GPS Clock Synchronization Module
Hardware Installation Manual

KYLAND

Kyland Technology Co., LTD.

GPS clock synchronization module

Hardware Installation Manual

Disclaimer: Kyland Technology Co., Ltd. tries to keep the content of this manual as accurate and as updated as possible. This document is not guaranteed to be error-free, and we reserve the right to amend it without notice to users.

Notice for Safety Operation

This product performs reliably as long as it is used according to the guidance. Artificial damage or destruction of the equipment should be avoided.

- Read this manual carefully and keep it for future reference;
- Do not place the equipment near water sources or damp areas;
- Do not place anything on power cable or put the cable in unreachable places;
- Do not tie or wrap the cable, which may cause a fire risk;
- Power connectors and other equipment connectors should be firmly interconnected and checked frequently;
- Do not repair the equipment by yourself, unless it is clearly specified in the manual;
- Please keep the equipment clean; if necessary, wipe the equipment with soft cotton cloth.

In the following cases, please immediately shut down your power supply and contact your Kyland representative:

- Water gets into the equipment;
- Equipment damage or shell damage;
- Equipment operation or performance has abnormally changed;
- The equipment emits odor, smoke or abnormal noise.

Contents

1 Product Overview

GPS clock synchronization module is specifically designed for switches including SICOM6028GPT, SICOM6424PT, SICOM3028GPT and SICOM3424PT, which support PTP protocol. The GPS receiver and precise clock included in the module can provide a very precise GPS signal for host switches.

GPS clock synchronization module provides one GPS signal input port and one PPS output port.
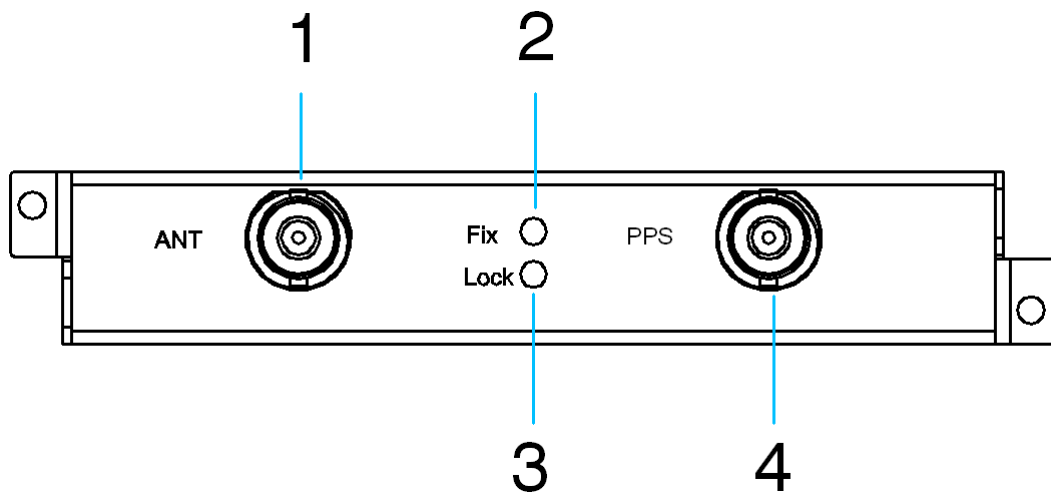
2 Structure and Interface

Figure 1 GPS clock synchronization module

Table 1 GPS clock synchronization module Panel

Number	Diagram Label	Description
1	ANT	GPS signal input port, BNC connector
2	Fix	Position Satellite LED
3	Lock	Frequency Lock LED
4	PPS	PPS output port, BNC connector

3 Installation
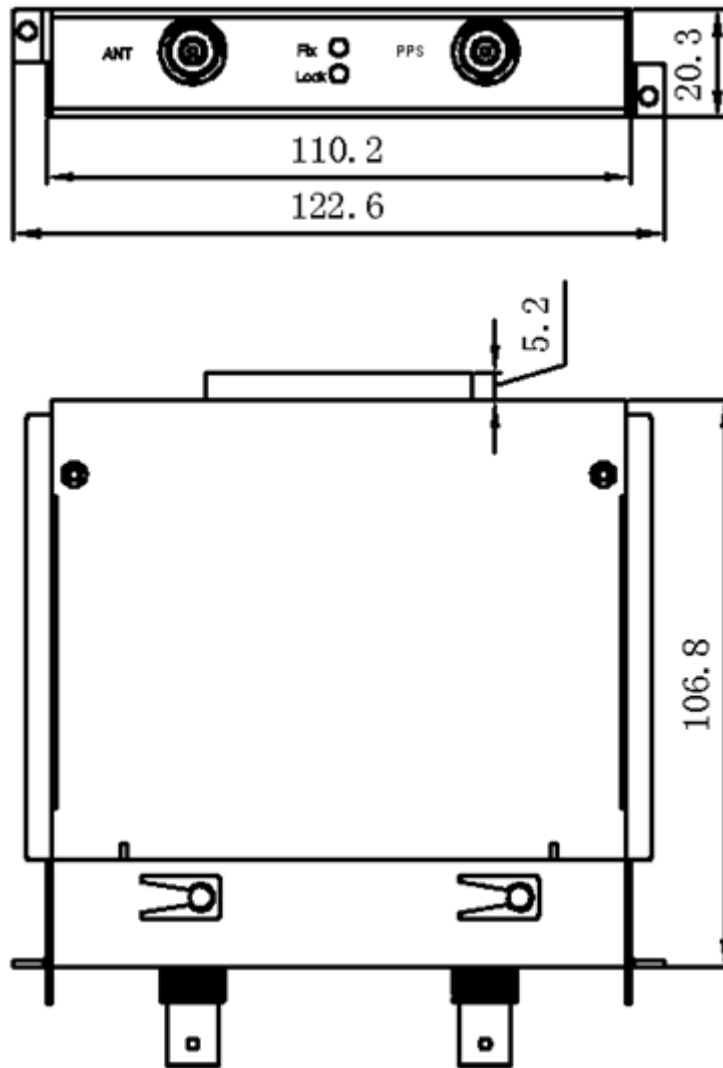
3.1 Dimension Drawing

Figure 2   Module Dimension Drawing

3.2 Installing the Module

Note: We recommend that the modules be installed and removed while the power is disconnected.

3.2.1 Installing the Module

The series switches provide six 0.5U Slots (Slot2-Slot7) in the rear panel. The GPS clock synchronization module can be installed into the random 0.5U slots as needed.

The installation method for upper slots (Slot2, 4 and 6) is to install the module facing up and lower slots (Slot3, 5 and 7) should be installed facing down.

● GPS clock synchronization module installation in upper slots(Slot2,Slot4 and Slot6)

Step 1: Place the module with the diagram label facing up. Insert the guide rail of module into the guide rail slot, as shown in   Figure 3 , and then push the module in along the guide rail slot until the module is in close contact with the switch.
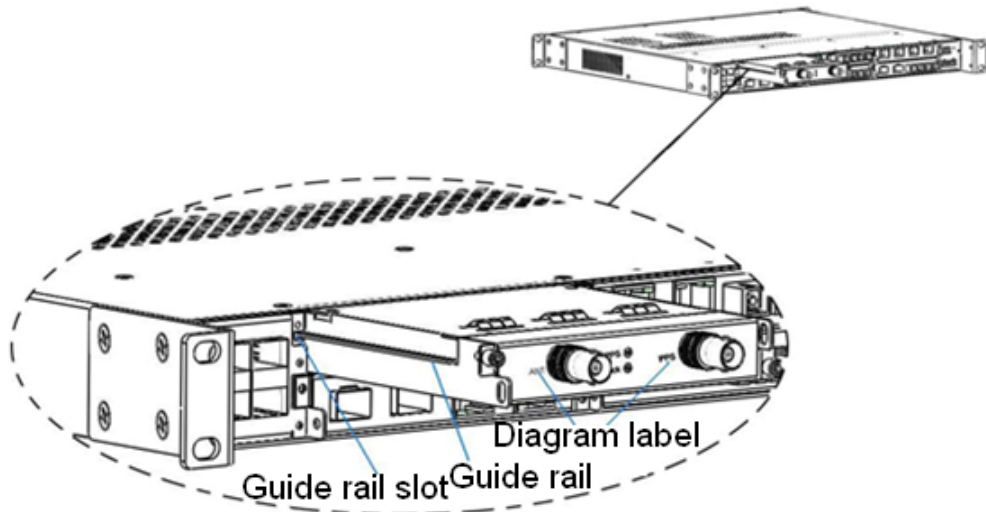
Figure 3   Module Installation 1

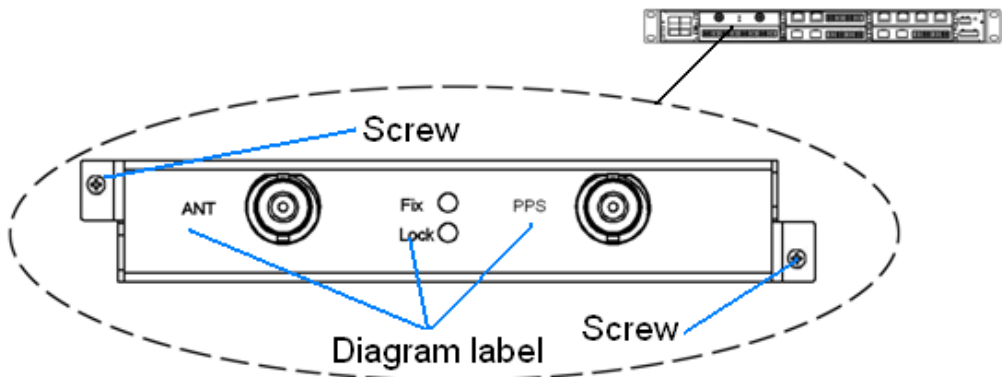Step 2: Secure the module into the switch chassis with two screws (M2.5×5), as shown in Figure 4.

Figure 4   Module Installation 2

● GPS clock synchronization module installation in lower slots(Slot3,Slot5 and Slot7)

Step 1: Place the module with the diagram label upside down. Insert the guide rail of module into the guide rail slot, as shown in Figure 5, and then push the module in along the guide rail slot until the module is in close contact with the switch.
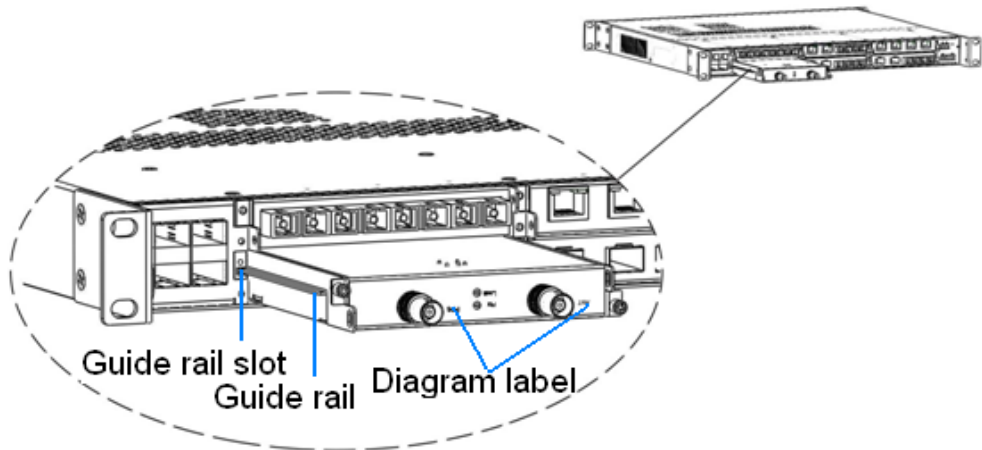
Figure 5   Module Installation 3

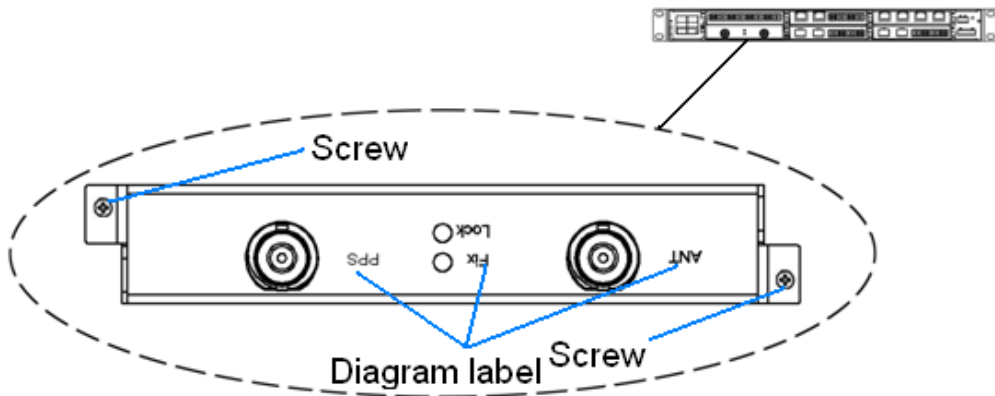Step 2: Secure the module into the switch chassis with two screws (M2.5×5), as shown in Figure 6 .

Figure 6   Module Installation 4

3.2.2Removing the Module

When removing an module, a puller as shown in Figure 7 is needed.
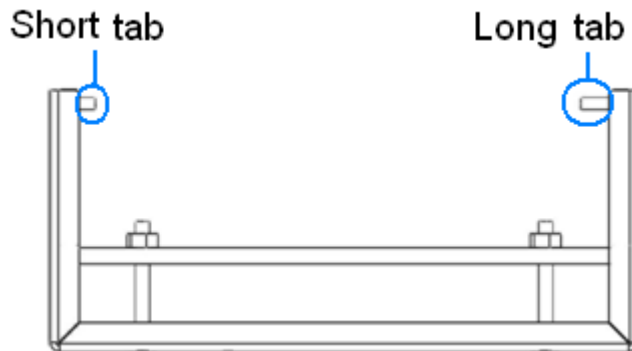
Figure 7 Puller

The specific mounting steps are as follows: (removal for upper and lower slots is the same)

Step 1: Remove the two fastening screws of the module and switch chassis.

Step 2: Insert the long tab into the handle of the module, as shown in Figure 8; then move the puller left to ensure adequate space for inserting the short tab.
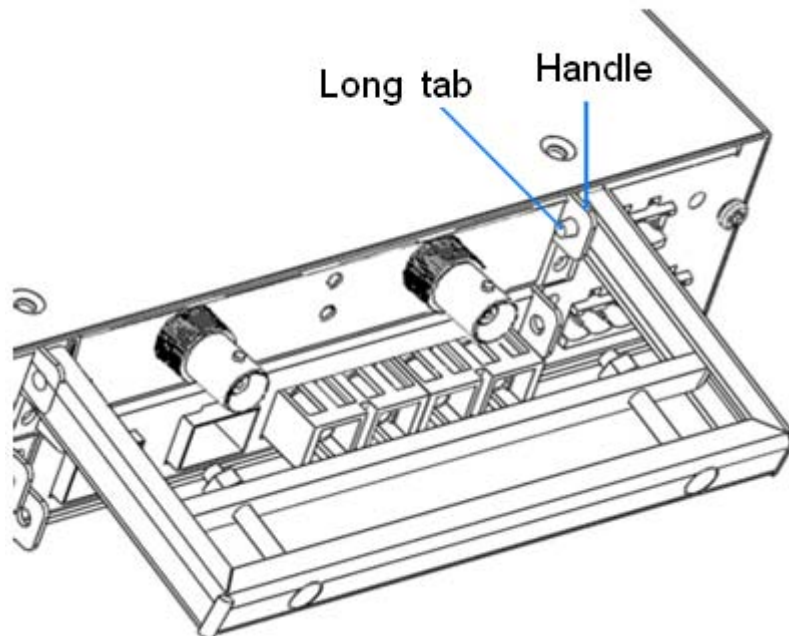

Figure 8 the Module Removal 1

Step 3: Insert the short tab of the puller into the other handle of the module as shown in Figure 9; move the puller to the right to keep both of the tabs inserted into the two handles of the module, as shown in Figure 10.
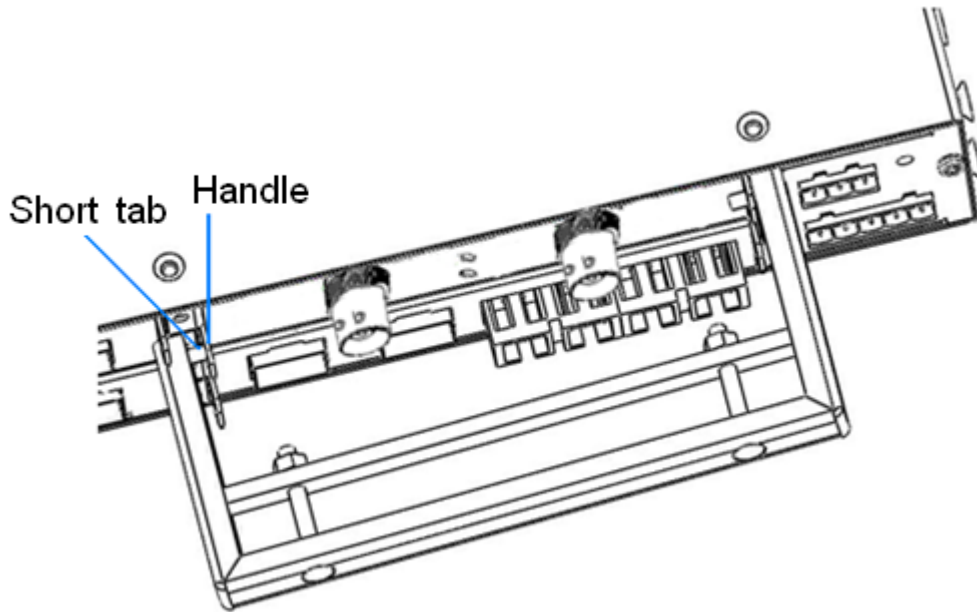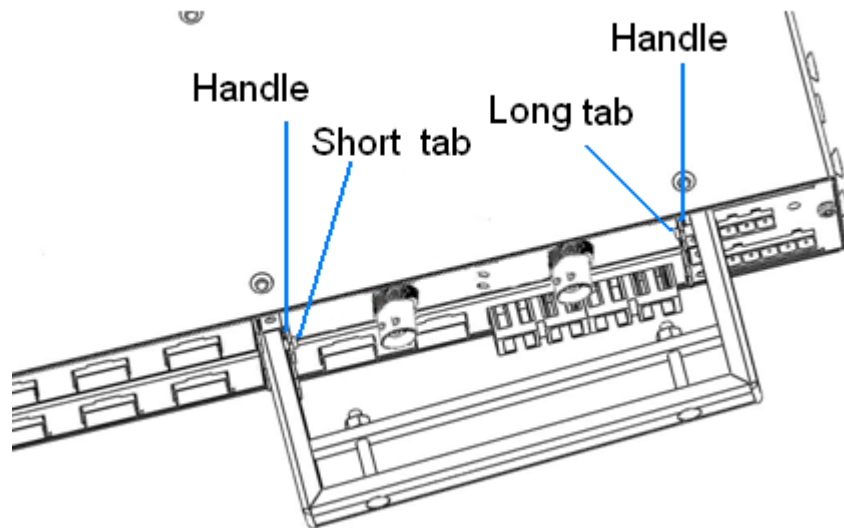

Figure 9 the Module Removal 2

Figure 10 the Module Removal 3

Step 4: Grip the handle of puller; push the handle in the direction of

arrow 1 with your thumb, and at the same time pull the handle outwards with your fingers in the direction of arrow 2. The module will pop-up. Pull the module outwards along the guide rail slot, until it completely comes out of the switch chassis.
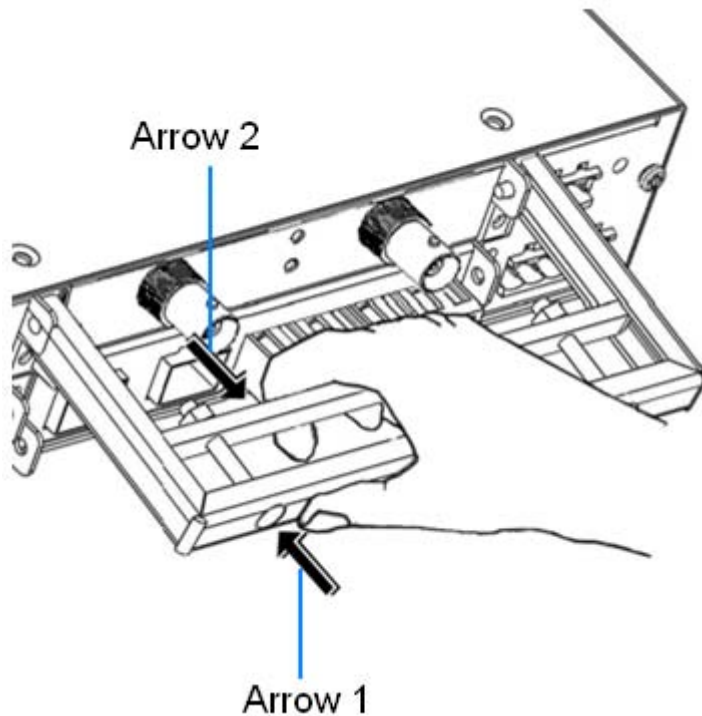
Figure 11 the Module Removal 4

Note: When using the puller, ensure to insert the long tab into the handle of the module first and then insert the short tab; otherwise the long and short tabs will not be inserted into the handles because of the specific design of the puller.

4 Cable Connection

4.1 GPS Signal Input Port

GPS signal input port can be used to connect and supply power for GPS antenna (as shown in Table 6 Product Optional Accessories) that can

receive satellite signal; the supplied power voltage is 5VDC. The port is assembled with BNC connector as shown in Figure 12.

Figure 12   GPS Signal Input Port

4.1.1 Installing GPS Antenna

Figure 13   Installing GPS Antenna

● Installation position

1. Lower than the top of the lightning rod

   To be protected by the lightning rod, the GPS antenna should be positioned lower than the top of the lightning rod.
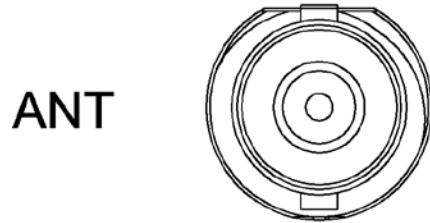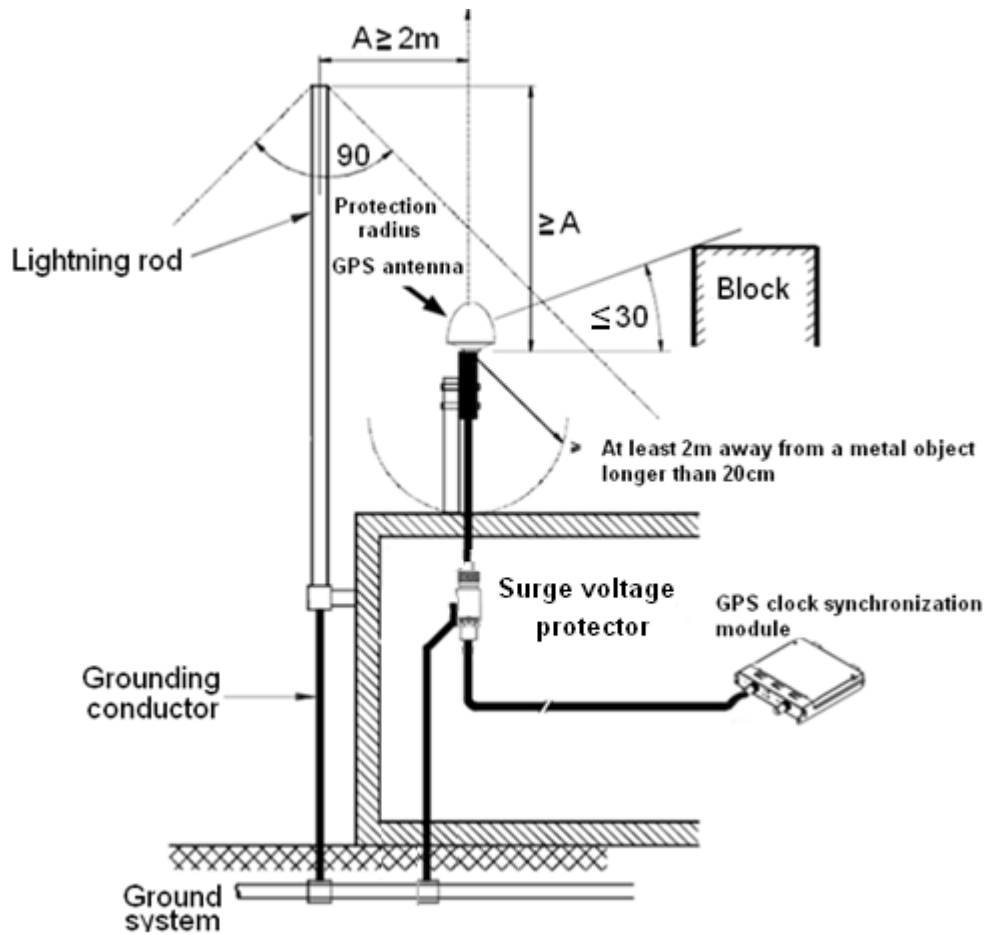
2. Unshielded view of the sky

   The GPS antenna should be positioned with a clear view of the sky. The biggest obstacle in the surrounding should not block a horizontal section larger than 30 degrees, that is, the vertical upward view without a block should be larger than 120 degrees, as shown in Figure 13.

3. Free from interference

   To prevent interference caused by reflected wave, the GPS antenna should be positioned at least 2m away from a metal object longer than 20cm, as shown in Figure 13.

   The GPS antenna should not be installed near another transmitting or receiving device, below a microwave antenna or high-voltage cable, or directly in the radiation direction of another transmitting antenna.

   A minimum of 2m distance should be kept between any two GPS antennas. You are advised to install multiple GPS antennas in different locations to prevent mutual interference.

● Installation steps

   You can choose whether to install the surge voltage protector as needed.Table 2 lists specific installation steps.

Table 2 GPS Antenna Installation

	GPS Antenna Installation (without surge voltage protector)	GPS Antenna Installation (with surge voltage protector)
Step 1: Purchase product optional accessories (as shown in Table 6)	20-meter low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-20m)	1. Adapter for low-loss RF coaxial cable (DT-ZJQ-BNC-TNC-01) 2. 20-meter low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-20m) 3. 2-meter low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-2m) 4. Surge voltage protector (DT-SP-01)
Step 2: Connect cables for GPS antenna	Lead the TNC (male) of the low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-20m) through the opening of the antenna bracket. Connect the TNC (male) of the low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-20m) to the TNC (female) of the GPS antenna. Tighten the bracket with the GPS antenna.	
Step 3: Secure GPS antenna	Secure the antenna bracket with a bolt at a higher position, for example, the top of a building. Parallel the receiving surface of the GPS antenna with the ground for optimal signal reception.	
Step 4: Connect GPS clock synchronization module	Connect the BNC (male) of the low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-20m) to the BNC (female) of the GPS signal input port on the GPS clock synchronization module.	1.Connect the BNC (male) of the low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-20m) to BNC (female) of the adapter for low-loss RF coaxial cable. (DT-ZJQ-BNC-TNC-01) 2. Solder a grounding conductor

|		(cross-sectional area≥4mm^2, as short as possible) to the GND of the surge voltage protector. Connect the grounding conductor to the ground system. 3. Connect the TNC (female) of the adapter for low-loss RF coaxial cable (DT-ZJQ-BNC-TNC-01) to TNC (male) of the surge voltage protector. 4. Connect the low-loss RF coaxial cable (DT-XL-LMR400-TNC-BNC-2m) to the TNC (female) of the surge voltage protector and the BNC (female) of the GPS signal input port on the GPS clock synchronization module respectively.
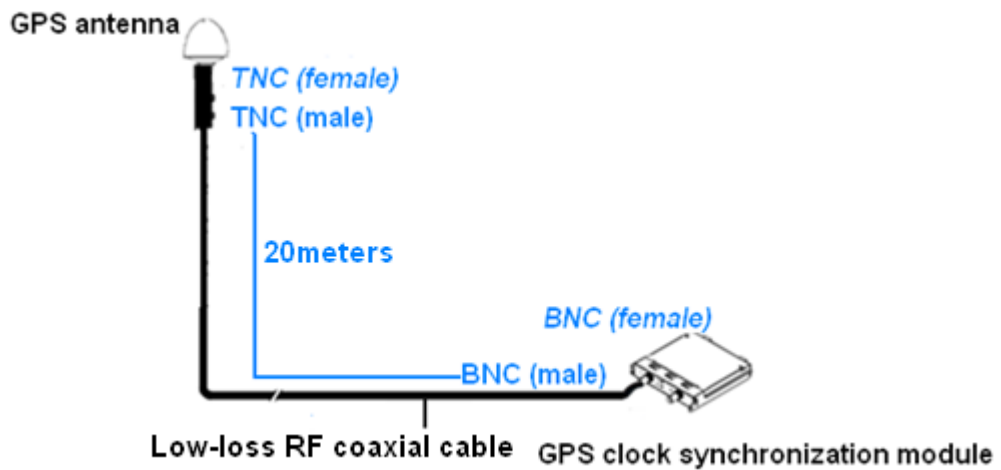
Figure 14   Connecting GPS Antenna to GPS Clock Synchronization Module (no
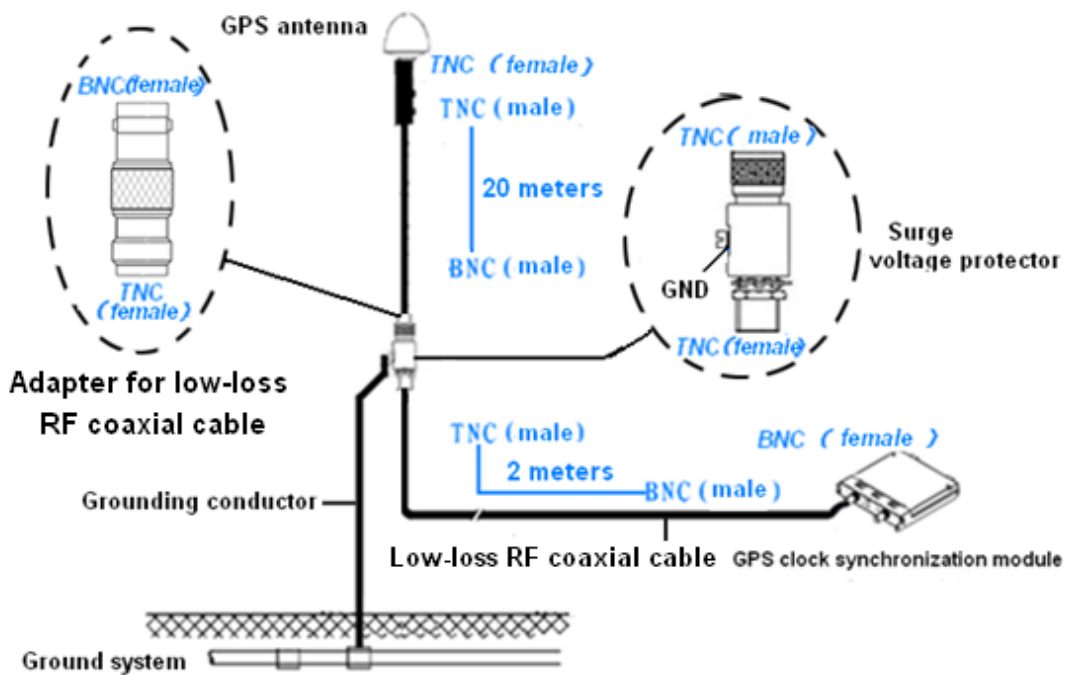
surge voltage protector)

Figure 15 Connecting GPS Antenna to GPS Clock Synchronization Module

(including surge voltage protector)

Note: It is recommended to install the surge voltage protector indoor. If it is installed

outdoor, you must take waterproof measures.

4.2 PPS Output Port

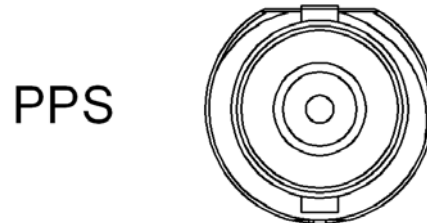The port assembled with BNC connector can be used for PPS (Pulses Per Second) output.

Figure 16 PPS Output Port

Note: PPS output, TTL +5V level, trigger by rising edge, pulse width 20ms-200ms, software adjustable step is 1ms.

5 LED Indicators

Table 3 Panel LED

LED	State	Description
Position Satellite LED		
Fix	ON	GPS antenna has positioning for at least 4 satellites.
Fix	OFF	GPS antenna has positioning for less than 4 satellites.
Frequency Lock LED		
Lock	ON	System clock has locked.
Lock	Blinking (1HZ)	Free oscillations
Lock	OFF	System clock has not locked.

6 Management Access

GPS clock synchronization module is managed by the host switch

(SICOM6028GPT, SICOM6424PT, SICOM3028GPT or SICOM3424PT).

The host switch manages the module through CLI, SNMP or Web browser.

Finishing the installation of the module as shown in 3.2.1, we can search for

the information of module through Console interface, telnet or Web browser.

6.1 Connected through Console Port

1. Install the driver for Mini USB onto your PC. The driver "Mini USB
   driver.exe" is in the software download folder, which is on the supplied
   CD.

2. Use the Console cable that is equipped with Mini USB connector at one
   end and USB connector at the other end to connect the Console
   interface on the switch with the USB port on PC.

3. On Windows desktop, click Start → All programs → Accessories →
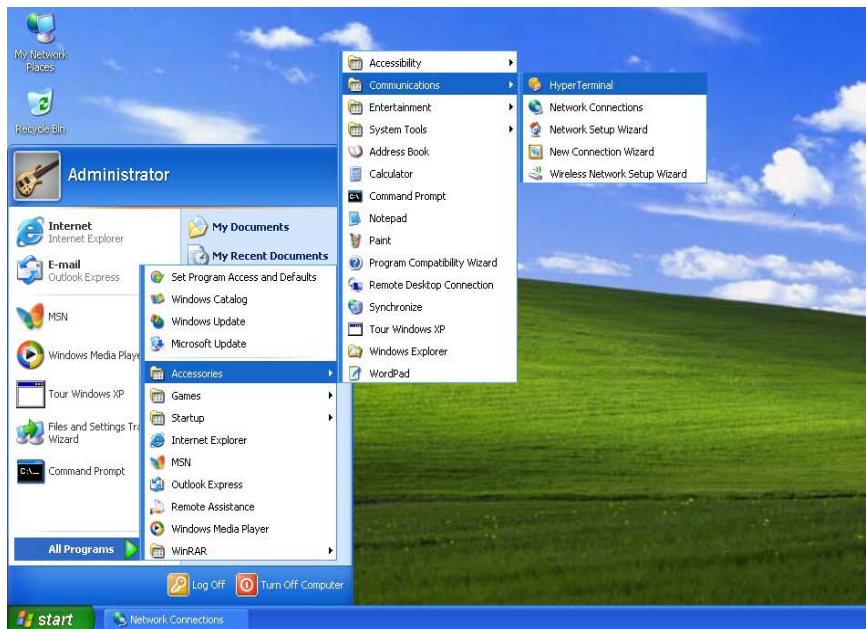   Communications → HyperTerminal.

Figure 17 Hyper Terminal

18

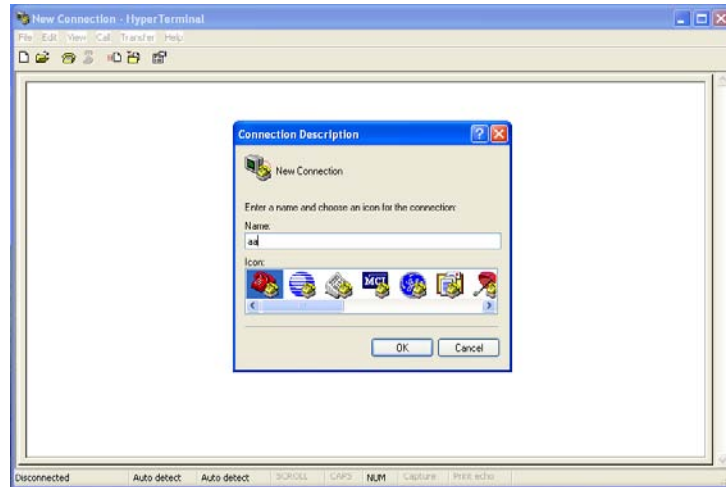4. Build a new connection named "aa"

Figure 18 New Connection

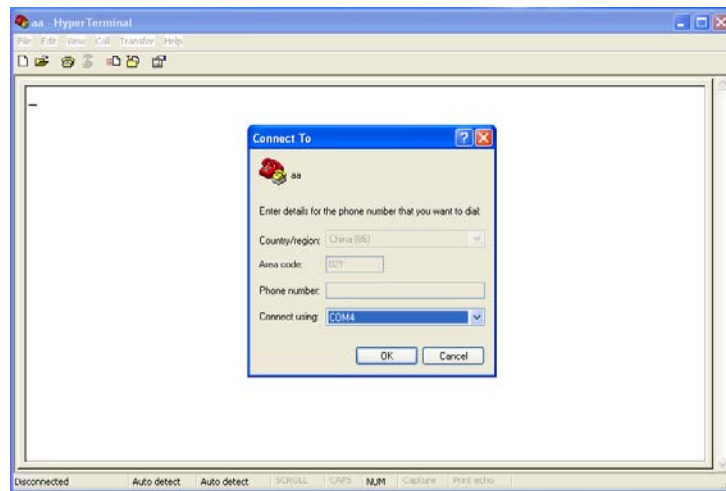5. Select COM port as the connection type.

Figure 19 Choose Port

6. Set the parameters of COM port (Bits per second: 115200, Data bits: 8, Parity: None, Stop bits: 1, Flow control: None)
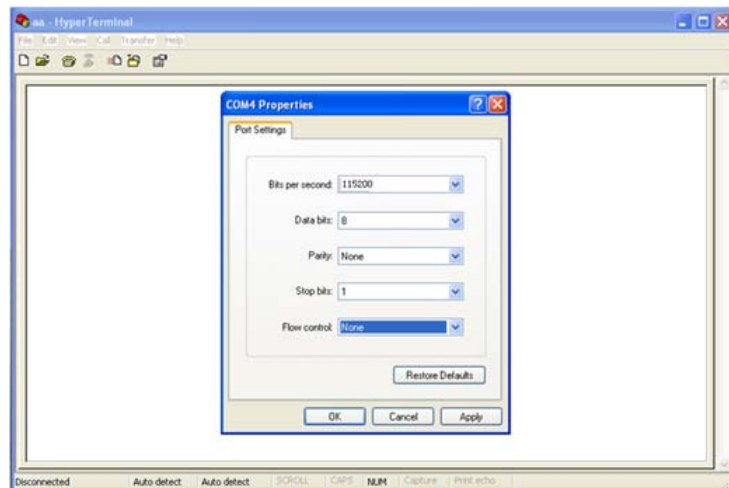
Figure 20 Set COM Parameters

7. Click "OK" to enter the CLI interface, and type in the command "enable" to enter management view, and then type in the command " show interface gps" to search for current information of the module.
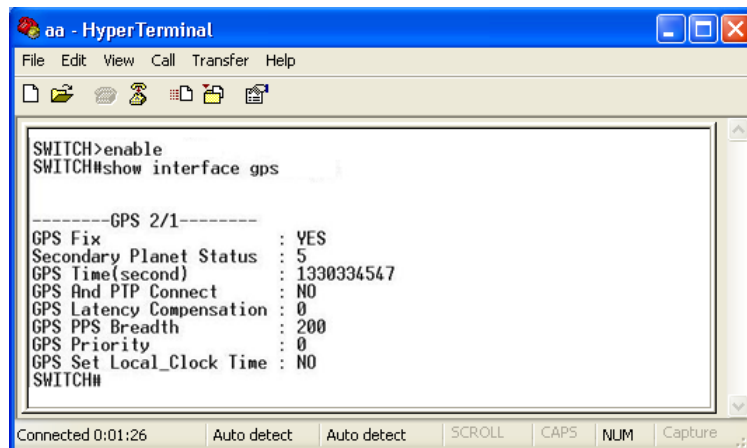

Table 4 describes the display information that appears after clicking the command "show interface gps"

Table 4 Display Information Description

Display Information	Description
GPS Fix	GPS antenna positioned at least 4 satellites.
Secondary Planet Status	the number of the satellites positioned

GPS Time(second)	GPS time
GPS And PTP Connect	Enable/disable the connection of GPS and PTP
GPS Latency Compensation	GPS latency compensation
GPS PPS Breadth	the width of GPS PPS
GPS Priority	the priority of the GPS clock synchronization module
GPS Set Local_Clock Time	Enable/disable the conversion from GPS time to local clock time

6.2 Connected through Ethernet Cable

1. Connect any RJ45 port of the switch with the Ethernet port of a personal computer with a RJ45 cable.

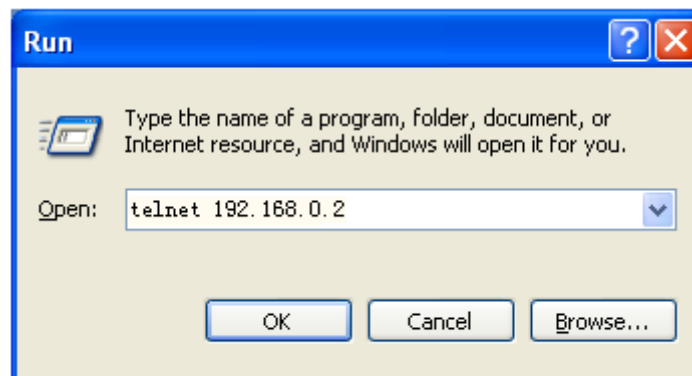2. Open Run window from the start menu, then input "telnet + 'IP address'". The default IP address is 192.168.0.2.

Figure 21 Enter Telnet

3. Click "OK" to enter the Telnet configuration interface as shown in Figure 22. Login with default user name "admin" and password "123", and type in the command "enable" to enter management view, and then type in the command "show interface gps" to search for current information of the module.
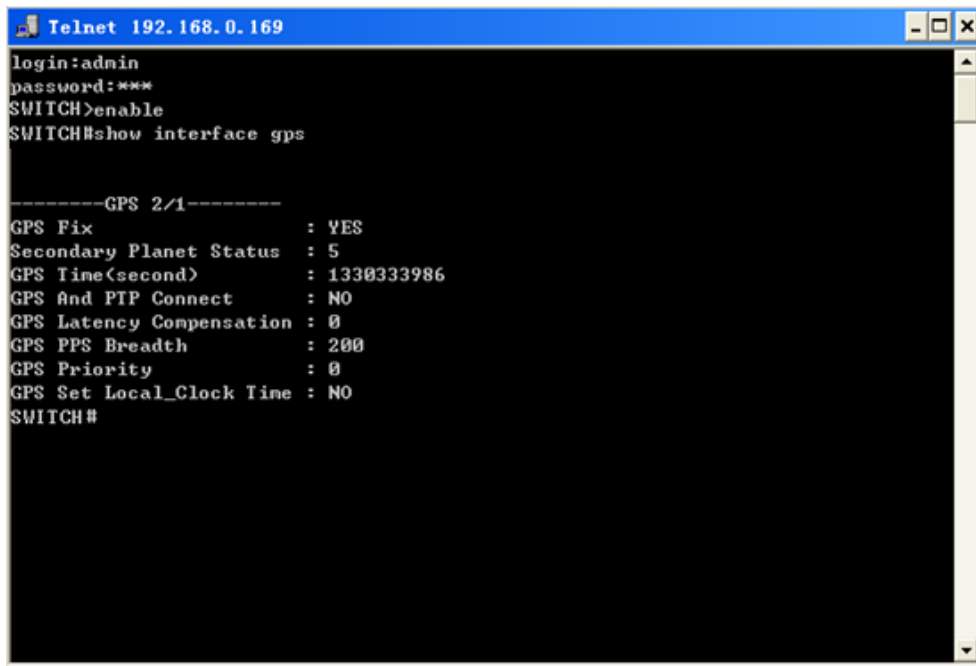
Figure 22 Telnet Configuration Interface

The description of display information that appears after clicking the command "show interface gps" is shown in Table 4.

6.3 Web Access

1. Connect the Ethernet port on the PC to any RJ45 port on the switch.

2. Input the IP address of the current switch in web browser, the default IP is 192.168.0.2. The Web interface access screen will appear as shown in Figure 23 (Take SICOM6028GPT for example); Enter the Web management page as shown in Figure 24 with default user name "admin" and password "123".

Figure 23 Web Interface Access Screen

3. As shown in Figure 24 below, there is a navigation tree menu on the left side; click Gps configuration (in red)→Gps configuration, and the Gps configuration interface will appear on the right; you can make and search for GPS configuration on upper and lower side of the Gps configuration interface separately. Refer to Table 4 for the description of the current GPS configuration information.
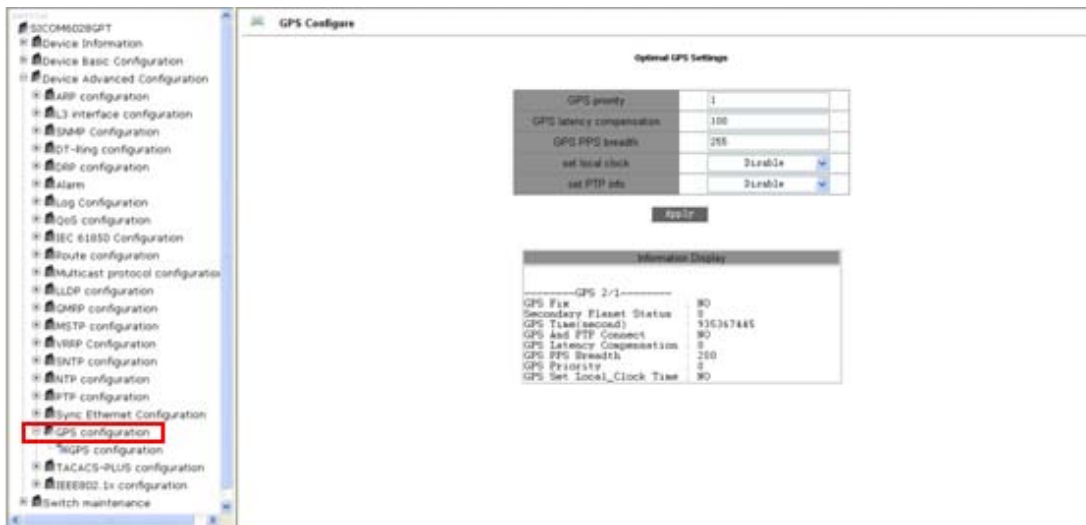

Figure 24 GPS Configuration Interface

Note: We recommend IE version 8.0 or greater.

7 Product Configuration Information

Table 5 Product Configuration

Model	Interface Description
SM6.6-GPS-OI-0.5U	GPS clock synchronization module, conversion from GPS signal to PTP, supports one GPS signal input (BNC connector), one PPS output (BNC connector)

Table 6 Product Optional Accessories

Model	Description
DT-GPS-ANT-01	Weatherproof housing GPS Antenna with 5VDC, TNC female connector
DT-SP-01	Surge voltage protector (with one TNC female and one TNC male connector) to be connected to the coaxial cables of GPS antenna.
DT-XL-LMR400-TNC-BNC-20m	20-meter low-loss RF coaxial cable with one TNC male connector and one BNC male connector
DT-XL-LMR400-TNC-BNC-2m	2-meter low-loss RF coaxial cable with one TNC male connector and one BNC male connector
DT-ZJQ-BNC-TNC-01	Adapter for low-loss RF coaxial cable with one BNC female connector and one TNC female connector

8 Basic Features and Specifications

● Physical Characteristics

Input: one GPS signal input

Port Connector: BNC

Receiver: 14 channels GPS C/A coding receiver

- Environment Limits

   Operating Temperature: 0℃~+50℃

   Storage Temperature: -40℃~+85℃

   Ambient Relative Humidity: 5%~95% (non-condensing)

- Sensitivity

   Tracking Sensitivity: -160 dBm

   Acquisition Sensitivity: -155 dBm

- Frequency

   1575.42MHZ±1.023MHZ

- Power Consumption

   4.5W (at starting up)

   3W (operating)

- Weight

   300g

- Warranty

   5 years

For more information about KYLAND products, please visit our website:

http://www.kyland.cn/