Software Operation Manual for PTS-10AL Economical Rack Clock Server

Published: April 2024
Edition: V1.1

KYLAND

Disclaimer

KYLAND Technology (Yichang) Co., Ltd. strives to make the information in this manual as accurate and up-to-date as possible. However, we cannot guarantee that this manual is completely free of any technical or clerical errors and reserve the right to modify it without notifying the user.

Published: Kyland (Yichang) Technology Co., Ltd.

Website: http://www.Kyland.com.cn

http://www.Kyland.cn

Customer Service Hotline: 010-88796676

Fax: 010-88796678

E-mail:services@Kyland.com.cn

Directory

Preface

This manual mainly introduces the access mode and software characteristics of PTS-10AL economical rack clock server product, and introduces the configuration and use method of this product in detail through Web interface.

Content organization

This manual is mainly introduced from the following contents:

Module	Characteristic description
1. Product introduction	➢ Overview ➢ Software characteristics
2. Device access mode	➢ Web access ➢ Telnet access ➢ SSH Access ➢ Debug serial access
3. Network	➢ Interface ➢ Static routing
4. Application	➢ Mail alarm setting ➢ MAC Address Filter Settings ➢ Alarm (basic alarm, power failure alarm)
5. Clock Server	➢ Synchronization source parameters ➢ Clock parameter ➢ NTP Parameters ➢ PTP Parameters ➢ Output parameter ➢ SNMP management ➢ Synchronization source state ➢ Clock state ➢ Local end operation
6. Users	➢ User management ➢ Change password
7. Systems	➢ Log ➢ Backup/Restore ➢ Upgrade ➢ System reset ➢ Restart

This manual stipulates that

1. Text format convention

Format	Description
< >	The content in "< >" represents the button name, such as "Click < Apply > button".
[]	The contents in "[]" indicate the window name and menu name, such as clicking the "[file]" menu item.
{}	The content in "{}" represents a combination, such as "{IP address, MAC address}" means that IP address and MAC address are a combination, and can Configure and display together.
→	Multi-level menus are separated by "→", for example, "Start → Program → Attachment" indicates the [Attachment] menu item under the [Program] submenu under the [Start] menu.
/	Choose one of two or more and separate it with "/", such as "addition/subtraction" for addition or subtraction.
~	Represents a range, such as "1 ~ 255" representing a range from 1 to 255.

2. Command-line format conventions

Format	Description
Bold font	Command-line keywords that display the software version of the switch as typed in the CLI configuration, such as "show version".
Italic	Command line arguments, parts that must be replaced by actual values, such as "show VLAN id" showing the VLAN number as VLAN VLAN information for the id.

3. Mark Protocol

Sign	Description
 Attention	Remind the matters needing attention in operation and configuration, and supplement the description of operation content.
 Description	Make necessary explanations for the operation contents.
 Warning	Special attention should be paid to incorrect operation, which may lead to data loss or device damage.

Product supporting materials

The supporting materials of PTS-10AL economical rack clock server include the following contents:

Data name	Content introduction
PTS-10AL Economical Rack Clock Server Hardware Installer	Learn more about board structure and hardware specifications
PTS-10AL Economical Rack Clock Server Software Installer	Understand the functions of device software and master the Web configuration method of each functional module and Configuration steps

1 Product Introduction

1.1 Overview

PTS-10AL is a rack-mounted multifunctional clock server that provides nanosecond time service for industrial fields. It supports automatic tracking and locking of BDS, GPS and GLONASS satellite absolute time reference and IEEE1588 and IRIG-B ground-based time reference. Through a safe and reliable time source selection mechanism, PTS-10AL can automatically select the correct external time source for time synchronization. By comparing the time difference between local clock and external time source one by one and analyzing the signal quality and stability of each time source in detail, PTS-10AL can choose a reliable time source as its own reference time. It supports a variety of time output signals including IEEE1588, NTP, IRIG-B, 1PPS, 1PPM, 1PPH, and TOD, which meet the requirements for device configuration management through web functions. It also supports management modes such as SNMP.

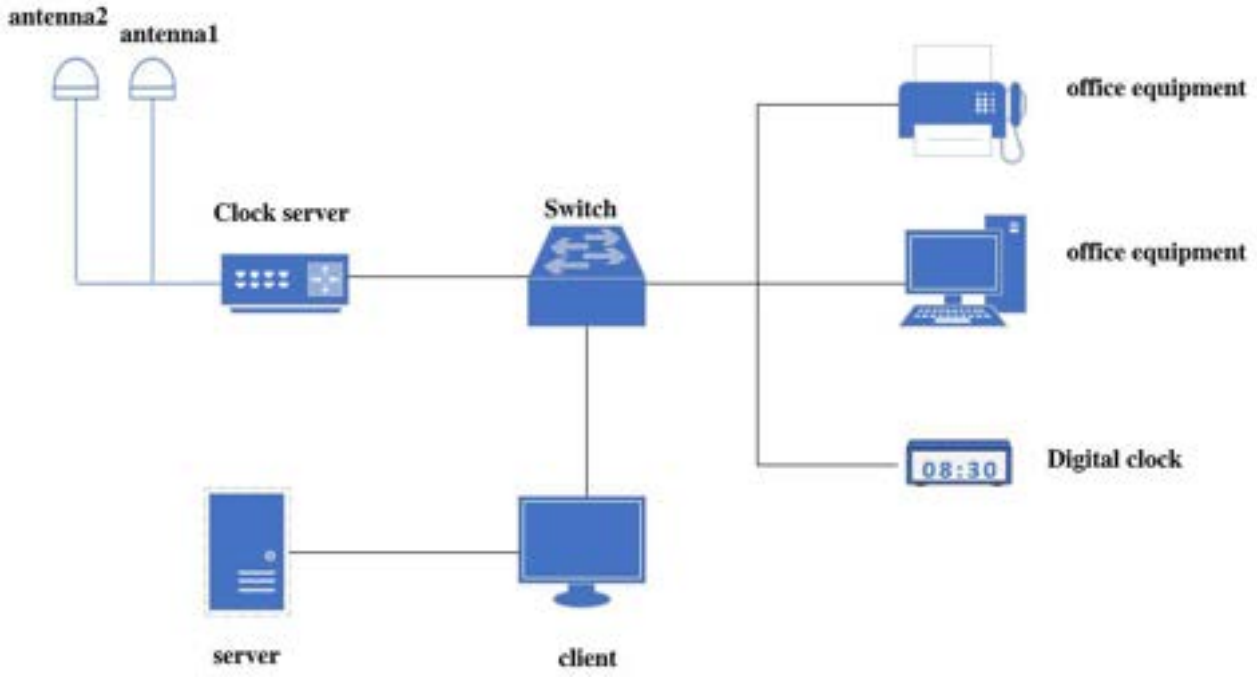

Figure 1 Time Synchronization Erection Diagram

1.2 Software Characteristics

This series of device has rich software features, which can meet different needs of customers.

Interface function: electrical port 10/100 m/1000M adaptive, optical port 1000M, support port isolation clock characteristics: support space-based synchronous source satellite source GPS/BDS/GLONASS

Support ground-based synchronous source IRIG-B (fiber input) & IEEE1588 (network port input)

Support setting time source priority, mode, etc.

Support setting clock time zone, summer time, clock output mode, etc.

Support for NTP v1/v2/v3/v4 & SNTP Support for MD5 Authentication (Network Port Output) Support for PTP & E2E and P2P (Network Port Output)

Support for IRIG-B (BNC interface input)

Supports 1PPS, 1PPM, 1PPH and TOD (serial interface output)

Support status information view includes synchronization source status & clock status support LCD screen display satellite signal status time information and so on

Routing: Support static routing

Security features: Support SSH, MAC address binding, user classification, AES\ DES\ 3DES data encryption

device management: Support Console/Telnet/Web management (HTTP/HTTPS)

Support KyCMT integrated debug management tools (device search, IP address configuration, etc.) support ICMP control messages

Support SNMP v1/v2c

Support for SNMP Trap

Support ARP, DNS, DHCP Client

Device maintenance: support to upgrade through WEB software

Supports FTP, TFTP, Syslog

Support SMTP mail alerts

Support MAC address whitelisting

Support LED screen configuration management

2 How To Access The Device

Support several ways to access devices:

- Web browser access
- Telnet access
- SSH Access
- Debug serial access

2.1 Web Access

Web login requires proper communication between the PC and the device network.

Note:
It is recommended to use Firefox or Google Browser to make the Web management interface more friendly. The device is not compatible with IE browser.

1. Enter "IP Address" in the address bar of the browser, and the login dialog box appears as shown in Figure 2. Enter the default user name "admin" and password "pwd4Kyland", or enter other created user names and passwords, and click the < Login > button;

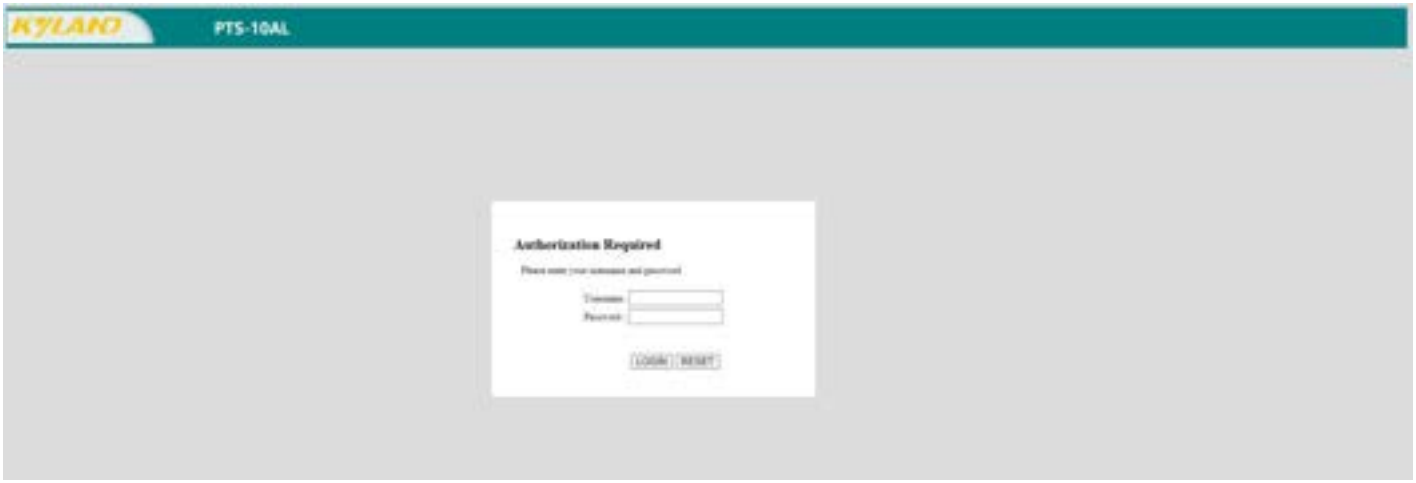

Figure 2 Web Login

Enter the main interface, and switch to English or Chinese Web operation interface in the upper right corner. The factory configuration defaults to Chinese interface.

2. At this time, successfully log in to the device page, and the configuration navigation tree is on the left, as shown in Figure 3;

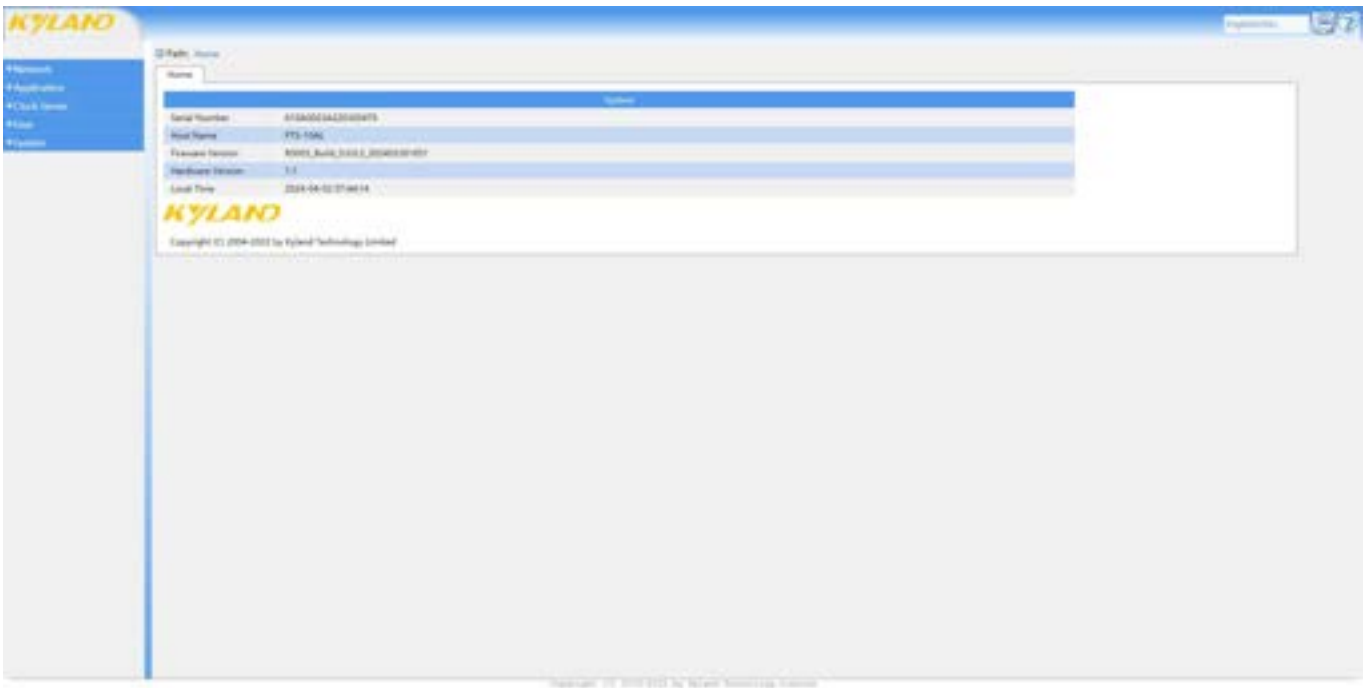

Figure 3 Web interface

The home interface is used to display device information, including: serial number, host name, software version, hardware version and device time. Serial number, host name and hardware version are set when they leave the factory, and will not change later; The page shows that the software version and time change with the actual situation.

Click the menu in the navigation tree to expand/close the menu item. Click Home to link to the Web shown in Figure 3

The first interface, that is, clicking the icon under any circumstances can switch to the first interface of the Web; Click English(USA) on the language display bar to switch the system language; Click to exit the Web operation interface; Click to enter Kyland Technology official website.

2.2 Other Access Methods

Web access can satisfy the normal use of the device. telnet, SSH, debugging serial port and other access methods are used to troubleshoot problems, limited to use under the guidance of technical support, and are not open to the outside world. If there is any need, please contact our technical support.

Warning	Special attention should be paid to incorrect operation, which may lead to data loss or device damage.

3 Network

3.1 Interface

3.1.1 Interface Information Display

The Network-Interface page is used to display the relevant network parameters of the serial server device, including device running time, MAC address, received/sent data volume, IP address, etc., as shown in Figure 4.

Figure 4 Network Interface Information

The running time of the device is timed from the start of the network card, and if the device is restarted, the data is recalculated; The MAC address is set when the device leaves the factory, and the MAC address is unique; The receiving/sending quantity is the receiving/sending data calculated after the device network card is started. IPv4 address represents the IP of the network card, and the correct IP address can communicate with other devices in the network.

3.1.2 Ip Address Configuration

1. After clicking the Network → Interface menu, the < Edit > button appears on the Network Interface page. Click the < Edit > button to enter the network interface editing interface. Users can set the IP address, subnet mask, gateway, custom DNS and multi-IP address of the network port-LAN (ge0) ~ LAN4 (eth4). When all parameters are set, click < Apply >, and the network function will automatically restart and take effect.

Protocol

Configuration option: Static address/DHCP

Default configuration: Static address

Function: Select Static address, you need to manually configure IP address and subnet mask; When DHCP is enabled, the device automatically obtains the IP address through the DHCP protocol

as a DHCP client. At this time, there should be a DHCP Server in the network as a client End assigns IP address and subnet mask.

IPv4 Address

Configuration format: x. y. z. w, address must be a valid IP address separated by dots ('x. y. z. w').

1) x, y, z, and w are decimal numbers between 0 and 255

2)x cannot be 0

3)x cannot be 127

4)x cannot be greater than 223

5)w cannot be 0 or 255.

Function: IP address of LAN interface.

IPv4 Subnet Mask

Configuration format: x. y. z. w, address must be a valid IP address separated by dots ('x. y. z. w'); The input subnet mask must be a continuous "1" to convert to binary before it can be verified as a legal subnet mask.

For example, subnet mask 255.255. 255.192, binary display 11111111.11111111.11111111.11000000. And it can be represented as 26, that is, in a 32-bit subnet mask, the first 26 bits are consecutive "1s". When the subnet mask input is not a continuous "1", it will check that the prompt is in an illegal format, such as 255.255. 250.0, and the binary display is 11111111.11111111.11111010.00000000.

Function: Identifies that the server belongs to a class A, B or C network.

IPv4 Gateway

Configuration format: x. y. z. w, the rules are the same as above

Function: It is a computer network how to forward packets to other nodes in the network, in the absence of a specific route, clear out the next hop IP address of sending packets.

Use a custom DNS server

configuration format: x. y. z. w,

with the same rules as above

Functions: DNS, Domain Name Server is a domain name and its corresponding IP address translation server. DNS stores a table of domain names and their corresponding IP addresses to resolve the domain names of messages.

2. Configure multiple IP addresses. You can manually configure the secondary IP address of the device IP interface, as shown in Figure 5.

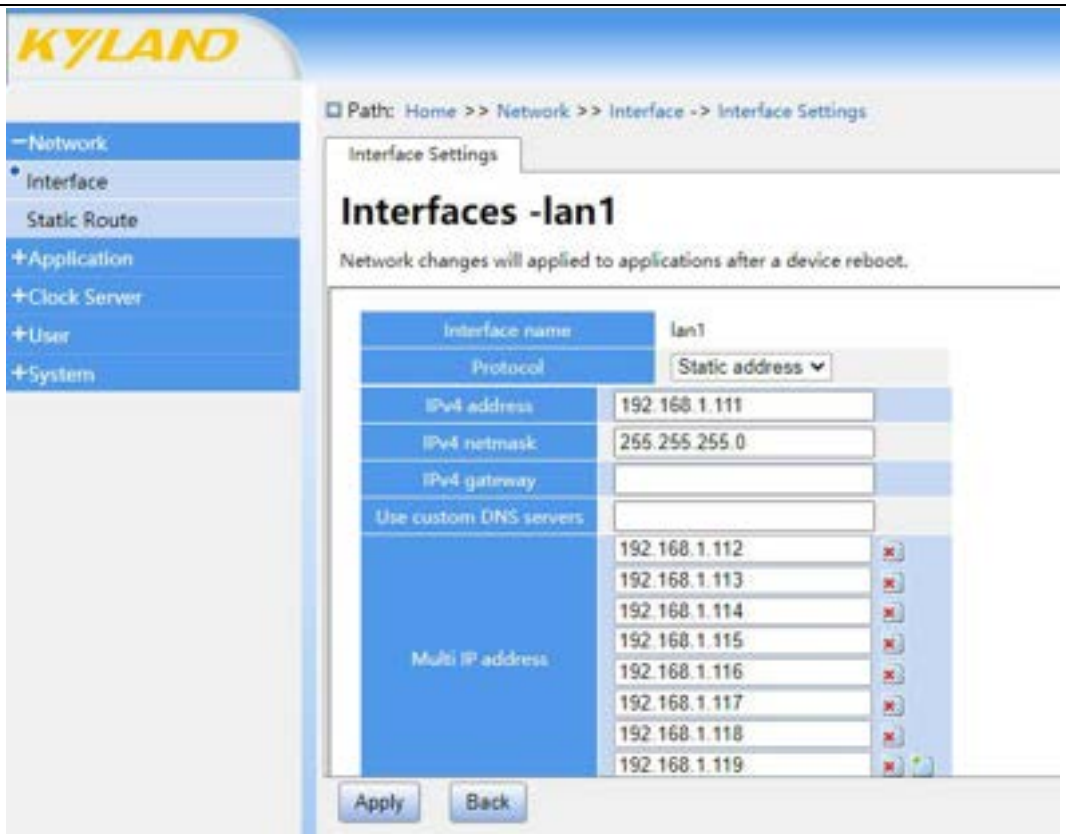

Figure 5 Configuring secondary IP

Configure multiple IP addresses, click <Add>button to add up to 8; Click <Delete>button to delete, and click<Apply> on the page, and the device restart will take effect.

Multiple IP addresses

Configuration format: x. y. z. w, the rules are the same as above, and the main IP needs to be in the same network segment. Function: Manual configuration of multiple IP addresses.

Note:

- Each IP interface corresponds to one primary IP address and can correspond to multiple secondary IP addresses;
- Different IP interfaces should be configured with different network segments for primary/secondary IP addresses, otherwise, it will cause the router to be unsure of which exit to choose.

3.2 Static routing

3.2.1 Introduction

The static routing function is divided into two parts: static routing and routing status. Static routing configuration includes destination network, subnet mask, gateway, and the interface can be selected as specified network interface or default, with a maximum of 10 static routes configured. The static routing function configuration is shown in the following figure:

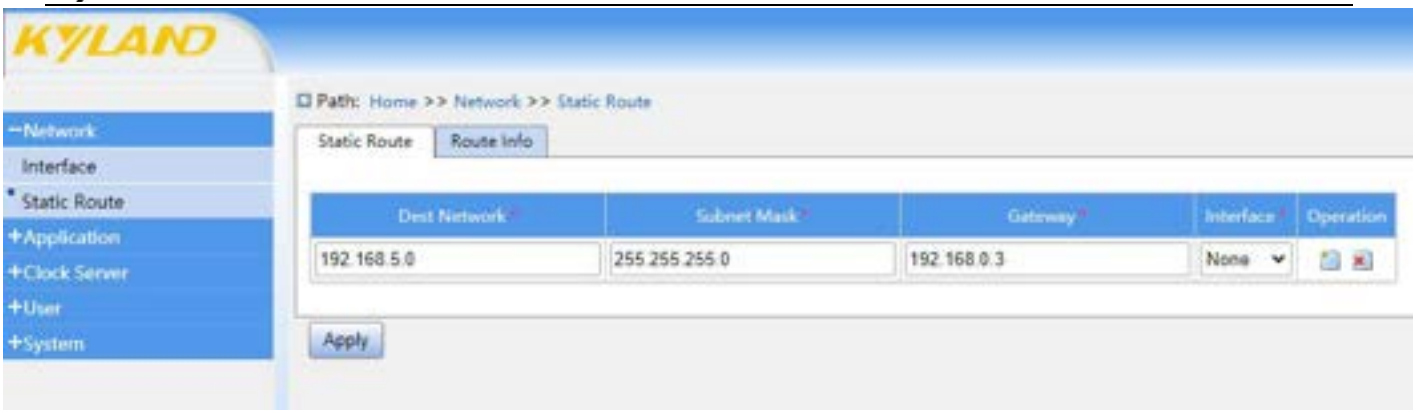

Figure 6 Example of Static Routing Configuration

The routing status function is used to view the existing routes of the device. The routing status is shown in the following figure:

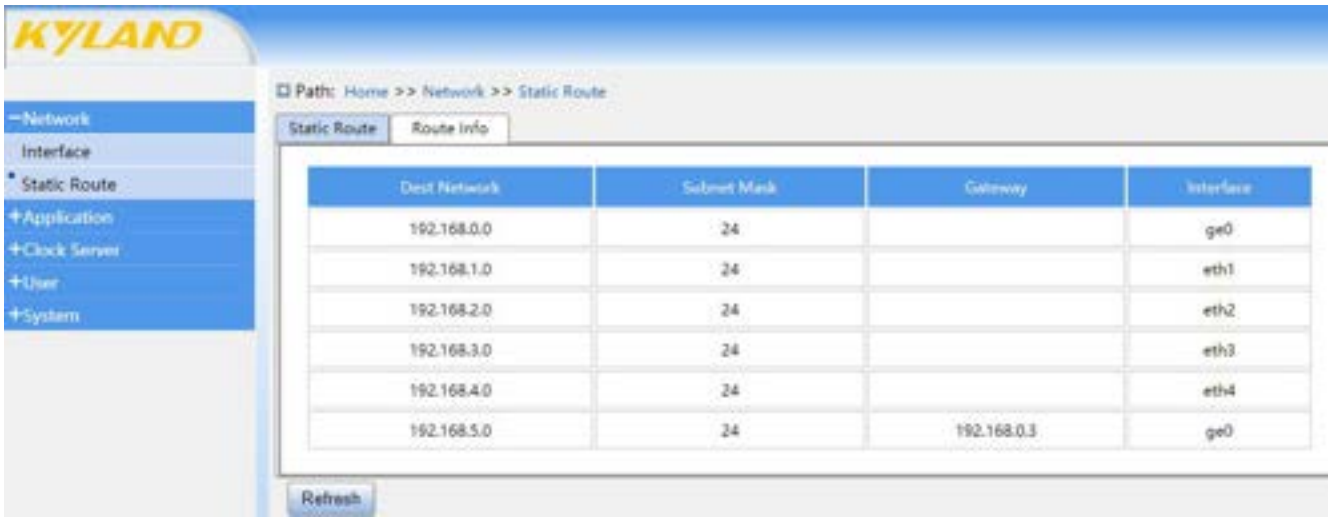

Figure 7 Routing Status Page

3.2.2 Web page configuration

The static routing function configuration interface is shown in the following figure:

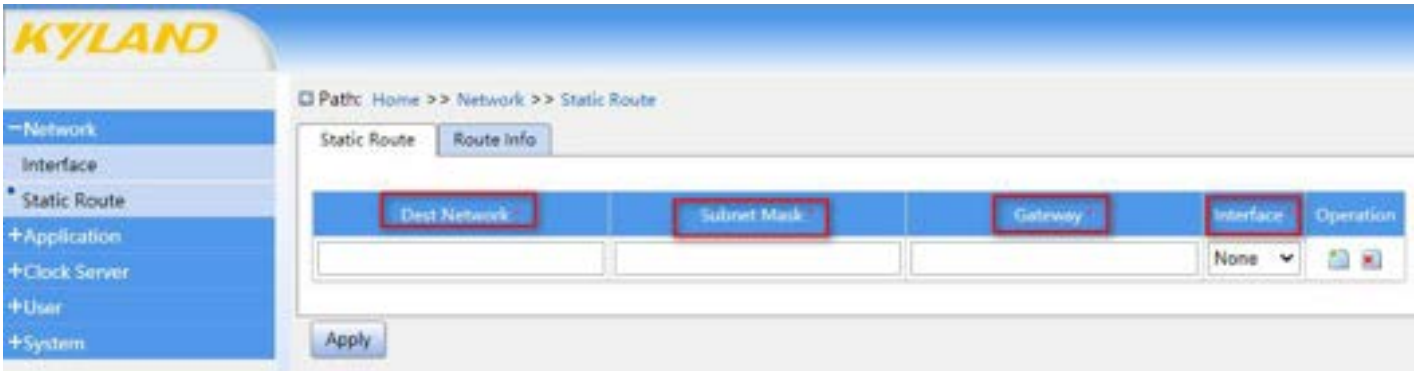

Figure 8 Static Routing Configuration Page

Destination network

Configuration options: The configuration format is the same as the IPv4 address rules in section 3.1.2.

Function: IP address where data arrives

IPv4 subnet mask

Configuration options: The configuration format is the same as the subnet mask rules in section 3.1.2.

Function: Identify the server as belonging to Class A, B, or C networks

Gateway

Configuration options: The configuration format is the same as the IPv4 address rules in section 3.1.2.

Function: The IP address of the next routing device that the data passes through before reaching the destination address

Interface

Configuration options: None, ge0, eth0, eth1, sfp0, sfp1

Function: The current route takes effect on the selected interface (gateway configuration must be in the same network segment as the current interface in order to be applied normally)

4 Application

4.1 Mail Alarm Setting

4.1.1 Introduction

The Mail Alert feature is used to send an alert message to a specified recipient (typically a network administrator). Periodically send the device IP, CPU/Mem to the network administrator by mail, so that the administrator can know the corresponding information in time.

The device supports sending alert messages to the following two types of events:

- IP: The device periodically emails its own IP information.
- CPU/Mem: The device periodically emails real-time usage of its own CPU and memory.

4.1.2 Web Page Configuration

Mail alarm configuration, as shown in Figure 9;

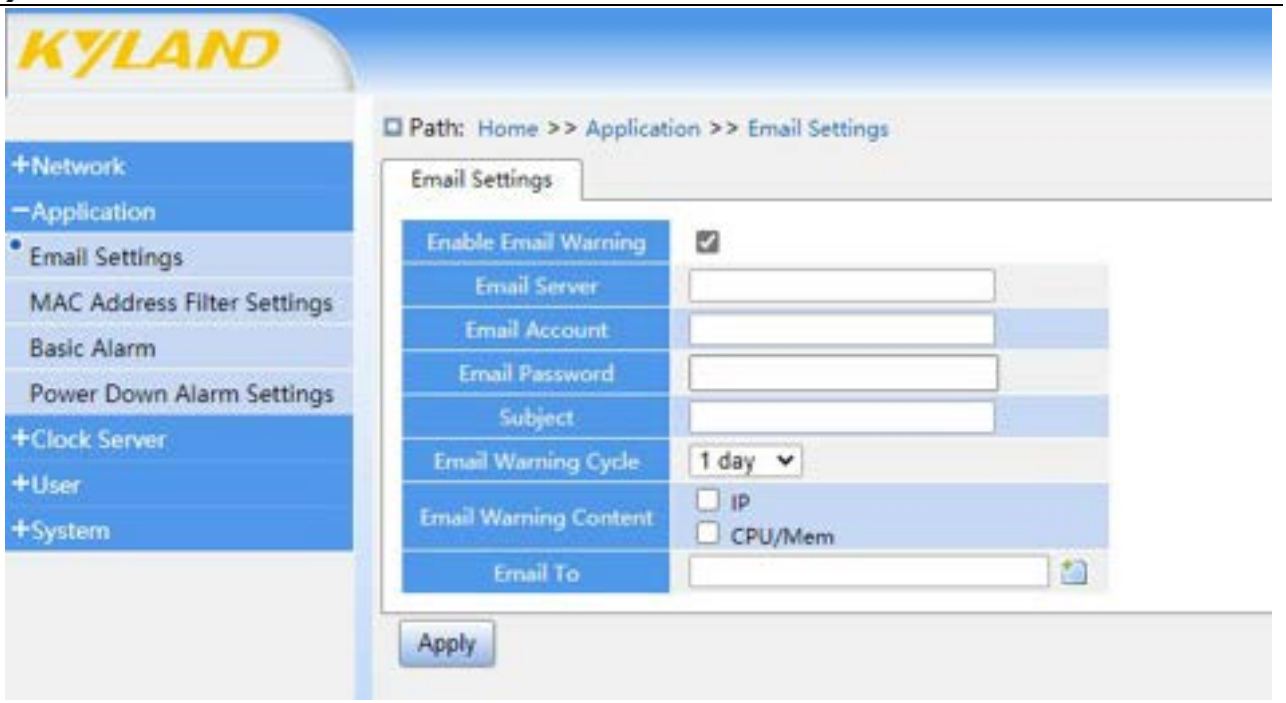

Figure 9 Mail Alert Configuration

Enable Mail Alerts Client

Configuration Options: Enable/Enable

Default Configuration: Not Enable

Function: Whether the mail alarm function is enabled.

Mail sending server address

Configuration format: Correctly formatted IP address

Function: Configure the address of the sending mail server.

Mail account address password

Configuration range: The correct format of the mail server account address, login password function:

Configure access to the mail server account password.

Mail Subject

Configuration range: 0 ~ 40 characters, special characters are not allowed.

Function: Alarm subject of receiving mail

Mail alarm cycle

Configuration Options: 1min/5min/20min/1hour/1day

Function: Configure the cycle for sending mail alerts

Mail alarm receiver

Configuration range: Legal email address

Function: The recipient receives the alarm subject of the mail

Note: Up to 4 can be added, click Add Account, click Delete Account

4.1.3 Typical Configuration Example

The mail alarm example configuration is shown in Figure 10:

Figure 10 Example OF Mail Alarm Page Configuration

Note:

This device logs in to the server through the SMTP protocol to send emails. If the server is a QQ email, it is necessary to enable SMTP separately on the QQ email page, and contact the service provider for other email addresses.

4.2 MAC Address Filter Settings

4.2.1 Introduction

MAC address filtering refers to filtering the MAC addresses of hosts accessing the network through devices, prohibiting or only allowing some hosts to access the network through devices.

Whitelist: Whitelist is the user who can pass the setting, and users outside the whitelist cannot pass.

Blacklist: Blacklist is set to users who cannot pass, and users outside the blacklist can pass.

4.2.2 Web Page Configuration

MAC address filtering settings, as shown in Figure 11;

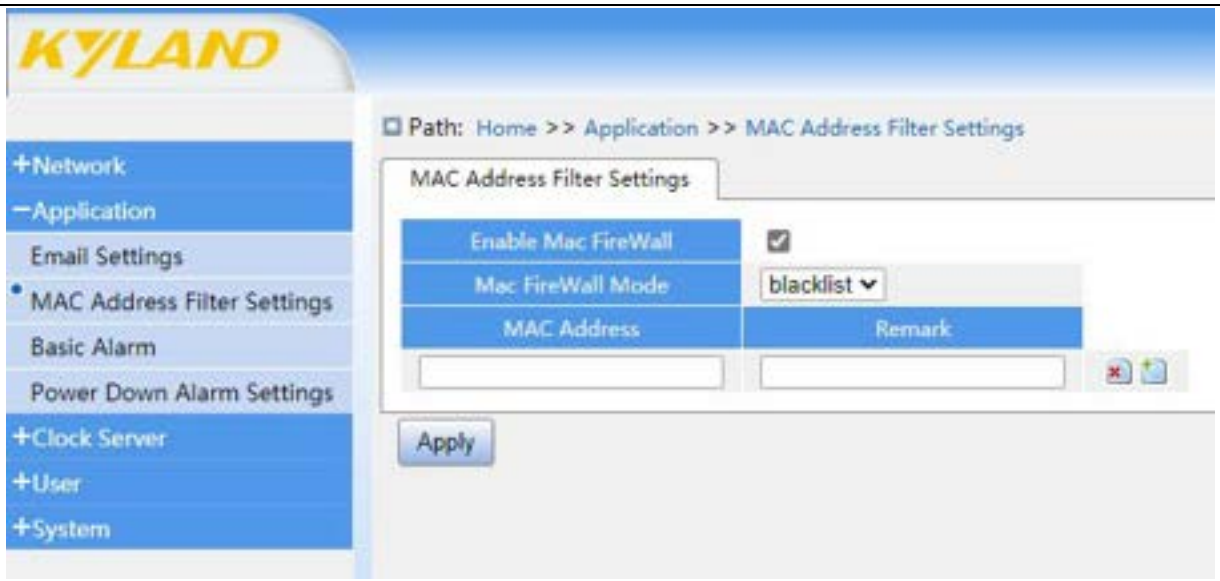

Figure 11 MAC Address Filter Setup Page

Enable MAC Address Filtering Settings

Configuration Options: Enable/Not Enable

Default Configuration: Not Enable

Function: Configure whether the MAC address filtering function is turned on.

MAC Address Filtering Mode

Configuration Options: Blacklist/White List

Default Configuration: Blacklist

Function: Configure whether the filtering mode is white list or black list.

MAC Address and Notes

Configuration range: MAC address format xx: xx: xx: xx: xx or xx-xx-xx-xx-xx-xx-xx-xx, x is hexadecimal number, remarks are not required, customized according to customer requirements, up to 4 new MAC addresses can be added, click Add entry, click Delete entry, and click < Apply > to confirm.

Note:

Please use the black/white lists with caution. Incorrect settings of the black/white lists can result in inability to access this device, and can only be recovered by resetting the blacklisted device through the debug serial port.。

4.3 Basic Alarm

4.3.1 Introduction

Alarm management can monitor the specified alarm variables CPU utilization and memory utilization. After the user defines the alarm entry, the system will obtain the value of the monitored alarm variable regularly. When the value of the alarm variable is greater than or equal to the upper threshold, an alarm event will be triggered.

4.3.2 Web Page Configuration

Configure the basic alarm, as shown in Figure 12;

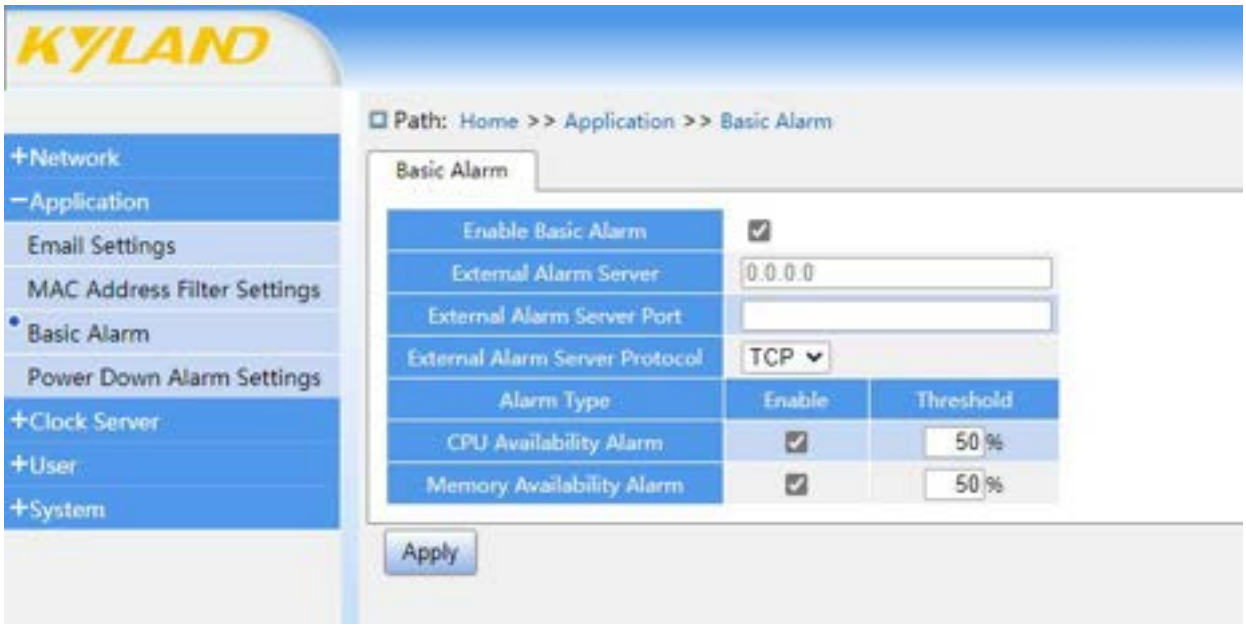

Figure 12 Configuring Basic Alarm

Enable basic alarm

Configuration Options: Enabled/Not Enabled

Function: Whether to enable the basic alarm service

External alarm server

Configuration range: A.B.C.D, legal IP address

Function: Configure the IP address of the server for external alarm reception.

External alarm server port

Configuration range: 1 ~ 65535

Function: Configure the port of the server that receives the alarm externally.

External alarm server protocol

Configuration Options: TCP/UDP

Function: Communication protocol with external server, if the other party is TCP server, select TCP; If it is UDP Server, select UDP

Alert Type

Configuration Options: CPU Utilization Alert, Memory Utilization Alert

Function: After activation, if the device's CPU and memory utilization rates exceed the threshold, an alert event will be triggered.

Threshold (%)

Configuration Range: 50~100

Default Configuration: 50

Function: Set the CPU/Memory utilization threshold, and generate a CPU/Memory utilization exceedance alert when the device's CPU/Memory utilization rate is higher than this value.

Note:

- The basic alarm function itself needs certain CPU and memory resources to trigger the alarm. If the CPU and memory utilization rate of the device is too high, for example, the memory utilization rate reaches 98%, it can no longer send alarm information to the outside.

4.4 Power Failure Alarm

4.4.1 Introduction

When enabled, the device monitors the system voltage. When the system voltage drops to a low voltage value, the circuit will detect and respond, triggering a power outage alarm function, and sending alarm information to the device administrator through UDP or SNMP protocol.

4.4.2 Web page configuration

Power failure alarm configuration and display, as shown in Figure 13;

Figure 13 Power-down Alarm

Enable power failure alarm

Configuration Options: Enable/Not Enable Default Configuration: Not Enable

Function: Whether power alarm is enabled.

Alarm protocol

Configuration Options: UDP/SNMP Default Configuration: UDP

Function: What protocol is the alarm information forwarded, if the receiving information is a UDP server, then enable UDP; If the SNMP server receives information, SNMP is enabled.

External Alarm Server

Configuration Range: A.B.C.D, a valid IP address

Function: Configure the IP address of the server that receives power outage alarms externally.

External Alarm Server Port

Configuration Range: 1~65535

Function: Configure the port of the server that receives alarms externally.

Alert Content

Configuration Range: 5~31 characters, only English characters are allowed

Function: The content of the message sent to the alarm server when an alarm is triggered.

5 Clock Server

5.1 Synchronization Source Parameters

5.1.1 Introduction

PTS-10AL supports automatic tracking and locking of external BDS, GPS and GLONASS satellite absolute time reference and IEEE1588 and IRIG-B ground-based time reference. At the same time, a high-stability wide-temperature crystal oscillator is adopted to establish an internal high-stability reference frequency source. When all external sources are lost, the device enters the local punctuality, which can continuously ensure the accuracy of timing time signals. In satellite mode Auto, clock products select the best galaxy from BDS, GPS and GLONASS to lock; When F-BDS, F-GPS and F-GLN are switched, the number of stars searched from the designated galaxy pair is the number of satellites in the designated galaxy that have been searched at present.

NOTE

Description:

- It is important to note that the efficiency of satellite acquisition is affected not only by the GPS module of this product but also greatly by the location of the antenna deployment. It is recommended to place the outdoor antenna in an open and unobstructed location, with the rooftop of a generally tall building being preferable.

5.1.2 Web Page Configuration

Click the "Synchronization Source Parameters" menu in the left navigation bar of the page, and the clock synchronization source parameter information will be displayed in the interface. The switching channel source is shown in figs. 14, 15 and 16;

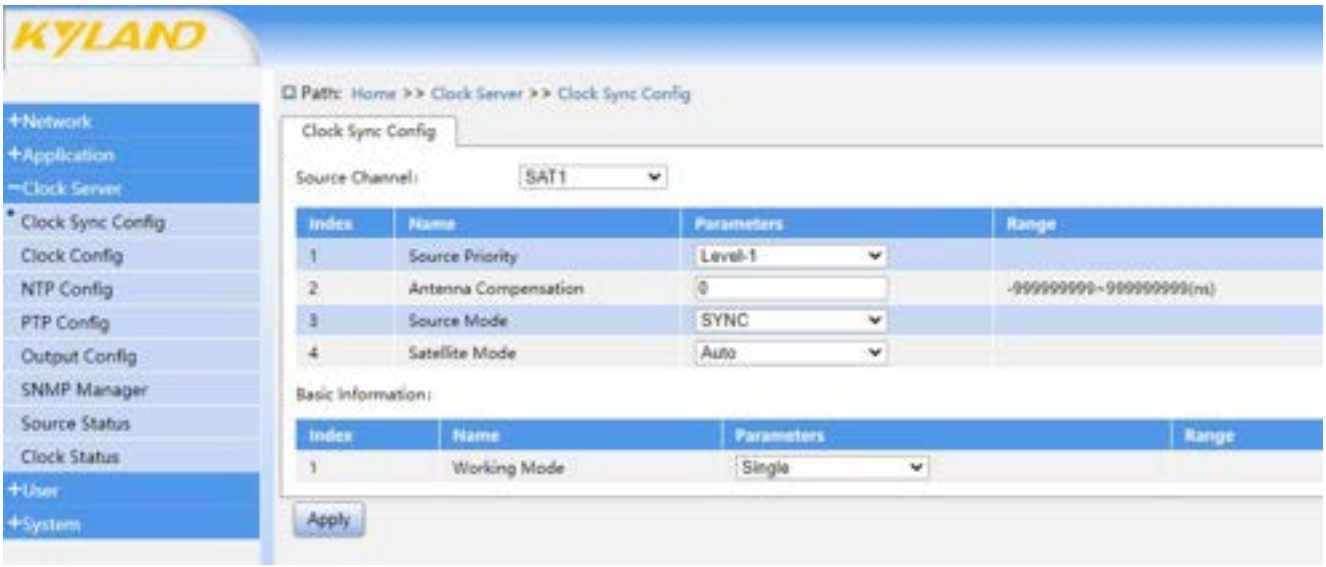

Figure 14 Sat Configuration Parameters

Figure 15 IRIG-B Configuration Parameters

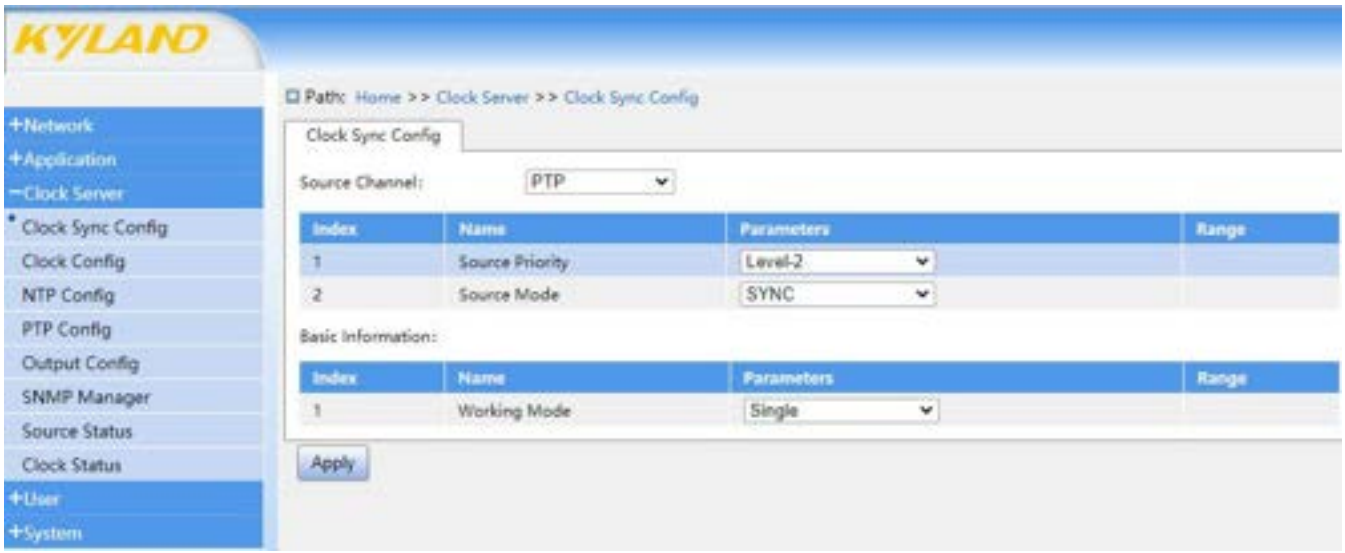

Figure 16 PTP Configuration Parameters

1. Configure Source Channel Parameters

Priority

Configuration options: Level-1~10

Default configuration: Level-1

Function: Set the reference sequence for the priority of external source signals, where 1 is the highest priority source and 10 is the lowest priority source.

Note:

- When switching SAT, IRIG-B and PTP source channels, the default priority configuration may be different, and according to the characteristics of source channels, the corresponding parameters will also change accordingly, such as SAT configuration parameters "priority, antenna delay, mode, satellite mode", IRIG-B configuration parameters "priority, mode, format, UTC" and PTP configuration parameters "priority, mode".
- The default priority of the local clock signal is also Level-10. When the external valid source is set to Level-10, the external source will automatically switch to local timekeeping after being locked.

Antenna Delay

Configuration options: -999999999~999999999 (ns)

Default configuration: 0

Function: Set the antenna delay compensation for the satellite channel receiver module according to different antenna types and lengths.

Mode

Configuration options: SYNC/PEER/NONE

Default configuration: SYNC

Function: Set the working mode of the time source. SYNC represents the system reference source, PEER represents the associated source, and NONE indicates not to use the time source role.

Satellite Mode

Configuration options: Auto/F-BDS/F-GPS/F-GLN

Default configuration: Auto

Function: Set the working mode of each satellite channel receiver module (Auto automatic/F forced).

Format

Configuration options: DC+/DC-

Default configuration: DC+

Function: Set the IRIG-B time format, including the selection of positive or negative polarity.

UTC

Configuration range: -12~12(h)

Default configuration: 0

Function: Set the time difference compensation between UTC and IRIG-B.

2. Configure Basic Information Parameters:

Working Mode

Configuration range: Multi-source/Single-source

Default configuration: Multi-source

Function: Single-source effective mechanism (as long as there is one valid external SYNC

source, it can work), multi-source effective mechanism (refer to the inputs of SYNC and PEER sources, and select a better source as the reference source).

5.1.3 Typical Configuration Example

When selecting the satellite synchronization source of space-based signal for alignment, the satellite synchronization source can be locked according to the following six steps:

The first step is to configure the priority of satellite synchronization source as Level-1, and the synchronization source with high priority is locked first;

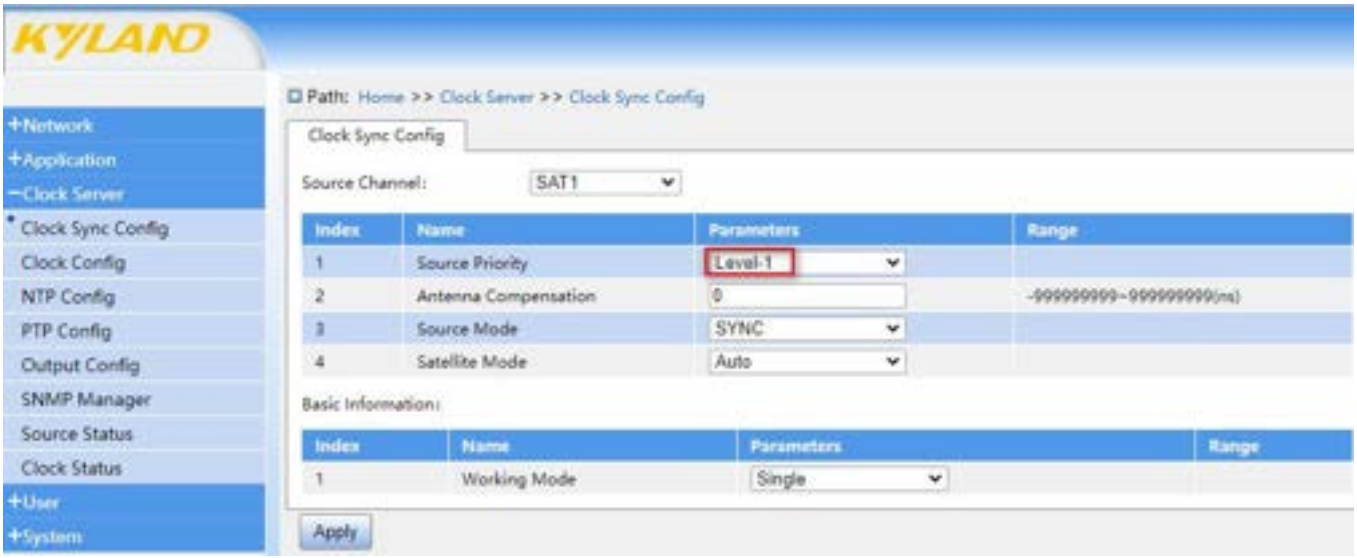

Figure 17 Priority configuration

The second step is to configure the antenna time delay as 0, and adjust the output time accuracy by compensating the antenna time delay according to the deviation of the output time signal;

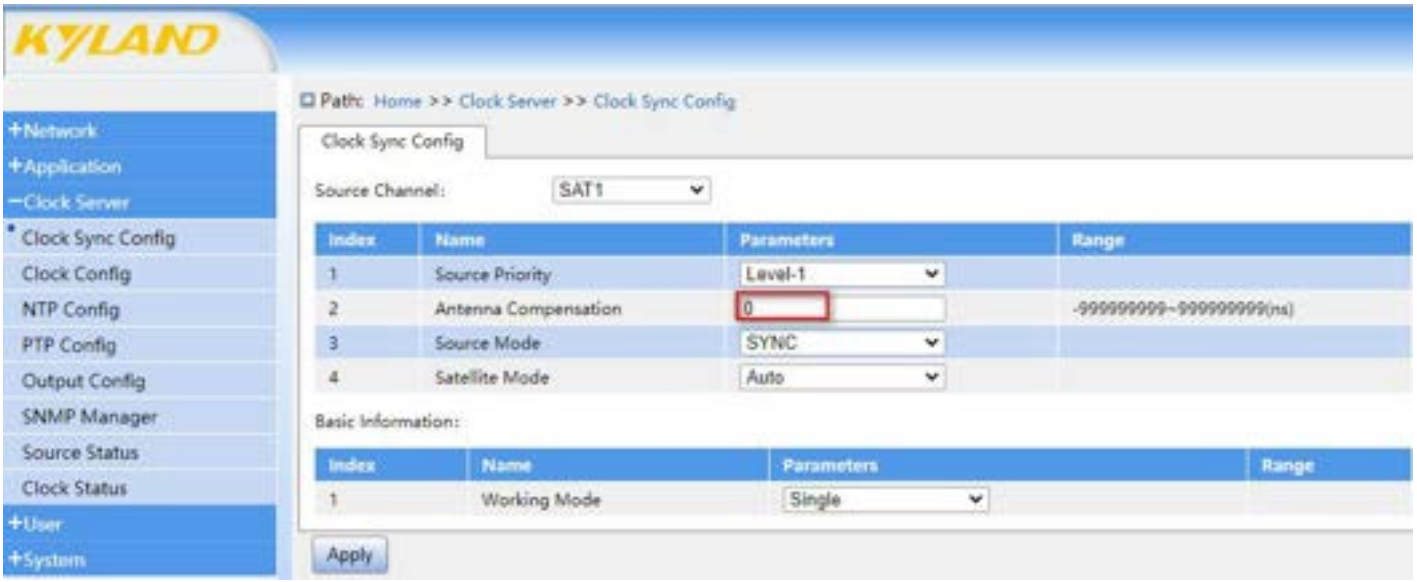

Figure 18 Antenna Delay Configuration

The third step, the configuration mode is SYNC

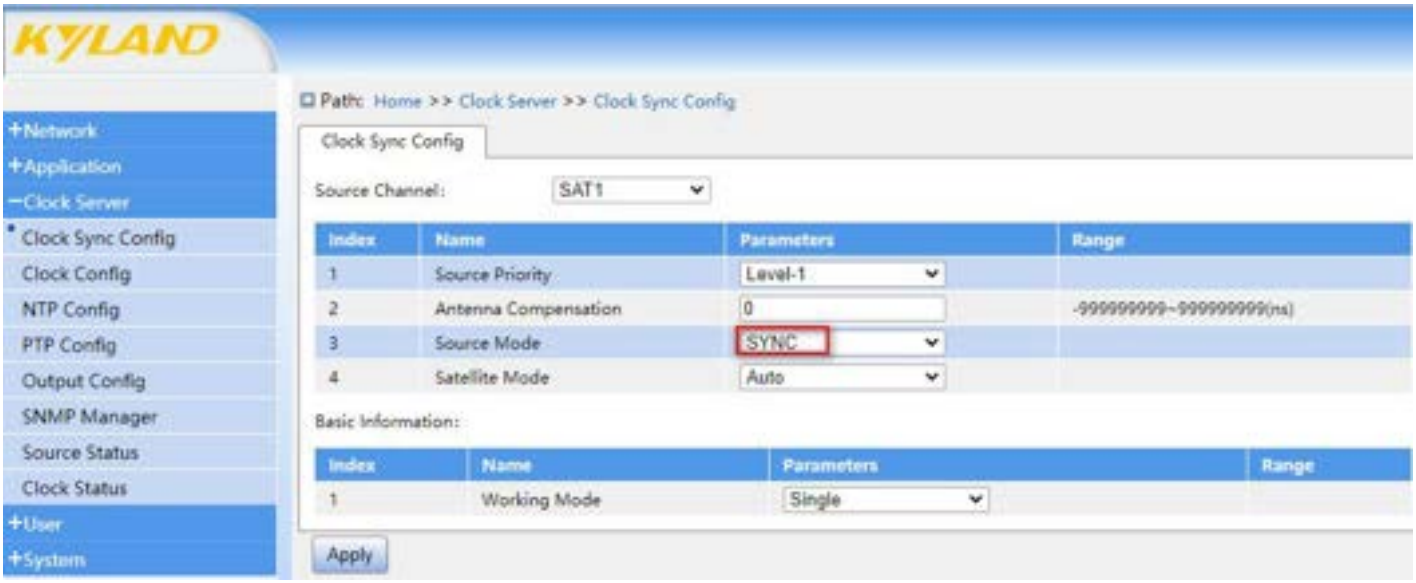

Figure 19 Mode configuration

The fourth step is to configure the satellite mode Auto, which means that the best signal is selected from BDS, GPS and GLONASS galaxies for timing, and the finally selected timing galaxy can be viewed from the display screen;

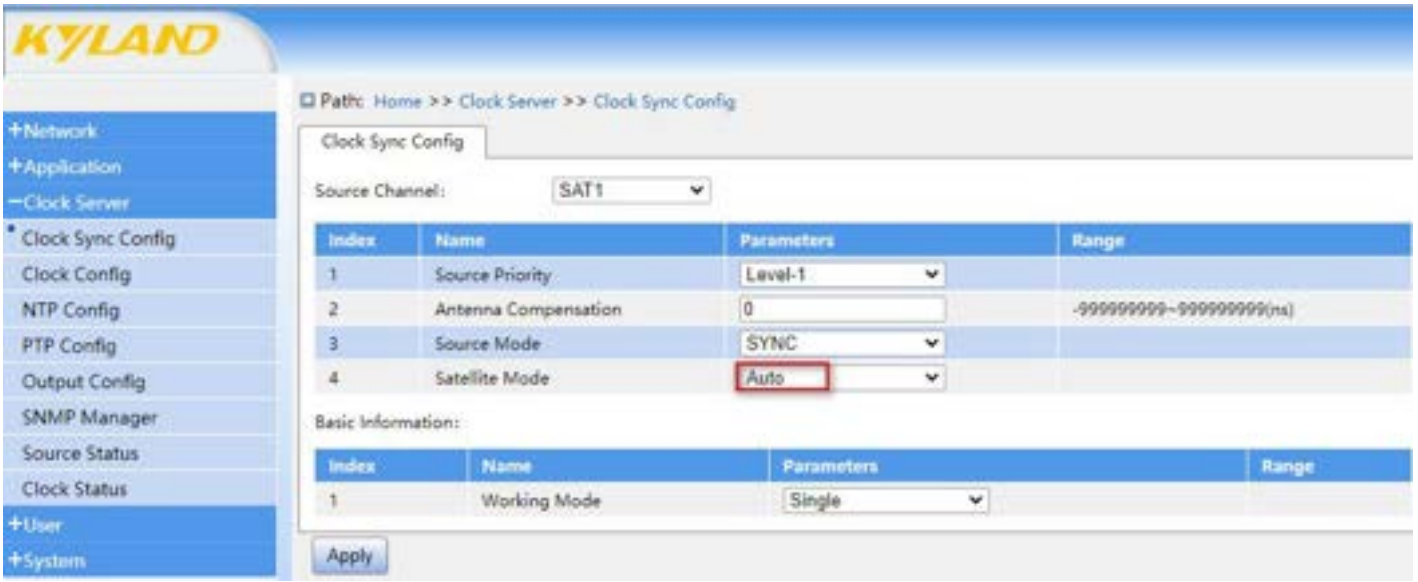

Figure 20 Satellite Mode Configuration

The fifth step is to configure multi-source working modes;

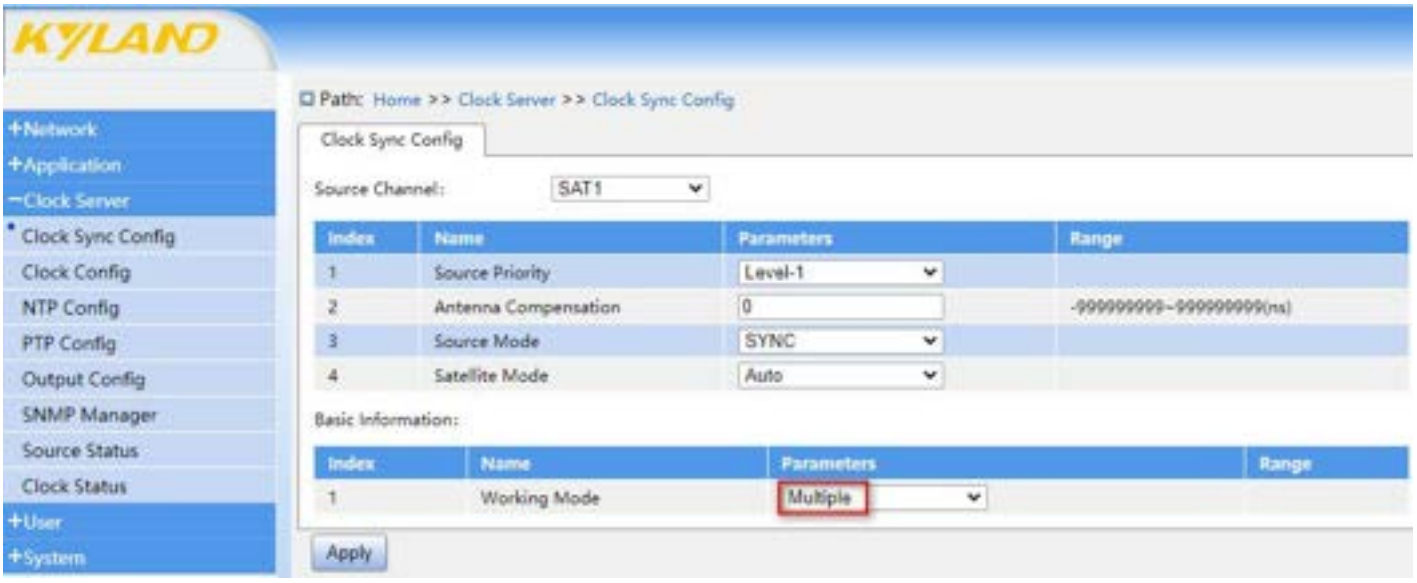

Figure 21 Operating Mode Configuration

The sixth step is to connect an effective antenna to the BNC port and wait for a period of time before the ANT1 and SAT1 lights of the device (with a search for more than 4 stars) remain on continuously. Then, wait for about 5 minutes for the Lock light to flash for 1 second per time, indicating that the device has selected satellite synchronization source lock. You can check the current synchronization source display as SAT1 in the clock status, check the satellite status and search for more than 4 stars in the synchronization source status, and display information such as locked galaxies on the LCD screen

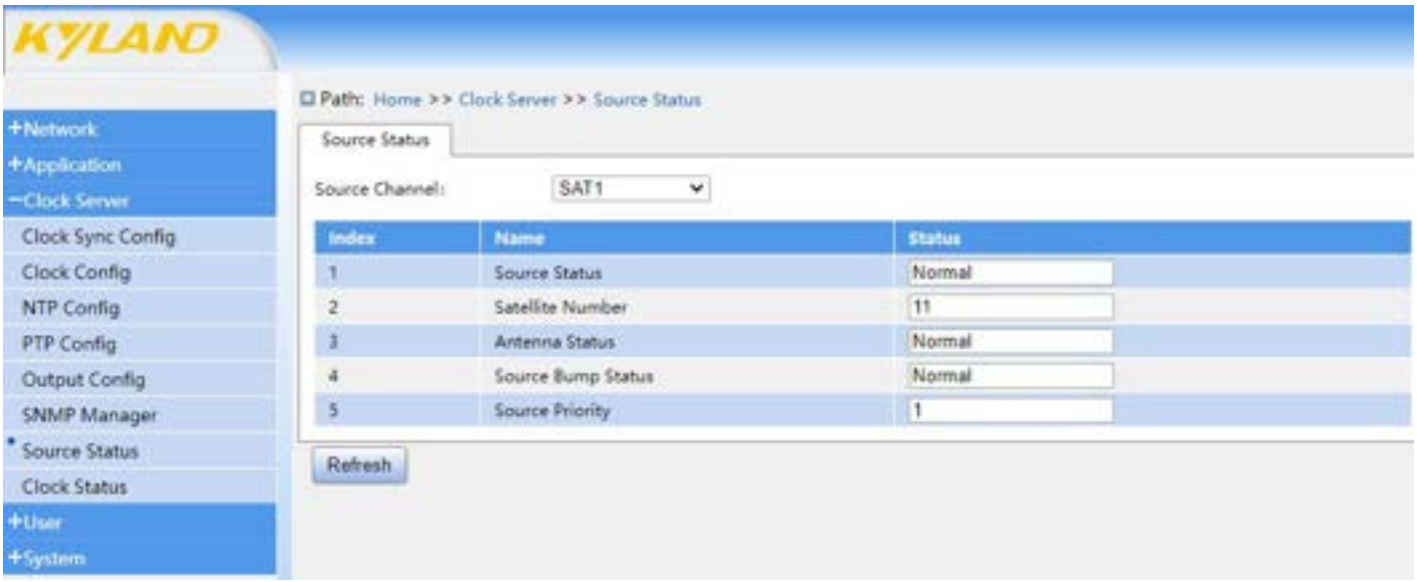

Figure 22 Synchronization source status

Figure 23 Clock status

Figure 24 LCD screen display

5.2 Clock Parameter

5.2.1 Introduction

Clock parameters include two parts. The first part of basic information configures time reference, clock time zone, time difference between TAI and UTC, and output mode. According to the leap second announcement from the National Time Service Center, the most recent leap second adjustment occurred at UTC time 0 hours, 0 minutes, and 0 seconds on January 1, 2017. After this leap second adjustment, the relationship between UTC and TAI will be: UTC-TAI = -37s. The negative value indicates that UTC is 37 seconds slower than TAI, reflecting the long-term trend of the Earth's rotation slowing down.

The second part of summer time is a system to adjust the time zone for the purpose of saving energy, the main purpose is to let people enjoy more sunlight and make full use of natural resources during the day. The output time of the summer time clock product is UTC plus summer time deviation, and the output time of the clock product after summer time is UTC time.

5.2.2 Web Page Configuration

Click on the "Clock Parameters" menu in the navigation bar on the left side of the page, and the clock parameter information will be displayed in the interface. Contains basic information and

summer time configuration information.

1. Configure the basic clock information, as shown in Figure 25;

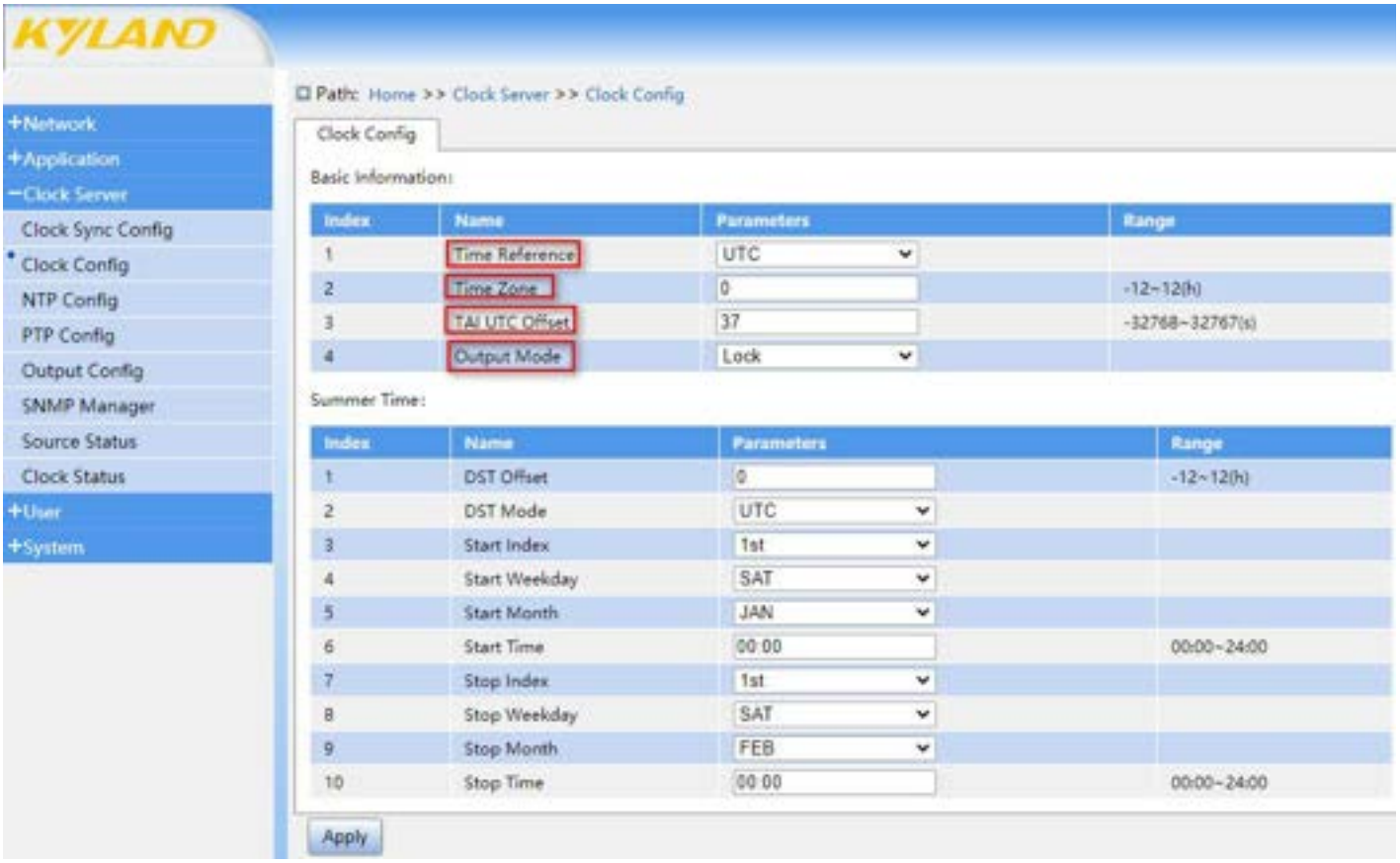

Figure 25 Basic information configuration of clock parameters

Time reference

Configuration options: UTC/TAI

Default configuration: UTC

Features: Configure the time reference used by time, UTC or TAI time as the time reference. The device fixedly uses UTC reference for satellite synchronization source and IRIG-B code synchronization source input signals, and the current configuration item is only valid for PTP synchronization source.

Clock time zone

Configuration options: -12 ~ 12 (h)

Default configuration:0

Function: Configure the time zone difference of time, -12.00 h ~ +12.00 h.

Time difference between TAI and UTC

Configuration Options: -32768 ~ 32767 (s)

Default Configuration: 37

Function: Configure the time difference between TAI and UTC. When the device processes the leap second forecast information of external synchronization source, it will automatically revise the current configuration. For example, after receiving and processing the positive leap second notice, the time difference

between TAI and UTC is automatically increased by one; After receiving and processing the negative leap second forecast, the time difference between TAI and UTC is automatically reduced by one.

Output mode

Configuration Options: Permanent/Synchronization

Default Configuration: Permanent

Function: Configure the time signal output mode. In the permanent mode, the device will output the time signal after being powered up and started. In the synchronous mode, the output signal can only be obtained after the time is synchronized and locked with the external source.

2. Configure summer time information, as shown in Figure 26:

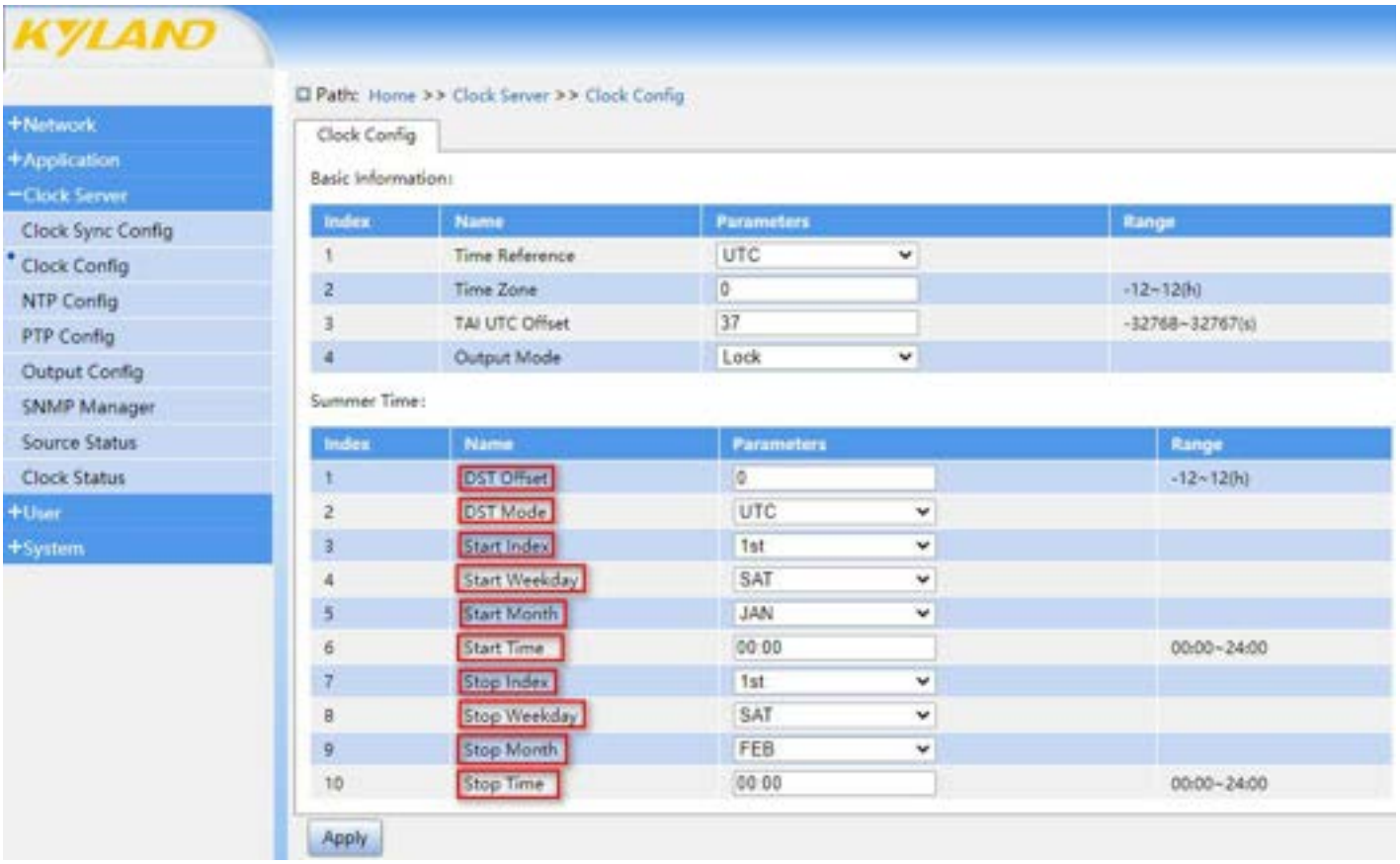

Figure 26 Time clock parameter summer time configuration

Summer time deviation

Configuration options: -12 ~ 12 (h)

Default configuration: 0

Function: Set how many hours summer time needs to be adjusted, and set the summer time deviation to 0 to indicate that summer time function is turned off.

Summer time mode

Configuration Options: UTC/LOCAL

Default Configuration: UTC

Function: Set the reference time benchmark used by summer time.

Start serial number

Configuration Options: First/Second/Third/Fourth/Fifth/Last

Default Configuration: First

Function: Set the start date of summer time in combination with the start week.

Start week

Configuration Options: Sunday/Monday/Tuesday/Wednesday/Thursday/Friday/Saturday

Default Configuration: Saturday

Function: Set the start date of summer time with the start sequence number.

Start month

Configuration Options:

January/February/March/April/May/June/July/August/September/October/November/December

Default Configuration: January

Function: Set the start month of summer time.

Start time

Configuration Options: 00:00 ~ 24:00

Default Configuration: 00:00

Function: Set the start time of summer time.

Stop sequence number

Configuration Options: First/Second/Third/Fourth/Fifth/Last

Default Configuration: First

Function: Set the stop date of summer time in combination with the stop week.

Stop week

Configuration Options: Sunday/Monday/Tuesday/Wednesday/Thursday/Friday/Saturday

Default Configuration: Saturday

Function: Set the stop date of summer time in combination with the stop sequence number.

Stop month

Configuration Options:

January/February/March/April/May/June/July/August/September/October/November/December

Default Configuration: February

Function: Set the stop month of summer time.

Stop time

Configuration options: 00:00 ~ 24:00

Default configuration: 00:00

Function: Set the stop time of summer time.

5.2.3 Typical Configuration Example

To configure summer time, you can configure the first step according to the following steps：

The first step is to configure the summer time deviation of 2 hours;

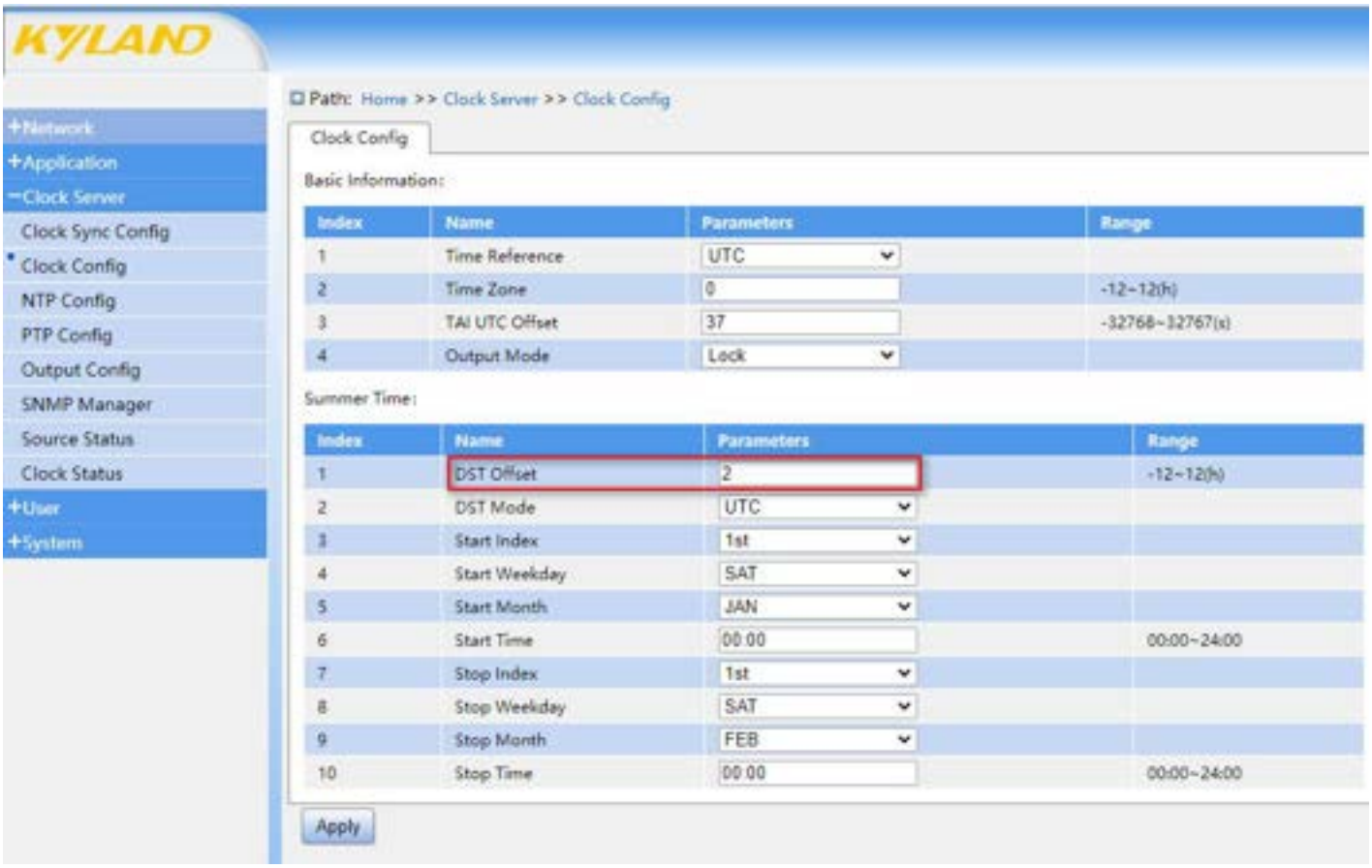

Figure 27 Summer time Deviation

The second step is to configure the summer time mode UTC;

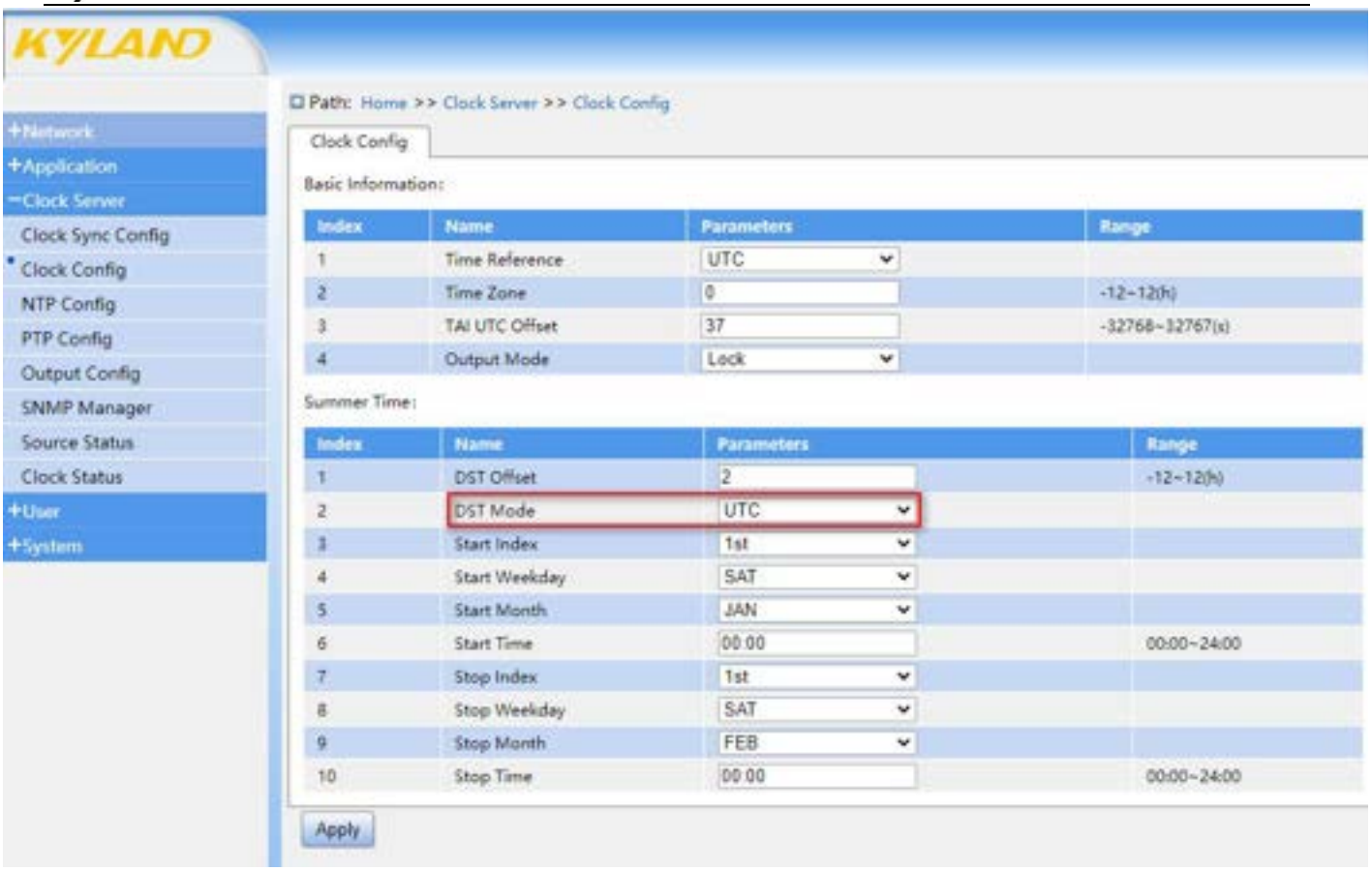

Figure 28 Summer time Mode

The third step is to configure the start time of summer time, including the start serial number, the start week, the start month and the start time

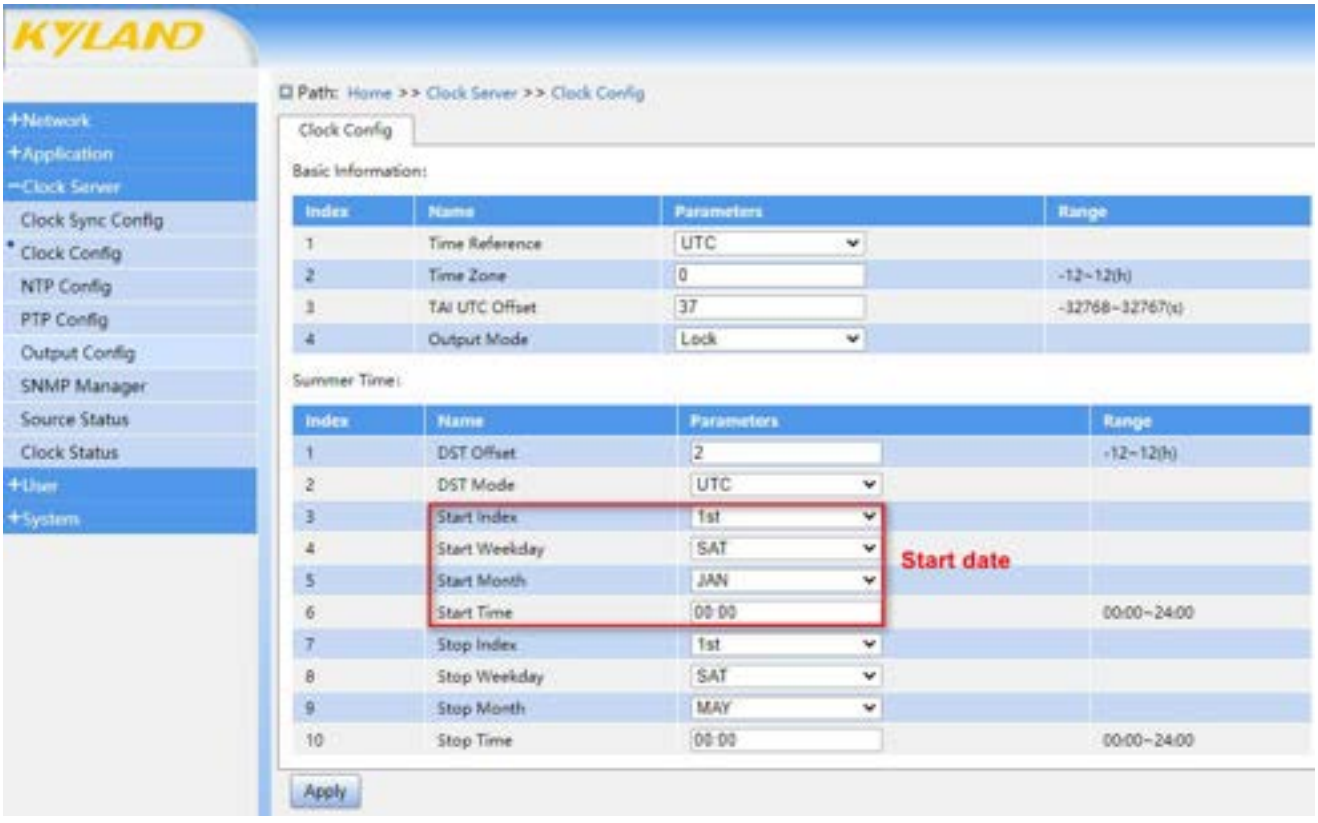

Figure 29 Summer time Start Time

The fourth step is to configure the summer time, month, day, hour and second, including stop serial number, stop week, stop month and stop time.

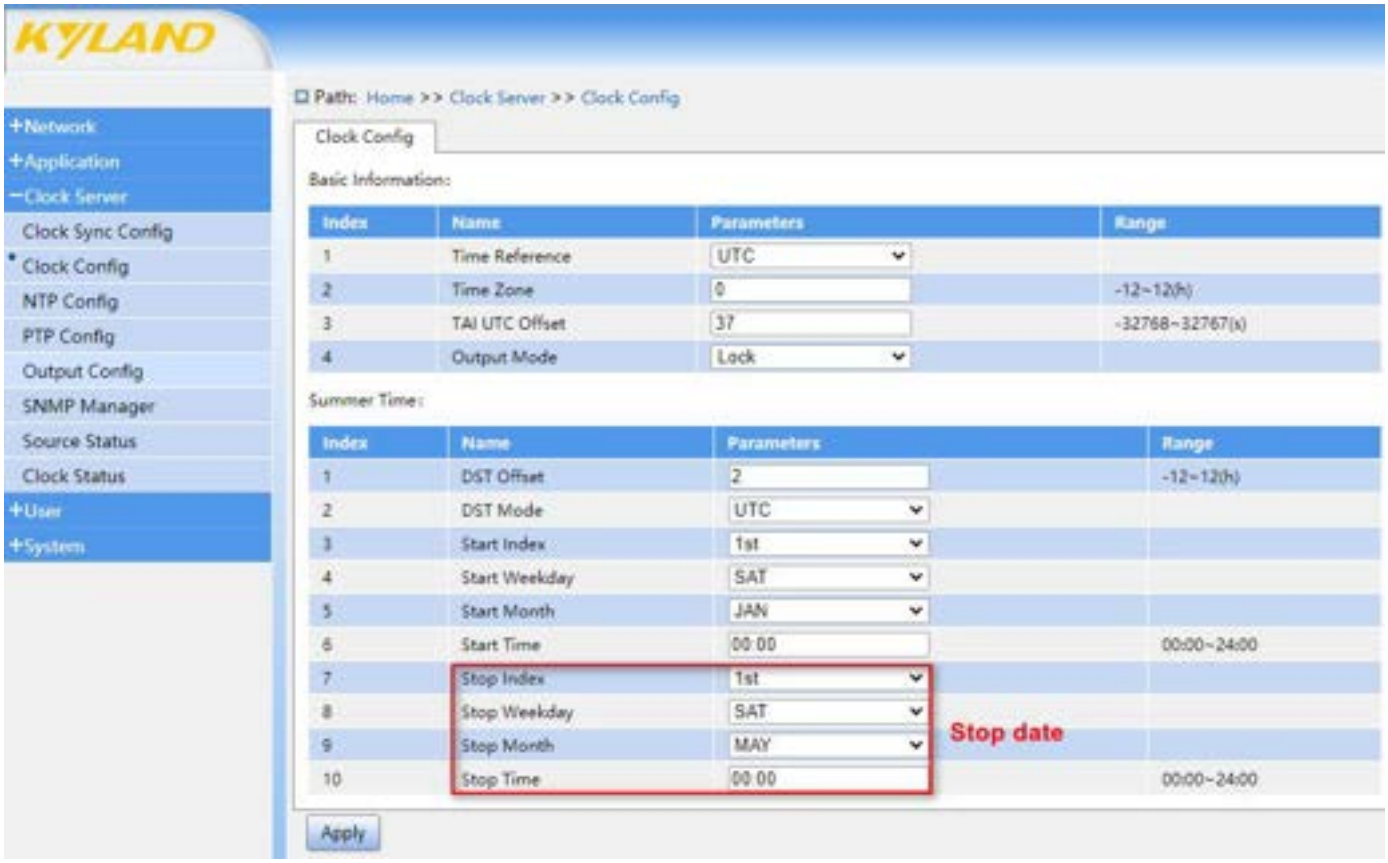

Figure 30 Summer time Stop Time

Upon application, when the UTC time reaches the start time of Summer time (DST), DST takes effect, and the clock output time will be UTC+2. When the UTC time exceeds the end time of DST, DST becomes ineffective, and the clock product will output the UTC time. Once the time surpasses the end of DST, DST is no longer in effect, and the clock product outputs the UTC time.

5.3 NTP Parameters

5.3.1 Introduction

Network Time Protocol (NTP) is a protocol used to synchronize the clocks of devices within a network to ensure that all devices have consistent timekeeping, enabling a variety of applications based on a unified time standard. It offers high precision time correction (with a difference of less than 1 millisecond on LANs and several tens of milliseconds on WANs), and it can prevent malicious protocol attacks through encrypted confirmation methods.

5.3.2 Web Page Configuration

Click the "NTP Parameters" menu in the left navigation bar of the page, and the NTP parameter information will be displayed in the interface:

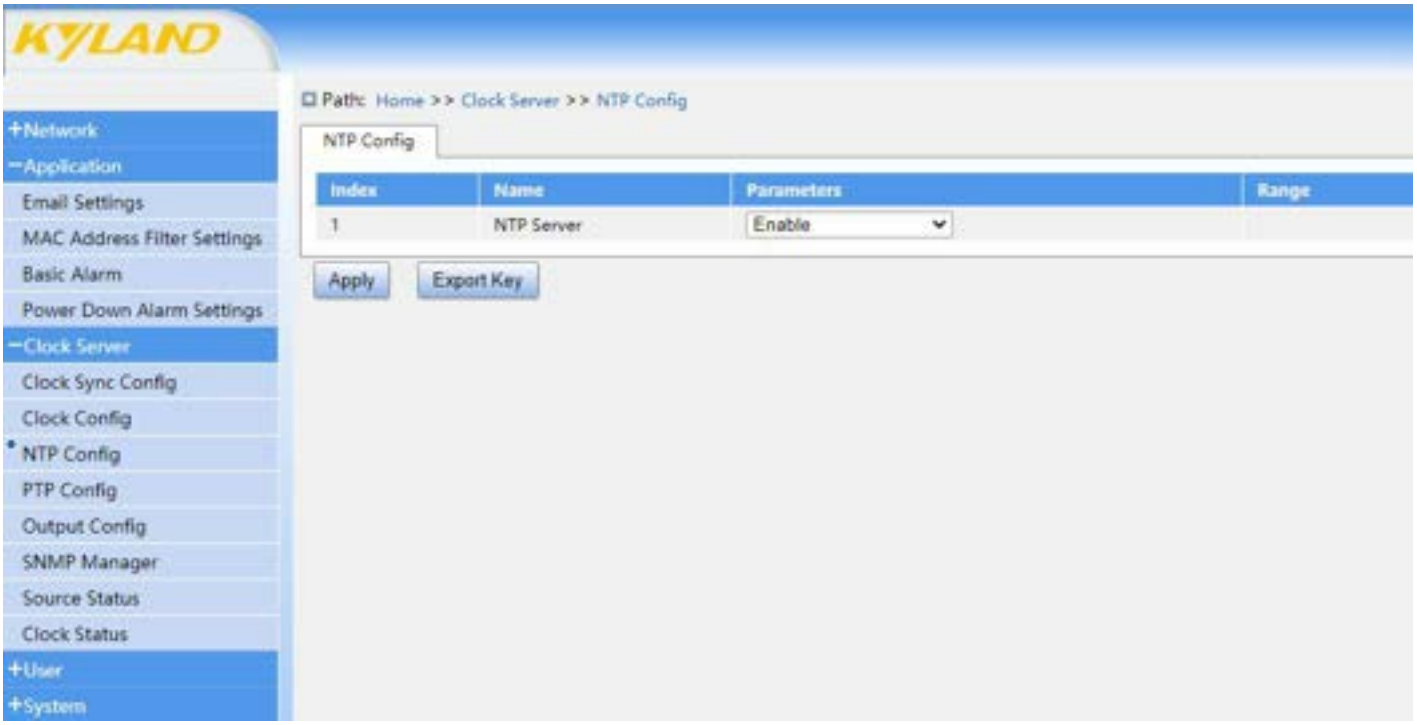

Figure 31 Configuring NTP Parameters

NTP Server

Configuration options: Enable/Disable

Default configuration: Enable

Function: To turn on or off the NTP server functionality.

Export Key

Function: Export keys via the web interface for MD5 authentication. The MD5 value of a file is like the "digital fingerprint" of the file. Each file has a unique MD5 value, and if anyone makes any changes to the file, the corresponding "digital fingerprint" (i.e., the MD5 value) will change.

5.3.3 Typical Configuration Example

Select NTP for timing, which can be configured according to the following three steps:

The first step is to enable the NTP server of the clock server

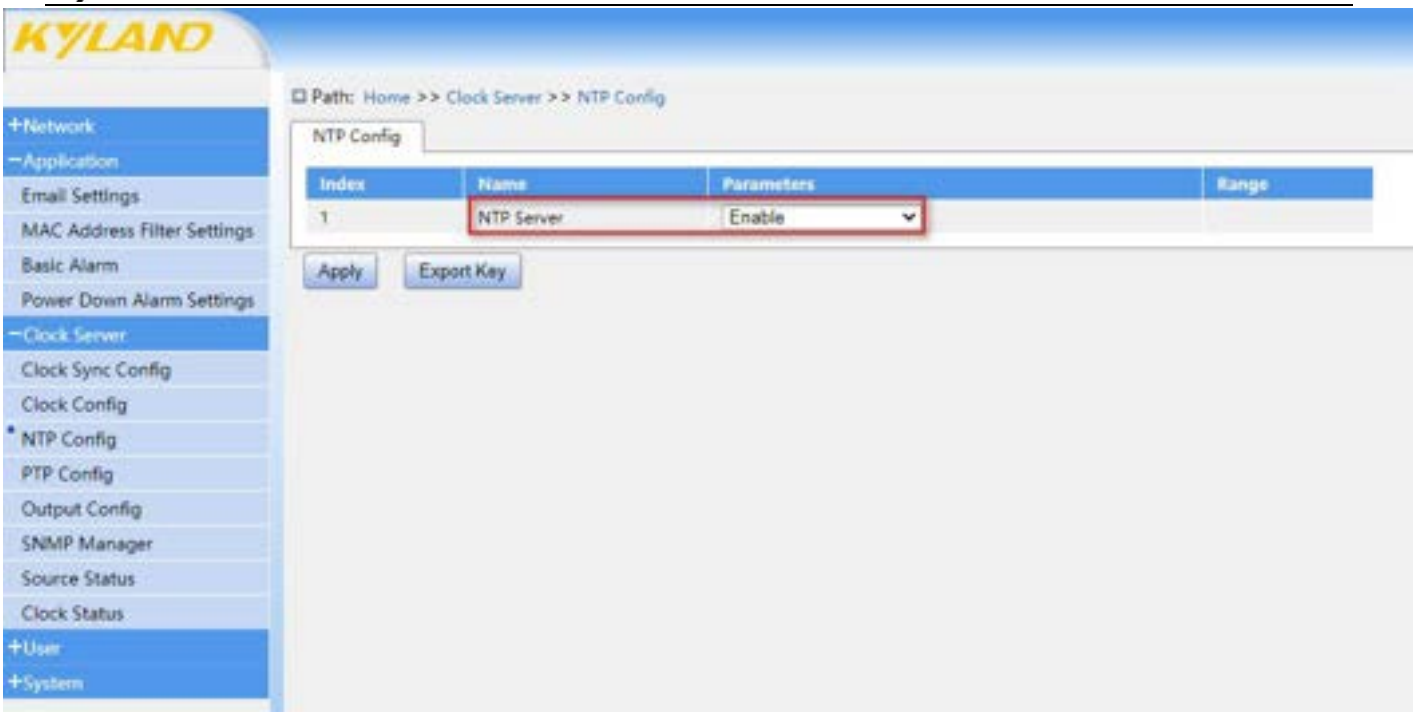

Figure 32 Enabling NTP Server

The second step is to modify the local time on the PC side

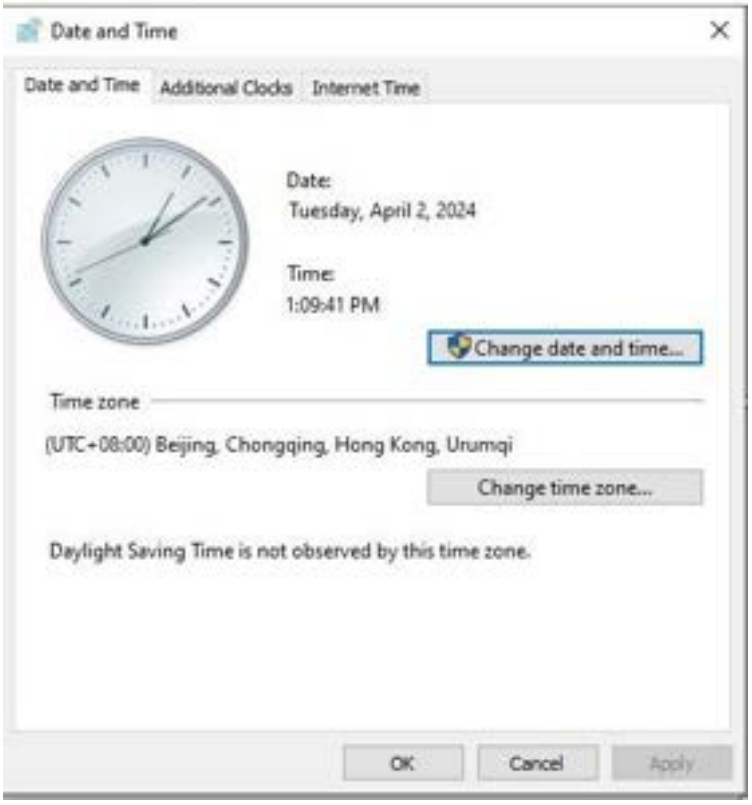

Figure 33 Modifying PC Local Time

The third step is to initiate the NTP client on the PC to request time synchronization from the NTP server. Once the synchronization is successful, the local time on the PC returns to normal.

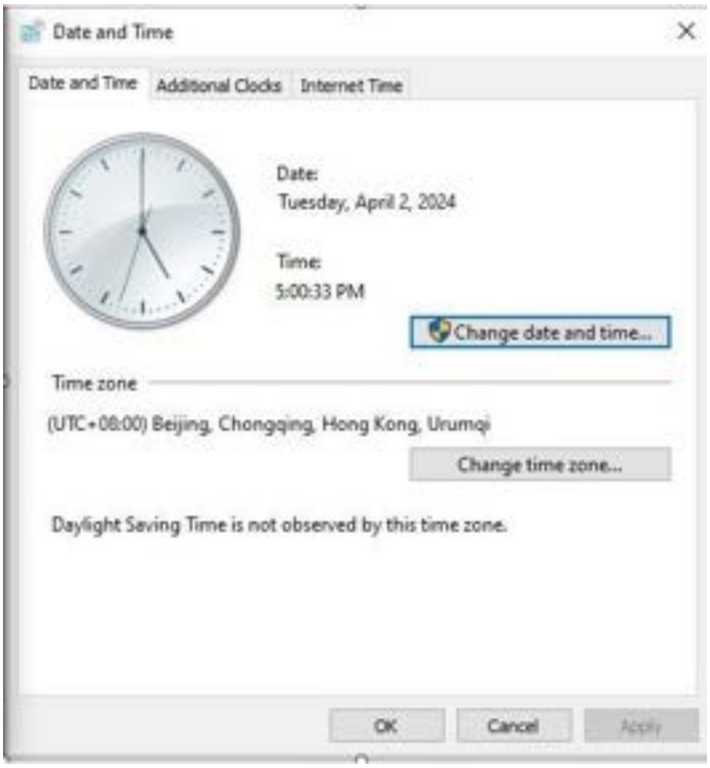

Figure 34 NTP Client Timing

Note:

- After the NTP server of the clock server is enabled, all network ports (1 gigabit electrical port/optical port integrated, 4 100-megabit electrical ports) can time the lower computer device, and the server IP is the IP of the network port, for example, the IP of the ge0 time service server is 192.168. 0.111,
  eth1 Outgoing Service Server IP is 192.168. 1.111.

5.4 PTP Parameters

5.4.1 Introduction

PTP (Precision Time Protocol) precise clock synchronization protocol is used to achieve network clock synchronization

PTP (Precision Time Protocol) is a protocol used for achieving network clock synchronization. It is one of the protocols specified in the IEEE 1588 standard and is also known as the "1588v2 clock synchronization protocol."

This high precision can meet the requirements of applications that demand high accuracy in clock synchronization, such as audio and video transmission, industrial automation, test and measurement, and fields requiring precision measurement.

According to different configurations, PTP of PTS-10AL can be used as synchronization source Slave Clock to obtain time information from master Clock for timing, and can also be used

as Master Clock for timing to external devices. To ensure reliable clocks, multiple clock sources are usually deployed in PTP domains. Usually, the clock is provided by a clock source with high priority. If the clock source fails,

BMC algorithm will re-elect the optimal clock, and build the shortest path tree with the new optimal clock as the root to provide time for PTP domain.

5.4.2 Web Page Configuration

Click the "PTP Parameters" menu in the navigation bar on the left side of the page, and the PTP parameter information will be displayed in the interface, as shown in Figure 35:

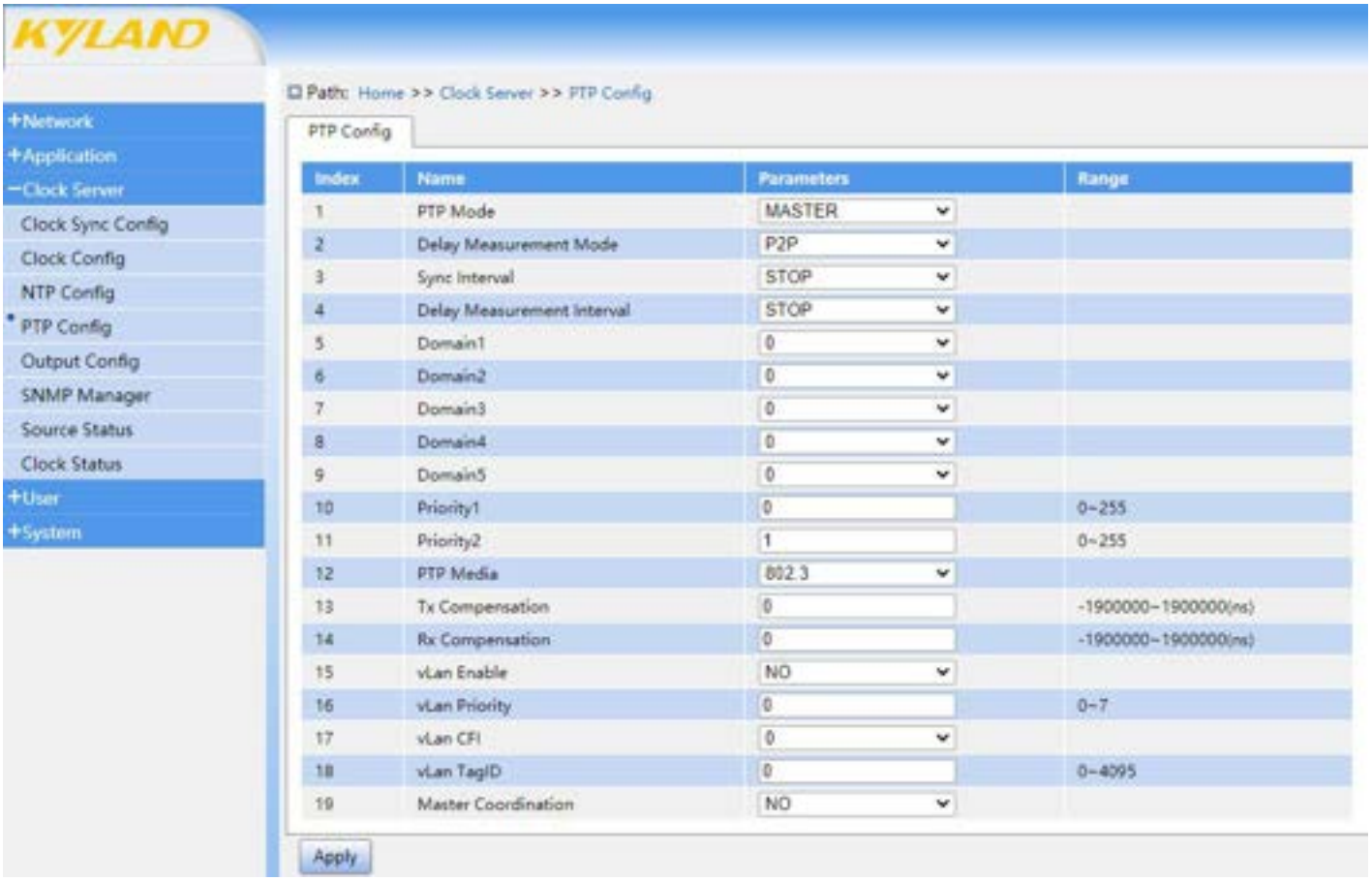

Figure 35 Configuring PTP Parameters

PTP Mode

Configuration options: Master/Slave/Boundary

Default configuration: Master

Function: Set the working mode of PTP, and support setting three working modes

（1）Master: The clock synchronization source to which other clocks will be synchronized;

（2）Slave: The clock that needs to be synchronized with the master clock

（3）Boundary: There are multiple ports connected to the clock of the network, one slave port is connected to the master clock port of the upstream device, and the other ports are connected to the slave port of the downstream device as the master. The downstream slave port isomorphic PTP protocol is directly synchronized with the boundary clock.

Delay Measurement Mode

Configuration options: E2E / P2P / Disable

Default configuration: P2P

Function: To set the time delay measurement mode or disable this mode;

(1) P2P: Equivalent Delay Mechanism, where each device in the network exchanges peer-delay measurement information with other devices, allowing each device to track the delay between itself and its neighboring devices.

(2) E2E: Delay Request-Response Mechanism, where devices send delay measurement information to the master device.

Sync Interval

Configuration options: 0~4 / Stop

Default configuration: Stop

Function: To set the frequency of sending entire primary time synchronization messages. The setting value n represents an actual interval of 2^n seconds.

Delay Measurement Interval

Configuration options: 0~4 / Stop

Default configuration: Stop

Function: To set the rate of delay measurement for PTP functionality. The setting value n represents an actual interval of 2^n * 10 seconds.

Domain 1~5

Configuration options: 0~3

Default configuration: 0

Function: To set the working domain of PTP messages. There may be multiple PTP domains in a network, where each PTP domain is an independent PTP clock synchronization system. There is only one clock source within a PTP domain, and all devices in the domain synchronize with this

clock source.

Priority 1/2

Configuration options: 0~255

Default configuration: 0/1

Function: To set the working priority of PTP messages.

PTP Media

Configuration options: 802.3 / IPV4

Default configuration: 802.3

Function: To set the type of PTP transmission protocol, supporting IEEE802.3 mode or IPv4.

Send Delay

Configuration options: -1900000~1900000(ns)

Default configuration: 0

Function: To set the send delay of PTP messages.

Receive Delay

Configuration options: -1900000~1900000(ns)

Default configuration: 0

Function: To set the receive delay of PTP messages.

VLAN Allow

Configuration options: Yes / No

Default configuration: No

Function: To set whether to send VLAN information.

VLAN Priority

Configuration options: 0~7

Default configuration: 0

Function: To set the priority of VLAN.

VLAN CFI

Configuration options: 0~1

Default configuration: 0

Function: To set VLAN CFI information.

VLAN TAGID

Configuration options: 0~4095

Default configuration: 0

Function: To set VLAN ID information.

Master Clock Coordination

Configuration options: YES/NO

Default configuration: NO

Function: To enable or disable the BMC (Broadcast Message Coordination) functionality of the master clock.

Note:

- In PTP domain, the selection of optimal clock and the establishment of port master-slave relationship all depend on the optimal clock BMC algorithm. BMC algorithm compares the data sets carried in Announce messages between clock nodes to select the optimal clock and determine the state of each PTP port.

  The data set used by the BMC algorithm to select the optimal clock and determine the state of the PTP port includes the following information:

  （1） Priority1: Clock priority is 1, which supports user configuration. The value range is 0 ~ 255. The smaller the value, the higher the priority.

  （2） Clock Class: Clock Class, defines the clock's ability to track International Atomic Time (TAI) for time or frequency.

  （3） Clock Accuracy: Clock accuracy, the lower the value, the higher the accuracy.

  （4） Offset Scaled Log Variance: Clock stability.

  （5） Priority2: Clock priority is 2, which supports user configuration. The value range is 0 ~ 255. The smaller the value, the higher the priority.

  When PTP device executes dynamic BMC source selection algorithm, the priority selection order is priority1 > Clock Class > Clock Accuracy > Offset Scaled Log Variance > Priority2, that is, first compare priority1 of the candidate time sources, and then compare clock-class if priority1 is the same, and so on, the clock with high priority, high level and good precision becomes the best clock. By changing the priority and level of the clock, the user can influence the selection of the master clock of PTP system, thus
  select the clock signal you want to synchronize. BMC algorithm can realize synchronous distribution and protection of PTP clock.

5.4.3 Typical Configuration Example

1. When selecting PTP as the synchronization source for alignment, you can configure it according to the following three steps:

The first step is to set the PTP mode to Slave, set Sync Interval and Delay Measurement Interval to 0, and keep the default values of other parameters unchanged;

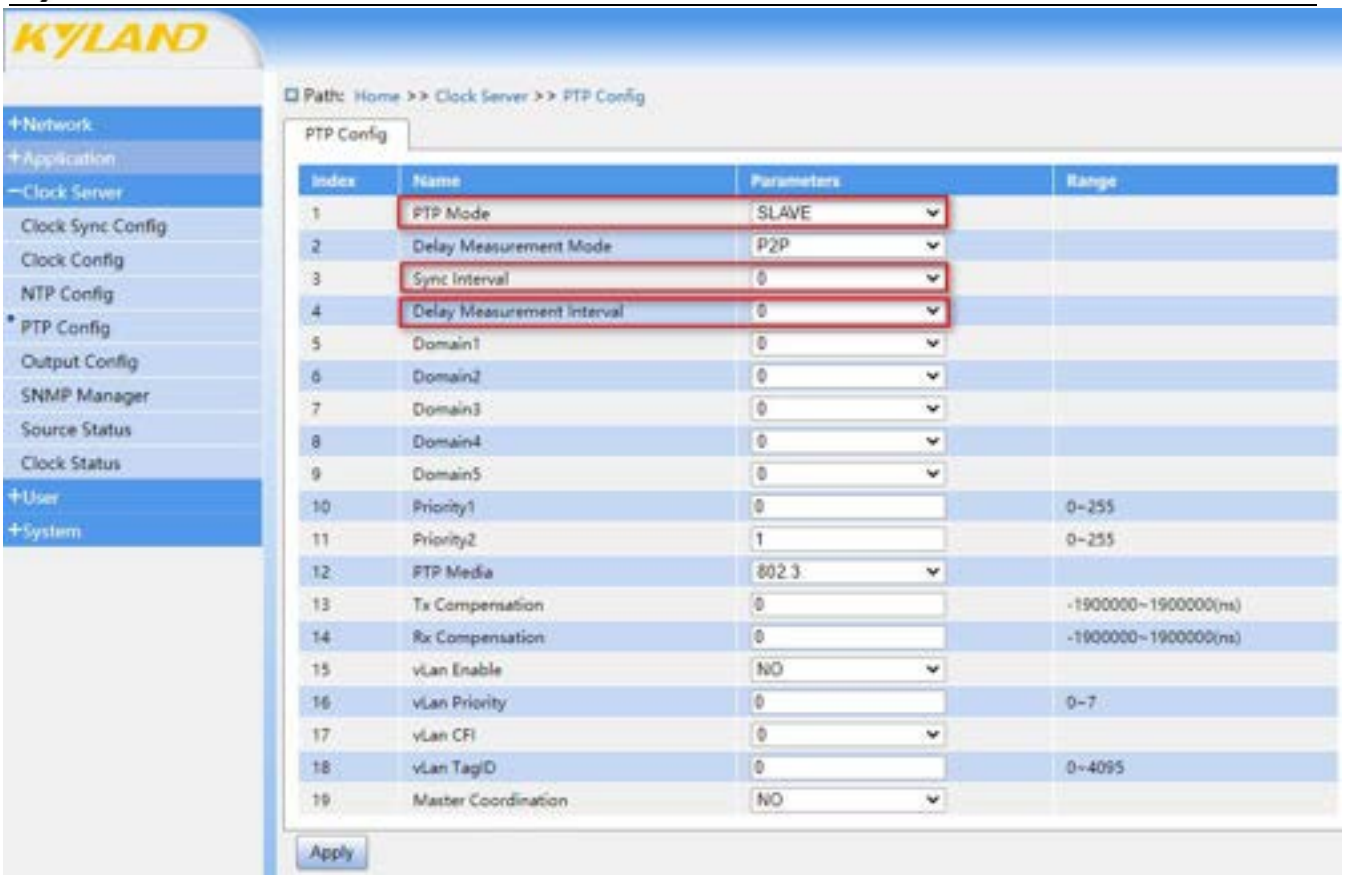

Figure 36 Configuring PTP As A Slave Clock

The second step is to modify the parameter information of the synchronization source to ensure that the priority of the source channel PTP is the highest, for example, the priority of the PTP is set to Level-1 and the other sources are set to Level-2;

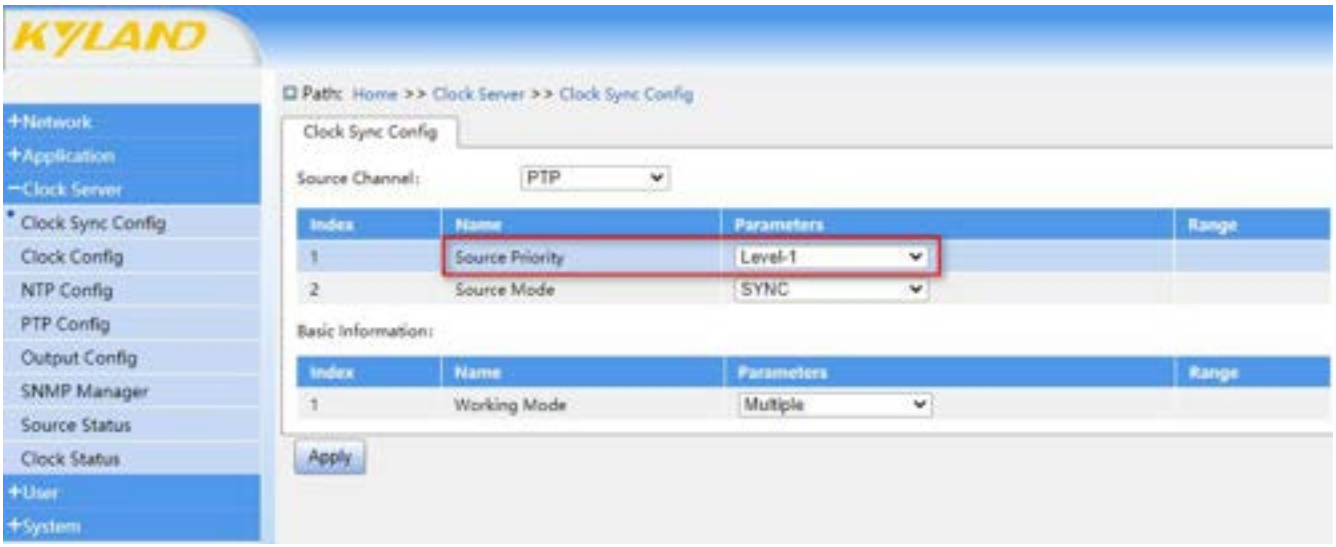

Figure 37 Configuring PTP Priority

By connecting an effective PTP master clock device via the network port and waiting for a period of time (approximately 5 minutes), the device's Lock light will flash once every second, indicating that the device has locked onto the selected PTP synchronization source. This can be viewed in the clock status where the current synchronization source is displayed as PTP, at which

point the clock device is synchronizing with the external PTP master clock device.

Figure 38 Current Synchronization Source PTP

2. Select PTP as the master clock A to time the external device B, which can be configured according to the following three steps:

In the first step, set the PTP mode to Master, set Sync Interval and Delay Measurement Interval to 0, and keep the other parameters unchanged by default

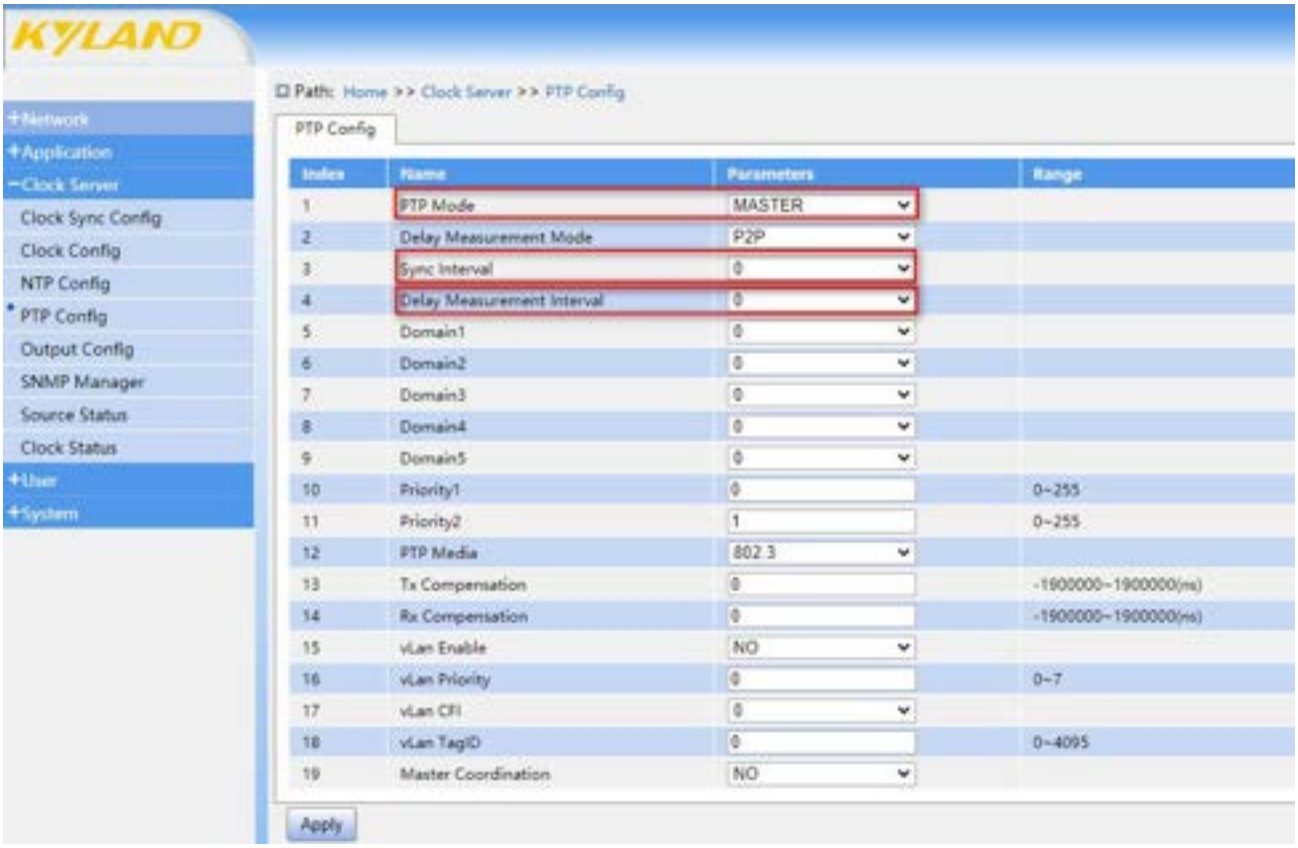

Figure 39 Configuring PTP as the Master Clock

In the second step, the slave clock device B (such as the device in the above scenario 1) is externally connected through the network port, and after waiting for a period of time (about 5min), the Lock lamp of device B flashes for 1s/time, indicating that the device selects external synchronization source locking, and the current synchronization source can be displayed as PTP in the clock state. At this time, device A gives time to device B, and device B gives time to device A.

Notes:

- Ensure that the network interface IP addresses of devices A and B are in the same subnet and have the same domain value when setting up the network as shown in the above configuration example.
- The PTP settings on the clock server designate the master clock, allowing all network interfaces (1 gigabit electrical port/optical port, 4 gigabit electrical ports) to distribute time to lower-level devices. The server IP is the same as the IP of the network interface, for example, the time distribution server IP for ge0 is 192.168.0.111, and the time distribution server IP for eth1 is 192.168.1.111.

5.5 Output Parameter

5.5.1 Introduction

In addition to outputting NTP and PTP time signals through the network port described in the above chapters, PTS-10AL also supports outputting NTP and PTP time signals through P1/P2, COM port outputs IRIG-B, 1PPS, 1PPM, 1PPH and TOD signals to meet the demand of time synchronization. The output signal types of P1/P2 and COM interface can be configured by output parameters.

5.5.2 Web Page Configuration

Click the "Output Parameters" menu in the navigation bar on the left side of the page, and the output parameter information will be displayed in the interface, as shown in Figure 40:

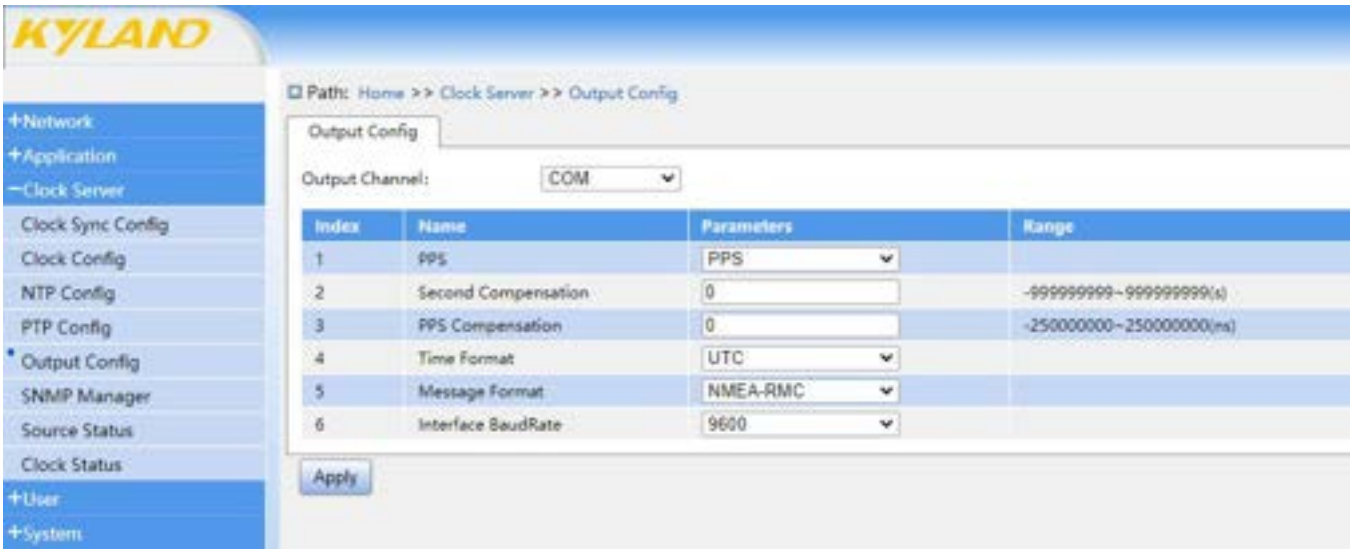

Figure 40 COM Channel Output Parameters

Figure 41 P1 Channel Output Parameters

Figure 42 Communication B-code parameter configuration

PPS

Configuration Options: PPS/IRIG-B/PPM/PPH/TOD

Default Configuration: PPS

Function: Configure the signal output type of the COM channel output

Second Offset

Configuration Options: -999999999~999999999(s)

Default Configuration: 0

Function: Configure the current output channel's second-level time offset. PPS signals do not support second offset.

PPS Offset

Configuration Options: -250000000~250000000(ns)

Default Configuration: 0

Function: Configure the current output channel's nanosecond-level time offset. TOD serial signals do not support nanosecond offset.

Time Format

Configuration Options: UTC / TAI / Local

Default Configuration: UTC

Function: Configure the time base of the current output channel, which can be selected as UTC/TAI/local time.

Information Format

Configuration Options: NMEA-RMC/NMEA-ZDA

Default Configuration: NMEA-RMC

Function: Configure the signal format of the TOD serial code of the current output channel.

Baud Rate

Configuration Options: 1200/2400/4800/9600/19200/38400/76800/115200

Default Configuration: 1200

Function: Configure the communication baud rate of the TOD serial code of the current output channel.

Output Signal

Configuration Options: PPS/IRIG-B/PPM/PPH

Default Configuration: IRIG-B

Function: Configure the signal output type of the P1/P2 channels.

IRIG-B Mode

Configuration Options: Odd /Even

Default Configuration: Odd

Function: Configure the IRIG-B parity bit of the current output channel.

IRIG-B Time Format

Configuration Options: UTC / TAI / Local

Default Configuration: UTC

Function: Configure the reference time used by the IRIG-B time of the current output channel.

IRIG-B Polarity

Configuration Options: Normal/Inverted

Default Configuration: Normal

Function: Configure the polarity of the IRIG-B signal of the current output channel.

AC

Configuration options:

IRIG-B1-AC output peak to peak (3.0V, 3.5V...115V, 12.0V)

IRIG-B1-AC output modulation ratio (3.0:1, 3.5:1... 5.5:1, 6.0:1)

Default configuration:

IRIG-B1-AC output peak to peak (12.0V)

IRIG-B1-AC output modulation ratio (3.0:1)

Function: When configuring AC B code output on the device, it is used to adjust the peak to peak value and modulation ratio of the output signal.

5.5.3 Typical Configuration Example

To configure the clock product to output IRIG-B code signals, you can follow the following three steps:

The first step is to switch the output channel to P1

Figure 43 Selecting the Output Channel

The second step is to select the output signal as IRIG-B

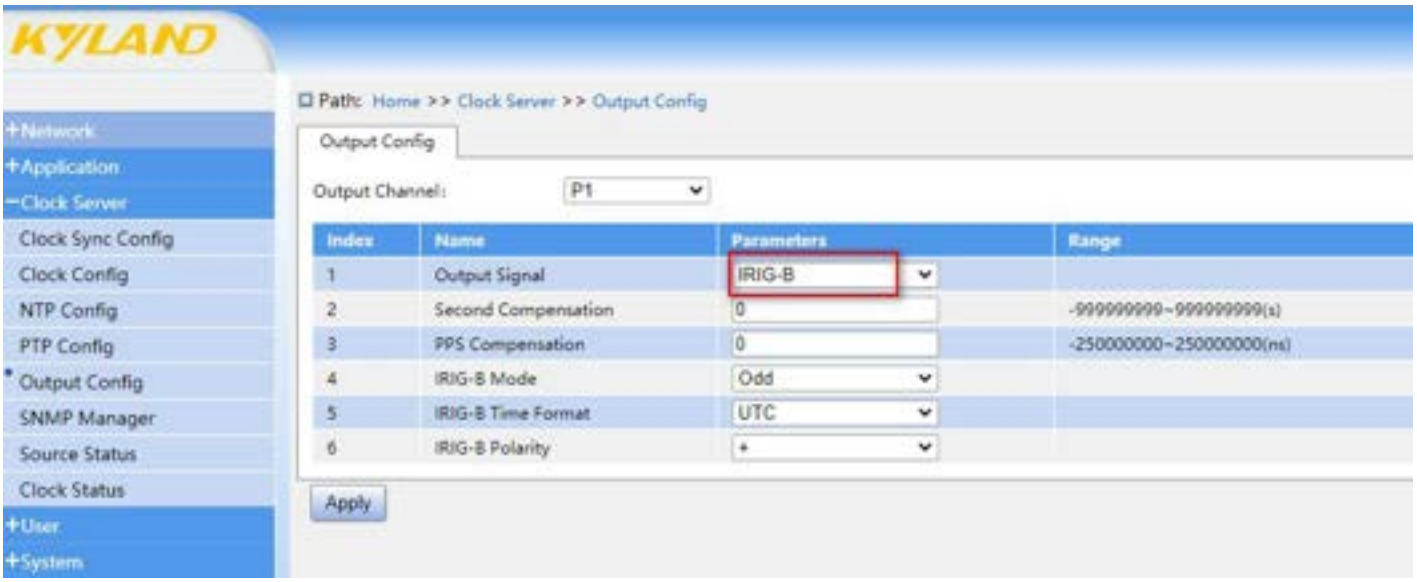

Figure 44 Selection output signal

The third step is to select IRIG-B mode as odd check

Figure 45 Selecting IRIG-B Mode

The fourth step is to select IRIG-B time format as local

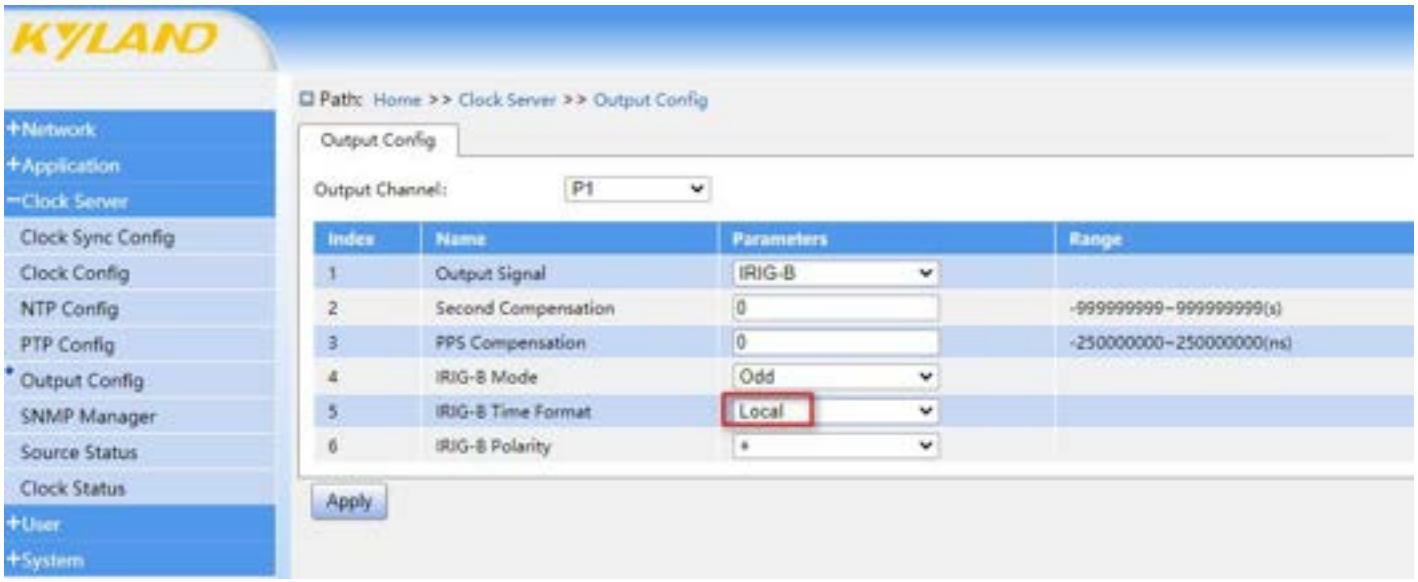

Figure 46 Selecting IRIG-B Time Format

The fifth step is to select the IRIG-B polarity as normal

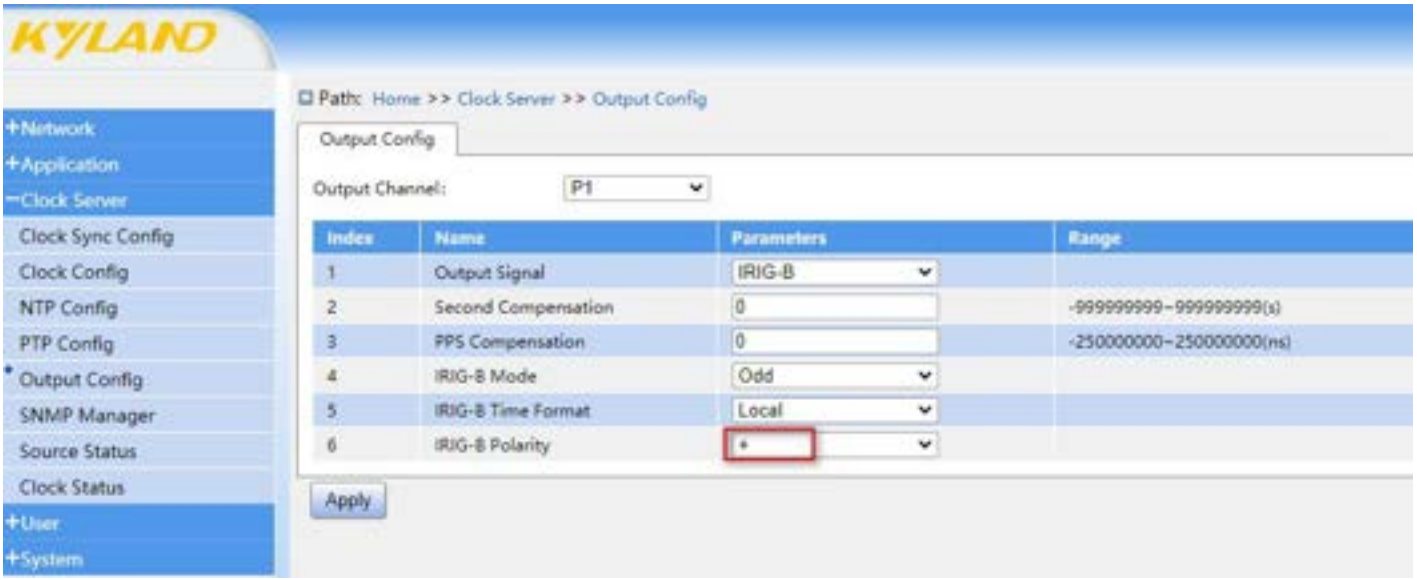

Figure 47 Selecting IRIG-B Polarity

At this time, the clock server P1 port output signal is B code, the offset value is 0, the check format is odd check, and the polarity is normal.

Note:

- When the configured clock time zone or summer time takes effect, the local time output by B code is UTC plus the set clock time zone or summer time deviation, and the clock time zone or summer time deviation is not added when outputting UTC or TAI time format.

5.6 SNMP Management

5.6.1 Introduction

SNMP (Simple Network Management Protocol) is a set of network management protocols defined by the Internet Engineering Task Force (IETF).

SNMP has three working modes, SNMP provides GET operation to obtain data from devices; SNMP provides SET operations to perform some settings to the device; SNMP also provides Trap operation, which is mainly used to send notifications to administrators when some important failures or changes occur in devices. This function is commonly referred to as SNMP traps.

5.6.2 Web Page Configuration

Click the "SNMP Management" menu in the left navigation bar of the page, and the SNMP parameter information will be displayed in the interface, as shown in Figure 48:

Figure 48 Configuring SNMP Parameters

SNMP management supports modifying proxy ports, Trap ports, and adding or removing V1/V2C access parameters

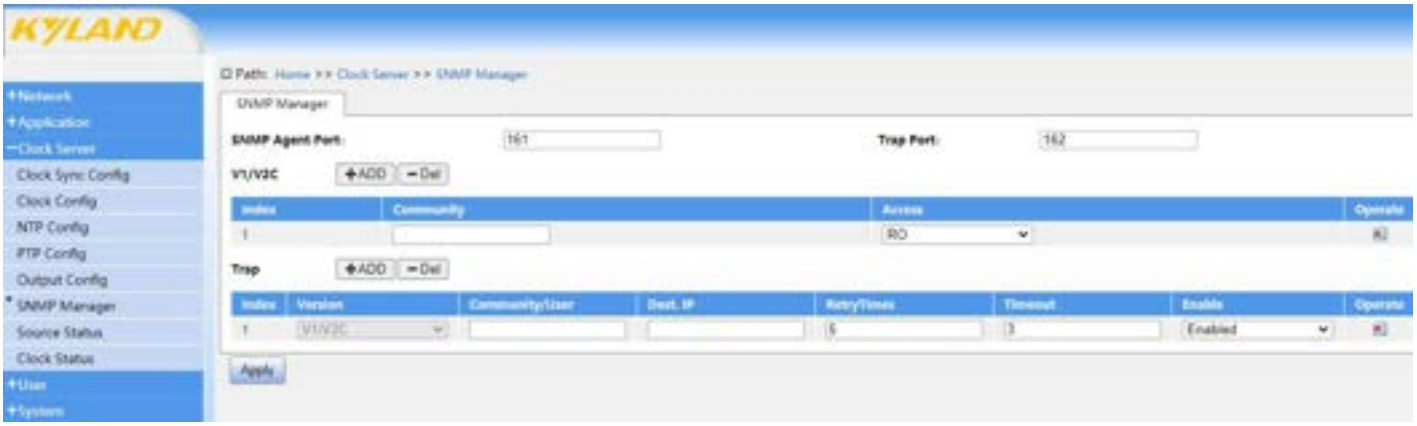

Figure 49 Configuring Access Parameters

SNMP Proxy Port

Configuration Options: Integers in

the range 1-65535 Default

Configuration: 161

Function: Port 161 is the standard port enabled by SNMP agent. The agent listens on this port to receive requests, such as Get

and Set requests, as well as sending responses such as SNMP monitor settings and getting monitoring information.

Trap port

Configuration Options: Integers in

the range 1-65535 Default

Configuration: 162

Features: Port 162 is the standard port on which the SNMP agent accepts attached trap messages. A trap message is a special type of SNMP message that notifies the agent to the manager when a

specific event occurs.

Community

Configuration options:

Non-special characters

Default configuration:

None

Function: This parameter determines the read-write permissions of the SNMP management data for users, with RO representing read-only and RW representing read-write.

Access Rights

Configuration Options: RO/RW

Default Configuration: RO

Function: This parameter determines the read-write permissions of SNMP management data for users. RO stands for read-only, and RW stands for read-write.

Trap Community/User

Configuration Options: Existing community users

Default Configuration: None

Function: This parameter determines whether the user of SNMP management data receives Trap information.

Trap Destination IP Address

Configuration Options: Standard IP format

Default Configuration: None

Function: This parameter is the IP address of the user of SNMP management data to receive Trap information (usually the PC's IP needs to be in the same subnet as the clock device's IP).

Note:

- When configuring IP parameters for the PTS-10AL, they must adhere to the following format:
  The IP address must be a valid IP address separated by dots ('x. y. z. w'),
  1) x, y, z, and w must be decimal numbers between 0 and 255,
  2) x cannot be 0,
  3) x cannot be 127,
  4) x cannot be greater than 223,
  5) w cannot be 0 or 255.

Trap Retransmission Times

Configuration Options: 1~10

Default Configuration: 5

Function: The number of times a Trap message is retransmitted if the initial send fails.

Trap Timeout

Configuration Options: 1~10

Default Configuration: 3

Function: The timeout period for sending a Trap message.

Trap Enable

Configuration Options: Enabled/Disabled

Default Configuration: Enabled

Function: To enable or disable the Trap function.

5.6.3 Typical Configuration Example

1.When using SNMP's GET and SET operations to manage the clock server, you can configure it in the following three steps:

The first step is to use the default proxy port 161, add the community user name of SNMP, and select the community

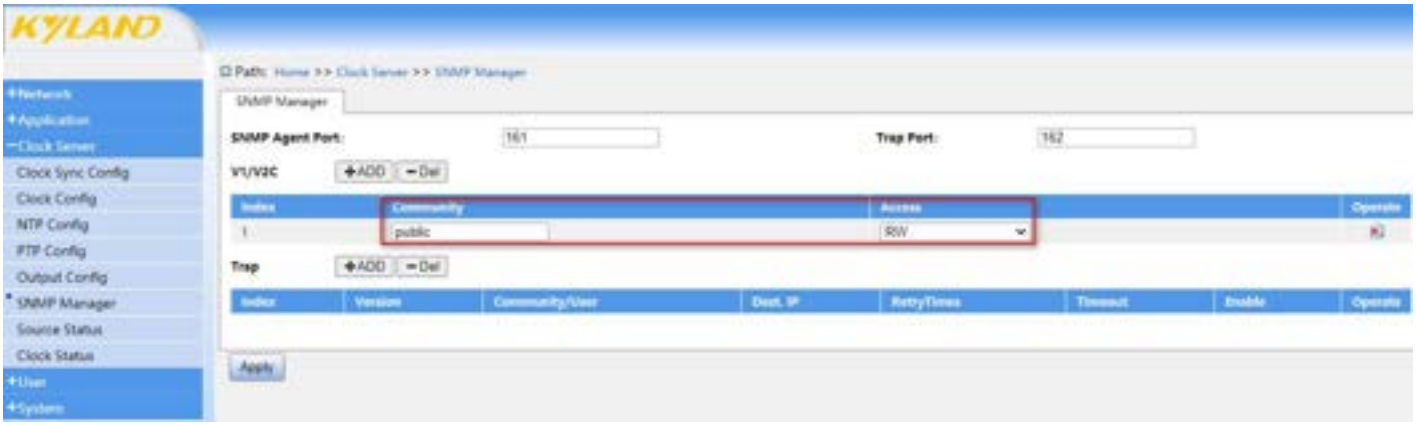

Figure 50 New SNMP Admin User

The second step, using the MIB Browser tool, configure the clock server network port IP, configure the SNMP proxy port, community name, SNMP version.

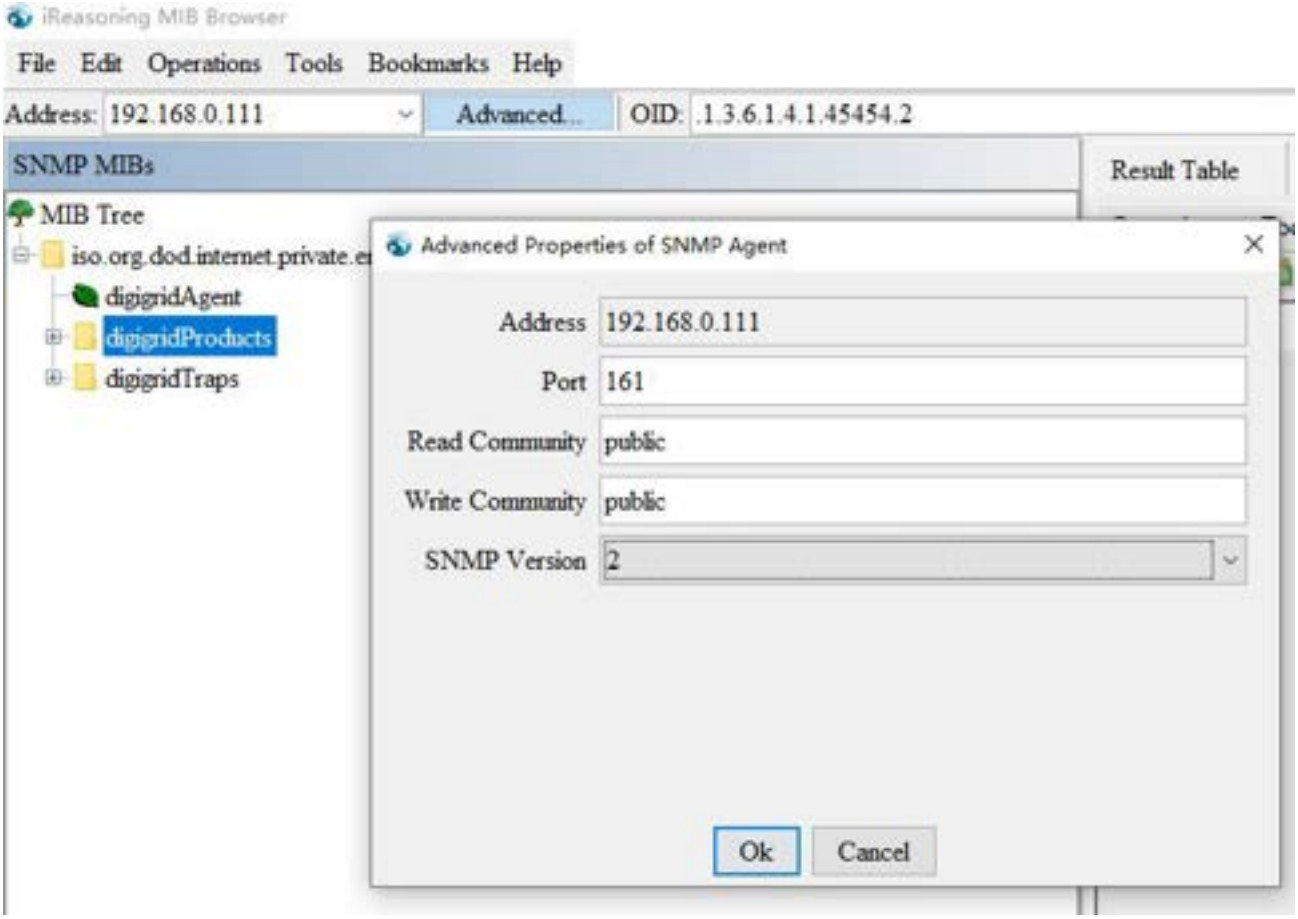

Figure 51 MIB Browser Tool Parameters

The third step, GET operation can be carried out on the function module of the clock server on the MIB Browser tool to obtain the configuration information of the specified object of the clock server, which is consistent with the configuration of the web interface parameters and changes in real time with the modification of the web interface parameters; The SET operation sets the configuration information of the specified object of the clock server, and after the setting is issued, the web interface can be viewed to synchronize this modification;

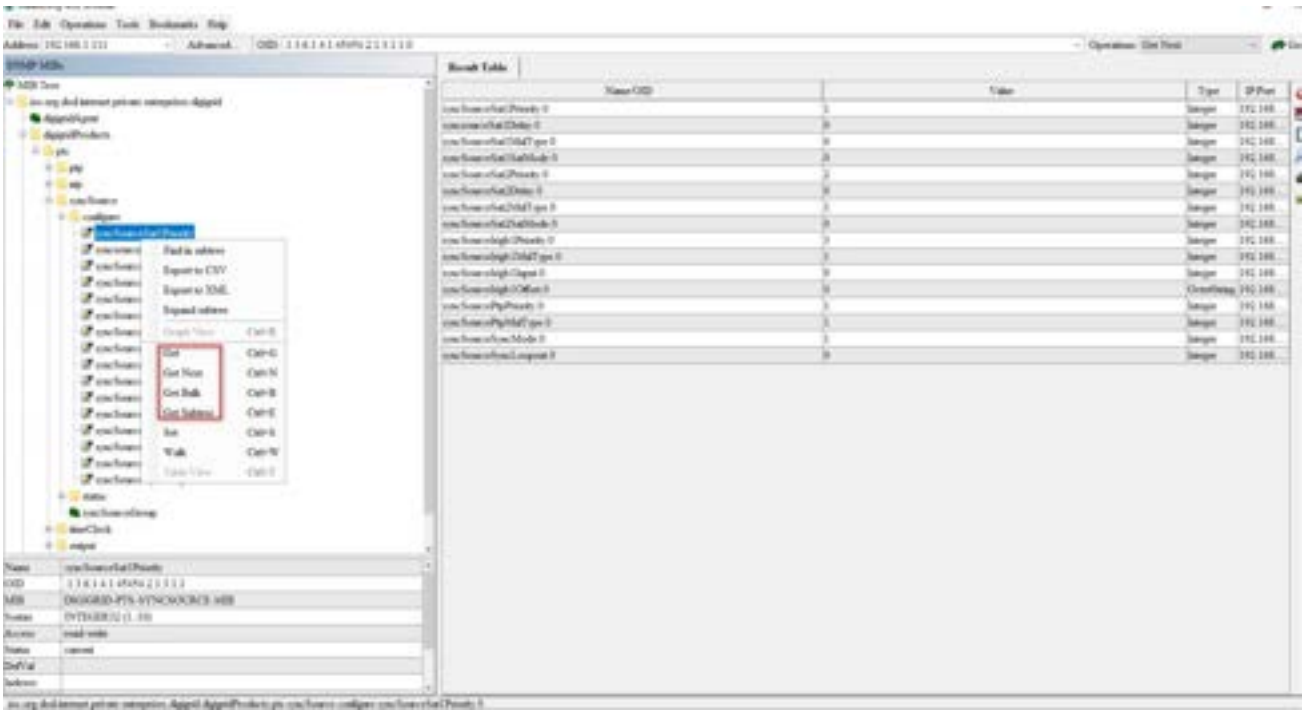

Figure 52 GET Operation

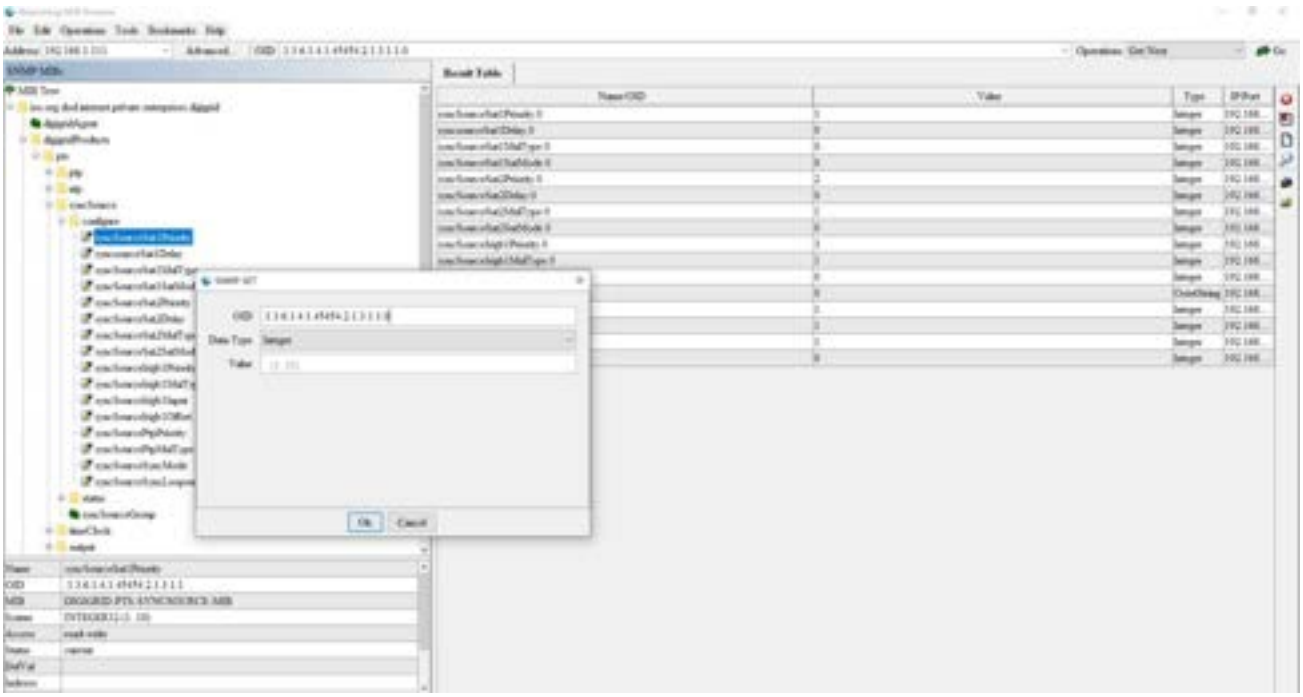

Figure 53 SET Operation

2.When using SNMP user to receive clock server Trap information, continue to configure in 2 steps on the premise that the community user has been created above:

The first step is to add a new Trap user, which must be an existing community user and the destination IP address is receiving SNMP Trap

IP of PC network port of information and other parameters default;

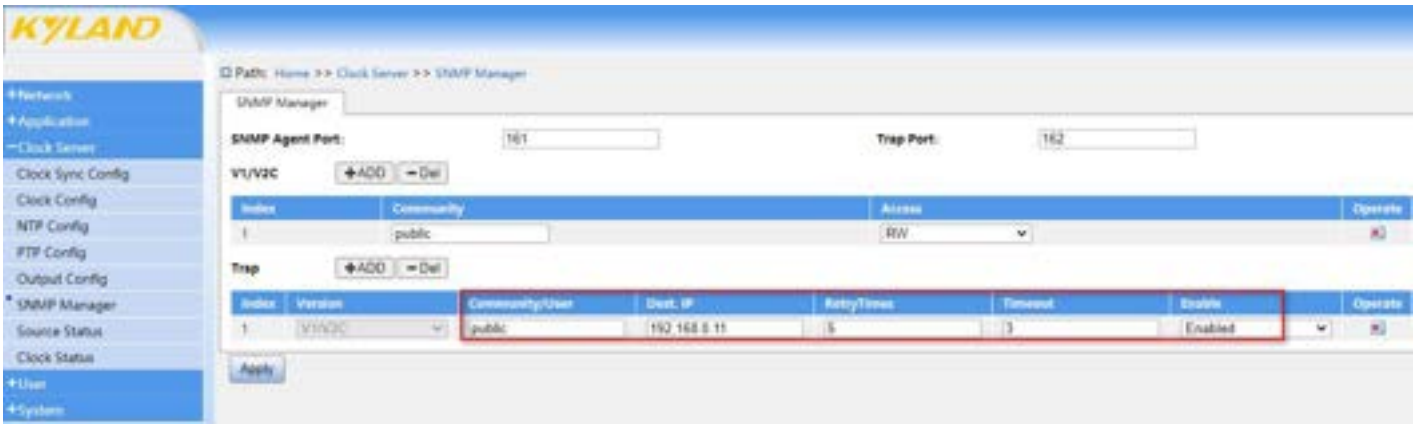

Figure 54 New Trap User

The second step is to configure Trap Port in Tools-> Trap Receiver using the MIB Browser tool, and click Start Button waiting for the clock server status changes, in this interface can get the reported Trap information;

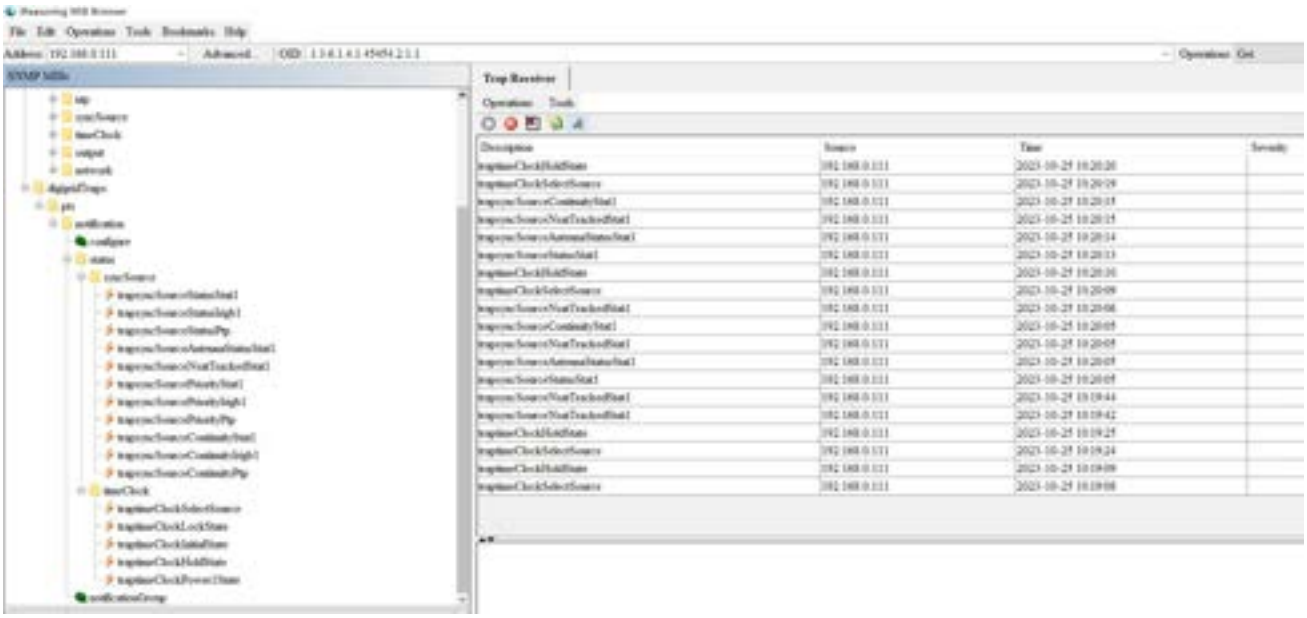

Figure 55 Trap Receiver Interface

5.7 . Synchronization Source State

5.7.1 Introduction

Synchronizing source status displays the working status of the time input source supported by the device.

Select different time source channel management interface will display the current status information of different time sources. For example, when SAT1 is selected, state information such as time source state, number of satellites, antenna state, time continuity state and source priority can be seen. "Normal" means that this status is good. If there is a problem, an "abnormal" alarm message will be displayed at the relevant position.

5.7.2 Web Page Configuration

Click the "Synchronization Source Status" menu in the left navigation bar of the page, and the synchronization source status information will be displayed in the interface:

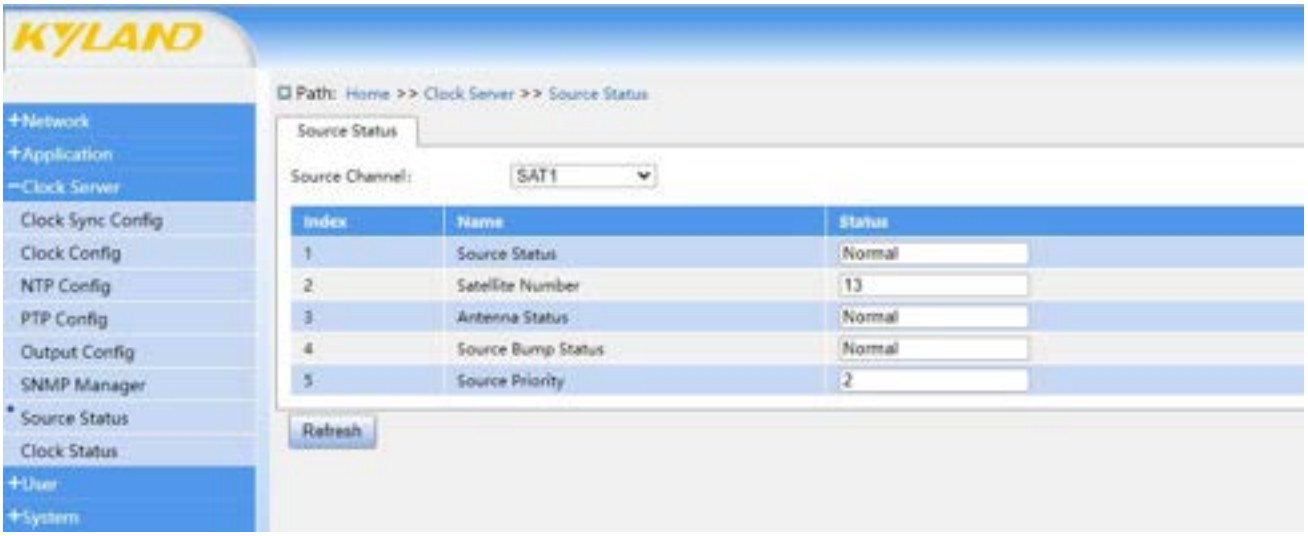

Figure 56 SAT1 Synchronization Source Status

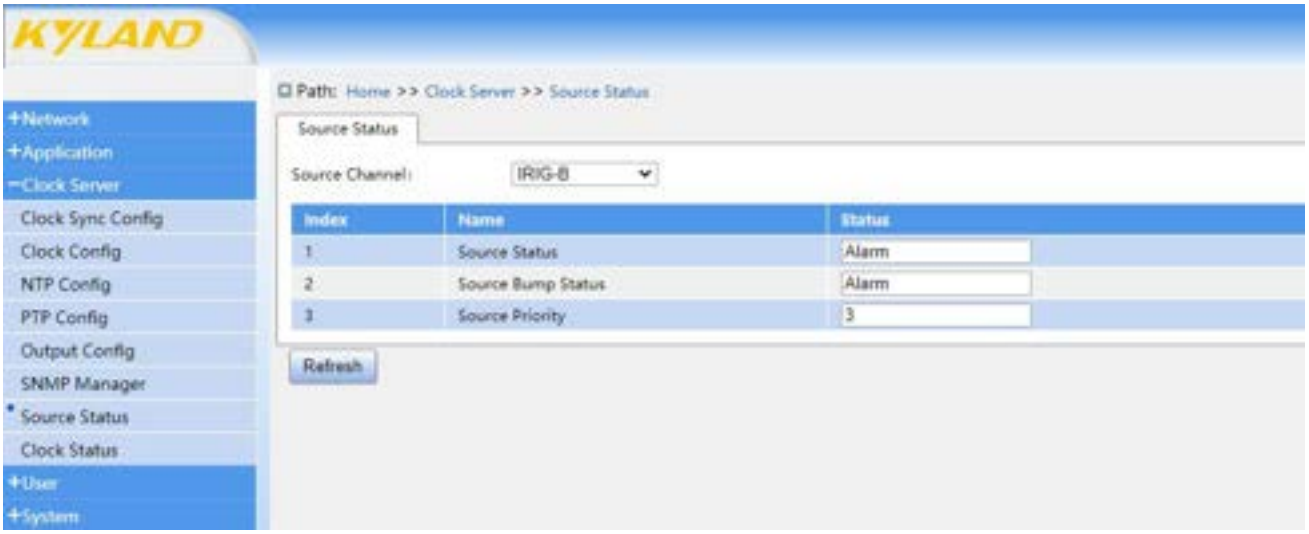

Figure 57 IRIG-B Sync Source Status

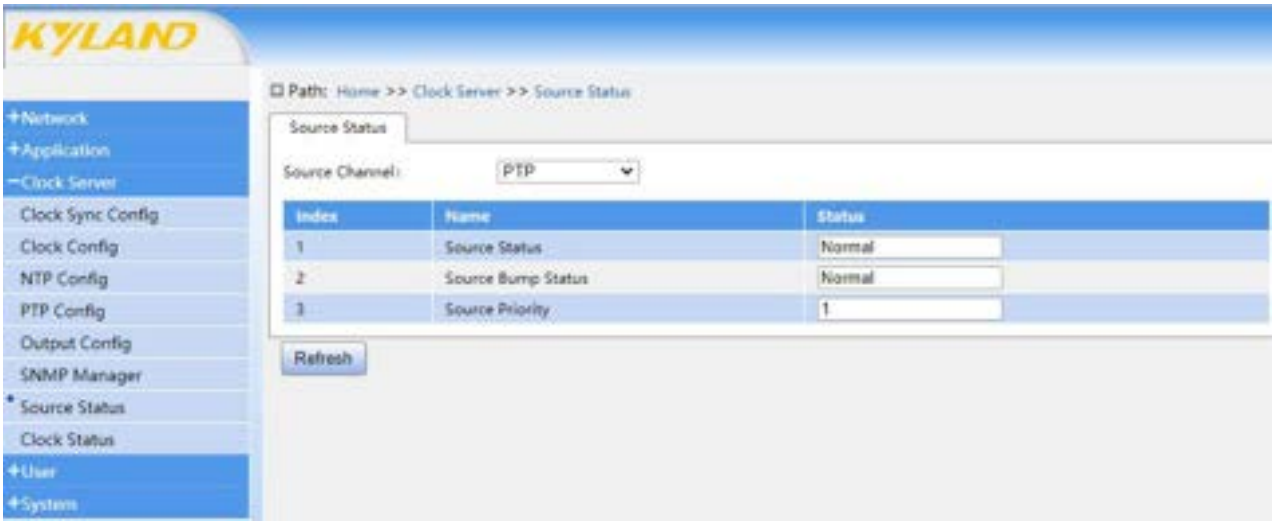

Figure 58 PTP Synchronization Source State

Clock Source Status

Status Information: Normal/Abnormal

Function: "Normal" indicates that the synchronization source is valid, and "Abnormal" indicates that the synchronization source is invalid.

Number of Satellites

Status Information: 0~255

Function: Displays the number of satellites found by the SAT channel.

Antenna Status

Status Information: Normal/Abnormal

Function: Indicates the status of the antenna.

Time Continuity Status

Status Information: Normal/Abnormal

Function: "Normal" indicates that the time information from the synchronization source is continuous, and "Abnormal" indicates that the time information from the synchronization source is not continuous.

Source Priority

Status Information: 1~10

Function: Shows the priority level of the source.

Note:

- The external synchronization sources supported by PTS-10AL are SAT1, SAT2, IRIG-B and PTP. When the source channel is switched to IRIG-B,
  PTP, the synchronization source status parameters no longer show the number of satellites and antenna status.

5.8 Clock State

5.8.1 Introduction

The clock status displays the external time source selected by the current device and the initialization status, punctuality status, power status, frequency, position information and version information of the current device.

5.8.2 Web Page Configuration

Click the "Clock Status" menu in the navigation bar on the left side of the page, and the clock status information will be displayed in the interface, as shown in Figure 55:

Figure 59 Clock status information

Current Synchronization Source

Status Information: SAT1/SAT2/IRIG-B/PTP/Local

Function: Displays the current external time source selected by the device.

Initialization Status

Status Information: Initialization Not Complete/Initialization Complete

Function: Shows the status of initialization.

Keep Time Status

Status Information: Tracking/Keep Time

Function: "Tracking" indicates that the device is locked to an external time source, and "Keep Time" indicates that no valid external time source device is present, and the device is using its internal time source.

Power Status

Status Information: Normal/Alarm

Function: Displays the status of the power supply operation.

Frequency

Function: Displays the frequency of the crystal oscillator.

Longitude

Function: Displays the longitude information of the device.

Latitude

Function: Displays the latitude information of the device.

Altitude

Function: Displays the altitude information of the device.

Version

Function: Displays the FPGA version information of the device.

Note:

- The current synchronization source status information supported by PTS-10AL includes SAT1, SAT2, IRIG-B, PTP and local. When the satellite source is normal, the current synchronization source is SAT1/SAT2 or other modes, and the longitude, dimension and height information display the real-time position information of the device; When the satellite source is abnormal, the display of device position information is not supported, and the longitude, dimension and altitude information are all 0.

5.9 Local End Operation

5.9.1 Introduction

The display screen of PTS-10AL clock device can display clock status information, including reference time information, PTP status information, synchronization source status information, clock status information, position information, version information, etc.; At the same time, you can also carry out related configuration operations, such as synchronization source configuration, clock configuration, NTP configuration, PTP configuration, output configuration, network configuration and so on. Through the operation of four buttons on the main panel, you can switch the information display and configure the operation of the product. The information displayed on the main page is shown in the following figure:

Figure 60 Example OF Status Information

Note:

- The PTS-10AL supports four keys for operating the screen, which are sequentially the " " left key, the " " right key, the " " confirm key, and the " " return key.

5.9.2 Local Side Configuration

The function of local terminal is mainly divided into two parts: status information display and system parameter configuration.

5.9.2.1 Status Information Display

Reference time display

The system reference time information is on the left side of line 1 of the display screen, and the time display format is YYYY-MM-DD HH: MM: SS. The following figure:

Figure 61 Reference Time Information

The summer time information is displayed after the time information by the "*" symbol

Figure 62 Summer time logo

PTP status information

The PTP operation mode is displayed on the right side of line 1 of the display screen. The PTP operation modes of PTS-10AL clock server are divided into three types, namely M (Master) PTP Master clock mode, S (Slave) PTP Slave clock mode and B (Boundary) PTP Boundary clock mode, as shown in Figure 59, 60 and 61 below respectively:

Figure 63 PTP Master Clock Mode

Figure 64 PTP Slave Clock Mode

Figure 65 PTP Boundary Clock Mode

Synchronize source status information

Synchronization source information is displayed in the second row, which can display the source state information when GPS, BDS, GLONASS, PTP and IRIG-B are used as synchronization sources respectively;

1. Satellite is used as synchronization time source, and the display format is as follows:

Figure 66 Satellite Synchronization Source: GPS

Figure 67 Satellite Synchronization Source: BDS

Figure 68 Satellite Synchronization Source: GLN

GPS\ BDS\ GLN xx-xx

xx (1st): Number of GPS satellites currently locked

xx (2nd): GPS antenna status, OK for normal antenna, NO for abnormal antenna

2. As a synchronization time source, PTP is displayed in the following format:

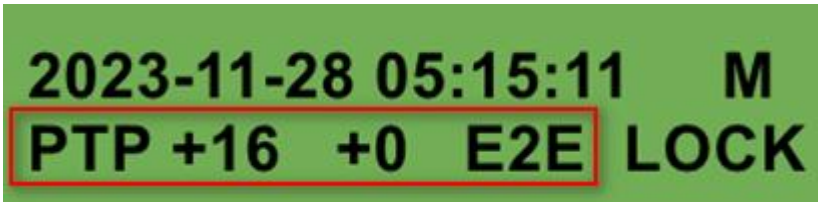

Figure 69 PTP Synchronization Source

PTP xx xx xxx

xx (1st): Time deviation in nanoseconds

xx (2nd): Route delay in nanoseconds, notice that when delay measurement mode is turned off, it is displayed here as "*"

xxx (3rd): Delayed measurement mode, P2P/E2E/Dis

3. IRIG-B acts as a synchronization time source and is displayed in the following format:

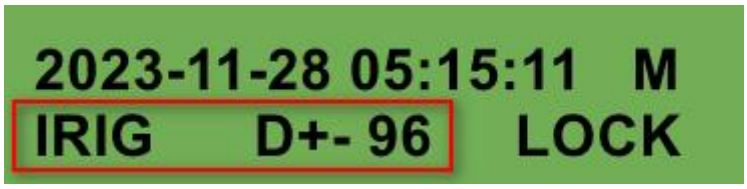

Figure 70 IRIG Sync Source

IRIG-B xx-xxx

xx (1st): IRIG-B input format polarity

DC + denotes positive polarity of DC B code and DC-denotes negative polarity of DC B code

xxx (2nd): Number of valid data frames for IRIG-B input source

Clock status information

For any time reference, the last message in Line 2 shows the working state of the current clock. In synchronous locking mode, the search status is displayed as SEEK, the initialization status is displayed as INIT, the tracking status is displayed as SYNC, and the locking status is displayed as LOCK. It is displayed as RCRV during time adjustment and HOLD during punctuality.

Figure 71 Clock Status: Search

Figure 72 Clock Status: Initialization

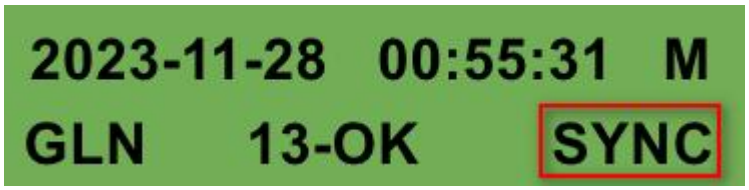

Figure 73 Clock Status: Tracking

Figure 74 Clock State: Lock

Figure 75 Clock Status: Adjusting

Figure 76 Clock Status: Punctuality

Location information

Satellite signals can provide position information. If the satellite time source is valid, the system will display the position information of the current device including longitude, latitude and altitude.

Figure 77 Position information: Longitude

Figure 78 Position information: Latitude

Figure 79 Position information: Height

Version information

Query the version information of the current software, and display the current version number and the date information of version management.

Figure 80 Version number

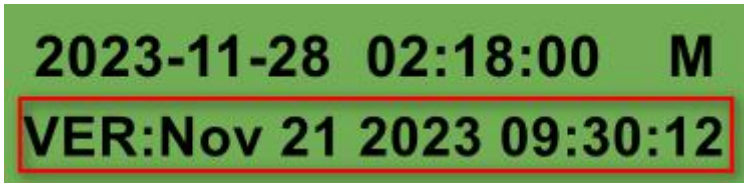

Figure 81 Version Date

5.9.2.2 System Parameter Configuration

After the clock device is started, the main interface is displayed as follows. Click the "Confirm" button to enter the clock configuration interface

Figure 82 System Parameter Interface

SYN

Note: Synchronize source configuration

Configurable clock server synchronization source parameters, including GPS, BDS and GLONASS satellite signals, ground B code, PTP synchronization signal source configuration. It is also possible to set the priority levels for various signal sources, the time zone offset for the B-code source, and configurations such as antenna delay compensation.

For specific parameter configuration and description, please refer to the synchronization source parameters of web pages in Section 5.1.

CLK

Note: Clock configuration

Explanation: The clock server's clock parameters can be configured, including basic clock parameters such as the clock reference, clock time zone, the time difference between UTC and TAI, and output mode. Additionally, Summer time (DST) information can be set, such as the DST offset, DST mode, DST start time, and DST end time.

For specific parameter configuration and description, please refer to the clock parameters of web pages in Chapter 5.2.

NTP

Note: NTP configuration

Note: You can configure whether the NTP service is enabled.

DEF

Note: Default configuration

Note: Restore factory settings.

Warning:

Restoring factory settings will completely reset the device, and the device configuration parameters will be restored to the factory default configuration state. Please operate carefully.

PTP

Note: PTP configuration

Note: Configurable clock server PTP parameters, including PTP mode, synchronization interval,

delay measurement interval, priority and VLAN and other related configurations. For specific parameter configuration and description, please refer to PTP parameters of web pages in Chapter 5.4.

OUT

Note: Output configuration

Explanation: The output parameters of the clock server can be configured, including the selection of each output channel for the clock's COM, P1 to P2, choice of output signal, signal delay compensation, polarity selection, and checksum mode, among other settings. For specific parameter configuration and description, please refer to the output parameters of web pages in Chapter 5.5.

NET

Note: Network configuration

Explanation: The network parameters of the clock server can be configured, including the IP address and subnet mask of the clock server's network interface.

SYS

Note: System management

Note: Modify the setting password information of the screen.

5.9.3 Typical Configuration Example

Configure the satellite synchronization source lock of space-based signal, which can be operated on the screen according to the following five steps:

The first step, select "SYN", click the "Confirm" button to enter, configure the working mode to single source, and the screen is displayed as follows:

Figure 83 Operating Mode: Single Source

The second step, click the "Right Click" button to switch to the information configuration of Antenna 1, including mode, satellite mode and antenna delay. The screen is displayed as follows:

Figure 84 Antenna 1 Configuration

The third step, select "SAT1-M", configure the satellite mode of antenna 1 to forced BDS, and enter the password after confirmation (the default password is 0000, which can be modified by SYS) for configuration

and saving, and the screen displays "Password OK!" Indicates that the satellite mode has been successfully configured to force BDS;

Figure 85 Satellite Mode Forced BDS

Figure 86 Enter Password

Figure 87 Password Entered Successfully

The fourth step, select "SAT1-P", configure the priority of antenna 1 to "Level-1", and enter the password after confirmation for configuration guarantee save;

Figure 88 Configuring Antenna 1 Priority

The fifth step, connect an effective antenna to the SAT1 interface, check the synchronization source state information of the screen, LOCK the galaxy as BDS, and change the clock state from INIT to LOCK state, indicating that the clock is locked according to the set galaxy;

Figure 89 Clock Lock

6 User

6.1 User management

6.1.1 Introduction

In order to solve the security risks caused by illegal users accessing the device, the device provides user hierarchical management function, which formulates different permissions based on different user identities to meet the diversified needs of user authority control.

6.1.2 Web Page Configuration

1. Create a new user, as shown in Figure 90:

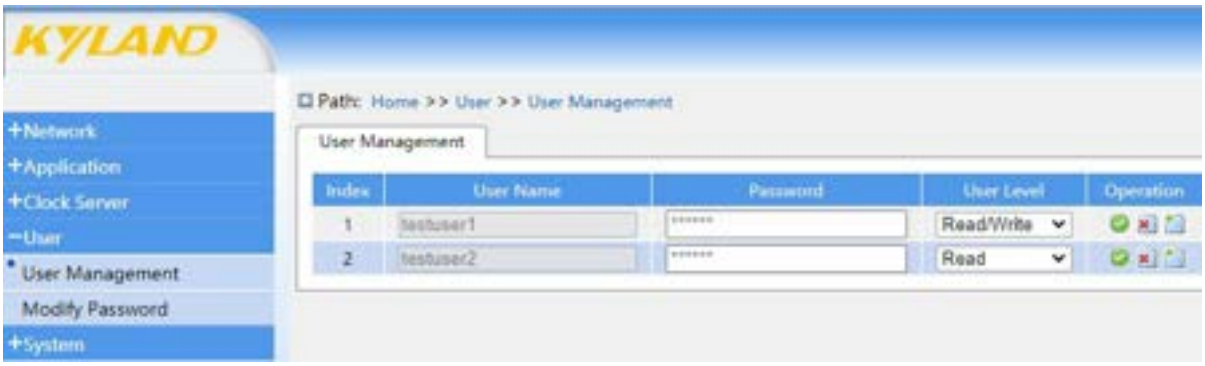

Figure 90 Creating A New User

Click < Add > button in the user name edit bar to add a new user, enter the user name and password, configure different user levels, and create up to 10 users. Enter the correct user name and password and click the < Confirm > button to complete the addition.

User name

Configuration range: 1~ 31 characters

Function: Configure user name.

Password

Configuration range: 8 ~ 31characters

Function: Configure user login password.

Authority level

Configuration range: read-write, read-only

Function: Configure the permission level of this user. Read-write users can modify various configurations of web pages, read-only Users can only view the configuration and cannot modify it.

Modify the user configuration, as shown in Figure 91;

Figure 91 Modifying User Configuration

Users only support changing passwords and permission levels. After entering the latest information, click the < Confirm > button to complete the modification. Click the < Delete > button to delete the user.

Note:

- The default user admin cannot be deleted.
- Only admin users have user management page permissions, and other users only have password modification page permissions

6.2 Change Password

Modify the login password of the current user, as shown in Figure 92;

Figure 92 Login Password Modification

Current password

Configuration range: 8 ~ 31 characters

Function: Confirm the identity of the current user and avoid the password being tampered with by others.

New password

Configuration range: 8 ~ 31 characters, lowercase letters, uppercase letters, numbers, special characters, meet one, strength +1, below strength 3 will prompt "password strength is low, do you

want to continue?" (Please use the combination of uppercase and lowercase letters, numbers and special characters for passwords). The minimum length of passwords is 5 digits, and special characters can only be.,! , @, #, $,%, ^, &, *, (,)

Function: Configure the new

password to be modified.

New password confirmation

Configuration range: 8 ~ 31 characters

Function: Confirm the new password that needs to be modified, so as to

avoid the incorrect entry of the new password and the inability to log in.

Cryptographic strength

Display range: red, orange, green

Function: Display the strength of the current new password. Red represents the weak strength of the password and is very easy to be cracked; Orange + orange means that the password strength is average and easy to be cracked; Red + orange + green means that the password is strong and not easy to be cracked.

Note:

After receiving the device, it is recommended that the customer configure a strong password according to their own needs to avoid losses caused by the device password being cracked by others.

7 System

7.1 Log

The system log page is used to record the running information of device, and can download the log, which is convenient for daily maintenance and fault detection of device.

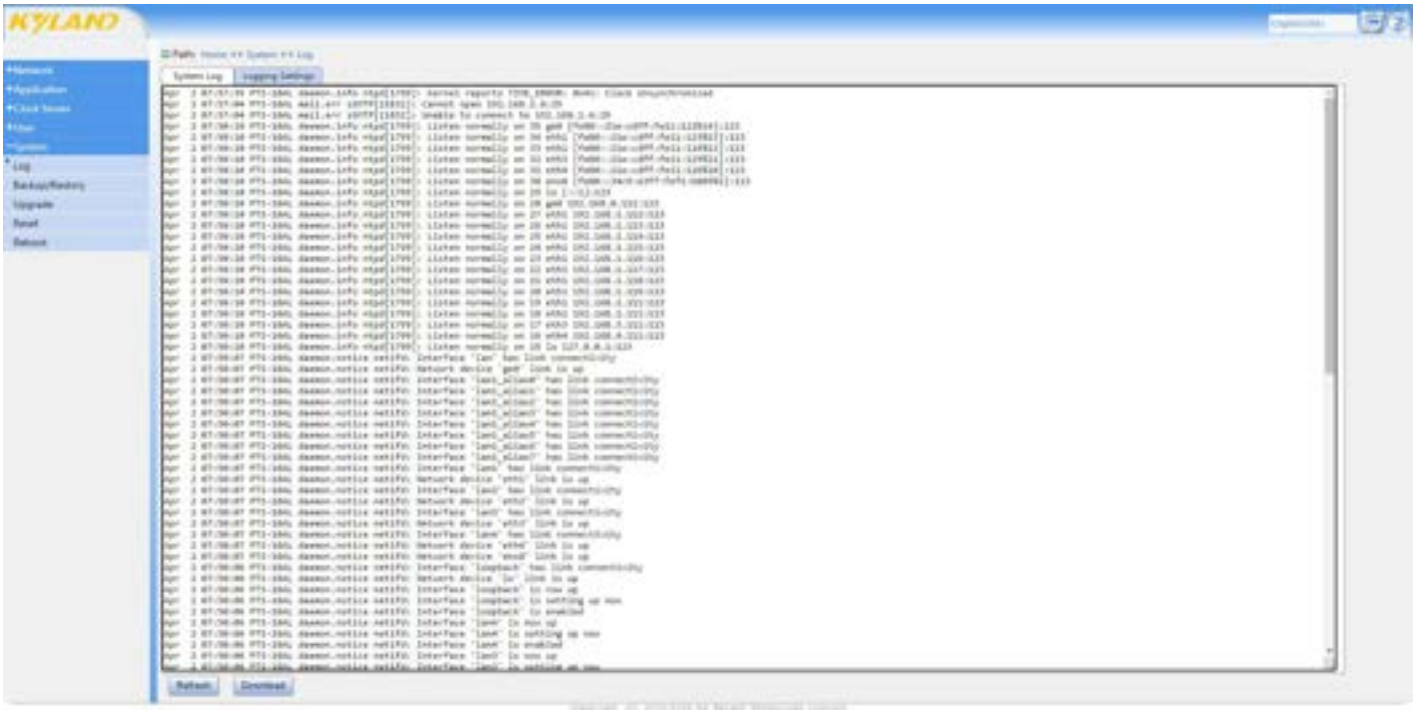

Figure 93 System Log Page

Log settings are used to send log information to specified external servers, and can be used to remotely monitor device operation information.

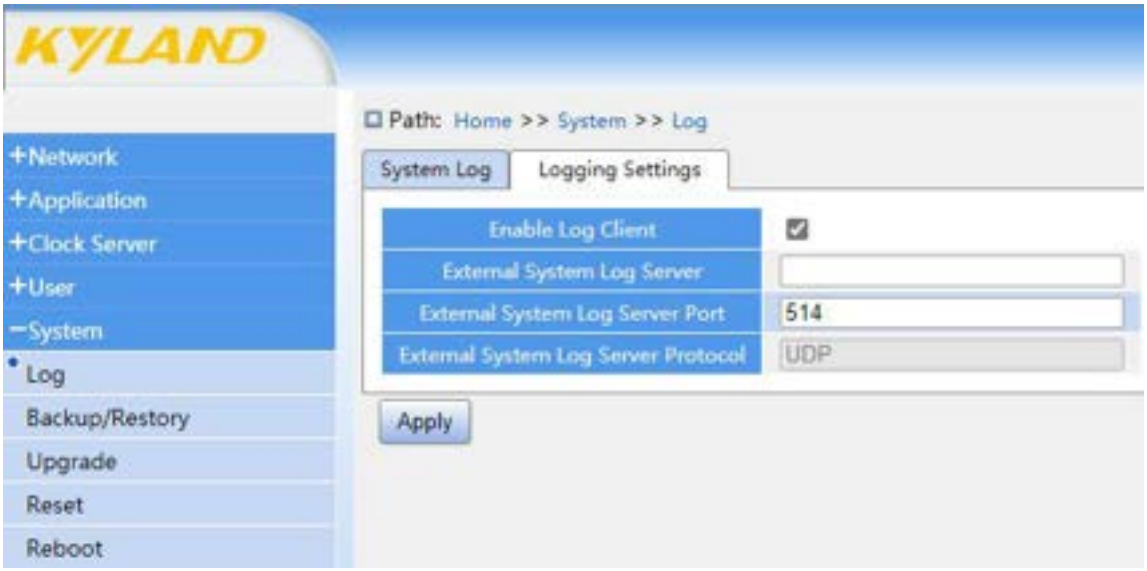

Figure 94 Log Setup page

Enable Log Client

Configuration Option: Enable/Disable

Default Configuration: Disable

Function: Enables the log client feature

External Log Server

Configuration Range: A.B.C.D, valid IP address

Function: As a Client, fill in the IP address of the log server with which the device communicates

External Log Server Port

Configuration Range: 1~65535

Function: As a Client, fill in the port of the log server with which the device communicates

External Log Server Protocol

Configuration Range: UDP

Function: The device's log feature only supports communication with a UDP protocol server.

7.2 Backup/Restore

The Backup Recovery page allows you to backup and upload configurations.

Click < Generate Backup > to download the current configuration file and archive it locally. Click < Browse > button, select the local configuration file path, click < Upload Backup > to import the local configuration file, and use the local configuration file to restore the device configuration information.

Figure 95 Backup Recovery Page

Note:

When restoring to the backup settings, the file device used will be verified, and if the device host name is inconsistent, recovery is not allowed.

7.3 Upgrade

The device can achieve better performance through software version upgrades. The upgrade for this series of devices includes KERNEL version upgrades and ROOTFS software version upgrades. When upgrading, the KERNEL version should be upgraded first, followed by the ROOTFS software version. It is possible to only upgrade the ROOTFS software version if the KERNEL version remains unchanged. Upgrades can be completed through the web interface.

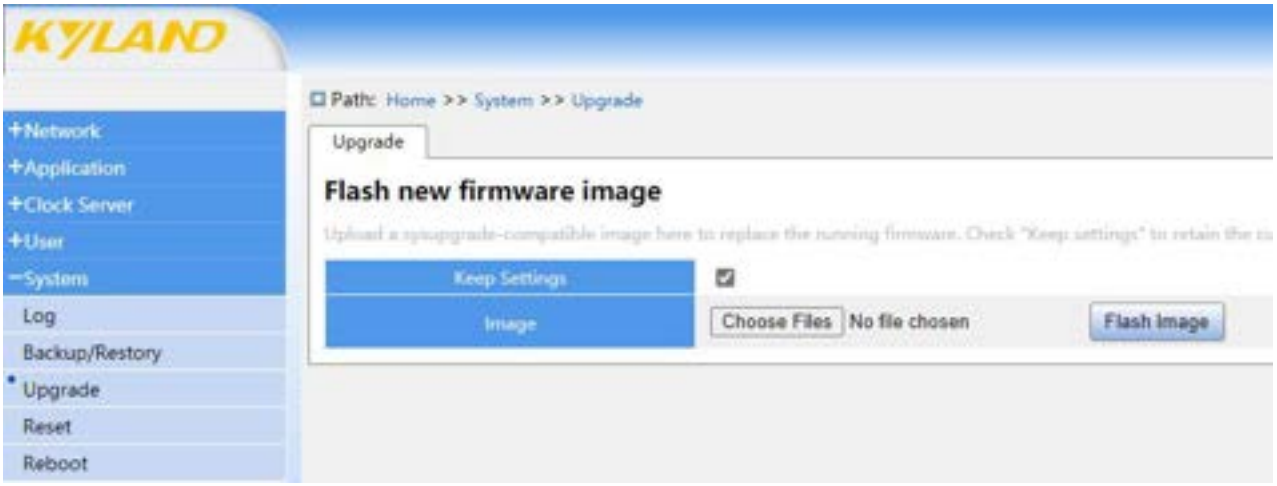

Figure 96 Software Upgrade Page

Click the < Select File > button, select the upgrade file path, and then click the < Upgrade > button to upgrade the web firmware. After the upgrade is successful, the gateway device will restart automatically and the system will be updated successfully.

Check the < Keep Configuration > button, and the configuration will be kept after upgrading. If < Keep Configuration > is not checked, the configuration will not be kept after upgrading, and the configuration information will be restored to the factory default configuration state.

Note:

The upgrade process will stop related business programs. If the upgrade fails and the related business still needs to be used, the machine will need to be restarted. During software upgrades, the device's power and network should be kept running normally to avoid upgrade failure.

7.4 System Reset

The System Reset page is used to restore this device to the factory setting state.

When you need to clear all the configuration information on the device, click the < Reset > button to restore the device to the factory default settings.

Figure 97 System Reset Page

Warning:

Restoring factory settings will completely reset the device, and the device configuration parameters will be restored to the factory default configuration state. Please operate carefully.

7.5 Restart

The Restart page is used to restart this device.

When you need to restart the device, you can click the < Execute Restart > button to restart the device

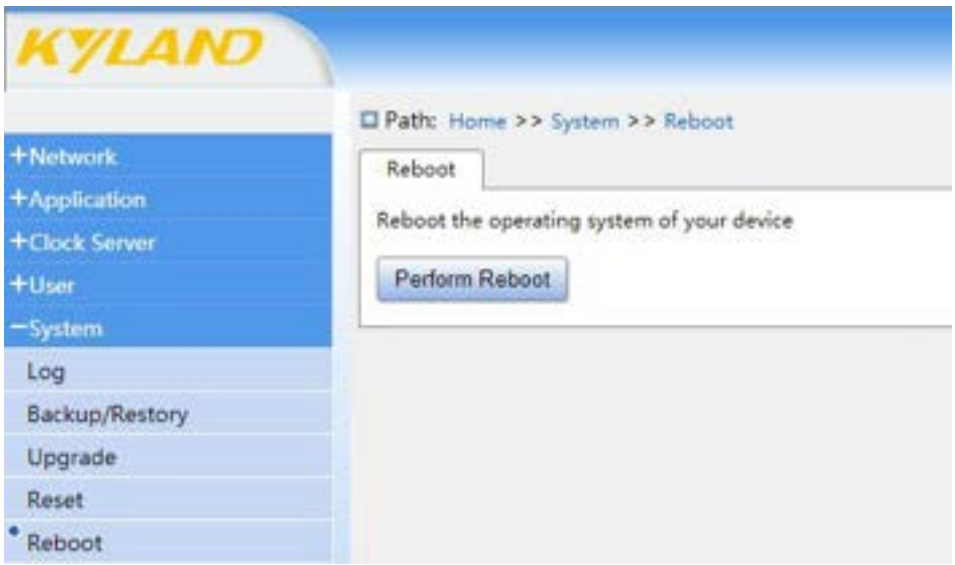

Figure 98 System Restart Page