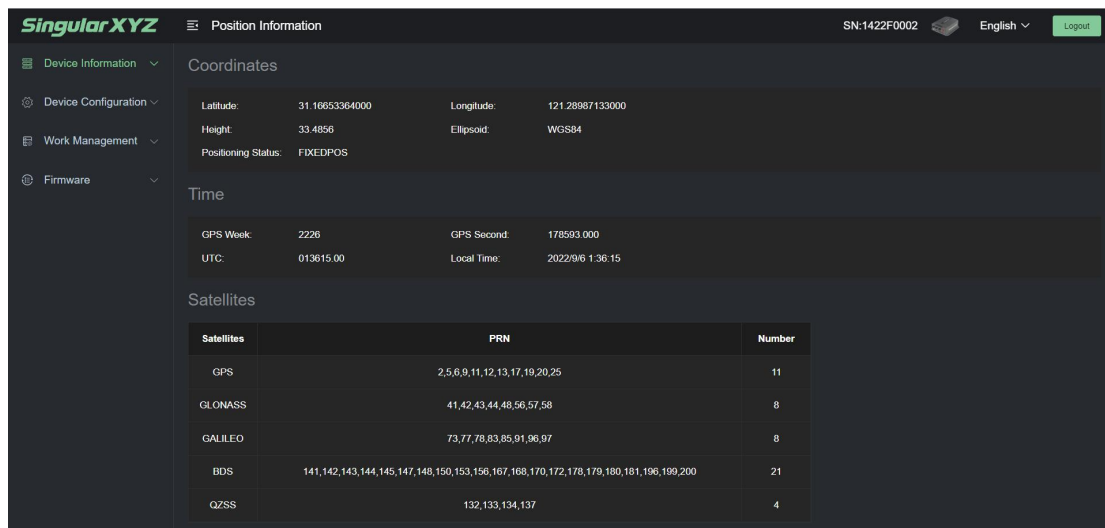
- ② Then type IP in browser, IP: 192.168.10.12



Username: admin

Password: admin

And you can login the configuration page. After accessing the main page, configuration menus are listed on the left, and receiver's settings on the right. Each configuration menu will be demonstrated in the following sections.



## 2.2 Ethernet network connection

If the WIFI were closed, you can login through network cable.

Workflow:

- ① The SV100 receiver can connect to an Ethernet network through its Ethernet port.
- ② Making sure that the SV100 and your computer are within the same Local Area Network. The default IP of SV100 is 192.168.1.1. Then change your computer 's IP address. For example IP address on your computer:

Use the following IP address (S):

IP address (D):	192.168.1.11
Subnet Mask (U):	255.255.255.0
Default Gateway (D):	192.168.1

- ③ Then type IP in browser, IP: 192.168.1.1, username and password are admin, login the configuration page. Then you can check status and configuration of the receiver.

## Chapter 3

## Receiver Status

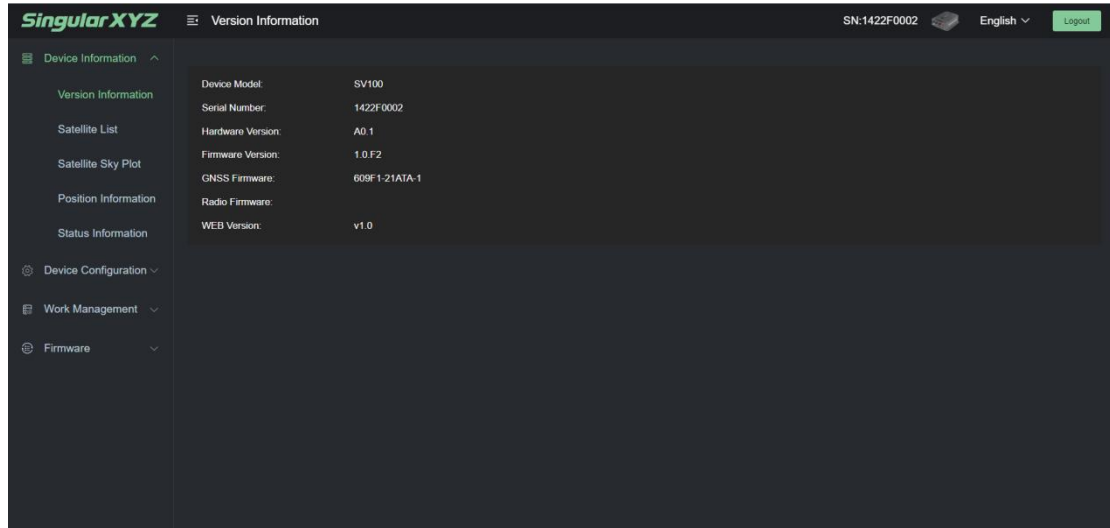
### 3. Receiver Status

Click Device Information, you can choose and check the corresponding receiver status, including Version Information, Satellite List, Satellite Sky Plot, Position Information and

Status Information.

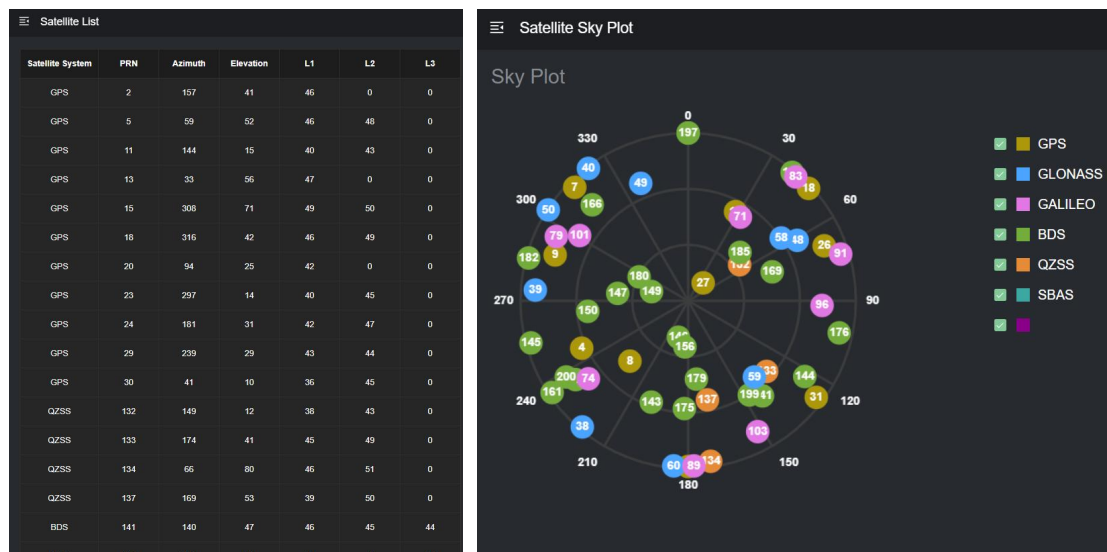
### 3.1 Version Information

Version information includes some basic information of the receiver, such as SN number, hardware version, firmware version, GNSS version etc.



### 3.2 Satellite List and Satellite Sky Plot

Satellite list and sky plot show you the information of each satellite in using, like satellite system, azimuth, elevation, SNR etc.



### 3.3 Position Information

Position information shows you GNSS constellation system tracked, coordinates, positioning status, time etc.

The screenshot shows the 'Position Information' section of the SingularXYZ interface. It is divided into several sub-sections: Coordinates, Time, Heading, and Satellites. The 'Coordinates' section displays Latitude (31.16634680000), Longitude (121.28589715000), Height (39.2054), Ellipsoid (WGS84), and Positioning Status (FIXEDPOS). The 'Time' section shows GPS Week (2254), GPS Second (269163.000), UTC (024545.00), and Local Time (2023/3/22 2:45:45). The 'Heading' section shows a heading of 0. The 'Satellites' section is a table listing the number of satellites from various constellations.

Satellites	PRN	Number
GPS	4,7,8,9,16,18,21,26,27,31	10
GLONASS	38,39,40,47,48,49,50,58,59,60	10
GALILEO	71,74,79,83,89,91,96,101,103	9
BDS	141,142,143,144,145,146,147,149,150,156,161,166,169,170,175,176,179,180,182,184,185,196,197,199,200	25
QZSS	132,133,134,137	4

### 3.4 Status Information

Status information shows you working mode and work status.

The screenshot shows the 'Status Information' section of the SingularXYZ interface. It displays various system metrics: Working Mode (Base), Memory Capacity (7.4GB), Available Memory (3.9GB), Power Type (External Power), and Battery Level (0%). The interface also shows the device's SN (SN:1422F0002), language (English), and a Logout button.

## Chapter 4

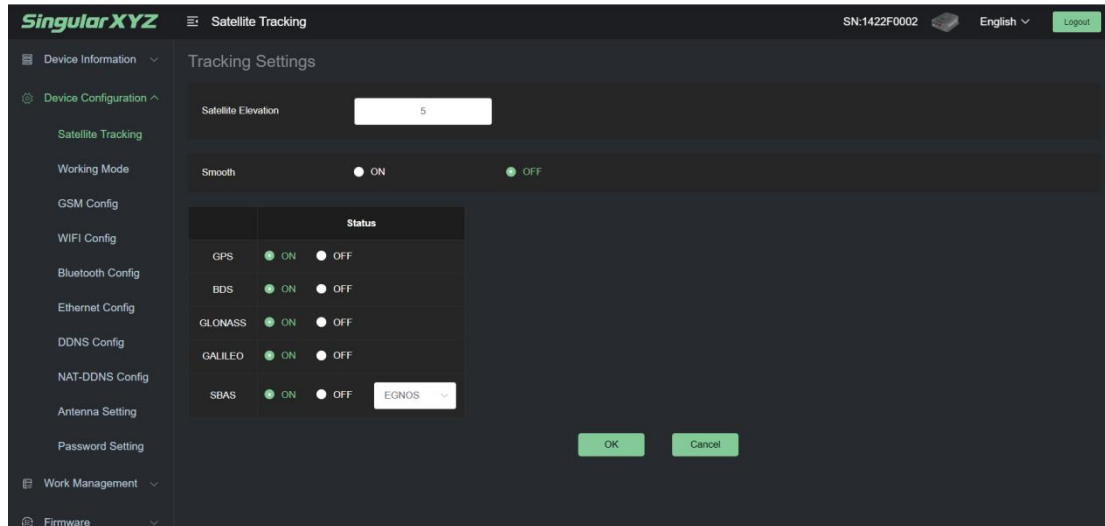
## Device Configuration

### 4. Device Configuration

This menu is prepared to do basic configuration of your receiver.

## 4.1 Satellite Tracking

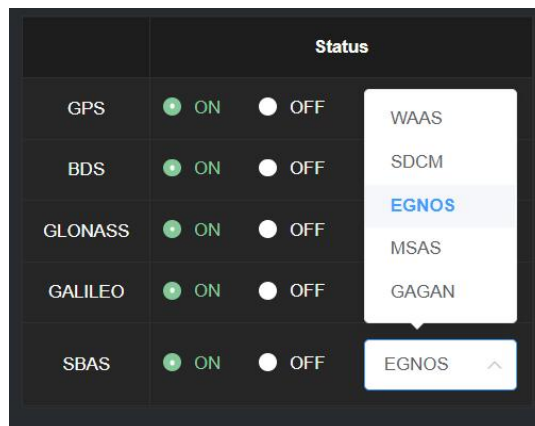
set elevation and satellite systems.



1) Satellite Elevation: Enter degree to set elevation as 5° ,10° ,15° etc.

2) Smooth: Choose on\off to enable or disable smooth mode.

3) Status: Choose on\off to enable or disable satellites system. For SBAS mode, you can choose WAAS\SDCM\EGNOS\MSAS\GAGAN.



## 4.2 Working mode

There are 3 work modes you can choose:

Rover mode: configure the receiver as a rover station.

Base mode: configure the receiver as a base station.

Working Mode Setting

Rover  Base  Single

Base ID: 1422F0002

Base Coordinates: GET

Longitude: 121 17 23.578224  E  W

Latitude: 31 9 59.588496  N  S

Height: 33.000000 m

Base Status: Stopped

Start Base Stop Base

Single mode: configure the receiver in single point positioning mode.

## 4.3 GSM config

Start up or shut off 4G, if you insert a SIM card, please reboot SV100 and start GSM.

SingularXYZ GSM Config SN:1422F0002 English Logout

Device Information

Device Configuration

Satellite Tracking

Working Mode

GSM Config

WIFI Config

Bluetooth Config

Ethernet Config

DDNS Config

NAT-DDNS Config

Antenna Setting

Password Setting

Work Management

Firmware

IMEI: 865167062352183

Signal Strength: 31

Network Status: Disconnected

SIM Status: ERR

APN: ctnet

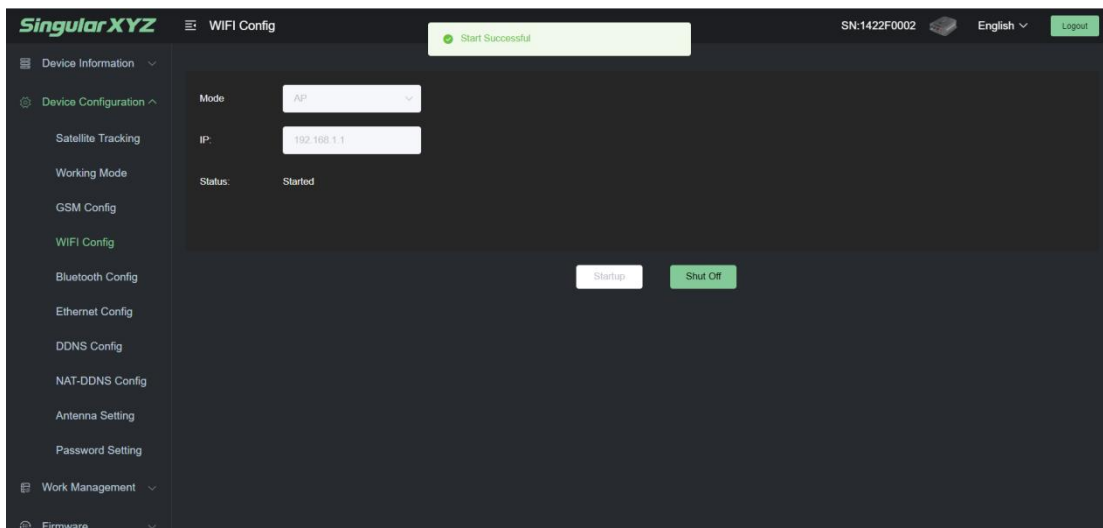
User: zyfq

Password: \*\*\*\*

Startup Shut Off

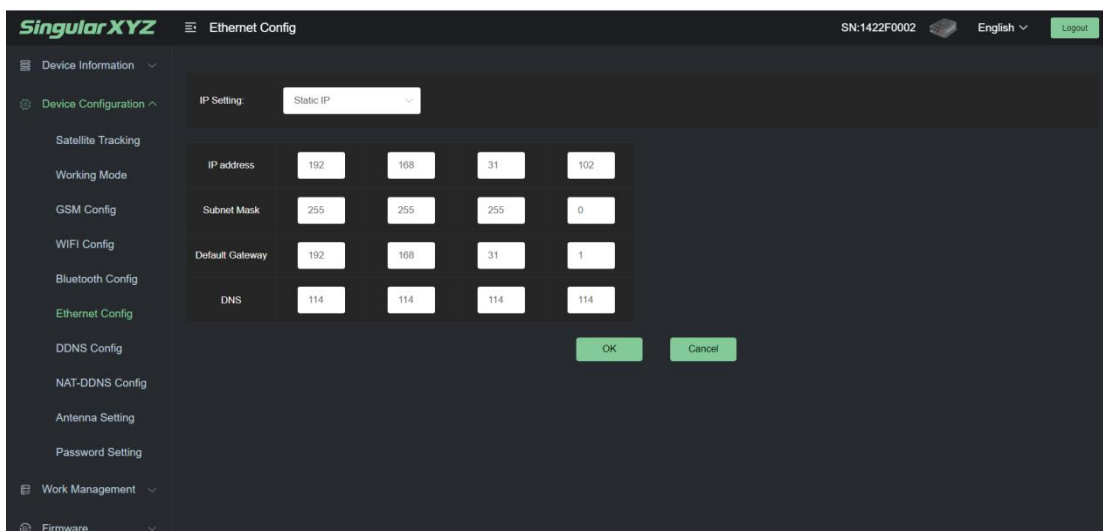
## 4.4 WIFI config

Start up or shut off WIFI, the IP can be edited.



## 4.5 Ethernet config

Edit IP information of Ethernet.



## 4.6 DDNS config

Start up or shut off DDNS, it supports No-IP, DynDNS, FreeDNS, Zoneedit.

Registered address:

<https://www.noip.com>

<http://www.dyndns.com>

<https://freedns.afraid.org>

<https://www.zoneedit.com>

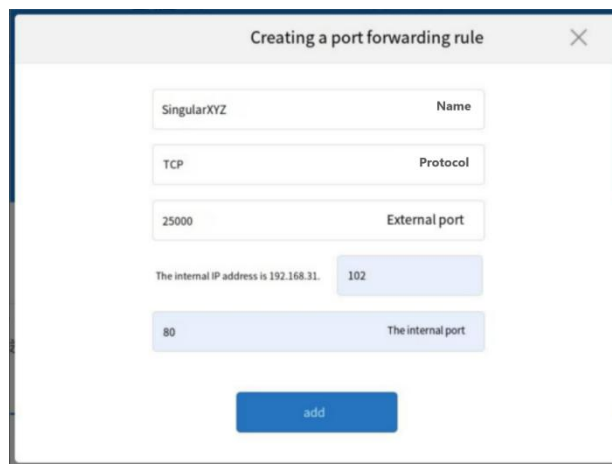
The DDNS (Dynamic Domain Name Server) system maps the dynamic IP address of a user to a fixed domain name resolution service. Every time a user connects to the network, the client program sends the dynamic IP address of the host to the server program located on the service provider's host through information transmission, realizing dynamic domain name resolution

Preparation: SV100, a fixed domain name, router with internet, network cable and computer.

- Connect SV100 to router through network cable
- Connect your computer to the WIFI of the SV100 GNSS receiver. Login the web of SV100. Set IP address to the same network segment as the router.

For example, the IP of the router is 192.168.31.1, the static IP of SV100 should be 192.168.31.\*

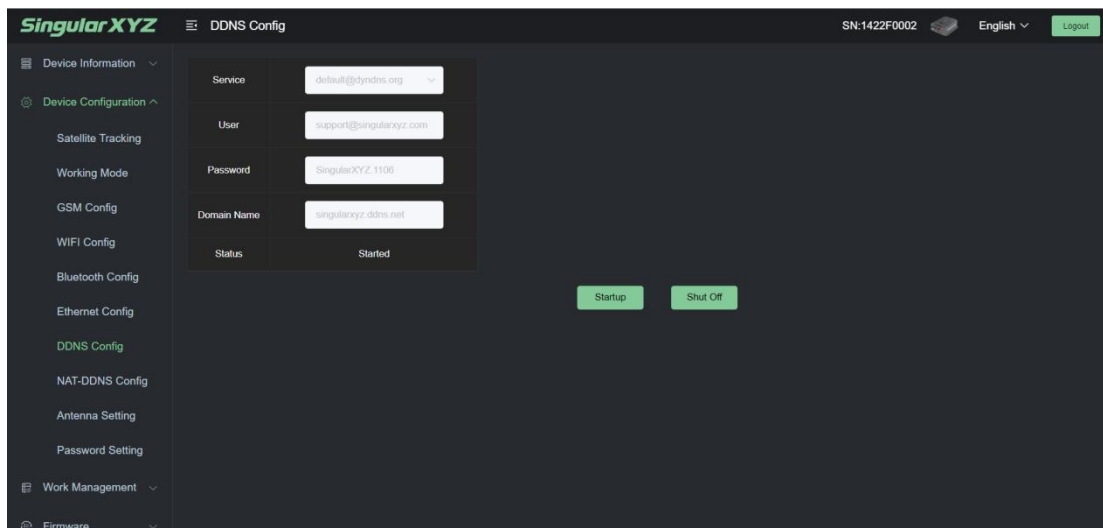
- Connect your computer to the WIFI of the router and login it's web, map an external port of the router to port 80 of the receiver IP address



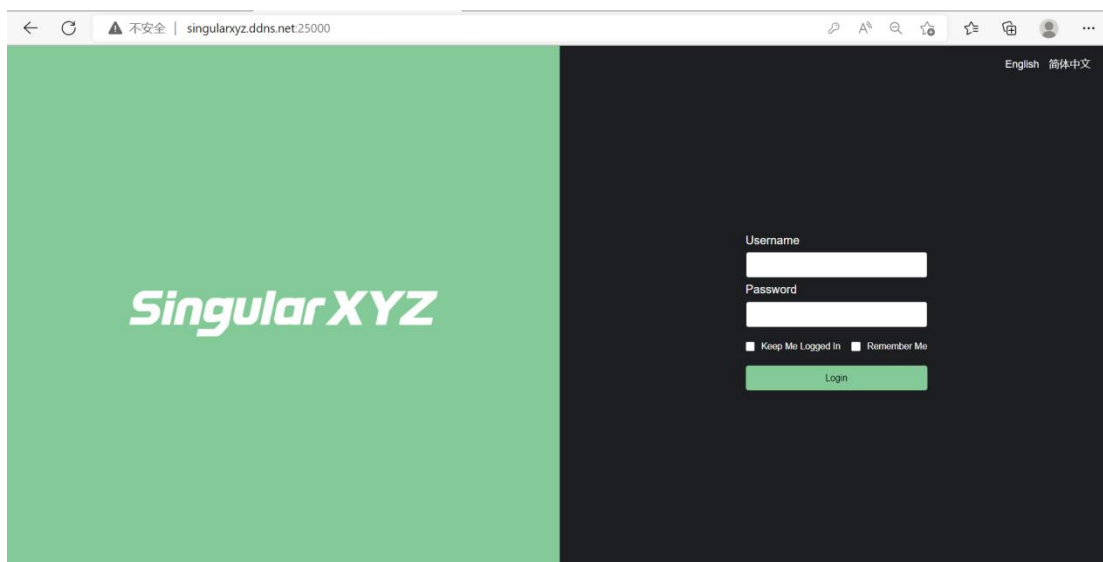
The screenshot shows a web interface titled "Creating a port forwarding rule". It contains several input fields and a button:

- Name:** SingularXYZ
- Protocol:** TCP
- External port:** 25000
- The internal IP address is 192.168.31.:** 102
- The internal port:** 80
- add** button

- Login the web of SV100, enter user, password, domain name and click startup.



- Finally, you can use the domain name and external port to login the web of SV100, realizing checking status and configuring remotely.



## 4.7 NAT\_DDNS config

Start up or shut off NAT\_DDNS, supporting NATAPP and NGROK.

Registered address:

<https://natapp.cn>

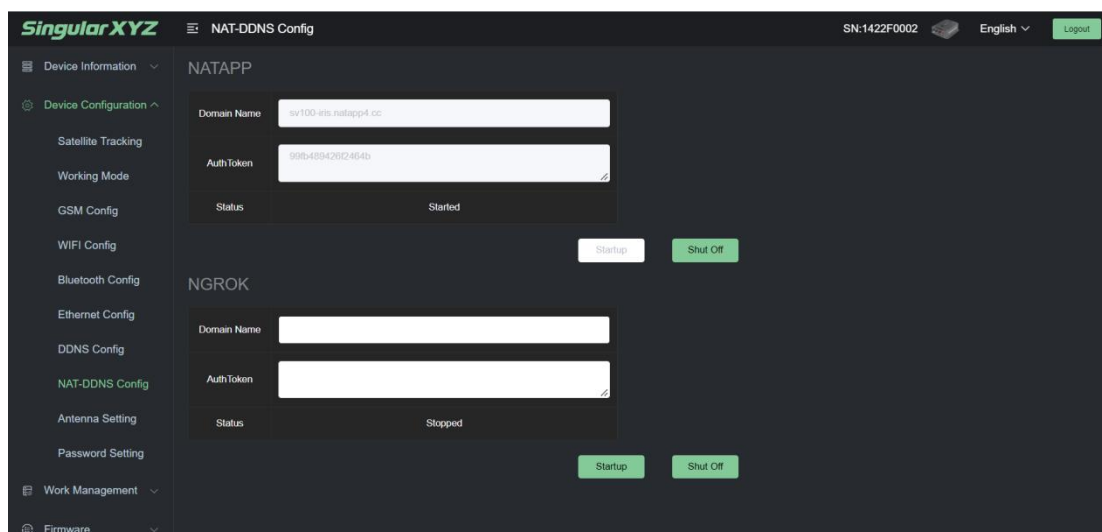
<https://ngrok.com>

NAT-DDNS (Network Address Translation- Dynamic Domain Name Server) technology enables users to realize dynamic domain name resolution service even in the Intranet IP address environment. Dynamic IP addresses communicate with the server in real time,

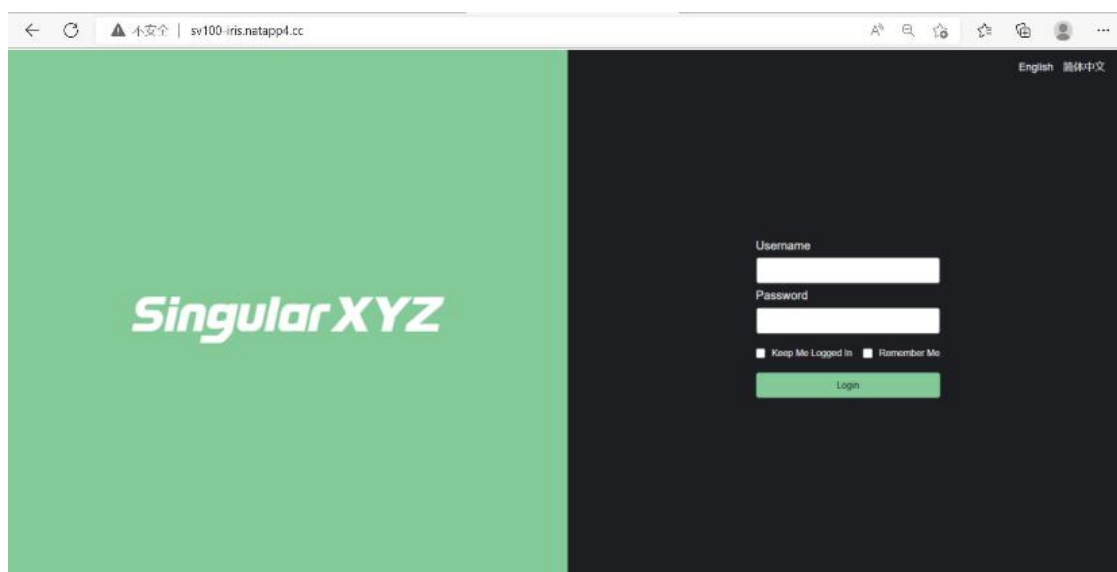
bind fixed domain names, and enable Internet users to access a certain Intranet host by entering a specific domain name. It is easy to set up WEB/MAIL/FTP servers on their own hosts. Can also achieve remote management, remote access and other functions.

Preparation: SV100, a fixed domain name, internet, computer

- Insert a SIM card or connect SV100 to router through network cable, making sure it get internet.
- Login the web of SV100. Enter domain name and authtoken code and click startup

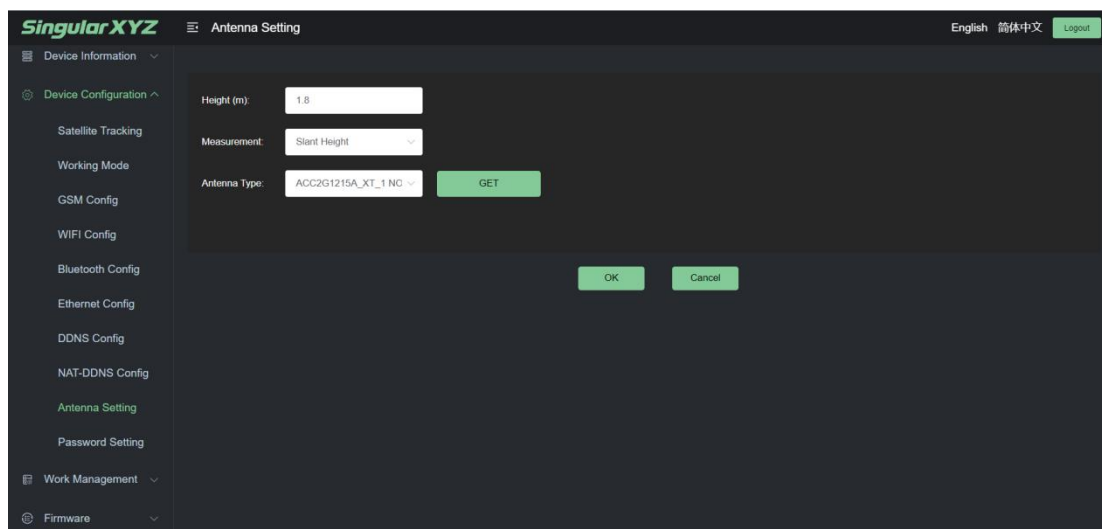


- Finally, you can use the domain name to login the web of SV100, realizing checking status and configuring remotely.



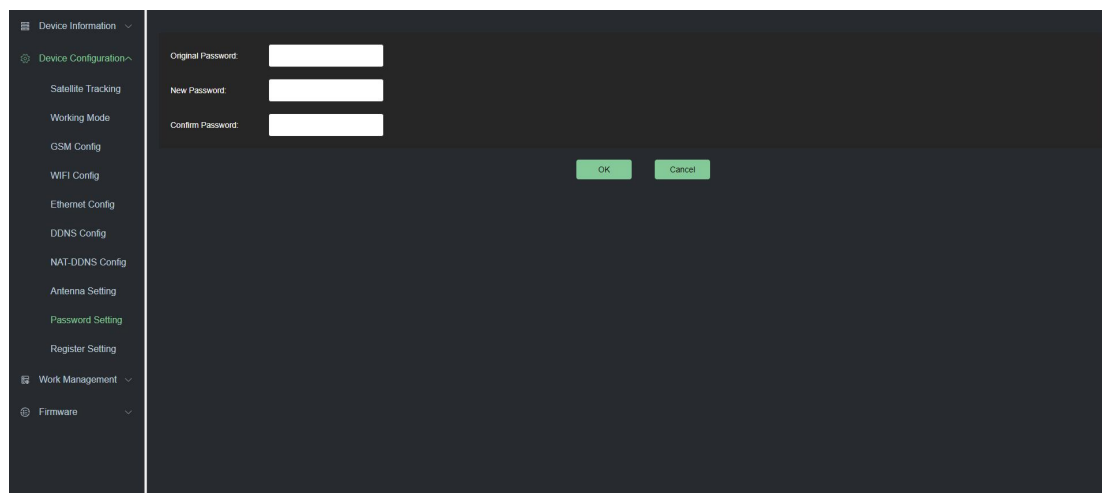
## 4.8 Antenna Setting

Set height and measurement for antenna, and click GET to choose the antenna type of your external antenna.



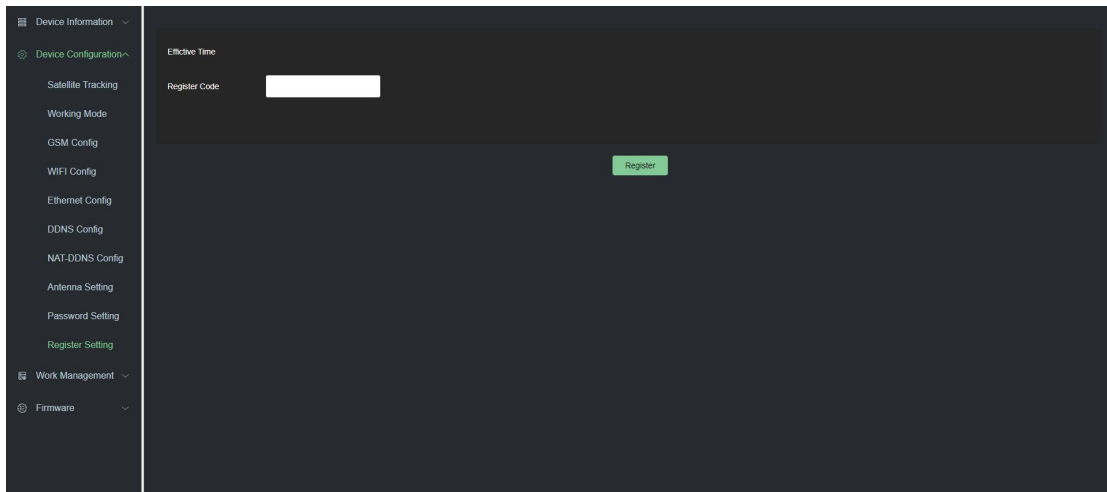
## 4.9 Password Setting

Set password of login, the original password are admin.



## 4.10 Register Setting

Enter register code to get a permanent or temporary use.



## Chapter 5 Work Management

### 5. Work Management

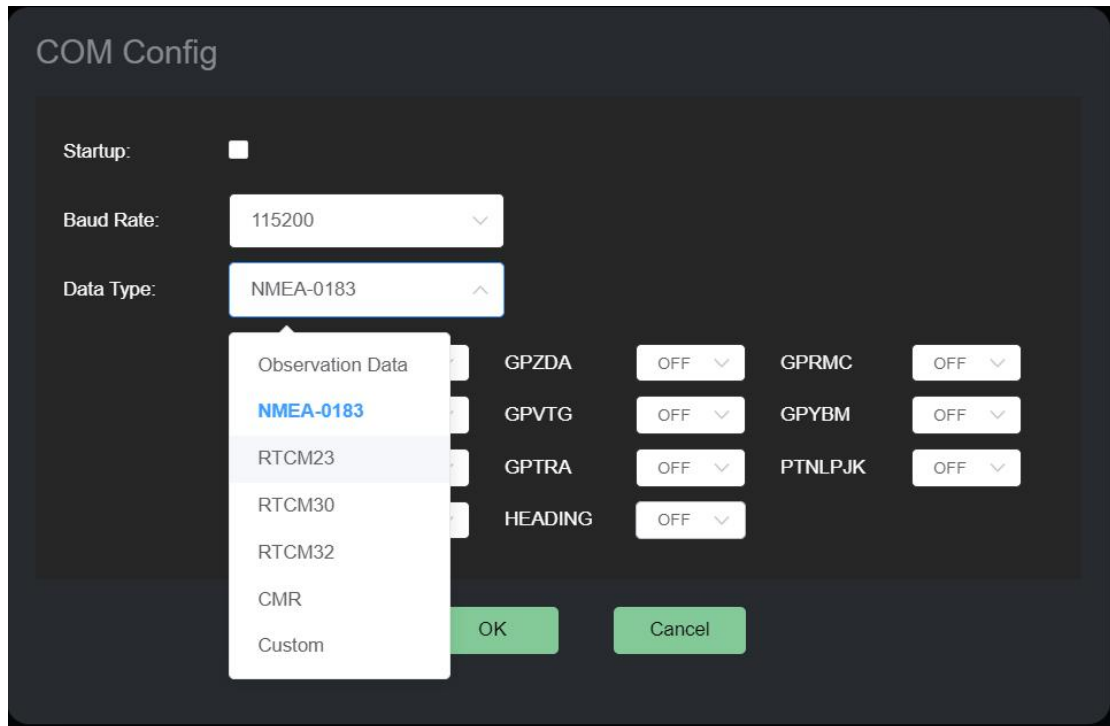
① Data transmission: there are 4 ways to transmit the data, 1 serial port, 2 TCP, 2 NTRIP, 1 radio

Data Transmission Overview			
Type	Port	Stream	Config
COM	1	NMEA-0183	<a href="#">Config</a>
TCP	192.168.1.99:6060	Observation Data	<a href="#">Config</a>
TCP	1121	NMEA-0183	<a href="#">Config</a>
NTRIP Server	47.103.96.216:8080	RTCM32	<a href="#">Config</a>
NTRIP Client	140.207.166.210:25001	22KM-K803-RTCM32	<a href="#">Config</a>
NTRIP Cater	8888		<a href="#">Config</a>
Radio		RTCM32	<a href="#">Config</a>

#### 5.1 COM Transmission

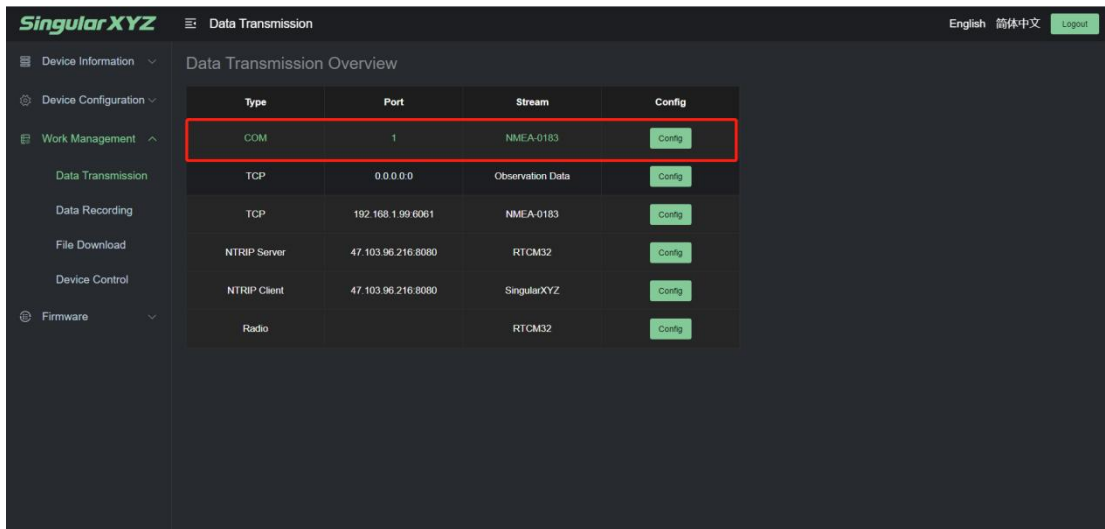
Connect to the com1 of the built-in GNSS board, The data will output from COM port of the receiver when you complete the serial port settings.

The format of Data flow includes NMEA-0183、observation data、RTCM、CMR and custom data.



Work flow:

- Set suitable baud rate
- Set data type,
- Choose the data type and specific data
- Finally check startup
- Click OK.



When it turns green, it means the mode is working.

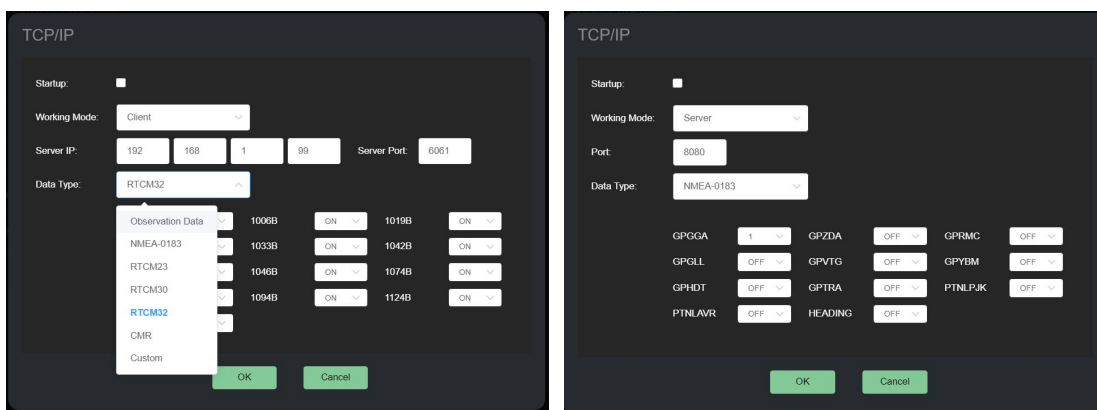
## 5.2 TCP transmission

Supports two TCP, Data flow can be transferred via the internet by using TCP Server or TCP Client.

TCP Server: Any user can receive the data through TCP protocol

TCP Clients: Send data to the specified IP address and port

The format of Data flow includes NMEA-0183、observation data、RTCM、CMR and custom data.



Work flow:

- Set SV100 as base or rover in working mode interface
- Choose work mode, TCP client or server
- Enter IP and port
- Choose the data type and specific data

- Check startup
- Click OK.

When it turns green, it means the mode is working.

## 5.3 Ntrip transmission

The SV100 can support Ntrip Client, Ntrip Server and Ntrip Caster protocols.

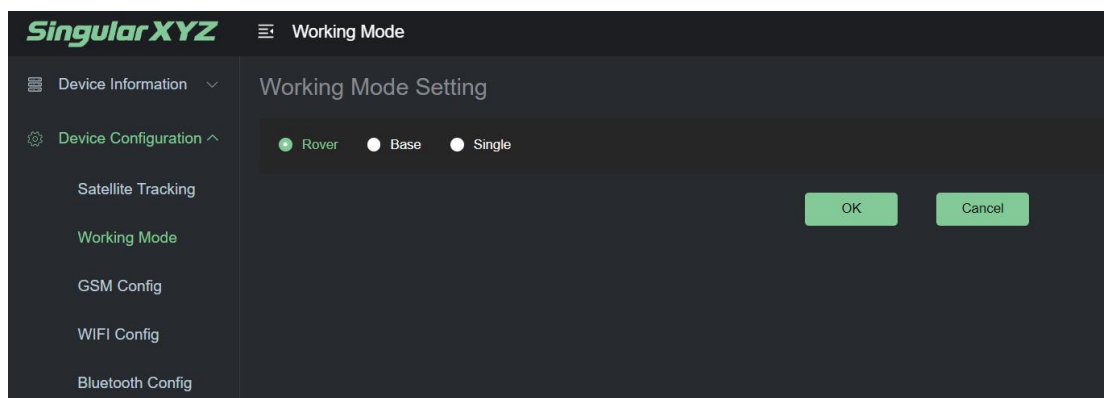
Ntrip client: You can acquire correction data from CORS through Ntrip Client protocol if setting the receiver as a rover.

Ntrip server: As a base station, you can broadcast correction data by using Ntrip Server protocol or the data forward software (supporting Ntrip Caster protocol) running in the server. If you have a static IP address, you can use Ntrip Server and Ntrip Caster of SV100 simultaneously to create a single reference station. This mode does not need any software to support, and is very convenient for using

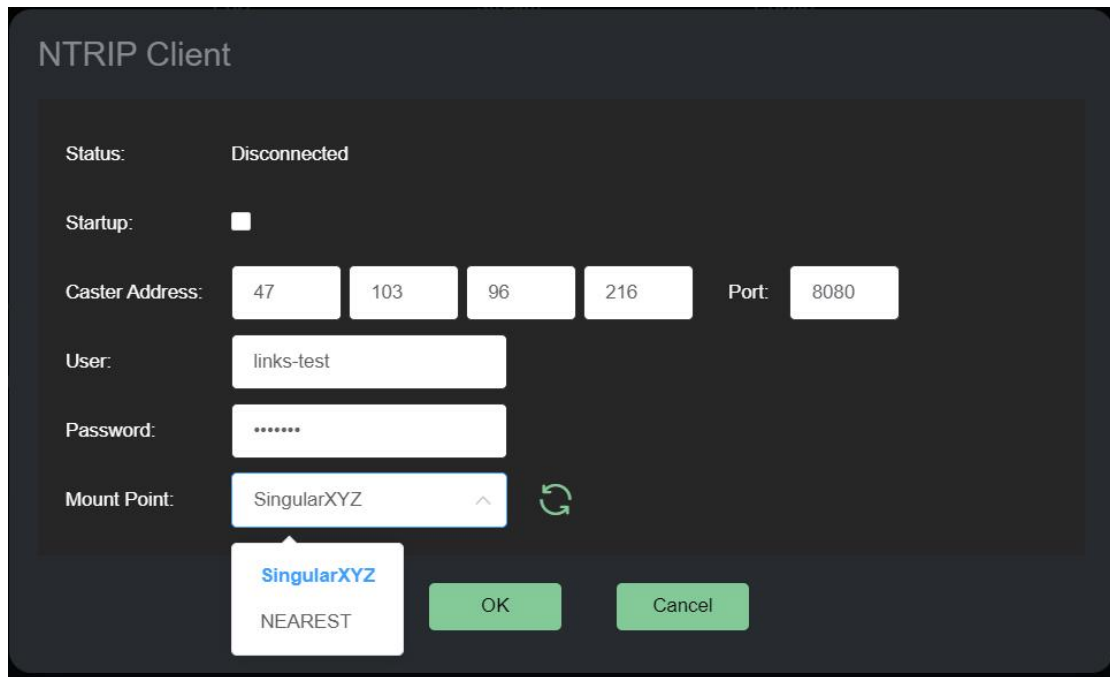
### 5.3.1 Ntrip Client

You can acquire correction data from CORS through Ntrip Client protocol if setting the receiver as a rover.

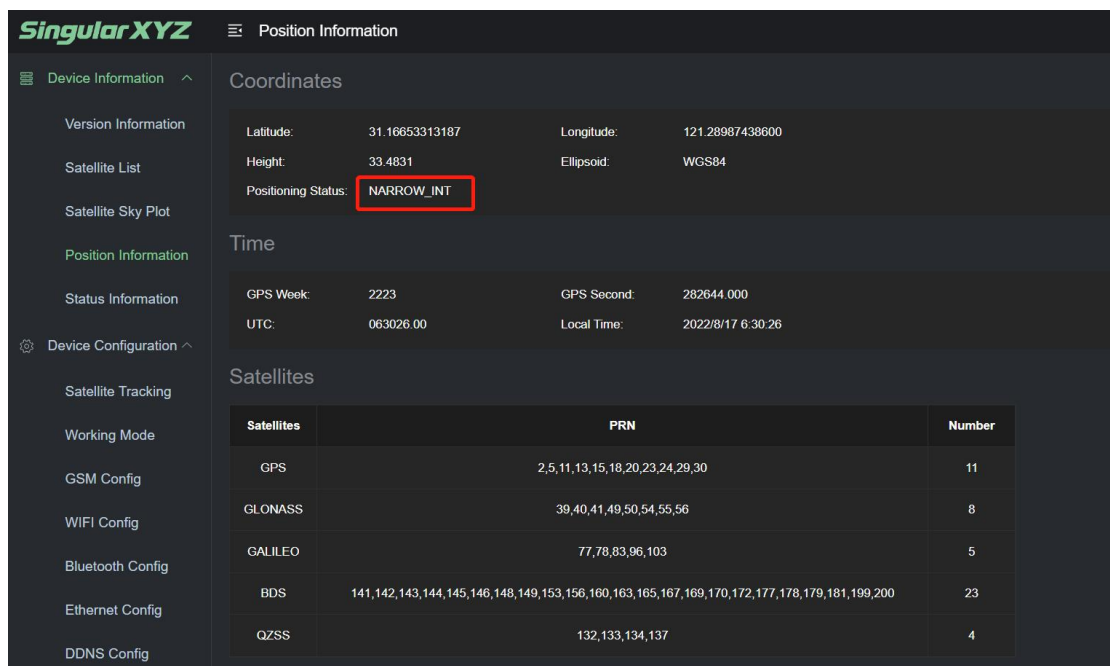
- Before setting the Ntrip Client, you should configure the receiver as Rover mode.



- Enter IP address, Port, User name and Pass word of CORS
- Click Get List to acquire the Mount Point list

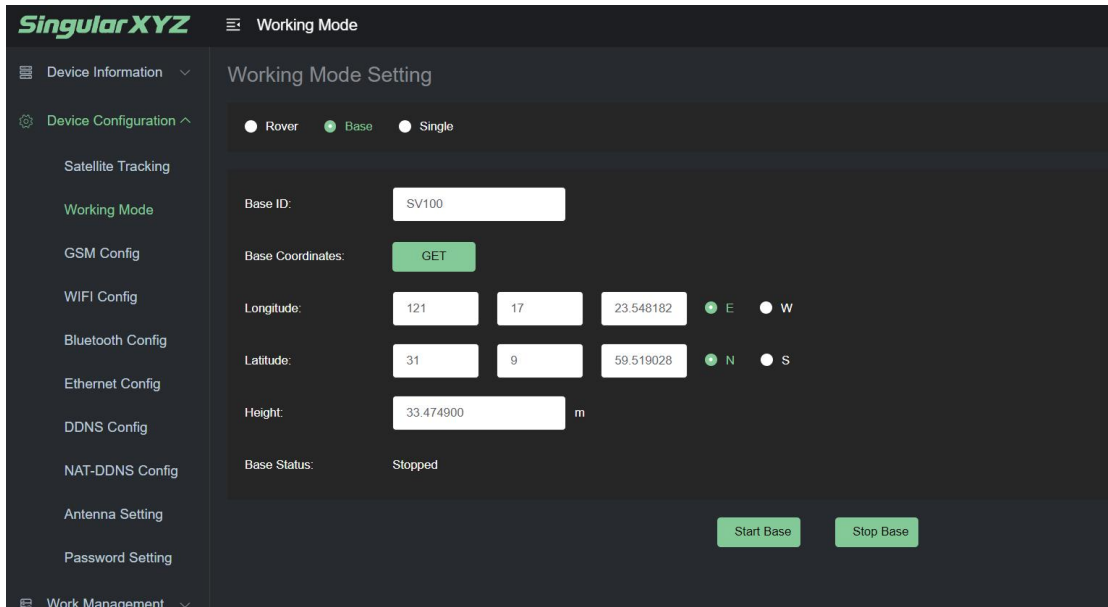


- Choose one of mount point、check startup and click OK button, you will receive correction data from CORS.
- Click position information to check the rover's status, and position Status should be NARROW\_INT.

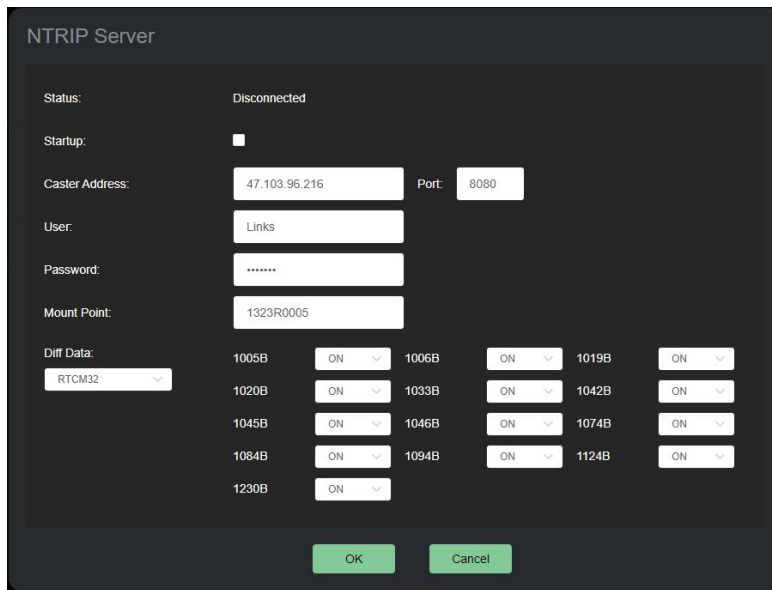


### 5.3.2 Ntrip Server

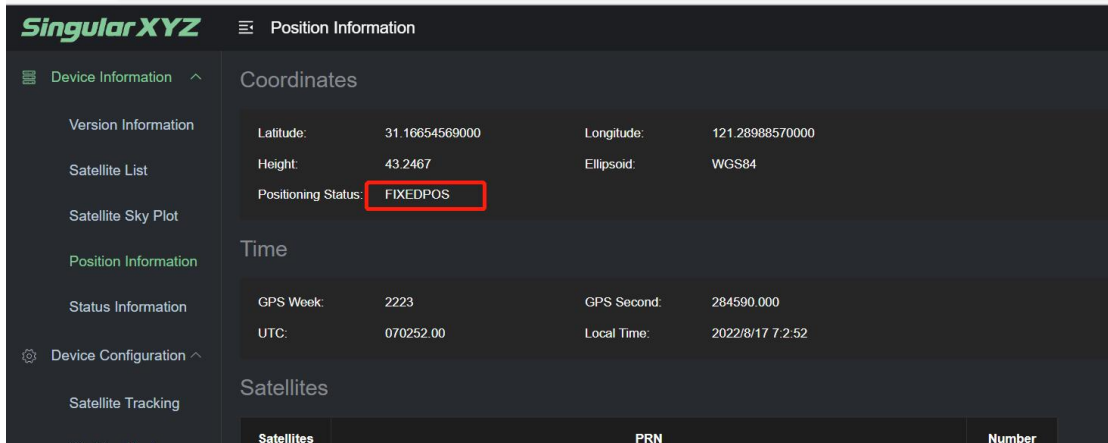
- Before setting the Ntrip Client, you should configure the receiver as Base mode.



- Enter IP address and Port(47.103.96.216:8080)
- User name and Pass word of CORS (enter anything for both is OK)
- Enter the Mount Point list(enter SN number usually)



- Choose the diff data type
- Check startup and click OK
- Click position information to check the base's status, and position Status should be FIXEDPOS.

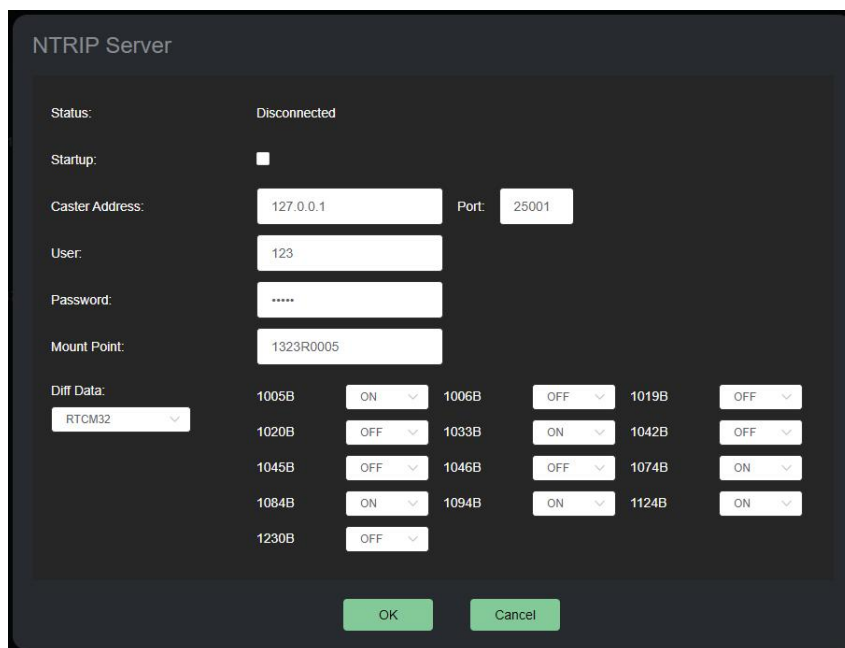


### 5.3.3 Ntrip Caster

SV100 can also work as a single reference station and send correction data through Ntrip Caster protocol. You need to configure both Ntrip Server and Ntrip Caster when you use this protocol. The setting is shown below:

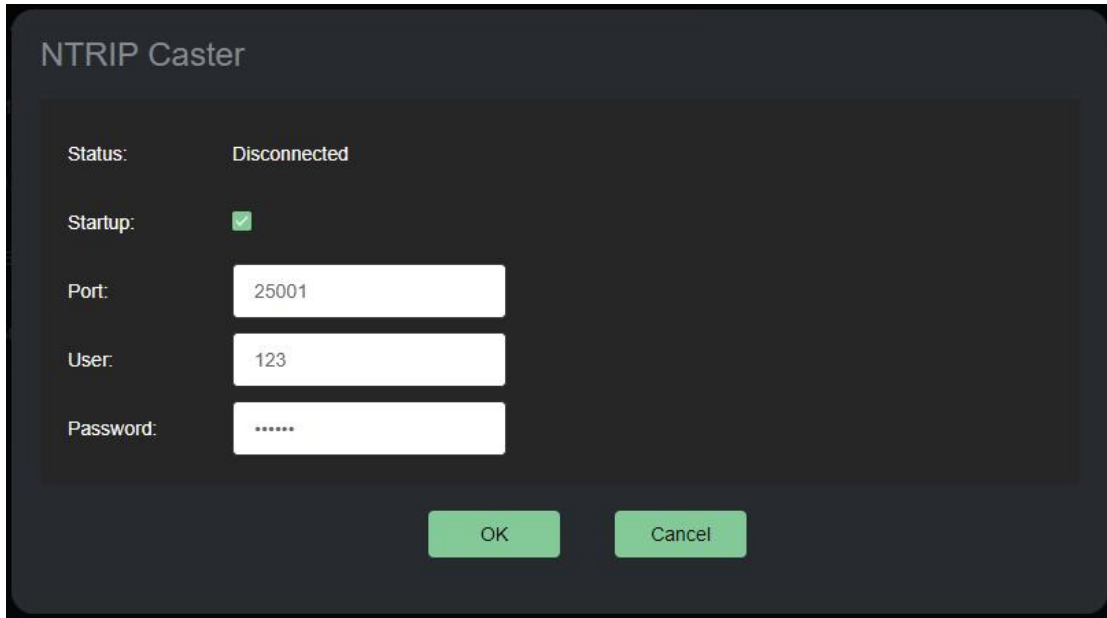
Configuration of Ntrip Server:

- Set the Ntrip Server address and Nrtip Server port; this IP address is 127.0.0.1, port is 25001.
- Enter custom username and password
- Enter mount point
- Enable startup button of Ntrip Server , Press OK to save the configuration



Configuration of Ntrip Caster:

- Enter port, this port should be same with Ntrip Server
- Enter Password, this password should be also same with Ntrip Server
- Enable startup button of Ntrip Caster, press OK to save configuration



The screenshot shows a configuration window titled "NTRIP Caster". The status is "Disconnected". The "Startup" checkbox is checked. The "Port" field contains "25001", the "User" field contains "123", and the "Password" field contains "\*\*\*\*\*". There are "OK" and "Cancel" buttons at the bottom.

- Finally set up port 25001 in the router for forwarding

All configurations of Ntrip Caster Protocol are shown above, then you can use a rover to get correction data.

## 5.4 Radio transmission

### 5.4.1 Base radio transmission

SV100 also supports to transmit or receive data.

- Set SV100 as Base station
- Choose mode as transmit
- Choose protocol, channel and diff data type, the frequency of channel 0 is editable.

Channel	transmitting frequency	receiving frequency
0	454.050	454.050
1	455.050	455.050
2	456.050	456.050
3	457.050	457.050
4	458.050	458.050
5	459.050	459.050
6	460.050	460.050
7	461.050	461.050
8	462.050	462.050
9	463.050	463.050

- Set power, low power or high power, power is higher ,the server range is bigger
- Check startup and click OK

**Radio**

Startup:

Mode:  Channel:

RX frequency:  TX frequency:

Protocol:  Air baud rate:

Power:

Diff Data:

1005B	<input type="text" value="ON"/>	1006B	<input type="text" value="OFF"/>	1019B	<input type="text" value="OFF"/>
1020B	<input type="text" value="OFF"/>	1033B	<input type="text" value="ON"/>	1042B	<input type="text" value="OFF"/>
1045B	<input type="text" value="OFF"/>	1046B	<input type="text" value="OFF"/>	1074B	<input type="text" value="ON"/>
1084B	<input type="text" value="ON"/>	1094B	<input type="text" value="ON"/>	1124B	<input type="text" value="ON"/>
1230B	<input type="text" value="OFF"/>				

- Click position information to check the base's status, and position Status should be FIXEDPOS.

### 5. 6. 1 Rover radio transmission

- Set SV100 as rover station.
- Choose mode as receive.
- Choose protocol, channel and frequency, they should be same with the base station.
- Check startup and click OK.

**Radio**

Startup:

Mode:

Channel:

RX frequency:

TX frequency:

Protocol:

Air baud rate:

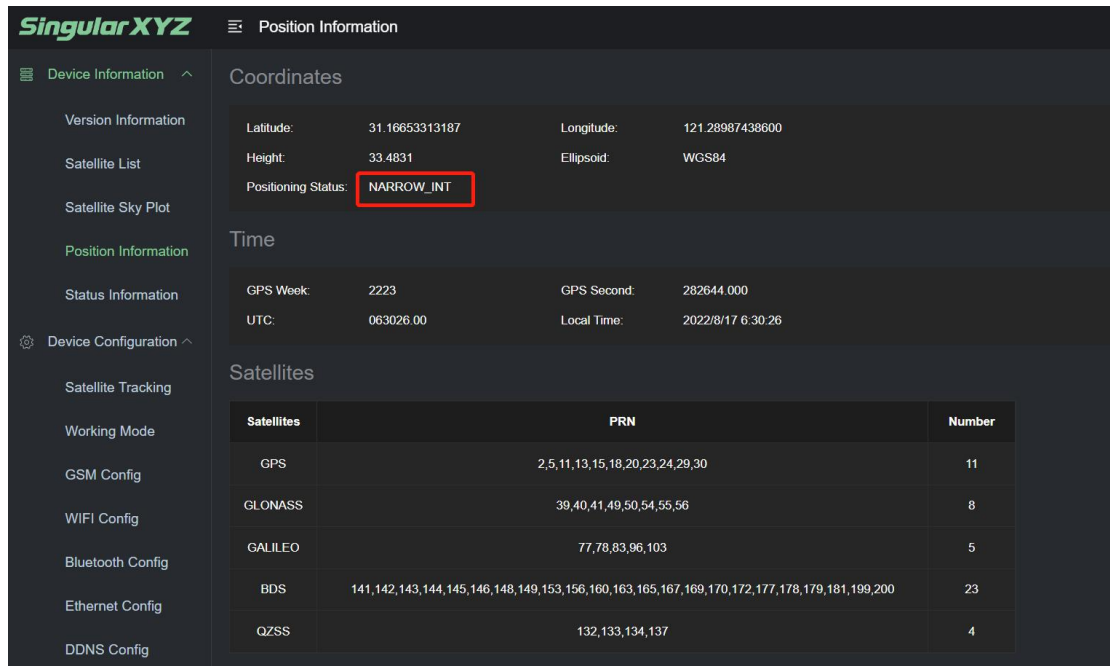
Power:

Diff Data:

1005B	<input type="text" value="ON"/>	1006B	<input type="text" value="ON"/>	1019B	<input type="text" value="ON"/>
1020B	<input type="text" value="ON"/>	1033B	<input type="text" value="ON"/>	1042B	<input type="text" value="ON"/>
1045B	<input type="text" value="ON"/>	1046B	<input type="text" value="ON"/>	1074B	<input type="text" value="ON"/>
1084B	<input type="text" value="ON"/>	1094B	<input type="text" value="ON"/>	1124B	<input type="text" value="ON"/>
1230B	<input type="text" value="ON"/>				

OK Cancel

- Click position information to check the rover's status, and if it receive the data from base station, position status should be NARROW\_INT.

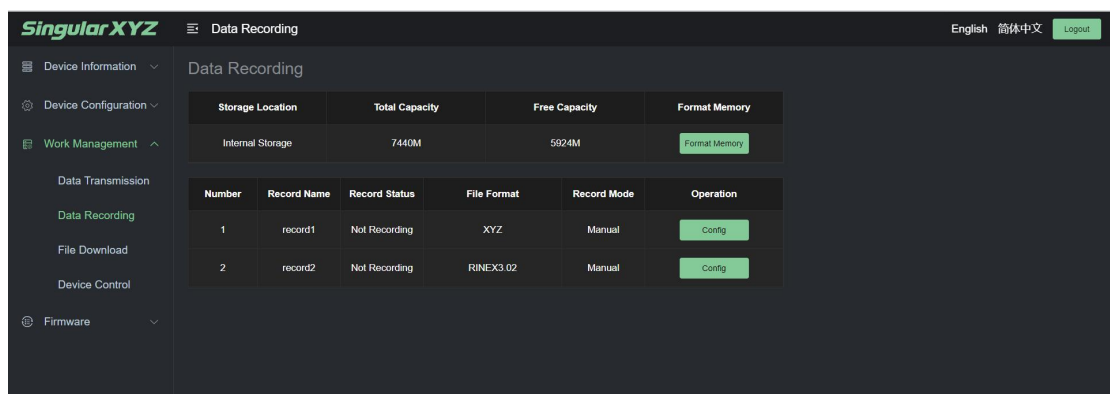


### 5.6.2 Radio RTK Bridge

This function is prepared for the customer who only have one CORS account but need to work with several rovers. The base station work as a repeater, receiving correction data from CORS, then broadcasting data by radio.

## 5.5 Data Recording

Data record menu is designed to set the storage mode for static date, the internal memory is 8 GB, 1 Hz sample frequency could be used for 1 month record.



In this page, you can know how much free memory is left to use, configure the record setting, also you can format the memory in need.

**CAUTION** - Please be careful to click the Format Disk button. It will empty all your data files in SV100.

Static data record workflow:

- Click Config button to configure the data recording settings
- Record Name: Support only number or letter
- Data Interval: Choose sample frequency, support 0.05\0.1\0.2\1\5\10\60 S.
- File Interval: Choose file Interval, support every 15 minutes or 1\2\4\24 hours to save a file. If you select 24 as file split, it will create two data files when it occurs to 24 o'clock (UTC Time). One is from start time to 24 o'clock, another is from 0 o'clock to end time.
- File Format: Support XYZ\ Rinex3.02\ Rinex3.04.
- Loop Recording: When storage is full, Yes means delete earliest data and store continually, No means stop recording
- Storage Space: Separate storage space in internal memory
- Record Mode: Support manual and automatic recording mode.

Record Settings

Record Status: Not Recording

Record Name: record1

Data Interval: 1s

File Interval: 1h

File Format: XYZ

Loop Recording: Yes No

Storage Capacity: 3000

Record Mode: Manual

Start Recording Cancel

## 5.6 File Download

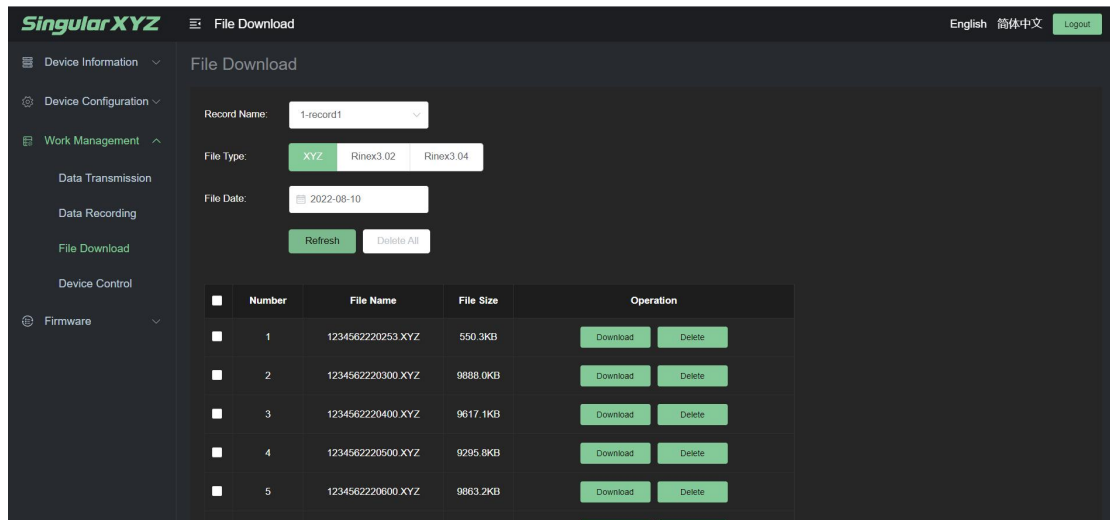
### 5.6.1 Web Download

After data recording, the data will be recorded in the internal memory, it is convenient to

download the data through WIFI

When the DDNS or NAT-DDNS mode is on, you can download it remotely

The download function works as a search interface for searching and downloading the data.



- Record Name: it must be same with the name when recording.
- File Type: keep same with data type
- File Date: choose the date when you record the data
- Finally click Refresh,the data will be listed, you can download or delete

## 5.6.2 USB download

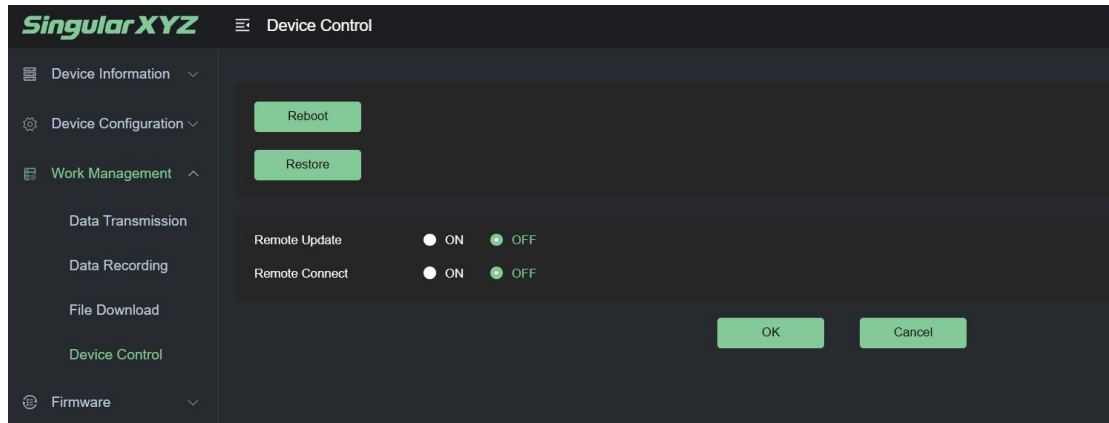
Connect USB cable to computer, the computer will read the data of the receive as a USB flash disk.

此电脑 > U 盘 (F:) > 1-record1 >

名称	修改日期	类型	大小
2022221	2022/8/9 10:00	文件夹	
2022222		文件夹	
2022223		文件夹	
2022224		文件夹	

## 5.7 Device control

There are two functions here you can set the receiver, reboot and freset. Other function are not enable now.



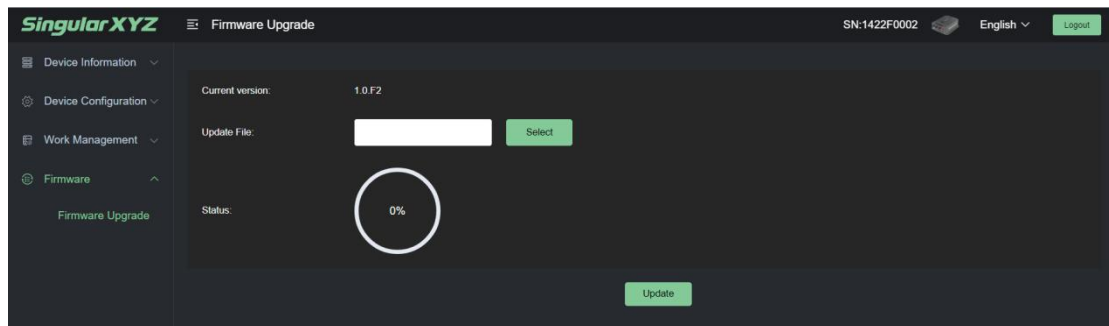
Reboot: restart the receiver

Freset: clear all the configuration and parameters, and restart the receiver

## Chapter 6

## Update

### 6. Update



- Current version: it shows the firmware you are using now.
- Update File: Click Select to choose latest firmware, it only support \*.ZIP format.
- Click Update and the Status will run as a process bar, when it finish, SV100 will reboot.

## Appendix I : Technical specifications

### Satellites Tracking:

BDS	B1I, B2I, B3I, B1C, B2a, B2b <sup>1</sup>
GPS	L1 C/A, L1C, L2P, L2C, L5
GLONASS	L1, L2
Galileo	E1, E5a, E5b
QZSS	L1, L2, L5
Cold start	<30s
RTK Initialization Time	<5s(typical)
RTK initialization reliability	>99.9%
Re-acquisition	<1s

### Accuracy:

Standalone	1.5m Horizontally 2.5m Vertically
DGPS	0.4m Horizontally 0.8m Vertically
RTK	8mm+1ppm Horizontally 15mm+1ppm Vertically
Velocity Accuracy	0.03m/s
Time Accuracy	20ns

### Data Format:

Data output format	- NMEA-0183 - Binary format *.xyz
Data update rate	1~50Hz selectable
Correction data format	RTCM v3.3/3.2/3.1/3.0
Network protocol	TCP, MQTT <sup>2</sup> , Ntrip

### Communication:

4G modem	FDD-LTE B1/B3/B5/B7/B8 TDD-LTE B38/B39/B40/B41 TDSCDMA B34/B39 WCDMA B1/B2/B5/B8 GSM B2/B3/B5/B8 CDMA1x/CDMA2000 BC0/BC1
UHF modem (optional)	- Working range: 3 – 5 km - Frequency range: 410-470MHz - Protocol: TRIMATLK, TRANSEOT, TRIMMARK3, etc. - Channel spacing: 25KHz - Transmit power: 0.5W/1.0W

Bluetooth	BT4.0
WiFi	802.11 a/b/g/n/ac
FTP	Support FTP download
NAT-DDNS	Support
Interface	<ul style="list-style-type: none"> <li>- 1 10-pin connector, including 1 RS232, 1 PPS output, 1 USB and power supply</li> <li>- 1 RJ45 for Ethernet</li> <li>- 1 TNC connector for GNSS antenna</li> <li>- 1 TNC connector for UHF antenna</li> <li>- 1 SMA connector for 4G antenna</li> <li>- 1 SIM card slot</li> </ul>

User Interaction:

LED Indicators	4 LEDs indicating battery, satellite tracking, RTK status and network
WebUI	<ul style="list-style-type: none"> <li>- Accessible via Wi-Fi, Ethernet</li> <li>- Support configuration, status checking, data transfer, data storage and system upgrade</li> </ul>
Power Switch	Power switch on 10-pin cable

Electrical:

Power consumption	3.5W
Input voltage	9 – 28V DC
Battery (optional)	6600 mAh, support up to 13 hours working time.
MTBF	> 20000 hours

Physical:

Size	110 mm × 110 mm × 110 mm
Weight	965 g
Storage	<ul style="list-style-type: none"> <li>- 8 GB<sup>3</sup></li> <li>- Support loop recording</li> </ul>
Housing material	Magnesium-aluminum alloy

Environmental:

Working temperature	-40 °C to + 75 °C
Storage temperature	-55 °C to + 85 °C
Humidity	95% non-condensing
Waterproof & dustproof	IP67
Drop	Designed to survive a 1m drop onto concrete

1. The BDS B2b signal is reserved for future upgrade.
2. The MQTT protocol is customizable.
3. Storage can be expanded to 32GB according to user demands.