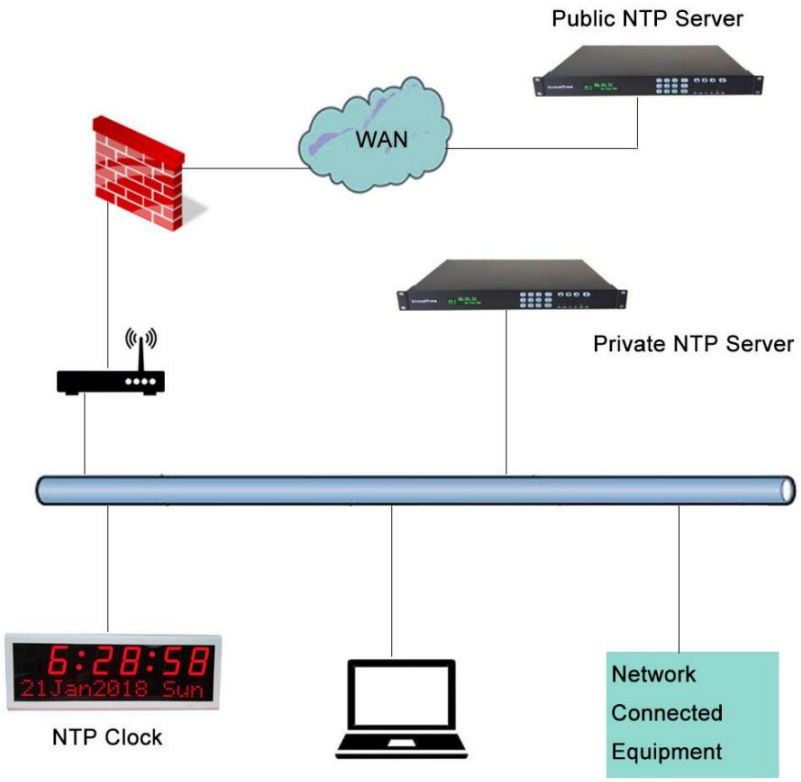
GlobalTime Electronic Co., Ltd

GTT400 Key Features and User Manual



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Chapter 1 The basic product information and packaging

GTT-400 network time server is the professional network equipment providing high-stable time source. GTT-400 network time server receives GPS satellite signals and extracts the timing information to adjust the server's local time. It distributes standard time via NTP

protocol (Network Time Protocol). If a PC or server needs time synchronization services, it will run a client program to read the NTP protocol, derive time information, and modify the time of related equipment.

The network time server is widely used in telecommunications, finance, taxation, public security and other special networks as well common corporate networks to unify the network time.

1.1 Key features

- Serves as stratum 1 time server, receive signal from GPS satellite, or GPS and GLONASS dual satellite(optional), or from external serial port. Can be set as slave time server to synchronize with host time server.

- Adopt RFC1119/1305 NTP protocol (Network Time Protocol) to delivery time
- Support RFC1769/2030 SNTP protocol (Simple Network Time Protocol)
- Different client programs support, Windows 98/2000/NT/XP, Linux, Unix, FreeBSD and other operating systems
- Four 10/100M BaseT adaptive network ports
- Response capability per unit time: >1000 times per second
- The GPS receiving system supports position-holding mode which greatly improves the functionality of the system
- OCXO, or Rb clock can be built-in to guarantee the accuracy of time-keeping
- Support SNMP, with the serial port to enter
- 6 lamps display the device working status

1.2 Packaging

Please check the shipping package which should contain the following items:

(1) GTT-400 network time server

(2) Power cable

(3) GPS antenna cable

(4) GPS satellite receiving antenna and the mounting support

(5) This user manual

(6) The software CD

(7) The packing list

1.3 Outline

With the rapid development of modern society, higher demand on the time precision and frequency is put on the agenda. Nowadays with the development of modern digital communication networks and the information superhighway construction, the political, cultural, technological and social information coordination is based on a strict system of time synchronization, especially in the communications, electricity, financial securities, computer networks, production line operation, administration and national defense and other fields urgently need the time synchronization equipment.

Global Positioning Satellite (GPS) signals act as the reference source of GTT-400 network time server. The time reference contained in the GPS satellite signals synchronizes with the universal time coordinated (UTC). The long-term frequency stability has achieved the10-13 level of magnitude of cesium atomic clock, which is equivalent to be only 1 second slower during 30 years. To adjust local time with this reference signal can eliminate the accumulation of deviation resulted from the low accuracy of local clock time and also can greatly improve the timing precision of the server.

GTT-400 network time server use the professional GPS timing receiver. It can receive and lock the satellite signal fast and reliably.

NTP protocol (Network Time Protocol) is a common international network timing protocol. Its principle is to launch a time polling to the server after an interval of time through the client. According to a certain filtering algorithm it can calculate the time deviation between the server and the client as well as the propagation delay caused by network transmission. Then according to these two parameters to adjust the client's local time and make it consistent with the server. Compared to other time calibration protocols, NTP protocol can eliminate the impact caused by network transmission delay, so it can provide high-precision timing services. Detailed description can be referred to the latest protocol standards documents RFC1305 and RFC2030. GTT-400 network time server can be compatible with NTP v2 / v3 / v4 in various versions.

1.4 The device profile description

The front panel description:

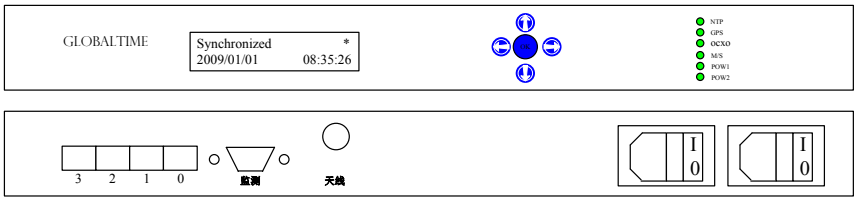


Figure 1-1 The front panel

The front panel:

- VFD display, to show the basic status of the device and the current UTC time
- The keyboard, to check and modify the system configuration
- Two power lights, to indicate the two-way power supply
- Four indicator lights, to indicate the service status of GPS and NTP

The back panel:

- Two power sockets with fuse . After opening the fuse base, there are a primary and a reverse fuse with specification of 0.5A on each side to facilitate users' replacement.
- One antenna plug as well as 50 ohm BNC Socket on the panel.
- Four 10/100M adaptive network ports
- One serial port for monitoring.

Chapter 2 Hardware installation and commissioning

2.1 The device structure

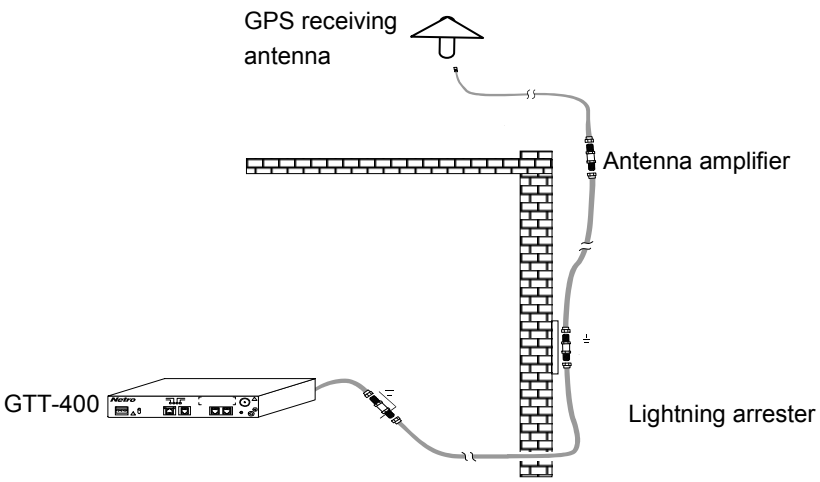


Figure 2-1 Device structure

GTT-400 network time server consists of the outdoor part and interior part. The outdoor part is composed of the GPS satellite receiving antenna, surge arrester and antenna amplifier (optional). The function is to complete the reception of satellite signals.

The interior part is the master device of GTT-400 network time server to complete the functions of the satellite signal demodulation, the local clock calibration, achieving NTP protocol and so on. It provides NTP timing service to other network equipment by 10M network ports. The following are the detail installation description of the outdoor part and the interior part.

2.2 Outdoor installation

The outdoor part is composed of the GPS satellite receiving antenna, transmission cables and antenna amplifier. The installation attentions are as follows:

At first, the antenna installation location needs to be carefully selected, which will significantly influence function of equipment. The antenna should be installed in high position, and can not be blocked by, such as the roof, open top, etc. If you want to achieve better results, you’ d better keep the elevation angle of 15 degrees from blocking. Please do not install the antenna inside the room, because GPS satellite signal is very weak and can not be received indoors. It does not matter if there are trees or plastic rain shelter above

the antenna, but other block will influence the signal significantly. In fact, only a book above the antenna can completely block out the satellite signal.

Second, antenna installation should be lower than the lightning rod or other constructions that can attract thunderstroke and the installation location should better be 10-15 meters away from them. GPS antenna itself is rarely struck by thunder blot but is often damaged by the stong induced electric field resulted from the stuck buildings (the lightning rod, tower, etc) around. In this circumstance, we should install the arrester in the cable. Normally the arrester will be installed at the position where the cable goes through the wall. By this, the arrester can be well earthed. The arrester should also be installed between the feeder and the equipment. Then lead the grounding wire from the arrester and connect it to the earth. The earth resistance should be under 4 ohm and must be firmly connected to ensure the reliable discharge by lightning.

Sometimes the antenna can be installed outside the window, but the building must be located in the open fields with no corner. In this way, it can receive at least half of the satellite signal. But as a long-term using equipment , it is recommended that the antenna is installed in high places, while the outside installation can be only adopted as a temporary test.

The high-power microwave transmitting of the same band can not be around where the GPS antenna is installed. In addition, we should try to avoid the GPS antenna from the direct irradiation of high-power electromagnetic radiation.

If the length of the feeder is less than 100 meters, the antenna and equipment can be directly connected; between 100 meters to 200 meters, one more line amplifier is needed; ranging from 200 meters to 300 meters, two more amplifiers are needed. If you need longer feeder links, please contact us, GlobalTime Electronic Co., Ltd. We will provide the special program to you. The feeder usually adopt 1 / 2 inch RF cable whose loss is 12.8dB/100m from the United States Andrew's.

When setting up the feeder:

1. Do not bend too much, because it will result in a broken feeder conductor.
2. When we connect the feeder into the interior, it should be bent into U-shape to prevent t water from flowing backward.

You can use GPS signal transponder to lead the signal to the interior. Generally speaking, GPS signals can be well received within 5 m of the transponder antenna. Because of the

way of forwarding, it is much effective for the prevention of lightning and the protection of the host. Problems caused by the lightning is the transponder damaged. Due to a certain transmitting power, it is suitable for some occasions.

Table 2-1 Antenna Specifications

Frequency range	1575±5MHz;	RF connector	N-type connectors
Polarization	Right-hand circular polarization	Installation	Thread (M24 × 1.5) connection
Antenna gain	≥3.5dB；	Volume	φ96×126mm；
Amplifier gain	≥37dB；	Operating temperature	-45℃～85℃；
Noise coefficient	≤1.5dB；	Storage temperature	-50℃～90℃；
Interference suppression	25dB(f0±100MHz)；	Humidity	0～100%
Power consumption	3V×20mA；		

2.3 Indoor installation

After connecting 220V AC to the master device, the indicator light "Power" on the front panel will light which indicates the running of power supply is normal. To measure the BNC antenna socket with a multimeter, the feed voltage should be up to 5V.

Then connect the antenna cable with the antenna socket.

Next, use a computer to pass through the IP address and network settings of the serial port configuration time server, save and exit, then restart GTT-400 Network time server to make the network settings take effect. After reboot, input the IP address of the PING server in another computer to check the network settings correct or not.

Last, log on the network time server through Telnet to observe the satellite receiving state, the information on time tracking state of the server and so on. When the server locks the satellite time (The indicator light on the panel turns green), GTT-400 starts to provide time

information to other clients within the network. The specific process of software configuration can refer to the following chapter.

Chapter 3 Equipment maintenance

3.1 Indicator state

Table 3-2 Indicator status

Indicator	Status	Description
Power supply	on	The power supply is normal
	off	The power supply is abnormal
NTP	off	The server is unlock and is searching for the time source
	green	The time source is locked
GPS	off	The satellite signal is not received
	green	The satellite signal is received
OCXO	off	No OCXO or not use OCXO for time keeping
	green	Use OCXO to for time keeping
M/S	off	Hot standby status
	green	The host status

3.2 The keyboard display

VFD display (vacuum fluorescent display), is of high brightness and wide vision. The screen can display 20 × 2 characters. The line above shows the status while the line followed shows the time.

When starting up, the system will show the company name: GlobalTime (about 15 seconds). Then display: "Searching ... ... - or E", which shows that it is searching for the satellite. After receiving the satellite signal, it will display: "Synchronizing ... ...* ". The time will be locked after 5-15 minutes and display: "Synchronized ... ...* ". "-" or "E" shown in the end of the first line indicates not receiving the satellite signal and "*" indicates receiving the satellite signal.

The second line shows the time, following the format of "year, month, day, hour", for example: "2005/06/24 13:21:08"

Press OK to enter the display menu. There are three items:

Network Information

GPS Information

NTP Information

You can select an item with the arrow keys. The interface is shown up as two lines, of which the one above is the current "focus line", by the right-click to expand the item while by the left-click to return to the previous menu.

The first-level menu	The second-level menu	The third-level menu
Network Information	Eth0 (Network port 0)	IP (IP address)
		MSK (Subnet mask)
		GW (Gateway)
GPS Information	Lat (Latitude)	
	Lon (Longitude)	
	Ht (Height)	
	Sat (Number of satellites)	
NTP Information	Stratum (Server stratum)	
	Root disp (Root discrepancy)	
	Source (Synchronous source)	

The third level menu of the network information can be edited, namely IP address, subnet mask and gateway can be edited. The key to enter into edit mode is pressing "ok "button under the third-level menu. The focus character will be displayed with the cursor. By pressing the up and down button, the cursor will modify the character display while pressing the left and right button, it will move to the next or previous character. After the modification, you can press the " ok" button to save settings. The settings will take effect after rebooting.

3.3 Server configuration debugging

There are four 10/100M adaptive network ports on GTT400. The default configuration is 192.168.2.8. It supports web, ssh, SNMP and NTP.

GTT-400 network time server can conduct maintenance and management through the local serial cable connection or the remote telnet connection. The local connection needs to use a cross serial cable with connectors on both sides (that is, 2,3 feet of the two sides are cross connected). The management is carried out on the Hyper- Terminal in Windows.

Remote SSH connection needs specialized SSH client. The following example describes the maintenance methods with local connection, so does remote maintenance.

3.3.1 User login

After connecting the hyper terminal, press ENTER and you will see the login interface just like the figure 3-2 shown. Then enter the user name " ntpuser " and the password "Users.". Note: Pay attention to the last ".". Once logging in, you can set your own password.

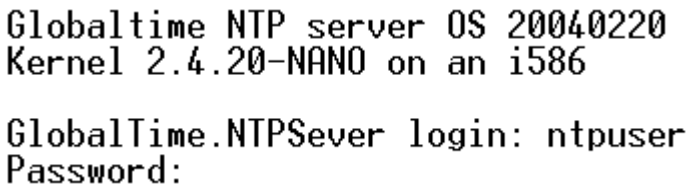


Figure 3-2 Login interface

After logging in, there will be a configuration interface. There are 9 choices. The detailed description of each function is introduced as follow:

1. Network Information
2. NTP Configuration
3. SNMP Setting
4. Heart Beat check
5. NTP status
6. GPS status
7. System function
8. Change the password
9. Q. Exit

3.3.2 Change network setting

When you press "1 ENTER" in the main configuration interface, initially it will ask whether to use DHCP protocol to assign IP address. If you would like to use DHCP protocol to assign IP

address, then select "Y". Otherwise, select "N". GTT-400 support IP address through DHCP, but it always need a static IP address because the server needs to supply the network timing service to other devices. As a result, in DHCP network system, the recommended configuration is to assign a static IP address from the IP Pool of DHCP server to GTT-400. Other devices can use the static IP to access GTT-400.

When it asks whether to use DHCP, If you select "N", it will prompt to enter the server IP address, netmask and gateway IP address. Finally it will prompt whether to modify the network configuration in accordance with settings entered, then select "Y" and it will change the equipment configuration. This configuration can not take effect until rebooting the server. So we need to restart the server. We can modify the network configuration for many times before restarting the equipment, but only the last one can take effect. The configuration interface is shown in Figure 3-4.

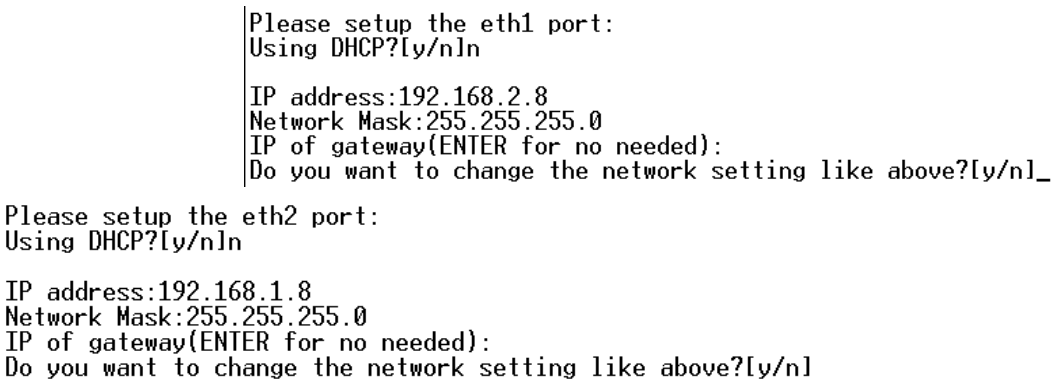


Figure 3-4 The network parameters configuration interface

Note: When it displays " Please restart the machine to make the change active." , press " ENTER" to return to the previous interface. Then select "4 Exit", the setting can take effect. If directly turn off the computer, it will result in the configuration failed. The four network ports can not be set to the same IP.

3.3.3 NTP configuration

1. NTP peer
2. NTP broadcast
3. MD5 keys
4. Select NTP MD5 key
5. Q. Exit !

NTP peer means that the double devices work in a peer to peer mode as the backup time source for each other. When GPS is not working well, the spare time source can be put to use while the levle of local time server will be reduced to 2.

NTPbroadcast is the broadcast mode of lower timing accuracy but larger system capacity which can reduce the network data flow.

MD5 key is the encrypted password to maintain MD5.
Select NTP MD5 key is to select one or several as the timing authentication password from the list of MD5. It can help the client to avoid malicious attacks changing the system time.

Note: both the client side and server side should use the same password.

3.3.4 SNMP setting

SNMP_TRAP_IP=192.168.2.101，TRAP　　the address of sending data
SNMP_TRAP_PORT=162，TRAP　　the data port
SNMP_PORT=161，SNMP　　Information query port
The above three can be modified.

3.3.5 Heartbeat check (optional function)

MASTER:N, represent whether it is started as the host
LOCALPORT:6050, Heartbeat detection port
REMOTE:192.168.1.6，IP address of the backup machine
WORKADDR:10.32.33.21，the working IP, that is, the shared IP of hot standby
WORKMASK:255.255.255.0，the mask of the work address
WORKGATEWAY:10.32.33.21，the gateway of the work address
STRATUM: 7, For heartbeat detection level, the smaller, the higher. In the case that both of the devices have become hosts, the low-level one will be initiative to be the backup equipment based on the negotiation.

The hot standby equipment will perform the following functions:

1. The master-slave relationship of the two servers is based on the configuration files and the boot sequence (see under for further information), that is, if machine A is started first, then A acts as the host while machine B is the backup one; if machine B is to started frist,

then B acts as the host while machine A is the backup equipment; if both of the machines are started in the same time, then the Master (can be configured) machine is the host. After restarting the host, it will remain to be the host.

2. In the case that both the host and the backup machine have been started, if the host is cut off the power supply unexpectedly, the backup machine will automatically switches to the host. The switching period is about 5s.

3. If the host is disconnected from the network unexpectedly and the backup machine is under the normal operation of the network, the backup machine will also automatically switches to the host.

4. GPS receiver of the host can not receive the satellite signals normally, if the network and GPS receiver with the backup machine are both in normal operation, then the backup machine automatically switches to the host. To prevent the devices from frequent switching when the GPS is not working well, only when it can not receive the satellite signals for 2 minutes can the two devices switch over.

5. If the switch has broken down and machine A and B are on the ends of the fault point, they can provide services for both the two networks. After the troubleshooting, the machine of higher priority will be (can be set) the host while another one will be the backup equipment.

3.3.6 NTP status

stratum=1，

precision=-19，

rootdelay=0.000，

rootdispersion=35.55，

Time source: GPS，Local time source can be internal clock, GPS, or OCXO

press Q: return

3.3.7 GPS status

Latitude: N31d18.182m represents latitude 31 degrees 18.182 minutes North.

Longitude: E121d28.8331m represents121 degrees 28.8331 minutes East longitude.

Received Satellite number: 6, the number of satellite signals received

press Q return !

3.3.8 System function

1). ping

input target IP(Q return):

input the target IP address and then press “Enter”, by pressing “Ctrl +c” to return to the previous sub-menu while “Q” to return to the previous menu.

2). Time

Mon jul 30 19:16:31 CST 2007

Display the current system time, by pressing “Enter” to return to the previous menu

Reset configuration

press Q return !

3.3.9 Change the password

If type "3" in the main configuration interface, it will enter into the "change password" interface, shown as figure 3-5. At first, you need to type the original password. If correct, it will prompt to a new password. The user password contains 5-8 characters. Note: the password can not be too simple. If take some meaningful words as the password, it will probably be refused by the system.

```
Changing the password of user ntpuser
Changing password for ntpuser
Old password:
Enter the new password (minimum of 5, maximum of 8 characters)
Please use a combination of upper and lower case letters and numbers.
Enter new password:
Re-enter new password:
Password changed.
Press any key to continue...
```

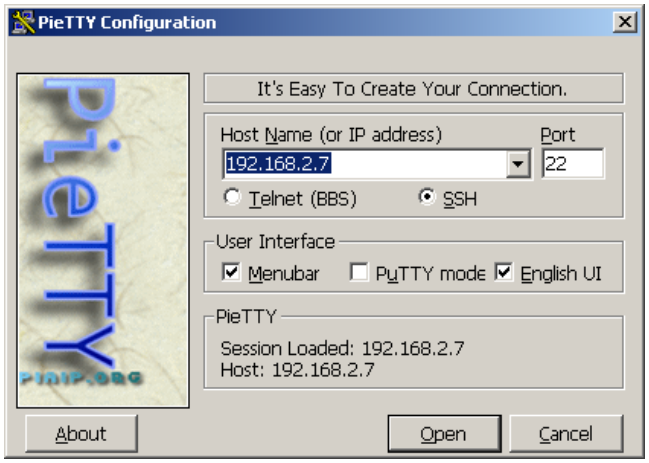
Figure 3-5 Change the password

3.3.10 Exit

type "4" in the main configuration interface, it will return to the user-login screen.

3.4 Time server login through the network

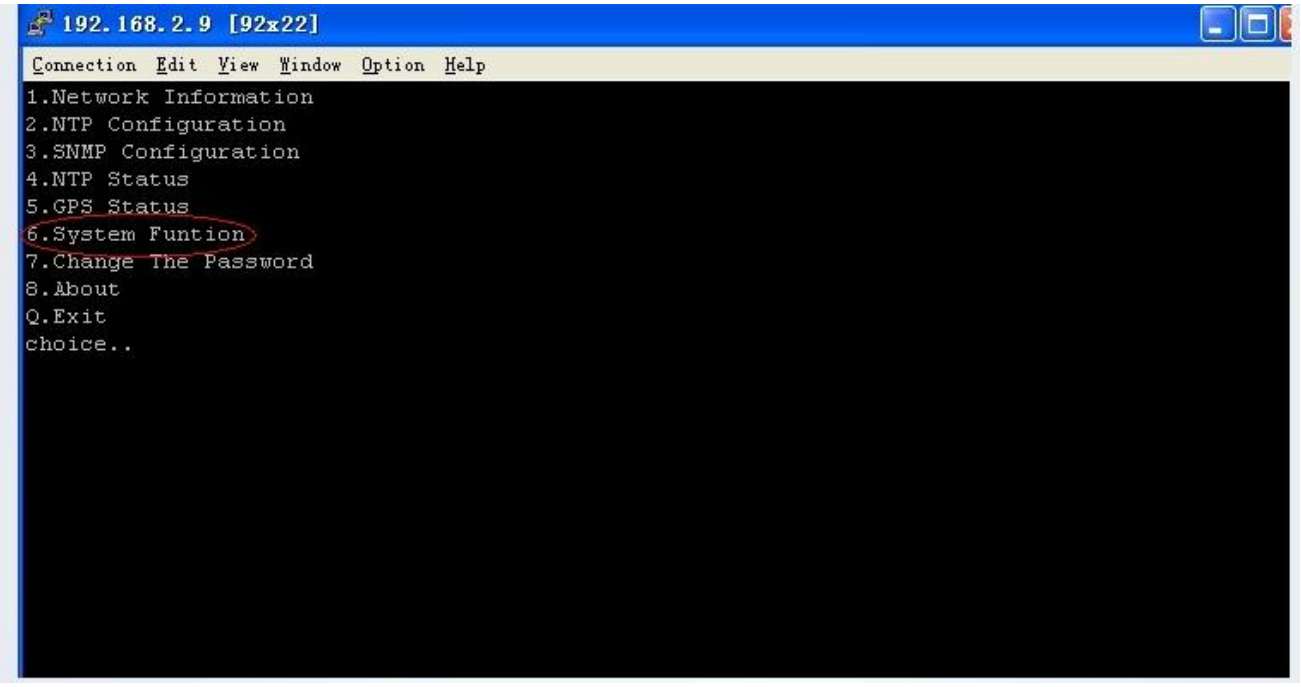
For the sake of the system security, the time server supports login by SSH. The login configuration is as the following interface. The interface after connecting is the same as the HyperTerminal login.

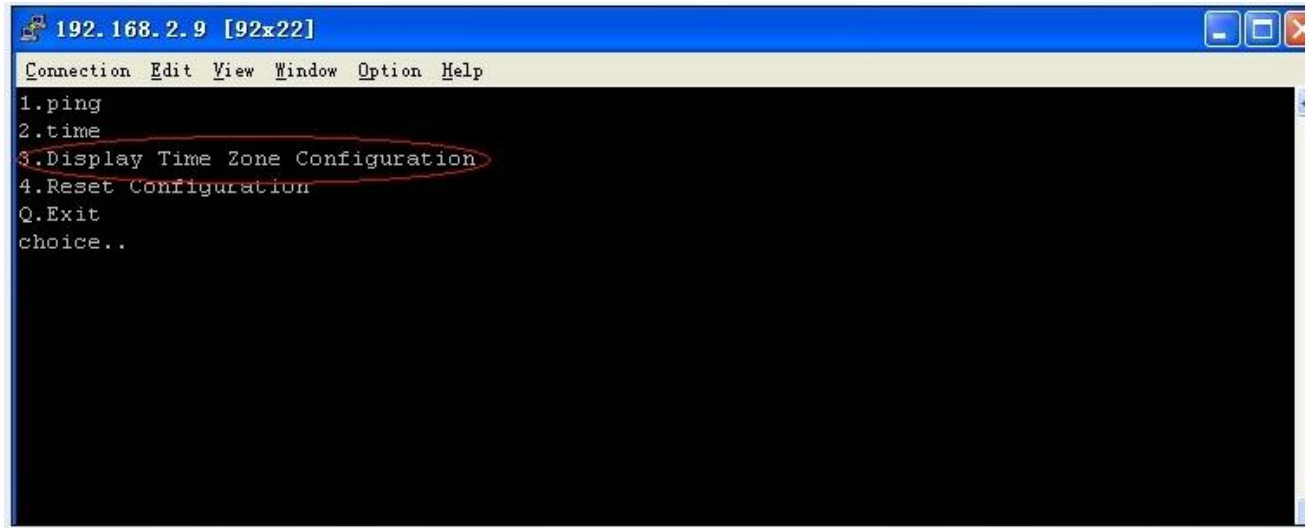


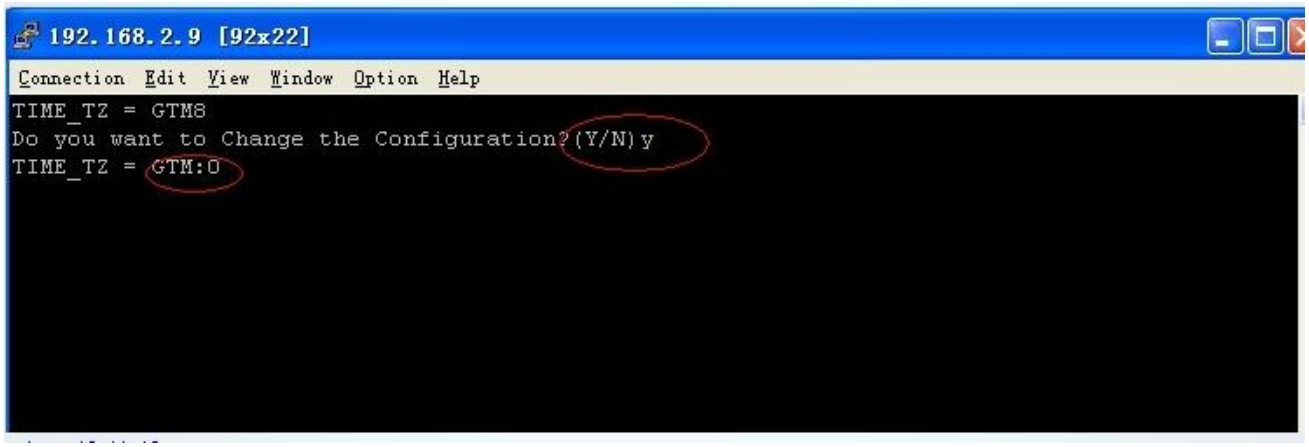
SSH login configuration interface

3.4.1 Time zone display function

Our new version allows users to configure time display on the front panel in different time zones:







3.5 Remote dial-up maintenance

We can use the MODEM to achieve remote dial-up maintenance with the serial monitoring port of GTT-400 network time server. In order to make it, please follow these steps:

Initially, set the MODEM to auto answer mode and connect the MODEM and a computer serial port with a serial cable. Type the following three commands in the HyperTerminal:

atS0=1

at&W0

at&Y0

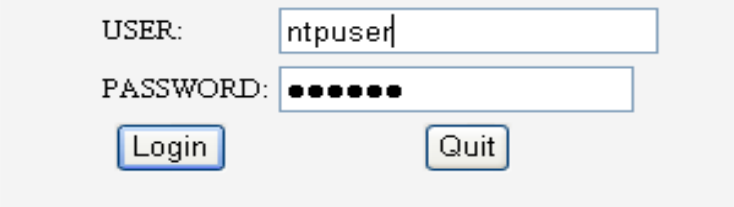
Note: The commands are case sensitive.

Then connect the MODEM and GTT-400 network time server monitoring port with a serial cable. Then plug the telephone line. Finally, dial this number through the Hyper Terminal of another computer with MODEM and it can be connected with the server. The configuration is as introduced in section 3.2.

3.6 Time server logon through the web browser

To configure the server via IE browser

Enter the time server’ s IP address in the address bar. If It displays the following screen, then the connection is successful. The user name is “ntpuser” and the password is “Users.”.



Login

3.6.1 The login interface

The login screen is as shown in the Figure 1.1. The users must login the system and be authenticated before configuring the server. The figure below is the main interface after a successful login.

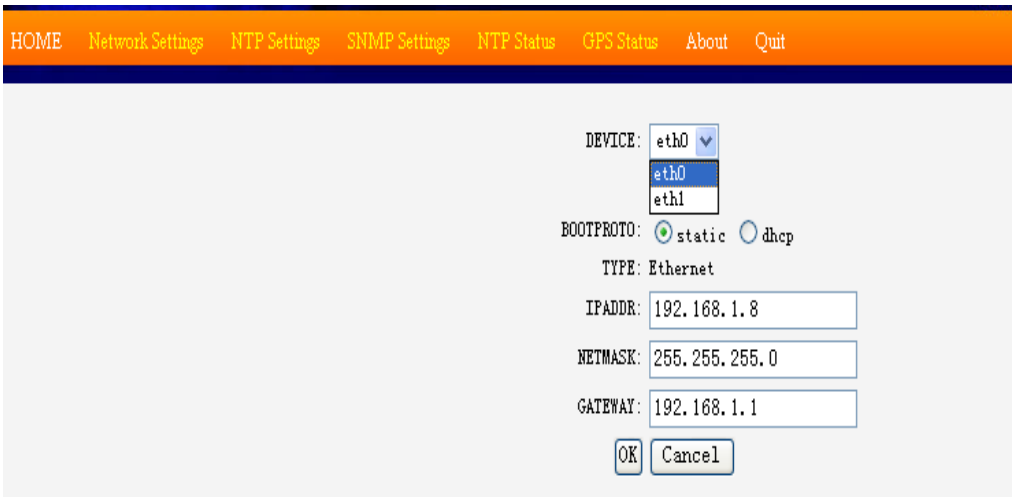
welcome window

The configuration item includes: (1) Network Settings (2) NTP settings (3) SNMP settings (4) Hot Standby (5) NTP status (6) GPS status

3.6.2 Network settings

Click “Network settings” in the navigation bar, it will enter the network configuration item. in the navigation bar click on "Network Settings".

Network settings are divided into DEVICE, BOOTPROTO, IPADDR, NETMASK and GATEWAY. They represent the network card equipment, starting mode, IP address, subnet mask and gateway. You can select the network card settings by clicking the drop-down menu under the DEVICE item, as shown below:

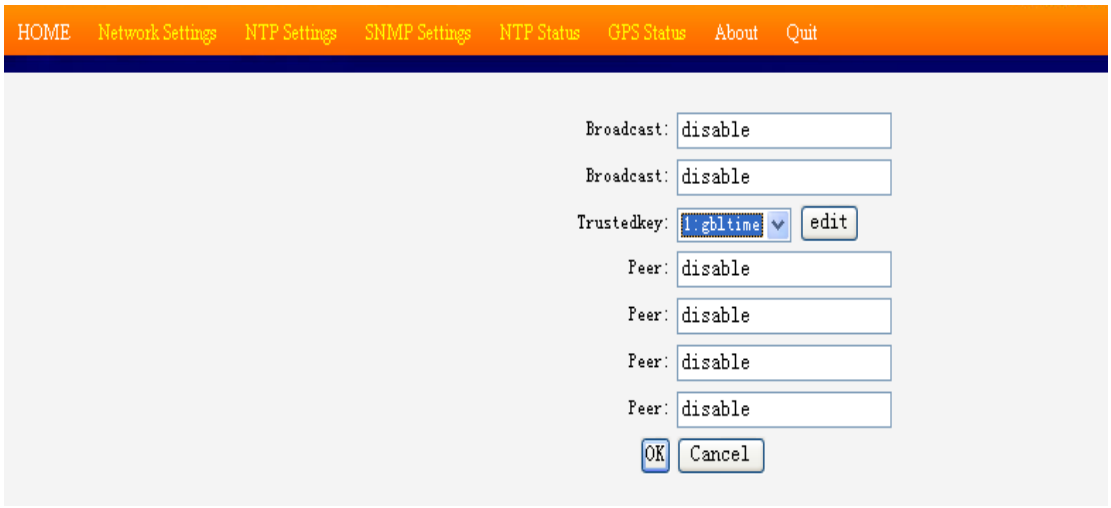


Network settings/ select the network card.

Then, set the related options. If you need to set a fixed IP for the network card, then select STATIC in the BOOTPROTO item. The operation is shown in Figure 1.3.1. Then assign the appropriate IP, subnet mask and gateway. Finally click Submit to save the settings. If there is no need for fixed IP, the network card will get IP through DHCP. Then you only choose DHCP under the BOOTPROTO item. The relevant information about the current card will be set out as below.

3.6.3 NTP settings

Click "NTP Settings" in the navigation bar to enter the NTP setting item, as below:



NTP settings

The items BROADCAST, TRUSTED KEY, PEER represent the broadcast IP address, MD5 checksum and PEER respectively.

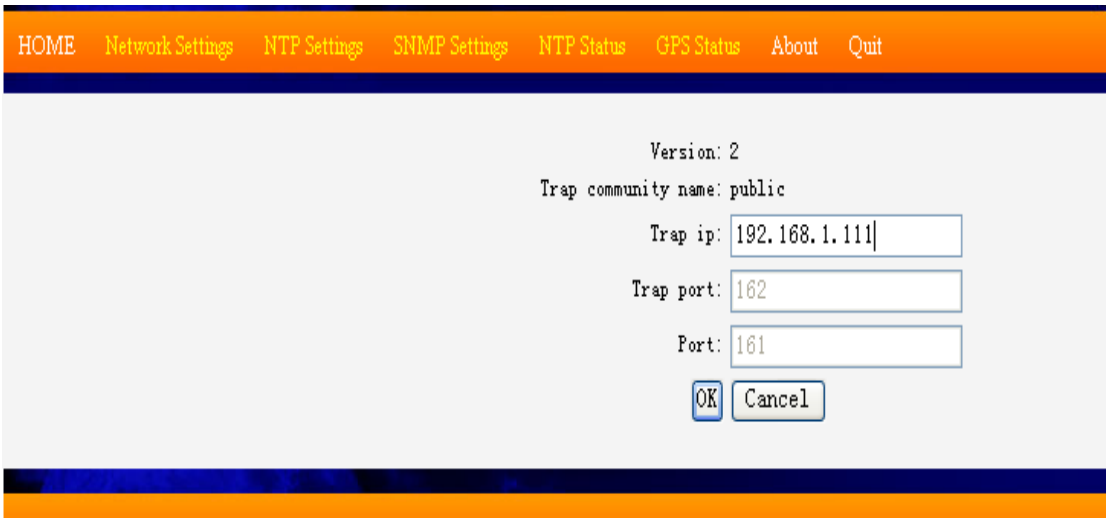
When the BROADCAST and PEER are not put to use, it will display "disable". If you need to configure the settings, then enter the exact IP address and click Submit.

TRUSTED KEY is the MD5 checksum and is used for checking the NTP service. Generally you only need to select the key items in the drop-down menu. If you need to add items by yourself, please click edit.

When setting the key number in the ID box, values range from 1 to 65535 and can not be repeated. The key value consists of the 8-bit characters and no punctuation is allowed. The fixed format: "ID M xxxxxxxx". After entering the two items for submission, the system will automatically save it to a fixed format and set it out in the web pages.

3.6.4 SNMP settings

Click the "SNMP Settings" in the navigation bar to set the SNMP items, as shown below:

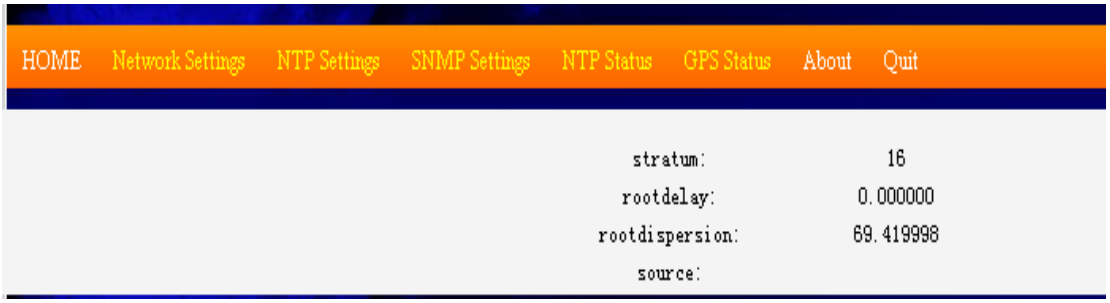


SNMP settings

The settings are divided into SNMP_TRAP_IP, SNMP_TRAP_PORT, and SNMP_PORT. That is to set the TRAP server address, TRAP information port number and general information port number. Likewise, fill in the appropriate IP, port number and submit the information. Usually the default port number is 161,162.

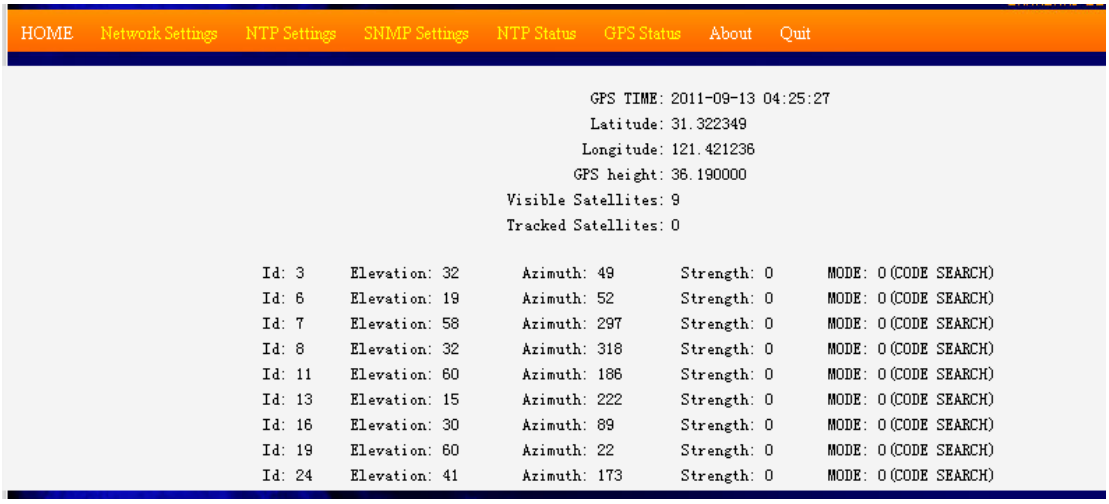
3.6.5 Check the status

The time server provides simple status query with clicking "NTP status" or "GPS status", as is shown in the following Figure:



NTP status

In NTP status, there are STRATUM (server layer), ROOTDELAY (delay), ROOTDISPERSION (precision).



GPS status

In GPS status, there are LATITUDE, LONGTITUDE and SATELLITE UMBER.

Note: The items above require filling in the right IP, otherwise it will result in the checkout failure and will not be saved. If you enter the IP address and can not access the management interface, you need to check the network status to make sure that power is on and the network port is connected to the management port.

3.7 Client configuration

Regarding WinXP/2003 system, it includes NTP services and can be directly set. The specific setting methods are as follows:

Firstly, double click the time mark on the right side of the windows task bar and it will pop up an interface with date and time properties. Then select the Internet time screen, which is shown as the picture in the next page.

Secondly, modify the windows default time server, such as modifying to 192.168.2.8.

Thirdly, click "Apply", and then "Update Now". After a successful synchronization, it will show successful ****** synchronization time in **year, **hour, **minute. The next synchronization: **year, **mounth **Date, **hour, **minute. Windows default is to synchronize once a week. If the screen displays RPC not available, you should open the Control Panel, select Administrative Tools / Services, search windows Time from the services list, choose to automatically open the service and restart it.

Fourthly, if you consider the synchronization cycle is too long, you can modify the registry to shorten the synchronization cycle. The specific registry key is in:

\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\NtpClient\SpecialPollInterval

The default is 604800 = 60 × 60 × 24 × 7, namely, a week.

synchronization once a day: The default is 86400

synchronization once an hour: The default is 3600

synchronization once ten minutes: The default is 600

Fifthly, after modifying the registry, you should stop windows time service and restart it. Then the time interval can be updated.

If it has been installed with other time synchronization software, you need to uninstall the software and restart the computer. The windows time service can work normally.

For Win2000/98 operating system, the time synchronization software provided by our firm or provided by the third-party are both available. The specific configuration can be referred to the respective user manual.

For UNIX systems, in general, there is ntpd daemon or xntpd daemon. Create the ntp.conf configuration file under the / ETC directory and type "server ******" (time server IP) in it. Then starting the daemon will do.

Regarding the details, please refer to the user manual or directly consult us.

3.8 Troubleshooting

3.8.1 All indicator lights are off when power is on

Check whether the power outlet is with electricity. There is a fuse socket in the device. You need to unplug it and check whether the fuse is intact.

3.8.2 Receiving no satellite signals for a long time

Emphasis should be placed on verifying whether the feeder system is normal.

Firstly, unplug the feeder on the side at the device. Then measure the BNC socket with a multimeter. Normally there is 5V antenna supply voltage. Otherwise, it shows that the equipment has been damaged.

Then verify the outdoor antenna is well connected, such as verifying the outdoor joints are tight, the connectors are waterproof, the antenna has leakage problem and so on. You should troubleshoot the obvious problems one by one.

Then disconnect the antenna connector and measure the resistance of the feeder. When the remote end is open, the near-end resistance should be infinite. Besides, when the remote end is shorted, the near-end resistance will be only a few ohms. If it is shown abnormal, verify the feeder and the connector is intact. The normal faults: the quality of the line is not good; the connectors are not done well; lines are scratched or bitten by small animals, etc. If the feeder is added a lightning arrester or an antenna amplifier in the middle, you still need to verify the two components is intact.

After eliminating the above breakdown, if it still can not receive the satellite signal, please contact the service hotline of Shanghai GlobalTime Electronic Co., Ltd. Our engineers will help you with the further processing.

3.8.3 Can not ping the time server after configuration

First, verify the physical network connection. You can see if the corresponding connection-status light is normal by observing HUB or switch connected with the time server. And then check if there is something wrong with the network settings. You can use a crossing cable to connect the server to the computer directly to see if ping is ok. Then use HUB to test in the same network segment. Finally test the different segments. Following these steps, it is easy to troubleshoot. Some firewall software on your computer will provide

a protective screen from ping operation. So it’ s better to check the network after turning off the firewall.

3.8.4 Instable satellite signal, the equipment is in hold mode sometimes

In general, it is caused by the improper site selection of the satellite receiver antenna. If this trouble occurs frequently, you should consider to select another site to install the antenna, that is, a place free of anything overshadowed and the surrounding microwave interference.

3.8.5 The client can not receive timing service

NTP protocol usually proceeds timing service through port 23 with UDP protocol and sometimes with TCP protocol. So port 23 service should be allowed to go through the intranets gateway and the firewall. Please check the gateway and the firewall configuration.

3.8.6 How to configure the network equipment to receive time service

NTP protocol is an international standard protocol. The network equipment of many manufacturers can receive NTP protocol to adjust their own time. For example, the routers of Cisco, Avaya, Ascend and Huawei can all receive NTP services. Some series switches also support the NTP protocol. For instance, the configuration command of Cisco router is:

ntp server <IP address>

Regarding the specific configuration, please refer to the manual provided by the manufacturers. To unify the network time by NTP protocol can effectively improve the quality of network service. It can also judge the cause of the malfunction by checking the unified time Log files when the network goes wrong.

Chapter 4 Detailed performance index of the equipment

GPS receiver

- 12 channel GPS receiver
- L1-Band, C/A Code
- position hold-type
- Cold-start time: 200 seconds
- Warm-start time: 50 seconds
- Hot-start time: 25 seconds
- Positional Accuracy: 100 meters

Timing performance

- Server Time Level: Stratum 1
- Server time precision: 1ms
- Precision of client time: 10ms
- Timing capacity: >1000 times per second

Network protocol support

- ✓ RFC 1119/1305 NTP v2/v3/v4
- ✓ RFC 1769/2030 SNTP v2/v3/v4
- ✓ SNMPv1/v2/v3/v4
- ✓ TIME/DAYTIME
- ✓ TELNET
- ✓ SSH
- ✓ FTP
- ✓ DHCP

Power supply and the environment:

- Power supply: 15W, 176 ~ 264V AC(or -48VDC)
- Environment:
- Temperature: 0 ~ 50 ℃
- Relative humidity: 0～90%RH(non-condensing)