SV100/SV100 Dual GNSS Receiver

User Manual

Introduction

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

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

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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If you have any questions that can't be solved in this manual, please contact your local SingularXYZ distribution partner. Alternatively, request technical support from SingularXYZ Intelligent Technology Ltd.

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Your feedback on this manual will help us improve it with future revisions.

Content

Chapter 1 Introduction

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, 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.

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 positioninginfrastructure, 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）	
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, for LAN network indicator.

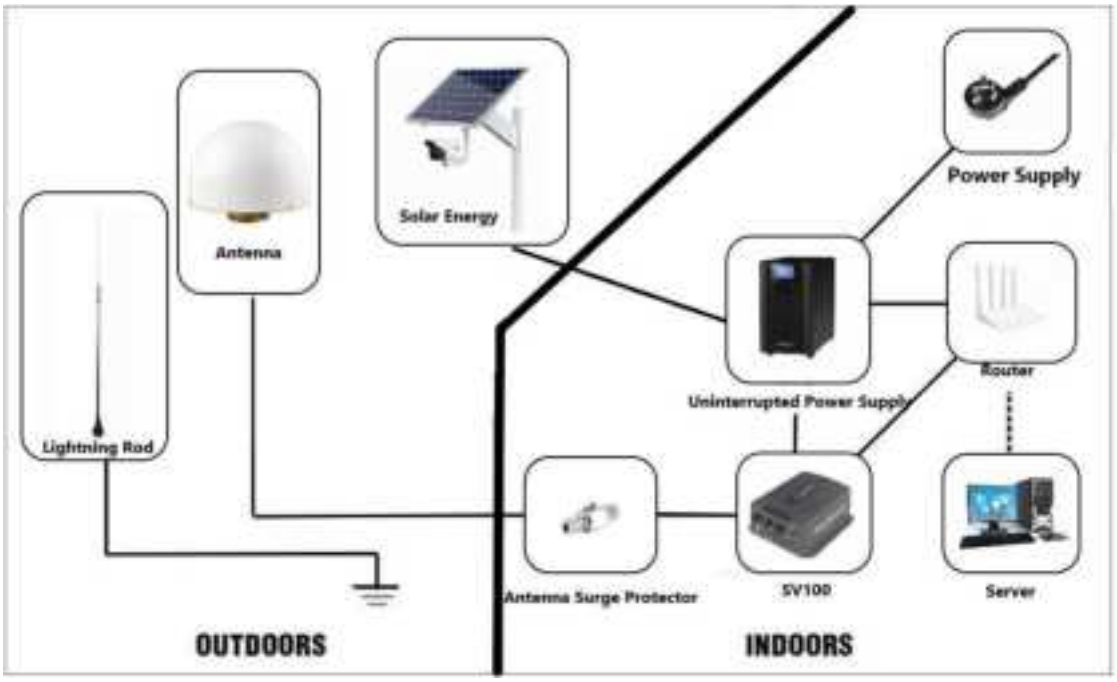
1. 3 SV100 connection view

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, 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.



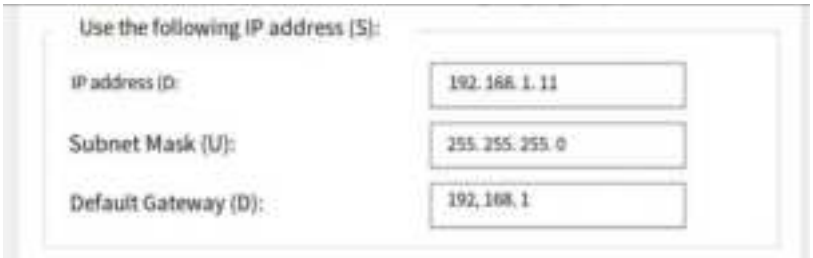
Chapter 2 Connection

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.
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:



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.

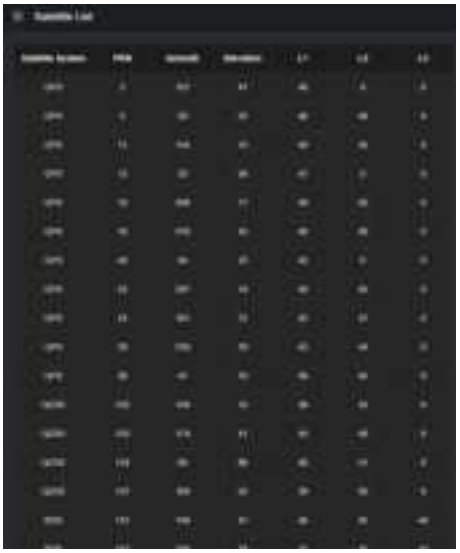
3. 1 Version Information

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.

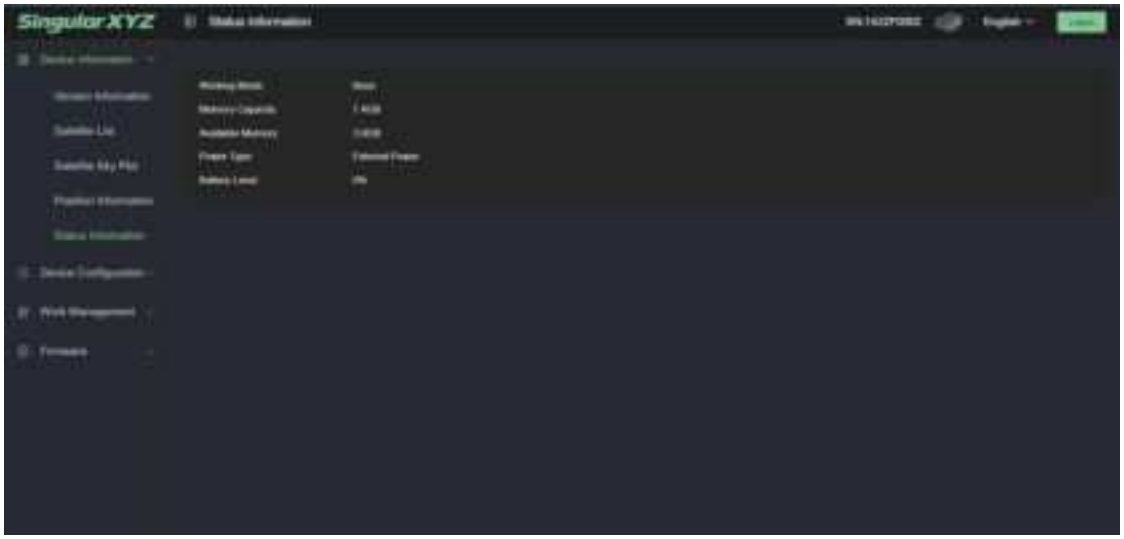


3. 3 Position Information

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

3. 4 Status Information

Status information shows you working mode and work status.



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 satellitesystems.

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

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

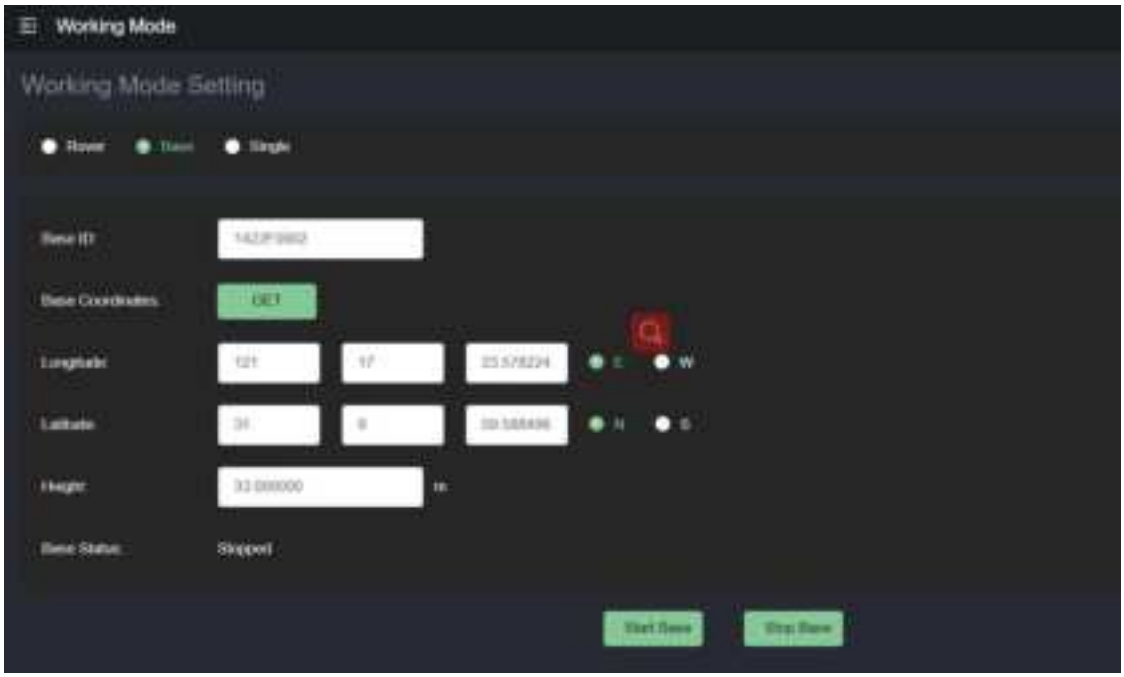
3) Status: Choose on\off to enable or disable satellites system. For SBAS mode, you can choose WAAS\SDCM\EGNOS\MSAS\GAGAN.

4. 2 Working mode

There are 3 work modes you canchoose:

Rover mode: configure the receiver as a rover station.

Base mode: configure the receiver as a base station.



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

4. 3 Ethernet config

Edit IP information of Ethernet.

4. 4 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

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

- 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. 5 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

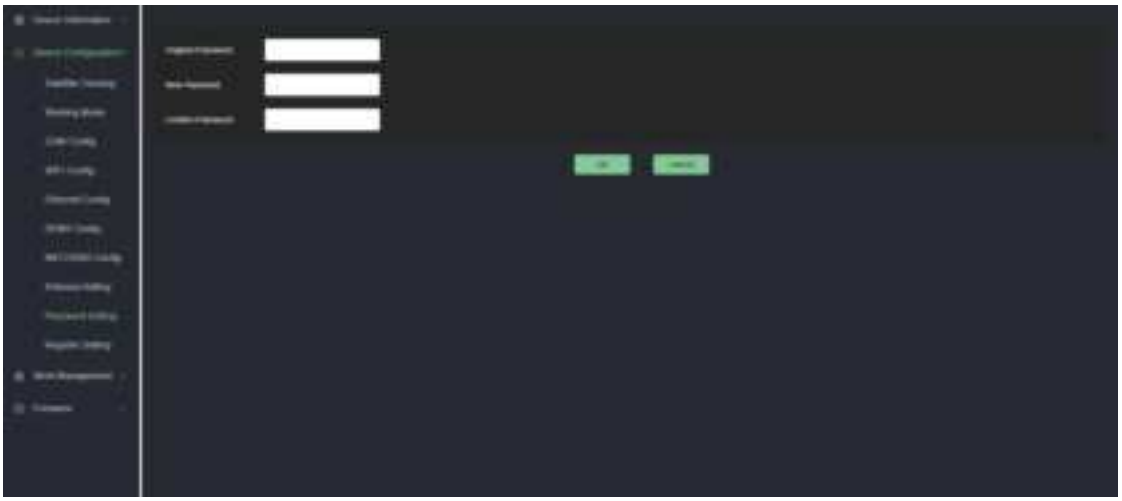
- Finally, you can use the domain name to login the web of SV100, realizing checking status and configuring remotely.

4. 6 Antenna Setting

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

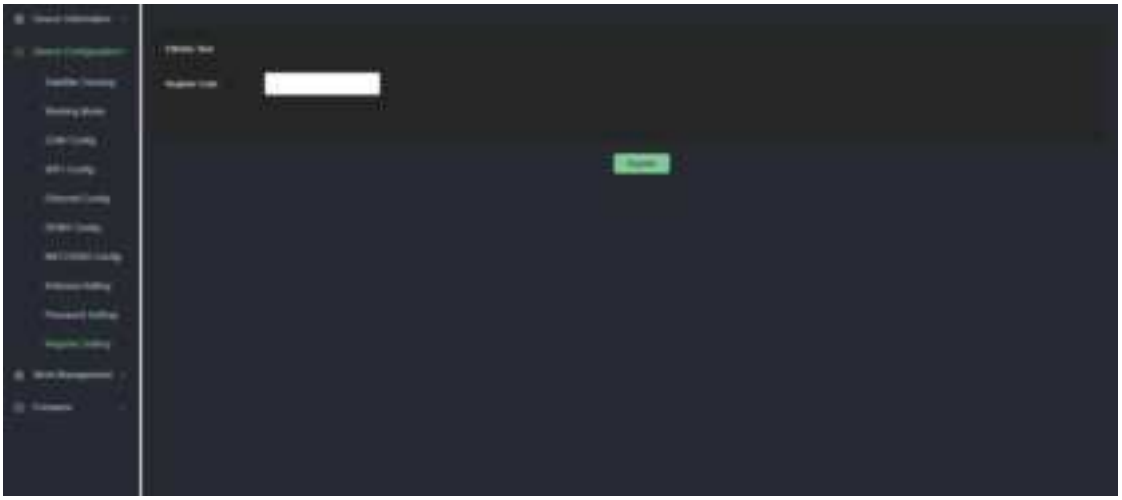
4. 7 Password Setting

Set password of login, the original password are admin.



4. 8 Register Setting

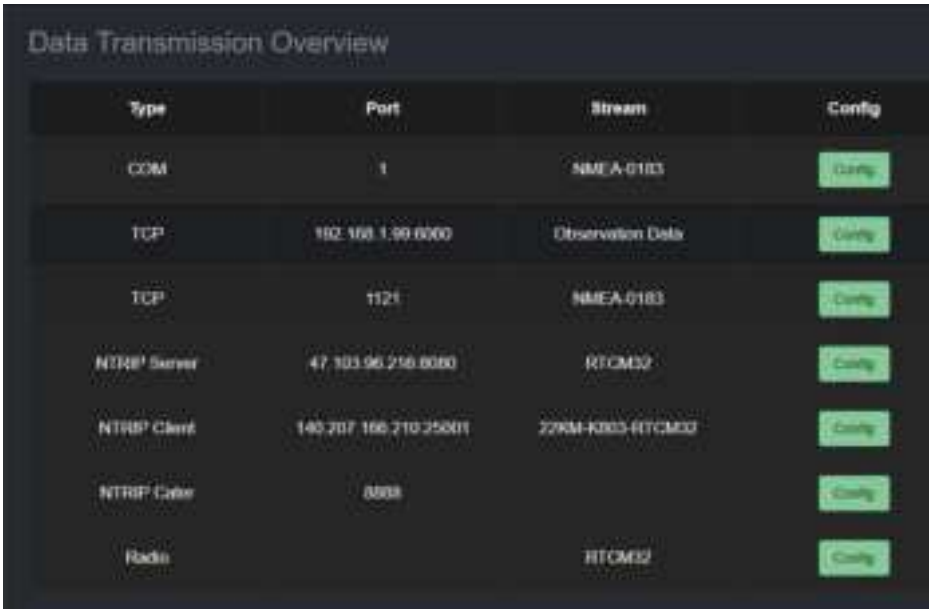
Enter register code to get a permanent or temporary use.



Chapter 5 Work Management

5. Work Management

① Data transmission: there are 3 ways to transmit the data, 1 serial port、2TCP、3 NTRIP



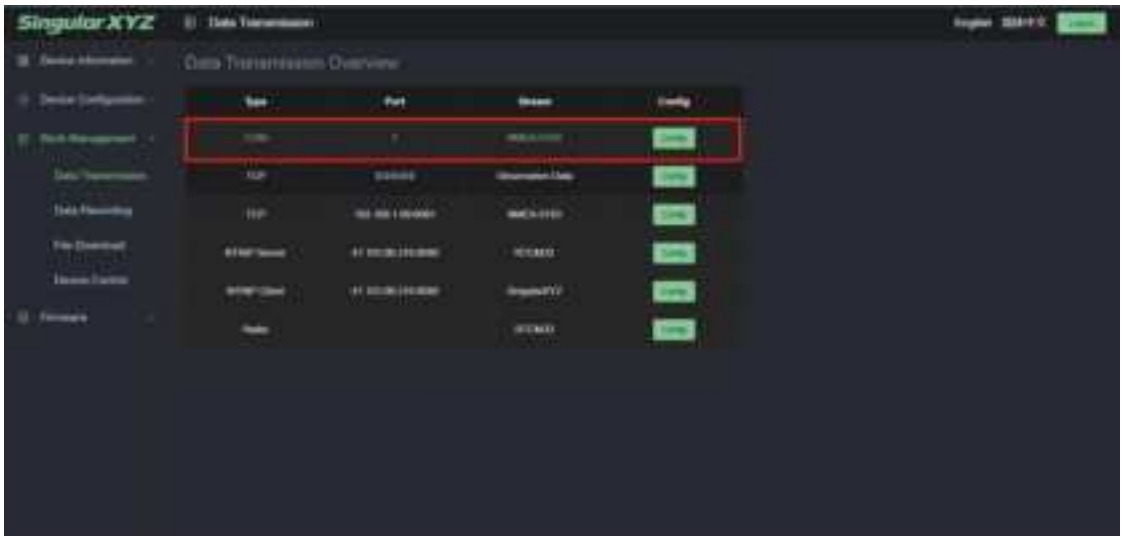
5.1 COM Transmission

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 isworking.

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 andport

The format of Data flow includes NMEA-0183、observation data、RTCM、CMRand 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 isworking.

5. 3 Ntrip transmission

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

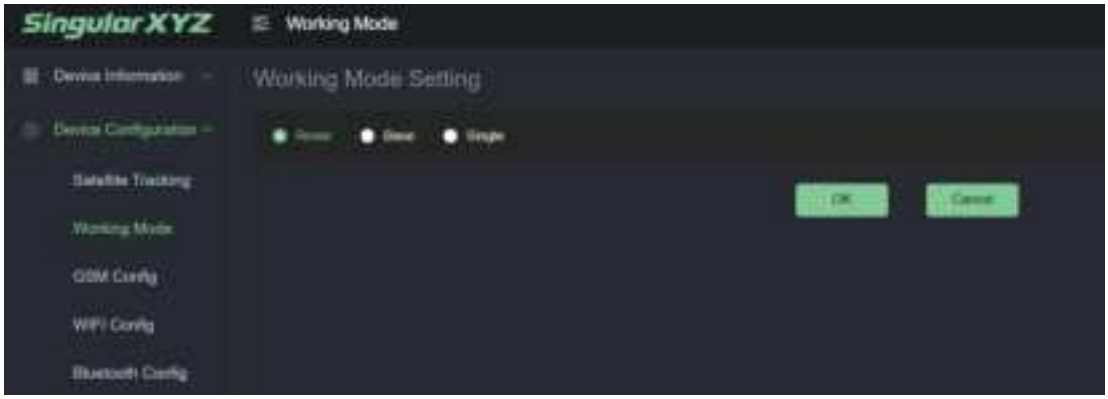
Ntrip clinet: You can acquire correction data from CORS through Ntrip Client protocol if setting the receiver as a rover.

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

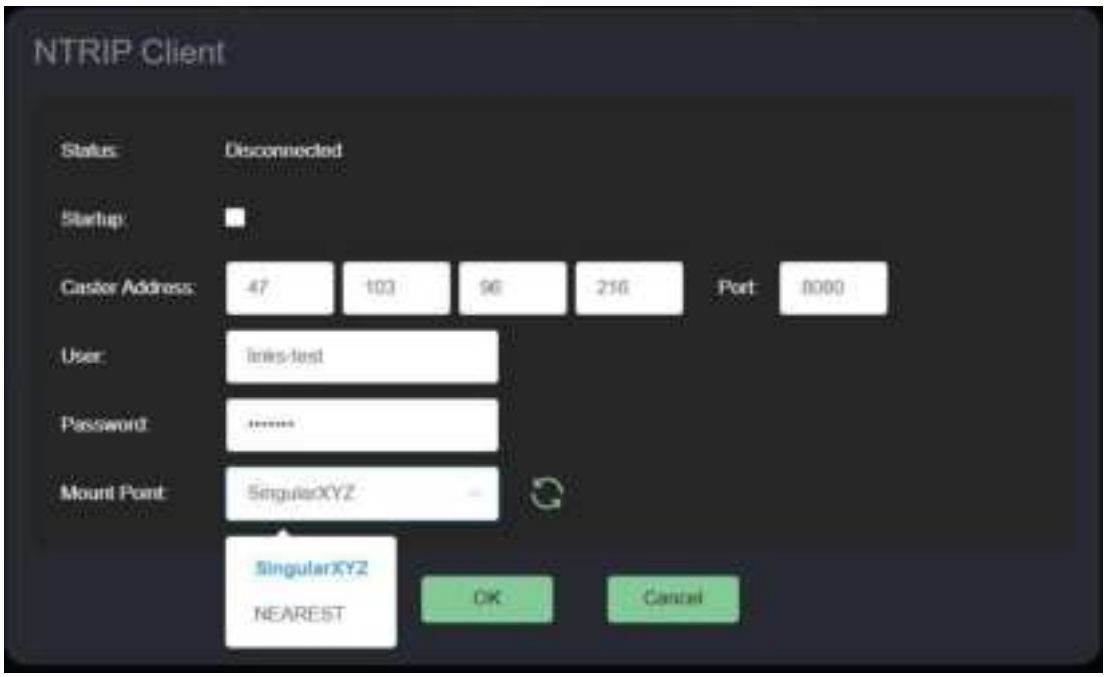
5. 3. 1 Ntrip Client

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

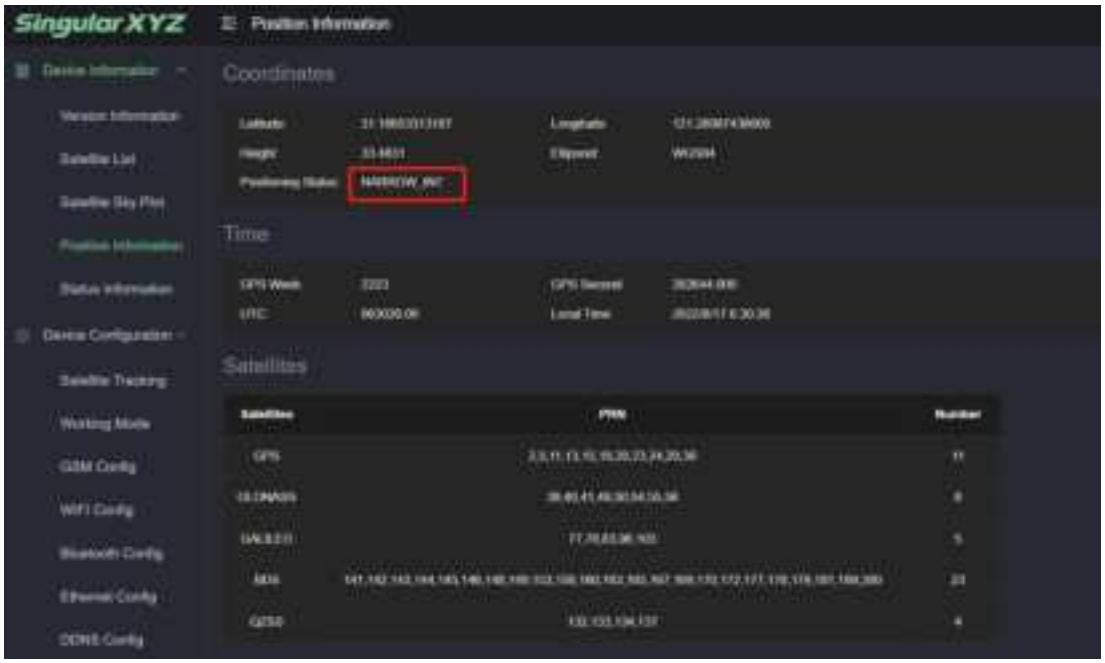
- Before setting the Ntrip Client, you should configure the receiver as Rover mode.



- 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

- 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 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, support0.05\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.

5.5 File Download

5.5.1 Web Download

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 Data: choose the date when you record the data
- Finally click Refresh,the data will be listed, you can download or delete

5. 5. 2 USB download

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

5. 6 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

FCC Caution:

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

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception,which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different
from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC’s RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.