

User Guide

10GigaBit iBypass Switch with Heartbeat™



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Additional Information

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Chapter 1

Introduction

Thank you for choosing Net Optics 10 GigaBit iBypass Switch, the most versatile intelligent Bypass Switch available today. This guide is designed to help answer your questions and provide an installation reference.

Net Optics iBypass Switch with Heartbeat provides a permanent access port for in-line network security and monitoring. The iBypass Switch automatically switches network traffic through added devices, or bypasses devices that are removed. The intelligent iBypass Switch Heartbeat provides notifications to protect network traffic against both signal and power loss on an attached device.

About this Guide

This guide describes the installation and use of the following models:

Part Number	Description
IBPO-HBSR-XFP	10 GigaBit SR iBypass Switch with Heartbeat
IBPO-HBLR-XFP	10 GigaBit LR iBypass Switch with Heartbeat
IBPO-HB50SR-XFP	10 GigaBit SR iBypass Switch with Heartbeat, 50um
IBPO-HBER-XFP	10 GigaBit ER iBypass Switch with Heartbeat

Features

Heartbeat Packet

The iBypass Switch monitors the attached device by sending a Heartbeat packet to the device. If the iBypass Switch does not receive the Heartbeat response, it automatically switches network traffic to bypass the unresponsive device—even if the device is still receiving power. The iBypass continues to send the Heartbeat, and will restore traffic flow through the device as soon as the link is restored.

Uninterrupted Traffic

This iBypass Switch supports fail-open monitoring with any 10 GigaBit device when it shares the same power source as the device. As long as the iBypass Switch is receiving power, it will divert network traffic to attached monitoring devices. In this state, all traffic is routed directly to the monitoring device connected to the iBypass Switch.

When the iBypass Switch loses power, traffic continues to flow through the network link, but is no longer routed through the iBypass Switch. This allows network devices to be removed and replaced without network downtime. Once power is restored to the iBypass Switch, network traffic is seamlessly diverted to the monitoring device, allowing it to resume its critical functions.

Simply Plug It In

10 GigaBit iBypass Switches use XFP transceivers; the port kit includes the cables you need to establish a secure network connection point for inline devices, and the cable to connect monitoring devices. For special applications, you may customize the Heartbeat Packet rate from the iBypass CLI (Command Line Interface).

Bypass Detect

You can set the Monitor Ports to cycle on and off while the iBypass Switch is in bypass mode. In Bypass Detect mode, the monitor ports will cycle through five seconds off followed by fifteen seconds on. The alternating link status can be used to trigger attached devices to send an alarm to a management system every time the iBypass Switch turns off the monitor ports. When the iBypass Switch returns to bypass disabled mode, the monitor ports remain on and the on/off cycle is discontinued.

Note

If XFP modules from other vendors are used with the iBypass Switch, Net Optics cannot warranty the operation of the iBypass Switch with these modules.

Passive, Secure Technology

- Fail-open monitoring with any 10 GigaBit appliance at speeds of 10 Gbps
- Protection against power, link, and application failure
- XFP (10 Gigabit Small Form Factor Pluggable) transceivers
- Increased reliability on critical network links
- High-speed switching with minimal insertion loss
- Custom Heartbeat packet option with configurable timeout (Heartbeat) and Retry
- Tap mode during Bypass
- Fully RoHS Compliant

Ease of Use

- LED indicators show power, link, bypass and activity status
- Front-mounted connectors support easy installation and operation
- Optional 19-inch rack frame holds two iBypass Switches

- Compatible with all major manufacturers’ monitoring devices, including protocol analyzers, probes, and intrusion detection/prevention systems

Support

Net Optics offers free technical support throughout the lifetime of your purchase. Our technical support team is available from 8 am to 5 pm Pacific Time, Monday through Friday at +1 (408) 737-7777 and via email at ts-support@netoptics.com. FAQs are also available on Net Optics website at www.netoptics.com

Bypass Modes

The Bypass Switch with Heartbeat bypasses attached in-line device when one of three events occurs:

- Power loss to the switch
- Link failure
- Application failure

Two LEDs on the front of the iBypass Switch indicate whether the switch is bypassing the connected appliance or not. When the Bypass ON and an indicator is illuminated, the bypass switch has not received the heartbeat packet as expected and is in bypass enabled mode. When the bypass OFF indicator is illuminated, the bypass switch is in bypass disabled mode and is sending traffic through the attached in-line device.

When the switch is in bypass enabled (ON) mode, the switch circuitry re-directs network traffic around the in-line appliance. In bypass enabled mode Network Ports A and B are connected (see below).

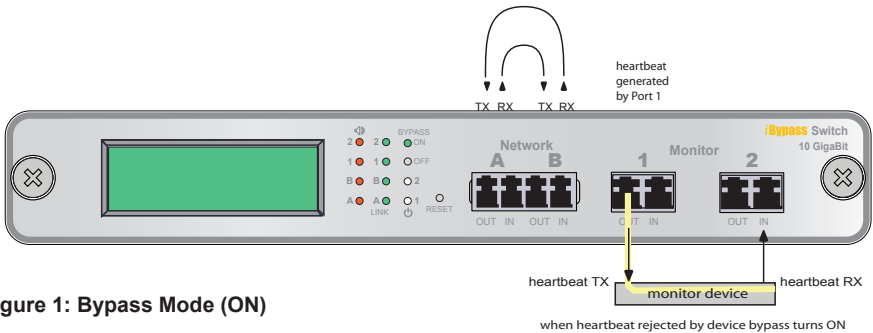


Figure 1: Bypass Mode (ON)

When the switch is in bypass disabled (OFF) mode, the switch circuitry sends network traffic through the in-line appliance. In bypass disabled mode, Network Port A is connected to Monitor Port 1 and Network Port B is connected to Monitor Port 2 (see below).

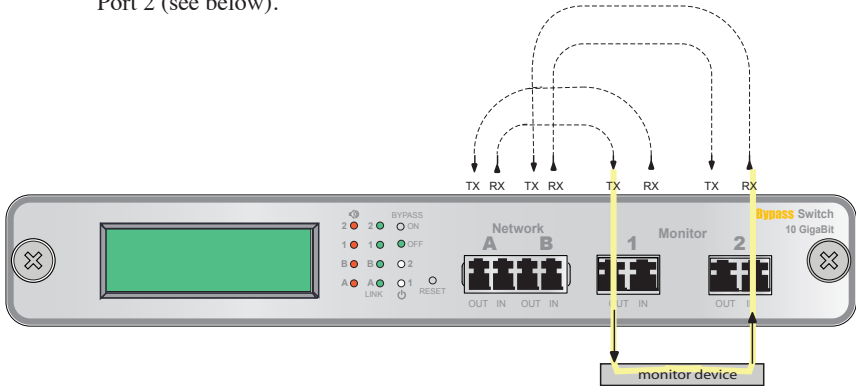


Figure 2: Bypass Mode (OFF)

Power Loss Bypass

The iBypass Switch protects link integrity when the attached monitoring device loses power. To install the iBypass Switch for this type of protection, the switch should share the same power source as the monitoring appliance. If you are using redundant power supplies for the bypass switch, make sure that both monitoring devices are connected to the same power source as the iBypass device.

Heartbeat Bypass

The iBypass Switch with Heartbeat protects against both physical link failure and application failure on the monitoring device. The bypass switch checks the path through the monitoring device by sending a packet at a predetermined rate (for example, once every millisecond from Monitor Port 1). The iBypass Switch validates the path when it receives the packet on the Monitor Port B. If the iBypass Switch does not receive the packet as expected three times in a row, the bypass switch will automatically enter bypass enabled (On) mode. You can use the CLI or remote interfaces to change the number of the Heartbeat packets required (Retry parameter 1-255) before the iBypass Switch enters bypass enabled mode. The switch continues to send the bypass packet and will return to bypass disabled mode when it receives three consecutive packets on Monitor Port 2.

The contents of the default Heartbeat packet can be seen on page 41.

Tap Mode During Bypass

Whenever the iBypass Switch is in Bypass Mode, it operates as a normal network Tap by copying the traffic received at Network Port A to Monitor Port 1, and traffic received at Network Port B to Monitor Port 2. This function enables the attached device to monitor network traffic out-of-band, for instance to baseline the system prior to putting the device in-line. The only difference from a normal network Tap is that Heartbeat packets continue to be transmitted (if the Switch is not in Manual Bypass mode) in order to detect when the monitoring tool comes back online.

Note:

When using the iBypass Switch as a network Tap, be sure to set the Bypass Detect Feature to "OFF" so the ports remain on constantly.

SNMP Traps

The iBypass Switch transmits SNMP traps for the following events:

- Bypass state changes
- Utilization exceeds the threshold on any port
- Any port link status changes
- Either power supply state changes

Chapter 2

Installing the 10 GigaBit iBypass Switch

This chapter describes how to install and connect the iBypass Switch. The procedure for installing the iBypass Switch follows these basic steps:

- Plan the installation
- Unpack and inspect the iBypass Switch
- Install (XFP) Small Form-Factor Pluggable transceivers
- Rack mount the iBypass Switch (optional)
- Connect power to the iBypass Switch
- Connect the CLI RS232 interface for configuration
- Configure the iBypass Switch default values with the CLI
- Connect the iBypass Switch to network devices
- Connect the Management Port to the network
- Connect iBypass Switch Ports to monitoring device(s)
- Check the installation

After the iBypass Switch is installed, you can remotely monitor and control the iBypass Switch from either Web Manager or System Manager.

Plan the Installation

Before you begin the installation of your iBypass Switch, determine the following:

- IP address of the iBypass Switch or, if you are deploying multiple iBypass Switches, a range of IP addresses
- Net Mask for the iBypass Switch
- IP address of the remote management console, if deployed over a WAN
- Gateway to the remote management console, if deployed over a WAN

Also make sure you have a suitable location to install the iBypass Switch. For power redundancy, use two independent power sources.

Unpack and Inspect the iBypass Switch

Unpack the iBypass Switch, power supplies, and all cables that are provided. Each iBypass Switch is delivered with the following:

- 2 Power supplies
- 2 LC fiber cables
- 1 RJ45 CAT5e cable
- 1 DB-9 RS232 cable
- Quick Installation Guide
- CD that contains this manual and System Manager software

You may have also purchased a panel for rack mounting the bypass switch, and an extended warranty. If any component is missing or damaged, contact Net Optics Customer Service immediately at +1 (408) 737-7777.

Installing XFP Monitor Port Transceivers

The XFP transceivers are packaged separately. You need to remove the temporary plugs from the iBypass Switch monitor slots and insert the XFP connectors into the monitor slots, as shown below, until they click into place.

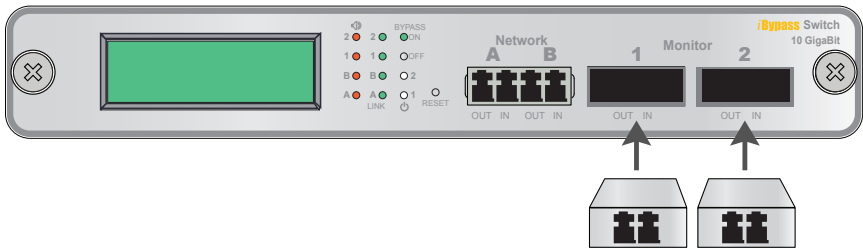


Figure 3: Insert XFP Connectors in Monitor Slots

Rack Mount the iBypass Switch (optional)

The iBypass Switch is designed for rack mounting in a two-slot, 19-inch panel. The mounting panel occupies one rack unit.

To rack mount the iBypass Switch:

1. Attach the two-slot panel to your equipment rack using the thumb screws on the panel.
2. Slide the iBypass Switch into one of the slots and secure the device by tightening the thumb screws.
3. Make sure that the rack is properly grounded.

Connect Power to the iBypass Switch

For power fault protection, the iBypass Switch has redundant power supplies. The second power supply is available to support the flow of traffic to the monitoring device in the event that the first power supply becomes unavailable. If the first power supply is unavailable, the second power supply provides all power for the iBypass Switch. Even if no power is available to the passive iBypass Switch, network traffic flows uninterrupted.

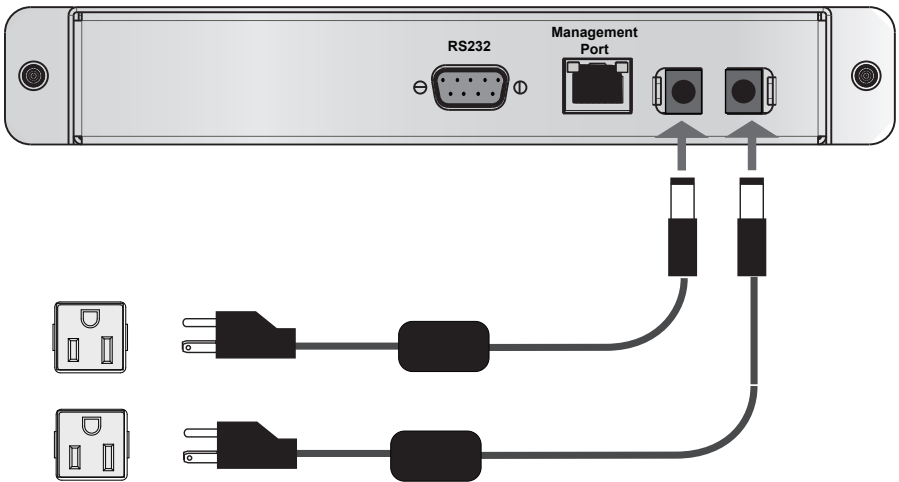


Figure 4: Connecting dual power supplies

Connect the power supplies to the back of the unit. If you plan to use redundant power, make sure that you connect the power supplies to two separate, independent power sources. The unit should now have one or both front panel Power LEDs illuminated, depending on whether you used one power cable or two.

Connecting to the CLI Interface

All configuration options, status, and statistics are accessible from the iBypass Switch Command Line Interface. You will set a new username and password, IP address for the iBypass Switch, utilization threshold levels for Port A and B, and the current date and time. Other parameters are optional and dependent on your installation. To do this configuration, you need to connect an RS232 DB9 cable to the back of the iBypass Switch and to your computer.

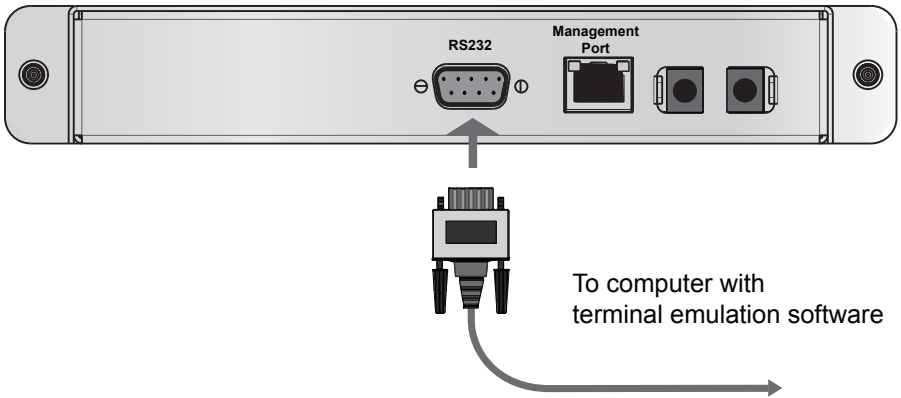


Figure 5: RS232 DB-9 connecting to computer

Your computer needs to have terminal emulation software such as HyperTerminal to access the iBypass Switch CLI via the RS232 cable..

To connect the CLI:

1. Connect a PC with terminal emulation software, such as HyperTerminal, to the iBypass Switch using the RS232 DB-9 cable supplied with the iBypass Switch.
2. Launch the terminal emulation software and set communication parameters to:

19200 baud
8 data bits
No parity
1 stop bit
No flow control

3. Power on the iBypass Switch. The Net Optics CLI banner and login prompt appear in the Terminal Emulation software (see below). The login default is **netoptics**.

```
*****  
* Net Optics Command Line Interface *  
*****  
login: netoptics  
password:
```

4. Enter the password. The default password is **netoptics**.

```
*****  
* Net Optics Command Line Interface *  
*****  
login: netoptics  
password: netoptics
```

Configure the iBypass Switch with the CLI

You should be logged into the iBypass CLI using terminal emulation software. If you are not, see the instructions on the previous page.

The default values for this iBypass Switch are:

- Management Port: **Enabled**
- IP Address: **192.168.2.100**
- Netmask: **255.255.0.0**
- Threshold Port A: **50%**
- Threshold Port B: **50%**
- Threshold Port 1: **50%**
- Threshold Port 2: **50%**
- Username: **netoptics**
- Password: **netoptics**

For security reasons, some parameters can only be set with the CLI. A complete list of CLI commands is in Appendix B. You will use the CLI now to:

- Change the login and password
- Assign a new IP address

- Change utilization thresholds
- Set the date and time
- Display and check the CLI settings
- Disable and enable the Management Port

Your terminal emulator should be displaying the Net Optics prompt shown below. If it does not, follow the directions on the previous page.

NetOptics:

You can change most settings later from one of the remote manager interfaces (for more information about remote interfaces, see Chapters 4 and 5).

Change the iBypass Switch Username and Password

1. Change the username by entering the following command:

```
set username <new username>
```

2. Change the password by entering the following command:

```
set password <new password>
```

3. Record the username and password in a secure location.

Assign a New iBypass Switch IP Address

Be sure that you have the correct new IP address for the iBypass Switch before you change the IP address value from the default 10.60.0.123. To change it:

Enter **set ip <new ip address>**.

Example: Enter **set ip 10.60.10.100** to set the iBypass Switch IP address to 10.60.10.100.

Change Port Utilization Threshold Levels

1. Enter **set threshold port a <new level>** to set a percentage of available bandwidth for Port A. Exceeding this limit will trigger the alarm.

Example: Enter **set threshold port a 30** to set the alarm threshold level for traffic received on Port A to 30%.

2. Enter `set threshold port b <new level>` to set a percentage of available bandwidth for Port B. (Exceeding this limit will trigger the alarm.)

Example: Enter `set threshold port b 30` to set the alarm threshold level for traffic received on Port B to 30%.

Set the Current Date and Time

Enter `set time <mm/dd/yyyy-hh:mm:ss>` where *mm* is month, *dd* is day of the month, *yyyy* is year, *hh* is hour, *mm* is minutes of the hour, and *ss* is seconds.

Time is based on the 24-hour clock.

Display and Check Current Settings

Enter `show set`.

The CLI displays the current setting, similar to the example below.

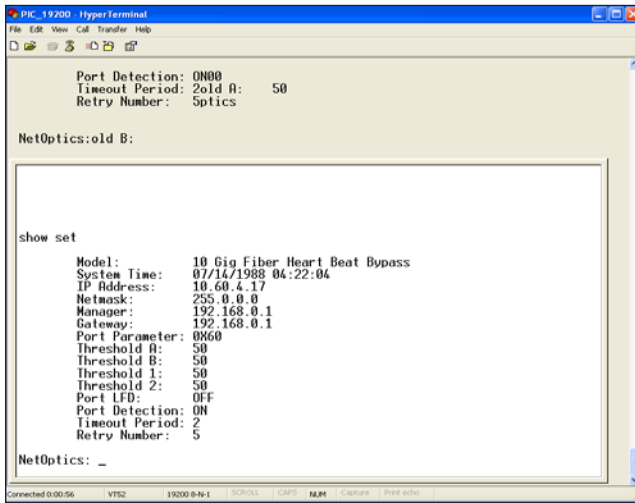


Figure 8:

Show Set command example

Using the CLI Help Command

1. Enter **Help** at the NetOptics prompt. The list of help topics is displayed.

```
NetOptics: help

*****
* Net Optics Command Line Interface *
*****

Usage: "help <variable>"

<variable>:
set      - Configure various options.
reset    - Reset options.
show     - Show current configurations
          and status.
echo     - Turn on or off echoing of
          characters.
display  - Toggle LCD display.
help     - This help screen.
```

Figure 9: iBypass Switch CLI Help Menu

2. To view the syntax for changing the iBypass Switch configuration parameters, enter **help set**.
3. Repeat with the variable of interest to view the syntax for all commands available from the CLI. For more information about CLI commands, see Appendix B.

Do not disconnect the DB9 cable yet from the RS232 port. You will use it once more to turn the iBypass Switch display on and off.

Connect the iBypass Switch to the Network

To connect the iBypass Switch to the network:

1. Connect Network Port A to the appropriate switch, server or router using an LC type fiber cable.

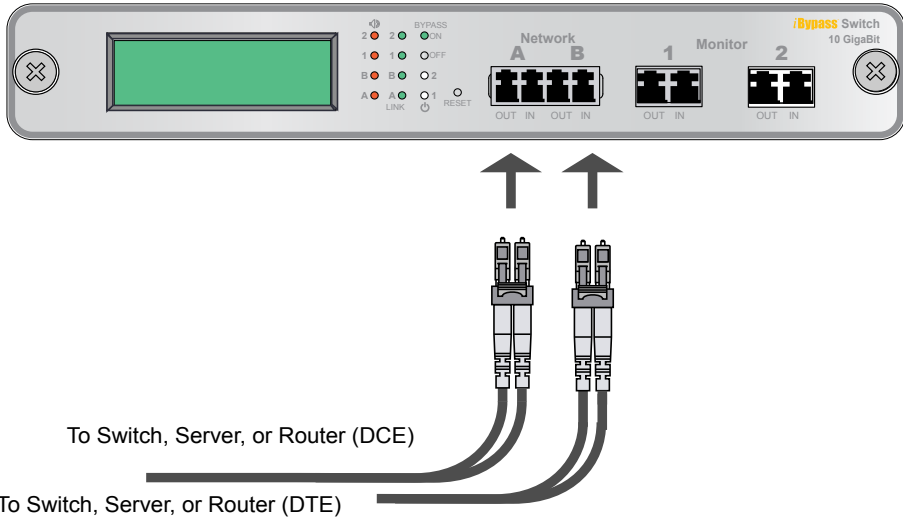


Figure 10: Connect the iBypass Switch to the Network

2. Connect Network Port B to the appropriate switch, server or router using an LC type fiber cable.

Connect the Management Port to the Network

To use either of the remote interfaces you must connect the Management Port on the back of the unit to the network.

To connect the Management Port:

1. Connect a CAT5 cable to the Management Port as shown in the following figure.

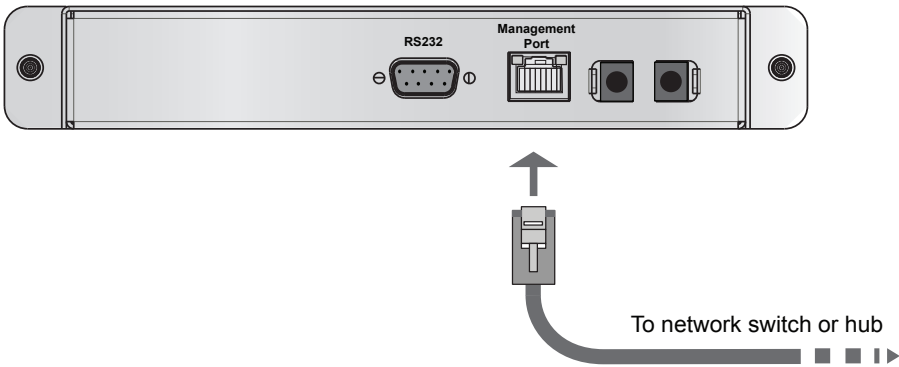


Figure 11: Connecting the Management Port

2. Connect the other end to a network switch or hub.

Disable, Enable and Check the Management Port

The CLI **display** command toggles the display on and off. From the terminal emulation software, do the following:

1. Enter **show display** to view the current setting. The default value is ON.
2. Enter **display**. Now look at the front of the iBypass Switch. Access from the Management Port is blocked and the iBypass Switch front panel does not display utilization or peak information.
3. Enter **display** again to restore the display and remote interfaces.

Connect a Monitoring Device to the iBypass Switch

The iBypass Switch is delivered with two monitor cables for monitoring device installation. Connect the cables to the monitoring device.

1. Connect Monitor Port 1 to the appropriate port on the monitoring device using the LC type fiber cable.
2. Connect Monitor Port 2 to the appropriate port on the monitoring device using the LC type fiber cable.

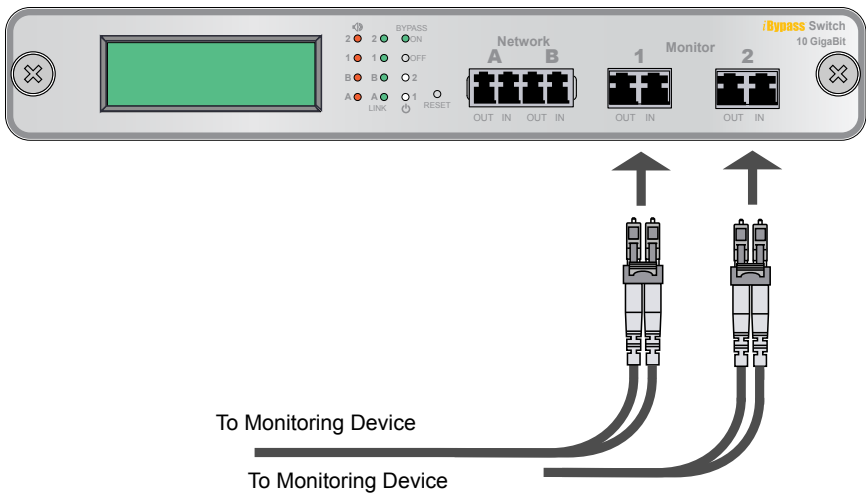


Figure 12: Connecting the Monitoring Devices

Check the Installation

You have connected the iBypass Switch to the network, to the monitoring device and to power. It should be functioning correctly now. Check the status of the following:

- Check that at least one power LED is illuminated.
- Check the link status LEDs located on the front panel to verify that traffic is passing through the switch.
- Check the display for utilization and peak information.
- Verify that the monitoring device is receiving traffic from the iBypass Switch.
- Verify that the Management Port is functional by typing the iBypass Switch's IP address in your Web browser. Net Optics' Web Manager should appear. If it does not, check the Management Port cables and connections and verify that the Display option in the CLI is set to ON.

Chapter 3 Front Panel

The utilization data on the display is refreshed every second. Network peaks are given as a percent of utilization and reflect the highest peak recorded since the last reset. The day and time information reflects the highest peak event since reset. You can set the iBypass Switch 24-hour clock through the CLI or by using the remote manager interfaces.

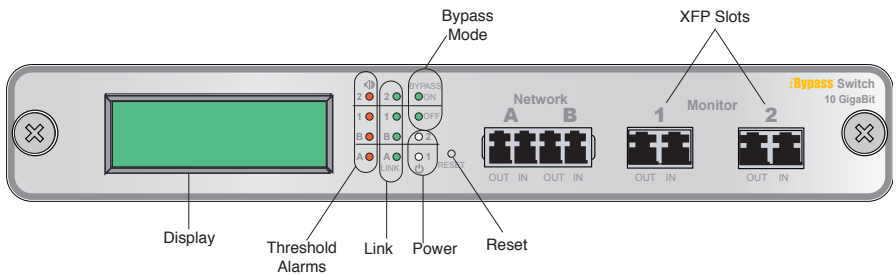


Figure 13: Front Panel of a 10 GigaBit iBypass Switch

For example:

If you set the thresholds for 30% utilization on Friday and over the weekend six peaks over 30% occur, the iBypass Switch provides information only on the highest peak.

If data is not displaying as expected, check the Network Port connectors for link status and activity. Also check the status of the display command using the CLI (see *Using the Command Line Interface* in chapter 2).

Utilization Alarm LEDs

Four LEDs indicate that utilization levels have exceeded the threshold. There is one LED for incoming traffic on the front panel. When a Utilization Alarm LED is red, it indicates that the threshold level was exceeded for that port since the last reset. The LEDs remain illuminated until reset via the reset button or remote interfaces.

Link LEDs

Four LEDs indicate link status. If a good link is established, the LED illuminates a steady green. If there is no current activity on this link, the LED flashes.

Power LEDs

If the iBypass Switch is deployed with both power supplies, both power LEDs will illuminate when connected to power. If a power LED is off, the corresponding power supply is not functioning or connected.

Reset Button

Press the Reset button to reset the traffic peak and time on the display and the Utilization Alarm LEDs. To prevent accidental resets, the Reset button is recessed from the front panel. To push the Reset button, use a thin, rigid tool such as an unbent paperclip.

Chapter 4

Web Manager

This chapter describes how to monitor and control individual iBypass Switches using Web Manager. The following topics are covered:

- Accessing Web Manager
- Viewing iBypass Switch Status
- Controlling iBypass Switch Connections
- Using the iBypass Switch Web Manager

The Web Manager browser-based interface allows you to change configuration settings, view status, and to control which Network ports are connected to the monitoring devices.

Note:

To access Web Manager, **Display** must be set to ON from the CLI. For more information, see *Using the Command Line Interface* in Chapter 2.

Access Web Manager

Web Manager is a browser-based interface that provides access to any iBypass Switch with an IP address. Web Manager supports all common browsers.

To access Web Manager:

1. Open an Internet browser on your computer.
2. Enter the iBypass Switch IP address in the URL. The default IP address is 192.168.2.100. Web Manager displays, as shown in the following figure.

Web Manager for HB Bypass

Bypass System Status

Bypass Status	<input type="text" value="UP"/>	Bypass Model	<input type="text" value="10 Gig Fiber HeartBeat"/>
Port A Link Status	<input type="text" value="DOWN"/>	Port B Link Status	<input type="text" value="DOWN"/>
Port 1 Link Status	<input type="text" value="DOWN"/>	Port 2 Link Status	<input type="text" value="DOWN"/>
Port A Port Speed	<input type="text" value="10 Gigabit"/>	Port B Port Speed	<input type="text" value="10 Gigabit"/>
Port 1 Port Speed	<input type="text" value="10 Gigabit"/>	Port 2 Port Speed	<input type="text" value="10 Gigabit"/>
Power Supply 1 Status	<input type="text" value="OFF"/>	Power Supply 2 Status	<input type="text" value="ON"/>
Bypass State	<input type="text" value="In"/>	<input type="button" value="Check HB Packet"/>	

Bypass Port A Statistics

Port A Peak Rate (%)	<input type="text" value="0"/>
Port A Peak Date & Time	<input type="text"/>
Port A Current Utilization Rate (%)	<input type="text" value="0"/>
Port A Total Packets	<input type="text" value="0"/>
Port A Total Bytes	<input type="text" value="0"/>
Port A CRC Errors	<input type="text" value="0"/>
Port A Collision Packets	<input type="text" value="0"/>
Port A Oversize Packets	<input type="text" value="0"/>

Bypass Port 1 Statistics

Port 1 Peak Rate (%)	<input type="text" value="0"/>
Port 1 Peak Date & Time	<input type="text"/>
Port 1 Current Utilization Rate (%)	<input type="text" value="0"/>
Port 1 Total Packets	<input type="text" value="0"/>
Port 1 Total Bytes	<input type="text" value="0"/>
Port 1 CRC Errors	<input type="text" value="0"/>
Port 1 Collision Packets	<input type="text" value="0"/>
Port 1 Oversize Packets	<input type="text" value="0"/>

Bypass Port B Statistics

Port B Peak Rate (%)	<input type="text" value="0"/>
Port B Peak Date & Time	<input type="text"/>
Port B Current Utilization Rate (%)	<input type="text" value="0"/>
Port B Total Packets	<input type="text" value="0"/>
Port B Total Bytes	<input type="text" value="0"/>
Port B CRC Errors	<input type="text" value="0"/>
Port B Collision Packets	<input type="text" value="0"/>
Port B Oversize Packets	<input type="text" value="0"/>

Bypass Port 2 Statistics

Port 2 Peak Rate (%)	<input type="text" value="0"/>
Port 2 Peak Date & Time	<input type="text"/>
Port 2 Current Utilization Rate (%)	<input type="text" value="0"/>
Port 2 Total Packets	<input type="text" value="0"/>
Port 2 Total Bytes	<input type="text" value="0"/>
Port 2 CRC Errors	<input type="text" value="0"/>
Port 2 Collision Packets	<input type="text" value="0"/>
Port 2 Oversize Packets	<input type="text" value="0"/>

Figure 14: Web Manager Window

3. Change any available fields. The following table describes the fields on the Web Manager window.

Field Name	Description
Bypass System Status	
Bypass Status	Indicates the current status of the iBypass, UP or DOWN.
Port A Link Status	Indicates the current status of the Port A Link, UP or DOWN.
Port 1 Link Status	Indicates the current status of the Port 1 Link, UP or DOWN
Port A Port Speed	Indicates the speed for Port A, 10 Gigabit
Port 1 Port Speed	Indicates the speed for Port 1, 10 Gigabit.
Power Supply 1 Status	Indicates whether power is , ON or OFF for this power supply.
Bypass State	Indicates the bypass state, ON or OFF
Bypass Model	Indicates the iBypass model number.

Field Name	Description
Port B Link Status	Indicates the current status of the Port B Link, UP or DOWN.
Port 2 Link Status	Indicates the current status of the Port 2 Link, UP or DOWN.
Port B Port Speed	Indicates the speed for Port B, 10 Gigabit..
Port 2 Port Speed	Indicates the speed for Port 2, 10 Gigabit.
Power Supply 2 Status	Indicates whether or not power is On for this power supply ON or OFF.
Check HB Packet (BUTTON)	Click to display the Heartbeat Packet window.
Bypass Port A/ Port 1 Statistics	
Port A/Port 1 Peak Rate	Peak traffic rate on Port A/Port 1.
Port A/Port 1 Peak Date and Time	Time of the peak traffic, formatted as: mm/dd/yyyy hh:mm:ss
Port A/Port 1 Current Utilization Rate %	The current utilization rate on Port A/Port 1.
Port A/Port 1 Total Packets	The total number of packets traversing this port since the last device reset.
Port A/Port 1 Total Bytes	The total number of bytes traversing this port since the last device reset.
Port A/Port 1 CRC Errors	The number of Cyclical Redundancy Check errors on this port since the last device reset.
Port A/Port 1 Over-size Packets	The total number of oversize packets traversing this port since the last device reset.
Bypass Port B/Port 2 Statistics	
Port B/Port 2 Peak Rate	Peak traffic rate on Port B/Port 2.
Port B/Port 2 Peak Date and Time	Time of the peak traffic, formatted as: mm/dd/yyyy hh:mm:ss
Port B/Port 2 Current Utilization Rate %	The current utilization rate on Port B/Port 2.
Port B/Port 2 Total Packets	The total number of packets traversing this port since the last device reset.
Port B/Port 2 Total Bytes	The total number of bytes traversing this port since the last device reset.
Port B/Port 2 CRC Errors	The number of Cyclical Redundancy Check errors on this port since the last device reset.

Field Name	Description
Port B/Port 2 Over-size Packets	The total number of oversize packets traversing this port since the last device reset.
Bypass Configuration	
IP Address	IP Address for the iBypass Switch nnn.nnn.nnn.nnn.
Net Mask	Netmask for iBypass Switch subnet nnn.nnn.nnn.nnn.
Manager IP Address	IP Address for the SNMP Manager nnn.nnn.nnn.nnn.
Gateway IP Address	IP Address for the default Gateway nnn.nnn.nnn.nnn.
Set Port Parameters (BUTTON)	Select to display a Port Setting window.
Edit HB Packet (BUTTON)	Select to display an Edit Heartbeat window. See the <i>Check and Edit HB Packet Window</i> section of this chapter for details about using the window.
Port A/Port B Utilization Threshold (%)	Percent utilization of Port A or Port B.
Port 1/Port 2 Utilization Threshold (%)	Percent utilization of Port 1 or Port 2.

Field Name	Description
Reset Port A/Port B Peak Rate	<p>Reset (toggle Yes/No) the rate of peak usage. The Peak Rate is a traffic measurement during peak time. The Net Optics iBypass Web Manager will capture the highest peak rate and time, and then display them in the Statistics section.</p> <p>Assume that these peaks occurred: 8:00 AM = 1%; 9:00 AM = 2%; 10:00 AM = 50%; 11:00 AM = 15%; 12:00 AM = 20%; 1:00 PM = 30%; 2:00 PM = 40%; 3:00 PM = 30%; 4:00 PM = 20%; 5:00 PM = 60%.</p> <p>In the Status window, at 10 AM, 50% was the Peak Rate and the display remained that way until 5 PM if no reset was done. If a reset was done at 11 AM, then the Peak Rate changed to 20% at noon, then 30% at 3 PM, then 40% at 2 PM, and then 60% at 5 PM.</p>
Reset Port A/Port B Statistics	Reset (toggle YES/NO) the statistics.
Reset Port 1/Port 2 Statistics	Reset (toggle YES/NO) the statistics.
Enable LFD	Enable/Disable Link Fault Detection. (Not applicable to fiber products.)
Heartbeat Timeout Period(s)	Number of milliseconds (0–100) between Heartbeat Packets sent from the iBypass unit to a connected monitoring device. The default is 1 milliseconds. If this parameter is set to 0, the Switch is forced into Bypass Mode.
Enable/Disable Detection	Turn Bypass Detect ON and OFF.
Heartbeat Retries	Number of heartbeats that do not come back from a device before an iBypass unit stops sending traffic through that monitoring device; the default is 3. Heartbeat packets continue to be sent and if one comes back from the attached device, traffic flow to the device resumes.
Set Date and Time	Displays a window where you can set the date and time (24-hour clock).

4. Save changes to the iBypass Switch by clicking **Submit Changes** at the bottom of the page.
5. To update the display, click your browser's refresh button.

Check/Change the Heartbeat Packet from Web Manager

Use the Heartbeat window to view hexadecimal information about the current Heartbeat packet or to edit the Net Optics Heartbeat packet and create your own customized Heartbeat packets (one for each monitored device). You can do this from Web Manager or System Manager.

From Web Manager, do the following to view or change the heartbeat packet:

Port A Total Packets	<input type="text" value="0"/>	Port B Total Packets	<input type="text" value="0"/>
Port A Total Bytes	<input type="text" value="0"/>	Port B Total Bytes	<input type="text" value="0"/>
Port A CRC Errors	<input type="text" value="0"/>	Port B CRC Errors	<input type="text" value="0"/>
Port A Collision Packets	<input type="text" value="0"/>	Port B Collision Packets	<input type="text" value="0"/>
Port A Oversize Packets	<input type="text" value="0"/>	Port B Oversize Packets	<input type="text" value="0"/>
Bypass Port 1 Statistics		Bypass Port 2 Statistics	
Port 1 Peak Rate (%)	<input type="text" value="0"/>	Port 2 Peak Rate (%)	<input type="text" value="0"/>
Port 1 Peak Date & Time	<input type="text"/>	Port 2 Peak Date & Time	<input type="text"/>
Port 1 Current Utilization Rate (%)	<input type="text" value="0"/>	Port 2 Current Utilization Rate (%)	<input type="text" value="0"/>
Port 1 Total Packets	<input type="text" value="0"/>	Port 2 Total Packets	<input type="text" value="0"/>
Port 1 Total Bytes	<input type="text" value="0"/>	Port 2 Total Bytes	<input type="text" value="0"/>
Port 1 CRC Errors	<input type="text" value="0"/>	Port 2 CRC Errors	<input type="text" value="0"/>
Port 1 Collision Packets	<input type="text" value="0"/>	Port 2 Collision Packets	<input type="text" value="0"/>
Port 1 Oversize Packets	<input type="text" value="0"/>	Port 2 Oversize Packets	<input type="text" value="0"/>
Bypass Configuration			
IP Address	<input type="text" value="10.60.417"/>	Manager IP Address	<input type="text" value="192.168.0.1"/>
Net Mask	<input type="text" value="255.0.0.0"/>	Gateway IP Address	<input type="text" value="192.168.0.1"/>
Port Enable	<input type="text" value="Enable"/>	<input type="button" value="Edit HB Packet"/>	
Port A Utilization Threshold (%)	<input type="text" value="50"/>	Port B Utilization Threshold (%)	<input type="text" value="50"/>
Port 1 Utilization Threshold (%)	<input type="text" value="50"/>	Port 2 Utilization Threshold (%)	<input type="text" value="50"/>
Reset Port A Peak Rate	<input type="text" value="No"/>	Reset Port B Peak Rate	<input type="text" value="No"/>
Reset Port 1 Peak Rate	<input type="text" value="No"/>	Reset Port 2 Peak Rate	<input type="text" value="No"/>
Reset Port A Statistics	<input type="text" value="No"/>	Reset Port B Statistics	<input type="text" value="No"/>
Reset Port 1 Statistics	<input type="text" value="No"/>	Reset Port 2 Statistics	<input type="text" value="No"/>
Enable LFD	<input type="text" value="Off"/>	Enable Detection	<input type="text" value="On"/>
Heart Beat Timeout Period(s)	<input type="text" value="2"/>	Heart Beat Retries	<input type="text" value="5"/>
<input type="button" value="Set Date & Time"/>		<input type="button" value="Submit Changes"/>	

Figure 15: Web Manager

1. Click **Check HB Packet** on the Web Manager main window.

You see the Heartbeat Packet window shown next.

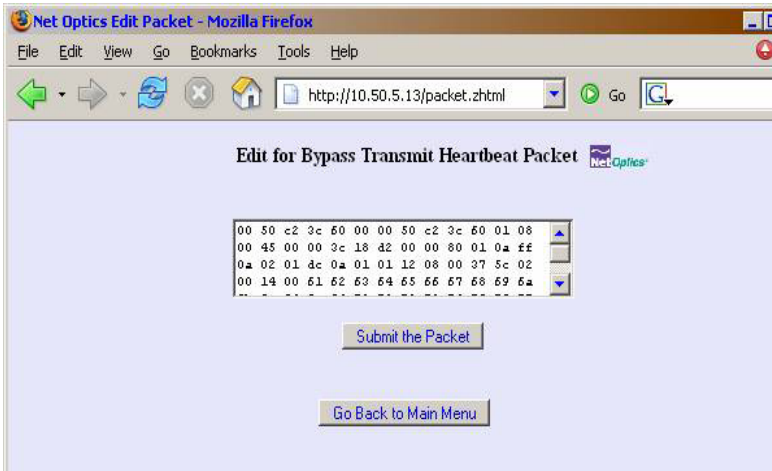


Figure 16: Heartbeat Packet Window

2. Change the hexadecimal values; be sure to adhere to IP address and MAC address conventions.
3. Click **Submit the Packet** to save the changes.
4. Click **Go Back to Main Menu** to return to the main Web Manager window.

Set Date and Time Window

Use the Set Date and Time window to set the current date and time. Click **Set Date & Time** on the main window to see the Date & Time window:

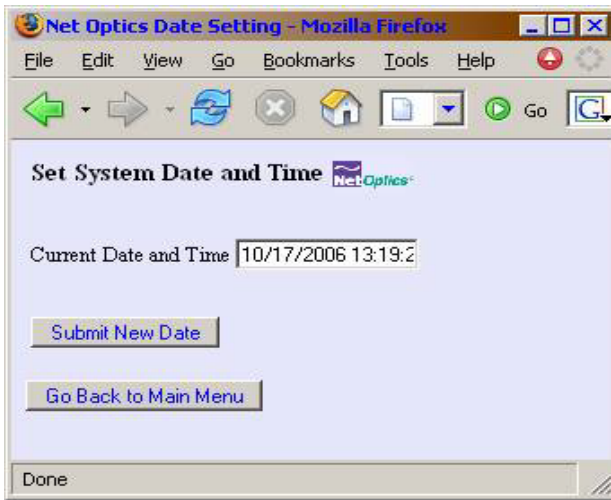


Figure 15: Set Date and Time Window

1. In the Current Date and Time text entry box type new values.
Be sure to retain the proper mm/dd/yyyy hh:mm:ss format.
2. Click **Submit New Date** to save the changes.
3. Click **Go Back to Main Menu** to return to the main Web Manager window.

Chapter 5

System Manager

Overview

This chapter describes how to install and use the Net Optics System Manager. Use the System Manager to change system settings, to view system status, and retrieve data from configured Net Optics iBypass Switch devices. The following topics are covered:

- Install System Manager
- Explore System Manager
- Create a Sytem Manager Group
- Delete a Sytem Manager Group
- Add iBypass Switches to a Group
- Delete an iBypass Switch
- Configure an iBypass Switch
- View iBypass Switch Information
- Change a Heartbeat Packet from System Manager

Install System Manager

The executable installation file for System Manager is distributed on the CD included with the iBypass Switch.

To install System Manger:

1. Locate **Setup.exe** on the CD and double click it.

The License Agreement dialog box appears as shown below.

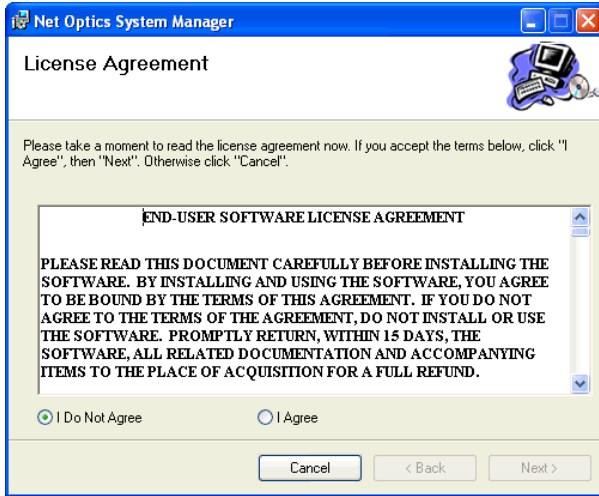


Figure 17: Net Optics System Manager License Agreement

2. After reading the agreement, select **I Agree** and click **Next** to install System Manager. The Welcome dialog appears.
3. Click **Next**. The Select Installation Folder dialog box appears.
4. To install in the default folder, select the default path in the **Folder:** text box. To install in a different location, either type the path in the **Folder:** text box or click **Browse** to find another location.
5. To check the space available for System Manager on the selected drive, click **Disk Cost**.
6. To limit access to System Manager to the current user of the PC, select **Just Me**. To allow access to any user logged into the PC, select **Everyone**.

- Click **Next**.

The Confirm Installation dialog displays.

- Click **Next** to continue with the installation. The Progress dialog displays.

To stop the installation, click **Cancel**. When the installation is complete, the Installation Complete dialog box appears, as shown in the following figure.

- Click **Close**. System Manager is now installed on your computer and a Net Optics shortcut icon has been placed onto your desktop.

Explore System Manager

This section explains the features and functions of System Manager. With System Manager you can:

- Create iBypass Switch groups
- Add and delete iBypass Switches from the system
- Remotely configure iBypass Switches
- View traffic utilization and peaks
- View traffic statistics

NOTE

In order to access an iBypass Switch with System Manager, the **Display** option must be set to ON in the CLI. For more information, see *Using the Command Line Interface* in Chapter 2.

To access System Manager:

- Double-click the System Manager icon on your PC desktop.

The startup window is shown in the following figure.



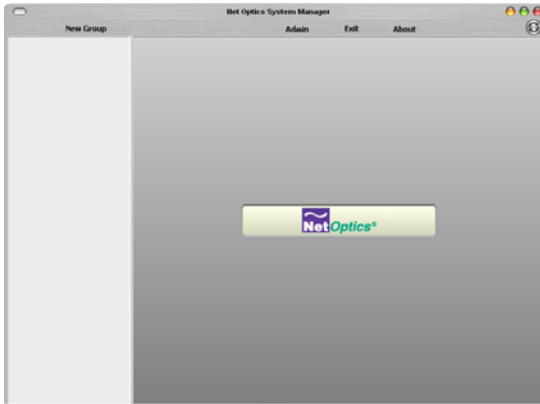


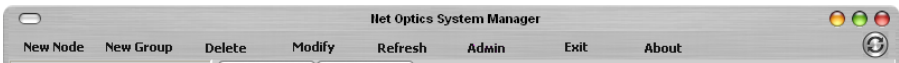
Figure 18: Initial System Manager window

A new System Manager does not yet show any Net Optics units. The **System Frame** portion of the window displays iBypass Switches and Groups as you add them to the system. The **Information Frame** portion of the window displays Status, Configuration and Control information for the selected unit.

Tip!

To use pop-up menu shortcuts, click your right mouse button in the System Frame.

Using the Toolbar



The following figure shows the System Manager toolbar.

Figure 19: Toolbar

The table below describes the icons found on the toolbar.

Tool	Description
New Device	Add devices to a group
New Group	Create an iBypass Switch group

Tool	Description
Delete	Delete devices from the system
Modify	Change the device name, IP address, model, and add notes
Refresh	Refresh the data display
Admin	Change username/password
Exit	Close Net Optics System Manager
About	View information about System Manager

Create a System Manager Group

Organize iBypass Switches or other Net Optics devices into groups for quick access. Devices must belong to a group. If you add an iBypass switch when there is no group, a group is created automatically.

To create an iBypass Switch group:

1. Click **New Group** in the toolbar.

A new group bar appears in the System Frame as shown in the following figure.

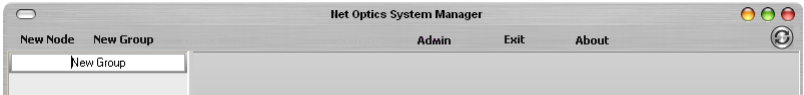


Figure 20: New Group

2. Either accept the default group name or edit it by typing the new name and pressing **Enter**.

Delete a System Manager Group

You can delete a group; however, all devices within that group will also be deleted from System Manager.

Note:

Deleting an iBypass Switch from System Manager does not affect the current operating status of the iBypass Switch. The iBypass Switch continues to pass traffic from the Network ports to the Monitor Ports. However, you will not have visibility from System Manager unless it is added back in.

To delete a group:

1. Right-click the group that you want to delete.
2. Select **Delete** from the pop-up menu.

The group and all associated devices are deleted from System Manager.

Add Devices to a System Manager Group

To configure and control iBypass Switches with System Manager, you must add each iBypass Switch to a group. Once you have added an iBypass Switch, you can configure, modify, and delete it from System Manager.

Note:

The iBypass Switch must be connected to the network as described in Chapter 2 before it can be added to System Manager.

To add an iBypass Switch to the system:

1. Select the group where the iBypass Switch will be added.
2. Click **New Device** in the toolbar. The **New Device** dialog box appears (see next figure).

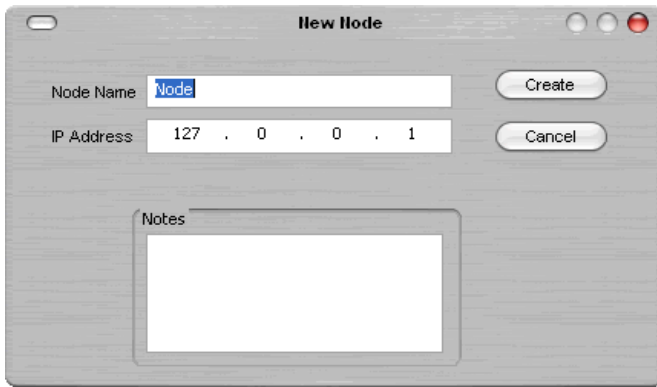


Figure 21: Adding a New iBypass Switch to a Group

3. Enter a name for the iBypass Switch in the **Node Name** text box. Each Node Name in the system must be unique.
4. Enter the IP address of the iBypass Switch in the **IP Address** text box. The IP address must be unique on the network.
5. Enter any relevant information about the iBypass Switch in the **Notes** text box.
6. Check your settings and click **Create**.

The System Manager now shows the iBypass Switch in the system (see the next figure).

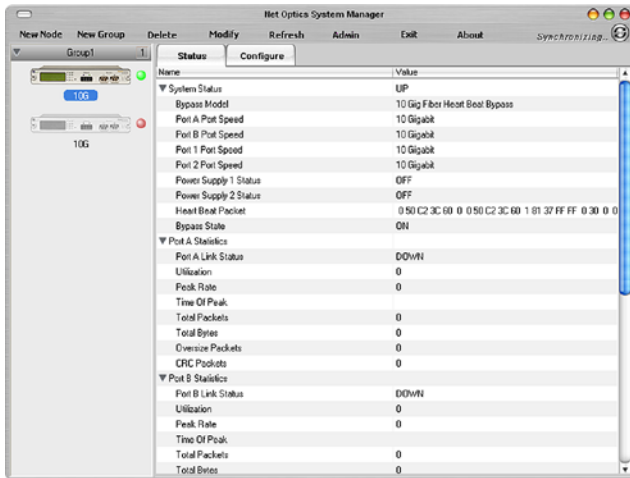


Figure 22: Net Optics System Manager with iBypass Switch

The indicator to the right of the iBypass Switch picture blinks green when the iBypass Switch is functioning normally. If there is an alarm condition on the iBypass Switch, the indicator blinks red. If System Manager cannot communicate with the iBypass Switch, the switch graphic is grayed. Check that the iBypass Switch is connected to the network and verify the configuration information.

Repeat Steps 1-6 for each iBypass Switch you are adding to System Manager.

Tip!

To change the display order of iBypass Switches, click and drag them into the desired order.

Delete an iBypass Switch from System Manager

You can delete an iBypass Switch from System Manager when you remove an iBypass Switch from your network. If you have removed an iBypass Switch from the network, System Manager continues to poll the iBypass Switch IP address for data until you delete the iBypass Switch from System Manager.

To delete an iBypass Switch from System Manager:

1. Select the device you want to delete by clicking its icon.

2. Click **Delete** in the toolbar.

A confirmation dialog box appears.

3. Click **Yes** to delete the iBypass Switch from System Manager.

Configure an iBypass Switch from System Manager

Set the configuration parameters of an added iBypass Switch from the **Configure** tab.

To configure an iBypass Switch:

1. Click the icon of the iBypass Switch you want to configure.
2. Click the **Configure** tab.

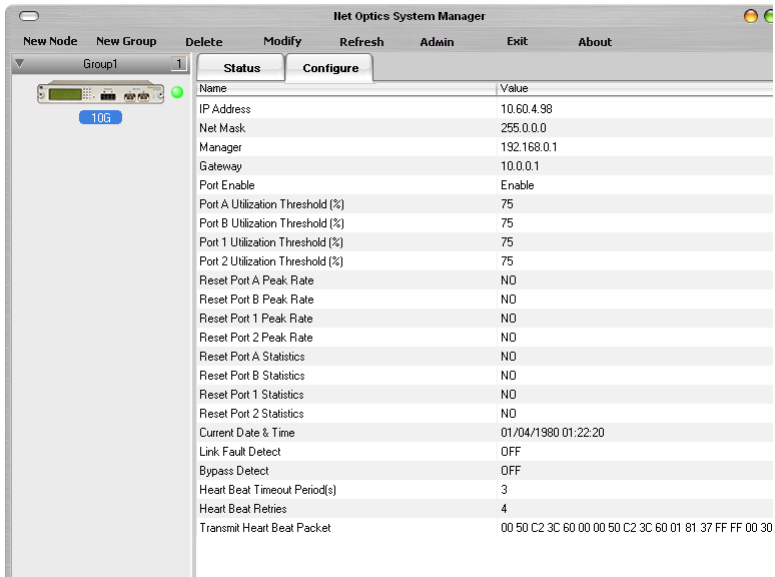


Figure 23: iBypass Switch Configure Tab

2. Click the value field for the parameter you want to configure.
3. Select an option from the drop-down list or enter a new value from your keyboard.

The following table describes the iBypass Switch options on the Configure Tab.

Field Name	Description
IP Address	IP address of the iBypass Switch; the default IP address is 10.60.0.123. Change the IP address by typing a new one in the box.
Netmask	The netmask; the default netmask is 255.255.0.0. Change the netmask by typing a new one in the box.
System Manager IP Address	IP address of either the host PC running System Manager over a WAN or the third-party SNMP management tool. Change the IP address by typing a new one in the box.
Gateway IP Address	IP address of the current WAN gateway. Change the gateway address by typing a new one in the box.
Port Enable	ENABLE/DISABLE the monitor ports.
Port A Utilization Threshold	Percentage level at which this port use triggers an alarm; as default the Port A alarm is triggered when Port A exceeds 50% utilization.
Port B Utilization Threshold	Percentage level at which this port use triggers an alarm; as default the Port B alarm is triggered when Port B exceeds 50% utilization.
Port 1 Utilization Threshold	Percentage level at which this port use triggers an alarm; as default the Port 1 alarm is triggered when Port 1 exceeds 50% utilization.
Port 2 Utilization Threshold	Percentage level at which this port use triggers an alarm; as default the Port 2 alarm is triggered when Port 2 exceeds 50% utilization.
Reset Port A Peak Rate	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Reset Port B Peak Rate	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Reset Port 1 Peak Rate	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Reset Port 2 Peak Rate	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Reset Port A Statistics	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.

Field Name	Description
Reset Port B Statistics	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Reset Port 1 Statistics	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Reset Port 2 Statistics	This value is NO unless you change it to YES. If you set it to YES, as soon as the port reset is complete, it returns to NO.
Current Date & Time	Click the existing date and adjust it with the up and down arrows.
Link Fault Detect	OFF (Not applicable to fiber products.)
Bypass Detect	Turn Bypass Detect ON or OFF. In most environments, Bypass Detect should be OFF.
Heartbeat Timeout Period(s)	Number of milliseconds (0–100) between Heartbeat Packets sent from the iBypass unit to a connected monitoring device. The default is 1 millisecond. If this parameter is set to 0, the Switch is forced into Bypass Mode.
Heartbeat Retries	Number of heartbeats that do not come back from a device before an iBypass unit stops sending traffic through that monitoring device; the default is 3. Heartbeat packets continue to be sent and if one comes back from the attached device, traffic flow to the device resumes.
Transmit Heartbeat Packet	View or change this heartbeat packet. The default is 00 05 c2 3c 60 00 00 50 c2 3c 60 01 08 00

The new configuration parameters take effect the next time System Manager polls the iBypass Switch. If System Manager detects a change when it polls, a circled arrow appears next to the value until the next polling.

View iBypass Switch Information from System Manager

System Manager allows you to view the current iBypass Switch configuration information, including the Monitor Port connections.

To view iBypass Switch information:

1. Click the image of the iBypass Switch you want to view in the System Frame. The following information is displayed.

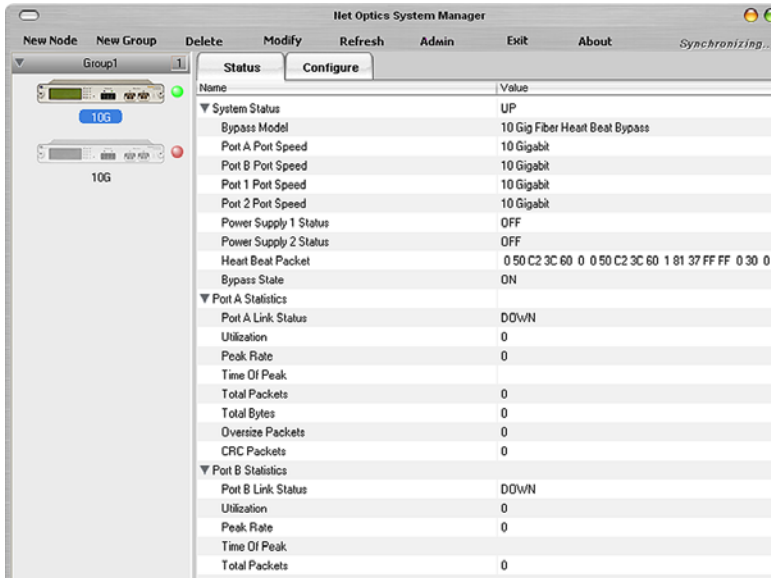


Figure 24: iBypass Switch Status Tab

The Status tab is a read-only list of information from the iBypass Switch. Use the scroll bar and arrows to view the entire list if necessary.

TIP!

Fields that have been updated since the last refresh display with a circle and arrow just to the left of the value field.

The following table describes the status fields.

Field	Description
System Status	UP/DOWN
Bypass Model	Fiber Heartbeat Bypass Model Number
Port Speed	10 GIGABIT
Power Supply 1, 2	OFF or ON

Field	Description
Heartbeat Packet	<p>Default Heartbeat packet which can be loaded using the "reset defaults" command, or manually configured using the CLI.</p> <p>The CLI command is "set txpacket xx-xx-xx-xx-etc. The txpacket command must be a single line so it is a long long data type. If you remove all the carriage returns and comments (in parentheses) from the data below, you can use it to configure the heart beat packet from the CLI.</p> <p>The first 12 bytes are the source and destination addresses. They are followed by a sequence of bytes that define the packet type. The payload bytes are all 0's and the last four bytes are the packet checksum (CRC).</p> <pre> set txpacket 00-50-c2-3c-60-00- (source address) 00-50-c2-3c-60-01- (destination address) 81-37-ff-ff- (packet type) 00-30-00-00- 00-00-40-04- ec-a2-c6-13- 01-02-c6-13- 01-01-00-00- 00-00-00-00- (payload bytes) 00-00-00-00- 00-00-00-00- 00-00-00-00- 00-00-00-00- 00-00-00-00- 00-00-00-00- a0-07-37-99 (CRC) </pre>
Bypass State	ON or OFF; see Chapter 1 for details.
Total Packets	Total number of packets that have passed through the iBypass unit since the last reset. When this value changes, a circled arrow appears next to the value to alert you to the change; if polling produces the same total packet result twice in a row, the circled arrow disappears.
Total Bytes	Total number of bytes that have passed through the iBypass unit since the last reset. When this value changes, a circled arrow appears next to the value to alert you to the change; if polling produces the same byte total twice in a row, the circled arrow disappears.

Field	Description
Oversized Packets	<p>This function tracks the number of oversized packets since the last reset. The Ethernet specification requires that no packet be larger than 1518 bytes (including checksum). Any packet that is larger than this is flagged as an error and discarded. These packets are also sometimes referred to as “Jabbers”. Packets too big are almost always caused by faulty hardware. The network adapter card on a link showing a high rate of oversized packets should be replaced. Support IEEE 802.1q</p>
CRC Packets	<p>This function tracks the number of CRC errors since the last reset. MAC Frame CRC errors are the most common. Ethernet packets are encapsulated in a MAC frame that contains a preamble, and a post-envelope CRC check. The Ethernet adapter on the sending station creates the preamble, inserts the packet data (addressing, protocol, data, etc.), calculates a CRC checksum and inserts it at the end of the packet. If the receiving station determines that the checksum is incorrect, the packet is assumed to be bogus and is discarded.</p> <p>MAC frame CRC errors are typically caused by faulty cabling. If the cabling connecting an Ethernet Adapter or hub is faulty, the electric connection may be on and off many times during a transmission. This on-and-off state can interrupt parts of a transmission and damage the signal. If the signal is interrupted partially during transmission, the CRC checksum that was calculated by the network adapter is longer valid and the packet is flagged as a CRC error and discarded.</p> <p>CRC errors are common on a busy network, and a small percentage does not reflect a network problem. When the percentage is large, or when a single station shows a larger percent CRC errors, there is probably a problem.</p>

Modify an iBypass Switch Name or Address from System Manager

There are two ways to modify an iBypass Switch name or address. Either change them from the Configuration Tab for the device, or use the **Modify** option in the menu. The second method is described here..

To change a switch name or IP address from the Modify iBypass Switch dialog:

1. In the System Frame, select the image of the iBypass Switch you want to change.
2. Click **Modify** in the toolbar. The Modify iBypass Switch dialog displays (see below).

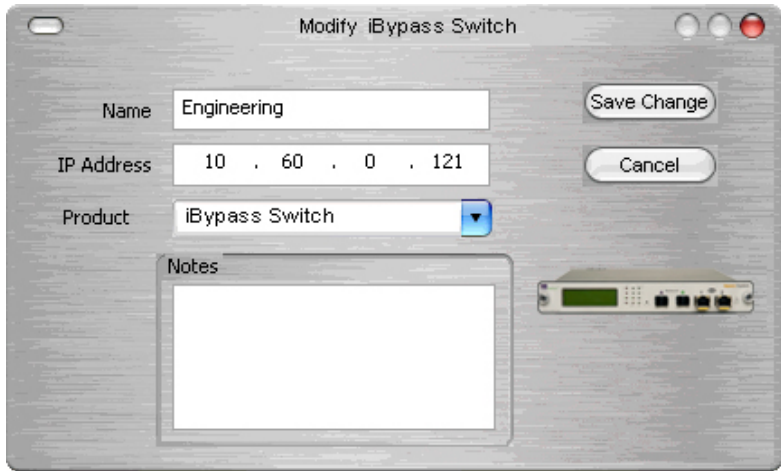


Figure 25: Modifying the iBypass Switch

3. Change the name or IP address of the iBypass Switch.
4. Optionally add notes.
5. Click **Save Change**.

Change a Heartbeat Packet from System Manager

The heartbeat packet for a 10 GigaBit iBypass Switch can be configured. To change the default packet from the System Manager main menu, click **Transmit Heartbeat Packet** and change the values.

Uninstalling System Manager

If available, it is highly recommended that software be uninstalled through this option of Windows.

1. Click the Start menu button and navigate to Settings/Control Panel.
2. Double Click **Add/Remove Programs**.
3. Locate the Net Optics System Manager icon and click "Install/Uninstall" or "Change and Remove Programs buton.
4. Follow the instructions provided through the software wizard.
5. Upon completion some directories may need to be removed by hand.

Appendix A

Specifications and Models

Specifications

Electrical

Power Supply Input

100-240VAC, 0.5A, 47-63Hz

Power Supply Output

12V, 5A

Environmental

Operating Temperature

0°C to 40°C

Storage Temperature

-10°C to 70°C

Relative Humidity

10% min, 95% max, non-condensing

Mechanical

Dimensions

1.350" high x 12.435" deep x 8.75"

IBPO-HBSR-XFP and IBPO-HBLR-XFP Connectors

- (1) DB9 (RS232 configuration port)
- (1) RJ45 (management port)
- (2) XFP (monitoring ports)
- (2) SR LC (network ports) or (2) LR LC (network ports)

Indicators

- (1) 2x16 Character LCD
- (4) Link LEDs (Fiber Model)
- (4) Threshold Alarm LEDs
- (2) Power LEDs
- (2) Bypass Mode LEDs

Optical SR Fiber Type

Fiber Type: Corning Multimode 62.5/125µm, wavelength 850nm

Split Ratio	Network Port Insertion Loss	Monitor Port Insertion Loss
60/40	1.25 dB	1.25 dB
50/50	1.25 dB	1.25 dB

Optical LR Fiber Type

Fiber Type: Corning Singlemode 8.5/125µm, wavelength 1310nm

Split Ratio	Network Port Insertion Loss	Monitor Port Insertion Loss
60/40	1.25 dB	1.25 dB
50/50	1.25 dB	1.25 dB

Transceiver Specifications

10 GigaBit SR 850nm, VCSEL

10 GigaBit LR 1310nm, Laser

Split Ratios (Fiber Model)

60/40, and 50/50

Software

iBypass Command Line Interface

Any terminal emulation software

Web Manager

Any browser

Net Optics System Manager

Windows 98, Windows 2000, Windows XP

Certifications

Fully RoHS compliant

Available Models

Models

IBPO-HBSR-XFP iBypass Switch with Heartbeat and XFP ports

IBPO-HBLR-XFP iBypass Switch with Heartbeat and XFP ports

Accessories

RK-iTP2 Two slot rack-mount panel

XFPKT-SR or XFPKT-LR XFP Kits, including cables

Appendix B

Command Line Interface

iBypass Switch CLI Syntax

This Appendix contains information about the syntax to be used with each CLI command. Commands include:

- Help
- Set
- Reset
- Show
- Echo
- Display

Command	Sub-Command	Syntax	Description
Help	Set	help set	Displays the set command options
	Reset	help reset	Displays the reset command options
	Show	help show	Displays the show command options
	Echo	help echo	Displays the echo command options
	Display	help display	Displays the display command options

Command	Sub-Command	Syntax	Description
Set	IP	set ip <address>	Where <address> is the ip address of the iTap
	Netmask	set netmask <address>	Where <address> is the ip address netmask
	Gateway	set gateway <address>	Where <address> is the ip address of the gateway
	Manager	set manager <address>	Where <address> is the ip address of the remote manager
	Parameter	set parameter <parameter>	Where <parameter> is 64 = Disable monitor ports 96 = Enable monitor ports (other variables not applicable)
	Threshold Port	set threshold <port ID> <parameter>	Where <port ID> is A or B and <parameter> is 0 to 100% of available bandwidth
	Time	set time <date & time>	Where <date & time> is mm/dd/yyyy-hh:mm:ss
	Username	set username <username>	Where <username> is the authorized user's name, 8 characters or less
	Password	set password <password>	Where <password> is the authorized user's password, 8 characters or less
	TX packet	xx-xx-xx	xx are bytes of HB packet separated by (-), include valid CRC

Command	Sub-Command	Syntax	Description
Reset	Peak	reset peak <port ID>	Where <port ID> is A or B
	Statistics	reset statistics port <port ID>	Where <port ID> is A or B
	Storage	reset storage	Resets configuration to factory defaults
Show	Set	show set	Displays current settings
	Status	show status	Displays iTap status
	Statistics	show statistics <port ID>	Where <port ID> is A or B
	Power	show power	Displays power status
	Display	show display	Displays the display setting. Display OFF disables remote interfaces and front panel LCD
	User	show user	Displays current user logged into the CLI
Echo	n/a	echo <on/off>	Echo off stops typed character from being displayed on the screen
Display	n/a	display	Toggles the front panel display and remote interface on and off

Configuring the Heartbeat

From the CLI, you can set:

Command	Sub-Command	Syntax	Description
Set	Timeout	Set Timeout	Timeout period <0-100>
	Retry	Set Retry count	Retry <0-255>

Note:

The default values for Timeout and Retry are 1 ms and 3 packets. This makes the Bypass Switch go to bypass mode in $3 \times 1 \text{ ms} = 3 \text{ ms}$ if no Heartbeat packet is detected. If customer equipment latency exceeds 3ms, then the Bypass Switch will go into bypass mode before it detects the first Heartbeat packet. Customers should change one or both of the above default parameters to the higher number to avoid this behavior.

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