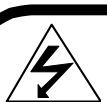
PTP-8080

User Manual

P/N: 900000156
Revision A

For Brandywine Communications products with the following Part Numbers:
03500180X

Safety Warnings



WARNING:
This unit contains lethal AC voltages. Disconnect the unit from the AC supply before removing the cover.

WARNING:
This unit contains dual power supplies. Isolate BOTH power supplied from AC Power before removing the top cover.

WARNING:
The lightning flash with an arrowhead inside of an equilateral triangle is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure. The "dangerous voltage" may be of sufficient magnitude to constitute a risk of electrical shock to people. Do not attempt to repair the unit without first unplugging it.

CAUTION:
The exclamation point inside of an equilateral triangle is intended to alert the user to the presence of important operation and maintenance instructions in the user guide. Only qualified personnel should repair this unit. Several board assemblies contain static sensitive devices. Appropriate procedures must be used when handling these board assemblies.

Revision History

Revision	Date	Comments
A	09/27/2016	Initial release

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1 Introduction

Figure 1 – PTP-8080

The PTP-8080 is a GPS Network Time Server (NTS) for PTP IEEE 1588 that provides secure, accurate and reliable time synchronization for networks and offers integrated fully managed network switch capabilities for 8 (10/100/1000BASE) Gigabit Ethernet ports. The PTP-8080 can be used for data centers, test facilities, military installations, federal or municipal agencies, financial services and technology firms, and many other enterprises which need precision timing to support their network operations.

The PTP-8080 provides exact time over Ethernet either based on the well-established NTP/SNTP protocol or PTP according to IEEE 1588 Std 2008. It not only provides NTP and PTP timing capabilities, but also a variety of other time codes and signals, such as GPS emulation and IRIG-B. The unit also provides backwards compatibility for older timing systems. Such interfaces are normally provided on the network boundaries integrated on relevant SNTP clients or PTP Slave Clocks platforms.

The PTP-8080 is used for applications that require reliable timing to accurately synchronize networks, systems, and devices and to log events with legally traceable time. The PTP-8080 Series offers a broad portfolio of features, including network master clocks (NTP or PTP), monitoring and management capabilities, and a complete software package to deliver high performance timing for network applications and devices. The PTP-8080 is easy-to-install and is fully configurable to customize features, interfaces, ports and protocols to your needs. These features include remote login and file transfer capabilities, which provide the utmost security using industry standard interfaces. A full-suite of network protocols includes SNMP capability, support for enterprise directory servers to authenticate users, internal and external logging and monitoring of error messages through Syslog, DHCP for installation convenience, and IPv4.

The PTP-8080 is a reliable and accurate NTP and PTP Grand Master Clock fulfilling the IEEE 1588 Std 2002 (v1) and IEEE 1588 Std 2008 (v2). The PTP-8080 contains a built-in state-of-the-art GPS receiver that is used as the time base for the GMC clock. The PTP-8080 platform supports 2-step clock modes and either E2E or P2P as the

delay mechanism. This means that all possible PTP profiles can be supported. The platform maximizes PTP performance since all critical PTP functions are implemented in hardware. The switch functionality in the PTP-8080 series offer full management based on HTTP, telnet, CLI or SNMP. Network Redundancy is achieved based on the RSTP protocol. The unit offers a wide operating temperature range: [-40°F to 158°F] / [-40°C to 70°C].

1.1 Specifications

Ethernet LAN ports	
10/100/1000 BASE-TX ports in RJ45 Auto MDI/MDIX	4-8
1000BASE-X SFP slots	4
BNC	
GPS antenna interface	Male BNC connector
OUT1	PPS output signal
10MHz	10MHz output
Technology	
Standards	IEEE 802.3 for 10Base-T IEEE 802.3u for 100Base-TX and 100Base-FX IEEE 802.3z for 1000Base-X IEEE 802.3ad for LACP (Link Aggregation Control Protocol) IEEE 802.1Q for VLAN Tagging IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol) IEEE 802.1X for Authentication IEEE 802.1AB for LLDP (Link Layer Discovery Protocol) IEEE 1588 Std 2008 (PTPv2) RFC 4330 NTP
MAC table	8192 MAC addresses
Priority queues	4
Switch properties	Store-and-forward and full wire speed on all ports
Security Features	Enable/disable ports, Port based network access control (802.1x) VLAN (802.1Q) to segregate and secure network traffic Radius centralized password management SNMPv3 encrypted authentication and access security
Network redundancy	RSTP
Management	HTTP, telnet, CLI and SNMP v1/v2/v3 or IPSet tool.
Other protocols	Multicast filtering based on: - IGMP snooping v2 or v3 - Up to 1024 multicast filters can be active VLAN (802.1Q) with VLAN tagging and GVRP Port configuration, status, statistics, monitoring, security
Console ports	2 x RS-232 in RJ45 connector – service port for PTP- and switch CPUs. Baud rate setting: 9600bps, 8, N, 1 for switch management 115200bps, 8, N, 1 for PTP server
NTP	
NTP clock modes	Client or server; client can be used in combination with PTP MC operation (kind of PTP BC operation), where NTP client is the time base of the switch.
NTP server	
Accuracy	1ms
IEEE1588	
PTP clock modes	GMC, TC or SC
PTP versions	PTPv2
Delay mechanism	End-to-End(E2E) or Peer-to-Peer (P2P
1 step- or 2 step clock	2-step only
Accuracy	20ns
Power	
Input Power	100-240AC
Power Consumption (Typ.)	20 Watts (typical)
Physical Characteristics	
Enclosure	IP30, Aluminum case
Dimension (W x D x H)	443.7(W) x 260(D) x 44(H) mm (17.47 x 10.24 x 1.73

	inch.)
Weight (g)	2500g
Installation	19” mounting.
Environmental	
Storage Temperature	[-40°F to 185°F] / [-40°C to 85°C]
Operating Temperature	[-40°F to 158°F] / [-40°C to 70°C]

2 Setup

Remove the PTP-8080 from the shipping carton. The following items should be included in the shipment:
1x PTP-8080
2x Power supply cables
1x CD-ROM containing User Manual and Utility Software
1x GPS Antenna and 100' cable if the GPS option is included

2.1 Installation

2.1.1 Mounting

The PTP-8080 can be installed into a 19" rack mount cabinet using rack slides. Slides are installed using 10-32 UNF-2B hardware.
Optional Rack Mount Slides:

P/N 002000123, SLIDE, RACK, 24", 21" TRAVEL, 85 LB
P/N 002000150, SLIDE, RACK, 28", 27" TRAVEL, 80 LB

Original Manufacturer: General Devices Chassis Trak Type C300.

2.1.2 Power

Insert the power cord of the PTP-8080 into an electrical socket to power up the unit.

If dual redundant power is required, connect both power sources to independent power sources.

2.1.3 Ethernet

Connect one end of an Ethernet patch cable to Ethernet port #1 located on the Front of the unit. Connect the other end of the Ethernet cable to the network with an Ethernet hub or switch. Connect the additional ports to the network as needed.

2.1.4 Input Reference

Connect any external input references to the appropriate BNC connector. The PTP-8080 is capable of receiving an input reference from GPS, IRIG-B, or NTP.

3 Configuration

3.1 Initial Setup

3.1.1 Installing the Discovery Utility

For information on installing or using the Discovery software provided with the PTP-8080, please see the user manual for the Discovery application. (P/N 900000157)

3.1.2 Connecting to the PTP-8080

Either use the Discovery utility, or enter the IP Address of the PTP-8080 retrieved via the Discovery utility into a web browser window; this will open the PTP-8080 control webpage.

3.2 Status

3.2.1 System Information

The System Information page under the status folder lists inventory information about the unit, as well as a graphical representation of which Ethernet ports are currently being used.

An Ethernet port that is colored black indicates that there is no cable connected to them.
An Ethernet port that is colored green indicates that there is currently a cable connected to it and it is successfully connected to a network.

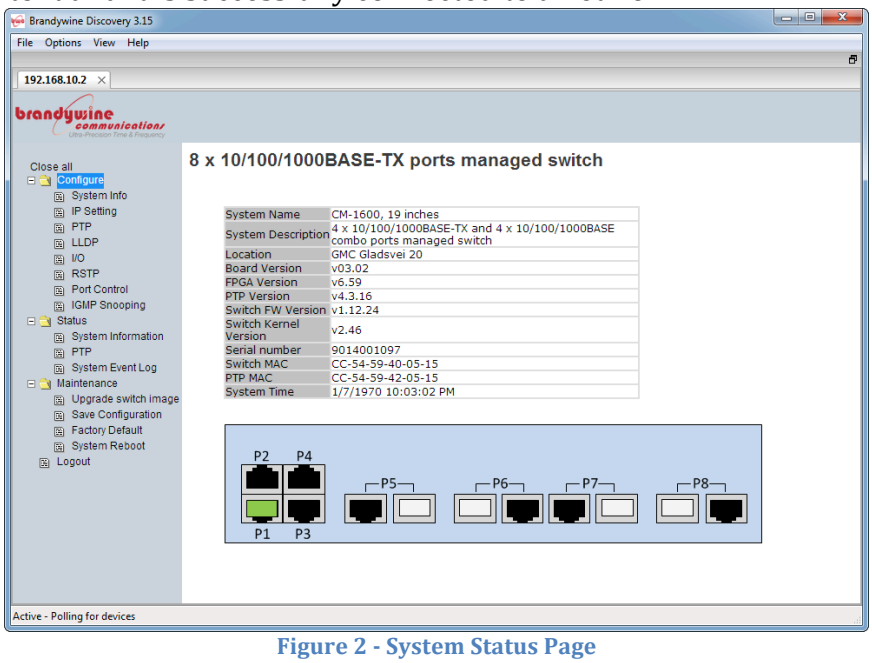


Figure 2 - System Status Page

3.2.2 PTP Status

The PTP status page shows the current state of the PTP stack, as well as the current end to end path delay. The PTP-8080 is designed to automatically measure and compensate any propagation delay in a PTP network.

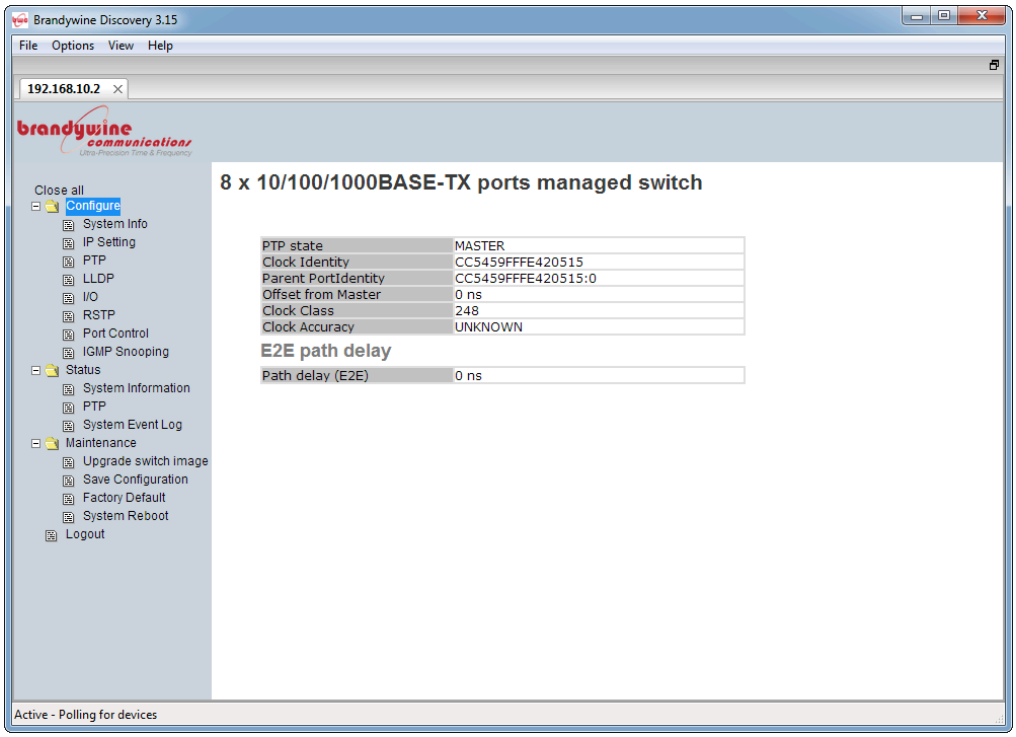


Figure 3 - PTP Status Page

3.2.3 System Event Log

The system event log page shows a listing of all fault messages that the system has generated while running for diagnostic purposes.

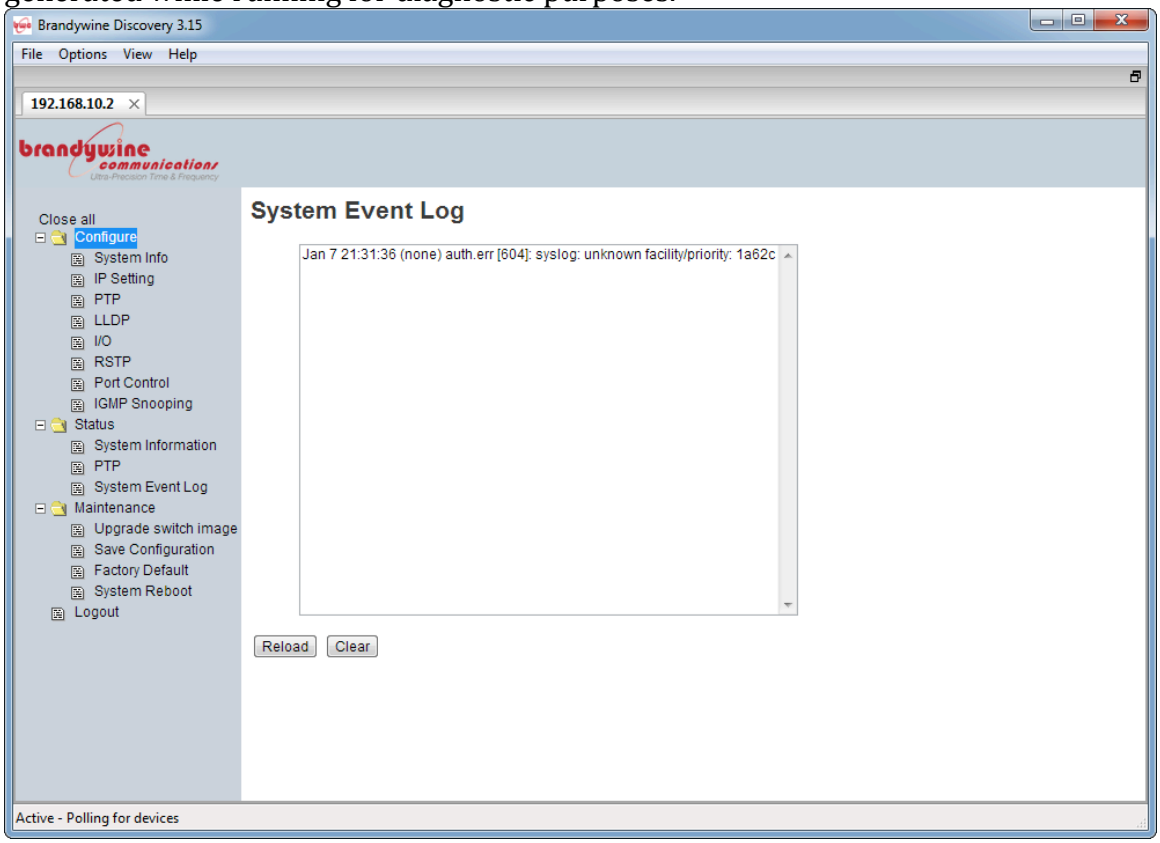


Figure 4 - System Event Log Page

3.3 Configuration Pages

3.3.1 System Information

The System Information configuration page allows the user to edit information fields for the purposes of unit identification. Editable fields include: System Name, System Location, System Contact, and Inventory ID. These fields are displayed on the System Information Status page, and are intended for use in identifying which physical unit is connected when accessed over a network.

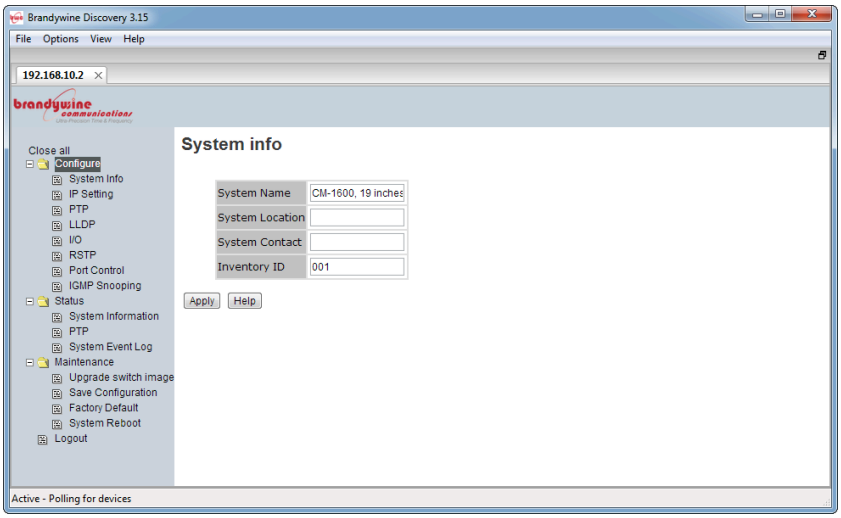


Figure 5 - System Information Configuration Page

3.3.2 IP Settings

The IP Settings page allows the user to adjust the IP address, Subnet Mask and Gateway address of the PTP-8080, as well as the option to enable DHCP. Brandywine Communications recommends the use of a Static IP address for ease of management purposes. Please note that the PTP-8080 uses two IP addresses, one for the network switch, which is not accessible for the user, and a separate one for the PTP and web server. Both the PTP server and the network switch must be in the same subnet so that both parts of the PTP-8080 can talk to each other.

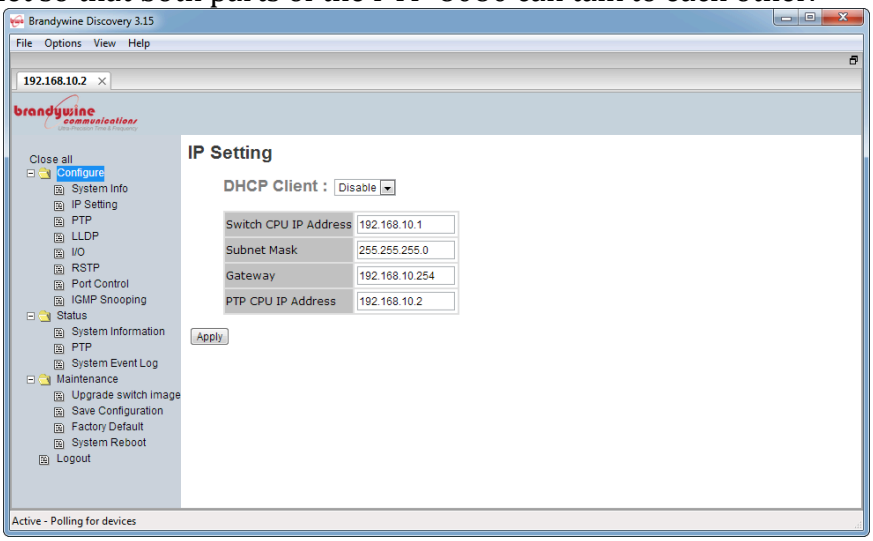


Figure 6 - IP Address Configuration Page

3.3.3 PTP Settings

The PTP Settings page allows the use to adjust and configure the PTP-8080's PTP service. More detailed information about each of these settings can be found by using the PTP-8080's built in help menu.

Two step: Setting this to TRUE runs the PTP clock in two step mode. On certain versions of the PTP-8080, this can be disabled to allow it to run in one step mode.
Priority 1: This field is used to determine the precedence of the available PTP servers, so that PTP clients can correctly determine a Grandmaster. This can be any value from 0 to 255.
Priority 2: This field is used to determine the precedence of the available PTP servers, so that PTP clients can correctly determine a Grandmaster. This can be any value from 0 to 255.
Domain Number: Defaults to 0. This determines which PTP domain the PTP-8080 is operating in. For most applications, this is 0.
Slave only: When set to TRUE, the unit will only receive time from another PTP source on the network. If this value is set to TRUE, the clock can never take the role of a network grandmaster.
Sync interval: Determines the interval period in seconds for how frequently the unit synchronizes with other PTP sources.
Announce interval: Determines how frequently in seconds the PTP-8080 announces to the network that it is an available PTP server for clients to connect to.
Delay request interval: Determines the interval in seconds between delay request messages going from the PTP slave to the PTP master.
Path delay request interval: Determines how frequently in seconds the PTP-8080 polls the network to determine the propagation delay from the PTP-8080 to its peer partners.
Delay response logMessageInterval: This is the value inserted into logMessageInterval of a delay response packet going from the master back to the slave. Note that this value is a function of the sync interval since it cannot be slower than 32 times the sync interval or faster than the sync interval. This parameter only has meaning when the PTP-8080 operates as the grandmaster.
Disable Ordinary Clock (TC only): When this is set to TRUE, the PTP-8080 will only operate as a TC switch, with no master or slave functionality.
Time Source: Determines the time input source for the PTP service to use. This can either be GPS, IRIG, Internal Oscillator or another PTP source on the network. Please note that setting the unit to "External GPS" or switch it to a different source from "External GPS" requires a reboot of the PTP-8080.
UTC Offset: Use this field to set the offset from UTC time in seconds. This is only valid if the PTP-8080 is running with the internal oscillator as a valid source.
PTP Version: This field determines what PTP version the PTP-8080 will use in operation. Please not that PTP version translation is not supported by the PTP-8080 and so the PTP version setting must match the rest of the network.
Delay Mechanism: Determines how the propagation delay is measured, either End to End (E2E) or Peer to Peer (P2P).

Network Protocol: Whether the PTP-8080 connects to the network using IPv4 or IPv6. Currently, only IPv4 and Ethernet layer 2 are supported.

On the right hand side of the PTP configuration page, is the option to enable or disable PTP on each of the Ethernet ports.

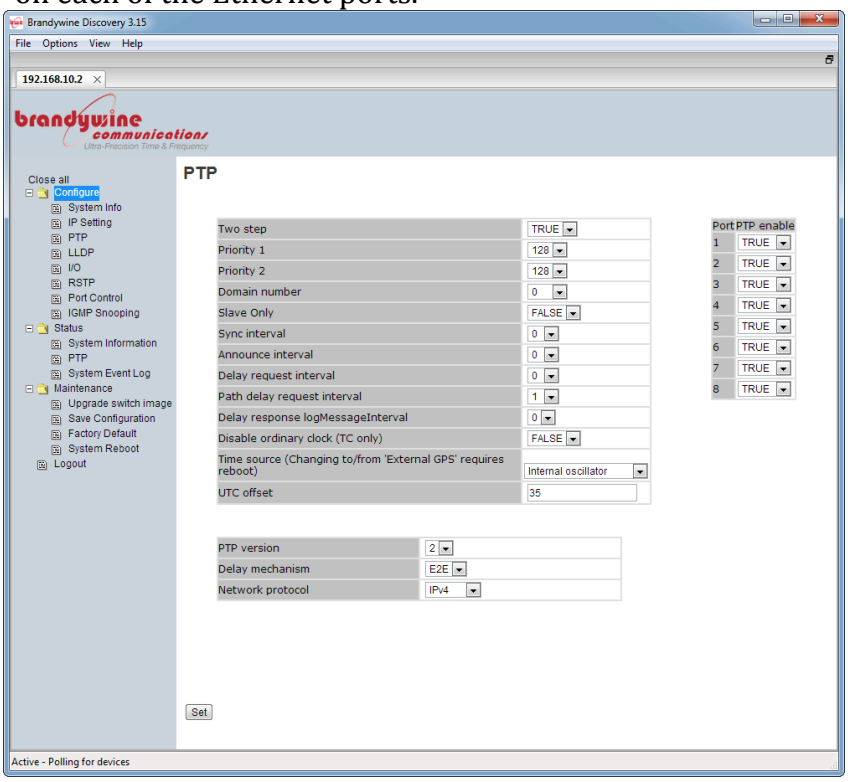


Figure 7 - PTP Settings page.

3.3.4 LLDP Settings

The LLDP settings page enables the user to enable Link Layer Discovery Protocol on the PTP-8080, as well as adjust the interval for when it announces itself over the network.

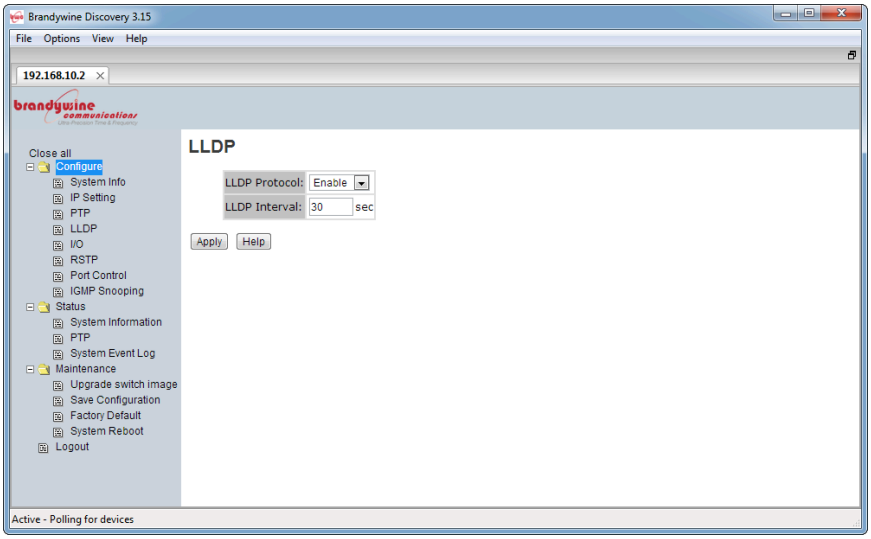


Figure 8 - LLDP Configuration page

3.3.5 I/O Settings

The I/O settings page allows the user to adjust various input and output settings for the PTP-8080. The PTP-8080 is capable of outputting 10MHz from a dedicated BNC connector, a dedicated IRIG-B connector, or 1PPS, IRIG-B (DC Level Shift), or 100Hz over a programmable BNC connector. In addition, the PTP-8080 can support up to four additional programmable outputs via the terminal block connector interface.

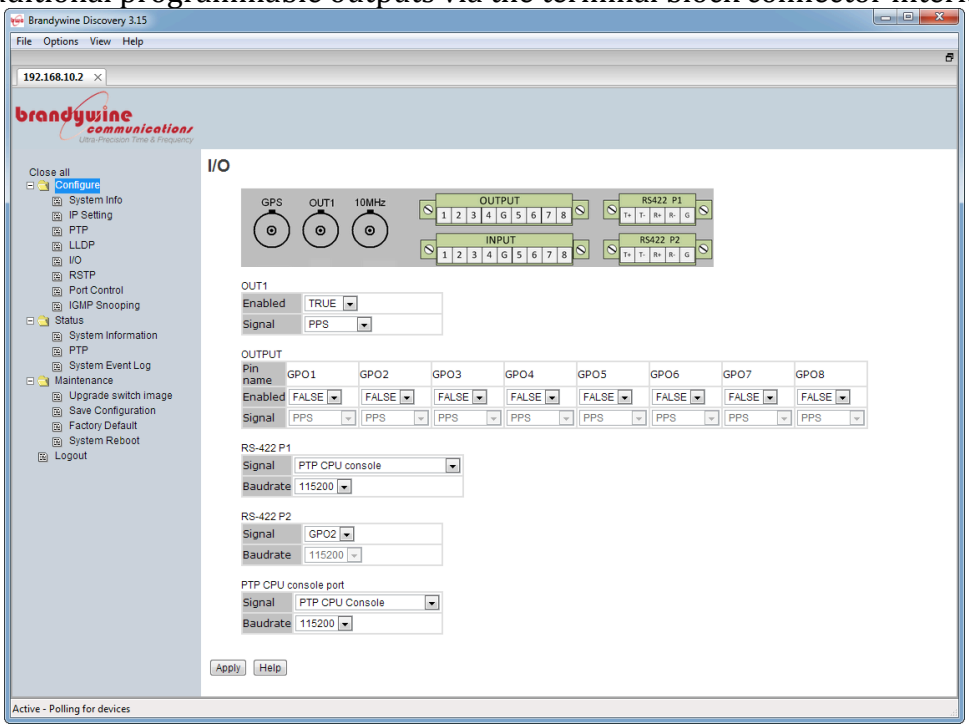


Figure 9 - I/O Settings Page

3.3.6 RSTP Settings

The RSTP Settings page allows the user to enable or disable RSTP mode for the PTP-8080, as well as set which version of RSTP to use. The PTP-8080 can use Rapid Spanning Tree Protocol" to quickly map out the network it's connected to and compensate for any changes in network topology. Brandywine recommends that RSTP mode be enabled. Please note that the PTP-8080 is a network switch and it is recommended that it not be looped back from another network switch or have two of its own ports connected to each other, in order to prevent a traffic storm.

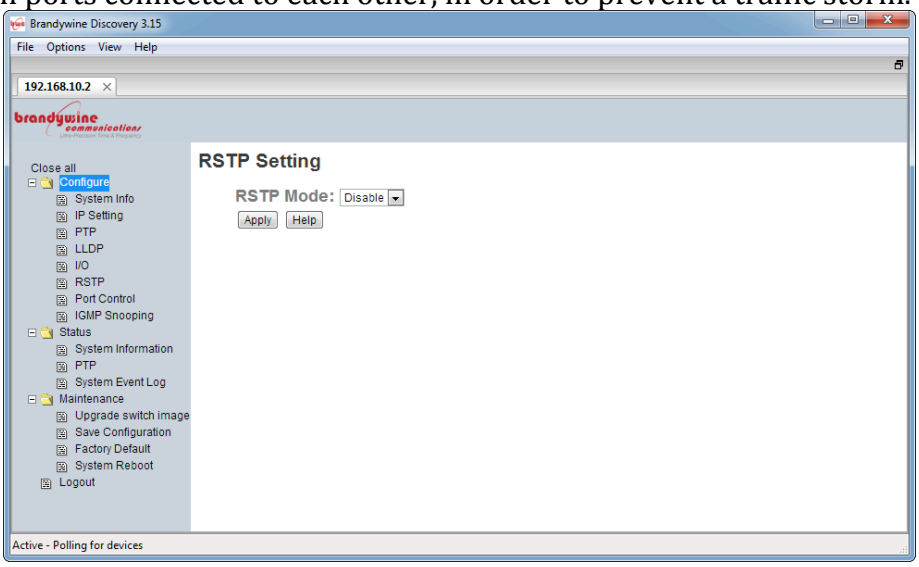


Figure 10 - RSTP Settings Page

3.3.7 Port Control Settings

The port control settings page enables the user to enable or disable each of the numbered PTP ports on the PTP-8080. In addition, the speed and duplex of each port can be set from the page. Please note that the PTP-8080's network ports are 10/100/1000BaseT ports and for most use cases they should be set to "Auto Negotiation" for RJ-45 copper use. When SFP is used, the speed must be set to "1000 Full." If it becomes necessary to force the PTP-8080 to run at a specific speed and duplex setting for other reasons, that can be set from here.

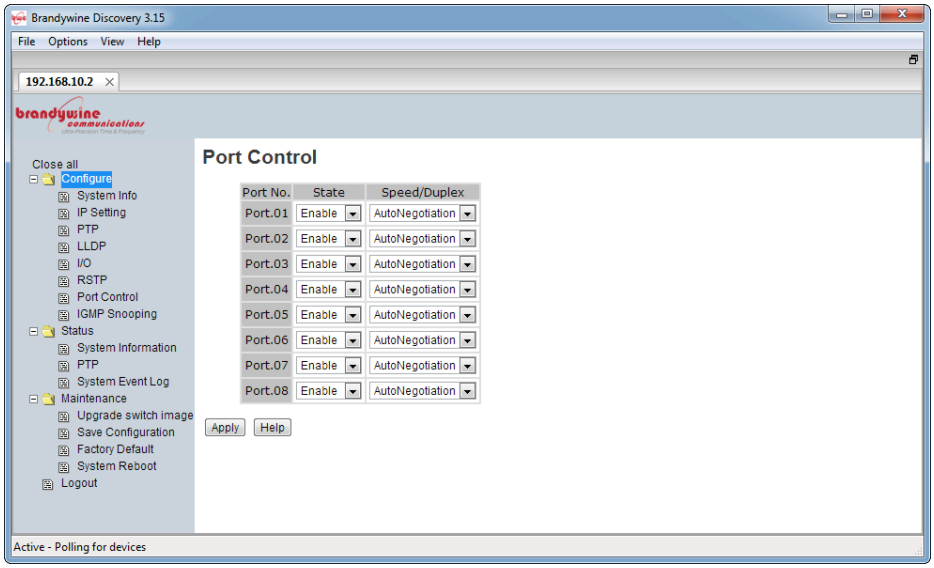


Figure 11 - Port Settings Page

3.3.8 IGMP Snooping

IGMP snooping allows the PTP-8080 to passively listen in to IGMP communications between hosts and routers as a way to keep track of changes in network topology in real time in order to efficiently map IP multicast streams, filtering them from links that don't need them in order to improve the efficiency of the PTP-8080.

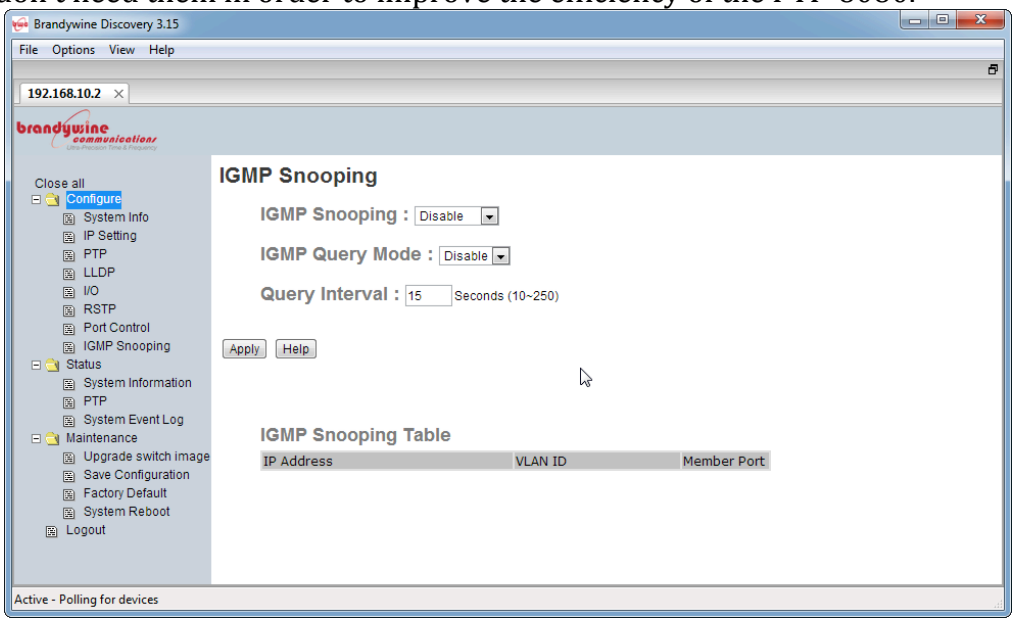


Figure 12 - IGMP Snooping Configuration Page

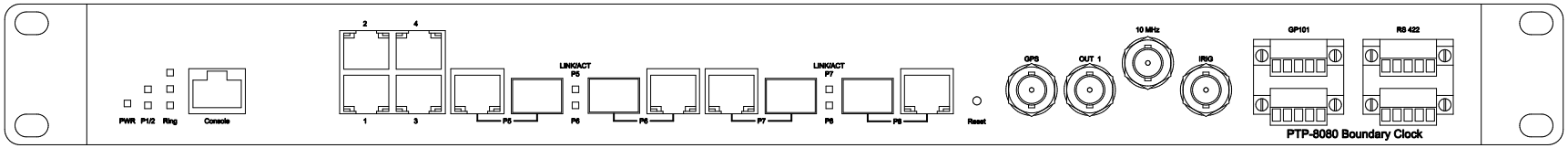
4 Support Information

All Brandywine Communications products come with a one-year warranty.

If the unit is still exhibiting problems not covered by the above troubleshooting guide, contact us for technical support at support@brandywinecomm.com or call us at 714-755-1050.

If it becomes necessary to return the unit to the factory for repairs, call us at 714-755-1050 extension 113 to arrange an RMA.

5 Outline Drawings



FRONT VIEW