



CORS System NET20 Plus User Guide



V2.0

Shanghai eSurvey GNSS Co., Ltd.

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CAUTION

Ignoring this indication and making an operation error could possibly result in personal injury or property damage.

- Do not perform disassembly which may cause fire, electric shock or burn. Only eSurvey authorized distributors can disassemble device.
- Do not cover the charger which may causes fire.
- Do not use defection power cable, socket or plug which may cause fire, electronic shock.
- Do not use wet charger which may cause fire, electronic shock.
- Do not close the instrument to burning gas or liquid
- Do not put the battery in the fire or high temperature condition which may cause explosion.
- Do not use the battery which is not specified by eSurvey.
- Do not use the power cable which is not specified by eSurvey. Fire could result.
- Do not short circuit of the battery. Fire could result.
- When this product encounters disturbance of severe Electrostatic Discharge, perhaps it will have some degradation of performance like switching on/off automatically and so on.

1 Technical Specification

1.1 Overview

NET20 Plus is a high-precision CORS reference station receiver. LINUX system as its development platform, and it supports for secondary development. It has powerful and stable function, and can be used in many fields.

1.2 Main features

- All aluminum alloy body design, strong and reliable, can cope with all kinds of harsh outdoor environment
- 336 (NET20 Plus-T) / 800 (NET20 Plus-H) channels with Multi-constellation GNSS
- Superior carrier phase observations of less than 1mm accuracy
- Internal battery for more than 12 hours operation.
- 4G LTE and Bluetooth / WLAN datalink support.
- Easy configuration from web UI and remote server.
- NTRIP server/caster support.
- With IP67 protection

1.3 Technical Specifications

1.3.1 Physical

- Weight: 2 KG
- Dimension: 222 mm * 164 mm * 79 mm

1.3.2 Environmental

- Operating temperature: -30°C - +65°C
- Storage temperature: -40°C - +80°C
- Humidity: Up to 100% (non-condensing)

1.3.3 Electrical

- Input: 9-28V
- Power: 2.8W

1.3.4 GNSS

- NET20 Plus-H
 - ✓ Channels: 800
 - ✓ Tracking signals:
 - GPS: L1 C/A, L1P,L1C,L2P, L2C, L5
 - GLONASS: G1,G2,G3
 - BeiDou: B1I, B2I, B3I,B1C,B2a,B2b,ACEBOC
 - Galileo: E1, E5a, E5b, E5 AltBOC, E6
 - IRNSS: L5
 - SBAS: L1, L5
 - QZSS: L1 C/A, L1C, L2C, L5,LEX
 - L-Band: Atlas H10/H30/Basic

- NET20 Plus -T
 - ✓ Channels: 336
 - ✓ Tracking signals:
 - GPS: L1 C/A, L2E, L2C, L5
 - GLONASS: L1 C/A, L2C/A, L3 CDMA
 - BeiDou: B1, B2, B3
 - Galileo: E1, E5a, E5b, E5 AltBOC, E6
 - NAVIC: L5
 - SBAS: L1CA, L5
 - QZSS: L1 C/A, L1SAIF, L1C, L2C, LEX
 - L-Band: OmniSTAR, RTX
- Positioning accuracy

Table 1-1 Positioning accuracy

Positioning mode	Accuracy	
	Horizontal	Vertical
Static	2.5mm + 1ppm	5mm + 1ppm
RTK	8mm + 1ppm	15mm + 1ppm
DGPS	0.25m + 1ppm	0.5mm + 1ppm

- Initialization time: <10s
- Initialization reliability: >99.9%

1.3.5 Ports

- 3 RS232 serial ports (DB9 and 2 LEMO 5pin).
- 1 RJ45 Ethernet port.
- 1 power port.
- 1 USB port.
- 1 4G LTE antenna port.
- 1 UHF antenna port.(Optional)
- 1 EVENT port.
- 1 1PPS port.
- 1 SIM card slot.
- 1 GNSS antenna port.

1.3.6 Data and Storage

- Output data format: NMEA-0183, binary, RINEX,RTCM2.x, RTCM3.x
- Internal memory: 32G
- External storage: TF Card

2 Hardware Structure

2.1 Receiver Appearance



Figure 2-1

2.1.1 Front Panel

The front panel of NET20 Plus receiver includes four buttons, four LED indicators, and one OLED display.



Figure 2-2

After switching on NET20 Plus receiver, current time information and GPS status are displayed in the main interface. The default language is English, and you can press the left and right arrow keys to obtain the current IP information.

Table 2-1 Function table

Name		Function
	Direction buttons	✓ To move the cursor up or left, short press the button.
		✓ To return to the previous menu, long press the button.
		To move the cursor down or right, short press the button.
	Function button	✓ To enter the main menu, long press the button. ✓ To define the direction button (◀▶ or ▲▼), short press the button.
	Power button	✓ To turn on/off NET20 Plus, long press the button. ✓ To confirm your selection, short press the button.
Power indicator		After switching on NET20 Plus receiver, the power light is on
Differential transmission indicator		When the differential data output, the differential indicator blinks evenly at 1-second interval
Bluetooth indicator		It will be light blue when NET20 Plus is connected via Bluetooth
Static recording indicator		When start static recording, static recording indicator blinks evenly at 1-second interval

2.1.2 Back panel

NET20 Plus receiver provides a variety of communication interfaces to facilitate users in different application scenarios.

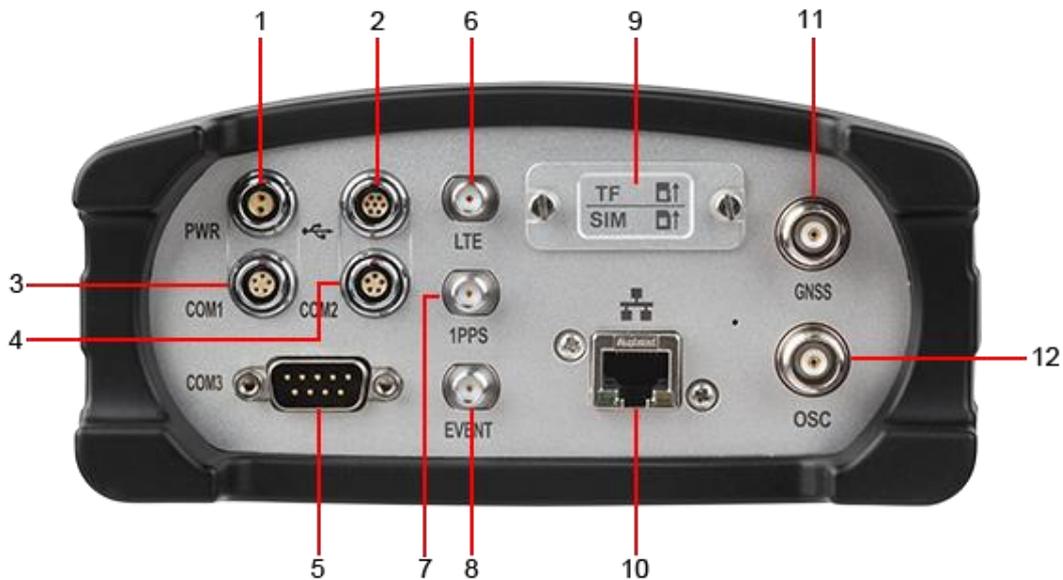
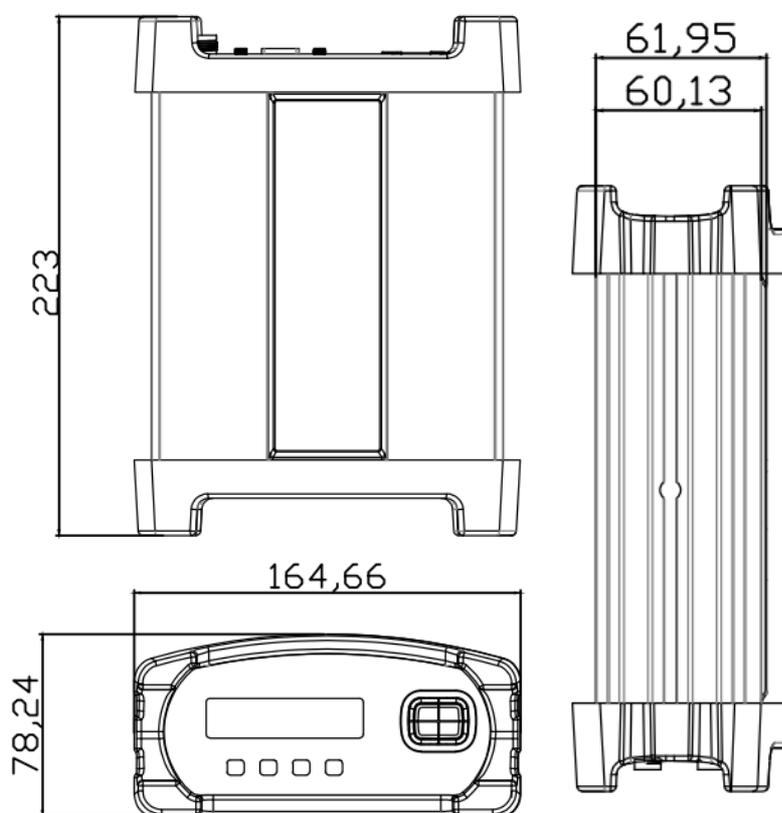


Figure 2-3 Back panel Table 2-2 Interface function table

No.	Name	Function
1	PWR	Receiver power supply interface, input voltage DC 9V-28V.
2	USB	USB interface
3	COM1	RS232 serial port
4	COM2	RS232 serial port (Optional RS485 serial port)
5	COM3	DB9 serial port
6	LTE	GPRS antenna interface
7	1PPS	1 Pulse Per Second output
8	EVENT	EVENT input
9	TF & SIM	TF interface & SIM card (standard size) interface
10	RJ45	Wired Ethernet port
11	GNSS	GNSS External receiver antenna connector
12	OSC	Access to external clock

2.2 Structural drawings / mounting dimensions



(Dimensions in mm)

Figure 2-4

3 WEB UI

There are two ways to login into the WEB interface, which are Ethernet port login and WIFI login. The WEB interface content of the two login modes is same.

1. Ethernet port login: Connect the RJ45 network port with the computer host and enter the IP address in the browser. Enter user name and password in the pop-up dialog box; the default username is *admin* and the default password is *password*.
2. WIFI login: when NET20 Plus WIFI hotspot is enable, the user can log in into the WEB interface by connecting to its WIFI network. The hotspot name is the serial number of the receiver. Enter the IP address: 192.168.10.1, a window will pop up, the default username is *admin* and the default password is *password*.

3.1 Summary

After a successful authentication to the WEB interface of NET20 Plus, the main page contents: Reference information, device version, system version, network parameters, memory status and so on. It is shown as below:

NET20 PLUS Reference Station

Summary											
System Information											
System Information	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Station Name</td><td>SHUN</td></tr> <tr><td>Expire Date</td><td>20191128</td></tr> <tr><td>Run Time</td><td>3 day 21 hour 14 min</td></tr> </table>	Station Name	SHUN	Expire Date	20191128	Run Time	3 day 21 hour 14 min				
Station Name	SHUN										
Expire Date	20191128										
Run Time	3 day 21 hour 14 min										
GPS Status											
Satellites											
Data Transmission											
Data Recording											
Configuration											
Reference Station	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Device Model</td><td>NET20 PLUS</td></tr> <tr><td>Device Serial</td><td>NET2009035008L</td></tr> <tr><td>GNSS Model</td><td>BD970</td></tr> <tr><td>GNSS Serial</td><td>5812C03560</td></tr> </table>	Device Model	NET20 PLUS	Device Serial	NET2009035008L	GNSS Model	BD970	GNSS Serial	5812C03560		
Device Model	NET20 PLUS										
Device Serial	NET2009035008L										
GNSS Model	BD970										
GNSS Serial	5812C03560										
GNSS Configuration											
Tracking Satellites											
Network	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Longitude</td><td>121°31' 49.41981"</td></tr> <tr><td>Latitude</td><td>31° 5' 3.87952"</td></tr> <tr><td>Height</td><td>60.241 m</td></tr> <tr><td>GNSS Status</td><td>Single</td></tr> <tr><td>Local Time</td><td>2019-09-27 13:03:04</td></tr> </table>	Longitude	121°31' 49.41981"	Latitude	31° 5' 3.87952"	Height	60.241 m	GNSS Status	Single	Local Time	2019-09-27 13:03:04
Longitude	121°31' 49.41981"										
Latitude	31° 5' 3.87952"										
Height	60.241 m										
GNSS Status	Single										
Local Time	2019-09-27 13:03:04										
Dynamic DNS											
Ntrip Server											
Recording											
Port Configuration											
Alerts											
SNMPD											
Firewall	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Internal Memory</td><td>86.688 MB / 223.866 MB (38% Free)</td></tr> <tr><td>Data Memory</td><td>18.951 GB / 28.582 GB (66% Free)</td></tr> </table>	Internal Memory	86.688 MB / 223.866 MB (38% Free)	Data Memory	18.951 GB / 28.582 GB (66% Free)						
Internal Memory	86.688 MB / 223.866 MB (38% Free)										
Data Memory	18.951 GB / 28.582 GB (66% Free)										
VPN Client											
Registration											
Download	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Battery Power</td><td>100%</td></tr> <tr><td>Power Source</td><td>EXTERNAL</td></tr> </table>	Battery Power	100%	Power Source	EXTERNAL						
Battery Power	100%										
Power Source	EXTERNAL										
System Management											
Configuration Set											
Language English ▾											
Logout											

Figure 3-1

Note: The effect of different browsers display may be slightly different, recommend using Google Chrome or IE.

3.2 System Information

3.2.1 System Information

The system information screen will display the station name, device model, device serial number, system version, application version information, built-in OEM board model and network parameter information.

NET20 PLUS Reference Station

Summary System Information System Information GPS Status Satellites Data Transmission Data Recording Configuration Reference Station GNSS Configuration Tracking Satellites Network Dynamic DNS Ntrip Server Recording Port Configuration Alerts SNMPD Firewall VPN Client Registration Download System Management Configuration Set Language English ▾ Logout	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: right;">Station Name</td><td>SHUN</td></tr> <tr><td style="text-align: right;">Expire Date</td><td>20191128</td></tr> <tr><td style="text-align: right;">Time Zone</td><td>GMT+08:00</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: right;">Device Model</td><td>NET20 PLUS</td></tr> <tr><td style="text-align: right;">Device Serial</td><td>NET2009035008L</td></tr> <tr><td style="text-align: right;">IMEI</td><td>868323029442479</td></tr> <tr><td style="text-align: right;">Hardware Version</td><td>NSC200-V4.20-RS485</td></tr> <tr><td style="text-align: right;">BOOT Version</td><td>1.11</td></tr> <tr><td style="text-align: right;">OS Version</td><td>4.1.6-1.13(181031)</td></tr> <tr><td style="text-align: right;">APP Version</td><td>2.12(190529)</td></tr> <tr><td style="text-align: right;">Web Version</td><td>2.12</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: right;">GNSS Model</td><td>BD970</td></tr> <tr><td style="text-align: right;">GNSS Serial</td><td>5812C03560</td></tr> <tr><td style="text-align: right;">GNSS Hardware Version</td><td>4.2</td></tr> <tr><td style="text-align: right;">GNSS Firmware Version</td><td>5.37</td></tr> <tr><td style="text-align: right;">GNSS Functionality</td><td>50Hz</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: right;">DHCP</td><td>Off</td></tr> <tr><td style="text-align: right;">MAC address</td><td>50:33:8B:64:DD:30</td></tr> <tr><td style="text-align: right;">IP</td><td>192.168.28.74</td></tr> <tr><td style="text-align: right;">Mask</td><td>255.255.255.0</td></tr> <tr><td style="text-align: right;">Gateway</td><td>192.168.28.253</td></tr> </table>	Station Name	SHUN	Expire Date	20191128	Time Zone	GMT+08:00	Device Model	NET20 PLUS	Device Serial	NET2009035008L	IMEI	868323029442479	Hardware Version	NSC200-V4.20-RS485	BOOT Version	1.11	OS Version	4.1.6-1.13(181031)	APP Version	2.12(190529)	Web Version	2.12	GNSS Model	BD970	GNSS Serial	5812C03560	GNSS Hardware Version	4.2	GNSS Firmware Version	5.37	GNSS Functionality	50Hz	DHCP	Off	MAC address	50:33:8B:64:DD:30	IP	192.168.28.74	Mask	255.255.255.0	Gateway	192.168.28.253
Station Name	SHUN																																										
Expire Date	20191128																																										
Time Zone	GMT+08:00																																										
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Hardware Version	NSC200-V4.20-RS485																																										
BOOT Version	1.11																																										
OS Version	4.1.6-1.13(181031)																																										
APP Version	2.12(190529)																																										
Web Version	2.12																																										
GNSS Model	BD970																																										
GNSS Serial	5812C03560																																										
GNSS Hardware Version	4.2																																										
GNSS Firmware Version	5.37																																										
GNSS Functionality	50Hz																																										
DHCP	Off																																										
MAC address	50:33:8B:64:DD:30																																										
IP	192.168.28.74																																										
Mask	255.255.255.0																																										
Gateway	192.168.28.253																																										

Figure 3-2

3.2.2 GPS Status

The GPS Status page displays the current NET20 Plus positioning, the base station coordinates and antenna type.

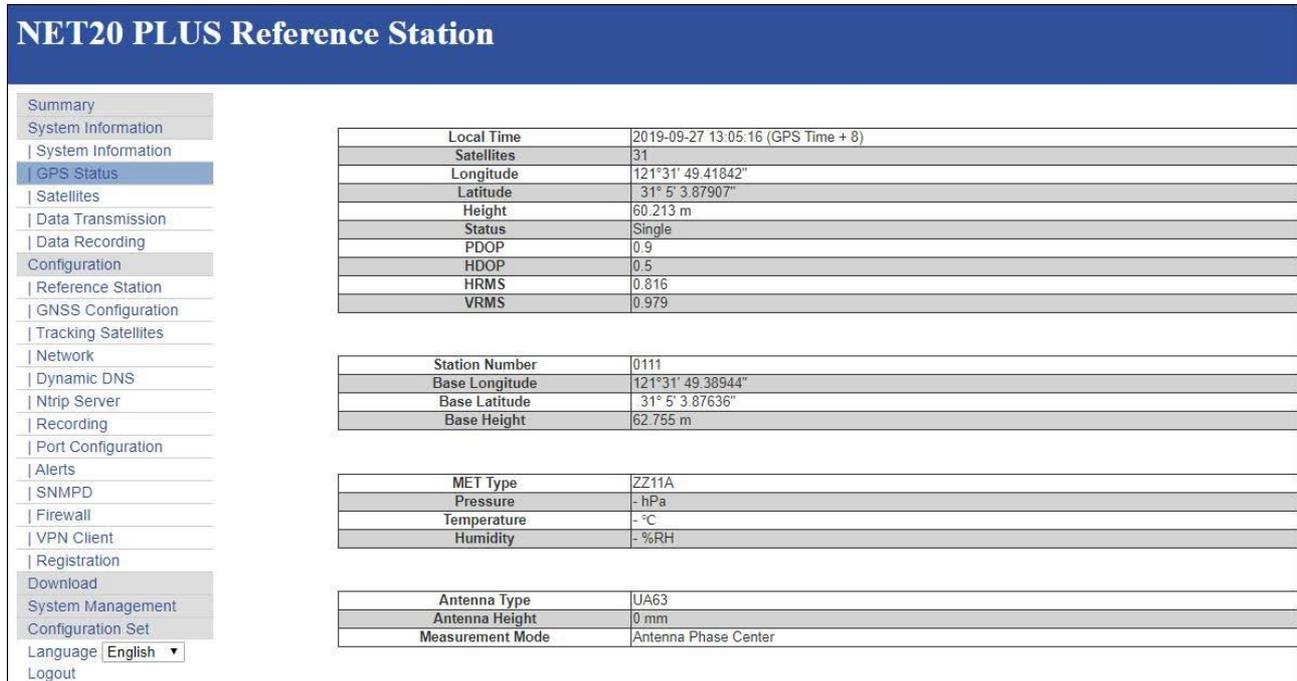


Figure 3-3

3.2.3 Satellites

This page shows the current satellite signal-to-noise ratio, elevation mask angle, azimuth and other information. The information of GPS, BEIDOU, GLONASS and GALILEO are displayed separately.

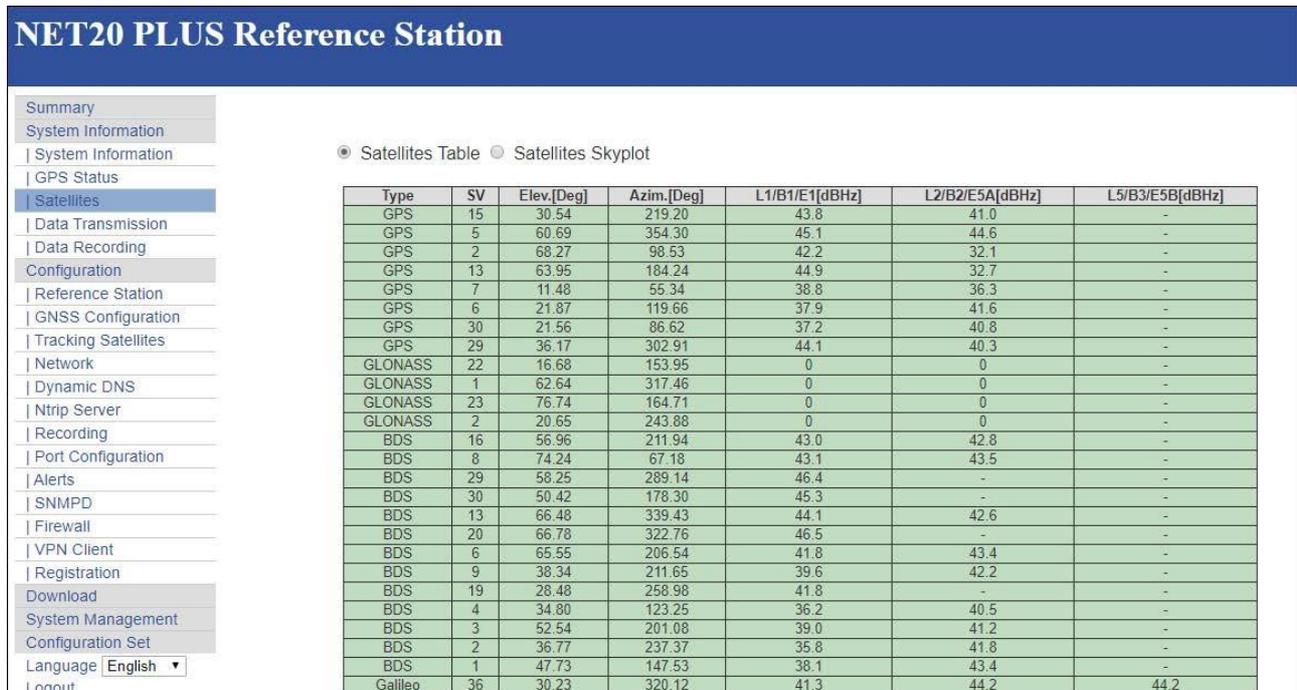


Figure 3-4

3.2.4 Data Transmission

After setting up the data transmission, the user can see the current data transfer status on the page as shown in figure 3-5. Click [Edit] to directly jump to [Ntrip Server].

NET20 PLUS Reference Station

Summary	
System Information	
System Information	
GPS Status	
Satellites	
Data Transmission	
Data Recording	
Configuration	
Reference Station	
GNSS Configuration	
Tracking Satellites	
Network	
Dynamic DNS	
Ntrip Server	
Recording	
Port Configuration	
Alerts	

Name	Caster Address	Mountpoint	Data Type	Status	Start Time	Data Size	Operation	
RTCM32	127.0.0.1:81	SH_RTCM32	RTCM32	transmitting	2019-09-26 10:24:20	49.440 MB	Edit	Start
RTCM32_10s	127.0.0.1:81	SH_RTCM32_10s	RTCM32_10	transmitting	2019-09-26 10:24:26	49.438 MB	Edit	Start
Yap	115.134.226.95:6060	eSurvey Test	RTCM32	transmitting	2019-09-26 13:29:37	43.707 MB	Edit	Start
sCMRx	127.0.0.1:81	SH_sCMRx	SCMRX	transmitting	2019-09-26 10:24:27	26.597 MB	Edit	Start

Figure 3-5

3.2.5 Data Recording

In this page, the user can see the specific data recording information as shown in figure 3-6. Click [Edit], the user could modify the parameters like path type, file name, interval, duration time, etc. as shown in figure 3-7.

NET20 PLUS Reference Station

Summary	
System Information	
System Information	
GPS Status	
Satellites	
Data Transmission	
Data Recording	
Configuration	
Reference Station	
GNSS Configuration	
Tracking Satellites	
Network	
Dynamic DNS	
Ntrip Server	
Recording	
Port Configuration	

Schedule Name	Interval	Path	Status	Start Time	Duration Tme	File Size	Operation	
UNSH	1S	201909/27/2700400.dat	recording	2019-09-27 12:00:01	120 min	7.053 MB	Edit	Start

Figure 3-6

NET20 PLUS Reference Station

- Summary
- System Information
- GPS Status
- Satellites
- Data Transmission
- Data Recording
- Configuration**
- Reference Station
- GNSS Configuration
- Tracking Satellites
- Network
- Dynamic DNS
- Ntrip Server
- Recording**
- Port Configuration
- Alerts
- SNMPD
- Firewall
- VPN Client
- Registration
- Download
- System Management
- Configuration Set
- Language English
- Logout

Compress(Global) : Off

Recording - UNSH

Schedule Name	UNSH
Path Type	YYYYMM/DD
File Name	DOYhmm.dat
Interval	1HZ
Duration Tme	2 hours
Pool	Stop When Full 20480 MB
Auto	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Integral Point Record	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
File Push	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Push Parameters	
Protocol	<input checked="" type="radio"/> FTP <input type="radio"/> GEO <input type="radio"/> RADIO
FTP Server Address	
FTP Server Port	
FTP User	admin
FTP Password	*****
Remote Directory	

Enable Disable

Figure 3-7

3.3 Configuration

3.3.1 Reference Station

On this page the user mainly can set the reference station, antenna, coordinate system and station coordinates, as shown in figure 3-8.

- Summary
- System Information
- GPS Status
- Satellites
- Data Transmission
- Data Recording
- Configuration
- Reference Station**
- GNSS Configuration
- Tracking Satellites
- Network
- Dynamic DNS
- Ntrip Server
- Recording
- Port Configuration
- Alerts
- SNMPD
- Firewall
- VPN Client
- Registration
- Download
- System Management
- Configuration Set

Observer Name	
Agency Name	
Station Name	SHUN
Marker Number	0
Marker Type	GEODETIC
Receiver Number	0
Country Code	CHN - China
Site ID	1100
Time Zone	GMT+08:00
HTTP Server Port	80

Antenna Type	Custom	UA63	Download	Choose File	No file chosen
Antenna Serial			Upload		
R(mm)	0				
H(mm)	0				
HL1(mm)	0				
HL2(mm)	0				

Figure 3-8

Reference station coordinates: If you do not need known coordinates to start the reference station, then click on "Load Current Position" to get the reference station coordinates approximately. However, if you need known coordinates, please input them according to the appropriate format.

The web access port is 80. After setting mapping in the router device, then you can access the NET20 Plus by Internet, enter the ip address and the port, e.g. 113.109.179.180:80

3.3.2 GNSS configuration

This menu is mainly for the satellite systems and the cutoff angle settings, as shown in figure 3-10.

NET20 PLUS Reference Station

<ul style="list-style-type: none"> Summary System Information GPS Status Satellites Data Transmission Data Recording Configuration Reference Station GNSS Configuration Tracking Satellites Network Dynamic DNS Ntrip Server Recording Port Configuration Alerts SNMPD Firewall VPN Client 	GNSS Configuration																		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Cutoff Angle</td> <td style="text-align: center;">10</td> </tr> <tr> <td style="text-align: center;">1PPS</td> <td style="text-align: center;"><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">BDS</td> <td style="text-align: center;"><input checked="" type="radio"/> Enable <input type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">GPS</td> <td style="text-align: center;"><input checked="" type="radio"/> Enable <input type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">GLONASS</td> <td style="text-align: center;"><input checked="" type="radio"/> Enable <input type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">Galileo</td> <td style="text-align: center;"><input checked="" type="radio"/> Enable <input type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">QZSS</td> <td style="text-align: center;"><input checked="" type="radio"/> Enable <input type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">SBAS</td> <td style="text-align: center;"><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">Event</td> <td style="text-align: center;"><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> </table>	Cutoff Angle	10	1PPS	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	BDS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	GPS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	GLONASS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	Galileo	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	QZSS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	SBAS	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	Event	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Cutoff Angle	10																		
1PPS	<input type="radio"/> Enable <input checked="" type="radio"/> Disable																		
BDS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable																		
GPS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable																		
GLONASS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable																		
Galileo	<input checked="" type="radio"/> Enable <input type="radio"/> Disable																		
QZSS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable																		
SBAS	<input type="radio"/> Enable <input checked="" type="radio"/> Disable																		
Event	<input type="radio"/> Enable <input checked="" type="radio"/> Disable																		
	<input type="button" value="Submit"/> <input type="button" value="Reload"/>																		

Figure 3-10

3.3.3 Tracking satellites

In this page, the user can select the satellites they want to track, as shown in figure 3-11.

NET20 PLUS Reference Station

<ul style="list-style-type: none"> Summary System Information GPS Status Satellites Data Transmission Data Recording Configuration Reference Station GNSS Configuration Tracking Satellites Network Dynamic DNS Ntrip Server Recording Port Configuration Alerts SNMPD Firewall VPN Client Registration Download 	Tracking Satellites																																																																																																																														
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G13		<input type="checkbox"/>	R13	<input type="checkbox"/>	C13	<input type="checkbox"/>	E13	<input type="checkbox"/>																																																																																																																							

Figure 3-11

3.3.4 Network

From Network option, the user can set the device network and FTP server settings as shown in figure 3-12.

NET20 PLUS Reference Station

<ul style="list-style-type: none"> Summary System Information System Information GPS Status Satellites Data Transmission Data Recording Configuration Reference Station GNSS Configuration Tracking Satellites Network Dynamic DNS Ntrip Server Recording Port Configuration Alerts SNMPD Firewall VPN Client Registration Download 	<div style="text-align: center; font-weight: bold; margin-bottom: 10px;">The Running Network</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Priority Network</td> <td colspan="2"> <input checked="" type="radio"/> Wired Net <input type="radio"/> Wireless Net <input type="radio"/> Mobile Net </td> </tr> <tr> <td>Current Network</td> <td colspan="2">WAN</td> </tr> <tr> <td>Default Gateway</td> <td colspan="2">192.168.28.253</td> </tr> <tr> <td>DNS</td> <td colspan="2">114.114.114.114 8.8.8.8</td> </tr> <tr> <td>PING</td> <td>Timeout :</td> <td>(s) Counts :</td> </tr> </table> <div style="text-align: center; font-weight: bold; margin-top: 10px;">Device Network Settings</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Wired Net</td> <td colspan="2"> <input checked="" type="radio"/> WAN </td> </tr> <tr> <td>DHCP</td> <td colspan="2"> <input type="radio"/> Enable <input checked="" type="radio"/> Disable </td> </tr> <tr> <td>IP</td> <td colspan="2">192.168.28.74</td> </tr> <tr> <td>Mask</td> <td colspan="2">255.255.255.0</td> </tr> <tr> <td>Gateway</td> <td colspan="2">192.168.28.253</td> </tr> <tr> <td>MAC address</td> <td colspan="2">50:33:8B:64:DD:30</td> </tr> <tr> <td>Link Status</td> <td colspan="2">Link connected</td> </tr> <tr> <td>Status</td> <td colspan="2">Internet access</td> </tr> </table>	Priority Network	<input checked="" type="radio"/> Wired Net <input type="radio"/> Wireless Net <input type="radio"/> Mobile Net		Current Network	WAN		Default Gateway	192.168.28.253		DNS	114.114.114.114 8.8.8.8		PING	Timeout :	(s) Counts :	Wired Net	<input checked="" type="radio"/> WAN		DHCP	<input type="radio"/> Enable <input checked="" type="radio"/> Disable		IP	192.168.28.74		Mask	255.255.255.0		Gateway	192.168.28.253		MAC address	50:33:8B:64:DD:30		Link Status	Link connected		Status	Internet access	
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Link Status	Link connected																																							
Status	Internet access																																							

Figure 3-12

DHCP: If the mode DHCP is enable, the NET20 Plus receiver will auto get an IP address, otherwise it uses the static IP.

WIFI hotspot: If WIFI hotspot option is enable, then you can use other devices equipped with WIFI to search and connect to the NET20 Plus receiver. The hotspot is named by the serial number of the receiver. You don't need to input a password. Access NET20 Plus by IP address 192.168.10.1. The hotspot only play the role of control and can't access to internet.

WIFI Client: When selecting WIFI client, in SSID box input a name of WIFI hotspot can be used for the search, and in the Password box input the password for connecting to WIFI hotspot, then submit. After connecting to the connection WIFI, the password can be seen in system terminal or panel interface (the displayed place will be different in different versions).

Mobile network: enable Mobile Net to use the SIM card into the NET20 Plus, it supports 4G network. Users can set the user name and password if required.

FTP download: You can set the parameters of the FTP server. If anonymous access is turned on, it does not require a user name and password to connect to the NET20 Plus. If anonymous access is turned off, enter the user name and password.

After using the FTP tool to connect to the NET20 Plus, the data appears as follows:

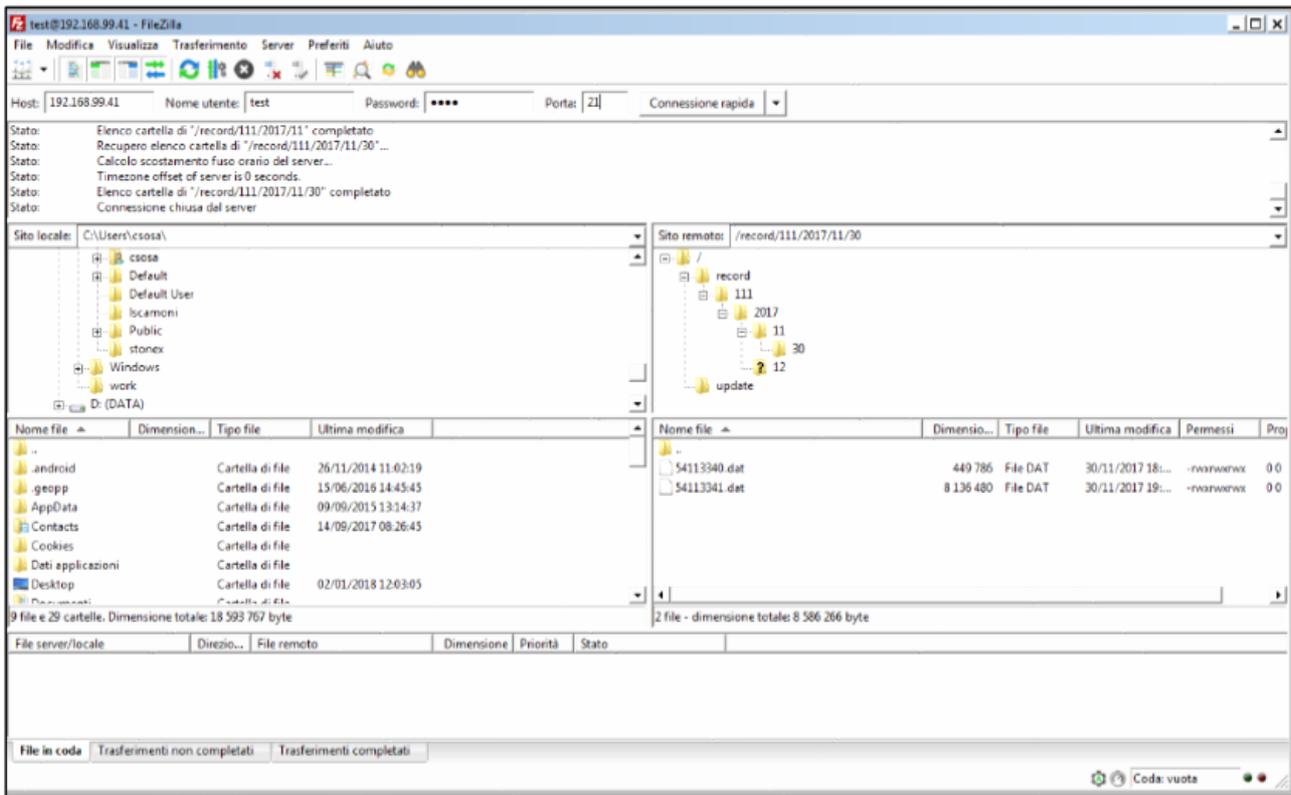


Figure 3-13

3.3.5 Ntrip Server

In this page, the user can set the NTRIP connection parameters of the reference station:

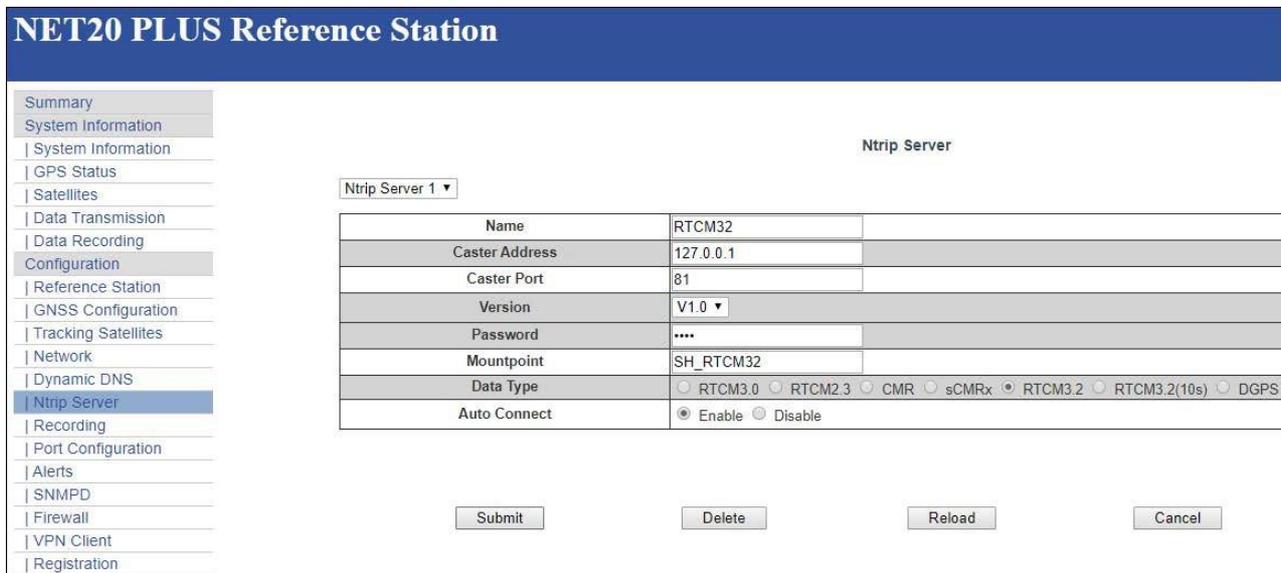


Figure 3-14

Remarks:

- The password in this page must match the password of the server NTRIP if it is required. If the password is not required by the server you can enter any value.
- When the [Auto Connect] option is chosen, after the network is disconnected, the data transmission will be automatically connected. If the option is disabled will be necessary

- to start the connection manually from the Data Transmission menu by clicking on start.
- c. Before setting the parameters, check in the page Reference Station if the coordinates are correct. Wrong coordinates cannot allow to transmit data to the server.

Click "Submit" to start the data transmission. In the Data Transmission page you can see the data transfer status displayed as "transmitting". The differential transmission indicator in the front panel of the receiver starts to blink.

3.3.6 Recording

In this page, the user can set the data recording parameters:

NET20 PLUS Reference Station

Summary
System Information
| System Information
| GPS Status
| Satellites
| Data Transmission
| Data Recording
Configuration
| Reference Station
| GNSS Configuration
| Tracking Satellites
| Network
| Dynamic DNS
| Ntrip Server
| Recording
| Port Configuration
| Alerts
| SNMPD
| Firewall
| VPN Client
| Registration
Download
System Management
Configuration Set
Language English
Logout

Compress(Global) : Off

Recording - UNSH

Schedule Name	UNSH
Path Type	YYYYMM/DD
File Name	DOYhmm.dat
Interval	1HZ
Duration Time	2 hours
Pool	Stop When Full 20480 MB
Auto	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Integral Point Record	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
File Push	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Push Parameters	
Protocol	<input checked="" type="radio"/> FTP <input type="radio"/> GEO <input type="radio"/> RADIO
FTP Server Address	
FTP Server Port	
FTP User	admin
FTP Password	*****
Remote Directory	

Convert Enable Disable

Figure 3-15

File name: The static date can be recorded in 4 ways.

Table 3-1 The rules of Static record file name

File name	Annotation
YYYYMMDDhhmmss.dat	Date and when, minute and second
YYYYMMDDhhmm.dat	Date and when, minute
DOYhmm.dat	Day of year, hour and minute
YYYYDOY?.dat	Year, day of year, period of time
ssssddf.yyt	Station name, day of year, period of time
Rinex302.dat	Named by rinex3.02 standard
Custom	Manually input the file name by the way of name + .dat

Duration time: After setting the record length, the file will be recorded depending on the setting time, and it will be stopped at the end of the record length. If you enable the auto record option, the NET20 Plus will start a new file automatically.

FTP push: First you should set the FTP server parameters. When it records the data in the internal memory, NET20 Plus will also send the data to FTP server automatically.

3.3.7 Port Configuration

Port setting includes Bluetooth port, COM1 port and Socket settings. They can support the function as follow:

- CMD(INPUT/OUTPUT): NET20 Plus commands
- NMEA(OUTPUT): Output Specified NMEA sentences
- RTK(INPUT): Differential Input
- RTK(OUTPUT): Differential Output
- RAW(OUTPUT): Raw data output
- BINEX (OUTPUT) Output Specified BINEX sentences COM1 can be used also to establish the communication with OEM.

NET20 PLUS Reference Station

<ul style="list-style-type: none"> Summary System Information System Information GPS Status Satellites Data Transmission Data Recording Configuration Reference Station GNSS Configuration Tracking Satellites Network Dynamic DNS Ntrip Server Recording <li style="background-color: #004a99; color: white;"> Port Configuration Alerts SNMPD Firewall VPN Client Registration Download System Management Configuration Set Language English ▾ 	<div style="text-align: right; font-weight: bold; font-size: small;">I/O Configuration</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Bluetooth</td> <td><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">COM1</td> <td><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">COM2</td> <td><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">COM3</td> <td><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">Ntrip Client</td> <td><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> <tr> <td style="text-align: center;">Ntrip Caster</td> <td><input checked="" type="radio"/> Enable <input type="radio"/> Disable</td> </tr> <tr style="background-color: #cccccc;"> <td style="text-align: center;">Port</td> <td style="text-align: center;">81</td> </tr> <tr> <td style="text-align: center;">Socket 1</td> <td><input type="radio"/> Enable <input checked="" type="radio"/> Disable</td> </tr> </table>	Bluetooth	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	COM1	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	COM2	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	COM3	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	Ntrip Client	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	Ntrip Caster	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	Port	81	Socket 1	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Bluetooth	<input type="radio"/> Enable <input checked="" type="radio"/> Disable																
COM1	<input type="radio"/> Enable <input checked="" type="radio"/> Disable																
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Ntrip Caster	<input checked="" type="radio"/> Enable <input type="radio"/> Disable																
Port	81																
Socket 1	<input type="radio"/> Enable <input checked="" type="radio"/> Disable																

Figure 3-16

3.3.7.1 *Bluetooth*

After opening the Bluetooth and choosing the output/input type, then click “submit”, you can use Bluetooth driver to scan the NET20 Plus. The Bluetooth of NET20 Plus is named by driver serial. Now we use the PDA to access the NET20 Plus by Bluetooth. The page of PDA will be shown as follow:

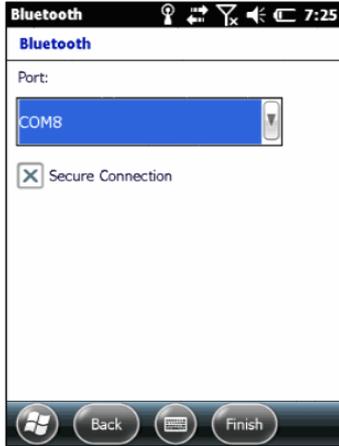


Figure 3-17



Figure 3-18

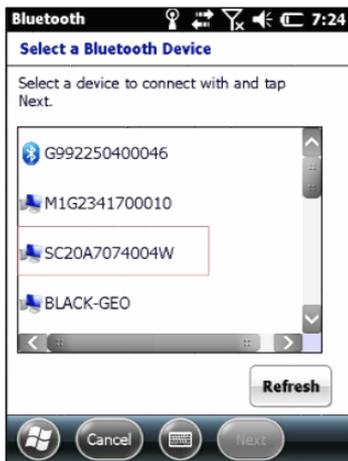


Figure 3-19

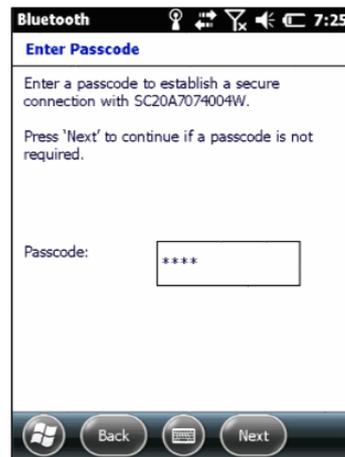


Figure 3-20

3.3.7.2 COM1

Note:

1. When data transmission on com1 is enabled, use the standard seven-pin cable to connect seven-pin interface in the back panel.
2. The baud rate of com1 must be consistent with the baud of receiving device. Figure 3-21 and Figure 3-22 are the process of the COM1 port output RTCM3.2.

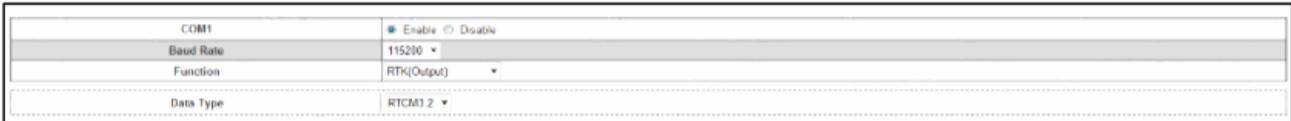


Figure 3-21

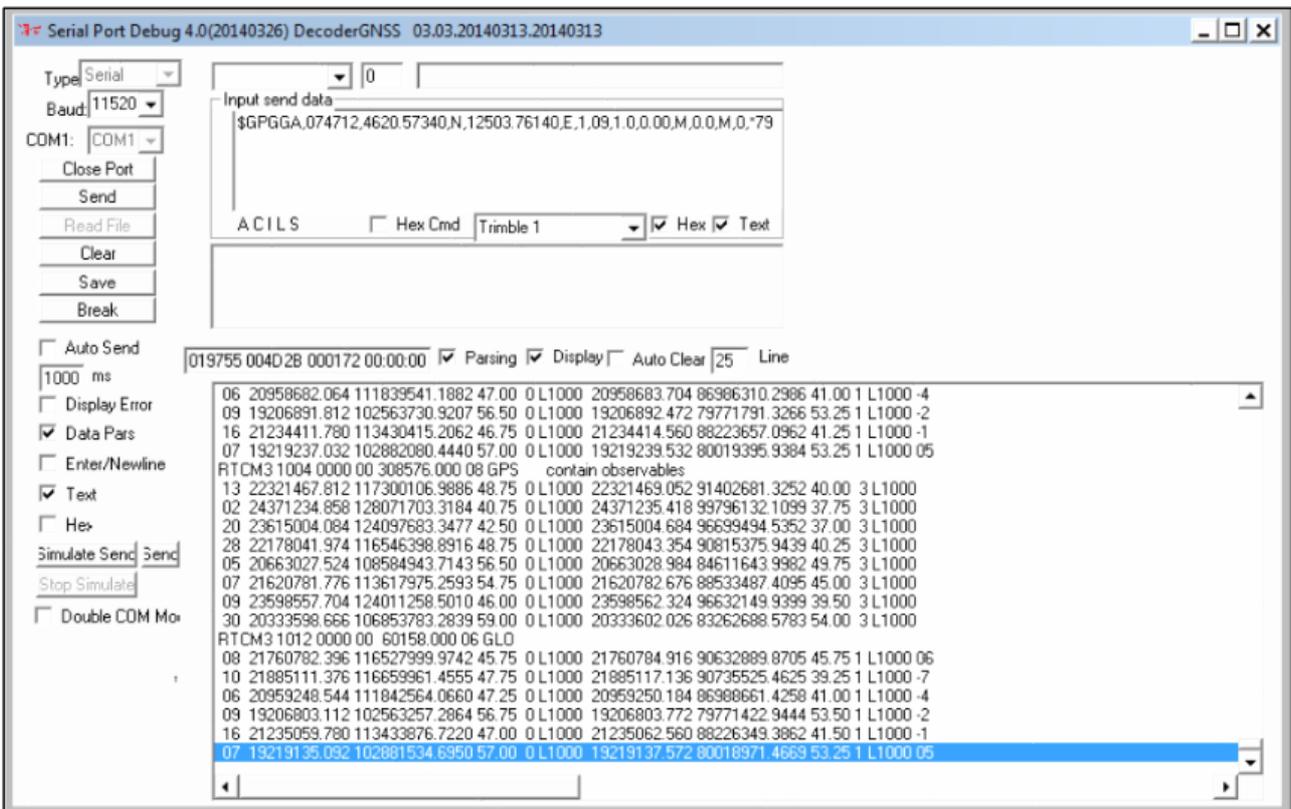


Figure 3-22

3.3.7.3 SOCKET

Figure 3-25 and Figure 3-26 are the process of output RAW data via socket.

Socket 1	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Type	TCP
Mode	Server
Port	6060
Function	RAW(Output)
Interval	1HZ
Ephemeris Frequency	Onchanged

Figure 3-25

The screenshot shows the Serial Port Debug 4.0 interface. The configuration panel on the left is set to Client mode, IP 192.168.10.1, and PORT 2013. The data display area shows the following output:

```

103732 019534 000029 14:11:48 Parsing Display Auto Clear 25 Line
G30 20708300.414 108822852.736 -1511.745 57.9 863 20708304.297 84797043.802 -1177.983 53.0 862 20708303.648 84797037.552 -1177.983 51.7 857
R06 22064941.689 117742753.157 -3750.378 42.0 873 22064944.636 91577700.711 -2916.962 39.6 866 GLOFreq -4
R07 19237783.879 102981361.103 -683.620 56.9 876 19237785.352 80096618.843 -531.705 53.9 866 GLOFreq 5
R08 20694384.131 110817489.617 2998.953 50.6 872 20694384.967 86191381.993 2332.519 50.2 866 GLOFreq 6
R09 19278300.336 102945048.332 -889.355 56.7 872 19278301.832 80068374.715 -691.721 54.8 866 GLOFreq -2
R10 20739481.659 110553109.887 3097.635 52.2 870 20739488.741 85985774.990 2409.272 42.9 866 GLOFreq -7
R16 22451191.087 119930230.884 -3968.805 42.8 873 22451193.418 93279082.375 -3086.849 38.9 866 GLOFreq -1
R17 24107204.162 129002517.840 948.901 42.8 272 24107206.617 100335299.536 738.031 40.5 272 GLOFreq 4
R24 24250045.663 129675895.271 -1860.927 37.8 272 24250047.783 100859036.369 -1447.389 27.6 6 GLOFreq 2
C05 39818389.742 207344803.791 36.140 38.5 862 39818387.959 160332148.085 27.903 39.2 860
C10 39134822.211 203785286.297 861.921 41.0 845 39134821.551 157579710.925 -666.547 40.9 844 39134814.485 165592209.517 -700.372 41.5 843
G14 21707592.258 113039212.848 33.724 52.6 875 21707590.335 87408083.140 29.919 53.5 861 21707584.464 91855685.663 31.445 54.5 861
    
```

Figure 3-26

3.3.8 Alerts

When NET20 Plus system or program exception occurs, NET20 Plus will use e-mail or cell phone text messages to notify manager in time for maintenance.

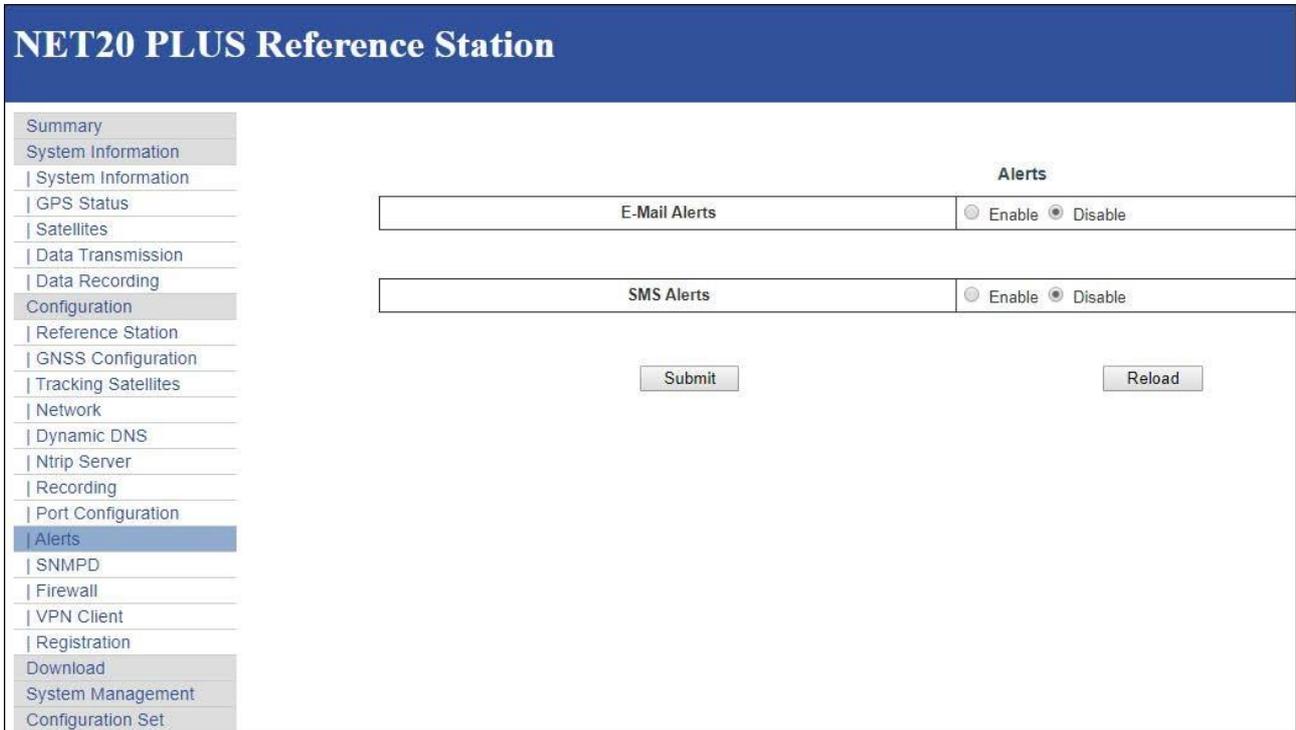


Figure 3-27

3.3.9 Registration

When NET20 Plus receiver expires, you need to register it. Enter the registration code and click Submit, then instrument registration will be completed.

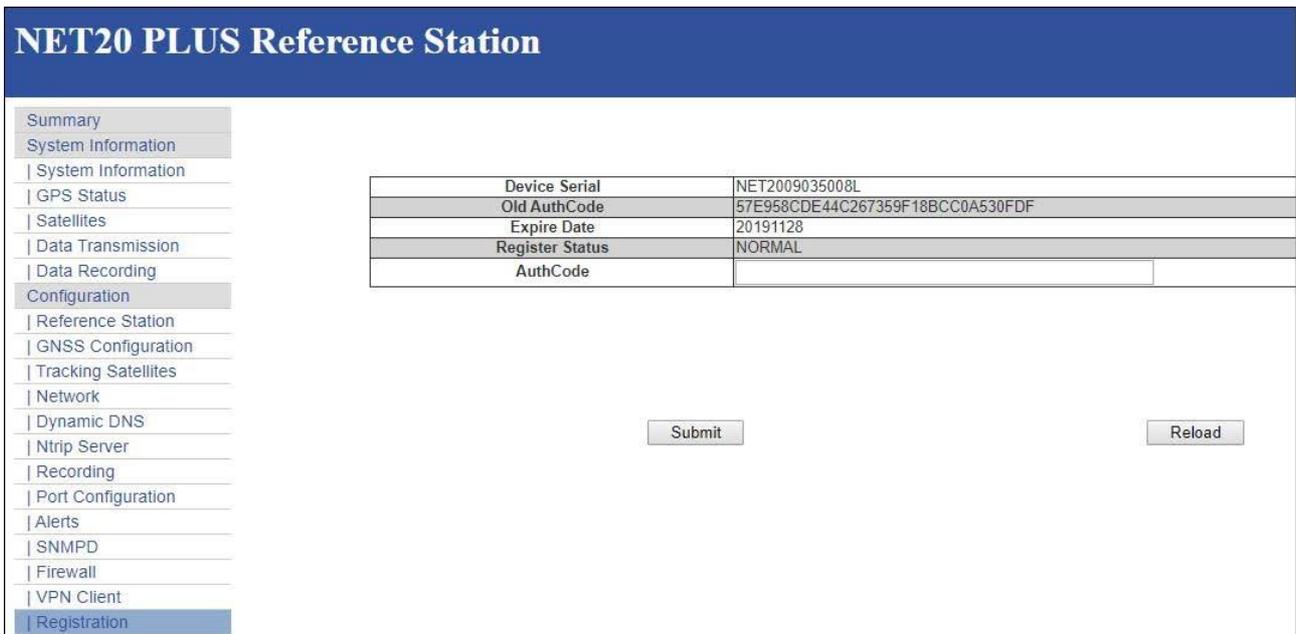


Figure 3-28

3.4 Download

Download data stored in the NET20 Plus receiver through the network connection. Alternatively, you can connect to NET20 Plus receiver for copying data via USB cable.

Select	Name	Size	Creation Time	Modification Time	Operation
<input type="checkbox"/>	201907	4.15G	-	-	FTP Push Download Delete
<input type="checkbox"/>	201908	3.127G	-	-	FTP Push Download Delete
<input type="checkbox"/>	201909	2.354G	-	-	FTP Push Download Delete

Figure 3-29

3.5 System Management

The users can upgrade the firmware, view logs, enable or disable the login, and format internal disk.

Figure 3-30

Note:

1. Log view part are abnormal operation of storage systems and procedures of a record;
2. When setting the security login, the admin account is the administrator account and the guest account can only view the information.

3.6 Help

Here provide operating guidelines for NET20 Plus introductory guiding.

4 Operation

4.1 Power on

Press the red power button on the panel, and until the initialization is completed, you can see the main menu display on OLED screen as shown in figure 4-1.

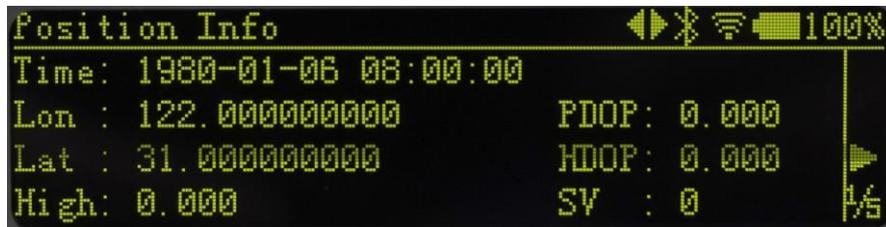


Figure 4-1

Press left or right soft key to view the current IP information of Ethernet, WIFI, GPRS and VPN.

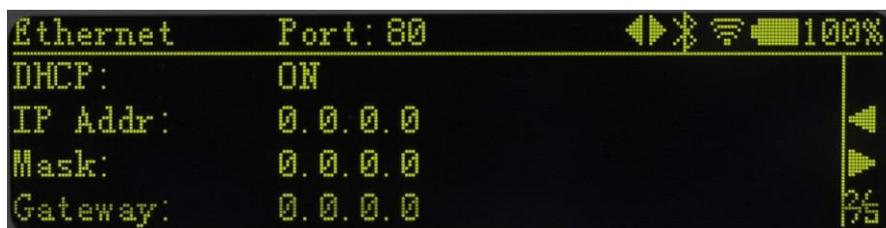


Figure 4-2

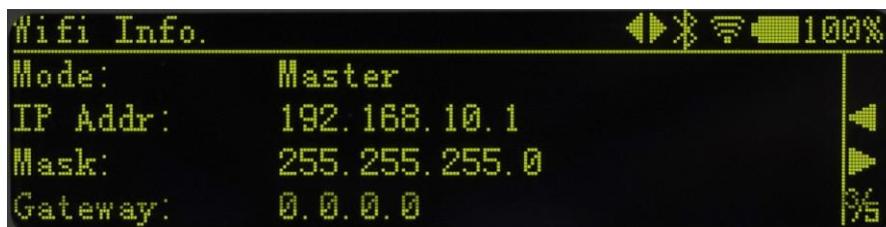


Figure 4-3

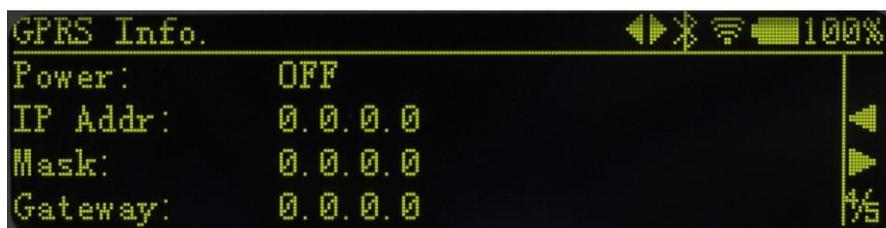


Figure 4-4



Figure 4-5

4.2 Quick setting

You can quickly set the receiver by the panel key. It includes six parts: device info, start record, transmit data, network settings, antenna settings and other settings.

Start Record: In the main interface, lightly press F2 key you can see the options shown in figure 4-6.



Figure 4-6

Lightly press power key to confirm, then enter into "Start Record", you can see the page shown in figure 4-7.



Figure 4-7

When the static is stopped, the cursor stops at the row of "Start Record"

Transmit Data:

When you transmit data by the panel, first you need to set the transmission parameters in the WEB UI page, then you can operate the panel. There are not transmission parameters settings on the setup panel.



Figure 4-8

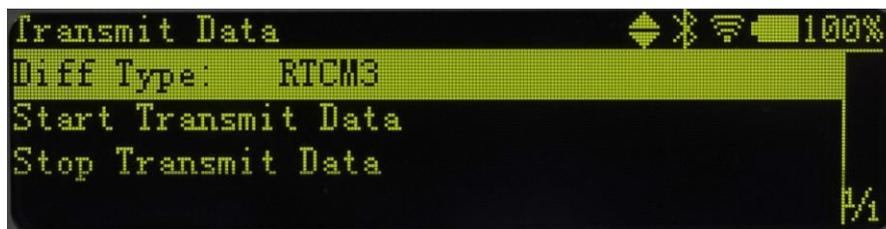


Figure 4-9

You can quickly set differential type, start and stop transmit data.

Network Settings:

NET20 Plus network settings can be set to automatically obtain the IP or choose a static IP mode.

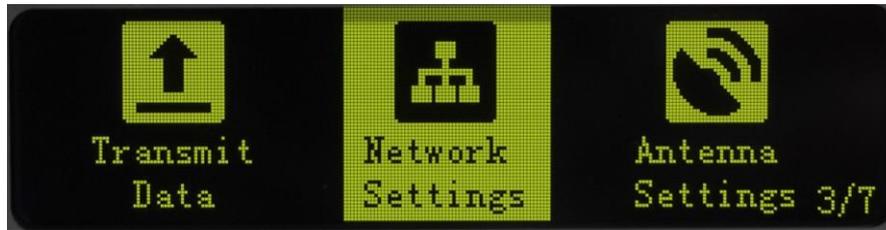


Figure 4-10



Figure 4-11



Figure 4-12

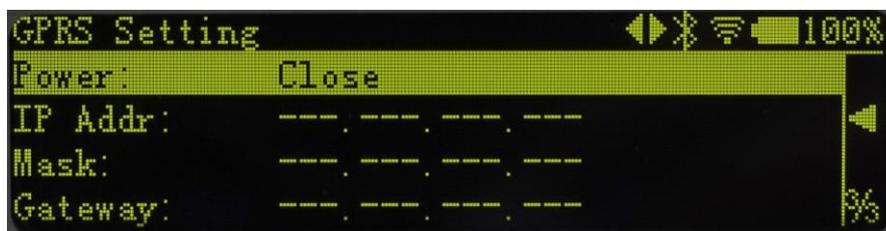


Figure 4-13

Antenna settings:

It shows the antenna parameters, including station name, antenna type and antenna height, set in the Web UI.



Figure 4-14



Figure 4-15

Other settings:

Other settings could set the OLED language display, OLED brightness, OLED turned off interval.



Figure 4-16



Figure 4-17

Device information:

In this page, you can get the information of device model, device serial, hardware version and BOOT version.



Figure 4-18



Figure 4-19

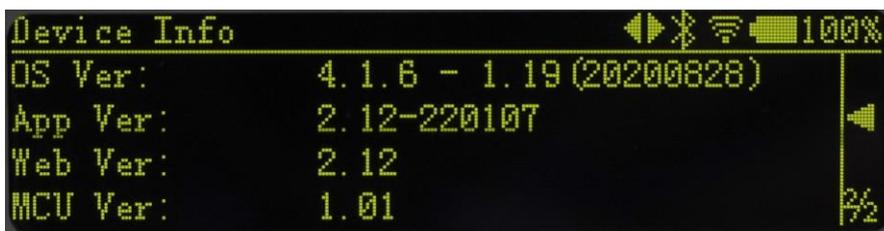


Figure 4-20

Restore factory

In this page, you can restore to factory settings.



Figure 4-21



Figure 4-22

5 Accessories

Table 5-1 Accessories of NET20 Plus

Net20 Plus					
NO.	Items	Quantity	Model	Description	Picture
1	Carton Box	1	---	---	
2	Net20 Plus	1	---	---	
3	Charger	1	PSAA30R-150	2-pin Lemo power cable Input: 100~240V~0.8A 50-60Hz Output: 15v, 2A	
4	5-Pin Cable	1	TC-183	For serial data output	
5	7-Pin Cable	1	TC.GK428.ABL	For internal storage access only	
6	Serial Cable	1	---	Female to female, cross serial cable	
7	4G Antenna	1	---	External 4G network antenna	
Optional					
1	Antenna	1	UA91 	Choke Ring Antenna, Multi-frequency	
2	Antenna	1	CM004	Choke Ring Antenna, Multi-frequency	
3	Antenna	1	UA35	GNSS Antenna	
4	Cable	1	TNC-TNC	5m, 15m, 30m	---
5	Software	1	NTRIPcaster	Single base station	---
6	Software	1	GNSS.Net	VRS network	---

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