

# NETWORK TIME SERVER

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GF-NTP-MINI

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## USER GUIDE





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# 1 Introduction

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The GF-NTP-MINI is a stratum 1 NTP server with an integrated GNSS receiver. It provides NTP output. The NTP server uses GNSS (Global Navigation Satellite Systems) signals from GPS, GLONASS, BeiDou, and QZSS as the primary time source for synchronization.

The time server has small size box, convenient installation, ultra-low power consumption.

## 2 Key Features

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- 6000 transaction/second for every port
- NTP accuracy 0.5-2ms
- Web UI monitoring and management
- Multi-GNSS receiver (GPS, GLONASS, Beidou and QZSS)
- NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (RFC5905)
- SNTP v3 (RFC 1769), SNTP v4 (RFC 2030)
- NTP md5 authentication
- NTP Unicast and Broadcast mode
- GPSd is supported via ethernet port 1 (TCP protocol, port 4001)
- 6 ~ 24 VDC
- Power consumption <2W

# 3 Mechanical Size

Mechanical size: 80 W × 23.80 H × 90 D (mm)



# 4 Physical Specifications



Item	Label	Comment
1	ANT	GNSS input, SMA connector
2	Ethernet	RJ45 connector, 10BASE-T/100BASE-TX Default IP: 192.168.0.100
3	PW	Power indication
4	NTP	NTP service state ON - Active, OFF - Stop
5	DC 12V	6V ~ 24V DC input

# 5 GNSS Antenna Placement

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The antenna receives the GNSS satellite signals and passes them to the receiver. The GNSS signals are spread spectrum signals in the 1575 MHz to 1610 MHz range and do not penetrate conductive or opaque surfaces. Therefore, **the antenna must be located outdoors with a clear view of the sky.**

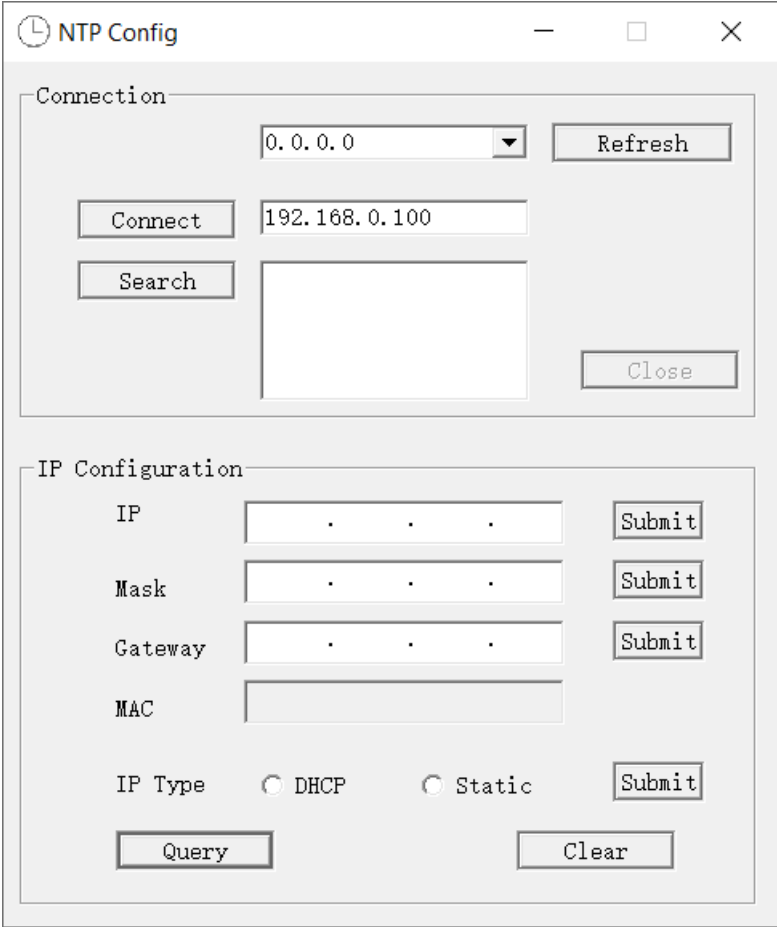
GNSS signals can only be received on a direct line of sight between antenna and satellite. The antenna should see as much as possible of the total sky. Seen from the northern hemisphere of the earth, more satellites will be visible in the southern direction rather than in northern direction. The antenna should therefore have open view to the southern sky. If there are obstacles at the installation site, the antenna should be placed south of the obstacles, preferably, in order not to block sky-view to the south.

If the installation site is in the southern hemisphere of the earth, then the statements above are reversed – more satellites will be visible in the northern direction. Near to the equator, it doesn't matter.

# 6 IP Configuration with Software

Prepare a PC and plug the ethernet cable between PC and the corresponding ethernet port which to be configured. For example, if you want to configure the IP address of ethernet port 2, then should connect the cable to it. The IP configuration software looks like below picture.

**The default subnet is 192.168.0.X for this NTP server, so the IP address of the PC must be set to the same subnet before the configuration.**



The screenshot shows the 'NTP Config' software window. It is divided into two main sections: 'Connection' and 'IP Configuration'.

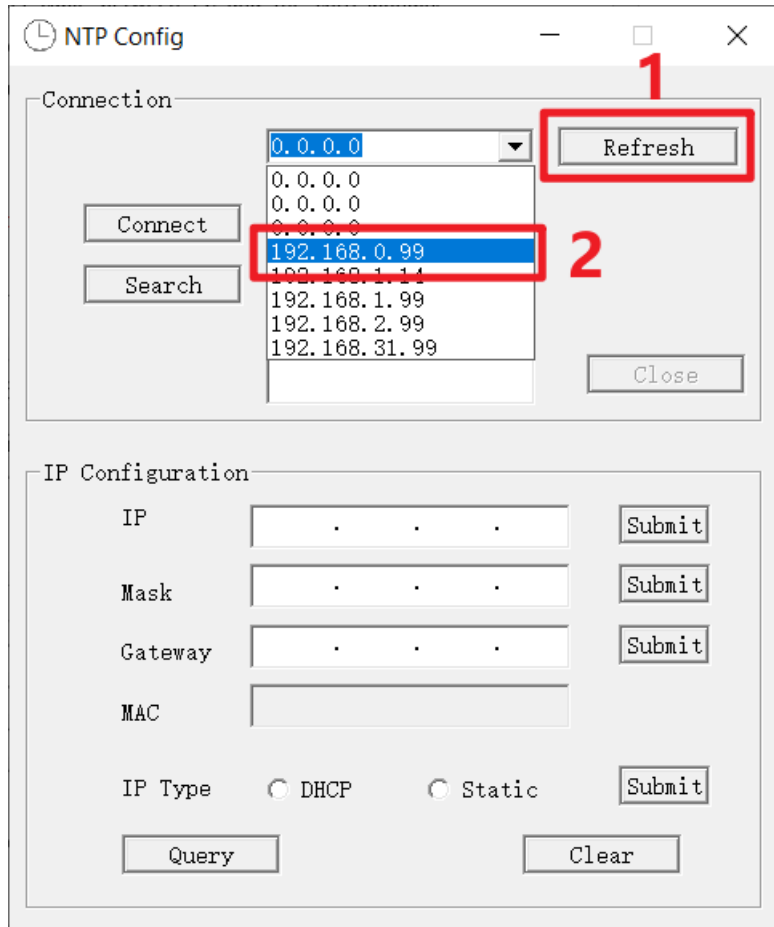
**Connection Section:**

- A dropdown menu shows '0.0.0.0' with a 'Refresh' button to its right.
- A 'Connect' button is positioned to the left of a text input field containing '192.168.0.100'.
- A 'Search' button is positioned to the left of a large empty text area.
- A 'Close' button is located at the bottom right of this section.

**IP Configuration Section:**

- 'IP' field: A text input field with three dots, followed by a 'Submit' button.
- 'Mask' field: A text input field with three dots, followed by a 'Submit' button.
- 'Gateway' field: A text input field with three dots, followed by a 'Submit' button.
- 'MAC' field: A text input field.
- 'IP Type': Two radio buttons labeled 'DHCP' and 'Static', followed by a 'Submit' button.
- 'Query' and 'Clear' buttons are located at the bottom of this section.

1. Click the Refresh button
2. Select the IP which connected to NTP server port from the list box



The screenshot shows the 'NTP Config' window with two main sections: 'Connection' and 'IP Configuration'.

**Connection Section:**

- A dropdown menu is open, showing a list of IP addresses: 0.0.0.0, 0.0.0.0, 0.0.0.0, 0.0.0.0, 192.168.0.99, 192.168.1.11, 192.168.1.99, 192.168.2.99, and 192.168.31.99. The IP address 192.168.0.99 is selected and highlighted in blue.
- A red box labeled '1' highlights the 'Refresh' button.
- A red box labeled '2' highlights the selected IP address 192.168.0.99.
- Other buttons in this section include 'Connect', 'Search', and 'Close'.

**IP Configuration Section:**

- Fields for IP, Mask, and Gateway, each with a 'Submit' button.
- A MAC address field.
- IP Type options:  DHCP and  Static, with a 'Submit' button.
- 'Query' and 'Clear' buttons at the bottom.

3. Click the search button
4. The IP address will be scanned on the edit box
5. Input the scanned the IP address on the edit box right of connect button
6. Click the connect button

The screenshot shows the 'NTP Config' window with two main sections: 'Connection' and 'IP Configuration'.

**Connection Section:**

- A dropdown menu at the top shows '192.168.0.99' with a red box and the number '6' next to it.
- A 'Refresh' button is to the right of the dropdown.
- A 'Search' button is highlighted with a red box and the number '3' below it.
- An input field below 'Search' contains '192.168.0.100' and is highlighted with a red box and the number '4' to its right.
- A 'Connect' button is highlighted with a red box and the number '5' to its right.
- A 'Close' button is at the bottom right.

**IP Configuration Section:**

- Fields for 'IP', 'Mask', and 'Gateway' each have a 'Submit' button to its right.
- A 'MAC' field is present without a button.
- 'IP Type' has radio buttons for 'DHCP' and 'Static', with a 'Submit' button to the right.
- 'Query' and 'Clear' buttons are at the bottom.

- Click the Query button
- Edit the value on the IP edit box, and then click the set button to modify the IP. The suggested modification order is Gateway -> Mask -> IP address

The screenshot shows the 'NTP Config' window with two main sections: 'Connection' and 'IP Configuration'.  
In the 'Connection' section, there is a dropdown menu showing '192.168.0.99', a 'Refresh' button, a 'Connect' button, an input field with '192.168.0.100', a 'Search' button, a list box containing '192.168.0.100', and a 'Close' button.  
In the 'IP Configuration' section, there are four rows of input fields with 'Submit' buttons:  
- IP: '192 . 168 . 0 . 100' with a 'Submit' button labeled '10'.  
- Mask: '255 . 255 . 255 . 0' with a 'Submit' button labeled '9'.  
- Gateway: '192 . 168 . 0 . 1' with a 'Submit' button labeled '8'.  
- MAC: '00 01 02 03 04 05'.  
Below these are radio buttons for 'IP Type' with 'DHCP' and 'Static' (selected) options, and a 'Submit' button.  
At the bottom, there is a 'Query' button highlighted with a red box and labeled '7', and a 'Clear' button.

Note: If you want to check the configuration then click the Close button and reconnect the port from step 1 and query the IP parameters.

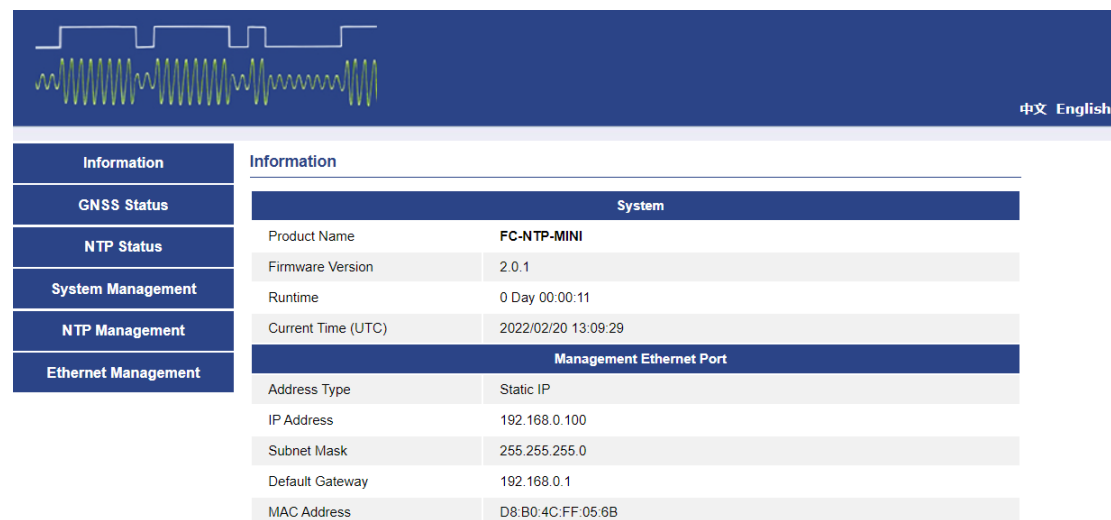
# 7 Web Interface

## 7.1 Main Page

Web access is permitted only through Ethernet port 1. Launch a web browser and open a connection to the NTP Server by entering the URL that specifies the IP address, <http://192.168.0.100> with username admin, password admin by default.

**Internet Explorer is not supported, Firefox, and Chrome are recommended.**

Entering the IP address will launch the main page.




Information	
Information	Information
GNSS Status	
NTP Status	
System Management	
NTP Management	
Ethernet Management	
<b>System</b>	
Product Name	FC-NTP-MINI
Firmware Version	2.0.1
Runtime	0 Day 00:00:11
Current Time (UTC)	2022/02/20 13:09:29
<b>Management Ethernet Port</b>	
Address Type	Static IP
IP Address	192.168.0.100
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
MAC Address	D8:B0:4C:FF:05:6B

Timing & Frequency

## 7.2 GNSS Status

The antenna connection, constellation, satellites tracking, and position information can be viewed on the GNSS status page.

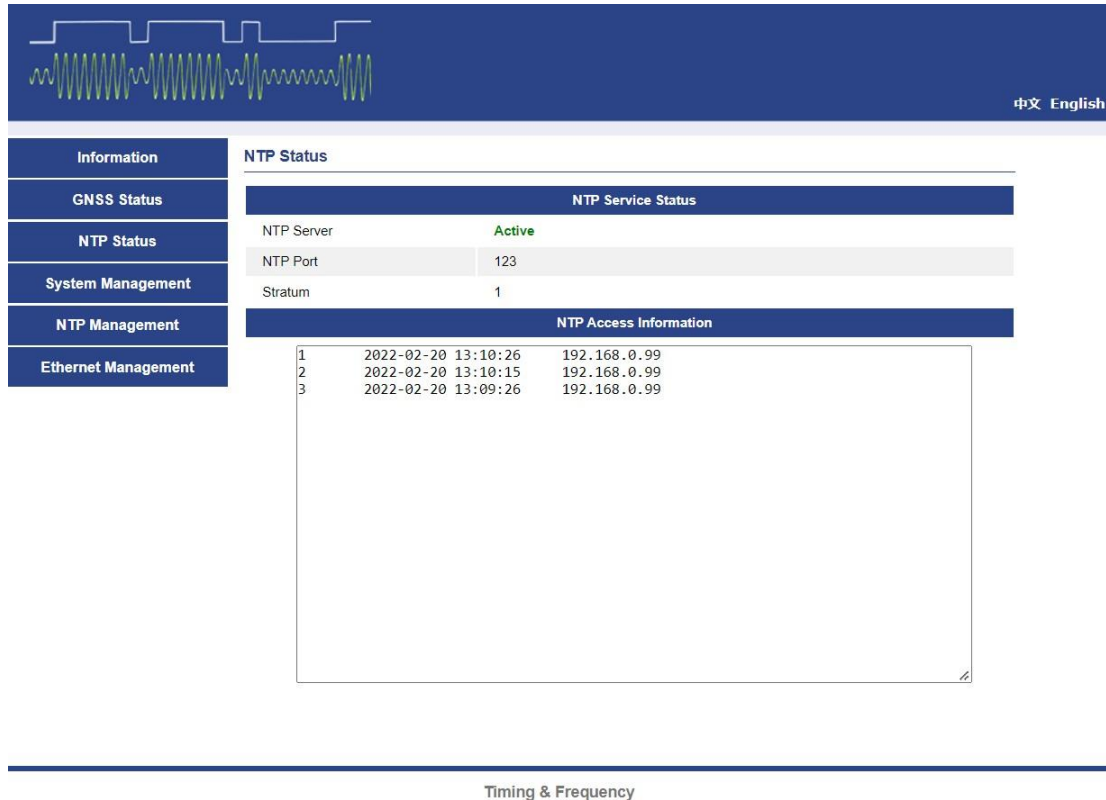


Information	GNSS Status	
GNSS Status	Receiver	
NTP Status	Antenna	OK
System Management	Constellations in use	GPS+BeiDou+GLONASS
NTP Management	SVs Used	13
Ethernet Management	GPS (used/viewed)	3/5
	BeiDou (used/viewed)	8/8
	GLONASS (used/viewed)	2/6
	Position	
	Latitude	N 6.78082
	Longitude	E 101.97160
	Altitude	26.6 m

Timing & Frequency

## 7.3 NTP Access Information

The NTP service status and clients access information can be viewed on this page.



The screenshot displays the NTP Status page. On the left is a navigation menu with the following items: Information, GNSS Status, NTP Status, System Management, NTP Management, and Ethernet Management. The main content area is titled 'NTP Status' and contains two tables.

The first table, 'NTP Service Status', shows the following information:

NTP Service Status	
NTP Server	Active
NTP Port	123
Stratum	1


The second table, 'NTP Access Information', shows the following data:

NTP Access Information			
1	2022-02-20	13:10:26	192.168.0.99
2	2022-02-20	13:10:15	192.168.0.99
3	2022-02-20	13:09:26	192.168.0.99

At the bottom of the page, there is a footer with the text 'Timing & Frequency'.

## 7.4 Ethernet Status

The connection status and IP address configuration can be viewed on this page.



Information	Ethernet Status	
GNSS Status	Ethernet Port 1   Ethernet Port 2   Ethernet Port 3   Ethernet Port 4	
NTP Access Information	Ethernet Status	
Ethernet Status	Connection Status	Not Connected
System Management	MAC Address	00:01:02:03:04:05
NTP Management	IP Assignments	
Ethernet Management	Address Type	Static IP
	IP Address	192.168.0.100
	Subnet Mask	255.255.255.0
	Default Gateway	192.168.0.1

Timing & Frequency

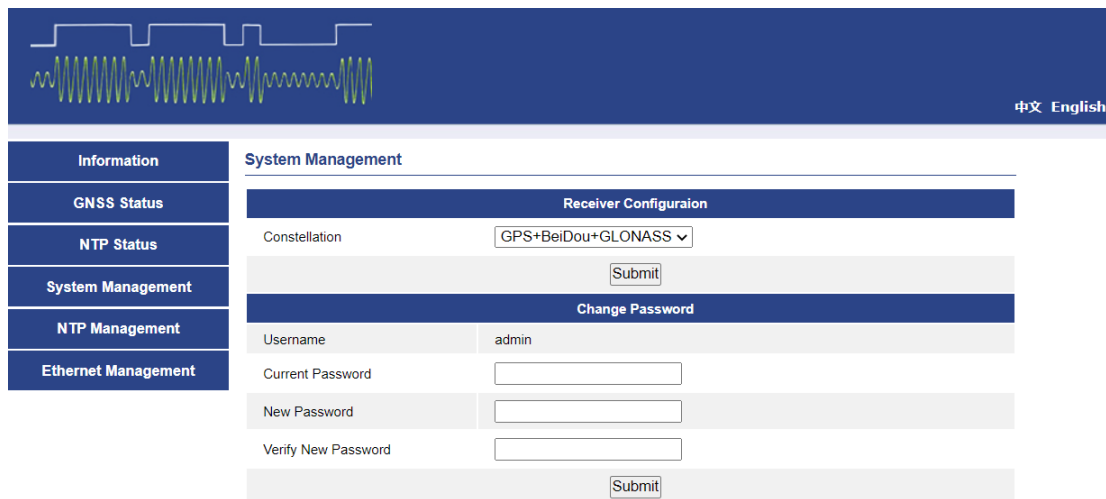
## 7.5 System Management

### 7.5.1 Receiver Configuration

The constellation can be configured as GPS only, BeiDou only, GPS + BeiDou, GPS + GLONASS, GPS + GLONASS + BeiDou.

### 7.5.2 Change Password

The password can be changed on this page, please note that the default login name is admin, and can't be modified.



The screenshot shows the web interface for the Network Time Server. At the top, there is a blue header with a signal waveform and the text "中文 English". Below the header is a navigation menu with the following items: Information, GNSS Status, NTP Status, System Management, NTP Management, and Ethernet Management. The "System Management" section is active and contains two sub-sections: "Receiver Configuration" and "Change Password".

**Receiver Configuration**

Constellation	GPS+BeiDou+GLONASS ▾
<input type="button" value="Submit"/>	

**Change Password**

Username	admin
Current Password	<input type="password"/>
New Password	<input type="password"/>
Verify New Password	<input type="password"/>
<input type="button" value="Submit"/>	

## 7.6 NTP Management

NTP broadcast and authentication of all ethernet ports can be configured on this page.

Information	<b>NTP Management</b>
GNSS Status	<b>NTP Broadcast</b>
NTP Status	Broadcast <input type="radio"/> Enable <input checked="" type="radio"/> Disable
System Management	Broadcast Intervals <input type="text" value="60"/> (seconds)
NTP Management	<input type="button" value="Submit"/>
Ethernet Management	<b>NTP Authentication</b>
	MD5 Authentication <input type="radio"/> Enable <input checked="" type="radio"/> Disable
	Unauthenticated NTP Request <input type="radio"/> Ignore <input checked="" type="radio"/> Accept
	MD5 Key Value <input type="text"/>
	<input type="button" value="Submit"/>

Timing & Frequency

## 7.7 Ethernet Management

The IP address can be configured on this page.

Ethernet Management	
IP Assignments	
Address Type	Static IP ▾
IP Address	192 . 168 . 0 . 100
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	192 . 168 . 0 . 1
<input type="button" value="Submit"/>	

Timing & Frequency

# 8 Specification

## NTP

Parameter	Description
<b>Interface</b>	10BASE-T/100BASE-TX Conforms to the IEEE 802.3
<b>Connector</b>	RJ-45
<b>Accuracy</b>	0.5-2ms
<b>Standard</b>	NTP v2 (RFC 1119) NTP v3 (RFC 1305) NTP v4 (RFC5905) SNTP v3 (RFC 1769) SNTP v4 (RFC 2030)
<b>MD5 Authentication</b>	Yes
<b>NTP Broadcast</b>	Yes

## GNSS Receiver

Parameter	Description
<b>Constellation</b>	GPS L1 Beidou B1 GLONASS L1 QZSS L1
<b>Antenna Power Feed</b>	3.3V
<b>Horizontal Position Accuracy</b>	<2.5 m CEP50 (autonomous) <2 m CEP50 (SBAS)
<b>Vertical Position Accuracy</b>	<5 m CEP50 (autonomous) <3 m CEP50 (SBAS)
<b>Time to First Fix</b>	<46s (50%), <50s (90%) cold start
<b>Sensitivity</b>	Tracking: -160 dBm Acq: -148 dBm
<b>Dynamic</b>	Velocity 515m/s

## Power

Parameter	Description
<b>DC Input Voltage</b>	6 ~ 24 VDC
<b>Power Consumption</b>	< 2W

## Environmental

Parameter	Description
<b>Operating Temperature</b>	-40 ~ 85°C
<b>Storage Temperature</b>	-40 ~ 85°C
<b>Operating Humidity</b>	5% ~ 95% RH (non-condensing)
<b>Storage Humidity</b>	5% ~ 95% RH (non-condensing)