User's Manual

iRBX6GF

Intelligent 6 Port HSR/PRP Ethernet Switch
IEC 61850 and IEEE 1613 Compliant

http://is5com.com/products/irbx6gf/

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iS5 COMMUNICATIONS
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FCC STATEMENT AND CAUTIONS

Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use, and radiate radio frequency energy. If not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will at his/her own expense, be required to correct the interference.

This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

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Changes or modifications not expressly approved by iS5 Communications Inc. could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the equipment.

Should this device require service, please contact support@iS5Com.com.

Caution: Physical Access

This product should be installed in a restricted access location. Access should only be gained by qualified service personnel or users who have been instructed on the reasons for the restrictions applied at the location, and any precautions that have been taken. Access must only be via the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

1. GETTING STARTED

1.1 About iRBX6GF

The iRBX6GF ("the Switch") is an Intelligent 6 Port Ethernet switch compliant with IEC 61850 and IEEE 1613 applications, with DIN rail and panel mount options, and optimized for harsh environments. The Switch provides redundant port for critical and high-availability networks. It supports both high-availability seamless redundancy (HSR, IEC 62439-3 Clause 5 [3]) and parallel redundancy protocol (PRP, IEC 62439-3 Clause 4 [3]).

Both of those standards provide redundant patch with no single point of failure and zero time to recover in case of failure. Single network faults in the ring will not result in any frame loss. The network is fully operational during maintenance, and any device can be disconnected and replaced without breaking network connectivity.

The Switch can protect mission-critical applications from network interruptions or temporary malfunctions with this fast recovery technology.

The iRBX6GF supports a wide range of operating temperature of -40°C to +75°C.

1.2 References

[1] 802.1Q *Virtual LANs* (dot1q, VLAN tag)

[2] RFC 1901, *Introduction to Community-Based SNMPv2*

[3] IEC 62439-3 *Industrial communication networks - High availability automation networks - Part 3: Parallel Redundancy Protocol (PRP) and High-availability Seamless Redundancy (HSR)*

[4] IEEE 1588 *Precision Clock Synchronization Protocol for Networked Measurement and Control Systems*

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[8] IEEE 802.1AB *Station and Media Access Control Connectivity Discovery (LLDP)*

[9] Simple Network Management Protocol, Protocol Details, https://en.wikipedia.org/wiki/Simple_Network_Management_Protocol Online, Accessed on Mar 4, 2019

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1.3 Acronyms

The following table shows all acronyms used in this document.

Acronym	Explanation
CLI	Command Line Interface
DNS	Domain Name Server
HSR	High-availability Seamless Redundancy
IP	Internet Protocol (IP)
LLDP	Link Layer Discovery Protocol
LLDP- MED	LLDP - Media Endpoint Discovery
LLDPDU	LLDP Data Unit
MIB	Management Information Base
NCO	Numerically Controlled Oscillator's
NTP	Network Time Protocol
OID	Object Identifier
PDU	Protocol Data Unit
PTP	Precision Time Protocol
P2P	Point-To-Point (link)
RSTP	Rapid Spanning Tree Protocol
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
TLV	type-length-value
TTL	Time to live
SSH	Secure Shell
UDP	User Datagram Protocol
UTC	Coordinated Universal Time
VACM	View based Access Control Model

1.4 Software Features

- IEEE 802.1Q for VLAN Tagging compliant
- IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol)
- IEEE 1588v2 PTP clock synchronization
- HSR (High-availability Seamless Redundancy)
- PRP (Parallel Redundancy Protocol)
- NTP Time Synchronization
- Precision Time Protocol (PTP)
- Multi User support (Admin/Guest)
- SNMP support
- SSH Support
- Login Banner for CLI and WebUI
- Inband and dedicated Management interface
- LLDP support
- WebUI Management

1.5 Hardware Specifications

Supports:

- 2 Combo ports: 2 x 10/100/1000Base-T(X) RJ45 or 2 x 100/1000Base-X SFP, and 4 x 100/1000 SFP
- Single HSR/PRP Redundancy Box (RedBox)
- IEEE 1588 v2 (one-step command) transparent clocks
- PPS and IRIG-B ports (future implementation)
- Available with dual power supplies
- DIN rail or wall mount design
- Rigid IP-40 galvanized metal housing
- Compliant with IEC 61850-3 Ed. 2 and IEEE 1613
- 4 ports 100/1000 Base-X and 2 ports of (10/100/1000 Base-TX or 100/1000Base-X)
- Operating temperature: 40°C to +75°C
- Storage temperature: 40°C to +85°C
- Operating humidity: 5% to 95%, non-condensing
- Dimensions: see section Physical Characteristics

2. HARDWARE INSTALLATION

2.1 DIN-Rail Installation

Each switch has a DIN-Rail bracket on the rear panel. The DIN-Rail bracket helps secure the switch on to the DIN-Rail.

2.2 Mounting on DIN-Rail

Step 1: Tilt the switch and position the top 2 catches of the metal bracket onto the top of the DIN-Rail.

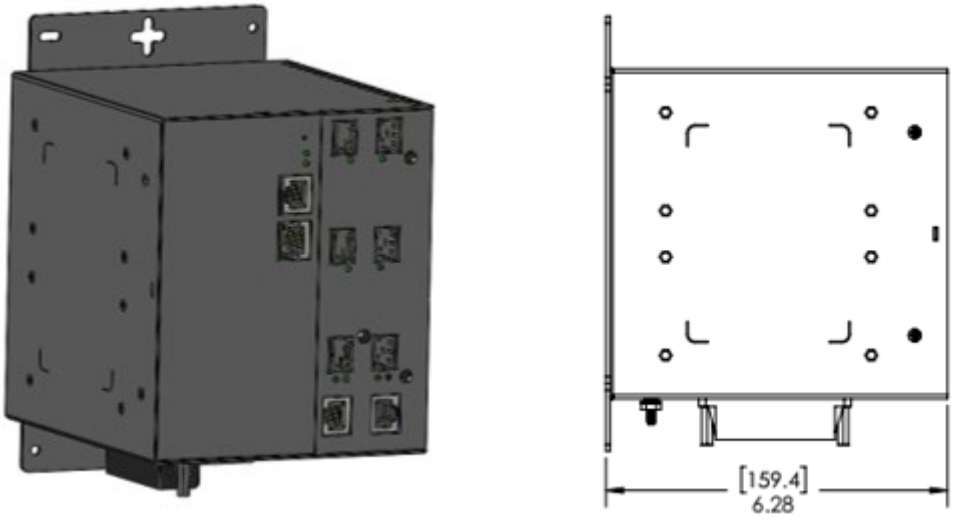
Step 2: Push the bottom of the switch toward the DIN-Rail until the bracket snaps in place.

2.3 Panel Mount Installation

The switch can also be panel or wall mounted. The following steps show how to mount the switch on a wall or panel.

2.3.1 Mounting on Wall or Panel

Option 1: Fix mounting brackets to the side of switch using the 4 screws included in the package.



Option 2: Fix mounting brackets to back of switch using 4 screws included in the package.

Note: To avoid damage to the unit when mounting the panel, use the screws provided.

3. HARDWARE OVERVIEW

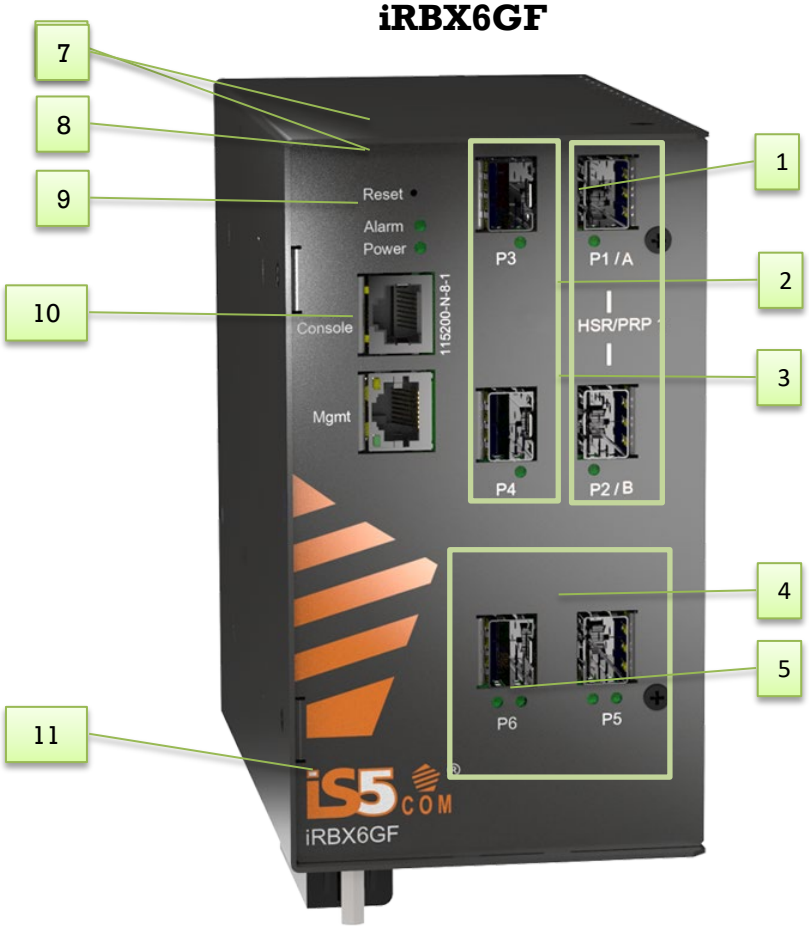
3.1 Front Panel

The following table describes the labels that are used on the iRBX6GF series.

Table 1 – iRBX6GF Front Panel

Port	Description
SFP ports	4 x 100 /1000Base-X SFP ports
Combo Ports	2 x 10/100/1000Base-T(X) or 2 x 100 /1000Base-X SFP ports
Management Port	1 x 100Base-T(X) port
Console	An RS-232 Serial interface; use RS-232 with RJ-45 connector to manage switch.

iRBX6GF



1. 100/1000 Base-X SFP ports (Ports 1 &2)
2. 100/1000 Base-X SFP ports (Ports 3 &4)
3. LED for SFP ports link status
4. LED for Combo ports link status
5. Ports 5&6
6. Reset button. To reset, push the button for 3 seconds
7. LED for Alarm. When the light on, it means failure
8. LED for Power. When the Power is UP, the green led will be light on
9. Console port
10. Management port
11. Power connector

3.2 Front Panel LED

Table 2 – Front Panel LEDs

LED	Color	Status	Description
Power	Green	On	DC power module up
Alarm	Red	On	Alarm triggered
10/100/1000Base-T(X) Fast Ethernet ports			
LNK	Green	On	Port link up
ACT	Green	Blinking	Data transmitted
Full Duplex	Amber	On	Port works under full duplex
SFP (not shown on picture below)			
LNK	Green	On	Port link up
ACT	Green	On	Data transmitted

Note: LEDs on P1,2,3,4 are always ON. No traffic activity indication.

3.3 Network Ports and Interfaces

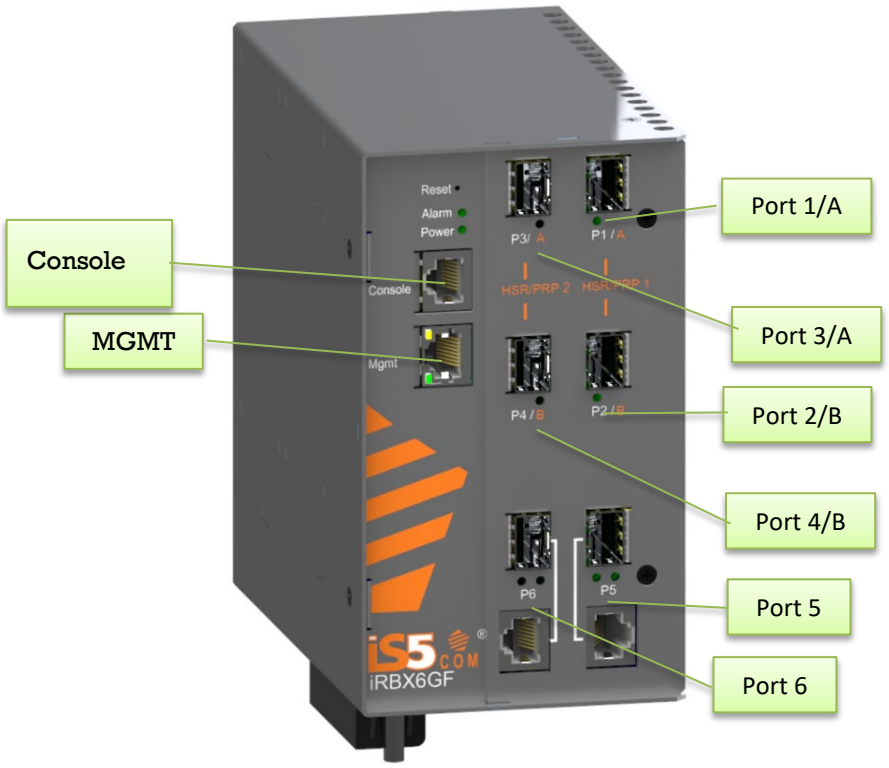


Table 3 – Port Naming

iRBX DIN Rail Face Panel Port Names	Internal Port Names	Description	Operation Mode
P1/A	**PORT 1**	Redundancy port A	HSR/PRP
P2/B	**PORT 2**	Redundancy port B	HSR/PRP
P3/A*	**PORT 3**	Inter-link port	Switching Port
P4/B*	**PORT 4**	Inter-link port	Switching Port
P5	**PORT 5**	(I) Inter-link port**	Switching Port
P6	**PORT 6**	Inter-link port	Switching Port
MGMT	**MGMT**	Management Port	Management Port

Note: **The ports P3/A and P4/B are not supporting HSR/PRP functionality.*

*** Port 5 is Interlink port when HSR-PRP-A/B coupling mode is used*

3.4 Bottom View Panel

The Phillips Screw Terminal Block, which is located on the bottom of the unit, has Phillips screws with compression plates that allow bare wire connections or crimped terminal lugs. To ensure secure and reliable connections under severe shock or vibration, the use of #6 size ring lugs is recommended. The terminal block comes with a safety cover that must be removed before connecting any wires. The cover must be reattached after wiring for ensuring safety of personnel.

The iRBX6GF series support dual redundant power supplies (PWR1 and PWR2). There are 3 options:

- LV: Dual Input 9-36VDC
- MV: Dual Input 36-75VDC
- HV: Input 110-370VDC or 90-264VAC.

There are also connections for Failsafe Relay. The Failsafe Relay is rated 1A @ 24VDC. The connections to the terminal block are listed in the table below.

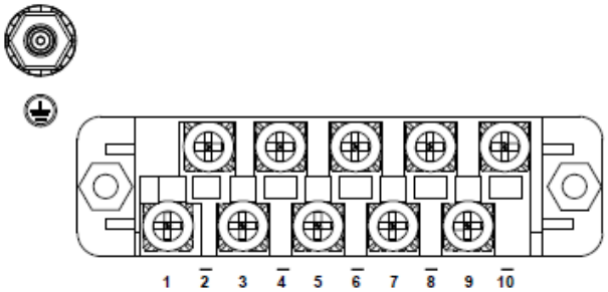


Table 4 – Power Connection

Table 5 - Revision 2000-0001-B01 and older

J2 Pinout	2000-0001-B01 (1500-0011-A02 PCBA)	Connection Details
Pin -1	PWR1 (L)—Live	Connect to the (Live) of DC Power Supply 1 or (Live) terminal of an AC power source.
Pin - 2	PWR1 (G)—Ground	DC Power Supply 1 ground connection or AC power ground connection
Pin - 3	PWR1 (N)—Neutral	Connect to the Neutral of the DC Power Supply 1 or (Neutral) terminal of an AC power source.
Pin - 4	G—Chassis Ground	Connected to the ground bus for DC inputs or Safety Ground terminal for AC Units; Chassis Ground connects to both power supply surge grounds via a removable jumper.
Pin - 5	PWR2 (L)—Live	Connect to the (Live) terminal of Power Supply 2 or backup DC power source.
Pin - 6	PWR2 (G)—Ground	Power supply 2 or backup DC power source ground connection
Pin - 7	PWR2 (N)—Neutral	Connect to the (Neutral) terminal of Power Supply 2 or backup DC power source.
Pin - 8	FAIL Open	Fault Relay
Pin - 9	FAIL RLY	Fault Relay
Pin - 10	FAIL Close	Fault Relay

Table 6 - Revision 2000-0001-C01 and newer

J2 Pinout	2000-0001-C01 (1500-0011-801 PCBA)	Connection Details
Pin -1	PWR1 (L)—Live	Connect to the (Live) of DC Power Supply 1 or (Live) terminal of an AC power source.
Pin - 2	PWR 1 (N)—Neutral	Connect to the Neutral of the DC Power Supply 1 or (Neutral) terminal of an AC power source.
Pin - 3	PWR1 (G)—Ground	DC Power Supply 1 ground connection or AC power ground connection.
Pin - 4	PWR2 (G)—Ground	Power supply 2 or backup DC power source ground connection
Pin - 5	PWR2 (L)—Live	Connect to the (Live) terminal of Power Supply 2 or backup DC power source.
Pin - 6	PWR2 (N) —Neutral	Connect to the Neutral of the DC Power Supply 2 or (Neutral) terminal of an AC power source.
Pin - 7	G—Chassis Ground	Connected to the ground bus for DC inputs or Safety Ground terminal for AC Units. Chassis Ground connects to both power supply surge grounds via a removable jumper.
Pin - 8	FAIL Open	Fault Relay
Pin - 9	FAIL RLY	Fault Relay
Pin - 10	FAIL Close	Fault Relay

Chassis Ground Connection

The iRBX6GF's chassis ground connection, which is located next to the terminal block, uses a #6-32 screw. We recommend terminating the ground connection using a #6 ring lug and a torque setting of 15 in.lbs (1.7Nm).

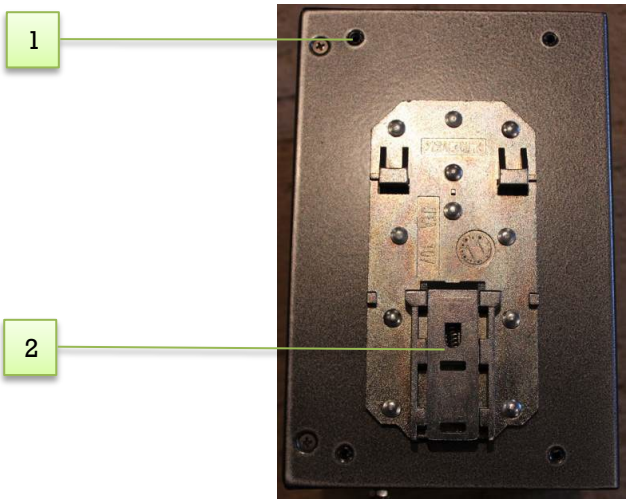
- *100-240VAC rated equipment: A 250VAC appropriately rated circuit breaker must be installed.*
- *Equipment must be installed according to the applicable country wiring codes.*
- *When equipped with a HI voltage power supply and DC backup,*

- *120-370VDC rated equipment: A 370VDC appropriately rated circuit breaker must be installed.*
- *A circuit breaker is not required for DC power supply voltages of 10-48VDC.*
- *For Dual DC power supplies, separate circuit breakers must be installed and separately identified.*
- *Equipment must be installed according to the applicable country wiring*

3.5 Rear Panel

The components on the rear of the iRBX6GF are as shown below:

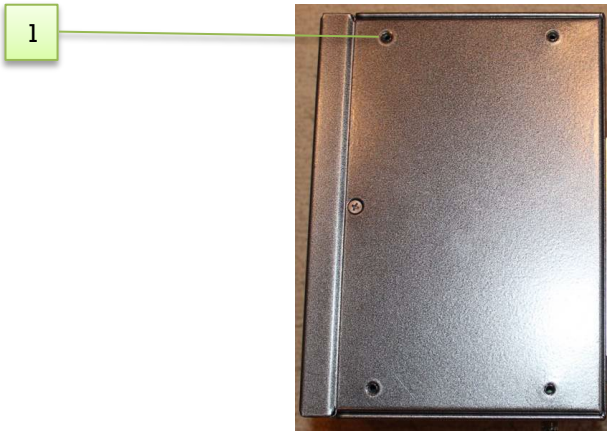
1. 4 Holes for the screws for the wall mount kit
2. DIN-Rail mount



3.6 Side Panel

The components on the side of the iRBX6GF are shown below:

1. Holes for the screws (4) for the wall mount kit



4. CABLES

4.1 Ethernet Cables

The iRBX6GF switch has standard Ethernet ports. According to the link type, the switches use CAT 3, 4, 5, and 5e UTP cables to connect to any other network device (e.g. PCs, servers, switches, routers, or hubs). For cable types and specifications, refer to the following table.

Table 7 – Port Numbering

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328ft)	RJ-45
1000BASE-T	Cat. 5/Cat. 5e 100-ohm UTP	UTP 100 m (328ft)	RJ-45

4.1.1 Pin Assignments

With 10/100/1000BASE-T(X) cables, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data. All pin assignments are as follows:

Table 8 – 10/100 Base-T(X) Line Pin Assignments

Pin Number	Assignment
1	TD+
2	TD-
3	RD+
4	Not used
5	Not used
6	RD-
7	Not used
8	Not used

Table 9 – 1000 Base-T Line Pin Assignments

Pin Number	Assignment
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

The iRBX6GF supports Auto MDI/MDI- X operation. Use a cable to connect the switch to a PC.

Table 10 – 10/100 Base-T(X) MDI/MDI- X Pin Assignments

Pin Number	MDI port	MDI-X port
1	TD+(transmit)	RD+(receive)
2	TD-(transmit)	RD-(receive)
3	RD+(receive)	TD+(transmit)
4	Not used	Not used
5	Not used	Not used
6	RD-(receive)	TD-(transmit)
7	Not used	Not used
8	Not used	Not used

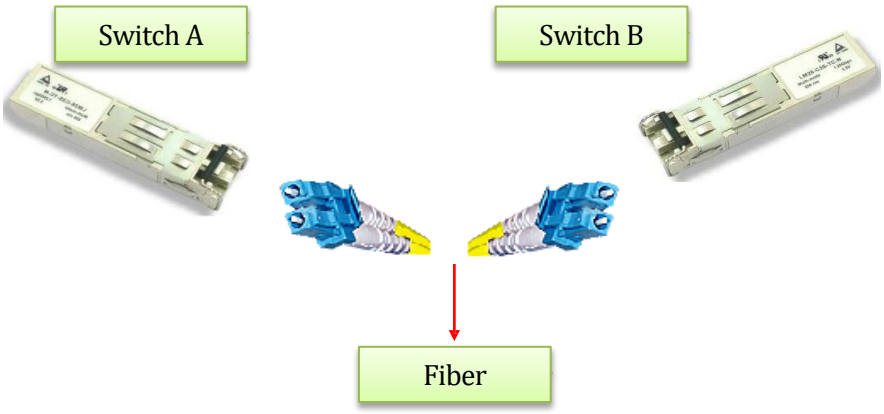
Table 11 – 1000 Base-T MDI/MDI- X Pin Assignments

Pin Number	MDI port	MDI-X port
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-

Note: "+" and "-" signs represent the polarity of the wires that make up each wire pair.

4.2 SFP

The switch comes with fiber optical ports that can connect to other devices using SFP modules. The fiber optical ports are multi-mode or single-mode with LC connectors. Remember that the TX port of Switch A should be connected to the RX port of Switch B.



4.2.1 Supported SFPs

iS5 Communications strongly recommends that suitable SFP modules are used. The SFP modules can be ordered from iS5 Communications.

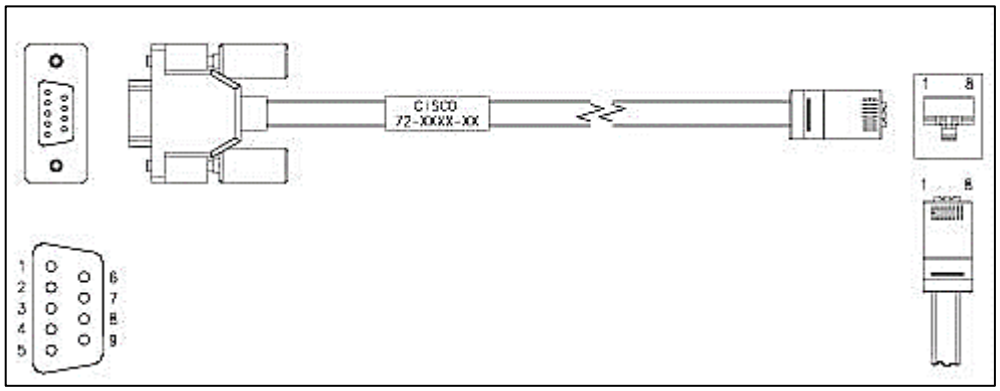
4.3 Console Cable

The iRBX6GF can be managed via the console port (a RS-232 Serial interface) by a RS-232 cable supplied with the switch. Connect the port to a PC using the RS-232 cable with an RJ-45 connector to a DB-9 female connector. The DB-9 female connector of the RS-232 cable should be connected to the PC, while the other end of the cable (with the RJ-45 connector) should be connected to the console port of the switch (Standard Cisco Serial Cable supplied with iRBX6GF).

Table 12 – Signals and Pinouts from Console Port RJ-45 to DB-9 Serial Port Adapter

Console Port		**PC COM Port**	
RJ-45		**DB-9**	
Pins	**Signals**	**Pins**	**Signals**
1	NC[1]	—	—
2	NC[1]	—	—
3	TXD[2]	2	RXD[3]
4	GND[4]	5	GND[4]
5	GND[4]	5	GND[4]
6	RXD[3]	3	TXD[2]
7	NC[1]	—	—
8	NC[1]	—	—

1. NC indicates not connected.
2. TXD indicates transmit data
3. RXD indicates receive data
4. GND indicates ground



5. SYSLOG GUIDELINES

5.1 Managing Disk Space

Syslog stores logging events. Depending on the compression level, from 16MB to 300MB of events may be stored.

Periodically(every 1 hour), the system checks the space available and performs the following steps:

1. After every reboot or after every 1 hour when and if 65% of the available space has been utilized, the 3 largest files will be truncated to 5K lines. Syslog would not report anything.
2. If the 85% of the available space has been used, the 3 largest log files are truncated to up to 2K lines. Syslog would report (this will be available in a future implementation):

```
syslog uses 86% of available disk space, truncating logs
```

3. If above 95% of the available space has been used, the 3 largest logs will be cleared. Syslog would report as follows (this reporting capability will be available in a future implementation):

```
syslog uses 86% of available disk space, removing ...
```

5.2 Examples of Syslog Messages

Table 13 – Examples of Syslog Messages

Facility	Action	Syslog message
system	(config-syslog)# clear web	cdb: admin cleared web syslog facility
cli	The configuration change events are recorded in the system log only.	2019-01-02 12:44:28 irbx info cdb: admin changed
lldp	LLDP neighbor has been discovered	PORT5 discovered Industrial ....
rstp	Topology change	TDB
rstp	Port up	PORT4: bridge state forwarding (200)
system	Port up	PORT4: link is up
rstp	Port down	PORT4: bridge state disabled (202)
system	Port down	PORT4: link is down

6. Alarms Management

An **event** is a distinct incident that occurs at a specific point in time, such as a port status change. Events can indicate errors, failures, or exceptional conditions in the network. Events can also indicate the *clearing* of those errors, failures, or conditions.

An **alarm** is a response to one or more related events. Only certain events generate alarms. Alarms have a state (cleared or not cleared) and a severity (for iRBX6GF, `info, warn, error, critical`). An alarm inherits the severity of its most recent event. Alarms remain open until a clearing event is generated (or if the alarm is manually cleared). [11]

A **trap** is an SNMP message. All SNMP messages are transported via User Datagram Protocol (UDP). The SNMP agent receives requests on UDP port 161. The manager may send requests from any available source port to port 161 in the agent. The agent response is sent back to the source port on the manager. The manager receives notifications (Traps and InformRequests) on port 162. [9]

A **Syslog message** is message sent via Syslog protocol using UDP port 514 (by default).

iRBX supports monitoring critical events such as a port up/down, temperature, or power supply status. These parameters are accessible through SNMP, CLI and Web UI. Critical alarms are viewed through LEDs of the switch

An user may selectively assign one or more of the events to monitor. If a monitored port changes its link status, or if temperature goes above a threshold or power supply goes down, an SNMP trap and/or syslog message is issued to report that event.

Alarm configuration is accessible through SNMP, CLI and Web UI.

6.1 SNMP Traps

iRBX6GF generates the following SNMP traps:

1. Power status:
   powersupplybothup(1)
   powersupply2down(2)
   powersupply1down(3)
2. Temperature
3. Port link status(Port up/down)—linkDown, linkUp
4. Cold Start—coldStart
5. Warm Start—warmStart

6.2 SNMP Traps and MIB OID

For a management system to understand a trap sent to it by an agent, the management system must know what the MIB object identifier (OID) defines. [11] MIB stands for Management Information Base.

Table 14 – SNMP Traps and MIB OID

Parameter	MIB OID	Values
power_status	1.3.6.1.4.1.41094.0.50.10.24.1.1.0	powersupplybothup(1) powersupply2down(2) powersupply1down(3)
temperature	1.3.6.1.4.1.41094.0.50.10.24.1.4.1	0- normal 1-exceeded
Port1 link status	1.3.6.1.2.1.2.2.1.8.1	1 – Port is up 2 – Port is down
Port2 link status	1.3.6.1.2.1.2.2.1.8.2	1 – Port is up 2 – Port is down
Port3 link status	1.3.6.1.2.1.2.2.1.8.3	1 – Port is up 2 – Port is down
Port4 link status	1.3.6.1.2.1.2.2.1.8.4	1 – Port is up 2 – Port is down

Parameter	MIB OID	Values
Port5 link status	1.3.6.1.2.1.2.2.1.8.5	1 – Port is up 2 – Port is down
Port6 link status	1.3.6.1.2.1.2.2.1.8.6	1 – Port is up 2 – Port is down

Note: Use IRBX6GF-MIB.txt for MIB definition

6.3 Alarms and SNMP Traps Configuration by CLI

```
irbx(config-alarm)#
  !                    Comments
  exit                 from alarm configuration mode
  monitor-ports        Alarm if ports change link state
  monitor-power        Alarm if power supply is off
  monitor-temperature  Alarm if temperature is higher than threshold
  snmp-trap-community  SNMP trap community name
  snmp-trap-manager    SNMP trap network manager IP address
```

For more details, refer to section 9.7.1 alarm and snmp-trap-community and snmp-trap-manager.

6.4 Alarm Configuration by WEB UI

iRBX6GF introduces a global alarm icon in the top right corner of the Web page which represents the status of the alarm.

Color is changed to red if one or more alarms have been triggered. Normal operation of iRBX6GF is identified by green color of the alarm icon.

For Alarms, refer to 10.1.5, Alarm.

For SNMP traps configuration, refer to Sec 10.1.5.1, Alarms to generate SNMP trap.

For alarm history, refer to Sec 10.1.5.2, History of Alarms.

6.5 Behavior During an Alarm

iRBX periodically (every minute) monitors for occurrence of selected events. Examples of such events are port down, temperature above an assigned threshold, power supply off, etc.
To process events, the following will be performed:

1. The events are recorded into Syslog (facility alarm)
2. An SNMP trap is sent if network manager IP is configured.

```
irbx(config-alarm)# snmp-trap-manager 192.168.10.10
```

3. Web UI updates its global alarm icon's color to reflect the event.

6.6 Cold / Warm System Start

During its start up, the device sends *coldStart* or *warmStart* trap, reporting its uptime on the previous run (if any). The previous uptime might be inaccurate with approximation of one hour.
To send the trap, the device should have the alarm-manager IP address configured. Perform the following command:

```
irbx(config-alarm)# snmp-trap-manager 192.168.10.10

Stopping rsyslog daemon: OK
Starting rsyslog daemon: OK
System warm start after uptime 00:09:40

Welcome to iRBX Switch
 Copyright (c) 2017 iS5 Communications
 All rights reserved

irbx login:
```

6.7 Fail Safe Relay

Test using the following commands (login as root)

```
cli.system.fsafe.on.sh
cli.system.fsafe.off.sh
```

Table 15 – Fail Safe Relay

	Situation/ Condition	Alarm Led	Fault Relay
1	**Shutting down**	OFF	ON
2	**Alarm cleared**	OFF	OFF
3	**Alarm detected**	ON (Red)	ON

7. REDUNDANCY OVERVIEW

7.1 Introduction

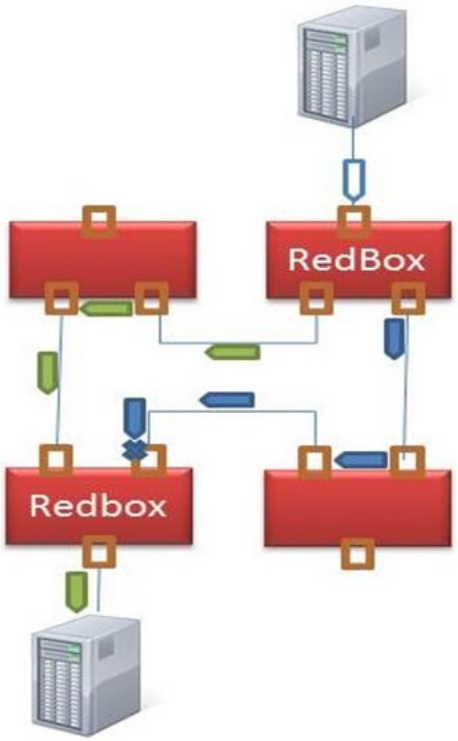
Industrial networks demand high availability and uninterrupted operation. A short loss of connectivity may have dramatic consequences in automation, power generation and distribution systems. Redundancy is used to minimize system downtime which is one of the most important concerns for industrial networking devices. HSR/PRP has zero recovery time compared to the existing redundancy technologies widely used in commercial applications, such as STP, RSTP, and MSTP.

5.1 HSR

HSR—High-availability Seamless Redundancy is a redundancy protocol for Ethernet that is standardized as per the IEC 62439-3 Clause 5 [3]. For more information, refer to:
http://en.wikipedia.org/wiki/High-availability_Seamless_Redundancy

HSR and PRP protocols are interoperable. Both protocols can be implemented in a network to achieve the desired topology. HSR-PRP operation is described in HSR-PRP (Dual RedBox Mode).

The basic HSR topology is a ring. The source RedBox duplicates the incoming frame and sends it using two different directions in the ring. If either one of the paths is broken, the frame will still be able to reach its destination using the second path. The receiving RedBox accepts first copy of the frame and discards the second one.

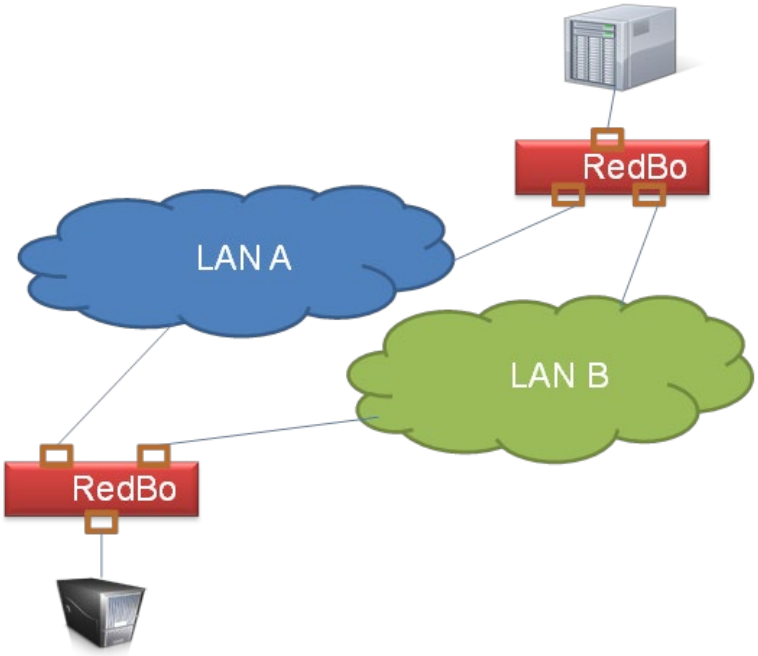


7.2 PRP

PRP (Parallel Redundancy Protocol) is a protocol standardized by IEC 62439-3 Clause 4 [3].

For more information, refer to:
http://en.wikipedia.org/wiki/Parallel_Redundancy_Protocol

Each node is connected to two separated and parallel networks (see the figure below). The nodes send two copies of each frame, one over each network. When a RedBox's node (Redundancy Box's node) receives a frame, it accepts the first copy and discards the second, eliminating the duplicate frame.



7.3 HSR-PRP (Dual RedBox Mode)

HSR-PRP mode, also called Dual RedBox mode, is used to bridge HSR and PRP networks. In this mode, two different RedBoxes connect to LAN A and LAN B of the PRP network. Two ports connect to the HSR ring and one port connects to one of the two PRP LANs. The traffic on the upstream interlink port connecting the RedBox to the PRP network is PRP-tagged. In HSR-PRP mode, the RedBox extracts data from the PRP frame and generates the HSR frame using this data and performs the reverse in the opposite direction. To avoid loops and use network bandwidth effectively, the Redbox does not transmit frames already transmitted in same direction.

8. FIRMWARE UPGRADE

The iRBX6GF firmware can be upgraded via uBoot and WebUI. For firmware upgrade via WebUI, refer to Section 10.1.4.1 Firmware Upgrade.

All upgrades are done through TFTP protocol as follows:

8.1 Connecting

Connect management PC with iRBX6GF's Management network port.

8.2 Installing TFTP Server

For Windows, download and install from:

https://bitbucket.org/phjounin/tftpd64

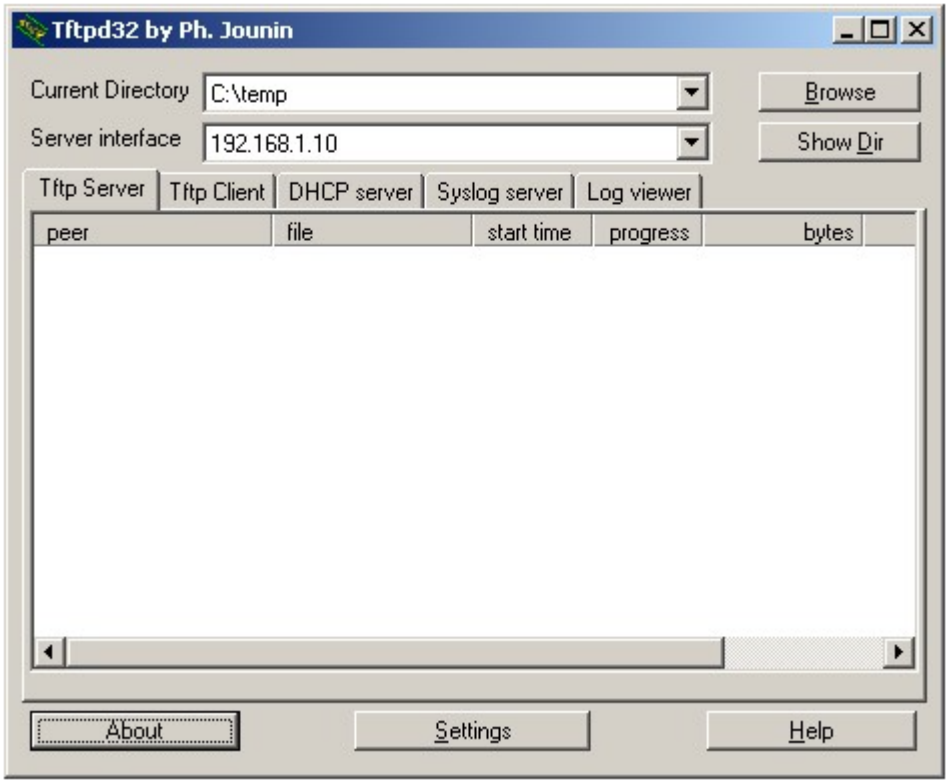


Figure 1 – TFTP Server Interface

8.3 Configuring TFTP Server

Use settings as shown in Figure 2 and Figure 3.

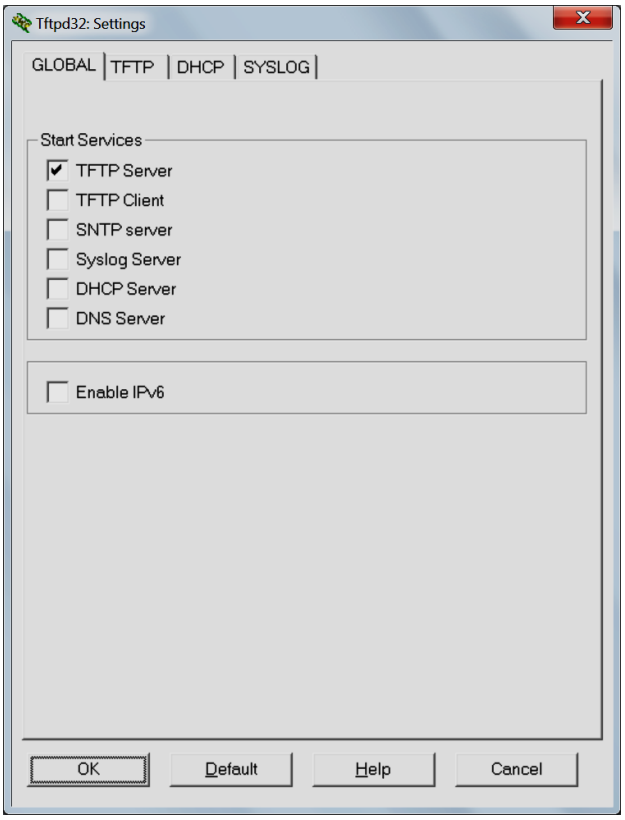


Figure 2 – TFTP Server Configuration

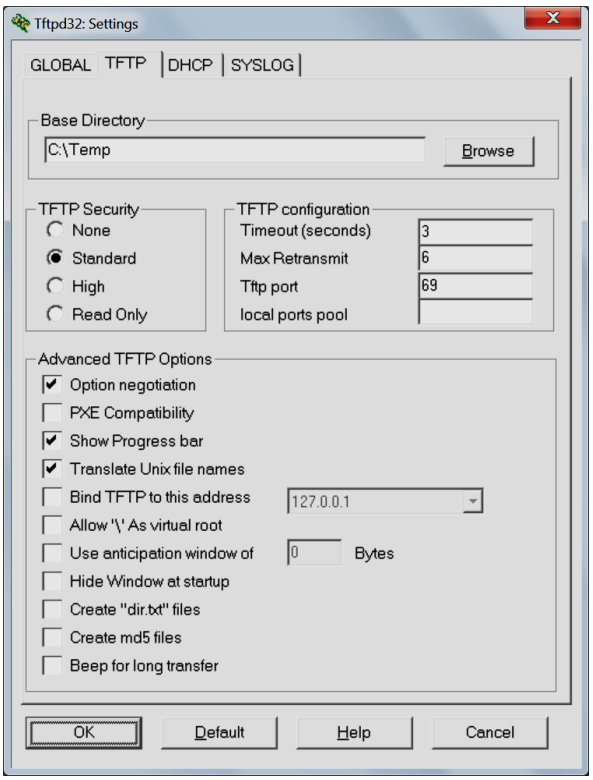


Figure 3 – TFTP Server Configuration (cont.)

8.4 Preparing Firmware Files

Obtain iRBX firmware files and copy them to the TFTP server base directory (c:\tftp)

- irbx-D-image-4.5.118.itb– firmware image for upgrade via Boot loader
- irbx-uboot-5.34.itb (latest uboot version at the moment of writing this manual)

8.5 iRBX Boot Loader Menu

iRBX maintains two firmware images (0 and 1) on CFI flash and one copy of a bootloader. See Figure 4 for the iRBX Boot Menu options.

- Options 0-1 show which firmware version reside on the flash on spots 0 and 1.
- Option 2 on Menu (*Edit Active Image*) allows controlling which image would be loaded by default upon device boot up. Option 9 might be used to save a change. After reset, the selection bar shows which image is selected for automatic load.
- Options 3-5 allow configuring iRBX device IP addressing.
- Options 6-7 allow configuring the TFTP Server address and pinging it to ensure the proper connectivity.
- Option 8 controls the filename pulled by TFTP.
- Option 9 triggers the update on non-Active image. To place the update on another Active Image, the Active number should be toggled by Option 2.

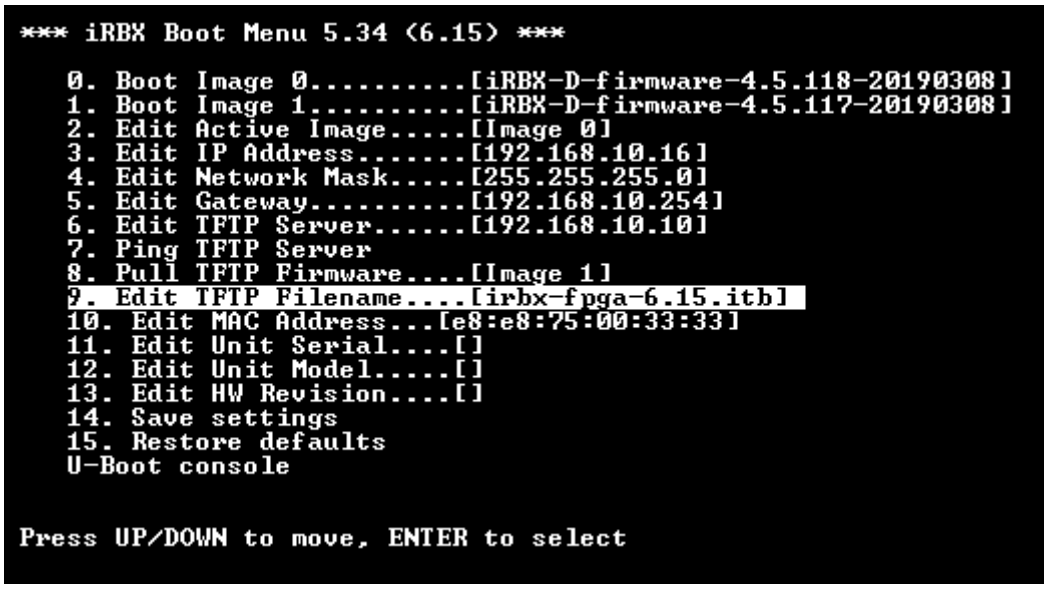


Figure 4 – iRBX Boot Menu

It is unlikely but possible that the boot loader might be corrupted. Then, direct (JTAG) flash programming will be required.

8.6 Upgrade Procedure

8.6.1 Upgrading via Boot Loader

Copy irbx_image-xxxxx.itb—firmware upgrade image file on TFTP Server to Base Directory (c:\TFTP).

8.6.1.1 Setting up IP addresses

- Set IP on PC and iRBX; make sure that IP addresses are in same subnet and pinging is successful.
- On PC, disable Windows Firewall
- Connect PC to iRBX Management port

You may use Option 7 to ping the TFTP Server and check connectivity. For the opposite direction, pinging from PC to iRBX may not work.

8.6.1.2 FPGA Upgrading

FPGA Upgrade can be performed through u-boot menu by following the steps:

1. Ensure compliance with the hardware requirements: D006-PS0103-FM0615-FB0614 or later
2. Obtain file irbx-fpga-X.YY.itb (for this manual the most current version is irbx-fpga-6.15.itb)

```
iRBX# configure terminal
iRBX# (config)# reboot
PORT1 forwarding
PORT2 forwarding
PORT3 forwarding
PORT4 forwarding
PORT5 forwarding
PORT6 forwarding
PORT1: bridge normal mode
PORT2: bridge normal mode
[0x8] <- 0x8000
reboot: Restarting system
Machine restart (c2800000)...


U-Boot 2014.10 (Dec 10 2018 - 20:51:31)

CPU   : Nios-II
SYSID : ffffffff, Wed Dec 31 23:59:59 1969
BOARD : iRBX
       Watchdog enabled
DRAM:  128 MiB
Flash: 128 MiB
Net:   ALTERA_TSE-0
```

The iRBX Boor menu 5.34 <6.15> appears:

3. Identify the FPGA version- currently the version is **6.15** and the file is *irbx-fpga-6.15.itb*.

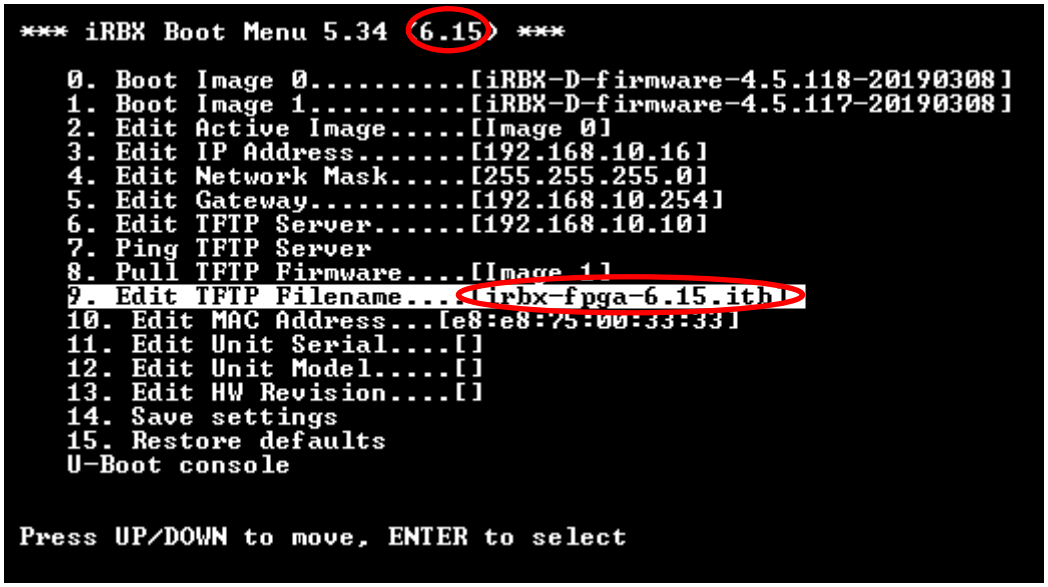


Figure 5 – iRBX Boot Menu with Circles for Version No and File Name

4. Once TFTP server IP is set up, press Option 8 to download the itb file

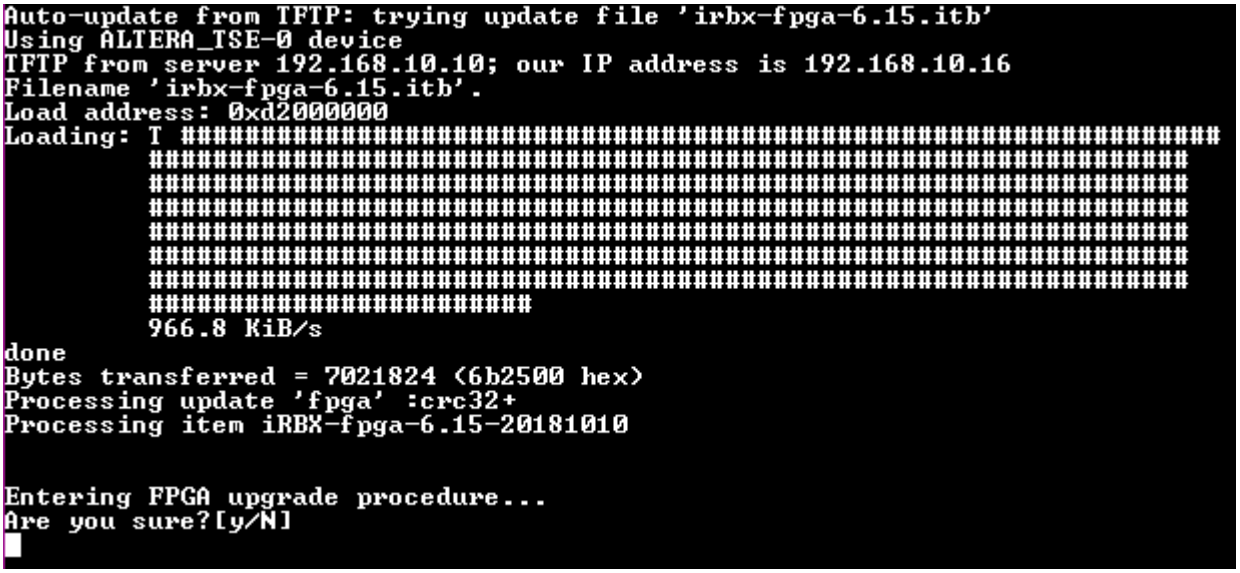


Figure 6 - Downloading the Current itb File

5. Press **y** to continue.

Note that the process takes a few minutes. Upon successful completion, the power cycle is required. On the failure, you may need to repeat the process or contact Tech Support:

On success, please power cycle and check FPGA version (top of u-boot menu)

In the case of failure (any reason the desired FPGA version cannot come up) the Backup (Factory default) version may be loaded and its version will appear.

8.6.2 Showing FPGA and firmware Versions

To verify the version of FPGA and firmware:

```
A-10.13-2# configure terminal
admin@A-10.13-2(config)# factory-reset reset
Syntax error: Illegal command line
admin@A-10.13-2(config)# factory-reset
please reboot the system
admin@A-10.13-2(config)# reboot
PORT1 forwarding
PORT2 forwarding
.
…..
Model                : iRBX6GF-HV-HV-D-2GSFP-2GSFP-2GCX
Serial               : RBX64917-00006
MAC Address          : E8:E8:75:80:01:88 (management)
MAC Address          : E8:E8:75:80:01:89 (internal)
Chip ID              : 00000611
System Time          : Fri Apr 20 05:03:29 UTC 2018
System Uptime        : 00:01:01
Software Version     : iRBX-D-4.3.120
Software Date        : 2018-01-08
Power supply 1,2     : OFF,OFF
Firmware Bank[0]     : iRBX-D-4.4.5-20180222 (backup)
Firmware Bank[1]     : iRBX-D-4.3.120-20180108 (active)
**********************************************************************


Type ? for help
@(config)# !
@(config)# rstp
@(config-rstp)# disable
PORT1 forwarding
PORT2 forwarding
PORT3 forwarding
PORT4 forwarding
PORT5 forwarding
[   70.434000] MGMT: port 5(PORT5.M) entered disabled state
PORT6 forwarding
[   70.446000] PORT6: state forwarding (120)
[   70.452000] PORT1: normal mode
[   70.457000] PORT2: normal mode
@(config-rstp)# !
@(config-rstp)# snmp
@(config-snmp)# community 1 public read-only
@(config-snmp)# enable
Restarting network management services:^C snmpd.
@(config-snmp)# !
@(config-snmp)# system
@(config-system)# banner "Welcome to iRBX Switch\\n Copyright (c) 2017 iS5
Communications\\n All rights reserved\\n"
Welcome to iRBX Switch
 Copyright (c) 2017 iS5 Communications
 All rights reserved

(config-system)# location Earth
@(config-system)# name irbx
@(config-system)# timezone America/Toronto
@(config-system)# !
@(config-system)# vlan 1
@(config-vlan1)# ports 1,2,3,4,5,6
@(config-vlan1)# !
@(config-vlan1)# ip
@(config-ip)# address 192.168.10.1/24
```

9. DEVICE MANAGEMENT

To control the iRBX switch, use the following options:

- SNMP—through Mgmt / Inband port
- Command Line Interface—RS-232 Serial interface
- WebUI—through Mgmt/Inband port

9.1 Configuration Parameters

The following parameters are preserved across restarts and might be changed through a management interface.

Table 16 – Configuration Parameters

Parameter	Description	Factory Default
hostname	Set system's network name	irbx
IP Address, IP Mask,	Switch Management IP address configuration	192.16810.1 255.255.255.0
Mode	Switch Redundancy protocol mode: HSR or PRP	HSR
SSH	Secure Shell Protocol	disabled
SNMP	Simple Network Management Protocol	enabled

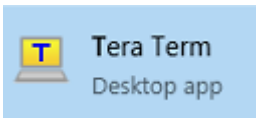
9.2 SNMP

The iRBX6GF switch supports MIB which defines the Network Management interfaces for the redundancy protocols defined by the IEC 62439 suite including Simple Network Management Protocol (SNMP). SNMP v1 is supported. Standard SNMP browser can be used to manage iRBX6GF by using standard IEC-62439-3_Ed2 mib file.

9.3 Command Line Interface Setup

CLI Management is performed by RS-232 Serial Console (115200, 8, none, 1, none). Before configuring RS-232 serial console, connect the RS-232 port of the switch to your PC. Follow the steps below to access the console via a RS-232 serial cable.

1. Start **Tara Term VT** (or other terminal emulator) application.

or the app from Command Prompt


2. Go to **Setup** menu and select **Serial Port**.

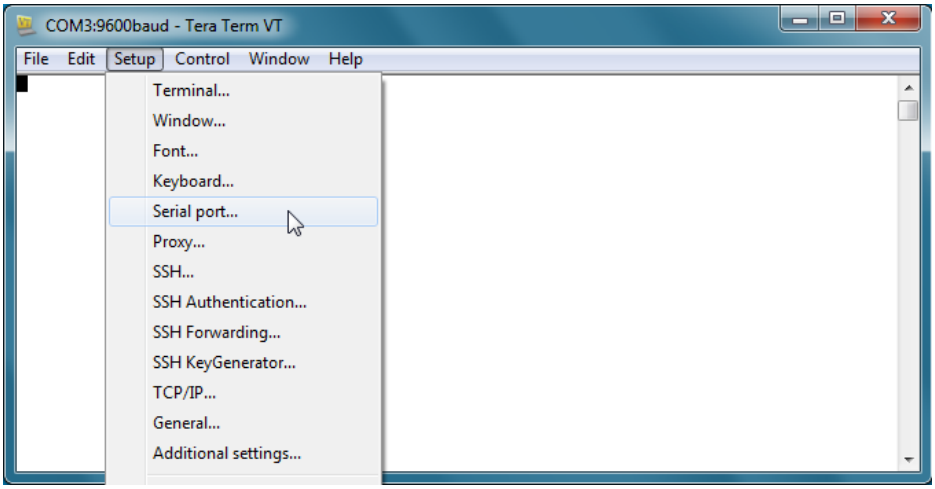


Figure 7 – Tera Term VT, Setup Menu

3. Select the COM Port used by your PC to connect to the Console Port. Set the rest of the properties to **115200** for Baud rate, **8** for Data bits, **none** for Parity, **1** for Stop bits, and **none** for Flow control. Then, click **OK**.

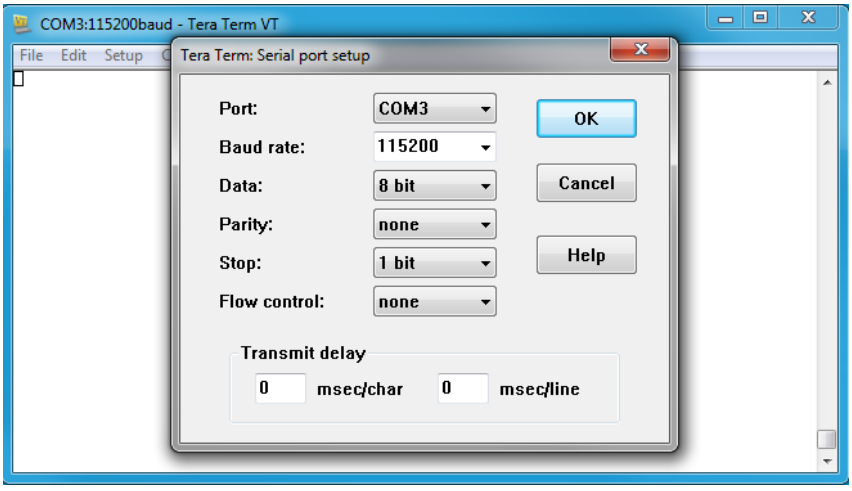


Figure 8 – Tera Term VT, Serial port setup

Use the following credentials to login (as illustrated on the figure below):

iRBX login: **admin**

Password: **admin**

Figure 9 – Tera Term VT, Login Screen

9.4 Command Line Interface Overview

There are 3 configuration contexts: **General Context**, **Show Context**, and **Configuration Context**.

To access Help in each configuration context, type a "?". When you type a question mark (" ?"), the following will appear in the 3 different contexts.

9.4.1 General Context

```
iRBX#
  !          Comments
  configure  Enter configuration mode
  exit       from the CLI
  ping       Send messages to network hosts
  show       Show system information
iRBX#
```

9.4.2 Show Context

```
iRBX# show ?
  banner       Show banner message
  config       Show running configuration
  date         Show current date
  ip           Show IPv4 settings
  lldp         Show lldp status
  mac_table    Show MAC table
  ntp          Show ntp status
  ports        Show ports status
  ptp          Show ptp status
  redundancy   Show redundancy status
  rstp         Show rstp status
  snmp         Show snmp status
  ssh          Show ssh status
  stats        Show traffic statistics
  syslog       Show all syslog events
  system       Show system status
  temperature  Show temperature (celsius)
  time         Show current time
  timezone     Show current timezone
  uptime       Show system uptime
  version      Show firmware version
  vlans        Show vlan configuration and membership iRBX# show
```

9.4.3 Configuration Context

```
iRBX# configure terminal
iRBX(config)#
!              Comments
  alarm          Alarm control
  do             To run exec commands in config mode
  exit           Exit from configure mode
  factory-reset  Restore factory default configuration
  ip             Configure IPv4 settings
  lldp           Link Layer Discovery Protocol
  no             Negate a command or set its defaults
  ntp            Simple Network Time Protocol
  password       Change password
  port           Configure port
  ptp            Precision Time Protocol
  reboot         Perform soft reboot
  redundancy     Ethernet IEC 62439-3
  rstp           Rapid Spanning Tree Protocol
  save           Save configuration on flash
  snmp           Simple Network Management Protocol
  ssh            Secure Shell Protocol
  syslog         System logging
  system         Configure system/unit parameters
  vlan           Configure vlan
  web            Control Web UI
iRBX(config)#
```

9.4.3.1 Context Sensitive Help

iRBX6GF CLI framework offers context sensitive help; The user can type a question mark (?) anytime during a session to get help. The help can be invoked in several ways. It is not displayed as a whole and is available only for the specific token from where it is invoked.
Examples of possible scenarios are given below.

1. If the user types "?" in the middle of a command or immediately after the command, the available options together with their description will be displayed.

```
iRBX(config-ip)# dn?
  dns1  Set DNS server 1
  dns2  Set DNS server 2

iRBX(config-ip)#
```

```
iRBX (config-alarm)# monitor-temperature?
  monitor-temperature  Alarm if temperature is higher than threshold

iRBX (config-alarm)# monitor-temperature
```

2. If an user enters a command at the appropriate prompt and enters a question mark (?) after hitting a space, this displays a corresponding help string.

```
iRBX(config-alarm)# monitor-temperature ?
  Number  celsius

iRBX (config-alarm)# monitor-temperature
```

Some of the basic concepts implemented for context sensitive help are:

- The next possible tokens are listed only in the alphabetical order and not in the order as available in the syntax or command structure.

```
iRBX(config-alarm)#?
!                    Comments
  exit                 Exit from alarm configuration mode
  monitor-ports        Alarm if ports change link state
  monitor-power        Alarm if power supply is off
  monitor-temperature  Alarm if temperature is higher than threshold
  snmp-trap-community  SNMP trap community name
  snmp-trap-manager    SNMP trap network manager IP address
```

- Sometimes the help string will specify a range or list.

```
iRBX(config-ip)# management ?
  vlan number in the range 1-4095  0-4095

iRBX(config-ip)# alarm
iRBX(config-alarm)# monitor-ports
  1,2,3,4,5,6  port list

iRBX(config-alarm)# monitor-ports
```

- The format is directly provided as help token for some non-keyword such as IP address, gateway, etc. For example, A.B.C.D represents that a MAC address of this format should be provided.

```
iRBX(config-ip)# address ?
  A.B.C.D/mask  IP address

iRBX(config-ip)#
```

- When the help token <cr> appears after the help string explaining the operation of the command, this means that the command can be executed at that point without any additional parameters.

```
iRBX(config)# ip
  ip  Configure IPv4 settings
  <cr>

iRBX(config)# ip
```

9.5 General Command Line Interface Syntax

Table 17 – General Level Command Line Interface

Command	Description	Example
?	Help. Lists all available commands	Command Line Interface Help
configure terminal	Enter Configuration mode	Enter Configuration mode
exit	Exit from the CLI	Exit from the CLI
ping	Send messages to network hosts	Send messages to network hosts
show	Show running system information	Show Commands list

NOTE: if port names displayed differently, follow **Port Naming Table**

9.5.1 Command configure terminal

```
iRBX# configure terminal
iRBX(config)#
```

Note: To go to the Configuration Context of CLI, always use the command ***configure terminal***.

To complete a command or keyword after entering a partial string, press the **Tab** or just hit **Enter**.

9.5.1.1 alarm command

```
iRBX (config)# alarm
iRBX (config-alarm)#
```

9.5.1.2 do command

```
iRBX (config)# do
  do  To run exec commands in config mode
irbx(config)# do
  configure  Enter configuration mode
  ping       Send messages to network hosts
  show       Show system information
```

9.5.1.3 exit command

```
iRBX# exit
Welcome to iRBX Switch
 Copyright (c) 2017 iS5 Communications
 All rights reserved
```

Or

```
iRBX (config-alarm)# exit
iRBX (config)#
```

9.5.1.4 factory-reset command

```
iRBX (config)# factory-reset
please reboot the system
iRBX (config)#
```

Note: Command *factory-reset* requires reboot of the system to apply the configuration settings.

9.5.1.5 ip command

```
iRBX (config)# ip
iRBX(config-ip)#
```

9.5.1.6 lldp command

```
iRBX (config)# lldp
iRBX(config- lldp)#
```

9.5.1.7 no command

```
iRBX (config)# no ?
  no  Negate a command or set its defaults

iRBX(config)# no
```

9.5.1.8 ntp command

```
iRBX (config)# ntp
iRBX(config-ntp)#
```

9.5.1.9 password command

```
RBX(config)# password change
iRBX(config)# password
  String  username

iRBX(config)# password admin
Changing password for admin
New password: password admin
```

9.5.1.10 port command

```
iRBX (config)# port 1
iRBX(config-port1)#
```

9.5.1.11 ptp command

```
iRBX (config)# ptp
iRBX(config-ptp#
```

9.5.1.12 reboot (a cold restart) command

```
iRBX(config)# reboot
PORT1 forwarding
PORT2 forwarding
PORT3 forwarding
PORT4 forwarding
PORT5 forwarding
PORT6 forwarding
[274522.075000] PORT1: normal mode
[274522.079000] PORT2: normal mode
[274522.443000] [0x8] <- 0x8000
[274522.590000] reboot: Restarting system
[274522.595000] Machine restart (c2800000)...


U-Boot 2014.10 (Feb 21 2017 - 16:43:20)

CPU   : Nios-II
SYSID : ffffffff, Wed Dec 31 23:59:59 1969
BOARD : iRBX
DRAM:  128 MiB
Flash: 64 MiB
Net:   ALTERA_TSE-0


  *** iRBX Boot Menu (5.23a) ***

     0. Boot Image 0.........[iRBX-D-4.4.5-20180222]
     1. Boot Image 1.........[iRBX-D-4.3.120-20180108]
     2. Edit Active Image.....[Image 1]
     3. Edit IP Address.......[192.168.10.1]
     4. Edit Network Mask.....[255.255.255.0]
     5. Edit Gateway.........[192.168.10.254]
     6. Edit TFTP Server......[192.168.10.250]
     7. Ping TFTP Server
     8. Pull TFTP Firmware....[Image 0]
     9. Edit TFTP Filename....[irbx-D-image-4.3.120.itb]
     10. Edit MAC Address...[e8:e8:75:80:01:88]
     11. Edit Unit Serial....[RBX64917-00006]
     12. Edit Unit Model.....[iRBX6GF-HV-HV-D-2GSFP-2GSFP-2GCX]
     13. Save Boot Menu settings
     14. Restore Boot Menu defaults
     U-Boot console


  Press UP/DOWN to move, ENTER to select


## Booting kernel from Legacy Image at d2000000 ...
   Image Name:   Linux-3.15.0
   Image Type:   NIOS II Linux Kernel Image (gzip compressed)
   Data Size:    1865503 Bytes = 1.8 MiB
   Load Address: d0000000
   Entry Point:  d0000000
   Verifying Checksum ... OK
   Uncompressing Kernel Image ... OK
[    3.258000] console [ttyS0] enabled
[    3.259000] bootconsole [early0] disabled
[    3.277000] ttyJ0 at MMIO 0x4000010 (irq = 2, base_baud = 0) is a Altera JTAG UART
[    3.429000] loop: module loaded
[    3.453000] 0.flash: Found 1 x16 devices at 0x0 in 16-bit bank. Manufacturer ID
0x000089 Chip ID 0x008961
[    3.455000] Intel/Sharp Extended Query Table at 0x010A
[    3.457000] Intel/Sharp Extended Query Table at 0x010A
```

```
**********************************************************************
                    CONFIGURATION FACTORY RESET
**********************************************************************
/
Initializing random number generator... [   17.879000] random: dd urandom read with 1 bits
of entropy available
done.
Starting lighttpd: OK
Starting lldpd: OK
Starting ports PORT1..PORT6
[   24.490000] altera_tse 8044000.ethernet eth0: device MAC address e8:e8:75:80:01:88
[   24.500000] altera_tse 8044000.ethernet eth0: TSE revision 1001
MAC[m]:  e8:e8:75:80:01:88
MAC[c]:  e8:e8:75:80:01:89
[   26.017000] afec0: Link down
[   27.024000] afec0: Link up, 1000Mb Full-Duplex
[   27.031000] afec0: Link up, 1000Mb Full-Duplex
2018-04-20T09:02:56 [INFO/lldpctl] LLDP PortID TLV type set to new value : ifname
2018-04-20T09:02:56 [INFO/lldpctl] lldpd should resume operations
[   29.652000] device PORT1.M entered promiscuous mode
[   29.729000] device PORT2.M entered promiscuous mode
[   29.802000] device PORT3.M entered promiscuous mode
[   29.880000] device PORT4.M entered promiscuous mode
[   29.956000] device PORT5.M entered promiscuous mode
[   30.028000] device PORT6.M entered promiscuous mode
[   30.239000] device eth0 entered promiscuous mode
[   30.315000] brm0: port 6(PORT6.M) entered forwarding state
[   30.318000] brm0: port 6(PORT6.M) entered forwarding state
[   30.321000] brm0: port 5(PORT5.M) entered forwarding state
[   30.322000] brm0: port 5(PORT5.M) entered forwarding state
[   30.530000] 8021q: adding VLAN 0 to HW filter on device RING0
[   30.638000] bonding: RING0: Enslaving PORT1 as an active interface with a down link
[   30.681000] bonding: RING0: Enslaving PORT2 as an active interface with a down link
[   30.756000] brm0: port 6(PORT6.M) entered disabled state
[   30.757000] brm0: port 5(PORT5.M) entered disabled state
[   30.970000] MGMT: port 6(PORT6.M) entered forwarding state
[   30.972000] MGMT: port 6(PORT6.M) entered forwarding state
[   30.973000] MGMT: port 5(PORT5.M) entered forwarding state
[   30.975000] MGMT: port 5(PORT5.M) entered forwarding state

exit
[   45.984000] MGMT: port 6(PORT6.M) entered forwarding state
[   45.986000] MGMT: port 5(PORT5.M) entered forwarding state
[   46.885000] PORT5: mode copper
[   47.973000] PORT6: mode copper
[   60.128000] random: nonblocking pool is initialized
**********************************************************************
Model               : iRBX6GF-HV-HV-D-2GSFP-2GSFP-2GCX
Serial              : RBX64917-00006
MAC Address         : E8:E8:75:80:01:88 (management)
MAC Address         : E8:E8:75:80:01:89 (internal)
Chip ID             : 00000611
System Time         : Fri Apr 20 05:03:29 UTC 2018
System Uptime       : 00:01:01
Software Version    : iRBX-D-4.3.120
Software Date       : 2018-01-08
Power supply 1,2    : OFF,OFF
Firmware Bank[0]    : iRBX-D-4.4.5-20180222 (backup)
Firmware Bank[1]    : iRBX-D-4.3.120-20180108 (active)
**********************************************************************
```

```
Starting cron ... done.
Starting konfd

Type ? for help
@(config)# !
@(config)# rstp
@(config-rstp)# disable
PORT1 forwarding
PORT2 forwarding
PORT3 forwarding
PORT4 forwarding
PORT5 forwarding
[   70.434000] MGMT: port 5(PORT5.M) entered disabled state
PORT6 forwarding
[   70.446000] PORT6: state forwarding (120)
[   70.452000] PORT1: normal mode
[   70.457000] PORT2: normal mode
@(config-rstp)# !
@(config-rstp)# snmp
@(config-snmp)# community 1 public read-only
@(config-snmp)# enable
Restarting network management services:^C snmpd.
@(config-snmp)# !
@(config-snmp)# system
@(config-system)# banner "Welcome to iRBX Switch\\n Copyright (c) 2017 iS5
Communications\\n All rights reserved\\n"
Welcome to iRBX Switch
 Copyright (c) 2017 iS5 Communications
 All rights reserved

@(config-system)# location Earth
@(config-system)# name irbx
@(config-system)# !
@(config-system)# vlan 1
@(config-vlan1)# ports 1,2,3,4,5,6
@(config-vlan1)# !
@(config-vlan1)# ip
@(config-ip)# address 192.168.1.10/24
@(config-ip)# gateway 192.168.1.1
@(config-ip)# !
@(config-ip)# lldp
@(config-lldp)# enable

2018-04-20T09:03:58 [INFO/lldpctl] LLDP PortID TLV type set to new value : ifname
2018-04-20T09:03:58 [INFO/lldpctl] lldpd should resume operations
@(config-lldp)# !
@(config-lldp)# ntp
@(config-ntp)# server1  1.pool.ntp.org
@(config-ntp)# server2  2.pool.ntp.org
@(config-ntp)# timezone -5
@(config-ntp)# enable
@(config-ntp)# !
@(config-ntp)# ssh
@(config-ssh)# enable
security keys are being generated
@(config-ssh)# !
@(config-ssh)# ptp
@(config-ptp)# disable
@(config-ptp)# one-step
@(config-ptp)# sync
@(config-ptp)# vlan 0
@(config-ptp)# !
@(config-ptp)# redundancy
```

```
@(config-redundancy)# mode HSR
[  122.006000] [0x8] <- 0x0202
Redundancy: using HSR mode with I-Port on PORT5
@(config-redundancy)# !
@(config-redundancy)# alarm
@(config-alarm)# temperature 75
@(config-alarm)# monitor-ports 1,2,3,4,5,6
@(config-alarm)# web
@(config-web)# acl
@(config-web-acl)# rule 1 allow *
@(config-web-acl)# session-timeout 30
Syntax error on line /etc/startup-config:48 "session-timeout 30": Unknown command
@(config-web-acl)#
@(config-web-acl)# ip
@(config-ip)# address 192.168.10.1/24
@(config-ip)# management-vlan 4
@(config-ip)# gateway 192.168.10.254

Welcome to iS5 Communications
 Copyright (c) 2017 iS5 Communications
 All rights reserved

irbx login:
```

9.5.1.13 redundancy command

```
iRBX (config)# redundancy
iRBX(config-redundancy)#
```

9.5.1.14 rstp command

```
iRBX (config)# rstp
iRBX(config-rstp)#
```

9.5.1.15 save command

```
iRBX(config)# save
iRBX(config)#
```

9.5.1.16 snmp command

```
iRBX (config)# snmp
iRBX(config-snmp)#
```

9.5.1.17 ssh command

```
iRBX (config)# syslog
admin@irbx(config-syslog)#
```

9.5.1.18 syslog command

```
iRBX (config)# ssh
iRBX(config-ssh)#
```

9.5.1.19 system command

```
iRBX(config)# system
iRBX(config-system)#
```

9.5.1.20 vlan command

```
iRBX (config)# vlan 1
iRBX(config-vlan1)#
```

Note: vlan must be followed by its number – e.g. vlan 1.

9.5.1.21 web command

```
iRBX (config)# web
iRBX(config-web)#
```

9.5.2 Command exit

```
iRBX# exit
Welcome to iS5 Communications
 Copyright (c) 2018 iS5 Communications
 All rights reserved
iRBX login:
```

9.5.3 Command ping

```
iRBX# ping 198.168.10.11
PING 198.168.10.11 (198.168.10.11): 56 data bytes

--- 198.168.10.11 ping statistics ---
5 packets transmitted, 0 packets received, 100% packet loss
iRBX#
```

9.5.4 Command show

```
iRBX# show
  show  system information
iRBX# show
  banner        Show banner message
  config        Show running configuration
  date          Show date
  ip            Show IPv4 settings
  lldp          Show lldp status
  log-auth      Show authentication log
  log-web       Show web ui log
  mac_table     Show MAC table
  ntp           Show ntp status
  ports         Show ports status
  ptp           Show ptp status
  redundancy    Show redundancy status
  rstp          Show rstp status
  snmp          Show snmp status
  ssh           Show ssh status
  stats         Show traffic statistics
  system        Show system status
  temperature   Show temperature (Celsius)
  time          Show current time
```

If you want to access the *show* command within the Configuration Context, use *do show* command. For details about do command, go to do command.

```
iRBX(config-system)# do show
banner       config       date         ip           lldp         log-auth
log-web      mac_table    ntp          ports        ptp          redundancy
rstp         snmp         ssh          stats        system       temperature
time         version      vlans
```

9.6 Show Context CLI Syntax

The user can use show commands to view switch performance statistics in the General Context mode. The following table gives details on their usage.

Table 18 – Show Context CLI

#	Command syntax	Description	Example
1	show banner	Show banner message	show banner command
2	show config	Show running configuration	show config command
3	show date	Show date	show date command
4	show ip	Show IPv4 settings	show ip command
5	show lldp	Show LLDP status	show lldp command
6	Show mac_table	Show MAC table	show mac_table command
7	Show ntp	Show NTP status	show ntp command
8	show ports	Show ports information	show ports command
9	Show ptp	Show PTP status	show ptp command
10	show redundancy	Show redundancy status	show redundancy command
11	show rstp	Show RSTP status	show rstp command
12	show snmp	Show SNMP status	show snmp command
13	show ssh	Show SSH status	show ssh command
14	show stats	Show ports statistics	show stats command
15	show syslog	Show all syslog events	
16	show system	Show system information	show system command
17	Show temperature	Show temperature (Celsius)	show temperature command
18	show time	Show current time	show time command
19	show timezone	Show current timezone	
20	show uptime	Show system uptime	
21	show version	Show firmware version	show version command
22	show vlans	Show VLAN configuration and membership	show vlans command

9.6.1 show banner command

```
iRBX# show banner
Welcome to iRBX Switch
 Copyright (c) 2018 iS5 Communications
 All rights reserved

iRBX#
```

9.6.2 show config command

```
iRBX# show config
!
alarm
 monitor-ports 1,2,3,4,5,6
 monitor-power 1
 monitor-temperature 75
!
Ip
 address 192.168.10.13/24
!
lldp
 enable
!
ntp
 enable
 server1 1.pool.ntp.org
 server2 2.pool.ntp.org
!
ptp
 disable
 one-step
 sync
 vlan 0
!
redundancy
 mode HSR
!
rstp
 domain 1
 enable
!
snmp
 community 1 public read-only
 enable
!
ssh
 enable
!
syslog
 enable
!
system
 banner "Welcome to iRBX Switch\\n Copyright (c) 2017 iS5 Communications\\n All rights
reserved\\n"
 location Earth
 name irbx
!
vlan 1
 ports 1,2,3,4,5,6
!
web
 enable
 session-timeout 30
 acl
iRBX #
```

9.6.3 show date command

```
iRBX# show date
Mon Feb 25 05:28:51 UTC 2019
iRBX#
```

9.6.4 show ip command

```
iRBX# show ip
Management interface:
MGMT      Link encap:Ethernet  HWaddr E8:E8:75:00:03:12
          inet addr:192.168.10.13  Bcast:192.168.10.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:26637 errors:0 dropped:0 overruns:0 frame:0
          TX packets:26332 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:2380622 (2.2 MiB)  TX bytes:6106378 (5.8 MiB)

Management VLAN:
iRBX#
```

9.6.5 show lldp command

```
iRBX# show lldp
------------------------------------------------------------------------------
Global configuration:
------------------------------------------------------------------------------
Configuration:
  Transmit delay: 30
  Transmit hold: 4
  Receive mode: no
  Pattern for management addresses: 192.168.10.13
  Interface pattern: eth0,PORT1,PORT2,PORT3,PORT4,PORT5,PORT6
  Interface pattern for chassis ID: (none)
  Override description with: iRBX6GF HSR/PRP Ethernet Switch
  Override platform with: Linux
  Override system name with: (none)
  Advertise version: no
  Update interface descriptions: no
  Promiscuous mode on managed interfaces: no
  Disable LLDP-MED inventory: yes
  LLDP-MED fast start mechanism: yes
  LLDP-MED fast start interval: (none)
  Source MAC for LLDP frames on bond slaves: local
  Port ID TLV subtype for LLDP frames: ifname
  Agent type:   unknown
------------------------------------------------------------------------------
------------------------------------------------------------------------------
LLDP Global statistics:
------------------------------------------------------------------------------
Summary of stats:
  Transmitted:  599
  Received:     776
  Discarded:    0
  Unrecognized: 0
  Ageout:       0
  Inserted:     3
  Deleted:      0
------------------------------------------------------------------------------
------------------------------------------------------------------------------
LLDP neighbors:
------------------------------------------------------------------------------
Interface:    PORT5, via: LLDP, RID: 3, Time: 0 day, 01:44:05
  Chassis:
    ChassisID:    mac e8:e8:75:00:08:5a
    SysName:      iES22GF
    SysDescr:     Intelligent 20-port managed Gigabit Ethernet switch with
8x10/100/1000Base-T(X) and 12x100/1000Base-X, SFP socket
    TTL:          60
    MgmtIP:       192.168.20.22
    Capability:   Bridge, on
  Port:
    PortID:       local 7
    PortDescr:    Port #7
```

9.6.6 show mac_table command

```
iRBX# show mac_table

PORT  MAC
   0  e8:e8:75:00:03:12
   5  48:2a:e3:09:2c:87
   5  e8:e8:75:00:08:5a
   0  e8:e8:75:00:03:13
   5  00:13:3b:11:7b:a5
iRBX#
```

9.6.7 show ntp command

```
iRBX# show ntp
ntp is enabled
iRBX#
```

s

9.6.8 show ports command

```
iRBX# show ports

Port   Panel  Enable Link   SFP    Duplex   RED      RSTP
-------------------------------------------------------
PORT1  P1/A   yes    down   1000x  -        HSR      -
PORT2  P2/B   yes    down   1000x  -        HSR      -
PORT3  P4/A   yes    down   n/p    -        no       -
PORT4  P5/B   yes    down   n/p    -        no       -
PORT5  P3     yes    1000   copper full     no       forwarding
PORT6  P6     yes    down   copper -        no       -
OOB    Mgmt   yes    down   copper -        -        - iRBX#
```

RED stands for Redundancy.

9.6.9 show ptp command

```
iRBX# show ptp

Component index: 0
 name           : Local NCO
 device id      : 0x0090
 revision id    :   0x02
 properties     :   0x1f

 Time read:
  seconds       : 1167708462
  nanoseconds   : 990163435
  subnsecs      : 0x0000
  clk cycle cnt: 0x00000b3dcad934e5

 Register content:
  nco subnsec reg       :     0x00000000
  nco nsec reg          :     0x3b04b1eb
  nco sec reg           : 0x00004599d12e
  nco cccnt reg         : 0x0b3dcad934e5
  nco step subnsec reg :     0x00000000
  nco step nsec reg     :           0x08
  nco adj nsec reg      :     0x19fcd5c3
  nco adj sec reg       : 0x000045984f04
  nco cmd reg           :           0x00

Device is listening. Unknown status. Contact support.
iRBX#
```

9.6.10 show redundancy command

```
iRBX# show redundancy
redundancy HSR
iRBX#
```

9.6.11 show rstp command

```
iRBX# show rstp

Enabled           yes
Domain ID           1
Self Bridge              e8:e8:75:00:03:13
Root Bridge        0.000.e8:e8:75:00:08:5a
Root Port         PORT5   | Path Cost         20000
Max Age             20    | Hello Time          2
Forward Delay       15    | Max Hops           20
Tx Hold Count        6    | Bridge Priority     8


Port     Link     Member   Dis-bpdu Cost     Priority P2P      Edge(Admin,Auto)  Role       State
-------------------------------------------------------------------------------------------------
R(A,B)   down     yes      no       0        128      auto     no       yes      disabled   discarding
PORT3    down     yes      no       0        128      auto     no       yes      disabled   discarding
PORT4    down     yes      no       0        128      auto     no       yes      disabled   discarding
PORT5    up       yes      no       0        128      auto     no       yes      root       forwarding
PORT6    down     yes      no       0        128      auto     no       yes      disabled   discarding
iRBX#
```

9.6.12 show snmp command

```
iRBX# show snmp

status:
snmpd is running

community:
rocommunity public default -V systemonly

users:
iRBX#
```

9.6.13 show ssh command

```
iRBX# show ssh
ssh-keygen is stopped
sshd is running
iRBX#
```

9.6.14 show stats command

```
iRBX# how stats
                                PORT1     PORT2     PORT3     PORT4     PORT5     PORT6
[0x3102] rx_bad_octets              0         0         0         0         0         0
[0x3104] rx_unicast_packets         0         0         0         0         0      1034
[0x3106] rx_broadcast_packets       0         0         0         0         0       675
[0x3108] rx_multicast_packets       0         0         0         0         0      2355
[0x310A] rx_undersize_packets       0         0         0         0         0         0
[0x310C] rx_fragment_packets        0         0         0         0         0         0
[0x310E] rx_oversize_packets        0         0         0         0         0         0
[0x3110] rx_jabber_packets          0         0         0         0         0         0
[0x3112] rx_error_packets           0         0         0         0         0         0
[0x3114] rx_crc_error_packets       0         0         0         0         0         0
[0x3122] rx_hsr_prp_packets         0         0         0         0         0         0
[0x3124] rx_prp_wrong_lan_packets   0         0         0         0         0         0
[0x3126] rx_hsr_prp_duplicate_packets 0       0         0         0         0         0
[0x312C] rx_policed                 0         0         0         0         0         0
[0x3130] rx_macsec_untagged         0         0         0         0         0         0
[0x3132] rx_macsec_notsupp          0         0         0         0         0         0
[0x3134] rx_macsec_unknownsci       0         0         0         0         0         0
[0x3136] rx_macsec_notvalid         0         0         0         0         0         0
[0x3138] rx_macsec_late             0         0         0         0         0         0
[0x3142] tx_unicast_packets         0         0         0         0         0      1407
[0x3144] tx_broadcast_packets       0         0         0         0         0         0
[0x3146] tx_multicast_packets       0         0         0         0         0       316
[0x3148] tx_hsr_prp_packets         0         0         0         0         0         0
[0x3160] tx_priority_queue_drop     0         0         0         0         0         0
[0x3162] tx_early_drop              0         0         0         0         0         0
iRBX#
```

Note: **show stats** command presents current status of counter. It differs from the shown next **show stats clear** command.

9.6.15 show syslog

```
iRBX# show syslog ?
  alarm                       Show alarm syslog events
  facilities                  List syslog facilities
  lldp                        Show lldp syslog events
  login                       Show login syslog events
  rstp                        Show rstp syslog events
  search                      through all facilities
  ssh                         Show ssh syslog events
  status                      Show syslog status
  system                      Show system syslog events
  web                         Show web syslog events
  info,warn,error,critical    - filter by severity
  <cr>

iRBX# show syslog
 [ lldp rstp ssh system web ]
2019-02-25 06:35:26 irbx info lldp: PORT1 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 00:06:38 irbx info lldp: PORT1 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 01:21:39 irbx info lldp: PORT2 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 05:20:51 irbx info lldp: PORT2 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 05:22:59 irbx info kernel:device PORT1 left promiscuous mode
2019-02-26 05:22:59 irbx info kernel:device PORT2 left promiscuous mode
2019-02-26 05:22:59 irbx info kernel:device PORT3 left promiscuous mode
2019-02-26 05:22:59 irbx info kernel:device PORT4 left promiscuous mode
2019-02-26 05:22:59 irbx info kernel:device PORT5 left promiscuous mode
2019-02-26 05:22:59 irbx info kernel:device RING0 left promiscuous mode
2019-02-26 05:23:00 irbx info cdb: admin set rstp_enable=no
2019-02-26 05:35:44 irbx info cdb: admin changed syslog_severity_alarm
2019-02-26 05:38:00 irbx info cdb: admin set syslog_enable_alarm=yes
2019-02-26 05:42:30 irbx info cdb: admin set syslog_enable_alarm=no
2019-02-26 05:43:13 irbx info cdb: admin cleared alarm syslog facility
2019-02-26 06:07:40 irbx info kernel:PORT2: link is down
2019-02-26 06:07:45 irbx info kernel:PORT2: link is up
2019-02-26 06:07:50 irbx info lldp: PORT2 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 06:07:52 irbx info kernel:PORT2: link is down
2019-02-26 06:07:56 irbx info kernel:PORT2: link is up
2019-02-26 06:08:00 irbx info kernel:PORT1: link is up
2019-02-26 06:08:06 irbx info lldp: PORT1 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 06:08:14 irbx info kernel:PORT2: link is down
2019-02-26 06:09:15 irbx info kernel:PORT1: link is down
2019-02-26 06:09:30 irbx info kernel:PORT2: link is up
2019-02-26 06:09:42 irbx info kernel:PORT1: link is up
2019-02-26 06:09:46 irbx info lldp: PORT1 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 06:11:23 irbx info lldp: PORT2 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 06:20:24 irbx info lldp: PORT2 discovered iREX6GF HSR/PRP Ethernet Switch
2019-02-26 06:23:44 irbx info kernel:altera_tse 8044000.ethernet eth0: Link is Up - 100Mbps/Full - flow control off
2019-02-26 06:24:18 irbx info lldp: eth0 discovered Intelligent 20-port managed Gigabit Ethernet switch with
8x10/100/1000Base-T(X) and 12x100/1000Base-X, SFP socket
2019-02-26 06:28:00 irbx info cdb: admin changed redundancy_mode
2019-02-26 06:28:00 irbx warning kernel:[0x8] <- 0x0202
2019-02-26 06:28:09 irbx info cdb: admin set rstp_enable=yes
2019-02-26 06:28:10 irbx info cdb: admin set rstp_R_enable=yes
2019-02-26 06:28:11 irbx info kernel:device PORT1 entered promiscuous mode
2019-02-26 06:28:11 irbx info kernel:device PORT2 entered promiscuous mode
2019-02-26 06:28:11 irbx info kernel:device RING0 entered promiscuous mode
2019-02-26 06:28:12 irbx info cdb: admin set rstp_3_enable=yes
2019-02-26 06:28:12 irbx info kernel:device PORT3 entered promiscuous mode
2019-02-26 06:28:13 irbx info cdb: admin set rstp_4_enable=yes
2019-02-26 06:28:13 irbx info kernel:device PORT4 entered promiscuous mode
2019-02-26 06:28:14 irbx info cdb: admin set rstp_5_enable=yes
2019-02-26 06:28:15 irbx info kernel:device PORT5 entered promiscuous mode
2019-02-26 06:28:16 irbx info cdb: admin set rstp_6_enable=yes
2019-02-26 06:28:16 irbx info kernel:device PORT6 entered promiscuous mode
2019-02-26 06:28:36 irbx info cdb: admin changed rstp_domain
2019-02-26 06:28:53 irbx info cdb: admin changed rstp_domain
```

9.6.15.1 show syslog alarm

```
iRBX#
show syslog alarm
  info,warn,error,critical - filter by severity
  <cr>
iRBX# show syslog alarm
```

9.6.15.1.1 show syslog alarm info, warn, error, critical

```
iRBX# show syslog alarm info
  <cr>

iRBX# show syslog alarm info
iRBX# show syslog alarm warn
  <cr>

iRBX# show syslog alarm warn
show syslog alarm error
  <cr>

iRBX# show syslog alarm error
iRBX# show syslog alarm critical
  <cr>

iRBX# show syslog alarm critical
```

9.6.15.2 show syslog facilities

```
iRBX#
show syslog facilities
  <cr>

iRBX# show syslog facilities
-------------------------------------------------------------------------
facility enabled  severity file           events              recent event
-------------------------------------------------------------------------
alarm    yes      warn     alarm.log          0      2019-02-26 05:43:13
lldp     yes      info     lldp.log          21      2019-02-26 06:43:16
login    yes      info     login.log          0                        -
rstp     yes      info     rstp.log         359      2019-02-26 06:42:54
ssh      yes      info     ssh.log            1      2019-02-26 06:42:45
system   yes      info     system.log        69      2019-02-28 05:39:19
web      yes      info     web.log         1474      2019-02-27 03:30:29
iRBX# (config-syslog-alarm)#
```

The following columns of information are shown above:

Column 1: facility name (as shown in the first row, alarm)
Column 2: it shows if the facility is enabled: the options are yes or no.
Column 3: max severity level to be recorded. Messages with higher severity Level are not recorded. The severity is established as follows:

```
iRBX# (config-syslog-alarm)# severity warn
iRBX# (config-syslog-alarm)#
```

The default severity is *info.*
Column 4: corresponding file name (e.g. alarm.log)
Column 5: number of recorded events (0 in the first row)
Column 6: last recorded event time stamp (e.g. 2019-02-26 05:43:13)

Table 19 – show syslog facilities

Label	Description
Facility name	Help. Lists all available commands
alarm	Alarm notifications for monitored(!) ports, power and temperature (if their Alarms are turned on). See *show alarm*.
Lldp, rstp, ssh	protocol messages
login	User login/logout and security messages
system	Show running system information
web	Web UI log

Table 20 – Syslog severity levels

Severity label	Description	Value (Numerical code)	Actions
info	INFO messages	6	Record all messages
warn	WARN or NOTICE messages	4 or 5	Record all messages except INFO (<=5)
error	ERROR, CRITICAL, ALERT, EMERGENCIES	0,1,2,3	Record all messages except INFO, NOTICE and WARN (<=3)

For more information such as Values and Syslog Definition for other alarms' severity level (e.g. debug) which are not available for iRBX6GF, refer to the table below.

Table 21 – Alarms Severity Mapping Table

Value	Severity	Keyword	Description	Examples	Syslog Definition
0	Emergency	emerg	System is unusable	This level should not be used by	LOG_EMERG
1	Alert	alert	Should be corrected immediately	Loss of the primary ISP connection.	LOG_ALERT
2	Critical	crit	Critical conditions	A failure in the system's primary	LOG_CRIT
3	Error	err	Error conditions	An application has exceeded its file storage limit and	LOG_ERR
4	Warning	warning	May indicate that an error will occur if action is not	A non-root file system has only 2GB remaining.	LOG_WARNING
5	Notice	notice	Events that are unusual, but not errors.		LOG_NOTICE
6	Info	info	Normal operational messages that require no action.	An application has started paused or ended successfully.	LOG_INFO
7	Debug	debug	Information useful to developers for debugging the application		LOG_DEBUG

9.6.15.3 show syslog lldp

```
iRBX# show syslog lldp ?
  info,warn,error,critical  - filter by severity
  <cr>

iRBX# show syslog lldp
2019-02-25 06:35:26 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 00:06:38 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 01:21:39 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 05:20:51 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:07:50 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:08:06 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:09:46 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:11:23 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:20:24 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:24:18 irbx info lldp: eth0 discovered Intelligent 20-port managed
Gigabit Ethernet switch with 8x10/100/1000Base-T(X) and 12x100/1000Base-X, SFP socket
```

Syslog lldp can be filtered by severity as well.

9.6.15.3.1 show syslog lldp info

```
iRBX# show syslog lldp info
2019-02-25 06:35:26 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 00:06:38 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 01:21:39 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 05:20:51 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:07:50 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:08:06 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:09:46 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:11:23 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:20:24 irbx info lldp: PORT2 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:24:18 irbx info lldp: eth0 discovered Intelligent 20-port managed
Gigabit Ethernet switch with 8x10/100/1000Base-T(X) and 12x100/1000Base-X, SFP socket
2019-02-26 06:38:34 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 06:41:48 irbx warning lldpd[658]: no privilege separation available
2019-02-26 06:41:48 irbx info lldpd[658]: protocol LLDP enabled
2019-02-26 06:41:48 irbx info lldpd[658]: libevent 2.0.22-stable initialized with
epoll method
2019-02-26 06:41:49 irbx info lldpd[658]: unable to get system name
2019-02-26 06:41:49 irbx info lldpd[658]: unable to get system name
2019-02-26 06:41:49 irbx info lldpd[658]: unable to get system name
2019-02-26 06:41:49 irbx info lldpcli[657]: LLDP PortID TLV type set to new value :
ifname
2019-02-26 06:41:49 irbx info lldpcli[657]: lldpd should resume operations
2019-02-26 06:42:21 irbx info lldp: eth0 discovered Intelligent 20-port managed
```

9.6.15.3.2 show syslog lldp warn

```
iRBX# show syslog lldp warn
2019-02-26 06:41:48 irbx warning lldpd[658]: no privilege separation available
iRBX# show
```

9.6.15.3.3 show syslog lldp error

```
iRBX# show syslog lldp error
  <cr>

iRBX# show syslog lldp error
iRBX#
```

9.6.15.3.4 show syslog lldp critical

```
iRBX# show syslog lldp critical
  <cr>

iRBX# show syslog lldp critical
iRBX#
```

9.6.15.4 show syslog login

```
iRBX# show syslog login
  info,warn,error,critical  - filter by severity
  <cr>

iRBX# show syslog login info
No events
iRBX# show syslog login warn
No events
iRBX# show syslog login error
No events
iRBX# show syslog login critical
No events
iRBX#
```

9.6.15.5 show syslog rstp

```
iRBX# show syslog rstp
  info,warn,error,critical  - filter by severity
  <cr>
admin@10.13# show syslog rstp info
2019-02-25 06:35:09 irbx info kernel:PORT1: bridge tunnel mode
2019-02-25 06:35:09 irbx info kernel:PORT2: bridge state 4
2019-02-25 06:35:09 irbx info kernel:PORT2: bridge tunnel mode
2019-02-25 06:35:11 irbx info kernel:PORT1: bridge state 2
2019-02-25 06:35:11 irbx info mstpd: MSTP_OUT_set_state: br0:RING0:0 entering
learning state
2019-02-25 06:35:11 irbx info mstpd: MSTP_OUT_set_state: br0:RING0:0 entering
forwarding state
2019-02-25 06:35:11 irbx info kernel:PORT2: bridge state 2
2019-02-25 06:35:11 irbx info kernel:PORT1: bridge state 3
2019-02-25 06:35:11 irbx info kernel:PORT1: bridge state forwarding (120)
2019-02-25 06:35:11 irbx info kernel:PORT1: bridge normal mode
2019-02-25 06:35:11 irbx info kernel:PORT2: bridge state 3
2019-02-25 06:35:11 irbx info kernel:PORT2: bridge state forwarding (120)
2019-02-25 06:35:11 irbx info mstpd: set_br_up: br0 was up
2019-02-25 06:35:11 irbx info mstpd: set_br_up: Set bridge br0 up
2019-02-25 06:35:11 irbx info mstpd: set_if_up: Port RING0 : up
2019-02-25 06:35:11 irbx info mstpd: set_br_up: br0 was up
2019-02-25 06:35:11 irbx info mstpd: set_br_up: Set bridge br0 up
2019-02-25 06:35:11 irbx info mstpd: set_if_up: Port RING0 : up
2019-02-25 06:35:11 irbx info mstpd: set br up: br0 was up
```

9.6.15.5.1 show syslog rstp error

Note that if the syslog rstp severity level is set up to info, a severity "error" will be not reported in the syslog file.

```
iRBX# show syslog rstp error
iRBX# (config-syslog)# facility rstp
iRBX# (config-syslog-rstp)# severity critical
iRBX# show syslog rstp critical
iRBX# show syslog rstp error
```

9.6.15.6 show syslog search

```
iRBX(config)# facility
  alarm,lldp,login,rstp,ssh,system,web  - facility name

iRBX(config)# exit
iRBX# show syslog search?
  search  through all facilities
iRBX# show syslog search remote
[ system ]
2019-03-01 00:31:01 10 info cdb: admin changed syslog_remote_2
iRBX# show syslog search info
[ system ]
2019-03-01 00:01:27 10 info cdb: admin cleared all syslog facilities
2019-03-01 00:31:01 10 info cdb: admin changed syslog_remote_2
iRBX#
```

It searches a facility for specific keyword as shown in the examples above.

9.6.15.7 show syslog ssh

```
iRBX# show syslog ssh
2019-02-26 06:42:45 irbx info sshd[1044]: Server listening on 0.0.0.0 port 22.
iRBX#
```

9.6.15.8 show syslog status

```
iRBX# show syslog status ?
  status  Show syslog status
  <cr>

iRBX# show syslog status
syslog enabled
disk usage 8%
remote server forwarding rules:
2: alarm,info,172.168.26.11,udp,514
iRBX#
```

9.6.15.9 show syslog system

```
iRBX# how syslog system
  info,warn,error,critical  - filter by severity
  <cr>

iRBX# show syslog system warn
2019-02-26 05:15:04 irbx err passwd: unknown user c
2019-02-26 06:28:00 irbx warning kernel:[0x8] <- 0x0202
2019-02-26 06:40:41 irbx crit system: starting up 4.5.114
2019-02-26 06:41:33 irbx err /usr/bin/konfd: Start daemon.
2019-02-28 06:12:43 10 crit system: factory reset by admin
iRBX# show syslog system error
2019-02-26 05:15:04 irbx err passwd: unknown user c
2019-02-26 06:40:41 irbx crit system: starting up 4.5.114
2019-02-26 06:41:33 irbx err /usr/bin/konfd: Start daemon.
2019-02-28 06:12:43 10 crit system: factory reset by admin

iRBX# show syslog system critical
2019-02-26 05:15:04 irbx err passwd: unknown user c
2019-02-26 06:40:41 irbx crit system: starting up 4.5.114
2019-02-26 06:41:33 irbx err /usr/bin/konfd: Start daemon.
2019-02-28 06:12:43 10 crit system: factory reset by admin
iRBX#
```

9.6.15.10 show syslog web

```
iRBX# show syslog web warn
2019-02-25 06:16:05 irbx err nginx: 2019/02/25 06:16:05 [error] 952#952: *1126 user
"logout" was not found in "/etc/nginx/.password", client: 192.168.10.10, server:
localhost, request: "PUT /s/index.html HTTP/1.1", host: "192.168.10.13", referrer:
"http://192.168.10.13/index.html"
2019-02-25 06:16:05 irbx err nginx: 2019/02/25 06:16:05 [error] 952#952: *1126 open()
"/var/www/iS5/banner.html" failed (13: Permission denied), client: 192.168.10.10,
server: localhost, request: "GET /banner.html?_=1551131326442 HTTP/1.1", host:
"192.168.10.13", referrer: "http://192.168.10.13/index.html"
iRBX#
```

9.6.15.11 show syslog info, warn, error, critical

```
iRBX# show syslog info
[ system ]
2019-03-01 00:01:27 10 info cdb: admin cleared all syslog facilities
2019-03-01 00:31:01 10 info cdb: admin changed syslog_remote_2
iRBX# show syslog warn
[ ]
iRBX# show syslog error
[ ]
iRBX# show syslog critical
[ ]iRBX#
```

9.6.16 show system command

```
iRBX# show system
Name                  : iRBX
Model                 : iRBX6GF-S-LV-LV-D-2GSFP-2GSFP-2GCX
Serial                : RBX64918-00001
HW Revision           : iRBX-D006-PS0103-FM0615-FB0015-SW04454
Location              : Earth
MAC Address           : E8:E8:75:80:02:5C (management)
MAC Address           : E8:E8:75:80:02:5D (internal)
Chip ID               : 00000615
CPU                   : NiosII,150Mhz
System Time           : Mon Feb 25 19:56:25 GMT-4 2019
System Uptime         : 5d,17:54:40
Software Version      : iRBX-D-4.5.112
Software Date         : 2019-02-15
Power supply 1,2      : ON,OFF
Firmware Bank[0]      : iRBX-D-firmware-4.5.112-20190215 (active)
Firmware Bank[1]      : iRBX-D-firmware-4.4.60-20190214 (backup)
 iRBX#
```

9.6.17 show temperature command

```
iRBX# show temperature
39
iRBX#
```

9.6.18 show time command

```
iRBX# show time
Mon Feb 25 19:57:04 GMT-4 2019
iRBX#
```

9.6.19 show timezone command

```
iRBX# show timezone
Etc/GMT-4
iRBX#
```

Note: for Time Zone Map, refer to https://www.timeanddate.com/time/map/ . Toronto is -4.

9.6.20 show timezone list command

iRBX# show timezone list
Africa/Abidjan
Africa/Accra
Africa/Addis_Ababa
Africa/Algiers
Africa/Asmara
Africa/Asmera
Africa/Bamako
Africa/Bangui
Africa/Banjul
Africa/Bissau
Africa/Blantyre
Africa/Brazzaville
Africa/Bujumbura
Africa/Cairo
Africa/Casablanca
Africa/Ceuta
Africa/Conakry
Africa/Dakar
Africa/Dar_es_Salaam
Africa/Djibouti
Africa/Douala
Africa/El_Aaiun
Africa/Freetown
Africa/Gaborone
Africa/Harare
Africa/Johannesburg
Africa/Juba
Africa/Kampala
Africa/Khartoum
Africa/Kigali
Africa/Kinshasa
Africa/Lagos
Africa/Libreville
Africa/Lome
Africa/Luanda
Africa/Lubumbashi
Africa/Lusaka
Africa/Malabo
Africa/Maputo
Africa/Maseru
Africa/Mbabane
Africa/Mogadishu
Africa/Monrovia
Africa/Nairobi
Africa/Ndjamena
Africa/Niamey
Africa/Nouakchott
Africa/Ouagadougou
Africa/Porto-Novo

Africa/Sao_Tome
Africa/Timbuktu
Africa/Tripoli
Africa/Tunis
Africa/Windhoek
America/Adak
America/Anchorage
America/Anguilla
America/Antigua
America/Araguaina
America/Argentina/Buenos_Aires
America/Argentina/Catamarca
America/Argentina/ComodRivadavia
America/Argentina/Cordoba
America/Argentina/Jujuy
America/Argentina/La_Rioja
America/Argentina/Mendoza
America/Argentina/Rio_Gallegos
America/Argentina/Salta
America/Argentina/San_Juan
America/Argentina/San_Luis
America/Argentina/Tucuman
America/Argentina/Ushuaia
America/Aruba
America/Asuncion
America/Atikokan
America/Atka
America/Bahia
America/Bahia_Banderas
America/Barbados
America/Belem
America/Belize
America/Blanc-Sablon
America/Boa_Vista
America/Bogota
America/Boise
America/Buenos_Aires
America/Cambridge_Bay
America/Campo_Grande
America/Cancun
America/Caracas
America/Catamarca
America/Cayenne
America/Cayman
America/Chicago
America/Chihuahua
America/Coral_Harbour
America/Cordoba
America/Costa_Rica
America/Creston
America/Cuiaba
America/Curacao
America/Danmarkshavn
America/Dawson
America/Dawson_Creek
America/Denver
America/Detroit
America/Dominica
America/Edmonton
America/Eirunepe

America/El_Salvador
America/Ensenada
America/Fort_Nelson
America/Fort_Wayne
America/Fortaleza
America/Glace_Bay
America/Godthab
America/Goose_Bay
America/Grand_Turk
America/Grenada
America/Guadeloupe
America/Guatemala
America/Guayaquil
America/Guyana
America/Halifax
America/Havana
America/Hermosillo
America/Indiana/Indianapolis
America/Indiana/Knox
America/Indiana/Marengo
America/Indiana/Petersburg
America/Indiana/Tell_City
America/Indiana/Vevay
America/Indiana/Vincennes
America/Indiana/Winamac
America/Indianapolis
America/Inuvik
America/Iqaluit
America/Jamaica
America/Jujuy
America/Juneau
America/Kentucky/Louisville
America/Kentucky/Monticello
America/Knox_IN
America/Kralendijk
America/La_Paz
America/Lima
America/Los_Angeles
America/Louisville
America/Lower_Princes
America/Maceio
America/Managua
America/Manaus
America/Marigot
America/Martinique
America/Matamoros
America/Mazatlan
America/Mendoza
America/Menominee
America/Merida
America/Metlakatla
America/Mexico_City
America/Miquelon
America/Moncton
America/Monterrey
America/Montevideo
America/Montreal
America/Montserrat
America/Nassau
America/New_York

America/Nipigon
America/Nome
America/Noronha
America/North_Dakota/Beulah
America/North_Dakota/Center
America/North_Dakota/New_Salem
America/Ojinaga
America/Panama
America/Pangnirtung
America/Paramaribo
America/Phoenix
America/Port-au-Prince
America/Port_of_Spain
America/Porto_Acre
America/Porto_Velho
America/Puerto_Rico
America/Rainy_River
America/Rankin_Inlet
America/Recife
America/Regina
America/Resolute
America/Rio_Branco
America/Rosario
America/Santa_Isabel
America/Santarem
America/Santiago
America/Santo_Domingo
America/Sao_Paulo
America/Scoresbysund
America/Shiprock
America/Sitka
America/St_Barthelemy
America/St_Johns
America/St_Kitts
America/St_Lucia
America/St_Thomas
America/St_Vincent
America/Swift_Current
America/Tegucigalpa
America/Thule
America/Thunder_Bay
America/Tijuana
America/Toronto
America/Tortola
America/Vancouver
America/Virgin
America/Whitehorse
America/Winnipeg
America/Yakutat
America/Yellowknife
Antarctica/Casey
Antarctica/Davis
Antarctica/DumontDUrville
Antarctica/Macquarie
Antarctica/Mawson
Antarctica/McMurdo
Antarctica/Palmer
Antarctica/Rothera
Antarctica/South_Pole
Antarctica/Syowa

Antarctica/Troll
Antarctica/Vostok
Arctic/Longyearbyen
Asia/Aden
Asia/Almaty
Asia/Amman
Asia/Anadyr
Asia/Aqtau
Asia/Aqtobe
Asia/Ashgabat
Asia/Ashkhabad
Asia/Baghdad
Asia/Bahrain
Asia/Baku
Asia/Bangkok
Asia/Barnaul
Asia/Beirut
Asia/Bishkek
Asia/Brunei
Asia/Calcutta
Asia/Chita
Asia/Choibalsan
Asia/Chongqing
Asia/Chungking
Asia/Colombo
Asia/Dacca
Asia/Damascus
Asia/Dhaka
Asia/Dili
Asia/Dubai
Asia/Dushanbe
Asia/Gaza
Asia/Harbin
Asia/Hebron
Asia/Ho_Chi_Minh
Asia/Hong_Kong
Asia/Hovd
Asia/Irkutsk
Asia/Istanbul
Asia/Jakarta
Asia/Jayapura
Asia/Jerusalem
Asia/Kabul
Asia/Kamchatka
Asia/Karachi
Asia/Kashgar
Asia/Kathmandu
Asia/Katmandu
Asia/Khandyga
Asia/Kolkata
Asia/Krasnoyarsk
Asia/Kuala_Lumpur
Asia/Kuching
Asia/Kuwait
Asia/Macao
Asia/Macau
Asia/Magadan
Asia/Makassar
Asia/Manila
Asia/Muscat

Asia/Nicosia
Asia/Novokuznetsk
Asia/Novosibirsk
Asia/Omsk
Asia/Oral
Asia/Phnom_Penh
Asia/Pontianak
Asia/Pyongyang
Asia/Qatar
Asia/Qyzylorda
Asia/Rangoon
Asia/Riyadh
Asia/Saigon
Asia/Sakhalin
Asia/Samarkand
Asia/Seoul
Asia/Shanghai
Asia/Singapore
Asia/Srednekolymsk
iRBX#

9.6.21 show uptime command

```
iRBX# show uptime
5d,17:57:51
iRBX#
```

9.6.22 show version command

```
iRBX# show version
show version
Version=4.5.114
Built=2019-02-21
iRBX#
```

9.6.23 show vlans command

```
iRBX# show vlans

Vlan        Ports
------------------------------------
1          1,2,3,4,5,6 (0x7f)

Management VLAN
------------------------------------
1

Port        Panel       PVID    Egress
------------------------------------
PORT1       P1/A        1       untagged
PORT2       P2/B        1       untagged
PORT3       P4/A        1       untagged
PORT4       P5/B        1       untagged
PORT5       P3          1       untagged
PORT6       P6          1       untagged
iRBX#
```

9.7 Configuration Context CLI Syntax

In the Configuration Context, the user can configure switch system parameters, ports, PTP, VLANs, RSTP, SNMP, etc. To go to the Configuration Context, execute ***configure terminal*** command first. When the (config)# prompt appears, use the commands shown in the following table.

Table 22 – Configuration Context Level CLI

#	Command syntax	Description	Example
	!	Comments	
1	alarm	Alarm Control	alarm command
2	do	To run exec commands in configure mode	do command
3	exit	Exit from configure mode	exit command
4	factory-reset	Restore factory default configuration	factory-reset command
5	ip	Configure IPv4 settings	ip command
6	lldp	Link Layer Discovery Protocol	lldp command
7	no	Negate a command or set its defaults	no command
8	ntp	Network Time Protocol	ntp command
9	password	Change password	password command
10	port	Configure Port	port command
11	ptp	Precision Time Protocol	ptp command
12	reboot	Halt and perform a cold restart	reboot command
13	redundancy	Ethernet IEC 62439-3	redundancy commands
14	rstp	Rapid Spanning Tree Protocol	rstp command
15	save	Save configuration on flash	save command
16	snmp	Simple Network Management Protocol	snmp command
17	ssh	Secure Shell Protocol	ssh command
18	syslog	System logging	syslog command
19	system	Configure system/unit parameters	system command
20	vlan	Configure vlan	vlan command
21	web	Control Web UI	web command

Note: If port names are displayed differently, follow Port Naming Table.

9.7.1 alarm command

```
iRBX(config)# alarm
iRBX(config-alarm)#
  !              Comments
  exit                 from alarm configuration mode
  monitor-ports        Alarm if ports change link state
  monitor-power        Alarm if power supply is off
  monitor-temperature  Alarm if temperature is higher than threshold
  snmp-trap-community  SNMP trap community name
  snmp-trap-manager    SNMP trap network manager IP address
iRBX(config-alarm)#
```

9.7.1.1 exit command

```
iRBX(config-alarm)# exit
iRBX(config)#
```

9.7.1.2 monitor-ports command

```
iRBX(config-alarm)# monitor-ports ?
  monitor-ports  Alarm if ports are down
iRBX(config-alarm)# monitor-ports 6
iRBX(config-alarm)# monitor-ports 7
Syntax error: Illegal parameter
iRBX(config-alarm)# monitor-ports 1,2,3,4,5,6
iRBX(config-alarm)#
```

Note: the maximum number of ports for that switch is 6.

9.7.1.3 monitor-power command

```
iRBX(config-alarm)# monitor-power ?
  monitor-power  Alarm if power supply is off

iRBX(config-alarm)# monitor-power 1
iRBX(config-alarm)# monitor-power 1,2
iRBX(config-alarm)#
```

9.7.1.4 monitor-temperature

```
iRBX(config-alarm)# monitor-temperature 75
iRBX(config-alarm)# monitor-tempe?

  Number  Celsius
iRBX(config-alarm)#
```

9.7.1.5 snmp-trap-community

```
iRBX(config-alarm)# snmp-trap-community
  String

iRBX (config-alarm)# snmp-trap-community is5
iRBX (config-alarm)#
```

9.7.1.6 snmp-trap-manager

```
iRBX(config-alarm)# snmp-trap-manager
A.B.C.D

iRBX (config-alarm)# snmp-trap-manager 8.8.8.8
iRBX (config-alarm)#
```

9.7.2 do command

```
iRBX(config)# do ?
  configure  Enter configuration mode
  ping       Send messages to network hosts
  show       system information

iRBX(config)# do
```

When used within Global Configuration mode, the ***do*** command allows going to system commands within this mode. See below for examples.

```
iRBX(config)# do ping 192.168.10.1
PING 192.168.10.1 (192.168.10.1): 56 data bytes
64 bytes from 192.168.10.1: seq=0 ttl=64 time=2.000 ms
64 bytes from 192.168.10.1: seq=1 ttl=64 time=2.000 ms
64 bytes from 192.168.10.1: seq=2 ttl=64 time=1.000 ms
64 bytes from 192.168.10.1: seq=3 ttl=64 time=1.000 ms
64 bytes from 192.168.10.1: seq=4 ttl=64 time=4.000 ms

--- 192.168.10.1 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 1.000/2.000/4.000 ms
iRBX (config)#
```

```
RBX(config-system)# do show
banner      config      date        ip          lldp        log-auth
log-web     mac_table   ntp         ports       ptp         redundancy
rstp        snmp        ssh         stats       system      temperature
time        version     vlans
iRBX(config-system)# do show banner
Welcome to iS5 Communications
 Copyright (c) 2017 iS5 Communications
 All rights reserved

iRBX(config-system)#
do show log-auth
Apr 17 17:05:41 irbx sshd[1791]: Server listening on 0.0.0.0 port 22.
Apr 17 21:40:58 irbx sshd[1791]: Received signal 15; terminating.
Apr 17 21:40:59 irbx sshd[6421]: Server listening on 0.0.0.0 port 22.
Apr 18 15:42:42 irbx sshd[6421]: Received signal 15; terminating.
Apr 18 15:44:30 irbx sshd[18398]: Server listening on 0.0.0.0 port 22.
iRBX(config-system)#

iRBX(config-system)#
```

9.7.3 exit command

```
iRBX(config)# exit
iRBX#
```

9.7.4 factory-reset command

```
iRBX(config)# factory-reset
please reboot the system
iRBX(config) reboot
[  205.376000] br0: port 5(PORT6) entered disabled state
[  205.377000] PORT6: bridge state 0
.
.
**********************************************************************
                    CONFIGURATION FACTORY RESET
**********************************************************************
/
Initializing random number generator... [   17.852000] random: dd urandom read with
3 bits of entropy available
done.
Starting lighttpd: OK
```

Note: use this command to restore the Factory settings, when you can't access the WebUI interface.

9.7.5 ip command

```
iRBX(config)# ip
iRBX(config-ip)#
  !                 Comments
  address           Set management IP address
  dns1              Set DNS server 1
  dns2              Set DNS server 2
  exit              Exit from IPv4 settings mode
  gateway           Set default gateway
  management-vlan   Set management VLAN
iRBX(config-ip)#
```

9.7.5.1 address command

```
iRBX(config-ip)# address ?
  A.B.C.D/mask  IP address

iRBX(config-ip)# address 192.168.10.11/24
iRBX(config-ip)#
```

9.7.5.2 dns1 command

```
iRBX(config-ip)# dns1 ?
  A.B.C.D  IP address of name server

iRBX(config-ip)# dns1 192.168.10.12
iRBX(config-ip)#
```

9.7.5.3 dns2 command

```
iRBX(config-ip)# dns2 ?
  A.B.C.D  IP address of name server

iRBX(config-ip)# dns2 192.168.10.11
iRBX(config-ip)#
```

9.7.5.4 exit command

```
iRBX(config-ip)# exit
iRBX(config)#
```

9.7.5.5 gateway command

```
iRBX(config-ip)# gateway ?
  A.B.C.D  IP address of default gateway

iRBX(config-ip)# gateway 192.168.10.254
iRBX(config-ip)#
```

9.7.5.6 management-vlan command

```
iRBX(config-ip)# management-vlan ?
  vlan number in the range 1-4095  0-4095
iRBX(config-ip)#
iRBX(config-ip)# management-vlan 4
iRBX(config-ip)#
```

9.7.6 lldp command

```
iRBX(config)# lldp
iRBX(config-lldp)# ?

  !        Comments
  disable  Disable lldp
  enable   Enable lldp
  exit     Exit from lldp configuration mode

iRBX(config-lldp)#
```

9.7.6.1 enable command

```
iRBX(config)# lldp
iRBX(config-lldp)# enable
2018-04-18T21:27:24 [WARN/lldpctl] unable to watch for neighbors. End of file
reached

2018-04-18T16:27:26 [INFO/lldpctl] LLDP PortID TLV type set to new value : ifname
2018-04-18T16:27:26 [INFO/lldpctl] lldpd should resume operations
iRBX(config-lldp)#
```

9.7.6.2 disable command

```
iRBX(config)# lldp
iRBX(config-lldp)# disable
2018-04-18T16:28:54 [WARN/lldpctl] unable to watch for neighbors. End of file
reached
iRBX(config-lldp)#
```

9.7.6.3 exit command

```
iRBX(config-lldp)# exit
iRBX(config)#
```

To see all LLDP configuration, Global statistics, and neighbors, use the *do show lldp* command.

9.7.7 no command

```
iRBX(config)# no
  no  Negate a command or set its defaults

RBX(config)# no
  interlink  Unset port as interlink
  vlan       Delete vlan

iRBX(config)#
```

9.7.7.1 no interlink command

```
iRBX(config)# no interlink
  interlink  Unset port as interlink
iRBX(config)# no interlink
```

9.7.7.2 no vlan command

```
iRBX(config)# no vlan 1
iRBX(config)#
```

9.7.8 ntp command

```
iRBX(config)# ntp
iRBX(config-ntp)#
  !         Comments
  disable   Disable ntp
  enable    Enable ntp
  exit      Exit from ntp configuration mode
  server1   Add time server 1
  server2   Add time server 2
  sync      Sync time now

iRBX(config-ntp)#
```

9.7.8.1 disable command

```
iRBX(config-ntp)# disable
iRBX(config-ntp)#
```

9.7.8.2 enable command

```
iRBX(config-ntp)#enable
NTP might conflict PTP
iRBX(config-ntp)#
iRBX(config-ntp)# exit
iRBX(config)# ptp
iRBX(config-ptp)# disable
iRBX(config-ptp)# exit
iRBX(config)# ntp
iRBX(config-ntp)# enable
iRBX(config-ntp)#
```

9.7.8.3 exit command

```
iRBX(config-ntp)# exit
iRBX(config)
```

9.7.8.4 server1 command

```
iRBX(config-ntp)# server
server1 server2
iRBX(config-ntp)# server
  server1  Add time server 1
  server2  Add time server 2
iRBX(config-ntp)# server1 1.pool.ntp.org
```

Note: type server1 without a space.

9.7.8.5 server2 command

```
iRBX(config-ntp)# server2 2.pool.ntp.org
iRBX(config-ntp)#
```

9.7.8.6 sync command

```
iRBX(config-ntp)# sync
Wed Apr 18 16:40:32 UTC 2018
iRBX(config-ntp)#
```

9.7.9 password command

```
iRBX(config)# password
  String  username

iRBX (config)# password string
```

9.7.10 port command

```
iRBX(config)# port 2
iRBX(config-port2)#
```

Note: leave a space between a port and its number (e.g. port 2, not port1).

```
iRBX(config-port2)#
  !         Comments
  disable   Disable port
  enable    Enable port
  exit      Exit from port configuration mode
  pvid      Set port default vlan
  tagged    Set port egress tagged mode
iRBX(config-port2)#
```

9.7.10.1 disable command

```
iRBX(config-port2)# disable
PORT2: power going down
iRBX(config-port2)#
```

9.7.10.2 enable command

```
iRBX(config-port2)# enable
PORT2: power is up
iRBX(config-port2)#
```

9.7.10.3 exit command

```
iRBX(config)# port 6
iRBX(config-port6)# exit
iRBX(config)# exit
iRBX#
```

9.7.10.4 pvid command

```
iRBX(config-port2)
  vlan number in the range 1-4095
iRBX(config-port2)# pvid
  pvid  Set port default vlan

iRBX(config-port2) tapvid 10
iRBX(config-port1)
```

9.7.10.5 tagged command

```
iRBX(config-port2)# tagged
  tagged  Set port egress tagged mode
  <cr>

iRBX(config-port2)# tagged
iRBX(config-port2)#
```

To see the *pvid* and *egress* values for port 1 and port 6, go to show vlans. Or use the *do show vlans* command from the Configuration Context

```
iRBX (config-port2)# do show vlans

Vlan        Ports
------------------------------------
1,2,3,4,5,6 (0x7f)

Management VLAN
------------------------------------
1

Port        Panel       PVID    Egress
------------------------------------
PORT1       P1/A        1       untagged
PORT2       P2/B        10      tagged
PORT3       P4/A        1       untagged
PORT4       P5/B        1       untagged
PORT5       P3          1       untagged
PORT6       P6          1       untagged
iRBX (config-port2)#
```

9.7.11 ptp command

```
iRBX(config-ptp)#
  !          Comments
  disable    Disable ptp
  enable     Enable ptp
  exit       Exit from ptp configuration mode
  mode       enable or disable tagging of PTP traffic
  one-step   Enable one-step ptp clock mode
  pcp        Priority code (PCP)
  sync       Enable host clock sync to PTP time
  vlan       VLAN ID for PTP messages

iRBX(config-ptp)#
```

9.7.11.1 disable command

```
iRBX(config)# ptp
iRBX(config-ptp)# disable
iRBX(config-ptp)#
```

9.7.11.2 enable command

```
iRBX(config)# ptp
iRBX(config-ptp)# enable
iRBX(config-ptp)#
```

9.7.11.3 exit command

```
iRBX(config-ptp)# exit
iRBX(config)#
```

9.7.11.4 mode command

```
iRBX(config-ptp)# mode ?
  mode  enable or disable tagging of PTP traffic
iRBX(config-ptp)# mode tagged
setting PTP VLAN 0 PCP 4
iRBX(config-ptp)#mode untagged
iRBX(config-ptp)#
```

9.7.11.5 one-step command

```
iRBX(config-ptp)# one-step
  one-step  Enable one-step ptp clock mode
  <cr>
iRBX(config-ptp)# one-step
iRBX(config-ptp)#
```

9.7.11.6 pcp command

```
iRBX(config-ptp)# pcp
  Number  Priority code (PCP)

iRBX(config-ptp)# pcp 5
setting PTP VLAN 0 PCP 5
iRBX(config-ptp)#
```

9.7.11.7 sync command

```
iRBX(config-ptp)# sync
  sync  Enable host clock sync to PTP time
  <cr>

iRBX(config-ptp)# sync
iRBX(config-ptp)#
```

9.7.11.8 vlan command

```
iRBX(config-ptp)# vlan ?
  vlan  VLAN ID for PTP messages

iRBX(config-ptp)# vlan 1
setting PTP VLAN 1 PCP 5
irbx(config-ptp)#
```

9.7.12 reboot command

See reboot (a cold restart) command.

9.7.13 redundancy commands

```
iRBX(config)# redundancy
!       Comments
  exit    Exit from redundancy configuration mode
  mode    Set redundancy mode
  netid   Set PRP NetID
iRBX(config-redundancy)#
```

9.7.13.1 exit command

```
iRBX(config)# redundancy
iRBX(config-redundancy)# exit
iRBX(config)#
```

9.7.13.2 mode command

```
iRBX(config)# redundancy
iRBX(config-redundancy)# Mode
  Redundancy mode:  HSR, PRP or HSR-PRP bridge modes: HSR-PRP-A for LAN A or HSR-
PRP-B for LAN B
iRBX(config-redundancy)# mode HSR
[13654.053000] [0x8] <- 0x0202
Redundancy: using HSR mode with I-Port on PORT5
iRBX(config-redundancy)# mode PRP
[13765.331000] [0x8] <- 0x0202
Redundancy: using PRP mode with I-Port on PORT5
iRBX(config-redundancy)#mode HSR-PRP-A
[790521.883000] [0x8] <- 0x0282
Redundancy: using HSR-PRP-A mode with I-Port on PORT5
iRBX (config-redundancy)#
```

9.7.13.3 netid command

```
iRBX(config)# redundancy
iRBX(config-redundancy)# netid
  netid  Set PRP NetID

iRBX (config-redundancy)# netid
  1..6  PRP NetID

iRBX(config-redundancy)# netid 6
[0x8] <- 0x0202
Redundancy: using HSR mode with I-Port on PORT5
iRBX(config-redundancy)#
```

Note that the netid's value is from 1 to 6. If `HSR-PRP-A and HSR-PRP-B is chosen, the netID is defined 1 by default.`

9.7.14 rstp command

```
iRBX(config)# rstp
iRBX(config-rstp)# ?
  !            Comments
  disable      Disable rstp protocol
  domain       Set bridge separate-domain id
  enable       Enable rstp protocol
  exit         Exit from rstp configuration mode
  fdelay       Set bridge forward delay
  hello        Set bridge hello time
  maxage       Set bridge max age
  maxhops      Set max hops
  port         Configure rstp port
  priority     Set bridge priority
  txholdcount  Set transmit hold count

!iRBX(config-rstp)#
```

For details on the RSTP configuration terms and values, see RSTP Bridge

9.7.14.1 disable command

```
iRBX(config-rstp)# disable
PORT5: bridge state 0
PORT5: bridge state disabled (122)
PORT1: bridge state 0
PORT1: bridge state disabled (122)
PORT1: bridge tunnel mode
PORT2: bridge state 0
PORT2: bridge state disabled (122)
PORT2: bridge tunnel mode
device PORT6 left promiscuous mode
PORT6: bridge state 0
device PORT5 left promiscuous mode
PORT5: bridge state 0
device PORT4 left promiscuous mode
PORT4: bridge state 0
device PORT3 left promiscuous mode
PORT3: bridge state 0
device RING0 left promiscuous mode
device PORT1 left promiscuous mode
device PORT2 left promiscuous mode
PORT1: bridge state 0
PORT2: bridge state 0
PORT1 forwarding
PORT2 forwarding
PORT2: bridge state forwarding (120)
PORT3 forwarding
PORT4 forwarding
PORT5 forwarding
PORT5: bridge state forwarding (120)
PORT6 forwarding
PORT1: bridge normal mode
PORT2: bridge normal mode
iRBX(config-rstp)#
```

9.7.14.2 enable command

```
iRBX(config-rstp)#
iRBX(config-rstp)# enable
[14645.112000] PORT6: state disabled (122)
2018-04-17 16:07:37 main: Sanity checks succeeded
[14648.140000] device RING0 entered promiscuous mode
[14648.144000] device PORT1 entered promiscuous mode
[14648.150000] device PORT2 entered promiscuous mode
[14649.431000] device PORT3 entered promiscuous mode
[14650.439000] device PORT4 entered promiscuous mode
[14651.618000] device PORT5 entered promiscuous mode
[14652.669000] device PORT6 entered promiscuous mode
[14652.831000] br0: port 5(PORT6) entered blocking state
[14652.832000] PORT6: bridge state 4
[14652.893000] br0: port 5(PORT6) entered blocking state
[14652.895000] PORT6: bridge state 4
[14652.950000] br0: port 5(PORT6) entered learning state
[14652.951000] PORT6: bridge state 2
[14652.952000] PORT6: state learning (121)
[14653.118000] br0: port 5(PORT6) entered blocking state
[14653.119000] PORT6: bridge state 4
[14653.120000] PORT6: state disabled (122)
iRBX(config-rstp)# [14655.369000] br0: port 5(PORT6) entered learning state
[14655.370000] PORT6: bridge state 2
[14655.371000] PORT6: state learning (121)
[14655.390000] br0: port 5(PORT6) entered forwarding state
[14655.391000] PORT6: bridge state 3
[14655.392000] PORT6: state forwarding (120)

iRBX(config-rstp)#
```

9.7.14.3 domain command

```
iRBX(config-rstp)# domain
  Number 0..9  in range (0-9), default is 0 (no separation)

iRBX(config-rstp)#domain 1
iRBX(config-rstp)#
```

9.7.14.4 exit command

```
iRBX(config-rstp)# exit
iRBX(config)#
```

9.7.14.5 fdelay command

```
iRBX(config-rstp)# fdelay ?
  Number  in range (4-30), default is 15

iRBX(config-rstp)# fdelay 5
CTL_set_cist_bridge_config: Got return code 0, -1
br0 Configured Bridge Times don't meet 2 * (Bridge Forward Delay - 1 second) >=
Bridge Max Age

Couldn't change bridge bridge_forward_delay
iRBX(config-rstp)# maxage 6
iRBX(config-rstp)# fdelay 5
iRBX(config-rstp)#
```

Note: I changed the maxage=6 (refer to maxage command), since the default maxage=20. A default value of 5 doesn't meet 2 * (`fdelay` -1)= 2 * (5-1)=8 it is not `>= 20 = Bridge Max Age`.

9.7.14.6 hello command

```
iRBX(config-rstp)# hello ?
  Number  in range (1-10), default is 2
iRBX(config-rstp)# hello 10
iRBX(config-rstp)#
```

9.7.14.7 maxage command

```
iRBX(config-rstp)# maxage ?
  Number  in range (6-40), default is 20
iRBX(config-rstp)# maxage 6
iRBX(config-rstp)#
```

9.7.14.8 maxhops command

```
iRBX(config-rstp)# maxhops ?
  Number  in range (6-40), default is 20

iRBX(config-rstp)# maxhops 6
iRBX(config-rstp)#
```

9.7.14.9 port command

```
iRBX(config-rstp)# port
  R(redundancy),3,4,5,6  port number

iRBX(config-rstp)# port R,3
iRBX(config-rstp-port-R,3)#
!              Comments
  admin-edge     Enables/disables the initial edge state of the port, default is no
  auto-edge      Enables/disables the auto transition to/from the edge state,
default is yes
  bpdu-discard   Discard BPDU when RSTP is off, default is forward
  exit           Exit from rstp port configuration mode
  member         Participate in protocol
  p2p            Identify point-to-point link, default is auto
  path-cost      Set path cost
  port-priority  Set port priority

iRBX(config-rstp-port-R,3)# exit
iRBX(config-rstp)# port R,7
iRBX(config-rstp-port-R,7)#
```

After port R,3, " Syntax error: Illegal parameter" appears.

9.7.14.9.1 admin-edge command

```
iRBX(config-rstp-port-R,3)# admin-edge
  Choice: yes|no

iRBX(config-rstp-port-R,3)# admin-edge yes
iRBX(config-rstp-port-R,3)#
```

9.7.14.9.2 auto-edge command

```
iRBX(config-rstp-port-R,3)# auto-edge
  Choice: yes|no

iRBX(config-rstp-port-R,3)# auto-edge yes
iRBX(config-rstp-port-R,3)#
```

9.7.14.9.3 bpdu-discard

```
RBX(config-rstp-port-R,3)# bpdu-discard
/irbx/sbin/rstp.port.bpdu.sh: line 27: can't create
/proc/driver/flx_frs/PORT/R,3/rstp_bpdu_discard: nonexistent directory
iRBX(config-rstp-port-R,3)#
```

9.7.14.9.4 exit

```
iRBX(config-rstp-port-R,3)# exit
```

9.7.14.9.5 member

```
iRBX(config-rstp-port-R,3)# member
  Choice: yes|no

iRBX(config-rstp-port-R,3)# member yes
iRBX(config-rstp-port-R,3)#
```

9.7.14.9.6 p2p

```
iRBX(config-rstp-port-R,3)# p2p
  Choice: auto|yes|no

iRBX(config-rstp-port-R,3)# p2p auto
iRBX(config-rstp-port-R,3)#
```

9.7.14.9.7 path-cost

```
iRBX(config-rstp-port-R,3)# path-cost
  Number  0..200000000, default is 0

iRBX(config-rstp-port-R,3)# path-cost 100
iRBX(config-rstp-port-R,3)#
```

9.7.14.9.8 port-priority

```
iRBX(config-rstp-port-R,3)# port-priority
  Port priority a multiple of 16  in range (0-240), default is 128

iRBX(config-rstp-port-R,3)# port-priority 64
iRBX(config-rstp-port-R,3)#
```

9.7.14.10 priority command

```
iRBX(config-rstp)# priority
  Number  in range (0-15). Priority is the number multiplied by 4096, default is 8

iRBX(config-rstp)# priority 9
iRBX(config-rstp)#
```

9.7.14.11 txholdcount command

```
iRBX(config-rstp)# txholdcount ?
  Number  in range (1-10), default is 6

iRBX(config-rstp)# txholdcount 1
iRBX(config-rstp)#
```

To view the changes in the RSTP parameters, use the *do show rstp* command.

```
iRBX(config-rstp)# do show rstp

Enabled           yes
Domain ID           1
Self Bridge              e8:e8:75:80:01:89
Root Bridge       8.000.e8:e8:75:80:01:89
Root Port        none   | Path Cost           0
Max Age             6   | Hello Time         10
Forward Delay       6   | Max Hops            6
Tx Hold Count       1   | Bridge Priority     8


Port     Link     Member   Dis-bpdu Cost     Priority P2P      Edge(Admin,Auto)  Role       State
-------------------------------------------------------------------------------------------------
R(A,B)   down     yes      no       0        128      auto     no       yes      disabled   discarding
PORT3    down     yes      yes      100      64       auto     yes      yes      disabled   discarding
PORT4    down     yes      no       0        128      auto     no       yes      disabled   discarding
PORT5    down     yes      no       0        128      auto     no       yes      disabled   discarding
PORT6    up       yes      yes      100      128      auto     yes      yes      designated forwarding
3922 msec
iRBX(config-rstp)#
```

9.7.15 save command

```
iRBX(config)# save
iRBX(config)#
```

9.7.16 snmp command

```
iRBX(config)# snmp
iRBX(config-snmp)#
  !           Comments
  community   Set community
  disable     Disable snmp protocol
  enable      Enable snmp protocol
  exit        Exit from snmp configuration mode
  v3-user     Set snmpv3 user

iRBX(config-snmp)#
```

9.7.16.1 community command

```
RBX(config-snmp)# community
  1..4  entry number

iRBX(config-snmp)# community 1 public read-only
iRBX(config-snmp)# community 4 private read-write
iRBX(config-snmp)#
```

If you use the do show command to view the snmp status:

```
RBX(config-snmp)# do show snmp

status:
snmpd is running

community:
rocommunity public default -V systemonly
rwcommunity private default -V systemonly
```

9.7.16.2 disable command

```
iRBX(config-snmp)# disable
Stopping network management services: snmpd snmptrapd.
iRBX(config-snmp)#
```

9.7.16.3 enable command

```
iRBX(config)# snmp
iRBX(config-snmp)# enable
Restarting network management services: snmpd.
iRBX(config-snmp)#
```

9.7.16.4 exit command

```
iRBX(config-snmp)# exit
iRBX(config-snmp)#
```

9.7.16.5 v3-user command

```
iRBX(config-snmp)# v3-user
  1..4  entry number
iRBX(config-snmp)# v3-user 1
  String  username - 8 characters min
iRBX(config-snmp)# v3-user 1 maurin
  MD5 or SHA  - hash function
iRBX(config-snmp)# v3-user 1 maurin SHA
  AES-128 or DES  - encryption algorithm
iRBX(config-snmp)# v3-user 1 maurin SHA DES
  read-only or read-write  - access mode
iRBX(config-snmp)# v3-user 1 maurin SHA DES read-only
  password 6-16 characters  - password
  <cr>
iRBX(config-snmp)# v3-user 1 maurin SHA DES read-only is5communication
   createUser maurin SHA "is5communication" DES
   rouser maurin
iRBX (config-snmp)#
```

9.7.17 ssh command

```
iRBX(config)# ssh
iRBX(config-ssh)#
  !         Comments
  disable   Disable ssh protocol
  enable    Enable ssh protocol
  exit      Exit from ssh configuration mode
  keygen    Regenerate SSH keys

iRBX(config-ssh)#
```

9.7.17.1 disable command

```
iRBX(config)# ssh
admin@irbx(config-ssh)# disable
Stopping sshd: OK
admin@irbx(config-ssh)# iRBX(config-ssh)#
```

9.7.17.2 enable command

```
iRBX(config)# ssh
iRBX(config-ssh)# enable
Starting sshd: OK
iRBX(config-ssh)#
```

9.7.17.3 exit command

```
iRBX(config)# ssh
iRBX(config-ssh)# exit
iRBX(config)#
```

9.7.17.4 keygen command

```
iRBX(config-ssh)# keygen
It might take around 20min. Continue? [y/N]y
Wed Apr 18 11:11:55 UTC 2018
Generating public/private rsa key pair.
Your identification has been saved in /data/etc/ssh_host_rsa_key.
Your public key has been saved in /data/etc/ssh_host_rsa_key.pub.
The key fingerprint is:
ab:ae:9c:eb:96:d0:a8:1a:3f:6a:a0:d2:02:54:3d:2d root@iRBX
The key's randomart image is:
+---[RSA 1024]----+
|     . .         |
|    . E .        |
|   .   o         |
| .               |
|.  o    S        |
|o o .    .       |
|=o . .   .       |
|=+o.o. .         |
|*o.+*+o          |
+-----------------+
Wed Apr 18 11:12:15 UTC 2018
Wed Apr 18 11:12:15 UTC 2018
Generating public/private dsa key pair.
Your identification has been saved in /data/etc/ssh_host_dsa_key.
Your public key has been saved in /data/etc/ssh_host_dsa_key.pub.
The key fingerprint is:
5d:a1:80:cc:98:dd:50:44:1e:b2:b6:49:7c:81:21:c1 root@iRBX
The key's randomart image is:
+---[DSA 1024]----+
|    .oB+XB   .   |
|     Eo*+.+ . .  |
|       = o . .   |
|      o + . .    |
|       o S .     |
|                 |
|                 |
|                 |
|                 |
+-----------------+
```

```
Wed Apr 18 11:19:29 UTC 2018
Wed Apr 18 11:19:29 UTC 2018
Generating public/private ecdsa key pair.
Your identification has been saved in /data/etc/ssh_host_ecdsa_key.
Your public key has been saved in /data/etc/ssh_host_ecdsa_key.pub.
The key fingerprint is:
d1:2b:5b:2c:97:bb:95:a8:e8:48:d5:79:b3:b1:46:62 root@iRBX
The key's randomart image is:
+---[ECDSA 256]---+
|                 |
|          .      |
|         . .     |
|        . + o    |
|       . E @     |
|      . . X B .  |
|     .    . * o  |
|    . . . o o    |
|     ..o . .     |
+-----------------+
Wed Apr 18 11:19:29 UTC 2018
Wed Apr 18 11:19:29 UTC 2018
Generating public/private ed25519 key pair.
Your identification has been saved in /data/etc/ssh_host_ed25519_key.
Your public key has been saved in /data/etc/ssh_host_ed25519_key.pub.
The key fingerprint is:
cb:ec:ee:51:b4:a5:65:ec:4b:94:07:a5:9c:e4:24:6d root@iRBX
The key's randomart image is:
+--[ED25519 256]--+
|           ..+..  |
|            BE=   |
|           ..% .  |
|          . O .   |
|         S + o    |
|        o o . .   |
|         =   .    |
|        . .       |
|        o+        |
+-----------------+
Wed Apr 18 11:19:30 UTC 2018
irbx(config)# system
irbx(config-system)# exit
irbx(config)iRBX(config-ssh)##
The key fingerprint is:
cb:ec:ee:51:b4:a5:65:ec:4b:94:07:a5:9c:e4:24:6d root@iRBX
The key's randomart image is:
+--[ED25519 256]--+
|           ..+..  |
|            BE=   |
|           ..% .  |
|          . O .   |
|         S + o    |
|        o o . .   |
|         =   .    |
|        . .       |
|        o+        |
+-----------------+
Wed Apr 18 11:19:30 UTC 2018
iRBX(config-ssh)#
```

Note: first time enabling of *ssh* and subsequent *keygen* can take long time to be completed.

9.7.18 syslog command

```
iRBX(config)# syslog
iRBX (config-syslog)#
  !          Comments
  clear      Clear all facilities
  defaults   Reset syslog configuration to defaults
  disable    Disable syslog service
  enable     Enable syslog service
  exit       Exit from syslog configuration mode
  facility   Configure facility
  remote     Configure remote forwarding rule
  restart    Restart syslog service

iRBX (config-syslog)
```

9.7.18.1 clear

```
iRBX (config-syslog)# clear
  clear  Clear all facilities
  <cr>
iRBX (config-syslog)# clear
iRBX (config-syslog)
```

9.7.18.2 defaults command

```
iRBX (config-syslog) # defaults
  defaults  Reset syslog configuration to defaults
iRBX(config-system)# defaults
iRBX (config-syslog) #
```

9.7.18.3 disable command

```
iRBX (config-syslog) # disable ?
  disable  Disable syslog service
  <cr>

iRBX (config-syslog) # disable
iRBX (config-syslog) #
```

9.7.18.4 enable command

```
iRBX (config-syslog) enable ?
  enable  Enable syslog service
  <cr>

iRBX (config-syslog)# enable
iRBX (config-syslog) #
```

9.7.18.5 exit command

```
iRBX (config-syslog)# exit
iRBX (config) #
```

9.7.18.6 facility

```
iRBX(config)# facility
  alarm,lldp,login,rstp,ssh,system,web  - facility name

irbx(config-syslog)# facility alarm
irbx(config-syslog-alarm)#?
!          Comments
  clear     Clear facility messages
  disable   Disable facility
  enable    Enable facility
  exit      Exit from facility configuration mode
  severity  Configure max severity level

iRBX(config-syslog-alarm) # enable
(config-syslog-alarm)#
```

9.7.18.6.1 severity

```
iRBX (config-syslog-alarm)# severity
  info,warn,error,critical

iRBX (config-syslog-alarm)# severity info
iRBX (config-syslog-alarm)# severity warn
  info,warn,error,critical
  <cr>

iRBX (config-syslog-alarm)# severity warn
iRBX (config-syslog-alarm)# severity error
iRBX (config-syslog-alarm)#
```

severity warn—ignores all INFO messages going to web facility
severity error—ignores all INFO and WARN messages going to system facility

9.7.18.6.2 enable

```
iRBX (config-syslog-alarm)# enable
iRBX (config-syslog-alarm)#
```

If you execute the command do show syslog:

```
iRBX (config-syslog-alarm)# do show syslog
[ alarm lldp rstp system web ]
2019-02-25 06:07:24 irbx info cdb: admin cleared all syslog facilities
2019-02-25 06:35:09 irbx info kernel:PORT1: link is up
2019-02-25 06:35:09 irbx notice alarm: PORT1 is up
2019-02-25 06:35:26 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-25 06:36:36 irbx info kernel:PORT1: link is down
2019-02-25 06:36:37 irbx notice alarm: PORT1 is down
2019-02-25 07:54:22 irbx info system: logout admin
2019-02-26 00:04:28 irbx info kernel:PORT1: link is up
2019-02-26 00:04:29 irbx notice alarm: PORT1 is up
2019-02-26 00:06:38 irbx info lldp: PORT1 discovered iRBX6GF HSR/PRP Ethernet Switch
2019-02-26 00:09:27 irbx info kernel:PORT1: link is down
2019-02-26 00:09:27 irbx notice alarm: PORT1 is down
```

9.7.18.6.3 disable

```
iRBX (config-syslog-alarm)# disable
iRBX (config-syslog-alarm)#
```

9.7.18.6.4 clear

```
iRBX (config-syslog-alarm)# clear
  clear  Clear facility messages
  <cr>

iRBX (config-syslog-alarm)# clear
iRBX (config-syslog-alarm)#
```

9.7.18.6.5 exit

```
iRBX (config-syslog-alarm)# exit
  exit  Exit from facility configuration mode
  <cr>
iRBX (config-syslog-alarm)# exit
iRBX (config-syslog-alarm)#
```

9.7.18.7 remote command

```
iRBX (config-syslog)# remote
  1..64  rule id number

iRBX config-syslog)# remote 2
  1..64  rule id number

iRBX (config-syslog)# remote 2
  alarm,lldp,login,rstp,ssh,system,web

iRBX (config-syslog)# remote 2 alarm
  info,warn,error,critical

iRBX (config-syslog)# remote 2 alarm info
  to

iRBX (config-syslog)# remote 2 alarm info to 172.168.26.11 udp 514
```

As shown above the syntax is *(config-syslog)# remote [ID] [facility] [severity] to [host] [proto] [port]*
It forwards facility messages to a remote syslog server.

9.7.18.8 restart command

```
iRBX (config-syslog)# restart
Stopping rsyslog daemon: OK
Starting rsyslog daemon: OK
iRBX (config-syslog)#
```

9.7.19 system

```
iRBX (config)# system
  system  Configure system/unit parameters
  <cr>

iRBX (config)# system
iRBX (config-system)#
```

9.7.19.1 banner

```
iRBX(config-system)# banner
  String  Enter a text surrounded by double quotes. Use \\n as newline
iRBX(config-system)# banner "this is iS5Com's new switch"
this is iS5Com's new switch
iRBX(config-system)# banner "Welcome to iS5 Communications"
Welcome to iS5 Communications
iRBX (config-system)#
```

9.7.19.2 date

```
iRBX(config)# (config-system)# date
  YYYYMMDDHHMM  type 12 digits of date and time

iRBX (config-system)# date 201902251102
Mon Feb 25 11:02:00 UTC 2019
iRBX (config-system)#
```

9.7.19.3 exit

```
iRBX(config)# system
iRBX(config-system)# exit
iRBX(config)#
```

9.7.19.4 location

```
iRBX(config-system)# location
  String  system location

iRBX(config-system)# location Earth
iRBX(config-system)#
```

9.7.19.5 name

```
iRBX(config-system)# name
  String  system name
iRBX(config-system)# name iRBX
iRBX(config-system)#
```

9.7.19.6 timezone

```
iRBX(config-system)# timezone
  String  timezone, see \'show timezone list\' for more information
iRBX(config-system)# timezone
Etc/GMT-4
iRBX(config-system)#
```

Note: for Time Zone Map, refer to https://www.timeanddate.com/time/map/ . Toronto is -4.

A *do show system* command can be executed to see all show parameters.

```
iRBX (config-system)# do show system
Name                 : irbx
Model                :
Serial               :
HW Revision          :
Location             : Earth
MAC Address          : E8:E8:75:00:03:12 (management)
MAC Address          : E8:E8:75:00:03:13 (internal)
Chip ID              : 00000615
CPU                  : NiosII,150Mhz
System Time          : Tue Feb 26 05:51:09 UTC 2019
System Uptime        : 1d,03:50:04
Software Version     : iRBX-D-4.5.114
Software Date        : 2019-02-21
Power supply 1,2     : ON,OFF
Firmware Bank[0]     : iRBX-D-firmware-4.5.112-20190215 (backup)
Firmware Bank[1]     : iRBX-D-4.5.114-20190221 (active) iRBX (config-system)#
iRBX (config-system)#
```

9.7.20 vlan command

```
iRBX (config)# vlan 1
iRBX(config-vlan1)# ?
  !       Comments
  exit    Exit from vlan configuration mode
  ports   Configure port membership

iRBX(config-vlan1)#
```

Note: The command vlan must be followed by its number – e.g. vlan 1.

9.7.20.1 ports

```
iRBX(config-vlan1)# ports
  1,2,3,4,5,6  port list

iRBX(config-vlan1)# ports 1,2
iRBX(config-vlan1)# exit
iRBX(config)# vlan 2
iRBX(config-vlan2)# ports 3,4
iRBX(config-vlan2)# exit
iRBX(config)# vlan 3
iRBX(config-vlan3)# ports 5,6
iRBX(config-vlan3)#
```

Use the *do show vlans* command to see all vlans' settings.

```
iRBX(config-vlan3)# do show vlans

Vlan       Ports
------------------------------------
1          1,2  (0x7)
2          3,4  (0x19)
3          5,6  (0x61)
Management VLAN
------------------------------------
1
Port       Panel      PVID   Egress
------------------------------------
PORT1      P1/A       1      untagged
PORT2      P2/B       10     tagged
PORT3      P4/A       1      untagged
PORT4      P5/B       1      untagged
PORT5      P3         1      untagged
PORT6      P6         8      tagged
iRBX(config-vlan3)#
```

9.7.20.2 exit

```
iRBX(config-vlan3)# exit
iRBX(config)#
```

9.7.21 web command

```
iRBX(config)# web
iRBX(config-web)#
  !                Comments
  acl              Set access control lists
  disable          Disable web
  enable           Enable web
  exit             Exit from web configuration mode
  session-timeout  Set web session auto-logout duration in minutes (0 - no timeout)
  ssl              Configure ssl
iRBX(config)# web
```

9.7.21.1 Command acl

```
iRBX(config-web)# acl
iRBX(config-web-acl)#
  !      Comments
  clear  Clear all acl entries and rule all
  exit   Exit from acl configuration mode
  rule   Set acl rule

iRBX(config-web-acl)#
```

9.7.21.1.1 Command clear

```
iRBX (config)# web
iRBX(config-web)#
iRBX(config-web-acl)# clear
/irbx/sbin/cli.web.acl.del.sh web
iRBX(config-web-acl)#
```

9.7.21.1.2 Command exit

```
iRBX(config-web-acl)# exit
iRBX(config-web)#
```

9.7.21.1.3 Command rule

```
iRBX(config-web-acl)# rule
  1..4

iRBX(config-web-acl)# rule 1 allow 4
iRBX(config-web-acl)#
```

9.7.21.2 Command disable

```
iRBX(config-web)# disable
Stopping lighttpd: OK
iRBX(config-web)#
```

9.7.21.3 Command enable

```
iRBX(config-web)# enable
Stopping lighttpd: OK
Starting lighttpd: OK
iRBX(config-web)#
```

9.7.21.4 Command exit

```
iRBX(config-web)# exit
iRBX(config)#
```

9.7.21.5 Command session-timeout

```
iRBX(config-web)# session-timeout
  session-timeout  Set web session auto-logout duration in minutes (0 - no timeout)

iRBX(config-web)# session-timeout
iRBX(config-web)# session-timeout 0
iRBX(config-web)#
```

9.7.21.6 Command ssl

```
iRBX(config-web)# ssl
iRBX (config-web-ssl)#
  !              Comments
  cert-delete    Delete certificate
  cert-export    Export certificate
  cert-generate  Generate self-signed certificate
  exit           Exit from acl configuration mode
  ssl-disable    Disable ssl
  ssl-enable     Enable ssl

iRBX (config-web-ssl)#
```

9.7.21.6.1 Cert-delete

```
iRBX (config-web-ssl))# cert-delete
iRBX (config-web-ssl)#
```

9.7.21.6.2 Cert-export

```
iRBX (config-web-ssl)# cert-export
No certificate found
iRBX (config-web-ssl)#
```

9.7.21.6.3 Cert-generate

```
iRBX (config-web-ssl)cert-generate
Generate self-signed RSA Certificate. Continue? [y/N]
Generate self-signed RSA Certificate. Continue? [y/N]y
Generating a 1024 bit RSA private key
.........++++++
.................................................++++++
writing new private key to '/data/etc/ssl/certs/irbx.pem'
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [CA]:CA
720184448:error:0D07A097:asn1 encoding routines:ASN1_mbstring_ncopy:string too
long:a_mbstr.c:158:maxsize=2

Note:
Self-signed certificate has been generated.
You may need to enable ssl and restart web service.
```

9.7.21.6.4 Command exit

```
iRBX (config-web-ssl)exit
iRBX(config- web)#
```

9.7.21.6.5 Command ssl-disable

```
iRBX (config-web-ssl) ssl-disable
/irbx/sbin/cli.web.ssl.enable.sh: line 29: /etc/init.d/S50nginx: not found
iRBX (config-web-ssl)#
```

9.7.21.6.6 Command ssl-enable

```
iRBX (config-web-ssl) ssl-enable
/irbx/sbin/cli.web.ssl.enable.sh: line 29: /etc/init.d/S50nginx: not found
iRBX (config-web-ssl)#
```

10. WEB MANAGEMENT

Warning!!!

Prior to upgrading the firmware, remove any physical loop connections.

DO NOT power off the unit during a firmware upgrade.

This section introduces configuration of the iRBX6GF switch by a web browser.

An embedded HTML web site resides in the flash memory of the CPU board. It contains advanced management features that allow the user to manage the iRBX6GF switch from anywhere on the network via a standard web browser such as Microsoft Internet Explorer.

The Web Management function supports Internet Explorer 5.0 or later. It is based on Java Applets with an aim at reducing network bandwidth consumption and enhances access speed in a viewing screen.

Note: By default, IE 5.0 or later versions do not allow Java Applets to open sockets. The browser settings need to be explicitly modified to enable Java Applets to be used on network ports.

The default values are as below:

- **IP Address:** *192.168.10.1*
- **Subnet Mask:** *255.255.255.0*
- **Default Gateway:** *192.168.10.254*
- **User Name:** *admin*
- **Password:** *admin*

To login, perform the following:

1. Launch Internet Explorer.
2. Type http:// and the switch's IP address (default is 192.168.10.1), and then press **Enter**.

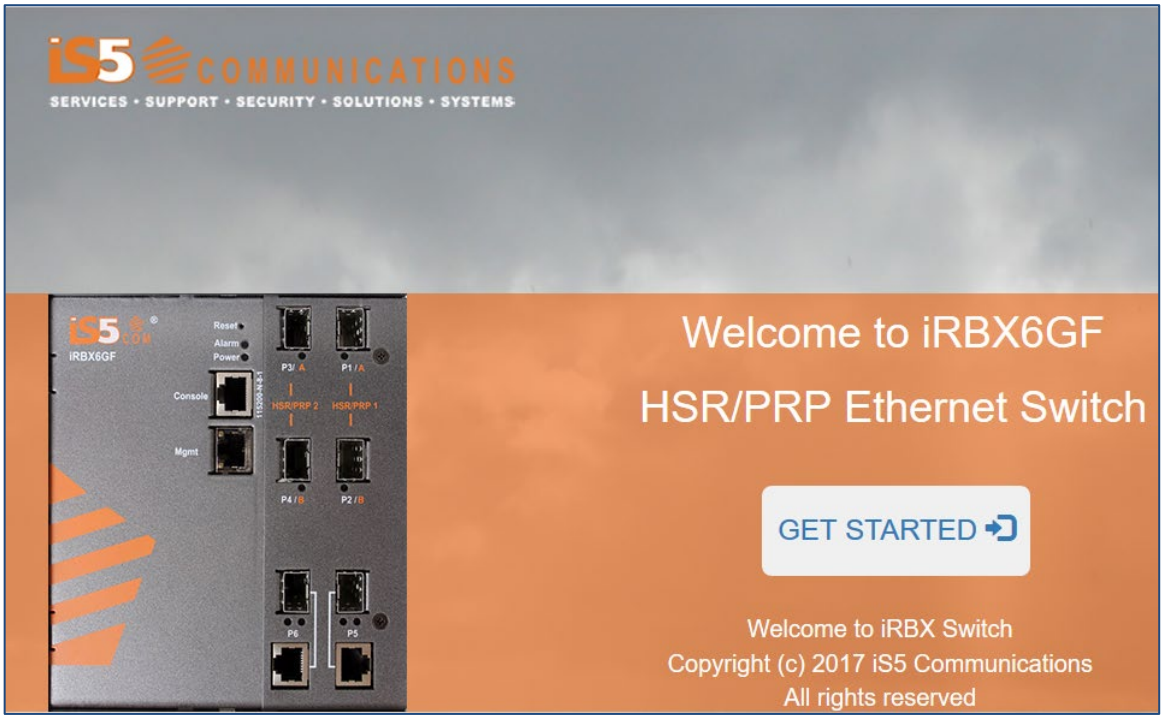


Figure 10 – Welcome to iRBX6GF Screen

3. The **Welcome to iRBX6GF** screen appears. Click GET STARTED
4. The login screen appears (see Figure 11 – Login Screen).

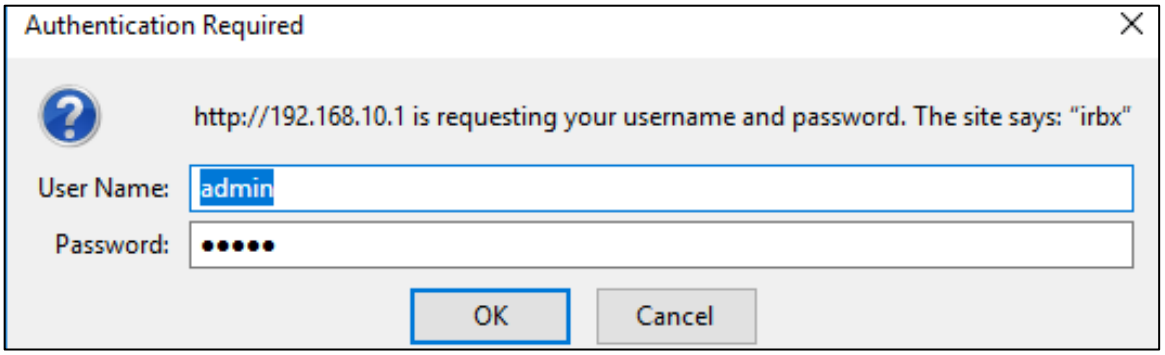


Figure 11 – Login Screen

5. Enter the username and password. The default username and password are "admin".
6. Click **OK**. The main interface of the Web Management appears (see Figure 12).

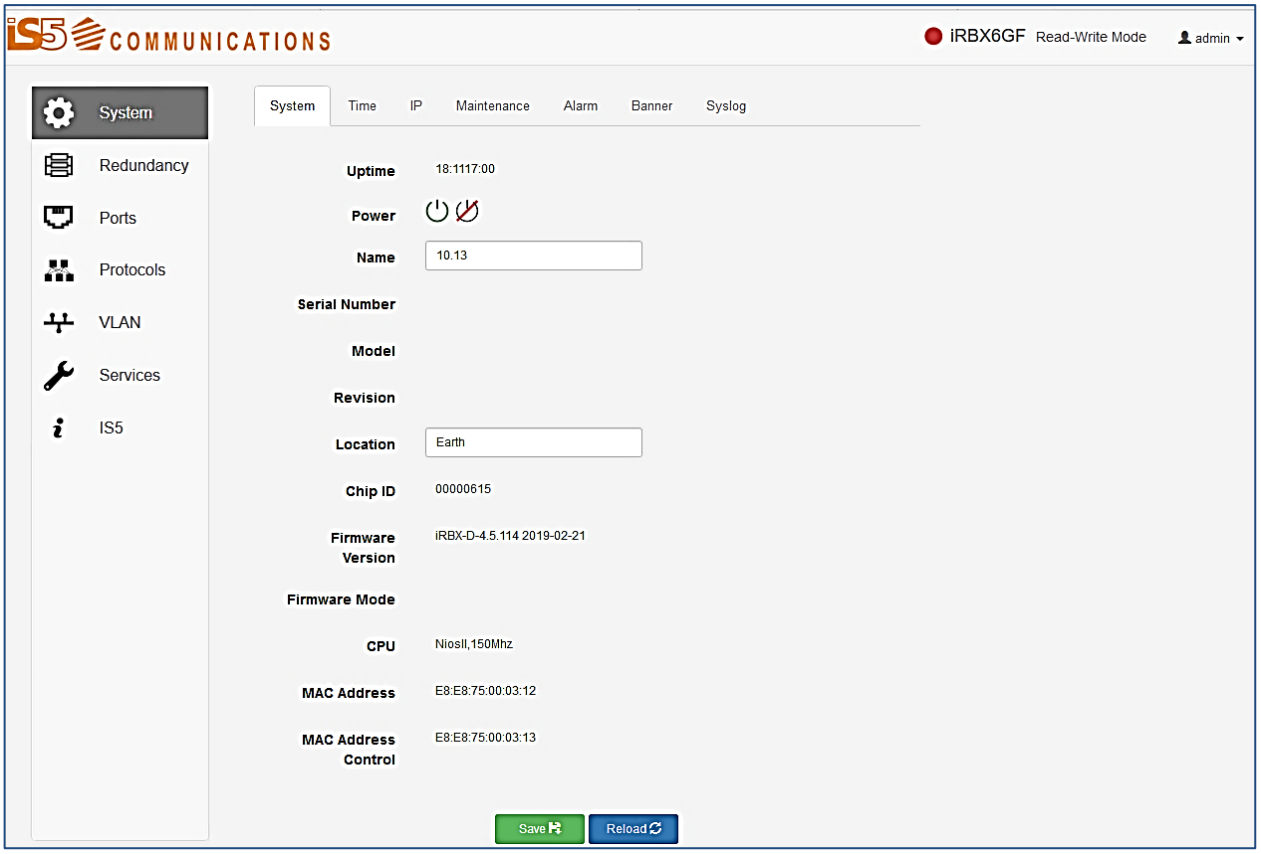


Figure 12 – Main Interface or System tab

10.1 System

10.1.1 System tab

See above Figure 12 – Main Interface or System tab.

The following table describes the labels for the **System** tab.

Label	Description
Uptime	Enter the current date. The format is *yyyymmddhhii*
Power	Shows if the power is ON
Name	Enter an alternate **Name** for the switch. For example, iRBX:
Serial Number	
Model	
Revision	
Location	Change the name for the **Location**.
Chip ID	It's a read-only field.
Firmware Version	iRBX-D-4.5.114 2019-02-21
Firmware Mode	
CPU	
MAC Address	E8:E8:75:00:03:54
MAC Address Control	E8:E8:75:00:03:55

10.1.2 Time

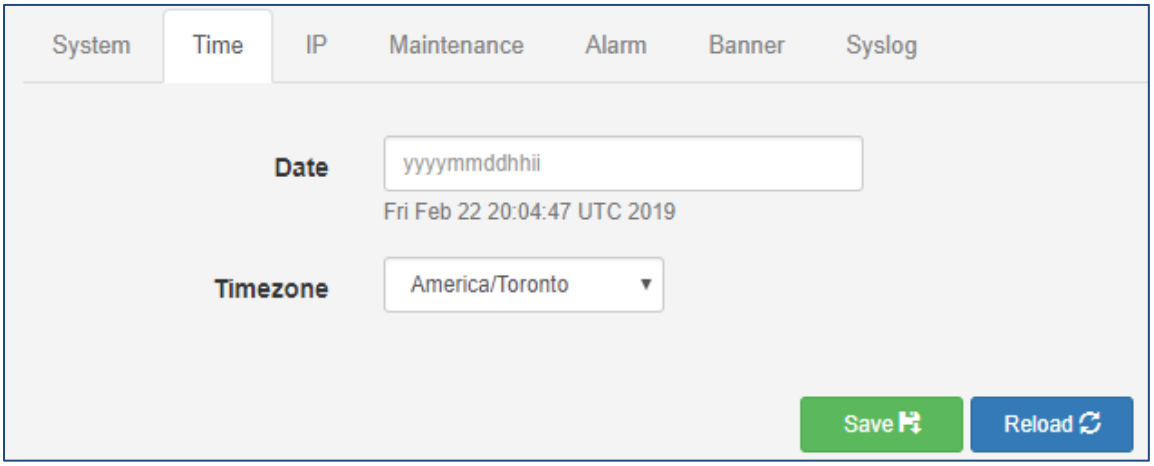


Figure 13 – System tab, Time

The following table describes the labels for the **System tab, Time** screen.

Label	Description
Date	Enter the current date. The format is *yyyymmddhhii*
Timezone	From the drop/down list, select a time zone (e.g. America / Toronto)
Save	Click to save changes.
Reload	Click to undo any changes made locally and revert to previously saved values.

10.1.3 IP

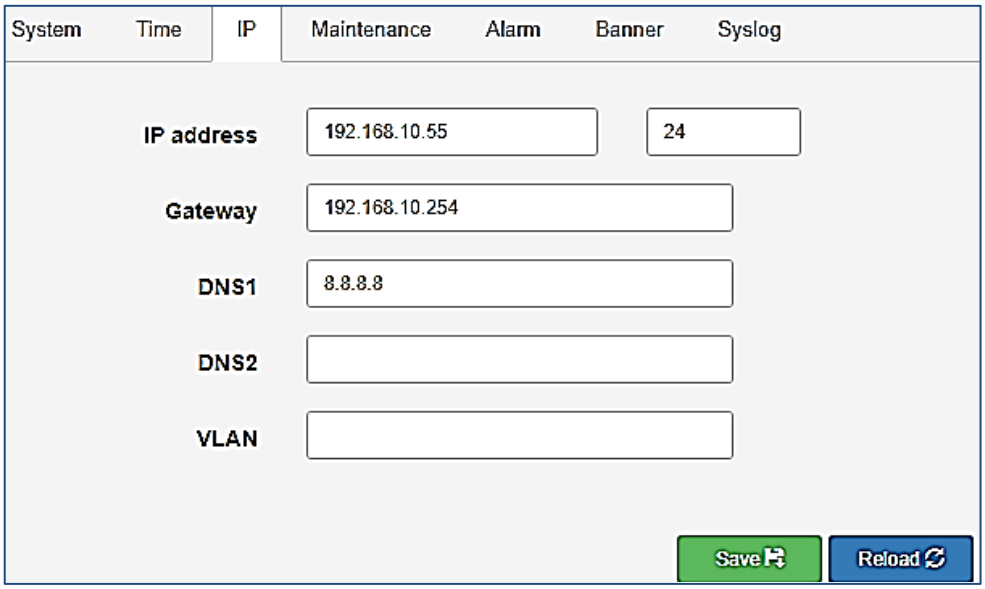


Figure 14 – IP Interface

The following table describes the labels for the **IP Interface** screen.

Label	Description
IP address	Set management **IP address** / mask. The default is shown
Gateway	Set **Gateway** address. The default is shown.
DNS1	Enter IP address corresponding to **DNS1** (Domain Name Server 1) name. Format is A.B.C.D. e.g. 8.8.8.8
DNS2	Enter IP address corresponding to **DNS2** name. Format is A.B.C.D.
VLAN	Set management **VLAN**. The default value is 1.
Save	Click to save changes.
Reload	Click to undo any changes made locally and revert to previously saved values.

10.1.4 Maintenance

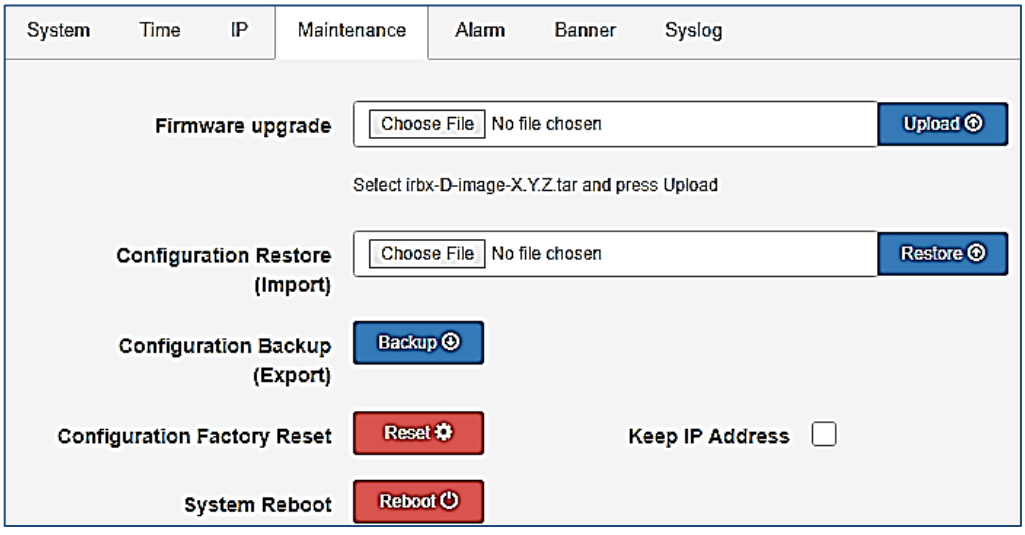


Figure 15 – Maintenance Interface

10.1.4.1 Firmware Upgrade

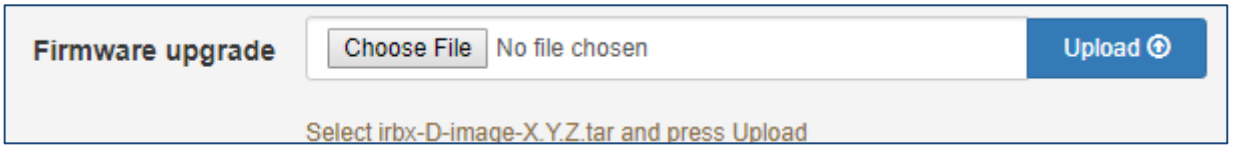


Figure 16 – Firmware upgrade Interface

The following table describes the labels for the **Firmware upgrade** screen.

Label	Description
Firmware upgrade	Select irbx-D-image-X.Y.Z.tar
Upload	Upload the selected file.

10.1.4.2 Configuration

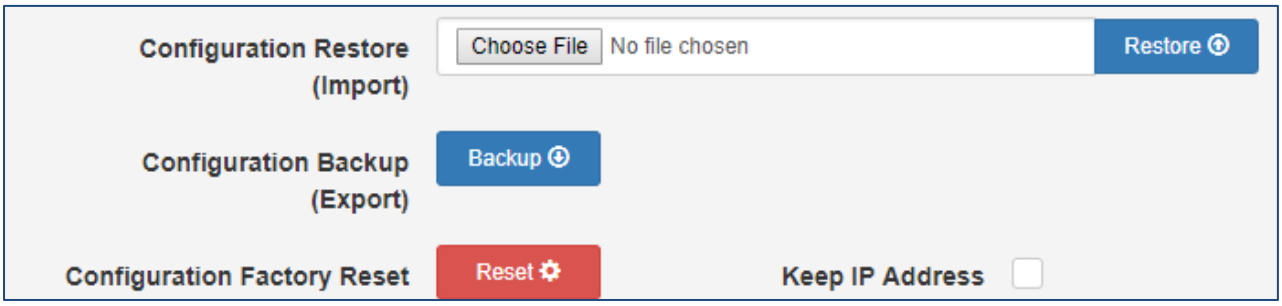
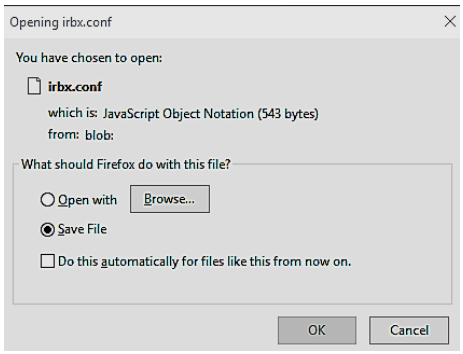


Figure 17 – Configuration Interface

The following table describes the labels for the **Configuration Interface** screen.

Label	Description
Configuration Restore (Import)	Select a configuration file and import it.
Configuration Backup (Export)	Click **Backup** and the following screen appears.  Select **Open with** or **Save** file indicating also where to save the file.
Configuration Factory reset	Select this option to reset to the factory's settings

10.1.4.3 System Reboot

Figure 18 – System Reboot Interface

10.1.5 Alarm

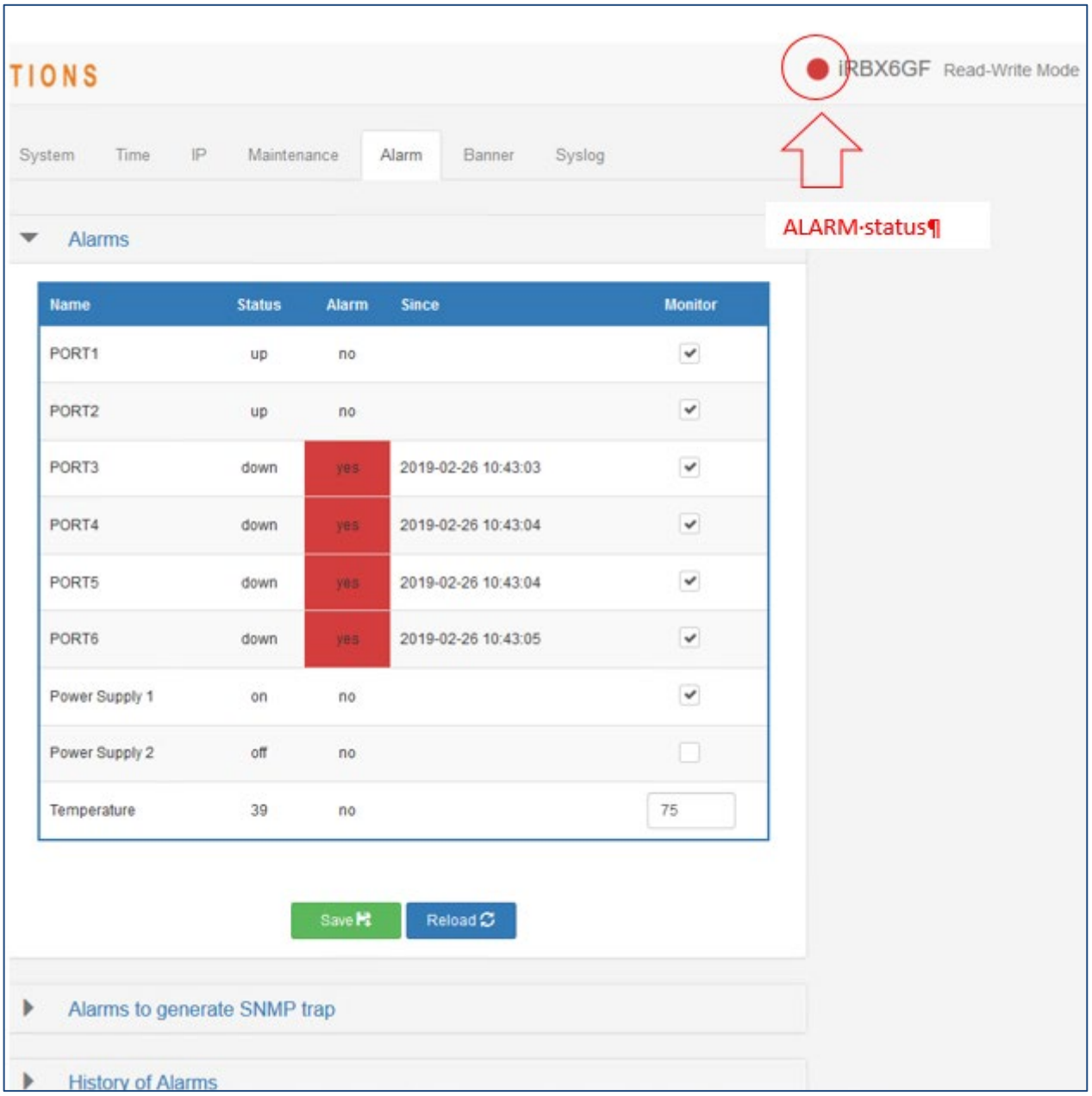


Figure 19 – Alarm Interface

The following table describes the labels for the **Alarm Interface** screen.

Label	Description
PORT1	To have an alarm warning if this port is down, add a checkmark in the **Monitor** box.
PORT2	To have an alarm warning if this port is down, add a checkmark in the **Monitor** box.
PORT3	To have an alarm warning if this port is down, add a checkmark in the **Monitor** box.
PORT4	To have an alarm warning if this port is down, add a checkmark in the **Monitor** box.
PORT5	To have an alarm warning if this port is down, add a checkmark in the **Monitor** box.
PORT6	To have an alarm warning if this port is down, add a checkmark in the **Monitor** box.
Power Supply 1	To have an alarm warning if the Power Supply 1 is down, add a checkmark in the **Monitor** box.
Power Supply 2	To have an alarm warning if the Power Supply 1 is down, add a checkmark in **Monitor** box.

Label	Description
Temperature	To have an alarm warning if the temperature is, change the default value of the threshold temperature. The default is 75 °C.
Status	It shows the status. The options are down, up, on or off, or a value for temperature.
Alarm	The options are yes or no. Yes is colored in red. yes
Since	It shows the duration of the alarm (e.g. 2019-02-26 04:09:27)
Save	Click to save changes.
Reload	Click to undo any changes made locally and revert to the saved values.

10.1.5.1 Alarms to generate SNMP trap

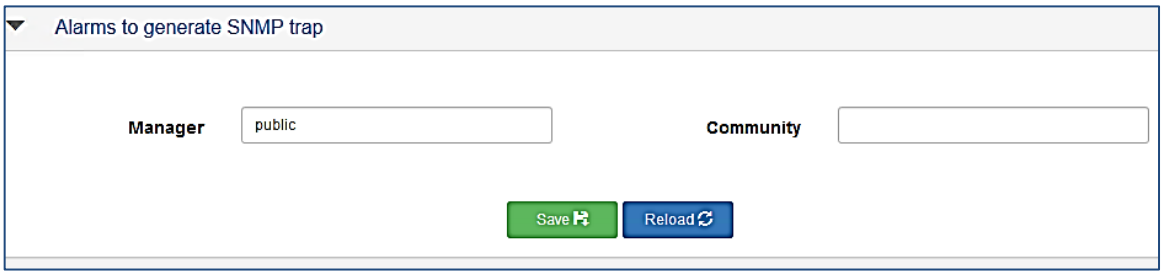


Figure 20 – Alarms to generate SNMP trap Interface

The following table describes the labels for **the Alarms to generate SNMP trap** screen.

Label	Description
Manager	Enter the Manager description.
Community	Enter the Community name.
Save	Click to save changes.
Reload	Click to undo any changes made locally and revert to previously saved values.

10.1.5.2 History of Alarms

Figure 21 – History of Alarms Interface

10.1.6 Banner

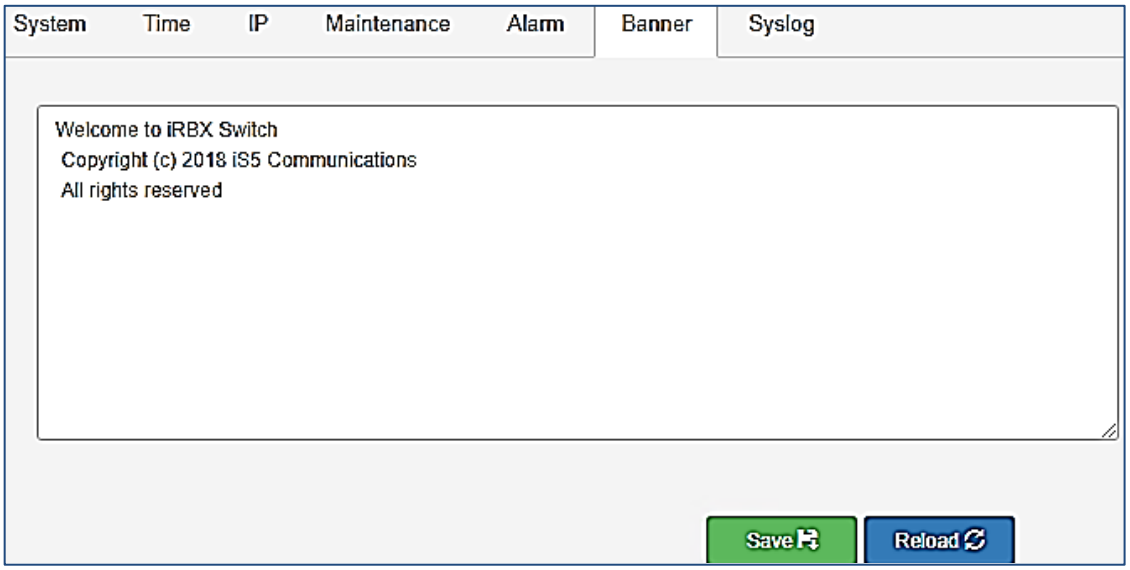


Figure 22 – Banner Interface

The following table describes the labels for the **Banner Interface** screen.

Label	Description
Banner	To change the default text in the **Banner**, enter new text in the box.
Save	Click to save changes.
Reload	Click to undo any changes made locally and revert to previously saved values.

10.1.7 Syslog

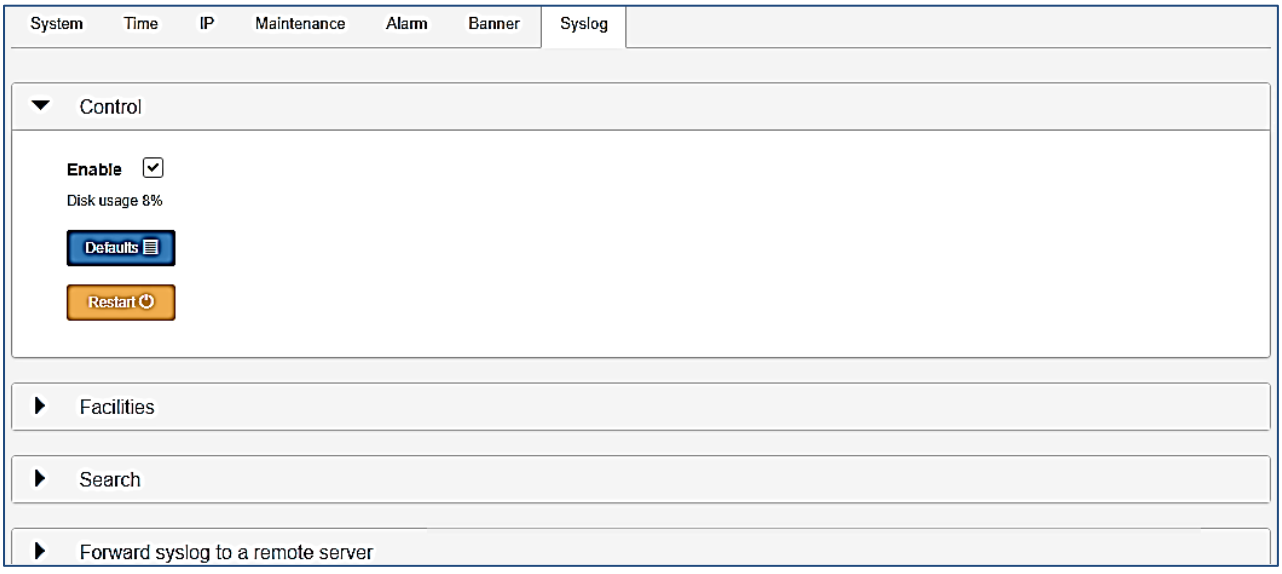


Figure 23 – Syslog Interface

10.1.7.1 Control

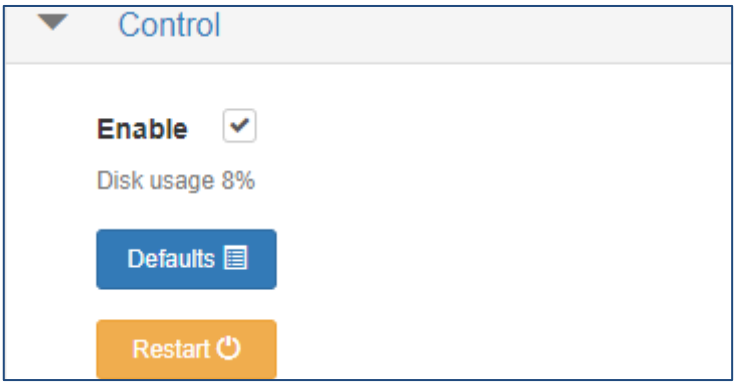
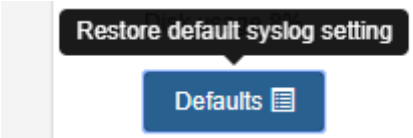


Figure 24 – Control, Syslog Interface

The following table describes the labels for the **Control, Syslog Interface** screen.

Label	Description
Enable	To monitor disk usage, add a checkmark in the box.
Defaults	 If that is successful, the following message appears "**Success!** Syslog defaults set"
Restart	Click to undo any changes made locally and revert to previously saved values.

10.1.7.2 Facilities

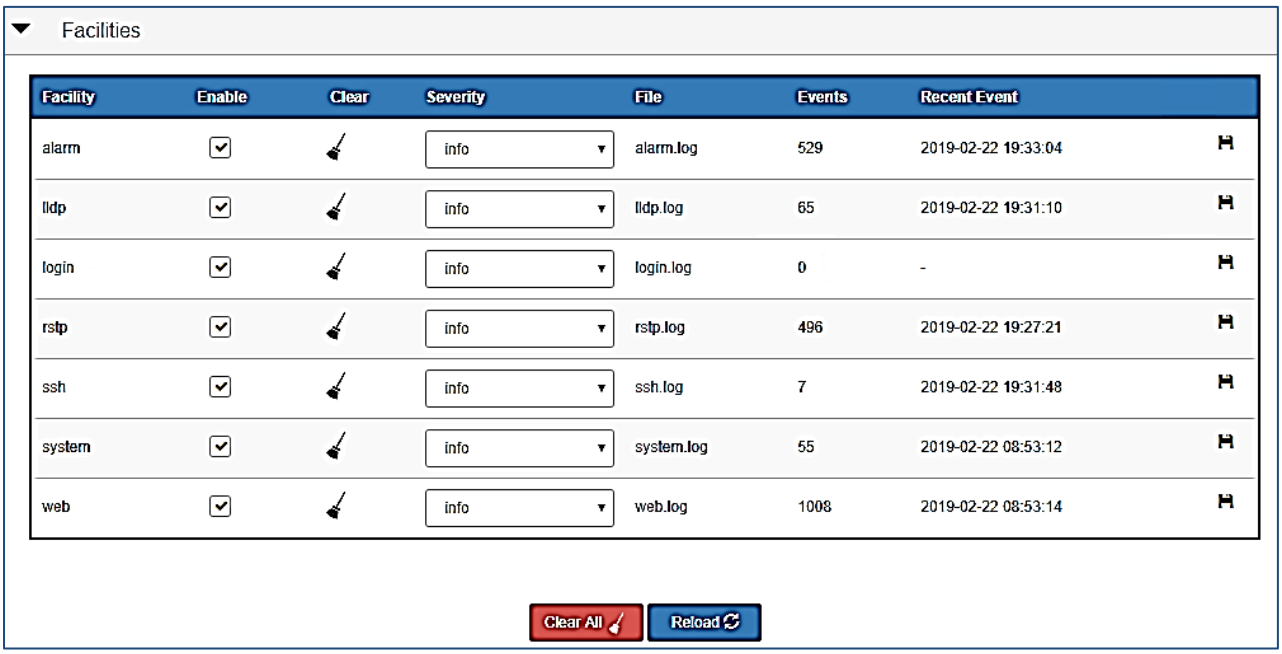


Figure 25 – Facilities, Syslog Interface

The following table describes the labels for the **Facilities, Syslog** screen.

Label	Description
Facility	The name of the facility e.g. lldp
Enable	Enter a checkmark to enable a facility. By default, all facilities are enabled.
Clear	Click to clear it.
Severity	Select a severity. The options are info, warn, error, and critical. The default is info.
File	It shows the name of the log file (e.g. lldp.log is the file used by lldp).
Events	Number of events for every facility (e.g. 65 events for lldp facility).
Recent Event	It show the name of the most recent event.
	Click to save changes.
Clear All	Click to clear changes.
Reload	Click to undo any changes made locally and revert to previously saved values.

10.1.7.3 Search

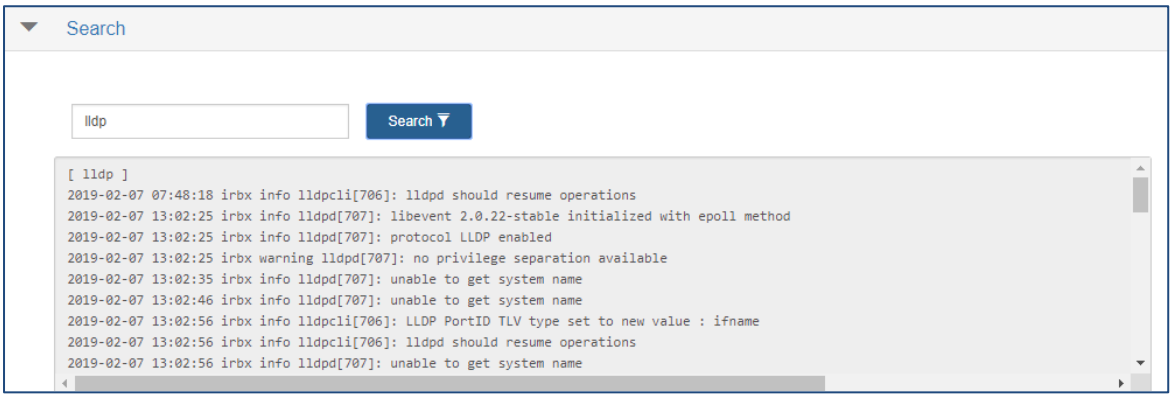


Figure 26 – Search, Syslog Interface

When lldp is entered in the **Search** box, the result is as shown above.

10.1.7.4 Forward syslog to a remote server

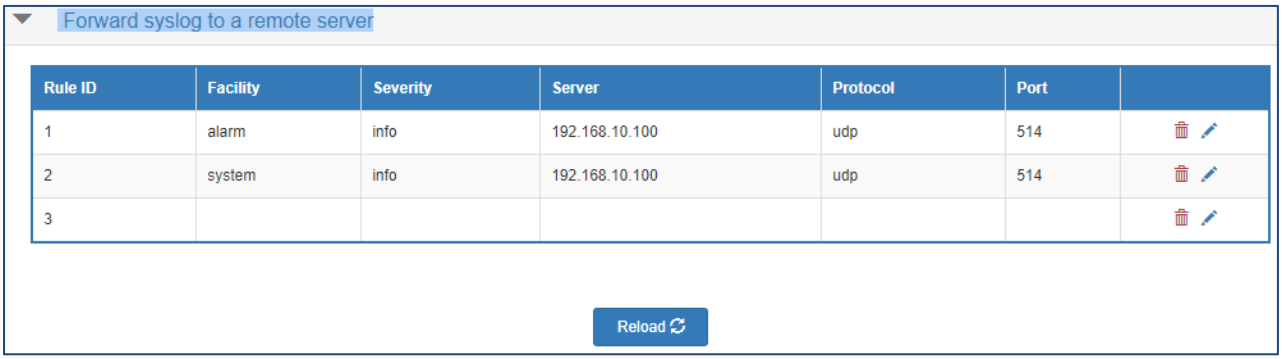


Figure 27 – Forward syslog to a remote server, Syslog Interface

The following table describes the labels for the **Forward syslog to a remote server, Syslog** screen.

Label	Description
Rule ID	This is the number of the rule.
Facility	Enter Facility name.
Severity	Select a severity. The options are info, warn, error, and critical. The default is info.

Server	Remote server IP address.
Protocol	The protocol to be used – UDP (User Datagram Protocol)
Port	Port No 514 is used for system logging, Syslog,[10]
	Click to delete a rule.
	Click to edit **Syslog Remote Rule Entry**.

When you click , **Syslog Remote Rule Entry** dialog box appears.

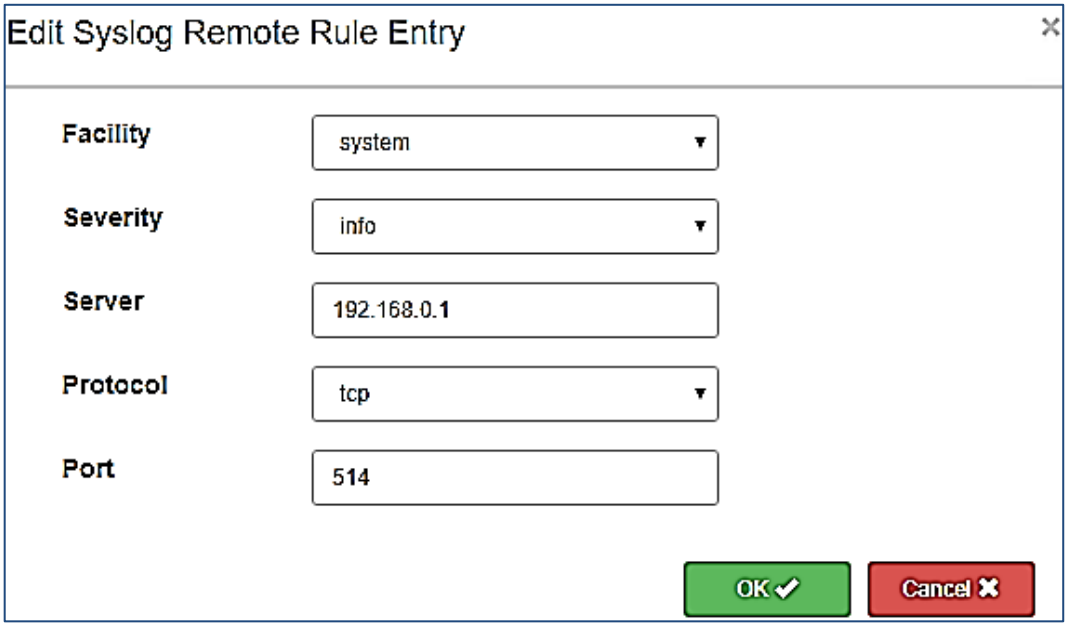


Figure 28 – Syslog Remote Rule Entry, Syslog Interface

The following table describes the labels for the **Syslog Remote Rule Entry Interface** screen.

Label	Description
Facility	Select a facility from the drop-down list. The options are alarm, lldp, login, rstp, system, web.
Severity	Select a severity. The options (filters) are info, warn, error, and critical. The default is info.
Server	Enter server IP address.
Protocol	Select a facility from the drop-down list. The options are tcp (Transmission Control Protocol) and udp (User Datagram Protocol).
Port	Port number. With UDP, the *server* is listening on *port* 514.
Reload	Click to undo any changes made locally and revert to previously saved values.

10.2 Redundancy

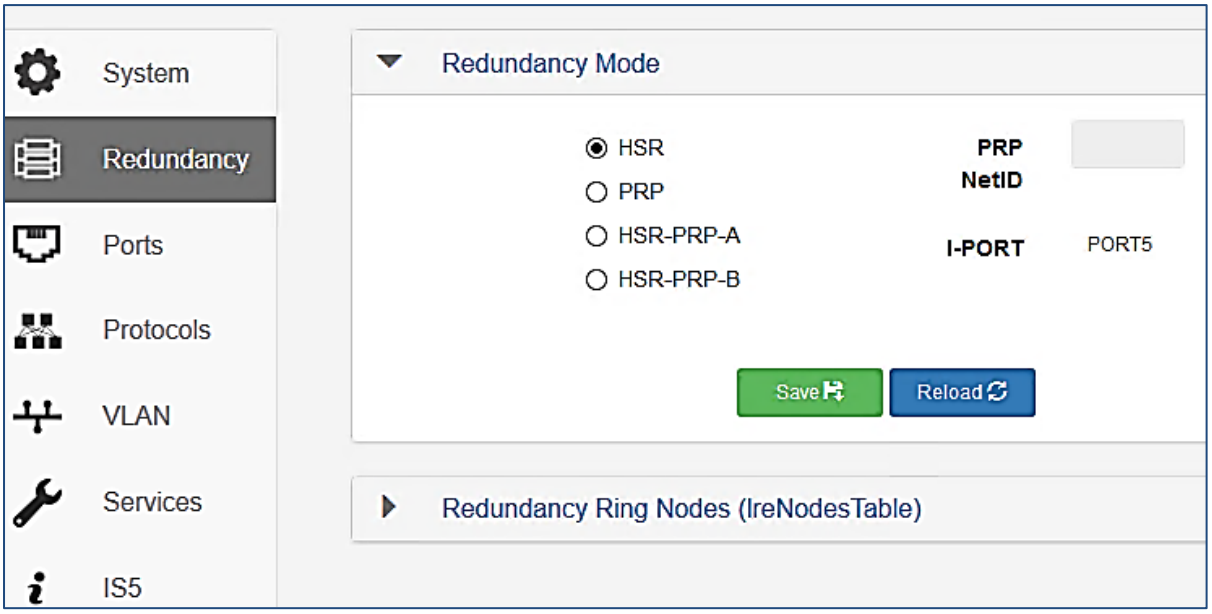


Figure 29 – Redundancy Interface

10.2.1 Redundancy Mode

The two redundancy protocols specified by IEC 62439-3 [3] are:

- PRP (Parallel Redundancy Protocol)
- HSR (High-availability Seamless Redundancy)

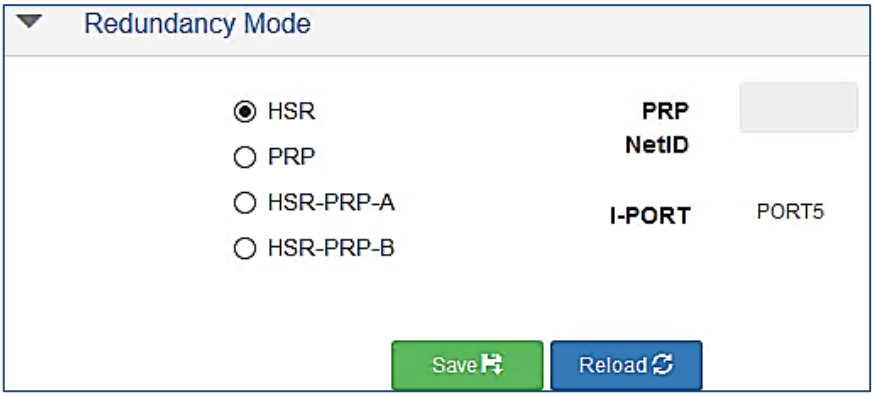


Figure 30 – Redundancy Mode Interface

The following table describes the labels for the **Redundancy Mode Interface** screen.

Label	Description
HSR	**HSR** is the default redundancy protocol option. If you want to switch to another redundancy mode, click one of the boxes below.
PRP	To switch to **PRP**, add a checkmark to the box adjacent to the label.
HSR-PRP-A	To switch to **HSR-PRP-A** for LAN A (Dual RedBox A), add a checkmark to the box adjacent to the label.
HSR-PRP-B	To switch to **HSR-PRP-B** for LAN B (Dual RedBox B), add a checkmark to the box adjacent to the label.

PRP NetID	For HSR-PRP-A/B, set **PRP NetID**. Note that the PRP NetID's value is from 1 to 6.
Save	Click **Save** to save the changes.
Reload	Click to undo any changes made locally and revert to the saved ones.

Note: iRBX6GF is using PRP mode with PORT5 as an I-Port (Interlink port) as seen in dimmed field next to I-PORT label. Port 5 is I-Port when HSR-PRP-A/B (Dual RedBox) mode is in use. For more details on Dual RedBox, see Section 7.3 HSR-PRP (Dual RedBox Mode).

10.2.2 Redundancy Ring Nodes (IreNodes Table)

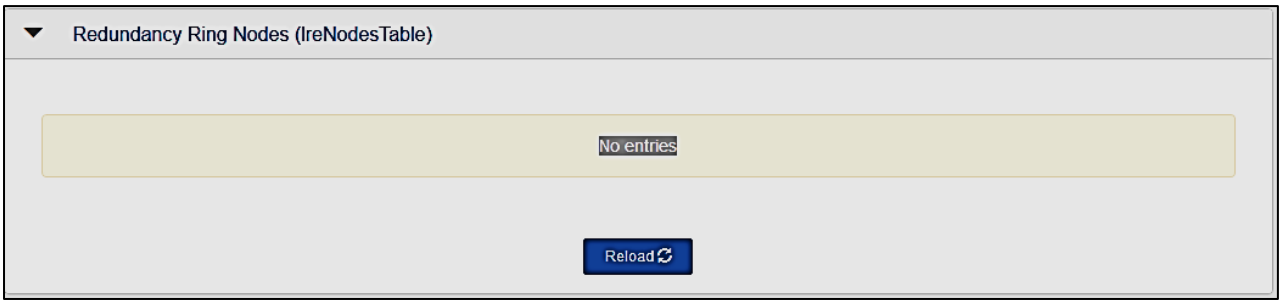


Figure 31 – Redundancy Ring Modes (IreNodes Table) Interface

IreNodes Table shows all dynamic entries available. Currently, there are no HSR ring nodes entries

10.3 Ports

This setting allows managing individual ports of the switch.

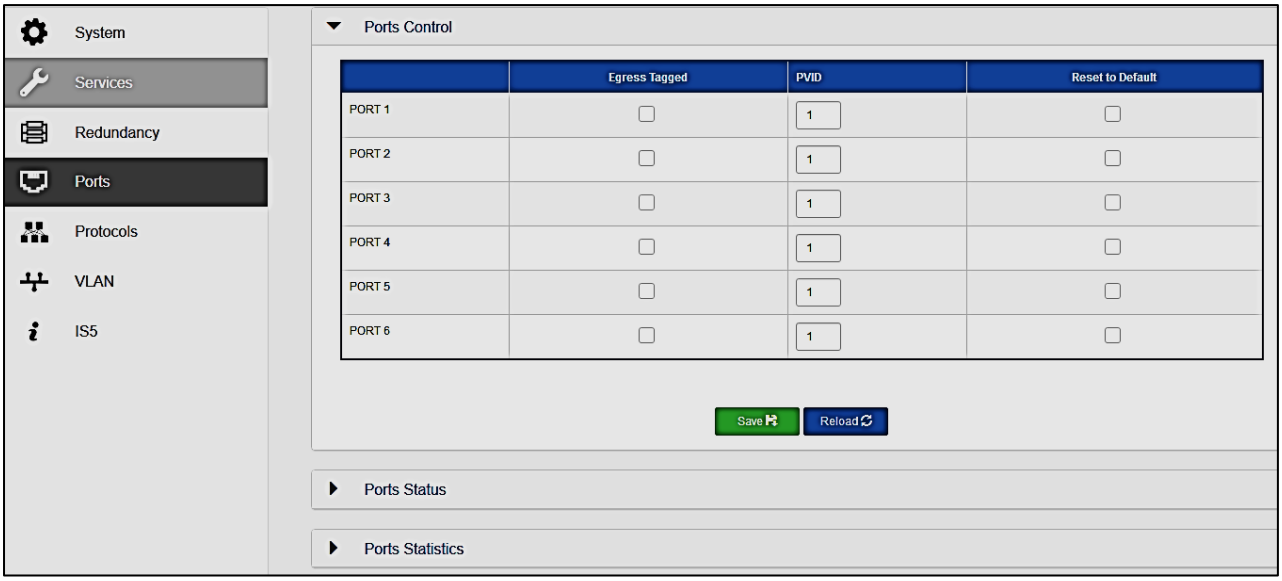


Figure 32 – Ports Interface

10.3.1 Ports Control

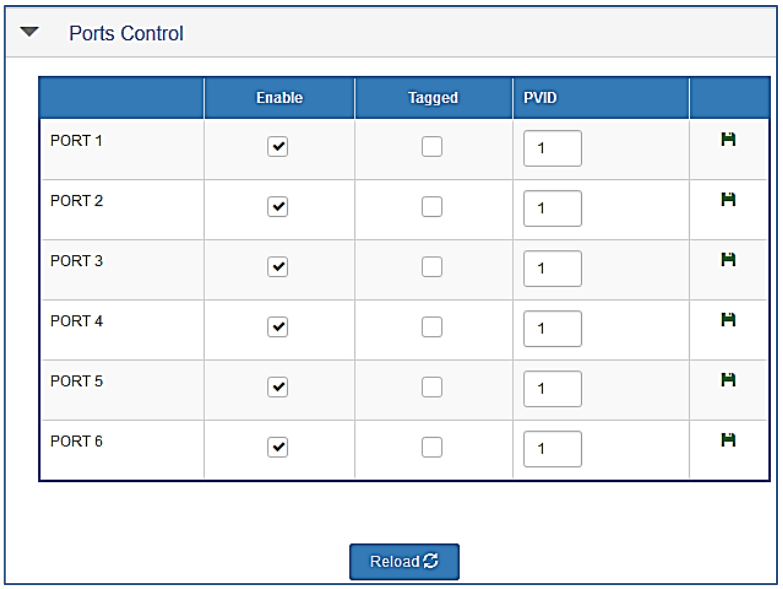


Figure 33 – Ports Control Interface

The following table describes the labels for **Ports Control Interface** screen.

Label	Description
Enable	Add a checkmark to enable it.
Tagged	To set a port as **Tagged**, check the box adjacent to the ports label. Tagged packets contain an 802.1Q (dot1q, VLAN) tag with a PVID (for more details, refer to IEEE 802.1Q [1]). The default value is untagged (not checked).
PVID	To assign **PVID** (port VLAN ID), enter a number in the appropriate box. The default value is 1. A Port VLAN ID (pvid) is a default VLAN ID that is assigned to an access port to designate the virtual LAN segment to which this port is connected. PVID number must be in the range 1-4095 (number of the available VLANs for the switch)

Label	Description
	Click **Save** to save the changes.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.3.2 Ports Status

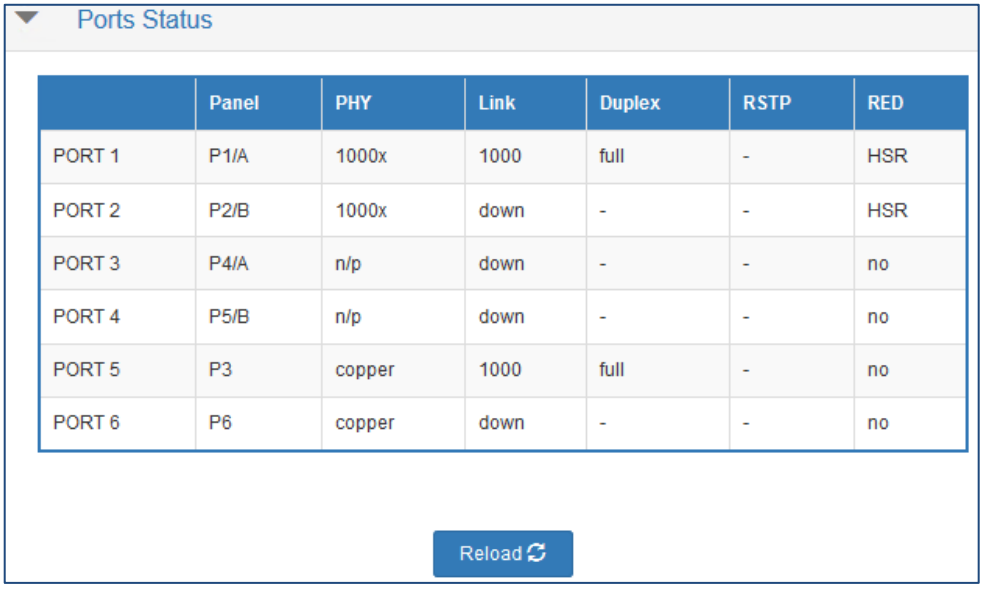


Figure 34 – Ports Status Interface

This table shows read-only information about all ports. Same information can be accessed when the show ports command is used.

10.3.3 Ports Statistics

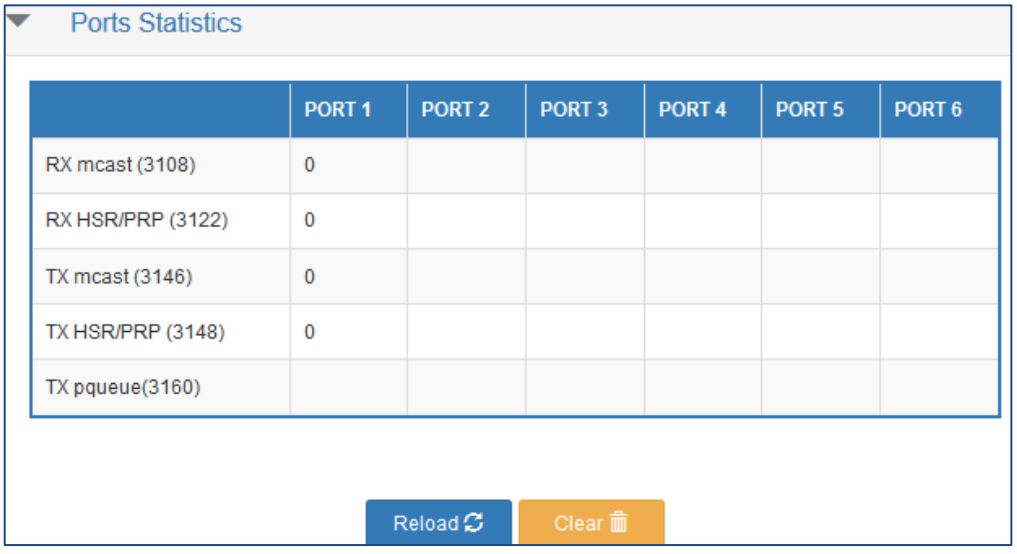


Figure 35 – Ports Statistics Interface

This table shows read-only information about ports statistics. Ports statistics can be accessed by using the show stats command.

10.4 Protocols

This web page shows all protocols available for iRBX6GF:

- RSTP (Rapid Spanning Tree Protocol)
- PTP (Precision Time Protocol)
- LLDP (Link Layer Discovery Protocol)
- NTP (Network Time Protocol)
- SNMP (Simple Network Management Protocol)

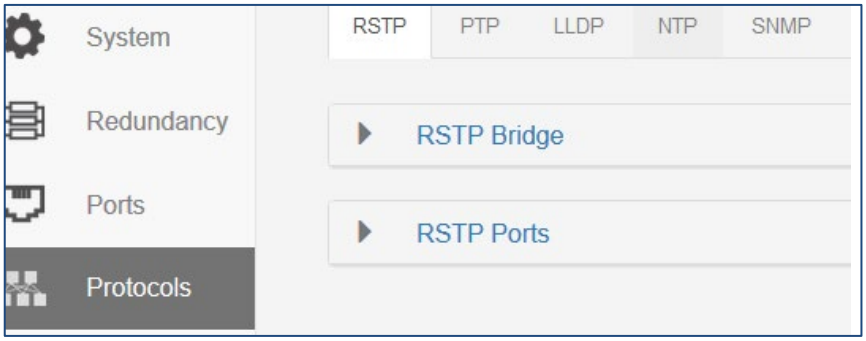


Figure 36 – Protocols Interface

10.4.1 RSTP

10.4.1.1 RSTP Bridge

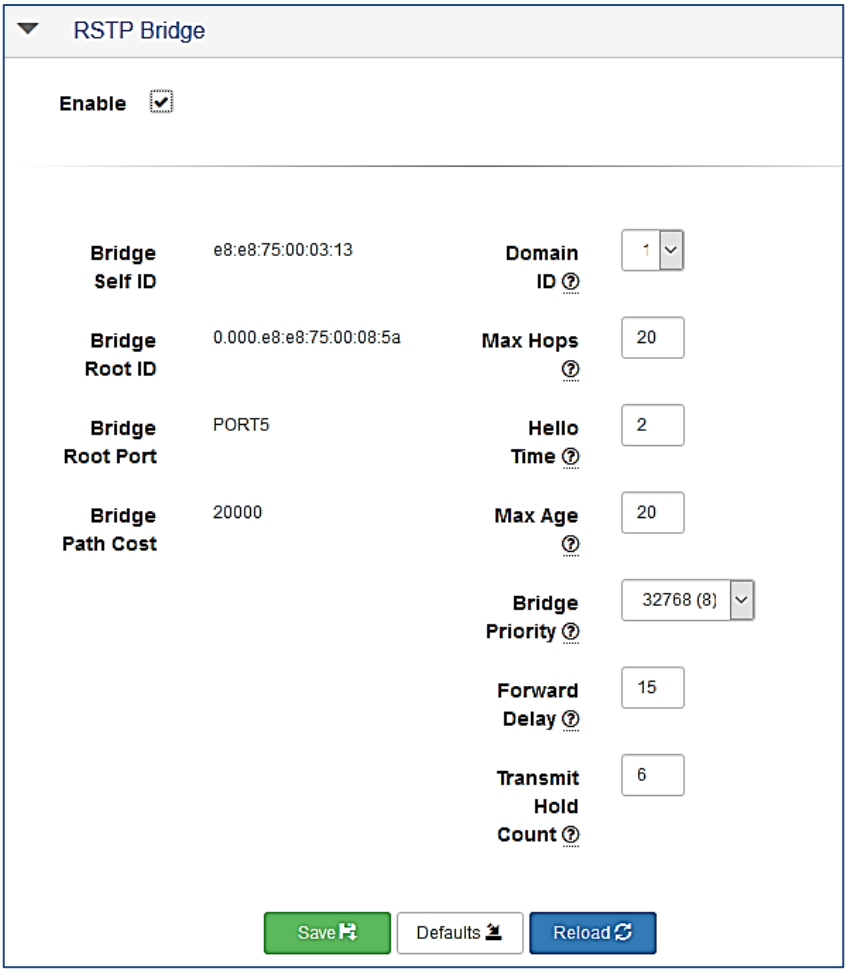


Figure 37 – RSTP Bridge Interface

The following table describes the labels for the **RSTP Bridge** screen.

Label	Description
RSTP Bridge < Enable	To enable the **RSTP Bridge**, check the box adjacent to the **Enable** label. By default, the **RSTP Bridge** is not enabled. Note: In discussions of spanning-tree protocols, the terms *bridge* and *switch* are often used interchangeably.
Bridge Self ID	When the RSTP Bridge is enabled, this is a read-only field of e8:e8:75:00:03:13.
Bridge Root ID	When the RSTP Bridge is enabled, this is a read-only field of 0.000. e8:e8:75:00:08:5a - Priority number / internal MAC address.
Bridge Root Port	When the RSTP Bridge is enabled, root port is the port that offers the lowest cost path to the root bridge. In this case, this Port 5.
Bridge Path Cost	When the RSTP Bridge is enabled, for this dialog box, this is a read-only field with a value of 20000.
Domain ID	Enter a value for **Domain** separation **ID** (0 stands for no separation). Its default value is 0 for not enabled RSTP Bridge, and 1 for enabled.
Max Hops	Enter a value. **Max Hops** is in range of 6 to 40; default is 20. The max hop count is the maximum number of hops the BPDU can traverse before getting discarded and also before the information held for a port is aged out. [6]
Hello Time	Enter a value. **Hello Time** is in range of 1 to 10; default is 2. **Hello Time** is the time interval at which the root bridge transmits configuration BPDUs. [5] RSTP is typically able to respond to changes within 3 × Hello Time (default: 3 times 2 seconds) or within a few milliseconds of a physical link failure.
Max Age	Enter a value. **Max Age** is in range of 6 to 40; default is 20. The maximum age timer specifies the maximum expected arrival time of hello BPDUs. If the maximum age timer expires, the bridge detects that the link to the root bridge has failed and initiates a topology reconvergence. The maximum age timer should be longer than the configured hello timer. [5]
Bridge Priority	Enter a value. Bridge rstp_priority is in range of 0 to 15. Priority is the number multiplied by 4096; default is 32768 (8). The bridge priority controls which bridge is elected as a root bridge
Forward Delay	Enter a value. **Forward delay** value must be in the range of 4 to 30 (in seconds), with a default of 15 sec. The forwarding delay timer specifies the length of time a RSTP bridge port remains in the listening and learning states before transitioning to the forwarding state. By default, the bridge port remains in the listening and learning states for 15 seconds before transitioning to the forwarding state. [5]
Transmit Hold Count	Enter a value. **Transmit Hold Count** is in range of 1 to 10; default is 6. **Transmit Hold Count** value is a counter that limits the maximum transmission rate of the switch. [6]
Save	Click **Save** to save the changes.
Defaults	Click **Defaults** to go back to all default values.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.4.1.2 RSTP Ports

Figure 38 – RSTP Ports Interface

The following table describes the labels for the **RSTP** Ports screen.

Label	Description
Port #	This is read-only column; R (A,B), 3, 4, 5, and 6.
Link	This is a read-only field with a value of *up* or *down*.
Enable	To disable the enabled RSTP ports, remove the box underneath to the **Enable** label. The default is enabled (i.e. with a checkmark).
Discard BPDU	To enable the **Discard BPDU**, check the box adjacent to its label. When RSTP is off by default, **Discard BPDU** is off (i.e. without a checkmark)
Path Cost	Enter a value for **Path Cost**. Its range is from 0 to 200000000. Its default value is 0. If there is more than one link between two switches, the RSTP root bridge calculates the cost of each path based on bandwidth. As per RSTP (802.1W-2004), path cost default can be calculated by the formula: *20 Terabit / seconds [7]* / *Bandwidth* (in bit/second). As seen from the formula above, the Path Cost depends on the link speed; faster link speeds indicate smaller costs.
Priority	Enter a value for the port's **Priority**. The port priority is in range of 0 to 240 in increments of 16; default is 128.
P2P	Identify the **P2P** (point-to-point link); default is auto. P2P connection is a permanent direct communication link between two parties. Other values are no /yes.
Admin Edge	Edge ports transition directly to the forwarding state, and so the protocol does not need to wait for BPDUs to be received on edge ports. To enable initial edge state of a port, check the box adjacent to **Admin Edge** label. Default is no (i.e. no checkmark). Do not configure a spanning-tree instance interface as an edge port if it is connected to any Layer 2 bridge. An instance interface connected to Layer 2 bridges but configured as an edge port can cause physical loops. [5]
Auto Edge	The auto edge feature enables automatic detection of edge devices or bridges connected to an interface. To enable auto transition to/from the edge state, check the box adjacent to **Auto Edge** label. Default is enabled (i.e. with a checkmark).
Role	This is a read-only column with a value of *disabled* for all bridge port roles, except for Port 6 for which the **Role** is *designated*. *Designated* value means that Port 6 is forwarding port for every LAN segment. Note that these values are assigned during Configuration Factory Reset.

Label	Description
State	This is a read-only column with a value of *discarding* for all ports, except for Port 6 for which the value is *forwarding*. *Discarding* means that no user data is sent to a port, and *forwarding* state of a port–a fully operational port. Note these values are assigned during Configuration Factory Reset.
Save	Click **Save** to save the changes.
Defaults	Click **Defaults** to go back to all default values.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.4.3 PTP

The purpose of Precision Time Protocol (PTP), as defined by IEEE 1588-2008 [4], is to synchronize independent clocks running on separate nodes of a distributed measurement and control system to a high degree of accuracy and precision.

PTP achieves accuracy when hardware timestamping is used. IEEE 1588-2008 standard has defined two types of switches (or routers) which specifically deal with their own queues. One device is called a transparent clock. This type performs hardware timestamps when a sync message arrives or departs the transparent clock.

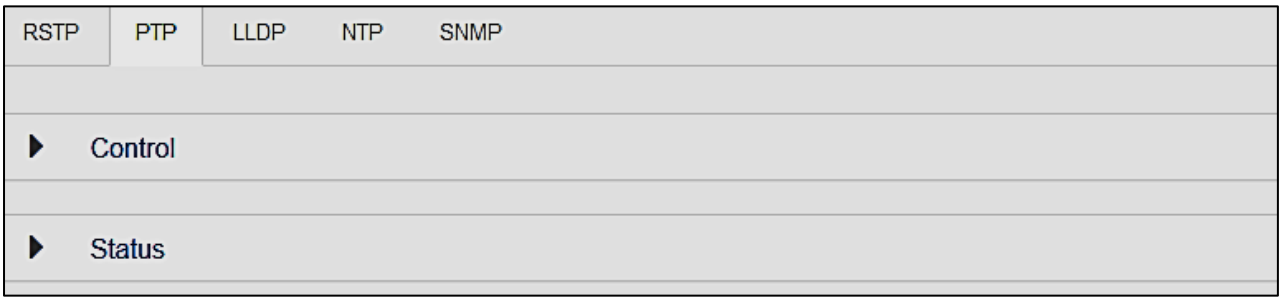


Figure 39 – PTP Interface

10.4.3.1 Control

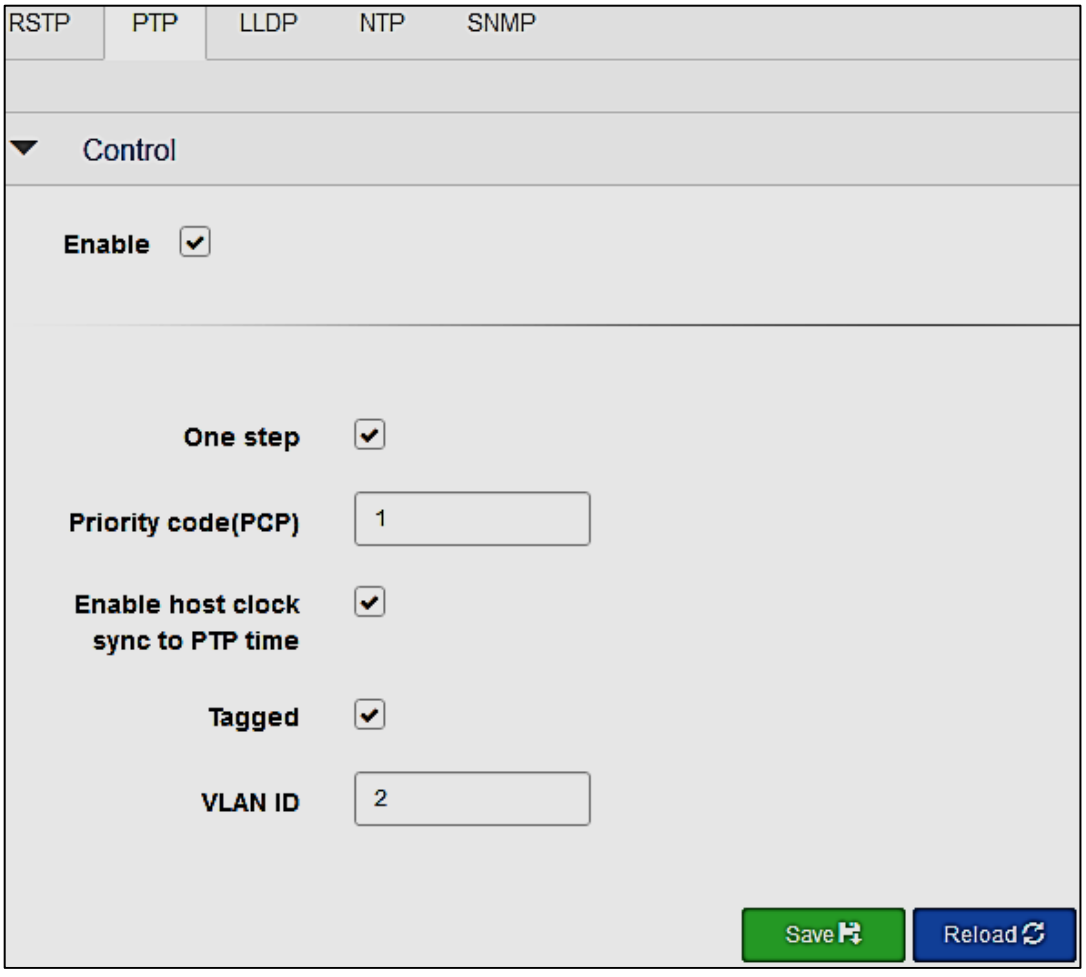


Figure 40 – PTP, Control Interface

The following table describes the labels for the **PTP, Control Interface** screen.

Label	Description
Enable	To enable PTP, check the box adjacent to the **Enable** label. By default, PTP not enabled.
One-step	If checked, the **One-step** PTP clock mode is enabled. This is the default setting. For any sync message, a hardware timestamp or stamps are generated. • One-step—the clock updates the SYNC message, which also has a correction field on-the-fly as it is about to leave the device, and pass the FOLLOW_UP message unaltered • Two-step-departure and arrival timestamps are used to update the correction field in a follow-up message (a second message different from the sync message).
Priority code (PCP)	Assign a value to the **Priority Code (PCP).** Smaller numeric values indicate higher priority.
Enable host clock sync to PTP time	If checked, the sync of the host clock is enabled. Remove the checkmark to disable it. The default is enabled sync of the host clock to PTP time.
Tagged	To configure the sending of tagged PTP packets, add a checkmark in the box next to label **Tagged**. The packet format for PTP messages can be 802.1q tagged or untagged. When PTP packets are sent on the native VLAN in E2E Transparent Clock Mode, they are sent as untagged packets. This is the default option.
VLAN ID	Enter a value for **VLAN ID** for PTP messages.
Save	Click **Save** to save the changes.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.4.3.2 Status

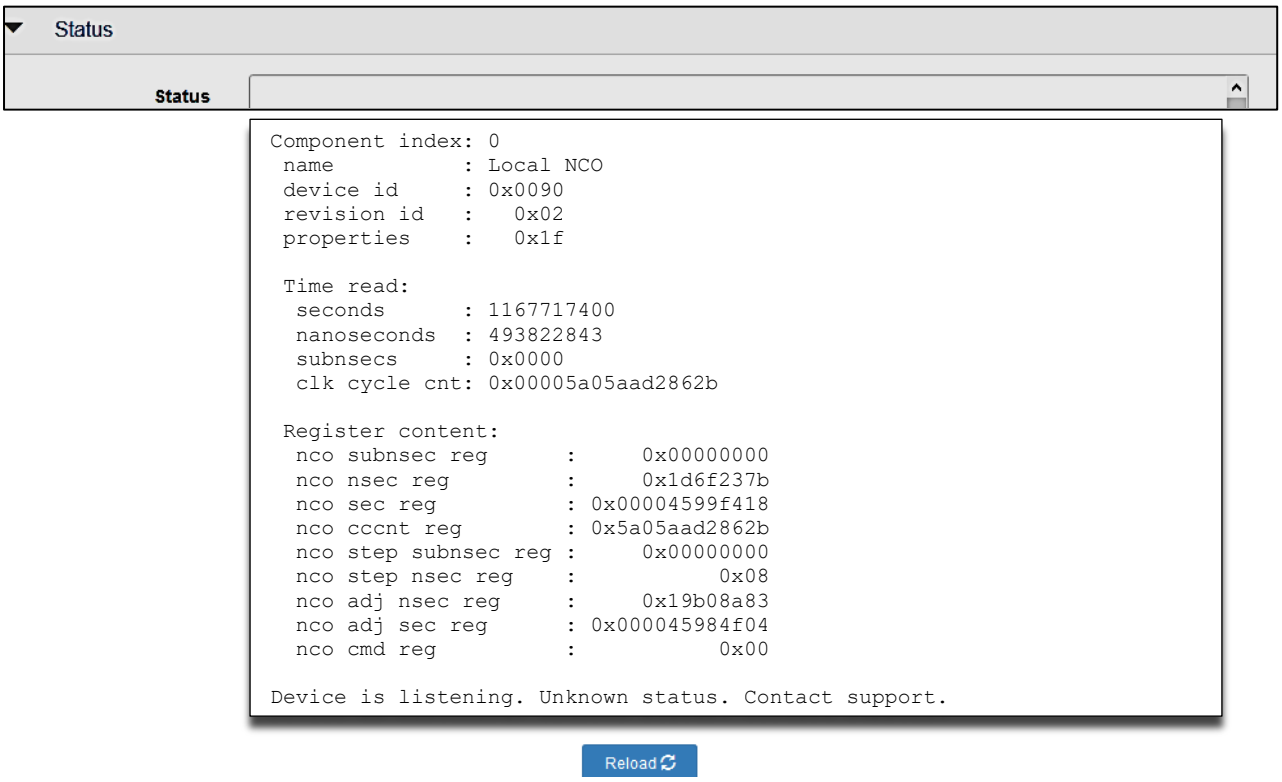


Figure 41 – PTP, Status Interface

This a status report for PTP features such as device id, time read, and numerically controlled oscillator's (NCO) characteristics.

10.4.4 LLDP

HSR supports LLDP (Link Layer Discovery Protocol) which provides an efficient Layer2 neighbor discovery mechanism. It allows devices to advertise information about them to peer devices on the same LAN and to learn information about peer devices.

LLDP information is sent by devices from each of their interfaces at a fixed interval, in the form of an Ethernet frame. Each frame contains one LLDP Data Unit (LLDPDU). Each LLDPDU starts with the following mandatory type-length-value (TLV) s: *Chassis ID*, *Port ID*, and *Time-to-Live (TLV)*. The mandatory TLVs are followed by any number of optional TLVs. The frame ends with a special TLV, named *end of LLDPDU* in which both the *type* and *length* fields are 0.

To see the LLDP configuration, Global statistics, and LLDP mandatory TLVs, use *do show lldp* command.

On the status report, TTL is the length of time (in seconds) for which an LLDP neighbor retains the advertised data before discarding it.

LLDP-MED (*Media Endpoint Discovery)*, the LLDP (IEEE 802.1AB)[8] industry standard for supporting advanced features on the network edge for Voice Over IP (VoIP) endpoint devices with specialized capabilities and LLDP-MED standards-based functionality, is supported by default. By default, LLDP-MED fast start mechanism is set to "yes" and LLDP-MED fast start interval=1.

10.4.4.1 Control and LLDP Neighbor Table

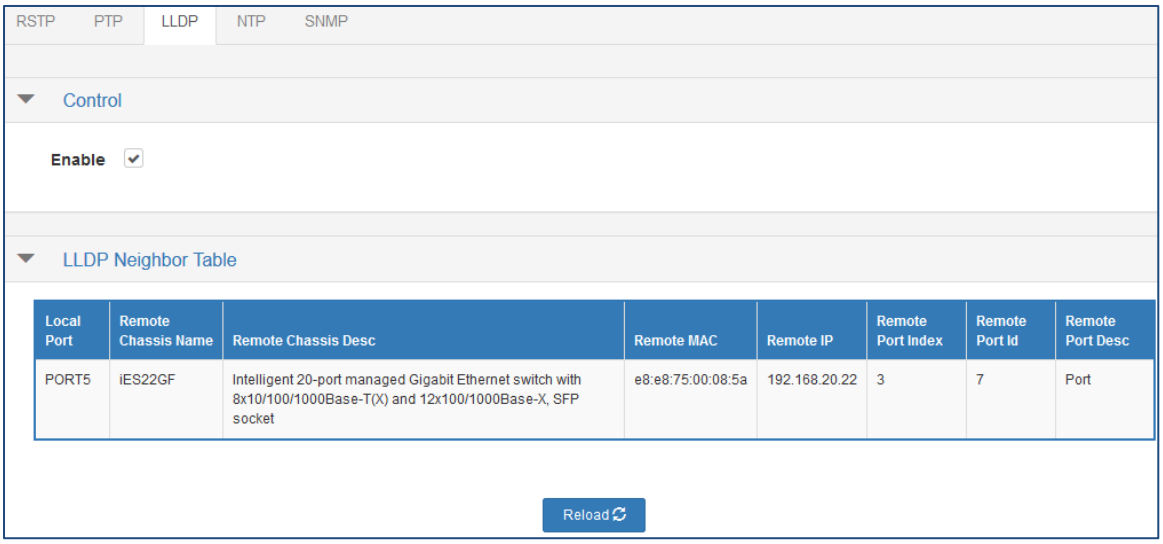


Figure 42 – LLDP Interface

The following table describes the labels for the **LLDP Interface** screen.

Label	Description
Control	
Enable	To enable LLDP, check the box adjacent to the **Enable** label. By default, LLDP is enabled. Enabling LLDP operation causes the switch to: • Use active, LLDP-enabled ports to transmit LLDP packets describing itself to neighbor devices. • Add entries to its neighbors table based on data read from incoming LLDP advertisements.
LLDP Neighbor Table	
Local Port	This is a read-only value of PORT5. This is the LLDP interface. "Local," means assigned locally by LLDP.
Remote Chassis Name	This is a read-only field (e.g. it shows iES22GF)
Remote Chassis Desc	This is a read-only field as shown above.
Remote MAC	This is a read-only value of e8:e8:75:00:08:5a. This is an ChassisID, where the chassis ID subtype is the MAC address of the switch.
Remote IP	This is a read-only field (e.g. 198.168.20.22).
Remote Port Index	This is a read-only field (e.g. 3)
Remote Port Id	This is a read-only field (e.g. 7)
Remote Port Desc	This is a read-only field with (e.g. port)
Reload	Click to undo any changes made locally and revert to the saved ones.

10.4.5 NTP

Network Time Protocol (NTP) is a protocol used to synchronize computer clock times in a network. NTP uses Coordinated Universal Time (UTC) to synchronize computer clock times with extreme precision, offering greater accuracy on smaller networks -- down to a single millisecond in a local area network and within tens of milliseconds over the internet. NTP does not account for time zones – we can enter the correct time zone in the timezone UTC field.

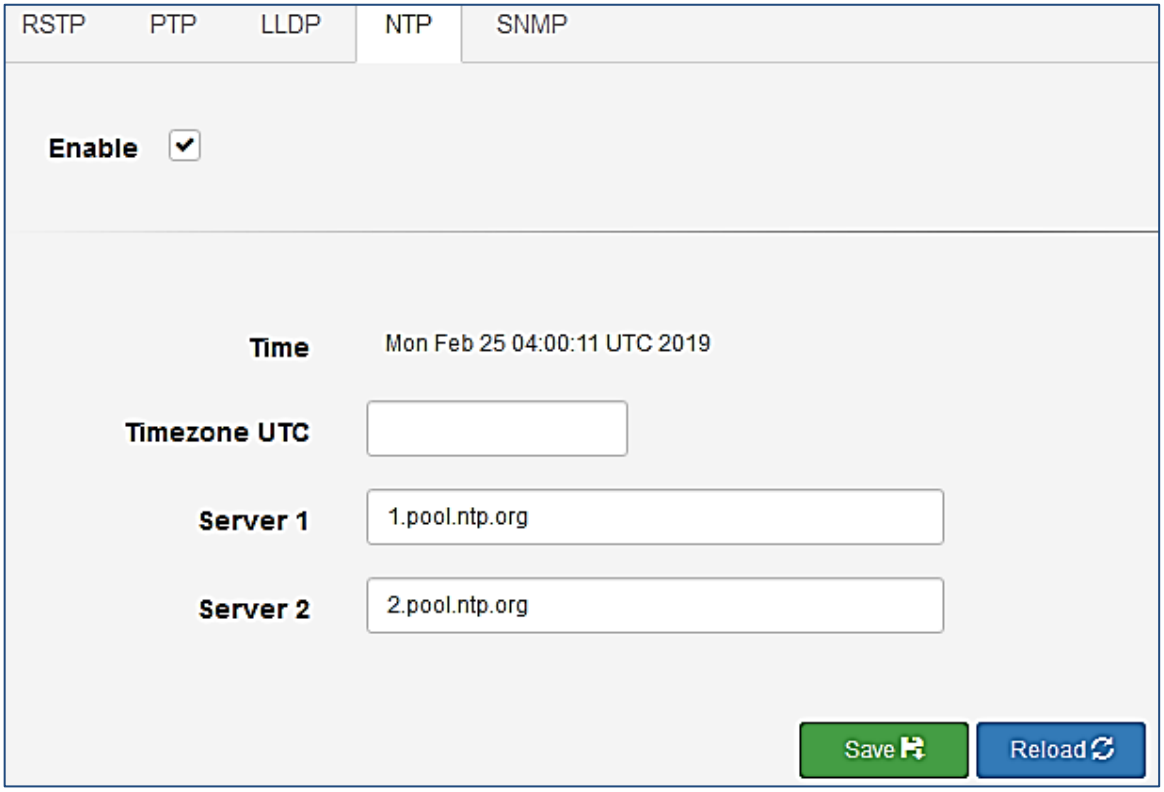


Figure 43 – NTP Interface

The following table describes the labels for the **NTP Interface** screen.

Label	Description
Enable	Add a checkmark to enable NTP>
Time	This is a read-only field showing system time
Timezone UTC	Universal Coordinated Time Timezone. The current for Toronto is -4.
Server 1	Add a time **Server 1**. The default is *1.pool.ntp.org*. The *pool.ntp.org* is a big virtual cluster of timeservers providing reliable and easy to use NTP service.
Server 2	Add a time **Server 2**. The default is *2.pool.ntp.org*.
Save	Click to save the changes.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.4.6 SNMP

Simple Network Management Protocol (SNMP), the most widely-used network management protocol on TCP/IP-based networks, is used for collecting information from /and configuring, network devices, such as servers, printers, hubs, switches, and routers on an Internet Protocol (IP) network.

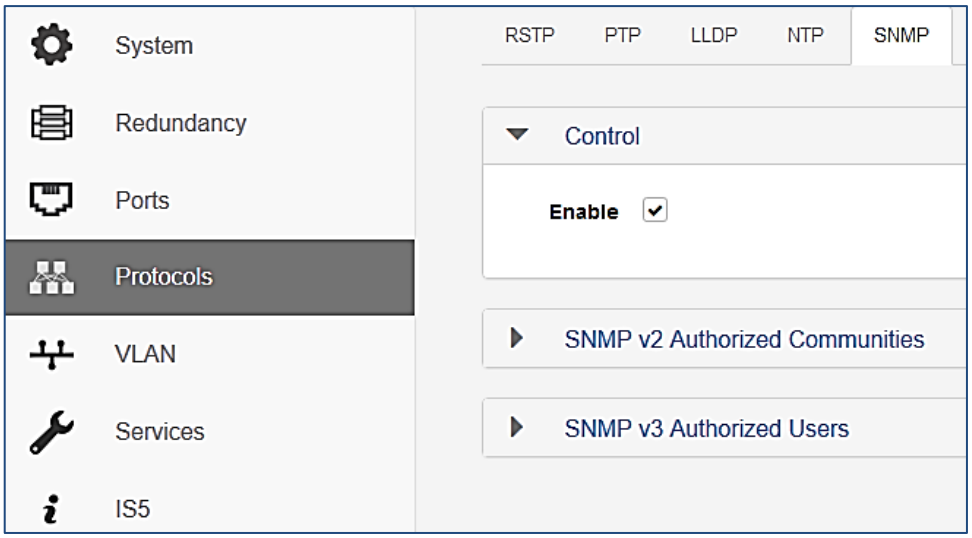


Figure 44 – SNMP Interface

The administrative framework for SNMPv2 associates each message with a "community". So, SNMP Ver 2 is commonly known as "Community-based SNMPv2 (SNMPv2C)" [2]. A security shortcoming of SNMP v2c is that the community strings used for authentication are communicated in cleartext over the network and can potentially be captured while in transit.

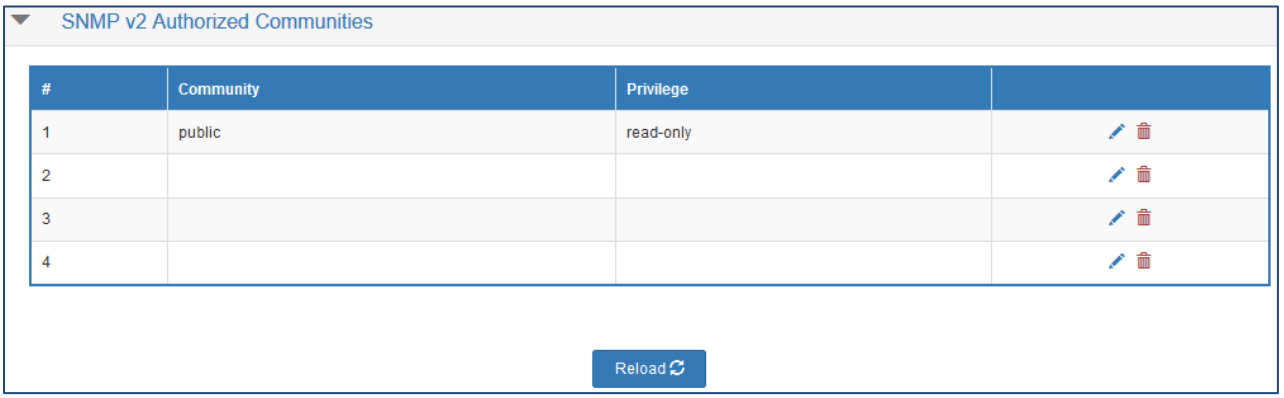
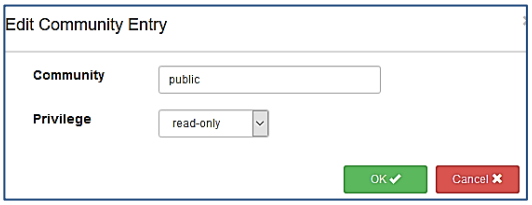


Figure 45 – SNMP v2 Interface

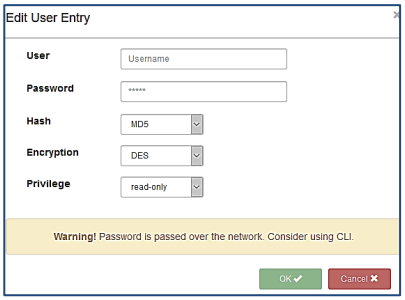
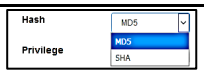
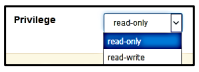
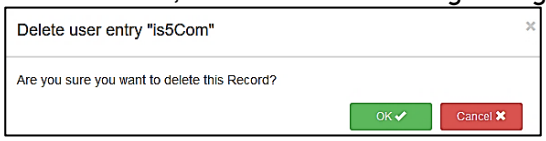
The following table describes the labels for the **SNMP v2 Interface** screen.

Label	Description
Control	
Enable	To enable SNMP, check the box adjacent to the **Enable** label. By default, SNMP is enabled.
SNMP v2 Authorized Communities	
#	A community string number. Default is *1 public read-only*
Community	The default **Community** name is public and is read-only field for community # 1. For community #2, the name entered in the **Edit Community Entry** will appear in this field (e.g. private as shown in Figure 45).
Privilege	The default **Privilege** is read-only as shown for community # 1. For community #2, the privilege entered in the **Edit Community Entry** will appear in this field (e.g. read-write as shown in Figure 45). There are 2 options: **read only** or **read-write.**
	To create a new community, on the row # of the dialog box, click . The **Edit Community Entry** appears.  • **Community**–enter a name (e.g. private) • **Privilege**–select one of the 2 options: **read only** or **read-write** After selection, click **OK** to save your choices or **Cancel** to discard them.
	For community string to be deleted, click . The following dialog box appears. Click **OK** to save your entry or **Cancel** to discard it.
Reload	Click to undo any changes made locally and revert to the saved ones.

SNMPv3 is designed mainly to overcome the security shortcomings of SNMPv1/v2, and it supports authentication and encryption. SNMP community strings are essentially used as "Passwords" for device authentication within the SNMP management infrastructure. To configure SNMPv3, first, SNMP v3 Authorized Users are established.

Figure 46 – SNMP v3 Authorized Users Interface

The following table describes the labels for the **SNMP v3 Authorized Users Interface** screen.

Label	Description
#	Number of Authorized users. This a read only column with 4 numbers:1,2,3, and 4.
	To create a new SNMP v3 Authorized User, click . The **Edit User Entry** appears.  The labels are as shown below.
User	Enter Username in the **User** field.(e.g. iS5Com)
Password	A SNMP v3 **Password** should meet the following requirements (admin1) • Community strings should be at least 20 characters or greater in length. • Community strings should contain characters from all four of the following categories: • Uppercase & lowercase characters (A through Z) • Base 10 digits (0 through 9) • Special characters (for example, &, $, #, %) • Community strings should not be based upon or contain a dictionary word. • Community strings should not contain or be based upon corporate culture or name. Public and private community strings should not match.
Hash	Select a **Hash** function from the drop--down menu:  • MD5 (Message Digest) algorithm has a hash value of 128 bits and as of 2010, the CMU Software Engineering Institute considers MD5 "cryptographically broken and unsuitable for further use"
Encryption	The encryption options are: • DES (Data Encryption Standard) – default. DES is a symmetric block cipher (shared secret key), with a key length of 56-bits. • AES (Advanced Encryption Standard) - AES allows selection of a 128-bit, 192-bit or 256-bit key, making it exponentially stronger than the 56-bit key of DES Note that only one encryption type for each SNMPv3 user can be specified.
Privilege	Select **Privilege** function from the drop--down menu: The options are: • Read-only • Read-write 
	For community string to be deleted, click . The following dialog box appears.  Click **OK** to save your entry or **Cancel** to discard it.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.5 VLAN

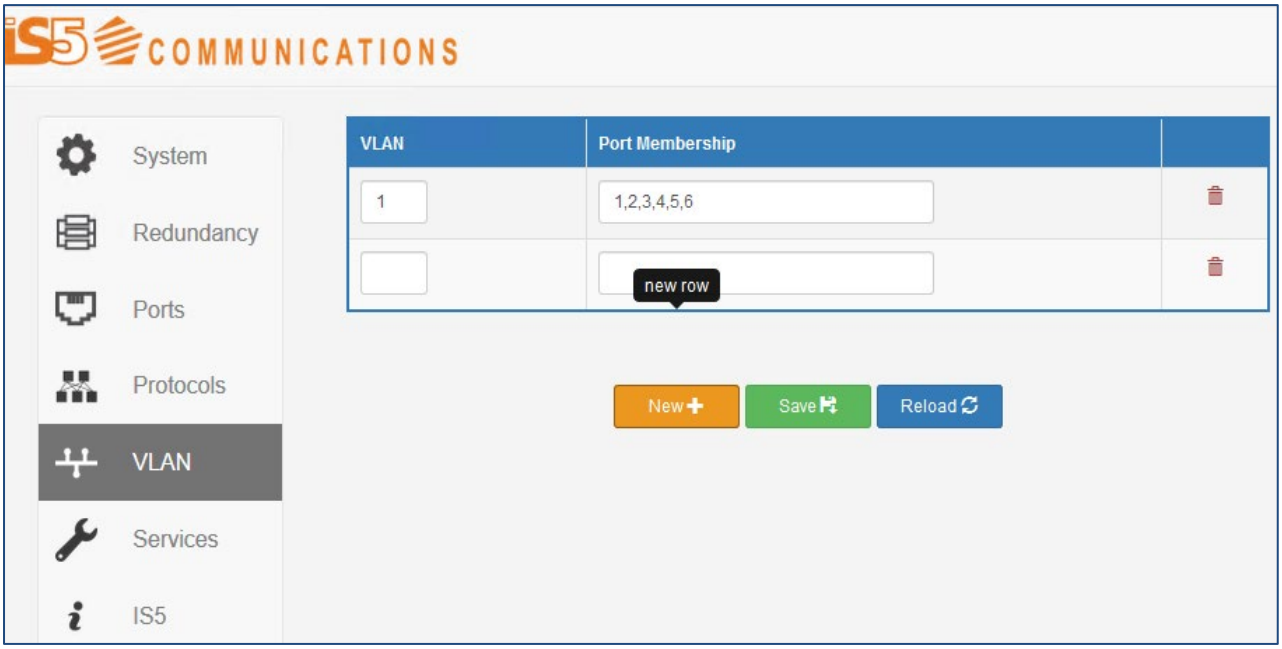


Figure 47 – VLAN Interface

Use the VLAN web page to configure port membership.

The following table describes the labels for the **VLAN Interface** screen.

Label	Description
VLAN	Add a VLAN number. The default is 1. The example in shows 2.
New	Click **New+** to add a new row to the table (see Figure 47). Repeat adding numbers as needed. The first row shows the default – VLAN 1 with all ports members.
Port Membership	Enter port numbers in this field.
Save	Click **Save** to save new VLAN and its ports membership. Note: it may take up to 30 seconds to save the date. At the end, the following message will appear
	For VLAN to be deleted, click . It will be deleted without any extra notification.
Reload	Click to undo any changes such as deletion and revert to the saved ones.

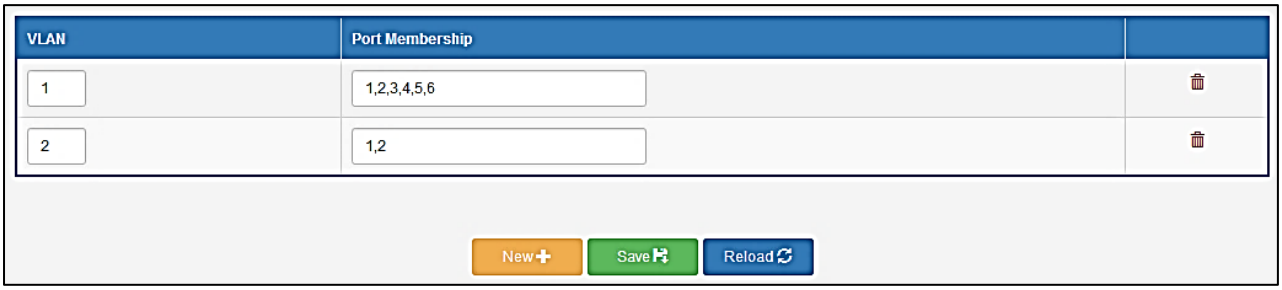


Figure 48 – VLAN Interface with VLAN 2

10.6 Services

10.6.1 Web

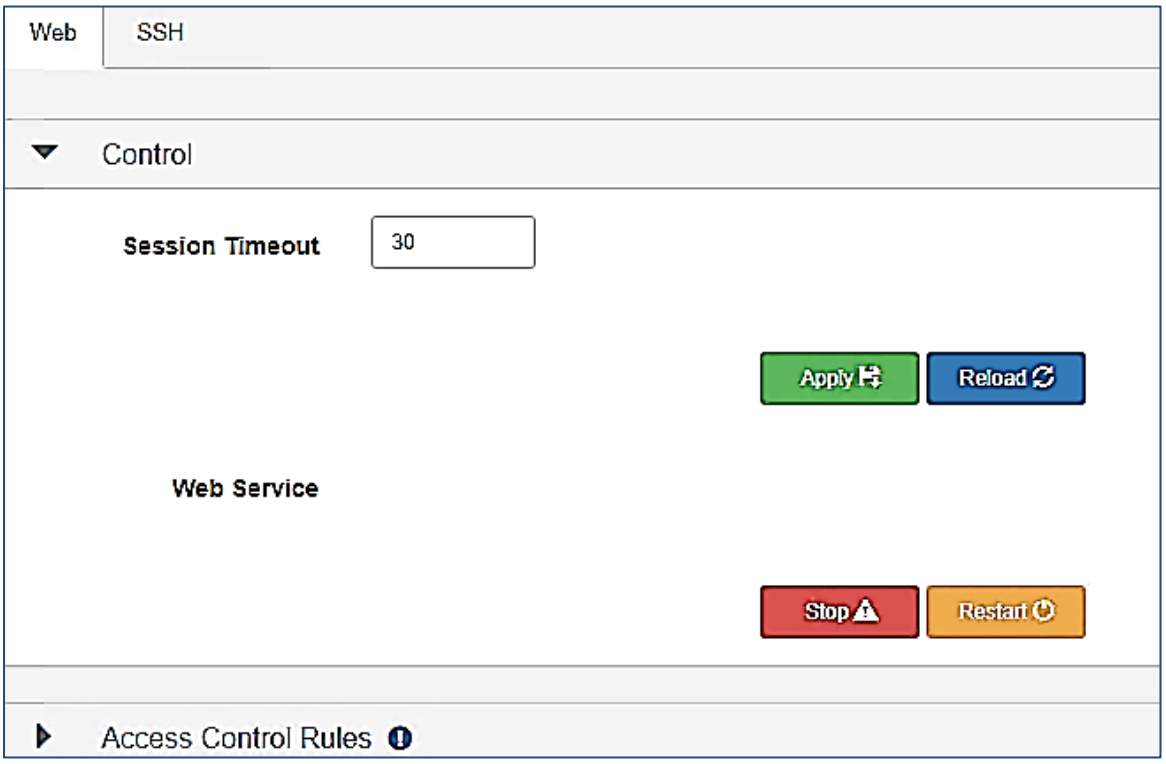


Figure 49 – Services, Web tab Interface

The following table describes the labels for the **Services, Web tab Interface** screen.

Label	Description
Control	
Session Timeout	Enter Session duration
Apply	Click **Apply** to save the changes.
Reload	Click to undo any changes made locally and revert to the saved ones.
Web Service	
Stop	Click to stop web service
Restart	
Access Control Rules	Configure IP networks which are allowed to access SNMP.

10.6.1.1 Access Control Rules

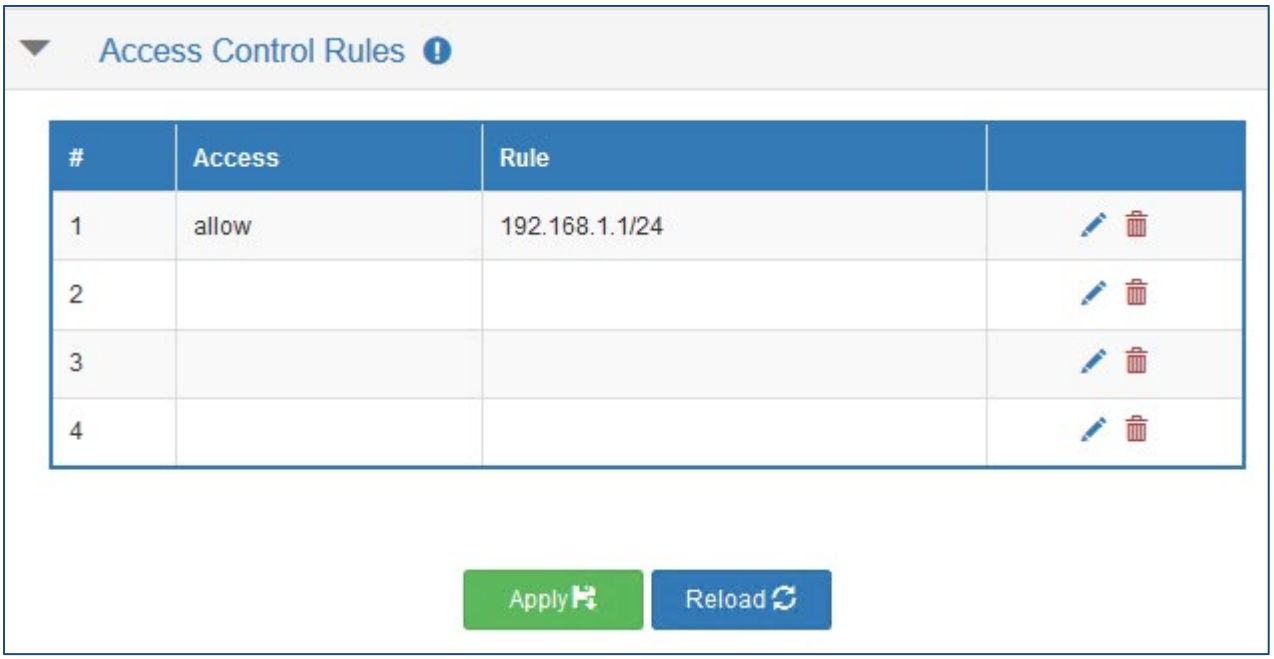
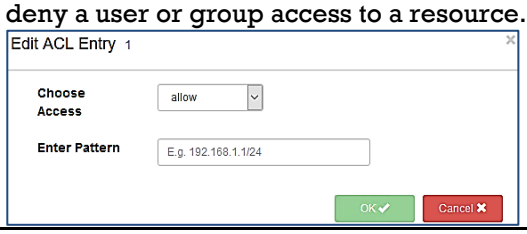
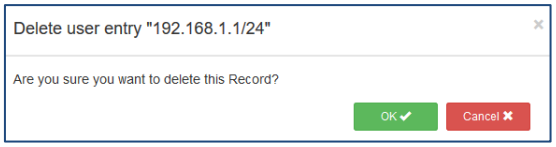


Figure 50 – Access Control Rules, Web tab Interface

The following table describes the labels for the **Services, Web tab Interface** screen.

Label	Description
#	Number of rule.
Access	The options are allow and deny. The default is allow
Rule	A pattern (e.g. 192.168.1.1./24)
Access Control Rules	Configure IP networks which are allowed to access SNMP.
	To add a new rule, click . The following **Edit ACL Entry** dialog box will appear. Access control entry (ACE) is an entry in an access control list (ACL) that will grant or deny a user or group access to a resource. 
Choose Access	Select Access. The options are allow and deny. The default is allow.
Enter Pattern	In **Edit ACL Entry** box, enter a pattern (e.g. 192.168.1.1./24). Click **OK** to confirm.
	To delete a record in the Access Control Rules table, click at the record's row. Click **OK** to save your entry or **Cancel** to discard it. 
Reload	Click to undo any changes made locally and revert to the saved ones.
Save	Click to save changes.
Reload	Click to undo any changes made locally and revert to the saved ones.

10.6.2 SSH

SSH (Secure Shell) is a cryptographic network protocol for operating network services securely over an unsecured network. An example application is a remote login to computer systems by users.

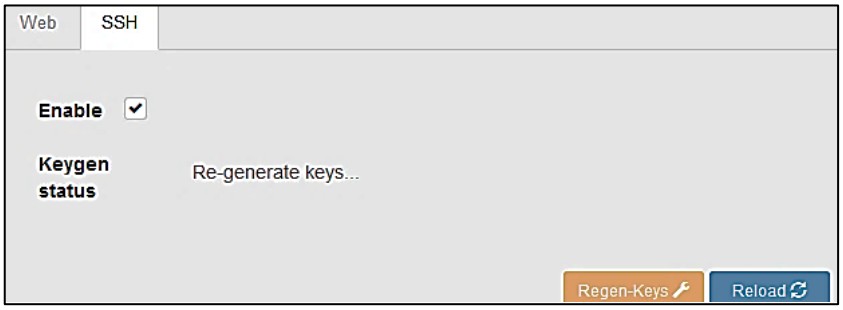


Figure 51 – Services, SSH tab Interface

The following table describes the labels for the **Services, SSH tab Interface** screen.

Label	Description
SSH < Enable	To enable SSH, add a checkmark in its adjacent box.
Keygen status < Regen-Keys	Click **Regen-Keys** to re-generate keys.
Reload	Click to undo any changes made locally and revert to the saved ones.

When you click **Regen-Keys**, the following message appears: *Success! Regeneration is in process, it may take up to 20 minutes for the process to complete.*

Next to the **Keygen Status** label, during the regeneration process, the following message appears: Keys are being re-generated...

10.7 IS5

Click IS5 to be redirected to iS5Com's web site - http://is5com.com/

11. TECHNICAL SPECIFICATIONS

Model Number iRBX6GF	
Physical Ports	
10/100/1000Base-T(X) RJ45 and 100/1000Base-X SFP	2 Combo Ethernet ports (Port 5 & 6)
100/1000Base-X SFP	2 Ethernet ports
100/1000Base-X SFP	2 HSR/ PRP ports (Port 1 &2)
PPS and IRIG-B Outputs (for future releases)	BNC Connector (based on request)
Technology	
Ethernet Standards	IEEE 802.3 for 10Base-T IEEE 802.3u for 100Base-TX and 100Base-FX IEEE 802.3ab for 1000Base-T IEEE 802.z for 1000Base-X
Priority Queues	4
Time Synchronization	Supports IEEE 1588v2 transparent clock
Network Redundancy	HSR, PRP as per IEC62439-3; RSTP - Rapid Spanning Tree Protocol
Software Features	IEEE 802.1Q for VLAN Tagging IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol) IEEE 1588v2 PTP clock synchronization HSR (High-availability Seamless Redundancy) PRP (Parallel Redundancy Protocol) NTP Time Synchronization Multi User support (Admin/Guest) SNMP support SSH Support Login Banner for CLI and WebUI Inband and dedicated Management interface LLDP support WebUI Management
Power	
Input Power	Redundant Power Supplies: Dual DC Inputs 9-36VDC, Dual DC Inputs 36-75VDC, or Dual Input 110-370VDC or 90-264VAC
Power Consumption (Typ.)	Up to 20 W
Overload Current Protection	Present
Reverse Polarity Protection	Internal
Physical Characteristics	
Enclosure	IP-40 Galvanized Steel
Dimensions iRBX6GF	133.7 (W) x 159.4 (D) x 203.2 (H) mm (5.27 x 6.28 x 8.00 inches) (panel mount option)
	133.7 (W) x 167.4 (D) x 175.7 (H) mm (5.27 x 6.59 x 6.92 inches) (DIN rail mount option)
Unit Weight (g)	~ 2700 g
Dimensions iRBX6GF-S	88.9 (W) x 159.4 (D) x 203.2 (H) mm (3.50 x 6.28 x 8.00 inches) (panel mount option)
	88.9 (W) x 167.4 (D) x 203.2 (H) mm (3.50 x 6.59 x 8.00 inches) (DIN rail mount option)
Unit Weight (g)	~ 2000 g
Environmental	
Storage Temperature	-40 to +85°C (-40 to 185°F)
Operating Temperature	-40 to +75°C (-40 to 167 °F) No fans
Operating Humidity	5% to 95% Non-condensing

Model Number iRBX6GF	
Regulatory Approvals	
IEC & IEEE	IEC 61850-3, IEEE 1613, IEC 62439-3
EMI	FCC Part 15, Class A, CISPR Class A (EN55022)
EMS	IEC 61000-4-2 (ESD), IEC 61000-4-3 (Radiated RFI), IEC 61000-4-4 (Burst), IEC 61000-4-5 (Surge), IEC 61000-4-6 (Induced (Conducted) RFI), IEC 61000-4-8, IEC 61000-4-11
Warranty	**5 years**

For dimensions, refer to the latest revision of the products datasheet:
http://is5com.com/products/irbx6gf/