M1G2 Receiver

User Manual

Edition: V2.0_202011

Statement

Please read carefully:

Thank you very much for purchasing our product. For instructions on how to use this product, please be sure to read the user manual.

This user manual is for your receiver only. If your receiver does not match the situation in the user manual, the actual situation of the receiver shall prevail.

The information in this document is subject to change without notice; We reserve the right to change or improve its products as well the content without any obligation to notify individual or organization of such changes or improvements. For any questions, please contact the customer service center or contact our authorized dealer.

Customer safety is important. Please read carefully the precautions and instructions in the user manual. To avoid accidental damage, use only original supplied parts. If you do not use the system or connect incompatible accessories in accordance with the correct procedures, it may cause damage to the equipment and may even endanger others and your safety. In this regard, the company does not assume any responsibility

Contents

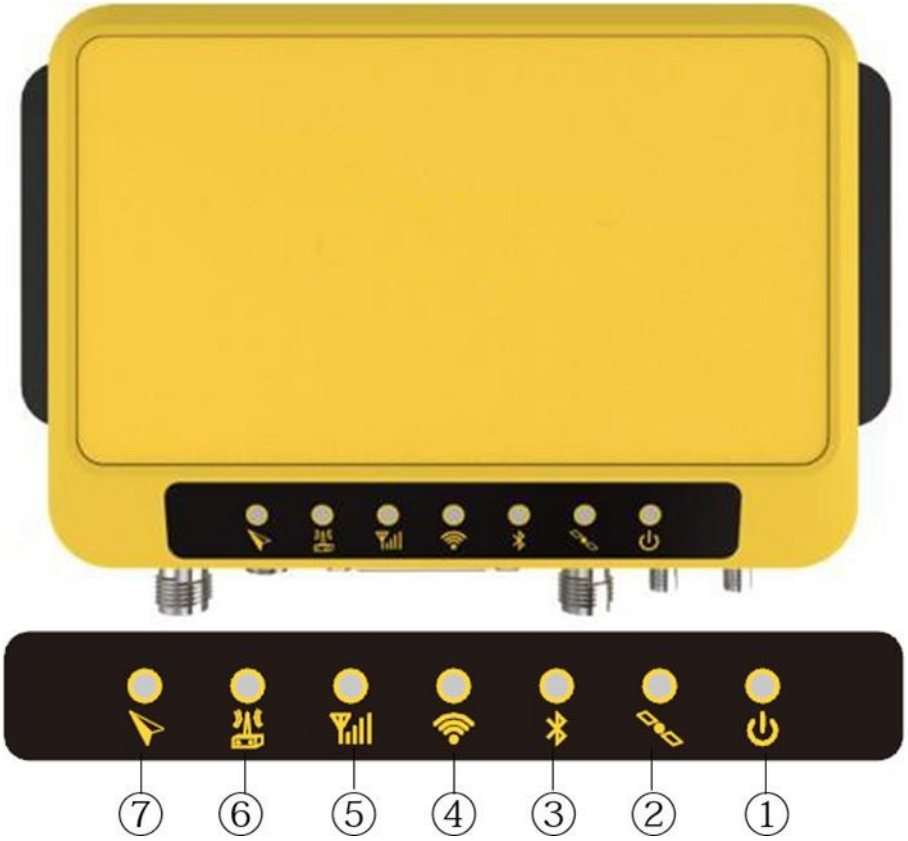
1. Product Description

The device is a high-precision GNSS receiver for engineering, monitoring, and other applications. The product is suitable for project applications such as vehicle monitoring, engineering inspection, and automated data collection. This chapter provides basic information to help you become familiar with this GNSS receiver.

Main features：

- Robust housing
- Support 4G LTE, UHF and Bluetooth / WLAN data link
- Easy host configuration via Web UI and remote server
- Adaptable power requirements to various environments
- Smart chain connection
- IP67

1.1 Top View



❶	Power	Red	Lights up red when power is on, lights off when power is off, no alarm status (cannot turn on below 9V, automatically turns on above 9V)；
❷	Satellite	Yellow	At single point solution, flashing yellow light at 1s interval; At floating point solution / fixed solution, the satellite light is always on; Invalid solution / below 4 satellites, satellite lights are off;
❸	Bluetooth	Blue	Bluetooth connection, Bluetooth light is always on; off when Bluetooth is disconnected；
❹	WiFi	Green	Client / AP is steady green when turned on；
❺	4G Network	Green	Lights green when 4G is turned on, and turns off when 4G is turned off;
❻	Radio	Green	Lights up green when the function is on and off when the function is off;

❼	Heading	Green	Lights up green when the function is on and off when the function is off;

1.2 Front View

❶	**GNSS2**	TNC，External antenna connector
❷	**PWR**	2 core LEMO Connector, power interface
❸	**D-SUB 26**	2 RS485 Serial port 1 RS232 Serial port 1 USB2.0 Port (supports OTG) 1 1PPS Output Interface 1 EVENT Port 1 CAN Port 1 100M Ethernet Port
❹	**GNSS1**	TNC, External GNSS Main antenna interface
❺	**LTE**	SMA，4G Antenna Port
❻	**UHF**	External UHF Antenna interface

1.3 Right side sight

❶	TF Card slot	MicroSD Card slot
❷	SIM Card slot	Standard size SIM card slot

1.4 Left side sight

1.5 Sight from the Bottom

2. Technical Specifications

GNSS Performance			
	PRO		STD
Channel	555	Channel	72
Satellite Tracking	GPS: L1 C/A, L1C, L2C, L2P	Satellite Tracking	GPS : L1C/A
	GLONASS: L1 C/A, L2 C/A, L2P		GLONASS: L1OF
	BeiDou: B1,B2		BeiDou: B1
	Galileo: E1, E5b		Galileo: E1B/C
	NavIc: L5		-
	SBAS: L1,L5		SBAS: L1,L5
	QZSS: L1 C/A, L1C, L2C		QZSS: L1C/A: WAAS, EGNOS, MSAS, GAGAN
Update rate	5Hz	Update rate	4Hz
Timing accuracy	20ns RMS	Timing accuracy	30ns RMS
RTK accuracy	10mm + 1ppm	RTK accuracy	3.0m（Float）
SBAS accuracy	60cm RMS	SBAS accuracy	Horizontal: 2.0m
DGPS accuracy	40cm RMS		Vertical: 2.5m
Velocity accuracy	<0.03m/s RMS	DGPS accuracy	-
Heading accuracy	2m baseline: 0.08 degrees	Cold start	<30s
	4m baseline: 0.05 degrees	Warm start	<2s
Hot start	＜19s	Hot start	<1s
Reacquisition	＜1s	Max Elevation	500m/s
Max Speed	1,850km/h	Max speed	500m/s
System		**Communication**	
Operation system	Linux	Network Modem	Integrated 4G Modem
Processor	AM335X Sitara ARM Cortex-A8	Bluetooth	V2.1+EDR / V4.1, Class2
Internal memory	512MB RAM+8GB storage	WLAN	WIFI IEEE 802.11 b/g/n
Expanded memory	Up to 32GB	UHF	TX/RX: 410MHz – 470MHz
Radio Modem	TRM101 (Channel 555)		Transmit Power: 1 W
Electical		Ports	D-SUB 26 interface: 2 x RS485 port , 1 x RS232 port ,
Power input	10 to 28V DC		1 x USB2.0 port（OTG supported）
Physical & Environmental			1 x 1PPS port , 1 x EVENT interface
Weight	550g		1 x CAN interface, 1 x 100M ethernet port
Size	150mm*105mm*34mm		PWR: 2-pin LEMO for power input
Operation temperature	-30℃ to +65℃		GNSS1: TNC port for main GNSS antenna
Storage temperature	-40℃ to +80℃		GNSS2: TNC, TNC for auxiliary GNSS antenna（Channel 555）
IP Level	IP67		LTE: SMA, 4G antenna port
Shock	Withstands 1.5m drop on concrete		UHF: external UHF antenna port
Vibration	50Hz, 0.5mm, 5mins	Others	SIM card slot, TF card slot

Illustrations and technical specifications are subject to change without notice.

2.1 Port

• D-SUB 26	2 RS485 Port 1 RS232 Port 1 USB2.0 Port（Support OTG） 1 1PPS Output Interface 1 EVENT Port 1 CAN Port 1 100M Ethernet interface
• PWR	2 core LEMO power Connector Port
• GNSS1	TNC, External GNSS Main antenna Port
• GNSS2	TNC，External antenna connector
• LTE	SMA，4G Antenna Port
• UHF	External UHF antenna interface
• SIM	Standard size SIM card Slot
• TF card	MicroSD Slot

2.2 Data Record

- Storage

Device	description
In Built storage	8G
External storage	MicroSD card

- Data Types: Binary, RINEX, BINEX
- Transmission rate: 2S, 5S, 10S, 15S, 30S, 60S 1Hz, 2Hz, 5Hz, (Optional 10Hz, 20Hz)

2.3 Data Flow

• Stream number	One NTRIP Server stream，one NTRIP Client stream，5 Serial port (TCP / UDP) flow
• Stream port	WIFI, Wireless, UHF, Ethernet, COM1, COM3
• Navigation output	GGA, ZDA, GSA, GSV, GST, VTG, RMC, GLL
• Differential output	RTCM 2.3, 3.0, 3.2, CMR, CMR+, DGPS, BINEX, RAW

2.4 User Interface

• LEDs	7 LED Lights, showing power, satellite, Bluetooth respectively、WIFI, network, radio, and heading status

2.5 System Configuration

• operating system	Linux
• Bluetooth	Bluetooth 2.1+EDR, V4.0
• WIFI	802.11 b/g/n, Hotspot/client mode
• Ethernet	100M

2.6 The internet

System	Frequency
LTE FDD	B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28
LTE TDD	B38/B39/B40/B41
UMTS	B1/B2/B4/B5/B6/B8/B19

GSM	B2/B3/B5/B8

2.7 Internet service

• NTRIP	Server / client
• Remote management	GNSS.NET Remote configuration
• FTP server	For data download
• E-mail alert	Used for low storage and other warning messages

3. Operating instructions

3.1 Insert the card

If you need a SIM card, please insert the SIM card before turning on the device. Please see the figure below. Firstly, open the card holder, then insert the SIM card and micro SD card as a note in the card holder.

3.2 Connect external accessories

In order to achieve the working state, the device needs to be connected to an external antenna, which can be connected to the GNSS 1 / 2.

If you need to power on the device, it must be connected to a 2-pin power cable.

If you need a SIM card, insert SIM card and connect the 4G antenna to the LTE interface.

If you need to use the radio, you should connect the radio antenna to the radio interface.

3.3 Power On / Off

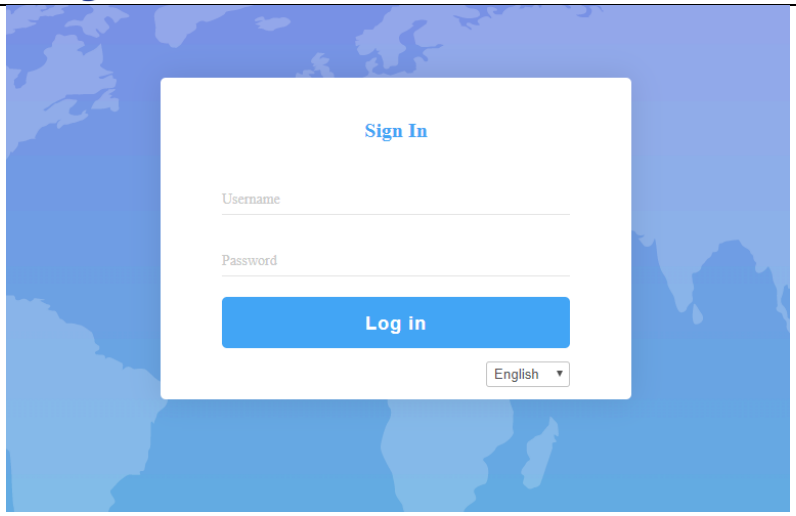
Once device is connected to the 2-pin power cable, it will automatically power on after the power has been turned on.

After power is on, the indicator will show the devices status. For example, the power light is red. If you turn on WIFI, WIFI will turn green. When the device has no power supply, it will automatically shut down.

4. Web UI

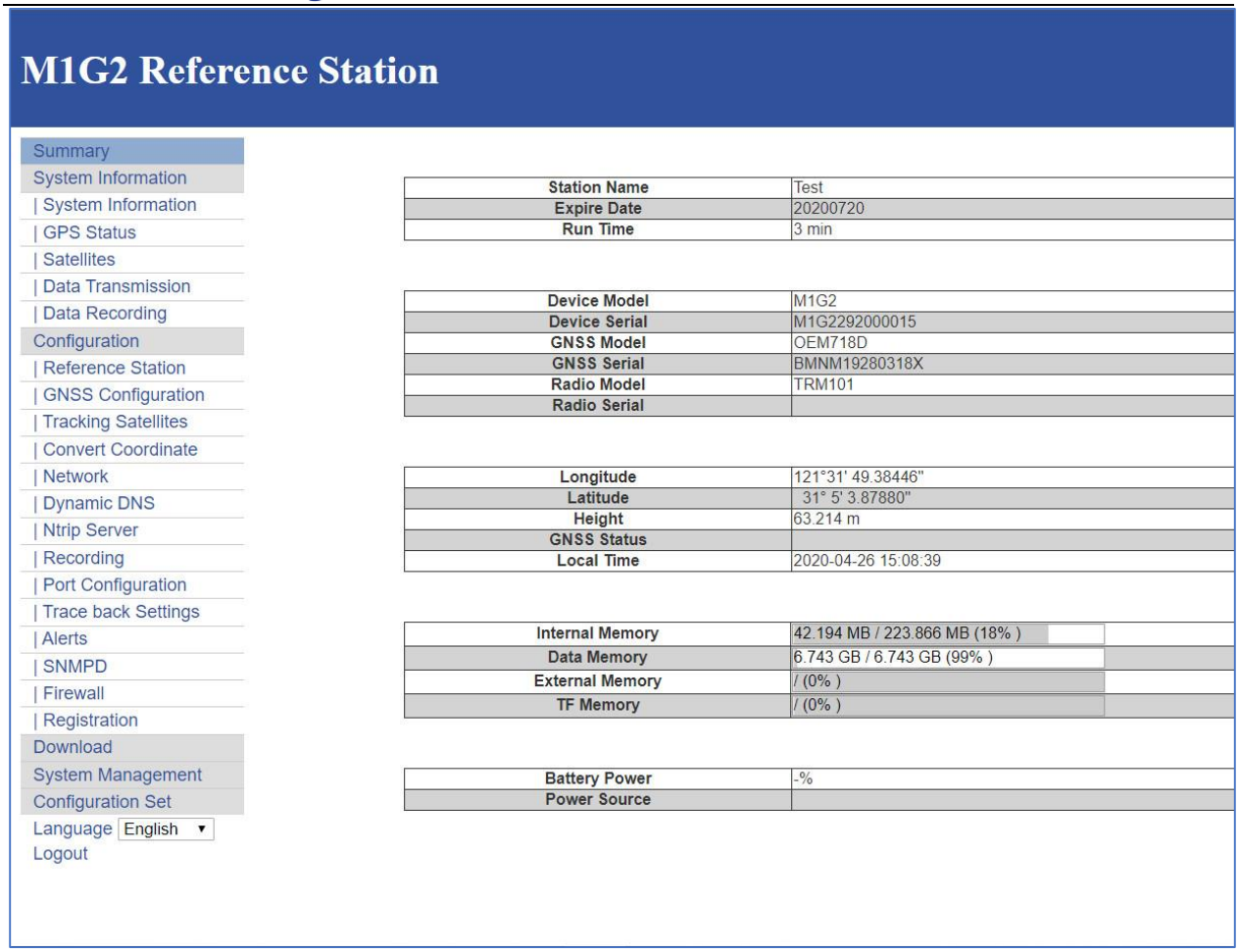
The device has Web user interface function, you can connect to device with WIFI to log into the Web interface to view device information and settings. The WIFI hotspot name is the serial number of the device. Enter the IP address: 192.168.10.1. When the user logs in, a window will pop up, and the account and password will need to be filled in.

- Username: admin
- Password: password.



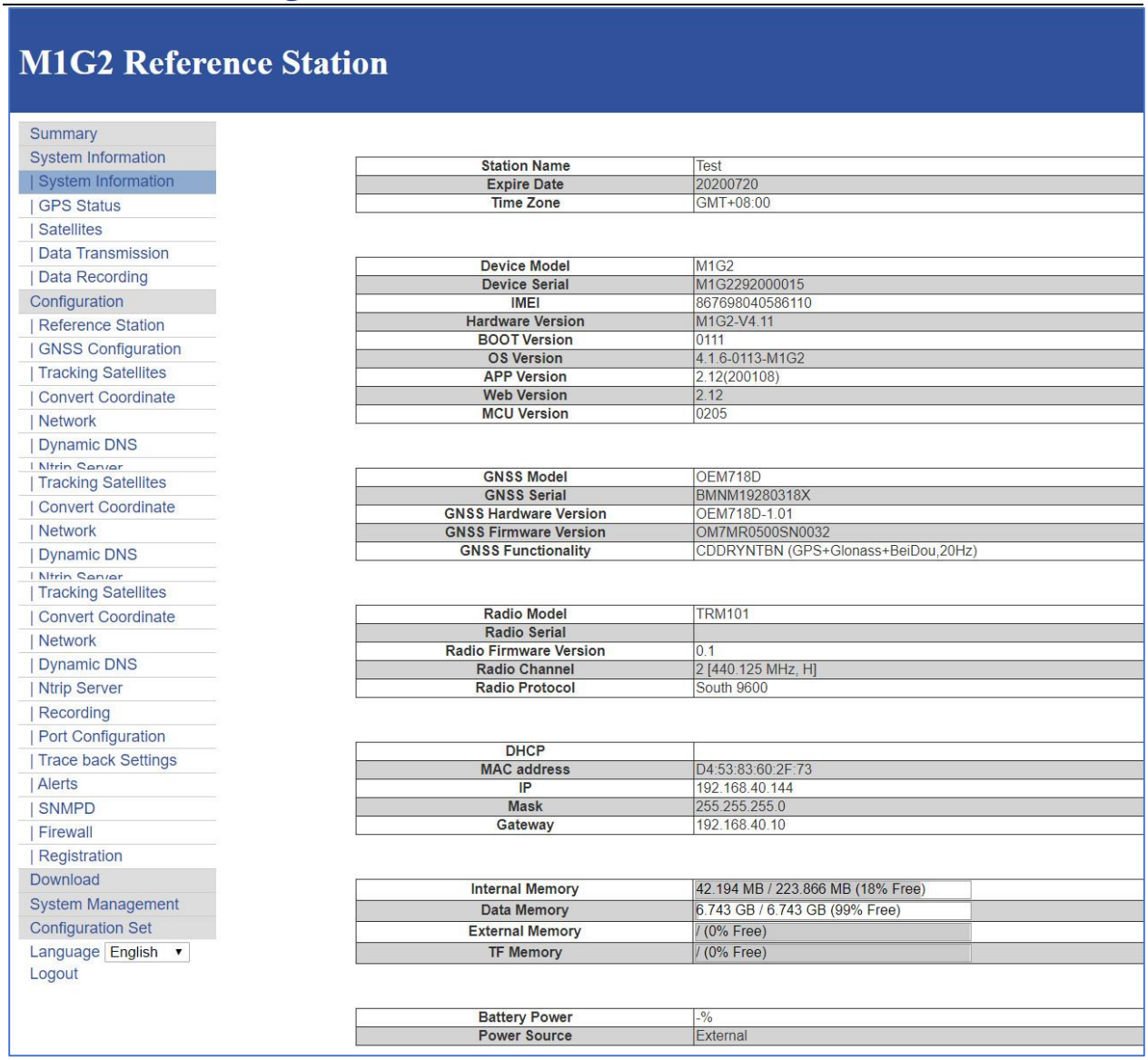
4.1 Summary

After verifying the login information, you can log in to the device web interface. The homepage content includes station name, expiration date, running time, equipment model, equipment serial number, GNSS model, GNSS serial number, radio model, radio serial number, and receiver location information. As shown below:



4.2 System Information

The system information interface will display the reference station name, device model, serial number, system version, application version information, built-in OEM Board information, built-in station information, storage parameter information.



4.3 GNSS Status

The status page shows the current device positioning status, base station coordinates, weather meter type and antenna type usage information.

M1G2 Reference Station

- Summary
- System Information
- | System Information
- | GPS Status
- | Satellites
- | Data Transmission
- | Data Recording
- Configuration
- | Reference Station
- | GNSS Configuration
- | Tracking Satellites
- | Convert Coordinate
- | Network
- | Dynamic DNS
- | Ntrip Server
- | Recording
- | Port Configuration
- | Trace back Settings
- | Alerts
- | SNMPD
- | Firewall
- | Registration
- Download
- System Management
- Configuration Set

Language English ▾

Logout

Local Time	2020-04-26 15:10:44 (GPS Time + 8)
Satellites	24
Longitude	121°31' 49.37925"
Latitude	31° 5' 3.87516"
Height	63.400 m
Status	Single
PDOP	1.231
HDOP	0.640
HRMS	1.719
VRMS	3.125

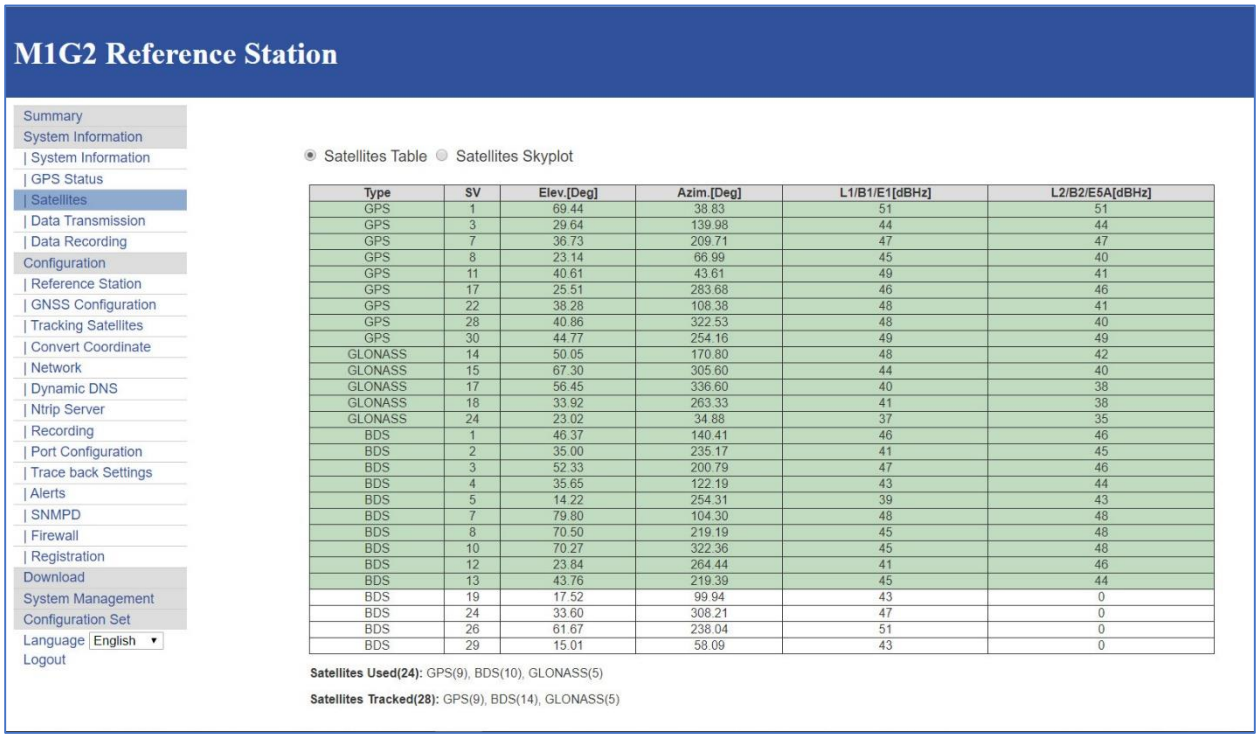
Station Number	0111
Base Longitude	113°21' 59.82440"
Base Latitude	23° 7' 35.67690"
Base Height	30.000 m

MET Type	ZZ11A
Pressure	- hPa
Temperature	- °C
Humidity	- %RH

Antenna Type	HX-GG486A
Antenna Height	0 mm
Measurement Mode	Antenna Phase Center

4.4 Satellite Information

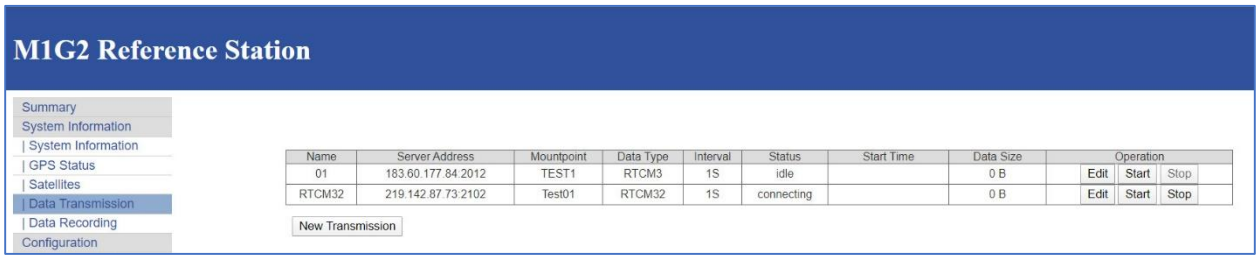
On this page you can see satellite maps and satellite lists.



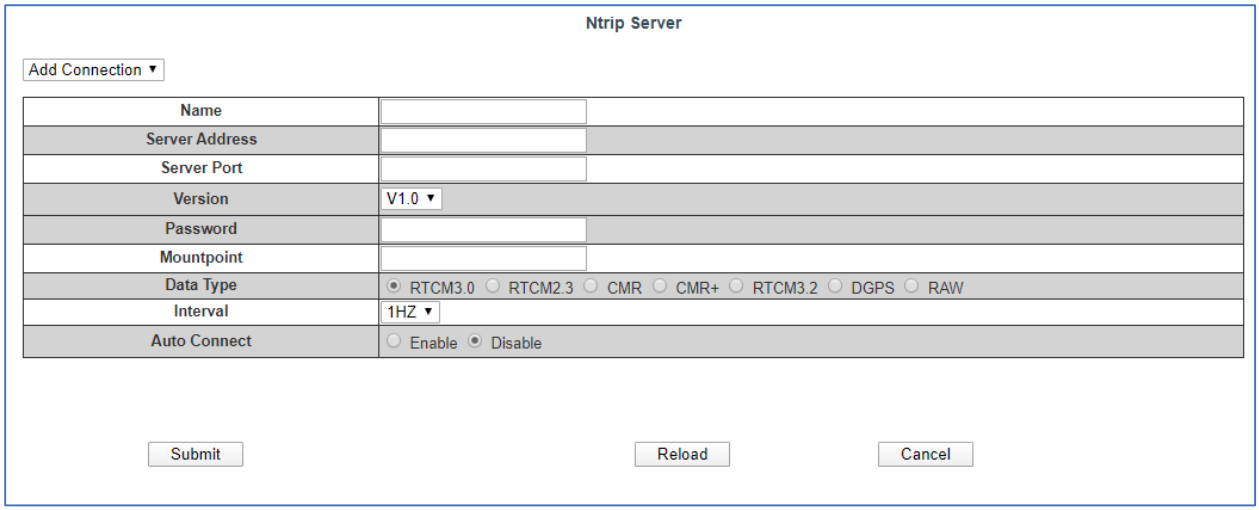
Type	SV	Elev.[Deg]	Azim.[Deg]	L1/B1/E1[dBHz]	L2/B2/E5A[dBHz]
GPS	1	69.44	38.83	51	51
GPS	3	29.64	139.98	44	44
GPS	7	36.73	209.71	47	47
GPS	8	23.14	66.99	45	40
GPS	11	40.61	43.61	49	41
GPS	17	25.51	283.68	46	46
GPS	22	38.28	108.38	48	41
GPS	28	40.86	322.53	48	40
GPS	30	44.77	254.16	49	49
GLONASS	14	50.05	170.80	48	42
GLONASS	15	67.30	305.60	44	40
GLONASS	17	56.45	336.60	40	38
GLONASS	18	33.92	263.33	41	38
GLONASS	24	23.02	34.88	37	35
BDS	1	46.37	140.41	46	46
BDS	2	35.00	235.17	41	45
BDS	3	52.33	200.79	47	46
BDS	4	35.65	122.19	43	44
BDS	5	14.22	254.31	39	43
BDS	7	79.80	104.30	48	48
BDS	8	70.50	219.19	45	48
BDS	10	70.27	322.36	45	48
BDS	12	23.84	264.44	41	46
BDS	13	43.76	219.39	45	44
BDS	19	17.52	99.94	43	0
BDS	24	33.60	308.21	47	0
BDS	26	61.67	238.04	51	0
BDS	29	15.01	58.09	43	0

4.5 Data transmission

This page displays the current data transmission status. Click [Edit] to set the transmission parameters.

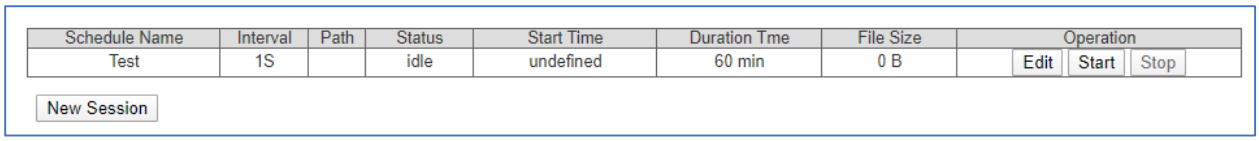


When you click "New Transfer", this page will pop up to prompt you to add a connection.



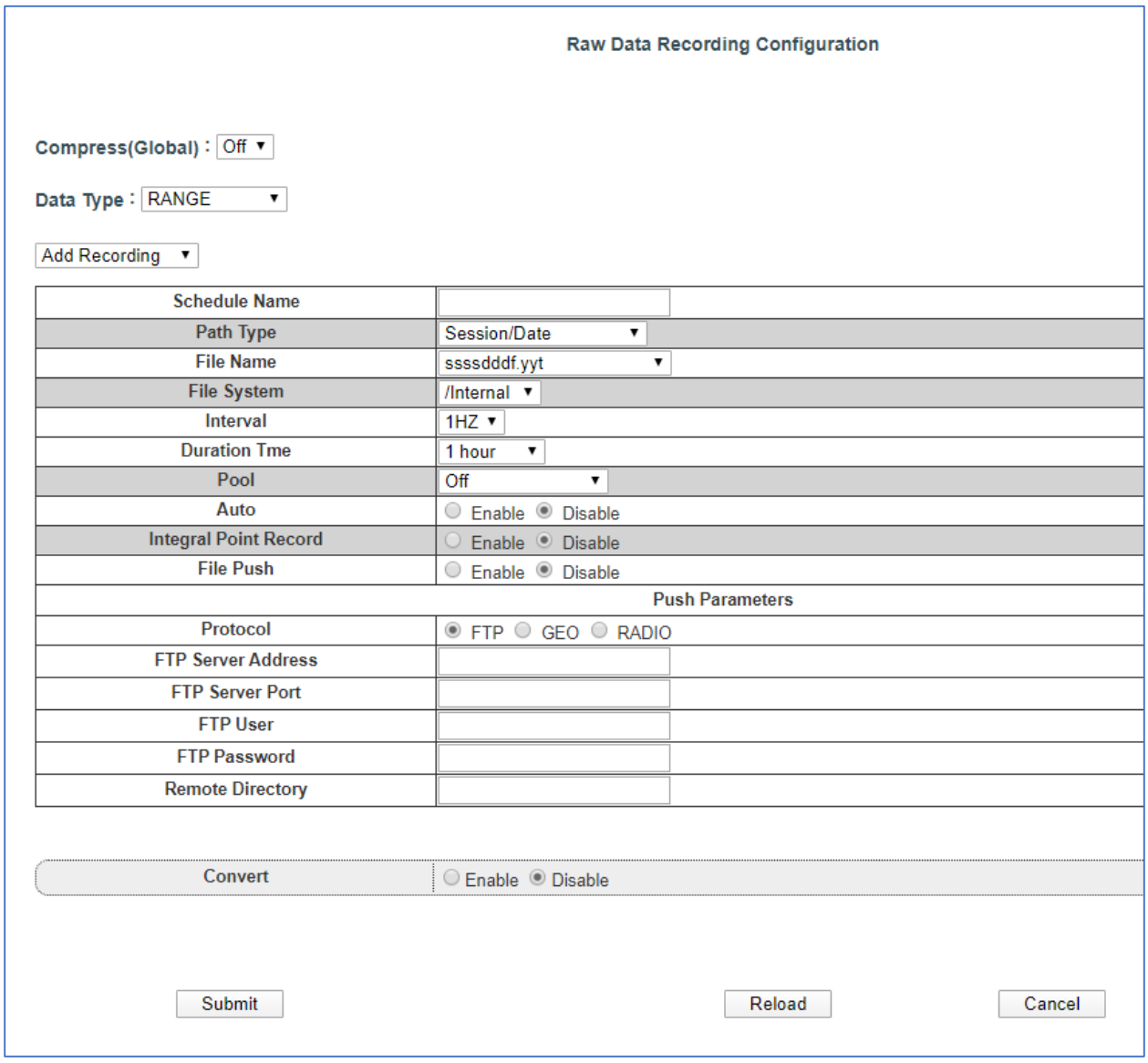
4.6 Data Records

Data records are used to store static data for data analysis, static results, and other post-processing results. On this page, the user can view the current data recording status and click [Edit] to set the recording parameters.



Schedule Name	Interval	Path	Status	Start Time	Duration Tme	File Size	Operation
Test	1S		idle	undefined	60 min	0 B	Edit Start Stop

New Session



Raw Data Recording Configuration

Compress(Global) : Off

Data Type : RANGE

Add Recording

Schedule Name	
Path Type	Session/Date
File Name	ssssdddf.yyt
File System	/Internal
Interval	1HZ
Duration Tme	1 hour
Pool	Off
Auto	Enable Disable
Integral Point Record	Enable Disable
File Push	Enable Disable
Push Parameters	
Protocol	FTP GEO RADIO
FTP Server Address	
FTP Server Port	
FTP User	
FTP Password	
Remote Directory	
Convert	Enable Disable

Submit Reload Cancel

4.7 Configuration

4.7.1 Base station settings

This page mainly sets the reference station name, mark number, receiver number, country code and time zone, etc.

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

Working mode: Set device to reference station or mobile station.

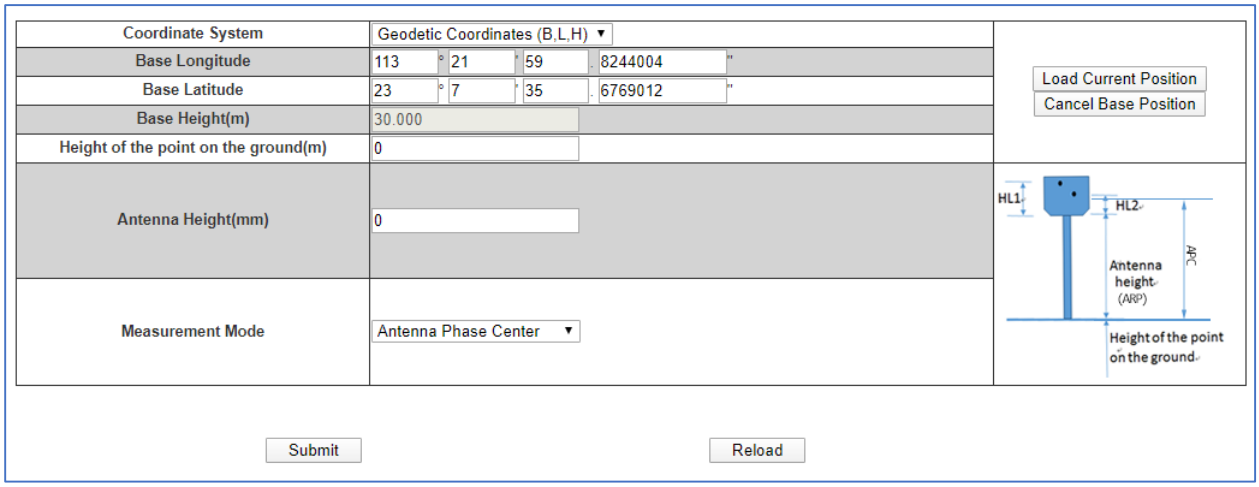
Working Mode	○ Base ◉ Rover

Antenna parameters: Select the corresponding antenna type and then enter the actual antenna height of the station.

Antenna Type	HX-GG486A
Antenna Serial	
R(mm)	0
H(mm)	0
HL1(mm)	116
HL2(mm)	142

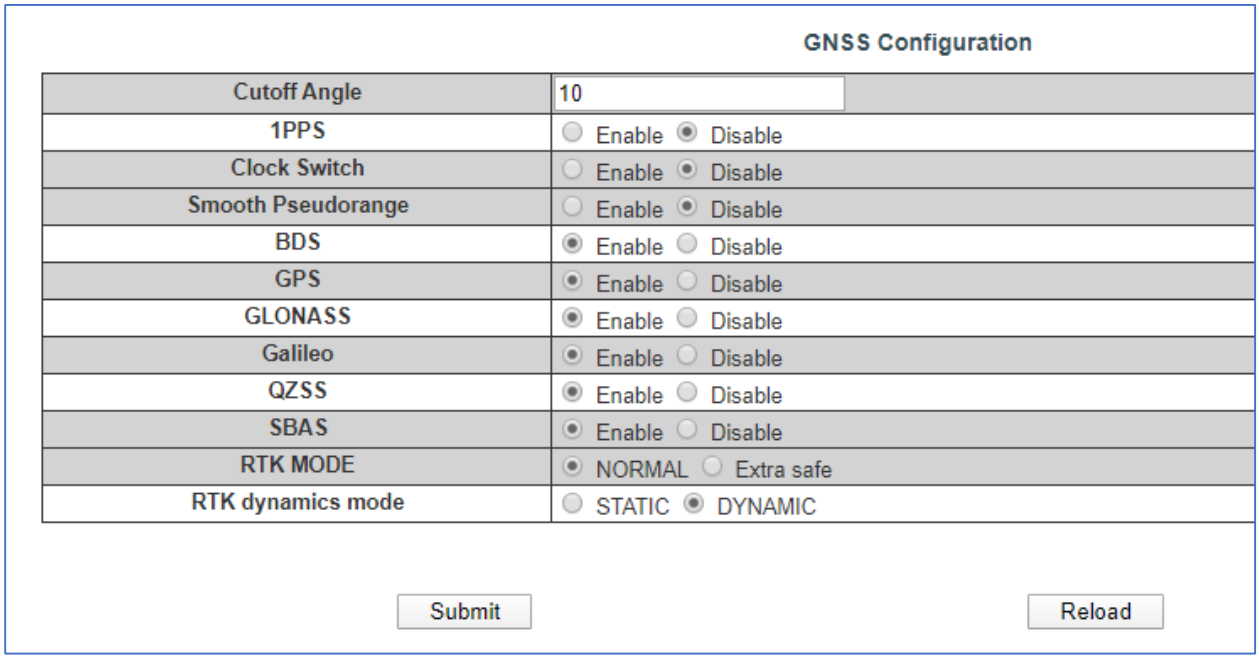
Reference station coordinates: If you don't need a known coordinate to start the reference station, click "Get the current coordinate" as a reference Check the coordinates.

However, if you need a known coordinate to start the reference station, follow the correct format to enter the known point coordinates.



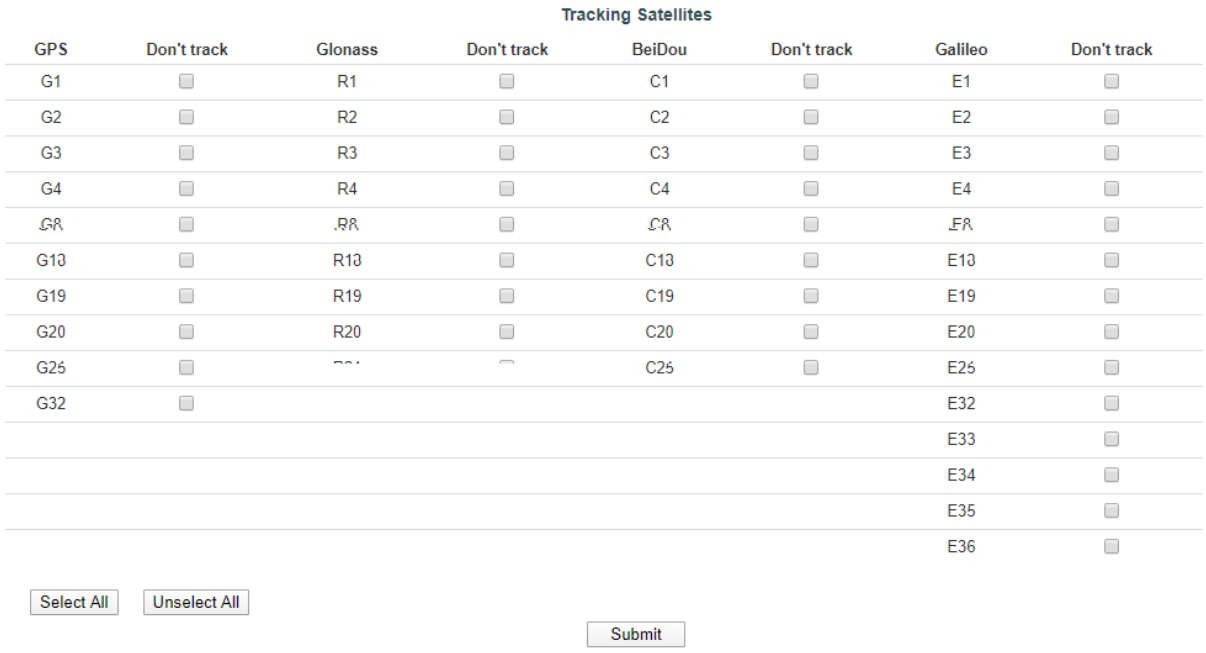
4.7.2 Satellite system settings

On this page, you can set the information of tessellate system and the cut off angle height.



4.7.3 Satellite tracking settings

On this page, you can choose the satellite you want.



4.7.4 Coordinate conversion parameter settings

This page is used to convert coordinate parameters.

Convert Coordinate

Enable Output	(•) Enable ( ) Disable
Destination Datum	
Datum	WGS84
Semi-Major Axis(a)	6378137
Bot-Flattening(1/f)	298.257223563
Seven Parameter	
Use Seven Parameter	☑
dX(m)	0
dY(m)	0
dZ(m)	0
RotateX(")	0
RotateY(")	0
RotateZ(")	0
Scale(ppm)	0
Projection Parameter	
Projection Type	Gauss
CenterMeridian(°)	0.0000000000
Scale	1
North(m)	0
East(m)	0
Ref-Height	0
Base-Lat(°)	0
Base-Lon(°)	0.0000000000
Parellel1	0
Parellel2	0
Four Parameter	
Use Four Parameter	☐
dX(m)	0
dY(m)	0
Rotate(")	0
Scale(ppm)	0

Submit Reload

4.7.5 Network settings

This page is mainly set for the data chain mode used by device.

The Running Network

Priority Network	◉ Wired Net ○ Wireless Net ○ Mobile Net
Current Network	WAN
Default Gateway	192.168.28.253
DNS	114.114.114.114|8.8.8.8 ▾
PING	Timeout : (s) Counts :

Device Network Settings

Wired Net	◉ WAN
DHCP	◉ Enable ○ Disable
IP	192.168.28.59
Mask	255.255.255.0
Gateway	192.168.28.253
MAC address	04:79:B7:E3:E1:CE
Link Status	Link disconnected
Status	Route disconnected

Wireless Net	○ Client ◉ Hotspot ○ Disable
MAC address	D4:53:83:60:2F:73
SSID	M1G2292000015
Password	12345678
IP	192.168.10.1

Mobile Net	○ Enable ◉ Disable

FTP Server Settings

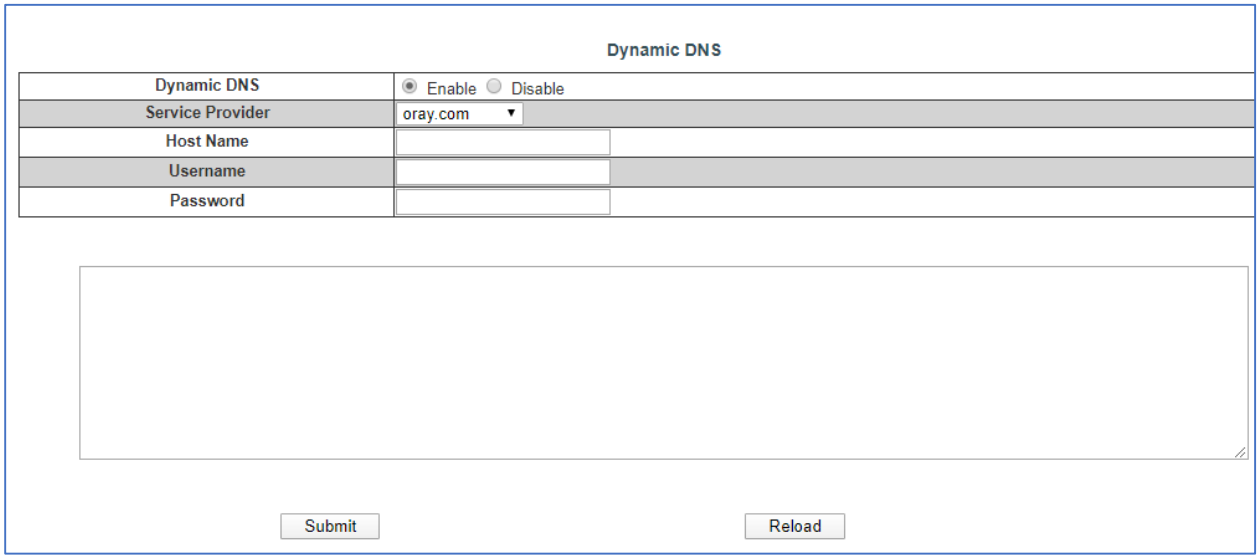
Anonymous Access	Disable ▾
User	123
Password	•••

NTP

NTP Server	○ Enable ◉ Disable

4.7.6 Dynamic domain name

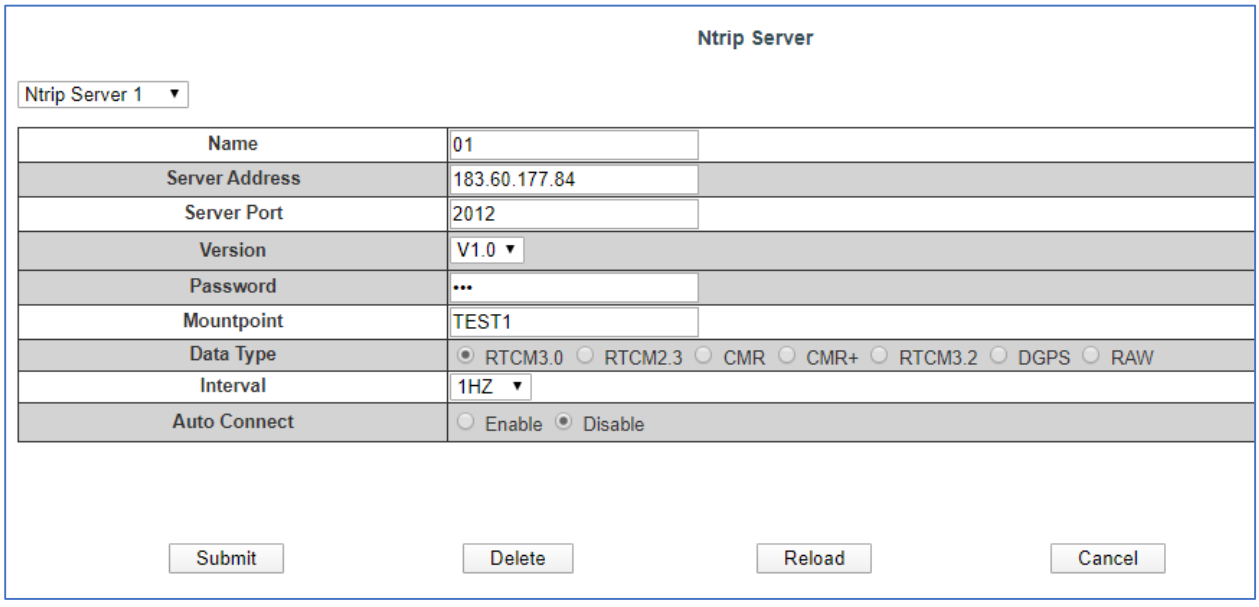
This page is mainly used to set dynamic domain name, service, host name, user name, password and so on.



4.7.7 Data transfer settings

In this page, you can set the transfer content and server for reference station.

Note: Passwords in this page can be entered arbitrarily, but cannot be empty.



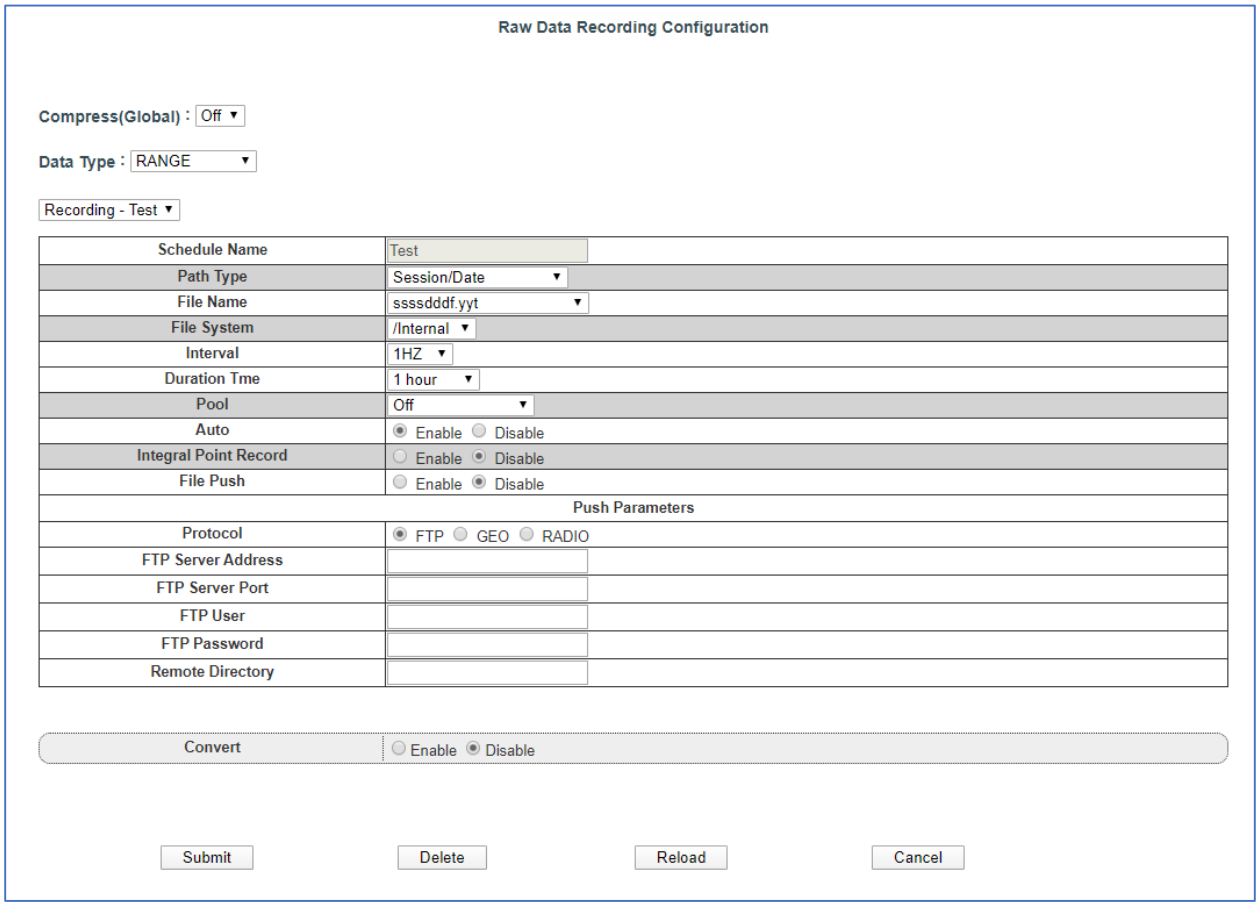
- When select [Automatic Connection] to open, after the network is disconnected, it will automatically connect the data transmission, otherwise it needs to manually start the transmission.

- Before setting the parameters, please go back to the reference station page to confirm that the base station coordinates are correct. If you need to start with a known coordinate, please enter a known coordinate.

- When the parameter settings are completed, click submit and the data transmission opens. In the status bar, you can see that the data transmission status is shown as "being transferred ". the host front panel differential transmission indicator starts flashing. The above process is to establish a base station transmission mode.

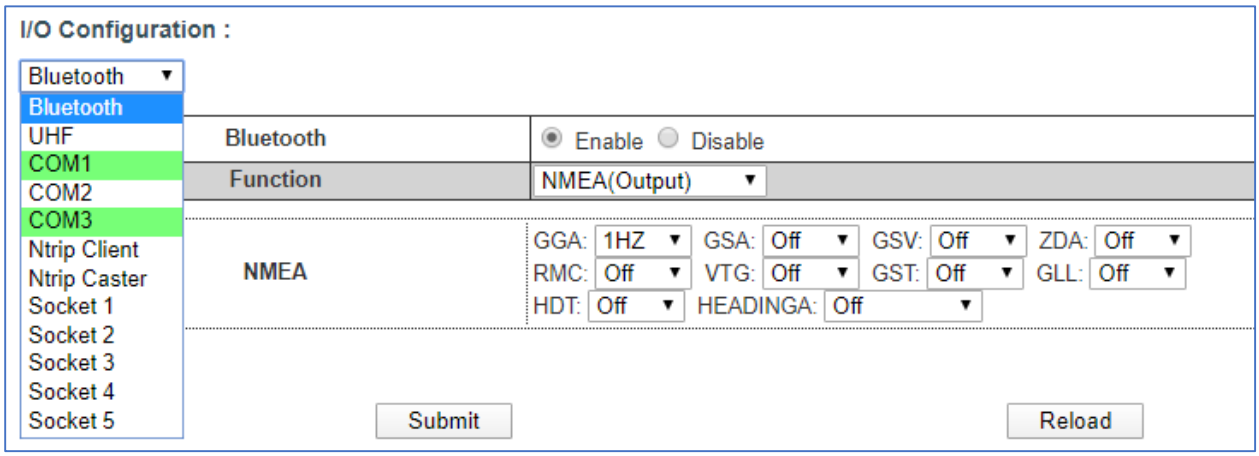
4.7.8 Data record

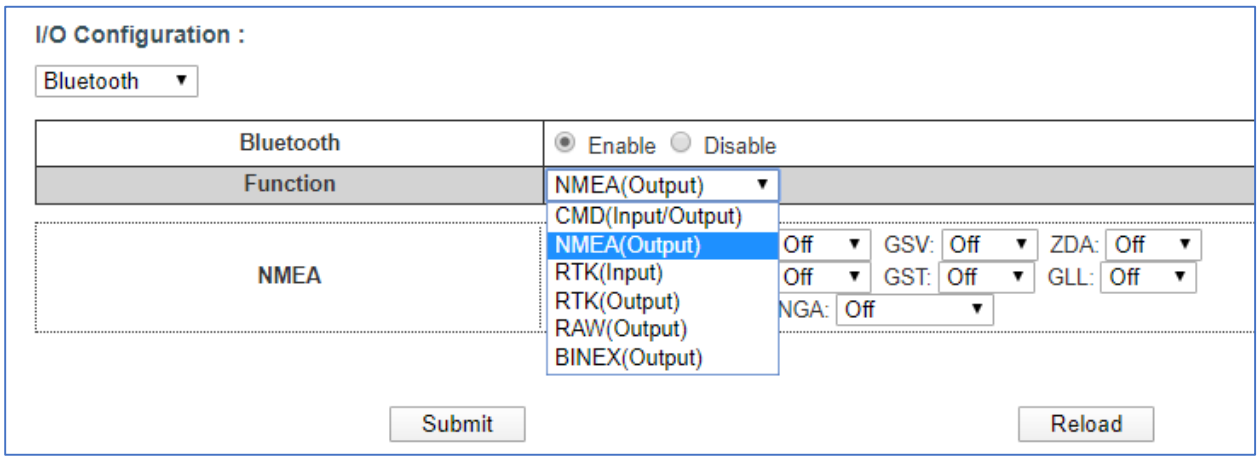
In this page, you can set up compressed storage, data format, time period name, path form and so on, and you can also choose the protocol.

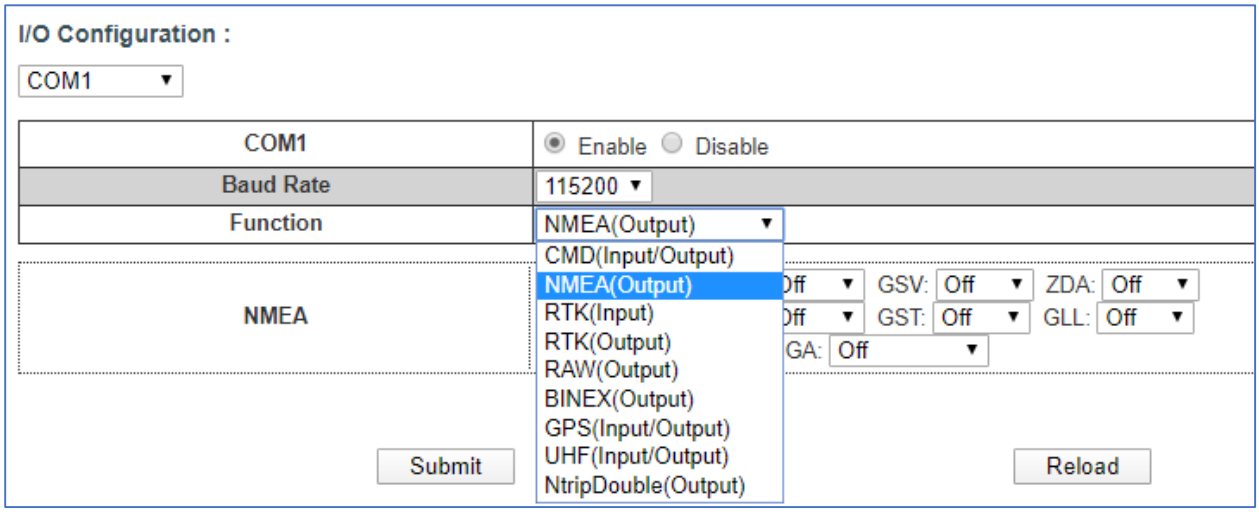


4.7.9 Port configuration

This page is mainly used to set up Bluetooth, Radio, COM1, COM3, NTRIP client, NTRIP server, Socket 1, Socket 3, Socket 4, Socket 5.







I/O Configuration :

UHF

UHF	Enable Disable
Radio Channel	2 440.125 MHz Default Frequency
Radio Protocol	South 9600
Radio Power	High
Channel Spacing	25
Function	RTK(Output)
Data Type	RTCM3.0
Interval	1HZ

Submit Reload

I/O Configuration :

Ntrip Client

Ntrip Client	Enable Disable
IP:Port	183.60.177.84:2012
Version	V1.0
Mountpoint	TEST Get Mountpoint
Upload GGA	10S
User	user
Password	••••

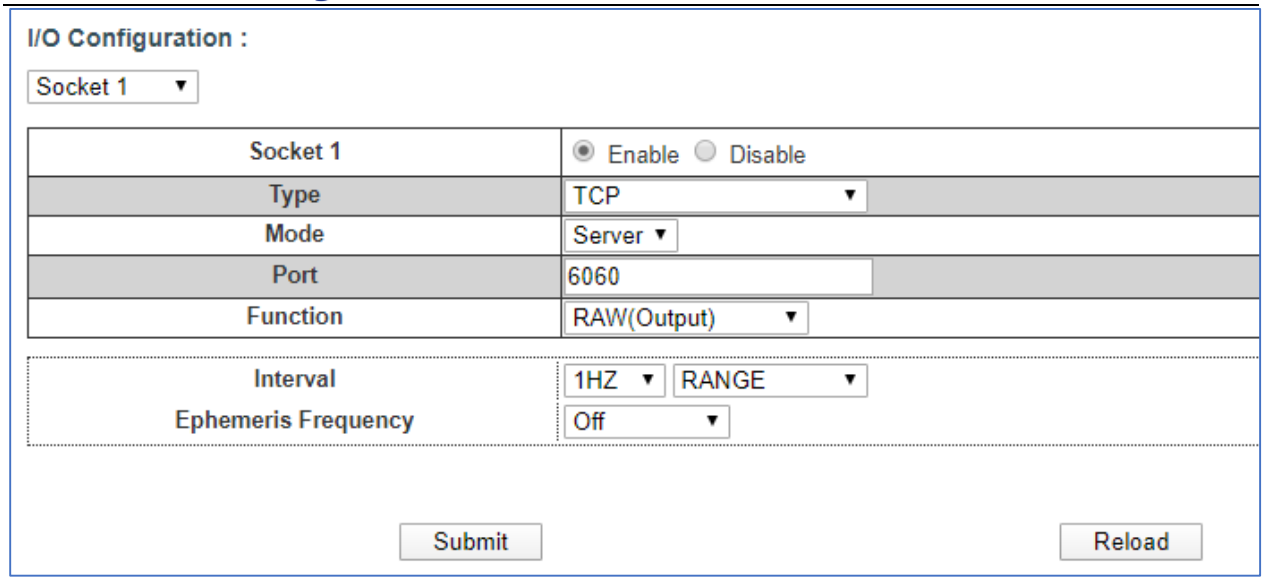
Submit Reload

I/O Configuration :

Ntrip Caster

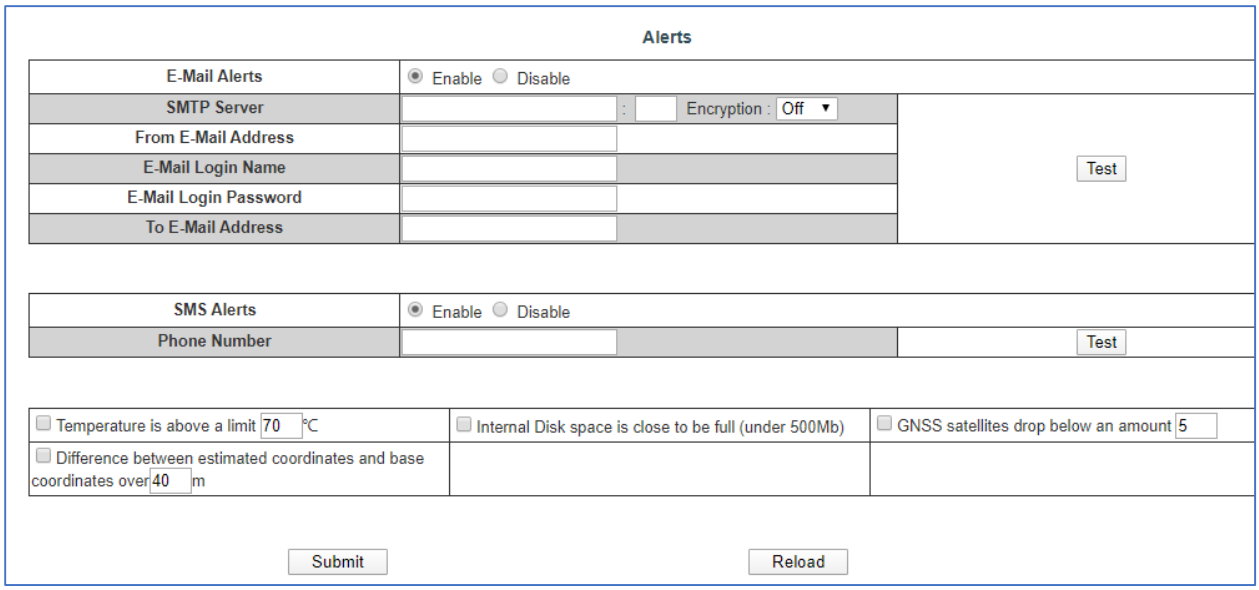
Ntrip Caster	Enable Disable
Port	6070

Submit Reload



4.7.10 Reminder Settings

This page is mainly used to install e-mail, text messages, telephone numbers. If you want to send message, you need to use the mobile network.

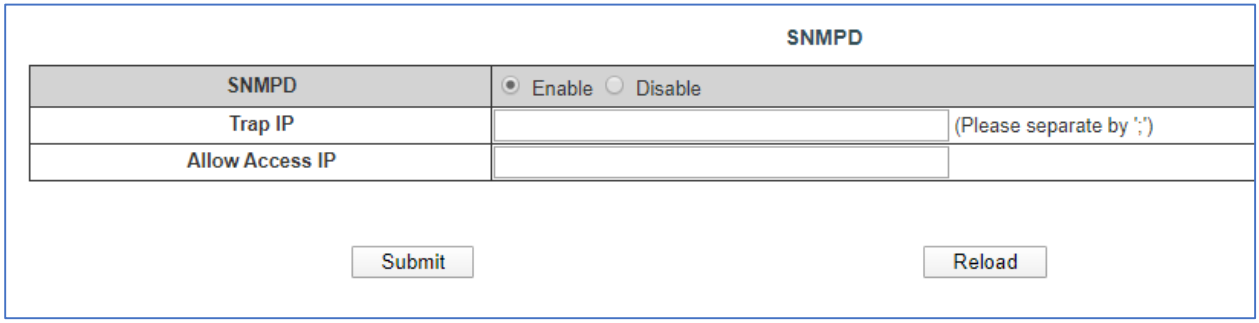


4.7.11 SNMP Proxy settings

When you come to SNMPD, you can see [Trap IP]and [Allow Access IP].

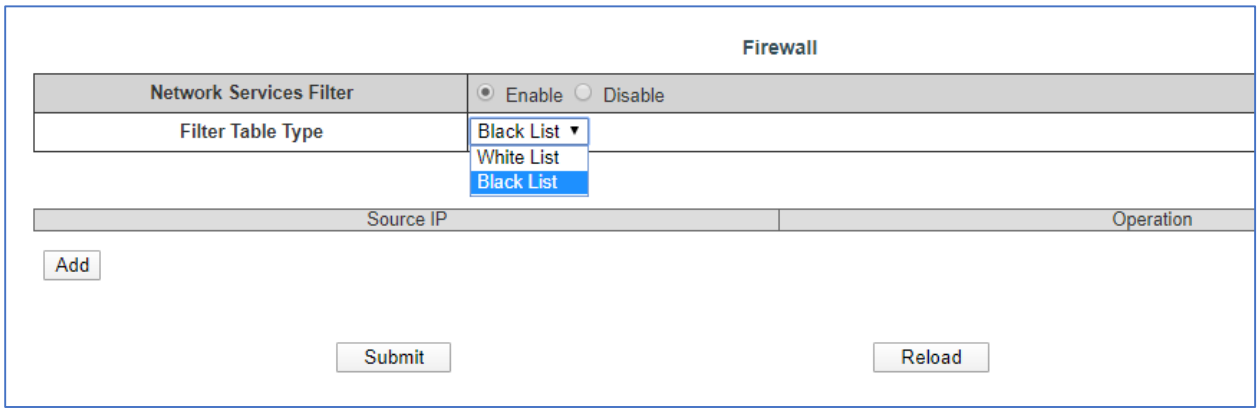
[Trap IP]: Receivers can specify some IPS and then automatically send information to those IPS.

[Allow Access IP]: Receivers can allow some devices to proactively obtain information about receivers through IP addresses.

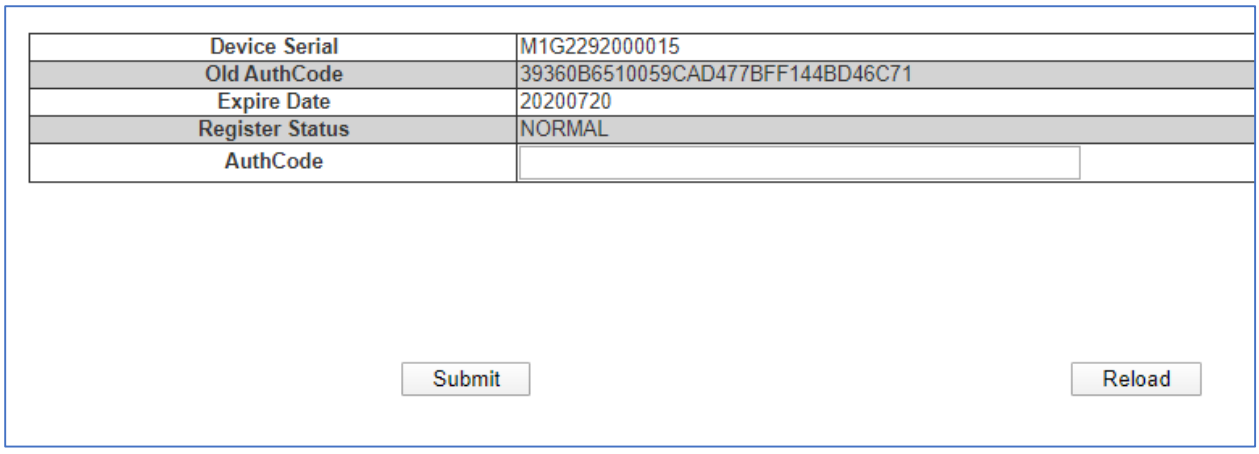


4.7.12 Firewall Setting

On this page, you can choose whether to open a firewall.



4.7.13 Registration of Device



4.7.14 Data Download

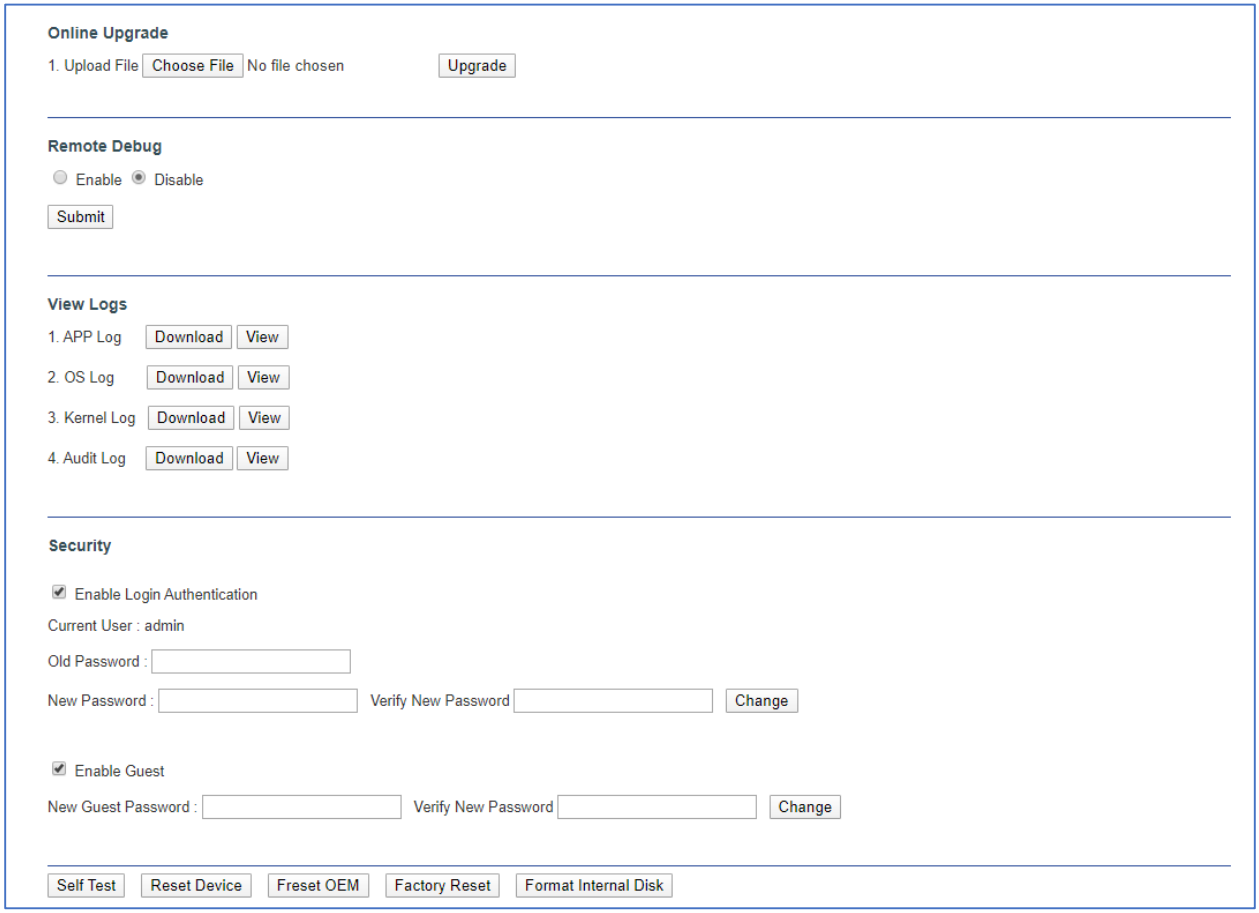
On this page, you can download observations and ephemeris.

Select	Name	Size	Creation Time	Modification Time	Operation
☐	INTERNAL	25.746M	-	-	FTP Push Package Delete

Select All Package Delete Selected Prev 1 1 (1/1) Next

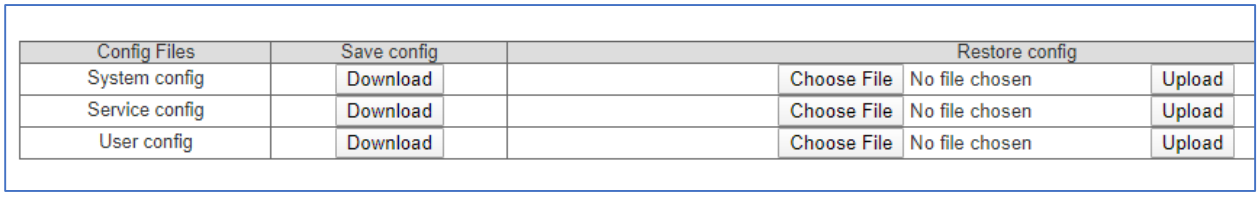
4.8 System Management

On this page you can set up online upgrade, remote debugging, view log, security.



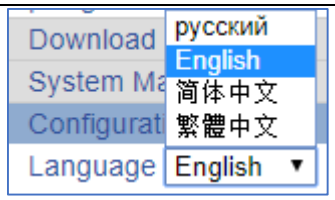
4.9 Configuration set

You can set a profile on this page.



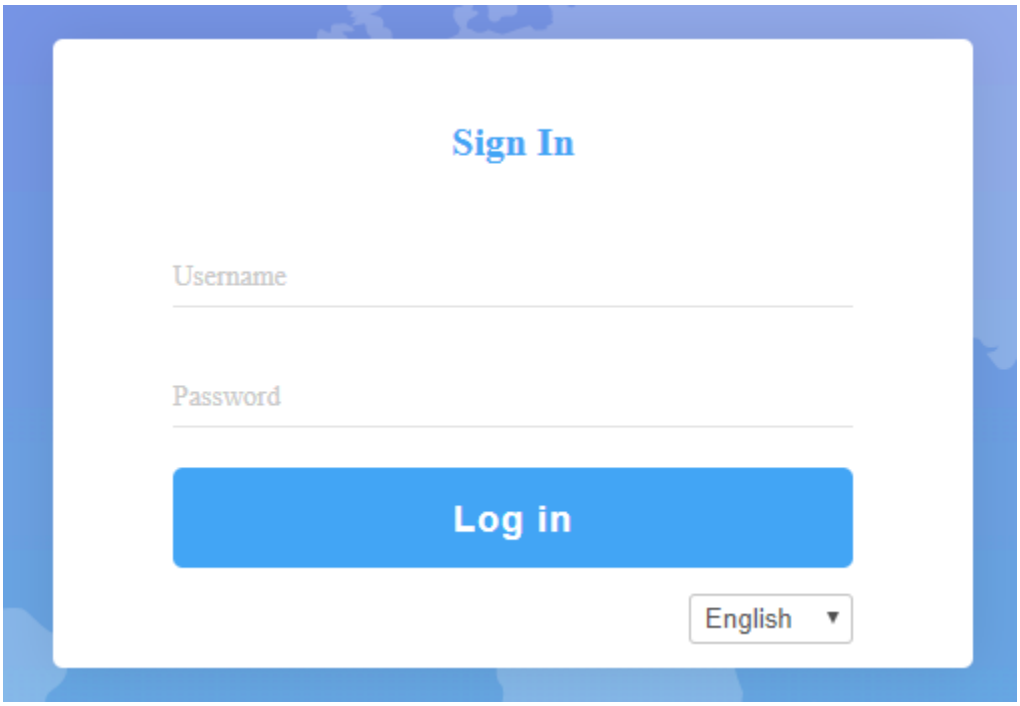
4.10 Language

It can be seen that MG 10 S has four languages available. Russian, English, Simplified Chinese, Traditional Chinese.



4.11 Logout

When you click log out, you will exit and return to the page.



Warranty Policy

The Guarantees Rights

- e-survey supports free exchange or refund within 7 days from the day when you have received the products, where the device appears "performance failure", which confirmed by e-survey repair center.

- e-survey supports free maintenance or exchange within 15 days from the day when you have received the products, where the device appears "performance failure", which confirmed by e-survey repair center.

- e-survey supports free maintenance or exchange the same type of device within one year from the day when you have received the products, where the device appears "performance failure", which is still not in working conditions after two repairs.

- e-survey supports a 24-month warranty service for the device host and a 3-month free warranty service for the accessory from the day when you have received the products.

Warranty service

If the device host meets the warranty conditions, the warranty service can be obtained according to the warranty card and the purchasing invoice. If the proof of purchase and the warranty card cannot be provided, and e-survey will use the delivery time as the standard for the warranty period.

- If it is a non-warranty product, and the repair center will handle the maintenance of the extra-fee.

- After the device is repaired, the same fault is con- firmed by the repair center and e-survey will provide a 3-month free warranty service.

- The transportation, delivery and disposal costs incurred during the delivery or inspection of the product to e-survey shall be borne by the user. The freight generated by the repair or inspection equipment returned to the user shall be borne by e-sur- vey.

- Equipment that needs to be repaired or sent for inspection, please back up the data in the machine in time.

- During the warranty period, the parts normally used for maintenance are free.

- The parts that have been replaced during the repair are owned by e-survey.

- e-survey is not responsible for non-product standard and software or applications that are not certified by the company.

Following conditions are not within the scope of the warranty and service

The device host and accessories have been subjected to: abnormal or improper use, improper storage of abnormal conditions, unauthorized disassembly or alteration, accidents, damage caused by improper installation.

- Damage caused by improper use of user, such as liquid injection, damage due to external force, etc.

- Failure to use, repair or transport caused by the equipment's instruction manual.

- Damage to the product is caused by external, including but not limited to, abnormal and unpredictable factors such as satellite systems, geomagnetism, static electricity, physical pressure, etc.

- Damage caused by force majeure such as earth- quakes, floods, wars, etc.

- Other conditions that cannot comply with the relevant provisions of the Guarantees Rights.

To be the leading provider of high-precision professional, solution & service in the global geospatial industry

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