FC-NTP-MINI NTP Server User Manual



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1. Product Overview:

This manual provides detailed instructions for installing and operating the NTP Network Time Server, along with essential product information to ensure proper installation and use.

The NTP Network Time Server is based on the NTP (v2, v3, v4) and SNTP protocols. It receives standard UTC time from a GNSS receiver and distributes the time information over the network. Devices such as computers and controllers can synchronize with the standard clock signal to achieve network time synchronization. Standard time information is transmitted over a TCP/IP network, supporting both unicast and broadcast modes.

It is easy to use. Simply connect a GNSS antenna to synchronize time across the entire network. Its compact design makes installation easy, while its ultra-low power consumption enables plug-and-play operation.

This product series has been extensively tested in real-world applications and provides stable and reliable performance.

2. Product Features:

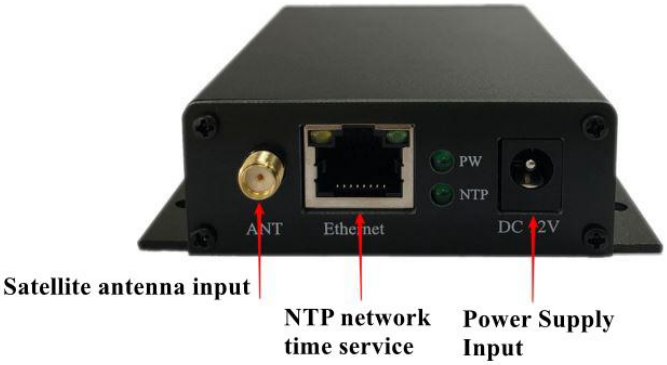
- Supports up to 6,000 requests per second
- Web UI for easy and efficient management
- LAN time synchronization accuracy: 0.5-2ms
- Built-in high-precision GNSS receiver for time synchronization
- Supports GPS, BeiDou, GLONASS, and QZSS
- NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (RFC 5905)
- SNTP v3 (RFC 1769), SNTP v4 (RFC 2030)
- Supports MD5 authentication
- Supports SERVER and BROADCAST modes
- Ethernet port supports 10/100Mbps, full/half duplex, and auto-negotiation
- Supports user-defined MAC addresses
- NMEA 0183 transmission over TCP
- Compact design for easy installation
- Power consumption: only 1W
- Industrial operating temperature range

3. Dimensions:

- Product Dimensions: 90mm (L) x 80mm (W) x 23.8mm (H)
- Product Color: Black



4. Interface Description:



- ANT: Satellite antenna input. SMA connector with 5V power supply.
- Ethernet: NTP network time service. RJ45 connector, 10/100Mbps auto-negotiation.
- DC 12V: Power input. 6-24V DC, 12V by default.
- PW: Power indicator.
- NTP: NTP status indicator. Stays on during normal operation and remains off when no NTP signal is available.

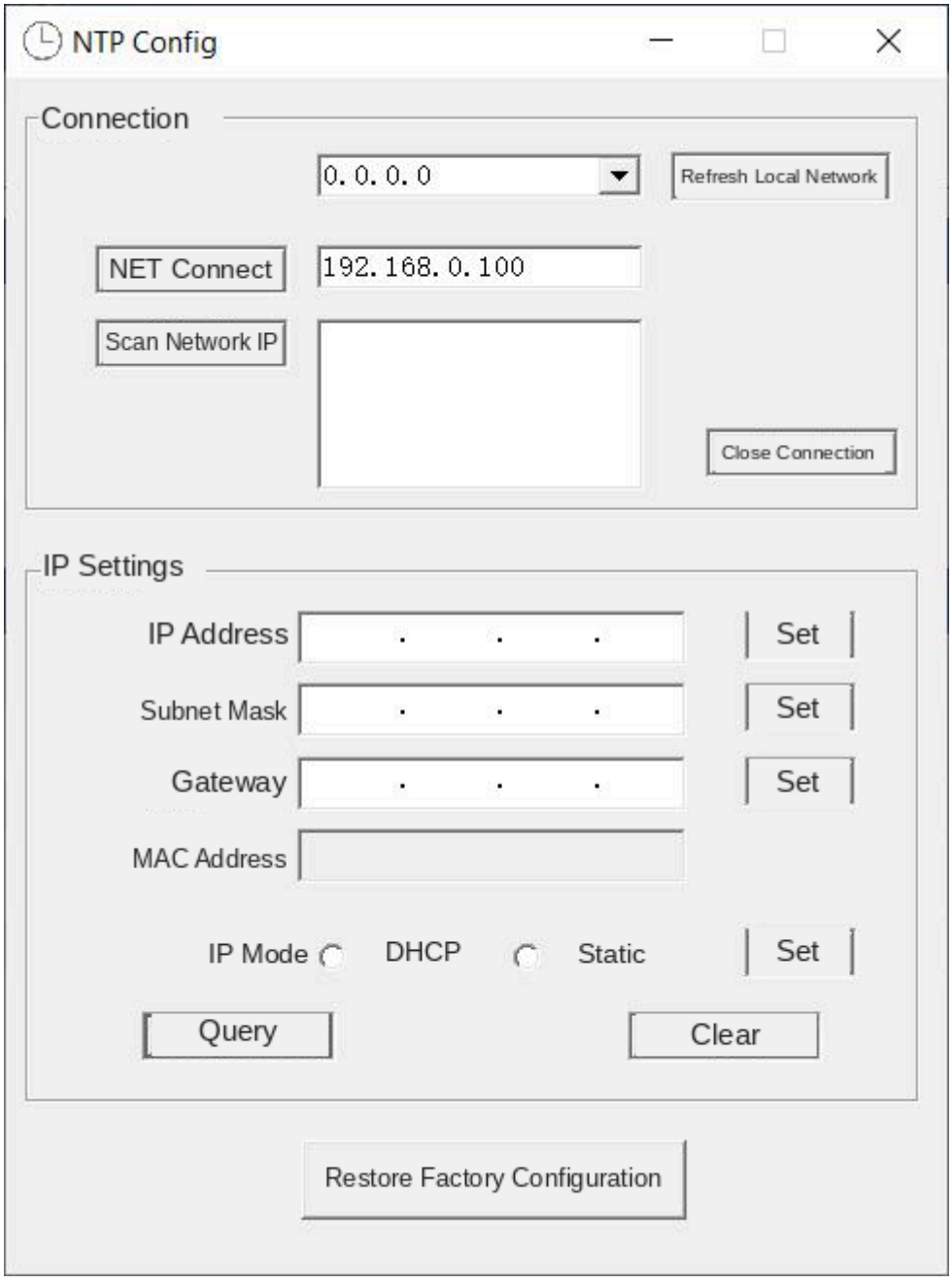
5. Device Operation:

5.1 IP Configuration

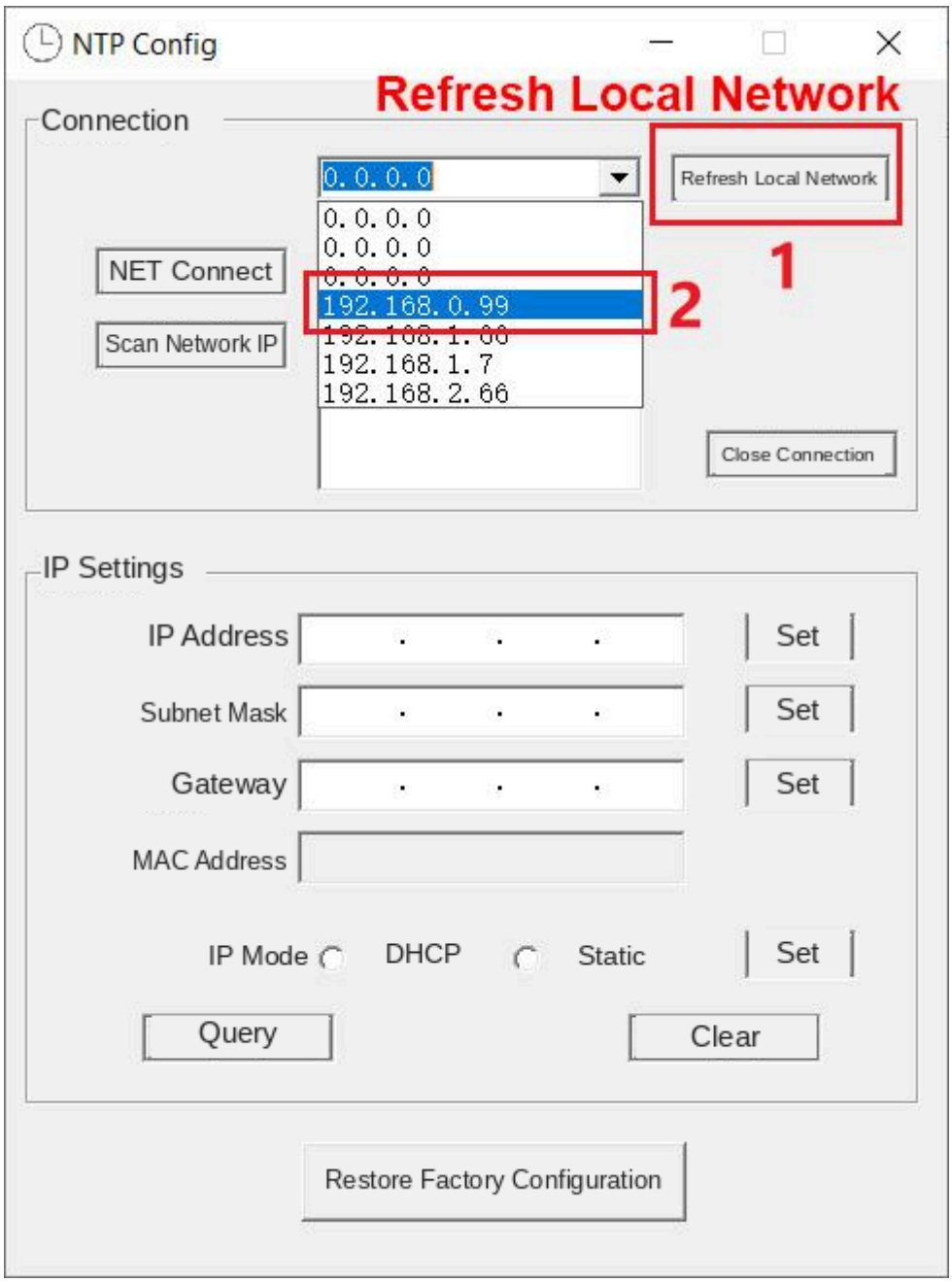
Prepare a laptop or PC and connect its Ethernet port to the Ethernet port of the device using a network cable.

The device's default IP address is 192.168.0.100. Set the laptop or PC to the same subnet as the device. For example:
IP Address: 192.168.0.99
Subnet Mask: 255.255.255.0

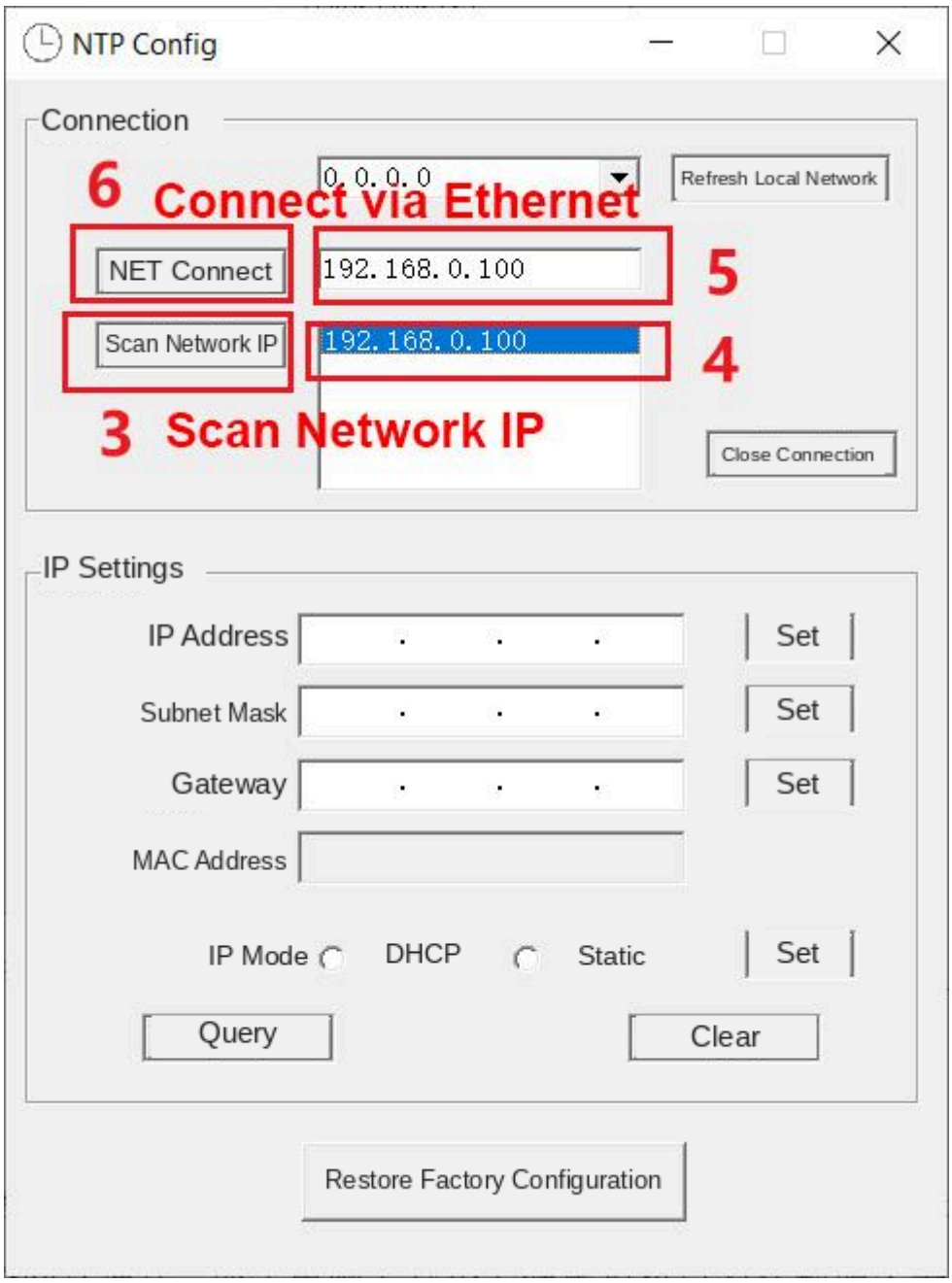
Run the IP Configuration Tool v2.2. The software interface is shown below.



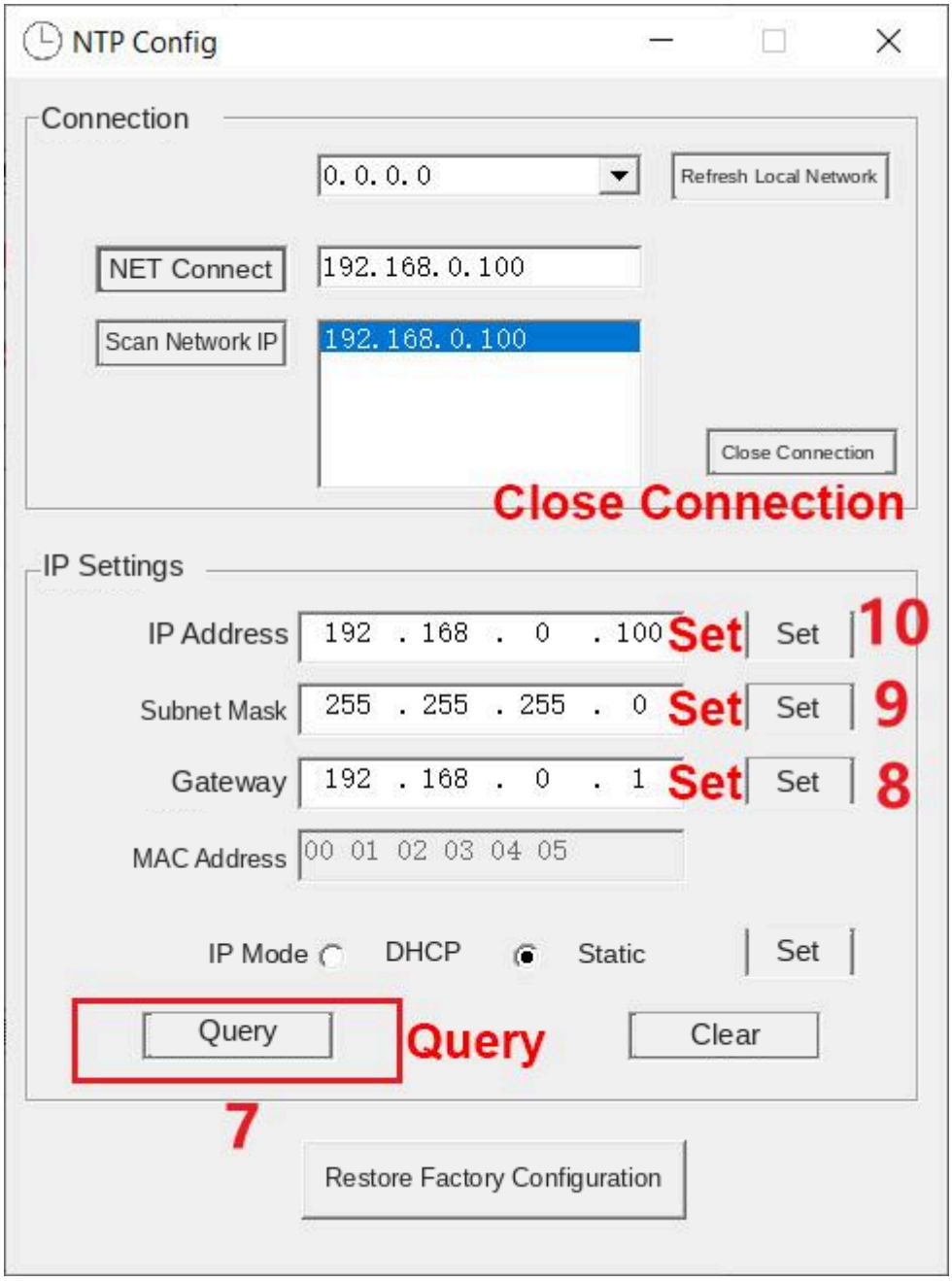
Step 1. Click the "Refresh Local Network" button.
Step 2. Select the newly configured 192.168.0.99 network from the drop-down list.



Step 3. Click the "Scan Network IP" button.
Step 4. Double-click the IP address displayed in the list.
Step 5. Confirm that the Ethernet port IP matches the scanned IP address.
Step 6. Click the "Connect via Ethernet" button.



Step 7. Click the "Query" button to display the device's IP configuration.
Step 8. Edit the IP settings and click the "Set" button to apply the changes. The recommended order is: Gateway → Subnet Mask → IP Address.



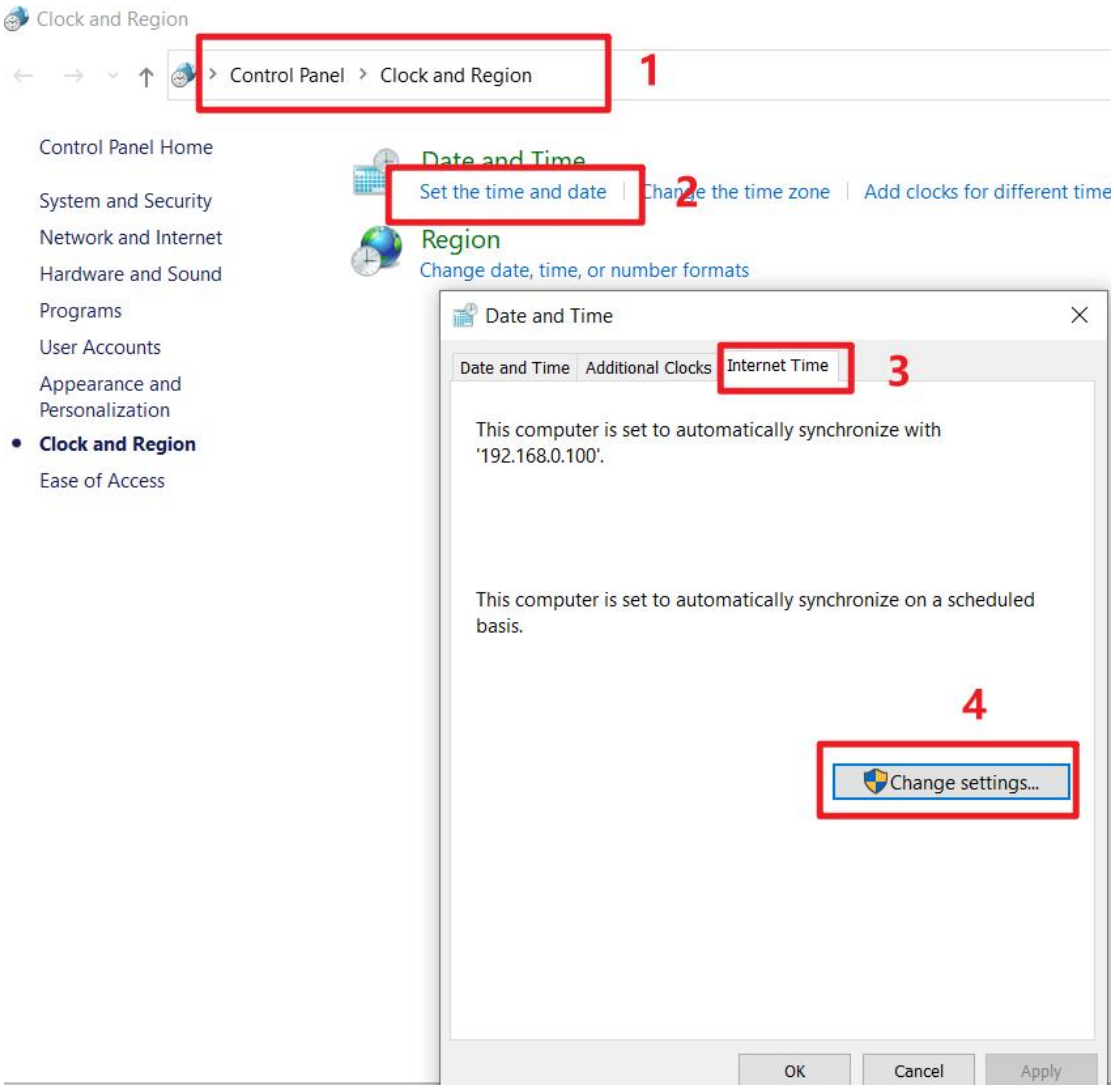
- **Note: The PC and NTP device must be on the same subnet for the changes to take effect. After configuration, click "Close Connection" and reconnect the device by following Step 1 to verify that the settings are correct.**

5.2 Time Synchronization in Windows

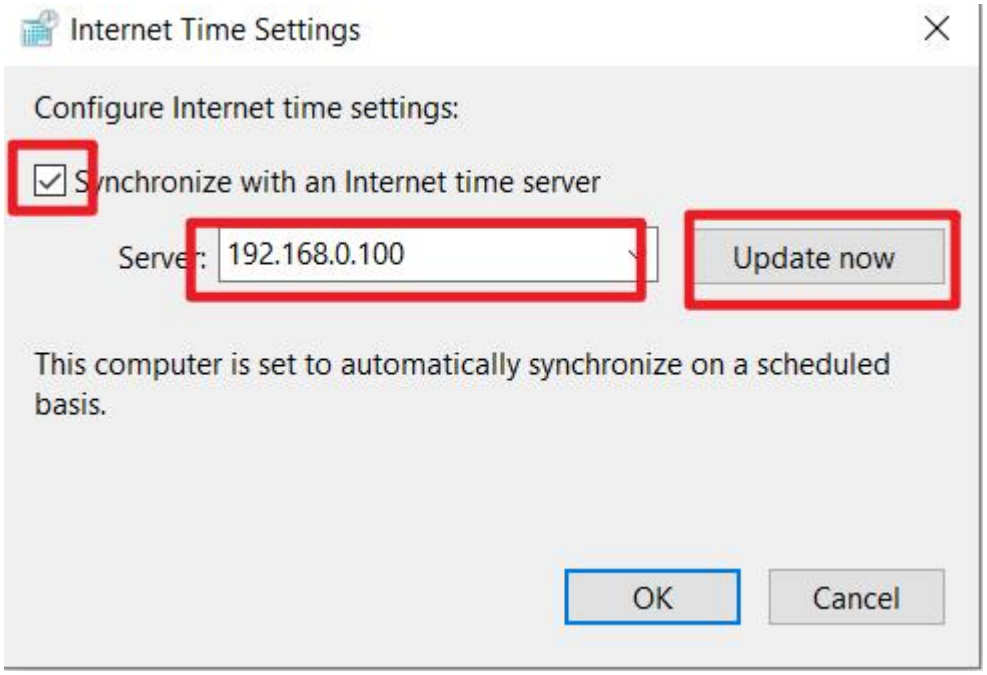
Open the Windows Control Panel. In the Date and Time window, select the Internet

SERVICE NOTE - Factory Restore button

The configuration utility shows a Restore Factory Configuration option. Its operation and whether it clears the administrator password have not been verified for all firmware versions. Contact Microdata technical support before use.



In the Internet Time Settings window, select Synchronize with an Internet time server. Enter the clock device's IP address in the Server field, then click Update Now. After synchronization is successful, click OK to return to the Date and Time window, then click OK again to apply the settings.



5.3 Time Synchronization in Linux

1. Check whether the NTP service is installed. If not, install it manually.
2. Edit the NTP client configuration file: vim /etc/ntp.conf
3. Add the access restriction: restrict 192.168.0.100 mask 255.255.255.0 nomodify notrap
4. Add the time server address: server 192.168.0.100 prefer
5. Start the NTP service: service ntpd start
6. Check the time synchronization status: ntpq -p

```
# For more information about this file, see the man pages
# ntp.conf(5), ntp_acc(5), ntp_auth(5), ntp_clock(5), ntp_misc(5), ntp_mon(5).

driftfile /var/lib/ntp/drift

# Permit time synchronization with our time source, but do not
# permit the source to query or modify the service on this system.
restrict default kod nomodify notrap nopeer noquery
restrict -6 default kod nomodify notrap nopeer noquery

# Permit all access over the loopback interface.  This could
# be tightened as well, but to do so would effect some of
# the administrative functions.
restrict 127.0.0.1
restrict -6 ::1

# Hosts on local network are less restricted.
# @1新增-权限配置
restrict 192.168.31.0 mask 255.255.255.0 nomodify notrap

# Use public servers from the pool.ntp.org project.
# Please consider joining the pool (http://www.pool.ntp.org/join.html).
# 注释掉原来的实际服务器地址
#server 0.centos.pool.ntp.org iburst
#server 1.centos.pool.ntp.org iburst
#server 2.centos.pool.ntp.org iburst
#server 3.centos.pool.ntp.org iburst

# @2新增-自己的时间服务器地址
server 192.168.21.179 profer
#broadcast 192.168.1.255 autokey        # broadcast server
#broadcastclient                        # broadcast client
#broadcast 224.0.1.1 autokey            # multicast server
#multicastclient 224.0.1.1              # multicast client
#manycastserver 239.255.254.254         # manycast server
#manycastclient 239.255.254.254 autokey # manycast client

# Enable public key cryptography.
#crypto

includefile /etc/ntp/crypto/pw

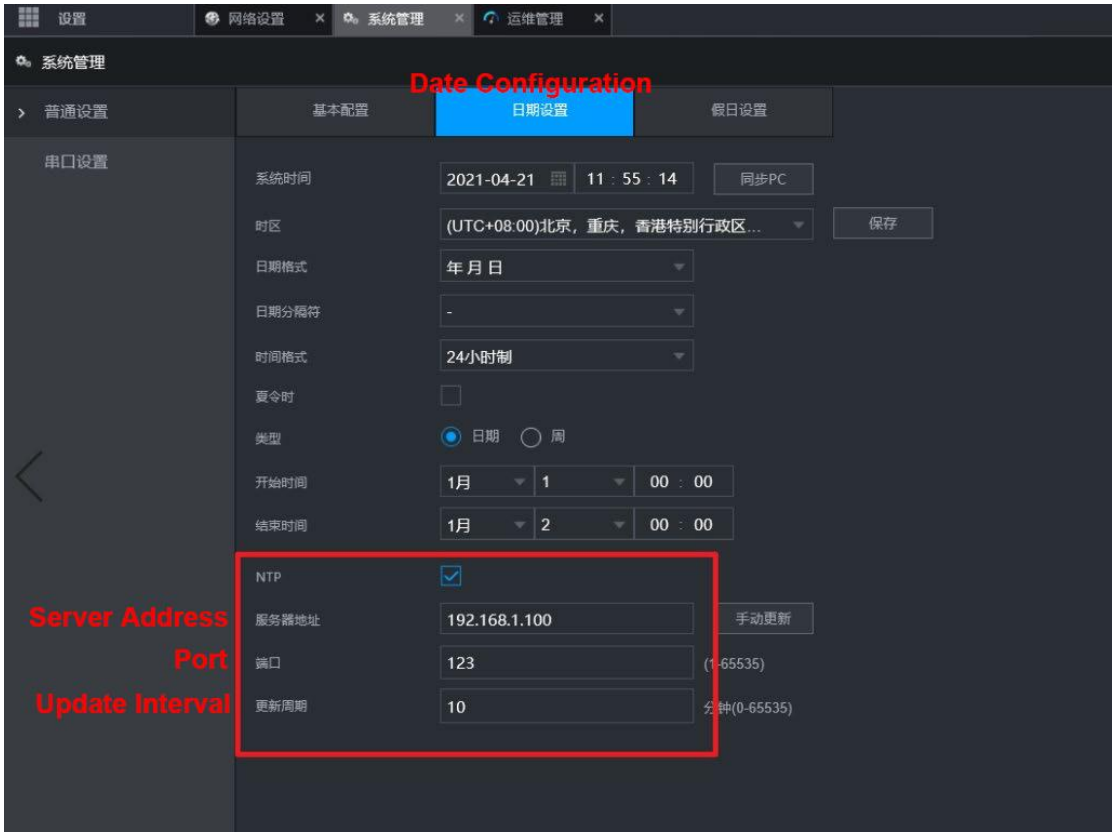
# Key file containing the keys and key identifiers used when operating
# with symmetric key cryptography.
keys /etc/ntp/keys
```

5.4 Time Synchronization for NVRs or Cameras

NVRs from manufacturers such as Hikvision, Dahua, and Hanbang Hi-Tech support the NTP/SNTP protocols. For configuration details, refer to the corresponding user manual.

Log in to the NVR's Web management interface and locate the Date Configuration settings.

Select Enable NTP and enter 192.168.0.100 as the server address. Set the NTP port to 123 and specify the synchronization interval, such as 10 minutes. Select the time zone that includes Beijing, then click Save. If prompted to restart the device, restart it.



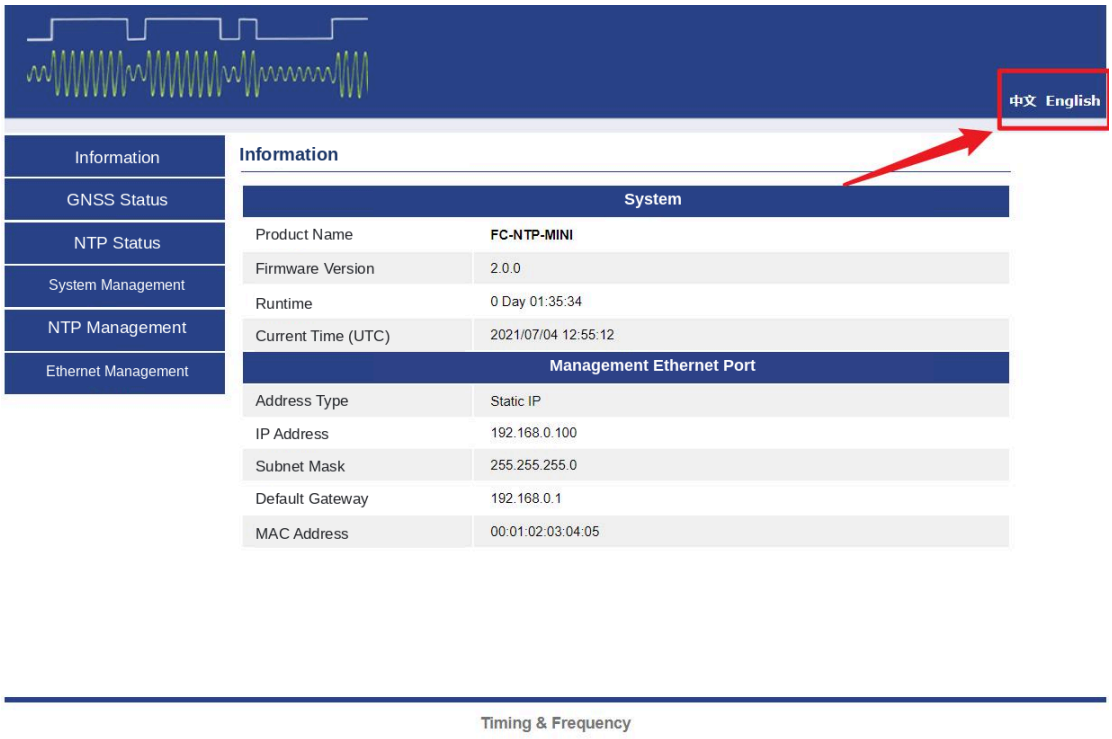
6. Web Management:

6.1 Web Login

The device supports Web-based management. Enter the device IP address in a web browser to open the Web management interface. The default username and password are both admin. The interface language can be switched in the upper-right corner. Chinese and English are currently supported.

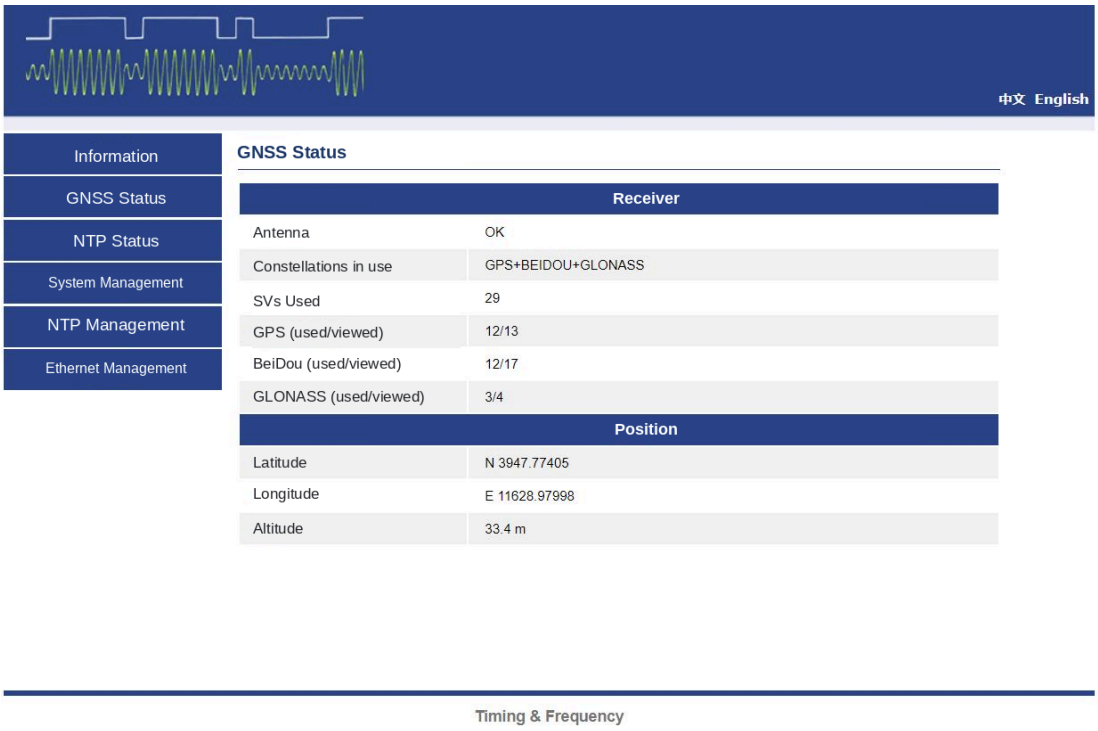
6.2 Web Home Page

The Web home page displays the basic device information, as shown below.



6.3 Satellite Status

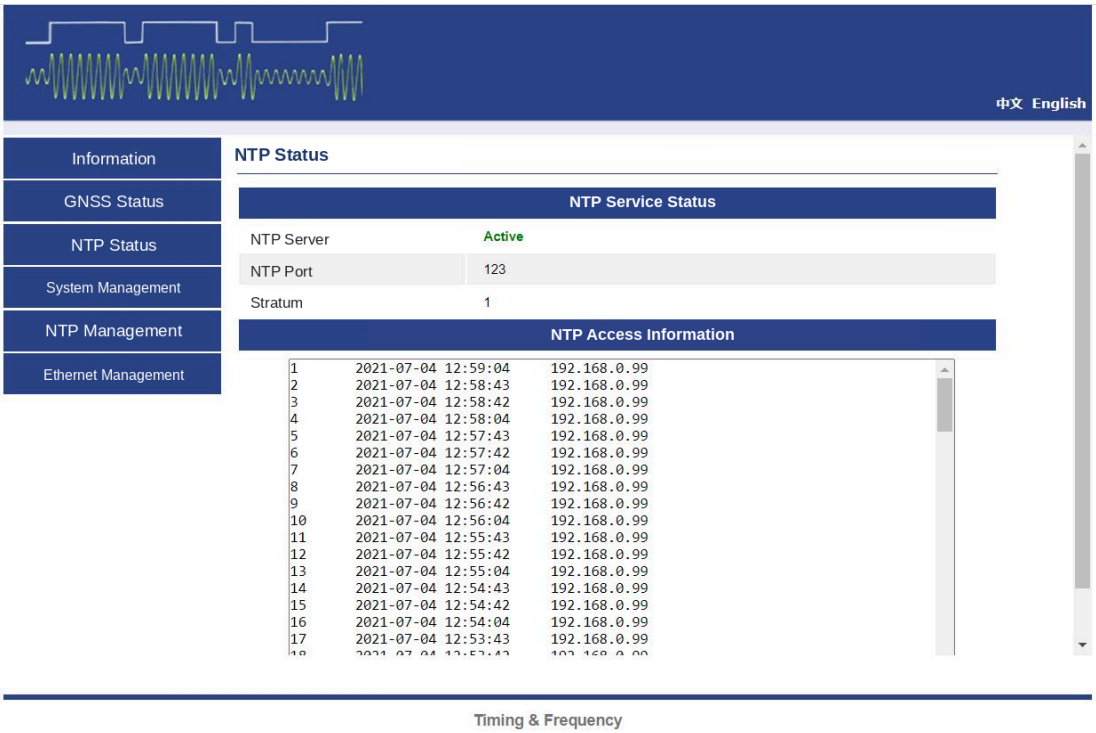
The Satellite Status page displays the current satellite reception status and positioning information. OK indicates a normal antenna connection, SHORT indicates a short circuit, and OPEN indicates an open circuit.



6.4 NTP Status

The NTP Status page displays the current NTP service status. Active indicates normal

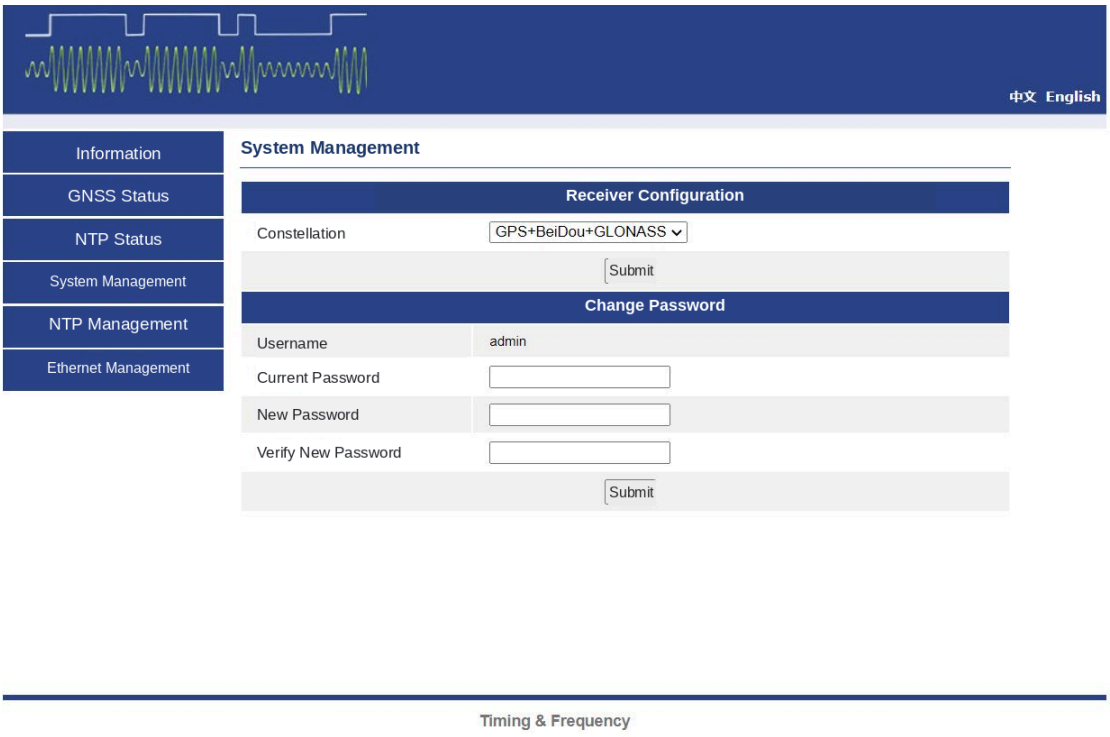
operation, while Inactive indicates that the service is stopped. The default NTP port is 123, and the default stratum is always 1. Client access information displays the IP addresses of currently connected clients and their access times.



6.5 System Management

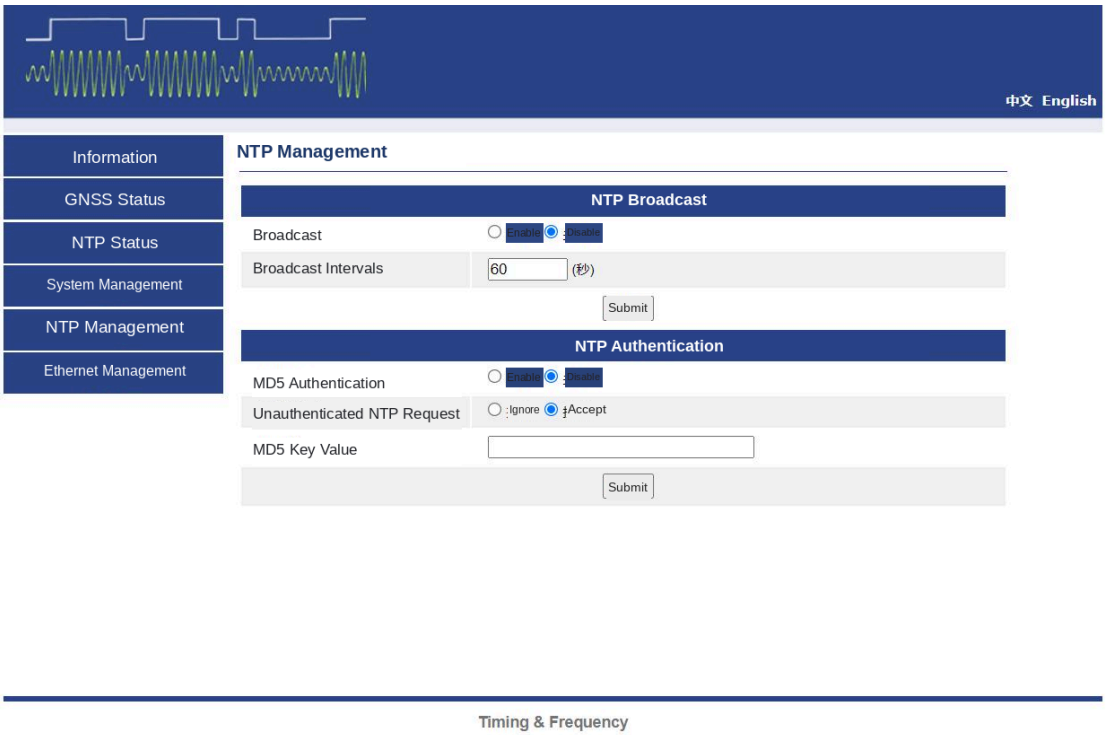
The System Management page allows the GNSS constellation to be configured. Options include GPS Only, BeiDou Only, GPS + BeiDou, GPS + GLONASS, and GPS + BeiDou + GLONASS. The default setting is GPS + BeiDou + GLONASS.

The default Web login username is admin and cannot be changed.



6.6 NTP Management

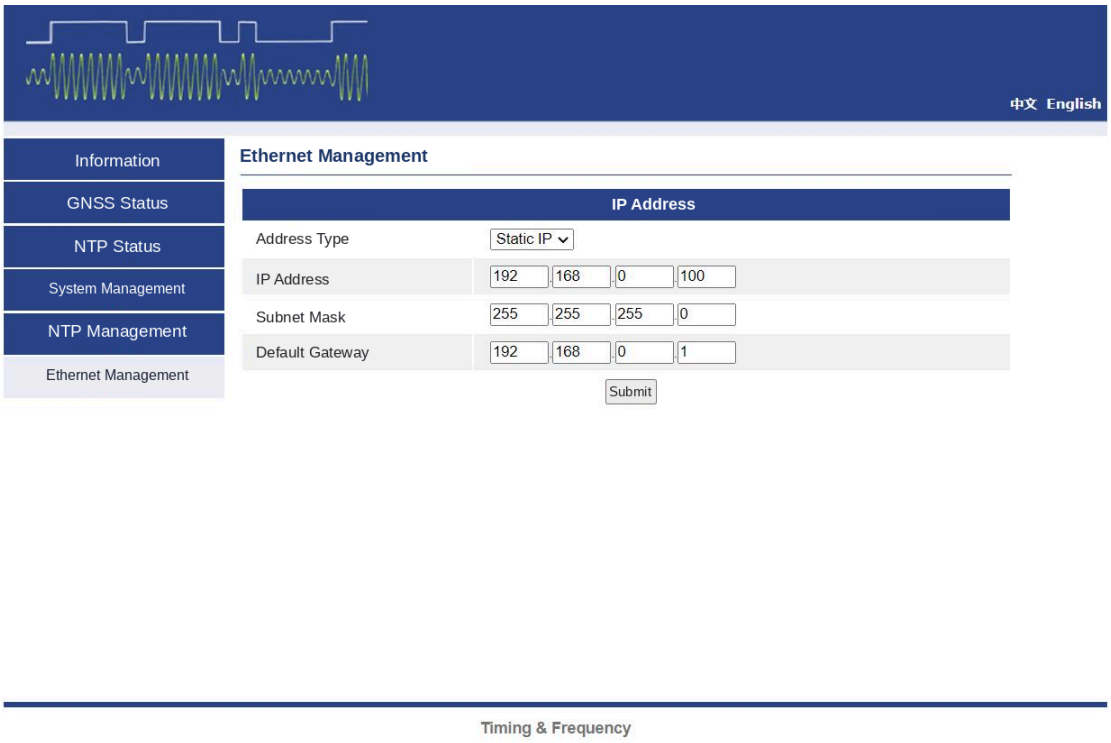
The NTP Management page allows configuration of the NTP Broadcast and MD5 Authentication functions.



6.7 Ethernet Management

The Ethernet Management page allows configuration of the device IP address. Select Static IP for the address type. To use DHCP, make sure a DHCP server is available on

the LAN. Otherwise, the device may become inaccessible after the setting is applied, and a device restart will be required to restore access.



7. Other Software Instructions:

7.1 Using the Chinese Version of the Third-Party Windows Time Synchronization Client

This software can replace the built-in Windows time synchronization client. As administrator privileges are required, right-click the software icon and select Run as administrator.



After opening the time synchronization client, right-click anywhere in the client window to open the menu.

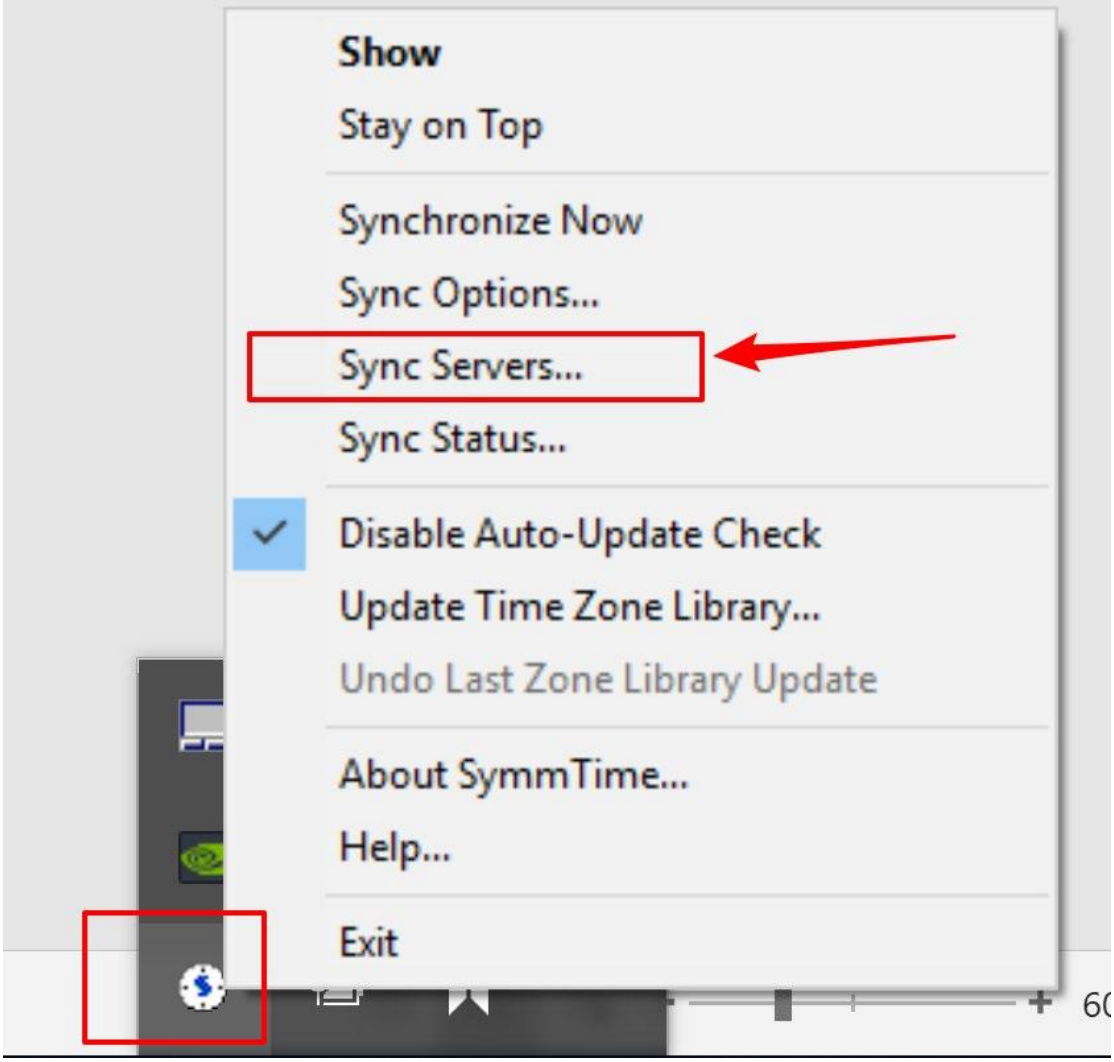


Select Sync Settings to open the following dialog box. Click Add, enter the IP address of the NTP Network Time Server, and click OK to save the settings. The dialog box also provides options for automatic queries, query intervals, and changing the local system time.

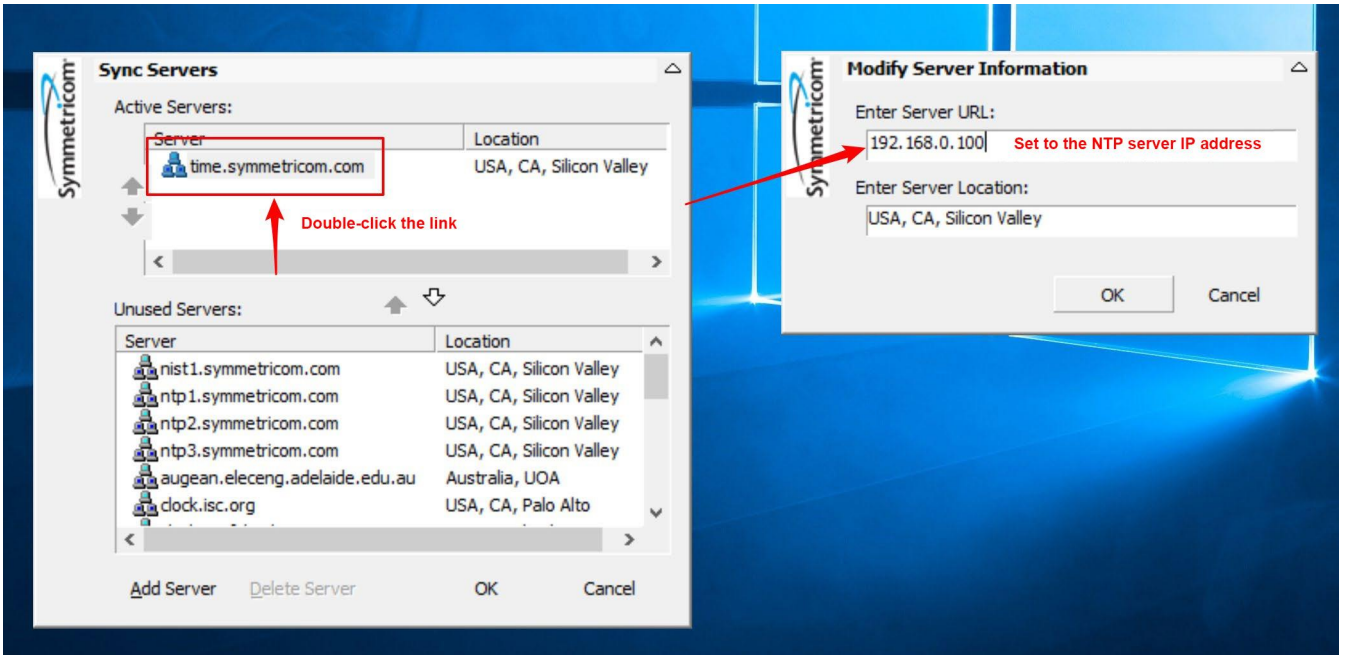


7.2 Using the English Version of the Third-Party Windows Time Synchronization Client

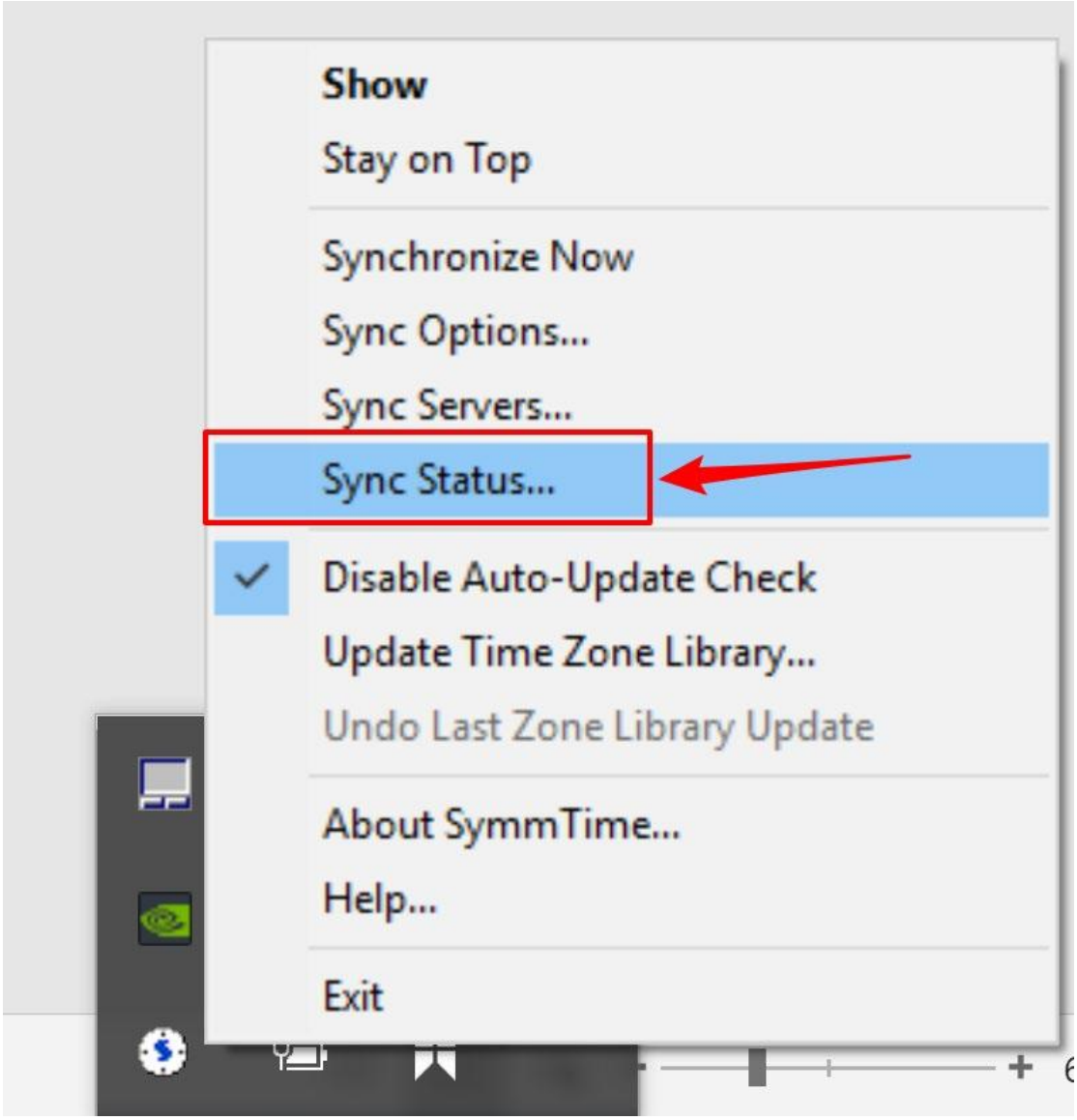
SymmTime is a recommended NTP client for Windows. Follow these steps:
Right-click the SymmTime icon in the system tray and select Sync Servers from the menu.



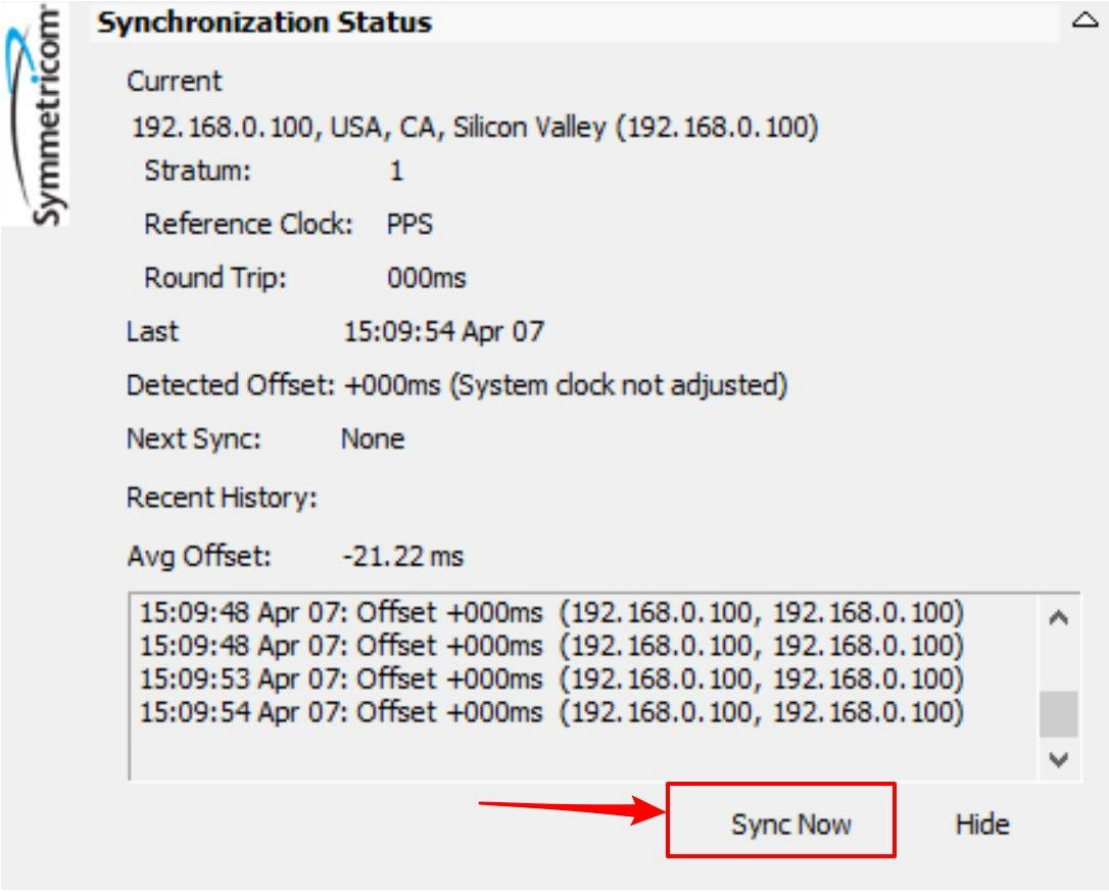
Double-click the link shown below and enter the IP address of the NTP server.



Right-click the system tray icon again and select Sync Status.



Click Sync Now to synchronize with the NTP server.

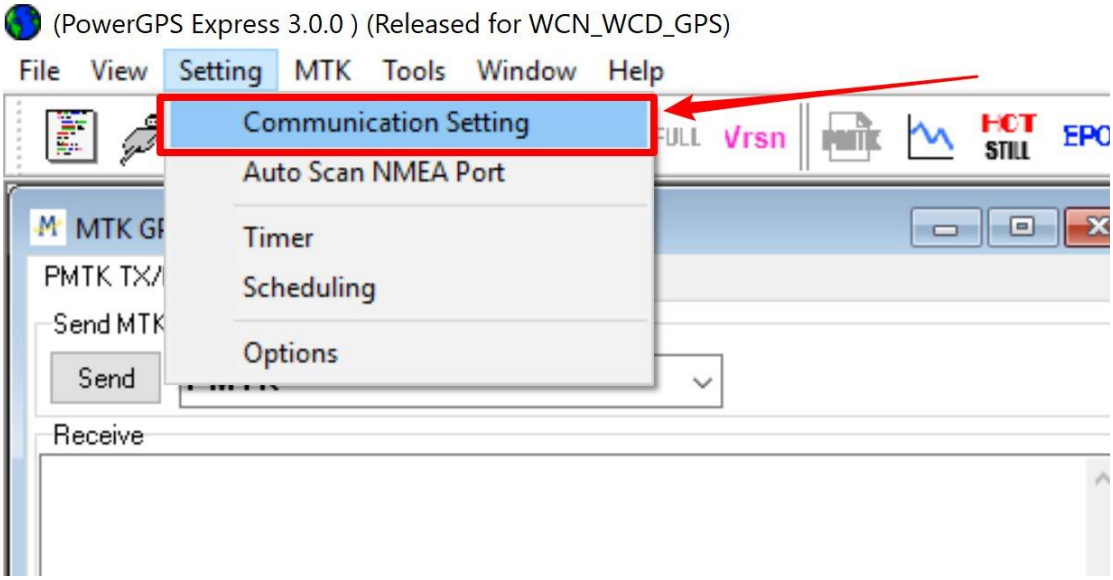


*** Note: Administrator privileges are required. Before synchronization, make sure the PC and NTP server are on the same subnet.**

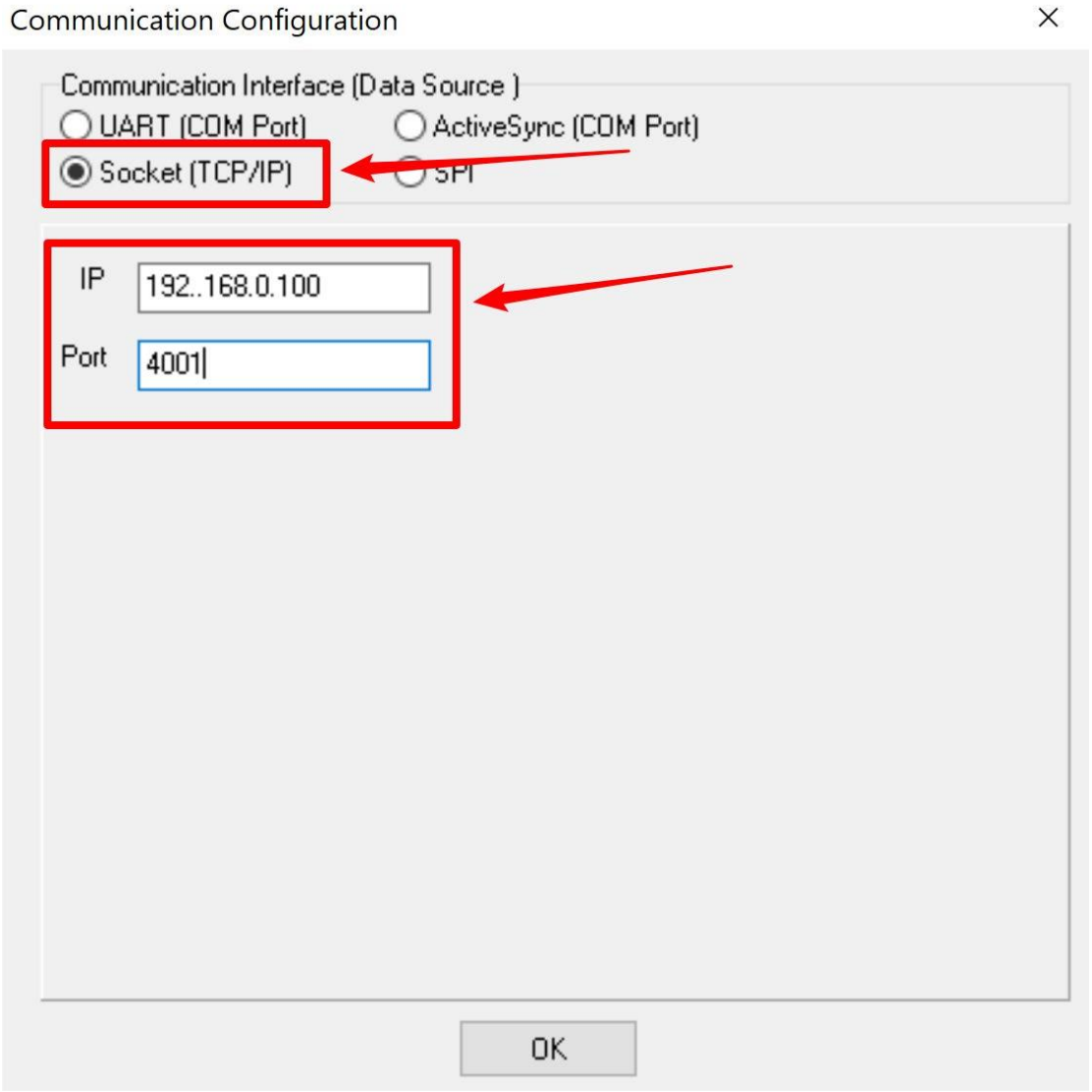
7.3 Checking Receiver Status with PowerGPS

Open PowerGPS. This is a portable version and does not require installation.

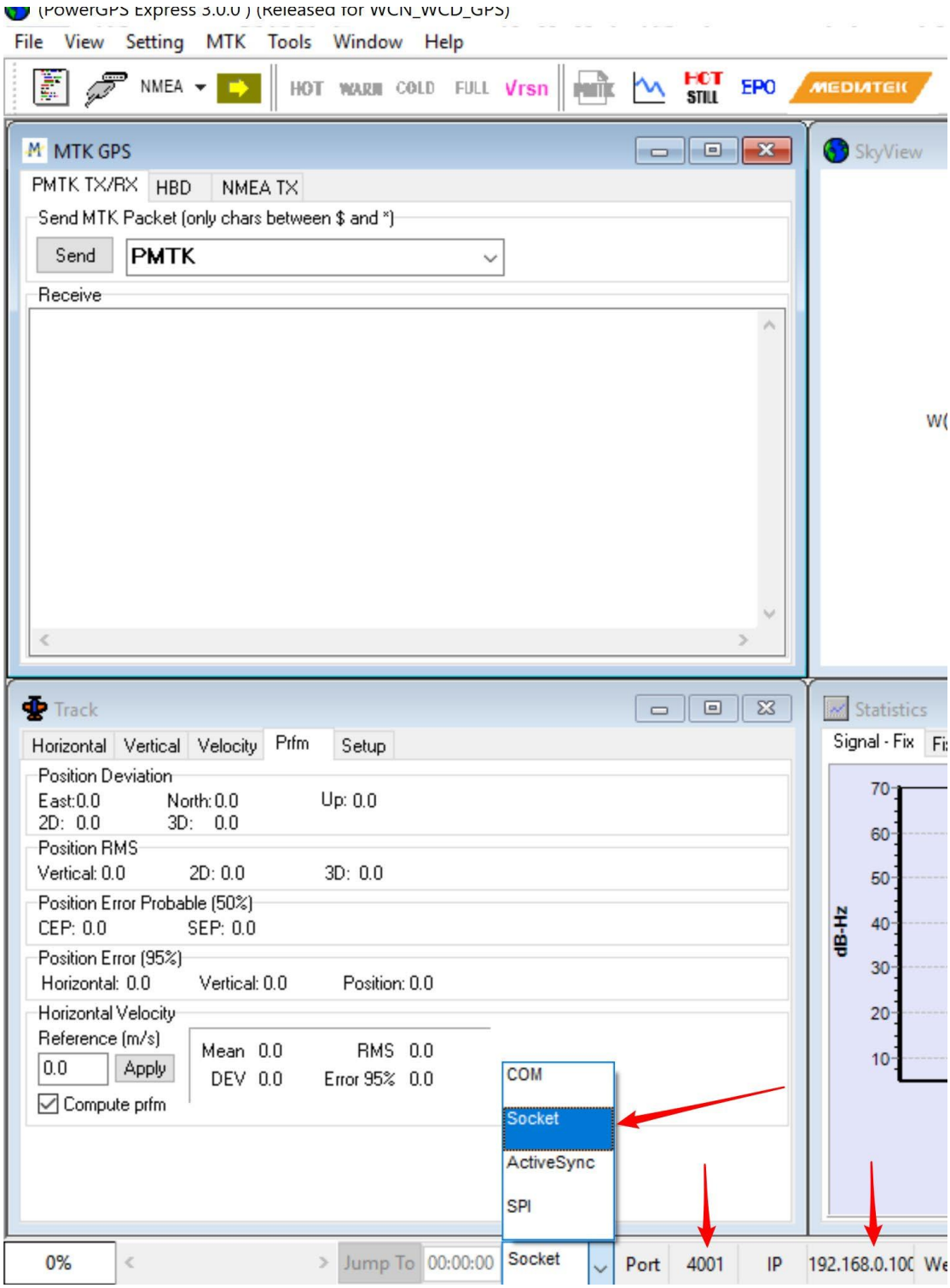
Select Setting → Communication Setting.



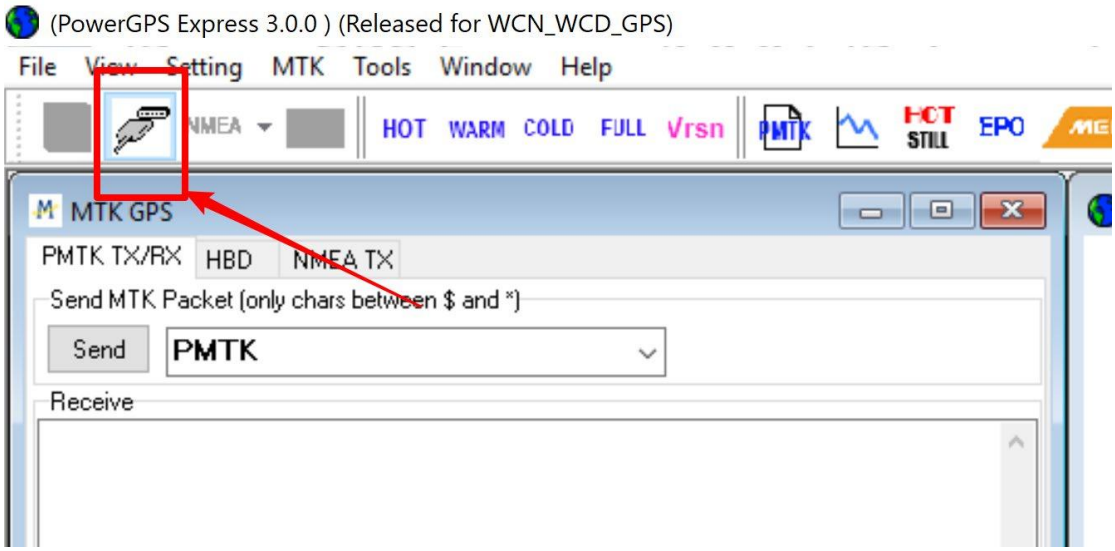
Select Socket (TCP/IP) and enter the device IP address. In the example below, the IP address is 192.168.0.100. This is for reference only; the actual device IP address may differ. The port must be set to 4001.



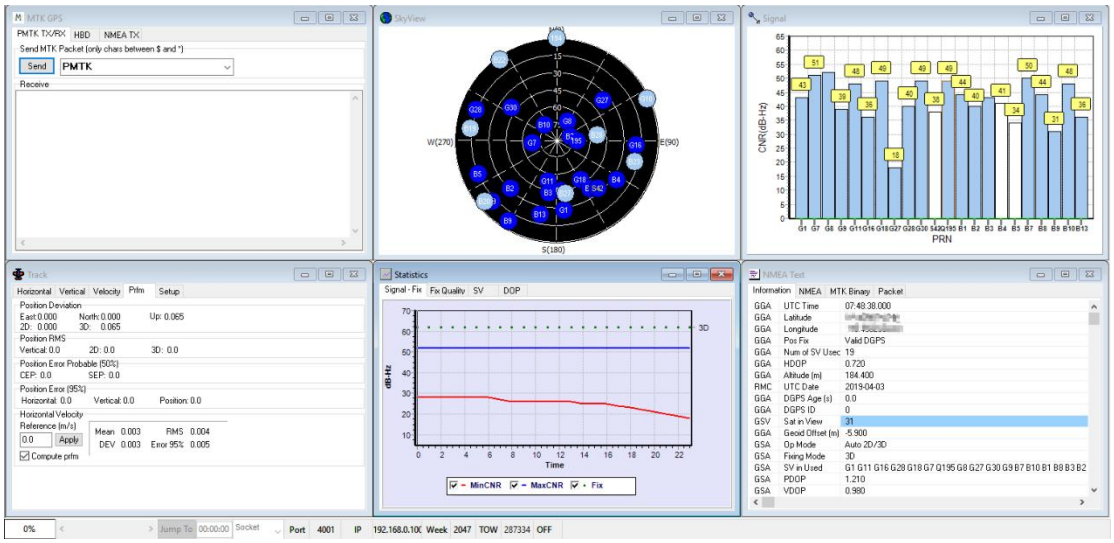
Select Socket on the main interface.



Click the Connect button shown below.

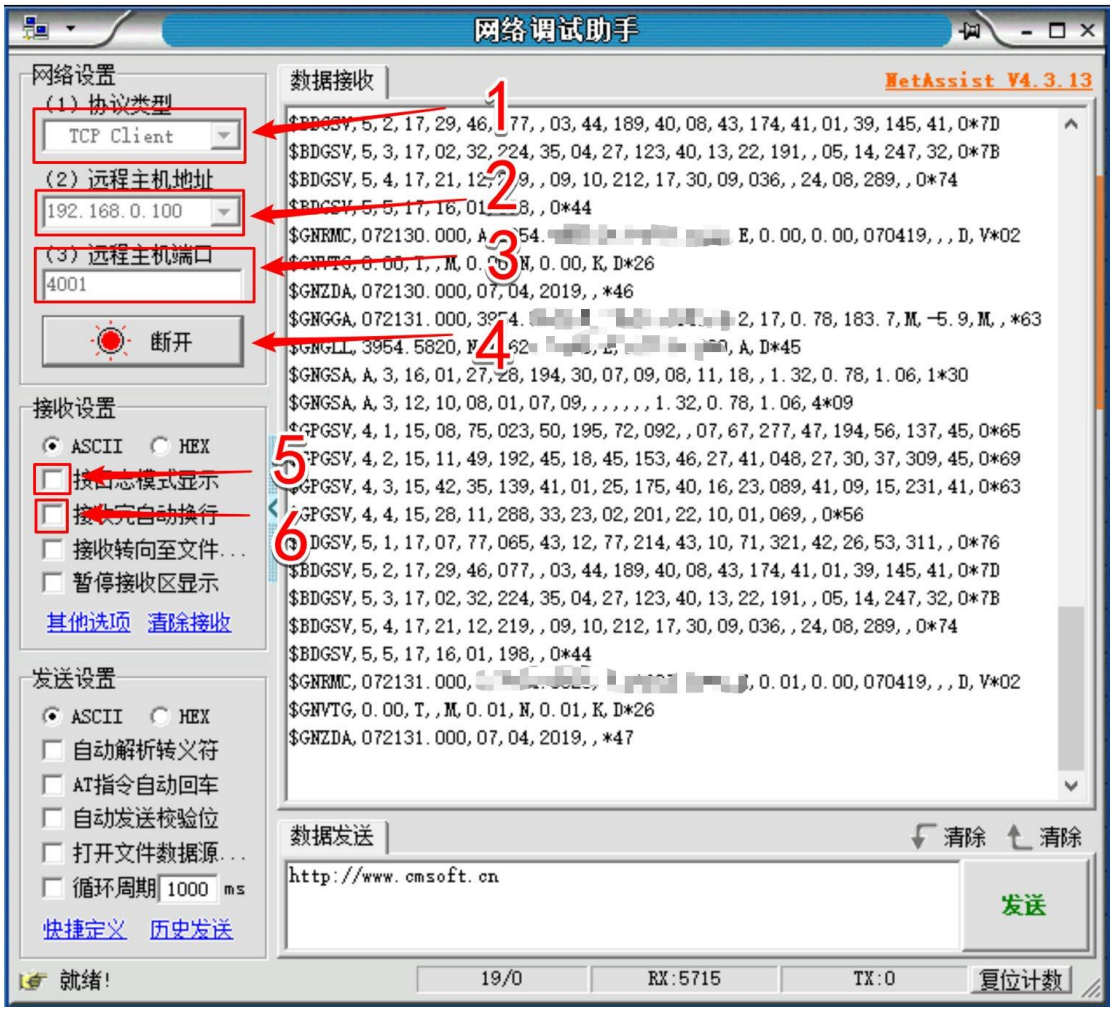


The interface after a successful connection is shown below.



7.4 NMEA 0183 Network Transmission

The device supports transmitting NMEA 0183 data from the GNSS receiver over TCP. Using NetAssist as an example, select TCP Client as the protocol type, enter the NTP server IP address as the remote host address, and set the port to 4001. The IP address 192.168.0.100 is used as an example; use the actual NTP server IP address. Click Connect to receive NMEA 0183 data from the device. For proper display, disable Display in Log Mode and Auto Line Break After Receiving.



8. Technical Specifications:

NTP Parameters

Parameters	Parameter Values
Interface	10/100Base-Tx
Interface Standard	IEEE 802.3u compliant
Interface Speed	10/100Mbps auto-negotiation
Connector	RJ-45
LAN Time Sync Accuracy	0.5-2ms
Supported Protocols	NTPv2, NTPv3, NTPv4, and SNTP
MD5 Authentication	Supported

Receiver Parameters

Parameters	Parameter Values
Supported Constellations	GPS L1, Beidou B1, GLONASS L1 and QZSS L1
Horizontal Positioning Accuracy	<2.5m CEP50 (autonomous) and <2m CEP50 (SBAS)
Vertical Positioning Accuracy	<5m CEP50 (autonomous) and <3m CEP50 (SBAS)
Time to First Fix	Reacquisition <1s 50%, Hot Start <1s 50%, Warm Start <33s 50%, and Cold Start <35s 50%
Sensitivity	Tracking -165 dBm and Acquisition -148 dBm
Time Synchronization Accuracy	100ns
Dynamics	Acceleration 4g and Velocity 515m/s

Electrical Parameters

Parameters	Parameter Values
Operating Voltage	DC 6V-24V
Operating Current	80mA at 12V
GNSS Antenna Voltage	3.3V
Network Port Specs	RJ45, 10/100 Mbps, Auto MDI/MDIX
Package Type	RJ45
Protection Level	2KV Electromagnetic Isolation
Operating Temperature	-40 to 85°C
Storage Temperature	-45 to 105°C
Operating Humidity	5%-95% RH (Non-condensing)
Storage Humidity	5%-95% RH (Non-condensing)